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Ahoua Kone Date

Adherence to CLTS practices: a qualitative examination of contextual factors that influence open defecation practices in the Zanzan district of Côte d'Ivoire

By

Ahoua Kone

MPH

Hubert Department of Global Health

Kate Winskell, PhD

Committee Chair

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By

Ahoua Kone

Bachelor of Arts, International Studies and French
University of North Carolina at Chapel Hill
2009

Thesis Committee Chair: Kate Winskell, PhD

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Abstract

Adherence to CLTS practices: a qualitative examination of contextual factors that influence open defecation practices in the Zanzan district of Côte d'Ivoire

By Ahoua Kone

Background: Open defecation is common in many low-and middle-income countries, including Côte d'Ivoire, which has a prevalence rate of 28% in rural areas and a national rate of 51%. Community-Led Total Sanitation (CLTS) was developed by Kar Kamal in 1999 as an approach to ending open defecation and encouraging community ownership of their sanitation problem.

Objective: My aim is to examine how contextual factors in the Zanzan district of Côte d'Ivoire influence the sustainability of open defecation cessation after the implementation of CLTS.

Methods: Twenty focus group discussions (FGDs) and demographic surveys were conducted from May-July 2015 with groups of men and women in ten villages categorized into three types according to their open defecation status following implementation of CLTS. Three in-depth interviews (IDIs) were also conducted with CLTS facilitators in July 2015. FGDs and IDIs transcripts were analyzed qualitatively using MAXQDA software, and descriptive statistics were drawn from the demographic surveys using the statistical software SAS.

Results: Participants indicated that the ability and willingness to end the practice of open defecation following implementation of CLTS was primarily contingent upon personal circumstances, some of which they had control over and others of which they did not. The catalyst for behavior change after CLTS implementation was framed in terms of receiving information about the negative health implications of open defecation, but once that knowledge was obtained, the desire to change was dependent on other factors. Financial constraint was seen as a prominent factor in the participants' ability to build latrines among all three types of villages. The inability to build latrines was also attributed to the physical environment. Community members' willingness to assist others in building their latrines, as well as the ability of the community's leaders to command authority, contributed to the village's open defecation status.

Conclusion: Programs that attempt to end the practice of open defecation through CLTS should adjust their project implementation to adequately address factors specific to the community, including personal benefits to be obtained from behavior cessation, financial constraints, and challenges with the environment that might hinder the uptake of latrine construction.

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Chapter I: Introduction

Context of Project

The United Nations (UN) Sustainable Development Goal (SDGs) 6 is dedicated to water and sanitation, with target 6.2 focused on ending open defecation, and ensuring that all populations are able to gain access to "adequate and equitable sanitation and hygiene" by 2030 (UN, 2016). Established by the UN to monitor the progress of the Millennium Development Goal (which preceded the SDGs) on water and sanitation (Goal 7), the Joint Monitoring Programme (JMP) for Water Supply and Sanitation led by World Health Organization and UNICEF estimates that as of 2012, 14% of the world population defecates in the open due to lack of access to sanitation facilities (WHO & UNICEF, 2014). Open defecation, or lack of proper sanitation, can lead to waterborne diseases such as typhoid, cholera, polio, and other febrile illnesses (WHO, 2015).

Efforts to improve sanitation and reduce open defecation in some regions of the world have resulted in steady and dramatic declines. For example, South Asia decreased its rates of open defecation from 65% to 38% between 1990 and 2012 (WHO & UNICEF, 2014). Despite global improvements, countries such as Côte d'Ivoire have only experienced moderate progress, with their overall prevalence of open defecation dropping from 36% to 28% between 1990 and 2015 (WHO & UNICEF, 2015). Unfortunately, the rate of open defecation has remained relatively high and unchanged in rural parts of Côte d'Ivoire; over the last 25 years, the prevalence of open defecation there has decreased from 56% in 1990 to 51% in 2015. Additionally, the coverage of improved sanitation facilities in Côte d'Ivoire

has marginally increased from 7% to 10% in rural areas and from 15% to 22% for the whole country during the same period (WHO & UNICEF, 2015).

Since 2008, MAP International-Côte d'Ivoire (MAP-CI) has implemented Community-Led Total Sanitation (CLTS) as a means of addressing the lack of proper sanitation facilities in rural areas of the country. CLTS was created by Kamal Kar in 1999 during an evaluation of the water and sanitation program by WaterAid Bangladesh and Village Education Resource (Deak, 2008). Kar and his evaluation team used participatory rural appraisal, an approach that integrates the opinions of rural residents in the management of projects to comprehend the relationship between poverty, open defecation and latrine usage (Deak, 2008; Kar & Pasteur, 2005). According to Kar, the findings demonstrated that toilet subsidies were not always successful in encouraging latrine construction and usage (Kar & Pasteur, 2005). He recommended a new approach, CLTS, that was also based on the findings of his participatory rural appraisal study, focused on ending open defecation, and removed hardware subsidies (Kar & Pasteur, 2005; Bartram et al., 2012). CLTS uses activities to 'trigger' community mobilization and disgust around open defecation (Bartram et al., 2012). Promoted by numerous national and bilateral organizations around the world, CLTS is considered to be a sustainable approach to ending open defecation because it requires community ownership of their sanitation problem (Dreibelbis et al., 2013; Bongartz et al., 2013; Sigler et al., 2014).

As of 2013, MAP-CI has been implementing CLTS as part of the PADEHA project *(Programme d'appui à l'accélération de l'accès durable à l'eau, à l'hygiène et à l'assainissement en Côte d'Ivoire)* in the Zanzan district of Côte d'Ivoire. PADEHA is a water, sanitation, and hygiene (WASH) project carried out in partnership with UNICEF, and the

governments of Côte d'Ivoire and The Netherlands, with the aim of improving access to sanitation and providing water for all populations. As the first step in achieving their objectives, PADEHA and its implementing agencies seek to end the practice of open defecation through the implementation of CLTS. An analysis of factors that might hinder a community's ability to stop open defecation and remain open defecation-free following implementation of CLTS is necessary is to determine if CLTS is a sustainable approach for MAP-CI and PADEHA.

Problem Statement

CLTS is sustainable only through permanent behavior change and social mobilization since members of the community may revert back to previous open defecation practices following implementation of CLTS (Movik & Mehta, 2010). While a majority of studies have focused on how the programmatic component of CLTS impacts the sustainability of its effects, very few have conducted analysis on the contextual factors that influence whether its effects are maintained, especially in Côte d'Ivoire. A study conducted in 10 Sub-Saharan African countries examining the sustainability of the impact of CLTS briefly mentioned that the community's attitude toward open defecation and perception of latrines might influence outcomes (Sah & Negussie, 2009). It also emphasized the commitment of leaders to ending open defecation in their community, and the ability of facilitators to maintain community engagement and demonstrate the importance of stopping open defecation as the key to sustainability of the behavior change (Sah & Negussie, 2009). The current research study builds upon pre-existing CLTS theories about behavior change, but contributes new data regarding the contextual factors that influence

open defecation practices among rural Ivoirians living in the Zanzan district. Identifying and understanding determinants that hinder full cessation of open defecation practices following implementation of CLTS may enable organizations to adjust their implementation process to address community-specific factors and circumstances that can contribute to the lack of latrine construction and usage.

Purpose of Project

In this study, I examine how contextual factors in the Zanzan district of Côte d'Ivoire can influence the sustainability of open defecation cessation following implementation of CLTS. Furthermore, I seek to: 1) comprehend the practices and norms regarding open defecation prior to and subsequent to CLTS triggering; and 2) assess the building, usage, and maintenance of latrines after CLTS triggering. I investigate how the interaction between various factors (structural, environmental, and socio-cultural) affect both individual and communal willingness to adapt to non-open defecation practices.

Definition of Terms

Community-led total sanitation (CLTS): sanitation behavior change model started by Kamal Kar in Bangladesh which aims to end the practice of open defecation.

Open defecation (OD): the practice whereby human excreta are disposed of in open spaces rather than toilets.

Open defecation free (ODF) villages: villages in which all members of the community use latrines to dispose of human feces instead of defecating in the open.

Reversed villages: villages where all members of the community at one point used latrines to dispose of human feces, but where some members have now abandoned latrines in favor of open defecation.

Triggering: a set of activities used by CLTS facilitators as a catalyst to motivate the community to abandon open defecation.

Chapter II: Literature Review

The following literature review synthesizes research on global open defecation trends, behavior modifications around sanitation, and the implementation of CLTS to end open defecation. In the absence of studies from Cote d'Ivoire about contextual determinants that hinder latrine construction and uptake after CLTS implementation, this review draws on studies from other sub-Saharan countries, as well as South Asia. The review will illustrate the knowledge gap in research about the practice of open defecation and demonstrate why programs such as CLTS should not be uniformly applied but rather tailored to address the contextual challenges populations face.

Global Burden of Open Defecation

The practice of open defecation is a prevailing global health challenge in most low- and middle-income countries (LMIC) around the world. In order to monitor the progress of global sanitation efforts toward achievement of Millennium Development Goal 7, UNICEF and the World Health Organization (WHO) defined open defecation as the disposal of human feces in "fields, forests, bushes, open bodies of water, beaches or other open spaces" (WHO & UNICEF, 2013). The global prevalence of open defecation has decreased from 21% in 1990, when UNICEF and the WHO's Joint Monitoring Programme (JMP) for Water Supply and Sanitation started collecting data, to 13% (946 million people) in 2015 (WHO & UNICEF, 2014; 2015). Of the 946 million people worldwide who defecate in the open, two-thirds live in Southern Asia and at least one-fifth live in sub-Saharan Africa. However, over the last 25 years, as the prevalence of open defecation decreased in Southern Asia, the inverse has occurred in sub-Saharan Africa. At national levels, countries like Ethiopia,

Angola, Guinea, Benin and Malawi have managed to decrease their rates of open defecation by at least 25% since 1990. Nonetheless, sub-Saharan African now accounts for more open defecators than it did in 1990 (WHO & UNICEF, 2015). It is impossible to identify a single factor that has contributed to the increase in open defecation practices in sub-Saharan African. However, this region of the world, along with China and India, have experienced exponential rates of urban population growth (Seto et al., 2011). Since 1990, sub-Saharan Africa's population has expanded by 96%. This increase does not translate into growth in the GDP that could potentially provide revenue for investment in sanitation to address the growing issues of open defecation (WHO & UNICEF, 2015; Seto et al., 2011).

Health Implications

Unsanitary disposal of human feces, through practices such as open defecation, can expose people to diarrheal illnesses or any diseases that are caused by contaminated food or water. Improperly stored food and water are easily infected by flies that transmit germs from the excreta left in the open (WHO, 2015). Diarrheal diseases can mostly be attributed to poor water quality due to fecal contamination (Hunter et al., 2010). Globally, diarrhea is responsible for at least 1.6 million deaths in all segments of the population, and in children under 5 years old, it is the second leading cause of death (Mara et al., 2010; WHO, 2013; Liu et al., 2015). The United States Centers for Disease Control and Prevention (CDC) estimates that globally, 2,195 children die every day from diarrheal illnesses, which contributes to more deaths than AIDS, malaria, and measles together (CDC, 2015). A study conducted in India, a country that has struggled to end the practice of open defecation, examined the relationship between open defecation and childhood stunting in various districts across the

country (Patil et al., 2014; Spears et al., 2013). Even when controlling for socio-economic factors such as education and income, the study found that a minimal increase of 1% in open defecation rate in the district was associated with a 7% increase in childhood stunting (Spears et al., 2013). Findings from the study illustrate the far-reaching implications of open defecation for health, which extend far beyond its impact on diarrheal diseases (Spears et al., 2013). Malnutrition, in turn, increases an individual's risk of mortality and morbidity, especially for women and children who are the most susceptible population groups (Blössner et al., 2005).

In addition to diarrheal diseases, lack of proper sanitation and exposed excreta in the environment provides an opportunity for the transmission of various neglected tropical diseases. Caused by the bacterium *Chlamydia trachomatis,* trachoma is the world's leading cause of preventable blindness and currently affects approximately 2.2 million people (Mara et al., 2010; WHO, 2016). One mechanical route of transmission for trachoma is infection through eye-seeking flies that reproduce in human feces (Montgomery et al., 2010; WHO, 2016). Numerous studies have shown an association between proper disposal of human feces and decreased risk of becoming infected with trachoma. A case-control study conducted in various rural villages in Tanzania, for example, found a significant decrease in the risk of children becoming infected with trachoma if they lived in a household that had a latrine (adjusted OR=0.62; 95% CI: 0.41-0.96) (Montgomery et al., 2010). Additionally, a study in Ghana confirmed the association between proper disposal of feces and the reduction of trachoma; trachoma prevalence decreased by 30% and the presence of trachoma-transmitting flies substantially decreased with the construction of toilets (Emerson et al., 2004; Mara et al., 2010).

The literature on open defecation quantifies a correlation between the practice and disease burden. However, individual and community perceptions about the practice are less well documented. Without explicit discussions about contextual factors that prevent people from constructing and using latrines, programs that aim to end open defecation and combat illness that are caused by them may struggle to reach their objective.

Knowledge, attitudes and practices

Despite evidence to demonstrate that open defecation may lead to numerous illnesses because of fecal-oral transmission of human excreta, organizations such as UNICEF are still unable to completely eliminate the practice. Research studies on the practice of open defecation in various countries imply that other factors besides knowledge, such as cultural norms supportive of open defecation, might be a barrier to ending the practice. Studies conducted in Tanzania and India found that open defecators had a nonchalant attitude toward open defecation and did not associate any stigma with their practice (Coffey et al., 2014; Banda et al., 2007). The practice of open defecation was an established norm within their community, and if they were to stop this practice, it would be primarily motivated by a desire to improve their sanitation conditions, not by shame (Sara & Stephens, 2014; Coffey et al., 2014). Some participants in rural parts of Northern India saw open defecation as an opportunity to explore and interact with the surrounding environment, and breathe "fresh air" as they journey to open defecation sites (Coffey et al., 2014).

Another study in Orissa, India further illustrated that although participants are aware of the association between open defecation and diarrheal illnesses, adherence to the

practice extends beyond its status as a cultural norm. In a cluster-randomized study conducted in Orissa, knowledge alone did not motivate participants to end the practice of open defecation. The participants were ashamed of the practice: their desire for dignity and privacy was the driving force behind their desire to build and use latrines (Pattanayak et al., 2009). In contrast to the participants in Orissa, privacy was not a cause for concern for some rural farmers in Benin. Spending a majority of their time on expansive farms with no latrines, these farmers were accustomed to open defecation practices, and familiar with its fertilizing potential on their crops, and were therefore less willing to give up the practice (Jenkins & Curtis, 2005). The perspectives of study participants in Orissa and Benin demonstrate that research on open defecation should examine communities' preference for open defecation, along with any perceived benefits they may obtain by continuing to defecate in the open.

Although participants in research studies tend to agree that open defecation is culturally ingrained, they also acknowledge that the practice presents them with some inconvenience and discomfort. A majority of study respondents in Tanzania, Ghana, and Benin were dissatisfied with the inconvenience of open defecation; unlike some respondents in India, they did not enjoy long walks to defecation sites (Sara & Stephens, 2014; Coffey et al., 2014; Jenkins & Curtis, 2005; Jenkins & Scott, 2007). The findings in Ghana and Tanzania highlighted an interest among respondents practicing open defecation in building latrines. Living in close proximity to urban centers or a population of people who do not defecate in the open was often cited as a motivating factor for those who desire to end the practice; they hoped the construction of latrines would enhance their social status (Sara & Stephens, 2014; Jenkins & Curtis 2005). However, they cited financial

constraints, lack of resources for latrine construction, limited building space, and competing priorities as main barriers to ending the practice (Sara & Stephens, 2014; Jenkins & Scott, 2007).

The normalization of open defecation and its incorporation into the daily rituals of its practitioners presents numerous challenges for eradication efforts. When examining the rationale behind the practice, the discourse in the literature mainly focuses on culture as an overarching theme within certain countries with a documented problem with open defecation. Nonetheless, there are other factors beyond culture that perpetuate the practice of open defecation and merit closer examination.

Behavior change and Sanitation

Countless behavior change models have been modified and applied in the sanitation field to encourage populations to end the practice of open defecation and construct latrines (Devine, 2009). Recently, a new model was designed that encompasses traditional behavior change models but focuses on sanitation: SaniFOAM (Focus on Opportunity, Ability, and Motivation) (Sara & Stephens, 2014; Devine, 2009). The basic concept of SaniFOAM is that once the target population and sanitation behavior have been identified, and the population has access to resources, they are capable of engaging in behavior change (through self-efficacy, social support, etc.), and are motivated to change, then behavior modification can occur (Devine, 2009). However, each of the four components (focus, opportunity, ability, and motivation) include determinants, such as cultural beliefs and accessibility of resources, that can momentarily obstruct or completely impede sanitation behavior change (Devein, 2009). While SaniFOAM provides a programmatic framework to

design, monitor, and evaluate programs specifically within the sanitation context, it fails to address how the framework can be used to overcome barriers to behavior change (Sara & Stephens, 2014). Despite a myriad of studies illustrating the *opportunity* and *motivation* to change on the part of those practicing open defecation, it also shows a lack of *ability* to change (e.g. economic difficulties, limited land space for construction) that is beyond the power of an individual to address (Jenkins & Curtis, 2005; Jenkins & Scott, 2007).

A framework for behavior change in sanitation often employed and advocated for by organizations like the World Bank is social marketing. Similar to SaniFOAM, social marketing also has its four components, or "Four Ps": product, place, price, and promotion (Cairncross, 2004). In order for social marketing to be successful in sanitation, implementers must create a demand (promote) for latrines (product), which must be made available and accessible through public venues (place) for the population at a cost (price) that can be subsidized for poorer populations (Cairncross, 2004). Proponents of social marketing in sanitation argue that lack of latrines already has a price affixed to it, in term of illness and healthcare; therefore, it is only rational that individuals stop the practice of open defecation and invest in latrine construction for the benefit of society (Cairncross, 2004; Jenkins & Scott, 2007). However, a high demand for the product does not always translate into the availability of the product for all who need it, and neither does it ensure a permanent change in behavior (Patil et al, 2014). One of the main challenges of social marketing is understanding household behavior and decision making that influence the uptake of latrines; often times when social marketing is unable to gather that information, it relies on stigma around a behavior or community laws to motivate people to embrace latrine usage (Jenkins & Scott, 2007; Devine & Kullmann, 2011).

Sanitation programs such as CLTS incorporate a multitude of behavior change constructs, including those drawn from SaniFOAM, social marketing, and even shame to raise the individual's and population's consciousness and increase desire to end their practice of open defecation (Dreibelbis et al., 2013; Pattanayak et al., 2009). Behavior change models attempt to provide a conceptual framework to comprehend, predict, and evaluate the uptake of a sanitation behavior. Despite the intricacies of the frameworks and acknowledgment of certain determinants that can hinder behavior change, the narrow focus of these models prevents them from addressing factors outside of the individual's behavioral control.

Community-Led Total Sanitation

Community-Led Total Sanitation was developed in 1999 by Kamal Kar while he was employed by WaterAid Bangladesh and their local partner, the Village Education Resource Center, as an evaluator for their water and sanitation program (Deak, 2008). The evaluation used participatory rural appraisal (an approach that integrates the opinions of rural residents in the management of projects) to understand the relationship between poverty, open defecation, and latrine usage in the area (Deak, 2008; Kar & Pasteur, 2005). Based on their findings, Kar decided that toilet subsidies did not motivate the population to build latrines or use them after construction. He therefore recommended a new approach that removed subsidies and 'triggered' the community to end the practice of open defecation (Kar & Pasteur, 2005; Bartram et al., 2012). In CLTS, 'triggering' consists of activities conducted by the facilitators to ignite awareness and mobilize the community around the importance of abandoning open defecation (Bartram et al., 2012). One of these

activities is the 'walk of disgust,' which involves walking around the village while the facilitator directs community members to areas of open defecation and asks who was responsible for the human excreta. The activity is meant to prompt disgust and embarrassment from community members, which CLTS hopes will create a desire to end the practice of open defecation (Kar & Chambers, 2008). CLTS is not the first nor will it be the last public health program to employ shaming as a tool to elicit an emotional response from the target population in hopes of spurring abandonment of a negative health behavior, in this case the practice of open defecation in favor of hygienic health practices (Lupton, 2015). Unfortunately, as studies in India and Tanzania demonstrated, stigma is not always an effective tool to elicit behavior change; the participants in both countries did not perceive any shame in their embrace of open defecation (Coffey et al., 2014; Banda et al., 2007). The use of shame in CLTS has generated literature on the discourse of individual human dignity and rights that some researchers believe is being ignored in favor of behavior change (Bartram et al., 2012; Engel & Susilo, 2014).

After initial success in Bangladesh, CLTS gained the support of agencies such as UNICEF, CARE, and the World Bank Water and Sanitation Program, and has been implemented in Sub-Saharan Africa, Asia, and Latin America (Kar & Chambers, 2008). Communities are not taught but instead encouraged to analyze the sanitation conditions of their community on their own. However, CLTS facilitators do inform community members on the use of local materials (mud, grass, stones) to build latrines and community solidarity to help members that are not able to build for themselves (Kar & Chambers, 2008).

Impact of CLTS

On the pathway to long-term behavior change are barriers – both internal and external to the community – that will hinder the progress of change. The ultimate aim of CLTS is to make all members of the community consciously aware of the health implications of open defecation, so that together as a unit they abandon the practice (Kar & Chambers, 2008). The extent to which that aim can be achieved is primarily dependent on the motivation and ability of members of the community to adapt and adhere to the behavior change proposed by CLTS (Movik & Mehta, 2010). A study in Bangladesh has suggested that the strong reliance on shaming and disgust can be ineffective in CLTS: while initial disgust is strong with women and adolescents, the shock gradually wanes over time and people revert back to old behavior (Movik & Mehta, 2010; Curtis et al., 2004). Reverting back to open defecation practices can be attributed to many factors, including lack of monitoring and evaluation on the part of CLTS implementers. Behavior change does not occur instantaneously and consistent monitoring would allow organizations to gauge community enthusiasm for latrine usage over time and adjust their implementation according to monitoring results. There are no standardized criteria for monitoring and evaluating CLTS villages (Movik & Mehta, 2010). Although a CLTS handbook exists to help standardize the implementation of programs, in practice organizations rely predominately on unskilled personnel to facilitate implementation, which contributes to the lack of uniformity of information transmitted (Sah & Negussie, 2009). Adhering to the self-empowerment principle of CLTS, some villages self-declare their open defecation-free status, whereas others are required to be approved by government officials. Even with

formal recognition, there tends to be overestimation of open defecation-free villages, which makes it impossible to truly gauge the success of the program (Movik & Mehta, 2010).

Compared to other sanitation programs, CLTS is a relatively new program that has merged different behavior change theories with the aim of ending the practice of open defecation and improving the health of communities. Debate around the success and limitations of CLTS is limited and mostly addresses South Asia, where the program has been implemented the longest (Kar & Chambers, 2008). For a country like Côte d'Ivoire, there is minimal literature on CLTS. Two studies have examined the impact of CLTS on neglected tropical diseases (Schmidlin et al., 2013; Acka et al., 2010). However, the studies have not analyzed the extent to which perception of socio-cultural, structural, and environmental factors influence a community's willingness to accept and end the practice of open defecation.

Chapter III: Manuscript

I. Introduction

The United Nations (UN) Sustainable Development Goal (SDGs) 6 is dedicated to water and sanitation, with target 6.2 focused on ending open defecation and ensuring that all populations are able to acquire "adequate and equitable sanitation and hygiene" by 2030 (UN, 2016). Established by the UN to monitor the progress of the Millennium Development Goal (which preceded the SDGs) on water and sanitation (Goal 7), the Joint Monitoring Programme (JMP) for Water Supply and Sanitation led by the World Health Organization and UNICEF estimates that as of 2012, 14% of the world population defecates in the open due to lack of access to sanitation facilities (JMP, 2014). Open defecation, or lack of proper sanitation, can lead to waterborne and foodborne diseases such as typhoid, cholera, polio, and other febrile illnesses (WHO, 2015).

Efforts to improve sanitation and reduce open defecation in some regions of the world have resulted in steady and dramatic declines. For example, South Asia decreased its rates of open defecation from 65% to 38% between 1990 and 2012 (WHO & UNICEF, 2014). Despite global improvements, countries such as Côte d'Ivoire have only experienced moderate progress, with their overall prevalence of open defecation dropping from 36% to 28% between 1990 and 2015 (WHO & UNICEF, 2015). Unfortunately, the rate of open defecation has remained relatively high and unchanged in rural parts of Côte d'Ivoire; over the last 25 years, the prevalence of open defecation there has decreased from 56% in 1990 to 51% in 2015. Additionally, the coverage of improved sanitation facilities in Côte d'Ivoire

has marginally increased from 7% to 10% in rural areas and from 15% to 22% for the whole country during the same period (WHO & UNICEF, 2015).

Since 2008, MAP International-Côte d'Ivoire (MAP-CI) has implemented Community-Led Total Sanitation (CLTS) as a means of addressing the lack of proper sanitation facilities in rural areas of the country. CLTS was created by Kamal Kar in 1999 during an evaluation of water and sanitation program by WaterAid Bangladesh and Village Education Resource (Deak, 2008). Kar and his evaluation team used participatory rural appraisal, an approach that integrates the opinions of rural residents in the management of projects to comprehend the association with poverty, open defecation and latrine usage (Deak, 2008; Kar & Pasteur, 2005). According to Kar, the findings demonstrated that toilet subsidies were not always successful in encouraging latrine construction and usage (Kar & Pasteur, 2005). He recommended a new approach, CLTS, that was also based on the findings of his participatory rural appraisal study, focused on ending open defecation, and removed hardware subsidies (Kar & Pasteur, 2005; Bartram et al., 2012). CLTS uses activities to 'trigger' community mobilization and disgust around open defecation (Bartram et al., 2012). Promoted by numerous national and bilateral organizations around the world, CLTS is considered to be a sustainable approach to ending open defecation because it integrates various behavior change models and requires community ownership of their sanitation problem (Dreibelbis et al., 2013; Bongartz et al., 2013; Sigler et al., 2014).

As of 2013, MAP-CI has been implementing CLTS as part of the PADEHA project *(Programme d'appui à l'accélération de l'accès durable à l'eau, à l'hygiène et à l'assainissement en Côte d'Ivoire)* in the Zanzan district of Côte d'Ivoire. PADEHA is a water, sanitation and hygiene (WASH) project carried out in partnership with UNICEF, and the

governments of Côte d'Ivoire and The Netherlands with the aim of improving access to sanitation and providing water for all populations. As a first step in achieving its objective, PADEHA and its implementing agencies seek to end the practice of open defecation through the implementation of CLTS. An analysis of factors that might hinder a community's ability to stop open defecation and remain open defecation free after the implementation of CLTS is necessary to determine if CLTS is a sustainable approach for MAP-CI and PADEHA.

CLTS is sustainable only through permanent behavior change and social mobilization and members of the community may revert back to previous open defecation practices following implementation of CLTS (Movik & Mehta, 2010). While a majority of studies have focused on how the programmatic component of CLTS impacts the sustainability of its effects, very few have conducted analysis on the contextual factors that impact the sustainability of the program, especially in Côte d'Ivoire. A study conducted in 10 Sub-Saharan African countries examining the sustainability of CLTS effects briefly mentioned the community's attitude toward open defecation and perception of latrines as factors that might influence outcomes (Sah & Negussie, 2009). It also emphasized the commitment of leaders to ending open defecation in their community, and the facilitators' ability to maintain community engagement and demonstrate the importance of stopping open defecation as the key to sustainability of CLTS effects (Sah & Negussie, 2009). The current research study builds upon pre-existing CLTS theories about behavior change, but contributes new data regarding the contextual factors that influence open defecation practices among rural Ivoirians living in the Zanzan district. Identifying and understanding determinants that hinder full cessation of open defecation practices after the implementation of CLTS may enable organizations that aim to end this practice to adjust

their implementation process to address community-specific factors and circumstances that can contribute to the lack of latrine construction and usage.

II. Methods

We conducted a mixed-methods study to determine rural Ivoirians' attitudes on the practice of open defecation, and the impact of those attitudes on the sustainability of open defecation-free villages following implementation of CLTS. Focus group discussions (FGDs) were conducted with groups of men and women across three types of CLTS villages (open defecation-free villages; villages that have reverted back to open defecation status; and villages that never abandoned open defecation) to identify factors that would either encourage communities to stop the practice of open defection or deter them from doing so following CLTS implementation. Additionally, semi-structured in-depth interviews (IDIs) were conducted with CLTS facilitators to understand CLTS implementation, and how those components could influence a community's ability to abandon open defecation.

Study Setting and Population

While less than one-fourth of the total Ivoirian population (22%) uses improved sanitation facilities, the rate of usage is even lower among the rural population at 10% (WHO & UNICEF, 2015). With the introduction of CLTS as a method of promoting community ownership over sanitation conditions, there is a need to understand what factors might inhibit communities from accepting CLTS teaching and permanently abandoning open defecation practices. Although MAP-CI has implemented CLTS across the country, the Zanzan district was chosen because it is currently the only district where MAP-

CI is still implementing CLTS and actively involved in the monitoring of villages after triggering. MAP-CI started implementing CLTS in villages in Bouna in 2010, and since then they have triggered approximately 1,013 villages. Of those 1,013 villages eligible for this study, three types of CLTS villages were selected based on their proximity to MAP-CI district offices in Bondoukou and Bouna. The three categories of villages were: 1) villages that were declared open defecation free (ODF) and had maintained their status; 2) villages that were once declared ODF, but had regressed to open defecation (OD) status; and 3) villages that were triggered but never declared ODF.

From the eligible villages, a convenience sample of 10 total villages were selected, they included: four villages (Allaladougou, Goly, Fodja, and Djadoubango) that had maintained their ODF status, two villages (Kondidouo and Tefro) that had reverted back to ODF status, and four villages (Koboko 2, Temogossie, Bakotia, and Seinguissigo) that had never attained ODF status (Table 1). It should be noted that the two villages that had reverted back to ODF status were triggered over four years prior to the other villages, limiting direct comparison between different types of villages. Two sets of FGDs were conducted in each village, one with a group of men and another with a group of women. In each village, a gatekeeper recruited available, eligible participants to form a convenience sample of 6-8 participants per FGD. Our inclusion criteria included any individual over the age of 18 who had resided in the village prior to CLTS implementation. Functional latrine owners, non-functional owners, and those who did not own latrines were all eligible. Depending on the village, the gatekeeper recruited eligible participant during a meeting in the village to inform the population about the FDGs or by going door-to-door.

Three IDIs were conducted with CLTS facilitators from a convenience sample that met the eligibility criteria. The eligibility criteria included: employment with MAP-CI as a CLTS facilitator for at least six months in either their Bouna or Bondoukou regional offices; had conducted at least three or more CLTS facilitations; and were over the age of 18. In total, 20 FDGs and three IDIs were conducted, and consent was obtained from all participants before interviews conducted.

Table 1: Village open defecation status

Village Type	Name of Village	Date of CLTS Implementation
Open Defecation Free	Allaladougou	March 2014
Open Defecation Free	Goly	March 2014
Open Defecation Free	Fodja	February 2014
Open Defecation Free	Djadoubango	February 2014
Open Defecation	Koboko 2	February 2014
Open Defecation	Temogoisse	February 2014
Open Defecation	Bakotia	March 2014
Open Defecation	Seinguissigo	March 2014
Reverted to Open Defecation	Tefro	January 2010
Reverted to Open Defecation	Kondidouo	January 2010

Table 2: Demographic information on study participants

Demographic	Percentage
Male	49%
Female	50%
Education level	
None	60.9%
Elementary	17.9%
Middle School	11.9%
High School	7.9%
University	1.3%
Languages spoken	
Abron	9.3%
Dioula	29.8%
French	66.2%
Kulango	68.9%
Lobi	21.2%

Table 3: Frequency distribution of educational level by sex

Education	Male	Female	Total
None	50%	71.4%	60.9%
Elementary	21.6%	14.3%	17.9%
Middle School	16.2%	7.8%	11.9%
High School	9.1%	6.5%	7.9%
University	2.7%	0%	1.3%
Total	**100%**	**100%**	**100%**

Data Collection

The FGDs allowed participants to reflect on individual and community perceptions of open defecation prior to and after CLTS implementation in the selected villages. The interview guides for the FGDs and IDIs were translated into professional French and then into colloquial Ivorian French to ensure comprehension by study participants. Interview

guides and probing questions were amended iteratively throughout data collection. Following the conclusion of the FGDs, study participants were asked to complete a brief 12 question survey about their educational background, latrine ownership, maintenance, and usage.

Data Processing and Analysis

We analyzed exposure variables (e.g. latrine functionality, number of latrines per household, number of individuals in household) and outcome variables (e.g. latrine usage and village open defecation status) in the surveys using the statistical software SAS version 9.4. The FGDs were transcribed verbatim in French; they were memoed, coded, and analyzed in MAXQDA10 qualitative data analysis software. The codes used in this analysis were developed deductively and inductively (e.g. knowledge, support, authority, money). Each code included a detailed description, inclusion and exclusion criteria, and an excerpt from the transcript to serve as a reference point. MAXQDA10 allowed for categorical analysis of segmented text based on code, which enabled cross-comparison of FGDs within and across the villages.

Ethical Consideration

The Institutional Review Board of Emory University in the United States determined this project (IRB00081173) did not qualify as human subjects research and was granted exemption status. Additionally, protocol and research instruments were submitted to the Ethics Research Committee of the *Ministère de la santé et de la lutte contre le SIDA* in Côte d'Ivoire for review and approval was granted.

Quality Control

Both the qualitative and quantitative data were anonymous, and no identifying information was attained or stored. Upon completion of transcription, all voice recordings of FGDs and IDIs were destroyed.

III. Results

Quantitative

Of the 151 participants surveyed after their FGDs in all 10 villages, 33.4% did not use a latrine. Of that proportion, 92% did not own a latrine and the remaining 8% had non-functioning latrines with no walls. Approximately 45% of all participants owned at least one latrine, and 23.2% of the 45% owned two or more latrines. One participant owned five latrines; however, at least 30 individuals resided in her household. CLTS recommends one latrine per five-member household. Only 45% of the households that had latrines adhered to that program recommendation; one household in Tefro had around 40 members but only two latrines for everyone to share. In villages that had not attained open defecation-free status, 25.4% of participants owned at least one latrine. Only one participant in the villages that had regressed to OD status did not have a latrine; of the 26 participants that did have latrines, 15% did not use their latrine. All participants except for one cited structural issues (fallen walls) for no longer using the latrine; the remaining participant stated he practiced open defecation because he disliked the smell of latrines.

The survey results quantify household latrine construction, functionality, and ownership among the different types of villages. However, they cannot identify factors that

contribute to these differing figures. For example, according to the survey, the rate of latrine ownership among ODF villages, OD villages, and villages that have reverted back to OD status is 100%, 25.4%, and 96.2% respectively. The rate of latrine ownership in villages that have lost their ODF status is comparable to villages that have maintained ODF status. However, they now share the same OD status as villages that have at least 60% less latrine coverage. The interviews conducted with participants in these villages provide contextual explanation for these statistics.

Table 4: Latrine status and usage by village open defecation status

Latrine Status	ODF Villages	OD Villages	Reverted to OD Villages	Total
Do not own a latrine	0%	74.6%	3.8%	31.8%
Do not use a latrine	0%	74.6%	7.4%	33.4%
Have a functional latrine	100%	25.4%	81.5%	65.6%
Own at least one latrine	100%	25.4%	96.3%	45%
Own 2 or more latrines	34.4%	1.6%	48.1%	23.2%

Qualitative

I: "In your opinions, why do people poop in the open?"

P: "It's because they don't know, they don't know that to poop in the open is bad. It's like us in the beginning."

P: "Because they haven't found the means to make latrines, that's why they poop in the open […] They also don't have the idea to make latrines. We were also like that."

P: “In the beginning, everyone haphazardly pooped in the open, they didn’t know it was bad. Also, it’s not their fault, we also didn’t know. We pray to God that MAP will go to them, and they will see pooping outside is bad and that they eat it.”

Male participants in the village of Allaladougou, Bondoukou, Côte d’Ivoire, ODF village

Behavioral norms

Across all 10 villages, participants traced the historical and cultural context of open defecation in their villages back to their forefathers who were unaware of latrine construction and usage. According to the participants, the practice of open defecation was a habit they developed as infants from the teachings of their parents. For the male participants, it meant taking walks with their fathers to the bush to defecate in the open, a practice they continued with their children. The male participants also described how they would dig holes with handheld shovels alongside their fathers to defecate in and close them before leaving. On numerous occasions the male participants mentioned coming across neighbors or friends while they were defecating in the bushes, and joking about running into each other at that moment. They would converse with each other as they were defecating in the open; at the time they did not associate shame with the practice because it was normalized in their community.

The female participants also acknowledged that the practice of open defecation was a habit they learned from their parents. However, unlike their male counterparts, they always felt uncomfortable with the lack of privacy. Although they never used the word ashamed, the women described being embarrassed at the thought of other members of the community seeing them defecate in the open. They were aware that the practice of open

defecation was normalized in their communities and they would not be judged by other members, but were not as jovial about the practice as the male participants. Some of the participants even described going deep into the bush to avoid being seen by other people. The sentiments regarding privacy were also shared by male participants in ODF villages (Allaladougou, Goly, Fodja, and Djadoubango) once they started using latrines. These participants described how they would encounter community members in the bush and they would defecate in the open next to each other with little regard to privacy. Now, that they were used to the enclosed space of a latrine, they would not feel as comfortable squatting next to their neighbor in the bush. As a participant in Allaladougou stated, he felt 'bizarre' and 'embarrassed' at the thought of abandoning a latrine in favor of returning to the bush and potentially encountering a neighbor. At least for these participants, the introduction of latrines and their willingness to use them resulted in a shift in their attitudes toward the disposal of human excreta. One participant in Tefro, despite owning a functional latrine, preferred the fresh air associated with open defecation over the smells in latrines. When he stated his preference, the other participants laughed him off and advised us to disregard his opinion. The participants questioned his sanity, as one participated stated: "he's not normal, no one normal would stop using a latrine and poop outside where snakes can bite him." But the participant stressed the importance of comfort when defecating, and for him that level of comfort could only be obtained in the bush and not with a pit latrine.

Health outcomes

While some of the participants noted privacy as a personal gain associated with abandoning open defecation, all the participants cited a decrease in the incidence of diarrheal diseases, especially among children, as a potential health outcome if the community abandoned the practice of open defecation. Although they were not always able to specify a disease other than diarrhea that would be averted, they linked an improvement in general welfare to cessation of open defecation. When probed, only the participants from ODF villages noted that they had witnessed an improvement in the community health once open defecation was no longer a practice. Furthermore, they attributed a decrease in diarrheal illnesses in both children and adults, lower healthcare expenditures (less frequent visits to health centers), and minor illness to their community's behavior change.

In contrast, while participants in Tefro and Kondidouo acknowledged the potential for improved health outcomes, they claimed to have never witnessed them despite having been once declared ODF. Despite repeated probing to determine factors that could have contributed to the discrepancy between the health outcomes they expected with latrine usage and what they experienced, the participants were unable to provide an explanation. Participants from villages that had never attained ODF (Koboko 2, Temogossie, Bakotia, and Seinguissigo) also indicated that they expected an improvement to the community's health and fewer visits to health clinics once open defecation stopped in the villages.

All the participants attributed the association they drew between health improvement and latrine usage to an activity conducted during their CLTS training. They were able to see the oral-fecal transmission pathway when their facilitator placed a sardine sandwich next to human excreta and they watched as flies moved between both items.

Throughout the interviews, the participants would state "*on le mange"* (we eat it) in reference to consuming fecal matter that was transmitted by flies. All the villages, regardless of their open defecation status, acknowledged that building and using latrines would mean they would no longer consumed their own fecal matter. In addition to oral-fecal contamination, one male participant in Allaladougou, an ODF village, stated that the smell of human excreta around the village caused people to become ill, but the use of latrines eliminated the smell and decreased the incidence of illnesses in the village.

Financial commitment

Participants, both males and females, in ODF villages ascribed lack of knowledge about the benefits of latrine usage and the public health consequences of open defecation as the primary reasons for the continued practice among some people. However, the interviews in all three types of villages (ODF, triggered but still OD, and villages that had lost their ODF status) demonstrated that despite awareness of the association between open defecation and health outcomes some villages did not abandon the practice. A persistent point of contention among all three types of villages was the financial commitment involved in building latrines. Participants in ODF villages would occasionally mention how lack of available funds initially delayed their latrine construction, but they were able to overcome this challenge. Participants in open defecation villages reiterated that financial hardship was the main reason for either not initiating or completing latrine construction. During CLTS implementation, participants were advised that cement (due to its cost) was not necessary for latrine construction; instead, they could use tarpaulin or wood sourced near their villages to build the walls of the latrine. The participants in nine of

the ten villages described a desire to wait and build with cement because it was sturdier and more durable than plastic or logs. According to male participants in Koboko 2 (triggered but still OD), even under financial constraints, individual ego and pride prevents people from building latrines from tarpaulin and log, especially when their neighbors are using cement for their latrines. They explained that the perception of impoverishment is more humiliating than appearing aloof and non-compliant with a program that aims to ameliorate living conditions. This perspective was only vocalized by male participants in Koboko 2.

While none of the participants in Allaladougou experienced any financial hardship that delayed the construction of their latrines, there were members of the community that had to wait until they sold the produce they farmed to start building. The male participants in Fodja, Goly, and Djadoubango discussed how men in the community provided free manual labor and built latrines for members of the community who were unable to do so themselves. However, the female participants said women with no male partners in Goly initially struggled to build their latrines; they begged the men in village to build the latrine for them since they were physically unable to, but the men were reluctant to provide assistance. These women were finally able to obtain assistance from men in the village when the chief of the village declared that everyone was required to own a latrine.

Community cohesion

The lack of assistance from men in the village was not an experience unique to women of Goly. The female participants in Koboko 2, Temogossie, Bakotia, and Seinguissigo also mentioned how they were unable to get assistance with latrine

construction despite numerous pleas. One female participant in Bakotia discussed that, as a widow, the only men who would be able to build her latrines are her young grandsons, who were currently enrolled in a middle school away from the village. Due to her grandsons' studies and her physical inability to build a latrine, she offered to pay various young men in the village to help her build her latrine and they each refused. According to her, they provided her with no further explanation then they did not have the time to build the latrine. Female participants with no male support in their lives in Koboko 2, Temogossie, and Seinguissigo reiterated the same experience. They would initially approach men in the village and ask them for assistance in building their latrines. Those who were not experiencing any financial hardship would offer to compensate them for their work. Unfortunately, the men in the community would always decline their request. Some of the women would seek latrine builders from other communities if they could afford it; however, the other women were left with no latrines despite efforts to initiate construction.

The discordance in the women's and men's FGDs from Koboko 2, Temogossie, Bakotia, and Seinguissigo regarding willingness to help out a fellow community member build a latrine is notable. Only in Tefro, a village that was once ODF but has reverted to OD, did both the male and female participants agree about the lack of assistance provided to one village member. According to the participants, the male community member refused to engage with other members of the community and would not attend required village meetings. The wall of his latrine fell when he was ill, therefore he was unable to rebuild it on his own. He asked the men of the village to help him out, but they refused because he isolated himself from other members of the community. The male participants stated that

they informed him they would be willing to help him rebuild his wall if he re-engaged with the community, but he never accepted their offer. The female participants in Tefro felt that despite the man's involvement in the community, due to his illness, the men of the village should help him rebuild his latrine. When asked what the women of Tefro could do to help the man get a functional latrine, they stated they have no authority in the village; therefore, their opinions and advice were never considered.

Authority

The female participants in Tefro, Kondidouo, Koboko 2, Temogossie, Bakotia, and Seinguissigo discussed their inability to effect change in their community. They acknowledged that they would like for latrines to be built and used in their villages. However, when they communicated this to their husbands or any other male figures in the community, their opinions were always disregarded. When we asked the women why they had not expressed their opinions to the village chief, they mentioned that the chiefs of their villages wield no power; their opinions and directives are not respected by the population. The notion of a village chief and village elders with no power was distinctive in our study to villages that practiced open defecation. In contract, the chiefs of villages like Goly, Fodja, and Djadoubango that are ODF commanded authority, according to the participants.

In our discussion with the participants of Fodja and Djadoubango, they mentioned that immediately after the implementation of CLTS, the village chief ordered a meeting of all community members. During the meeting, he required all members of the village to build latrines and, along with the elders, they imposed fines and bylaws for non-compliance, and for not using the latrines once they were constructed. In Djadoubango, the

fine initially for not building a latrine was 10,000 West African CFA franc (approximately $17), but they realized the amount might have been excessive and reduced it to 5,000 West African CFA francs. Similar to other CLTS villages, Djadoubango had provided MAP-CI with a deadline of when all latrines would be completed, and the fines would be implemented on a weekly basis after that deadline. The participants mentioned that despite some hesitancy to accept CLTS teachings, they feared the consequences of disregarding the chief's orders, and started constructing their latrines. The chief of Koboko 2 (OD village) had tried to implement a fine as a means to mobilize latrine construction in the village. However, according to both male and female participants, members of the village ignored his order and there was no effort on his part or that of other elders to enforce the rule. Since the chief of Allaladougou, another ODF village, did not reside in the village, a group of men (including the chief's son) decided to develop fines and rules for the village regarding latrine construction and usage. When we asked the participants in Allaladougou how they felt about these bylaws, they said it was a good way to force all members of the community to cease the practice of open defecation. Although the fines and exact bylaws changed from village to village, chiefs or groups of individuals with power in ODF villages (Allaladougou, Djadoubango, Goly, and Fodja) were able to leverage their leadership and force their community members to build latrines and stop defecating in the open.

The environment

The physical and natural environment were external factors that participants in both villages that had never attained OD status and villages that had regressed to OD status believed contributed to their status. In OD villages of Koboko 2 and Temogoisse,

participants described starting the process of digging latrines only to stop because the ground was too rocky for them to dig through with their tools. In other villages, the ground was composed of sand that would easily refill the holes they were digging. Though despairing, the participants mentioned that the issues were rectifiable if members of the village knew someone who specialized in latrine construction; however, they would be unlikely to employ that individual due to financial constraints.

When CLTS was introduced to them, participants in villages that regressed to OD status initially accepted the advice of their facilitators and built their latrines out of wood, tarpaulin, and even clay. Over the years, the clay developed cracks, the tarpaulin ripped, and the wood started rotting, which led to the walls falling down. Some of the participants decided to rebuild with cement, if the funds were available; others used the resources available to them (wood, clay, tarpaulin). The rate of deterioration of walls constructed with clay, wood, or tarpaulin was not uniform in these villages. Despite using these materials, some participants still had latrine walls that were intact despite being constructed in 2010. In contrast to villages like Tefro and Kondidouo (reverted back to OD), the ODF villages in our study have not experienced any issues with their walls or other structural components of their latrines. These participants did not use tarpaulin or logs. Instead, a majority of the latrines were built using cement and clay. The age of the latrines might also be a factor in their structural decay, as the latrines in ODF villages were built in 2014, whereas those in Tefro and Kondidouo were constructed in 2010. The varying degrees of deterioration among the various types of materials used to construct latrines in Tefro and Kondidouo suggest that, while the materials used to construct the latrines might

contribute to their collapse, how long the materials have been exposed to the natural elements could be another factor.

Doer/non-doer

Continuing the discussion about how and why they reverted back to defecating in the open, participants in Kondidouo and Tefro mentioned that they felt they were building the latrines to appease MAP-CI and regional authorities, but did not think they were benefitting from using the latrines. Once CLTS facilitators from MAP-CI stopped monitoring and evaluating their progress in the village, they were no longer motivated to use the latrines. Participants also mentioned the rewards (t-shirts, new water pumps) that other CLTS villages received for achieving open defecation status. They, however, were never given such incentives and felt under-appreciated by MAP-CI. Discussions with the participants indicated that they were initially willing to embrace the teachings of CLTS and take ownership of their sanitation conditions. However, the desire to accept the teachings of CLTS for these participants did not necessarily translate into an understanding that the behavior modification process they were undertaking was meant to benefit their own health rather than to appease non-community members.

During our discussion with participants in Koboko 2, they mentioned a desire to attain the same social status as ODF villages near them, and even listed action steps they were going to implement the week after the FGD. Three weeks after the FGD, UNICEF and MAP conducted a joint monitoring of the village and witnessed that none of the action plans had been initiated. The case of Koboko 2 demonstrates that while social status can be

leveraged to encourage latrine ownership, evoking it alone will not impact behavior change.

For all these villages, the catalyst for ending open defecation was acknowledging that although the practice of open defecation was a habit acquired from their forefathers, now that they were aware of its health implications, they had a responsibility to act upon that knowledge. Being aware that open defecation can result in fecal-to-oral transmission in food and water was not persuasive enough for some members of the village. Instead, witnessing neighbors and friends build their latrines inspired them to start on their own construction. These late latrine builders were initially hesitant about the benefits of latrines, but seeing close acquaintances build and use them encouraged them to reassess their own reluctance. Repeatedly, when we asked the participants to explain their swift change of heart toward latrine acceptance, one male participant in Goly told us that if his friends and a majority of the village were willing to take the time to build latrines, it signaled to him that latrines were something important and worth investing in.

CLTS implementation

In our IDIs with CLTS facilitators, we asked them to describe how they select villages where CLTS will be implemented. They are initially provided with a list of villages by MAP-CI that were never triggered and have a documented history of open defecation. Other OD villages are added to the list based on the facilitators' travels around the area and discussion with the local population. It is then their responsibility as facilitators to visit the village, talk to the village chief and leaders about latrine usage in the community, and observe any evidence of open defecation. The facilitators mentioned that during their

conversation with the chief, they ask about community tension to establish if community members would be willing to assist each other with latrine construction. If, based on their discussions and observations, they notice that latrine usage is not at 100%, they request permission from the chief to talk to all members of the community about latrines. During this initial meeting, they never disclose that they are going to trigger the village for CLTS: it is supposed to be a big reveal on the day of implementation. Besides walking around the village and engaging with community leaders, the facilitators do not conduct any additional pre-assessments such as relative wealth of community members, social inequality, or any perceived problems with the physical environment (as witnessed in Koboko 2 and Temogoisse).

When we asked the facilitators how communities can overcome barriers like financial hardship or environmental factors (rocky grounds) to construct latrines, they stated that these obstacles could be resolved through village leadership and community cohesion. If the chief is committed to establishing an open defecation-free village, and he commands authority and respect from the community members, then he can leverage that power to encourage members to build latrines. Additionally, if there is no tension in the community, members of the village will provide assistance to fellow residents who are struggling with latrine constructions. The facilitators did acknowledge that people endure circumstances that make it harder for them to construct latrines. However, individually, they all stated that if the person is committed to building the latrines and ending the practice of open defecation despite any hardship, they will find a way.

When we discussed the process of triggering villages and what that entailed, all three facilitators described the the same set of activities. They employed activities such as

the ‘walk of disgust’ around the village, a sandwich next to human excreta as described by FGDs participants, and mapping open defecation areas around the village. These are the standard activities they use based on a week-long training they received on CLTS implementation and their technique rarely varies despite the diversity of villages they trigger. The last activity during triggering is to ask the members of the community if they agree to end the practice of open defecation by building latrines and when they expect all members of the community to complete their latrine. Though the villages are informed they are free to declare a timeframe, the facilitators inform them it cannot exceed four months from the time they were triggered. Based on the timeframe, the facilitators said they monitor the progress of latrine construction in the village, based on their availability, until the deadline. According to them, if they notice that the village has made little to no progress, they discuss with village leaders to understand the slow progress and how the community leadership can address it. The facilitators discussed that while the community can declare themselves ODF, MAP-CI does not recognize that status unless an official evaluation is conducted by MAP-CI staff, including the facilitator and members from the local prefecture office. Upon completion of the evaluation, the facilitator is no longer responsible for the monitoring the open defecation status of the village: the responsibility falls upon the CLTS committee that is established by the village and a CLTS committee at the prefecture office. According to the facilitators, they also have no obligation to monitor villages that do not reach their ODF status by their declared deadline.

Though they previously mentioned that commitment to ending open defecation practices would allow people to overcome obstacles, when asked about potential improvement they would like to see with CLTS, all the facilitators stated that they wished

CLTS would provide subsidies for community members to build latrines, especially women. They acknowledged that they inform communities about various methods for latrine construction, but they realized that some people are not physically or financially capable of building their latrines. Despite the appearance of community cohesion, they stated that community members are not always willing to assist their fellow neighbors. The facilitators believed that providing financial assistance would increase latrine construction and usage.

IV. Discussion and Conclusion

We explored contextual factors described by participants in villages that had maintained their open defecation-free status, those that had reverted back to open defecation, and villages that were never able to obtain open defecation-free status after CLTS implementation. In our discussion of the villages' success in obtaining ODF status, we examine their progress along the stages of change, a behavioral framework incorporated in CLTS (Prochaska & DiClemente, 1992). The villages of Allaladougou, Goly, Fodja, and Djadoubango had gone through the stages of pre-contemplation, contemplation, preparation, action, and had reached the final stage of maintenance by sustaining their open defecation-free status. Our findings among some of the participants in Allaladougou, Goly, Fodja, and Djadoubango reflect a desire and implicit social pressure to reach or maintain the same social status as others around them, and in these villages the new status symbol was a latrine. These findings are similar to those of Jenkins et al. (2005) in their study in Benin.

Members of open defecation-free villages were not the only ones that wanted to obtain the same social status as their neighbors: some in open defecation villages also

desired to attain their neighbors' status or the social status of villages that were declared open defecation free. CLTS had been implemented in the villages of Koboko 2, Temogossie, Bakotia, and Seinguissigo a year before the FGDs were conducted, yet they were unable to obtain ODF status. Some households in the villages were able to construct their latrines, but the majority of households had either declared an intent to build latrines or had taken some steps in that direction by digging holes, but never progressed past this stage. While the opportunity and motivation existed for the villages to end the practice of open defecation, they were usually lacking the ability in the form of access to resources (money, tools) and additional time that could enable them to complete the stages. Furthermore, participants would encounter environmental determinants (rocky or sandy grounds) while digging that prevented them from constructing their latrines. Our findings in this regard were similar to Devine's (2009) analysis of SaniFOAM as a behavioral model for sanitation programs, and how factors along the path to behavior change can momentarily or permanently hinder progress. Although the participants also cited financial constraints as barriers to completing their latrines, without the proper equipment and the knowledge to operate the tools, the participants in villages with either rocky or sandy grounds will have a harder time completing the process of abandoning the practice of open defecation

As the stages of change framework is a circular model, individuals can easily revert back to the initial phases, as witnessed by the participants in the villages of Kondidouo and Tefro. At one point considered model open defecation-free villages, these villages reverted back to the practice of open defecation. Regression to open defecation practices in CLTS villages has been attributed to lack of consistent monitoring and evaluation (Movik & Mehta, 2010). However, as the participants of Kondidouo and Tefro, and CLTS facilitators

illustrate, the problem is not with sub-standard assessment: it resides instead in participants' lack of conviction that ending open defecation is personally beneficial to them rather than solely to outside authorities. Based on our findings in villages like Tefro, Koboko 2, and Bakotia, we could not truly ascertain if the initial enthusiasm for CLTS and latrine usage still lingered. If these villages have lost their desire to build latrines as Movik and Mehta (2010) suggest occurs once facilitators start to disengage from the community, it is impossible to determine if they will ever achieve open defecation-free status or remain in their current status.

The participants in all the villages, regardless of their stage of change, mentioned that they only defecate or used to defecate in the open bushes and fields around the villages but never within the village itself. There is an inherent appreciation and desire for cleanliness within the village that does not apply to the surrounding areas. Another factor that accounts for failure to attain ODF status is not living in close proximity to their excreta. The villages are able to momentarily disregard the practice of open defecation because they were not openly confronted by it and have a decreased risk of exposure to fecal-oral transmission. Jenkins et al. (2015) found evidence that those who practice open defecation were more willing to build and use latrines once they ran out of space to defecate in the open. While our participants never discussed action plans if they should run out of space for open defecation, the possibility of encountering their excreta closer to their village might be a motivating factor in the participants' return to latrine usage.

For the participants in the Zanzan district, discussion about the cultural context of open defecation confirmed findings of other studies conducted on the practice as a behavior that has been normalized in the community (Banda et al., 2007; Coffey et al.,

2014; Jenkins et al., 2005). Although one male participant in particular has always enjoyed the fresh air he encounters when defecating in the open, the female participants were always embarrassed by the practice and desired privacy accorded to them through the use of latrines. In addition to the female participants, the male participants in ODF villages cited privacy as a reason they would not return to practicing open defecation. This sentiment was similar to one expressed by respondents in Orissa, India who listed privacy as a motivating factor to build and use latrines (Pattanayak et al., 2009).

Limitations

This study is not without limitations. The participants were a convenience sample recruited by gatekeepers and their views may not be representative of those of the village population as a whole. Although using a gatekeeper facilitated the recruiting process, it could have also restricted the type of participants that were recruited. Due to their status as CLTS enforcers, gatekeepers might have recruited participants that were not as critical of CLTS or forthcoming about open defecation practices in villages that were not ODF. Additionally, the association with MAP-CI might have created an unequal power dynamic, where participants were hesitant to openly express their thoughts for fear that it would be perceived as incorrect by a person of authority. Prior to the start of each interview, the participants were informed that I was a student conducting research on the CLTS projects conducted by MAP-CI but I was not employed by MAP-CI. However, due to logistical constraints, one MAP-CI employee, conducted four FDGs and his affiliation with MAP-CI was disclosed to the participants before the start of the interviews. The use of a translator in some interviews might have reduced the depth and breadth of some of the participants'

responses. Demographic surveys regarding household latrine usage and maintenance were restricted to those who participated in the FGDs. Given that these were farming villages where all members of the village would spend the majority of their day on the farms, the survey data may be subject to certain biases. All FGDs and demographics surveys were conducted in the morning. Based on discussion with village leaders and the gatekeepers, all the villages had a preference for weekday morning interviews, which would allow them some time in the afternoon to work in their farms and rest in the evening upon their return. As a consequence of convenience sampling and small sample size, the results from the surveys may not be representative of each village and also cannot be extrapolated to other villages. A confounding factor for comparison across village types was present in the differing length of time that had elapsed since CLTS implementation in villages that had reverted to open defecation status versus those that were either open defecation free or currently openly defecating. The IDIs with the facilitators were also based on convenience sampling, and none of the facilitators that had implemented CLTS in the FGD villages were available during the study. They were either no longer employed by MAP-CI or were implementing CLTS in other villages. Despite the study's limitations, the findings illustrate that for the communities in the Zanzan district of Côte d'Ivoire, adherence to a sanitation behavior change program like CLTS can be influenced by multifaceted factors like the perceived benefits of open defecation cessation, perceived social status, economic challenges, and the physical and natural environment.

V. Recommendations

Further studies should be conducted analyzing the influence of contextual factors on the practice of open defecation and the community's ability to adhere to the principles of CLTS post implementation. Conducting follow-up studies in the villages would enable researchers to examine the lasting impact of CLTS, especially among the open defecation-free villages. For example, the open defecation-free villages that participated in our study had attained their status a year before the study was conducted and had yet to experience any problems with their latrines unlike villages that reversed status. The study should also include villages in other districts of Côte d'Ivoire to examine if location and ethnicity influence achievement or maintenance of ODF status. Furthermore, the survey should be expanded to include questions about distance from latrines, types of latrines, wall and roofing material for latrines, satisfaction with current defecation location, functionality of latrines, and perceived advantage and disadvantages of latrine use. Expanding the survey questions would allow researchers to comprehensively explore the attitudes and practices around latrine usage.

The findings of our study demonstrate that the abandonment or continued practice of open defecation after CLTS triggering is contingent upon a range of factors. We believe contextual factors should be adequately assessed prior to triggering. Discussion with village leaders and observation of the presence of human feces or latrines in the village should not be the only predictor of a village's ability to adopt CLTS teachings. An organization should assess household socio-economic status, attitudes about open defecation, community's prior exposure to sanitation programs, and social inequality in the village, which may be exacerbated by the shaming techniques used in CLTS. Furthermore,

facilitators should discuss the ground composition with members of villages to determine if the natural environment would allow communities to build latrines without the use of cement. If organizations and projects such as MAP-CI and PADEHA are committed to adhering to CLTS principles and not provide subsidies to villages, they should go beyond current observations of latrines and human excreta and adequately assess which villages are capable of building latrines. Based on our findings, we recommend organizations not use CLTS as their only means of ending open defecation. Despite a willingness to end this practice, some village are not capable of doing so if the only resource they are provided with is CLTS teachings, as a result of structural and environmental barriers that are disregarded in CLTS.

In conclusion, the participants' insightful discussion provided valuable perspectives into the contextual factors that influence open defecation and the potential sustainability of CLTS effects in the Zanzan district of Côte d'Ivoire. We learned that financial hardship and not understanding the rationale for behavior change can obstruct the cessation of open defecation practices, and that a community's willingness to take full ownership of their open defecation through communal support and bylaws can enhance sustained behavior change. However, we feel that further research is needed to fully comprehend the capacity of CLTS to catalyze and sustain behavioral modifications around open defecation in light of individual and community level determinants, including: understanding of the relationship between open defecation and diseases; inability to construct latrines based on the availability of building materials; challenges posed by the physical environment; and a personal preference for open defecation despite the availability of latrines.

VI. References

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