EVALUATING THE PERFORMANCE AND THE SUSTAINABILITY OF THE COMMUNITY- LED TOTAL SANITATION (CLTS) PROGRAMME IN GHANA

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Thesis submitted in fulfilment of the requirements for the Degree

DOCTOR OF ENGINEERING:

CIVIL ENGINEERING

in the

Department of Civil Engineering

Faculty of Engineering, Built Environment and Information Technology

at the

Central University of Technology, Free State

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BLOEMFONTEIN

May 2024

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DECLARATION OF INDEPENDENT WORK

I, **Patricia Asantewaa-Tannor,** student number ######### do hereby declare that this research project submitted to the Central University of Technology, Free State, for the Degree of **Doctor of Engineering: Civil Engineering**, is my own independent work, and complies with the Code of Academic Integrity, as well as other relevant policies, procedures, rules and regulations of the Central University of Technology, Free State, and has not been submitted before to any institution by myself or any other person in fulfilment (or partial fulfilment) of the requirements for the attainment of any qualification.

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ABSTRACT

Community-led total sanitation (CLTS) is a widely used sanitation intervention in ending open defecation through a community-wide behavioural change towards latrine construction and use, resulting in certified open defecation-free (ODF)communities. However, the effects of its implementation activities on improving the performance of the programme and the factors that significantly drive sustainable, long-term behavioural change, are yet to be ascertained. To achieve the aim of this study, which was to evaluate the performance and sustainability of the CLTS programme in Ghana, a sequential, exploratory, mixed-methods approach that allowed the integration of qualitative and quantitative data was adopted. Data collected from semi-structured interviews with CLTS practitioners and implementers, focus group discussions and direct observations in 25 selected cases in certified ODF communities across eight regions in Ghana were analysed thematically. The results were used to develop a conceptual framework and questionnaire which were administered to CLTS practitioners and implementers. The quantitative data, analysed using the partial least square structural equation modelling, were used to validate the conceptual framework developed from the qualitative data. A confirmatory factor analysis showed the inter-relationship between variables. The framework showed that, for CLTS to achieve improved performance and long-term behavioural change in sanitation practices, implementers, practitioners, and governments should prioritise leadership, ownership, motivation and commitment, financial and behavioural change factors of sustainability, which were found to influence improved performance and sustainability of the programme significantly. Thus, through active and supportive leadership, and ownership of the CLTS programme by top-management of the sanitation sector and the CLTS beneficiary communities; readily available financial support for effective application of CLTS implementation resources and post-implementation activities, such as follow-ups, maintenance and reconstruction of improved latrines, beneficiary communities would be motivated to commit to long-term behavioural change in sanitation practices that provide comfort, convenience and prestige culminating in improved performance and sustainability of the CLTS programme. The results showed further that, when combined with school-led total sanitation, and sanitation marketing and support in the form of targeted subsidies, CLTS yielded sustainable outcomes. The findings of the study showed that the framework developed could be used by sanitation donors, governments and organisations to sustain long-term behavioural change in sanitation practices.

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Keywords: Behavioural change, Community-led total sanitation, Health and wellbeing, Leadership, Sustainability, Ghana

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DEDICATION

This work is dedicated firstly to my husband, Mr. Kofi Tannor, and children: Bertrand-Henry Kofi Tannor, Careen-Deniece Theresa Tannor, and Brett-Harvey Adu Amoako Tannor.

Secondly, this study is dedicated to my parents, Mr. Adu Amoako and Madam Theresa Tannor, my siblings Desmond Adu Amoako, Joseph Twum, Raymond Davies, and my support system, Regina Takyiwaa.

Lastly, this study is dedicated to all the grandchildren of my grandparents, striving to find a place in formal education.

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ACKNOWLEDGEMENTS

Glory be to the Lord Almighty for His grace and mercies that have granted me this momentous academic opportunity.

This study would not have been possible without the contribution and support of some key people, whom I acknowledge as follows.

- A special thank you to my Principal Promotor Prof. Fidelis Abumere Emuze. Prof., your kind is rare. I salute you for prompt delivery, constructive correction, mentorship, and seasonal kind words that inspired and motivated me throughout my studies. May God richly bless you.
- Many thanks to Professor Dilip Das for your directions and pieces of advice throughout the study period.
- My sincere gratitude goes to Prof. Kwadwo Sakyi, the former Vice Chancellor, and the management of Ho Technical University, as well as Prof. Dzansi for the collaboration between Ho Technical University (HTU) and Central University of Technology, Free State, which led to my success story today.
- I would also like to thank the current Vice-Chancellor of HTU, Prof. Benjamin Honyenugah for his words of encouragement and support over the period.
- I would also like to say a big thank you to all the WASH experts, Consultants, and staff of Environmental Health Directorates who availed themselves to be part of this study. A special thanks to Mrs Stella Awusavi, the Volta Regional Environmental Health Director. Ma'am, God bless you for your timely support.
- I also thank Dr Twumasi Ankrah and Miss Belinda Dagbah for helping in the transcription of the recorded interviews and focus group discussions.
- I express my heartfelt gratitude to my colleague, my father and my mentor, Mr. Eric Kwadwo Adzivor for his unwavering support. Maputo, may God richly bless you.
- My sincere appreciation goes to all the staff of the Civil Engineering Department of HTU, especially Dr Charles Atombo and Dr Emmanuel Kofi Afetorgbor (Heads of Department) and my students, Elorm Hayibor, Counsellor Gbedema and Prosper Ofori Damoah, for the immense support and standing in for me in times when I needed your support the most.

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- Heartfelt gratitude to my friends, especially Mrs Sharon Amanda Owusu Boateng, for the motivation behind this topic and study, Patrice Kwesi Dzontoh and Ing. Dr Bismark Kofi Meisuh for your unending support and words of encouragement.
- My heartfelt gratitude goes to Pastor Owusu and Mama Fausti, and Pastor Akayue and Mama Hannah for their prayers and show of love. May God bless your ministries.
- To my family, Mr. Kofi Tannor, I salute you for your understanding, love, unflinching support and constant pieces of advice. May the heavens open and answer when you call. My children, Bertrand-Henry, Careen-Deniece and the PhD baby, Brett-Harvey, for the daily prayer support and understanding of the need for my absenteeism.
- I express my heartfelt gratitude to my support system, Regina Takyiwaa, for putting her life on hold for me and my household all these years. Remain blessed.
- My sincere appreciation goes to my number one cheerleader, my mum, Theresa Tannor, for denying herself luxury to put me through school against all odds. Your daily calls and prayers kept me going. My Daddy, Mr Adu Amoako, thank you for believing in me and granting me the opportunity to go to school. I really appreciate it.
- Finally, I say a big thank you to my siblings, Desmond, Joeseph and, especially, Davis. Honestly, I would not have asked for a better family. I appreciate you. You guys are too much.

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LIST OF PUBLICATIONS

A. Peer-reviewed journal paper pending publication:

Asantewaa-Tannor, P., Emuze, F. & Das, D. (2023). Is Community-Led Total Sanitation Programme Ending Open Defecation? A Sustainability Perspective from Stakeholders in Ghana. *Journal of Waste and Resource Management* (Accepted with major revision).

B. Peer-reviewed conference papers that has been published:

Asantewaa-Tannor, P., Emuze, F. & Das, D. (2021). Factors Enhancing the Sustainability of Community Led-Total Sanitation Programme in Ghana. *The Seventh International Seeds Conference 2021: Adapting and Changing Behaviour and Practice, 1 - 3 September, 2021. Leeds Beckett University Leeds, UK.*

Asantewaa-Tannor, P., Emuze, F. & Das, D. (2019**).** Conceptual Perspective on the Sustainability of Community-Led Total Sanitation Programme in Ghana. *14th International Postgraduate Research Conference 2019: Contemporary and Future Directions in the Built Environment Conference Proceedings 16 – 17 December, 2019. Salford, UK*

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LIST OF ABBREVIATIONS

Abbreviations/Acronyms	Full description
CCA	Confirmatory Composite Analysis
CLTS	Consumer-Led Total Sanitation
CTVs	Community Technical Volunteers
CUT	Central University of Technology
CRS	Catholic Relief Services
CWSA	Community Water and Sanitation Agency
DEHO	District Environmental Health Officer
DICCS	District Inter-Agency Co-ordinating Committee on Sanitation
DLT	District League Tables
EFA	Exploratory Factor Analysis
EHA	Environmental Health Assistant
EHD	Environmental Health Directorate
EHO	Environmental Health Officer
FF	Field Facilitators
ESMM	Exploratory Sequential Mixed-Methods
FGDs	Focus Group Discussions
GNA	Ghana News Agency
GSS	Ghana Statistical Service
HH	Household
HTU	Ho Technical University
H&S	Health and Safety
IDS	Institute of Development Studies
KVIP	Kumasi Ventilated Improved Pit
LT	League Tables
MCE	Municipal/Metropolitan Chief Executive
MDG	Millenium Development Goals
MEHO	Municipal/Metropolitan Environmental Health Officer
MLGRD	Ministry of Local Government and Rural Development
MMDAs	Metropolitan/Municipal, District Assemblies
MM	Mixed-Methods

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NGOs	Non-Governmental Organisations
NL	Natural Leaders
NLN	Natural League Network
OD	Open Defecation
ODF	Open Defecation-Free
PLS	Partial Least Square
REHO	Regional Environmental Health Officer
RCC	Regional Co-ordination Council
RING	Resiliency in Northern Ghana
RSMS	Rural Strategy Model for Sanitation
SanMark	Sanitation Marketing
SDG	Sustainable Development Goal
SEM	Structural Equation Modelling
SLTS	School-Led Total Sanitation
SSIs	Semi-Structured Interviews
UN	United Nations
UNICEF	United Nations International Children's Emergency Fund
USAID	United States Agency for International Development
VSLAs	Village Savings and Loans Associations
WASH	Water, Sanitation and Hygiene
WHO	World Health Organisation

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DEFINITION OF TERMS

Community-led total sanitation: CLTS is an integrated approach that aims to achieve and sustain ODF communities (Kar & Chambers, 2008: 4). It involves the facilitation of the analysis of a community's sanitation profile, OD practices and the consequences, resulting in a collective decision to become ODF (Kar & Chambers, 2008: 4).

Hybrid CLTS: the combination of CLTS with other approaches, such as sanitation marketing, with the aim of improving the change in sanitation behaviours (Galvin, 2015: 9).

CLTS sustainability: the ability of a community to achieve and maintain its ODF status (Cavil *et al*., 2015: 3).

Enabling conditions (factors): refer to the institutions/organisation and the process of implementation, and physical and technical factors of sustainability of the CLTS programme (Cavil *et al*., 2015: 6).

Improved latrine or toilet: a toilet that hygienically separates human excreta from human contact. It is a facility either with connection to a public sewer or a septic system, a pour-flush latrine, a simple pit latrine with slab or a ventilated, improved pit latrine with slab (GSS, 2022: 41).

Open defecation: defecation in the open, bushes, fields and forest without covering it (Kar & Chambers, 2008: 4).

Open defecation-free: the absence of visible or exposed faeces in the environment (Kar & Chambers, 2008: 4).

Sanitation Ladder: a tool that reflects the different defecation practices starting with OD and provides a wide range of latrine options which the improve sanitation in incremental stages (Russpatrick *et al*., 2017: 2).

Reversion or slippage: refers to the rate at which households revert to OD after ODF certification or the percentage of households that do not use latrines (USAID, 2018: 35).

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Unimproved toilet: a toilet facility that does not separate excreta from human contact safely and hygienically. It is a facility without a flush/pour flush (to piped sewer system, septic tank, pit latrine), a ventilated improved pit (VIP) latrine without slab, a pit latrine without slab, a composting toilet without slab or a bucket/pan latrine (GSS, 2022: 41).

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CHAPTER 1: BACKGROUND TO THE STUDY

1.1. Introduction

In 2015, when the United Nations committed to ending all forms of open defecation (OD) by 2030 through target 6.2 of the Sustainable Development Goals (SDGs), 673 million people practiced OD (WHO/UNICEF, 2017). After more than five years of combined efforts from governments and sanitation donors and partners, 419 million people still do not have access to a toilet and, so, defecate in the open (WHO/UNICEF, 2023). Globally, although the proportion of the population practising OD has reduced by approximately 38%, records show an increase in OD in rural areas in sub-Saharan Africa and Asia, such that nine out of ten people practice OD (WHO/UNICEF, 2023). The effects of OD are detrimental. The practice of OD has been linked to stunted growth, lower cognitive skills and diarrhoea which has denied approximately 432,800 children of their fifth birthdays (Prüss-Ustün *et al*., 2019; WHO/UNICEF, 2020). Ending OD is critical to avoid other ensuing public health-related issues and to improve the dignity, safety, and pride of women and children.

Concerning this, the aim of SDG target 6.2 is to end all forms of OD by the year 2030. Actually, the quest by national governments and sanitation donors to end OD has led to the development of several approaches or interventions. One such intervention that has gained international recognition is Community-Led Total Sanitation (CLTS) developed by Kar Kamal of the Institute of Development Studies (IDS) in 2000. From a humble beginning in Bangladesh, CLTS has spread to over 60 countries with half of the population having adopted it into their national sanitation policies (Zuin *et al*., 2019). The intervention relies on a community-based approach where communities take charge of their sanitation challenges without any forms of monetary or hardware subsidies. CLTS uses participatory techniques that create shame and disgust among community members to decide collectively to change their sanitation behaviours by constructing and using latrines in a certified ODF community (Kar & Chambers, 2008).

During the past two decades, the CLTS intervention has been accredited with achievements of ODF districts and sub-regions in Asia and sub-Saharan Africa (Zuin *et al.*, 2019). However, evidence about the programme's effectiveness and sustainability is mixed (Venkataramanan *et al*., 2018). The programme has shown short-term sustainability success across implementing

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countries, such that traces of OD are found in certified ODF communities. This is because the focus has been on the elimination of OD using behavioural change techniques rather than the provision of high quality latrines (Mamo *et al*., 2023). A suite of factors have been pointed out in grey and scientific literature (both qualitative and quantitative) to affect the performance and sustainability of the CLTS programme *(Augsburg et al., 2022; Delaire et al., 2022; Tribbe et al*., 2021; USAID, 2022b). Factors such as contextual, socio-economic, political and psychological, amongst others, have been explored by researchers. While Ntaro *et al*. (2022) examined the influence of contextual and psychological factors on ODF status, Stuart *et al*. (2021), investigated the effects of contextual factors on the achievement and sustainability of ODF communities two to three years after ODF certification. Yet, there is a dearth of the study of these factors on the long-term sustainability of the CLTS programme and its outcomes.

CLTS was piloted in Ghana in 2006 and subsequently adopted as a sanitation approach to end OD in rural communities. Full implementation began across the entire country in 2012, and a considerable number of communities have attained ODF status (Delaire *et al*., 2022; Tsekpetse-Akuamoah *et al*., 2022). However, there is little evidence of the long-term sustainability of these ODF communities and the communities' behavioural change in sanitation practices. Also, the programme is implemented using numerous activities. The effectiveness of these activities towards the sustainability of the CLTS programme has been questioned (USAID, 2018; Venkataramanan *et al*., 2018). A better understanding of the effects of these activities and the drivers of performance and sustainability would be beneficial to WASH experts, CLTS implementers and practitioners, and policy-makers because it would help to identify the effective activities to be employed and the performance and sustainability factors to be prioritised for long-term sustainability.

1.2. Overview of the CLTS Programme and its Spread

Community-Led Total Sanitation (CLTS) is an integrated approach to achieving and sustaining open defecation-free (ODF) status. CLTS entails the facilitation of the community's analysis of their sanitation profile, their practices of defecation and the consequences, leading to collective action to become ODF. The implementation of the programme take place in three phases: pre-triggering (involves the selection of a community, entry into the community and establishing a rapport for triggering); triggering (community gathering with an external facilitator who uses participatory tools such as s walk of shame through a defecation area

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to drive a community towards latrine construction); and post-triggering (involves routine follow-ups, verification, declaration and ODF certification). The activities employed at each stage are not rigid and organisations are at liberty to include other activities, but the focus of behavioural change in sanitary behaviours should not be compromised (Kar & Chambers, 2008: 11).

The programme began in Bangladesh but has spread successfully across over 60 countries with half of the population adopting it as part of their sanitation policies (Zuin et al., 2019). CLTS was first piloted in many African countries, including Ethiopia, Zambia and Ghana, in 2006 (Kar & Chambers, 2008; UNICEF, 2015). In the course of the piloting, many African countries, including Ghana, revised their sanitation policies and adopted the CLTS approach as a national strategy for expanding sanitation and hygiene practices into rural areas.

In Ghana, full implementation of the programme began in 2010 in eight regions and was subsequently rolled out in all 16 regions by 2012 (Tsekpetse-Akuamoah et al., 2022). With financial support from an array of local and international non-governmental organisations and local government, several communities have been declared ODF in Ghana, through the CLTS programme. In a recent study by Delaire et al. (2022), it was found that over 5,000 communities have been declared ODF across the nation. However, the programme is faced with challenges to long-term sustainability of its outcomes, even though studies have shown short-term sustainability of the programme's outcomes (Delaire et al., 2022; Zuin et al., 2019). Although, sustainability is a global challenge, the effect of the programme is not seen as rural sanitation continue to lag behind urban sanitation (GSS, 2022).

1.2.1 CLTS adoption and implementation in Ghana

CLTS was introduced in Ghana in 2006 and it later became a principal component of the National Environmental Sanitation Strategy (NESS) in 2010, after four years of extensive piloting in five selected regions, namely, Northern, Upper West, Greater Accra, Central and Eastern regions, by four independent organisations (CWSA, Plan Ghana, UNICEF and WaterAid) (MLGRD, 2013: 10; Magala & Roberts, 2009). After 18 months of piloting, an evaluative team observed the significant performance of the programme such that approximately 308 communities were declared ODF. Subsequently, the CLTS programme was adopted into the National Environmental Sanitation Policy (NESP) as a rural sanitation approach to end OD in the rural communities (Magala & Roberts, 2009: 10). Full

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implementation of the programme began across the 16 regions in 2012 (Tsekpetse-Akuamoah *et al*., 2022).

Failure of the subsidy approach led to the adoption of a new approach. In 2006, CLTS was piloted in selected regions where OD was prevalent by CWSA, UNICEF, Plan Ghana and Care. The regions included Upper East, Upper West, Northern, Volta and Central regions. Three years later, a situational analysis conducted by Magala & Roberts (2009) revealed high successes such that 210 communities out of 510 were declared ODF and 157 were ODF basic (Triggered but had not attained 80% latrine coverage). Based on the results, the Government of Ghana adopted CLTS in 2010 as the rural sanitation approach to end OD. After more than a decade of implementation in rural communities across the nation, little is known about the performance and sustainability of the CLTS programme.

Upon adoption, the Ministry of Local Government and Rural Development (MLGRD), established the Environmental Health Directorate (EHD) to co-ordinate the implementation of the programme (Magala & Roberts, 2009: 11). Furthermore, the implementation of the CLTS programme was based on the five-core mandate of the RSMS model developed based on NESP, which include: 1) Building/creating an enabling environment (mainstreaming CLTS into sanitation policy and building consensus at all levels); 2) Strengthening capacity (introducing CLTS in schools (SLTS), training in sanitation marketing); 3) Creating demand (training, facilitating, sensitising and supervising management, heads of institutions, natural leaders, including women and children, and instituting reward schemes); 4) Facilitating supply (introducing and providing low-cost sanitation toilet options/technologies and supply within communities); and 5) Monitoring and evaluation (monthly, quarterly and annual monitoring using appropriate mechanisms) (Bibby *et al*., 2011: 11). In addition, as part of the monitoring and evaluation, and to ensure harmonisation of assessment, verification and certification of a community as ODF, a National Verification and Certification Protocol was developed (MLGRD, 2013). Other techniques and activities, such as the BASIS, were developed for record-keeping and monitoring of field facilitators, and national, regional and league tables were established for displaying the performance of regions and districts.

However, since its final adoption in 2012, the implementation has been fully supported, supervised and carried out by the government officials made up of the RICCs, DICCS, MEHOs, DEHOs, EHOs and EHAs (See Section 2.6.3 below), and local and international non-

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governmental organisations, including UNCEF/GoG (which patterners with the government), Global Communities (GC), USAID, WaterAid, World Vision (WV), Catholic Relief Services (CRS), RING (Resiliency in Northern Ghana), SNV, Plan Ghana, Care International, and the Community Water and Sanitation Agency (CWSA) (Magala & Roberts, 2009: 16; Tsekpetse-Akuamoah *et al*., 2022: 2).

From a modest commencement in 5 regions with high records of OD, CLTS is currently implemented in all 16 regions of Ghana (Magala & Roberts, 2009: 16; Tsekpetse-Akuamoah *et al*., 2022). Implementation of the programme has led to the certification and declaration of over 5000 ODF communities (Stuart *et al*., 2021: 4065) across 147 districts (Tsekpetse-Akuamoah *et al*., 2022: 2). Despite these high numbers, after more than a decade of implementation, no district has been declared as ODF because of high incidences of slippage/reversion resulting from frequent collapse of rudimentary latrines, rocky/unstable soils, perennial flooding, no water supply infrastructure for latrine reconstruction, and financial constraints among others such as previous subsidy, beliefs and norms, and large dependence on local materials for latrine construction and donors (Delaire *et al*., 2022; Tsekpetse-Akuamoah *et al*., 2022). Additional factors include poor quality of implementation resulting from unskilled facilitators, lack of logistics for post-triggering and post-ODF follow-ups or monitoring, lack of political will, commitment and prioritisation of sanitation within the MMDAs (Asantewaa-Tannor *et al*., 2021).

Despite these challenges, records indicate CLTS has led to 49% ODF communities in Ghana (Stuart *et al*., 2021), representing approximately 80% latrine coverage across the nation, according to Delaire *et al*. (2022: 3). For continual increase in the number of sustained ODF communities, several authors have suggested the need for combining CLTS with other approaches. For example, allowing subsidy either in kind or in cash to the poor and the marginalised in a the community (Apanga *et al*., 2022; Delaire *et al*., 2022; USAID, 2022). However, these authors have failed to point out where and when such subsidies should be applied because reports indicate that subsidy could either dampen the spirit of mobilisation or cause disputes among the community members. The results of a recent study of targeted subsidy conducted in Northern Ghana showed a 15% decrease in OD but it failed to increase the construction of durable latrines because those who do not qualify under the RSMS model still live under low-income levels (Trimmer *et al*., 2022). Broadly, the government of Ghana implements pure CLTS, as described in Section 2.6 and does not support subsidy. However,

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the RSMS model allows room to provide support for the poor and marginalised. When and how to apply the subsidy remains the question to be answered.

1.2.2. Organisations and institutions responsible for implementing CLTS in Ghana

The organisations and institutions responsible for implementing CLTS in Ghana include the Government of Ghana, the Community Water and Sanitation Agency (CWSA), and international development organisations such as UNICEF, Global Communities, USAID, Plan International, WaterAid, and World Vision (Delaire *et al*., 2022 Tsekpetse-Akuamoah *et al*., 2022: 2). The Government of Ghana has included CLTS in national policy and established institutional support mechanisms, such as co-ordinating committees at national and regional levels (Crocker, Abodoo *et al*., 2016). These organisations and institutions collaborate to implement CLTS interventions and promote sanitation and hygiene in communities across the country (Tsekpetse-Akuamoah *et al*., 2022). Though these organisations and institutions are responsible for the implementation of the CLTS programme, sustainability of the programme remains a challenge.

1.3. Overview of CLTS Sustainability

CLTS sustainability is "the ability of a whole community to achieve and maintain its ODF status" (Cavil *et al*., 2015: 2). The main aim of CLTS is to produce an ODF community by changing sanitary behaviours and enhancing the construction of pit latrines (Kar & Chambers, 2008). It is expected that the communities will sustain their behavioural change in sanitary practices and maintain their ODF status. However, this is seldom observed, making sustainability a sensitive issue for the CLTS programme. Thus, sustainability of the CLTS intervention has been the major debate during conferences and workshops in all the countries implementing CLTS. While some researchers view the sustainability challenge as being a flaw in the development of the programme, others attribute it to too much focus on latrine construction (Bongartz *et al*., 2016).

The CLTS programme has shown evidence of short-term sustainability, which is presented in reports, and several grey and less empirical research *(Kouassi et al., 2023; Venkataramanan et al*., 2018). For instance, the previous most cited short-term sustainability study was one carried out by Plan International Netherlands across five of its sponsored countries: Ethiopia, Kenya, Liberia, Uganda and Serra-Leone. The authors found that the implementation of the CLTS

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intervention resulted in the achievement ODF communities with 87% functional and 13% dysfunctional toilets four years after implementation (Tyndale-Biscoe *et al*., 2013). In a similar, recent study by USAID (2022) in Cambodia, Ghana, Liberia, and Zambia, sustained ODF communities were found with 32%, 49%, 57% and 35% dysfunctional toilets, respectively. In a recent, systematic review by Kouassi *et al*. (2023), it was reported that CLTS has shown significant increase in latrine coverage, use and sustained behaviour change. However, sustainability still remains a challenge because reports show that OD is still being practised in certified ODF communities, with several ODF communities slipping back to OD (Mamo *et al*., 2023).

Factors contributing to slippage have been presented in many studies (Abebe & Tucho, 2020; Cavil *et al*., 2015; Kouassi *et al*., 2023). The systematic review conducted by Cavill *et al*. (2015) tried to group the sustainability factors into three dimensions: (1) enabling conditions, (2) physical and technical sustainability and (3) social and behavioural sustainability. While the enabling conditions refer to institutions and the process of implementation, physical and technical factors refer to a sustainable market and sanitation services, and the last dimension refers to sustainable change in social and behavioural norms, motivation, equity and inclusion, and meeting the needs of all people. Cavill *et al*. (2015) suggested that studies be carried out into the influence of these factors on long-term behavioural change as a result of the CLTS programme. Enabling conditions is one of the factors about which there have been few studies.

1.4. Problem Statement

Globally, the CLTS is implemented by the array of donors and NGOs (Zuin *et al*., 2019). The findings of a recent study by Tsekpetse-Akuamoah *et al*. (2022) revealed eight NGOs that have remained committed and supportive in implementing CLTS in Ghana. Through these organisations, numerous communities have been declared ODF, yet, OD remains a challenge in Ghana (GSS, 2022). It is not known how the ODF communities are sustaining their status. Also, little is known about the activities carried out by these organisations and their effects on the performance and sustainability of the ODF communities. Meanwhile, Kar and Chambers (2008) emphasised further the crucial role that organisations and their activities play in the performance and sustainability of the programme and its gains (ODF communities). Thus, not every organisation is suitable for implementing the CLTS intervention. It is imperative to identify the activities carried out by these organisations and their effect on the performance and

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sustainability of the CLTS programme.

Although the findings of studies about CLTS sustainability have shown sustained sanitation behaviours in the short-term over the past decade, evidence of long-term sustainability is limited (Clarke *et al*., 2021). Also, little is known about the drivers of long-term sustainability of the CLTS programme and its outcomes. CLTS is a behavioural change intervention. Yet, while there are frameworks that link determinants of sustained behavioural change in sanitation and sustained health impacts with many sanitation interventions, there is a lack of frameworks of drivers of sustained behavioural change in sanitation through the CLTS programme (Orgill-Meyer *et al*., 2019).

Researchers have cautioned CLTS implementers regarding generic implementation of the programme and have suggested the need for contextual studies about drivers of long-term sustainability of the CLTS programme and its outcomes. An evaluation of the performance and sustainability of CLTS would provide contextual evidence of the drivers of long-term sustainability as well as their significant associations through a sustainability framework.

1.5. Research Questions

CLTS researchers, practitioners and implementing NGOs are looking for evidence of the long-term sustainability of the CLTS programme and its gains. With more than a decade of implementation of CLTS in Ghana, and having attained a considerable number of ODF communities, it is imperative to identify what factors are contributing to the sustainability of these communities and the CLTS programme in general. The primary research question was: What are the factors contributing to the performance and long-term sustainability of the CLTS programme in Ghana? This is crucial to enhance sustained change in sanitation behaviours as Ghana strives to meet SDG 6 and target 6.2. The secondary research questions that were used to guide the study included the following:

- Which organisations are responsible for the implementation of the CLTS programme in Ghana?
- What are the activities carried out by the organisations implementing the CLTS programme in Ghana?
- How do these activities carried out by the organisations impact the improved performance and sustainability of the CLTS programme in Ghana?

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- What are the factors influencing and affecting improved performance and sustainability of the CLTS programme in Ghana?
- What can be done to improve the performance and sustainability of the CLTS programme in Ghana?

1.6. Research Aim

The aim of the study was to evaluate factors contributing to the performance and the sustainability of the CLTS programme in Ghana.

1.7. Specific Objectives

To evaluate the CLTS programme, the study was guided by the following objectives:

- To identify the various organisations implementing the CLTS in Ghana.
- To examine critically the activities carried out by the organisations implementing CLTS in Ghana.
- To evaluate the impact of these activities on the improved performance and sustainability of the CLTS programme.
- To examine the factors affecting the improved performance and sustainability of the CLTS programme in Ghana.
- To develop a framework that would guide organisations towards improved performance and sustainability of the CLTS programme.

1.8. Overview of Research Methodology

A mixed-methods (MM) approach, specifically the exploratory sequential mixed-methods (ESMM) approach and a multiple case study strategy were adopted for this study. The basis for the adoption of MM was to allow for rigorous collection and analysis provided by the integration of both qualitative and quantitative data in a single study (Dawadi *et al*., 2021: 4). Thus, a mixed-methods design was necessary for comprehensive understanding of the phenomenon being studied and, besides, a single approach was not enough to address the research problem (Creswell, 2014: 265; Leavy, 2017: 9). According to Creswell and Clark (2018), An ESMM approach is useful if the researcher intends to evaluate an intervention or a phenomenon being implemented, and CLTS is an intervention that is being implemented solely to end OD. Likewise, the case study strategy offers a platform where an in-depth investigation of a particular instance (single case) or instances (multiple cases) of a phenomenon can be

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undertaken in a single study. Thus, a case study strategy offers the researcher the opportunity to investigate single or multiple cases in a single study (Fellows & Liu, 2015: 115; Johannesson & Perjons 2021: 59).

Based on an extensive literature review, an interview guide was developed and used to collect qualitative data during semi-structured interviews with practitioners and implementers of the CLTS intervention. Aided by the information gathered from the experts, focus group discussions and direct observations were conducted in selected cases in 25 CLTS beneficiary (ODF) communities. The data were transcribed verbatim, as explained by Flick (2018: 375). The themes and factors of performance and sustainability emanating from the thematic analysis of the data were used to develop the conceptual framework and questionnaire using a five-point Likert Scale which was administered to the experts and implementers of the CLTS programme face to face and on the internet to obtain the quantitative data for this study, as presented in Chapter 5.

The quantitative data analysed using partial least square structural equation modelling was used to validate the conceptual framework developed from the qualitative data. The developed framework showed that leadership, motivation and commitment, ownership, effective tools, and financial sustainability factors significantly influence the improvement and long-term sustainability of the CLTS programme through sustained behavioural change in sanitation practices.

1.9. Scope and Delimitations of the Study

The focus of the study was to determine the drivers of performance and sustainability of the CLTS programme in Ghana and provide an improved performance and sustainability framework for the CLTS programme in Ghana. The scope of the study was limited to:

- Eight regions, 11 MMDAs, and 25 ODF communities in Ghana.
- Organisations implementing the CLTS programme in Ghana.
- Targeted respondents included practitioners, consultants, environmental health officers (EHO) and members of ODF communities with direct experience in the CLTS implementation processes.

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The study was delimited to eight regions and 25 ODF communities as a results of time constraints and the restrictions imposed by Covid-19 during the study period. However, the regions covered were considered to have high levels of OD and had been early beneficiaries of the CLTS programme with some of the regions and their communities being ranked at the top of the National League Tables (UNICEF, 2019). Also, the targeted respondents were better placed to provide insightful information based on their experiences with CLTS over the years.

1.10. Assumptions of the Study

The following were the assumptions that formed the basis of this study:

- The activities and tools used by organisations implementing the CLTS were linked to sustained behavioural change in sanitation practices through the CLTS programme.
- Ownership of the CLTS programme and its outcomes can influence long-term behavioural change in sanitation practices.
- Supportive leadership can be linked to sustained behavioural change in sanitation practices.
- Enforcing sanitation by-laws can lead to the long-term sustainability of behavioural change in sanitation practices.
- Motivation and commitment can be linked to sustained behavioural change in sanitation practices in CLTS-beneficiary communities.
- Appropriate contextual factors (institutional/technical/environmental conditions) can lead to sustained behavioural change in sanitation gains.
- Sustained behavioural change in sanitation practices can lead to improved performance and sustainability of the CLTS programme in Ghana.

All of the above assumptions are discussed in Chapter 7, Sections 7.3.1 - 7.3.5.

1.11. Contributions of the Study

The long-term sustainability of behavioural change in sanitary practices achieved with the CLTS intervention remains a major challenge for implementing countries and organisations. Meanwhile, long-term sustained behavioural change in sanitary practices is crucial for achieving SDG 6 and improving the health and well-being of people. Several drivers of sustainability have been identified, yet the relationships between these drivers and long-term behavioural change in sanitary practices are not well established (Chirgwin *et al*., 2021). Also, the effectiveness of the CLTS activities in the performance of the programme has been highly

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questioned (Chirgwin *et al*., 2021; USAID, 2018). Accordingly, researchers continue to recommend the integration of the CLTS programme with other sanitation interventions for sustainable outcomes, and stopping generic practice of CLTS has been found to be significant contextually (Crocker *et al*., 2017; Ficek & Novotný, 2019; Stuart *et al*., 2021). There is a need to establish the effectiveness of the activities for improved performance and to develop a framework that would inform stakeholders implementing CLTS about the factors on which to focus to attain the long-term sustainability of sanitation gains and the CLTS programme.

The findings of this study contribute to the existing body of knowledge by establishing that CLTS activities have a direct positive impact on behavioural change in sanitation practices towards the improvement of performance and sustainability of the CLTS programme. Also, the findings of the study contributed to the existing body of knowledge by establishing that, when combined with SLTS, SanMark and support in terms of targeted subsidies, CLTS yielded sustainable outcomes. Finally, the improved performance and sustainability framework, developed from the integration of qualitative and qualitative data collected, showed that, when countries, organisations and donors implementing the CLTS programme pay maximum attention to leadership, ownership, effective tools, motivation and commitment and financial factors of sustainability, long-term sustainability of the CLTS programme could be achieved through sustained behavioural change in sanitation practices.

1.12. The Significance of the Study

Long-term sustainability of behavioural change in sanitary practices is a major challenge facing the CLTS programme. Understanding the factors contributing to this challenge in a specific context can help practitioners to develop more effective context-specific strategies which will address the unique challenges pertaining to a particular community, region and the country in general. The information provided in this study can serve as a source of evidence for policy-makers and practitioners in developing similar sanitary policies, improving upon the CLTS programme, and in allocating funds and resources to regions and communities that are more likely to produce sustainable outcomes. Policy-makers and governments can use the information presented in this study to foster collaborations with NGOs to develop strategies to improve upon the long-term sustainability of the CLTS programme towards the achievement of SDG target 6.2. The developed framework contributes to the limited literature on the long-term sustainability of the CLTS programme. Therefore, with this study, practioners and

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policy-makers could identify and address key factors that influence and affect the long-term sustainability of the CLTS programme.

According to WHO/UNICEF (2020:11), OD is a great concern since it is linked to most public health diseases, including diarrhoea that claims the lives of children under the age of five years. Meanwhile, the CLTS programme seeks to is to eliminate OD which is a challenge to public health. The purpose of the programme is to declare communities ODF through the construction and use of latrines. The information presented in this study can be used by public health practitioners and professionals to develop contextual, public heath, promotional messages about the construction and usage of latrines, which will enhance health promotion campaigns across the regions in Ghana and, invariably, contribute to the attainment of SDG 6, the purpose of which is to promote the health and well-being of society.

1.13. Structure of the Thesis

This thesis consists of seven chapters as shown in Figure 1.1. The background to the study, overview of the CLTS programme, its adoption in Ghana and organisations responsible for its implementation as well as the overview of its sustainability were presented in Chapter 1. Additionally, the problem statement, research questions, aim and specific objectives were presented in Chapter 1. The scope of the study, assumptions, and contribution to the body of knowledge were also highlighted in this chapter. Chapter 2 contains a review of literature on the emergence and spread of the CLTS programme, the impacts of the CLTS programme, factors affecting the performance and sustainability of the CLTS programme and the conceptual perspectives of the proposed framework. Chapter 3 contains an explanation of the methodology used and a description of the sequential exploratory mixed method design and the multiple case study approach adopted for the study. The Results and interpretation of the qualitative data collected from the case study are presented in chapter 4. Chapter 5 contains the analysis and interpretation of the survey data collected to test the proposed framework. In Chapter 6, the results emanating from the analysis of the survey data are discussed. The summary, conclusions and recommendations are presented in Chapter 7.

1.14. Chapter Summary

This chapter contains the background, the problem statement, aims and specific objectives of the study. The scope, assumptions, significance of the study and contributions to knowledge of

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the study were also presented in this chapter. In the next chapter, the relevant concepts and literature that helped in identifying the research gaps that authenticated the problem statement and justified the need for this study are discussed.

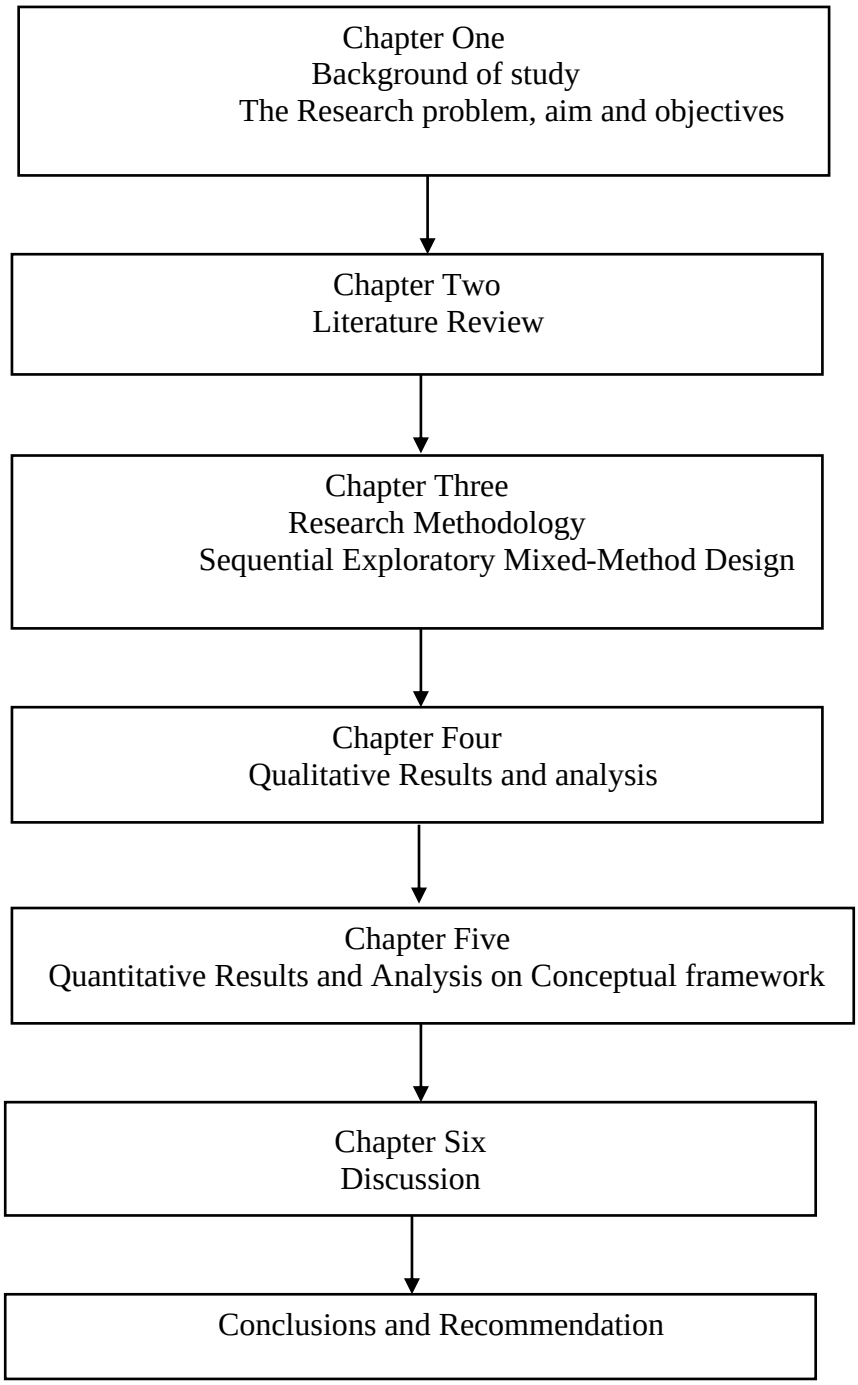

Figure 1.1: Structure of Thesis

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CHAPTER 2: LITERATURE REVIEW

2.1. Introduction

In this chapter, the literature about the implementation, performance and sustainability of the CLTS programme is comprehensively reviewed. The topics discussed under each section were carefully chosen to contribute to the achievement of the aim of the research to evaluate the performance and sustainability of the CLTS programme. The themes include the emergence and spread of the CLTS programme, the impacts of the CLTS programme, and factors influencing and affecting the performance and sustainability of the CLTS programme. Other topics include hybrid CLTS, the adoption and implementation of the CLTS programme in Ghana, and the conceptual perspectives of the proposed framework.

2.2. Emergence and Spread of the CLTS Programme

According to the programme developers, CLTS is an integrated approach the aim of which is to achieve and sustain ODF communities (Kar & Chambers, 2008: 4). It involves the facilitation of the analysis of a community's sanitation profile, OD practices and the consequences, resulting in a collective decision to become ODF (Kar & Chambers, 2008: 4). Furthermore, the programme is focused on encouraging change in collective sanitation behaviour, rather than toilet construction or provision, through a social awakening stimulated by facilitators within or outside the community.

CLTS emerged in Bangladesh through the work of Kamal Kar (Galvin, 2015: 10; Kar & Chambers, 2008: 76). The aim of the programme that uses participatory techniques, provocative language, such as "shame" and "disgust", and crude words like "shit" is to encourage collective change in sanitation behaviour without the provision of a subsidy. The approach was piloted in a Mosmoil village in Rajshahi District in Bangladesh in 1999, where it yielded the desired results. The programme was piloted in four other districts in Bangladesh following the success in Rajshahi District and, subsequently, spread across Bangladesh, Asia and Eastern America.

Currently, CLTS has spread to over 66 countries worldwide with half of the population adopting it into their national sanitation policies (USAID, 2018; Zuin *et al*., 2019). Apart from

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the success, the programme's spread is attributed to its being developed at the time when national governments and donors were looking for an effective approach to meet their SDG target set for sanitation. Compared with other sanitation approaches, communities could be declared open defecation-free in twelve (12) weeks and, so, it was perceived to be a fast and an effective way to eliminate OD in the global sanitation sector. Therefore, CLTS received massive support from sanitation practitioners, governments, international donors and NGOs such as UNICEF, WaterAid, CARE, Plan International, Concern Worldwide, World Bank, USAID, Global Communities and SNV (USAID, 2018; Zuin *et al*., 2019). Hence, the wide spread of CLTS around the globe. The programme has some distinctive characteristics which are not found in previous sanitation approaches. These characteristics are discussed in this section.

2.2.1. Distinctive characteristics of the CLTS programme

Unlike previous sanitation approaches, CLTS relies on the premise that, ideally, communities must take charge of their own development, including sanitation. CLTS tries to eliminate all forms of external influences by allowing communities to take charge of their sanitation challenges. According to Zuin *et al*. (2019), CLTS presents a paradigm shift away from previous, externally driven, top-down, subsidy-driven individual-based interventions to a bottom-up, no subsidy, community-based behavioural change approach that stops all forms of OD through latrine construction with locally available resources. The distinctive characteristics of the CLTS programme were summarised in three statements by USAID (2018: 6) as CLTS:

provides no subsidies, either software (monetary) or hardware (in-kind);

1. provides no prescriptions or dictation of any latrine technologies (hardware designs) or models;
2. uses crude and emotional drivers such as eating or drinking each other's shit, shit, dignity, pride, disgust, and shame to trigger behaviour change.

What is intriguing about the CLTS programme is that it uses well-designed and established participatory methods or activities, which are implemented in stages by CLTS facilitators. The stages include: pre-triggering, triggering and post-triggering, and it has been reported that the effectiveness of the CLTS programme is dependent on quality of implementation at each stage (Harter & Mosler, 2018; Kar & Chambers, 2008). Thus, a flop at any stage of implementation

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is detrimental to the programme's success. The stages or processes of implementing the CLTS programme are presented in the ensuing section.

2.2.2. The stages of the CLTS programme

As indicated in the previous section, CLTS is implemented in three stages, including: pre-triggering, triggering, and post-triggering (verification and certification). Each stage of implementation is crucial and necessary for immediate response and success.

- **Pre-triggering**

This is the first stage of implementation and it involves selecting a favourable community for the CLTS engagement, mobilising and building rapport with community leaders (Kar & Chambers, 2008: 13). A community is selected for implementation based on its "challenge levels" (USAID, 2018: 6). The challenge levels entail high levels of OD practice, visibly dirty environments and rampant health issues. Others include previous sanitation interventions (such as subsidy), type of soil (stable or rocky), topography, land cover and water supply, community size, enthusiastic leaders, high social cohesion etc. (Kar & Chambers, 2008: 15). Researchers have found factors such as small community size and remoteness, cultural homogeneity or social cohesion, high social capital, enthusiastic traditional leaders and no previous subsidy as pre-triggering factors that influence the performance and sustainability of the CLTS programme (Stuart *et al*., 2021; Venkataramanan *et al*., 2018). The programme developers also emphasised the need for careful selection of communities, as it is deemed to be crucial for effective triggering and implementation (Kar & Chambers, 2008).

- **Triggering**

This stage has been described as the "the heart of the CLTS programme" because it determines the acceptance or rejection of the programme (USAID, 2018: 34). Triggering is a communal gathering where external facilitators use a set of designed participatory techniques and activities meant to arouse a sense of shame and disgust of the current sanitation situation and trigger a collective sense of behaviour change towards OD and sanitation in general (USAID, 2018). Based on the response (matchbox in gas station, where all communities are triggered and ready to end OD), the facilitators assist the community to develop action plans indicating: effective dates on when to achieve ODF; enact sanitation by-laws; and select emerging, enthusiastic, community members, "the so called natural leaders (NLs)", who wish to champion the course of attaining ODF status (Kar & Chambers, 2008). Depending on the level

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of response of the community, ODF status could be attained within a period of 3 weeks to 6 months (Bardosh, 2015; Kar & Chambers, 2008). The activities and techniques used are detailed in the CLTS handbook (Kar & Chambers, 2008). However, according to the programme developers, organisations should be guided by the activities and can include other activities deemed to be beneficial. Sigler *et al*. (2015) found a wide range of activities that included those in the handbook and new activities. Although these activities are being used, there is limited information about their effectiveness in changing sanitary behaviour (ending OD) and subsequent sustainability (Sigler *et al*., 2015; USAID, 2018). Post-triggering activities are discussed in the next section.

- **Post-Triggering**

Post-triggering is critical for sustaining the community drive to stop OD after triggering because communities have differing needs and priorities (Bardosh, 2015; Kar & Chambers, 2008). Thus, any delays in post-triggering could affect the spontaneous collective sense of change in behaviour. Post-triggering involves various activities, the aim of which is encourage latrine construction, participatory monitoring in the form of routine follow-up, assisting in obtaining latrine materials, training NLs and other artisans, updating community maps and action plans, including community verification and certification of ODF status (Kar & Chambers, 2008). The verification process involves the inspection of a community using set guidelines or protocols to obtain information about whether or not it still practices OD. The certification is the confirmation and official recognition of a community as ODF (Kar & Chambers, 2008). The verification and certification processes vary per country. Thus, there is no specific protocol because each country has its own designed national protocols. For instance, while a community in Ghana requires latrine coverage of 80% to be certified as ODF (MLGRD, 2013), a community in Cambodia requires 85% and in Zambia 100% coverage (Stuart *et al*., 2021). Afterwards, ODF communities are expected to progress up the Sanitation Ladder, but this rarely occurs because of regular slippage (Abebe & Tucho, 2020; Kouassi *et al*., 2023). Nevertheless, CLTS has been found to be effective in reducing OD, increasing latrine coverage and usage, and improving health (Bushen *et al*., 2022; Cameron *et al*., 2019; Morris & Shapiro, 2021). The impact of the CLTS programme is presented in the next section.

2.2.3. The impact (performance) of the CLTS programme

Evidence shows limited impact studies on the CLTS programme (USAID, 2018; Zuin *et al*., 2019). However, first and foremost, there is a general consensus among practitioners and

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researchers that CLTS has been remarkably successful in eliminating OD which was the aim (Ficek & Novotný, 2019). While Pickering (2015) found 33% reduction in OD 18 months after ODF in a single study in Mali in 2015, Crocker *et al*. (2016) found 19.9% decrease in OD in Ghana. A recent report, Zuin *et al*. (2019) showed 0% to 50% decrease in OD resulting from the implementation of the CLTS programme across implementing countries. The second most recorded impact of the CLTS programme is perceived improved health. Cameron *et al.* (2019) found a decrease in roundworm infestation in children in rural Indonesia, and Bushen *et al*. (2022) reported a decreased prevalence of diarrhoea in South Western Ethiopia. Furthermore, CLTS has been prolific in changing sanitation behaviours through latrine construction, use, maintenance and rebuilding of collapsed latrines. For instance, in a study conducted by Crocker, Saywell and Bartram (2017), sustained behaviour change was found to be a potential social norm in Ghana and Ethiopia from the way community members rebuilt and repaired collapsed latrines. Also, Mamo *et al.* (2023) reported that 57% of the respondents rebuilt latrines in Ethiopia after severe floods caused the collapse of all latrines.

In addition, the CLTS programme has resulted in increased access to latrines and, more importantly, an increase in ODF communities, districts and regions in countries implementing the CLTS programme, especially sub-Saharan Africa and Asia (Zuin *et al*., 2019). Based on a systematic review, Venkataramanan *et al*. (2018) found 43 outcomes of the CLTS programmes, in which access to latrines and number of certified ODF communities appeared 112 and 113 times, respectively, in the 200 documents used for the review. For example, Zuin *et al*. (2019) reported that 47 out of 77 districts in Napal have been declared ODF. Zuin *et al*. (2019) indicated further that Zambia was the first African country to have declared a district ODF in 2015 and was followed by Kenya in 2016. Even though other CLTS implementing countries, including Ghana, do not have ODF districts, they have a considerable number of communities that have been declared ODF (Stuart *et al*., 2021). For instance, Stuart *et al*. (2021) reported that more than half of the 5000 communities that received CLTS in Ghana have been declared ODF. Other impacts of the CLTS programme often reported in literature include increased latrine ownership, increased coverage and consistent use, and improved knowledge of sanitation and hygiene practices as presented in Table 2.1.

Albeit that these impacts are encouraging, CLTS is criticised for lack of sustainability resulting from high levels of slippage (9% -100%), even in well-performing ODF communities (Stuart *et al*., 2021), and inconsistent latrine usage (Tribbe *et al.*, 2021). For instance, in 2013, UNICEF found OD reversion rates varying from 10% to 57% from seven sustainability studies

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conducted in Africa (UNICEF, 2013). A similar study conducted in Kenya, Ethiopia, Sierra Leone and Uganda by Plan Netherlands in the same year recorded 13% reversion in ODF communities (Tyndale-Biscoe *et al*., 2013). The results of a more recent study, conducted by Stuart *et al*. (2021) in Cambodia, Ghana, Liberia and Zambia, showed 19% increase in OD reversion. The high levels of slippage are a clear confirmation of the argument that latrine coverage does not always translate into latrine usage (Le & Makarchev, 2020). Actually, the assessment of CLTS impacts is short term, such that they are explored between six and 48 months after implementation, as shown in Table 2.1. In view of this, researchers continue to suggest the need for rigorous, long-term, sustainability studies of the CLTS programme (USAID, 2018; Venkataramanan, Crocker, *et al*., 2018). The sustainability of the CLTS programme is discussed in the next section.

Table 2.1: Impacts (outcomes) of the CLTS programme

Impact factor	Country	Type of intervention	Rate of impact	Reference
Latrine ownership	India	CLTS + Campaign	29.3% increase	Orgill *et al.*, 2019
	Mali	Pure CLTS	65% increase	Pickering *et al.*, 2015
	Ghana	CLTS+NLs Training	18.3% increase	Crocker *et al.*, 2016
	Tanzania	CLTS + promotion	16.1% increase	Briceño *et al.*, 2017
Latrine use	Mali	Pure CLTS	78% increase	Pickering *et al.*, 2015
	Ghana	CLTS + health	98% toilet use	USAID, 2021
	Bangladesh	CLTS + promotion	67% latrine use	Guiteras *et al.*, 2015
OD reduction	India	CLTS + campaign	6.8% decrease in OD	Orgill *et al.*, 2019
	Mali	Pure CLTS	33% reduction	Pickering *et al.*, 2015
	Ghana and Mozambique	CLTS +RANAS		Mosler & Harter, 2018
	Ghana	CLTS+NLs Training	19.9% reduction	Crocker *et al.*, 2016
	Tanzania	CLTS + promotion	12.4% decrease	Briceño *et al.*, 2017
Latrine coverage /access to latrine	Ethiopia	CLTS + hygiene	89% increase	Tessema 2017
	Indonesia	Pure CLTS	Modest increase	Cameron *et al*,. 2019
	Indonesia	CLTS + marketing	44% increase	Cameron *et al*,. 2019
	Ghana	CLTS + Subsidy	70% increase	USAID, 2021
	Malawi	Pure CLTS	96% increase	(Harter e*t al*., 2019)
	Zambia	CLTS + Hygiene	15.9% increase	Yebaoh-Antwi *et al.*, 2019
Improved Health	Ethiopia	CLTS + hygiene	Significantly associated with diarrhoea	Tessema 2017
	Mali	Pure CLTS	Improvement in height and weight	Pickering *et al*,, 2015
	Indonesia	Pure CLTS	Reduced prevalence of roundworm (44% decrease)	Cameron *et al*,. 2019

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Impact factor	Country	Type of intervention	Rate of impact	Reference
Behavioural change	Ghana and Ethiopia	CLTS + other interventions	Latrine rebuilding	Crocker *et al*,, 2017
	Ethiopia	CLTS+ Hygiene	57%	Mamo *et al.*, 2023
Knowledge of sanitation and hygiene practices	Zambia	Pure CLTS	High knowledge	Lawrence *et al.*, 2016

2.2.4. Sustainability of the CLTS programme

Sustainability of the CLTS has been the topmost concern of researchers, practitioners and implementers of the programme. Indeed, sustainability "is the burning issue facing the CLTS programme" according to USAID (2018: 34). Yet, researchers have not been able to define the sustainability of the CLTS programme clearly. The programme developers referred to CLTS sustainability as "the ability of an ODF community to go up the Sanitation Ladder" (Kar & Chambers, 2008: 55). Progressing up the Sanitation Ladder requires ODF communities to stop all forms of OD, and build and reconstruct durable latrines (improved latrines), repair, maintain and empty filled pit latrines, and keep a clean environment. With reference to the above statement, in a review of the sustainability of the CLTS programme, Cavil *et al*. (2015: 2) defined CLTS sustainability as "the ability of a whole community to achieve and maintain its ODF status". In essence, the sustainability of the programme is the achievement and maintenance of sanitation outcomes. In another review by USAID (2018: 35), sustainability of the CLTS programme was described as " the persistent reduction of OD or the measure of increase in private latrine ownership after CLTS implementation". Cagnet (2022) defined CLTS sustainability as "sustained adoption of the ODF behaviours". For the purposes of this study, Cavil's definition was used.

Broadly, there are four pillars of sustainability: economic, environment, social and human (cultural) (Purvis *et al*., 2019). However, specific to water, sanitation and hygiene (WASH) interventions, UNICEF (2018) presented five pillars of sustainability, including: financial, institutional, technical, social, and environmental. While financial sustainability requires government and intervention implementers to provide funding during and after the programme phase, institutional sustainability provides the necessary policies, human capacity and procedures for the implementation of the intervention. Similarly, while technical sustainability provides the needed technical support during and after the project, environmental sustainability entails the provision of the needed physical conditions in their natural environment without compromising the livelihood of the people. Behavioural sustainability refers to creating an

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all-inclusive, demand-driven, culturally sensitive, enabling environment for the implementation and continuous functioning of the intervention and its outcomes.

In relation to CLTS, Cavil *et al.* (2015: 7) identified three dimensions of sustainability after reviewing four sustainability studies. These include: "1) enabling conditions of institutions and processes, which entails leadership commitment, political priority and campaigns, programme quality, intensity and inclusiveness, post-ODF follow-ups, timing and planning of implementation activities, good management, and financial mechanisms; 2) physical and technical sustainability which involves physical conditions; latrine quality, technical support and market supply; and 3) social and behavioural sustainability which entails motivations, sustainable social norms, natural leaders, shared latrines and preference of OD". *Novotný et al*. (2018) argued that, for the CLTS programme and its outcomes to be sustained, governments, practitioners and implementers should have an all-inclusive approach specifically for the CLTS intervention based on country-specific sustainable factors. The factors influencing the sustainability of the CLTS programme are explored in the following section.

2.2.4.1. Factors enabling the sustainability of the CLTS programme

Although available records show limited studies on the long-term sustainability of the CLTS programme, it has shown a considerable amount of impactful short-term sustainability (Apanga *et al.*, 2022; Odagiri *et al*., 2017; Tribbe *et al*., 2021). The short-term sustainability has been found to be influenced by several factors, and the most reported influencing factor is implementation quality or facilitating conditions (Zuin *et al*., 2019;Venkataramanann *et al*., 2018). Factors contributing to the implementation quality of the CLTS programme have been discussed extensively in Section 2.4.2 and presented in Table 2.2.

Another significant factor reported to influence the sustainability of the CLTS programme is an enabling environment (Cavil *et al*., 2015; Zuin *et al*., 2019). While Cavil *et al*. (2015) suggested post-ODF follow-ups, high social cohesion, access to market and latrine materials, and supportive political and traditional leadership and campaigns as factors of the enabling environment, Zuin *et al.* (2019) reported access to technical support and construction materials, and high commitment of local government officials. In studies conducted on these enabling factors, they have been found to be effective in sustaining sanitation practices. For instance, in Ghana and Cambodia, Tribbe *et al*. (2021) found that strong traditional and natural leadership support resulted in consistent latrine use. Similarly, the results of a long-term impact

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assessment of the CLTS programme in India by Orgill-Meyer *et al*. revealed that national campaigns embarked on by the government resulted in high latrine ownership and lower OD practice. These studies provide the basis on which, through government and national systems involving community leadership, a whole nation can be reached through the CLTS programme. However, how enabling conditions, especially leadership, influence sustained behaviour by the CLTS programme remains unknown.

Furthermore, the sustainability of the CLTS programme has been found to be influenced by contextual factors (Novotný, Hasman *et al*., 2018; Stuart *et al*., 2021). For instance, *Stuart et al*. (2021) investigated the extent to which 18 contextual factors influenced the performance of the CLTS programme across four countries (Zambia, Cambodia, Liberia and Ghana), and found that each of the factors significantly associated with the achievement of ODF, differed across the countries. The contextual factors comprise environmental and socio-economic factors. While the environmental factors often reported by researchers include soil type or conditions, vegetation cover, water availability, remoteness and population of the community, the common socio-economic factors include wealth, income and literacy (Mishra *et al*., 2021; Odagiri *et al*., 2017; Stuart *et al*., 2021). Stuart *et al*. (2021) showed that wealthier households are more likely to rebuild and construct improved latrines than poor households. Similarly, Mishra *et al*. (2021) indicated that communities with access to water are more likely to sustain their ODF status than communities without. Based on this mixed evidence of the relationship between contextual factors and the CLTS intervention across regions, it is imperative to identify how country-wide contextual factors influence behaviour change through the CLTS programme. Little is known about how these contextual factors affect behavioural change.

Moreover, motivation has been found to play a major role in the sustainability of the CLTS process. Frequently mentioned motivational factors include: pride and dignity, convenience, comfort and safety, privacy, shame or fear, disgust, health and availability of water, and available technical support (Kouassi *et al.*, 2023; Mishra *et al*., 2021; Orgill-Meyer *et al*., 2019; Tyndale-Biscoe *et al*.,2013). In earlier research about sustainability, Tyndale-Biscoe *et al*. (2013) found comfort, convenience, pride and privacy to be positive motivational factors for latrine use and sustained ODF status across four countries (Cambodia, Kenya, Zambia and Sierra Leone). Based on a recent study, Mishra *et al*. (2021) and Kouassi *et al*. (2023) found understanding of health benefits, dignity and availability of water for construction and

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reconstruction of latrines as motivation for sustained sanitation behaviours in rural Burkina Faso and Mali.

Albeit that all these factors influence sustainability, there is a general consensus among researchers and practitioners that quality of implementation is critical or fundamental to the success (achievement of ODF) and the sustainability of the programme. In view of this, the implementation factors influencing the performance and sustainability of the CLTS programme are discussed in the next section.

2.2.4.2. Implementation factors enabling the sustainability of the CLTS programme

As indicated earlier, CLTS is implemented through a series of processes which have direct impact on the performance and sustainability of the programme. According to Kar & Chambers (2008: 9), the successful implementation of the CLTS programme depends on two critical conditions: a facilitator's attitude and behaviour, and sensitive institutional support. Similarly, the findings of a review by USAID (2018: 35) revealed that the success of the CLTS programme is a "function of the implementation modalities, physical environment and contextual factors". The findings indicated further that the implementation modalities entailed quality of implementation, which includes elements such as the quality of triggering, skilfulness and persuasiveness of the facilitator, and frequency of follow-ups, amongst others. Similarly, Kouassi *et al*. (2023) revealed that the acceptance, adoption and sustainability of CLTS is dependent on the commitment of NLs, economic factors, environmental factors, institutional triggering and governance, which are implementation modalities. Furthermore, Delaire *et al*. (2022) and USAID (2022) found that traditional as well as institutional leadership assisted the achievement and sustainability of the CLTS programme.

In addition, Ficek and Novotný (2019) showed how sociocultural, socio-political and environmental factors increased the sense of latrine ownership. Furthermore, based on an assessment of the role of implementation factors on the success and sustainability programme by Harter *et al*. (2019), community participation, post-triggering and post-ODF follow-ups were found to be paramount in the achievement and sustaining of the CLTS programme. Other implementation factors found to contribute effectively to the achievement and sustainability of ODF include available construction materials, latrine options (sanitation marketing) and technical support, social capital and norms, available financial resources and subsidy (Cameron *et al*., 2019; Kouassi *et al*., 2023; Tribbe *et al*., 2021).

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According to Venkataramanan, Crocker *et al*. (2018), a factor can either be an enabler or a constraint (barrier) based on context. For example, while subsidy is perceived by others to dampen the morale of community members and postpone the ODF achievement in Indonesia (*Cameron et al*., 2019), it served as a form of motivation for durable latrine construction in Ghana (Stuart *et al*., 2021; USAID, 2022). Therefore, it is imperative for researchers to continue to explore the drivers of long-term sustainability of the programme in order to identify factors that work effectively in a particular country. Table 2.2 shows the factors considered as enablers or constraints in the implementation and sustainability of the CLTS programme.

Table 2.2: Enablers and barriers to implementation of the CLTS programme

Factor(s)	Enabler	Barrier	Reference(s)
Social capital	×		(Cameron *et al*., 2019; Harter *et a*l., 2019)
Social norm (Belief in the OD practice)		×	(Cameron *et al*., 2019; Harter & Mosler, 2018)
Social cohesion	×		(Stuart *et al*., 2021)
Community participation	×		(Harter & Mosler, 2018)
Quality of triggering	×		(Venkataramanan *et al*., 2018)
Skilfulness of the facilitator	×		(Venkataramanan *et al*., 2018)
Finances		×	(Tyndale-Biscoe *et al*., 2013), (Stuart *et al*., 2021)
Motivation	×		(Tyndale-Biscoe *et a*l., 2013)
Community regulations (Sanctions and fines)	×		(Shrestha *et al*., 2018; USAID, 2018)
Technical support		×	(Stuart *et al*., 2021)
Knowledge and understanding of OD effects			(Lawrence *et al*., 2016; Linggar *et a*l., 2019)
Access to supply of latrine hardware	×		(Shrestha *et al*., 2018; Singh & Balfour, 2015)
Community behaviour (Expectation of subsidy and incentives)		×	(Ficek & Novotný, 2019; Harter *et al*., 2019b; Venkataramanan *et al*., 2018)
Previous sanitation approach		×	(Shrestha *et al*., 2018)
Sanitation marketing	×		(Munkhondia, 2023)
Supportive traditional leaders	×		(Delaire *et al*., 2022, 2022)
Soil conditions		×	*(Delaire et al., 2022; Stuart et al*., 2021)
Duration of programme	×		(Harter *et al*., 2019)
Shame, disgust	×		(Stuart *et al*., 2021; Tyndale-Biscoe et al., 2013)
Pride and dignity	×		(Kouassi *et al*., 2023; Orgill-Meyer *et al*., 2019)
Triggering techniques and activities	×		*(Harter et al., 2019; Sigler et al*., 2015)

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Factor(s)	Enabler	Barrier	Reference(s)
Political commitment		×	(Ficek & Novotný, 2019; Novotný, Humňalová, *et al.*, 2018)
Remoteness of community	×		(Stuart *et al.*, 2021)
Size of community			(Kar & Chambers, 2008; Stuart *et al.*, 2021)
Follow-up	×		(Harter et *al.*, 2019; Sigler et al., 2015)
Training of natural leaders	×		(Crocker, Abodoo, *et al.*, 2016; Harter *et al.*, 2019; Singh & Balfour, 2015)
Latrine ownership	×		(Ficek & Novotný, 2019)
Local government ownership			*(Venkataramanan, Crocker et al.*, 2018)
Improved health	×		(Harter & Mosler, 2018; Tyndale-Biscoe *et al.*, 2013)

Source: Researcher's construct, 2022

2.2.4.3. Barriers to the Sustainability of the CLTS programme

Foremost among the sustainability challenges of the CLTS programme is the issue of slippage or reversion to OD (Abebe & Tucho, 2020; Kouassi *et al.*, 2023). Records indicate that rates of slippage range between 5% and 100% from 9 months after ODF to 1-5 years after ODF, respectively (Abebe & Tucho, 2020; Stuart *et al.*, 2021). For instance, the findings of a study conducted by Stuart *et al.*, (2021: 4069) revealed that a 25% slippage, 9 months after ODF achievement, increased to 53% a year afterwards, and 73% 3 years later. Reasons for these high rates of reversion to OD included frequent collapsing of latrines resulting from unstable soils, and financial constraints to building durable latrines (Abebe & Tucho, 2020; Delaire *et al.*, 2022; Ntaro *et a*l., 2022). Technically, toilets constructed during the implementation of the programme are "unimproved" (simple pit without a slab or a shared latrine) or rudimentary and poor in quality, which results in frequent collapse and subsequent OD. Factors such as lack of post-ODF follow-up, readily available technical support and access to water for latrine reconstruction contribute to frequent reversions (Clarke *et al.*, 2021; Delaire *et al.*, 2022; Ngambut & Kapakado, 2018; Ntaro *et al.*, 2022). Tessema (2017) found that lack of behavioural change resulting from lack of motivation, often because of unpleasant smell, contributed to reversion to OD.

Secondly, inability of communities to progress up the CLTS Sanitation Ladder is a factor that constraints the sustainability of the CLTS programme (Mamo *et al.*, 2023; Russpatrick *et al.*, 2017). The CLTS programme allows households to begin at the very bottom of the Sanitation

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Ladder (construction of unimproved latrines) with the view that, once they were satisfied with the use of latrines, they would construct improved version. Unfortunately, that is not always the case. For instance, in Ethiopia, households have refused to construct improved latrines because they have generally become comfortable with the use of unimproved latrines (Mamo *et al*., 2023). Similar to slippage, lack of movement up the Sanitation Ladder is a result of frequent collapse of rudimentary latrines built because of financial constraints, which gradually leads to demotivation and finally ends in slippage (Delaire *et al*., 2022; Mamo *et al*., 2023; Russpatrick *et al*., 2017). Other factors, such as contextual (unfavourable soil conditions), technical, and lack of behavioural change in sanitation practices have denied most communities progress up the Sanitation Ladder (Cameron *et al*., 2019; Russpatrick *et al*., 2017).

Another significant challenge to CLTS sustainability is the issue of unsustainable behavioural change to new sanitation practices (Ngambut & Kapakado, 2018). The CLTS approach is to use techniques that arouse shame and disgust, reveal the cost of poor health, as well as health benefits, to encourage collective behavioural change in sanitary practices (Kar & Chambers, 2008; USAID, 2018). Researchers have argued that this type of technique only leads to short-term behaviour change rather than long-term, as fear and disgrace might lead to construction of toilets but not reconstruction after implementation (Galvin, 2015). Besides the techniques, other researchers have argued that the 3 months period used for CLTS implementation is unlikely to bring about lasting, sustainable change in behaviour (Galvin, 2015: 5; Ngambut & Kapakado, 2018: 13).

Furthermore, Augsburg *et al*. (2022) and Stuart *et al*. (2021) suggested that CLTS is likely to result in unstainable behavioural change in unfavourable contexts. Thus, CLTS is not a generic intervention. What works in a particular context might not work in another context. For example, the findings of a recent study by Stuart *et al*. (2021: 4071) revealed that communities with low population density, high social cohesion and stronger socio-economic homogeneity are able to achieve and maintain CLTS ODF sanitation gains and, hence, sustain new norms. Conversely, in the same study, Stuart *et al*. (2021: 4071) indicated that smaller communities might not result in sustained behaviour change because community size did not corelate in Zambia as it did in Ghana. Accordingly, researchers continue to advocate the context-specific factors in order to avoid the syndrome of a generic approach.

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Other significant factors contributing to unsustainable behaviourial change include: the use of CLTS as a stand-alone intervention, financial constraints, lack of motivation and commitment resulting from frequent collapse and unhygienic latrines (Kouassi *et al*., 2023; Ntaro *et al*., 2022). It is often argued that CLTS alone is not enough to bring about sustainable behavioural change. Integrating CLTS with training of natural leaders and sanitation marketing resulted the maintenance of a new norm because households rebuilt their toilets after collapse in Ghana, Ethiopia and Malawi (Crocker *et al*., 2016, 2017; Munkhondia, 2023).

More often than not, researchers suggest the need for post-project follow-ups or monitoring to achieve the sustainability of sanitation interventions including the CLTS programme (Apanga *et al.*, 2022; Zuin *et al*., 2019). According to Sigler *et al*. (2015), this is seldomly done, as they found only one out of 10 organisations to have embarked on a post-ODF follow-up even though they fully recognised the need for it. Reasons for lack of post-ODF follow-up include financial constraints and lack of ownership and take-over by local government. For example, Venkataramanan (2016) reported that local government leadership fails to take over ownership of ODF communities when implementing NGOs finish up, thereby resulting in reversion. In order to off-set this post-implementation challenge, the developers of the CLTS programme admonish implementers to select and use "natural leaders" (enthusiastic community people who emerge during the CLTS triggering) to serve as facilitators within the community to assist in achieving and maintaining the ODF status of the community. Unfortunately, reports indicate that most of these NLs relapse because of a lack of motivation, loss of interest and commitment and new priorities over time (USAID, 2018: 35).

2.2.4.4. Proposed solutions to CLTS sustainability challenges and gaps

Researchers continue to advocate the combination of CLTS with other interventions such as sanitation marketing, targeted subsidy, capacity building (e.g. training of NLs), technical support, behavioural change communications and SLTS (Ficek & Novotný, 2019). In recent studies, the concentration has been on combining sanitation marketing and targeted subsidies with CLTS (Israel *et al*., 2022; Munkhondia, 2023; Nicoletti *et al*., 2022). Yet, the proponents of CLTS still insist on zero subsidy which is a significant core value of the CLTS intervention. According to Crocker *et al*. (2016), combining training of NLs with CLTS yielded a decrease of 18.3% in OD in Ghana. Although capacity building is recommended, researchers indicate that most implementing sanitation organisations avoid it because of the cost implication (Crocker *et al*., 2016; 2017).

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Another significant, proposed solution is provision of context-specific CLTS triggering activities and frameworks to avoid a generic approach (Venkatarmanann, 2018). This statement was confirmed by Harter *et a*l. (2019) who showed that CLTS was significantly influenced by all the 18 contextual factors used in their study. Yet, carrying out such studies is limited. This indicates that there is a need for context-specific CLTS frameworks to be developed, using evidence-based contextual factors. Available information shows that there is no such context-based sustainability framework of the CLTS programme in Ghana.

In addition to these suggestions and provisions, there are more to be explored. For example, evidence-based results on how sustainability factors, such as financial, institutional, social, and environmental factors influence behavioural change, and improve the performance and the sustainability of the CLTS programme have scarcely been explored. Nevertheless, researchers have indicated that, for effective performance of the CLTS programme, implementers should consider combining the CLTS with other approaches (Ficek & Novotný, 2019). The so-called "hybrid CLTS" is discussed in the next section.

2.2.5. Hybrid CLTS

Hybrid CLTS is the combination of CLTS with other interventions (Galvin, 2015; Harter & Mosler, 2018**).** Although CLTS, as a stand-alone intervention, has achieved several successes in terms of latrine coverage, ownership and use, and reduction in OD, researchers continue to suggest the need for integrating CLTS with other interventions for more sustainable results. These suggestions are based on incremental successes and sustainable outcomes achieved when CLTS was combined with other interventions such as training of natural leaders, sanitation marketing, and targeted subsidies (Crocker *et al*., 2016, 2017; Munkhondia, 2023; Trimmer *et al*., 2022)**.** For instance, the results of impact studies carried out by Crocker *et al*. on training of natural leaders showed a reduction of 18.3% in OD. In Malawi and Bangladesh, integrating CLTS with sanitation marketing increased the uptake of latrines from 9% to 18% and also helped communities to move up the Sanitation Ladder (Munkhondia, 2023). The results of a more recent study by Trimmer *et al.* (2022) showed that using voucher-eligible households for the poor and marginalised attenuated OD by 15%.

Although such evidence exists, some advocates of pure CLTS believe that combining it with other interventions, especially subsidy, would remove the core principle of "zero subsidy", which can lead to no change in sanitary behaviour (Andres *et al.*, 2019). Implementers of hybrid

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CLTS must focus on post-ODF maintenance and sustainability of latrines (USAID, 2021). Also, Zuin *et al*. (2019) noted that CLTS must be combined with behaviour change communication or techniques (BCC or BCCT) for the purpose of high-quality and sustainable outcomes. According to USAID (2018), the CLTS can be combined with an array of interventions for high-quality performance and sustainability, but implementers and policy-makers should ensure effective integration to avoid disrupting the collective action process of the CLTS programme. Over the years, CLTS has been combined with targeted subsidy or support, school-led total sanitation (SLTS), social norms campaigns, provision of water, and sanitation marketing. These CLTS hybrids are presented and discussed extensively in the next section.

2.2.5.1. CLTS and subsidy (support)

There is evidence of a high level of slippage among the poor and marginalised in ODF communities because of the inability of households to construct improved latrines owing to financial constraints (Abebe & Tucho, 2020; Kouassi *et al*., 2023). It is as a result of this that researchers continue to suggest combining CLTS with support or subsidy for sustained behaviour as well maintenance of toilets among the poor (Stuart *et al*., 2021; Zuin *et al*., 2019). Subsidies can take various forms such as household rebates and discount on vouchers, reduction in sale prices of materials, and micro-credit (Trimmer *et al*., 2022). CLTS combined with subsidies has yielded remarkable increases in latrine coverage, ownership and OD reduction in Asia, Ghana and other countries (Nicoletti *et al*., 2022; Trimmer *et al*., 2022). In most of these studies, targeted subsidies were used. For instance, the results of a study of targeted subsidy conducted in Ghana showed that using voucher-eligible households led to a 46% increase in functional latrines and 15% decrease in OD (Trimmer *et al*., 2022). Similarly, sales in latrines increased significantly in rural communities in Cambodia when poor households were given discount on latrines (Nicoletti *et al*., 2022).

Undoubtedly, the addition of subsidy to the CLTS intervention has been proven to be significant, yet, it is argued that provision of subsidies might instil a dependency culture, instead of self-determination or self-respect which CLTS promotes (Tsekpetse-Akuamoah *et al*., 2022). Also, it has been argued that, when not properly employed, subsidy is likely to impose high financial burdens on implementing NGOs and governments, dampen the spirit of self-mobilisation or undermine intrinsic motivators, cause discrepancies and delay in the implementation processes, and lead to no behavioural change or sustainability (Andres *et al*.,

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2019; Nicoletti *et al*., 2022). However, implementers must be concerned with the timing and phasing of subsidy in order to avoid the possibility of undermining the "no subsidy" principle of the CLTS intervention for sustained behaviour change (Venkataramanan *et al.*, 2018). In addition, Radin *et al*. (2020) argued that care must be taken to avoid missing out on the core principle of CLTS, which is "no subsidy", making it a relatively cost-effective sanitation intervention,

With regards to support, the type of support to be employed by implementers has been highly debated among practitioners and implementers (Andres *et al*., 2019). Support can be employed either as a hardware or software (Kohlitz *et al.*, 2019; Trimmer *et al*., 2022). While software support encompasses capacity-building and training of field facilitators and NLs, financial mechanisms (community-wide savings, financial rewards and incentives, cash transfers, vouchers, supplier rebate etc.), hardware includes technical support and supply of materials (Kohlitz *et al*., 2019; Trimmer *et al*., 2022). In the study by Trimmer *et al*. (2022), support given to eligible households (the poor and marginalised) yielded an increase in latrine coverage, but several non-eligible households could not construct improved latrines. In India, support was given to all households, with the poor receiving more, and this resulted in an increase in coverage of improved latrines (Orgill-Meyer *et al*., 2019). Support given can be either external or internal. Records show that communities provide internal support through community mobilisation either to help the marginalised construct latrines or the rich provide financial support to the marginalised and free manual labour or technical support (Kohlitz *et al*., 2019; Trimmer *et al*., 2022). Implementers can provide support by building capacity, facilitating supply of hardware, follow-up (monitoring and supervision), access to water, technical support and reward in kind or in cash.

2.2.5.2. CLTS and sanitation marketing

Sanitation marketing (SanMark) entails creating demand through promotion of latrine products (various latrine options. e.g. pit latrines, pour flush, water closets etc.), and supply of services and materials (technical support, construction materials etc.) made available to households for informed decisions about permanent high-quality toilets (Kasulo *et a*l., 2020). SanMark encompasses understanding householders' motivations and constraints regarding sanitation adoption and use, in order to develop demand and supply-side interventions to ensure that appropriate sanitation products and services are available to match the demand (Munkhondia, 2023).

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Integrating CLTS with sanitation marketing is being advocated, yet there are few experiences. Munkhondia (2023) reported in Malawi that integrating sanitation marketing with CLTS helped communities to progress up the sanitation ladder through the construction of improved latrines,. Munkhondia (2023) reported further that SanMark combined with CLTS increased sanitation coverage by 8.9%. Similarly, integrating CLTS with SanMark through a project called "Total Sanitation and Sanitation Marketing (TSSM)" in East Java, Indonesia, resulted in unprecedented change in behaviour towards sanitation that led to 1.4 million people gaining access to sanitation (Mukherjee & Mukherjee, 2018).

Although evidence shows promising results, phasing out is a challenge, because it is likely to undermine the behavioural change process, result in delays in the implementation process, demotivate the poor from constructing toilets with local materials, as well as prevent local-level innovations/initiatives. Furthermore, Hanchett (2016) noted that SanMark without entrepreneurs and micro-creditors offering subsidised goods and interest on loans leaves the poor at a greater disadvantage. Munkhondia (2023) emphasised the importance in SanMark of latrine supply chain development, training of masons in designing and constructing durable latrines at low cost. Munkhondia (2023) further reiterated that SanMark requires technical innovations in terms of latrines to withstand harsh weather conditions. Reference is made to the national latrine guidelines of Kenya which show a diverse range of latrines which suit the economic dynamics of households.

2.2.5.3. School-Led total sanitation (SLTS)

School-Led total sanitation (SLTS) is an approach that is focused on creating open defecation-free (ODF) environments within schools and their surrounding communities. It is a variation of the CLTS approach, the aim of which is to mobilise communities to take collective action against open defecation (Novianti & Pertiwi, 2019; Rany & Dewi, 2022; Venkataramanan, Crocker et al., 2018). It is part of CLTS interventions, the aim of which is to improve sanitation conditions and reduce the prevalence of diseases such as diarrhoea (Novianti & Pertiwi, 2019; Rany & Dewi, 2022). SLTS recognises the role of schools as catalysts for behaviour change and hygiene promotion, leveraging the influence of students, teachers, and parents to create sustainable sanitation practices (Ficek & Novotný, 2019). By implementing SLTS, schools can serve as models for good sanitation practices, leading to improved health and hygiene outcomes for students and the wider community.

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The findings of studies have shown that CLTS interventions, including school-led initiatives, can have positive effects on sanitation and hygiene practices. For example, based on research in Zambia, it was found that CLTS interventions led to an increase in the proportion of care-givers who reported washing hands before preparing food or after defecation (Yeboah-Antwi *et al.*, 2019). Similarly, the Swachh Bharat Mission in India, which includes school-level activities, has contributed to improved hygiene practices and increased public awareness of sanitation (Sarkar & Bharat, 2021). The scalability and viability of CLTS interventions have also been demonstrated. The rapid diffusion of these interventions across countries, such as Bangladesh, Ethiopia, India, Indonesia, Kenya, and Pakistan, suggests their potential for widespread implementation (Zuin *et al*., 2019). Economic evaluations have shown that the cost-benefit ratio of CLTS interventions is generally favourable, indicating their feasibility (Radin *et al*., 2020). Rany and Dewi (2022) highlighted the need for improved implementation of SLTS programmes, particularly in ecological aspects such as open defecation-free programmes and waste management. Thus, school-led total sanitation is an effective approach to improving sanitation and hygiene practices within communities. By involving schools in promoting and implementing sanitation initiatives, CLTS interventions can contribute to better health outcomes and increased public awareness of sanitation.

2.2.5.4. CLTS and social norms campaigns

The effectiveness of social norms campaigns on CLTS has been studied in various contexts. Crocker *et al*. (2017) found that communities with higher, initial, potential social norms were able to sustain their latrine usage 18 months after implementation. This suggests that CLTS outcomes can be sustained when combined with training provided to local role-players. Campaigns combined with CLTS showed high levels of ODF achievement in rural communities of Nigeria and India (Orgill-Meyer *et a*l., 2019; Rabiu, 2023). Similarly, post-ODF campaigns in rural Pakistan led to modest reversion to unsafe sanitation practices (Augsburg *et al*., 2022).

Bhanot (2021) highlighted the use of injunctive norms messaging in social norms campaigns, which can convey social judgments about behaviour and motivate positive behaviour change. The evidence of these studies demonstrates the potential of social norms campaigns to influence behaviour and promote sustainable sanitation practices in CLTS initiatives.

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2.2.6. Rural sanitation interventions in Ghana

Several sanitation approaches have been adopted by the government of Ghana in its quest to end OD in rural communities. The most popular among them is the subsidy approach (SA) and community-led total sanitation CLTS (Bediako, 2016). According to Bediako (2016), the subsidy approach (SA) was adopted and implemented between 1990 and 2006. The aim of the government at the time was to fund household toilets partly in rural communities on the assumption that, when community members are helped halfway, they would construct and use toilets. In that case, the majority of the rural populace would have access to toilets, thereby increasing sanitation coverage (Bediako, 2016). Unfortunately, that could not be realised.

Osumanu *et al*. (2019) explained that the rich in the community were the only people who could provide the remaining funding or products for the toilets. Subsequently, the poor and the marginalised within the community perceived toilets as being the property of the rich. Although sanitation coverage increased, OD in the rural areas increased as well (Semabiah, 2019). Osumanu *et al*. (2019) explained further that sanitation coverage is possible with the provision of free sanitation hardware and, hence, the increase in sanitation coverage within that period.

Apart from the rich capturing all the problems associated with SA, another significant problem was the lack of behavioural change towards the use of latrine. Findings from several studies revealed that community members who built the toilets had better use for them on the basis that the product was too expensive to be used as a toilet (Bediako, 2016; Doe & Aboagye, 2022). For example, in communities where hardware, such as slabs were provided, people used them as surfaces for drying farm produce. Others used the toilets to store maize and yams (Osumanu *et al*., 2019). After over a decade of implementing the subsidy approach, the government sought a new approach. Through consultations with sanitation providers, such as UNICEF, USAID, Plan Ghana etc. and some experts in the sector ministry, CLTS was recommended (Bediako, 2016). At that time, CLTS was evolving and spreading across Africa. Based upon the recommendation, the Government of Ghana including WASH experts and practitioners began to pilot the CLTS programme in Ghana, as discussed in sections 1.2., 1.2.1 and 1.2.2.

2.3. Conceptual perspective of the study

A conceptual framework was drawn after the qualitative data analysis and a thorough review of factors affecting performance and sustainability, as shown in Figure. The factors in the

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framework include leadership, financial, effective tools, environmental/technical/institutional (contextual factors), motivation and commitment, ownership, behavioural change and law enforcement. The eight factors affect the behaviour of people during the implementation of the CLTS process. However, how these factors relate to behavioural change have not been shown clearly in the literature. Also, behavioural change leads to performance and sustainability of the CLTS programme. Likewise, all the sanitation frameworks have not depicted how behavioural change influences performance and sustainability of the CLTS programme. The factors in the conceptual framework and the theories that influenced the factors are discussed in the next section.

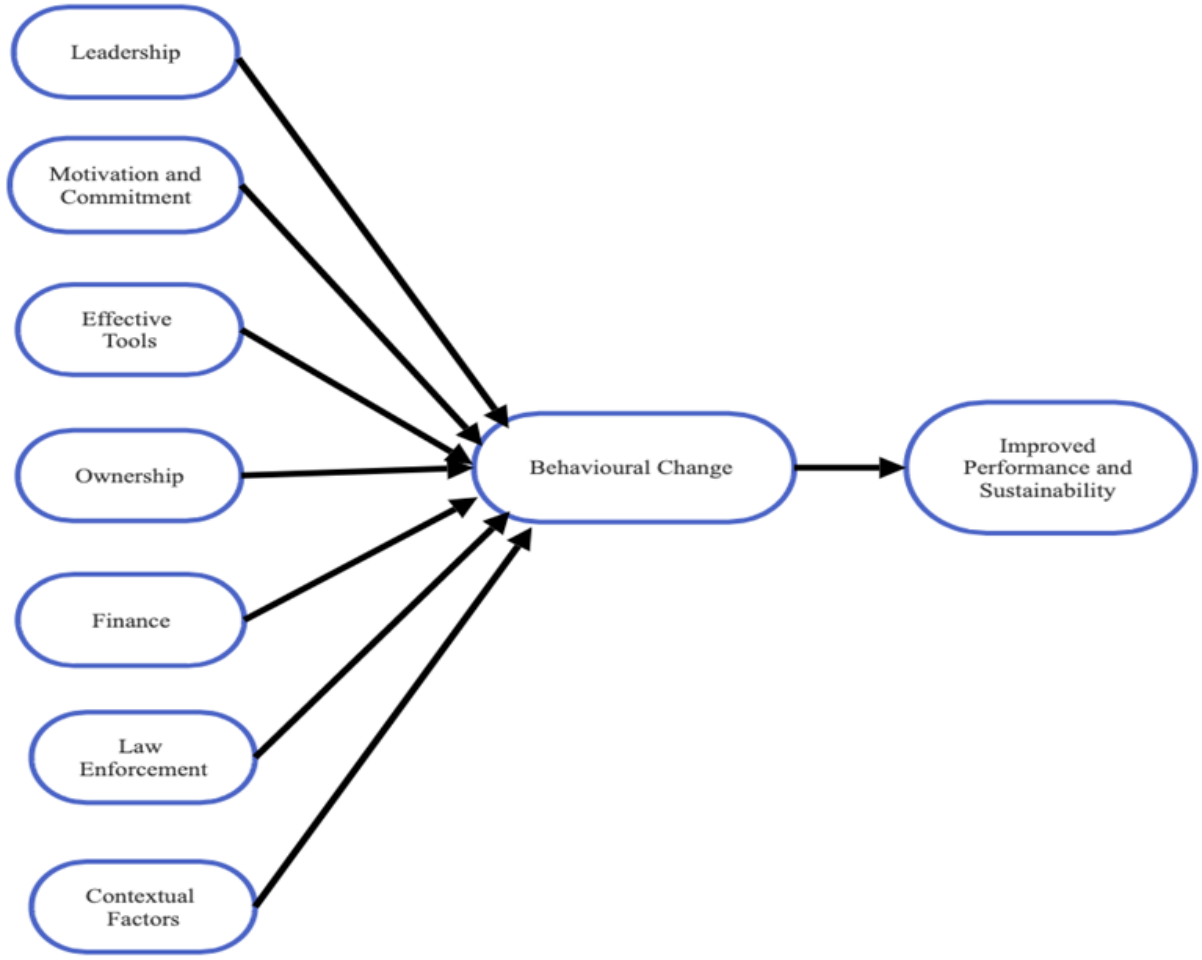

Figure 2.1: Conceptual framework

- **Research hypothesis**

Leadership directs guiding policies and promotes a culture that influences behaviour. Financial stability provides resources, while ownership encourages a sense of responsibility. Law

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enforcement provides a regulatory framework, shaping behaviour. In the context of CLTS, effective and flexible leadership from implementing organisations and the community is crucial for the performance of the programme and sustainability of the community-wide behavioural change (Delaire *et al*., 2022; Kar & Chambers, 2008). Based on another study, it was indicated that adequate finances and financial mechanisms are needed for quality implementation at the institutional and organisational levels, and the construction and maintenance of durable latrines, as well as movement up the Sanitation Ladder at the community level (Kohlitz *et al*., 2019). Institutional and community ownership, when cultivated, impart a sense of responsibility, enhancing sustainable behavioural shifts of implementers and community households (UNICEF, 2019; Venkataramanan, 2016). In a study by Tribbe *et al*. (2021), it was also found that participatory by-laws can enforce sustained sanitation practices and reinforce desired behaviours. According to Cavil *et al.* (2015), motivation is sustainability of social and behavioural change that can either influence or affect latrine adoption (new norm) and sustain ODF behaviours. Reeve (2018) indicated further that motivation energises and drives a person or community to change a behaviour or a goal. Besides, behavioural change can influence the sustainability of the CLTS programme. From the literature reviewed above, behavioural change depends on effective leadership inspiring a shared vision, financial support for initiatives, a sense of ownership promoting commitment, and by-laws providing restrictions to OD practice. Therefore, the following hypotheses were formulated.

H_1: Leadership positively influences improved performance and sustainability of the CLTS programme through behavioural change.

H_2: Motivation and commitment positively influence improved performance and sustainability of the CLTS programme through behavioural change.

H_3: Finance positively influences improved performance and sustainability of the CLTS programme through behavioural change.

H_4: Effective tools (effective techniques and strategies) positively influence improved performance and sustainability of the CLTS programme through behavioural change.

H_5: Ownership positively influences improved performance and sustainability of the CLTS programme through behavioural change.

H_6: Law enforcement positively influences improved performance and sustainability of the CLTS programme through behavioural change.

H_7: Contextual factors positively influence improved performance and sustainability of the CLTS programme through behavioural change.

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H_8: Behavioural change factors positively influence improved performance and sustainability of the CLTS programme.

2.3.1 The influence of leadership factors on improved performance and sustainability of the CLTS programme

Kar and Chambers (2008) cited institutional and community leadership as being one of the favourable conditions for the achievement and sustainability of ODF status. While institutional leaders include government and local government officials and leaders of NGOs implementing CLTS, community leaders include traditional (chiefs), opinion leaders, and elected political and natural leaders (Tribbe *et al*., 2021). The crucial role that leadership plays in the spread, implementation, success and sustainability of the CLTS programme has been identified in several studies. The rapid spread of the CLTS is attributed to the influential and committed leadership role played by the programme developers ,as well as governments, donors and NGOs (Zuin *et a*l., 2019). Evidence shows that effective government leadership increased latrine coverage in Nepal and led to the achievement of 45 ODF districts (Shrestha *et al*., 2018). Supportive and strong traditional leadership (chiefs) promoted latrine use and coverage in Ghana (Tribbe *et al*., 2021). This was possible because local leaders (traditional chiefs) hold a symbolic role in most African countries including Ghana. Chiefs form an embodiment of values, traditions and symbols of authority in the cities and rural communities, and so are revered, trusted and supported by their subordinates (Delaire *et al*., 2022). For example, in rural Indonesia, communities who trusted their community leaders attained ODF more quickly (Odagiri *et al*., 2017). Similarly, in Nigeria and Ghana, local leadership engagement led to an increased number of ODF achievements and promoted a sense of community ownership (Tiwari *et al*., 2017; UNICEF, 2019). In addition, Delaire *et al*. (2022) found that communities with active natural leaders and strong leadership support were more likely to sustain their ODF status (Delaire *et al*., 2022). However, although significant associations have shown in several studies between increase in latrine coverage and use and ODF sustainability with leadership, there is a dearth of evidence for an association between behavioural change and sustainability with leadership.

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2.3.2 The influence of finances on improved performance and sustainability of the CLTS programme

There is a general consensus among WASH experts, including CLTS practitioners, that finances significantly influence the performance and sustainability of the CLTS programme. Several studies have revealed that financial resources are positively associated with ODF achievement and sustainability (Delaire *et al*., 2022; Nicoletti *et al*., 2022; Odagiri). Thus, the achievement and sustainability of the ODF status is dependent on available financial resources. CLTS has been found to be cost effective over time because of the zero-subsidy principle, yet, funds are required for effective implementation (training of field facilitators, natural leaders, follow-ups) and sustainability (construction of improved latrines, post ODF follow-up etc.) of CLTS outcomes (Cha *et al*., 2020; Radin *et a*l., 2020). For instance, the findings of a study conducted by Delaire *et al*. (2022) revealed that wealthier households were more able to reconstruct and build durable latrines than poor households.

Furthermore, post-ODF follow up has been recommended by several researchers, yet, it is seldom done because of the financial constraints of the local government after implementing organisations have finished up. Similarly, records indicate that communities are unable to move up the Sanitation Ladder because of a lack of financial resources to construct improved latrines (Cameron *et al*., 2019; Israel & Shapiro, 2021; Ntaro *et al*., 2022). Accordingly, researchers have advocated sustainable financial mechanisms that can enable governments to provide funds for post-ODF activities and the poor within the communities (Kohlitz *et al*., 2019; Murakwani *et al*., 2022; Radin *et al*., 2020; Trimmer *et al*., 2022).

Financial mechanisms for sanitation, proposed by Kohlitz *et al*. (2019) include community-wide support (the rich in society help the needy, or the community mobilises to construct latrines for the poor), targeted in-kind subsidies, vouchers and financial or material rebates. Targeted subsidy for the poor through the use of vouchers has been found to yield significant latrine coverage in Asia, India, Bangladesh and sub-Saharan Africa (Nicoletti *et al*., 2022; Trimmer *et a*l., 2022). Murakwani *et al*. (2022) maintained that, when financial support was integrated into CLTS intervention in Zimbabwe, not only did it increase sanitation coverage but many people were able to afford the cost of materials and construction of toilets. While Odagiri *et al.* (2017) advised national governments to provide a free flow of financial resources to aid improved latrine constructions, Murakwani *et al*. (2022) appealed to implementers to consider providing financial support as an add-on to the CLTS programme to

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aid sustainable activities post-ODF. However, there is a dearth of evidence for the association between financial support and behavioural change regarding sanitation.

2.3.3 The influence of effective tools (techniques and activities) on improved performance and sustainability of the CLTS programme

Effective techniques are the activities and strategies used by implementers during implementation and post-implementation stages of the CLTS programme. While implementation activities include pre-triggering (e.g. selection of communities), triggering (e.g. transect walk) and post-triggering activities (e.g. follow-up), post-implementation techniques are post-ODF activities, as contained in the CLTS handbook and discussed in Section 2.2.2. Effective techniques are essential for raising awareness and stimulating a sense of responsibility and community-wide behavioural change towards sanitation. Although researchers have indicated that achievement and sustainability of ODF are dependent on these activities and techniques, they have scarcely been explored (USAID, 2018; Venkataramanan *et al*., 2018). The most cited study is one that was carried out by Sigler *et al*. (2015). In this study, the researchers sought to identify the activities that were carried out by organisations that were implementing the CLTS programme across 10 countries, and found that the organisations employed all the activities contained in the CLTS handbook together with new activities initiated based on experience. Sigler *et al*. (2015) indicated that the most frequently used techniques were triggering and post-triggering activities which included: transect walk, defecation area mapping, shit calculation, selection of natural leaders, calculation of health expenses and follow-up. In the same study, when the organisations were asked to rank the activities in order of importance, the practitioners ranked follow-up as the most important activity for the performance and sustainability of ODF after the CLTS programme. This was supported by Cameron *et al*. (2019) who reported that the performance and sustainability of the CLTS programme was positively and significantly influenced by the frequency of follow-ups (Cameron et al., 2019. Similarly, Tribbe *et al*. (2021) found that post-ODF follow-up carried out by active NLs significantly influenced the sustainability of ODF status in rural Ghana and Cambodia.

Other activities that have been found to influence the improved performance and sustainability of the CLTS programme include: training of NLs, ODF declaration and certifications, establishing CLTS committees, and raising of signboards (Crocker *et al*., 2017;

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Venkataramanan *et al*., 2018). For instance, selection and training of NLs was found to influence the achievement and sustainability outcome significantly in Ghana and Ethiopia (Crocker *et al*., 2017). It is noted that information about effective activities is mixed, as revealed in a review by USAID (2018) that transect walk had no direct impact on the people of Cambodia but succeeded in creating disgust and shame among the people of Kenya. Although researchers continue to explore effective activities, the focus has been on ODF achievement and sustainability and not on behavioural change which is a major determinant of sustainability.

2.3.4 The influence of contextual factors on improved performance and sustainability of the CLTS programme

The role of environmental, technical, and institutional factors in the implementation of CLTS cannot be under-estimated. These factors have been found to have a significant impact on the success of the CLTS programme. Environmental factors, such as accessibility, socio-economic conditions, and enabling environments have been identified as important predictors of CLTS performance (Stuart *et al*., 2021). Utilising high-resolution datasets about these factors can help to target CLTS activities for the most favourable contexts (Stuart *et al.,* 2021). Apanga *et al*. (2022) highlighted the importance of an enabling environment, where access to latrine materials, social capital and homogeneity influence the performance and sustainability of ODF status.

Technical factors, including the availability of technical support, affordable and durable sanitation facilities and construction materials, access to water supply have also been found to affect the implementation and sustainability of CLTS (Fallatah, 2021; Sakas *et al*., 2022). Lack of technical factors, poor environmental conditions and lack of responsibility from institutions have resulted in OD reversion. While the primary focus of CLTS is community mobilisation, technical factors, such as the design and sustainability of sanitation systems, are crucial for the successful implementation and long-term effectiveness of sanitation programmes (Cameron *et al*., 2019; Davis *et al*., 2019; Hashemi, 2020).

Institutional factors, such as educational cultures and contextual and conceptual factors, have been reported as challenges when implementing CLTS (Fallatah, 2021). These factors can create constraints and hinder the successful implementation of CLTS programmes (Fallatah,

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2021). Overall, understanding and addressing these environmental, technical, and institutional factors are crucial for the effective implementation of CLTS programmes. By adapting CLTS to local environments, considering contextual feasibility, and addressing challenges related to materials, facilities, and educational cultures, CLTS programmes can be embedded better in local practices and achieve desired outcomes.

2.3.5 The influence of motivation and commitment on improved performance and sustainability of the CLTS programme

Reeve (2018) defined motivation as an internal condition that drives change in the self or the environment. Reeve (2018) indicated further that motivation is the drive that energises a person or community to change a behaviour or achieve a goal. Usually, motivation can either drive someone to act or not. Cavil *et al.* (2015) classified motivation as a sustainable social and behavioural change that can either influence or affect latrine adoption (new norm) and sustained ODF behaviours. Kouassi *et al*. (2023) found motivation to be crucial in the acceptance and continuation of the new norm (behavioural change in sanitation) brought about by the CLTS programme. The CLTS programme creates a demand for change in sanitary behaviour through construction and use of latrines in a certified ODF community. For this demand or new norm to be sustained, communities must be motivated or satisfied with the new norm, and their satisfaction will lead to commitment that will enhance latrine rebuilding, signifying potential sustainability of the new norm (Mosler *et al*., 2018).

According to Venkataramanan *et al*. (2018), communities are motivated by several factors in achieving and sustaining their ODF status. The results of a review of the effectiveness of the CLTS programme by Venkataramanan *et al*. (2018) revealed improved health, dignity and pride as universal motivators that motivate communities to achieve and sustain ODF. Based on the results of a study about what motivates communities to achieve and sustain sanitary and hygienic behaviours, Malima *et al.* (2022) identified an increase in social status, comfort and the need for safety and privacy as the main motivational factors driving the rural communities in Tanzania to achieve and sustain the desired behaviours. Similarly, Mishra *et al.* (2021) and Kouassi *et al*. (2023) found understanding of health benefits, dignity and availability of water for construction and reconstruction of latrines as being motivation to sustain sanitary behaviours in rural Burkina Faso and Mali. Other motivational factors that drive communities to sustain their ODF status in rural communities in Ghana and Zimbabwe include: disgust,

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shame, available construction materials, technical and social support, and financial resources (Asantewaa-Tannor *et al*., 2021; Delaire *et al*., 2022; Murakwani *et al*., 2022). However, practitioners and researchers still grapple with how these motivational factors affect or influence behavioural change in sanitary behaviours, and the CLTS programme in general.

Motivation without commitment to change in sanitary behaviour or a new social norm can result in reversion and, subsequently, contribute to a sustainability challenge. Thus, commitment is paramount in the success of implementation and sustainability of the CLTS programme. Apanga *et al*. (2022) found that governments and community leaders that often show high levels of commitment towards the CLTS intervention, have more ODF regions and communities that are sustained. For instance, countries, such as Ethiopia, Cambodia, Nepal and India, whose governments were committed to national sanitation campaigns using the CLTS programme, have not only increased sanitation coverage, but have significantly reduced OD practices (Sakas *et al*., 2022; UNICEF/WHO, 2019). Although this evidence exists, evidence of how motivation and commitment affect or influence behavioural change is limited. Meanwhile, advocates of the CLTS programme continually advice local governments to show high-level political commitment in order to enhance the sustainability of behavioural change in sanitation practices since communities are likely to commit to behavioural change in sanitation practices when they see the commitment and involvement of governments in the provision of sanitation.

2.3.6 The influence of ownership on improved performance and sustainability of the CLTS programme

Ownership of CLTS is crucial to sustainability because the programme is highly sponsored by donors and advocates of sanitation. According to Cameron *et al*. (2019), the scaling up the CLTS programme requires local government to take ownership from donors, and community leadership to take ownership from local governments. According to the programme developers, CLTS requires the support of both institutional and community leadership for its sustainability, and this support can only be given when institutions and communities own the approach and its gains (Kar & Chambers, 2008). Ownership of a CLTS programme includes responsibility, commitment and involvement of local government and communities towards the planning, implementation and sustainability of the programme and its outcomes (Sakas *et al*., 2022). Although there are sparse results regarding the association between ownership and behavioural

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change, it is noted that the CLTS programme has caused the sanitation sector across developing countries to receive strong support from government and community leadership which previously was not the case (Tribbe *et al.*, 2021). The results of a study by Sakas *et al.* (2022) revealed that local government leadership that owned the CLTS programme showed high-level commitment and responsibility towards ODF achievement and sustainability by providing a sufficient number of local government staff for field work, logistics and budgeting for CLTS activities. Similarly, it was reported by UNICEF (2019) that the districts that were ranked at the top of the National League Tables in the Northern regions of Ghana (Nandom and Tatale Sangul), showed strong ownership and innovative leadership which translated into high numbers of ODF communities being achieved. For instance, while the district chief executive of Tatale Sangul ensured that funds were made available for CLTS activities, including logistics for field facilitators, the chiefs and queen mothers of Nandom districts ensured that every household constructed a toilet.

Moreover, the findings of several studies indicate that those who own latrines are likely to use, maintain and rebuild them (Harter *et al*., 2018; Orgill-Meyer *et al*., 2019). For instance, Harter *et al*. (2018) showed a strong association between latrine ownership and latrine rebuilding among the people of Mozambique. Similarly, Crocker *et al.* (2017), associated latrine rebuilding with change in sanitary behaviours in Ghana and Ethiopia. This is an indication that ownership fosters behavioural change which is needed to sustain and maintain sanitation practices in the long term. However, there is scarce evidence for the association between ownership and behavioural change that drives sustainability.

2.3.7 The influence of law enforcement on improved performance and sustainability of the CLTS programme

Law enforcement comprises application of sanitation by-laws in the form of fines and sanctions being administered to defaulters of ODF behaviours (Tribbe *et al*., 2021). Sanitation by-laws provide a form of legal framework for regulating and enforcing sanitation standards (Mensah *et al.*, 2022). In Ghana, the MMDAs are responsible for enacting and enforcing sanitation by-laws. It is noted that lack of compliance to sanitation by-laws has resulted in Ghana being listed among the dirtiest and most OD populated countries (Mensah *et al*., 2022). As part of the requirements for attaining ODF in terms of the CLTS approach in some countries, including Ghana, communities are encouraged to establish sanitation by-laws, usually in the form of fines and sanctions, to punish defaulters of ODF (Kar & Chambers, 2008; USAID, 2018). Also, the

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by-laws, especially sanctions, are shifts in social norms that are expected to lead to a sustained, community-wide change in behaviour through an immediate rebuilding of latrines after collapse or improvement of previous latrines (USAID, 2018). Sanctions can take the form of either mocking or shaming, threats, and coercion, and fines can either be in cash or kind (Delaire *et al*., 2022; Venkataramanan *et al*., 2018).

However, the findings regarding fines and sanctions remain mixed. While the findings of a suite of studies have shown significant associations between sustained latrine use, coverage, sustainability and sustained behaviour change in sanitation practices (immediate response by households to rebuild latrines after collapse (Israel & Shapiro, 2021; Mishra *et al*. 2021; USAID, 2022), others found them not to be statistically significant (Delaire *et al*., 2022; Kouassi *et al*., 2023). For instance, communities with committed leaders were found to apply a system of fines and sanctions that yielded high sustainability of sanitation gains in Northern Ghana (Israel & Shapiro, 2021). Coercion and threats led to latrine construction and poor use in Nepal and Bangladesh. Sanctions and fines created high tension in community-based decision autonomy which led to the exclusion of the poor in the community (Kouassi *et al.* (2023; Venkataramanan *et al*., 2018). Similarly, in Cambodia, threats resulting from fines and sanctions resulted in inconsistent latrine use and coverage (USAID, 2022).

This confirms the on-going debate about the use of fines and sanctions as a community empowerment strategy. While human rights activists consider the use of shame and mocking as an infringement of the right to sanitation, Bartram *et al*. (2012), Venkataramanan (2016), and Bateman and Engel (2018) demand that CLTS advocates should consider the poor and the marginalised in the enforcement of the sanitation by-laws to avoid punishing the marginalised for their poor circumstances. Efforts should be made to ensure that law enforcement activities are conducted in a manner that builds trust and maintains positive community relationships (Vigh *et al*., 2020; Yeboah-Antwi *et al.*, 2019). Meanwhile, available records indicate that, even though most ODF communities have these by-laws, they hardly apply them because of a lack of committed leaders and frequent collapse of latrines (Delaire *et al*., 2022).

2.3.8 The influence of behavioural change on improved performance and sustainability of the CLTS programme

Researchers have often linked behaviour change resulting from CLTS to communities progressing up the Sanitation Ladder, rebuilding and consistent use of latrines, a community's

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willingness to pay for sanitation, latrine ownership, a community's acceptance and continuation of a new social norms i.e. no OD (Harter *et al.*, 2018; Kouassi *et al.*, 2023; Sakas *et al.*, 2022). These attributes could only be achieved through change in the mindsets and attitudes of the people, or sustained behavioural change. There is wide consensus among practitioners and implementers that CLTS has been effective in changing the mindsets of people across many developing countries (Zuin *et al*., 2019). Zuin *et al*. (2019) reported further that available evidence from countries such as Bangladesh, Nepal, Ethiopia and Indonesia, clearly shows that CLTS has been able to change the mindsets of the people to regard OD as an unacceptable social practice.

Behavioural change is driven by several factors. One significant determinant of behavioural change, often cited in literature, is knowledge of health benefits associated with the CLTS programme (Cameron *et al.*, 2019). The CLTS programme uses participatory techniques, such as the transect walk, and feco-oral pathway, to highlight the effects of OD as well as the benefits of latrine construction and use (Harter *et al*., 2019). These activities, in a sense, generate knowledge and make communities aware of how they are eating and drinking each other's faeces. The knowledge acquired in CLTS includes software (impacts of OD on health) and hardware (skill in toilet construction). The results of the first impact evaluation studies, conducted by Crocker, Saywell and Bartram (2017), showed that training offered to NLs provided available technical support in the communities, and this was significant in achieving and maintaining ODF status and the sustainability of the CLTS programme in general. The evidence of behavioural change in CLTS is when communities move up the Sanitation Ladder. According to Robinson and Gnilo, (2016) communities can only progress up the Sanitation Ladder when they have the acquired technical skills to move from simple latrines to improved latrines. This is supported by the revelation that available technical support, combined with the willingness of the community to move up the Sanitation Ladder, has been found to influence CLTS sustainability significantly (Sakas *et al.*, 2022) . Also, Delaire *et al.* (2022) asserted that communities with access to technical support are likely to move up the Sanitation Ladder and also sustain their ODF status. However, it is argued that knowledge alone is not enough to bring about behavioural change. Reference is made to previous sanitation approaches, such as PHAST, that provided knowledge and awareness but failed to bring about behavioural change in sanitation (Venkataramanan, Hueso *et al*., 2018).

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Furthermore, motivation and commitment of local and government leadership, post-ODF follow-up, adequate financial support, political will and CLTS prioritisation by government have also been found to affect latrine coverage and consistent use, which have a direct impact on sustainability (Sakas *et al*., 2022; Tribbe *et al*., 2021). Reference is made to the Government of India, who made it a priority, through sanitation campaigns (Total Sanitation Campaign (TSC) and "Swachh Bharat Mission-Gramin (SBM-G)"), to increase latrine coverage which has resulted in long-term, sustained behavioural change in sanitation practice (Mishra *et al*., 2021; Orgill-Meyer *et al*., 2019). Similarly, Novotný, Humňalová *et al*. 2018) found high latrine coverage in Ethiopia, resulting from the high political commitment exhibited by the government. Conversely, lack of financial support has resulted in high levels of slippage in certain communities in Ethiopia.

A broad spectrum of CLTS critics argued that CLTS has shown more short-term than long-term successes in behavioural change (Kouassi *et al*., 2023). It is argued that behavioural change does not occur instantaneously and spontaneously, as the proponents of CLTS claim, but over time (Galvin, 2015). Furthermore, Ficek & Novotný (2019), disclosed that disgust and shame that lead to spontaneous collective action diminish over time, resulting in unsustainable behavioural change. In addition, Ngambut and Kapakado (2018) found that CLTS has not been oriented towards the expected behaviour change, resulting in rapid reversion. Meanwhile, studies about the factors that enhance long-term sustainability of change in sanitary behaviours are limited. For sustained behavioural change, one significant factor that is often mentioned in literature, is post-ODF follow-up which is seldomly carried out (Venkataramanan *et al*., 2018).

The above debate regarding the behaviour change associated with CLTS makes it more relevant to evaluate the factors that influence behavioural change that are likely to translate into improved performance and sustainability of the programme. While several studies have been conducted about behavioural change and health impact, little has been done regarding behavioural change, performance and sustainability. Through a conceptual framework, the relationship between behavioural change and sustainability of the programme could be established.

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2.3.9 Improved performance and sustainability of the CLTS programme

Improved performance and sustainability of the CLTS implementation programme is crucial for achieving the United Nations' Sustainable Development Goals and improving public health (Stuart *et al*., 2021). Sustainability is broadly defined as the continuation of a programme's outcomes after all forms of assistance have ceased (UNICEF, 2015). In the CLTS context, this means the capacity of a community to progress up the Sanitation Ladder, from eliminating open defecation (OD) to maintaining and upgrading sanitation facilities (Kar & Chambers, 2008). The desired outcomes range from tangible achievements like latrine ownership to broader constructs such as the likelihood of sustained behavioural change (USAID, 2018). Central to sustainability of CLTS are its foundations in the pillars of sustainability, including economic, environmental, social, and human dimensions (Purvis *et al*., 2019). For WASH interventions, these pillars extend to encompass financial, institutional, technical, social, and environmental factors (UNICEF, 2018).

It is suggested in the literature that several factors must be considered when studying the long-term sustainability of the CLTS programme. Foremost is the quality of its implementation, which is fundamentally influenced by factors such as the facilitator's attitude and the supportive role of institutions (Kar & Chambers, 2008; Zuin *et al.*, 2019). Effective implementation also hinges on community participation, the quality of the triggering process, and consistent follow-ups (Venkataramanan *et al*., 2018). External factors, including the socio-political and physical environment, also play a role, intertwined with community norms and social capital (Cameron *et al.*, 2019; Kouassi *et al*., 2023). It is noted that the role of subsidies in assessing the long-term sustainability of the CLTS programme is a contentious factor. For instance, while subsidies motivated communities to construct durable latrines in Ghana, they dampened communities' morale to construct latrines in Indonesia (Ficek & Novotný, 2019; Stuart *et al*., 2021). Furthermore, positive results have been shown based on long-term impact evaluations of CLTS campaigns in increasing the demand for household latrines and raising awareness of the social costs of poor sanitation (Orgill-Meyer *et al*., 2019). In essence, ensuring the long-term success and sustainability of CLTS demands a thorough understanding of CLTS foundational principles, contextual nuances, and strategic implementation.

While several drivers of long-term sustainability of the CLTS programme have been identified, empirical evidence of the factors is limited (USAID, 2018; Venkataramanan *et al*., 2018).

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In the few empirical studies, usually either one or two of these drivers are explored in a single study. For instance, the few CLTS studies conducted in Ghana provided evidences of short-term sustained behavioural change of sanitation practices such as the coverage, use, repair and maintenance of latrines (Crocker, Saywell & Bartram, 2017; Delaire *et a*l., 2022; Morris & Shapiro, 2021; Tribbe *et al*., 2021). The results of a study conducted by Delaire *et al.* (2022) two-and-half years after programme intervention, showed that wealthier households were likely to use and reconstruct latrines after collapse. The findings suggest that long-term sustainability of the CLTS could be influenced by financial factors. Similarly, Tribbe *et al*. (2021) evaluated community conditions underlying CLTS sustainability in Ghana and Cambodia 18 months after CLTs intervention and found latrine coverage and use to be influenced by active traditional leaders and commune-level leaders, regular follow-ups and financial support. In all these studies, short-term sustainability of the CLTS programme was evaluated using one or two drivers of sustainability. However, the conclusions of most short-term sustainability studies suggest the need of further studies on factors likely to influence long-term sustainability of the CLTS programme and its gains. Therefore, it is imperative to develop a framework that would include several drivers of sustainability that are likely to aid the longevity of the programme's outcomes.

2.4. Overview of literature and the associated gaps

Evidence shows that the CLTS intervention is widely implemented by donors and NGOs with little support from governments who have adopted the programme (Zuin *et al*., 2019). Sigler *et al*. (2015) highlighted a wide range of activities carried out by these organisations. However, the study did not include the effects of these activities on the sustainability of the CLTS programme. Meanwhile information about the influence of CLTS activities on the effectiveness and sustainability of the CLTS programme are mixed. While some researchers advise implementers to place more emphasis on pre-triggering and post-triggering activities, others insist on intensification of post-implementation activities and sustained behavioural change in sanitation practices (Augsburg *et al.*, 2022; Kouassi *et al*., 2023).

CLTS sustainability studies have provided evidence of behavioural change in sanitation practices sustained in the short-term, such as the use, repair and maintenance of latrines (Crocker *et al*., 2017; Delaire *et al*., 2022). The findings of a study conducted two-and-half years after programme intervention by Delaire *et al*. (2022) showed wealthier households were

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likely to use consistently, repair and reconstruct latrines after collapse. The findings suggest that long-term sustainability of the CLTS could be influenced by financial factors. However, it is argued that financial support could have negative effects on behavioural change and hinder long-term sustainability (Bongartz *et al*., 2016; Tribbe *et al.*, 2021). Similarly, Tribbe *et al*. (2021) evaluated community conditions underlying CLTS sustainability in Ghana 18 months after CLTs intervention and Cambodia and found latrine coverage and use to be influenced by active traditional leaders and commune-level leaders, regular follow-ups and financial support. Findings from the study by Tribbe *et al*. (2021) included only the role of community dynamism without considering the dynamism among implementers. Therefore, some researchers recommend that, for effective implementation and behavioural change sustained in the long term, the CLTS programme should not be used as a stand-alone intervention (Venkataramanan *et al*., 2018; Crocker *et al*., 2017). Meanwhile, researchers continue to provide lists of drivers of sustainability but fail to demonstrate how these factors influence the sustainability of the CLTS programme. The present study is intended to fill these gaps by providing lists of organisations implementing CLTS in Ghana, their activities, and effects of the activities on the sustainability of the CLTS programme. A framework that includes several drivers of sustainability factors would be beneficial to implementers and policy-makers alike. In order to answering the research questions and filling the gaps identified, the related literature was reviewed to cover all the specific objectives, as shown in Table 2.3.

Table 2.3: Breakdown of literature review with regards to research objectives

Literature review section	Objectives				
	1	2	3	4	5
Emergence and spread of the CLTS programme (Section 2.2)	×	×	×		×
The impact (Performance) of the CLTS programme (Section 2.3)		×	×	×	×
Sustainability of the CLTS programme (Section 2.4)		×	×	×	×
Hybrid CLTS (Section 2.5)	×	×	×	×	×
Rural sanitation interventions in Ghana (Section 2.6)	×	×	×	×	×
The conceptual perspectives of the study (Section 2.7)		×	×	×	×

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2.5. Chapter Summary

In the chapter, the CLTS programme and the activities carried out at each stage were discussed. The impacts of the programme and its associated problems were also discussed. In addition, the contentious issues surrounding the sustainability of CLTS, and its influencing and hindering factors, bringing to fore the gaps in the body of knowledge, were revealed in the chapter. Finally, the conceptual perspective and the hypothesis of the study were presented in this chapter. The research methodology, design, approach and strategy used to address the research gaps are presented in the next chapter.

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CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This chapter contains information about the methodology adopted to achieve the aim of this study. The application of the research onion framework is discussed, which includes the research philosophy, approaches to theory development, choice of methodology, the research strategy, the research time horizons, data collection and analytical processes. Integrating the research objectives, validity, reliability and generalisation, and ethical considerations are also discussed. In this chapter the choices made at every stage of the research process are explained and justified.

Several methodology terms are used in this chapter and the definitions of these terms as they are used in this thesis are as follows.

- **Focus group discussion**: a technique where a researcher assembles a group of individuals to discuss a specific topic (Nyumba *et al*., 2018: 21).
- **Questionnaire:** an instrument used to gather facts and opinions from respondents by using a written document including a list of questions distributed to the respondents (Johannesson & Perjons, 2021: 70).
- **Interview:** a communication session between a researcher and a respondent, in which the researcher controls the agenda by asking questions to the respondent (Johannesson & Perjons, 2021: 70).
- **Central tendency:** a measurement of mean, median and mode (Robson & McCartan, 2015: 419).
- **Content validity:** the degree to which an instrument or measuring device (questions in a questionnaire) adequately addresses the research questions or problem under investigation (Saunders *et al*., 2019: 517).
- **Cross-case analysis:** an analysis that involves an examination of more than one case; this can be either a variable-oriented or case-oriented analysis (Babbie, 2020: 386).
- **Variable-oriented analysis:** describes and/or explains a particular variable (Babbie, 2020: 386).
- **Descriptive statistics:** portray an accurate profile of people, events, or situations (Saunders *et al*., 2019: 162). A basic form of descriptive statistics displays parts of a data sample through tables or charts (Johannesson & Perjons, 2021: 70).

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- **Explanatory research:** is used to establish causal relationships between variables. The emphasis is on studying a situation or problem to explain the relationships between variables (Saunders *et al*., 2019: 162).
- **Face validity:** shows agreement that a scale or question logically appears to measure accurately what it is intended to measure (Saunders *et al*., 2019: 803).
- **Indicators:** variables that are used to gauge concepts that are more abstract and less quantifiable directly (Bryman *et al*., 2021: 93).
- **Latent variables:** cannot be directly observed; they represent a common feature that explains the variance shared by the observed variables, whereas the unique factor accounts for the unique variance of each observed variable (Mindrila, 2017: 4).
- **Measures of variability:** the extent to which the data values in a set of scores are tightly clustered or relatively widely spread out is a second important feature of a distribution for which several indices are in use. Variability includes range, mean deviation, variance, and standard deviation (Robson & McCartan, 2015: 419).
- **Multivariate analysis:** the analysis of the simultaneous relationships among several variables. Examining simultaneously the effects of age, gender, and social class on religiosity would be an example of multivariate analysis (Babbie, 2020: 437). The analysis involves the application of statistical methods that simultaneously analyse multiple variables (Hair, 2017: 2).
- **Observed variables:** any attributes that can be directly measured (Mindrila, 2017: 4). They are often called factor loading/observed/measured variables, manifest variables, or surface attributes.
- **Population:** a complete group of people or set of cases or elements from which a sample is taken (Saunders *et al*., 2019: 294).
- **Purposive sampling:** a type of non-probability sampling in which the units to be observed are selected based on the researcher's judgment about which units will be the most useful or representative. It is also called judgmental sampling. (Babbie, 2020: 193).
- **Qualitative analysis:** a method for examining social research data without converting them to a numerical format. It is a non-numerical examination and interpretation of observations to discover underlying meanings and patterns of relationships (Babbie, 2020: 385).

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- **Quantitative analysis:** a numerical representation and manipulation of quantitative data (Babbie, 2020: 417).
- **Research methods:** the techniques and procedures used in the collection and analysis of data (Saunders *et al*., 2019: 4).
- **Saturation:** occurs in purposive sampling when the addition of more units does not result in new information that can be used in theme development. Saturation is the general rule used for purposive sampling, (Bryman *et al*., 2021: 300).

3.2 The Application of the Research Onion Framework

Palić *et al.* (2016: 9) defined research as "creating a new knowledge" whereas Fellows and Liu (2015: 4) described research as a "voyage of discovery whether or not something is discovered". Fellows and Liu (2015: 4) argued further that whether a discovery is made or not in research is dependent on several factors such as beliefs (paradigm) or views, research philosophy, methodological choice, research strategy, duration of the study, context and environmental factors. Generally, there are three approaches to research, namely: qualitative, quantitative and mixed methods (Creswell, 2014: 31). However, according to Creswell (2014: 31), these approaches are underpinned by the basic philosophical assumptions the researcher brings to the study, procedures of inquiry (research design) and specific research methods. In addition, Creswell (2014: 31) argued that the selection of these approaches is dependent on the nature of the research problem,. Therefore, a researcher must choose an extant framework that can help to translate the approach to a research problem into practice (Creswell, 2014: 34).

The "Research Onion", developed by Saunders *et al*. (2019: 130) was the framework adopted for this study. According to Saunders *et al*. (2019: 130), the research onion offers the researcher an opportunity to choose a robust research methodology because it was developed based on the three distinct research philosophies (beliefs and assumptions), namely: epistemology, ontology and axiology that underpin research. Therefore, a researcher must have more information and understanding of these philosophies to serve as a guide in developing the research questions, selecting the research methods (procedures and processes) for data collection and analysis, and interpreting the findings (Berryman *et al.*, 2019: 2), and these are discussed in the next section.

3.2.1 Ontology, Epistemology and Axiology

Social role-players are concerned about their existence and the reality of their world. The nature of this reality and how this reality is generated into knowledge are the general assumptions

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regarding ontology and epistemology, respectively. Therefore, the general assumptions made to understand "the nature of reality" are referred to as ontology, and the assumptions about what constitutes valid, legitimate and acceptable knowledge about the nature of reality, and how it can be created, measured and communicated are called epistemology (Saunders *et al*., 2019: 133). Ontology is the researcher's response to the question: "what is reality?" and is focused on what can be known about the phenomenon being studied, while epistemology, is the researcher's response to the question: "how can reality be known?", and is also concerned with how the world can be studied by indicating assumptions and processes required in obtaining knowledge of the world (Bryman *et al*., 2021: 66).

There are two stances in ontology, namely, objectivist and subjectivist stances, where "objectivism" refers to the stance that human beings or social role-players are concerned with their existence, and "subjectivism" refers to the view that social phenomena are produced by perceptions and subsequent behaviours of social role-players who are concerned about their existence (Creswell, 2014: 37). Epistemology, on the other hand, involves the debate about the nature of knowledge, and the extent to which something can be true (Greener & Martelli, 2015: 41). Epistemology shapes ontological assumptions because what can be known (ontology) is measured by procedures and processes of how it can be known (epistemology). For instance, a positivist's assumption leads to quantitative measurements that result in objective findings and generalisability (Saunders *et al*., 2019: 134). In addition, Hathcoat *et al*. (2019: 101) indicated that ontological and epistemological positions serve as a navigation system by which the researcher can find direction through knowledge development processes. Therefore, a researcher must have some level of knowledge and understanding of ontological and epistemological issues because they can shape the methodological and interpretative decisions of the researcher (Hathcoat *et al*., 2019: 100).

Axiology refers to the roles of values and ethics in obtaining knowledge about the nature of reality (Saunders *et al*., 2019, p. 134). It includes issues such as how researchers interact with their values and the values of the participants of the study. Similar to epistemology and ontology, the axiological issues affect the findings and interpretation of the results. For instance, Saunders *et al*. (2019: 133) indicated that a subjectivist researcher is often value-bound, whereas an objectivist researcher is often value-free. Therefore, Saunders *et al*. (2019: 9) argued that researchers must be able to articulate their values in order to provide credible judgements and interpretations of the research conducted. Thus, a researcher must be

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able to produce credible findings by acknowledging and understanding their values in the collection, analysis and interpretation of data and findings. The research onion, developed by Saunders *et al*. (2019), which was underpinned by these three distinctive assumptions, is discussed in the next sections.

3.2.2 The research onion

The research onion presented in Figure 3.1 illustrates a step-by-step approach to examining the research philosophy, approach, methods, strategy, time and data collection, and analysis. The research onion has six layers. The first or outer layer of the framework includes the types of research philosophy, namely: positivism, interpretivism, post-modernism, critical realism and pragmatism. The pragmatists believe that there are more approaches to examining the nature of reality and assert that a researcher can use different assumptions, multiple methods and worldviews in a single study (Saunders *et al*., 2019: 181). Based on the research problem and the practical solution the researcher sought to find, together with the procedures and values needed to find the solution, a pragmatic worldview was adopted for the present study. The second layer of the research onion provides the approaches to theory development, namely: deductive, inductive and abductive approaches. While deductive research starts from general (general observations seeking pattern) to specific (theorising the patterns), inductive moves from specific observations to more general theories. Abductive research on the other hand, combines both deductive and inductive research approaches in a single study where the data may be collected to explore a phenomenon, identify patterns and themes, and the themes used to develop conceptual framework that can be tested to build a new theory or modify an existing one. The abductive approach allows the use of both quantitative and qualitative approach in a single study where the researcher may choose to collect qualitative data on a phenomenon or using an existing theory and use the results obtained to conduct a quantitative survey to test qualitative findings. Most researchers have associated the abductive approach with the pragmatic philosophical stance, but Creswell (2014: 62) argued that, depending on the research problem, and the availability of relevant literature about the problem under investigation, the researcher has the liberty to adopt any of the approaches. Based on this premise, the abductive approach was adopted for this study such that qualitative data was collected on the CLTS phenomena from stakeholders and beneficiaries, and the findings used to develop a conceptual framework which was tested through quantitative survey. The methodological choices available to a researcher include: mono-method quantitative, mono-method qualitative, multi-method quantitative, multi-method qualitative, mixed-methods simple and mixed-methods

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complex, and these are presented in the third layer of the research onion. The methodological choice often associated with the pragmatic worldview is mixed-methods, which integrates both qualitative and quantitative approaches in the same study (Saunders *et a*l., 2019: 181) and, so, the simple mixed-methods was adopted for this study. Peeling away the methodological choice gives way to the fourth layer of the research onion, called strategy, and this includes case study, surveys, grounded theory, ethnography, action research experiment and archival research. Although these strategies can be underpinned by either single or multi-research philosophies, a researcher is at liberty to use one or more strategies in creating a research design (Sahay, 2016: 5). However, the researcher adopted survey and case-study strategies that allowed the researcher to collect and analyse both quantitative and qualitative data for this study. Since all researches are time-bound, the fifth layer of the research onion is the time horizon, indicating that research can be either cross-sectional or longitudinal.

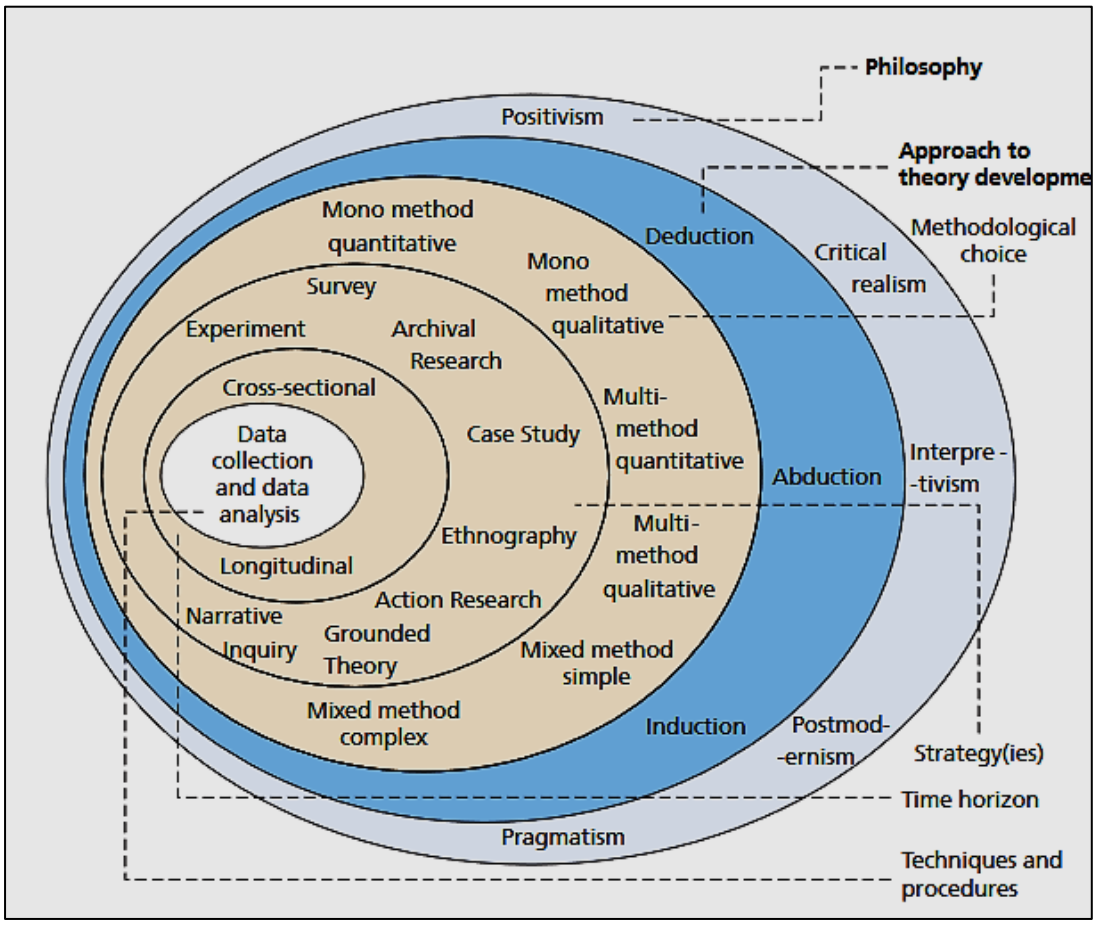

Figure 3.1: The research onion

Source: Saunders et al. (2019: 130)

Given the time frame of the present study, the cross-sectional time horizon was adopted. Lastly, the core of the research onion framework, which is the sixth layer, includes data collection and

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analytical techniques. The data collection techniques chosen for this study included interviews, focus group discussions, observation and questionnaires, and these were analysed using thematic and statistical analysis. A summary of the structural layers adopted for the research is presented in Table 3.1.

Table 3.1: Designed structural research layers developed from the research onion framework.

S/N	Saunders's structural research layers	Research components adopted
1	Research Philosophy	Pragmatism
2	Approach to theory development	Abductive approach
3	Methodological choice	Mixed-methods research approach
4	Research strategy	Case study and survey research
5	Research time horizon	Cross-sectional
6	Research techniques and procedures	Semi-structured interviews, observations, focus group discussions for case studies, and self-administered questionnaires for survey research

3.3 The Research Philosophies

According to Mauthner (2020: 76), research philosophy refers to the theories regarding "the nature of the reality" under investigation, and how knowledge can be created and justified from this reality. Furthermore, Saunders *et al*., (2019: 130) defined research philosophy as a set of beliefs and assumptions regarding knowledge development. Similarly, Žukauskas *et al.*, (2018: 121) defined research philosophy as a system of thoughts (assumptions) with which a discovery or reliable knowledge is developed. Thus, research philosophy is the development of knowledge based on a system of assumptions and beliefs, and this invariably is what researchers do when they embark on research. Moreover, Saunders *et al.* (2019: 130) pointed out that a thoughtful and reliable set of assumptions will create a sound research philosophy that will form the foundation upon which a researcher will choose the methodology, research design and strategy, data collection methods and analysis procedures towards knowledge development. This statement is confirmed by Creswell (2014: 34), and Greener and Martelli, (2015: 43), as they reiterated that the philosophical worldview that a researcher adopts will

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dictate the choice of research design as well as methods, techniques and procedures for data collection and analysis.

In summary, Crossan (2015: 47) enumerated three important reasons why a researcher should explore and adopt a philosophical stance before adopting a methodological choice for a particular study: 1) to assist in refining and specifying the methods for a study; 2) to assist and enable a researcher to evaluate methods and methodologies to avoid inappropriate limitations that might undermine the study; and 3) to help a researcher to be more innovative and creative in selecting a suitable method for a study. Accordingly, Saunders *et al.* (2019: 130) advised researchers to explore critically and understand the various philosophical stances in order to choose one that can guide the research, and also lead to the achievement of the aim of the research. In this study, the purpose of the research was to evaluate the performance and sustainability of the CLTS programme in Ghana and, after critically exploring the various philosophical stances, as suggested by Saunders *et al*. (2019: 130), the researcher adopted the pragmatic research philosophy for the study.

Pragmatism is broadly defined as a research philosophy that provides a framework for questioning and evaluating ideas and beliefs in terms of how they perform in the real world (Kelly & Cordeiro, 2020: 2). This definition is supported by Morgan (2014: 16) and Žukauskas *et al.* (2018: 121). The pragmatic research philosophy is flexible because it can be adapted to any social science research regardless of the methodological choice (Morgan, 2014: 16). In addition, it is the only philosophy that is amenable to different worldviews and assumptions, multiple methods, as well as different procedures for data collection and analysis (Creswell, 2014: 40; Creswell & Clark, 2018: 84). Thus, pragmatists believe that there are multiple answers to every real-life problem, especially when building a conceptual foundation on a real-life practice (Saunders *et al*., 2019: 181). In addition, the pragmatic approach allows a researcher to combine both deductive and inductive approaches through abductive thinking by mixing both quantitative and qualitative approaches in a single study (Bryman *et al*., 2021: 66; Creswell & Clark, 2018: 88).

A significant feature of the pragmatic worldview is that it allows the researcher to place the problem at the centre of inquiry Creswell (2014,: 40); Žukauskas *et al*., (2018: 123) by looking at the "what" and " how" to solve the research problem by linking all methodological decisions to the research questions (Creswell, 2014: 40; Leavy, 2017: 168). Accordingly, a pragmatic

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researcher focuses on the practical reality of the research and, therefore, focuses on "what works" in the real world of practice to solve a particular research problem. This statement is supported by Creswell and Clark (2018: 87) and Saunders *et al*. (2019: 123).

In this study, the purpose of the research was to identify practical solutions to improve the performance and sustainability of the CLTS programme in Ghana because sanitation coverage was still low (4% increase from the year 2000 to 2019) in rural communities in Ghana, after more than a decade of adopting and implementing the CLTS programme. After clearly defining the research problem, the research objectives were formulated from the research questions which followed from the defined research problem to assist in achieving the aim of the research. Based on the assumptions underpinning the study, the survey strategy and the simple mixed-methods approach, with more emphasis on the exploratory sequential mixed-methods approach, were considered to be appropriate for the study.

However, according to Žukauskas *et al*., (2018: 130), every research study has four main aspects, namely: the research aim, research design/model, theoretical perspective and the research questions, as illustrated in Figure 3.2. The inter-relatedness of these four elements, as applied to this study, depicted how the performance and sustainability of the CLTS programme could be improved to increase sanitation coverage in Ghana. Through semi-structured interviews with the programme practitioners and implementers, observations and focus group discussions with CLTS beneficiary communities, and a self -administered questionnaire, data were collected, statistically analysed, and used to develop an improved performance and sustainability framework for the CLTS programme.

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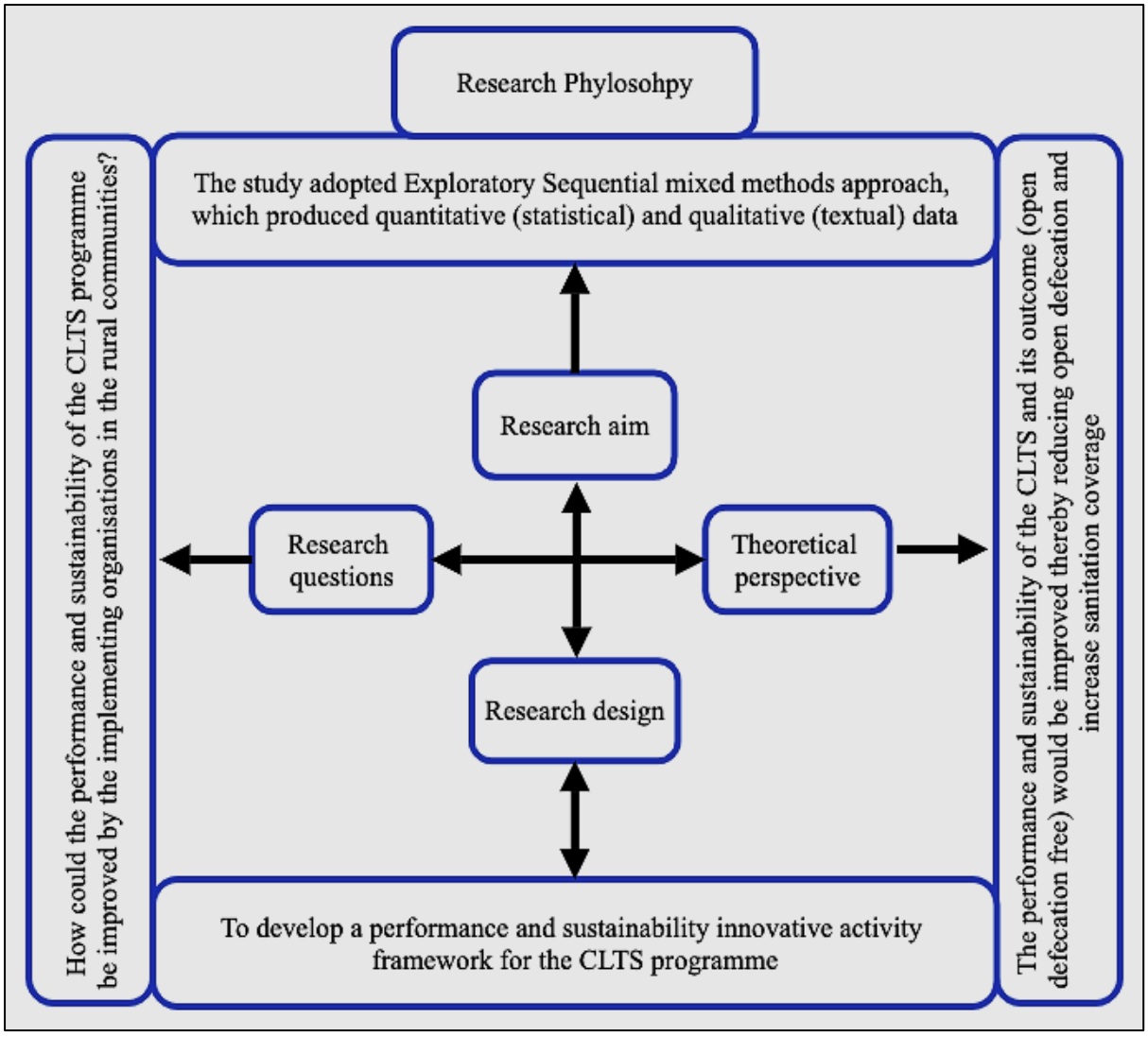

Figure 3.2: Four main aspects of research philosophy

Source: Adapted and modified from Žukauskas et al. (2018: 130)

3.4 Approach to Theory Development – Abductive Approach

Saunders *et al*. (2019: 27) stated that, although a researcher might or might not explicitly mention the theory that underpins the research design framework, it is often made clear in the presentation of findings and conclusions. Accordingly, Saunders *et al*. (2019: 27) advised researchers to include theory in the research design, since the theory is considered to be a set of guiding principles/procedures that apply to a particular case, circumstance, phenomenon or observation (Cohen *et al*., 2018: 70). Saunders *et al*. (2019: 130) showed that there are three approaches to theory, namely: deduction, abduction and induction (see Figure 3.1 in Section 3.2.2). A researcher may either apply induction or deduction or combine both in a single study. Thus, by combining deductive and inductive approaches in a study, the researcher is using the

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abductive approach. This means that the researcher combines inductive and deductive approaches through abductive thinking (Bryman *et al.*, 2021: 66; Creswell & Clark, 2018: 88). Accordingly, the abductive approach was adopted for this study.

The abductive approach to theory includes the collection of data to explore a phenomenon by collecting data to generate themes, identify patterns and develop a framework or theory, and test the theory or framework through subsequent data collection (Saunders *et al.*, 2019: 153). While the former part of the abductive theory employs the principles of the inductive approach, the latter employs the deductive principles of the theory. Moreover, logically, abductive inference is based on known premises to generate testable conclusions that allow for generalisation from the interaction between the specific and general (Saunders *et al.*, 2019: 153). Thus, the abductive approach allows the researcher to work either from specific to general (inductive approach) or general to specific (deductive approach). However, the fundamental import of adopting the abductive approach is its iterative nature that allows the researcher to shift back and forth between literature and the social world to provide the best interpretation of data (Bryman *et al.*, 2021: 65).

According to Bryman *et al.* (2021: 65) and Saunders *et al.* (2019: 153), an abductive approach allows the researcher to formulate research questions from a well-defined problem and collect data that lead to the formulation of a hypothesis, development of a framework and testing the framework by collecting and interpreting another set of data. On this premise, the researcher formulated a primary research question from the aim of the study, being: How is the CLTS being implemented to perform and sustain its outcomes in the rural communities in Ghana? To be able to answer this research question, secondary questions were developed from which the specific objectives were formulated. With the adoption of the pragmatic philosophy, combined with the flexibility of the abductive approach, a simple mixed-methods approach was adopted which allowed the researcher to collect qualitative data through semi-structured interviews, focus group discussions and direct observations. The qualitative data were thematically analysed, and the results were used to develop a performance and sustainability conceptual framework, hypotheses, and a questionnaire which was used to collect quantitative data to test the hypotheses and the framework. The selection of the approach to theory paved the way for the selection of a research methodology. Therefore, the overall plan governing the study is presented in the next section.

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3.5 Choice of Methodology

The methodology is a theory of how the inquiry should proceed. Research methodology was described by Berryman (2019: 273) as an overall plan for studying a research question or phenomenon that is consistent with epistemology and ontology. According to Creswell and Clark (2018: 88), research methodology means the process of conducting research. Creswell (2014: 45), and Creswell and Clark (2018: 85) indicated further that the research methodology provides the detailed procedures of data collection and techniques of analysis, and the interpretation of a study that a researcher proposes. There are several research methodologies available to a researcher, as shown in Figure 3.1. However, the choice of methodology that a researcher makes is influenced by the research philosophy and the research problem (Creswell, 2014: 45).

In this study, a simple mixed-methods (MM) approach was adopted. Mixed-methods as a research methodology encompass philosophical assumptions that direct the processes of analysis of data collected from several sources in a single study (Dawadi *et al*., 2021: 4). The mixed-methods approach has been described as an approach that integrates both qualitative and quantitative data rigorously collected and analysed in response to research questions with either the qualitative data influencing the quantitative data or vice versa in a single study (Bryman *et a*l., 2021: 131; Creswell & Clark, 2018: 48; Dawadi *et al*., 2021: 4; Leavy, 2017: 9). The mixed-methods approach is useful because it:

- provides a comprehensive understanding of the phenomenon being studied because of the integration of open-ended qualitative data and closed-ended quantitative data collected in response to research questions (Creswell, 2014: 265; Leavy, 2017: 9);
- allows researchers to use multiple views, all relevant available techniques and instruments, and multiple methods to address a research problem in a single study (Creswell & Clark, 2018: 54);
- offers new insight and rich knowledge in answering complex research questions and phenomena that cannot be answered with a single approach (Creswell & Clark, 2018: 53);
- allows researchers to harness the strengths that off-set the weaknesses in both quantitative and qualitative approaches (Creswell & Clark, 2018: 53);
- allows researchers to combine inductive and deductive approaches through abductive thinking (Creswell & Clark, 2018: 54);

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- Allows researchers to develop an effective, rigorous and refined conclusion by using the results of one method, for instance, using qualitative results, to strengthen or shape the results of the quantitative method (Dawadi *et a*l., 2021:5).

The MM approach has undergone several classifications but the most prominent is the parsimonious, three-core, mixed-methods design, namely the explanatory sequential design, the exploratory sequential design, and the convergent design created by Creswell and Clark (2018: 121), as shown in Table 3.2. According to Creswell and Clark (2018), these three core designs provide a logical framework that guides the implementation of the research processes and leads to the achievement of high-quality and rigorous data collection and analysis (Creswell & Clark, 2018: 121). Table 3.2 indicates further that, upon adopting a particular design, a researcher should be able to justify its appropriateness to the research problem.

The researcher adopted the exploratory sequential mixed-methods design (ESMM) for this study because this design helps in the generation of new variables or factors that might not be available in the literature (Creswell and Clark, 2018: 123). In addition, ESMM designs are useful if the researcher intends to evaluate an intervention or a phenomenon being used. CLTS is an intervention that is being implemented solely to end open defecation and, hence, the researcher's choice of design was appropriate. In this study, the researcher first collected qualitative data through semi-structured interviews with experts (practitioners) and implementers of the CLTS intervention. Aided by the information gathered from the experts, the researcher conducted focus group discussions and direct observations in CLTS beneficiary communities. The data were transcribed verbatim, as explained by Flick (2018: 375). The themes and factors emanating from the verbatim transcribed data are presented in Chapter 4. The researcher used the themes and factors that resulted from qualitative data to develop the questionnaire, with a five-point Likert Scale, which was self-administered by the experts and implementers of the CLTS programme, to collect the quantitative data for this study, as presented in Chapter 5. The quantitative data were used to confirm the conceptual framework developed from the qualitative data. The type of data collected is dependent on the research strategy employed and, so, the research strategy is discussed in the next section.

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Table 3.2: Description of the three-core mixed methods design

Type of mixed-methods design	Description of MM Design
Convergent Design	A design where a researcher collects both quantitative and qualitative data, analyses them separately or merges the results and compares findings to validate one set of findings from the other or to identify the ways the findings converge or diverge (2018: 122).
Explanatory Sequential Design	This design involves two distinctive phases, where a researcher can first collect and analyse quantitative data, and use the results to collect qualitative data in phase two to explain or expand the quantitative data collected in phase one (2018: 122).
Exploratory Sequential Design	This design involves two distinctive phases. where the researcher first collects and analyses qualitative data and then develops survey instruments to collect quantitative data based on the qualitative results (2018a: 123). This was adopted for the study.

Source: Adopted and modified from Creswell and Clark (2018: 122-123)

3.6 Research Strategy

According to Bryman *et al*. (2021: 77), research strategy means the overall orientation or general research approach adopted that reflects the methodological assumptions in conducting research. Johannesson and Perjons (2021: 53) described a research strategy as an overall plan that guides a researcher in planning, executing, and monitoring the study. From the research onion, developed by Saunders *et al*. (2019), as shown in Figure 3.1, there are several research strategies but the type of strategy a researcher chooses is dependent on the research questions and objectives, the amount of existing knowledge in that field, the extent of time resources and available to the researcher, and the philosophical views of the researcher (Saunders *et al*., 2019: 163). Accordingly, Johannesson and Perjons (2021: 53) advised researchers to be careful to adopt a strategy that is suitable for answering the research questions under consideration, as well as fulfilling all ethical obligations.

The researcher adopted a case-study and survey strategy as the most appropriate research strategies for this study, See Figure 3.3. Through the case-study and the survey strategies, qualitative and quantitative data were collected, respectively. Using direct observation, semi-structured interviews, and focus group discussions, the qualitative data was collected from key

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informants including WASH experts (practitioners) and implementers, and beneficiary communities of the CLTS programme. Subsequently, using a self-administered questionnaire, quantitative data were obtained**.**

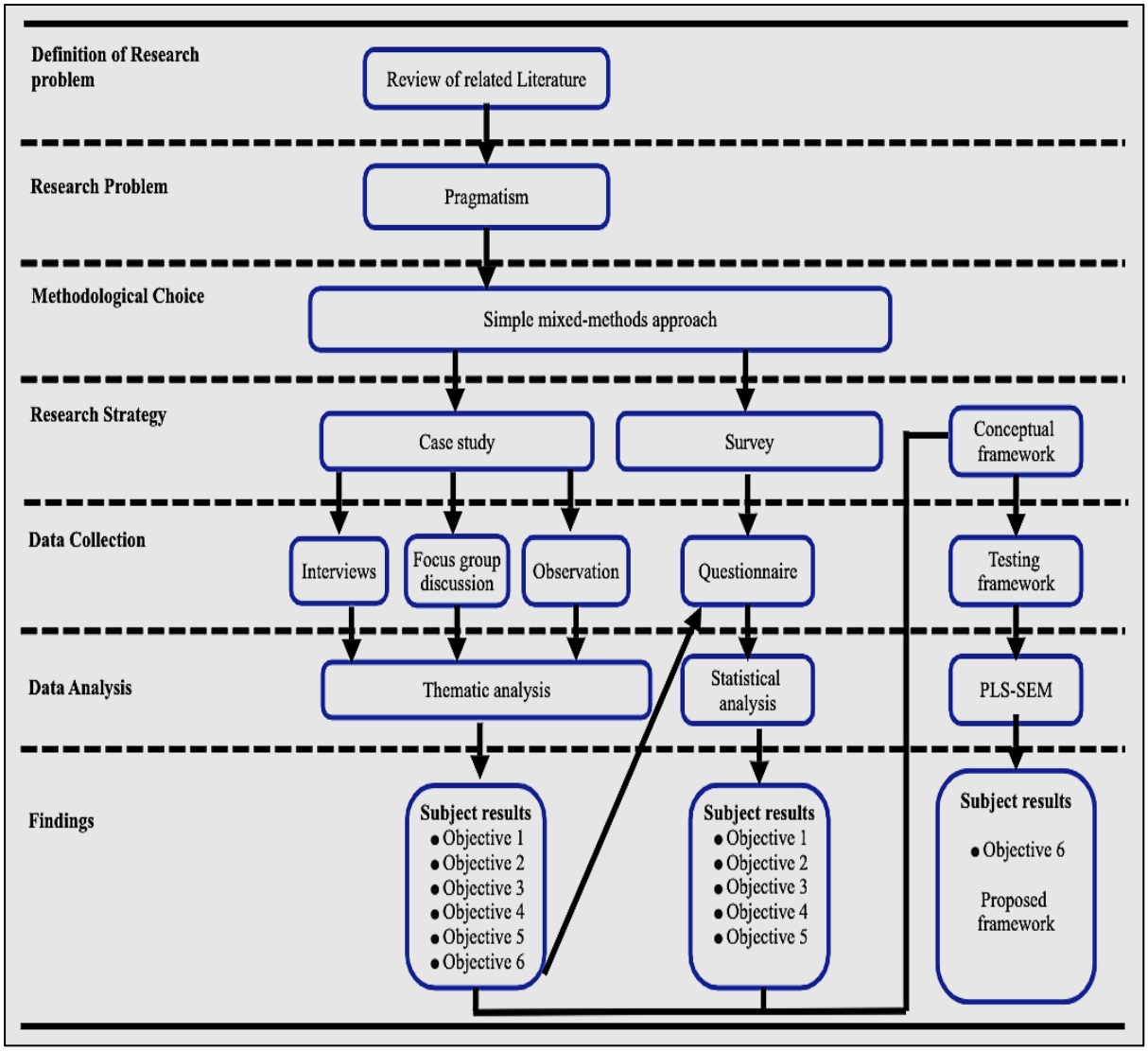

Figure 3.3: Research design

Source: Researcher's construct

3.6.1 Case studies and their descriptions by regions

Fellows and Liu (2015: 115), and Johannesson and Perjons (2021: 59) described a case study as a strategy that offers an in-depth investigation of a particular instance (single case) or instances (multiple cases) of a phenomenon in a single study. Thus, a case study strategy offers the researcher the opportunity to investigate single or multiple cases in a single study (Fellows & Liu, 2015: 115; Johannesson & Perjons 2021: 59). However, cases must be selected carefully

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to obtain either a similar (literal) or contrasting (theoretical) results (Yin, 2018: 91) In summary, Johannesson and Perjons (2021: 53) stated that case study is usually focused on:

- contemporary phenomena;
- single case or multiple cases;
- providing in-depth information (as much detailed information as possible about a particular case being studied is gathered);
- natural setting or context (a case is not different from its context and so should be studied in its natural environment);
- relationship and processes (an instance should be studied holistically taking into consideration all relationships and processes in its natural setting);
- multiple sources of data collection and techniques and methods (in-depth information can be collected using multiple data collection techniques and methods).

Therefore, a case study is viewed as being a complex strategy, as it is used to investigate multiple factors, events, and relationships that occur in the real world. However, Johannesson and Perjons (2021: 53) asserted that a researcher should be well informed about the choice of case or phenomenon to be investigated by clearly defining the research questions to be answered. Therefore Yin (2018: 32) provided the following three key ways that might guide a researcher in choosing a case-study strategy because the choice of a strategy influences the method selected:

(1) When research questions begin with “how” or “why”,
(2) When there is little or no control over behavioural events.
(3) The focus of the study is a contemporary phenomenon in a natural context.

Accordingly, the researcher adopted a multiple case study, as shown in Table 3.3 and Figure 3.4, to aid in obtaining qualitative data and similar results based on the following:

- CLTS is a contemporary phenomenon/intervention that is implemented in regions with different settings, cultures, weather conditions, and behaviours, with the sole purpose of ending open defecation in rural communities in Ghana. Also, the complexity of the

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CLTS phenomenon requires diversified views from practitioners, managers and benefactors of the intervention.

- The intervention is being implemented by both governmental and non-governmental agencies in the rural communities, and the researcher had no control over the behaviour of the experts and implementers of these organisations and community members, nor over the implementation processes or the possibility of manipulating the variables used in assessing them.
- The purpose was to understand the CLTS phenomenon and obtain in-depth primary data from multiple data sources which comprised practitioners, implementers and beneficiaries of the programme in the real-life context where boundaries between the context and phenomenon are unclear, and variables are uncontrollable.
- The various regions were treated as multiple case studies.
- Although the research questions for this study, presented in Chapter 1 did not necessarily begin with "how" or "why", the research still qualified as a case study because it fell in the last two categories. Furthermore, the study proffered in-depth answers to the following research questions: (1) Which organisations are responsible for the implementation of the CLTS programme in Ghana? (2) What are the activities carried out by the organisations implementing the CLTS programme in Ghana? (3) How do these activities influence the performance and sustainability of the CLTS programme? (4) What are the factors that influence and affect the performance and sustainability of the CLTS programme in Ghana? (5) What can be done to improve the performance and sustainability of the CLTS programme in Ghana?

Table 3.3: Description of multiple case-study projects

Case study number	Case study description
Case Study 1	Northern region (Savannah, Northern and North-East)
Case Study 2	Central Region
Case Study 3	Upper East
Case Study 4	Upper West
Case Study 5	Volta
Case Study 6	Oti

Source**:** Researcher's Construct

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Figure 3.4: Location of Cases in Ghana

Source: Researcher's Construct

Description of the cases by region

The study was carried out in eight regions as shown in Table 3.3 above. The selection of the regions was based on four reasons, which include: high prevalence of OD GSS (2022), implementation of CLTS began in these regions (Mariwah, 2017; Mariwah *et al*., 2022; Tsekpetse-Akuamoah *et al*., 2022; UNICEF, 2015: 2), high numbers of ODF recorded over the past decade, and CLTS gains are more effective and sustainable in certain settings (Cameron

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et al., 2019; Crocker *et al*., 2016; Guiteras *et al*., 2015). Administratively, Ghana is made up of 16 regions which are made up of metropolitan, municipal, and district assemblies (MMDAs). The regions, as well as the MMDAs, are responsible for the provision of sanitation for urban and rural communities.

Nationally, sanitation is a major problem, such that traces of OD can be found in all the 16 regions. In 2012, when CLTS was completely adopted, the regional variations of OD were: Upper East (81.9%), Upper West (78.7%), Northern, Savannah and North-East (72.9%), Volta and Oti (30.8%) and Central (18.1 %) (Ntow, 2012). Recent data on sanitation from the population census undertaken in 2021 still shows high levels of OD in the regions with 5 regions recording more than 50%, including the regions listed above, even though implementation began in them (GSS, 2022: 59). Through the programme, several communities have been declared and certified as ODF (Stuart *et al*., 2021). However, little is known about the long-term sustainability of these ODF communities across the 16 regions. Meanwhile, sustainability has been a major challenge of the CLTS programme. Since these regions differ in terms of economic activities, population, cultural beliefs, psychological and context specific factors, it is imperative to evaluate the performance and sustainability of the programme across the regions to determine how the ODF communities are sustaining their status. The Eight regions presented in six cases are described below.

Case 1: Northern Region

Until 2018, the Northern Region was the largest region in Ghana. The region was divided administratively into three regions, namely: Northern, Savannah and North East, after a referendum in 2018. At the time of data collection for this study, the available data about ODF communities covered the three regions. Therefore, the three regions were treated as one case because they have similar culture, beliefs, economic, psychological and contextual factors, as indicated by (Abubakar, 2018; Alhassan & Anyarayor, 2018; Appiah-Effah *et al*., 2019; Novotný, Hasman *et a*l., 2018). For instance, the findings of a study by Appiah-Effah *et al*.(2019) revealed that some communities in the Northern Region believed that toilets are surrounded by evil spirits, and so refused to use latrines provided for them. Again, the population census carried out in 2020 showed that OD is prevalent in these regions, with Savannah Region recording the highest percentage of 68.5% (population and districts, GSS, 2022: 59). Meanwhile, reports indicate that the Northern Region increased its percentage coverage of ODF communities from 61.4% in 2020 to 62.6% in 2021, after the adoption of the

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CLTS programme in the region (population and districts, 2021). Although records indicate that none of the districts in this region is declared ODF, Mion District was identified to be declared ODF as far back as 2015 (UNICEF, 2015: 2).

The population of the three regions was 2,310,939. The principal economic activities of the people in these three regions include agriculture, hunting, and forestry. Thus, the informal sector employs approximately 84% of the people in the region. According to Delaire *et a*l. (2022), the majority of the people in these regions lives below 1 dollar per day. The region experiences perennial drought as well as flooding in the dry and rainy seasons, respectively. The soil type in the Northern Region is stable for farming and toilet construction.

Case 2: Central Region

The Central Region is one of Ghana's 16 administrative regions, with a population of approximately 2,859,821 and a population density of 220/km^2 (580/sq. mile). It is bounded to the north by the Ashanti and Eastern Regions, to the west by the Western Region, to the east by the Greater Accra area, and to the south by the Gulf of Guinea. The Central area is well known for its numerous, prestigious, higher education institutions, as well as an economy centred on an abundance of industrial minerals and tourism. Many tourist attractions, such as castles, forts, and beaches, can be found along the Central Region's coastline.

The Central Region is an educational powerhouse, having some of the greatest schools in the country. The primary economic activities are salt mining and fishing along the coast (the region accounts for 40% - 45% of all fish landings in Ghana). Fish farming is another profitable enterprise for individuals wishing to invest in the region. The Central Region features lagoons in addition to the sea, making fish farming a notable feature along the region's shore. This business provides an enormous opportunity for investors since it has the capacity to sell fresh and preserved fish to neighbouring nations. The hinterland rain-forest regions are excellent for large-scale oil palm, cocoa, citrus, and pineapple production, although gold mining is prevalent in Upper Denkyira, notably in the Offin river basin.

According to the regional news of Friday 17 June 2022, only 248 out of 3630 communities in Central Region are declared open defecation free. The number represents 14% of the communities that have access to decent toilet facilities in the region. Yet, 11.7% still practice OD (GSS, 2022: 59)

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Case 3: Upper East Region

The Upper East Region, located in Northern Ghana, with a population of approximately 1,301,226, is the third smallest of Ghana's 16 administrative regions. It has a total land area of 8,842 square kilometres, accounting for 2.7% of Ghana's total land area. Bolgatanga, often known as Bolga, is the regional capital of the Upper East. Navrongo, Paga, Bawku, and Zebilla are all important towns in the area. The Upper East Region is located in the northeastern corner of Ghana, bordered to the north by Burkina Faso and to the east by Togo, the Upper West Region to the west, and the Northern Region to the south. It is located between latitudes 10° 30′N and 11°N and longitudes 0°W and 1°W. Each district in the Upper East Region is led by a district chief executive.

Agriculture, hunting, and forestry are the region's principal economic activities. Agriculture employs approximately 80% of the economically active population. Millet, guinea-corn, maize, groundnuts, beans, sorghum, and dry season tomatoes and onions are the principal crops. Production of livestock and poultry is also significant. The Vea Project in Bolgatanga, which covers 850 hectares, and the Tono Project in Navrongo, which covers 2,490 hectares, are the two largest irrigation projects. They employ approximately 6,000 small-scale farmers in total. Other water-holding constructions (dams and dugouts) supply water for both household and agricultural use. The region had been unanimously declared the country's "stronghold of open defecation", with some proud offenders even taking self-photographs while squatting unhidden to expel waste, until the United Nations Children's Fund (UNICEF) in collaboration with Ghana's Ministry of Local Government and Rural Development launched a far-reaching raid to "exorcise the endemic practice from the region". OD is practised by approximately 68.4% of people in the region, despite on-going education about the dangers of open defecation (GSS, 2022: 59).

Case 4: Upper West Region

The Upper West Region of Ghana is located in the north-western corner of Ghana, with a population of approximately 901,502 people. It is surrounded to the east by the Upper East Region, to the south by the Northern Region, and to the west and north by Burkina Faso. Wa is the regional capital and largest settlement in the Upper West. Under the Provisional National Defence Council (PNDC) military dictatorship, the Upper West was established in 1983 by the then head of state, Flight-Lieutenant Jerry Rawlings. The region was formed from the old Upper Region, which is now known as the Upper East Region. It was the youngest region in

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Ghana for approximately 35 years, until the Nana Addo Dankwa Akufo-Addo Government added six additional regions in 2018, raising the total number of administrative regions in the country.

Peasant farming is the major economic activity of the inhabitants in the region. This is backed by agriculture or associated industries employing 72.2% of the economically active population. The region's hardworking farmers grow maize, guinea corn, millet, yams, rice, soya beans, and cotton, in addition to raising a large number of cattle.

Mr Agambire Alhassan Inusah, Monitoring and Evaluation Officer of the Upper West Regional Environmental Health and Sanitation Department, reported that the Region has 65% Open Defecation-Free (ODF) coverage. According to Mr Inusah, 758 settlements in the region have achieved ODF status out of a total of 1,167, yet it recorded the highest OD in the 2020 census (GSS, 2022: 59).

Case 5: Volta Region

Volta Region (or Volta) is one of sixteen administrative regions in Ghana, with Ho as its regional capital. It had a population of approximately 1,659,040 in 2021. The territory is multi-ethnic and linguistic, divided into 25 administrative districts, and includes groups such as the Ewe, Guan, and Akan peoples. The Volta Region occupies the southern half of Ghana's eastern border, which it shares with the Republic of Togo. Greater Accra, Eastern Region in the west, the Oti Region in the north, and the Gulf of Guinea in the south. The Volta Region is located at latitude 3° 45'N and longitude 8° 45'N. It has a total land size of 20,572 square kilometres and spans from the coast of the Gulf of Guinea across all of the country's vegetational zones.

Agriculture has played an important part in the socio-economic growth of the region since being the Gold Coast and, more recently, Ghana. The region's economy is mostly rural and agricultural, employing approximately 74% of the economically active people. Crops, livestock, fisheries, agro-forestry, and non-traditional commodities are the major sub-sectors. The average holding is approximately 0.46 hectares. Cereals, legumes, vegetables, oil trees, root and tubers, pulses, and plantation crops are among the industrial and food crops grown in the region. Nonetheless, the region is provided with lush vegetation that enables the cultivation

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of a diverse range of cattle. Mono-cropping, mixed cropping, and mixed farming are the most common farming techniques.

Chiefs, the media, religious and civil society organisations in the Volta Region have been urged to unite to combat the prevalence of open defecation (OD) in the region. Mr Ben Arthur, Executive Secretary of the Coalition of Non-Governmental Organisations in Water and Sanitation (CONIWAS), noted at a workshop that over 50% of the region's population engages in the practice, with 31% doing so on a daily basis. This was confirmed by the 2020 population census as it revealed that about 21.1% of the populace still practice OD (GSS, 2022: 59).

Case 6: Oti Region

This new region's capital is the ancient town of Dambai, which is located on the eastern bank of the Oti River, a tributary of the Volta Lake. The Republic of Togo borders the Oti Region to the east, the Northern Region to the south, the Volta Region to the west, and the Volta Lake to the west. The population is approximately 747,248 people. The region is divided into eight districts: Kadjiebi, Jasikan, Nkwanta North, Nkwanta South, Krachi East, Krachi Nchumuru, Biakoye District, and Krachi West. The vegetation is primarily grassland, particularly savanna, with clusters of drought-resistant trees just as baobabs and acacias. Farming is the most common land-use and the primary source of income for the majority of people in the Oti Region. This is because of the region's largely rural nature, as well as the region's abundance of natural resources and rich soils.

The Nkwanta North District Assembly was placed first among the Oti Region's eight districts and municipalities in the most recent Open Defecation-Free (ODF) compilation. Kadjebi and Nkwanta South Municipal Assembly were second and third, respectively. Krachi Nchumuru was last, after Biakoye District, Krachi East Municipal Assembly, Jasikan Municipal Assembly, and Krachi West. An assessment of open defecation and efforts to eradicate it through the construction and use of household latrines in the eight Municipalities and District Assemblies for 2022 revealed that the Krachi West Municipality had the highest percentage of people engaged in open defecation, while the Nkwanta North District Assembly, Kadjebi District, and Nkwanta South Municipality had the lowest percentage. In total, the percentage of the populace that practice OD is 40.1% (GSS, 2022: 59).

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3.6.2 Research survey

More often than not, research entails asking questions and receiving responses, or it involves gathering data from participants in surveys of a population or from individuals, using questionnaires, interviews or case studies (Fellows & Liu, 2015: 154). Fundamentally, a research survey is used by researchers to provide a statistical or numerical description of the behaviour or views of an entire population or a sampled population associated with the investigated research problem (Creswell, 2014: 155). Also, a research survey is widely used because it enables researchers to collect a large amount of quantitative data that can be analysed statistically, using descriptive or inferential statistics over a short period (Johannesson & Perjons, 2021: 111). Therefore, Babbie (2020: 250) suggested that a survey strategy is the best strategy for a researcher who is interested in obtaining original data for describing a large populace.

In addition, data obtained using a research survey can be used to produce and test models resulting from the relationships between research variables (Saunders *et a*l., 2019: 163). Moreover, research surveys tend to offer an indication of the prevalence of a phenomenon (Yin, 2018: 294) and, so, are suitable for exploratory and descriptive studies where individuals or groups of people are the units of analysis (Saunders et al., 2019b: 166). Research surveys enable researchers to generalise the findings of their study. Nevertheless, the main concern of survey studies is sampling which is required for the generalisability of findings. Therefore, a researcher must carefully determine the appropriate sample size by using the appropriate sampling techniques (Johannesson & Perjons, 2021: 45).

In this study, a survey strategy was adopted as one of the strategies to assist in:

- exploring a contemporary intervention; CLTS that is being implemented to alter OD behaviours, and formulating the research questions as recommended by Yin (2018: 39);
- obtaining quantitative data from a sampled population, using a self-administered questionnaire comprising closed-ended questions measured on a five-point Likert Scale. Information was sought from selected CLTS implementers, experts, using techniques that provided valuable information from the selected people and beneficiary communities, as suggested by Johannesson & Perjons (2021: 45).

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- Testing a conceptual model or framework resulting from the relationships between research variables (Saunders *et al*., 2019: 163)

3.7 Research Time Horizons

Saunders *et al*. (2019: 130) identified two different time horizons, namely, longitudinal and cross-sectional. A study is said to be cross-sectional when a particular phenomenon (or phenomena) is studied at a specific time (Saunders *et al*., 2019: 176). Thus, a study is commonly called cross-sectional when all measures are taken at the same time or, in practice, over a relatively short period (Robson & McCartan, 2015: 17). It is noted that time horizons are independent of the research strategy or choice of methodology, but a researcher ought to indicate the time horizon of the study (Saunders *et al*., 2019: 176).

The time horizon for this study was cross-sectional because the researcher studied a particular phenomenon within a specific time, and all the measures were taken within the same time in each phase of the research process. The qualitative data collection was done in two phases, such that the semi-structured interviews with the experts and implementers took place between October 2020 and March 2021, and the focus group discussions with the beneficiary communities were conducted between November 2021 and February 2022. The quantitative data to evaluate the conceptual framework were collected through a self-administered questionnaire between 30 June and 11 August 2022. The data collection processes and analysis are presented in the next section.

3.8 The Research Process

A multi-stage process that a researcher must follow to carry out a project or study is referred to as a research process (Saunders *et al*., 2019: 11). The research process includes the layouts of techniques and procedures used to carry out the study. The research process used in this study is shown in Figure 3.5 and is explained according to the research process developed by Saunders *et al*. (2019: 12).

In the first stage, the research problem was clearly defined based on the literature and personal discussion with some CLTS implementers, that the performance and sustainability of the CLTS programme were a major concern to practitioners and implementers (both governmental and non-governmental organisations) of the programme. The research questions, the aim and the

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specific objectives were formulated to address the clearly defined research problem. Subsequently, existing literature that was relevant to the research problem was critically reviewed, leading to the selection and adoption of the research philosophy (pragmatism), the methodology (sequential exploratory mixed-methods) and the research strategies (case study and survey) in the second stage. During the third stage, qualitative data were collected using semi-structured interviews, focus group discussions, and observations which were analysed using thematic analysis. The themes emanating from the analysis assisted in the development of an improved performance and sustainability framework, and a structured questionnaire was pilot-tested using some selected practitioners and implementers of the CLTS programme. The questionnaires were self-administered face-to-face and electronically, using WhatsApp and emails, to obtain the quantitative data. In the last and final stage, the quantitative data were analysed statically using descriptive and exploratory analysis to test the framework, which was the main aim of the study. The conclusions were drawn and the recommendations for future studies were made from the findings, and the project report was written and submitted.

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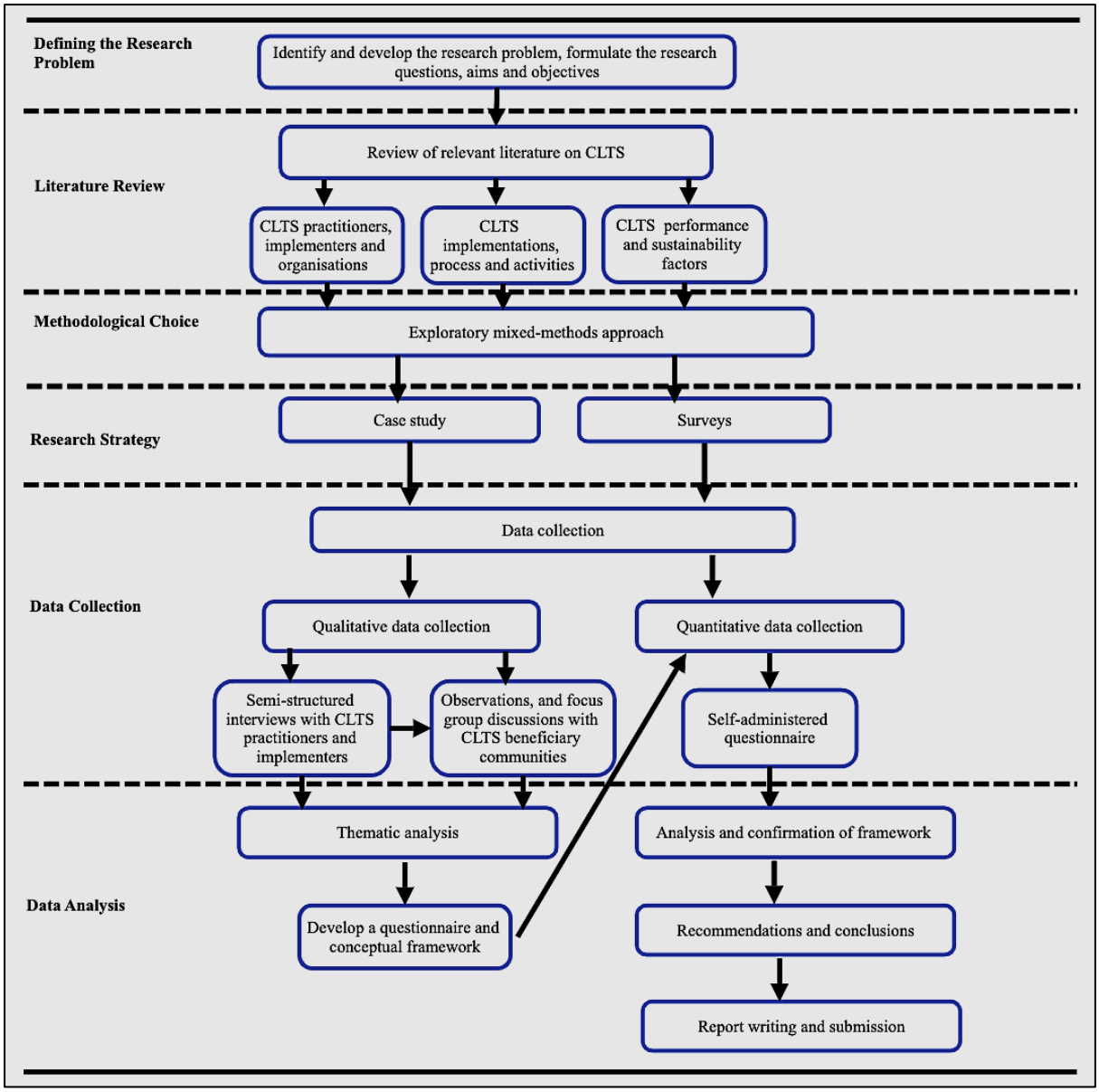

Figure 3.5: Research process

Source: Researcher's construct

3.9 Data Collection Process

Data collection is the thrust or most critical part of an empirical research project, so it is not surprising that Saunders *et al*. (2019: 130) presented it at the core of the research onion. Data collected about any phenomenon under investigation in any empirical research can be in two forms, namely, primary and secondary data. Data collected can be numeric, called quantitative data, or textual, called qualitative data (Johannesson & Perjons, 2021: 55). Secondary data are collected from existing literature found in journals, documents, reports, repositories, conference papers and books. On the other hand, primary data are usually collected using data

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collection techniques such as interviews, focus group discussions, observations and questionnaires, as explained in Sections 3.8.1.1. to 3.8.1.4).

In this study, the secondary data were collected from journals, documents, reports, repositories conference papers or books in the field of study. The secondary data collected helped in identifying gaps in the literature, which led to the development of research questions, aims and objectives of the study. The primary data were collected using qualitative and quantitative data collection techniques, including interviews, focus group discussions, observations and questionnaires, respectively, which were necessitated as a result of the nature of the research questions, the choice of methodology (sequential exploratory mixed methods) and the research strategy (multiple case study) adopted for the study.

3.9.1 Data collection techniques

Data collection techniques are often described as instruments employed in obtaining data for an empirical research project. Regardless of the data required, a researcher is likely to use either qualitative or quantitative data collection techniques or both (Johannesson & Perjons, 202: 55; Saunders *et al*., 2019: 121). It is often helpful for a researcher to use both in a single study to allow for triangulation leading to accurate and rigorous results (Johannesson & Perjons, 2021: 55). However, the type of data collection technique used by a researcher is based on the choice of methodology and the research strategy adopted for the study. In this study, the sequential exploratory mixed-methods approach adopted required the collection of qualitative and quantitative data, hence, the use of both techniques. Informed by the case study strategy adopted, the qualitative data were collected using semi-structured interviews, focus group discussions and direct observations. Similarly, the survey strategy adopted necessitated the collection of quantitative data which were obtained through questionnaires. The various data collection techniques used in this study are discussed in the next sections.

3.9.1.1 Interviews

Interviews were conducted for this study because they enable the researcher to gather sensitive and complex information, opinions, and experiences, and to elicit emotions and attitudes of the respondents, as reported by Johannesson & Perjons (2021: 59). Furthermore, through the interviews, the researcher was able to obtain insightful and in-depth information from respondents about the problem under study, as indicated by Johannesson & Perjons (2021: 59). Thus, the aim of the interview was to obtain concrete information about the modalities

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and sustainable activities undertaken by organisations implementing the CLTS programme in Ghana.

In this study, the researcher conducted semi-structured interviews (SSIs) specifically with experienced practitioners and implementers of the CLTS programme, as explained by Johannesson & Perjons (2021: 59). The researcher commenced the SSIs after ethical clearance was obtained from CUT (See Appendix A4). An interview guide (see Appendix A1) was developed by the researcher to facilitate the interviews (Bryman *et al* 2021: 357; Flick, 2018: 237). The interview guide contained a cover letter and the main questions which included both open-ended and close-ended questions. The cover letter requested the consent of the interviewees and an assurance of their confidentiality, as explained by Bryman *et al*. (2021: 396). In addition, the researcher reassured respondents of their confidentiality and privacy at the start of every interview session.

As stated earlier, the researcher developed an interview guide, using themes obtained from relevant literature, which was pre-tested with selected experts and implementers of the CLTS programme. The guide which contained both open-ended and close-ended questions was sent to the interviewees a day or two before the interview to prepare them ahead of time so that the researcher could draw from the rich and insightful perspectives and opinions of the respondents. In addition, during the interviews, the researcher furnished the interviewees with the background of the study in order to gain their informed consent for involvement in the study and to obtain appropriate responses. Also, intermittently, the researcher repeated the responses of the interviewees to confirm their responses, as stated by Flick (2018: 238).

The researcher conducted SSIs between October 2020 and March 2021, across eight regions of Ghana, with experts and implementers of the CLTS programme from both governmental and non-governmental organisations by phone, face-to-face, and using Zoom, which lasted between 45 and 60 minutes. The interviewees were sampled using purposive and snowballing sampling techniques because only participants with knowledge about the CLTS programme were required for the study. A total of 26 participants (which fell within the sample size required for interviews, as indicated by Bryman *et al* (2021: 230) were interviewed with seven face-to-face (P1, P2, P5, P6, P7, P8, and P9), two via zoom (P3 and P4) and the rest over the telephone (P10 to P23) because of long-distance and Covid -19 restrictions, as shown in Table 4.1 in Section 4.1.1. All interviews were recorded on a SMART phone (with permission

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from the interviewees), which were later transcribed verbatim and analysed thematically. The interviews were terminated when saturation was reached, as suggested by Bryman *et al* (2021: 299); Creswell & Clark, 2018: 265); Johannesson & Perjons, 2021" 50). For the purposes of triangulation and confirmation of the information provided by the interviewees, a focus group discussion was conducted at the community level, as discussed in the next section.

3.9.1.2 Focus group discussion

Focus group discussion (FGD) was used to collect data from 25 CLTS beneficiary (ODF) communities across eight regions of Ghana. The FGDs enabled the researcher to explore the perceptions of a group of community members regarding the CLTS programme that led to the attainment of a multiplicity of information on the programme's performance and sustainability within the shortest time at the same location (Krueger & Casey, 2015: 36 - 37). Thus, the FGDs conducted at the community level provided in-depth information from a broad section of the community, and helped in authenticating and triangulating the information provided by the key informants in the SSIs.

A FGD guide was developed by the researcher to assist in the discussion, as suggested by Johannesson & Perjons (2021: 61). The FGD guide consisted of a cover letter and open-ended questions. While the former contained the aim of the study, assurance of confidentiality and the time required for the discussion, the latter consisted of general information about the CLTS programme and the natural leaders (NLs). The researcher provided the cover letter as a form of introduction and to gain the consent of the focus group members for their participation, and to assure them of their privacy, as explained by Bryman *et al*. (2021: 396). Also, the researcher reassured respondents of their confidentiality and privacy at the start of every discussion session.

The researcher served as the moderator in all the FDG sessions, and either a trained FF or NL served as an interpreter or note-taker, especially in places where language was a barrier. For clarity and understanding of the questions in the guide, it was sent to the FF and the NL two or three days before the meeting. The researcher also repeated the questions once or twice to obtain the expected response. The FGDs were conducted face to face between the researcher and the community members (males and females) with a note-taker, as recommended by Flick (2018: 254) in 25 rural communities across eight regions in Ghana, between November 2021 and February 2022. A total of 8-10 people participated in each group (including men and

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women, landlords, landladies and tenants who were involved in the CLTS processes) and each discussion lasted between 45 and 70 minutes. The FGD allowed each participant to contribute freely and willingly to the issues relating to the CLTS phenomenon without fear or intimidation (Flick, 2018: 254). The FGDs continued until a point of saturation was reached, when there was no new information obtained (Flick, 2018). All the FGDs were recorded with permission from the participants. The recordings were transcribed verbatim and the themes that emerged were analysed thematically, as explained by Bryman *et al.* (2021: 469). The names of the communities were coded to protect their confidentiality and anonymity (see Table 4.5 in Section 4.2.3). For the purposes of authenticating the status of the communities, the researcher conducted direct observations in the beneficiary communities.

3.9.1.3 Direct Observation in Beneficiary Communities

According to Flick (2018, p. 314), observations help the researcher to generate first-hand information based on what they see, feel, and hear because they were personally there. Given this, the researcher carried out direct observations in beneficiary communities to complement the SSIs and FGDs, and for authenticating the ODF status of the communities and the triangulation of information obtained, as suggested by Bryman *et al*. (2021) and Flick (2018). The researcher developed an "observation schedule or checklist" (Appendix A2) based on the national ODF verification and certification protocol (Revised Protocol for CLTS verification and certification, 2013) which formed the basis of observation, as explained by Johannesson & Perjons (2021, p. 61). The Checklist was based on the ODF certification and verification protocol because a community is verified and declared ODF upon meeting the requirements enshrined in the protocol, and also, the performance and sustainability of the programme are always evaluated regarding the ODF status of the beneficiary communities.

The researcher went around the community with the NLs and the FFs in a bid to observe the environment and to check on previous OD sites and the pit latrines, either before or after the FGD in the beneficiary communities. The observational study was necessary because it provided the researcher with direct evidence regarding the ODF status of the communities, as shown in Table 4.5 in Section 4.2.3.

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3.9.1.4 Questionnaire survey

In empirical research, questionnaires are associated with survey strategy, where questionnaires are typically used as a data collection instrument (Johannesson & Perjons, 2021: 55; Saunders *et al*., 2019: 383). Saunders *et al*. (2019: 382) described a questionnaire, conceived and designed by Sir Francis Galton, as a data collection technique in which respondents answer the same set of pre-determined questions in a standardised manner. Questionnaires were used in this study because they enabled the researcher to collect data from a large group of people for the quantitative analysis within the shortest possible time (Saunders *et al*., 2019: 383). According to Saunders *et al*. (2019: 384), questionnaires can be in two forms, namely, self-administered questionnaires (where respondents complete questionnaires themselves) and interviewer-administered questionnaires (where the researcher/interviewer assists the interviewee to answer the questions). (Saunders *et al*. (2019) indicated further that self-administered questionnaires can be administered electronically via the internet, using email and social media (WhatsApp, Facebook etc.), post, delivery and collection, and these are made easier with the development of software applications such as Google Forms, Survey Monkey, and Zoomrang because they provide links that can be sent to respondents to complete. Accordingly, in this study, a self-administered questionnaire was developed, following the guidelines, as suggested by Saunders *et al*. (2019: 384). The questionnaire consisted of a cover letter and four sections; A, B, C and D. The cover letter contained the purpose of the survey, statement of confidentiality (privacy) and the time for completion of the questionnaire. This was done to gain the informed consent of the respondents for their participation and to assure them of their anonymity, as explained by Bryman *et al*. (2021: 396). While Section A was about general information for statistical purposes, Section B was about factors affecting sustainability, Section C was about factors affecting implementation or performance, and Section D was about the most frequently used activities and strategies used during implementation of the programme. The questionnaire consisted of closed-ended questions measured on a five-point Likert Scale, where 1 represented strongly disagree, 2 represented disagree, 3 represented neutral, 4 represented agree and 5 represented strongly agree for section B. The Sections C and D were measured using a five-point Likert Scale, where 1 represented very important, 2 represented important, 3 represented neutral, 4 represented less important and 5 represented not important.

The questionnaires were self-administered, face-to-face, on phones (WhatsApp platforms) and in emails. This was made possible because the questions were transferred onto Google Forms

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(an online platform) and the link was sent to several experts and implementers of the CLTS programme across Ghana. The questionnaire survey was carried out between 30 June and 11 August 2022. The results were analysed statistically and then the findings were used to evaluate the conceptual framework developed based on the findings from the qualitative data collected.

3.9.2 Research sampling techniques

Sampling is viewed as an important component in every investigation because it provides the basis upon which results can be generalised and justified as valid and reliable (Bryman *et al*., 2021: 49). Briefly, sampling is described as the process for selecting a unit or a section of the population for investigation or observation (Babbie, 2013: 125; Leavy, 2017: 95). According to Saunders *et al*. (2019: 298), sampling can be used when the population being studied is large and, so, it is impractical or expensive to collect data from the total population. Broadly, sampling can be grouped into two types, namely, probability and non-probability sampling, where the former is used when the entire population is known, and it is possible to answer the research questions and objectives using statistical inferences from the characteristics of the entire population. However, the latter is used when the target population is not known, and the researcher does not intend to answer the research questions and objectives using statistical inferences from the characteristics of the target population (Saunders *et al*., 2019: 296). Saunders *et al*. (2019: 296) indicated further that probability sampling is usually associated with survey strategy and allows for generalisation, but though it can be used to answer research questions and objectives, non-probability sampling does not allow for the generalisation of the findings. In addition, probability sampling is useful for descriptive studies, whereas non-probability sampling is useful for exploratory studies.

The types of probability and non-probability sampling techniques include random, stratified, systematic and cluster sampling, and quota, purposive, snowballing (self-selection and volunteer) and convenience (haphazard), respectively (Saunders *et al*., 2019: 297). Each of these sampling techniques has advantages and disadvantages, but a researcher can combine several techniques of both types of sampling in a single project to obtain rigorous, valid and reliable results.

In this study, non-probability sampling technique was used for the interviews, focus group discussions and the quantitative survey because the researcher wanted to access and explore the rich knowledge and experiences of the practitioners, implementers and beneficiary

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communities of the CLTS programme. Also, the researcher wanted to sample participants relevant to the research questions and the CLTS phenomenon. Further, the population of the practitioners, implementers and the beneficiary communities of the CLTS programme as well as the number of toilets per communities was not known. Accordingly, purposive and snowballing sampling techniques were employed to collect qualitative and quantitative data, as explained by Johannesson and Perjons (2021: 46). Purposive and snowballing were appropriate for the study because the researcher required the knowledge of people involved in the implementation and sustainability processes of the CLTS programme. To access such people, the researcher initially obtained contacts of a few individuals in organisations identified as implementing CLTS in Ghana through a literature review and personal visits (purposive sampling), to invite them to take part in the study. These few individuals later gave the telephone numbers of other practitioners who could provide valuable information to the study (snowballing). In this study, the qualitative data were obtained using purposive sampling and snowballing, and quantitative data were obtained using purposive sampling only.

3.9.2.1 Qualitative sampling

Based on the case-study sampling strategy, qualitative data were collected for this study. A total of six cases, representing eight regions, were selected through purposive sampling techniques because the researcher was only interested in regions that had been implementing CLTS from the commencement of the programme and had recorded high numbers of ODF communities, (See Section 3.5.1.1). Similarly, through purposive sampling and snowballing, stakeholders of various organisations were interviewed while focus group discussions and direct observations were carried out in communities within these regions using purposive and convenience sampling techniques respectively. The purposive sampling was employed for interviews with stakeholders and focus group discussions with the beneficiary communities because the researcher wanted to use only stakeholders familiar with the CLTS programme, and communities that had gone through the CLTS implementation processes, and had been declared and certified as open defecation-free. However, for direct observation of toilets in beneficiary communities, convenience sampling was employed so as to allow the researcher assess available toilet facilities within the communities.

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3.9.2.2 Survey research sampling

Through purposive sampling, quantitative data was collected for this study. Purposive sampling was employed because CLTS is a phenomenon that is being implemented by a specific group of people (experts, practitioners and NGOs in the WASH sector) whose population is not hard to find. Thus, within the WASH sector not all the practitioners and experts were implementing the CLTS programme and the respondent could only be selected through purposive sampling where only the implementers of the programme could answer the questions related to the programme. The respondents did not have any existing database that could be used to calculate the sample size. However, the link of the questionnaire was sent to identified experts and practioners who shared the link with their fellow implementers via WhatsApp platforms. In all, a total of 202 respondents took part in the study. In addition, purposive sampling allowed the researcher to obtain in-depth and precise information from implementers of the programme thereby enhancing the validity of study. A survey researcher is often required to conduct pilot studies to ensure the reliability of the research instruments, as discussed in the next section.

3.9.3 Pilot studies of the study

According to Fellows and Liu (2015: 97), pilot testing is a trial execution of the research that enables the researcher to examine the research design, instruments for data collection, availability of data from selected sources and the challenges of analysing the data (Fellows & Liu, 2015: 97). Therefore, the pilot testing of this study was conducted for the following reasons:

1. to know whether the questions set will succeed or, in other words, whether the protocol will be able to provide answers to the research questions (Saunders *et al*., 2019: 541);
2. to know whether the respondents will be able to understand the questions, and this will enhance the validity of the questionnaire (Saunders *et al*., 2019: 541);
3. to refine the questionnaire or protocol, thereby establishing content validity and providing clarity for respondents who wish to participate in the study (Saunders *et al*., 2019: 541);
4. to assess the validity of the questions and the reliability of the data (Saunders *et al*., 2019: 541);
5. to improve response rate by eliminating potential sources of difficulty and ambiguously worded questions, and issues such as no spaces for recording answers (Fink, 2017: 27);
6. to detect the effects of dependent and independent variables (Fellows & Liu, 2015: 97).

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7. to have an idea of the reliability and suitability of the questions (Saunders *et al*., 2019: 541).

In summary, the researcher conducted pilot studies on the questionnaires to establish both external and internal validity of the measuring instrument. However, before the pilot study, the questionnaire was administered to some identified CLTS practitioners and implementers for their constructive reviews and input. The inputs from the experts were incorporated into the questions before the pilot studies. The pilot study began on 15 June 2022 and ended on 13 July, 2022. Some of the questionnaires were administered via mail, WhatsApp and drop and collect. The questionnaires were sent to 45 respondents but only 26 were returned. The analysis from the pilot studies have been presented in section 3.9.3.1. From the analysis of the pilot, questions with low responses were rephrased and incorporated into the questionnaire before the main study.

3.9.3.1 Analysis of pilot study for the main study

The response from the pilot study was analysed using SPSS 25, and the Cronbach's alpha of each leading indicator metric was calculated, as explained by Bryman *et al*. (2021: 96). The alpha levels for all the indicators were within the acceptable range, with a maximum value of 0.9 (rated as being very good) and minimum of 0.7 (acceptable). This indicated internal consistency in the measurement scale. Table 3.4 shows the leading indicators and their factor levels.

All the leading indicators in the Table 3.4 rated very good except behavioural change factors. This implies that the questions under the leading indicators were clear and devoid of ambiguity, and so the questions were maintained and used in the final data collection. However, the responses under behavioural change factors leading indicators showed less values. In view of this, the questions under behavioural change factors with low values were rephrased to give further clarity to the questions thereby improving upon the content validity as well as internal consistency of the measurement scale.

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Table 3.4: Cronbach's alpha for the study

No.	Leading indicator	Cronbach's alpha
1	Leadership factors	0.95
2	Motivational factors	0.94
3	Law enforcement factors	0.98
4	Behavioural change factors	0.78
5	Financial support	0.94
6	Ownership	0.94
7	Enhancing sustainability factors	0.96
8	Implementation factors	0.93
9	Effective tools	0.94

3.10 Data Analysis

The fundamental purpose of research is to provide an output or to make an informed decision that could be useful to policy-makers, and managers of organisations, and this is the basis for data analysis. Thus, the purpose of data analysis is to provide information on the relationships between variables, using either qualitative or quantitative analytical techniques (Fellows & Liu (2015: 193), and also to create patterns in the data that provide a theoretical understanding of social life (Babbie, 2020: 138). The ability of the researcher to make informed decisions (establish relationships between variables) is dependent on how well data are analysed. Therefore, Yin (2018: 142) noted that researchers must adopt a general analytic strategy to govern the process of data analysis. Furthermore, Yin (2018: 142) outlined five analytical procedures that a researcher can employ, including: pattern matching, explanation building, time-series analysis, logic models and cross-case analysis. It was on the basis of these five procedures that both qualitative and quantitative data were analysed.

3.10.1 Qualitative data analysis

According to Saunders *et al.* (2019: 538), qualitative data are derived from many sources such as notes from interviews, observations and focus group discussions called textual data, spoken words or extended speech called verbal data, and images, drawings and videos referred to as visual data. The data obtained using any of these sources are often voluminous and laborious to analyse, and, so, Yin (2018: 142) suggested that researchers can reduce the data by examining, categorising, tabulating, testing and assembling them. Therefore, by way of examination, the researcher firstly transcribed all the interviews and focus group discussions into textual data, and coded and categorised items according to the research questions, using cross-case, variable-oriented, analysis, as explained (Babbie, 2020: 491). The cross-case

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variable-oriented analysis allows the researcher to establish relationship between variable of different cases. Similarly, it allows the researcher to explore an in-depth similarities and differences across many cases. In view of this, the transcripts from the interviews and the focus group discussions were coded using related variables used for the data collection (interviews and FGDs) through "find search" in Microsoft Word. Subsequently, the themes that emerged which encompasses behavioural change, motivational, financial, and leadership factors that enable the CLTS programme's sustainability, were coded using "find search" in Microsoft Word and inductive reasoning. The data were then analysed thematically, as explained by Flick (2018: 81). The themes were interpreted further and used to develop a questionnaire for the collection of quantitative data which were used to strengthen and confirm the qualitative data, and also to confirm the improved performance and sustainability framework for the CLTS programme developed after qualitative analysis.

3.10.2 Quantitative data analysis

Quantitative data can be analysed statistically to provide descriptive and inferential statistics, which allow for establishing statistical relationships or comparisons between variables, and complex statistical modelling (Saunders *et al*., 2019: 564). Fellows & Liu (2015: 193) further reiterated that quantitative data analysis is often undertaken to provide statistical and inferential evidence of relationships between variables (dependent and independent variables) and statistics that are useful in determining the directions of these relationships. According to Saunders *et al*. (2019: 564), there are various forms of quantitative analysis ranging from descriptive, bivariate or multivariate correlational (which include exploratory or confirmatory factor analysis) and inferential analysis. Robson and McCartan (2015: 410) and Creswell and Clark (2018: 310) indicated that quantitative statistical analysis can be carried out using analytical software or statistical packages such as the Statistical Package for Social Sciences (SPSS) (which is very useful for descriptive or exploratory data analysis), STATA, SAS, R, and several others, such as Smart PLS (useful for partial least squares structural equation modelling).

In this study, descriptive and multivariate correlational data analyses were conducted using SPSS Version 25 and SMART PLS Version 4 for exploratory factor analysis (EFA) and confirmatory factor/data analysis (CFA or CDA), respectively. The closed-ended, self-administered questionnaire was in four sections, A, B, C, and D (see Appendix A3). Descriptive statistical analysis was conducted for Sections A and D, whereas CFA and EFA were conducted

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for Sections B, C, and D. However, before analysing the quantitative data, the data were cleaned and classified into numerical codes, as explained by Saunders *et al*. (2019: 570) and, afterwards, the data were analysed following the outline provided by Creswell & Clark (2018: 310).

3.10.3 Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA)

According to (Brown, 2015: 11), the aim of both EFA and CFA is to reproduce the observed relationships among a set of indicators, with a smaller group of latent variables. However, the two analyses differ significantly from each other, such that EFA always precedes CFA (Brown, 2015: 5; Mindrila, 2017: 3). Therefore, a researcher can employ EFA as an exploratory or descriptive technique to discover the appropriate number of related factors, and to identify measured variables that are relevant indicators of the many latent magnitudes (Brown, 2015: 11; Mindrila, 2017: 2). EFA has been described as a data-driven approach that requires no specification of the initial number of factors or patterns of relationships between the common factors (latent variables are variables that cannot be directly observed) and the indicators (factor loading, which is the relationship between latent and observed variables). Thus, EFA means exploring a large set of data to uncover the underlying associations and explain the relationships between all the observed and measured variables (Mindrila , 2017: 3), and this can be done using several statistical packages such as SPSS, R Packages SEM, SmartPLS etc. EFA provides a platform that enables the researcher to specify the number of factors to be used for CFA (Brown, 2015: 11). The results of EFA can be presented using frequencies, tables, charts (histograms, bar charts), and descriptive statistics (central tendencies, measures of variability, and trends) (Robson & McCartan, 2015: 414 - 419). However, the descriptive statistics are not able to test whether the factor loadings are the same across the identified relationships, hence the use of CFA., CFA is employed to first establish the factor structure and then the factor model is confirmed using CFA (Mindrila, 2017: 3). In this study, EFA was conducted using the SPSS 25 package, as explained by Mindrila (2017: 3).

On the other hand, according to Brown (2015: 1), CFA is one of the most commonly used statistical methods in applied research because it is well-equipped to address any type of questions the researcher formulates. Brown (2015: 1) further described CFA as a type of SEM that leads to the establishment of relationships between observed variables (measurement models) and latent variables. Before every research project, the researcher poses questions with some anticipated answers in mind and, so, CFA helps the researcher either to confirm the

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initially anticipated results or establish entirely different results by making inferences about relationships between variables (Robson & McCartan, 2015: 414)). As stated by Robson and McCartan (2015: 414) the purpose of CFA is to establish whether the data collected by the researcher provided the information the researcher intended to find, because it enables the researcher to specify the number of variables or factors to be loaded. Again, CFA is often used after EFA has been used to test and refine the testing instrument (Brown, 2015: 10). Meanwhile, there are several statistical software packages, such as Amos, SAS PROC CALIS, SmartPLS, R packages, SEM or R studios, lavaan, OpenMx, LISREL, EQS, and Mplus, available for conducting CFA (Brown, 2015: 5; Narayanan, 2012: 9). Each of these packages can be used by a researcher depending on the *a priori* knowledge guiding the research (Narayanan, 2012: 4). In this study, Smart Partial Least Squares (SmartPLS) was the statistical package used for the CFA and hypothesis testing. The CFA was necessary for the confirmation of the improved performance and sustainability conceptual framework developed after the qualitative data analysis.

3.10.4 Structural equation modelling

Over the past two decades, SEM has become very popular and has been referred to as a second-generation technique because it contains statistical methods that allow multivariate analysis of data (Hair *et al*., 2017: 46; Westland, 2019: 3). SEM has become popular across several fields because it combines exploratory factor and structural path analysis which are statistically powerful approaches that allow simultaneous assessment of different models (Hair Jr *et al.*, 2017: 106). Therefore, SEM has been described as a multivariate quantitative procedure that identifies and describes the relationships between observed (manifest) and latent (unobservable) variables (Thakkar, 2020: 1). Thus, SEM enables researchers to integrate latent variables measured indirectly by observable variables (Hair *et al*., 2017: 4). In addition, SEM allows for examining sets of dependence connections simultaneously by solving several equations (Thakkar, 2020: 1). Thakkar (2020: 1) stated further, that SEM enables the researcher to test or confirm a theoretical model or conceptual framework using the relationships between observed and latent variables, and/or to developing an entirely new model by determining complex relationships among concepts. SEM is particularly useful in all fields, especially in social sciences where many of the concepts are inherent and cannot be observed directly (Westland, 2019: 3).

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Categorically, there are two types of SEM, namely, covariance-based SEM (CB-SEM) and Partial Least Squares SEM (PLS-SEM) (Hair *et al*., 2017: 4). CB-SEM is used primarily either for confirmation or rejection of theories or models by establishing relationships between latent and manifest variables in a given data set (Hair *et al*., 2017: 4; Thakkar, 2020: 1). In contrast, PLS-SEM is useful for developing theories or models by explaining the relationships between observed and unobservable variables. However, according to (Hair *et al*., 2017: 4), researchers grapple with the challenge of when to apply or use any of the approaches, so, several authors have tried over the years to provide some form of justification for the usage of either PLS-SEM or CB-SEM. These justifications are presented using similar factors shown in Table 3.5. However, Hair *et al*. (2017: 4) were quick to advise researchers to be careful of the limitations associated with the two methods to provide the necessary measures to help in the validation of the results produced by them.

Table 3.5: Differences between PLS-SEM and CB-SEM

Factor	PLS-SEM	CB-SEM	Contributing Authors
Insufficient theory	Used when there is less developed theory or insufficient information on concepts (Hair *et al*., 2017: 15).	Very useful for theory testing, confirmation or comparison of alternative theories (Hair *et al*., 2017: 23).	Hair *et al*., 2017; Thakkar, 2020
Statistical properties	1. Extremely suitable for prediction because it estimates path model relationships that maximise endogenous constructs (Hair *et al*., 2017: 17). 2. Very useful when the goal of the research is to identify key driver constructs (Hair *et al*., 2017: 22; Sarstedt *et al*., 2021: 10).	Extremely unsuitable for predictions because of factor (score) indeterminacy (correlations between a common factor and any variable outside the factor model are themselves intermediate) (Hair *et al*., 2017: 17; Sarstedt *et al*., 2021: 10).	Hair *et al*., 2017: 15; Sarstedt *et al*., 2021: 10
Non-normal data and distribution assumptions	Non-parametric and works efficiently with distributional assumptions (non-normal distributed data) without any identification of standard errors (Hair *et al*., 2017: 18)	Parametric and sensitive to normally-distributed data (makes distributional assumptions) with the identification of standard errors (Hair *et al*., 2017: 18)	
Sample size	1. Works efficiently with a small sample size by achieving high levels of statistical power and increase in precision with a larger sample size (Hair *et al*., 2017: 18).	Very robust with a large sample size determined using the rule of thumb from maximum likelihood estimation with the least sample size (Hair *et al*., 2017: 18-19).	Hair *et al*., 2017: 18-19

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	2. Allows the use of very small samples to represent a population less than 100 (Hair *et al*., 2017: 18-19)		
Formative indicators	Analyses formative indicators without identification of problems because it requires no modification (Hair *et al*., 2014: 4; Hair *et al*., 2017: 23)	Analyses of formative indicators often lead to the identification of problems because SEM requires more modifications (Hair *et al*., 2017: 23)	Hair *et al*., 2014\ 4

In this study, PLS-SEM was employed based on the factors indicated in Table 3.7, and the fact that it is applicable in various fields, especially social science. The plausibility of PLS-SEM being used to test and confirm theories has been criticised because of its inability to develop "structural models that include causal loops or circular relationships between the unobserved variable", and "no established goodness of fit". However, according to Hair *et al*. (2017: 18), researchers can off-set these limitations by using newly designed statistical tools such as SmartPLS, which has been designed by factoring in these limitations. Based on this premise, SmartPLS Version 4 was used for data analysis in this study.

3.11 Integration of the Research Objectives

To address the performance and sustainability of the CLTS programme in Ghana, five research objectives were set:

1. Research Objective 1: To identify the various organisations implementing the CLTS in Ghana.
2. Research Objective 2: To critically examine the activities carried out by the organisations implementing CLTS in Ghana.
3. Research Objective 3: To evaluate the impact of these activities on the performance and sustainability of the CLTS programme.
4. Research Objective 4: To examine the factors influencing and hindering the performance and sustainability of the CLTS programme in Ghana.
5. Research Objective 5: To develop a framework that would guide organisations towards improved performance and sustainability of the CLTS programme.

The researcher used the findings from the qualitative data analysis, which addressed objectives one to five, to develop the improved conceptual framework for the performance and

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sustainability of the CLTS programme (Research Objective 5). The achievement of the first four objectives was made possible through qualitative data collected from semi-structured interviews, focus group discussions and direct observations. The semi-structured interviews were used to collect data from CLTS practitioners and implementers (organisations identified through literature review and relevant documents, both local and international) to ascertain information relating to Objectives 1,2,3,4 and to gather information about CLTS beneficiary communities, as presented in Chapter 4. After that, focus group discussions were conducted in CLTS beneficiary communities that had been able to sustain their ODF status over two to ten years to achieve Objectives 1, 2, 3 and 4, as presented in Chapter 4. Thereafter, themes emanating from the thematic analysis of the interviews and focus group discussions were used to develop a questionnaire to collect the quantitative data to test and confirm Objectives 1, 2, 3, 4 and 5 (conceptual framework developed from the qualitative data analysis), as presented in Chapter 5. With PLS-SEM, the improved performance and sustainability conceptual framework was tested and validated using the SmartPLS statistical package, using the quantitative data from the self-administered, closed-ended questionnaires.

3.12 Validity and Reliability of the Research Data

According to Bryman *et al.* (2021: 94), reliability and validity are crucial measures that a researcher must consider in survey research because they are connected to every aspect of the research process (design of data collection instruments, data collection and analysis, and the overall findings of the research) (Creswell & Clark, 2018: 359). Also, validity and reliability determine the quality and rigour of the research design and findings (Bryman *et al.* 2021: 104). Therefore, it is imperative for a researcher to provide proof of reliability and validity to verify the study, as discussed in Sections 3.12.1 and 3.12.2.

3.12.1 Validity

Research comprises a series of processes that require measurements or decision-making at every stage. The quality of these decisions or measurements contributes to the plausibility and generalisability of the findings, and this is what Creswell & Clark (2018: 359) referred to as validity. Thus, validity is the quality of the research design (suitability of research questions or hypotheses, consistency of research methods and instruments for data collection and analysis) and interpretation rigour (consistency of interpretations of respondents, findings and conclusions) (Creswell & Clark, 2018: 359). Therefore, validity addresses the question of

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whether or not indicators effectively measure the concepts they are supposed to capture (Bryman *et al.*, 2021: 97). Therefore, the onus lies on the researcher to establish validity at every stage of the research process. To be able to do this, Creswell & Clark (2018: 370) suggested that validity should be established using the validity strategies associated with the research method chosen for a study. As indicated in Section 3.4, the exploratory sequential mixed-methods design was the researcher's choice of methodology and, so, validity was established as suggested by Creswell & Clark, (2018: 361). Creswell and Clark (2018: 361) stated further that, in the case of MM, validity checks should be conducted separately for qualitative and quantitative methods, and for the integration of the two approaches. The validity of a MM approach means using strategies that address the possible threats to drawing accurate inferences and precise assessments of the integrated data.

The validity of any of the approaches can be established by using the two types of validity, namely, external validity and internal validity, as identified by Bryman *et al.* (2021: 104)**.** External validity is the extent to which the findings of the research can be generalised to other people, settings or times (Creswell & Clark, 2018: 325), and this is normally addressed by selecting participants for the study. In other words, external validity answers the question of whether findings apply to other settings or populations (Fellows & Liu, 2015: 147). To answer this question of external validity for both qualitative and quantitative approaches, the requirements suggested by Creswell & Clark (2018: 371) were employed such that the qualitative data were collected from only CLTS practitioners and implementers, and CLTS beneficiary communities who had insight into the CLTS processes across Ghana through semi-structured interviews and focus group discussions, respectively. The data were transcribed verbatim and analysed thematically and the results were used to develop the closed-ended questionnaire which was then administered through purposive sampling and snowballing to collect the quantitative data from CLTS practitioners and implementers who had in-depth knowledge of the CLTS intervention.

Internal validity is defined as the extent to which claims of cause and effect can be made (Creswell & Clark, 2018: 325). However, according to Bryman *et al*. (2021: 83), internal validity is based on the conclusion of whether or not there is a causal relationship between two or more variables. To meet this requirement for internal validity, face and content validity of the interview and focus group discussion guides used for collecting the qualitative data were designed in consultation with some selected CLTS practitioners and implementers to ensure

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the suitability of the guides. Also, guides were designed in alignment with the research objectives. Moreover, the participants in the interviews and the communities selected for the focus group discussions were contacted to obtain their agreement to participate in the study. In addition, at the start of the interview or focus group discussion, the researcher explained the reasons for the study.

Similarly, the questionnaire for the qualitative data collection was sent to some CLTS practitioners and implementers to check the suitability of the questions, as suggested by Saunders *et a*l. (2019: 40). The closed-ended questionnaire, developed from the qualitative data analysis concerning the research questions and objectives, was administered to insightful CLTS practitioners and implementers across Ghana. However, before administering the questionnaire, a pilot study was conducted to increase the face validity as well as the content validity of the questionnaire. Finally, to ensure that the study was constructively validated, the questionnaire was developed using the constructs used in developing the conceptual framework from the qualitative data analysis, as explained by Fellows and Liu (2015: 147). All of these were taken to increase the internal validity of the study and also to boost confidence in the accuracy of the results and the level of generalisability of the study, as suggested by Fellows & Liu (2015: 147).

3.12.2 Reliability

According to Saunders *et al*. (2019: 517), reliability is referred to as consistency. However, Bryman *et al*. (2021: 96) refers to reliability as the consistency of measures of a construct or concept based on considering three important factors: stability (which means a measure remains stable and does not fluctuate over time or a measure that allows for testing or re-testing of a measure); internal reliability (consistency of the scale or index for measures of multiple concepts); and inter-rater reliability (consistency of respondents). In summary, reliability accounts for the consistency of the research methods, participants, data collection instruments, and analytical procedures employed in a study. However, Creswell & Clark (2018: 326) argued that reliability plays little role in qualitative research because the researchers might emphasise their subjective interpretations. Yin (2018: 82), on the other hand, claimed that the goal of reliability is to reduce errors and biases in the study and, so, suggested that the best way to attain internal reliability in a qualitative study is thorough documentation of the procedures used throughout the research process by the researcher.

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In this study, the qualitative data were collected from CLTS practitioners and implementers using semi-structured interviews, focus group discussions and participant observations aided by interview guides and an observation checklist, developed by the researcher in consultation with CLTS practitioners after a thorough review of relevant literature on CLTS based on the research objectives. The quantitative data were collected from CLTS practitioners and implementers after the interviews and FDGs had been transcribed verbatim and analysed using a six-step process of thematic analysis proposed by Flick (2018: 259). The themes from the analysis were aligned with the research questions and objectives to develop the closed-ended questionnaire, which was self-administered through email and WhatsApp, only to people with in-depth experience of the CLTS programme.

To meet the criteria of internal reliability, a pilot study was conducted, as suggested by Saunders *et al*. (2019: 517), and the quantitative data were tested statistically using Cronbach's alpha. Furthermore, the internal reliability of the data of the main study were tested using Cronbach's alpha in SPSS Version 25. Cronbach's alpha is used to test the internal reliability of statistical data. Essentially, it calculates the average possible split-half of reliability coefficients called the Cronbach coefficient. The Cronbach coefficient ranges between 0.00 and 1.00 with an acceptable limit for internal consistency of 0.70 (Bryman *et al*., 2021: 96).

3.13 Ethical Considerations

Ethics in research refers to a set of principles or rules of conduct to which a researcher must conform (Robson & McCartan, 2015: 208). According to Robson and McCartan (2015: 208). Ethics in research is a process and not an end in itself, and must be reviewed throughout the research process. This is because, most often, the researcher becomes involved with people (participants) or organisations whose identities, the information given, and privacy must be kept confidential. The ethical considerations in research, especially social science research, include the willingness of participants to participate in the research, and the researcher's commitment to protecting the anonymity, privacy and confidentiality of the participants (Robson & McCartan, 2015: 219).

Thus, ethical considerations are very important and, so, the researcher must adhere to all the ethical principles associated with the research design chosen for the study. In this study, the researcher adhered to all the ethical issues related to the study by:

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1. Writing to organisations that were implementing the CLTS programme to explain the background of the study to them, and also to request their agreement to participate in the research.
2. Assuring participants of their confidentiality in the introductory cover letter, in the interview and FGD guide, and on the closed-ended questionnaire.
3. Re-affirming the confidentiality, anonymity and privacy of the participants during the interviews and focus group discussions.

3.14 Chapter Summary

The research philosophy as well as the research methodology used in the study have been presented and explained in this chapter. A pragmatist research philosophy and a mixed-methods research approach with emphasis on exploratory sequential mixed-method were adopted and used accordingly. The research design was surveys which included semi-structured interviews, focus group discussions and questionnaire administration to achieve the objectives of the study. The mixed method approach aided in the collection and integration of both qualitative and quantitative data, as presented in chapters 4 and 5. The qualitative data collected from the interviews, focus group discussion and participant observation have been presented in the next chapter

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CHAPTER FOUR: QUALITATIVE RESULTS

4.1. Introduction

In this chapter, the analysis and interpretation of the data collected during semi-structured interviews (SSIs) with implementers, from selected cases (FGDs conducted in CLTS-beneficiary communities), and from direct observations are presented. The participants were informed about the background and the purpose of the research concerning the performance and sustainability of the CLTS programme. The data analysis based on the fieldwork is presented in the order of the salient questions used in the interview guide (see Appendix C) and the protocol for FGDs. The conceptual framework developed using the themes that emanated from the analysis is also presented in this chapter.

The questions used in the SSIs were as follows:

1. What is the name of your organisation?
2. What are the activities and techniques used by organisations in implementing CLTS programmes in Ghana?
3. How are these activities and techniques contributing to the performance and sustainability of the CLTS programme?
4. Has CLTS helped in increasing sanitation coverage, and is the coverage fast or slow?
5. Are communities able to sustain their ODF status? How are the communities sustaining their ODF status?
6. What challenges hinder the performance and sustainability of the CLTS programme?
7. How can the CLTS programme be enhanced to increase performance (coverage) and sustainability?

4.1.1. Organisations implementing the CLTS programme in Ghana

Response to Question 1; What is the name of your organisation?

Question 1 was asked to address objective 1: to identify the various organisations implementing the CLTS in Ghana. A total of 26 interviews were conducted across eight regions in Ghana. The interviewees included CLTS WASH experts (CLTS experts, WASH consultants, practitioners and coordinators) and CLTS implementers (Field Facilitators (FFs)). Details of the interviewees are presented in Table 4.1. The organisations are coded in the table for the

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purposes of confidentiality. During the interviews (refer to Appendix C, Figure C8), eight international organisations and local NGOs were identified, including, UNICEF, Global Communities, WaterAid, CRS, RING, CWSA, World Vision and Plan Ghana. However, only six of the organisations: UNICEF, Global Communities, WaterAid, CWSA, World Vision and Plan Ghana were active in the field. While UNICEF and CWSA operate in all the regions of Ghana, the rest of the organisations operated in specific regions. For instance, World Vision operated in Northern and Central regions, Plan Ghana also operated in the Northern, Volta and Central regions only, and Global communities operated in the Oti and Northern regions.

Table 4.1: Lists of interviewees

No.	Name of organisation	Code of reference	Years of experience	Region	Position
1	UNGO	P1	4	Volta	Regional WASH Consultant
2	EGO	P2	7	Volta	Regional Monitoring and Evaluation Focal Person
3	UNGO	P3	4	Northern, Upper East/ West	Regional WASH Consultant
4	UNGO	P4	8	Greater Accra	National WASH Officer
5	PNGO	P5	3	Volta	Regional WASH Co-ordinator
6	PNGO	P6	10	Volta	CLTS Facilitator for Plan International Ghana (FF)
7	EGO	P7	9	Volta	DEHO; WASH Focal Person
8	EGO	P8	6 &2	Volta	EHA (FF)
9	GCNGO	P9	13	Oti	Behaviour Change Specialist
10	UNGO	P11	4	Central	Regional WASH Consultant
11	EGO	P10	11	Oti	DEHO (FF)
12	WVNGO	P12	7	Central/ Northern	WASH Officer
13	PNGO	P13	3	Upper East	Project Coordinator
14	EGO	P14	3	Central	EHA (FF)
15	EGO	P15	5	Central	EHA (FF)
16	EGO	P16	9	Central	Regional Project Co-ordinator (WASH Focal Person)
17	EGO	P17	3	Central	EHA (FF)

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No.	Name of organisation	Code of reference	Years of experience	Region	Position
18	WVGO	P18	11	Central	Regional WASH Officer
19	EGO	P19	11	Oti	EHA (FF)
20	EGO	P20	9	Upper East	DEHO (FF)
21	EGO	P21	14	Upper East/ West	Assistant Chief EHA (FF)
22	EGO	P22	9	Upper East	Principal EHA (FF)
23	MGO	P23	20	Greater Accra	Environmental Health Technologist
24	GCNGO	P24	8	Central	WASH Co-ordinator
25	EGO	P25	11	Upper East	DEHO (FF)
26	CGO	P26	3	Upper East/West	WASH Co-ordinator

4.1.2. The activities carried out by organisations implementing CLTS in Ghana

In response to question 2: What are the activities and techniques used by organisations in implementing CLTS programmes in Ghana?

This question was asked to address objective 2: to examine critically the activities carried out by organisations implementing CLTS in Ghana. The responses from the interviewees highlighted many techniques and activities. However, through a sub-question under Question 2: "What techniques and activities do you frequently use during the implementation of the CLTS programme?", the activities and techniques most frequently used by the interviewees in implementing the CLTS were ascertained (Table 4.2).

Table 4.2: Activities and techniques used at each stage of CLTS implementation

Stage	Activity and tools	Responses
Pre-triggering	• Select communities • Community visits • Meeting with the community's traditional and opinion leaders • Assess the sanitation challenge of the community • Stakeholder engagement • Set a date for triggering	• The field facilitators are allowed to select the communities to trigger (P2, P5, P7, P10, P11). • I often visit the community twice, the first is to build rapport with the community leaders and introduce the CLTS programme to them, and the second visit is to assess the sanitation challenges of the community and then fix a triggering date with community leaders (P17).
Triggering	• Transect walk or walk of shame • Defecation area mapping • Shit calculation • Medical cost calculation • Feco-oral pathway or Diagram • Set sanitation by-laws	• I always use the defecation area mapping and the walk of shame because they are participatory, especially the open defecation area mapping which allows people to identify who is defecating behind their houses (P17).

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Stage	Activity and tools	Responses
	• Sanitation marketing • Select emerging natural leaders • Draw up action plans with community members • Set ODF declaration date	• The feco-oral pathway works for me a lot because it explains to the people how they are consuming each other's faeces (P5) • I select all NLs that emerged just to offer them training so as to ensure that at any point in time, there will be a NL to offer technical assistance when the programme ends (P3). • I ensure that the action plans are drawn on the same day of triggering. That tells them that we are in agreement because everyone will be there. In this way, they usually go by the timelines on the plan (P7). • We have to aid them to set their own fines and sanctions because it is a prerequisite for certification (P7, P8). • Each community has its sanitation by-laws such that in "Buokorkorpe", a household toilet facility has been added to the requirements of the bride price (P2).
Post-Triggering	• Follow-up • Training of NLs, community technical volunteers (CTVs) and artisans. • Update action plans and maps. • Toilet siting and construction • Material supply • Sanitation marketing • Formation of health clubs • Video shows and campaigns • Community ODF Assessment • Declaration and Certification • Celebrations and raising ODF signboards in ODF community • Establish village savings and loans associations for sanitation (VSLAS). • Update stakeholders on the programme • National/District League Tables	• My organisation pays for 15 visits throughout the whole process (P1). • The follow-up is not enough. For instance, UNGO pays for only 15 visits but Madam, trust me you can visit a community as many as 30 times (P8). • My organisation is committed to the training of NLs for the purposes of sustainability of the ODF of the communities (P4). • Up North, what helped me is the introduction of video shows in the communities and the use of media campaigns and awareness creation using the celebrities within the region (P3). • I always introduce the various toilet facilities at the household levels when I realise, they can afford an advanced toilet facility. This I do to avoid delays because I have just 3 months (P17). • Some of the communities are far from the cities and so I have to buy and carry materials on my motorbike and send them (P15). • After declaration, I always make sure we celebrate our success by bringing revered dignitaries like the Municipal Chief Executive (MCE), Municipal environmental health director (EHD) including the supporting NGOs to the community. These celebrations boost the

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Stage	Activity and tools	Responses
		morale of other communities to achieve ODF (P21). • I try to introduce the VSLAS in the communities to allow the people to save for an advanced toilet facility. It has really helped many people to construct KVIPs (P5). • The district league tables increased the number of ODF communities astronomically because of the healthy competition it created among the REHOs and MEHOs in the Northern region (P3).

The main activities carried out in the pre-triggering stage by the interviewees include the selection of communities based on their sanitation challenges. This, according to the interviewees, especially the NGOs, is the sole responsibility of the Environmental Health Officers (EHOs) or the CLTS implementers (FFs) in the MMDAs. It was also found that, after the selection, the FFs visit the community twice, on average, purposely to meet the chiefs and elders of the community. The FFs indicated that the first visit is usually done to establish rapport with the community leaders and make their intentions known to them. The second visit is made to ascertain baseline information on sanitation challenges, previous sanitation approaches, issues of diarrhoea, soil types and to schedule a date for triggering, as specified in the CLTS handbook. The interviewees indicated that triggering is usually scheduled on "taboo" days or non-farming days in the community to enable maximum participation. This is because on these days people rest and do not perform any activities in the communities. P17 stated: "The main occupation here is farming. It's on Tuesday, the taboo day that you will find them at home. You have to come early in the morning like 6 am because in the afternoon some will go for funerals and other scheduled activities".

According to the interviewees, triggering is usually done in the early hours of the morning on the scheduled date so that community members can have the rest of the day to themselves since it is a day of rest. All the interviewees indicated that triggering lasts between two to three hours. For instance, P14 stated: "I always make sure that I do not go beyond three hours when triggering. I start at 6:30am and by 10 am we are done". The interviewees mentioned a number of triggering techniques. The most frequently used techniques reported by all the interviewees included: transect walk, defecation area mapping, shit calculation, fico-oral pathway or diagram (F-diagram) and medical cost calculation. The interviewees reported that these

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techniques are most frequently used because their participatory nature allows full community participation which often leads to "match-box in gas station" responses. The interviewees revealed further that these techniques are not used in isolation but are combined based on experience and the nature of the community being either homogeneous or heterogeneous. For instance, P3 indicated that just the transect walk and defecation area mapping used in a homogenous community is enough to arouse the people. However, in a heterogeneous community, the transect walk, defecation area mapping and fico-oral pathway might or might not be able to trigger the community. Thus, in a heterogeneous community, more techniques are likely to be used for triggering to arouse the community. Other sparingly used techniques include faeces in a glass of water and strands of hair demonstrations.

"I cannot mention one tool because I have used all the triggering tools before. However, based on experience, I always use the defecation area mapping and the walk of shame because they are participatory, especially the open defecation area mapping which allows people to identify who is defecating behind their houses" P17.

According to the interviewees, other activities carried out during triggering include enacting of by-laws (fines and sanctions), drawing up action plans, selecting emerged natural leaders (NLs), and setting the date of attaining ODF. Some of the interviewees indicated that, sometimes, toilets are sited and construction of latrines begins on the same day of triggering and, hence, commencement of post-triggering.

"Once I see that the people are ready to construct the latrines, I site them at once. I don't waste time at all. What if they change their minds?" (P17).

"I ensure that the action plans are drawn on the same day of triggering. That tells them that we are in agreement because everyone will be there. In this way, they usually go by the timelines on the plan" (P7).

Another significant activity reported by the interviewees was the enactment of fines and sanctions. According to the interviewees, the protocol requires communities to enact fines and sanctions and, so, during post-triggering, the communities are assisted to enact their own fines and sanctions. Some of the interviewees revealed that these fines and sanctions are translated

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into other languages understood by neighbouring communities or visitors and displayed at community centres for all to see.

"Every community have their sanitation by-laws such that in Buokorkorpe, a household toilet facility has been added to the requirements of the bride price" (P2).

With regard to post-triggering, activities highlighted include: follow-ups, enacting fines and sanctions, updating of defecation area maps and action plans, siting of toilets, construction of latrines, and training of NLs, artisans and community technical (trained) volunteers (CTVs). All the interviewees indicated that they embark on follow-ups. According to the interviewees, follow-up is crucial to attaining ODF, as it serves as a form of encouragement and motivation to the people. For instance, P21 indicated that updating the defecation area mapping during follow-up is one activity that motivates the community members to construct latrines. To increase morale and secure the ODF attainment, some of the interviewees reported using rewards such as T-shirts, Vent pipes or tippy taps to the first people upon completing the digging of a pit or the construction of a latrine. Also, the interviewees reported that most of the NGOs require and pay for a specified number of follow-ups (for example, UNGO requires 15 visits). However, the field facilitators, reported that to secure the achievement of ODF, the average number of follow-ups can be about 30 times. The cost of the rest of the visits is borne by them.

"Yes, follow-up is paramount. Madam! without it, you will not achieve any results. With me, follow-up begins the next day after triggering because if you relax or skip it, you will have to trigger again" (P19).

"The specified follow-up is not enough. For instance, UNGO pays for only 15 visits but Madam, trust me you can visit a community as many as 30 times" (P8).

In addition, all interviewees reported that the NLs selected are trained together with artisans and CTVs (people with knowledge of construction but have not received any form of training) on the siting of latrines and construction of various latrine options. The interviewees indicated that training these people has made technical support available within the communities, which is contributing immensely to the sustainability of the ODF status. Moreover, some of the interviewees stated that, during the training, Natural Leaders' Networks (NLNs) are formed.

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This group meets quarterly to share their successes and achievements. According to P3, the NLN contributed to the high numbers of ODF communities in the Northern regions because it created healthy competition among the NLs of adjoining communities causing them to work harder to meet their ODF set dates.

Furthermore, some of the interviewees reported that they embark on stakeholder (Chiefs, MCEs mayors and regional ministers) consultations and engagement at the community and MMDA levels during post-triggering in order to update them on the progress and challenges faced. Other interviewees also indicated that they engage the authorities of the religious body from time to time to enable them to use their platforms to educate their members on the need for, and use of, toilet facilities. One interviewee mentioned using the media (radio) and celebrities (musicians, radio presenters) in the Northern regions. For instance, P3 revealed that, through the use of "gingles" in the media and the involvement of some celebrities in the North, the majority of the communities met their set dates of ODF.

Also, some of the interviewees revealed that sanitation marketing (SanMark) and various latrine options (SanMart) are introduced to individual households during post-triggering follow-ups. According to the interviewees, this is done at the household levels of individuals who seem to have the resources to avoid delays in attaining the ODF status. This is because not all the members have the resources to construct improved latrines, yet, once they become aware, they would want to raise funds to construct a latrine, which may take a long time, thereby leading to unnecessary delays to the attainment of ODF within the allocated time. As a result of this, some of the interviewees introduced the Village Savings and Loans Association for Sanitation (VSLAS). Through this initiative, many people have constructed improved latrines.

The interviewees revealed that, with regular follow-ups, on average, communities are able to achieve ODF between three and six months. Meanwhile, communities are expected to achieve ODF in three months according to the CLTS handbook. On average, it takes approximately three to six months. However, P8 indicated that some communities can take more than a year to attain ODF. The interviewees indicated that the communities that attain ODF are celebrated and certified in a grand style, such that the media and other important stakeholders, such as regional ministers and MCEs, are invited to grace the occasion. Certificates of honour or ODF

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certificates (See Appendix C, Figure C6) are presented to the ODF communities. Signboards are raised in the communities to indicate that the community is an ODF community.

4.1.3. The effects of activities on improved performance and sustainability of the CLTS programme

In response to Question 3: How are these techniques and activities contributing to the performance and sustainability of the CLTS programme?

The responses to question three addresses objective 3: to evaluate the impact of these activities on the improved performance and sustainability of the CLTS programme. The responses revealed the great impact the activities carried by these organisations on the performance and sustainability of the programme through attainment and maintenance of the CLTS status. All the interviewees reported that the use of participatory techniques such as transect walks, open defecation mapping, shit calculations and feco-oral pathways often resulted in "match-box in gas station" responses (all community members become ready to change their sanitation situation). Thus, these techniques arouse the disgust that is the aim of CLTS and consequently result in a community-wide decision to end OD. Immediate follow-ups carried out after a "match-box in gas response" often led to ODF achievement within two to three months. For example, P17 indicated that, in one community in the Central Region, the transect walk turned into toilet siting because the community members could not bear the shame of OD.

"During the walk of shame, you can see the disgust and shame on the faces of the people and as a result, after the walk, there is not much talking" (P3).

Several of the interviewees reported that, through the feco-oral pathway, communities are made aware of the consequences of OD and the benefits of being an ODF community. Likewise, the shit calculations give communities a fair idea of the extent to which faeces are washed into their bodies of water, and this causes communities that drink from rivers and streams to become disgusted at the thought of drinking and eating each other's faeces and, therefore, call for an end to OD. P7 revealed that this is one of the significant motivational factors for the achievement and sustainability of ODF status.

"When they see the volume of faeces being washed into their water bodies on a daily basis, the next question is 'What can we do to end this?' Quickly, you introduce them to the household toilets" (P5).

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All the interviewees stated that post-triggering and post-ODF follow-ups play a crucial role in the achievement of ODF and the sustainability of the CLTS programme, respectively. Thus, the two activities are very impactful. The interviewees indicated that immediate post-triggering follow-up often yields fast results in the attainment of ODF. Some interviewees indicated that this is because the disgusted and ashamed chiefs and elders mobilise their community members to quicken the process of attaining ODF. Immediate post-triggering is very important because it encourages community members to commit to their action plans, so any delay will cause communities to shift to other competing priorities and some of the interviewees indicated that this sometimes might require another triggering. Some participants shared their experiences as follows:

P17 stated: "As for me I begin my follow-up right after triggering for those ready to dig their pits. I don't wait till the next day. What if they change their minds?"

P8 shared that "the rains began after two follow-ups, and the road to the community became unmotorable. After two weeks, when I returned to the community, most had abandoned their pits. However, that day when they saw me, all began to work again and within three months, the community was declared ODF".

Though post-triggering follow-up is necessary, they are often not enough, according to the FFs. To increase performance and ODF achievement, the FFs suggested that implementing partners should consider allowing an average of 20 post-triggering follow-ups. Unfortunately, follow-ups end after the ODF declaration. The reason is that donors or NGOs do not provide funding for post-ODF follow-ups. According to all the NGOs, the government is supposed to take over post-ODF follow-up after the organisations have finished up, but they refuse to do it. P5 reiterated: "We expect the government to take over the communities when we fold up but when the organisation folds up, that ends it, and that is a big challenge. It is the responsibility of the District/Municipal Environmental Health Officers (DEHOs/MEHOs) to continue with the follow-ups after the ODF declaration… but you know their popular song no money but because our organisation (Plan International, Ghana) is not just interested in providing sanitation but behavioural change, we continue to follow up even up to 3 years". P9 also indicated "Our organisation does its own internal periodic monitoring and evaluation to find out slipped and ODF communities. Thus, we continue to do post-ODF follow-up in our ODF

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communities, and this really helped a lot of our communities to remain ODF even after several years".

Some of the FFs indicated that they embark on post-ODF follow-up by themselves, as and when there is a need (when NLs call us for help) or when triggering nearby communities (P2, P9, P5, P6, P14, P15, P22, P20, P16 and P7). According to P7, the irregular post-ODF follow-ups have helped many of the communities in Akatsi District to remain ODF even after nine years. P7 reiterated: "As for Akatsi, we do our own follow-ups because we don't want our communities to go back to OD. Besides, we want to continue to be first in the Volta region".

It was reported by the interviewees that all selected NLs that emerged are trained alongside community technical volunteers (CTVs). These trained NLs and CTVs serve as technical experts in the communities and provide technical support in terms of latrine construction during and after implementation. Some of the interviewees indicated that, during implementation, some of the trained NLs and CTVs were taken to other new communities to assist with training as well as the construction of toilets. P3 noted that these kinds of activities led to the formation of a natural leaders' network (NLN). According to P3, this network enables them to meet, either on a monthly or quarterly basis, to share experiences and also to make it easier for the dissemination of information as well as to serve as a refresher training. P3 indicated further that the NLN, in a way, created healthy competition among the villages which helped to increase the numbers of ODF communities. Not only have the trained NLs and CTVs created healthy competition among communities, but have also made technical support available in most communities where they help HHs to construct improved latrines and repair and reconstruct full and collapsed latrines. According to the interviewees, this has helped to sustain the ODF status. For instance, P17 stated: "The trained NLs and CTVs available in CEAKW have helped majority of the community members who can afford KVIPs to construct them. Now almost every HH in the community has a KVIP".

Another significant activity that the interviewees noted that contributed to the achievement and sustainability of ODF status was the enactment and enforcement of by-laws often in the form of fines and sanctions. Enacting sanitation by-laws (fines and sanctions) is a requirement for verification and certification. However, they are agreed upon by all community members and, so, each member is responsible for their enforcement. P2 note that, for easy understanding of community by-laws by all, some of the communities' type and print them, and place them at

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community centres for all, including visitors, to read and abide by them. According to some of the interviewees, recalcitrant community members were compelled to construct their latrines through the enforcement of sanitation by-laws, which led to communities attaining 80% ODF achievement. For example, P2 revealed that, in the Akorpepe Community in the Ho West District in the Volta Region, a head of a HH who refused to reconstruct a new latrine was brought to the assembly by the chief for further action. P2 indicated further that the assembly summoned the culprit and, in less than two weeks, the he built the toilet. Similarly, P17 reported that the community members in CEABA in the Central Region summoned the chief of the community to the assembly using fines and sanctions to compel him to construct his latrine.

Moreover, it was reported by the interviewees that the communities that religiously enforce the fines and sanctions have been able to sustain their ODF status. The fine charges range from 10 cedis ($ 0.88) to 20 cedis ($ 1.77). These fines are paid by culprits or defaulters of OD as well as HHs who refuse to construct a toilet after a given time. For instance, in some communities, an HH has up to two weeks to reconstruct a new latrine after collapse or when full. Failure to do so within the allocated time attracts a fine of 20 cedis each day till commencement begins (P2, P3, P5 and P10). Just as culprits are punished, rewards are given to people (whistle-blowers clubs usually comprising children) who report defaulters of the by-laws (P2, P23, and P17).

P2 mentioned that although the by-laws are effective at the community level, most of the MMDAs do not have by-laws. P11 and P10 indicated that, because of the absence of by-laws at the MMDA level, it is often difficult to punish the culprits. However, P23 reported that MMDAs have been mandated to publish their own gazette of by-laws. Yet, only a few confirmed to have finished drafting the by-laws but have not gazetted them (P21, P22, P20, P14, P15, P16). “My district has finished drafting but there is no money to gazette it” (P14).

Other activities contributing to the performance and sustainability of the CLTS programme are the Village Savings and Loans Association for Sanitation (VSLAS), sanitation marketing and National/District Leagues Tables. According to P17, P23, P3, P5, P14, P15 and P1, the community members want improved latrines, yet, they have no money. To help them attain durable latrines, some of the NGOs institute the Village Savings and Loans Association for Sanitation (VSLAS) through the facilitators, Community members are introduced to a system of contribution called “susu”. The group contributes money over a period of 6 to 12 months

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and then shares it among group members. The purpose of the money is for sanitation, so, sometimes the money can be given in equivalent materials for construction. P5 revealed that most of the communities that embraced the VSLAS constructed durable latrines and, so, are still ODF. P23 revealed that, in order to off-set the financial constraints and, with the evidence of the VSLAS, the government of Ghana has begun to pilot sanitation funds in some of the regions through some private financial institutions to enable farmers to borrow money to construct durable toilets and pay it back during harvest.

The LT is a table that showcases the list of all ODF communities either at the national, regional or municipal/district level. The NLT are often published in the newspapers, whereas the regional and district tables are placed on boards at the respective offices. For instance, P3 indicated that, in the North, the LT is launched in a grand durbar with chiefs of ODF communities, regional ministers, DCE/MCES, and implementers all in attendance. P3 stated further that the LT creates healthy competition among the MMDAs because the MMDAs that emerge first are rewarded with two motorcycles. Unfortunately, it was discovered that only a few of the regions and MMDAs publish their LT. Also, the national league tables are not given much attention, so they do not have much influence on other regions to work hard on ODF sustainability. Therefore, it was not surprising when the FGD participants had no idea about the LT.

“I remember at the first launch, Bunprugn Yunyo District was last. The DCE almost cried when his colleagues were teasing him but, at the second launch, his district moved to the 16th position’’ (P3).

Among the implementing NGOs, only UNICEF was practising sanitation marketing. The FFs that worked for UNICEF revealed that though sanitation marketing is to be introduced during triggering, they do it at the HH level based on experiences gathered when it was introduced at the triggering stage. Introduced at the HH level for those that can afford it, SanMark has enabled several community members to construct improved latrines permanently. In the Central Region and some parts of the Volta Region, SanMark has increased the number of durable latrines within communities.

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4.1.4. The performance of the CLTS programme in Ghana

In response to Question 4: Has the CLTS programme helped in increasing sanitation coverage, and is the coverage fast or slow?

Question 4 was asked to address the first part of objective 4: to examine the factors influencing and affecting the improved performance of the CLTS programme in Ghana. All the interviewees indicated that the CLTS programme has helped in increasing sanitation coverage in Ghana by responding unequivocally "yes". However, when asked whether the coverage has been fast or slow, 13 interviewees indicated that the coverage had been slow, while 10 were of the view that the coverage had been fast, and two were neutral. The interviewees were quick to attach reasons to their responses, as shown in Table 4.3. In all, it can be deduced that CLTS has not only increased coverage, but also helped in creating awareness in many communities, such that non-triggered communities sometimes request the programme when they hear about it. P19 stated: "Even now, I have two communities that have requested, just that there is no funding because of Covid-19."

"Yes, though coverage has not been quite impressive, 4% (2015-2021)! But compared to 15% (from 1990-2015). 4% is a huge jump" (P5).

However, the interviewees associated the slow pace or progress in coverage with several hindrances such as lack of political commitment and support, previous approaches, expectation of subsidy, and regular collapse of latrines. When the government as well as communities remain committed, the CLTS programme helps to increase coverage astronomically.

This finding is consistent with several studies in which it is reported that CLTS has helped increased sanitation coverage. Sakas *et al*. (2022) found latrine coverage after CLTS in Nepal, Morris and Shapiro (2021) showed sustained latrine coverage after the CLTS programme.

Table 4.3: Responses of the interviewees regarding coverage

Participants	Responses		Remarks		Reasons
	Yes	**No**	**Fast**	**slow**	
P1	Yes		Fast		Many communities have been reached within the shortest time compared with other approaches.
P2	Yes			Slow	Communities recalcitrant to change behaviours slow down the process.
P3	Yes			Slow	Communities continue to slip after OD.

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Participants	Responses	Remarks		Reasons
P4	Yes		slow	
P5	Yes	Fast		Results are seen on a daily basis.
P6	Yes	Fast		More durable latrines are being constructed which is sustainable.
P7	Yes	Fast		Faster compared to the subsidy time.
P8	Yes	Fast		Awareness has been created among the masses.
P9	Yes	Fast		10 out 12 communities a year is a huge coverage.
P10	Yes		Slow	Lack of government support and no funds from the organisations means no CLTS.
P11	Yes		Slow	Lack of commitment from government and community ownership.
P12	Yes	Fast		More communities have been reached.
P13	Yes		Slow	Too much slippage due to the rudimentary nature of the toilet.
P14	Yes	Fast		People are constructing latrines everywhere.
P15	Yes		Slow	Community members are not committed and so build latrines at their own pace.
P16	Yes		Slow	Urbanisation affects progress because communities close to the urban centres want durable latrines yet they can't afford them.
P17	Yes		slow	3 months to change behaviour is too small, FFs are not enough to monitor.
P18	Yes	normal		Government structures not helping, lack of consistency.
P19	Yes	Fast		A lot of people have been reached.
P20	Yes	Fast		Increased latrine construction.
P21	Yes		slow	No commitment from the top.
P22	Yes		slow	Lack of consistency and government support for monitoring.
P23	Yes	Fast		Compared to the subsidy approach, this is fast, many communities at least now know about toilets.
P24	Yes	neutral		People are aware of toilet construction.
P25	Yes		slow	But awareness has been created.
P26	Yes		Slow	Politicians promises of communal latrines.

4.1.5. Factors Influencing the Sustainability of the CLTS programme in Ghana

In response to Question 5: Are communities able to sustain their ODF status? How are communities sustaining their ODF status?

Question 5 was asked to address the second part of objective 4: to examine the factors influencing the sustainability of the CLTS programme through the maintenance of ODF status

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by communities. All the interviewees responded in affirmation that some communities are able to sustain their ODF status. When asked how these communities were sustaining their ODF status, several items were mentioned (see Table 4.4) and these have been presented under motivational, leadership, financial and behavioural factors. Other items such as fines and sanctions, League Tables and environmental conditions were reported.

- **Motivational sustainability factors**

The main motivational factors reported by the interviewees included: pride, dignity, comfort and convenience. Others were: available technical support, improved health, post-ODF follow-up, privacy, safety and security.

  - **Pride, dignity, comfort and convenience**

    All study participants mentioned pride, dignity, comfort and convenience as the main motivational factors for sustaining ODF status. The interviewees reported that ODF community members pride themselves on their ODF status whenever they visit OD communities.

    "To me, the number one motivating factor is the pride of owning an ODF status. You have no idea how they pride themselves with their title especially when they go for funerals in OD communities" (P1).

  - **Improved health, privacy, safety, security, post-ODF follow-up and available technical support**

    All the respondents indicated that the latrines built through the CLTS programme have helped in improving health, and provided safety, privacy and security. Some interviewees reported that some of the ODF community members always expressed the change in the health status of children in their communities. Other motivational factors mentioned by some of the respondents were: available technical support and post-ODF follow-up by FF and NLs. According to P5, P7, P8 and P17, they occasionally visit ODF communities to provide technical assistance upon request by NLs or when triggering nearby communities. They stated further that the readily available technical assistance combined with the unannounced visits have helped some communities to maintain their status since they do not want to be caught unawares.

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- **Leadership sustainability factors**

Active NLs and strong traditional support emerged as themes that motivated and encouraged communities to sustain their ODF status. Some interviewees indicated that communities that had strong leadership and active NLs attained ODF within a shorter duration and were also able to sustain their status. For instance, P7 revealed that the Chief of VOABI was a very supportive and active NL and, as a result, his community attained 100% latrine coverage within two weeks, and it is still ODF. Similarly, P3 noted that the Northern Region recorded the highest number of ODF communities because of the active support of the chiefs and the Regional/District Inter-Agency Coordinating Council (RICCS/DICCS), at both implementation and post-ODF stages. Conversely, P10 and P17 indicated that the Central Region recorded low ODF numbers because of a lack of leadership support at the district and community levels. For instance, P17 stated: "at CEABA, in the Central Region, the chief himself refused to construct the latrine on the basis that too much latrines will let the community smell".

- **Behavioural change sustainability factors**

Latrine rebuilding, construction of improved (quality) latrines and communities' understanding of the consequences of OD emerged as behavioural change sustainability factors, with enhancing factors such as enforcement of fines and sanctions, and regional/district league tables (RLT/DLT).

  - **Latrine rebuilding and construction of improved latrines**

    The interviewees reported that communities showed behavioural change through the reconstruction of collapsed latrines with local or durable materials. According to P3, in the North, a community can lose approximately 40% of latrines in the rainy season but almost all these latrines are reconstructed when the rains stop, "….and this is what I call behavioural change". P1 stated further that the communities are not only reconstructing collapsed latrines, but are also replacing the rudimentary ones with improved latrines. In addition, P11 noted that the programme had brought about behavioural change, such that people were ready to take loans to reconstruct improved latrines which previously they would not have done.

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- **Fines and sanctions**

  Some of the interviewees revealed that communities currently had understanding of the consequences of OD and, because of that, they had put measures in place not to return to OD. Examples of such measures include sanitation by-laws that dissuade people from returning to OD. The fine charges ranged from GH¢10.00 ($0.74) to GH¢ 20.00 ($3.75). Interestingly, P2 revealed that, as part of the measures to ensure that ODF status is sustained, a would-be husband in Akorpepe community in the Ho West Municipal District, must have a toilet facility in his house.

  "Madam, the people have changed. These people reconstructing improved latrines with their own money means change has occurred" (P17).

  "They set the fines and sanctions themselves, and they are working p*apaap*a [very well]" (P8)**.**

- **National/regional /municipal/ district league tables (LT)**

  The league table was mentioned by 21 out of 26 interviewees as a factor contributing to the implementation and sustainability of the CLTS programme among the MMDAs. As indicated earlier, the LT is a table that showcases the list of all ODF communities either at the national, regional or municipal/district level. The NLT are often published in the newspapers, whereas the regional and district tables are placed on boards at the respective offices. For instance, P3 indicated that in the North, the LT is launched at a grand durbar with chiefs of ODF communities, regional ministers, DCE/MCES, and implementers all in attendance. P3 stated further that the LT creates healthy competition among the MMDAs because the MMDAs that emerge first are rewarded with two motorcycles. While the Northern CTS implementers were committed to the launching of the DLTs, the Southern sector were not.

  "I remember at the first launch, Bunprugn Yunyo District was last. The DCE almost cried when his colleagues were teasing him but, at the second launch, his district moved to the 16th position'' (P3).

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- **Financial mechanisms**

According to P17, P23, P3, P5, P14, P15, and P1, the community members want improved latrines, yet, they have no money. To help them attain durable latrines, some of the NGOs institute the Village Savings and Loans Association for Sanitation (VSLAS) through the facilitators. P5 revealed that most of the communities that embraced the VSLAS constructed durable latrines and, so, are still ODF. According to P23, upon realising the effect of the VSLAS, the government was piloting a sanitation fund through some private financial institutions to enable farmers to borrow money to construct durable toilets and pay it back during harvest.

Table 4.4: Factors enhancing sustainability of CLTS in Ghana

No.	Description/Themes	Interviewees	
		A	B
1	Strong leadership and ownership by community.	All Interviewees	
2	Enforcement of by –laws / fines and sanctions.	All Interviewees	
3	Trained natural leaders' network/ Community Trained Volunteers.	All Interviewees	
4	Financial Mechanism (VSLAS).	Some Interviewees	P9, P14 and P15
5	Follow up after ODF declaration.	All Interviewees	
6	Regional/district league tables.	Some Interviewees	P5, P6 and P23
7	Dignity/pride/comfort/convenience.	All Interviewees	
8	Improved latrine technologies	All Interviewees	

Where **A** represents Interviewees who mentioned the themes and **B** represents interviewees who did not mention the themes

4.1.6. Factors Hindering the Sustainability of the CLTS Programme in Ghana

In response to Question 6: What are the barriers to the achievement and sustainability of ODF status?

The answers to question 6 address the second part of objective 4: to examine the factors affecting the improved performance and sustainability of the CLTS programme. The interviewees revealed whiles some communities have not been able to sustain their ODF status, others were not able to achieve ODF at all. Therefore, when asked what could be the factors

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hindering the achievement and sustainability of the programme, the factors mentioned were almost the reverse of the themes mentioned Table 4.4 in Section 4.1.6, as shown in Table 4.5. The themes included lack of behavioural change, lack of strong leadership / inactive Natural Leaders, reversion to OD (resulting from poor latrine quality, frequent collapse of latrine, lack of logistics and motivation for field facilitators), lack of behavioural change (insufficient time/short-term duration, inefficient post-triggering follow-ups), financial constraints (poverty/lack of financial support/mechanisms), lack of post-ODF follow-up, lack of government and community ownership, lack of enforcement of by-laws, expectation of subsidies and of the programme. Others included: inconsistent implementation modalities, poor road network, political interference, and poor toilet quality.

Among these factors, the main factor that affected ODF achievement and sustainability of ODF status was inactive traditional and natural leaders. P17 indicated that ODF achievement was sometimes difficult without the support of the chief. P11 reiterated that the situation is worst when the community members have no regard for their chiefs. P11 stated: “The fundamental problem in the Central Region is that most of the people have no regards for their chiefs. It is difficult to get people to participate in triggering”. Some of the interviewees expressed concern about the inconsistent implementation modalities. P5 stated: “Government has not been consistent with the implementation process at all. Today no subsidy, tomorrow subsidy. While some of us are trying to let the people construct latrines out of their own resources, government (CWSA) comes with free digni-loo [see Appendix C, Figure C7, World Bank-sponsored project] which changes everything”. All of the interviewees mentioned the previous subsidy approach as a significant hindering factor. P22 stated that almost every community in the North had received subsidy before and, so, the people were always in constant expectation of subsidy. According to the interviewees, this was a serious problem.

The second most important factor resulting in no ODF achievement and sustainability is financial constraints exhibited by Regarding hindrances to sustainability, all interviewees in affirmation mentioned reversion to OD as the main cause. The fundamental factor leading to slippage is the frequent collapse after floods. Although P3 reported that the Northern Region was always top of the league tables, the issue of slippage is very disturbing as a result of the constant seasonal floods. “Sometimes, a whole community can be wiped off. These people have lost their homes and are trying to build them. The last thing they think about is the toilet” (P3). In the Central Region, P11 reported that communities fail to reconstruct latrines because

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they have the beaches and a lot of forest around them. Other factors contributing to reversion to OD include financial constraints and poor quality of latrines. P1 stated that, because of the rudimentary nature of the latrines, they cannot stand the rains, especially when not lined. However, P17 and P5 revealed that most of the HHs want improved latrines but cannot afford them and, so, have to construct with local materials.

Another significant problem mentioned was a lack of post-ODF follow-up. None of the organisations included in this study had conducted any form of post-ODF follow-up. As indicated earlier, post-ODF rests with the government, but it fails to do it. All interviewees indicated that the main reason for the lack of follow-up by government is financial constraints. MMDAs fail to release money needed for fuel for motorcycles, maintenance and basic logistics, for example, raincoats. Some of the interviewees mentioned lack of ownership and commitment on the part of government and some of the communities, such that some officials always feel entitled to payment whenever they went to the field (P10, P11, P5,). P11 stated: "The attitude of the government officials shows lack of ownership. It is as if the programme belongs to us. While we, the NGOs are doing our part, government refuses to take up these communities and allow them to slip. Sometimes, some government officials require the NGOs to release money for ODF verification and assessment". P5 also shared: "At one of our meetings, one of the EHOs said, 'If we make all the communities become ODF, what work will we do?' With such a mindset, how can we attain ODF?". However, P17 reported that some of the FFs, who embark their own post-ODF follow-up, stop at some point for lack of recognition and logistics.

Table 4.5: Factors hindering achievement and its sustainability

No.	Theme/ Description	Interviewees	
		A	B
1	Inactive traditional and Natural Leaders	All interviewees	
2	Financial constraints	All interviewees	
3	Reversion to OD	All interviewees	
4	Lack of post-ODF follow-up	All interviewees	
5	Lack of behavioural change	All interviewees	
6	Lack of government and community ownership	Some interviewees	P4, P6, P20, P23
7	Lack of enforcement of sanitation by-laws	Some interviewees	P9, P11, P13, P15, P23

Where **A** represents Interviewees who mentioned the themes and **B** represents interviewees who did not mention the themes

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4.1.7. Factors that can increase the performance and sustainability of the CLTS programme

In response to Question 7: How can the CLTS programme be enhanced to improve performance (coverage) and sustainability

Question 7 was asked to find out what the stakeholders of the programme think can be done to improve on the performance and sustainability of the CLTS programme. The interviewees were asked to indicate in their view what they thought could be done to improve performance and sustainability of the CLTS programme. The factors that were identified from the transcripts included ownership of the CLTS programme by Government (government owning ODF communities) and communities (owning the ODF status), NGOs planning for post-ODF follow-up in the implementation of the CLTS programme, reward and recognition of field facilitators, active Natural Leaders and communities that are able to sustain their ODF, refresher training for Natural Leaders, national campaigns and promotions, hybrid CLTS (integrating CLTS with other interventions such as SanMark, friendly financial mechanisms). Some of the interviewees, especially the donor partners, responded that government and communities must first of all own the CLTS programme and ODF status, respectively. According to the interviewees, when government as well as communities take full ownership of the CLTS programme and its sanitation gains, slippage would reduce. Thus, when government owns the project, there would be funds allocated to embark on post-ODF follow-ups or, perhaps, communities would take ownership and trigger themselves instead of always waiting for government. Similarly, community ownership would foster a form of responsibility and commitment towards maintenance of ODF status.

Some interviewees also stated that, in order to sustain the morale of natural leaders, there should be refresher training for them from time to time. P5 stated that government should intensify national campaigns and promotions with the purpose of creating awareness. Some donor partners mentioned that the release of the MMDA common fund must be linked to the number of sustained ODF communities. A number of the interviewees indicated that communities that are able to sustain their ODF must be recognised together with their FFs, at World Toilet Day Celebrations for instance. P7 suggested that, since the NGOs are the sole financiers of the CLTS implementation, for long-term sustainability to be achieved, government should engage the NGOs to include sustainability measures such as intensifying and integrating CLTS with other interventions, such as SanMark, targeted subsidies and easy-to-access financial mechanisms to enable communities to build improved latrines

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permanently. These measures could be included right at the planning stages of the programme. Some excerpts from the transcripts follow:

"Madam, it's very painful when, after your toils, nobody recognises what you are doing. At least we should be celebrated too" P (17).

"Most of the MMDAs fail to release money for CLTS activities. I think they should tie the release of their common fund to the number of sustained ODF status. At least, for once, they will show some commitment towards the programme" (P5).

Some of the FFs suggested that organisations should extend the time of ODF achievement to between six months and one year to allow for behavioural change and more improved latrines to be constructed.

Table 4.6: Factors likely to increase performance and sustainability of the CLTS programme

No.	Theme/ Description	Interviewees	
		A	B
1	Ownership of CLTS programme	Some interviewees	P4, P6, P20, P23
2	Refresher Training for NLs	Some interviewees	P9, P13, P14, P15
3	Intensifying National campaigns and promotions	Some interviewees	P12, P18, P22, P23
4	Reward and recognition	Some interviewees	P9, P13, P14, P15
5	Hybrid CLTS	Some interviewees	P1, P6, P8, P12

Where **A** represents Interviewees who mentioned the themes and **B** represents interviewees who did not mention the themes.

4.2. Focus Group Discussions (FGDs) in ODF Communities

The FGDs were carried out across eight regions and in 25 communities, as shown in Table 4.4 and Appendix C, Figure C9. The results have not been presented according to each case study because the responses were similar. However, emphasis is placed on cases where responses differed. Also, the regions are grouped into the northern and southern sector, where the northern sector comprises the Northern region, North East, Savanah, Upper West and Upper East Regions, and the southern sector consists of Volta, Oti and Central Regions.

The question used in the FDGs were as follows:

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1. What were some of the activities undertaken during the implementation of the programme?
2. Which of the activities undertaken motivated the community to construct latrines or helped in achieving ODF?
3. How long has the community been ODF, and is it still ODF? If no, what were the causes for the slippage?
4. How are the communities sustaining their ODF status?
5. What do you think can be done to improve upon the implementation and the sustainability of the programme?

4.2.1. Knowledge on the activities undertaken during CLTS implementation

Response to Question 1: What were some of the activities undertaken during the implementation of the programme?

Question 1 was posed to the participants of the beneficiary communities address objective 2: to critically examine the activities carried out by the organisations implementing the CLTS programme. The purpose of this question was to obtain information about the knowledge level of the participants concerning the programme and to obtain information about the activities that were carried out during the implementation of the programme. Interestingly, most of the participants could remember and describe extensively some of the activities that were carried out. The most frequently described activities included: the transect walk (walk of shame), open defecation area mapping, shit calculation, feco-oral pathway and medical cost calculations. Other activities mentioned were: regular follow-up by the field facilitators, preparing and updating community plans, selecting and training NLs, enacting by-laws, and ODF declarations and celebrations. For example, a participant in the Central Region described a transect walk as follows: “We walked round the whole community and visited the places people defecate. When we saw a fresh toilet, the *Nsamasaman* [FF] would stop and ask ‘whose toilet is this?’ At some point he would point to somebody and we would laugh at them. At times, too, we would stand and smell the toilet. It was embarrassing and very shameful to see the community covered with toilet” (a woman, CEAKW). This signifies that communities could remember the activities carried out even years after implementation. As long as they remember these activities and how they felt, the communities are more likely to sustain their behaviour change as well as their ODF status. Implementers should consider creating more lasting memories that would remain in the minds of community members for a long time.

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4.2.2. Effects of activities undertaken towards the achievement of ODF (Performance of the CLTS programme)

Response to Question 2: Which of the activities undertaken motivated the community to construct latrines or helped in achieving ODF?

Question 2 was asked to address objective 2: to evaluate the impact of the activities carried out by the organisations on the improved performance and sustainability of the CLTS programme. The participants indicated that all the activities contributed to the achievement of the ODF status, especially the transect walk, defecation area mapping, shit calculation, feco-oral pathway, updating of community maps and regular follow-ups by the FFs, the verification, certification and the celebrations, and the introduction of VSLAS. The participants in the North shared that the shit calculation and the feco-oral pathway way were the activities that aroused a community-wide behavioural change towards OD practice. The reason was that most of the communities in the North drink from surface water, and the shit calculation showed how much faeces they were drinking into their systems. Also, most of the buildings in the North do not have kitchens where food can be placed and covered. This means that their foods are exposed to flies from faeces every day. Through the feco-oral pathway, the participants became aware of how much faeces they were ingesting. An opinion leader in UPEBAB shared: "after the calculation of the faeces, I realised how much faeces I have consumed all my life. I got angry in my spirit and said never again. I offered to be a natural leader and, in less than three months, we became ODF". He stated further: "our women are busy and would not wash the utensils nor clean the house on market days. After the *Samasama* [Field facilitator] explained how the flies get to the house, everyone called for change. Now our women keep the house neat". In fact, UPEBAB is one of the neatest communities in the Northern regions.

Unlike the Northern regions, the people in the southern sector live in semi-detached houses that have kitchens. However, the transect walk and the open defecation area mapping caused the community-wide behavioural change: "the open defecation area mapping showed how we were defecating behind our neighbours' houses. People were defecating behind each other's houses". A young woman in CEAAD, in the Central Region shared: "Through the open defecation area mapping, I realised I was defecating right behind my sister's house. I felt so embarrassed. I just offered to lead the campaign to stop the menace". Besides these triggering techniques, it was reported by all the participants that they were motivated by the presence of the FFs in the community to construct latrines. According to the participants, the celebrations after the ODF declaration that brought several dignitaries to the community left a lasting pride

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in their hearts. The participants also indicated how they pride themselves with their ODF status and signboards (refer to Appendix C, Figure C5), especially when visitors come to their communities.

Specifically, the VSLAS has been beneficial to the people of the North, as discussed in Section 4.2.4. Therefore, based on the results, it can be concluded that the activities undertaken by organisations were contributing to the performance of the CLTS programme.

4.2.3. Information about sustained ODF status and factors hindering the sustainability of ODF status

Response to Question 3: How long has the community been ODF, and is it still ODF? If no, what were the causes for the slippage?

The purpose of this question was to determine the number of years since ODF and to obtain information about the current ODF status of the communities which helped in addressing objective 4: to examine the factors influencing and **affecting the improved performance and sustainability of the CLTS programme.** The number of years since ODF differed per community and ranged between three and nine years. Eight out of the 25 communities responded "No", regarding reversion to ODF (See Table 4.7). The status of the communities was verified further through observational studies using an observational guide. Six out of the eight reversed communities were in the northern part of Ghana (Northern 3 regions, Upper East 2 and Upper West 1) and two in the southern part (Central 1 and Oti 1). According to observation, the numbers were high in the northern part of Ghana because the toilets are made of mud, whereas those in the southern parts are made of blocks (refer to Appendix C, Figure C1). Again, the northern part of Ghana usually experiences floods during the wet seasons and these rudimentary latrines are susceptible to floods. The reversed communities gave reasons such as the frequent collapse of toilets (see Figure C3), lack of access to water, lack of finances to buy materials to construct improved latrines, inactive NLs and traditional leadership, and lack of post-follow-up by FFs. One community, UPWBR, expressed concern for the need for waste management companies to de-sludge pits.

While some of the non-ODF communities showed evidence of reconstruction of toilets (refer to Figure C4) others did not, as shown in Figure C3 in Appendix C. "NOSCH" is a typical community which has refused to use the toilets and also failed to reconstruct because the entire community was aggrieved as they did not receive any financial support, although the municipal

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assembly claimed on a radio station that they did. This questions the behavioural change that the CLTS programme claims to achieve. The following are some excerpts from FGDs:
"The toilet is good but the collapse is too much. Every year you have to rebuild the toilet after the rains, this is the fourth one I am reconstructing. I have told myself; that is the last one. I may construct again if I get money that can build a KVIP" (a young man, UPEPGO).

"They should come for their toilet. We don't need it. You persuaded us to use our own money when they have given you money for us" (an opinion leader, NOSCH).

"Those times the field facilitator used to come around, everyone kept the toilet clean, and even the community was neat but these days he only comes to NOMAF, and so we have also relaxed" (NL, NOMAF).

Table 4.7: Lists of ODF and Non-ODF communities

Region	District	Code of Reference	Organisation for Implementation	Years after ODF	ODF status
	Bongo Soe	UPEBSAS	CWSA	3	Yes
		UPEBSAN	UNICEF	3	Yes
Upper East	Bongo	UPEBAB	CWSA	3	Yes
		UPEBAY	UNICEF	3	No
	Paga	UPEPGO	World Vision	3	Yes
		UPEPNA	CWSA/IDA	3	No
Upper West	Nandom	UPWTU	UNICEF	7	Yes
		UPWBR	SNV	3	No
Northern	Salvelugu	NOSNY	RING	3	No
Savannah East					
Western North		NOSCH	RING	3	No
	Mion	NOMMA	UNICEF	5	Yes
		NOMAF	UNICEF	5	No
Central					
		CEAAD	UNICEF	5	Yes
	AOB	CEAIS	UNICEF	5	Yes
		CEANS	UNICEF	3	Yes
	Adjumako	CEAKW	UNICEF	3	Yes
		CEABA	UNICEF	3	No

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Region	District	Code of Reference	Organisation for Implementation	Years after ODF	ODF status
Oti	Kadjebi	OTKMP	World Vision	9	Yes
		OTKYA	UNICEF	5	Yes
	Nkwanta	OTNAH	World Vision	3	Yes
		OTNSA	World Vision	5	No
Volta	Akatsi	VOABI	UNICEF	9	Yes
	South	VOAKP	UNICEF	4	Yes
	Ho	VOHHSO	UNICEF	7	Yes
		VOHHW	UNICEF	5	Yes

Source: Researcher's' field data

4.2.4. Factors enabling the sustainability of ODF status (sustainability of the CLTS programme)

Response to Question 4: How are the communities sustaining their ODF status?

Question 4 was asked to help in highlighting the factors enabling the sustainability of the CLTS programme. The response to the question helped in addressing objective 4: to examine the factors influencing and affecting the improved performance and sustainability of the CLTS programme. Several factors were identified in the transcripts and so were grouped under the following themes: supportive traditional and active natural leaders, available financial mechanism, available technical support, and enforcement of fines and sanctions (See Table 4.9). All the communities that were still ODF as at the time of data collection attributed it the supportive traditional leadership and active natural leaders in the community. Thus, most of the ODF communities attributed their ODF status to the hard work of their natural leaders who continue to embark on follow-ups, provide the technical support for latrine reconstruction, organise communal labour and enforcement of by-laws.

"In fact, we own our ODF this woman (FF). Every morning, she organises the women to sweep the entire community and she calls for communal labour when the places are bushy or from time to time" (an opinion leader, UPWTU).

Some of the FDG participants mentioned available financial mechanism in the form of Village Savings and Loans Association for Sanitation (VSLAS). The VSLAS was more functional in the northern part than the southern part. Communities in the south reported failed systems while, in UPEBSAN in the Upper East, the participants, indicated how beneficial the VSLAS has been. "The savings has not only helped in constructing toilets, now we can pay our

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children's school fees with it", a woman gladly shared in UPEBSAN. Again, in UPWBR in the Upper West Region, the Queen mother stated: "most of the households now have improved latrines through the VSLAS". Unfortunately, the UPWBR community was not still ODF because some sections of the communities still did not have latrines. According to some of the participants, they have been able to construct durable latrines because of the readily available technical support provided by the NLs and the trained volunteers in the community. "They always encourage us to construct durable latrines to save cost, opined an old man in CEAAD. It was also found out that the communities that are still ODF were governed by fines and sanctions. In UPEBAB, an old man indicated that though they have not used their laws before everyone is careful not to default because "in this community, we do not play with our laws".

Further, when asked: "What was their motivation for sustaining their ODF status?", all the communities mentioned improved health, pride and dignity, convenience and comfort, security, privacy and safety, available technical support, and unannounced follow-ups by FFs. Some of the participants stated that they no longer had to walk through the rain or thick darkness to the bush to attend sanitary needs. While some mentioned punctuality and safety of school children, FGD participants in the northern part of Ghana mentioned access to fresh vegetables during the wet season, which actually was not possible because of the practice of OD. Some of the FGD participants revealed that the unannounced visits by the implementers had made them cautious to abide by all the certification requirements. Also, the participants reported that some of the natural leaders (NLs) in the communities continued to embark on follow-ups on households, assist in the reconstruction of collapsed toilets, and call for communal labour to clean up the community.

"I feel safer using the toilet than using the bush. After using the toilet, I do not feel safe going to defecate in the bush again" (a participant, NOSCH).

"You can go to private at any time, even when it is raining" (chief, CEAAD).

4.2.5. Factors Perceived by communities to cause an increase in the performance and the sustainability of the CLTS programme

Response to Question 5: What do you think can be done to improve upon the implementation and the sustainability of the programme?

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Question 5 was asked to find out what the beneficiary communities to know what they think can be done to improve upon the performance and sustainability of the CLTS programme. The main themes that emanated from this question included financial support, provision of water and extension of the duration of implementation. All of the participants mentioned in affirmation financial support for construction of improved latrines. The participants of the southern sector indicated that the financial support could be in a form of loan that could be paid during harvest time (since most of the community members are farmers). While the people of the southern sector were willing to take up loans to construct improved latrines, the northern sector were asking for free latrines. Some communities suggested that the programme should include water and extend the duration of implementations to 6 months. In UPEBSAN, a woman stated: "3 months is too short. We are farmers and we need time to go to our farms. Some of us do not have people to help us, we have to wait for others to finish. The pressure was just too much".

4.3. Direct observations of communities

Direct observations in the communities were necessary first to complement the data collected at the FGDs and the SSIs. Secondly, the observations were necessary to provide evidence of the true state of the ODF communities. A direct observation was conducted in all 25 communities by the researcher with an observation guide (see Appendices A1 and B1) based on the verification and certification protocol of Ghana (Appendix C, Figure C10). From the observations, it was confirmed that 17 out of the 25 communities were still ODF (refer to Table 4.4 and Appendix B1). There was evidence of behavioural change in most of the ODF communities, such that the HHs were rebuilding and replacing rudimentary latrines with improved latrines. This was evident in most of the communities in the southern sector. For instance, in the Oti Region, a cocoa famer in OTKYA Community gladly showed his new KVIP (Kumasi ventilated improved pit) that he has built with a loan taken from the sanitation fund being piloted (refer to Appendix C, Figure C2). All the toilet facilities in CEAKW in the Central Region were all KVIP.

Behavioural change could also be seen in the communities based on the evidence of latrine use and neatness of the communities. In the northern regions, UPEBAB, UPEPGO, and UPWTU were the neatest communities, whereas almost all the communities, with the exception of CEANS and OTNSA, were neat in the southern sector. Some of the communities in the North

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were ODF but still not neat because they were full of plastic waste. However, all of the non-ODF communities in the northern regions were very dirty, especially UPEPNA (see Appendix B1).

All the latrines visited had tippy-tap, handwashing facilities, except for those in the north that had no water in them because of a lack of water. The observation also showed several more collapsed latrines in the north than in the southern sector. This was mainly because the toilets in the south are more durable. Two of the communities that recorded the highest latrine collapse were NOSCH and UPEBAY. The people of NOSCH have abandoned the toilets because of the disagreement they have with the MCE, indicating lack of behavioural change.

In summary, it can be inferred that the CLTS programme is being sustained, as communities have shown sustained behavioural change. However, behavioural change communication should be intensified while organisations implement the programme with the provision of water. These observations are consistent with the findings of Delaire *et al*. (2022) and Tribbe *et al*. (2021) who made similar observations in rural communities of Northern Ghana and Cambodia.

4.4. Chapter Summary

The qualitative data collected from stakeholders of the CLTS programme and the direct observations were presented in this chapter. Various findings based on thematic analysis were discussed. The findings from the direct observations were used to complement the results from the stakeholders.

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CHAPTER 5: QUANTITATIVE RESULTS

5.1. Introduction

In this chapter, the results and interpretation of the statistical analyses are presented. The chapter addresses objective 5: to develop a conceptual framework that can be used to improve upon the improved performance and sustainability of the research programme. This chapter is organised so that the first section contains general/background information, including the respondents' profiles and information about CLTS. The second and third sections contain construct descriptive statistics and the normality of the data, respectively. The last three sections consist of evaluation of the measurement and structural models, as well as further PLS-SEM analysis known as Importance-Performance Map Analysis (IPMA).

5.2. General Information

In this section of the analysis, background information is provided. This includes the respondents' profiles and information about CLTS. The results are presented in sub-sections 5.2.1 and 5.2.2.

5.2.1. Respondents' profile

In this sub-section, the respondents' profiles are recorded. These include: region, level of education, years of experience with the organisation, and years of experience with CLTS. The results are presented in Table 5.1.

Table 5.1: Respondents' profiles

Characteristics	Frequency	(%)
Region		
Ashanti	5	2.5
Central	9	4.5
Eastern	2	1.0
Greater Accra	9	4.5
North-East	4	2.0
Northern	45	22.3
Oti	11	5.4
Upper East	13	6.4
Upper West	18	8.9
Volta	84	41.6
Western	2	1.0
Total	**202**	**100.0**

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Characteristics	Frequency	(%)
Level of education		
Senior High School	6	3.0
Tertiary	181	89.6
Doctoral	5	2.5
Others	10	5.0
Total	**202**	**100.0**

Characteristics	Frequency	(%)
Years of experience with the organisation		
<1 year	7	3.5
1-5 years	65	32.2
6-10 years	67	33.2
11-16 years	37	18.3
16-20 years	17	8.4
21-25 years	7	3.5
>25 years	2	1.0
Total	**202**	**100.0**

Characteristics	Frequency	(%)
Years of experience with CLTS		
<1 year	9	4.5
1-5 years	94	46.5
6-10 years	85	42.1
11-16 years	12	5.9
16-20 years	2	1.0
Total	**202**	**100.0**

Table 5.1 shows that most of the respondents were from the Volta Region (41.6%), while 22.3% were in the Northern Region, 8.9% from the Upper West Region, and 6.4% from the Upper East Region. The rest were from the Ashanti Region (2.5%), Central Region (4.5%), Eastern Region (1.0%), Greater Accra Region (4.5%), North-East (2.0%), Oti Region (5.4%) and Western Region (1.0%). In terms of level of education, most (89.6%) had tertiary education. The rest reached senior high school level (3.0%), 2.5% had doctorate degrees, while 5% indicated others.

In terms of years of experience with their organisations, the majority (33.2%) had 6-10 years' experience, 32.2%, 18.3% and 8.4% had 1-5 years, 11-16 years, and 16-20 years' experience, respectively. Others had 21-25 years' experience (3.5%), >25 years' experience (1.0%) and <1 year experience (3.5%). Regarding years of experience with CLTS, most (46.5%) had 1-5 years' experience, 42.1% had 6-10 years' experience, and 5.9% had 11-16 years' experience. The rest had 16-20 years' experience (1%), and <1 year experience (4.5%).

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5.2.2. Information about CLTS

This sub-contains information about CLTS. Issues, such as interventions provided, support given by their bases, provision of subsidies and the reasons, among others, are discussed.

5.2.2.1. Interventions provided

Table 5.2 shows interventions that the organisations provided. Top among them is pure/traditional CLTS (71.6%), followed by CLTS + School-Led Total Sanitation (61.3%) and CLTS + Sanitation marketing (59.8%). Other interventions provided were CLTS + Support (45.6%), CLTS + Health Facilities (45.6%), and CLTS + Social Norms Campaign (45.1%).

Table 5.2: Interventions provided

Interventions	Frequency	(%)
Pure / Traditional CLTS	143	71.6
CLTS + Sanitation Marketing	122	59.8
CLTS + Support	93	45.6
CLTS + Social Norms Campaign	92	45.1
CLTS + School-Led Total Sanitation	125	61.3
CLTS + Health Facilities	93	45.6
Others (e.g., sanitation fund, SBCC, provision of water facility)	3	1.5
None	3	1.5

5.2.2.2. The interventions yielded sustainable outcomes

Table 5.3 shows the results of the interventions that yielded sustainable outcomes. From the table, CLTS + Sanitation Marketing (28.2%) emerged as the intervention that yielded the most sustainable outcomes. This was closely followed by Pure/Traditional CLTS (26.2%), and CLTS + Support (22.3%). Others were CLTS + Social Norms Campaign (9.9%), CLTS + School-Led total Sanitation (7.9%), and CLTS + Health Facilities (5.4%).

Table 5.3: Interventions which yielded sustainable outcomes

Interventions	Frequency	(%)
CLTS + Health Facilities	11	5.4
CLTS + Sanitation Marketing	57	28.2
CLTS + School-Led total Sanitation	16	7.9
CLTS + Social Norms Campaign	20	9.9
CLTS + Support	45	22.3
Pure / Traditional CLTS	53	26.2
Total	**202**	**100.0**

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5.2.2.3. Type of support given during CLTS implementation

Table 5.4 provides additional information about the support given under the CLTS + Support intervention. From the results, capacity building and training (71.7%) and supervision and monitoring (56.5%) were the dominant support offered. These were followed by technical support (43.5%), facilitating supply of sanitation hardware (41.3%), water and hygiene facilities (30.4%), and creating demand (21.7%). The remaining support included financial support (17.4%), reduced material cost (15.2%), reward in kind (8.7%), innovations (2.2%) and social behaviour change (2.2%).

Table 5.4: Support given

Support	Frequency	(%)
Capacity building and training	33	71.7
Facilitating supply of sanitation hardware	19	41.3
Creating demand	10	21.7
Supervision and monitoring	26	56.5
Financial support	8	17.4
Water and hygiene facilities	14	30.4
Reward in kind	4	8.7%
Technical support	20	43.5
Reduced material cost	7	15.2
Innovations	1	2.2
Social behaviour change	1	2.2

5.2.2.4. Bases for the support given during the implementation of the CLTS programme

Table 5.5 illustrates the bases for providing support. When the respondents were asked to provide the bases for providing the support, the results in Table 5.5 revealed that helping the poor and marginalised (42.2%) and hardworking and dedicated communities (28.9%) formed the major bases for delivering the support. Other bases were households with women as heads (13.3%) and serving as a form of motivation (8.9%).

Table 5.5: Bases for providing the support

Bases	Frequency	(%)
Hardworking and dedicated communities	13	28.9
Households with women as heads	6	13.3
To help the poor and marginalised	19	42.2
To serve as a form of motivation	4	8.9
Others	3	6.7
Total	**45**	**100.0**

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5.2.2.5. Provision of subsidy

Table 5.6 shows whether the organisations provided subsidy. It is evident that the majority (85.6%) did not provide subsidy. However, 14.4% claimed to have provided subsidy.

Table 5.6: Whether organisation provides subsidy

Response	Frequency	(%)
No	173	85.6
Yes	29	14.4
Total	**202**	**100.0**

5.2.2.6. Implementers' perceptions of Traditional CLTS (Pure CLTS) and Hybrid CLTS (CLTS + subsidy)

Table 5.7 shows the results for which of the two interventions (i.e. CLTS + subsidy vs traditional CLTS) has the potential to yield a more sustainable outcome. It was observed that a little over half of the respondents (55%) claimed CLTS + subsidy had the potential to yield a more sustainable outcome, while the rest (45%) opted for traditional CLTS.

Table 5.7: Intervention having the potential to yield a more sustainable outcome

Intervention	Frequency	(%)
CLTS + subsidy	111	55.0
Traditional CLTS	91	45.0
Total	**202**	**100.0**

5.2.2.7. Implementers' views on CLTS with subsidy

Table 5.8 shows why CLTS + subsidy has the potential to yield a more sustainable outcome compared with traditional CLTS. From the results in Table 5., most (47.5%) of the respondents claimed CLTS + subsidy enables poor households to construct improved latrines. Furthermore, 20.8% stated that CLTS + subsidy allows for the construction of improved latrines, 16.3% indicated that CLTS + subsidy enhances the increase in latrine coverage and ownership, and 12.4% indicated that CLTS + subsidy helps to improve self-mobilisation towards ODF. Other reasons (3%) were that CLTS + subsidy helps people to become more responsible in securing their total sanitation and allows for the construction of resilient and improved latrines that can be used for a longer time to help to change lives.

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Table 5.8: Reasons for CLTS + Subsidy

Reasons	Frequency	(%)
Allows for the construction of improved latrines	42	20.8
Enables poor households to construct improved latrines	96	47.5
Enhances increase in latrine coverage and ownership	33	16.3
Helps to improve self-mobilisation towards ODF	25	12.4
Others (e.g. Helping people become more responsible in securing their total sanitation; Allowing for the construction of resilient and improved latrines that can be used for a longer time to help to change lives)	6	3.0

5.2.2.8. Implementers' views on effects of CLTS with subsidy

Table 5.9 indicates the negative effects associated with CLTS + subsidy. It was observed that most respondents believed CLTS + subsidy can place financial stress on government (40.1%) and implementers, as well as dampen the spirit of self-mobilisation (31.7%). CLTS + subsidy also delays the CLTS implementation process (24.8%) and demotivates implementers (1%). Another effect is that CLTS + subsidy results in no complete ownership.

Table 5.9: Negative effects associated with CLTS +Subsidy

Effects	Frequency	(%)
Can dampen the spirit of self-mobilisation	64	31.7
Can delay the CLTS implementation process	50	24.8
Can put financial stress on government and implementers	81	40.1
Can demotivate implementers	2	1.0
Others, such as there is no complete ownership	5	2.5
Total	**202**	**100.0**

5.2.2.9. Implementers' views on when to give subsidy in the implementation process

The results regarding the stages of CLTS implementation process at which subsidy should be allowed are presented in Table 5.10. Most respondents (46.6%) suggested that subsidy should be allowed at the post-ODF stage to reconstruct durable toilets. In addition, 34.8% and 24.5% proposed post-triggering and triggering stages, respectively. Another stage at which subsidy should be allowed is during pre-triggering planning (4.5%).

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Table 5.10: Stage of CLTS implementation process when subsidy should be allowed

Stage	Frequency	(%)
Triggering	50	24.5
Post-triggering	71	34.8
Post-ODF for reconstruction of durable toilet options	95	46.6
Others such as during pre-triggering planning	9	4.5

5.2.2.10. Implementers' views on who should be given subsidy during the CLTS implementation process

When asked to indicate who should be given subsidy during the CLTS implementation process, as shown in Table 5.11, the results revealed that most (39.7%) believed anyone who cannot afford to construct latrine should be given subsidy during the CLTS implementation process. Furthermore, 27.2% and 14.9% proposed that the poor and the marginalised, and the old and disabled should be given subsidy during the CLTS implementation process, respectively. Also, 10.9% thought that everyone should be given subsidy during the CLTS implementation process, and 6.4% suggested that households with women as heads should be given subsidy during the CLTS implementation process. Others (1.5%) indicated that those who have started construction of latrines should be given subsidy during the CLTS implementation process.

Table 5.11: Who should be given subsidy during the CLTS implementation process

Options	Frequency	(%)
Everyone	22	10.9
Households with women as heads	13	6.4
The old and disabled	30	14.9
Anyone who cannot afford to construct a latrine	79	39.1
The poor and the marginalised	55	27.2
Others (e.g. those who have started construction of latrines)	3	1.5
Total	**202**	**100.0**

5.2.2.11. Implementers' views on what can be done to improve upon the performance and sustainability of the CLTS programme

Table 5.12 shows the respondents' views on what can be done to improve upon the performance and sustainability of the CLTS programme. It was observed that the top three recommendations were: the MMDAs enforcing sanitation by-laws (27.7%), MMDAs must prioritise and own CLTS (27.2%), and MMDAs and implementers must budget and carry out ODF follow-ups (26.7%). Moreover, 6.9% advised conducting national campaigns and promotions through mass media, 5.4% recommended that implementers should provide subsidy for improved

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latrines, while 4.5% proposed instituting a reward system at all levels. Other recommendations (1.5%) included intensifying social behaviour change, and MMDAs supporting implementing partners to subsidise improved latrines.

Table 5.12: What can be done to improve upon the performance and sustainability of CLTS

Recommendation	Frequency	(%)
MMDAs must prioritise and own CLTS	55	27.2
MMDAs must enforce sanitation by-laws	56	27.7
Instituting a reward system at all levels	9	4.5
MMDAs and implementers must budget and carry out ODF follow-ups	54	26.7
National campaigns and promotions through mass media	14	6.9
Implementers should provide subsidy for improved latrines	11	5.4
Others (e.g. Intensify social behaviour change campaigns, MMDAs support implementing partners to subsidise improved latrines)	3	1.5
Total	**202**	**100.0**

5.3. **Descriptive Analysis**

The descriptive statistics of the constructs are presented in this section. This includes the mean scores, standard deviations, skewness, and kurtosis of the measurement items. Table 5.13 shows the sample characteristics in terms of the descriptive statistics for the variables. The results in Table 5.13 revealed that all items had mean values exceeding 3.2, which signifies wide-ranging positive perception of the statements. On a five-point scale, according to Castro and Martins (2010), a mean value above 3.2 is a reasonable threshold to suggest positive perception of items. For leadership factors, the mean ranged from 4.31 to 4.39, with an overall mean score of 4.34. The mean scores for motivation factors and law enforcement ranged from 3.87 to 4.51 and 4.36 to 4.60, with composite mean scores of 4.31 and 4.48, respectively. Similarly, behavioural change factors and financial support had mean scores ranging from 3.98 to 4.64 and 4.12 to 4.44, with composite mean scores of 4.42 and 4.24, respectively.

Also, the mean scores for CLTS ownership and enhancing sustainable factors (i.e. improved performance and sustainability) ranged from 4.34 to 4.53 and 4.25 to 4.54, with overall mean scores of 4.44 and 4.41, respectively. Likewise, implementation factors and strategic and effective techniques had mean scores ranging from 4.10 to 4.82 and 4.48 to 4.75, with

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composite mean scores of 4.46 and 4.63, respectively. These results suggest that most of the respondents had positive perceptions about all the variables.

Evaluation of the skewness and kurtosis values suggest that most of the values were negatively skewed and were outside the normality range of -1 and +1 (for skewness); and -2 and +2 (for kurtosis). For normality, skewness should be close to zero, i.e. between -1 and +1; and kurtosis should be between -2 and +2 (George & Mallery, 2010). Thus, there were issues with normality. Consequently, the data were subjected to another form of normality tests (results reported in the next section).

Table 5.13: Descriptive statistics related to the factors

Items	N	Min.	Max.	Mean	Std. Deviation	Skewness	Kurtosis
Leadership Factors (LF)							
LF1	202	1	5	4.32	0.977	-1.805	3.324
LF2	202	1	5	4.32	0.952	-1.839	3.412
LF3	202	1	5	4.39	0.952	-1.939	3.685
LF4	202	1	5	4.32	0.947	-1.858	3.536
LF5	202	1	5	4.39	0.930	-1.855	3.440
LF6	202	1	5	4.33	0.871	-1.601	2.847
LF7	202	1	5	4.31	0.959	-1.538	2.023
Composite LF				*4.34*	*0.941*	*-1.776*	*3.181*
Motivation Factors (MF)							
MF1	202	1	5	4.44	0.822	-1.844	4.057
MF2	202	1	5	4.41	0.769	-1.586	3.441
MF3	202	1	5	4.23	0.864	-1.264	1.909
MF4	202	1	5	4.41	0.788	-1.980	5.662
MF5	202	1	5	4.46	0.811	-1.765	3.435
MF6	202	1	5	4.34	0.814	-1.586	3.453
MF7	202	1	5	4.50	0.793	-1.993	4.546
MF8	202	1	5	4.13	0.976	-1.213	1.400
MF9	202	1	5	4.35	0.847	-1.289	1.286
MF10	202	1	5	4.27	0.846	-1.348	2.296
MF11	202	1	5	4.24	0.906	-1.431	2.240
MF12	202	2	5	4.39	0.753	-1.126	0.870
MF13	202	1	5	4.34	0.851	-1.650	3.462
MF14	202	1	5	4.36	0.787	-1.417	2.354
MF15	202	1	5	4.51	0.774	-2.080	5.560
MF16	202	1	5	4.42	0.814	-1.697	3.580
MF17	202	1	5	4.43	0.796	-1.756	4.089
MF18	202	1	5	4.47	0.817	-1.615	2.293
MF19	202	1	5	3.87	1.177	-0.985	0.234
MF20	202	1	5	4.25	1.037	-1.388	1.107
MF21	202	1	5	3.94	1.114	-1.017	0.348

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Items	N	Min.	Max.	Mean	Std. Deviation	Skewness	Kurtosis
MF22	202	1	5	4.13	0.969	-1.123	0.945
MF23	202	1	5	4.13	0.888	-1.202	1.830
MF24	202	1	5	4.21	0.850	-1.001	0.740
MF25	202	1	5	4.44	0.797	-1.618	2.714
Composite MF				*4.31*	*0.866*	*-1.479*	*2.554*
Law Enforcement (LE)							
LE1	202	1	5	4.48	0.799	-1.897	4.445
LE2	202	1	5	4.60	0.713	-2.406	7.346
LE3	202	1	5	4.36	0.794	-1.465	2.808
Composite LE				*4.48*	*0.769*	*-1.923*	*4.866*
Behavioural Change Factors (BCF)							
BCF1	202	1	5	4.64	0.632	-2.524	9.806
BCF2	202	1	5	4.56	0.661	-2.049	6.998
BCF3	202	1	5	4.50	0.735	-1.710	3.527
BCF4	202	2	5	4.37	0.744	-1.236	1.605
BCF5	202	2	5	4.41	0.722	-1.190	1.366
BCF6	202	1	5	4.48	0.728	-1.731	3.937
BCF7	202	1	5	4.52	0.754	-2.174	6.368
BCF8	202	1	5	4.48	0.799	-2.031	5.079
BCF9	202	1	5	3.98	1.044	-1.038	0.754
BCF10	202	1	5	4.40	0.824	-1.726	3.671
BCF11	202	1	5	4.26	0.958	-1.633	2.704
Composite BCF				*4.42*	*0.782*	*-1.731*	*4.165*
Financial Support (FS)							
FS1	202	1	5	4.18	0.940	-1.271	1.681
FS2	202	1	5	4.19	0.981	-1.546	2.519
FS3	202	1	5	4.12	0.987	-1.254	1.551
FS4	202	1	5	4.27	1.036	-1.587	2.123
FS5	202	1	5	4.44	0.972	-2.065	4.021
Composite FS				*4.24*	*0.983*	*-1.545*	*2.379*
CLTS Ownership (CO)							
CO1	202	1	5	4.41	0.995	-2.125	4.314
CO2	202	1	5	4.47	0.786	-1.838	4.091
CO3	202	2	5	4.53	0.670	-1.410	1.884
CO4	202	1	5	4.34	0.944	-1.867	3.736
CO5	202	1	5	4.37	0.856	-1.855	4.155
CO6	202	1	5	4.51	0.755	-1.928	4.715
CO7	202	1	5	4.48	0.812	-1.993	4.708
Composite CO				*4.44*	*0.831*	*-1.860*	*3.943*
Enhancing Sustainable Factors (ESF)							
ESF1	202	1	5	4.30	0.805	-1.169	1.423
ESF2	202	1	5	4.54	0.639	-1.533	3.838
ESF3	202	1	5	4.33	0.818	-1.275	1.871
ESF4	202	1	5	4.40	0.836	-1.849	4.308
ESF5	202	1	5	4.50	0.793	-2.037	5.116
ESF6	202	1	5	4.25	0.981	-1.439	1.894
ESF7	202	1	5	4.46	0.727	-1.431	2.507
ESF8	202	1	5	4.42	0.907	-1.946	3.971

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Items	N	Min.	Max.	Mean	Std. Deviation	Skewness	Kurtosis
ESF9	202	1	5	4.45	0.804	-1.794	3.753
ESF10	202	1	5	4.42	0.801	-1.597	3.022
ESF11	202	1	5	4.41	0.843	-1.691	3.262
Composite ESF				*4.41*	*0.814*	*-1.615*	*3.179*
Implementation Factors (IMF)							
IMF1	202	2	5	4.82	0.421	-2.687	9.813
IMF2	202	2	5	4.63	0.577	-1.480	2.029
IMF3	202	1	5	4.19	1.010	-1.323	1.278
IMF4	202	1	5	4.20	0.892	-1.291	1.987
IMF5	202	1	5	4.61	0.654	-2.103	6.000
IMF6	202	1	5	4.36	0.910	-1.699	2.921
IMF7	202	1	5	4.45	0.785	-1.593	2.701
IMF8	202	2	5	4.39	0.746	-1.056	0.597
IMF9	202	2	5	4.71	0.581	-2.171	4.982
IMF10	202	1	5	4.59	0.729	-2.085	4.744
IMF11	202	1	5	4.55	0.816	-2.450	7.096
IMF12	202	1	5	4.43	0.803	-1.695	3.379
IMF13	202	1	5	4.10	0.988	-1.077	0.729
IMF14	202	1	5	4.18	1.073	-1.337	1.110
IMF15	202	1	5	4.51	0.755	-1.787	3.569
IMF16	202	2	5	4.53	0.720	-1.677	2.776
IMF17	202	1	5	4.56	0.725	-1.888	3.982
IMF18	202	2	5	4.58	0.620	-1.444	2.142
IMF19	202	2	5	4.40	0.754	-1.152	0.905
Composite IMF				*4.46*	*0.766*	*-1.684*	*3.302*
Strategies and Techniques (ST) / Effective Techniques (ET)							
ST1	202	2	5	4.71	0.563	-2.140	5.205
ST2	202	1	5	4.48	0.714	-1.505	2.912
ST3	202	2	5	4.64	0.686	-2.005	3.642
ST4	202	2	5	4.72	0.559	-2.215	5.562
ST5	202	2	5	4.64	0.592	-1.739	3.358
ST6	202	1	5	4.60	0.670	-2.038	5.346
ST7	202	2	5	4.75	0.556	-2.477	6.661
ST8	202	2	5	4.75	0.582	-2.652	7.528
ST9	202	2	5	4.53	0.699	-1.624	2.687
ST10	202	3	5	4.69	0.534	-1.491	1.313
ST11	202	2	5	4.50	0.700	-1.512	2.391
ST12	202	2	5	4.56	0.645	-1.421	1.780
ST13	202	1	5	4.58	0.680	-2.031	5.407
Composite ST/ET				*4.63*	*0.629*	*-1.912*	*4.138*

5.4. **Data Normality Test**

Further testing for statistical normality was conducted using the Kolmogorov-Smirnov and Shapiro-Wilk method. For non-normal distribution, the *p*-value must be less than 0.05 (Field, 2013; Osborne & Waters, 2019). The results presented in Table 5.14 show that all the items

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had *p*-values of less than 0.05 ($p < 0.05$). Thus, this study's data were not normally distributed. Since the normality assumption was not supported by the data in this research, it was necessary to carry out further statistical analysis, making use of non-parametric techniques such as the PLS-SEM (Hair *et al*., 2019; Hair Jr., 2021; Mishra *et al*., 2019).

Table 5.14: Normality of data

Items	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	*df*	Sig.	Statistic	*df*	Sig.
LF1	0.307	202	0.000	0.696	202	0.000
LF2	0.292	202	0.000	0.686	202	0.000
LF3	0.338	202	0.000	0.662	202	0.000
LF4	0.288	202	0.000	0.683	202	0.000
LF5	0.334	202	0.000	0.678	202	0.000
LF6	0.290	202	0.000	0.725	202	0.000
LF7	0.315	202	0.000	0.723	202	0.000
MF1	0.341	202	0.000	0.683	202	0.000
MF2	0.318	202	0.000	0.717	202	0.000
MF3	0.258	202	0.000	0.778	202	0.000
MF4	0.302	202	0.000	0.677	202	0.000
MF5	0.356	202	0.000	0.682	202	0.000
MF6	0.283	202	0.000	0.730	202	0.000
MF7	0.364	202	0.000	0.650	202	0.000
MF8	0.248	202	0.000	0.792	202	0.000
MF9	0.323	202	0.000	0.744	202	0.000
MF10	0.270	202	0.000	0.764	202	0.000
MF11	0.264	202	0.000	0.759	202	0.000
MF12	0.317	202	0.000	0.747	202	0.000
MF13	0.295	202	0.000	0.724	202	0.000
MF14	0.296	202	0.000	0.735	202	0.000
MF15	0.365	202	0.000	0.647	202	0.000
MF16	0.336	202	0.000	0.702	202	0.000
MF17	0.329	202	0.000	0.699	202	0.000
MF18	0.375	202	0.000	0.679	202	0.000
MF19	0.237	202	0.000	0.825	202	0.000
MF20	0.319	202	0.000	0.728	202	0.000
MF21	0.254	202	0.000	0.822	202	0.000
MF22	0.246	202	0.000	0.801	202	0.000
MF23	0.264	202	0.000	0.796	202	0.000
MF24	0.255	202	0.000	0.798	202	0.000
MF25	0.343	202	0.000	0.698	202	0.000
LE1	0.358	202	0.000	0.670	202	0.000
LE2	0.404	202	0.000	0.590	202	0.000
LE3	0.299	202	0.000	0.737	202	0.000
BCF1	0.412	202	0.000	0.577	202	0.000
BCF2	0.371	202	0.000	0.639	202	0.000
BCF3	0.361	202	0.000	0.680	202	0.000
BCF4	0.296	202	0.000	0.737	202	0.000

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Items	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	*df*	Sig.	Statistic	*df*	Sig.
BCF5	0.315	202	0.000	0.736	202	0.000
BCF6	0.342	202	0.000	0.681	202	0.000
BCF7	0.362	202	0.000	0.638	202	0.000
BCF8	0.351	202	0.000	0.656	202	0.000
BCF9	0.242	202	0.000	0.824	202	0.000
BCF10	0.321	202	0.000	0.705	202	0.000
BCF11	0.271	202	0.000	0.727	202	0.000
FS1	0.255	202	0.000	0.783	202	0.000
FS2	0.259	202	0.000	0.749	202	0.000
FS3	0.243	202	0.000	0.788	202	0.000
FS4	0.315	202	0.000	0.717	202	0.000
FS5	0.376	202	0.000	0.625	202	0.000
CO1	0.352	202	0.000	0.625	202	0.000
CO2	0.346	202	0.000	0.678	202	0.000
CO3	0.372	202	0.000	0.685	202	0.000
CO4	0.303	202	0.000	0.690	202	0.000
CO5	0.298	202	0.000	0.691	202	0.000
CO6	0.366	202	0.000	0.661	202	0.000
CO7	0.358	202	0.000	0.658	202	0.000
ESF1	0.279	202	0.000	0.771	202	0.000
ESF2	0.368	202	0.000	0.677	202	0.000
ESF3	0.300	202	0.000	0.758	202	0.000
ESF4	0.318	202	0.000	0.693	202	0.000
ESF5	0.362	202	0.000	0.653	202	0.000
ESF6	0.298	202	0.000	0.747	202	0.000
ESF7	0.345	202	0.000	0.713	202	0.000
ESF8	0.347	202	0.000	0.664	202	0.000
ESF9	0.339	202	0.000	0.684	202	0.000
ESF10	0.331	202	0.000	0.712	202	0.000
ESF11	0.334	202	0.000	0.704	202	0.000
IMF1	0.496	202	0.000	0.447	202	0.000
IMF2	0.416	202	0.000	0.635	202	0.000
IMF3	0.275	202	0.000	0.765	202	0.000
IMF4	0.246	202	0.000	0.781	202	0.000
IMF5	0.406	202	0.000	0.614	202	0.000
IMF6	0.323	202	0.000	0.705	202	0.000
IMF7	0.344	202	0.000	0.701	202	0.000
IMF8	0.319	202	0.000	0.751	202	0.000
IMF9	0.455	202	0.000	0.551	202	0.000
IMF10	0.414	202	0.000	0.607	202	0.000
IMF11	0.396	202	0.000	0.588	202	0.000
IMF12	0.335	202	0.000	0.699	202	0.000
IMF13	0.240	202	0.000	0.807	202	0.000
IMF14	0.293	202	0.000	0.754	202	0.000
IMF15	0.371	202	0.000	0.667	202	0.000
IMF16	0.377	202	0.000	0.661	202	0.000
IMF17	0.399	202	0.000	0.639	202	0.000
IMF18	0.390	202	0.000	0.664	202	0.000

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Items	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	*df*	Sig.	Statistic	*df*	Sig.
IMF19	0.323	202	0.000	0.742	202	0.000
ST1	0.450	202	0.000	0.558	202	0.000
ST2	0.351	202	0.000	0.703	202	0.000
ST3	0.438	202	0.000	0.581	202	0.000
ST4	0.455	202	0.000	0.547	202	0.000
ST5	0.420	202	0.000	0.617	202	0.000
ST6	0.406	202	0.000	0.621	202	0.000
ST7	0.472	202	0.000	0.507	202	0.000
ST8	0.475	202	0.000	0.488	202	0.000
ST9	0.376	202	0.000	0.666	202	0.000
ST10	0.443	202	0.000	0.597	202	0.000
ST11	0.359	202	0.000	0.685	202	0.000
ST12	0.389	202	0.000	0.671	202	0.000
ST13	0.393	202	0.000	0.629	202	0.000

a. Lilliefors Significance Correction

5.5. **Measurement Model Assessment (Confirmatory Composite Analysis)**

Considering the non-normality of the data, a PLS-SEM technique, using SmartPLS 4 (Ringle *et al*., 2022) was used for further analysis (Hair *et al*., 2019; Hair Jr., 2021). Consequently, the measurement model (i.e. confirmatory composite analysis) was evaluated in this section of the analysis, which includes checking the latent variables for reliability, convergent validity, and discriminant validity. The details of the findings are presented in Sub-sections 5.5.1 and 5.5.2.

5.5.1. Reliability and convergent validity tests

In this sub-section, reliability and convergent validity of the measures are assessed. Reliability and validity of the measures were enhanced by iterative processes, with low-loading items being removed (Hair *et al*., 2019). Cronbach's alpha and composite reliability coefficients (i.e. rho_a and rho_c) were used to determine the level of reliability of a construct, and an AVE > 0.50 was used to determine whether or not a construct had convergent validity *(Hair et al*., 2019; Usakli & Kucukergin, 2018).

5.5.1.1. Indicator loadings, reliability and collinearity results

Table 5.15 shows the indicator loadings, and reliability and collinearity results. The results demonstrate that all retained indicator loadings were significant ($p < 0.001$). Also, indicator reliability was established satisfactorily, as the reliability estimates were greater than 0.50. Also, there was no multi-collinearity issue in the data, as the VIF values were less than 5 (Hair *et al*., 2019; Saari *et al*., 2021; Sarstedt *et al.*, 2019).

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Table 5.15: Indicator loadings, reliability and collinearity results

Items	Loadings	Reliability	*t*-statistics	*p*-values	VIF
Behavioural Change Factors (BCF)					
BCF1	0.616	0.785	9.368	0.000	1.766
BCF2	0.792	0.890	19.601	0.000	2.674
BCF3	0.806	0.898	23.886	0.000	2.795
BCF4	0.650	0.806	11.774	0.000	1.724
BCF5	0.780	0.883	17.585	0.000	2.585
BCF6	0.745	0.863	17.020	0.000	2.156
BCF7	0.780	0.883	19.115	0.000	2.300
BCF8	0.732	0.856	12.931	0.000	2.083
BCF10	0.673	0.820	11.985	0.000	1.847
BCF11	0.604	0.777	8.879	0.000	1.441
CLTS Ownership (CO)					
CO1	0.791	0.889	19.644	0.000	2.537
CO2	0.732	0.856	10.848	0.000	1.827
CO3	0.719	0.848	14.384	0.000	1.650
CO4	0.808	0.899	20.113	0.000	3.034
CO5	0.697	0.835	11.549	0.000	2.249
CO6	0.747	0.864	15.180	0.000	1.892
CO7	0.776	0.881	14.892	0.000	1.971
Enhancing Sustainable Factors (ESF)					
ESF2	0.729	0.854	15.511	0.000	1.777
ESF3	0.617	0.785	11.984	0.000	1.607
ESF4	0.688	0.829	11.503	0.000	1.761
ESF5	0.750	0.866	15.299	0.000	2.182
ESF6	0.710	0.843	15.027	0.000	2.055
ESF7	0.788	0.888	18.057	0.000	2.360
ESF8	0.776	0.881	20.556	0.000	2.386
ESF9	0.820	0.906	23.219	0.000	2.932
ESF10	0.738	0.859	14.105	0.000	1.946
ESF11	0.821	0.906	24.067	0.000	2.795
Financial Support (FS)					
FS1	0.707	0.841	11.625	0.000	1.608
FS2	0.772	0.879	14.201	0.000	1.837
FS3	0.696	0.834	9.705	0.000	1.424
FS4	0.830	0.911	25.648	0.000	2.071
FS5	0.826	0.909	22.518	0.000	2.050
Implementation Factors (IMF)					
IMF1	0.704	0.839	10.852	0.000	1.843
IMF2	0.718	0.847	13.462	0.000	1.854
IMF5	0.736	0.858	17.092	0.000	1.951
IMF7	0.660	0.812	9.755	0.000	1.723
IMF9	0.754	0.868	14.523	0.000	2.368
IMF10	0.728	0.853	10.350	0.000	2.044
IMF11	0.742	0.861	12.389	0.000	2.198
IMF12	0.667	0.817	9.971	0.000	1.820
IMF15	0.671	0.819	12.398	0.000	1.883

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Items	Loadings	Reliability	*t*-statistics	*p*-values	VIF
IMF16	0.648	0.805	9.020	0.000	1.859
IMF17	0.667	0.817	10.567	0.000	2.210
IMF18	0.824	0.908	25.159	0.000	3.041
Law Enforcement (LE)					
LE1	0.665	0.815	7.017	0.000	1.214
LE2	0.872	0.934	35.150	0.000	1.832
LE3	0.856	0.925	28.026	0.000	1.713
Leadership Factors (LF)					
LF1	0.672	0.820	10.382	0.000	1.821
LF2	0.856	0.925	27.953	0.000	3.130
LF3	0.889	0.943	36.046	0.000	3.786
LF4	0.756	0.869	13.108	0.000	2.324
LF5	0.785	0.886	15.134	0.000	2.206
LF6	0.841	0.917	25.327	0.000	2.568
LF7	0.797	0.893	18.594	0.000	2.305
Motivational Factors (MF)					
MF2	0.770	0.877	18.761	0.000	2.371
MF3	0.662	0.814	11.202	0.000	1.912
MF4	0.784	0.885	18.740	0.000	2.645
MF5	0.759	0.871	17.873	0.000	2.809
MF6	0.742	0.861	15.269	0.000	2.635
MF7	0.696	0.834	11.522	0.000	2.344
MF9	0.747	0.864	18.631	0.000	2.463
MF10	0.697	0.835	12.350	0.000	2.420
MF12	0.700	0.837	14.474	0.000	2.074
MF13	0.655	0.809	10.572	0.000	1.962
MF14	0.661	0.813	10.855	0.000	1.923
MF15	0.780	0.883	18.238	0.000	2.533
MF16	0.675	0.822	10.654	0.000	1.971
MF17	0.648	0.805	13.414	0.000	1.722
MF18	0.614	0.784	9.851	0.000	1.677
Strategies and Techniques/Effective Techniques (ST/ET)					
ST3	0.635	0.797	9.935	0.000	1.459
ST4	0.734	0.857	11.975	0.000	2.074
ST5	0.750	0.866	13.154	0.000	2.236
ST6	0.700	0.837	7.986	0.000	1.966
ST7	0.795	0.892	18.173	0.000	2.458
ST8	0.770	0.877	14.781	0.000	2.233
ST10	0.710	0.843	15.704	0.000	1.730
ST11	0.604	0.777	10.741	0.000	1.727
ST12	0.722	0.850	15.343	0.000	2.259
ST13	0.715	0.846	10.192	0.000	1.911

5.5.1.2. Construct reliability and convergent validity

Table 5.16 shows the results for construct reliability and convergent validity. The results indicate that all the latent variables had construct reliability values above the minimum

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threshold of 0.7. Thus, construct reliability, using Cronbach's alpha and composite reliability coefficients (i.e. rho_a and rho_c), was established (Hair *et al*., 2019; Shmueli *et al*., 2019). For the convergent validity, it was evident that every construct had an AVE greater than the critical level of 0.50, thus meeting the requirements for convergent validity (Hair *et al*., 2019; Shmueli *et al*., 2019). Thus, construct measures demonstrated the presence of adequate construct reliability and convergent validity (Hair *et al*., 2019; Hair Jr. *et al*., 2017; Shmueli *et al*., 2019).

Table 5.16: Construct reliability and convergent validity

Constructs	Cronbach's alpha	Composite Reliability (rho_a)	Composite Reliability (rho_c)	Average Variance extracted (AVE)
Behavioural Change	0.896	0.900	0.915	0.520
Effective Techniques	0.893	0.896	0.913	0.512
Finance	0.826	0.840	0.878	0.591
Improved Performance and Sustainability	0.911	0.914	0.926	0.557
Institution Technical/Environmental Conditions	0.911	0.916	0.925	0.506
Law Enforcement	0.719	0.750	0.843	0.645
Leadership	0.907	0.917	0.926	0.644
Motivation and Commitment	0.928	0.932	0.937	0.501
Ownership	0.873	0.877	0.902	0.568

5.5.2. Discriminant validity tests

After confirming the construct reliability and convergent validity of the measurement model, the next step was to evaluate the model for discriminant validity (Hair *et al*., 2019; Hair Jr. *et al*., 2017). The three criteria for establishing the discriminant validity were applied in this study. Thus, the heterotrait-monotrait (HTMT) ratio (Table 5.17), Fornell and Larcker criterion (Table 5.18) and the cross-loading method (Table 5.19) were employed.

5.5.2.1. Hetrotrait-Monotrait (HTMT) criterion Test

Table 5.17 shows the HTMT values used in determining the discriminant validity of the constructs. All the HTMT values were less than the more cautious maximum threshold of 0.85. Thus, all the variables were distinct from one another and, hence, discriminant validity was established (Hair *et al*., 2019; Henseler *et a*l., 2015).

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Table 5.17: HTMT criteria

Constructs	1	2	3	4	5	6	7	8
1. Behavioural Change								
2. Effective Techniques	0.528							
3. Finance	0.719	0.453						
4. Improved Performance and Sustainability	0.656	0.611	0.686					
5. Institution /Technical Environmental Conditions	0.426	0.726	0.443	0.612				
6. Law Enforcement	0.617	0.285	0.565	0.488	0.237			
7. Leadership	0.622	0.301	0.456	0.359	0.345	0.417		
8. Motivation and Commitment	0.741	0.475	0.509	0.531	0.469	0.693	0.611	
9. Ownership	0.735	0.422	0.769	0.754	0.376	0.564	0.404	0.589

5.5.2.2. Fornell-Larcker criterion test

Table 5.18 shows the outcomes of using the Fornell-Larcker criterion for evaluating discriminant validity. As shown, the square root of the AVE (provided diagonally) for each construct is more than the inter-construct correlations for all latent variables. Thus, the discriminant validity of the latent constructs has been proven (Fornell & Larcker, 1981).

Table 5.18: Fornell-Larcker criteria

Constructs	1	2	3	4	5	6	7	8	9
1. Behavioural Change	***0.721***								
2. Effective Techniques	0.478	***0.716***							
3. Finance	0.624	0.386	***0.768***						
4. Improved Performance and Sustainability	0.601	0.560	0.599	***0.746***					
5. Institution Technical/ Environmental Conditions	0.388	0.663	0.386	0.565	***0.712***				
6. Law Enforcement	0.500	0.228	0.427	0.398	0.189	***0.803***			
7. Leadership	0.564	0.274	0.390	0.334	0.318	0.340	***0.802***		
8. Motivation and Commitment	0.684	0.437	0.449	0.492	0.433	0.568	0.570	***0.708***	
9. Ownership	0.668	0.386	0.662	0.673	0.350	0.446	0.376	0.544	***0.754***

5.5.2.3. Cross loadings of related factors

The cross-loading requirement for discriminant validity calls for indicators to have stronger associations with their target constructs than with any other constructs. Table 5.19 shows that the outer loading of each construct indicator is higher than its cross-loadings on the other

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constructs. Therefore, the application of the cross-loading standard also demonstrated the presence of discriminant validity (Bin-Nashwan *et al.*, 2019; Hair (Jr.) *et al*., 2017).

Table 5.19: Cross loadings

Items	BC	CO	IPS	FS	IMF	LE	LF	MF	ET
BCF1	***0.616***	0.267	0.346	0.368	0.309	0.281	0.407	0.420	0.358
BCF10	***0.673***	0.512	0.436	0.472	0.290	0.343	0.312	0.462	0.366
BCF11	***0.604***	0.501	0.508	0.629	0.363	0.302	0.364	0.337	0.316
BCF2	***0.792***	0.499	0.489	0.400	0.297	0.416	0.406	0.573	0.388
BCF3	***0.806***	0.532	0.469	0.451	0.270	0.336	0.402	0.514	0.352
BCF4	***0.650***	0.359	0.290	0.411	0.258	0.346	0.432	0.455	0.288
BCF5	***0.780***	0.488	0.405	0.446	0.246	0.351	0.466	0.554	0.356
BCF6	***0.745***	0.564	0.407	0.443	0.199	0.447	0.409	0.534	0.386
BCF7	***0.780***	0.551	0.516	0.462	0.236	0.413	0.456	0.517	0.279
BCF8	***0.732***	0.476	0.416	0.407	0.346	0.346	0.419	0.549	0.365
CO1	0.498	***0.791***	0.505	0.605	0.193	0.359	0.277	0.383	0.177
CO2	0.476	***0.732***	0.458	0.427	0.269	0.468	0.310	0.529	0.289
CO3	0.572	***0.719***	0.409	0.464	0.308	0.205	0.358	0.493	0.367
CO4	0.484	***0.808***	0.557	0.583	0.201	0.347	0.249	0.335	0.205
CO5	0.365	***0.697***	0.477	0.477	0.178	0.318	0.201	0.262	0.197
CO6	0.572	***0.747***	0.575	0.432	0.341	0.355	0.325	0.456	0.425
CO7	0.502	***0.776***	0.569	0.513	0.316	0.320	0.226	0.358	0.319
ESF10	0.480	0.464	***0.738***	0.377	0.416	0.276	0.248	0.377	0.453
ESF11	0.466	0.537	***0.82 1***	0.425	0.528	0.328	0.237	0.396	0.539
ESF2	0.507	0.500	***0.729***	0.416	0.458	0.290	0.371	0.441	0.488
ESF3	0.323	0.401	***0.617***	0.457	0.434	0.163	0.237	0.345	0.370
ESF4	0.452	0.452	***0.688***	0.430	0.467	0.257	0.245	0.411	0.408
ESF5	0.425	0.551	***0.750***	0.508	0.381	0.260	0.251	0.332	0.366
ESF6	0.417	0.497	***0.710***	0.541	0.340	0.345	0.207	0.272	0.337
ESF7	0.468	0.502	***0.788***	0.413	0.402	0.304	0.201	0.355	0.427
ESF8	0.437	0.541	***0.776***	0.540	0.399	0.308	0.249	0.331	0.349
ESF9	0.468	0.565	***0.820***	0.402	0.388	0.410	0.237	0.392	0.413
FS1	0.397	0.384	0.367	***0.707***	0.317	0.273	0.358	0.368	0.356
FS2	0.429	0.420	0.376	***0.772***	0.281	0.343	0.272	0.289	0.268
FS3	0.441	0.513	0.399	***0.696***	0.306	0.343	0.342	0.299	0.284
FS4	0.555	0.562	0.510	***0.830***	0.289	0.294	0.248	0.359	0.300
FS5	0.548	0.624	0.605	***0.826***	0.302	0.386	0.305	0.404	0.289
IMF1	0.246	0.180	0.308	0.192	***0.704***	0.120	0.098	0.205	0.423
IMF10	0.303	0.303	0.503	0.380	***0.728***	0.133	0.203	0.262	0.476
IMF11	0.253	0.198	0.356	0.340	***0.742***	0.134	0.166	0.293	0.451
IMF12	0.208	0.184	0.342	0.230	***0.667***	0.097	0.228	0.227	0.389
IMF15	0.292	0.350	0.424	0.272	***0.671***	0.105	0.244	0.338	0.410
IMF16	0.203	0.218	0.381	0.274	***0.648***	0.146	0.286	0.307	0.396
IMF17	0.222	0.173	0.278	0.140	***0.667***	0.138	0.244	0.323	0.446
IMF18	0.296	0.241	0.426	0.251	***0.824***	0.137	0.258	0.308	0.574
IMF2	0.337	0.276	0.466	0.293	***0.718***	0.131	0.254	0.316	0.608
IMF5	0.320	0.252	0.458	0.327	***0.736***	0.174	0.309	0.371	0.486
IMF7	0.275	0.246	0.357	0.275	***0.660***	0.153	0.238	0.398	0.387

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Items	BC	CO	IPS	FS	IMF	LE	LF	MF	ET
IMF9	0.292	0.311	0.444	0.271	***0.754***	0.138	0.179	0.320	0.545
LE1	0.319	0.286	0.268	0.376	0.165	***0.665***	0.241	0.416	0.148
LE2	0.422	0.392	0.327	0.337	0.150	***0.872***	0.240	0.504	0.244
LE3	0.450	0.386	0.358	0.333	0.147	***0.856***	0.333	0.450	0.155
LF1	0.335	0.151	0.168	0.303	0.185	0.169	***0.672***	0.341	0.185
LF2	0.501	0.367	0.343	0.372	0.271	0.297	***0.856***	0.479	0.219
LF3	0.456	0.348	0.274	0.270	0.193	0.267	***0.889***	0.458	0.173
LF4	0.359	0.241	0.188	0.237	0.220	0.293	***0.756***	0.378	0.186
LF5	0.449	0.253	0.232	0.295	0.276	0.238	***0.785***	0.488	0.197
LF6	0.525	0.327	0.269	0.354	0.292	0.292	***0.841***	0.550	0.280
LF7	0.491	0.369	0.359	0.340	0.321	0.332	***0.797***	0.464	0.277
MF10	0.398	0.310	0.321	0.328	0.406	0.415	0.405	***0.697***	0.265
MF12	0.397	0.292	0.266	0.227	0.302	0.307	0.377	***0.700***	0.301
MF13	0.378	0.336	0.309	0.276	0.299	0.332	0.323	***0.655***	0.350
MF14	0.436	0.395	0.381	0.341	0.327	0.456	0.358	***0.661***	0.373
MF15	0.498	0.390	0.407	0.247	0.337	0.421	0.429	***0.780***	0.390
MF16	0.474	0.345	0.209	0.271	0.226	0.299	0.431	***0.675***	0.287
MF17	0.500	0.384	0.447	0.396	0.357	0.389	0.378	***0.648***	0.306
MF18	0.521	0.426	0.414	0.298	0.283	0.370	0.258	***0.614***	0.364
MF2	0.569	0.429	0.377	0.342	0.286	0.473	0.443	***0.770***	0.322
MF3	0.446	0.354	0.283	0.236	0.182	0.375	0.386	***0.662***	0.188
MF4	0.592	0.432	0.377	0.337	0.290	0.483	0.468	***0.784***	0.306
MF5	0.492	0.328	0.281	0.319	0.349	0.358	0.498	***0.759***	0.307
MF6	0.495	0.449	0.374	0.346	0.334	0.414	0.441	***0.742***	0.281
MF7	0.416	0.450	0.392	0.347	0.224	0.390	0.337	***0.696***	0.268
MF9	0.550	0.410	0.352	0.421	0.390	0.488	0.478	***0.747***	0.323
T10	0.394	0.269	0.402	0.256	0.468	0.132	0.217	0.351	***0.710***
ST11	0.292	0.223	0.331	0.299	0.374	0.191	0.221	0.289	***0.604***
ST12	0.300	0.279	0.378	0.323	0.454	0.191	0.202	0.312	***0.722***
ST13	0.342	0.356	0.444	0.335	0.469	0.248	0.158	0.291	***0.715***
ST3	0.393	0.261	0.413	0.267	0.390	0.163	0.228	0.288	***0.635***
ST4	0.362	0.267	0.433	0.206	0.494	0.127	0.193	0.320	***0.734***
ST5	0.273	0.269	0.353	0.219	0.490	0.179	0.238	0.265	***0.750***
ST6	0.276	0.232	0.323	0.228	0.495	0.095	0.168	0.269	***0.700***
ST7	0.375	0.293	0.431	0.324	0.544	0.136	0.197	0.385	***0.795***
ST8	0.353	0.294	0.450	0.291	0.555	0.172	0.134	0.321	***0.770***

5.6. **Structural Model Assessment**

After it was determined that the measurement model was adequate in terms of its reliability and validity, an evaluation of the structural model was carried out to provide an estimate of the impact that the predictor variables had on the outcome variables. The results include the structural model's fit and explanatory power (Table 5.20), predictive power and relevance, using PLSpredict (Table 5.21), direct effects (Table 5.22) and indirect effects (Table 5.23) (Hair *et al*., 2019; Hair Jr *et a*l., 2017; Ringle *et al*., 2020).

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5.6.1. Structural model fit and explanatory power of related factors

Table 5.20 shows the model fit and explanatory power of the structural model. As demonstrated in Table 5.20, the results showed that the model had a good fit, as the standardised root mean square residual (SRMR) was 0.071, which is less than the 0.08 threshold (Hu & Bentler, 1998). Furthermore, the d_G value of 6.870 is below the 95% and 99% confidence interval values. Thus, using both SRMR and d_G values, the structural model exhibited a good fit, hence the path relations could be examined.

Furthermore, the statistics in Table 5.20 signified that the structural model had good explanatory power (Hair *et al*., 2019; Usakli & Kucukergin, 2018). Specifically, the R^2 values demonstrated that the model explained 66.9% of variation in behavioural change and 36.1% of variation in improved performance and sustainability, respectively. This implies that effective techniques, finance, institution technical/environmental conditions, law enforcement, leadership, motivation and commitment, and ownership contributed significantly to behavioural change. Similarly, behavioural change meaningfully accounted for improved performance and sustainability.

Table 5.20: Structural model fit and explanatory power (Coefficient of determination)

Fit Criteria	**Estimate**	
SRMR	0.071	
d_ULS	16.051 (95%CI = 11.323; 99%CI = 12.563)	
d_G	6.870 (95%CI = 9.005; 99%CI = 9.956)	
Explanatory power (Coefficient of determination)		
Construct	**R^2**	**Adjusted R^2**
Behavioural Change	0.669	0.657
Improved Performance and Sustainability	0.361	0.358

5.6.2. Structural model's predictive power using PLS-Predict

Based on the PLSpredict technique, out-of-sample predictive relevance/accuracy and power of the structural model is recorded in Table 5.21 (Legate *et al*., 2021; Shmueli *et al.*, 2019). As presented in Table , all the Q^2 predict values were positive, indicating that the PLS-SEM model out-performed the most naïve linear model (LM) benchmark (Hair *et al.*, 2019). In addition, the results revealed that the PLS-SEM model had lower RMSE and MAE compared with higher RMSE and MAE values for the LM model. Consequently, it was concluded that the structural

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model had a high level of predictive relevance/accuracy and power (Sarstedt *et al*., 2021; Shmueli *et al*., 2019).

Table 5.21: Structural model's predictive power using PLS-Predict

Items	Q^2predict	PLS-SEM_RMSE	PLS-SEM_MAE	LM_RMSE	LM_MAE
BCF1	0.156	0.583	0.403	0.742	0.512
BCF10	0.275	0.703	0.497	0.860	0.617
BCF11	0.270	0.822	0.595	0.932	0.689
BCF2	0.293	0.558	0.396	0.645	0.458
BCF3	0.289	0.622	0.437	0.751	0.531
BCF4	0.223	0.658	0.504	0.883	0.633
BCF5	0.330	0.593	0.445	0.749	0.546
BCF6	0.358	0.585	0.416	0.633	0.480
BCF7	0.319	0.626	0.422	0.724	0.489
BCF8	0.296	0.673	0.439	0.852	0.596
ESF10	0.194	0.722	0.554	0.916	0.645
ESF11	0.242	0.735	0.561	0.806	0.577
ESF2	0.245	0.557	0.461	0.694	0.509
ESF3	0.173	0.748	0.595	0.813	0.607
ESF4	0.201	0.750	0.555	0.963	0.638
ESF5	0.224	0.701	0.510	0.880	0.600
ESF6	0.204	0.880	0.658	1.059	0.745
ESF7	0.198	0.653	0.525	0.808	0.585
ESF8	0.232	0.797	0.562	0.831	0.605
ESF9	0.240	0.703	0.528	0.839	0.601

5.6.3. Direct path (effects) of factors

As shown in Table 5.22 and Figure 5.1, eight direct paths were examined. The results revealed no multi-collinearity concerns, as all the VIF values were below 3, ranging from 1.000 to 2.360. (Hair *et al*., 2019). The assessment of the direct path results revealed six significant direct effects out of the eight direct paths. Specifically, strategic or effective techniques (β = 0.174; *SE* = 0.077; p = 0.023; f^2 = 0.047; 95%CI [0.032; 0.330]), financial support (β = 0.201; *SE* = 0.089; p = 0.024; f^2 = 0.061; 95%CI [0.039; 0.389]), and leadership factors (β = 0.194; *SE* = 0.073; p = 0.008; f^2 = 0.074; 95%CI [0.069; 0.367]) had significant positive influence on behavioural change. Similarly, motivational factors (β = 0.276; *SE* = 0.119; p = 0.020; f^2 = 0.098; 95%CI [0.060; 0.513]), and CLTS ownership (β = 0.250; *SE* = 0.103; p = 0.016; f^2 = 0.090; 95%CI [0.086; 0.494]) had momentous positive effect on behavioural change. However, institution technical/environmental conditions (contextual factors (implementation factors; β = -0.084; *SE* = 0.063; p = 0.184; f^2 = 0.011; 95%CI [-0.232; 0.022]) and law enforcement (β = 0.056; *SE* = 0.084; p = 0.509; f^2 = 0.006; 95%CI [-0.111; 0.209]) had insignificant effects on behavioural change. These findings imply that effective techniques, finance, leadership,

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motivation and commitment, and ownership were significant predictors of behavioural change. However, behavioural change was not significantly driven by contextual factors (institution technical/environmental conditions) and law enforcement.

Lastly, the direct path between behavioural change and improved performance and sustainability emerged to be significantly positive ($\beta = 0.601$; $SE = 0.080$; $p = 0.000$; $f^2 = 0.565$; 95%CI [0.413; 0.732]). This suggests behavioural change drives improved performance and sustainability.

Table 5.22: Direct path (effects) results

Paths	β	*SE*	*t*-statistics	*p*-values	f^2	VIF	Bias Corrected Confidence Interval	
							LL (2.5%)	UL (97.5%)
ST/ET -> BC	0.174	0.077	2.268	0.023	0.047	1.926	0.032	0.330
FS -> BC	0.201	0.089	2.256	0.024	0.061	1.991	0.039	0.389
IMF -> BC	-0.084	0.063	1.330	0.184	0.011	1.935	-0.232	0.022
LE -> BC	0.056	0.084	0.661	0.509	0.006	1.606	-0.111	0.209
LF -> BC	0.194	0.073	2.654	0.008	0.074	1.542	0.069	0.367
MF -> BC	0.276	0.119	2.327	0.020	0.098	2.360	0.060	0.513
CO -> BC	0.250	0.103	2.415	0.016	0.090	2.090	0.086	0.494
BC -> IPS	0.601	0.080	7.540	0.000	0.565	1.000	0.413	0.732

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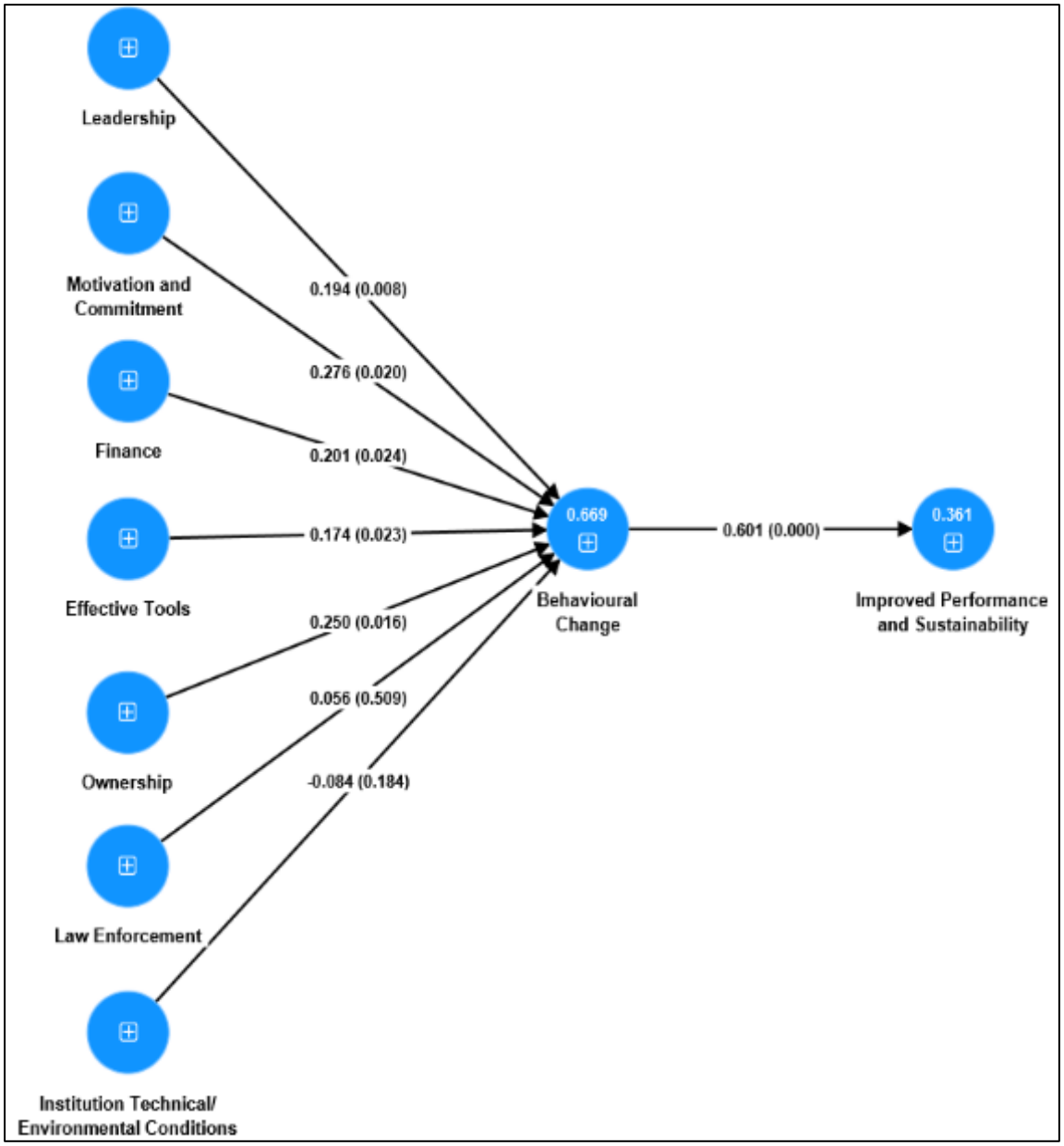

Figure 5.1: Structural model estimates

5.6.4. Indirect path (mediating effects) of factors

The mediating effects of behavioural change are recorded in Table 5.23. It is evident that, with exceptions of institutional/technical/environmental conditions (implementation factors) and law enforcement factors, strategic or effective techniques (β = 0.104; *SE* = 0.050; p = 0.036; 95%CI [0.016; 0.211]), financial support (β = 0.121; *SE* = 0.053; p = 0.023; 95%CI [0.024; 0.233]), and motivational factors (β = 0.166; *SE* = 0.075; p = 0.027; 95%CI [0.036; 0.324]) had significant indirect effects on improved performance and sustainability through behavioural change. Similarly, leadership factors (β = 0.117; *SE* = 0.045; p = 0.009; 95%CI [0.042; 0.228]), and CLTS ownership (β = 0.150; *SE* = 0.074; p = 0.043; 95%CI [0.041; 0.344]) had significant

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indirect effects on improved performance and sustainability through behavioural change. According to Carrión *et al*. (2017) and Nitzl *et al*. (2016), a mediating effect exists when the indirect effect is significant. These results suggest that behavioural change mediated (although partially, as both direct and indirect effects were significant) the influence of strategic or effective techniques, financial support, leadership, motivation and commitment, and ownership on improved performance and sustainability. In other words, strategic or effective techniques, financial support, leadership, motivation and commitment, and ownership drove behavioural change which, in turn, led to improved performance and sustainability.

Table 5.23: Indirect path (mediating effects) results

Paths	*β*	*SE*	*t*-statistics	*p*-values	Bias Corrected Confidence Interval	
					LL (2.5%)	UL (97.5%)
ST/ET -> BC -> IPS	0.104	0.050	2.099	0.036	0.016	0.211
FS -> BC -> IPS	0.121	0.053	2.275	0.023	0.024	0.233
LE -> BC -> IPS	0.034	0.051	0.655	0.512	-0.071	0.125
IMF -> BC -> IPS	-0.050	0.038	1.320	0.187	-0.140	0.012
MF -> BC -> IPS	0.166	0.075	2.215	0.027	0.036	0.324
LF -> BC -> IPS	0.117	0.045	2.607	0.009	0.042	0.228
CO-> BC -> IPS	0.150	0.074	2.024	0.043	0.041	0.344

5.7. Importance-Performance Map Analysis (IPMA)

IPMA is a form of advanced analysis that is employed in PLS-SEM, and was used in this study so that the predictors of the research model could be understood more thoroughly (Ringle & Sarstedt, 2016). It is essential to carry out this analysis because it assists in putting management initiatives in appropriate order of importance. In effect, the IPMA gives practical implications for defining realistic management and policy measures to enhance the performance of the predictors (Ramayah *et al*., 2018; Ringle & Sarstedt, 2016; Saari *et al*., 2021; Sarstedt *et al*., 2014; Valaei & Jiroudi, 2016). Accordingly, the importance and performance of all predictors of the target constructs, behavioural change (Table and Figure) and improved performance and sustainability (Table and Figure), are examined in this section.

5.7.1. Importance Performance Map of predictors for behavioural change

As demonstrated in Table 5.24 and Figure 5.2, the trend of importance revealed that motivation and commitment (0.276) had the highest importance in shaping behavioural change, closely followed by ownership (0.250), financial support (0.201), leadership (0.194) and strategic or

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effective techniques (0.174). However, institutional/technical/environmental conditions (implementation factors; -0.084), and law enforcement (0.056) are less important in driving behavioural change. Thus, motivation and commitment, ownership, financial support, leadership and strategic or effective techniques are the five most important factors for driving behavioural change. This suggests that priority must be given to factors such as motivation and commitment, ownership, financial support, leadership and strategic or effective techniques to facilitate behavioural change.

Table 5.24: IPMA results for behavioural change

Predictors	Importance (Total Effects)	Performances
Effective Tools	0.174	88.412
Finance	0.201	81.303
Institution Technical/ Environmental Conditions	-0.084	88.757
Law Enforcement	0.056	87.067
Leadership	0.194	83.481
Motivation and Commitment	0.276	84.634
Ownership	0.250	85.643

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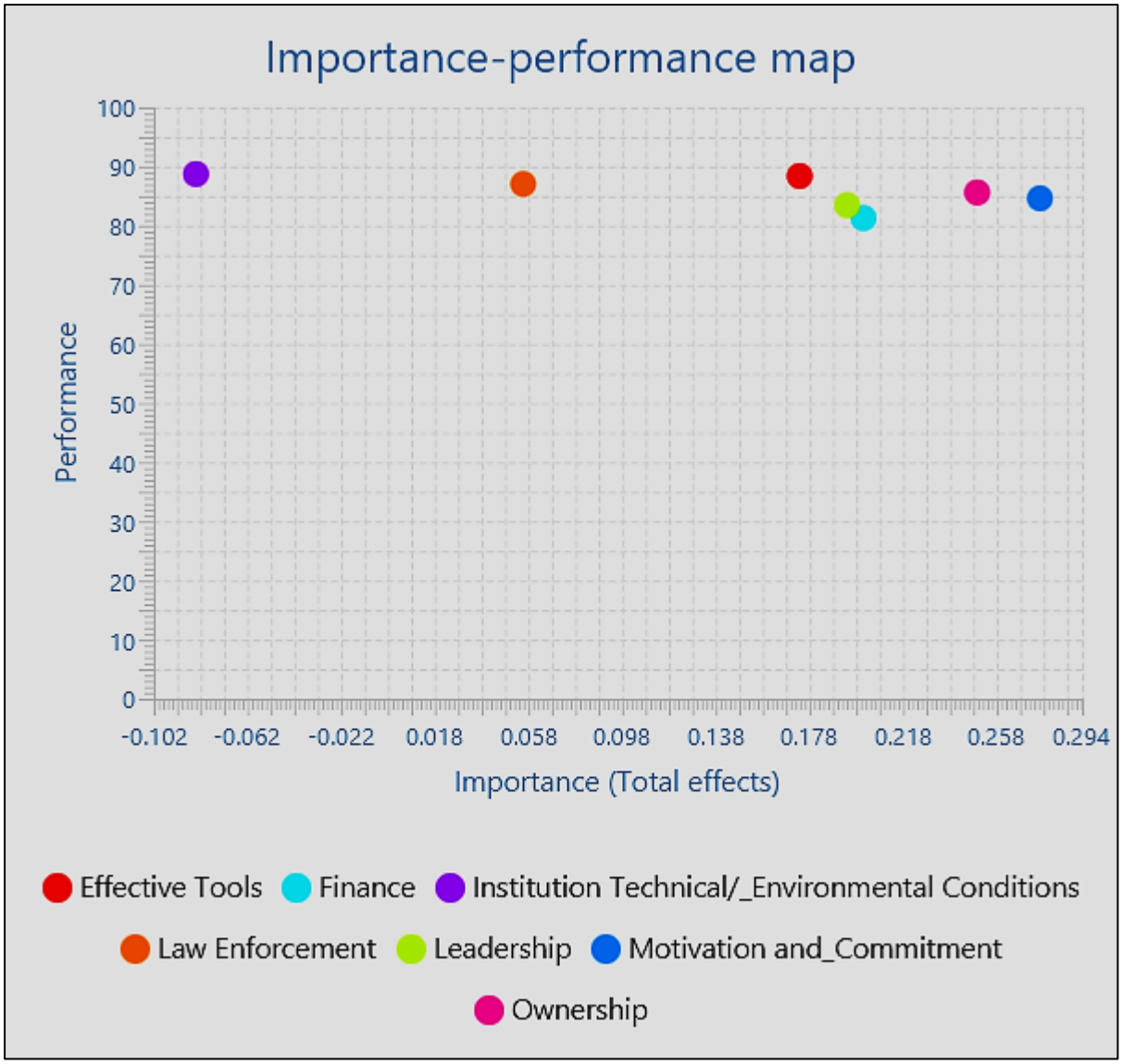

Figure 5.2: IPMA for behavioural change

5.7.2. Importance Performance Map of predictors for improved performance and sustainability of the CLTS programme

As shown in Table 5.25 and Figure 5.3, behavioural change (0.601) has the uppermost importance in shaping improved performance and sustainability. This is closely followed by motivational factors (0.166), then ownership (0.150), financial support (0.121), leadership (0.117) and strategic/effective techniques (0.104). Again, institutional/technical/environmental conditions (implementation factors; -0.050), and law enforcement (0.034) were less significant in fostering improved performance and sustainability. Thus, to foster improved performance and sustainability, priority should be given to behavioural change, motivation and commitment, ownership, financial support, leadership and strategic/effective techniques.

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Table 5.25: IPMA results for improved performance and sustainability

Predictors	Importance (Total Effects)	Performances
Behavioural Change	0.601	85.791
Effective Techniques	0.104	88.412
Finance	0.121	81.303
Institution Technical/Environmental Conditions	-0.050	88.757
Law Enforcement	0.034	87.067
Leadership	0.117	83.481
Motivation and Commitment	0.166	84.634
Ownership	0.150	85.643

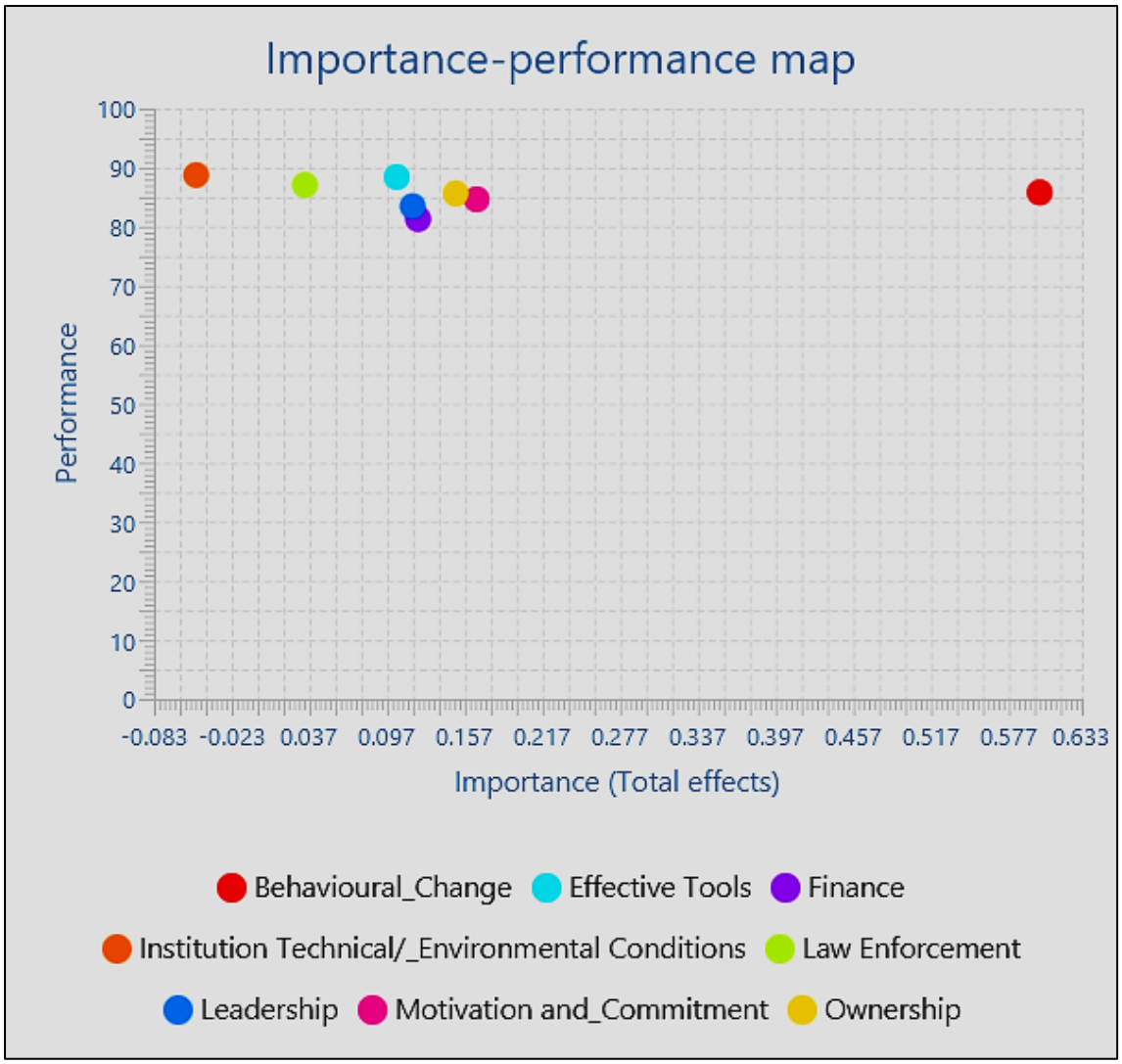

Figure 5.3: IPMA for improved performance and sustainability

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5.8. **Chapter Summary**

In this chapter, the descriptive statistics of the stakeholders of CLTS implementation, and the parameters necessary for CLTS improved performance and sustainability were discussed. A discriminant validity test was carried out to establish the associations between the respondents and the constructs. The descriptive statistics provided the means and standard deviations for the constructs. In addition, normality tests were conducted using the Kolmogorov-Smirnov and Shapiro-Wilk methods. PLS-SEM analysis, involving measurement framework assessment to examine the validity and reliability of latent variables, and the structural framework assessment was carried out. Consequently, an analysis of the reliability and convergent validity of the measures was examined. Eight associations or direct paths were examined and six of them had direct significant effect, whereas two did not.

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CHAPTER 6: DISCUSSION

6.1. Introduction

Achieving ODF is a fundamental step towards ensuring long-lasting change in sanitary practices and hygienic behaviours. Thus, ODF achievement is the first step towards CLTS performance and sustainability. Sustainability involves, not only the initial success of triggering behavioural change through latrine construction and use, but also the continued adherence to improved sanitary practices and the ability of a community to progress up the Sanitation Ladder. This chapter is divided into two sections. In the first section, the discussion is focused on intervention integrated with the CLTS for sustainable outcomes of the programme, support for the CLTS programme, and indicators for improving the sustainability of the CLTS programme based on experts' views. In the second section, the descriptive statistics of the constructs making up the framework, resulting from the structural equation modelling based on eight hypotheses are discussed. The results showed six significant associations and two non-significant associations between the independent variables (leadership, ownership, finances, effective techniques, law enforcement and contextual factors), the mediating variable (behavioural change) and the dependent variable (improved performance and sustainability). The hypothesis that stated that law enforcement positively influences behavioural change, and the hypothesis that stated that contextual factors positively influence behavioural change were rejected, while the remaining six hypotheses that stated leadership influences behavioural change, finances influence behavioural change, ownership influences behavioural change, effective techniques influence behavioural change, and behavioural change influences improved performance and sustainability could not be rejected. The discussion of the structural results is based on Figure 6.1. The chapter concludes with the chapter summary.

6.2. Available Interventions Based on Experts' Views

As indicated above, this section contains information about the CLTS, and the hybrids implemented by the organisations implementing the CLTS programme. The experts who participated in the study were learned (with the majority having tertiary education) and experienced individuals with over five to ten years of experience with the CLTS intervention.

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6.2.1. CLTS programme plus integrated interventions

The results mean that the most prevalent interventions are pure or traditional CLTS and integration of CLTS with school led total sanitation followed by sanitation marketing. This implies that, even though organisations are implementing pure CLTS, it is not implemented as a stand-alone programme but is integrated with other interventions. This finding is supported by Figure 6.1, and Venkataramanan *et al*. (2018) and Crocker *et al*. (2017) who purported that, for sustained behavioural change in sanitation, CLTS should not be used as a stand-alone intervention. This finding underscores a foundational commitment to the community-driven approach of CLTS, where local communities are expected to participate actively in the planning and execution of their sanitation issues. Further, a dual focus on both community and school environments suggests a comprehensive approach to sanitation. It suggests that experts believe schools are influential hubs for disseminating sanitation awareness and influencing behavioural change among members of communities. In addition, they perceived that economic and marketing aspects of sanitation are important factors to be considered. Incorporating marketing strategies that are aligned with the broader goal of promoting sustainable sanitation, makes sanitation products and services more attractive and accessible to communities. Subsequently, the results reflect a recognition that effective sanitation initiatives require a combination of community engagement, educational interventions in schools, and market-driven strategies that provide goods and services where they are needed at an affordable price. These results suggest a dynamic and adaptable approach among the surveyed organisations, displaying a commitment to leveraging diverse interventions to achieve meaningful and sustainable improvements in sanitary and hygienic behaviours.

It was observed that all interventions aimed at promoting sustainable outcomes fall below the 50% threshold. This raises serious concerns about the effectiveness and longevity of the implemented strategies. Sustainable outcomes often require continued efforts, community engagement, and ongoing support. Therefore, a lower probability of sustainable outcomes could be the result of a potential lack of emphasis on long-term planning and sustainability within the design and implementation of the interventions. Additionally, a lack of integration of community feedback and participation might be a contributing factor. The explanation for this result is that sustainable interventions are more likely to succeed when they are aligned with community needs, values, and practices. If the interventions are not effectively engaging the entire community or there is a disconnect between the interventions and the community context, achieving sustained outcomes is likely to become challenging. However, the findings

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revealed that the experts believed that CLTS + SanMark is likely to yield sustainable results, and this is consistent with the findings of Guiteras *et al*. (2015) and Novotný *et al*. (2018), who found that sanitation marketing increased sustained sanitation behaviours.

It is also noted that CLTS + subsidy, and traditional CLTS have the potential to yield more sustainable outcomes. Based on a similar study in Ghana, it was found that CLTS interventions, such as subsidies for the poor to eliminate OD, while aiding the poor to construct latrines improved performance (Radin *et al*., 2020). Similarly, targeted subsidies for the poor increased latrine ownership and coverage in rural communities of Northern Ghana (Israel *et al*., 2022). This finding is also supported by findings by Nicoletti *et al*. (2022), who found that CLTS with targeted subsidy increased the sales and construction of durable latrines in Cambodia.

6.2.2. CLTS + support

The results indicated capacity-building, training, supervision, and monitoring as being the dominant supportive measures in the CLTS programme. This indicates that, from the perspective of experts, a complete and community-focused approach is essential. By investing in the skills, knowledge, and continuous follow-ups among households and communities, organisations are likely to create a basis for sustained behavioural change and the long-term success of the CLTS programme.

Besides, the provision of support for the CLTS programme being directed towards the poor and marginalised, and support provided for hardworking, dedicated communities would accentuate a high commitment towards the sustainability of CLTS gains, thereby contributing to the longevity of the programme. From the findings, the experts believed that CLTS + subsidy has to be given to anyone who cannot afford to construct a latrine, and not the poor alone. This approach might not only address immediate change in sanitatary behaviours, but also contribute to a long-term, community-wide behavioural change and the CLTS programme in general. This is supported by the studies of Israel *et al*. (2022) and Trimmer *et al*. (2022), who found that, although subsidies were given to the poor and marginalised, there were many HHs that could still not afford construction materials and improved latrines. Similarly, in India, when support was given to all HHs, with the poor receiving more support, latrine coverage and improved latrines increased (Orgill-Meyer *et al*., 2019).

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However, the results also highlighted the negative effects associated with the implementation of the CLTS programme combined with subsidies. It was observed that a significant portion of the respondents (40.1%) expressed concerns that the CLTS + subsidy approach could place a substantial financial burden on the government. This observation is noteworthy as it suggests that this approach might lead to demand for substantial financial resources, which might not always be readily available. According to previous studies, the need for government funding to sustain CLTS + subsidy initiatives could strain public budgets and potentially divert resources from other critical sectors (Guiteras *et al*., 2015).

Another concerning aspect is the impact of subsidy on CLTS implementers. A notable 31.7% of respondents believed that the introduction of subsidies could dampen the spirit of self-mobilisation within communities. This finding is critical, as CLTS often relies on community engagement and self-driven initiatives to promote change in sanitary behaviours (Andres *et a*l., 2019; Kar & Pasteur, 2005). This implies that the introduction of subsidies might inadvertently lead to a reduction in community-driven efforts, as people might become reliant on external financial incentives rather than taking ownership of sanitation projects themselves. It was observed further that approximately 25% of the respondents' expressed concerns that the inclusion of subsidies in CLTS programmes can lead to delays in the implementation process. This result explains that there is a possibility of delay in the overall implementation timeline, which could hinder the timely achievement of ODF associated with the CLTS programme. Moreover, a very small percentage of respondents (1%) reported that a CLTS + subsidy intervention could demotivate implementers, specifically donors. While this percentage is relatively low, it should not be overlooked, because a small number of demotivated implementers can have a significant impact on the implementation and success of the CLTS programme since they are the sole financiers of the programme as reported by Tsekpetse-Akuamoah e*t al*. (2022) and USAID (2018).

These findings underscore the importance of carefully designing and managing the CLTS + subsidy intervention to minimise potential drawbacks. Results-based funding that rewards a whole community with water systems or incentives to construct improved latrines could be considered, as indicated by Andres *et al*. (2019) and Perez *et al*. (2012). This is likely to address the issue of providing subsidy, not only for the poor, but for all who cannot afford to construct improved latrines. To address the issue of implementation delays, programme implementers and governments should provide results-based approaches that will recognise and reward

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communities that sustain their ODF status, as was done in Morocco (Perez *et al*., 2012). Organisations and governments should plan when to phase out subsidies in order to ensure efficient fund allocation. In addition, measures should be established to monitor FF activities to provide transparency in the administration of subsidies. Care should also be taken to avoid missing the core principle of the CLTS programme, which is the emphasis on no subsidy that makes it relatively cost effective, as found by Radin *et al*. (2020).

6.2.3. Indicators for improving sustainability of the CLTS programme

The CLTS practitioners' ranking of enforcement of sanitation by-laws, prioritising and owning CLTS, and budgeting for ODF follow-ups by MMDAs suggests a recognition of the role of local governance in the success and sustainability of sanitation behaviours. The expert's agreement on MMDAs enforcing sanitation by-laws and prioritising CLTS is an indication that community behaviour can be changed by regulatory frameworks and sustained commitment from local authorities. Sanitation by-laws serve as legal instruments that provide a basis for regulating and enforcing sanitation standards (Mensah *et al*., 2022). This suggests that, to sustain significant behavioural change, MMDAs must be active in creating an environment where communities are legally bound to adopt and maintain improved sanitation practices. However, this should be done with care in order not to infringe on the rights of the poor and marginalised (Bartram *et al*., 2012; Engel & Susilo, 2014).

The behavioural change towards championing and sustaining CLTS interventions can continue when MMDAs integrate broader development plans, allocate resources, and ensure continuous efforts in sanitation monitoring. The recommendation for MMDAs and implementers to budget and carry out ODF follow-ups indicates that achieving ODF status is a significant milestone, but sustaining it requires on-going efforts. Post-ODF follow-up has been reported to increase the sustainability of the CLTS programme, but it is rarely carried out because of a lack of finances from local government (Apanga *et al*., 2022; Venkataramanan, 2016). Experts calling for budget allocation and for post-follow-up activities suggests a commitment to engagement, ensuring that communities, not only achieve ODF status, but also maintain and build upon those achievements. Based on a study, Sigler *et al*. (2015) analysed behavioural change techniques in a community-led total sanitation programme and found that CLTS practitioners ranked follow-up and monitoring activities as the most important activities for achieving ODF.

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In general, the findings collectively emphasise the need for local governance to scale up their commitment in terms of finances to ensure that post-ODF activities are carried out for long-term sustainability. Involvement of MMDAs is critical in creating an enabling environment for sustainable behavioural change and improved sanitation practices within communities. The findings ultimately suggest the need for a collaborative and integrated approach, where local authorities prioritise and are actively involved in sanitation programmes.

6.3. **Positive Stakeholders' Perception of the CLTS Programme**

The measured mean values exceeding 3.2 for all items within each factor (conditions) that enables CLTS sustainability, (leadership, financial support, ownership, law enforcement, motivation and commitment, as well as institutional, technical, and physical conditions), generally indicate a positive stakeholder perception. On a five-point scale, according to Castro and Martins (2010), a mean value above 3.2 is a reasonable threshold to suggest positive perception of items. Therefore, the findings of the study highlight a positive assessment of various enabling factors that influence CLTS. In the context of CLTS, leadership is one of the important factors, with mean values above 3.2 suggesting a strong and effective guiding influence. This could mean that organisational and community leaders are successfully aligning with the CLTS objectives, providing direction, and promoting a sense of collective purpose among community members. In addition, the positive assessment suggests that financial support is perceived as important in the implementation and sustainability of the CLTS programme, as well as other sanitation-related projects and programmes within the community.

Ownership reflects a sense of responsibility among local government authorities, implementers and community members. The result suggests that, when local government, as well as communities, own CLTS achievements and engage in CLTS initiatives, the sustainability of behavioural changes would be reinforced. The positive assessment of law enforcement, motivation, and commitment factors, each with mean values surpassing 3.2, indicates that regulatory frameworks, motivational strategies, and efforts to build commitment are perceived positively within the community. This suggests that the legal context is supportive, motivation is effective, and community members are committed to the CLTS goals. Contextual factors, such as institutional support, technical expertise, and physical facilities, are perceived as strong contributing factors to the overall evaluation of the performance and sustainability of the CLTS programme.

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In general, consistent, high, mean values across all enabling CLTS sustainability factors (enabling conditions) affirms a positive perception of CLTS implementers about the importance of leadership, financial support, ownership, law enforcement, motivation, and commitment, as well as institutional, technical, and physical conditions in the sustainability of the CLTS programme. This suggests that, when a conducive environment is provided, there is potential for effective CLTS implementation and sustained behavioural change in sanitation practices within the community.

6.4. **Structural Equation Modelling**

This section addresses objective 5: to develop a framework that would guide organisations towards improved performance and sustainability of the CLTS programme. A structural framework was based eight (8) hypotheses. The hypotheses were tested using structural equation modelling analysis. The analysis confirmed six (6) significant associations and two (2) non- significant associations between the exogenous variables (leadership, motivation and commitment, finances, effective tools and ownership), the intervening variable (behavioural change) and the endogenous variables (improved performance and sustainability). This implies that the hypotheses H1, H2, H3, H4, H5 and H8 in the conceptual model were supported. Thus, these 6 hypotheses are accepted. However, law enforcement and technical/institutional factor did not have significant relationship with the outcome variables (improved performance and sustainability). Hence, H6 and H7 in the conceptual model were rejected. In view of this, the discussion in the subsequent sections will be done based on Figure 6.1.

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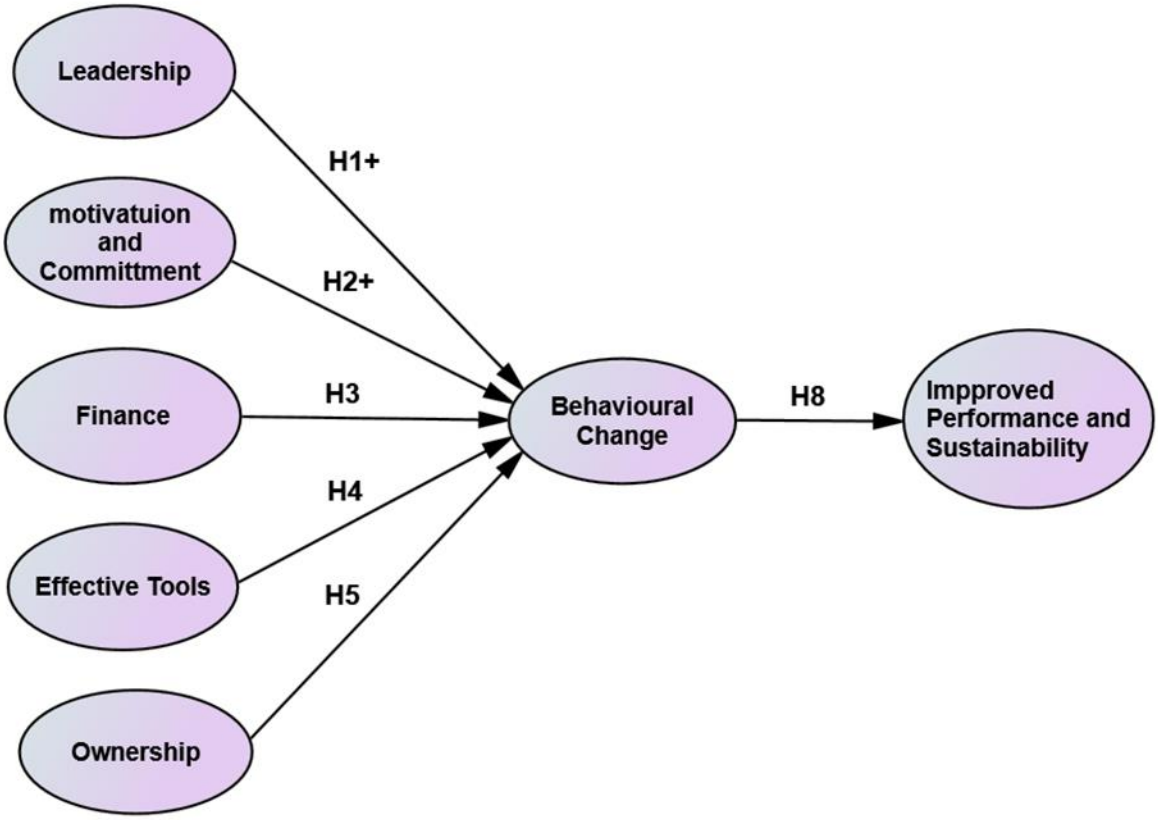

Figure 6.1: An improved performance and sustainability framework of the CLTS programme in Ghana

6.4.1. Relationship between leadership and behavioural change

The result shown in Figure 6.1 depicts that leadership has a positive and significant influence on behavioural change towards the sustainability of the CLTS programme. This means that a strong community leadership drive, active NLs combined with the strong involvement of a sanitation committee and effective leadership of government can drive a community toward accepting and sustaining the CLTS intervention. The finding is supported by the findings of Tribbe *et al*. (2021) and Delaire *et al*. (2022) that strong traditional and active natural leadership promoted the latrine coverage, consistent latrine uses and sustainability of ODF status in Ghana. Similarly, the finding concurred with the finding of Shrestha *et al*. (2018) that effective government leadership contributed to the increase in latrine coverage in Nepal. This suggests that, with influential, innovative and active leadership from national government to the local levels (MMDAs and communities) during both implementation and post-implementation, the CLTS programme can experience long-term sustainability. Similarly, strong leadership which enhances free flow of information, co-ordination and engagement among local government

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officials, traditional and natural leaders, and community members, can significantly improve behavioural change towards sustainability of the CLTS programme.

6.4.2. Relationship between motivation and commitment and behavioural change

The result shows a direct, positive significant relationship between motivation and commitment and behavioural change towards improved CLTS programme performance. There is no literature that directly supports this finding. However, inferences can be drawn from findings of previous, related studies. For instance, Harter *et al*. (2018) showed a strong association between latrine ownership and latrine rebuilding among the people of Mozambique. Similarly, Crocker *et al.* (2017), associated latrine rebuilding with a potential behavioural change in sanitation behaviours in Ghana and Ethiopia. This is an indication that ownership fosters behavioural change which is needed to sustain and maintain sanitation practices in the long term.

Again, the finding can be related to the findings of Sakas *et al.* (2022) who reported that local government and community leadership that owned the CLTS programme showed high-levels of commitment and responsibility towards ODF achievement and sustainability by providing the necessary funding and adequate local government staff and logistics for CLTS activities. For instance, in Ghana, strong ownership combined with supportive leadership translated into behavioural change towards OD, thereby resulting in high numbers of sustained ODF communities (UNICEF, 2019). This implies that, when local government and communities own the CLTS programme and its outcomes, it could foster behavioural change that will lead to improved performance and sustainability.

6.4.3. Relationship between ownership and behavioural change

The result shows a direct, positive, significant relationship between ownership and behavioural change towards improved CLTS programme performance. There is no literature that supports this finding directly. However, inferences can be drawn from the findings of previous, related studies (Alemu *et al*., 2018; Mosler *et al*., 2018; Orgill-Meyer *et al*., 2019; USAID, 2021). Based on these studies, it was found that ownership influences latrine rebuilding, consistent use and sustainability of ODF status. Similarly, the finding of the present study can be related to the findings of UNICEF (2019) and Venkataramanan (2016), who reported that local government and community leadership that owned the CLTS programme showed high-levels of commitment and responsibility towards ODF achievement and sustainability by providing

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the necessary funding and adequate local government staff and logistics for CLTS activities. For instance, in Ghana, strong ownership combined with supportive leadership translated into behavioural change towards OD, thereby resulting in high numbers of sustained ODF communities (UNICEF, 2019). This implies that, when local government and communities own the CLTS programme and its outcomes, it could foster behavioural change that will lead to improved performance and sustainability.

6.4.4. Relationship between effective techniques and behavioural change

The result shows that strategic or effective techniques had a direct, positive, significant influence on behavioural change towards improved CLTS performance. This result affirmed the importance of strategic or effective techniques in driving sustained behavioural changes through the CLTS programme. This proves that the religious use of activities and techniques can motivate and bring about positive community-wide behavioural change which will lead to improved performance and sustainability of the CLTS programme. This finding is supported by Venkataramanan *et al*. (2018), who stated that CLTS activities can serve as motivation that drives behavioural change. Active NLs combined with effective follow-up by FFs will serve as a catalyst for sustained behavioural change, as purported by Tribbe *et al*., (2021). Furthermore, this result implies that a well-designed technique could enhance the effectiveness of the CLTS initiative, possibly by addressing specific barriers. This means promoting community behavioural change, not only requires investing in techniques, but also strategically aligning the techniques with the goals for behavioural change. Therefore, the onus rests with the implementers to select techniques and activities carefully that would fit in a particular context, because a comprehensive approach that combines strategic techniques with community engagement, capacity building, and sustained efforts aid in achieving sustained behavioural change in sanitation practices.

6.4.5. Relationship between finance and behavioural change towards CLTS improved performance and sustainability

The findings indicate that finances positively and significantly influenced behavioural change in the performance and sustainability of the CLTS programme. This implies that finances are one of the critical factors in modifying the behaviour of a community towards sustaining the performance of the CLTS programme. The findings indicated further that, when MMDAs make funds available to the FF to embark on post-ODF follow-ups at the appropriate time, communities were encouraged and motivated to maintain and reconstruct latrines. Similarly,

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when given access to funds for sanitation, ODF communities will maintain and reconstruct durable latrines, which will move them up the Sanitation Ladder. This finding is supported by Delaire *et al*. (2022) who revealed that wealthier households were more likely to reconstruct and build durable latrines than low income households. Kohlitz *et al.* (2019) and Trimmer *et al*. (2022) advocated the establishment of financial mechanisms that can enable government to fund post-ODF activities, as well as provide funds for the poor and marginalised in the communities to aid mobility up the Sanitation Ladder. For sustained behavioural change, and improved performance and sustainability, Murakwani *et al*. (2022) advised implementers to consider providing financial support as an add-on to the CLTS programme.

6.4.6. Relationship between Law enforcement and behavioural change towards CLTS improved performance and sustainability

The results show that enforcement factors do not significantly influence behavioural change towards improving the performance and sustainability of the CLTS programme. This implies that the effects of law enforcement are minimal, indicating that behavioural change can be sustained with or without law enforcement. This finding concurs with available literature because the findings regarding the effect of by-laws on CLTS sustainability are mixed. For instance, Mishra *et al.* (2021) found that fines and sanctions were significantly associated with sustained latrine use, coverage and behaviour in sanitation practices, whereas Delaire *et al*. (2022) and Kouassi *et al.* (2023) found them not to be statistically significant. Fines and sanctions form part of the requirements for attaining ODF status in certain countries, including Ghana. However, while some ODF communities are religiously applying them, others hardly use them. This is a likely reason for the finding of this study.

Moreover, in the context of CLTS, the less pronounced effect of law enforcement on behavioural change could be because of its reliance on extrinsic motivations such as penalties. However, over time, community members might not find these extrinsic motivators as persuasive as the intrinsic motivations that arise from understanding the health and social benefits of safe sanitation. The emergence of compensatory behaviours, such as reverting to open defecation when latrines are not available or are poorly maintained, can deflect the direct influence of legal mechanisms. In addition, simply having sanitation laws or regulations does not assure their efficacy. Mensah *et al*. (2022) reported that lack of enforcement of sanitation by-laws resulted in lack of compliance in the urban cities of Ghana. The effectiveness of these laws often depends on consistent and predictable enforcement. Inconsistent or perceived unfair

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application of these regulations can hinder the desired behavioural change. Based on these premises, law enforcement was removed from the model.

6.4.7. Relationship between contextual factors and behavioural change towards CLTS improved performance and sustainability

The results show that contextual factors do not significantly influence behavioural change towards the performance and sustainability of the CLTS programme. Within CLTS, the insignificant effect of institutional or environmental factors on behavioural change possibly might be because the institutional or environmental factors might not always be aligned with the intrinsic motivations or cultural norms of communities. Fallatah (2021) and Sakas *et al*. (2022) purported that, for institutional or environmental conditions to be effective and influence behavioural change, there should be the provision of durable and affordable sanitation facilities and construction materials, workable soils, available technical support, active leaders etc., to motivate communities to sustain sanitation behaviours. In communities where there is available institutional support and technical assistance, and favourable enabling conditions, there is effective implementation as well as sustained change in sanitation practices. Otherwise, the effects on behavioural change cannot be ascertained and, hence, the non-significance influence of contextual factors in this study. Thus, lack of technical factors, poor environmental conditions and lack of responsibility from institutions (MMDAs) is likely to result in OD reversions and, for that matter, to attenuate behavioural change.

This finding of the study is a reflection of the reality, as seasonal flooding that results in frequent collapse of latrines, and lack of local government support and technical assistance are the major cause of slippage in developing countries. Behavioural change starts with a change in mind and understanding of the sanitation challenge, which often results in a collective decision to end OD. Even though communities might have understanding of the benefits of changing sanitary behaviours, unfavourable contextual conditions can result in no behavioural change. Thus, when community members are unable to see the link between the contextual conditions and the resulting sanitation benefits, the success of the CLTS programme might be compromised and affect long-term behavioural change in sanitary behaviours. Based on this premise, institutional/ environmental conditions (contextual factors) were removed from the model.

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6.4.8. Relationship between behavioural change and improved performance and sustainability of the CLTS programme

The result suggests that there is a positive relationship between behavioural change and improved performance and sustainability of the CLTS programme. The findings reflect a fundamental understanding of the inter-relation between human behaviour and the success of community-wide interventions. This is because, when individuals in the communities genuinely integrate practice of new behaviours into their daily routines, OD will reduce and toilet construction and use will increase, and change in sanitary behaviours will be sustained. This implies that behavioural change is a positive driver of the sustainability of the CLTS programme. Also, the finding can be interpreted as meaning that it is only when behaviour is changed that sustainability of the CLTS programme can be achieved. This finding concurs with the long-standing assertion that behavioural change has a positive effect on the sustainability of WASH interventions (Chirgwin *et a*l., 2021).

The CLTS intervention, triggers a community-wide behavioural change and motivates communities to achieve ODF through latrine construction and use. Sustained behavioural change is achieved when communities show consistent latrine use and sustained ODF status, which amounts to sustainability. The result shows that behavioural change directly influences sustainability. This means that a shift of community habits towards adopting improved sanitary practices has a ripple effect that extends beyond the individual level. Also, the findings mean that behavioural change, therefore, involves the communities' taking ownership of new sanitary practices, ensuring consistent use and maintenance of sanitation facilities, and incorporating these behaviours into cultural and social norms. This finding is supported by the findings from several studies that behavioural change resulted in latrine acceptance and consistent latrine use, reconstruction, and sustained latrine coverage (Kouassi *et a*l., 2023; Mamo *et al*., 2023).

6.5. Chapter Summary

This chapter contains a discussion of the intervention integrated with the CLTS for sustainable outcomes, types of support used in the implementation of the CLTS programme, and indicators for improving the sustainability of the CLTS programme based on the views of experts. The chapter also contains a discussion of the descriptive statistics of the constructs that form the conceptual framework and the CLTS improved performance and sustainability framework

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developed from the primary data collected for this study. The associations between the independent variable and the mediating variables, and the relationship between the mediating variable and the dependent variable, were also discussed.

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CHAPTER 7: CONCLUSIONS AND RECOMMENDATIONS

7.1. Introduction

This chapter comprises a summary of the study, conclusions relating to the research objectives arising out of the research questions, and the recommendations emphasising how the performance and sustainability of the CLTS programme can be improved by paying attention to behavioural change factors. The main conclusion of the study and contributions to the body of knowledge follow the summary. The chapter ends with the recommendations based on the study.

7.2. Organisation of Chapters

This thesis consists of seven chapters. The background of the study was presented in Chapter 1, followed by a review of literature about the emergence and spread of the CLTS programme in Chapter 2, which contains the impacts of the CLTS programme, factors affecting the performance and sustainability of the CLTS programme and the conceptual framework for the improved performance and sustainability of the CLTS programme. In Chapter 3, the research methodology used was explained and the exploratory sequential mixed-methods design adopted for the study was described. The results and interpretation of the qualitative data collected from the case study were presented in Chapter 4. The analysis and interpretation of the survey data collected to test the validity of the conceptual framework were presented in Chapter 5. In Chapter 6, the results emanating from the analysis of the survey data were discussed and the improved framework for the performance and sustainability of the CLTS programme was presented. The summary, conclusions and recommendations are presented Chapter 7.

7.3. Conclusions of the Study

Implementation of the CLTS programme in Ghana is funded solely by NGOs with staff support from the government. The organisations have been able to assist a considerable number of communities to attain ODF in Ghana. The activities undertaken by these organisations have also proven to be effective, as they continue to serve as motivation for communities to sustain their ODF behaviours. Although sustainability remains a major concern in Ghana, communities are sustaining their ODF status based on factors that enable sustainable, motivational and behavioural change combined with active leadership and financial support. However, reversed

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communities are faced with the frequent collapse of latrines, and lack motivational and behavioural change, active leadership and financial support. For the CLTS programme to enhance sustained sanitary behaviours, it is necessary to consider critically six drivers of behavioural change that drives improved sustainability. These include motivation and commitment, ownership, financial support, active leadership and the use of effective techniques that ignite sustainable sanitation gains. Also, organisations must continue to integrate CLTS with sanitation marketing, school-led sanitation and support in the form of subsidy to all who cannot afford to construct improved latrines at the post-ODF stage.

7.3.1. Identification of organisations implementing CLTS in Ghana – (Objective 1)

This objective was addressed by answering the research question: Which organisations are implementing the CLTS programme in Ghana? This question was answered in Chapter 4, Section 4.1.1. Based on an extensive literature review, several organisations were identified but, through semi-structured interviews with experienced CLTS practitioners, consultants and implementers, eight committed organisations were identified. The organisations included UNICEF, Plan Ghana, Global Communities, World Vision, RING, CRS, WaterAid and CWSA (the only governmental institution). This implies that, although the government has adopted the CLTS intervention, it is funded solely by NGOs. The local government officials who were interviewed, revealed that most of these NGOs (with UNICEF being the greatest support) have been religiously committed to the CLTS programme and have helped in declaring many communities ODF. Thus, the organisations have been very supportive, and since this is what is required of organisations implementing the CLTS programme, "Organisational or institutional support needs to be flexible and consistent" (Kar & Chambers, 2008: 9). This implies that the organisations are suitable for implementing CLTS. Therefore, Objective 1 was achieved.

7.3.2. Examining the activities carried out by the organisations implementing the CLTS programme in Ghana – (Objective 2)

This objective was addressed by answering the research question: What are the activities carried out by the organisations implementing the CLTS programme in Ghana? Objective 2 was achieved, as it was found that all the organisations follow the three stages of implementation and employ the suite of activities and techniques associated with each stage, as presented in the CLTS Handbook. However, it was found that an organisation may use a particular technique or activity based on experience and the dynamics of the community

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(homogeneous or heterogeneous). Also, interviewees (implementing organisations and the FFs) indicated that one or two activities may be combined especially at the triggering stage to attain the needed response ("match-box in a gas station"). From the interviews and FGDs conducted (based on the activities that communities could remember), the most common techniques used by the organisations during the triggering and post-triggering stages included: transect walk, open defecation area mapping, shit calculation, feco-oral pathway, selection and training of natural leaders, post-triggering follow-ups, certification and celebrations, the raising of signboards at the entrance of ODF communities. The implementers explained that these techniques are participatory and can encourage the participation of community members.

The results from the interviews (see Section 4.1.2) also showed that some of the organisations combined the CLTS programme with other interventions. While Plan Ghana runs an integrated project that combines the provision of water systems, school-led total sanitation (SLTS), and menstrual hygiene practices, as well as a financial scheme (VSLAS), UNICEF added SanMark, SLTS and launching of league tables to its activities. The quantitative data collected showed further that some of the organisations combined CLTS with subsidy, support and social norms campaigns, as shown in Section 6.2.1.

7.3.3. Critical evaluation of the effects of these activities on the performance and sustainability of the CLTS programme in Ghana – (Objective 3)

This objective was addressed by answering the research question: How do these activities employed by the organisations influence the performance and sustainability of the CLTS programme? This question was answered through the analysis of the qualitative and quantitative data collected. As indicated in Chapter 4, Section 4.1.3 and Section 4.2.2, the interviewees and the FGD participants reported that the use of participatory techniques, such as the walk of shame, open defecation area mapping and feco-oral pathways during triggering, aroused the disgust which led to a "match-box in gas station" response that resulted in a community-wide decision to end OD by achieving ODF. It was reported that post-triggering follow-up quickened ODF achievement. Similarly, post-ODF follow-up resulted in sustained behavioural change, latrine rebuilding and consistent latrine use. However, it was reported that post-ODF follow-up was seldom carried out because of financial constraints on MMDAs.

Trained NLs provided available technical support that encouraged the construction of improved latrines in the ODF communities. Fines and sanctions, as well as celebrations after ODF declarations, served as a form of motivation for sustained ODF. It was revealed by the

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interviewees and the focus group participants that communities with financial mechanisms, such as VSLAS and sanitation funds, were able to construct improved latrines. Interestingly, it was reported by the interviewees that the activities, especially the celebrations, have helped to create awareness of the CLTS programme across many communities, and this awareness has helped to increase sanitation coverage in rural communities in Ghana. Similarly, the participants also indicated that the programme has been beneficial in such a way that health is improved, the communities are clean, punctuality of school children has increased, and dignity and pride have been restored.

The results from the quantitative data revealed that techniques and activities (effective techniques) positively influence behavioural change as well as the performance and sustainability of the CLTS programme, as shown in Chapter 6, Section 6.4.4. From the discussion above, it is clear that Objective 3 was achieved.

7.3.4. Critically examine the factors affecting the performance and sustainability of the CLTS programme – (Objective 4)

This objective was achieved by answering the research question: What are the factors influencing and affecting the improved performance sustainability of the CLTS programme in Ghana? This question was addressed from two perspectives:

- factors influencing the performance and sustainability of the CLTS programme;
- factors affecting the performance and sustainability of the CLTS programme.

The first perspective of the question was answered through the analysis of the qualitative and quantitative data collected. As indicated in Chapter 4, Sections 4.1.4 and 4.1.5, the interviewees and the focus group participants reported that the factors influencing the performance and sustainability of the CLTS programme include: supportive traditional and active natural leaders, ownership, post-triggering and post-ODF follow-ups, available technical support, available financial schemes (VSLAS), enforcement of sanitation by-laws (fines and sanctions), comfort, pride, dignity and convenience associated with ODF status and latrine use. The results showed that, with support from traditional and natural leaders, combined with available technical support provided by FFs and NLs during post-triggering and post-ODF follow-ups, communities are able to construct and reconstruct improved latrines, which is a sign of

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sustained behavioural change that drives ODF achievement and sustainability. Similarly, the provision of financial support, enforcement of by-laws, combined with the comfort, pride, dignity and convenience associated with ODF status and latrine use serve as a motivation for latrine ownership and sustainability.

Other factors, including the raising of signboards and celebrations after the ODF declaration, serve as a motivation for sustainability. Some of the interviewees reported that the launch of District/National League Tables created healthy competition among districts and regions, which led to increased commitment of local government officials to the achievement of ODF and sustainability of the status. However, the participants were not aware of the league tables. Implementers should consider using the league tables as a form of recognition for sustained ODF communities. An interviewee reported that this could be triggered at the community level and it would serve as a form of recognition, which would translate into sustainability of the CLTS programme.

In summary, the factors were grouped under: leadership, financial support, ownership, law enforcement, behavioural change, motivation and commitment, and contextual (institutional, technical, and physical conditions) after an extensive literature review. The factors were used to develop a conceptual framework which was validated, using the quantitative data collected. The descriptive analysis of the quantitative data (see Chapter 6, Section 6.3) showed that behavioural change**,** leadership, financial support, ownership, law enforcement, motivation and commitment, as well as institutional, technical, and physical conditions influence the sustainability of the CLTS programme in Ghana.

The second perspective of the question was answered through qualitative analysis, as shown in Chapter 4, Sections 4.1.6 and 4.2.3. The factors hindering the performance and sustainability of the CLTS programme include: frequent collapse of latrines (a major contributor to OD reversion), lack of water, lack of behavioural change, lack of governmental and community-wide ownership and post-ODF follow-up and enforcement of by-laws, poverty, inactive NLs and unsupportive traditional leaders. Some of the interviewees (FFs) reported a lack of logistics and poor road networks as a hindrance to ODF achievement and post-ODF follow-up. Previous subsidy approaches, political interference and expectation of subsidy by the communities were reported by the interviewees as hindrances to performance and sustainability. Critically examining the two perspectives, it could be deduced that, when all the influencing factors are

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provided, the hindrances can be off-set, thereby increasing performance and sustainability. Therefore, Objective 4 was achieved.

7.3.5. The development of a framework that would guide organisations towards improved performance and sustainability framework for the CLTS programme – (Objective 5)

This objective was achieved by answering the research question: What can be done to improve the performance and sustainability of the CLTS programme in Ghana? The results of the qualitative data collected were supported by the literature reviewed to develop an eight-factor conceptual framework including: leadership, ownership, motivation and commitment, law enforcement, financial support, effective tools, contextual factors (institutional, technical and environmental conditions), behavioural change, and improved performance and sustainability. The quantitative data collected were analysed using the PLS-SEM programme EQS, Version 6.2 with the purpose of validating the hypotheses of the framework.

The results from a confirmatory composite analysis (CCA) showed that five of the factors have a direct positive and significant influence on sustaining behavioural change in sanitation practices. The factors included: ownership, leadership, financial support, motivation and commitment, and effective techniques. An importance-performance map analysis (IPMA), carried out on the construct of behavioural change, revealed that these factors are the chief drivers of behavioural change in supporting the performance and sustainability of the CLTS programme. Therefore, it was established that sustained behavioural change in the CLTS programme can be facilitated through these factors.

The findings revealed further that behavioural change factors have a direct, positive and significant influence on the improved performance and sustainability of the CLTS programme in Ghana. Invariably, this means that behavioural change is the main component required to improve the performance and sustainability of the CLTS programme in Ghana. However, law enforcement and contextual factors have no significant influence on behavioural change and improved performance and sustainability of the CLTS programme in Ghana and, so, were rejected and removed from the framework. However, the purpose of the development of the conceptual framework, which was to identify the relationships between the identified constructs and improved performance and sustainability of the CLTS programme in Ghana, was attained. On this premise, it can be concluded that Objective 5 was achieved.

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7.4. Contribution to the Body of Knowledge

The contributions made to the body of knowledge through this research are discussed in this section. The contributions made are demonstrated on two levels, including:

- methodological contribution and awareness;
- empirical evidence or scholarly findings.

7.4.1. Methodological contribution

The knowledge gap in the literature reviewed informed the choice of exploratory sequential mixed-methods as the methodology to address the six research questions formulated. The novelty of this method in this study of CLTS sustainability is seen through the conceptual framework and the questionnaires that were developed from the qualitative data collected from CLTS implementers, practitioners, and beneficiary communities. The method supported the collection of qualitative data through SSIs and FGDs, the development of questionnaires and a conceptual framework from the analysed qualitative data. Through a survey, the questionnaires were administered to CLTS practitioners and implementers, and the conceptual framework was validated by analysing the quantitative data, using structural equation modelling, PLSEM, Version 6.2. This method was a deviation from the norm in studies about CLTS sustainability. Organisations implementing CLTS and the local government can adopt the questionnaires developed when monitoring and evaluating the performance and sustainability of the CLTS programme. Researchers and academics undertaking studies about WASH interventions can adopt the questionnaires.

7.4.2. Empirical evidence or scholarly findings

Gaps identified in Section 2.6 showed limited empirical evidence of the drivers of long-term, sustained behavioural change in sanitation practices and the sustainability of the CLTS programme. Meanwhile, sustained, long-term behavioural change and sustainability are crucial to achieving SDG target 6.2, the aim of which is to end all forms of OD by 2030. The CLTS sustainability framework developed in this study could assist implementing organisations and governments regarding what factors to prioritise when:

- shaping sustained behavioural change in sanitation practices;

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- Achieving long-term sustainability of the CLTS programme.

In shaping and fostering sustained behavioural change in sanitation practices, organisations and governments should prioritise motivation and commitment, ownership, and financial and leadership support, as well as the activities and techniques (effective techniques) used in the implementation of the programme.

Similarly, organisations and governments, as well as proponents of the CLTS programme, should focus their attention primarily on activities that foster sustained behavioural change in sanitation practices, followed by motivation and commitment, ownership, financial and leadership support, and effective techniques at the implementation and post-ODF stages.

Finally, the study has contributed to the unending debates on whether or not:

- the CLTS programme can provide long-term, sustainable, behavioural change in sanitation practices;
- CLTS must be combined with other interventions for sustainable outcomes.

As indicated in Chapter 4, this study showed that communities have been able to sustain their change in sanitation behaviours (use of latrines) and sustainability of ODF status, 3-9 years after certification, mainly through supportive traditional and active natural leaders, post-ODF follow-ups, and enforcement of fines and sanctions.

As indicated in Chapter 6, implementing organisations are not only implementing the traditional CLTS but are integrating it with other approaches such as school-led-total sanitation, sanitation marketing and support in the form of targeted subsidy for the poor and marginalised. These integrated programmes appear to yield sustainable outcomes that can be inferred from the sustained ODF status (17 out of the 25 communities were still ODF at the time of data collection).

However, researchers can build on the following findings:

- Integrated CLTS or hybrid CLTS sustainable results that fall below 50%;

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- Law enforcement and contextual factors that are not significant in behavioural change in sanitation practices, as well as the long-term sustainability of the CLTS programme.

7.5. **Limitations to the Study**

The selected case study focused on eight out of the 16 regions because including all regions was not feasible due to financial limitations and a lack of sufficient time. Therefore, the opted focus on a representative subset of eight regions to make the study manageable and still meaningful within the available resources.

Using questionnaires for research is valuable for data collection, but it has limitations. Respondents might give socially desirable answers or misrepresent their true feelings and behaviour's, resulting in response bias. They may answer in ways that make them look good or align with societal norms instead of revealing their genuine attitudes and behaviours.

The study uses specific variables to explain behavioural change and improved sustainability performance of CLTS programme among the practitioners. However, other unidentified factors may also play a role. Future research should investigate these additional factors to develop a more comprehensive model and better understand phenomenon.

ODF communities were purposively sampled and because the sample was not randomly selected, it is not representative of the broader population. This limitation means that the findings from these specific communities cannot be reliably extended to or assumed to apply to other communities or the population at large. In other words, the results are specific to the sampled communities and may not be applicable in different contexts or to other groups that were not included in the sample. This lack of generalizability is a trade-off for the detailed, contextual understanding gained from purposive sampling

The study was limited to professionals involved in CLTS, potentially limiting its representativeness of the wider communities that have already achieved ODF status. Consequently, the study's conclusions might not be representative of all ODF communities, potentially overlooking significant variations in practices, challenges, and successes. Therefore, while the study provides valuable insights, the generalizability of the findings could be compromised. Future research should include a more diverse range of communities. This broader approach could offer more comprehensive understanding of the impacts and effectiveness of ODF initiatives across different communities.

The study did not consider the potential mediating role of the behavioural factors that could influence the relationships between the constructs. Additionally. Interaction effect of the

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construct on behavioural change and improved performance sustainability was not assessed. Future research should investigate these moderating and interaction effect to further highlight the reasons underpinning the phenomenon of behavioural change and improved sustainable performance of CLTS programme.

7.6. **Recommendations**

Based on the findings of the study, the following recommendations were made:

- CLTS proponents, practitioners, and implementers, as well as local government, could improve the performance and sustainability of the CLTS programme by prioritising behavioural change in sanitation by focusing on post-ODF activities that would aid the communities to constantly remember the consequences of OD, the benefits of construction and reconstruction of improved latrines and mobility up the Sanitation Ladder;
- Policymakers and implementers as well as local government could consider recognising and celebrating sustained ODF communities from time to time to serve as a source of motivation that is likely to ignite commitment;
- Government could improve on the performance and sustainability by owning the ODF communities as well as the CLTS programme by providing sustainable funding and logistics for post-ODF activities, especially follow-ups which could be embarked on quarterly;
- Government and implementing NGOs could improve upon the performance and sustainability of the CLTS programme by providing sustainable and accessible financial mechanisms such as the VSLAS and sanitation fund (which would be separated from MMDA's central accounts) in the communities to enable construction of improved latrines. This fund could be accessed based only on results (results-based funding);
- Government and implementing NGOs could improve upon the performance of the and sustainability of the programme by providing support in the form of subsidy for all who cannot afford to construct a latrine.

For further research, it is recommended that:

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- a study should cover all 16 regions since CLTS is implemented across the country, which would include sufficient beneficiary ODF communities to allow for generalisation of results;
- a study should be carried out using a sequential exploratory mixed method that would use random sampling, community FGDs and HH interviews in the collection of qualitative data, and also collect the quantitative data from all stakeholders of the CLTS programme. This would allow for generalisation of results;
- similar studies should be carried out in other countries implementing the CLTS intervention to improve upon the CLTS framework.
- Interaction effect of the construct on behavioural change and improved performance sustainability was not assessed. Future research should investigate these moderating and interaction effect to further highlight the reasons underpinning the phenomenon of behavioural change and improved sustainable performance of CLTS programme.

A study should be undertaken about the rejected hypotheses (**H_6:** law enforcement positively influences behavioural change through the CLTS programme, and **H_7:** contextual factors positively influence behavioural change through the CLTS programme) to ascertain the reasons why contextual factors and law enforcement did not positively influence behavioural change and sustainability.

7.7. Chapter Summary

In conclusion, it can be said that the study's recommendations are highly important and beneficial. However, the findings are only applicable to the Ghanaian context, especially the sampled population. Therefore, care must be taken in generalising findings statistically beyond the sampled population.

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APPENDIX A

Appendix A1: Interview Guide

FACULTY OF ENGINEERING, BUILT ENVIRONMENT AND INFORMATION TECHNOLOGY

22nd September, 2020

To Experts, Consultants, Project Engineers and Officers

Dear Sir/Madam,

RE: An Evaluation of the Performance and Sustainability of Community-Led Total Sanitation (CLTS) Programme in Ghana.

This interview is part of a research project to meet the requirement for a Civil Engineering doctoral qualification at the Central University of Technology, Free State South Africa.

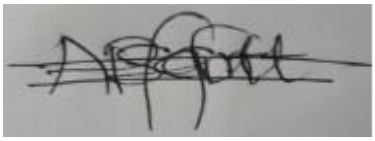
This phase of the interview aims to ascertain concrete information on modalities and innovative and sustainable activities used by organisations in implementing the CLTS approach.

Please note that all responses will be ***confidential and exclusively*** for academic use. The information obtained will be used to develop a set of questionnaires that will be sent to you later for ranking so as to provide an innovative and sustainable activity framework for the CLTS intervention in Ghana

Should you have any queries, please do not hesitate to contact the study promoter Professor F.A. Emuze at femuze@cut.ac.za.

The interview will take about 30 minutes.

Thank you.



Professor F.A Emuze
(Promoter)

Patricia Asantewaa-Tannor
(Doctoral Candidate)

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INTERVIEW QUESTIONS

SECTION A: Information about the Interviewee

1. Name of Organisation: …...……?
2. Type of Organization: Governmental or Non-governmental?
3. Name of the interviewees: ……?
4. Position held in the firm: ……?
5. Years of experience in the organisation: ……?

Definition of Terms

Response of the community members after they have been introduced to CLTS. There are always four types of responses. These are listed below:

Matchbox in a gas station – every community member is ignited/convinced and ready to take action to end open defecation.
Promising flames – the majority are ready to take action but a few are not.
Scattered sparks – most are not ignited but a few are and ready to take action to end OD.
Damp matchbox – community members are not ignited and do not seem ready to take any action.
A community after attaining ODF status can either sustain it or slip:
Sustained ODF – a community that has been able to maintain its ODF status.
Slippage – a community that has gone back to OD/one that could not maintain its status.
Natural Leaders – are activists and enthusiasts who emerge and take the lead during CLTS processes.
Pre-Triggering – Selecting a community, Introducing CLTS and building rapport with the selected community members especially the leaders of the community.
Triggering – Participatory sanitation profile analysis (assessing the sanitation situation with community members through transect walk, calculation of faeces etc.) and the ignition moment (performing a series of experiments to be aware of how in one way or the other they are eating or drinking each other's faeces).
Post Triggering – Action planning by the community (community members agree on specific dates and events to undertake to end ODF e.g., construction of pit latrines, training of artisans etc.) and Follow-up by the facilitator and NLs.
Verification – A team of members go around the community to inspect to assess whether a community is ODF.
Certification – is the official confirmation and recognition of ODF status. A community is celebrated and certified as an ODF.
Scaling UP – Where a community after attaining ODF status takes collective action to improve their community in terms of water supply and hygiene promotions. That is going up the sanitation ladder.

List of Abbreviations

CLTS	Community- Led Total Sanitation
MDG	Millennium Development Goal MDG
NGOs	Non-Governmental Organisations
NLs	Natural Leaders
OD	Open Defecation
ODF	Open Defecation Free

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PoA Plan of Action

SECTION B: GENERAL INFORMATION ON CLTS

a. How long has the organisation been implementing CLTS?
b. How many communities have you implemented CLTS in?
c. Did any of these communities attain ODF?
   (i) If no, why?
   (ii) If yes, what are some of the reasons that contributed to their achievement?
   - Eloquent/ likeable facilitators
   - Skills of the facilitator
   - Use of trained natural leaders
   - Use of untrained natural leaders
   - Cohesive soils
   - Social cohesion among community members
   - High level of community participation of
     - Men
     - Women
     - Both
     - Children
   - Individual motivation
   - Subsidy and incentives
   - Readily available materials for toilet construction (sanitation marketing)
   - Dislike for use of provocative terms such as 'shit'
   - Regular visits (follow-ups) and monitoring
   - Campaigns for latrine construction

   (iii) Any other reasons apart from the aforementioned ones?
   (iv) How long did it take the communities to become ODF?
   (v) How many of these communities are still ODF or have slipped?
   (vi) Could you please enumerate some of the reasons for the sustained ODF?
   - Continuous follow-up after verification and certification
   - Readiness of a community to go up the sanitation ladder
   - Sanctions or fines imposed by community leaders on those caught defecating in the open
   - Existence of clubs and campaign groups
   - Any others?

   (vii) Did any of the ODF communities scale up after attaining ODF status?
   (viii) What are some of the activities they carried out in the scaling-up process?
   (ix) Could you please enumerate some of the reasons for the slippage?
d. What modalities do you use to declare a community as ODF?
   - Number of latrines constructed
   - Number of households with latrines
   - No visible faeces (whether human or animal) in the community
   - Number of reduced community-shared latrines
   - Plan of action (PoA) to achieve ODF

   (i) Any other modalities apart from the aforementioned ones?
e. Does the organization use the verification and certification protocol of Ghana or it uses its own verification and certification protocol?
f. If no to e., why?
g. In your own opinion, has the CLTS approach helped in increasing sanitation coverage?

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h. If yes, how? And if no, why?
i. In your opinion has the increase in coverage been slow or fast?
j. If slow, why?
k. What do you think can be done to enhance CLTS implementation to increase coverage?
l. If fast, why?
m. What are some of the challenges hindering the progress of the CLTS programme?
    - Lack of government commitment
    - Political interference
    - Financial challenges
    - Previous sanitation approaches
    - Communities prefer incentives to lack of subsidy
    - Lack of community participation
    - Untrained Natural Leaders
    - Lack of skilled personnel for latrine construction
    - The use of locally made materials for latrine construction
    - Difficulty in getting access to latrine construction materials
    - Lack of regular follow-ups and monitoring

n. Any other factors?

SECTION C: CLTS ACTIVITIES CARRIED OUT BY THE ORGANIZATION

1. PRE-TRIGGERING STAGE

I. What are the factors considered in selecting communities for the CLTS implementation?
    - Small settlement
    - Remote towns or villages
    - Socially and culturally homogenous communities
    - Communities with no previous interventions (subsidies)
    - Communities with high incidence of diarrhoea and child mortality
    - Communities with no toilet facilities
    - Communities with visibly unclean and filthy environment covered with human faeces
    - Soils are suitable and easy to dig

II. Any others?
III. Which of the above factors do you think are major contributing factors to a community accepting the CLTS programme?
IV. What do you do to communities that do not have the above factors?
V. Have there been instances where a community with the above favourable factors rejected the CLTS approach?
VI. If yes, what was the reason?
VII. How many times do you visit a particular community before triggering?
VIII. Do you select facilitators from the communities or the organisation sends its facilitators?
IX. Are the facilitators given any form of training?
X. If yes, how much do you spend on training?
XI. Can you specify the amount spent on just selecting a community?

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2. TRIGGERING

i. Which of the following activities does your organisation carry out?
- Transect walk
- Defecation area mapping
- Food with faeces demonstration
- Water with a strand of hair demonstration
- Water with faeces
- Faeces calculation
- Medical cost calculation
- Use of provocative words such as 'shit'
- Walk of shame
- Any others?

ii. Which of the above activities do your organization use most and why?

iii. Can you describe the level of participation of community members during triggering?

iv. Which of the above yields the quickest response?
- Matchbox in a gas station (everyone is ignited and ready to take action to end OD)
- Promising flames (majority are ready to take action but a few are not)
- Scattered sparks (most are not ignited but a few are and ready to take action to end OD)
- Damp matchbox (community members are not ignited and do not seem ready to take any action)

v. When communities are ignited, which of the interventions do you use?
- Planning intervention
  - Information about various latrine options
  - Action plan by members on activities to attain ODF
  - Selection of natural leaders
- Social intervention
  - Regular visits to strengthen community members
  - using maps to show households with latrines
- Sanitation marketing (making available construction materials within the community)
- Promise of other needed facilities such as water if a community is declared ODF.
- Any other interventions or approaches used?

vi. Do people come out with new (sustainable) ideas or models on activities or interventions enumerated above? Kindly share your experience.

vii. How many times do you visit a community after triggering or before it attains ODF status?

viii. In your opinion, do the activities enumerated in 'i' influence the CLTS approach?

ix. What strategies do you use if communities do not show interest in the CLTS approach?
a. Depart from the community
b. Give them vials to test their water contamination
c. Others specify…..

x. What are the reasons associated with damp matchbox communities?
a. Promise of political leaders
b. People feel it's the government's responsibility to construct latrines
c. Community members resist change
d. Any others?

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xi. Does the use of provocative language offend community members? Kindly share your experience
xii. At what stage do you select Natural Leaders?
   a. Day 1 of triggering
   b. Day 2 of triggering
   c. Other, specify
xiii. Do you offer training for Natural Leaders in all the communities triggered?
xiv. If yes why? And if not, why?
xv. Can you compare the impact of CLTS in communities where NLs are trained to communities where NLs are not trained?
xvi. In your opinion, do you think Natural Leaders play a significant role towards a community' attainment of ODF?

3. POST TRIGGERING

i. How many times does the facilitator visit the communities triggered?
ii. What activities does the facilitator do?
   a. Convene meetings with natural leaders, religious groups etc. to explain technical problems bothering community members as well as the leaders themselves
   b. Remind community members of action plans
   c. Inspect latrines under construction
   d. Convince those with latrines to convince their friends
   e. Facilitate access to sanitation hardware
   f. Others
iii. What are some of the challenges encountered during the post triggering phase?
iv. Do people come out with new (sustainable) ideas or models on toilets construction? Kindly share your experience.
v. What motivates the construction of toilets?
   a. Members are ashamed and want to end OD
   b. Members appreciate facilitator
   c. Members are promised incentives
   d. Campaigns
   e. Formation of clubs
   f. Reward by traditional leaders
   g. Reduction in prices of construction materials
   h. Display of households with latrines of raised signboards
   i. others
vi. How does the organization monitor the progress of latrine construction and coverage?
   a. Usage of monitoring forms
   b. Recording in books
   c. Any other?
vii. How does the organization check the quality of follow-ups?

4. VERIFICATION AND CERTIFICATION

i. Did all the communities trigger qualify for verification and certification?
ii. If yes, what enhanced that?
iii. If no, why?
iv. How many days does it take your organization to begin verification and certification processes?
v. What are some of the activities carried out during verification?

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- Visits to former OD sites
- Inspections of latrines
- Following animals that feed on faeces. Examples are fowls, dogs etc.
- Distinctive marks indicating hygiene
- Surprise visitation to the community
- Any others

vi. Do you use a national verification protocol or organizational protocol?

vii. Is the verification done solely by the organization or it done in collaboration with the other organisations?

- Community evaluators
- Staff of government department
- Staff of NGOs
- Natural leaders from other communities
- Any other

viii. Does any of the above groups often delay the verification process?

ix. After verification, how long does it take for a community to be declared ODF?

x. Can you recall the shortest time it took a community to be declared ODF?

xi. When do your organisation end follow up after ODF?

5. SCALING UP

i. How many of the communities declared ODF managed to scale up or go up the sanitation ladder?

ii. What are some of the activities they carried out to scale up?

Thank You for Contributing to this Research Effort

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Appendix A2: Observation Checklist

OBSERVATION CHECKLIST

Name of Region: ……...
Name of Community: ……
Years after ODF Declaration: ……

Verification and Certification items

No.	Items	Yes	No
1.	80% of households have latrines		
2.	Evidence of toilet usage		
3.	Traces of open defecation/visible faeces		
4.	No faeces on squat holes		
5.	The squat hole is properly covered		
6.	Containers for anal cleansing materials are covered or properly disposed off.		
7.	No evidence of entry of the house fly		
8.	Superstructure to provide privacy		
9.	Evidence of handwashing facilities		
10.	Evidence of usage: the presence of soap and water		
11.	No traces of animal faeces		
12.	Clean surrounding		
13.	The scent of faeces in the air		
14.	Bushes and refuse damps cleared		
15.	The presence of a certification signboard		
16.	Fines and sanctions		
17.	VSLAS		
18.	ODF status		

Source: Researcher

General Comments

……
……
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Appendix A3: Questionnaire

FACULTY OF ENGINEERING, BUILT ENVIRONMENT AND INFORMATION TECHNOLOGY

25th November, 2021

To Whom It May Concern,

Dear Sir/Madam,

RE: An Evaluation of the Performance and Sustainability of Community-Led Total Sanitation (CLTS) Programme in Ghana

We write to humbly request your participation by completing a questionnaire developed out of an earlier interview conducted on the same topic. This questionnaire forms part of the data collection process for an ongoing doctoral study being carried out by Patricia Asantewaa-Tannor under the supervision of Prof. Fidelis Emuze at the Central University of Technology, Free State, South Africa.

Your participation in this research will be highly appreciated. Please note that all responses will be ***confidential and exclusively*** for academic use. The information obtained will be used to develop a sustainability model and performance activity for the CLTS intervention in Ghana.

Should you have any queries, please do not hesitate to contact the study promoter, Professor F.A. Emuze via femuze@cut.ac.za.

Completion of the questionnaire will take about 30 minutes.

Thank you.

Prof. Fidelis Emuze (Promoter) Patricia Asantewaa-Tannor (PhD Candidate)

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PERFORMANCE AND SUSTAINABILITY OF COMMUNITY-LED TOTAL SANITATION PROGRAMME IN GHANA

The purpose of this study is to develop a performance and sustainability model for the Community-Led Total Sanitation (CLTS) for implementers and beneficiaries of the programme. You are invited to participate in this study by completing the enclosed questionnaire, which should take approximately **20 minutes** to complete. The questionnaire is divided into **four (4) sections**: **section A** is on General information for statistical purposes, **section B** is on factors affecting sustainability, section C is on implementation factors and section D is on most frequently used activities and strategies used during implementation of the programme.

SECTION A: GENERAL INFORMATION

Please, tick (*ü*) in the brackets or fill the blank spaces where appropriate.

1. Region/District…….
2. Name of your organisation……
3. Position in the organisation……
4. Level of education …….
5. Years of experience with the organisation…….
6. Years of experience with CLTS……..
7. Which of these interventions does your organisation provide? (You may tick more than 1)
   - [ ] Pure / Traditional CLTS
   - [ ] CLT S+ Sanitation marketing
   - [ ] CLTS + Support
   - [ ] CLTS + Social Norms Campaign
   - [ ] CLTS + School Sanitation
   - [ ] CLTS + Health Facilities Sanitation

     Any other…….

8. Which of the interventions mentioned in question 6 yielded sustainable outcomes?
   - [ ] Pure / Traditional CLTS
   - [ ] CLTS + Sanitation marketing
   - [ ] CLTS + Support
   - [ ] CLTS + Social Norms Campaign
   - [ ] CLTS + School sanitation
   - [ ] CLTS + Health Facilities Sanitation

9. If CLTS + Support, what support do you give? (Tick more than 1)
   - [ ] Capacity building and training
   - [ ] Facilitating supply of sanitation hardware
   - [ ] Creating final demand
   - [ ] Supervision and monitoring
   - [ ] Financial support
   - [ ] Water and hygiene facilities
   - [ ] Reward in kind
   - [ ] Technical support
   - [ ] Reduced material cost

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Other …….

10. On what basis do you provide the support? Tick only one
    [ ] To help the poor and marginalised
    [ ] Households with women as heads
    [ ] Hardworking and dedicated communities
    [ ] To serve as a form of motivation
    Other ……..

11. Do your organisation provide subsidy? Tick only one.
    Yes [ ] No [ ]

12. Why does your organisation provide subsidies?
    [ ] Allow for the construction of improved latrines
    [ ] Enable poor households to construct improved latrines
    [ ] Enhance increase in latrine coverage and ownership
    [ ] Help improve self-mobilisation
    Other ……..

13. Which of these two (2) interventions has the potential to yield a more sustainable outcome?
    [ ] CLTS + subsidy

    [ ] Traditional/ Pure CLTS

14. Enumerate some of the negative effects associated with CLTS + Subsidy
    [ ] Can dampen the spirit of self-mobilisation
    [ ] Can delay the CLTS implementation process
    [ ] Can put financial stress on the government
    [ ] Can demotivate implementers and donors
    Other ……..

15. Which stage of the CLTS implementation process should subsidy be allowed? You may tick more than one
    [ ] Triggering
    [ ] Post-triggering
    [ ] Post-ODF for the reconstruction of durable latrines
    Other

16. Who should be given a subsidy in the implementation of the CLTS process? Tick only one
    [ ] Everyone
    [ ] Households with female heads
    [ ] The old and people with disabled
    [ ] Anyone who cannot afford to construct a latrine
    [ ] The poor and the marginalised
    [ ] Other ……

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SECTION B: FACTORS AFFECTING SUSTAINABILITY

Please rate your **level** of agreement by ticking the following CLTS sustainability **factors** on a 5-point Likert scale; where 1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; and 5 = strongly agree.

	FACTORS	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
		5	4	3	2	1
Leadership Factors (LF)						
LF1	Government leadership at the regional level					
LF2	Government involvement in administrative activities of CLTS at the district level					
LF3	Strong traditional leadership drive					
LF4	Active support of ODF by natural leaders					
LF5	Strong community cohesion					
LF6	Strong involvement of sanitation committees					
LF6						
Motivational and Commitment Factors (MF)						
MF1	Unannounced follow-up visits by officers after ODF					
MF2	Availability of technical support for latrine construction					
MF3	Recognition of active natural leaders					
MF4	Recognition of field facilitators who follow up after ODF					
MF5	Pride as an ODF community					
MF6	Village savings and loans association for sanitation					
MF7	Construction of durable toilets					
MF8	Available construction materials					
MF9	Available sanitation funds					
MF10	The willingness of communities to go up the sanitation ladder					
MF11	Health benefits - no cases of sanitation-related diseases					
MF12	Use of league tables					
MF13	Recognition of ODF communities					
MF14	Ownership of ODF by community members					
MF15	Satisfaction with latrine usage					
MF16	We no longer want to eat each other's faeces					
MF17	Support with cement and roofing sheet					
MF18	Celebration of world toilet day in ODF communities					
MF19	Provision of subsidy for durable latrines once and for all					

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MF20	One-time construction of durable latrines					
MF21	Sheep coordinators and school health clubs					
MF22	Whistleblowers raising alarms on OD					
MF23	Quarterly follow-ups by EHO after ODF					
Law Enforcement (LF)						
LF1	Prosecution of recalcitrant community members by EHOs					
LF2	Enforcement of community by-laws by community leadership					
LF3	Enforcement support by natural leaders					
Behavioural Change Factors (BCF)						
BCF1	We do not want to eat each other's faeces again					
BCF2	Reconstruction of toilet upon collapse					
BCF3	Readiness to go up the sanitation ladder					
BCF4	Construction of improved latrines					
BCF5	No expectation of subsidy from implementers					
BCF6	Maintenance and repairs of toilet facilities					
BCF7	Access to funds for latrine construction					
Financial Support (FS)						
FS1	Access to village savings and loans					
FS2	Access to sanitation fund					
FS3	Logistics for natural leaders					
FS4	Accounts for Sanitation by the MMDAs					
FS5	Availability of funds for post-ODF activities					
CLTS Ownership (CO)						
CO1	Government provides logistics for follow-ups quarterly after ODF certification					
CO2	Involvement of administrative heads at regional and district levels in CLTS activities					
CO3	Ownership of ODF status by community members					
CO4	Access to MMDAs funds for post-ODF activities					
CO5	MMDAs financing signboards, certification and celebration of ODF status					
CO6	Regular reporting on the status of the ODF Community by FFs					
CO7	Prioritisation of CLTS by regional and district administrative heads					
Enhancing Sustainable Factors (ESF)						
ESF1	Allowing room for change (6-12 months)					
ESF2	Use of more behavioural change communications					
ESF3	The provision of sanitation hardware to enhance the sustainability of CLTS					

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ESF4	Sensitisation of MMDAs management on CLTS activities					
ESF5	Intensified advocacy at national, regional and district levels by sanitation providers					
ESF6	Release of common fund linked to several ODF communities or districts					
ESF7	Field facilitators must give a bi-annual report on the communities declared ODF					
ESF8	The government must provide logistics for follow-ups quarterly after ODF certification					

SECTION C: FACTORS AFFECTING IMPLEMENTATION /PERFORMANCE

In relation to CLTS implementation, please rank in order of importance the following **factors** on a 5-point Likert scale; where 1 = Not important; 2 = Less important; 3 = Neutral; 4 = Important; and 5 = Very important.

CONTEXTUAL FACTORS (IMF) **(TECHNICAL/INSTITUTIONAL/ ENVIRONMENTAL CONDITIONS)**		**Very Important**	**Important**	**Neutral**	**Less Important**	**Not Important**
		5	**4**	**3**	**2**	**1**
IMF1	Skilful and committed field facilitators					
IMF2	Planning and timing for implementation					
IMF3	Access to implementation hardware subsidy					
IMF4	Assigning natural leaders to households					
IMF5	Engaging traditional leaders					
IMF6	Engaging top local government officials					
IMF7	Regular use of ODF league tables at district, regional and national level					
IMF8	Use of trained natural leaders to trigger ODF					
IMF9	Provision of logistics for field facilitators					
IMF10	Easy access to funds for sanitation activities					
IMF11	Dedication of funds for sanitation from MMDA					
IMF12	Communities with strong social cohesion					
IMF13	Selection of remote communities					
IMF14	Strong political will and support					
IMF15	Use of religious leaders during post-triggering and post ODF					
IMF16	Use of children as change agents					
IMF17	Training of artisans and community technical volunteers					
IMF18	Available artisans for various latrine options					
IMF19	Cohesive and workable soils					

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SECTION D: FREQUENTLY USED IMPLEMENTATION TOOLS (EFFECTIVE TOOLS (ET)/ STRATEGIC TOOLS (ST)

Please rank in order of importance the following **factors** on a 5-point Likert scale; where 1 = Not important; 2 = Less important; 3 = Neutral; 4 = Important; and 5 = Very important.

FACTORS EFFECTIVE TOOLS (ET)/ STRATEGIC TOOLS (ST)		Very Important	Important	Neutral	Less Important	Not Important
		5	4	3	2	1
ST1	Transect walk					
ST2	Medical cost calculation					
ST3	The use of the F-diagram					
ST4	Defecation area mapping					
ST5	Creating awareness among leaders					
ST6	Selecting and training natural leaders					
ST7	Training of field facilitators					
ST8	Follow-ups by field facilitators					
ST9	Raising of signboards within ODF communities					
ST10	Certification and celebration of ODF communities					
ST11	Sanitation marketing of latrine materials by identified suppliers					
ST12	Use of campaigns and health clubs, role plays, and media sensitization by implementers during CLTS implementation					
ST13	Sensitising community members using traditional and religious leaders					

Thank you for contributing to the evaluation of the performance and sustainability of the CLTS programme in Ghana.

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Appendix A4: Focus Group Discussions

FACULTY OF ENGINEERING, BUILT ENVIRONMENT AND INFORMATION TECHNOLOGY

25th November, 2021

To Whom It May Concern,

Dear Sir/Madam,

RE: An Evaluation of the Performance and Sustainability of Community-Led Total Sanitation (CLTS) Programme in Ghana

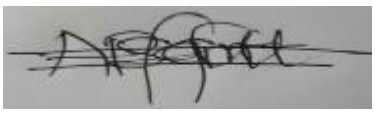
This interview/focus group discussion is part of a research project aimed at meeting the requirement for a Civil Engineering doctoral qualification at the Central University of Technology, Free State, South Africa.

The aim of this phase of the interview/focus group discussion is to ascertain information on the impact of CLTS on the lives of the communities that have been triggered.

Please note that all responses will be kept ***strictly confidential and exclusively*** for academic use. The information obtained will be used to develop a questionnaire that will be sent to you later for ranking required to produce a framework for the CLTS intervention in Ghana.

Should you have any queries, please do not hesitate to contact the study promoter, Professor F.A. Emuze at femuze@cut.ac.za.
The interview will take about 60 minutes.

Thank you.



Prof. Fidelis Emuze (Promoter)

Patricia Asantewaa-Tannor (PhD Candidate)

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PROTOCOL

Name of community……...

Number of years in Community: …….....

General Information

Please furnish us with the information related to the following questions:

1. How did you hear about Community Led -Total Sanitation?
2. Can you recall the organisation that came to implement CLTS in your community?
3. Can you recall some of the activities they did with you? Or what do you remember about the project?
4. Which of the activities listed above motivated you to construct a latrine? Or what motivated you to construct a latrine?
5. Has the programme helped you or the community? Can you explain how?
6. Is your community still ODF and why?
7. What activities are you using to sustain the ODF status?
8. What have you been doing to maintain your status?
9. If they were to implement the programme again in your community, what would you want the implementers to change or add?
10. What help did you receive from the EHO or organizers?
11. How were you assessed you?
12. How did you celebrate your certification Day?
13. Are natural leaders significant? If yes how?
14. How did the Natural leaders support you to achieve ODF?
15. How did the Natural leaders help in your achievement?
16. What form of support did you receive from your chiefs and political leaders?
17. Should the implementers change the duration of the programme? If yes or no, why?

NATURAL LEADERS

1. What motivated you to be a natural leader?
2. What training were you taken through as a natural leader?
3. What activities did you carry out as a natural leader?
4. In your opinion, is your role significant to the programme?
5. Were you taken to other communities to help them? What help?

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COMMUNITY OBSERVATION

Table B1: Evidence from direct observations in beneficiary communities

Regions	Districts	Community Codes	Years of ODF	Evidence Toilet Usage	Reconstruction of collapsed or full Toilets	Evidence of Collapsed toilets	Odour free	Visible Faeces	Clean Surrounding	Evidence of Sharing	Evidence of OD	Evidence of Handwashing facility	VSLAS	ODF Status	Remarks
CASE STUDY 2	Adjumako	CEAKW	5	√	×	×	√	×	√	√	×	√	×	√	Clean surrounding,
		CEABA	3	√	√	×	×	×	√	×	√	×	×	×	Not active NLs, smell of toilet in the air.
	AOB	CEAIS	5	√	√	√	√	×	√	√	×	√	×	√	Chief as NLs, very neat, supportive leaders and active NLs
		CEANS	3	√	×	×	√	×	√	×	×	×	√	√	Very neat. Active N.L, reconstruction of broken toilets
		CEAAD	5	√	×	×	√	×	√	√	×	√	×	√	
CASE STUDY 1	Savelegu	NOSCH	3	√	×	×	×	×	√	√	×	×	×	×	Active NL but people very poor cannot repair broken Toilets. Asked for support
		NOSNY	3	√	×	×	×	×	√	×	×	×	×	×	People have abandoned the use of toilets because they are angry, no active NLs

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	Mion	NOMMA	5	√	√	√				√	√	√	√	√	Very Active NLs, no strayed Animals, clean surroundings, reconstruction of broken toilets, rocky soil
		NOMAF	5	√	×	√	√	×	×	√	×	×	×	×	Very dirty 70% of toilet collapsed, N.L not active
CASE STUDY 5	Akatsi South	VOABI	9	√	×	×	√	×	√	×	×	√	×	√	Active NLs (Chief himself; available artisan, neat surrounding
		VOAKP	4	√	×	×	√	×	√	×	×	√	×	√	Active NLs, neat surroundings
	Ho	VOHHSO	7	√	×	×	√	×	√	×	×	√	√	√	Active NLs, fines and sanction working
		VOHHW	5	√	×	×	√	×	√	×	×	√	√	√	Very Active NLs, and supportive chief, clean surroundings
CASE STUDY 6	Nkwanta	OTNSA	5	√	√	√	√	×	√	√	√	×	×	×	Active NL but a poor attitude towards reconstruction of toilets
		OTNAH	5	√	√	√	√	×	√	√	×	×	×	√	Active NLs, fines and sanction working.
	Kadjebi	OTKMP	9	√	√	√	√	×	√	√	×	√	√	√	Very Active NLs, no strayed animals clean

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		OTKYA	5	√	√	√				√	×	√		√	Active NLs/ Chie, no artisans (lack technical support).
CASE STUDY 3	Bongo/ Bongo soe	UPEBAB	3	√	√	√	√	×	√	×	×	√	√	√	Active NLs/ Leaders by laws working, very neat
		UPEBAY	3	√	×	√	×	×	×	×	√	×	×	×	Very dirty community, NLs not active, waiting for support to reconstruct broken toilets
		UPEBSAS	3	√	×	×	√	√	√	×	×	√	×	√	Evidence of tippy taps but not in use because children waste the water, NLs very active
		UPEBSAN	3	√	√		√	√	×	√	×	√	√	√	Active NLs, Active VSLAS No artisans to construct durable toilets, have bought cement iron rods
	Paga	UPEPGO	3	√	×	×	√	√	√	√	×	√	×	√	NLs Very active, By-laws working, supportive leaders
		UPEPNA	3	√	×	√	×	√	×	×	√	×	×	×	Very dirty, about 70% of latrines have collapsed, expecting subsidy to reconstruct NL not active and misleading people

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CASE STUDY 4	Nandom	UPWBR	3	√	√	√				×	×	×	√	×	Very active USLAS, Active NLs problem with desludging 70% of toilets have collapsed
		UPWTU	7	√	√	√	√	√	√	√	×	√	√	√	Active NL, very neat close to sanitised. Fines and sanctions are working (few people have paid fines), supportive chief.

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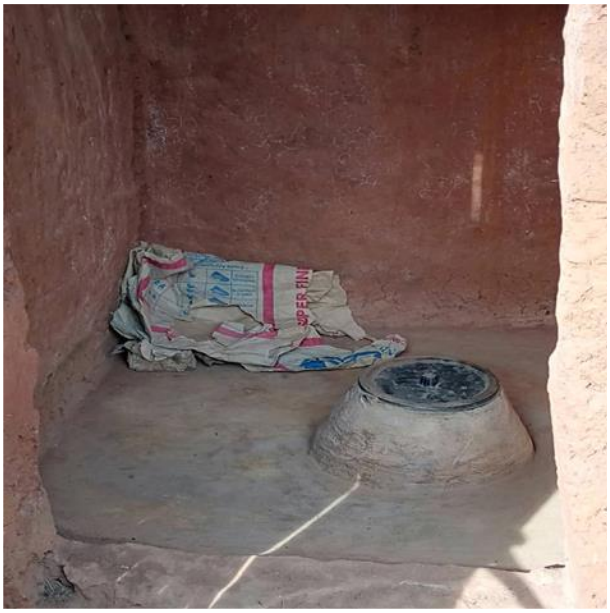
APPENDIX C

Appendix C1: Sanitation Facilities

(a) VAOKP, Volta Region

(b) NOMMA, Northern Region

(c) UPEBAB, Upper East, Region



(d) UPEBSAS, Northern Region

Figure C1: Toilet built with mud and thatch.

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(a) A proud owner of a KVIP latrine at OTKYA

(b) CEAIS, Central region

Figure C2: Toilet built with block and roofing sheets

Figure C3: Evidence of collapsed toilet in NOSCH, Northern region

Figure C4: Evidence of reconstruction of toilets in OTKMP, Oti region

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Figure C5: A digni-loo toilet in UPEBAB community, Upper East region

Figure C6: ODF certificate for UPWNTU

Figure C7: ODF signboard in UPEPNA

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Appendix C2: Evidence of Data collection

Figure C8: Interview with FFs, Akatsi -Volta region

Figure C9: FGD in UPEBSAN, Upper East

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Figure C10: Observation of toilet VOABI, Volta region

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