SCHOOL OF PUBLIC HEALTH
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PROCESS EVALUATION OF GREATER ACCRA SUSTAINABLE SANITATION AND LIVELIHOODS IMPROVEMENT PROJECT (2017-2026), THE CASE OF ADENTA MUNICIPALITY

BY
ABIGAIL BUERKUOR MORTEY
(22010389)

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DECLARATION

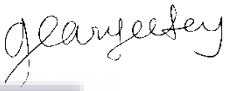
I, Abigail Buerkuor Mortey, hereby declare that excluding precise references which have been duly acknowledged, this submission is my own work towards my MSc dissertation and that, to the best of my knowledge, it contains no material previously published by another person nor material which has been accepted for the award of any of any other degree of the University or elsewhere.

ABIGAIL BUERKUOR MORTEY
(Student)

SIGNATURE: 

DATE: 25th April, 2025

DR. GENEVIEVE CECILIA ARYEETEY
(Supervisor)

SIGNATURE: 

DATE: 25th April, 2025

DEDICATION

I dedicate this work to the Almighty God whose grace has been a constant source of strength and provision throughout this journey.

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I am thankful to God Almighty for his grace and mercies throughout the master's programme.

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ABSTRACT

Introduction: Over the past decade, Ghana's urban basic sanitation coverage rose from 21% in 2010 to 27% in 2016. However, these gains remain marginal to achieving access to adequate and equitable sanitation and hygiene for all by 2030. Launched in 2017, the Greater Accra Sustainable Sanitation and Livelihoods Improvement Project (GASSLIP) sought to accelerate access to sustainable sanitation infrastructure and services in the region.

Objective: To conduct a process evaluation of the implementation of the sanitation component of the Greater Accra Sustainable Sanitation and Livelihoods Improvement Project (GASSLIP) in the Adenta Municipality.

Methods: Guided by the Reach and Implementation dimensions of the RE-AIM framework, this cross-sectional mixed-methods evaluation solicited data from households in Adenta and staff of Adenta Municipal Assembly (AdMA). Structured questionnaires and checklists collected quantitative data on coverage, reasons for participation, characteristics of participants, and delivery protocol adherence. Key informant interviews with AdMA staff explored qualitative data on implementation experiences including adaptations, barriers and facilitators. Quantitative data was analyzed in STATA 15 and Microsoft Excel 2021, using descriptive statistics, Fishers exact test and multiple logistic regression model. Qualitative data was coded and thematically analysed using NVivo 11.

Results: Eighty-five percent (85%) of participants benefited from GASSLIP with 82% receiving biodigesters, 11.7% pit latrines, 4.3% handwashing facilities and 24.6% receiving behavioural change education. Convenience and ease of access was a prominent reason (88.9%) for participation. Multivariable logistic regression identified age, education, occupation, income, and household ownership as significant socio-economic characteristics associated with beneficiary status. Delivery protocol adherence was high (96%). Implementation experiences included

enhanced training, expanded eligibility, adjusted outreach timing, increased construction targets, strong local collaboration, and technical partner support with funding constraints being a main barrier.

Conclusion: While GASSLIP achieved high infrastructure coverage and institutional adherence to delivery protocols, its extension into sustainable sanitation practices is limited by low coverage of behaviour-change activities and equity gaps. Strengthening community outreach, tailoring mobilisation strategies, and establishing sanitation-infrastructure loan mechanisms are essential to expanding implementation gains.

Keywords: Sustainable Sanitation, RE-AIM Framework, Low-Income Communities, Process Evaluation

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LIST OF ABBREVIATIONS

Abbreviation	Full Meaning
AdMA	Adenta Municipal Assembly
AfDB	African Development Bank
BCC	Behavioural Change Campaign / Communication
CLTS	Community-Led Total Sanitation
DALYs	Disability Adjusted Life Years
GAMA	Greater Accra Metropolitan Area
GASSLIP	Greater Accra Sustainable Sanitation and Livelihoods Improvement Project
GIS	Geographic Information System
GSMA	Global System for Mobile Communications Association
HP2020	Healthy People 2020
JMP	Joint Monitoring Programme (WHO/UNICEF)
KAP	Knowledge, Attitudes and Practices
KPIs	Key Performance Indicators
LAKMA	La Kwadwo Municipal Assembly
LIUC	Low-Income Urban Community
MMDAs	Municipal, Metropolitan and District Assemblies
MSWR	Ministry of Sanitation and Water Resources
NESR	National Environmental Sanitation Regulation
NVivo	Qualitative Data Analysis Software
PCU	Project Coordinating Unit
QoL	Quality of Life
RE-AIM	Reach, Effectiveness, Adoption, Implementation and Maintenance
SDGs	Sustainable Development Goals
SPH	School of Public Health
STATA	Statistical Analysis Software
SWP	Sanitation and Water Project
ToC	Theory of Change
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WASH	Water Sanitation and Hygiene
WHO	World Health Organisation

DEFINITION AND MEASUREMENT OF INDICATORS

OBJECTIVE	NAME OF INDICATOR	DEFINITION	MEASUREMENT
OBJECTIVE 1	Household participation rate in GASSLIP sanitation facilities	**Numerator**: Number of households that participated/benefited from toilet facilities constructed under GASSLIP in beneficiary communities in Adenta municipality. **Denominator**: Total number of households approached and interviewed in GASSLIP beneficiary communities in Adenta municipality.	Percentage calculated from data obtained from household survey in beneficiary communities in Adenta Municipality
	Coverage of sanitation component outputs received by households	The level of project outputs that households have received/participated in.	Percentage calculated from data obtained from household survey in beneficiary communities in Adenta Municipality
OBJECTIVE 2	Reasons for household participation	Reasons/motivations of households to participate/construct toilet facilities under GASSLIP	Frequency and percentage calculated from data obtained from household survey in beneficiary communities in Adenta Municipality
OBJECTIVE 3	Socio-economic profile documentation rate of participants	**Numerator**: Number of participants with documented socio-economic characteristics (income, education, occupation, geographic location etc.) **Denominator**: Total number of enrolled participants	Percentage calculated from data obtained from household survey in beneficiary communities in Adenta Municipality
OBJECTIVE 4	Number of KAP/Baseline meetings conducted	The number of PCU briefing meetings attended by municipal staff on baseline study	Count from AdMA records
	Number of staff training sessions conducted	The number of PCU training sessions attended by municipal staff	Count from AdMA records
	Number of behavioural change campaigns conducted	The number of sanitation door-to-door campaigns, community events, hygiene competitions and educational materials facilitated	Count from AdMA records

	Number of social marketing activities conducted	The number of advertisements and social marketing activities facilitated	Count from AdMA records
	Number of household sanitation facilities constructed	Number of household toilets and handwashing stations constructed	Count from AdMA records
	Number of school WASH facilities established	Number of school toilets and handwashing stations constructed	Count from AdMA records
	Number of school WASH clubs established	Number of WASH clubs created to promote school sanitation education	Count from AdMA records
	Number of solid waste facilities distributed	Number of waste bins, SPVs and skip containers distributed	Count from AdMA records
	Establishment of call centre for sanitation-related issues	Existence of a functioning call centre for sanitation complaints and cesspit services	Count from AdMA records
	Staff availability for GASSLIP implementation	Availability of identified municipal staff for GASSLIP implementation	Interviews with municipal staff
	Procurement of solid waste management facilities	Number of waste bins, SPVs and skip containers received from PCU	Count from AdMA records
	Availability of AfDB-GoG funds for implementation	Timely release of funds for municipal-level GASSLIP implementation	Key informant interviews with municipal assembly staff
OBJECTIVE 5	The presence of adaptations to sanitation component delivery	The adaptations to implementation enumerated by municipal staff	Key informant interviews with municipal assembly staff
	The presence of facilitators to sanitation component delivery	The facilitators to implementation enumerated by municipal staff	Key informant interviews with municipal assembly staff
	The presence of barriers to sanitation component delivery	The barriers to implementation enumerated by municipal staff	Key informant interviews with municipal assembly staff

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

The World Health Organisation (WHO) defines sanitation as the provision of facilities and services for the safe disposal of human urine and faeces and the maintenance of hygienic conditions, through services such as garbage collection and wastewater disposal (WHO, 2018). Basic sanitation is generally a fundamental human right for all and critical to public health. Target 6.2 of the Sustainable Development Goals (SDGs) mandates nations to work towards achieving access to adequate and equitable sanitation and hygiene for all and end open defecation by 2030 (World Health Organization & United Nations Children's Fund, 2021)

Many countries have made significant progress in ensuring that people have at least a basic level of sanitation. The World Health Organisation (WHO)/United Nations Children's Fund (UNICEF)'s Joint Monitoring Program (JMP) estimates that from 2015 to 2022, the proportion of the world's population using safely managed sanitation services increased from 49% to 57%. (WHO/UNICEF, 2024). This progress signifies an additional 911 million people gaining access to these essential services (WHO/UNICEF, 2024). Also, the number of people practicing open defecation decreased from 715 million to 419 million. Data from the World Health Organisation (WHO) of the period under review showed an increase in global Gross Domestic Product Per capita (GDPCAP). GDPCAP is a strong determinant of improved sanitation coverage (Munamati et al., 2016). Global assessments indicate that many countries lack sufficient domestic financing to sustain progress in water, sanitation and hygiene services, with the majority of low and lower-

middle income countries reporting that current funding levels are insufficient to meet national WASH targets (WHO & UN-Water, 2022).

Despite global progress, poor sanitation, resulting from the practice of widespread open defecation and indiscriminate dumping of refuse (Abalo et al., 2018) remains on the high side. An estimated 3.5 billion people, nearly half of the world's population, lack safely managed sanitation. Out of these 3.5 billion people, 1.5 billion lack basic sanitation services. In addition, 419 million people still practice open defecation (UNICEF, 2022). These figures translate to an increased health risk and disease burden. In 2019 alone, an estimated 1 million deaths and 74 million Disability Adjusted Life-years (DALYs) occurred from diarrhoeal diseases (WHO, 2022; Prüss -Ustün et al., 2019). This number of deaths is equivalent to 69% of global diarrhoeal deaths. Besides diarrhoeal diseases, poor sanitation has been linked to the spread of antimicrobial resistance and exacerbation of malnutrition and neglected tropical diseases (Prüss -Ustün et al., 2019; Nasim et al., 2022, UNICEF, 2022).

In Africa, the health risks from poor sanitation are particularly severe, as the continent carries 47% of Water Sanitation and Hygiene (WASH) attributable disease burden (WHO, 2022). Over 987 million people, representing 69% of the population, still lack safely managed sanitation services. Out of these, 780 million people lack a basic sanitation service, and 193 million people still practice open defecation (WHO, 2022). Rapid urbanization and population growth in the past few decades have magnified the sanitation service problems (Yok-shiu, 2019). Sub-Saharan Africa is reported to have the lowest global WASH coverage. Compared with a global rate of 2%, the annual urban population growth rate in the region stands at 4.1% (Saghir & Santaro, 2018). Within urban areas, disparities in access exist between the wealthy and the poor urban areas (WHO/UNICEF Joint Monitoring Programme for Water Supply, 2017).

Much like other Sub-Saharan countries, Ghana's population has become increasingly urbanized. The percentage of urban dwellers increased from 54% in 2015 to 59% in 2022 (O'Neill, 2024). Associated with urban growth is the increased need for maintenance and provision of sanitation infrastructures and service delivery (Bishoge, 2021). Over the past decade, Ghana has increased policy action to address poor urban sanitation. The National Environmental Sanitation Policy (NESP) was revised in 2010 to redirect the country's effort to maintain a clean and physical environment in all human settlements (MSWR, 2017). The policy emphasizes the role of the central government and local assemblies in waste management, enforcing sanitary regulations, and providing sanitation infrastructure facilities. The policy also states the role of the private sector in the provision of sanitation services (Knott, 2022). In line with this policy, The World Bank, the Dutch Embassy, and other development partners have supported a number of initiatives to increase urban sanitation coverage. The country reported a noticeable increase in urban basic sanitation coverage; that is from 21% in 2010 to 27% in 2016 (World Health Organization & United Nations Children's Fund, 2021). However, these gains are considered marginal to achieving access to adequate and equitable sanitation and hygiene for all as well as, ending open defecation by 2030. The Greater Accra Sustainable Sanitation and Livelihoods Improvement Project (GASSLIP) was initiated in 2017 in line with Ghana's National Environmental Sanitation Policy (NESP), as part of accelerated efforts to improve access to sustainable sanitation infrastructure and services. The overall objective of the project is to improve the health standards and socio-economic well-being of the urban poor within the Greater Accra Metropolitan Area (GAMA). Originally designed for a five-year period (2017–2022), it was extended by an additional five years, making for a revised completion year of 2026. The project targets the urban and peri-urban poor residents where an estimated 64% of GAMA's 4.3 million population lives, to a great extent, in deplorable sanitary

conditions and experience a recurring problem of diarrhoeal diseases and flooding (AfDB, 2017). Using an integrated approach across the sanitation value chain, the project components/interventions border on the provision of domestic and municipal level sanitation infrastructure, support for skills development and capacity enhancement for sanitation service management within GAMA.

This study seeks to evaluate the implementation of the sanitation component of GASSLIP. The study draws on the Reach and Implementation dimensions of the RE-AIM framework for this evaluation. A detailed exposition of the RE-AIM framework is presented in Chapter Two of this dissertation. The RE-AIM framework is a valuable evaluation tool commonly used to assess public health interventions including weight loss and physical activity (Dunton et al., 2012; Hodgson et.al, 2023; Smedegaard et al., 2017), nutrition projects (Rohmah et.al., 2020), continuum of care in maternal and newborn health (Kikuchi et al., 2021), studies on mass drug administration (Manyeh et al., 2020). This is the first study to apply the RE-AIM framework in evaluating the Greater Accra Sustainable Sanitation and Livelihoods Project.

1.2 Problem statement

The Greater Accra Sustainable Sanitation and Livelihoods Improvement Project (GASSLIP) aims to enhance access to sustainable sanitation facilities and services with a focus on peri-urban and urban poor communities within the Greater Accra Metropolitan Area (GAMA). By the project's midpoint in 2021, it was anticipated that 63% of GAMA's population would have access to safely managed sanitation services, with 50% practicing safe solid waste disposal, 25% of wastewater being safely collected and treated, and open defecation rates reduced to 2% (AfDB, 2017). However, six (6) years into GASSLIP's implementation, evidence indicates that over half of Accra's population still lacks access to basic sanitation services.

According to the Ghana Demographic and Health Survey 2022, GAMA has the highest share of individuals with at least basic sanitation access at 40% (Ghana Statistical Service GSS] & ICF, 2023). Yet, a significant portion (51.2%) continues to share improved facilities among multiple households. Open defecation persists in some communities, with a prevalence of 4.9%, exacerbating health risks such as diarrheal diseases among children under five. In fact, GAMA recorded the second-highest number of diarrhea cases for this demographic in 2022 (1,057 cases) (Ghana Statistical Service, 2021).

Inadequate sanitation imposes considerable health, economic and environmental costs on households and communities. Poor containment and unsafe disposal of faecal waste increase exposure to enteric pathogens, thereby heightening the incidence of diarrhoeal disease, malnutrition and other sanitation-related morbidities (WHO/UNICEF, 2021; AfDB, 2017). These outcomes contribute to increased household healthcare expenditure, reduced productivity and school absenteeism, with low-income households disproportionately affected (Institute for Fiscal Studies, 2018; O'Neill, 2024). Environmental contamination of drains and surface water also exacerbates recurrent flooding and contributes to the degradation of living conditions in high-density settlements (AfDB, 2017; Gyimah et al., 2022). Conversely, improving access to safely managed sanitation yields measurable benefits including reductions in disease burden, improvements in household welfare, strengthened environmental health and enhanced community resilience (WHO/UNICEF, 2024; MSWR, 2017). These benefits are central to achieving the intended outcomes of GASSLIP and advancing sanitation improvements across GAMA.

Several studies have highlighted the sanitation challenges faced by various municipalities within GAMA. For instance, Mikhael and Craig (2019) reported that only 31% of households in Ga West Municipal Assembly had exclusive access to improved private toilets. Similarly, Gyimah et al.

(2022) found that environmental sanitary conditions in Chorkor remained stagnant or worsened over time, while La showed only marginal improvements. These findings illustrate a broader trend where a copious amount of research on pro-poor sanitation interventions primarily focuses on urban slums and coastal areas, neglecting peri-urban communities. In this context, a process evaluation of GASSLIP is essential, particularly because the project specifically targets low-income communities in peri-urban areas.

As a peri-urban area experiencing rapid urbanization and socio-economic challenges, Adenta exemplifies the unique sanitation needs that GASSLIP aims to address. A process evaluation in this context is essential to gain insights into performance and to inform strategies for enhancing sanitation services in similar peri-urban settings. Currently, there are no research publications on process evaluation and inadequate monitoring and evaluation reports on GASSLIP. This study, therefore, sought to provide information on the implementation status of the sanitation component of GASSLIP in Adenta, a municipal area within GAMA.

1.3 General objective

The main objective of this study was to conduct a process evaluation of the sanitation component of the GASSLIP in Adenta.

1.3.1 Specific objectives

1. To assess the extent of coverage of the sanitation component of GASSLIP among households in Adenta.
2. To ascertain the reasons for participation in the sanitation component of GASSLIP among households in Adenta.

3. To determine the socio-economic characteristics associated with beneficiary status in the sanitation component of GASSLIP.
4. To assess the extent of adherence to delivery protocols of the sanitation component of GASSLIP in Adenta.
5. To explore the implementation experiences of the sanitation component of GASSLIP in Adenta.

1.3.2 Research questions

1. What is the extent of coverage of the sanitation component outputs of GASSLIP among households in Adenta?
2. What are the reasons for participation in the sanitation component of GASSLIP among households in Adenta.
3. What are the socio-economic characteristics associated with beneficiary status in the sanitation component of GASSLIP
4. To what extent were the delivery protocols of the sanitation component of GASSLIP adhered to?
5. What are the implementation experiences in the delivery of sanitation component of GASSLIP in Adenta?

1.4 Justification

An evaluation of the GASSLIP project was crucial to providing a comprehensive overview of its current status since its inception. The investigation into the processes of GASSLIP implementation was aimed at increasing knowledge on how to maximize performance to improve on sanitation

outcomes. This knowledge can be useful to GASSLIP program implementers and funders in adjusting for similar projects and future initiatives.

This research can also contribute to existing knowledge on urban sanitation interventions, aiding other researchers in identifying gaps for further investigation. Again, the study provides evidence that can be used by sanitation service providers to customize their services according to the health requirements of target populations. Lastly, the findings from this study are expected to have implications for policy and planning, providing insights that can guide better implementation of future urban sanitation projects aligned with target population needs.

1.5 Conceptual Framework of the Study

The conceptual framework for the study was adapted from the RE-AIM framework, developed by Glasgow and his colleagues in 1999. The conceptual framework in Fig 1.1 illustrates the Reach and Implementation dimensions as key dimensions influencing the implementation status of the sanitation component of GASSLIP while acknowledging the role of barriers and facilitators in shaping the study outcome.

The Reach Dimension was conceptualised through the coverage of sanitation component outputs to households, reasons for household participation, and the association between participant characteristics and beneficiary status. Coverage covers the extent of household participation in sanitation infrastructure, Behaviour Change Campaigns (BCC) and social marketing interventions, and of solid waste management extension services. Reasons for participation are integrated to explain why households engage, while a statistical analysis of association highlights a comparison between background characteristics (e.g., age, education, ownership) of beneficiaries and non-beneficiaries of the sanitation component of GASSLIP.

The Implementation dimension was conceptualised through adherence to sanitation component delivery protocols and adaptations to these protocols. Adherence was measured by the completion of municipally assigned input, activity and output protocols. However, real-world implementation often necessitates modifications, leading to adaptations in input, activity, or output protocols. These adjustments can either enhance or hinder the project's performance, depending on their alignment with intended project objectives. The study framework further captures the potential of barriers and facilitators to impact study outcome. These factors, together with the other elements in the framework, provide a snapshot of the current implementation status of the sanitation component of GASSLIP.

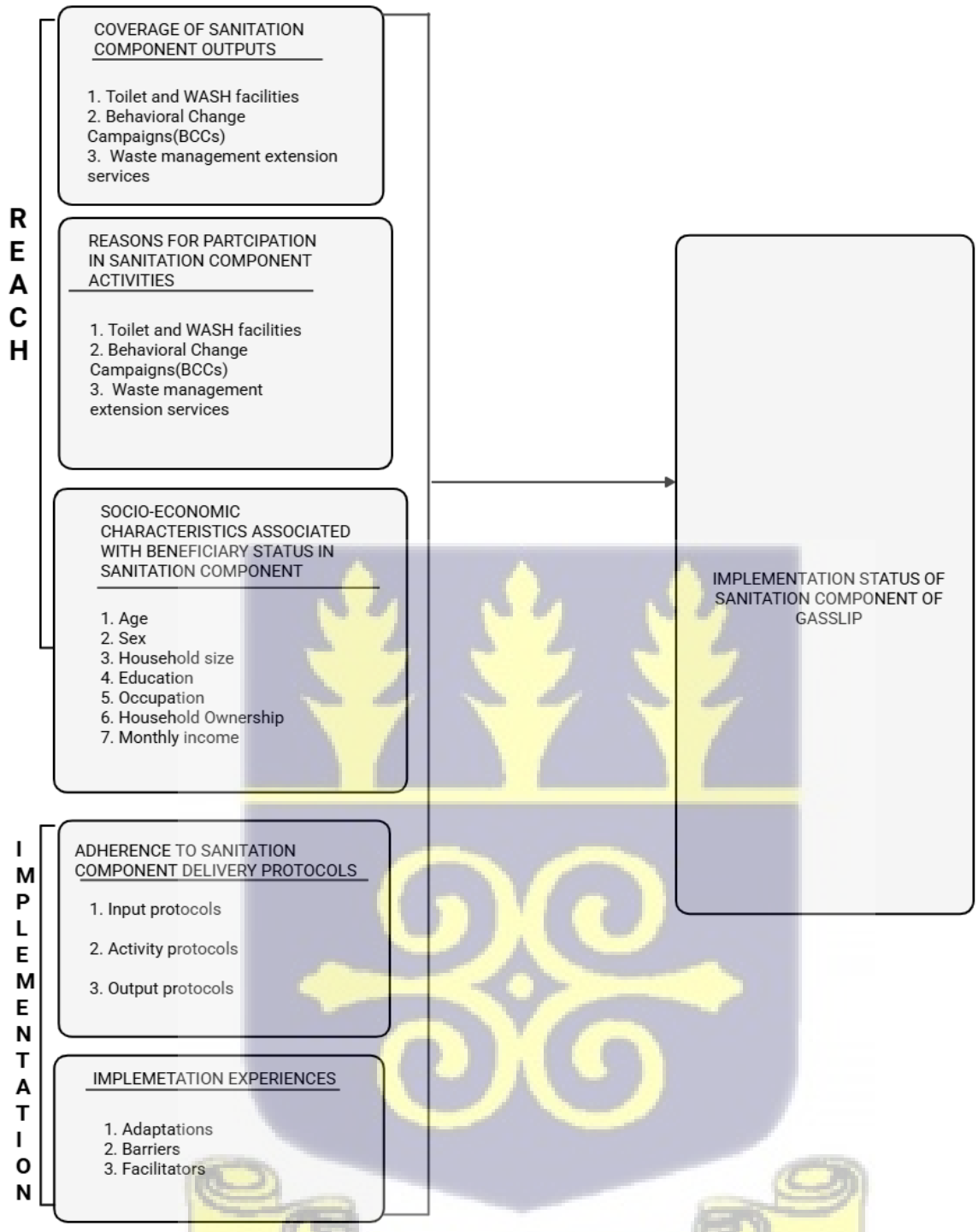

Figure 1.1: **Conceptual Framework of the Study**
Source: Adapted from the RE-AIM framework (1999)

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Overview

This chapter presents key global and regional scientific discourses on sanitation interventions, with an emphasis on low-income areas. The topics under this chapter cover conceptual, empirical and theoretical data on important trends in sanitation, as well as methodological approaches to sanitation interventions. The chapter presents a summary of the evidence presented, drawing attention to the gaps, limitations, and opportunities identified in the reviewed literature. Also, a thorough description of GASSLIP and the REAIM evaluation framework is provided. The chapter concludes with a presentation of study frameworks.

The literature reviewed in this chapter was identified through a structured search of peer reviewed and grey sources. Searches were conducted using PubMed, Web of Science, Scopus, Google Scholar and institutional repositories including UNICEF, WHO and the Ministry of Sanitation and Water Resources. Key search terms included "urban sanitation", "household sanitation interventions", "behaviour change sanitation", "process evaluation", "sanitation fidelity", "RE-AIM implementation", "Ghana sanitation project" and "low income urban communities". Boolean connectors such as "AND" and "OR" were applied to refine searches. Studies were included if they reported on sanitation interventions, programme coverage, behaviour change, implementation fidelity or evaluation of WASH projects within low income or peri urban settings. Priority was given to empirical studies published between 2014 and 2024. Additional references were identified through backward citation searches of relevant articles and technical reports. This approach ensured that the review captured both global and Ghana specific evidence relevant to process evaluations of sanitation interventions.

2.2 Sanitation in the Era of Sustainable Development Goals

Target 6.2 under Goal 6 of the Sustainable Development Goals (SDGs) aims to achieve universal access to adequate and equitable sanitation and hygiene by 2030, with a focus on eliminating open defecation and addressing the needs of women, girls, and vulnerable groups. The WHO/UNICEF Joint Monitoring Program (JMP) sanitation service ladder is a globally recognized classification system used to assess and monitor progress toward universal sanitation access, particularly in line with Sustainable Development Goal (SDG) Target 6.2 (WHO/UNICEF, 2023). The ladder categorizes sanitation services into five levels based on safety, accessibility, and proper waste management:

- **Safely managed sanitation:** facilities that effectively segregate excreta from human touch and ensure proper disposal and treatment either on-site or off-site. Examples include flush toilets connected to a sewer system, as well as ventilated improved latrines. Safely managed sanitation also includes basic sanitation that is limited to individual families and not shared.
- **Basic sanitation:** facilities that effectively segregate excreta from human contact, although they may not guarantee proper disposal. This category comprises pit latrines equipped with slabs and upgraded ventilated pit latrines.
- **Limited sanitation:** facilities that do not sufficiently isolate waste from human touch, resulting in a significant health hazard. Examples range from pit latrines lacking a slab or flush toilets to hazardous pit latrines.
- **Unimproved sanitation:** facilities that lack proper excreta separation and offer an immense health risk. This category encompasses open defecation and bucket latrines.

- Open defecation refers to the act of disposing of human feces in open locations such as fields, forests, shrubs, bodies of water, beaches, and other similar areas.

According to Govindaswamy and Rangappa (2023), the JMP ladder highlights the complexities and challenges in achieving universal sanitation access, emphasizing the need for integrated strategies that address both the technical and social aspects of sanitation. Addressing these challenges is crucial for reducing public health burdens and achieving broader SDG objectives related to health, poverty reduction, and environmental sustainability (Pouramin et al., 2020; Govindaswamy & Rangappa, 2023).

2.3 Sanitation Interventions Coverage in Underserved Communities

Access to safely managed sanitation remains critically low among vulnerable groups such as low-income households, rural populations, and residents of informal settlements, as highlighted by data from the WHO/UNICEF Joint Monitoring Programme (JMP). These stark disparities have spurred a significant increase in sanitation intervention efforts, with global investments in such programs rising by approximately 30% over the past decade (World Bank, 2022). To bridge access gaps and effectively reach underserved populations, interventions have primarily focused on strategies such as subsidies, behavioural change campaigns, financial mechanisms, and enforcement policies.

A common methodological feature among literature is the use of mixed method designs to evaluate intervention effectiveness with coverage as a key metric for program effectiveness. Experimental and quasi-experimental approaches dominate, reflecting a strong emphasis on generating credible and actionable evidence. For instance, Günther et al. (2016) and the Institute for Fiscal Studies (2018) utilized randomized controlled trials (RCTs) to assess subsidy impacts and sanitation marketing efforts, ensuring causal relationships between interventions and outcomes. Apanga et

al. (2020) adopted repeated cross-sectional surveys to evaluate the longitudinal impacts of integrated rural sanitation programs across multiple countries, while Takele et al. (2023) employed a quasi-experimental approach combined with qualitative interviews to capture both measurable outcomes and contextual influences. The inclusion of qualitative methods, such as thematic analysis in Sclar et al. (2022) and key informant interviews in Takele et al. (2023), provide deeper insights into the factors affecting intervention success.

In terms of the type, subsidy programs consistently emerge as a pivotal mechanism for improving sanitation coverage, as demonstrated across multiple studies. Apanga et al. (2020) documented a significant 53-percentage-point increase in coverage through an integrated rural sanitation approach that targeted vulnerable populations, including low-income households and female-headed families. Similarly, Dwumfour-Asare et. al (2020) report that the GAMA-SWP intervention in Ghana achieved widespread adoption when subsidies were increased to 70%, making sanitation facilities more affordable for low-income households. Also, findings from Günther et al. (2016) demonstrate that tiered subsidies for ventilated improved pit (VIP) latrines significantly boost household investments in sanitation infrastructure, particularly among low-income groups. These findings collectively highlight the effectiveness of subsidies in overcoming financial barriers, a barrier to household infrastructure access.

In addition to subsidies, Behavioural Change Campaigns (BCCs) and Community-Led Total Sanitation (CLTS) are harnessed to raise awareness and encourage latrine use, although their impacts on coverage vary based on implementation contexts and complementary strategies (Trimmer et al. 2022; Takele et.al, 2023; Garn et al., 2017). Per evidence from Trimmer et al. (2022), CLTS alone is insufficient to sustain improvements in rural Ghana, where sanitation

conditions deteriorate without additional financial support. Combining CLTS with subsidies leads to better outcomes, demonstrating the need for integrated approaches (Trimmer et al., 2022).

Despite these areas of consensus, differences in program outcomes and contextual influences are apparent. The magnitude of coverage varies considerably across studies. Garn et al. (2017) reported modest improvements, with an average 14% increase in coverage across reviewed interventions, reflecting the variability of results depending on program design and implementation fidelity. In contrast, Apanga et al. (2020) and Dwumfour-Asare et al. (2020) reported substantial gains, attributed to integrated strategies that combined financial, behavioral, and enforcement mechanisms.

Contextual differences between urban and rural settings also significantly shape intervention outcomes. Urban areas pose unique challenges, including high population density, shared facilities, and reliance on public toilets, as highlighted by Dwumfour-Asare et al. (2020). These challenges necessitate tailored approaches, such as enforcing sanitation bye-laws to compel landlords to provide household toilets. Conversely, rural interventions, such as those studied by Trimmer et al. (2022), benefit from durable infrastructure solutions and direct subsidies, which were more effective in these less densely populated settings.

2.4 Program Adherence (Fidelity) in Sanitation Interventions

According to Saunders et al. (2005), program adherence (fidelity) is a measure of what extent the intervention was developed and used as intended. The literature on the fidelity of sanitation interventions reveals a spectrum of outcomes shaped by contextual, structural, and behavioral factors. Across the studies reviewed, a consistent emphasis is placed on the role of fidelity in achieving desired sanitation outcomes. For instance, Rajaman et al. (2014), using semi-structured interviews, household surveys, and direct observations, highlighted the high fidelity and recall

associated with the SuperAmma intervention in rural India. This intervention leveraged behavior change communication strategies and achieved strong adherence to handwashing practices across diverse socioeconomic groups. Similarly, Msemwa (2017) conducted a cross-sectional study combining surveys and observational checklists, demonstrating exceptional success in the CLTS program in Njombe district, Tanzania, where latrine use increased from 3% to nearly 99%. These examples underscore how rigorous methodologies and context-sensitive implementation protocols can lead to transformative sanitation practices.

In contrast, other studies illustrate how challenges in implementation fidelity can compromise outcomes. Freeman et al. (2022), in a cluster-randomized trial evaluating the Andilaye intervention in Ethiopia, found limited impacts on sanitation behaviors and mental well-being. The study utilized household surveys and observational methods to measure WASH access and behavioral outcomes but attributed the intervention's failure to poor fidelity and insufficient community engagement. Similarly, Greenland et al. (2017), employing the intervention's theory of change-based process evaluation in Zambia, observed low reach and inconsistent fidelity in a multi-behavior intervention targeting diarrhea control. The mixed-methods approach, which included household surveys, focus groups, and direct observations, revealed significant contextual challenges in peri-urban and rural areas that hindered the intervention's effectiveness. These findings highlight the complex interplay between intervention design, delivery, and local dynamics, which can either enhance or hinder fidelity.

Despite these differences, certain themes emerge as commonalities across literature. Effective community engagement appears to be a pivotal factor in successful implementation. Sclar et al. (2022), through a mixed methods process evaluation combining quantitative fidelity scoring and qualitative thematic analysis, underscored the value of multi-level communication strategies in

fostering adherence. The Sundara Grama intervention in rural India achieved high delivery scores for activities such as household visits and community meetings, supported by pre-intervention rapport building and the involvement of local stakeholders. Similarly, Msemwa (2017) highlighted how proper community mobilization and triggering mechanisms facilitated the success of the CLTS program. Across these studies, community involvement and rapport-building activities emerged as essential for ensuring fidelity to protocols.

Resource allocation also emerges as a critical factor influencing fidelity. Antwi-Agyei et al. (2017), in a process evaluation of Tanzania's National Sanitation Campaign using surveys and key informant interviews, emphasized the need for adequate funding and stronger stakeholder partnerships to sustain sanitation improvements. The study revealed significant gaps in infrastructure, with only 29% of schools having soap at handwashing stations, despite moderate success in implementing sanitation guidelines.

However, disparities in adherence rates and outcomes point to significant differences in intervention design and contextual adaptability. For example, while Msemwa (2017) reported near-universal adherence in Njombe district, Greenland et al. (2017) documented substantial challenges in reaching peri-urban populations in Zambia due to logistical issues and competing priorities. Similarly, while Rajaman et al. (2014) achieved broad acceptance of behavior change messaging in rural India, Freeman et al. (2022) found minimal impact from the Andilaye intervention, illustrating how variations in strategies and local dynamics can influence outcomes.

Moreover, few studies have explored the long-term sustainability of behavior change or the psychological mechanisms underpinning adherence. The lack of standardized tools for monitoring fidelity, as noted by Sclar et al. (2022), also poses challenges for cross-comparative evaluations and generalizability.

Contrasting views within the studies offer valuable insights into the multifaceted nature of fidelity. Some researchers, such as Rajaman et al. (2014), advocate streamlined and cost-effective behavioral strategies, emphasizing their scalability and feasibility. Conversely, Antwi-Agyei et al. (2017) argue for a more structural approach, calling for investments in infrastructure and institutional capacity to create a supportive enabling environment. These perspectives highlight the ongoing debate about the relative importance of behavioral versus structural interventions in achieving fidelity.

Overall, literature underpins the critical role of fidelity in determining the success of sanitation interventions. The evidence suggests that high-fidelity implementations, supported by robust community engagement and adequate resources, are more likely to achieve sustained behavior change and improved sanitation outcomes. However, the variability in outcomes across studies highlights the need for adaptable intervention designs that are sensitive to local contexts. By synthesizing lessons from diverse settings, the field can advance toward more effective and inclusive sanitation interventions, ultimately contributing to better public health outcomes.

2.5 Summary of gaps from the empirical review

A key limitation identified across the reviewed studies was the predominant reliance on program theories of change and descriptive methodologies like case studies, surveys to evaluate sanitation interventions (e.g., Sclar et al., 2022; Msemwa, 2017; Antwi-Agyei et al., 2017). While these approaches provide a structured framework for aligning and measuring program inputs with expected outcomes, they often lack the flexibility to capture process dynamics and contextual variations effectively. Yeboah-Assiamah (2015) and Muthoni et al. (2023) emphasize internal program alignment but do not incorporate any independent external evaluation frameworks. This

methodological limitation restricts the ability to comprehensively assess how interventions function in diverse contexts or adapt to real-world challenges.

The absence of external and process-oriented frameworks results in under exploration of critical factors such as implementation fidelity, stakeholder engagement, and barriers to adoption. This gap diminishes the capacity of evaluations to provide actionable insights necessary for refining and scaling interventions in diverse settings. This study addressed these gaps by employing the RE-AIM framework, an evaluation tool that evaluates both process and outcomes through dimensions such as reach, adoption and implementation. This approach offers a significant improvement over traditional descriptive methodologies, contributing to more holistic and actionable evaluations of sanitation interventions.

2.6 Urban Sanitation Interventions in Ghana

Urban sanitation interventions in Ghana have evolved significantly over the past few decades, driven by the urgent need to address public health crises associated with inadequate sanitation facilities. Historically, urban sanitation in Ghana faced numerous challenges, including political instability and insufficient infrastructure, which led to widespread open defecation and the proliferation of waterborne diseases (Mariwah et al., 2017; Mariwah, 2018). The introduction of various sanitation policies and programs since the 1990s, such as the National Environmental Sanitation Policy and CLTS initiatives, has aimed to improve sanitation access and infrastructure in urban areas (Mensah & Enu-Kwesi, 2019). These interventions have been critical in reshaping the landscape of urban sanitation, particularly in major cities like Accra and Kumasi, where strategic plans have been implemented to enhance waste management and promote hygiene practices.

The contributions of these urban sanitation interventions are evident in multiple studies highlighting their positive impacts on public health and environmental quality. For instance, the review by Appiah-Effah et al. (2019) highlights that improved sanitation infrastructure significantly reduces diarrhea cases, underscoring the direct health benefits of such interventions. Similarly, Osumanu et al. (2020) reported a decline in cholera outbreaks in Tamale following the installation of water and sanitation facilities, emphasizing the critical role these interventions play in disease prevention. Furthermore, Mensah and Enu-Kwesi (2019) demonstrate how poor urban environmental sanitation undermines ecological quality and local livelihoods, underscoring the value of strengthened sanitation systems in urban Ghana. Complementing this, the World Bank's Implementation Completion and Results Report shows that the Greater Accra Metropolitan Area Sanitation and Water Project (GAMA-SWP) substantially expanded access to improved household sanitation among low-income urban residents and reduced environmental contamination through increased coverage of hygienic toilet facilities (World Bank, 2020). In addition, evaluations of Community-Led Total Sanitation (CLTS) in Ghana have reported increased latrine construction and measurable reductions in open defecation in intervention communities, although sustainability challenges persist (Harter et al., 2020; Adam & Badu, 2024).

Despite these advancements, controversies persist regarding the implementation of urban sanitation interventions in Ghana. Issues such as inadequate maintenance of public toilets, weak community engagement, and patterns of political patronage continue to constrain the effectiveness of sanitation programmes (Adjei et al., 2019; Osumanu et al., 2020). Research in Ghana shows that overcrowding, poor maintenance and unhygienic conditions in many public toilets undermine user confidence and lead some residents to continue practising open defecation, particularly in low income urban settlements (Mariwah et al., 2017; Yeboah-Assiamah, 2015). These operational and

governance gaps are consistent with recent evidence demonstrating low compliance with environmental sanitation regulations in both urban and peri-urban settings, driven by weak enforcement and institutional capacity constraints (Mensah et al., 2022). Moreover, debates surrounding public-private partnerships have highlighted persistent challenges related to accountability and regulation, with many initiatives failing to deliver sustainable outcomes due to insufficient oversight (Mensah & Enu-Kwesi, 2019). These controversies underscore the need for coherent, integrated and well-regulated sanitation interventions.

The Greater Accra Sustainable Sanitation and Livelihoods Improvement Project (GASSLIP) was introduced to address persistent urban sanitation and solid waste challenges in the Greater Accra area and to expand access to safe, sustainable sanitation for low income households. Government reports indicate that under GASSLIP, 4,160 household toilets had been completed out of a planned 5,000, with the project explicitly targeting low income communities in the Greater Accra Metropolitan Area (Ministry of Sanitation and Water Resources, 2022; Ministry of Sanitation and Water Resources, 2024). In addition, the Ministry reported in 2022 that 205 small motorised tricycles, 25 skip loaders and 50 skip containers were being procured for distribution to beneficiary metropolitan, municipal and district assemblies to strengthen solid waste collection (Ghana News Agency, 2022). Despite this infrastructure roll-out, documentation of GASSLIP's implementation and effects in peer reviewed literature remains limited, with most available information found in government and project reports rather than academic evaluations.

2.7 Project Description: The Greater Accra Sustainable Sanitation and Livelihoods Improvement Project (2017-2026)

The Greater Accra Sustainable Sanitation and Livelihoods Improvement Project was established in response to the urgent need for improved sanitation in Ghana, where only 20% of the urban

population as of 2017 had access to adequate sanitation facilities (African Development Bank, 2017). This translated to increased health crises like cholera outbreaks in the country with the Greater Accra Region recording the highest numbers (Knott, 2020). The Project targets the GAMA which comprises eleven (11) Metropolis, Municipal and Districts areas of the Greater Accra Region. They are: They are Ga South Municipal Assembly (GSMA), Ga Central Municipal Assembly (GCMA), Ga West Municipal Assembly (GWMA), Ga East Municipal Assembly (GEMA), Accra Metropolitan Assembly (AMA), La-Nkwatanang Municipal Assembly (LaNMA), Adentan Municipal Assembly (AdMA), Ledzokuku/Krowor Municipal Assembly (LeKMA)), La-Dadekotopon Municipal Assembly (LaDMA), Tema Metropolitan Assembly (TMA) and Ashaiman Municipal Assembly (AshMA).

The project primarily targets households within GAMA, prioritizing low income urban and peri-urban communities, where approximately 64% (2.6 million) of the GAMA population reside (AfDB, 2017).

2.7.1 Goal

The overall objective of the Project is to improve the health standards and socio-economic well-being of the urban poor within the Greater Accra Metropolitan Area. The specific objectives are to increase access to improved and sustainable climate resilient sanitation and hygiene; improve livelihoods for the urban poor; strengthen public and private sector capacity to better deliver and manage sanitation infrastructure and services.

2.7.2 Project Components and Activities

The Project's intervention strategy is based on an integrated approach across the sanitation value chain from waste containment to safe disposal and reuse. The project has five components namely:

i. Sustainable Sanitation and Hygiene

ii. Improved Waste Management Infrastructure and Services

iii. Institutional Strengthening and Capacity Improvement

iv. Enhanced Livelihoods and Improved Economic Wellbeing

v. Project Management

Sustainable Sanitation and Hygiene together with Improved Waste Management Infrastructure and Services make up the Sanitation Component of GASSLIP.

2.7.3 Implementation Arrangements

Direct implementation and coordination of the project is overseen by the Project Coordinating Unit (PCU) domiciled with the Ministry of Local Government and the Ministry of Sanitation and Water Resources. Under the Sanitation Component, the 11 beneficiary Metropolitan Municipal District Authorities (MMDAs) are responsible for implementation of sub-activities that focus on:

- Baseline and KAP studies and development of gender sensitive training and promotional materials.
- Demand creation for household sanitation facilities through social marketing, and behavioral change campaigns targeting women/youth.
- Construction of sustainable and climate resilient on-site household sanitation facilities in low-income areas, where 30% of the cost is paid by the households/house owners, and the remaining 70% is paid by the project as an output-based subsidy.
- Construction of gender and disability friendly innovative school WASH facilities, and implementation of WASH clubs in schools.
- Solid waste (garbage) extension services using solid waste collection/composting facilities e.g. bins, skip loader trucks, etc.

2.8 Study Frameworks

2.8.1 Theory of Change

The study's theory of change in Figure 2.1 outlines how the various components of GASSLIP contribute to achieving improved health standards and socio-economic well-being. Establishing sustainable household and school sanitation service facilities creates the foundation by providing proper disposal options e.g. toilets, handwashing stations, bins, etc. The waste generated from these sanitation facilities is collected efficiently and treated properly when waste collection and treatment infrastructure services are improved. Strengthening institutions and improving household livelihood ensures the sustainability of established services and facilities. Enhanced project management ensures that all components work together effectively to deliver outcomes that lead to the improved health standards and socio-economic well-being of GAMA's populace. This proposed flow of change is dependent on the transparency and accountability of household targeting mechanisms and project materials procurement processes. Also, since the implementation of the project is mainly through state institutions (MMDAs), a stable political and economic climate is assumed to positively facilitate GASSLIP.

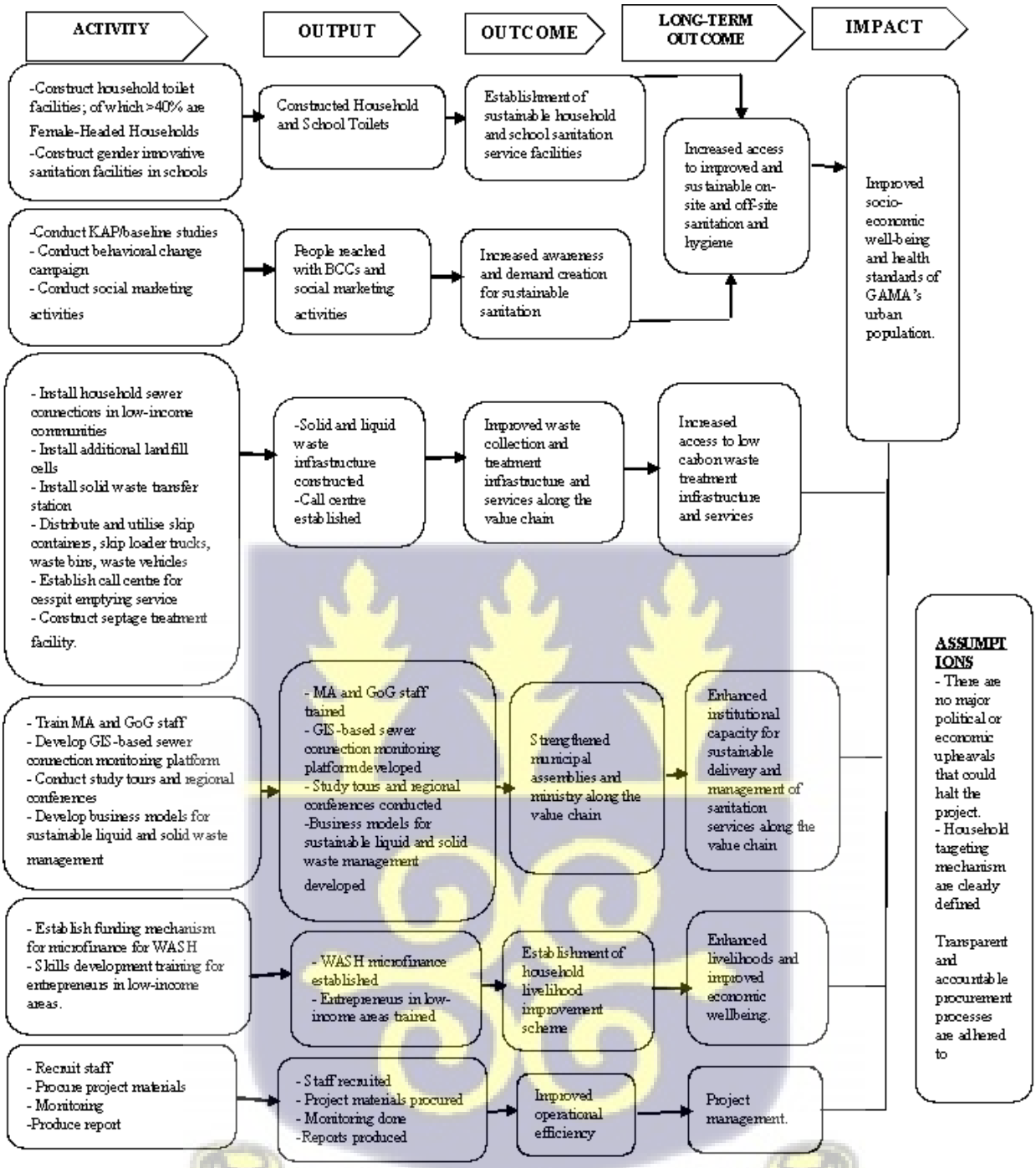

Figure 2.1: *Theory of Change for GASSLIP*

Source: Adapted from World Bank, 2020

2.8.2 RE-AIM Framework

The RE-AIM stands for Reach, Effectiveness, Adoption, Implementation and Maintenance. The framework, developed by Glasgow and his colleagues (1999), is a widely used planning and evaluation tool utilized across the fields of public health, behavioral science, and implementation science. The framework has five dimensions which are measured at both individual and staff level.

"The Reach dimension (individual level) addresses the extent to which a target population is engaged on the project, focusing on characteristics like demographics and coverage. Effectiveness (individual level) addresses an intervention's impact on individual outcomes including quality of life, economic and generalizability or heterogeneity of impacts. including its positive and negative effects. Adoption (staff level/multiple settings) addresses the willingness of individuals and organizations to take up the intervention, while Implementation examines fidelity to various components of an intervention. It includes cost, and adaptations and recruitment made during delivery. Maintenance assesses the long-term sustainability of both individual behavior changes and institutional practices" (Holtrop et.al., 2021).

REAIM is concerned about a program's performance and impact in terms of its different dimensions, outcomes related to population health and the context in which a program is effective or not. All or some of the framework's dimensions can be operationalized in an evaluation (Harden et al., 2019). The framework covers both process and outcome evaluations and is particularly relevant for evaluating multi-faceted programs which often involve multiple components and activities (Holtrop, 2021). This study operationalised the Reach and Implementation dimensions of the RE-AIM to evaluate the sanitation component of GASSLIP at the municipal assembly level. The RE-AIM framework as seen in Fig 2.2 served as the mother framework from which the conceptual framework for the study was developed.

Figure 2.2: *Elements of the RE-AIM Framework*

Source: Adopted from The RE-AIM framework (1999)

2.9 Chapter Summary

This chapter has provided a review of the landscape of sanitation intervention evaluation. It has also described the GASSLIP, which is the focus of this evaluation. While the literature reveals concerted efforts to improve sanitation infrastructure and services, information on GASSLIP's implementation in various institutional settings is scarce. The chapter sets the stage for this study to address these gaps by evaluating the implementation of GASSLIP in GAMA using Adenta Municipality as a case study, thereby contributing to the broader discourse on urban sanitation interventions performance and effectiveness.

CHAPTER THREE

3.0 METHODS

3.1 Overview

This chapter outlines the methodological approaches employed by the study. These include study design, population, sampling design, study variables and indicators, data collection techniques and analysis.

3.2 Study location/area

The study was conducted in Adenta Municipality, one of the sixteen administrative areas within the GAMA. Situated approximately 10 kilometers northeast of Accra, Adenta is geographically positioned between latitude 5° 40' N and longitude 3° 09' W, extending to latitude 5° 48' N and longitude 11° 43' W. The municipality shares its boundaries with Kpone-Katamanso and Ashaiman Municipalities to the east, Madina/La Nkwantanang Municipality to the west, Kpone-Katamanso to the north, and Madina/La Nkwantanang and Ledzokuku Krowor Municipalities to the south.

According to the 2021 Ghana Population and Housing Census, Adenta Municipality has a population of 237,546, marking a significant increase from 78,215 in 2010 and, a resulting population density of approximately 3,007 persons per km² across its area of 78.99 km² (Ghana Statistical Service, 2021). The municipality comprises 236,188 households, with an average household size of 3.7 persons (Ghana Statistical Service, 2021). This demographic shift underscores Adenta's role as a transitional zone between urban and rural settings, accommodating diverse communities and economic activities.

Adenta Municipality is divided into four main administrative zones: Gbentanaa Zonal Council, Nii Ashale Zonal Council, Koose Zonal Council, and Sutsurunaa Zonal Council. These zones play a vital role in coordinating essential services such as sanitation, health, and education within the municipality, ensuring effective governance and community engagement.

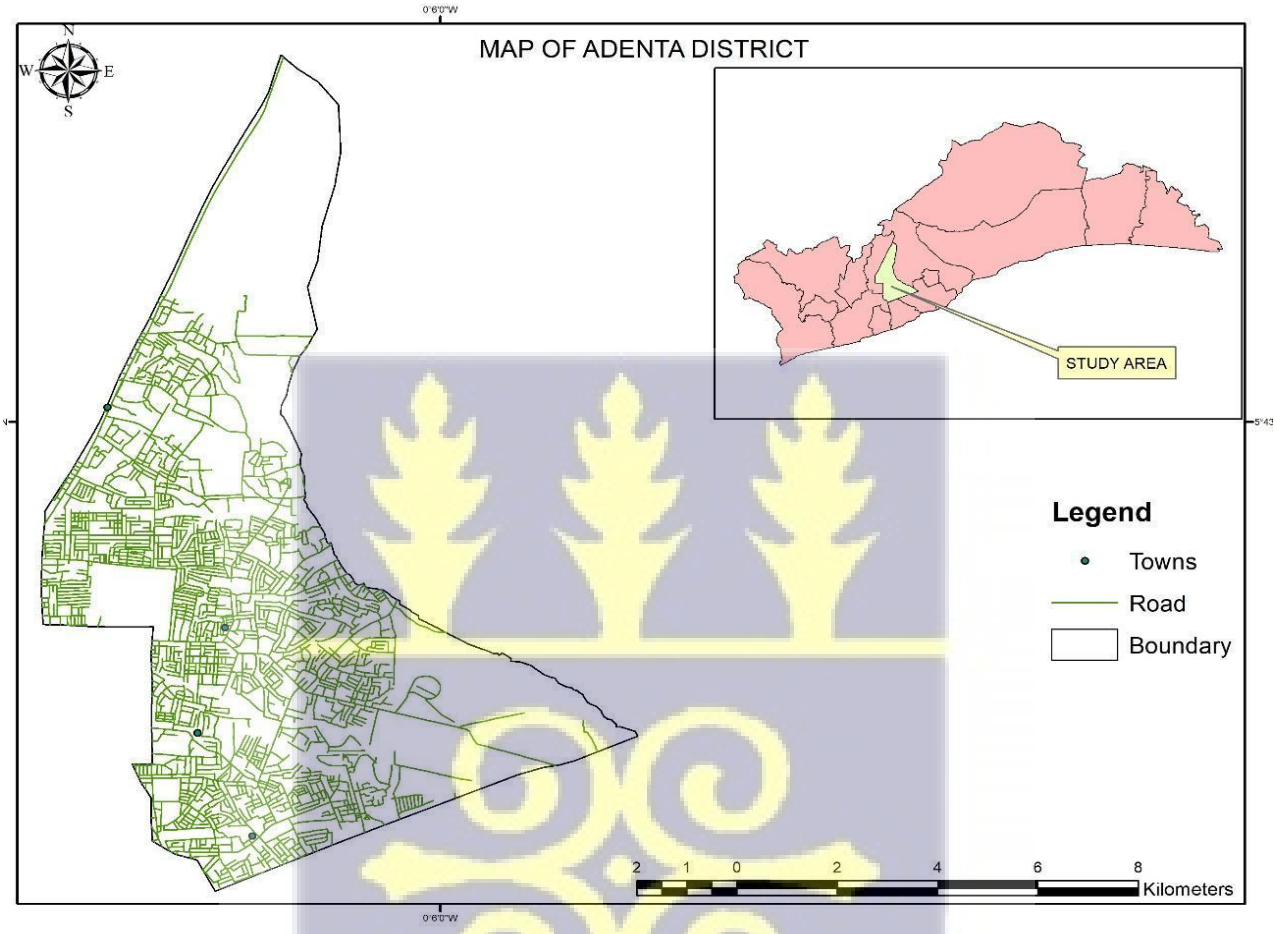

Figure 3.1: *Map of Adenta Municipality*

Source: Author 2025

3.3 Study design

This study utilised a process evaluation design in assessing the implementation of the sanitation component of GASSLIP. A process evaluation examines a program's implementation to determine how well it adheres to the strategic framework outlined in the logic model (USAID, 2009). This

involves tracking the inputs, activities, and processes specified in the project's logic model, with a particular focus on the institutions responsible for program implementation. Process evaluations are essential for understanding not only whether an intervention achieves its objectives but also how and why it operates effectively within real-world settings (Moore et al., 2015). Additionally, they provide a foundational reference for subsequent impact evaluations by illuminating the implementation context and identifying factors that influence program success or present challenges.

To conduct this process evaluation, a cross-sectional mixed methods approach was employed. Cross-sectional designs are widely utilized in public health research to assess the prevalence and distribution of outcomes within a defined population (Levin, 2006). Thus, this approach was relevant for providing a snapshot of the sanitation component of GASSLIP in Adenta. The research questions and objectives of this evaluation were guided by the Reach and Implementation dimensions of the RE-AIM framework. Structured questionnaires were administered to beneficiary households to assess Reach dimension at the individual/household level. Structured questionnaires together with key informant interviews were utilized to explore the Implementation dimension at the staff/ implementor level. By integrating quantitative and qualitative data, a study enhances its findings by offering both quantifiable results and a deeper contextual understanding of the factors influencing program outcomes (Joslin & Müller, 2016).

3.4 Logic Model for GASSLIP

Table 3.1: *Logic Model for GASSLIP Sanitation Component*

INPUT	PROCESSES	OUTPUTS	OUTCOMES	IMPACT
Materials Training materials, promotional materials, waste bins, SPVs, skip containers **Funds from** (AfDB, GoG funds and beneficiaries) **Human Resource** (MA staff, waste collectors, media and advertising consultants, contractors, beneficiaries)	• Knowledge, Attitudes and Practices (KAP) / baseline study meetings • Staff training sessions • Behavioural change campaign facilitation • Social marketing facilitation • Household sanitation facility construction • School WASH club establishment • Solid waste facilities (waste bins, SPVs, skip trucks, skip containers) distribution • Call centre for sanitation-related issues establishment	• Number of participants attending KAP and baseline meetings • Number of staff training sessions delivered • Number of behavioural change campaigns delivered • Number of social marketing activities implemented • Number of household sanitation facilities constructed • Number of school WASH clubs established • Number of solid waste facilities distributed (waste bins, SPVs, skip trucks, skip containers) • Functioning call centre established for sanitation-related issues	• Demand creation and awareness on sustainable sanitation practices, infrastructure and services • Increased access to safely managed sanitation facilities • Improved waste management services in municipalities	Improved health standards of GAMA's population

3.5 Study population

The target population for this study consisted of all households in beneficiary communities in Adenta and Adenta Municipal Assembly staff. These are the primary stakeholders in the project implementation at the municipal level.

3.6 Eligibility criteria

3.6.1 Inclusion criteria

Study participants included staff identified as GASSLIP project officers and/or municipal environmental health officers at the Adenta Municipal Assembly (AdMA). The study participants also included households in beneficiary communities in Adenta. Only participants who provided consent were interviewed.

3.6.2 Exclusion criteria

Study participants were excluded if they met the inclusion criteria but had additional factors that made them ineligible to participate. Specifically, eligible AdMA staff and household respondents were excluded if they:

- declined or withdrew informed consent at any stage of the data collection;
- did not wish to continue with the interview;
- were too ill, distressed, or otherwise unable to provide reliable information at the time of data collection; or
- were unavailable after at least three repeat visit attempts by the data collection team.

Households outside GASSLIP beneficiary communities and AdMA staff who were not GASSLIP project officers and/or municipal environmental health officers did not meet the inclusion criteria and were therefore not approached for recruitment.

3.7 Study variables

The outcome variable of the study was the implementation status of the sanitation component of GASSLIP. In order to evaluate the implementation status of the sanitation component of

GASSLIP, the five (5) specific objectives of the study were measured as dependent variables. These objectives were guided by the Reach and Implementation dimensions of the RE-AIM framework. The operational definitions used in the study can be seen in Table 3.2.

The independent variables comprised socio-demographic and household characteristics that were expected to influence participation in, or exposure to, the GASSLIP sanitation interventions. These included respondent age, sex, level of education, occupation, household income, household size, tenure status, type of dwelling, years of residence in the community, access to water supply, previous sanitation facility type and prior involvement in other sanitation initiatives. These variables were included because they are known to shape household decision-making, adoption behaviour and engagement with sanitation interventions.

Table 3.2: *Operational Definition of RE-AIM dimensions.*

Dimension	**Operational Definition**	**Classification**
Reach (Individual level)	The households in beneficiary communities that actively participated or not.	Quantitative
	The reasons for household participation	Quantitative
	The characteristics of participants compared to non-participants (association between socio-economic characteristics of study participants and GASSLIP sanitation component beneficiary status).	Quantitative
Implementation (Staff level)	The adherence of the municipal assembly to stipulated activity and output protocols	Quantitative
	The implementation experiences (adaptations, barriers and facilitators)	Qualitative

3.8 Sampling

3.8.1 Sample Size Determination

Qualitative sample size determination

The study employed a total population sampling for the qualitative component due to the finite number of staff identified as GASSLIP project officers and/or municipal environmental health officers at the Adenta Municipal Assembly (AdMA). The staff included the GASSLIP coordinator at the AdMA Head Office, along with the unit heads in the municipal environmental health department across the four zonal councils, totalling five (5) participants.

This approach was used because all individuals occupying these positions were directly responsible for implementing the sanitation component of GASSLIP, and excluding any of them would result in loss of critical programme-level information. In qualitative research, sample adequacy is determined by role relevance and completeness of perspective rather than numerical size; therefore, interviewing the entire population of relevant actors ensured full coverage of implementation experiences.

Quantitative sample size determination

For the household surveys, Yamane's formula (1967) was applied to determine the sample size from the total 300 beneficiary households. Yamane's formula for sample size determination is:

$$n = \frac{N}{1 + N\,(e^2)}$$

- Where n= sample size
- N= total population (300)
- e= desired level of precision (0.05 or 5%)

Substituting the values:

$$n = \frac{300}{1 + 300(0.05^2)}$$

$$n = \frac{300}{1.75}$$

$$n = 171$$

Thus, the required sample size using Yamane's formula was 171 households. The study employed Yamane's formula because it is well-suited for finite populations, providing a statistically sound and simplified approach while incorporating a margin of error (Yamane, 1967). It is widely used in social science and health research due to its ease of application and flexibility in accommodating different precision levels (Etikan & Bala, 2016).

A 15 percent non-response rate was incorporated to account for potential attrition, consistent with conservative estimates for household surveys (Lynn, 2017; Olson, 2012; Lavrakas, 2008). This adjustment increased the sample size to ensure adequate representation.

$$n_{adjusted} = \frac{n}{1 - non\ response\ rate}$$

$$n_{adjusted} = \frac{171}{1 - 0.15}$$

$$n_{adjusted} = 201$$

Therefore, the final sample size for household surveys was 201 households.

3.8.2 Sampling method

The study purposively selected interview participants based on their organizational roles and potential to provide comprehensive insights into the status of GASSLIP. The quantitative aspect involved stratified cluster sampling, where identified low-income communities were divided into four zonal council areas (geographic clusters). Simple random sampling was utilized to select households within these clusters to ensure representativeness and minimize selection bias. The

stratified cluster sampling approach ensures methodological rigor, facilitates data triangulation, and enhances the study's overall validity and reliability (Teddlie & Yu, 2007).

3.9 Data collection techniques/tools

Two (2) primary data collection tools were utilized in this study namely: structured questionnaires and interview guides. These tools are widely recognized for their effectiveness in capturing both quantitative and qualitative data in social research (Brace, 2018).

3.9.1 Quantitative approach

A structured questionnaire (checklist) was administered at the Adenta Municipal Assembly during a face-to-face interview with the municipal GASSLIP coordinator. This was done after consent was obtained. Structured questionnaires were also administered to households after consent was obtained. The questionnaire included questions soliciting their GASSLIP participation experiences. A maximum of 30 minutes was spent completing a questionnaire per individual.

3.9.2 Qualitative Approach

Key informant interviews were conducted with the municipal GASSLIP coordinator as well as unit or department heads across the four zonal councils. In total, **five** key informant interviews were conducted, reflecting all municipal staff who held direct responsibilities for the implementation of the sanitation component of GASSLIP within AdMA. The interviews were recorded using an audio recorder, and the recordings were used as references to support accurate data transcription and analysis.

3.10 Quality control

3.10.1 Training of Field Staff

To ensure comprehension of the questionnaire and maintain data quality, data enumerators underwent two (2) day training on the use of data collection tools. The training covered study protocols, questionnaire administration in English and local language (Twi), ethical guidelines for human participant protection, confidentiality protocols, and procedures for obtaining informed consent. Mock interviews were conducted to prepare enumerators for various field scenarios.

3.10.2 Pre-testing Data Collection Tools

The questionnaires and the checklists for data review were pre-tested in purposively selected households in Adenta that were not part of the study sample. This was done to help identify ambiguities and assess the tool's effectiveness in capturing relevant data. Based on feedback from the pre-test, necessary revisions were made to the questionnaire to ensure that they elicited the right responses that answered the objectives of the study.

3.10.3 Supervision of Fieldwork

The Principal Investigator (PI) supervised the data collection exercise to ensure adherence to study protocols. This involved daily debriefing sessions between enumerators and PI to resolve issues arising from the field.

3.10.4 Data processing and management

All questionnaires were administered via the Kobo Collect online platform using tablets. Data was then exported into STATA 15, where range checks and validation rules were applied to ensure that the data is accurate and complete to minimize errors. This was done to support data validation and the minimization of errors. Data gathered from all the interviews were recorded using a voice

recorder and stored in files created on a personal computer with password to prevent access by unauthorised persons.

3.11 Data Analysis

The data collected was analysed in a structured manner to address each of the study's specific objectives.

3.11.1 Extent of Coverage of the Sanitation Component of GASSLIP

Extent of coverage was determined based on the proportion of participants who benefitted from GASSLIP, the distribution of the GASSLIP facilities among beneficiaries and the participation of residents of Adenta municipality in the behaviour change campaign by GASSLIP. Analysis was done using descriptive analysis such as frequencies and percentages and results presented in tables and charts as frequencies and percentages. Participation in behaviour change campaigns was self-reported by respondents during the household survey.

3.11.2 Reasons for Participation in Sanitation Component of GASSLIP

The reasons for participating in the sanitation component of GASSLIP was analysed using frequencies and percentages and results presented in table.

3.11.3 Association between Socio-Economic Characteristics of Study Participants and Beneficiary Status in the GASSLIP Sanitation Component

The association between background characteristics of participants and GASSLIP beneficiaries was determined using Chi square or Fisher's exact test. Simple and multiple regression analyses were further performed to determine the background characteristics associated with being beneficiary of GASSLIP. Level of statistical significance in all cases was established at $P < 0.05$, with confidence interval 95%.

3.11.4 Extent of Adherence to Delivery Protocols

The extent of adherence to sanitation component delivery protocols was determined by evidence of completion of input, output and activity protocols as assigned to the Municipal Assembly. Twelve (12) key indicators were assessed using a tertile scoring system where 1 = fully adherent, 0.5 = partially adherent, and 0 = not adherent. Scores were assigned based on available evidence of completion, including reports, and observed outputs. The total delivery score was computed using Microsoft Excel template by summing individual activity scores and then multiplied by 100 to arrive at a percentage score. Based on this, an ordinal classification system was applied to determine the overall adherence status: <37.5% = not adherent, 37.6–75% = partially adherent, and 76.1–100% = fully adherent.

Adherence was assessed by assigning a score of one to each activity or output that was fully completed by the municipal team and zero where the activity was not completed. Scores for each actor were summed to obtain an overall adherence score. The adherence values reported in the results represent the mean adherence scores across all responsible staff.

3.11.5 Implementation Experiences (Adaptations, Barriers and Facilitators)

Recorded interviews were transcribed verbatim. Similar responses on adaptations, barriers and facilitators enumerated by study participants were group under the same theme, assigned codes using N-Vivo 11. The content and structure of the various themes were then interpreted. Also, simple descriptive statistics were utilized to show the demographic characteristics of interview participants.

3.12 Ethical consideration

This research proposal was subjected to ethical review of the Noguchi Ethical and Protocol Review Committee. Permission was sought from the Adenta Municipal Assembly Head Office. Following this, a forwarded reply was sent to the four zonal councils. The data collection commenced after the approval of the letters from the municipal assembly.

3.12.1 Informed Consent

The study involved adults of 18 years and above. The objectives of the study were explained to the participants. The study's purpose, procedures, potential risks, and benefits were explained to participants before consent forms were given to participants. Only those who signed the consent forms were enrolled in the study.

3.12.2 Potential Risk/Benefit

The study posed no risk to participants. Neither were there personal gains for participants. It is however expected that findings from this research would contribute to improving the implementation of GASSLIP and other sanitation projects in similar contexts.

3.12.3 Privacy/Confidentiality

All respondents were assured of confidentiality and privacy of their responses. Participants' responses were anonymized with personal identifiers only accessible to the research team.

3.12.4 Compensation

There was no financial compensation for participation in the study.

3.12.5 Voluntary Consent/Withdrawal

Participating in this study was completely voluntary. Participants who refused to answer any question or opted to end the interview at any point in time were permitted to without any repercussion. Participants were informed of their right to withdraw their participation should they decide to after consent has been given.

3.12.6 Declaration of Conflict of Interest

The researcher declares no conflict of interest of any form as far as this study is concerned.

CHAPTER FOUR

4.0 RESULTS

4.1 Overview

This chapter presents results of collected data according to the objectives of the study.

4.2 Quantitative Results

4.2.1 Socio-demographic characteristics of participants

Majority of the participants of the study (58.2%) were males. The mean age was 49 years (standard deviation (SD)±10) ranging from 25 to 75years, with participants within the age group 41 – 50 years constituting a higher proportion (39.8%). Most of the participants (47.3%) had household size ranging 3-5. A higher proportion of participants (33.8%) had acquired tertiary education. More than half of the participants (53.7%) had their occupation in the informal sector. Almost equal proportions of participants earned monthly income within the ranges GHS1000.00-GHS2000.00 (34.8%) and GHS2001.00-GHS3000.00 (33.8%). Majority of the participants (58.7%) owned their houses and the housing structure occupied by majority of participants (74.6%) were completed buildings. A higher proportion of the participants (22.4%) had their residential facilities located at Amrahia as shown in table 4.1 below.

Table 4.1: *Socio-demographic characteristics of participants*

Variable	Frequency	Percentage (%)
Sex		
Male	117	58.2
Female	84	41.8

Age (in years)		
30 and below	6	3
31-40	32	15.4
41-50	80	39.8
51-60	56	27.9
61-70	25	12.4
Above 70	3	1.5
Household size		
Less than 3	25	12.4
3-5	95	47.3
6-8	64	31.8
9-11	10	5
Above 11	7	3.5
Education		
No formal education	6	3
Primary	40	19.9
Junior High School	49	24.4
Senior High School	38	18.9
Tertiary	68	33.8
Occupation		
Unemployed	7	3.5
Informal sector (petty trading, artisanship, etc.)	108	53.7
Formal employment (government/private sector job)	76	37.8
Other (pensioner)	10	5
Monthly income (GHS)		
Below 1000.00	11	5.5
1000.00 - 2000.00	70	34.8
2001.00-3000.00	68	33.8
Above 3000.00	52	25.9
Household ownership		
Owned	118	58.7
Rented	71	35.3
Other (caretaker, family property)	12	6

Housing structure		
Completed building(cement/brick/stone/blocks)	150	74.6
Uncompleted building(cement/brick/stone/blocks)	42	20.9
Wooden structure	3	1.5
Kiosk	5	2.5
Other	1	0.5
Location of residence		
Adjiringanor	4	2
Ogbojo	17	8.5
Amrahia	45	22.4
Botwe	28	13.9
Otinibi	5	2.5
Frafraha	12	6
Adenta[¥]	37	18.4
Nanakrom	5	2.5
Dodowa	8	4
New Legon	11	5.5
Lakeside	12	6
Malejor	5	2.5
Abokobi	3	1.5
Amanfrom	3	1.5
Other[d]	6	3
Total	**201**	**100**

[¥] Adenta refers to towns such as; Adenta Sankora, Adenta new site, Adenta down, Adenta village, Adenta aviation, Adenta flats, Adenta SDA, and Adenta Mamomo.
[d] Other include; Akatamanso Nsamanpomu, Oyarifa and Doryimu

4.2.2 Extent of coverage of the sanitation component of GASSLIP

Beneficiaries of GASSLIP

As shown in figure 4.1 below, majority of the participants (i.e., residents of Adenta municipality) (85%) had benefited from GASSLIP.

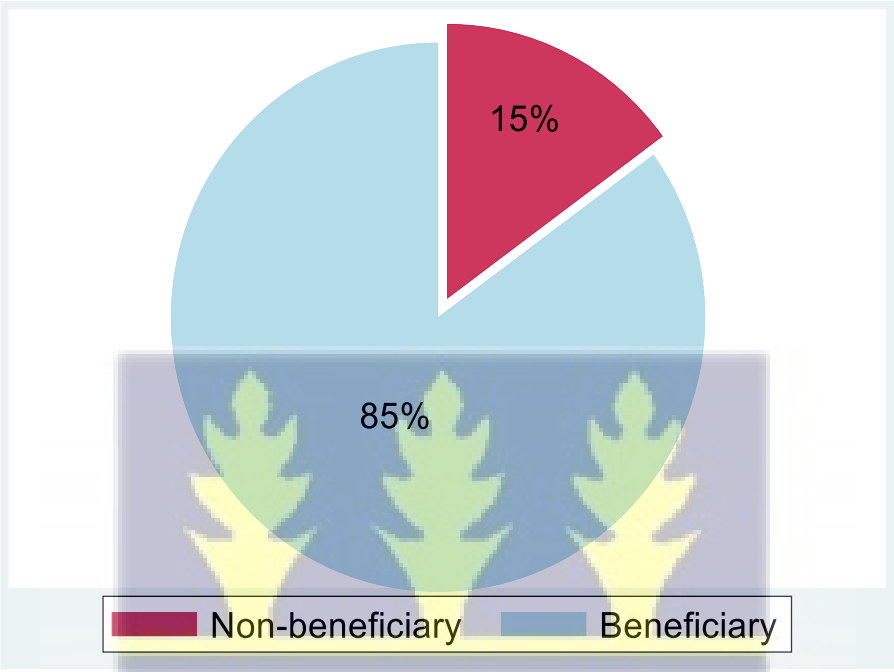

Figure 4.1: *Beneficiaries of GASSLIP*

Distribution of GASSLIP facilities

The results in Table 4.2 show that majority of the participants (82.5%) had received composting toilets (bio-digester), while 11.7% received dry pit latrines. Also, majority of participants (74.3%) received handwashing facilities.

Table 4.2: *Distribution of GASSLIP facilities*

Variables	Frequency	Percentage (%)
GASSLIP toilet facility received		
Flush/pour-flush	7	4.1
Dry pit latrines	20	11.7

Composting toilets (bio-digester)	141	82.5
Container-based toilet	3	1.8
Receipt of handwashing facility		
Received	127	74.3
Did not receive	44	25.7
Total	**171**	**100**

Behavioural change campaign participation

The results in figure 4.2 shows that a few participants (24.6%) participated in behavioural change campaigns related to sanitation under GASSLIP.

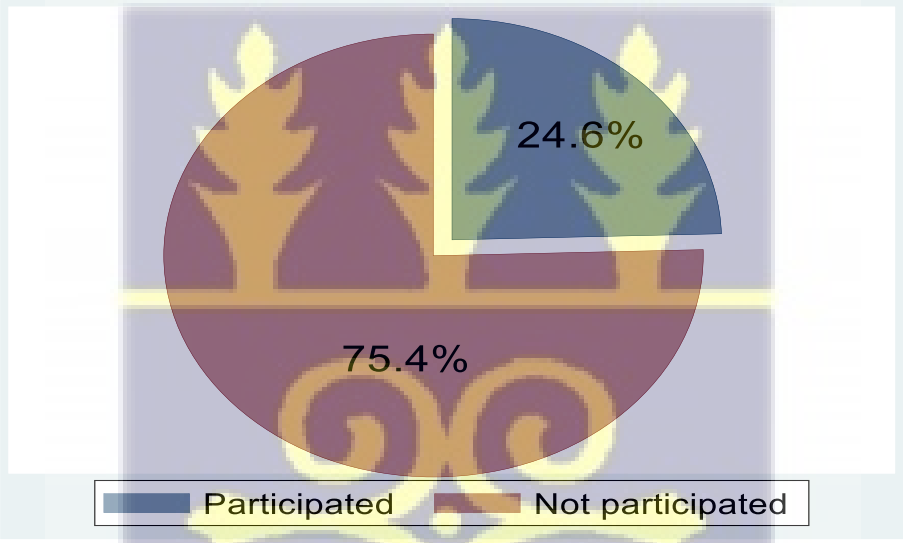

Figure 4.2: *Behavioural change campaign participation*

4.2.3 Reasons for participation in the sanitation component of GASSLIP

As shown in in Table 4.3 below, "convenience and ease of access to sanitation facilities" was the reason given by majority of participants (88.9%) for participating in the sanitation component of GASSLIP, followed by "perceived improvement in health outcomes" (64.3%) and then, "financial support/subsidy for sanitation facilities" (60.2%).

Table 4.3: *Reasons for participation in the sanitation component of GASSLIP*

Variable	Frequency	Percentage (%)[¥]
Financial support/subsidy for sanitation facilities	103	60.2
Perceived improvement in health outcomes (e.g., incidence of disease)	110	64.3
Convenience and ease of access to sanitation facilities	152	88.9
Community sensitization and education campaigns	72	42.1
Influence from neighbors or community leaders	93	54.4
Social prestige/status improvement	59	34.5
Government policy or enforcement	65	38

[¥] Multiple response, percentages represent percentage of cases

4.2.4 Association between socio-economic characteristics and GASSLIP beneficiary status

As shown in Table 4.4, there was no significant difference between beneficiaries and non-beneficiaries of GASSLIP based on sex (χ^2= 0.98, p=0.323), occupation (p=0.549), monthly income (p=0.061) and location of residence (p=0.842). However, there was significant difference between beneficiaries and non-beneficiaries of GASSLIP based on age (p=0.002), household size (p=0.007), education (p<0.001) and household ownership (p<0.001).

Table 4.4: *Association between background characteristics and beneficiaries of GASSLIP*

Variables	Beneficiary of GASSLIP: Non-beneficiary N(%)	Beneficiary N(%)	Total N(%)	χ2	p-value
Sex				0.98	0.323
Male	15 (50.0)	102 (59.6)	117 (58.2)		
Female	15 (50.0)	69 (40.4)	84 (41.8)		
Age (in years)					**0.002*[a]**
30 and below	3 (10.0)	3 (1.8)	6 (3.0)		

31-40	9 (30.0)	22 (12.9)	31 (15.42)	
41-50	8 (26.7)	72 (42.1)	80 (39.8)	
51-60	9 (30.0)	47 (27.5)	56 (27.9)	
61-70	0 (0.0)	25 (14.6)	25 (12.4)	
Above 70	1 (3.3)	2 (1.2)	3 (1.5)	
Household size				**0.007*[a]**
Less than 3	2 (6.7)	23 (13.5)	25 (12.4)	
3-5	12 (40.0)	83 (48.5)	95 (47.3)	
6-8	10 (33.3)	54 (31.6)	64 (31.8)	
9-11	6 (20.0)	4 (2.3)	10 (5.0)	
Above 11	0 (0.0)	7 (4.1)	7 (3.5)	
Education				**<0.001*[a]**
No formal education	2 (6.7)	4 (2.3)	6 (3.0)	
Primary	14 (46.7)	26 (15.2)	40 (19.9)	
Junior High School	6 (20.0)	43 (25.1)	49 (24.4)	
Senior High School	5 (16.7)	33 (19.3)	38 (18.9)	
Tertiary	3 (10.0)	65 (38.0)	68 (33.8)	
Occupation				0.549[a]
Unemployed	0 (0.0)	7 (4.1)	7 (3.5)	
Informal sector (petty trading, artisanship)	18 (60.0)	90 (52.6)	108 (53.7)	
Formal employment (government/private job)	12 (40.0)	64 (37.4)	76 (37.8)	
Other (pensioner)	0 (0.0)	10 (5.8)	10 (5.0)	
Monthly income (GHS)				0.061[a]
Below 1000.00	5 (6.7)	6 (3.5)	11 (5.5)	
1000.00 - 2000.00	10 (33.3)	60 (35.1)	70 (34.8)	
2001.00-3000.00	8 (26.7)	60 (35.1)	68 (33.8)	
Above 3000.00	7 (23.3)	45 (26.3)	52 (25.9)	
Household ownership				**<0.001*[a]**
Owned	6 (20.0)	112 (65.5)	118 (58.7)	

Rented	24 (80.0)	47 (27.5)	71 (35.3)	
Other (caretaker, family property)	0 (0.0)	12 (7.0)	12 (6.0)	
Location of residence				0.842[a]
Adjiringanor	1 (3.3)	3 (1.8)	4 (2.0)	
Ogbojo	4 (13.3)	13 (7.6)	17 (8.5)	
Amrahia	10 (33.3)	35 (20.5)	45 (22.4)	
Botwe	2 (6.7)	26 (15.2)	28 (13.9)	
Otinibi	0 (0.0)	5 (2.9)	5 (2.5)	
Frafraha	2 (6.7)	10 (5.8)	12 (6.0)	
Adenta[¥]	5 (16.7)	32 (18.7)	37 (18.4)	
Nanakrom	0 (0.0)	5 (2.9)	5 (2.5)	
Dodowa	2 (6.7)	6 (3.5)	8 (4.0)	
New legon	2 (6.7)	9 (5.3)	11 (5.5)	
Lakeside	1 (3.3)	11 (6.4)	12 (6.0)	
Malejor	1 (3.3)	4 (2.3)	5 (2.5)	
Abokobi	0 (0.0)	3 (1.8)	3 (1.5)	
Amanfrom	0 (0.0)	3 (1.8)	3 (1.5)	
Other[d]	0 (0.0)	6 (3.5)	6 (3.0)	

*Statistical significance, $p<0.05$, [a]Fisher's exact test used (expected cell count less than 5)
[¥] Adenta refers to towns such as; Adenta Sankora, Adenta new site, Adenta down, Adenta village, Adenta aviation, Adenta flats, Adenta SDA, and Adenta Mamomo. [d] Other include; Akatamanso Nsamanpomu, Oyarifa and Doryimu

Logistic regression to establish background characteristics associated with being beneficiary of the GASSLIP

The results in table 4.5 shows simple and multiple logistic regression analysis of all variables under background characteristics of participants. After adjusting for confounding variables in the multiple logistic regression analysis, age, education, occupation, monthly income and household ownership were found to be significantly associated with being beneficiary of GASSLIP. The model showed after adjusting for confounding variables that being within the age group 41-50 years positioned participants to be 42.45 times likely to benefit from GASSLIP compared to being within the age 30years and below [AOR=42.45, CI= (3.35-536.94), p value=0.004)]. Also,

participants who were 51-60 years old had 27.1 times odds of benefiting from GASSLIP compared to those who were 30 years and below [AOR=27.1, CI= (1.91-385.75), p value=0.015)]. The model also showed that the odds of being beneficiary of GASSLIP was 717.63 times among participants who had acquired tertiary education as compared to those with no formal education [AOR=717.63, CI= (10.20-50500.26), p value=0.002)]. Participants whose occupation were in the informal sector had 7.38 times odds of benefiting from GASSLIP compared to those who were unemployed [AOR=7.38, CI= (1.3- 42.73), p value=0.026)]. Also, earning monthly income within GHS 2001.00 – GHS 3,000.00 made a participant 40.18 times likely to benefit from GASSLIP compared to monthly income earnings below GHS1000.00 [AOR=40.18, CI= (3.21-502.56), p value=0.004)]. Additionally, being in a rented household made a participant 95% less likely to benefit from the sanitation project compared to owning a household [AOR=0.05, CI= (0.0-0.25), p value<0,001)].

Table 4.5: *Logistic regression to establish background characteristics associated with being beneficiary of the GASSLIP*

Variables	OR	95% CI	P-value	AOR	95% CI	P-value
Sex			0.325			
Male	Reference				Reference	
Female	0.68	0.31-1.47		1.51	0 .41-5.55	0.535
Age (in years)			**0.044***			
30 and below	Reference				Reference	
31-40	2.4	0.41-14.47		7.43	0.52-106.77	0.140
41-50	9	1.54- 52.27		42.46	3.36-536.94	**0.004***
51-60	5.22	0.91-30.11		27.12	1.91- 385.75	**0.015***
61-70		1			1	
Above 70	2	0.11-35.81		0.17	0.0-19.81	0.47
Household size			**0.007***			
Less than 3	Reference				Reference	

3-5	0.6	0.13-2.88		0.54	0.06-5.14	0.591
6-8	0.47	0.1-2.31		0.38	0.03-4.06	0.421
9-11	0.06	0.01-0.4		0.41	0.02- 7.83	0.553
Above 11		1			1	
Education			**0.002***			
No formal education	Reference				Reference	
Primary	0.93	0.15-5.72		2.22	0.09-53.43	0.623
Junior High School	3.58	0.53-23.96		54.60	1.67-1789.53	**0.025***
Senior High School	3.3	0.47- 22.98		35.64	1.08-1177.97	**0.045***
Tertiary	10.83	1.39-84.53		717.64	10.19-50500.26	**0.002***
Occupation			0.874			
Unemployed	Reference				Reference	
Informal sector	0.94	0.42-2.08		7.38	1.27-42.73	**0.026***
Formal employment		1			1	
Other (pensioner)		1			1	
Monthly income (GHS)			0.066			
Below 1000.00	Reference				Reference	
1000.00 - 2000.00	5	1.28-19.53		10.16	0.86-119.70	0.065
2001.00-3000.00	6.25	1.55-25.28		40.18	3.21-502.56	**0.004***
Above 3000.00	5.36	1.28-22.37		3.41	0.35- 32.83	0.288
Household ownership			**<0.001***			
Owned	Reference				Reference	
Rented	0.1	0.04-0.27		0.05	0.0-0.25	**<0.001***
Other		1			1	

*Statistical significance, p<0.05, OR=Crude Odds Ratio, AOR=Adjusted Odds Ratio

4.2.5 Extent of Adherence to Delivery Protocols

Table 4.6 presents findings from the checklist administered at the municipal assembly. Eleven (11) out of twelve (12) indicators scored 1, indicating full adherence to assigned sanitation component protocols. Only one (1) indicator scored 0.5, indicating partial completion. The total delivery score was 11.5 out of 12, representing a 95% delivery rate. Overall, implementation was classified as

fully adherent. The adherence score reported reflects the mean adherence score calculated across all responsible municipal actors based on their individual activity scores.

Table 4.6: *Delivery Protocol Adherence at Adenta Municipal*

Sanitation Component Delivery Protocols	**Delivery Score**	**Status of Adherence to Delivery Protocol**
The presence of 4-member GASSLIP implementation team and supporting officers at the municipal assembly	1	Fully adherent
The presence of third parties (contractors and consultants) for implementation	1	Fully adherent
Procurement/receipt of 22 solid waste facilities from PCU	`1	Fully adherent
Attendance of at least 1 KAP/Baseline Meetings	1	Fully adherent
Participation in at least 1 staff training session by the PCU	1	Fully adherent
Facilitation of all behavioral change campaign activities (*focus group discussions with religious groups, community meetings*)	1	Fully adherent
Facilitation of all social marketing activities	1	Fully adherent
Construction of 300 household facilities	1	Fully adherent
Construction of one (1) gender disaggregated school WASH facility	1	Fully adherent
Establishment of school one (1) WASH club	1	Fully adherent
Distribution of ten (10) solid waste facilities (240 litres) dustbins among schools	1	Fully adherent
Distribution of twelve (12) solid waste facilities (SPVs and skip containers) for community/household waste extension services	0.5	Partially adherent
Total Delivery Score		**11.5**
Total Delivery Percentage Score		**96%**
Overall Adherence Score		**Fully Adherent**

Delivery Score: 0 = No/Not available 0.5 = Partially completed 1= Yes/available
Adherence Score: <37.5% = Not Adherent 37.6- 75% = Partially Adherent 76.1-100% = Fully Adherent,

4.3 Qualitative Results

4.3.1 Profile of Key Informant Interview Respondents

Key informants comprised municipal assembly staff directly involved in the implementation of the GASSLIP sanitation component across the various zonal offices of the Adenta Municipal Assembly. Participants included environmental health officers, and unit heads, most of whom had been engaged in sanitation or infrastructure-related roles for over five years. The age of respondents ranged from 32 to 54 years, with the majority in mid-level to senior management positions. Their roles and experience provided valuable insights into institutional delivery, adaptation processes, and the contextual challenges encountered during implementation.

4.3.2 Implementation Experiences (Adaptations, Barriers and Facilitators)

Adaptations

Key informants involved in the delivery of the sanitation component of GASSLIP in Adenta were asked about the adaptations made to delivery protocols during implementations and reasons. They reported several adaptations across input, activity, and output levels. Respondents highlighted changes in human resource development and mobilization, local tailoring of engagement strategies, and shifts in facility delivery targets.

Capacity building emerged as a prominent input-level adaptation. The project extended training activity schedules. This was explained in the following remarks:

> "*We have received more capacity building as well… Training sessions were initially set for a few times, but we ended up attending more training sessions and what do you call this…workshops. So, if not us here, sometimes our people from the zonal council attend on*

behalf of the assembly… And I tell these sessions have been very helpful in positioning us to implement the project."

_GASSLIP R01

"We received extended training programs for our staff, which were tailored to address the unique challenges we experienced on the field".

_GASSLIP R03

Respondents also noted changes to household recruitment criteria.

"For GASSLIP, we extended household participation to everybody in the identified low-income communities. Whether you lived in a completed building or uncompleted building, it was for everybody … Because people were genuinely interested, and the in-quote poor were not taking it up as much…. You see it wasn't like in GAMA project where it was strictly for the poor"

_GASSLIP R02

On activity implementation, most participants reported that activities remained consistent with initial plans. Just a few minor modifications were made to enhance effectiveness and ensure responsiveness to community dynamics. These included adjusting the timing of behavior change campaigns and social marketing sessions, to coincide with religious gathering days and community events. This was elaborated by participants as follows:

"*We rescheduled our outreach meetings to coincide with the meeting days of community groups…committee, church, mosque…. so to ensure higher attendance*".

_GASSLIP R04

"We had quite a number of focus group discussions with community groups…. So, we schedule these meetings on days that is convenient for them so they can attend in their numbers"

_GASSLIP R05

"*No, it was just as it was planned. Well, probably some of the things that came up were that in the construction of the toilet facility, the facility was to be fully tiled, but some of the facilities were tiled halfway, you understand. So probably those are some of the few gaps*".

_GASSLIP R01

On the output level, the unanimous response from respondents was the increase in household toilets constructions. This increase reflected both strong performance and expanded project scope. One respondent explained:

"Yes, so the only change was that initially we were to construct 200 households in the municipality. But 100 more quota was assigned to us…. That was because we met our target."

_GASSLIP R05

Facilitators to Implementation

Key informants also discussed several facilitators that have supported successful implementation. These included prior experience from the GAMA project, consistent staff training, availability of technical partners, and strong local collaboration. The following remarks demonstrate this:

"*So GASSLIP learnt from the GAMA project. In the GAMA project, they didn't add the handwashing stations but as we were implementing, some of the innovative things that came out was the addition of the handwashing stations. So, this was inculcated in GASSLIP. And then even the cisterns that were used in the GAMA project were taking more water but in subsequent ones and in the GASSLIP it made use of micro-flash systems so smaller high pressure that requires less water. This was done so that the lifespan of the facility would be extended.*"

_GASSLIP R01

"The training sessions we have been a part of have greatly helped… In the sense that there is a common understanding on what is to be done when it comes to GASSLIP. So that is what I mean by that it helped a lot…"

_GASSLIP R04

"Also, so I have told you we have had a number of workshops, and we have also built capacity so based on those fundamentals it has helped in delivery. In addition, you realise that the project is using third party organizations…. providing technical assistance… so these are organizations that stands out in those areas of expertise so getting things done per their area of specialty makes things flow so probably that is why we are successful in most of our activities. There has been a lot of trainings and engagement with the third parties who are best in their fields and the willingness of the assembly to also partner and get the results".

_GASSLIP R01

Facilitators to Implementation

Despite these enablers, key informants also pointed to key barriers, particularly related to funding constraints, infrastructure limitations, and procurement delays. These barriers often affected both the scope and timing of activity implementation:

> "*Limited slots, for example the WASH facilities for schools, we expected more schools to benefit but then they were also considering that it's not just Adenta, we have a number of assemblies so if you are given one then probably that is what can be afforded. Then at the household level, don't forget the project is paying the larger percentage (70%) so based on the funds availability they cannot go beyond their funds. So the initiative is good but limited funds won't let you get more results as expected."*
>
> *_GASSLIP R01*

> "*Well occasional bureaucratic delays with initiating construction after households have made payments caused some dissatisfaction among beneficiaries. You see them coming around to register their displeasure*".
>
> *_GASSLIP R03*

> *The challenge is the informal settlers, they are in wooden structures, metal cubicles, what have you, at places that are not formal, and the question is where are they going to attend nature's call? The bushes, or uncompleted buildings and all, you see. So they are the challenge now…. When I say they are the challenge, I mean we know the issues but how do we get to them to come on board since the 30% household contribution, the 700 cedis, they cannot afford".*
>
> *_GASSLIP R01*

4.4 Summary of Results

Table 4.7: *Summary of Study Results*

OBJECTIVE	INPUT	ACTIVITY/PROCESS	OUTPUT	RESULTS
1: Extent of coverage of GASSLIP outputs	Contractors, Standalone toilet, consultants, staff	Construction of household toilet facility Conduct of Behaviour Change Campaign	Households that benefited/had toilet and WASH facilities constructed Household participation in Behaviour Change Campaigns	85% benefited (82% biodigesters, 11% pit latrines, 74.3% handwashing facilities); 24.6% participated in behaviour change activities
2: Reasons for participation	Households, staff, contractors, standalone toilet, consultants, staff	Construction of household toilet facility	Households that benefited/had toilet and WASH facilities constructed	88.9% cited convenience and ease of access
3: Association between socio-economic characteristics and beneficiary status	Households	Construction of household toilet facility Conduct of Behaviour Change Campaign	Households that benefited/had toilet and WASH facilities constructed	Significant association with age, education, occupation, income, and household ownership
4: Extent of adherence to delivery protocols	Staff, funds, sanitation materials, contractors, consultants	Baseline meetings; staff training sessions; toilet and WASH facility construction and distribution	Baseline meeting attendance; staff training sessions conducted; toilet and WASH facility constructed and distributed	96% adherence to delivery protocols
5: Implementation experiences (adaptations, barriers, facilitators)	Staff, funds, sanitation materials, contractors, consultants	Baseline meetings; staff training sessions; toilet and WASH facility construction and distribution	Baseline meeting attendance; staff training sessions conducted; toilet and WASH facility constructed and distributed	Key Adaptations include: increased staff training, expanded eligibility, adjusted outreach timing, increased construction targets Key facilitators included prior project experience, staff

				training, technical partner support. Barrier was funding constraint

CHAPTER FIVE

5.0 DISCUSSION

5.1 Overview

This chapter provides a discussion of the findings derived from the data analysis presented in Chapter Four. The chapter addresses the extent of coverage of the sanitation component of GASSLIP, reasons for participation, an examination of the characteristics of beneficiaries and participants, implementation fidelity as well as adaptations, barriers and facilitators. The chapter concludes with an outline of the study limitations.

5.2 Extent of Coverage of the Sanitation Component

The findings demonstrate that 85% of households approached in low-income communities in Adenta benefited from GASSLIP sanitation outputs, with 82.5% receiving composting toilets and 74.3% equipped with handwashing facilities. This level of infrastructure reach exceeds the modest, average 14% coverage gains reported across diverse sanitation interventions by Garn et al. (2017) and even outperforms the 53-percentage-point increase seen in integrated rural programs in Apanga et al. (2020). Moreover, it aligns closely with the high adoption rates observed in urban Ghana by Dwumfour-Asare et al. (2020), when subsidies were increased to 70%.

However, only 24.6% of households participated in behavioural change campaigns. This gap between hardware delivery and software engagement echoes Trimmer et al. (2022), who found that CLTS alone often underperforms without financial incentives, and Sclar et al. (2022), who highlighted that rigorous community mobilization is essential to translate facilities into sustained practice.

Furthermore, the disparity between infrastructure uptake and behavioural engagement suggests that simply installing facilities is not sufficient to shift long-term sanitation practices. In similar urban settings, Garn et al. (2017) and Apanga et al. (2020) both noted that high hardware coverage must be paired with ongoing, context-specific Behavior Change Communication (BCC) if improvements are to be sustained. Indeed, Dwumfour-Asare et al. (2020) found that when subsidies drove rapid toilet adoption, follow-up BCC activities were critical for ensuring consistent use and maintenance. The limited 24.6% participation rate in GASSLIP's campaigns may reflect scheduling conflicts, competing livelihood priorities, or insufficiently tailored messaging issues Trimmer et al. (2022) identified in CLTS programs and Sclar et al. (2022) underscored in peri-urban mobilization.

The relatively lower uptake of BCC and social marketing, despite strong hardware, highlights an opportunity to refine GASSLIP's outreach. Embedding behaviour-change messages into the household construction process, offering post-installation follow-ups, and providing small usage incentives (e.g., soap or cleaning kits) are all tactics shown to elevate engagement in urban sanitation projects (Dwumfour-Asare et al., 2020; Sclar et al., 2022). By addressing these software gaps, in concert with the already effective subsidy and infrastructure delivery model future iterations of GASSLIP can convert high coverage into lasting sanitation behaviour change. These patterns should, however, be interpreted with caution because household exposure to project outputs and participation in BCC activities were self-reported, which introduces the possibility of recall or social desirability bias.

5.3 Reasons for Participation

Convenience and ease of access (88.9%) was the most cited motivator, followed by perceived health improvements (64.3%) and availability of subsidies (60.2%). This pragmatic orientation

corroborates Günther et al. (2016), who demonstrated that affordability and expected health benefits drive low-income household uptake, and Apanga et al. (2020), who showed that subsidies both lower cost barriers and reinforce positive health perceptions. In contrast, social prestige and government enforcement were less influential, paralleling findings by Garn et al. (2017) that normative and regulatory levers often lag behind pragmatic incentives in impacting coverage. Taken together, these patterns suggest that GASSLIP's strength lies in its subsidy-driven model but that greater emphasis on social marketing and community advocacy (Takele et al., 2023) could further enhance engagement.

The overwhelming preference for convenience and ease of access (88.9%) suggests that reducing the "hassle factor" is as important as cost. Dwumfour-Asare et al. (2020) similarly observed that when facilities are physically closer and simpler to maintain, uptake jumps even among the poorest households. Moreover, Günther et al. (2016) reported that when tiered subsidies are paired with local supply chains for materials and spare parts, households remain more engaged over time because they can quickly fix minor breakdowns. Therefore ease encompasses not just initial installation but ongoing operability.

5.4 Association Between Background Characteristics and Participation

Age, education, occupation, monthly income and household ownership were found to be significantly associated with being beneficiary of GASSLIP. Tertiary-educated and homeowner households participated at disproportionately higher rates. This mirrors Dwumfour-Asare et al. (2020), who noted that education fosters greater understanding of long-term benefits, and Takele et al. (2023), who found that property ownership provides security for sanitation investments. Conversely, income was not a significant predictor, suggesting that GASSLIP's 70% subsidy effectively neutralized cost differentials, an outcome similarly reported by Apanga et al. (2020) in

rural Ghana. However, Trimmer et al. (2022) observed in purely behavioral interventions that socio-economic disparities persisted even under high subsidy, indicating that infrastructure subsidies alone may not fully counteract all participation barriers. Although monthly income showed a borderline association with beneficiary status, the analysis used predefined income brackets from the GASSLIP monitoring system, and continuous income values were not collected. In addition to education and home ownership, the observed influence of household size and age on GASSLIP uptake underscores important equity considerations. Larger households were more likely to participate. Perhaps because greater numbers of potential users increase perceived value and justify the investment whereas single-person or very small households may have felt less urgency or lacked the collective decision-making capacity described by Takele et al. (2023). Likewise, older household heads demonstrated higher uptake, which may reflect both greater stability of tenure and deeper familiarity with communal development initiatives, a pattern noted by Msemwa (2017) in Tanzanian peri-urban settings. These demographic nuances suggest that "one-size-fits-all" outreach risks leaving smaller, younger, or more transient households underserved. It is important to note that these associations reflect patterns within the sampled beneficiary communities and may not be generalisable across the wider GAMA municipalities, particularly because the sampling frame relied on existing beneficiary registers that may not capture all eligible or non-beneficiary households.

Moreover, the lack of an income effect while demonstrating the power of subsidies also highlights that financial incentives alone cannot fully address non-monetary barriers. Trimmer et al. (2022) showed that behavioural interventions without a strong social component often fail to reach lower-income or less educated groups, even when cost is not the primary hurdle. Similarly, Sclar et al. (2022) emphasized the role of social capital and peer networks in mobilising participation,

indicating that renters or those without established local ties may require more tailored engagement strategies.

Taken together, these findings point to the need for hybrid approaches that combine financial subsidies with targeted social marketing, peer-educator models, and landlord engagement particularly aimed at smaller, renter-occupied households and younger adults. By stratifying outreach by household composition and tenure status, implementers can better ensure equitable reach and adoption across all demographic segments, thereby strengthening both the representativeness and sustainability of sanitation interventions.

5.5 Adherence to Delivery Protocols (Implementation Fidelity)

Adenta Municipal Assembly achieved a 96% fidelity score, fully implementing 11 of 12 key protocols. This high level of compliance aligns with Rajaman et al. (2014) and Msemwa (2017), whose process evaluations in India and Tanzania linked rigorous protocol adherence to strong sanitation outcomes. However, despite complete roll-out of BCC activities at the assembly level, household participation remained low, an inconsistency also documented by Greenland et al. (2017), who reported that high programmatic fidelity does not necessarily guarantee equitable community reach. Thus, future evaluations should assess not only whether activities occur but also how they are delivered, in line with recommendations from Freeman et al. (2022) for complex WASH initiatives. These findings also need to be interpreted alongside the study's small qualitative sample of five staff members, which, although reflecting all individuals directly responsible for implementation in AdMA, inherently limits the breadth of perspectives captured on fidelity processes.

The finding also brings to light the distinction between institutional fidelity, the completion of planned activities by implementing agencies and community-level exposure or uptake, which

determines the actual impact of such activities. As noted by Sclar et al. (2022), the success of sanitation programs depends not only on the structural completion of interventions but also on how well these interventions resonate with community norms, expectations, and household realities. Moreover, Trimmer et al. (2022) observed that in cases where community dynamics and informal housing arrangements are not sufficiently considered, even well-executed protocols can fail to reach marginalized groups. In this study, the mix of informal and formal settlements in low-income communities and logistical delays further complicated the fidelity outcome relationship. Hence, going beyond procedural completion to assess participation equity and communication effectiveness is critical for future sanitation programs, especially in diverse urban contexts like Adenta.

5.6 Adaptations and Influencing Factors (Barriers and Facilitators)

Two key adaptations emerged from results. First, input adaptation involving additional capacity-building workshops. This practice aligns with Antwi-Agyei et al. (2017), assertion that continuous staff development is essential for maintaining high implementation fidelity in sanitation programmes . The second was the output adaptation that involved scaling up household toilet infrastructure numbers rather than the initially targeted 200 facilities. 300 sanitation facilities were ultimately constructed when demand showed higher than projected uptake. This corroborates Apanga et al. (2020) underscoring the value of flexible output scaling to maximize reach without compromising service quality.

Several facilitators supported both strict adherence to activity protocols and the successful implementation of the above adaptations. First, prior experience with the GAMA-SWP project, a project that preceded GASSLIP at the Assembly, provided institutional memory and operational lessons that accelerated planning and troubleshooting. Dwumfour-Asare et al. (2020) found that

leveraging learnings from previous sanitation interventions strengthens subsequent programme rollout by reducing duplication of effort and fostering stakeholder trust. Secondly, consistent staff training ensured that officers had a shared understanding of implementation goals and outcomes. As highlighted by Msemwa (2017), ongoing capacity building underpins sustained fidelity in process evaluations of sanitation interventions. Furthermore, the availability of technical partners, i.e contractors and consultants, supplied critical expertise in both hardware maintenance and digital reporting, reflecting Apanga et al. (2020)'s observation that effective partnerships complement government capacity and improve service delivery.

Despite these strengths, funding constraints were a prominent factor that limited reaching a wider number of households and schools. It was also noted that household funding constraints, especially among informal settlements, hindered uptake among informal settlements. As noted in Antwi-Agyei et al. (2017), insufficient recurrent funding undermines the consistency of sub-national sanitation programmes. Because the study used a cross-sectional design, these adaptations and barriers represent conditions at a single point in time and may not fully capture shifts in implementation dynamics across different project phases.

CHAPTER SIX

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusion

This process evaluation shows that the sanitation component of GASSLIP within Adenta has established a solid foundation for improving urban sanitation through the provision of household infrastructure and coordinated municipal-level delivery systems. The project's implementation approach, which combines hardware delivery with behaviour-change strategies, has succeeded in extending sanitation services to a substantial proportion of households who previously faced significant barriers to access. The evaluation demonstrates that when municipal structures are supported with clear protocols, technical assistance and opportunities for adaptive management, implementation can progress with consistency and operational discipline.

The findings also suggest important constraints that shape the effectiveness of the intervention. Household engagement with the behaviour-change and social marketing components remains limited, indicating that hardware provision alone may not be sufficient to stimulate sustained sanitation practices. Differences in household characteristics illustrate persistent inequities in uptake, which implies that general mobilisation strategies may overlook the needs of renters, younger household heads and other groups with weaker incentives to invest in sanitation. These patterns highlight the need for differentiated and context-sensitive outreach if future phases of GASSLIP are to promote equitable participation.

The evaluation further reveals that high institutional adherence to protocols does not automatically translate into strong community reach. This gap underscores the importance of implementation quality beyond procedural completion, particularly regarding communication, follow-up and community responsiveness. Adaptations made during implementation show that local teams are

capable of adjusting activities to emerging demands, and this adaptive capacity is likely to support future iterations of the project when properly resourced.

Taken together, the study indicates that the sanitation component of GASSLIP is making meaningful progress toward expanding sanitation access in low-income peri-urban areas. However, the project's long-term value will depend on its ability to strengthen household-level engagement, address persistent equity gaps and integrate behaviour-change strategies more deeply into its operational model. Enhancing these areas will be essential to sustaining gains and accelerating movement towards safer, more inclusive, and more resilient sanitation systems within the municipality.

6.2 Recommendations

Policy Makers

1. Enhance policy dissemination and operational guidance: Ensure that all implementing units have timely access to updated sanitation policies, operational guidelines and training materials. Strengthened dissemination, accompanied by periodic orientation sessions, will support uniform interpretation and implementation of mGASSLIP protocols across municipalities.

2. Allocate dedicated funding for behaviour-change communication: Establish a protected budget line for behaviour-change communication and community mobilisation activities. This is necessary to address the low exposure to BCC activities identified in the study and to ensure that sanitation infrastructure delivery is complemented by sustained behaviour-change engagement.

Municipal Assembly / GASSLIP Coordinating Unit

1. Institute structured monitoring and feedback mechanisms: Conduct routine review meetings involving municipal staff, PCU representatives and contractors, using simple monitoring

dashboards to track coverage, adherence to protocols and BCC participation. This will enable timely identification of implementation gaps and enhance coordination.

2. Strengthen beneficiary registry and community mapping systems: Undertake regular updating of household registers, including geotagging where feasible, to ensure accurate tracking of project coverage and equity. Reliable registries will support more effective targeting and follow-up during future project phases.

Research

1. Assess long-term sustainability of sanitation outcomes: Conduct follow-up studies to examine facility use, maintenance practices and hygiene behaviours one to two years after implementation. This will provide insight into the durability of project outcomes and guide future planning.

6.3 Limitations of the Study

The study had several limitations that should be considered when interpreting the findings. First, due to financial and time constraints, only the sanitation component of GASSLIP was evaluated. Evaluating the livelihoods component alongside sanitation would have strengthened the study through triangulation of programme effects. Second, the cross-sectional design provides only a snapshot of GASSLIP implementation at one point in time and does not account for longer-term outcomes or changes that may occur after the study period. Third, the study applied only two of the five RE-AIM dimensions. Operationalising all five dimensions could have provided a more comprehensive assessment of programme performance.

In addition to these limitations, findings cannot be generalised beyond the AdMA beneficiary communities because the study did not include all GAMA municipalities or non-beneficiary households. Much of the household information was self-reported, introducing the potential for

recall and social desirability bias in reporting participation and sanitation practices. Although the qualitative component used total population sampling, the small number of municipal staff limited the breadth of implementation experiences captured. Household sampling relied on existing beneficiary registers, and any inaccuracies in these registers may have introduced selection bias. Finally, direct observation of facility use was limited, and reliance on respondent reporting may not fully reflect actual usage behaviour.

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APPENDICES

Appendix A: Participant Information Sheets

Participant Information Sheet for Municipal Assembly Staff

Title of Study: Process Evaluation of the Greater Accra Sustainable Sanitation and Livelihoods Improvement Project, the Case of the Adenta Municipality

Principal Investigator: Abigail Buerkuor Mortey
Address: Department of Health Policy Planning and Management
School of Public Health
University of Ghana

General Information about Research

You are invited to participate in a research study evaluating the implementation of the sanitation component of the Greater Accra Sustainable Sanitation and Livelihoods Improvement Project (GASSLIP) in the Adenta Municipality. As a municipal implementer of the project, your insights and experiences are valuable in assessing the project's implementation and reach. This would be useful for policy planning and execution of similar sanitation projects in Ghana and beyond. The study involves answering a structured questionnaire and/or participating in an interview which will take approximately 20/45 minutes respectively. For the purposes of transcription, the interviews will be recorded. All data collected will be kept for a period of five (5) years after the study, after which it will be destroyed.

Possible Risks and Discomforts

There are minimal risks, primarily limited to the time spent answering questions.

Possible Benefits

While there are no direct benefits to you, your participation will contribute to improving sanitation services and policies in your community.

Confidentiality

Your responses will be kept confidential, and no personally identifiable information will be shared in reports or publications.

Compensation

There will be no compensation, either in cash or kind, for participation in this study.

Voluntary Participation and Right to Leave Research

Your participation is entirely voluntary, and you may withdraw at any time without consequences.

Notification of Significant New Findings

Participants will be informed of any significant new findings that arise during the study if such findings may influence their decision to continue participation.

Contacts for Additional Information

Feel free to ask any questions or register concerns, at any point in time during this interview. If you have further questions or clarifications, you can contact the principal investigator and supervisor anytime during the day via email on:

abmortey20@gmail.com

gcaryeetey@ug.edu.gh

Your rights as a Participant

This research has been reviewed and approved by the Institutional Review Board of Noguchi Memorial Institute for Medical Research (NMIMR-IRB). If you have any questions about your rights as a research participant, you can contact the IRB Office between the hours of 8am-5pm through the landline 0302916438 or email addresses:

nirb@noguchi.ug.edu.gh

Participant Consent Form

The above document describing the benefits, risks and procedures for the research title *(*Process Evaluation of the Greater Accra Sustainable Sanitation and Livelihoods Improvement Project, the Case of the Adenta Municipality*)* has been read and explained to me. I have been given an opportunity to have any questions about the research answered to my satisfaction. I agree to participate as a volunteer.

_____

Date Name and signature or mark of volunteer

If volunteers cannot read the form themselves, a witness must sign here:

I was present while the benefits, risks and procedures were read to the volunteer. All questions were answered, and the volunteer has agreed to take part in the research.

_____

Date Name and signature of witness

I certify that the nature and purpose, the potential benefits, and possible risks associated with participating in this research have been explained to the above individual.

_____

Date Name Signature of Person Who Obtained Consent

Participant Information Sheet for Households

Title of Study: Process Evaluation of the Greater Accra Sustainable Sanitation and Livelihoods Improvement Project, the Case of the Adenta Municipality

Principal Investigator: Abigail Buerkuor Mortey
Address: Department of Health Policy Planning and Management
School of Public Health
University of Ghana

General Information about Research

You are invited to participate in a research study evaluating the implementation of the sanitation component of the Greater Accra Sustainable Sanitation and Livelihoods Improvement Project (GASSLIP) in the Adenta Municipality. As a household beneficiary, your insights and experiences are valuable in assessing the project's implementation and reach. This would be useful for policy planning and execution of similar sanitation projects in Ghana and beyond. The study involves answering a structured questionnaire which will take approximately 20 minutes of your time. All data collected will be kept for a period of five (5) years after the study, after which it will be destroyed.

Possible Risks and Discomforts

There are minimal risks, primarily limited to the time spent answering questions.

Possible Benefits

While there are no direct benefits to you, your participation will contribute to improving sanitation services and policies in your community.

Confidentiality

Your responses will be kept confidential, and no personally identifiable information will be shared in reports or publications.

Compensation

There will be no compensation, either in cash or kind, for participation in this study.

Voluntary Participation and Right to Leave Research

Your participation is entirely voluntary, and you may withdraw at any time without consequences.

Notification of Significant New Findings

Participants will be informed of any significant new findings that arise during the study if such findings may influence their decision to continue participation.

Contacts for Additional Information

Feel free to ask any questions or register concerns, at any point in time during this interview. If you have further questions or clarifications, you can contact the principal investigator and supervisor anytime during the day via email on:

abmortey20@gmail.com

gcaryeetey@ug.edu.gh

Your rights as a Participant

This research has been reviewed and approved by the Institutional Review Board of Noguchi Memorial Institute for Medical Research (NMIMR-IRB). If you have any questions about your rights as a research participant, you can contact the IRB Office between the hours of 8am-5pm through the landline 0302916438 or email addresses:

nirb@noguchi.ug.edu.gh

Participant Consent Form

The above document describing the benefits, risks and procedures for the research title *(*Process Evaluation of the Greater Accra Sustainable Sanitation and Livelihoods Improvement Project, the Case of the Adenta Municipality*)* has been read and explained to me. I have been given an opportunity to have any questions about the research answered to my satisfaction. I agree to participate as a volunteer.

_____

Date Name and signature or mark of volunteer

If volunteers cannot read the form themselves, a witness must sign here:

I was present while the benefits, risks and procedures were read to the volunteer. All questions were answered, and the volunteer has agreed to take part in the research.

_____

Date Name and signature of witness

I certify that the nature and purpose, the potential benefits, and possible risks associated with participating in this research have been explained to the above individual.

_____

Date Name Signature of Person Who Obtained Consent

QUESTIONNAIRE FOR GASSLIP BENEFECIARY HOUSEHOLDS

University of Ghana

School of Public Health

Participant ID: ……..……..

A) SOCIO-DEMOGRAPHIC CHARACTERISTICS

1. Age of Respondent …….
2. Sex: Male ☐ Female ☐
3. Household Size: ……...
4. Household Composition:
   i. Single adult
   ii. Nuclear family (parents & children)
   iii. Extended family
   iv. Other (specify): ……
5. What is your highest level of education?
   i. No formal education
   ii. Primary
   iii. Junior High School
   iv. Senior High School
   v. Tertiary
   vi. Other (specify): ……
6. What is your occupation?
   i. Unemployed
   ii. Informal sector (e.g., petty trading, artisanship)
   iii. Formal employment (e.g., government/private sector job)
   iv. Other (specify): ……
7. Monthly Household Income:
   i. Below GHS 1000
   ii. GHS 1000 - GHS 2000
   iii. GHS 2001 - GHS 3000
   iv. Above GHS 3000
8. Housing Arrangement:
   i. Owned
   ii. Rented

iii. Other (specify): …….

9. Type of Housing Structure:

i. Completed building (Cement/brick/stone/blocks)

ii. Uncompleted building (Cement/brick/stone/blocks)

iii. Wooden Structure

iv. Kiosk

v. Other (Specify)

10. Location of residence……..

B) REASONS FOR PARTICIPATION IN THE SANITATION COMPONENT OF GASSLIP

11. How did you first learn about the GASSLIP sanitation program?

- ☐ Community meetings/ education campaigns
- ☐ Social Marketing Activities (e.g. radio/TV advertisements, fliers, banners, etc.)
- ☐ Social media
- ☐ Neighbours/ Friends
- ☐ Municipal Assembly officers/ Local Government
- ☐ Non-Governmental Organizations (NGOs)
- ☐ Other (specify): ……

12. Please indicate whether the following reasons influenced your household's participation in the sanitation component of GASSLIP or not.

Reason	**No influence - 0**	**Influenced - 1**
Financial support/subsidy for sanitation facilities	☐	☐
Perceived improvement in health outcomes (e.g., incidence of disease)	☐	☐
Convenience and ease of access to sanitation facilities	☐	☐
Community sensitization and education campaigns	☐	☐

Influence from neighbors or community leaders	☐	☐
Social prestige/status improvement	☐	☐
Government policy or enforcement	☐	☐
Other (specify)	☐	☐

C) EXTENT OF COVERAGE OF THE SANITATION COMPONENT OF GASSLIP

13. Are you a beneficiary of GASSLIP?

1. No
2. Yes

14. What kind of toilet facility did you receive under GASSLIP?

i. Flush/Pour-flush
ii. Dry pit latrines
iii. Composting toilets (bio-digester)
iv. Container-based toilet
v. Other (Specify)

15. Do you share this facility with others who are not members of your household/ other households?

Yes/ No

13a. If answer to 15 is yes, what are the reasons for sharing this facility with others?

---

16. Where is this toilet facility located?

i. In own dwelling
ii. In own yard/ compound
iii. Elsewhere

17. Did you receive a handwashing facility under GASSLIP?

Yes/No

18. Have you received/participated in any behavioural change campaigns related to sanitation under GASSLIP?

☐ Yes
☐ No

18a. If yes, through which medium(s) did you receive the information? (Check all that apply)

- Radio
- Television
- Community meetings
- Social media
- Posters/Brochures
- Word of mouth
- Other (specify): ……

19. Are you aware of any social marketing activities promoting sanitation in your community under GASSLIP?

☐ Yes

☐ No

19a. If yes, which social marketing activities have you been exposed to? (Check all that apply)

- Door-to-door sensitization
- Community drama or skits
- Promotional giveaways (e.g., t-shirts, stickers)
- Community clean-up exercises
- Radio/TV advertisements
- Flyers/banners/ posters
- Other (specify): ……

20. How does your household usually dispose of garbage?

- Collected by municipal service provider (GASSLIP)
- Collected by other private service provider
- Disposed of in designated waste disposal area
- Disposed of within household yard or plot
- Buried or burned
- Disposed of elsewhere

21. Are there any factors that affected your participation in the project?
Yes/ No

21b. If yes, what were they (Select all that apply)

- High cost of participation
- Lack of awareness or information
- Cultural beliefs or practices
- Political reasons
- Previous experience with similar programs
- Other (specify): ……...

22. In what ways can the sanitation component of GASSLIP be improved to ensure more households benefit from the program?

……

……

Thank you for your time

CHECKLIST ADMINISTERED AT THE MUNICIPAL ASSEMBLY

University of Ghana

School of Public Health

No.	Question	Response	Measurement (Outputs)	
		Were protocols put in place as stipulated in the years preceding? **Available/ Yes…….1** **Partial……. 0.5** **Not available/No…….0**	**Target**	**Actual**
1.	The presence of 4-member GASSLIP implementation team and supporting officers at the municipal assembly	**(if No skip to end of interview)**		
2.	The presence of third parties (contractors and consultants) for implementation			
3.	Procurement/receipt of 22 solid waste facilities from PCU			
4.	Attendance of at least 1 KAP/Baseline Meetings (*reports, study instruments, others*)			
5.	Participation in at least 1 staff training session by the PCU			
6.	Facilitation of all behavioral change campaign activities (*community education meetings, door-to-door education, focus groups education discussions with religious leaders*)			
7.	Facilitation of all social marketing activities			
8.	Construction of 300 household facilities			

9.	Construction of one (1) gender disaggregated school WASH facility			
10.	Establishment of one (1) school WASH club			
11.	Distribution of 10 solid waste facilities among schools			
12.	Distribution of 12 solid waste facilities among communities			

INTERVIEW GUIDE FOR MUNICIPAL ASSEMBLY STAFF

University of Ghana

School of Public Health

Section A: General Background

1. Name of Respondent: ……. Age…….
2. Sex: Male ☐ Female ☐
3. Position: …….
4. How long have you been engaged in the program's delivery at the municipal assembly level?
5. Can you describe your role in the implementation of the GASSLIP sanitation component?

Section B: Adaptations to GASSLIP Delivery Protocols

6. Have there been any modifications to the initial input protocols (e.g., materials, technical, funds, or human resources) in the implementation of GASSLIP?
   i) If yes, what are they?
   ii) What are the reasons/factors accounting for modifications?
7. Have there been any modifications to the initial activity protocols in the implementation of GASSLIP.
   i) If yes, what are they?
   ii) What are the reasons/factors accounting for modifications?
8. Have there been any modifications to initial output protocols in the implementation of GASSLIP?
   i) If yes, what are they?
   ii) What are the reasons/factors accounting for modifications
9. What were the criterion for selecting beneficiary households?
   i) Have there been any changes to this criterion?
   ii) If yes, what necessitated these changes?

Section C: Barriers and Facilitators to Sanitation Component Delivery

10. What are some facilitators influencing GASSLIP's delivery? How do they impact delivery?
11. What are the barriers/challenges influencing GASSLIP's delivery? How do they impact delivery?
12. In what ways can these barriers be controlled to improve GASSLIP's delivery?
13. Is there anything else you would like to share regarding the implementation, adaptations, or outcomes of the sanitation component of GASSLIP?

……
……
……
……

Thank you for your time

Appendix C: Ethical Clearance and Supporting Letters

UNIVERSITY OF GHANA

NOGUCHI Memorial Institute for Medical Research University of Ghana

COLLEGE OF HEALTH SCIENCES
INSTITUTIONAL REVIEW BOARD

5th March 2025

ETHICAL CLEARANCE

FEDERALWIDE ASSURANCE FWA 00001824 **IRB 00001276**

NMIMR-IRB CPN 068/24-25 **IORG 0000908**

On 5th March 2025, the Noguchi Memorial Institute for Medical Research (NMIMR) Institutional Review Board (IRB) at a full board meeting reviewed and approved your protocol titled:

TITLE OF PROTOCOL : **Process Evaluation of the Greater Accra Sustainable Sanitation and Livelihoods Improvement Project, the Case of the Adenta Municipality**

PRINCIPAL INVESTIGATOR : **Abigail Buerkuor Mortey, MSc Cand.**

Please note that a final review report must be submitted to the Board at the completion of the study. Your research records may be audited at any time during or after the implementation.

Any modification of this research project must be submitted to the IRB for review and approval prior to implementation.

Please report all serious adverse events related to this study to NMIMR-IRB within seven days verbally and fourteen days in writing.

This certificate is valid till 4th March 2026. You are to submit annual reports for continuing review.

Signature of Chair: .....
Dr. Abraham Hodgson
(NMIMR – IRB CHAIR)

INTEGRI PROCEDAMUS

P. O. Box LG 581, Legon, Accra, Ghana | Tel: +233 (0) 302-916438
Email: nirb@noguchi.ug.edu.gh | www.noguchimedres.org | wwwug.edu.gh

UG

Appendix D: RE-AIM Framework Checklist

Measuring the Use of the RE-AIM Model Dimension Items
Checklist

Study Topic Area:	**Study Setting:**
Dimensions/Items	**Included?** (Yes, No, Yes-Inappropriate Use, N/A)
Reach	
Exclusion Criteria (% excluded or characteristics)	
Percent individuals who participate, based on valid denominator (not of volunteers who indicate interest)	
Characteristics of participants compared to non-participants or to target population	
Use of qualitative methods to understand reach and/or recruitment	
Effectiveness	
Measure of primary outcome with or w/o comparison to a public health goal (e.g. HP 2020 goals, exercise 30 min/day; eat 5 Fruits &Veggies)	
Measure of broader outcomes (e.g., other outcomes, measure of QoL or potential negative outcome) or use of multiple criteria	
Measure of robustness across subgroups (e.g. moderation analyses)	
Measure of short-term attrition (%) and differential rates by patient characteristics or treatment condition	
Use of qualitative methods/data to understand outcomes	
Adoption – Setting Level	
Setting Exclusions (% or reasons)	
Percent of settings approached that participate (valid denominator)	
Characteristics of settings participating (both comparison and intervention) compared to either: non participants **or** some relevant resource data	

Measuring the Use of the RE-AIM Model Dimension Items
Checklist

Adoption – Setting Level (continued)	
Use of qualitative methods to understand adoption at setting level	
Adoption – Staff Level	
Staff Exclusions (% or reasons)	
Percent of staff invited that participate	
Characteristics of staff participants vs. non participating staff or typical staff	
Use of qualitative methods to understand staff participation	
Implementation	
Percent of perfect delivery or calls completed, etc. (e.g., adherence or consistency)	
Adaptations made to intervention during study	
Cost of intervention (time or money)	
Consistency of implementation across staff/time/settings/subgroups (not about differential outcomes, but process)	
Use of qualitative methods to understand implementation	
Maintenance – Individual Level	
Measure of primary outcome (with or w/o comparison to a public health goal) at ≥ 6mo follow-up after final intervention contact	
Measure of broader outcomes or use of multiple criteria at follow-up (e.g., measure of QoL or potential negative outcome) at follow-up	
Robustness data - something about subgroup effects over the long-term	
Measure of long-term attrition (%) and differential rates by patient characteristics or treatment condition	
Use of qualitative methods data to understand long -term effects	
Maintenance- Setting Level	
If program is still ongoing at ≥ 6 month post study funding	
If and how program was adapted long-term (which elements retained AFTER program completed)	
Some measure/discussion of alignment to organization mission or sustainability of business model	
Use of qualitative methods data to understand setting level institutionalization	