EFFECT OF OPEN DEFECATION, A CASE STUDY AT DONG VILLAGE OF TIAP-TIAP COUNTY, GOK STATE -SOUTH SUDAN.

BY

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Declaration:

This research project is my original work and has not been presented for a

Diploma in any other university.

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**Dedication**

I dedicate this research project to my lovely **wife Hon. Athiei Maker, Mother Alat Muk; father Majok Cawul, Uncle Aguer Chol** and **colleagues.**

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ABBREVIATION OF ACRONYMS

CHCs - Community Hygiene Clubs

CHPs - Community Hygiene Promotion

CI - Confidential Interval

CLTS - Community Led Total Sanitation

CSO - Civil Society Organization

GARD - Great Action for Relief and Development

PHAST - Participatory Hygiene, Sanitation and Transformation

UNICEF - United Nations International Children Emergency Fund

W4L - Water for Lakes

WASH - Water, Sanitation and Hygiene

WHO - World Health Organization

**Abstract,**

The concepts of water, sanitation and hygiene (WASH) initiatives are based on good hygiene practice, access to improved water supply and improved sanitation, which are essential to reduce environmental health risks for population’s well-being at the global level. Poor hygiene in urban areas as compare to rural areas as put as a title above in this page is the major concern in my area of research because it focus on hygiene behaviors at two different aspect, in term of it population and environmental situation, and it can give clear indication of what to improve and how it will be done. Over one million people around the world die each year from diseases caused by a lack of safe water and sanitation, with most of these deaths recorded in developing countries. Using good sanitation and hygiene practices is one of the most effective means of reducing the spread of diarrheal diseases, which are the leading cause of death among children under five years. There are three key practices that can significantly reduce these risks: Handwashing with soap alone can prevent between 500,000 and 1.4 million deaths per year (Curtis, Cairn cross, 2003). Access to proper sanitation facilities at home can reduce diarrheal diseases by 32% (Scott, 2006). The hygienic treatment, handling and storage of drinking water can also significantly help improve families’ health. In addition to improving public health, the positive impacts of proper hygiene and sanitation also include: reduced spending on healthcare, increased productivity and a higher school enrolment rate. Encouraging individuals and communities to adopt good sanitation and hygiene practices is one of the key factors for development. The scope of this document focuses on two distinct activities that is hygiene and sanitation which is integral part of water projects. The aim of hygiene awareness rising is to improve the hygiene behaviors not only on water and sanitation service users, but also of inhabitants of a given town or area. Hygiene awareness-raising takes place through various types of information and communication activities. Sanitation promotion aims to provide households with sanitation facilities, particularly toilets, showers and sinks. Sanitation promotion also usually involves information and communication activities. It is difficult to separate hygiene awareness raising and sanitation promotion: if a household has a toilet installed but fails to follow the appropriate hygiene practices, there will be less of a positive impact on the family’s health. And vice versa: hygiene awareness rising will have little impact if it is carried out in an unsanitary environment where families have no interest in using sanitation facilities. The type of hygiene and sanitation covered in this document is (PHAST) methodology: Participatory Hygiene, Sanitation and Transformation, and in this document Hygiene refers to all measures, practices and behaviors that aim to reduce infection and the outbreak of infectious diseases. Within this document, hygiene specifically refers to the practices and behaviors used within the community of Tiap-Tiap and Dong: by using 5 critical movements of handwashing: (1) Washing hand before eating, (2) Washing hand after defecation, (3) washing hand before preparing food (4) washing hand before feeding baby (5) washing hand after cleansing baby bottom and personal hygiene; the handling, storage and treatment of water at home; food hygiene. Sanitation as covered in this document refers to the management of household wastewater and excreta. It therefore does not include solid waste or waste produced by polluting, industrial activities.

CHAPTER ONE: INTRODUCTION

* 1. BACKGROUND OF THE STUDY.

This research was done at Tiap-Tiap county-Cueibet, Gok State in South Sudan, supported with some information during research period by the two ministries of Gok State, which are state ministry of health department of public health and state ministry of physical infrastructure directorate of water hygiene and sanitation Poor hygiene & sanitation by use of open defecation is one of the most accurate indicators of rural poverty and health problems. According to the World Health Organization (WHO), over 600 million urbanites live in low quality shelters or other areas plagued by overcrowding and inadequate provision of sanitation services, including potable water and safe waste disposal. The number of people without access to these services is still increasing, despite general improvements in urban sanitation programs.  In the last twenty years, sanitation coverage has made great strides, but it continues to be less accessible to the urban poor.  According to the UNDP-World Bank Water and Sanitation Program, in 1990, 453 million urbanites “had no sanitation services,” and despite efforts to ameliorate this crisis, in 1994, this number had increased to 589 million people. The challenge of sanitation intervention is to keep up with the growing population.  Currently, the rate at which sanitation programs are being introduced to communities is far lower than the rate of overall population growth, resulting in more underserved people, despite these attempts to increase coverage.  Further, the population growth results in overcrowding, exacerbating poor hygiene issues. The concepts of water, sanitation and hygiene (WASH) initiatives are based on good hygiene practice, access to improved water supply and improved sanitation, which are essential to reduce environmental health risks for population’s well-being at the global level Poor hygiene in rural areas as put as a title above is the major concern in my area of research because it differentiate hygiene behaviors at two different aspect, in term of it population and environmental situation, and it can give clear indication of what to improve and how it will be done. This research was done in Tiap-Tiap which is the capital headquarters of the county, and moreover this document is produce at Dong Village in Tiap-Tiap County Cueibet, Gok State. Furthermore, the definition of urban areas according to this document is not limited to other definition, urban are areas that are much populated, congested and overcrowded by the number of people, houses and animals living in the area whereas rural areas has less number of people, houses and animals. Therefore in term of poor hygiene both two terms urban and rural have some positive and negative effects on hygiene behavior practices, of which hygiene health department has to maintain the positive practices and encourage good hygiene practices. One of the poor hygiene is Lack of clean **water** which increases the risk of cholera, typhoid and hepatitis - **water**-borne diseases that are prone to explosive outbreaks. Poor sanitation and hygiene can increase the spread of diseases like intestinal worms, blinding trachoma and schistosomiasis, which affect people in the developing countries. Many health problems are associated with **poor sanitation** and waste management, principally caused by contact with human faeces. ... **Environmental impacts** of **poor sanitation** and waste management at a local level include pollution of land and watercourses, the visual **impact** of litter, and **bad** odors in areas that use open defecation.

So in rural areas: Health costs associated with waterborne diseases such as malaria, diarrhea, and worm infections represent more than one third of the income of **poor** households, while in rural areas. Health risks are often exacerbated by **poor sanitation**. ...**Urban** solid waste disposal is another **sanitation**-related challenge. Photo of (CHCs) community hygiene clubs discussing poor hygiene and open defecation in Tiap-Tiap Village.

It is great to see an update of the commitments made at a similar meeting during my research. Clearly, a ‘focus on the poorest, most marginalized and unsaved and save water change’, must include the needs of poor people living in urban slums alongside their rural counterparts. However, there is precious little experience in ‘eliminating open defecation’ in urban places. This will be a huge challenge that should not be under-estimated.

At the end of the research project, worked with the Water for Lakes project reflect on how I’d adapted the usual CLTS process for the challenges of an urban context. This research highlights the greater scope of action required in urban contexts because of the importance of better-quality toilets, and the need for safe faecal sludge management. It explores the whole range of stakeholders who need to be involved from tenants and landlords, to pit empties, builders, banks and micro-credit, different levels of government, the local water and sewerage utility company, and many more.

* 1. **Problem Statement:**

Tiap-Tiap County is one of the remote area where open defecation is lovely practices by the community and during my investigation, why they practiced open urination and defecation they said they have a plenty of forest so they cannot waste their time on digging pit latrine, as a result of using open defecation many people suffering from diarrhea in dry and wet seasons the transmission of diarrhea disease occurred through fly and malaria is also one of the common factors that affected people during wet season due to poor sanitation. waste and ruminant are ever near with people, people fears of going to the long distance because of dew, so the excretion is rampant so there mosquito live around with people and it is transmitted some virus from person to person therefore the rapid malaria occurred. The poor hygiene is also common because many people accepted that five critical movement of handwashing are not practices that is; wash hand with soap/ash and clean water after visit latrine, wash hand with soap/ash and clean water before eating, wash hand with soap/ash and clean water before preparing food, wash hand with soap and clean water before feeding baby and wash hand with soap and clean water after cleansing baby bottom, because some of us ignored, while others don’t even know all those mentioned washing skills, majority of the respondents in Dong village said many of the household used ground and surface water during wet season that cause scabies and some itching that later caused infection from women, that caused barren of some people because water from pool are un protected and danger when taking it without treatment in cueibet town there is poor hygiene and sanitation in public pit latrine also open defecation is practiced due to the poor management of the city council and public health officers which is the major challenge in town, when I investigate them they respondent said that many people focuses at their respective home hygiene and community health workers are paying less many that make them to do small work and market inflation affected them, diarrhea cases are ever common in Cueibet town compare to Dong where people travel for long distance for open defecation.

**1.4 Research Objective:**

**1.4.1 GENERAL OBJECTIVE:**

TO DETERMINE EFFECT OF POOR HYGIENE IN RURAL AREA OF DONG-TIAP-TIAP COUNTY, GOK STATE -SOUTH SUDAN.

**1.4.2 Specific objectives:**

To achieve this, the research will focus on the following-objectives:

1. To determine the challenges facing hygiene practices promotion campaign.
2. To identify changes in the health status of the community hygiene clubs.
3. To determine the changes in quality of life of the community respondents.
4. To determine awareness level of WASH practices.

1.5 Research Questions:

To address the research objectives, the research questions to be asked are as follows:

1. Has there been a change since the hygiene promotion campaign has been conducted in Tiap-Tiap?
2. Has there been a change in the health status of the community hygiene clubs since the start hygiene training in their village?
3. Has the quality of life of the community hygiene clubs changed over the course of The implementation of the WASH project
4. Is the community aware of the water supply and sanitation? Infrastructure set up for them and is the infrastructure being utilized?

**1.6 Research hypotheses:**

The null hypotheses for this study is that hygiene in WASH is not essentially as a life-saving intervention and lives can be saved for as long as there is food assistance health and good nutrition support. The will be tested against the alternative hypotheses for this study, which is that WASH is an essential and critical Life-Saving intervention that contributes to disease prevention, improved nutrition status, and Improved food utilization.

**1.7 Justification and rationale of the study:**

The aims of study as resulted in this research are to critique qualitatively the importance of hygiene in WASH as a Life-saving intervention. This research will ultimately assist decision makers during prioritization, especially for logistically constrained humanitarian interventions where humanitarian activities are usually scaled down to only the most critical to save lives. In complex places coupled with or resulting from insecurity such as in recent Sudan conflict, South Sudan, Syria and Somalia, there have been instances where humanitarian responses have had to scale down their operations to only critical life saving interventions. In such emergencies, the only logistical options available often involve airlifting of humanitarian supplies and personnel to hard to reach areas, and the humanitarian team, often made up of locals and international expatriate staff, has to be small enough for ease of evacuation should the security situation demand.

**1.8 Scope and Limitation**

This research is limited to only to poor hygiene and sanitation and its results will thus only be applicable to such. The research will rely on primary data collected from two villages, Dong and Tiap-Tiap. In terms of sample size, the area population in Dong and Tiap-Tiap were 250 only represents 75% of the total population estimated where I did random selection. This is a major limitation that cannot be ignored, but the study will attempt to analyze trends throughout Tiap-Tiap to enable the study to be utilized at a greater scale.

The other limitations that will affected the study are time (less than 2 months available for

Study and office worked) and financial constraints as the researcher will have to rely on her own resources to fund the research.

**CHAPTER TWO: LITERATURE REVIEW.**

**2.1.1 Introduction**

This chapter reviews literature on poor hygiene and WASH practices, in Dong, Tiap-Tiap areas and its influence on public health and nutrition. The first section introduces the reader to WASH, and distinguishes between daily used of open defecation and WASH in a development setting. The subsequent sections describe the linkage between WASH, Public Health and Nutrition, and some of the theoretical concepts used in this study. The last section provides a review of the concepts discussed and a conclusion.

**2.2.2 Definition of WASH.**

WASH is the collective term for Water, Sanitation and Hygiene which due to their interdependent nature, these three core issues are grouped together to represent a growing sector (WHO and UNICEF, 2015, UNICEF, 2008) .WASH includes a number of interventions that could be grouped in several categories: water supply (improving water quantity and quality), sanitation (particularly safe excreta disposal) and hygiene promotion/education (including hand washing, food, personal and environmental hygiene) (Dodos, 2017) . Water, sanitation and hygiene improvements can be classified into four groups of related interventions (Esrey et al., 1991, Fewtrell et al., 2005). Water supply improvements include provision of an improved source of water and/or improved distribution, such as piped water or standpipes, provided either at public (source) or household (point-of-use) levels. Sanitation (‘hardware’) improvements provide improved means of excreta disposal, through latrines or connection to the public sewer (Waddington et al., 2009). While each a separate field of work, each is dependent on the presence of the other. For example, without toilets, water sources become contaminated; without clean water, basic hygiene practices are not possible (UNICEF, 2016). The main purpose of a WASH intervention is often to ensure equitable access to water in both quantity and quality, while preventing diseases and sustaining lives and livelihoods; and reducing the economic and social burden brought about by the lack of access to clean water, sanitation and hygiene (Oxfam, 2018, WVE, 2017). Additionally, WASH interventions have been known to promote dignity, and support access to better living conditions and livelihood opportunities (NRC, 2018) .

**2.2.3 Sanitation**

Sanitation generally refers to the provision of facilities and services for the safe disposal of human urine and faeces including the maintenance of hygienic conditions, through services such as garbage collection and wastewater disposal (WHO, 2018a). Inadequate sanitation is a major cause of disease world-wide and improving sanitation is known to have a significant beneficial impact on health both in households and across communities (WHO, 2018a) . Sanitation can be understood as interventions that reduce human exposure to diseases by providing a clean environment in which to live (UNICEF, 2016). Adequate sanitation, together with good hygiene and safe water, are fundamental to good health and to social and economic development. That is why, in 2008, the Prime Minister of India quoted Mahatma Gandhi who said in 1923, ‘‘sanitation is more important than independence’’ (Mara et al., 2010) Sanitation is essential to the survival and development of children. In 2015, 39% of the global population (2.9 billion people) used a safely managed sanitation service defined as use of a toilet or improved latrine, not shared with other households, with a system in place to ensure that excreta are treated or disposed of safely (WHO and UNICEF, 2015) . 68% of the world’s population (5.0 billion people) used at least a basic sanitation service while 2.3 billion people still do not have basic sanitation facilities such as toilets or latrines, of these, 892 million still defecate in the open, for example in street gutters, behind bushes or into open bodies of water (WHO, 2018b) . In WASH programming, sanitation aspects target mainly provision of safe excreta disposal means. Interventions such as community-led total sanitation (CLTS) campaigns promote open defecation free communities (Robinson, 2006) , and these are coupled with construction and rehabilitation of sanitation facilities and hand washing facilities as well as conducting community and school hygiene campaigns aimed at creating healthy hygiene behavior (WVE, 2017) and solid waste management and site drainage activities, to reduce standing water and garbage where disease-carrying mosquitoes or vermin can breed (NRC, 2018) .

**2.2.4 Hygiene Promotion**

Hygiene promotion is a planned approach that aims to reduce the incidence of poor hygiene practices and conditions that pose the greatest risk to the health of children, women and men (WSP, 2005). This research aims to induce changes in health-related behavior to prevent disease (Curtis et al., 2001). Something as simple as hand washing can save lives. Washing hands with soap at critical times, like after going to the toilet or before eating, can have a significant impact on children’s health. Good hygiene practices reduce the incidence of diseases such as pneumonia, trachoma, scabies, skin and eye infections and diarrhea-related diseases like cholera and dysentery. Diarrheal diseases are responsible for between two and three million deaths and over a billion episodes each year worldwide, mainly in children in developing countries (Bern et al., 1992). Diarrheal disease control programmes have been set up in most countries over the past three decades focusing on the promotion of oral rehydration, breast‐feeding and hygiene (Borghi et al., 2002). A series of reviews by Feachem et al. in the 1980s suggested that the promotion of personal hygiene was likely to be one of the most effective and cost‐effective interventions for the prevention of diarrheal disease (Feachem and Koblinsky, 1984, Briscoe et al., 1986). Since then evidence for the effectiveness of hygiene promotion has mounted (Shahid et al., 1996, Peterson et al., 1998). In WASH programming, hygiene promotion interventions vary from agency to agency, but the core activities may involve active disease surveillance and increased vigilance on water quality and sanitation practices during disease outbreaks, solid waste management and site drainage activities, hygiene promotion and community mobilization to promote safe hygiene and health-seeking behaviors’, and to empower displaced people to take an active role in WASH operations (NRC, 2018, Oxfam, 2018, UNICEF, 2016).

**2.2.5 WASH and health**

Globally, around 1.4 million child deaths are estimated to be due to inadequate access to hygiene, sanitation and water (Prüss-Üstün et al., 2008). Above all, the health burden associated with inadequate WASH services falls disproportionately upon very young children with the estimated impact of improving water supply, excreta disposal, and hygiene practices for all would reduce global child mortality by a third (Sandy Cairncross, 2013). Overall, WASH interventions have the potential to reduce the global disease burden (in DALYS) by 9.1% and global mortality by 6.3% (Prüss-Üstün et al.2008). The vast majority of the burden of disease theoretically preventable by WASH is due to diarrheal diseases. In total, 64.2 million DALYs are attributed to unsafe water and poor sanitation and hygiene practices (Sandy Cairncross, 2013). The distribution of deaths due to diarrheal disease is heavily skewed toward the developing world; 80% of all fewer than five deaths due to diarrheal disease occur in sub-Saharan Africa and South Asia. There is suggestive evidence that hygiene (i.e. handwashing) substantially reduces diarrhea diseases in the community. There is suggestive evidence that sanitation, and household water treatment can reduce diarrhea (Prüss-Üstün et al., 2008). There is suggestive evidence that increasing water quantity directly reduces the risk of diarrhea and other WASH related diseases. Few studies have looked at the effect of water, sanitation and hygiene interventions on mortality, and these have not been of good quality (Dodos, 2017). Therefore, there is currently only weak epidemiological evidence that WASH interventions reduce mortality, even if biological plausibility remains high. The effect on health of different WASH interventions is likely to extend to a large variety of infectious diseases such as worm infections, trachoma, acute respiratory infections and most importantly diarrhea (Sandy Cairncross, 2013) . A clean environment by ensuring access to water, sanitation and hygiene has historically been a key to improving health and survival in countries now regarded as developed. There is little evidence to suggest that equally impressive improvements in health and longevity cannot be achieved in low income settings today by effective and sustainable WASH interventions (Sandy Cairncross, 2013).

**CHAPTER THREE: RESEARCH METHODOLOGY**

**3.1 Introduction**

The purpose of this chapter is to give an experienced investigator enough information to replicate this study. As it is indicated in the title, this chapter includes the research methodology of the dissertation. In this chapter, the researcher/author has outlined the research strategy, the research method, the research approach, and the methods of data collection, the selection of the sample, the research process, and the type of data analysis, the ethical considerations and the research limitations of the project.

**3.1.2 Study Area**

The study areas for this research are Tiap-Tiap and Dong villages of Gok state, South Sudan which are residential area. Most of these areas are inaccessible to the government and humanitarian agencies due to lack of feeder roads and better communication services.

**3.1.3 Research Approach**

The study will utilized both quantitative and qualitative approaches. Qualitative and quantitative information was gathered in a participatory manner using multiple data collection techniques informed by the general and specific objectives of the study. This study utilized the case study research method. For several decades, case study research has undergone substantial methodological development which has resulted in a pragmatic, flexible research approach, capable of providing comprehensive in-depth understanding of a diverse range of issues across a number of disciplines.

**CHAPTER FOUR: RESEARCH FINDINGS AND DISCUSION**

**4.1.1 Latrine Data Collection** **in Gok State:**

Latrine possession, disposal of children's faeces and waste-water in 1,015 households in 33 sites in Cueibet, Tiap-Tiap and Malou pec were studied in May. Assistants conducted interviews and observed the state and use of latrines, disposal of children's faeces, wastewater, and household socio-demographic characteristics. Latrine possession was 50.4% in Malou pec, 55% in Tiap-Tiap and 45% in Dong. In piped sites, 45.5% of Cueibet, 40.5% of Jierial and 35% of Mukodic households had latrines. Over 30% of latrines in rural Malou pec contaminated with faeces, compared with 10% in Cueibet. More latrines in urban Rumbek and Juba had contaminated surroundings than in the rural areas. The mean number of people using a toilet in the urban areas (10) was significantly higher than in rural areas (7), (*F* = 45.5; *P* < 0.001). Toilets in Rumbek Town and Juba capital city of South Sudan were more likely to be fouled than in neighboring estate. Households where the head was an educated professional or business person, or the toilet had a door, lid or concrete wall or floor or waste water was disposed of in the latrine, were less likely to have fouled toilets. Most households disposed of the faeces safely with a few placing them in the garden or elsewhere. The study emphasizes the need to promote appropriate sanitation and hygiene.

**Latrine Data Collection** **in Gok State**.

|  |  |  |  |
| --- | --- | --- | --- |
| S/NO | AREAS NAME | PERCENTAGES | REMARKS |
| 1 | MALOU-PEC | 50.4% | COUNTY |
| 2 | TIAP-TIAP | 55% | COUNTY |
| 3 | CUEIBET | 40.5% | CCOUNTY |
| 4 | JIERIAL | 35% | VILLAGE |
| 5 | DONG | 45% | VILLAGE |

**4.1.2 GENERAL INFORMATION OF THE RESPONDENT HOUSEHOLD INTERVIEWS.**

The aim of this research was to collect quantitative data that could allow for evidence-based assessment of WASH projects’ effectiveness and impact. The end line data gathered from individual interviews have been compared with baseline data and evaluation reports obtained from World Vision to clearly show positive changes that have taken place as a result of implementation of WASH projects in the area. In order to have statistically viable data, appropriate sample sizes for various activities would have been calculated based on the number of benefiting households at 95% confidence level and margin of error of 0.1 using modified version of (Krejcie and Morgan, 1970) table of sample determination. However due to limitations in funding and scope of this study, it would not have been possible to interview the over 500 households that were calculated. Therefore 30 households were interviewed by the researcher, and to avoid biases associated with non-random sampling, individual households were selected using systematic random sampling. In the event that this research is to be used beyond the academic purpose of fulfilling requirements of this diploma, further data collection will have to be considered.

**4.1.3 Qualitative data collection.**

For deeper understanding of the variables under investigation as well as triangulation, the researcher collected qualitative information through various methods targeting different groups of people. These were done through individual household interview, Focus Group Discussions (FGDs) with male and female beneficiaries; Key Informant Interviews with Community leaders and officials from government.

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**4.1.4 DISCUSIONS.**

To build the two logistic regression models, six potential confounding factors collected in the cross-sectional survey and describing the socio-economic characteristics of the study population were identified as i) The location of the residence, ii) level of education of the respondent: not educated or highest level achieved (primary, secondary and higher school); (iii) the religion: Christianity, Islam and ‘other’; (iv) housing condition reflecting the socio-economic status (e.g. very-low class socio-economic households: traditional housing made of wood and plastic, low class socio-economic households: shared courtyard referring to grouped houses with a common courtyard and most of the household are using open defecation and middle class socio-economic households: economic or social housing); (v) household size: number of people living in a household as a continuous variable; and (vi) the presence of the household head’s wife at home during the survey. In poor areas, most of the household head’s wives stay at home for household duties.

The model was not reduced as the number of model parameters does not clearly exceed 10% of the number of cases or non-cases. The odds ratio (OR) and corresponding confidence intervals (CI) were present.

**4.1.5 Data Analysis:**

Manual forms (questionnaires) of quantitative data will be transferred to a central system at the end of each day of data collection. The files will be continuously verified and checked for errors before being encoded and transferred to Microsoft Excel data Analysis software. The analyzed data will be presented in the form of tables and graphs to make interpretation and comparison easier. Qualitative data will be analyzed by coding and sifting into themes before inferences are drawn. Results within and across different groups of people interviewed and from various methods will be collated and Triangulated.

Tiap-tiap Hygiene Promotion and Solid Waste Hygiene Promoters per 1500 hosted communities, Number of Garbage Pits. The increase in WASH coverage is further supported by increase in number of hygiene promoters from 2 per every 1000 people, to 10 per every 1000 people in the 2 household. There is a gradual increase in the number of consultations recorded over the course of the research, due mainly to increasing population and increasing capacity of health agencies to respond to the bigger population.

**Chapter 5: Recommendations and Conclusions**

**5.1 Recommendations**

This study was carried out with limited time and resources, and can be expanded and replicated to produce more conclusive results. In particular the following recommendations are suggested:

1. More data collection, especially from WASH agencies and the Health Information Management System (HIMS).

2. More household interviews and key informant interviews.

3. More desk reviews to collect data from different sources across the web. It was noted that a lot of data has been collected by several agencies across the years in the study locations, and most of the findings have not been published, and in cases where they have been published they are not easily searchable or accessible.

4. Latrine Construction Management of fecal waste is fundamental to minimize the spread of fecal-oral diseases. Human faeces are a primary transmission route of many waterborne diseases. Proper management of both waste and disease vectors are necessary. In most outbreak response situations, sanitation facility interventions are the installation of permanent or temporary latrines (Yates et al., 2016). Latrines are constructed to provide a safe method for excreta disposal. Latrine design varies according to the space and material available, the culture and traditions of the beneficiaries and urgency. In most cases, a simple design of a pit latrine is the most efficient approach.

5. Drinking of under groundwater should be often be encouraged and developed relatively cheaply and progressively to meet demand with lower capital investment than many surface water schemes, generally has excellent natural quality, and is usually adequate for potable supply with little or no treatment, generally has a protective cover provided by the soil and unsaturated zone (MacDonald and Calow,2009). Groundwater can be extracted from a boreholes and shallow wells (both public and private) by means of fitting a hand-pump, diesel/petrol-driven pumps or an electric or solar pump (IOM, 2018, Vrba and Renaud, 2016) . Groundwater supply for larger populations, schools and hospitals can be secured by drilling deeper boreholes which can be equipped with treatment and filtration plants that allow producing water of high quality (Vrba and Renaud, 2016). The cost of groundwater development varies considerable from a few thousand dollars for a shallow well, to hundreds of thousands for large diameter deep boreholes in arid regions (Table 2.4). It therefore follows that it might be a cost effective and sustainable solution to ensure safe water is made available in some areas more than in others.

**5.1.2 Conclusion**s

As demonstrated by the research and analyses studies presented here, rapid rural-urbanization is changing global perceptions of poverty and health. As more people crowd into cities, more health issues arise, calling for additional research, innovation, and networking between city activists and policymakers. Cities contain gaping inequities that can be eliminated with appropriate responses and innovations. In fact, far from being purely burdensome, urbanization offers countless positive prospects for communities, presenting new opportunities for accessible health services. Urbanization should be viewed as an impetus for improving living conditions and public health. The challenge now is to keep up with the changes associated with urbanization and enable equal and widespread access to the new resources that are bound to spring up among these growing communities.

Poor conditions of WASH are associated with 6.6% of the global burden of disease and disability, and 2.4 million deaths annually due to diarrhea, subsequent malnutrition, and their consequences (Prüss-Üstün et al., 2008, Ngure et al., 2014) . UNICEF defines under nutrition (which together with over nutrition is called malnutrition) as “the outcome of insufficient food intake and repeated infectious diseases” and includes being underweight for one’s age, dangerously thin for one’s height – wasted, too short for one’s age - stunted, and deficient in vitamins and minerals – micronutrient deficiencies (UNICEF, 2006) . Much is now known about the role of water and sanitation in regard to diarrhea, but its relative contribution of diarrhea to stunting remains controversial (Ngure et al., 2014).

It is however generally agreed that implementation of hygiene and sanitation interventions implemented with 99% coverage would reduce diarrhea incidence by 30% and further reducing the prevalence of stunting by around 4% at 36 months of age (Bhutta et al., 2008) . It is also widely acknowledged that combined poor WASH coverage and poor nutrition are leading risk factors for morbidity and mortality among children under 5 years (Lim et al., 2012) . Furthermore, it is claimed that poor WASH accounts for as much as 50% of maternal and childhood underweight, primarily through the well‐described synergy between diarrheal diseases and under nutrition, whereby one increases vulnerability to the other (Trasande, 2009). (Ngure et al.2014). Globally, around 1.4 million child deaths are estimated to be due to inadequate access to hygiene, sanitation and water (Prüss-Üstün et al., 2008). Above all, the health burden associated with inadequate WASH services falls disproportionately upon very young children with the estimated impact of improving water supply, excreta disposal, and hygiene practices for all would reduce global child mortality by a third (Sandy Cairncross, 2013). Overall, WASH interventions have the potential to reduce the global disease burden (in DALYS) by 9.1% and global mortality by 6.3% (Prüss-Üstün et al.2008). The vast majority of the burden of disease theoretically preventable by WASH is due to diarrheal diseases. In total, 64.2 million DALYs are attributed to unsafe water and poor sanitation and hygiene practices (Sandy Cairncross, 2013).

There is suggestive evidence that hygiene (i.e. handwashing) substantially reduces

diarrhea diseases in the community. There is suggestive evidence that sanitation, and household water treatment can reduce diarrhea (Prüss-Üstün et al., 2008). There is suggestive evidence that increasing water quantity directly reduces the risk of diarrhea and other WASH related diseases. Few studies have looked at the effect of water, sanitation and hygiene interventions on mortality, and these have not been of good quality (Dodos, 2017). Therefore, there is currently only weak epidemiological evidence that WASH interventions reduce mortality, even if biological plausibility remains high. The effect on health of different WASH interventions is likely to extend to a large variety of infectious diseases such as worm infections, trachoma, acute respiratory infections and most importantly diarrhoea (Sandy Cairncross, 2013). A clean environment by ensuring access to water, sanitation and hygiene has historically been a key to improving health and survival in countries now regarded as developed. There is little evidence to suggest that equally impressive improvements in health and longevity cannot be achieved in low income settings today by effective and sustainable WASH interventions (Sandy Cairncross,2013) .

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**Appendix consent form**

My name is Aisha Shidow pursuing A diploma of WASH at Africa Institute for project

management studies(AIPMS). I am undertaking a study on investing the importance of WASH

Programmes in emergency situation . Your community has been chosen to participate in this

research study to give their opinion on matters affecting their life concerns about water,

sanitation and hygiene. I am here by requesting you to participate in the study. If you agree to

participate I will interview you, regarding your personal information and what you think about

WASH, the interview may last for about 30 minutes.

Any information that is going to be obtained from you will be kept confidential. Your name will

not be mentioned or identified in any report. You are free to withdraw at any time if you feel

uncomfortable with the questions. If you have any question during the interview please ask and

am there to help.

Respondent I have read and understood the entire document (which has further been explained to me) and have agreed to participate in the research conducted by Daniel Majur Majok; which will involve me providing my opinion on questions in relation to the WASH in community.

I voluntarily sign this agreement.

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Phone number: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Interviewed by:

Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Signature/ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

RESPONDENT QUESTIONNAIRE

Good morning/afternoon/evening, my name is Daniel Majur Majok, I am a representative of GARD the same time researcher, I am conducting an important evaluation in this settlement. The objective of the evaluation is to establish and document the impact and effectiveness of poor hygiene. All information collected is completely confidential and will only be used for evaluation purposes. Your household has been selected at random to represent many other households, to give a general picture of the area The information you give will be treated with strict confidentiality, and your name or that of any of your household members shall not appear anywhere in the report. The information that you provide will be use purposely for school research only. This interview will take approximately 10 minutes to complete. Your time and assistance is greatly valued.

May I Interview you?

1. Yes 2. No.

If respondent does not agree to be interviewed, End the Interview at this point and thank them for their time.

1 Name of the respondent (Optional) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2 Sex of the respondent 1. Male

2. Female

3 Relationship of the respondent to the household head? 1. Self

2. Spouse

3. Child

4. Other (Specify)

4 Were you born here, displaced from another location? 1. Born here

2. Displaced from another location

5 If 2 in 4 above, what was the reason for relocation?

1. Conflict related reasons

2. Voluntary/ Personal reasons

3. Other types of violence

4. Natural disasters (drought or flood)

6. How long have you been living in the current location? 1. less than 3 months

2. 3-6 months

3. 6 months – 1 year

4. 1-2 years

5. More than 2 years

WATER, SANITATION AND HYGIENE

WATER

7 What is your main source of drinking water?

(Circle one answer only)

1. Piped Water Into Dwelling (House)

2. Piped water in compound / yard

3. Public Tap/Standpipe (kiosk)

4. Borehole

5. Protected Shallow Well

6. Unprotected Shallow Well

7. Protected Spring

8. Unprotected Spring

9. Rainwater Collection

10. Bottled Water

11. Tanker-Truck

12. Surface Water (River, pond, dam . lake)

8 Is your nearest water source currently functional or non-

functional?

1. Functional

2. Non-functional

3. Abandoned

If non functional/ abandoned, for how long has it been in

that state?

1. Under 1 month

2. 2-4 months

3. 5-6 months

4. 6-12 months

5. Over 1 year

10

If non functional, who are you expecting to repair it? 1. Trained community member

2. Non-trained community member

3. Community volunteer

4. Non- community member;

5. Nobody;

6. Other (Specify)

11 Do you pay for water from the main source above?

1. Yes

2. No (if no move to 16)

12 If yes, how much do you pay? (fill in the circle and mode

of payment)

[\_\_\_\_\_\_\_\_\_\_\_\_] pounds per month/20 L Jerry can

If no, are you willing to pay if you had access to reliable

and good quality water?

1. Yes

2. No

14 When you purchase water, who do you purchase from? 1. Water kiosk located in my community/village?

2. Water kiosk located in another community/village

(which one?)

3. I pay a fee to a community water committee in my

community

4. I pay for water to be delivered to my home/community

5. Other: Describe \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

15

Is there a water management committee that manages

this water source?

1. Yes (if yes move to 19)

2. No

16

Who is mainly responsible for management of the water

points in this community?

1. Nobody move to 29

2. Village/camp leader

3. Local administration

4. Community members/users association

5. Private/investor

62

Other Specify\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

17 How can you rate your satisfaction of the following water

service parameters?

category 1 2 3 4 5

Management

quality

tariff

reliability

Complaints

handling

1=Very dissatisfied, 2=dissatisfied, 3=neither satisfied

nor dissatisfied, 4= satisfied, 5=very satisfied

18 If yes, above what are the good things that they do? 1. They manage finances transparently

2. They maintain the water source/point well

3. They have organized meetings to discuss water issues

19 If not satisfied with their management, what are the

reasons?

1. They mismanage finances

2. They do not maintain the water point properly

3. They do not talk to us about water problems

4. Others (Specify)

20 Were there any times in the last three months that your

main water point was NOT fully functional?

1. Yes

2. No

3. Don’t know

21 If yes, what was the problem? 1. Broken parts

2. Pump not operational

3. Leaking pipes

4. Lack of water at the water scheme

5. Other

Specify\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. 99 – Not applicable

22 If yes to 30 above, How long did it take to repair

or fix the problem?

1. Less than one week

2. About 2 weeks

3. About a month

4. About 2 months

5. More than 2 months

6. Never been repaired

7. Don’t know

8. 99 Not applicable

23 If still not fixed, what are the reasons? Circle all

that apply

1. Lack of spare parts

2. Lack of specialised technician

3. No funds for repair

4. I don’t know

5. Other, specify\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

24 Are there any people in this community/settlement

trained in water source maintenance and repair?

1. Yes

2. No

25 How long does it take to go to the water source and

back during the dry period including queuing?

(Tick one )

1. Less than 5 minutes

2. 5-30 min

3. 30-60 minutes

4. 2-3 hours

5. 3-6 hours

6. More than 6 hours

How long does it take to go to the water source and back during the dry period including queuing?

(Tick one)

1. Less than 5 minutes

2. 5-30 min

3. 30-60 minutes

4. 2-3 hours

5. 3-6 hours

6. More than 6 hours.

How much water did your household collect for domestic

use yesterday?(do not include water for watering

animals or gardens)

(20litre is standard jerry can)

1. 20 litres (1 jerry can)

2. 40 litres (2 jerry cans)

3. 60 litres (3 jerry cans)

4. 80 litres (4 jerry cans)

5. More (Specify)

27

How much water would your household collect if you

had access to more water?

1. Don’t need extra

2. 40 litres (2 jerry cans)

3. 60 litres (3 jerry cans)

4. 80 litres (4 jerry cans)

5. 100 litres (5 jerry cans)

6. more

28

Do you consider the water safe for drinking? 1. Yes

2. No

3. Don’t know

29

How do you determine if water is safe for drinking?

(Tick all that apply)

1. If it looks clean and tastes good

2. If it doesn’t smell bad

3. If it has been treated

4. If it comes from a hand pump /borehole

5. Don’t know

6. Other (specify): \_\_\_\_\_\_\_\_\_\_\_\_\_\_

30

Is the water that you fetch treated at the source? 1. Yes

2. No Go to 43

3. Don’t know

31

How is the water treated at the source? 1. Chemical / Chlorine application

2. Solar water disinfection

3. Filtering

4. Other\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. Don’t know

32

Does your household purify or treat water in any way

before you drink?

1. Yes always

2. Yes sometimes

3. No Go to 45

If Yes above, in what ways do you treat water?

( Circle all mentioned )

1. Boil

2. Sieve with cloth or other means

3. Left to settle

4. Chlorinate/ use water guard

5. Use water filter or ceramic sand

6. Solar water dis-infection

7. Use herbs

8. Other specify\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Who mainly goes to fetch water from your household?

(Circle one )

1. None (Water in the house/ yard)

2. Adult woman (15+)

3. Adult man (15+)

4. Boys (Under 15 Years)

5. Girls (Under 15 Years)

6. Household worker

7. Other (Specify)

35

OBSERVE: Where do you store water after fetching?

1. 20 litre Jerri can

2. Wide mouth container without top

3. Wide mouth container with closable top

4. Narrow mouth container with open top

5. Narrow mouth container with closable top

6. Closed container with tap

7. I Don’t store

8. Other (specify):\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Who participates in important decisions about water in this community

1. Men only

2. Men and women

3. Men and children

4. Women and Children

5. Men ,Women and Children

6. Don’t know

7 Are you satisfied with your level of participation in decision making on water issues in this settlement?

1. Yes

2. No

3. Not Involved

4. Don’t know

SECTION B SANITATION

8 Where do you go for defecation? 1. Latrine within the household

2. Shared communal latrine

3. Public/paid latrine

4. Bush

5. Other (Specify)

39 OBSERVE: Is there a latrine in the compound/vicinity

that looks like it is in use?

[observe if there is an active path to the latrine]

1. Yes

2. Latrine not in use

3. No latrine

40

If there is a latrine, OBSERVE: What type of

latrine is it?

1. Traditional pit latrine

2. Ventilated Improved Pit Latrine

3. Flush Toilet

4. Other improved facility; specify: \_\_\_\_\_\_\_\_\_\_\_

41

OBSERVE: Does the latrine have a cover for the hole? 1. Yes

2. No

42

Who uses the latrine? 1. Adult men only

2. Aduly females only

3. Only adults

4. Every member of the household

43

Who cleans the latrine? 1. Nobody

2. Adult woman (15+)

3. Adult man (15+)

4. Boys (Under 15 Years)

5. Girls (Under 15 Years)

6. Household worker

7. Don’t know

8. Other (Specify)

44

OBSERVE: Does the latrine have a smell? 1. Yes

2. No

45

OBSERVE: Does the latrine have flies? 1. Yes

2. No

46

If shared, the toilet with how many families do

you share it?

\_\_\_\_\_\_\_\_\_\_\_\_\_# of HHs/families

47

If shared, how far is the nearest toilet from your

house?

1. Less than 50m

2. 50-100m

3. more than 100m

48 What are the reasons that some people defecate in the

1. No Toilet

65

bush? (Circle all answers mentioned) 2. Toilets Are Dirty

3. Toilets are unsafe

4. Toilet smells bad

5. No Privacy

6. Toilet Is Far From House

7. Long Waiting Time

8. Don’t know

Other (specify): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

49 Where do the children defecate?

1. In an open area

2. In nappies / underwear

3. In a designated location

4. Potty- added

50 What happens to their feces?

1. Thrown in the latrine

2. Left lying on the ground

3. Thrown outside / in the bush

4. Taken to the garbage

5. Dig a hole and cover up

6. Left to animals to eat

51 Have your received the following trainings on sanitation?

CLTS- Community Led Total sanitation

PHAST- Participatory Hygiene and Sanitation

Transformation Training

CLTS 1. Yes 2. No

PHAST 1. Yes 2. No

52 How satisfied are you with human waste disposal,

garbage disposal and general sanitation in this

settlement?

1. Very satisfied

2. Satisfied

3. Unsatisfied

4. Very unsatisfied

C HYGIENE

53 In the last 24 hours, when did you wash your hands?

(Tick all that apply) 1. Only when they look dirty

2. After visiting latrine

3. After taking children to the toilet

4. Before cooking

5. Before eating

6. Before breastfeeding / feeding a child

7. After handling animals

54 In washing of hands above, what did you use?

1. Water only

2. Water and Ash

3. Water and sand

4. Water and Soap

5. Water and Detergent

6. Other Specify \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

55 Do you have soap in this household now?

1. Yes

2. No

56 Is soap readily available at the local market?

1. Yes

2. No

OBSERVATION ONLY: Is there any usable hand

washing facility for the sanitation facilities (latrines)?

1. No available washing facility

2. There are water and soap near or within the latrine

(ONLY in households with latrine facility)

3. There is ONLY water near or within the latrine (ONLY in household with latrine facility)

4. There are water and soap at a designated hand washing area.

5. There is ONLY water at a designated hand washing area.

Have you heard any health/hygiene messages for the

last 3 months? 1. Yes

2. No

If YES, can you tell me which hygiene messages you

can recall?

(MULTIPLE RESPONSES POSSIBLE)

0= Not applicable

1=Use latrine for defecation

=Clean &amp; cover water containers

3=Dispose baby’s feces to the toilet

4=Wash hands with water &amp; soap

5=Prepare food hygienically

6= Water treatment (boil, chlorine, etc.)

7=Cleanliness

8=Dispose garbage properly

9=Use of mosquito nets

10=Cover food

11=Stop open defecation

12=Use of ORS/SSS

66=Other (specify):\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

From where did you hear this/these message/s?

(MULTIPLE RESPONSES POSSIBLE) 0=Not Applicable

1=Government’s health workers

2=Community Health Volunteers

3=School

Photo of (CHCs) community hygiene clubs discussing poor hygiene and open defecation in Tiap-Tiap Village

