



Testing CLTS Approaches for Scalability

Systematic Literature Review

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Acronyms and Abbreviations

BMGF Bill and Melinda Gates Foundation

CATS Community Approaches to Total Sanitation

CLTS Community-led Total Sanitation

IDS Institute of Development Studies (University of Brighton, UK)

ODF Open Defecation-free

PHAST Participatory Hygiene and Sanitation Transformation

SSHE School Sanitation and Hygiene Education

SLTS School-led Total Sanitation

TCAS Testing CLTS Approaches for Scalability

UNC University of North Carolina

UNICEF United Nations Children's Fund

WEDC Water Engineering and Development Centre (University of Loughbrough, UK)

WHO World Health Organization

WSP Water and Sanitation Program (of the World Bank)

1. Executive Summary

This report presents findings from a systematic literature review conducted by The Water Institute at UNC as part of the Plan International USA project: “Testing Community-led Total Sanitation (CLTS) Approaches for Scalability” (TCAS). The report is a result of a sub-agreement to UNC from Plan International USA, the recipient of a grant from the Bill and Melinda Gates Foundation (BMGF). Despite widespread implementation of CLTS and many claims of success, no systematic review has been carried out on the effectiveness and impact of CLTS programs. The two objectives of this systematic review were to characterize the breadth of peer-reviewed and grey literature on CLTS, and to describe available evidence on the impact of key internal actors—natural leaders, teachers, and local government—on sanitation and hygiene outcomes.

Peer-reviewed studies are generally published in scientific journals and reviewed by a group of experts in the field prior to publication. Grey literature is defined as documents not found in peer-reviewed publications, with less control over the quality of publication. In general, results from peer-reviewed studies tend to be interpreted as rigorous evidence, while it may be more difficult to ascertain the validity of findings from grey literature. However, grey literature tends to be more extensive and is accessed more frequently by practitioners, making it an important addition to a systematic review (Higgins et al. 2009).

Part 1 of this report focuses on methods and findings of the peer-reviewed literature review, and Part 2 describes methods and findings from the review of grey literature. Seventeen peer-reviewed studies were selected from a search of six online scientific databases, and 115 grey literature documents were selected from searches of websites of eleven organizations working on CLTS.

The grey literature on CLTS was more extensive than peer-reviewed literature. While peer reviewed studies focused on the impact of sanitation and hygiene interventions, grey literature focused on processes, such as triggering and the role of key actors in implementation. Documents in the grey literature expressed the need for rigorous and systematic evaluation of CLTS, which was confirmed by the absence of such studies in the scientific literature. Most peer-reviewed studies identified in this review, except for Pattanayak et al. (2009) and Huda et al. (2009), did not utilize methods that permitted impact evaluation, yet they still drew conclusions about the impact of their interventions on sanitation and hygiene. The grey literature also reported conclusions about the outcomes of CLTS programs that were not always appropriate given the basic monitoring data used to draw these conclusions. Examples from the grey literature instead highlighted case studies of CLTS successes and, in a few cases, examples of CLTS failures, primarily measured by the number of communities triggered and declared ODF. Anecdotal qualitative findings featured community-reported improvements in their physical environment, household standing, and health outcomes.

CLTS practitioners may be more likely to refer to grey literature than to scientific literature for two reasons: a) grey literature focuses on processes and implementation, and b) grey literature is easy and free to access compared to paid scientific journals. In this manner, grey literature has the potential to be

an important decision-making tool for CLTS practitioners—from local facilitators to policy makers to donors. In future work, it would therefore be important to develop a metric to progressively assess the quality of CLTS grey literature to better gauge the rigor and generalizability of this material.

The following conclusions emerged from the peer-reviewed literature (Part 1):

- There are few scientific studies addressing the impact of either CLTS or key internal actors on sanitation and hygiene outcomes.
- Two methodologically rigorous studies showed a significant increase in latrine ownership and use from total sanitation and hygiene education interventions. However, a broader range of social impact indicators must be considered to evaluate the impact of CLTS, such as change in social standing, cleanliness, and the effect of behavior change techniques.
- Children can be effective behavior change agents and natural leaders for improving their peers' hygiene and sanitation behavior in the school environment. The implication for investigators in the Ghana TCAS study is to analyze which subsets of the population are influenced by different types of natural leaders to understand dynamics of behavior change through CLTS.
- Teachers can be important agents to accelerate the progress of school sanitation activities, validating the TCAS study design in Ethiopia.
- One study on the role of local government actors in sanitation provision highlights the potential for using qualitative research methods in guiding the training assessment of local government actors in the TCAS study in Kenya.

The following conclusions were found consistently across the grey literature (Part 2):

- The absence of external peer review in the grey literature indicates the need for a quality assessment framework, which would allow the CLTS practitioner community to progress through a continuum of increasing rigor in the strength of findings found in grey literature.
- The importance of structured monitoring and evaluation mechanisms, especially to sustain behavior change and the scale-up of CLTS activities, was emphasized in most documents.
- Structured follow-up activities following triggering were reported to have helped communities eliminate open defecation. Follow-up visits by outsiders were considered to be effective motivators for community members to stop open defecation.
- A harmonized approach between international, national, and local organizations, framed by a national CLTS strategy, was reported as important to scale-up CLTS in any given country.
- The effect of behavioral techniques used during the triggering process on sustained behavior change was not explored by CLTS agencies.
- Key actors of interest in the TCAS study—natural leaders, teachers and schools, and local government actors—were all referenced as important players in CLTS implementation across the grey literature, but no evaluations were found of their role in achieving CLTS outcomes.

Both peer-reviewed and grey literature will influence the types of indicators included in different parts of the TCAS study. This study also addresses knowledge gaps common to both sets of literature by looking at various stages of CLTS, from inputs and processes to outputs and outcomes, in a more systematic and rigorous manner than the existing body of evidence.

The findings presented in this report demonstrate the value of evaluating both peer-reviewed and grey literature to understand the breadth and nature of presently available evidence on CLTS. The review also consolidated the future research and evaluation needs expressed by the CLTS practitioner community, which is of importance to funding agencies, other practitioners, researchers, and governments.

2. Introduction

2.1 Community-Led Total Sanitation

Community-led total sanitation (CLTS), an approach that emerged in 2000 in Bangladesh, focuses on eradicating open defecation by generating change in sanitation behavior at a community-wide level and stimulating demand for latrines. CLTS has grown in popularity in the past decade and has been adopted by many countries across South Asia, Latin America, and the African continent. Governments are looking to scale-up CLTS activities to achieve improvements in their countries' sanitation situation.

2.2 Testing CLTS Approaches for Scalability

The "Testing CLTS Approaches for Scalability" (TCAS) study, funded by the Bill and Melinda Gates Foundation (BMGF), aims to improve the cost-effectiveness and scalability of certain CLTS innovations, focusing on three African countries where Plan International is implementing CLTS programs: Ghana, Kenya, and Ethiopia. The project will collect, evaluate, and disseminate practical lessons learned about overcoming common challenges to implementing CLTS at scale. The study aims to test identified strategies that can enhance the roles of internal actors, including facilitators, communities, and the government, in various aspects of CLTS implementation.

2.3 Systematic Review

This is the first systematic review on the effectiveness and impact of CLTS programs and aims to inform the TCAS study on existing best practices in CLTS and the role of internal actors in sanitation and hygiene interventions. Dissemination of findings from this review will also inform the broader evidence base on sanitation and hygiene interventions in order to scale-up appropriate and effective interventions. This report consists of two parts: Part 1 focuses on methods and findings of the peer-reviewed literature review and Part 2 describes methods and findings from the review of grey literature.

3. Objectives and Research Questions

The two primary objectives of this systematic literature review are to:

1. Characterize the breadth of peer-reviewed scientific and grey literature focusing on CLTS.
2. Describe available evidence on the impact of key internal actors on sanitation and hygiene.

3.1 Research Questions

The four main questions guiding the review are:

1. What does the evidence show regarding the success or failure of CLTS?
2. Does an intervention that focuses on natural leaders have an impact on sanitation and hygiene outcomes, and if so what is the nature and magnitude of this impact?
3. Does an intervention that focuses on teachers and schools have an impact on sanitation and hygiene outcomes, and if so what is the nature and magnitude of this impact?
4. Does an intervention that focuses on district/local government actors have an impact on sanitation and hygiene outcomes, and if so what is the nature and magnitude of this impact?

3.2 Definitions

The CLTS approach follows a process of pre-triggering, triggering, and post-triggering. Pre-triggering is the introduction and rapport building period prior to introducing CLTS in a community. Triggering consists of a variety of activities that stimulate a community-level sense of disgust about open defecation, inciting a community to change its sanitation situation. Post-triggering efforts relate to follow-up activities by CLTS facilitators to ensure that a community follows through on eradicating open defecation (Kar et al. 2008).

“Natural leaders” or spontaneous leaders are those who “emerge and take the lead during CLTS processes” (Kar et al. 2008). These people do not have to be elected leaders or village chiefs. They can include, for example, religious leaders and school-going children, or specifically focus on female members of the community. We define “district/local government actors” as those who are hired by the government, including district and local medical or health officers, administrative officials, and community health workers.

Peer-reviewed studies are generally published in scientific journals and reviewed by a group of experts in the field prior to publication. Grey literature is defined as documents not found in peer-reviewed publications, with less control over the quality of publication. Results from peer-reviewed studies are generally interpreted as rigorous evidence, while it is more difficult to ascertain the quality of findings from grey literature (Higgins et al. 2009).

For peer-reviewed literature (Part 1), we included CLTS interventions and also explored similar interventions, namely those that are demand-driven, participatory, or aim for eradication of open defecation. For grey literature (Part 2), we focused only on CLTS interventions. Documents on approaches such as UNICEF’s Community Approaches to Total Sanitation (CATS) and India’s Total

Sanitation Campaign (TSC) were included only if they referred to CLTS. Sanitation marketing is an emerging approach which is starting to be added on to CLTS activities as a “post-trigger” or appears on its own in pilot studies. We only included documents on sanitation marketing that also mentioned CLTS.

Note on grey literature:

While the systematic review of grey literature is not exhaustive, we believe it is illustrative of the larger body of CLTS grey literature and captures the key findings relevant to future CLTS work and the TCAS study. Section 5.1 discusses the methods used to search and select grey literature for this review.

4. Part 1 – Systematic Review of Peer-reviewed Scientific Literature

4.1 Methods

Search Strategy

The methodology for this review is broadly informed by the four-step process detailed by Moher et al. (2009). We selected six large online databases listed in Table 1. The databases were selected after reviews of other peer-reviewed published systematic reviews on water, sanitation, and hygiene and consultations with sector experts.

Table 1. Databases used for review of peer-reviewed scientific literature

Database	Subject of Database
Cochrane Library	Database of systematic reviews
Embase	Biomedicine and pharmacology (includes Medline)
Global Health	International public health database
Web of Science	Sciences, social sciences and humanities
Science Direct	Scientific, technical and medical literature
PubMed	Biomedical literature (includes Medline)

The detailed search strategy can be found in Appendix 1 for all four questions. Given the broad scope of the four questions, a multifaceted search strategy was used that included a combination of key words (including American and British spellings) relating to:

- Main subject matter: CLTS, internal actors, teachers and schools, local government
- Key aspects of the main subject matter congruent to the main theme: sanitation, hygiene, demand-led, participatory sanitation, participatory hygiene, participatory approaches, total sanitation, behavioral intervention, behavior change, social marketing, defecation, open defecation, defecation free, demand creation, community leaders, tribal leaders, elected leaders, natural leaders, social cohesion, community dynamics, teachers, educators, head masters, schools, students, institutional champion, district officials, regional officials, provincial officials, local government, *E. coli*, trachoma, cholera)

Screening Process

Figure 1 describes the screening process used for this review. For primary screening, two researchers reviewed titles of all records identified through the six databases. Abstracts were reviewed if the title did not clearly indicate relevance of the article to the systematic review.

The secondary screening involved reviewing the abstracts passing primary screening for relevance to one or more of the four questions based on inclusion/exclusion criteria. Articles passing secondary screening went through a full text review by one researcher to arrive at the final list of articles for the four questions. References from the final articles were also reviewed for additional results.

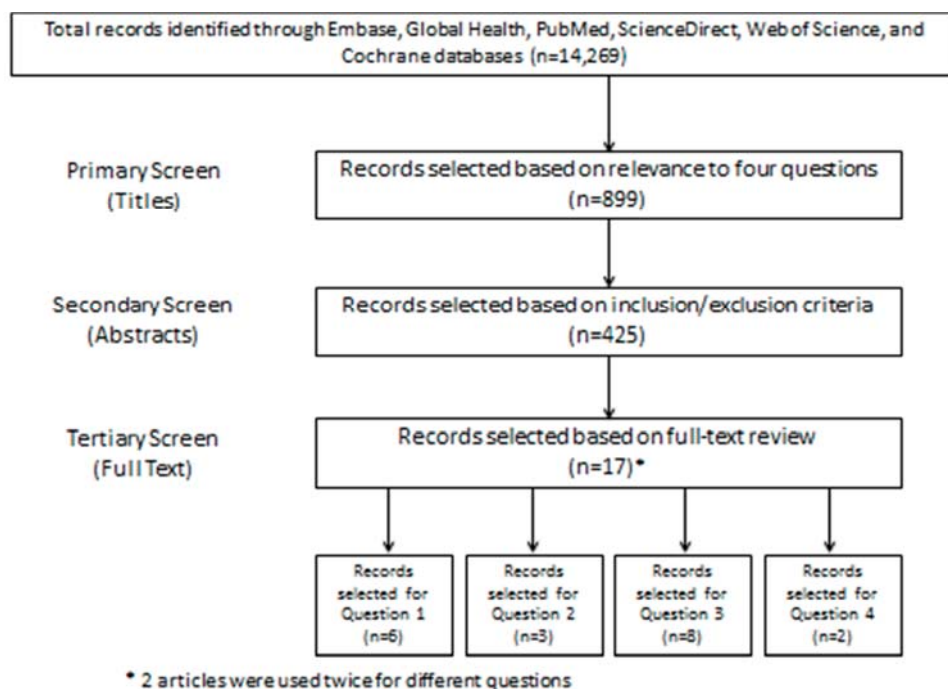


Figure 1. Screening process for peer-reviewed scientific literature.

Inclusion and Exclusion Criteria

For Question 1 on CLTS impact, articles were included if they reported a formal research design and pertained to CLTS or community-led sanitation approaches, including India’s Total Sanitation Campaign (TSC), Zimbabwe’s Community Health Clubs (CHCs), and Indonesia’s Community-based Sanitation (CBS) system. For Questions 2 through 4, we used broader inclusion criteria, and included articles that reported and described their study methodology and used a specified set of indicators for success. In addition, for Question 2 on natural leaders, articles had to pertain to the role of any community leaders in sanitation and hygiene interventions. For Question 3 on teachers and schools, articles were included if they pertained to the role of educators in sanitation and hygiene. School sanitation interventions have been popular for many decades and were likely to result in a large number of articles; a systematic review by The Water Institute (Jasper et al. 2012) on the impact of water and sanitation in schools on health and educational outcomes was also recently published. This systematic review is attached in Appendix 5 for reference. In this report, we have only focused on articles that specify interventions with teachers or other educators. For Question 4 on local government actors, articles were included if they pertained to the role of local and district government workers in sanitation and hygiene interventions. These workers included community health workers, volunteers paid by the government, and medical and sanitation officers.

We did not place a limit on the years in which articles were published. Because the focus of the review was on impact or effect of sanitation and hygiene interventions, the following types of articles were excluded: articles that addressed only on water-related interventions, purely descriptive studies, and studies that did not pertain to humans. The final set of articles that passed the full-text screening process was reviewed qualitatively for each of the four questions.

4.2 Results

Description of Literature

Seventeen studies were selected for review. These studies are summarized in

Table 2 by location, study design, sampling method, setting, and focus. Only two articles, one of which was a commentary on CLTS, explicitly mentioned CLTS. The remaining articles were included for insight into interventions similar to CLTS or the role of the internal actors described earlier.

CLTS or similar interventions

Six studies met the inclusion criteria of having a formal study design and covering CLTS-related interventions, although only one study by Whaley et al. (2011) explicitly assessed CLTS and compared it to Community Health Clubs (CHCs) in Zimbabwe. Another study by Bartram et al. 2012 was included for its commentary specific to CLTS, although it was not a research study.

The non-CLTS studies selected were the following:

- Pattanayak et al. (2009) evaluated India's Total Sanitation Campaign (TSC)'s subsidy approach with a shaming approach.
- Roma et al. (2010) assessed community-based sanitation (CBS) in Indonesia.
- Waterkeyn et al. (2005) describes the impact of CHCs in Zimbabwe.
- Huda et al. (2012) assessed a slightly different sanitation, hygiene, and water improvement project in Bangladesh (SHEWA-B) that focused on community participation.

Finally, one study by Whittington et al. (2012) compared costs and benefits of different water, sanitation, and health programs, including CLTS and India's TSC.

The studies are not comparable as they assessed different interventions and used a mix of quantitative and qualitative techniques. A description of each study is provided to place their findings in context, followed by relevant evidence.

Whaley et al. (2011) primarily used qualitative methodology to compare CLTS with CHCs in Zimbabwe. CHCs view the lack of sanitation as a "social and structural issue" and therefore tackle a variety of health issues in addition to sanitation and hygiene. The clubs operate for six months as a meeting point for members, culminating in a "model home competition" where members vote for households that show the best adoption of learned health behaviors. Three districts were evaluated in which a CHC intervention, CLTS intervention, or both were initiated; one district was surveyed six months after the intervention to assess "effectiveness," and the remaining two districts were surveyed two years after the intervention to assess "sustainability." Indicators covered participation by community members; latrine ownership, use and maintenance of latrines; absence of open defecation; and use of hand washing facilities. The study found that CLTS was more effective than CHCs in promoting latrine construction, but that CHCs improved adoption of hand washing more than CLTS interventions. They found "little resistance to the idea" of building latrines in the communities, but affordability was the key

obstacle. When comparing the approach of CLTS to CHCs, the study found that people were “more prone to accept the way in which CHCs operate by using what might be termed a ‘positive’ approach to changing behaviour, whereas the negative emotions elicited by CLTS tended to sit less comfortably with them” (Waterkeyn et al. 2005). Broad applicability of the study’s findings is limited due to multiple factors: the study was cross-sectional, sampling was not randomized, and different households and districts were surveyed for the six-month and two-year follow-ups, respectively. Furthermore, findings were sometimes inconsistent and were not clarified by the authors. For example, in the two districts evaluated two years after the intervention, 95% of households did not practice open defecation but no latrines were apparently in use (Whaley et al. 2011). Therefore, quantitative data from the study should not be generalized but rather used as a suggestive measure of change. Qualitative findings from this study can be useful to understand some key challenges and successes of CLTS in these two districts in Zimbabwe (Whaley et al. 2011).

Pattanayak et al. (2009) evaluated the impact of a modified total sanitation campaign (TSC) on latrine adoption and use in a coastal district of Orissa, India. The intervention used a combination of information, education, and communication (IEC) activities and CLTS-related tools such as shaming to trigger change, as well as latrine construction with and without subsidies. Using a cluster-randomized study design, data were collected at baseline and immediately following the intervention. Treatment and control communities were assessed for latrine ownership and latrine use as the primary outcome indicators (Pattanayak et al. 2009). The study found that following the TSC intervention in India, latrine ownership was 19% higher in treatment villages than in control villages. Separating the treatment effect by the different strategies used, namely subsidies and information, education, and communication (IEC) activities, the study found that IEC was responsible for two-thirds of the treatment effect. Authors concluded that an intensive educational campaign had a “substantial and statistically significant effect on latrine adoption and use” (Pattanayak et al. 2009). This well-designed cluster-randomized trial has already been used to inform the study design of the TCAS Study in all three countries.

Roma et al. (2010) used a multiple case study, mixed-methods approach to explore the role of community participation in Indonesia’s community-based sanitation program (CBS). While not analogous to CLTS, Roma describes the Indonesian government’s program as a demand-responsive approach, where communities participate in the planning of activities, training, and management of financial and operational responsibilities. As with India’s TSC, the CBS system provides government subsidies, and expects recipients to provide a small portion of total investment costs in cash and kind. Roma used eight indicators, five of which are described as quantitative “receptivity indicators” to measure correlation between community involvement and acceptance of sanitation. Qualitative findings from the study indicated that participatory approaches by sanitation providers were successful in empowering residents of the communities and increasing their acceptance of the selected sanitation system. More than half of the nine case study communities felt a strong sense of inclusiveness in the management of the system, and almost all communities felt a strong sense of responsibility for maintenance of the system.

Waterkeyn et al. evaluated the effectiveness of CHCs in Zimbabwe between 2000 and 2001 using qualitative and quantitative methods. The study compared villages in two districts with CHCs with a matched control group of villages and used 20 hygiene indicators, five of which related to latrines and defecation practices. They found that two years after the implementation of CHCs, latrine coverage (built in the previous one year) in one district rose to 42% compared to 2% in its matched control area, and in the other treatment district, latrine coverage rose to 36% compared to 4% in the control area. They found that those without latrines practiced “can sanitation,” and dug a hole before defecation to bury their feces instead of practicing open defecation.

Huda et al. (2012) described findings from an 18-month evaluation of a large-scale water supply, sanitation and hygiene project in Bangladesh (SHEWA-B), which focused on engaging local residents to develop their own community action plans. These plans included targets for improved hygiene practices and latrine coverage and usage. Community hygiene promoters were trained to disseminate eleven key messages and encourage community participation. A case-control design was used to evaluate changes in outcome indicators from baseline to 18 months. The study found that most behavior change indicators were not significantly affected by the community participation-based intervention. There was no significant decrease in diarrheal illness, and no significant improvement in hand washing after defecation or before food. Cleanliness of latrines, appropriate disposal of child feces, and drinking water indicators saw improvements, but could not be attributed to the intervention. However, the study did find a significant decrease in people without access to a latrine (from 10% at baseline to 6.8% after 18 months) as well as a significant improvement in frequency of washing both hands with soap or ash after cleaning a child’s anus (from 22% at baseline to 36% after 18 months). The main focus of the intervention was to promote hygiene through awareness and health education activities, and investigators suggested that this strategy was likely to be ineffective in their study setting.

Whittington et al. (2012) did not evaluate CLTS specifically, but rather conducted a cost-benefit analysis of six water, sanitation and health programs, one of which includes total sanitation campaigns that target open-defecation. This study has been included in the review to explore cost-related inputs that would be required to monitor CLTS interventions. The authors propose a list of costs and benefits that should be taken into account when evaluating total sanitation interventions, including: capital costs, which will vary considerably based on the technology in use; subsidies; awards and incentives that are given for achieving zero open defecation; and private costs such as time spent in community meetings and maintenance of latrines after construction.

The benefits they included may also be considered indicators for evaluating CLTS interventions, such as improvements in health outcomes, convenience of use, time savings, privacy, and dignity. Their analysis found that total sanitation was the only intervention out of the six they included in their analysis that delivers “significant time savings,” namely the time saved in travel to another defecation site. Authors indicate that factors leading to “high sustained usage” of sanitation are still unclear and will depend on different contexts (Whittington et al. 2012).

Table 2. Characteristics of 17 studies included in review of peer-reviewed scientific literature

Study	Study Location	Study Design (as reported by study)	Sampling Method	Setting	Broad Focus Area	Specific Focus of Intervention
Whaley et al. (2011)	Zimbabwe	Quasi-experimental, cross-sectional	Purposive and random sampling	Rural	Community-based sanitation	CLTS and CHC interventions
Pattanayak et al. (2009)	India	Cluster-randomized trial	Simple random sampling	Rural	Community-based sanitation	Subsidy-driven and behavior change sanitation intervention (Total Sanitation Campaign)
Roma et al. (2010)	Indonesia	Multiple case study, cross-sectional	Purposive and random sampling	Urban/ Rural	Community-based sanitation	Participatory methods for community-based sanitation system
Huda et al. (2009)	Bangladesh	Intervention study	Simple random sampling	Rural	Health education for water, sanitation, hygiene	Participatory WaSH education intervention
Whittington et al. (2012)	World-Wide	Benefit-cost analysis	N/A	Urban/ Rural	Review	Costs and benefits of different health-related interventions
Waterkeyn et al. (2005)	Zimbabwe	Cross-sectional case control study	Purposive and random sampling	Rural	Community-based sanitation	CHC intervention
Ahmed et al. (1993)	Bangladesh	Longitudinal study	Purposive sampling	Rural	Health education for childhood diarrhea	Behavior change intervention
Lee et al. (1991)	Thailand	Quasi-experimental	Purposive and random sampling	Rural	Health education for childhood diarrhea	Community-based health education program
Onyango et al. (2005)	Kenya	Quasi-experimental	Purposive	Rural	Health education for hygiene	School children as health change agents
Jasper et al. (2012)	World-Wide	Systematic review	N/A	Urban/ Rural	Review	Water and sanitation interventions in schools

Blanton et al. (2010)	Kenya	Intervention study	Convenience sampling	Rural	Health education for water treatment and hygiene	Health education intervention
Lang (2012)	Ghana	Descriptive study	Purposive sampling	Urban	Health education for hand hygiene	Hand hygiene training/education intervention
Lansdown et al. (2002)	Tanzania	Intervention study	Simple random sampling	Rural	Health education for schistosomiasis and helminth infections	Behavior change intervention / training
Freudenthal et al. (2006)	Tanzania	Descriptive study	N/A	Rural	Health education for schistosomiasis prevention	Participatory action research for enabling environments for prevention of schistosomiasis
Magnussen et al. (2001)	Tanzania	Descriptive study	Purposive sampling	Rural	Health education and school-based chemotherapy for urinary schistosomiasis	Teacher-managed school programme to treat urinary schistosomiasis
Ulukanligil et al. (2006)	Turkey	Cluster-randomized trial	Stratified random sampling	Urban	Health education and school-based chemotherapy for helminth infections	Community perceptions on anthelmintics school-based program
Allison (2002)	South Africa	Multiple case study	Purposive sampling	Urban	Urban sanitation	Role of CBOs and local government on urban sanitation provision

A recent commentary by Bartram et al. 2012 questions the “social motivation approaches” used by CLTS, questioning “whether it is ever acceptable to prejudice the human rights of individuals in the interests of the common good.” Authors express concern with stigma and shaming techniques used in CLTS, reports of monetary benefits that people are otherwise entitled to being withheld because of open defecation, and reports of abuses to people’s right to justice. The paper emphasizes the need for systematic analysis of CLTS and other interventions that focus on community-level mobilization, potentially at the cost of individual rights

Natural leaders and sanitation/hygiene

The systematic searches did not find any studies evaluating the role of “natural leaders” as defined by CLTS guidelines (Kar et al. 2008). Nevertheless, three studies were included to explore the role of community-level leaders in sanitation and hygiene interventions. Two of the three studies pre-date the introduction of CLTS.

Although not explicitly stated as such, in one study set in Bangladesh (Ahmed et al., 1993), women were considered as a type of natural leader. This community-based intervention used direct participation of the target population to improve hygiene practices and reduce childhood diarrhea. Village leaders were used to help implement a “Clean Life” campaign, where volunteer mothers were chosen to teach other community mothers twice a week on hygiene practices. Effectiveness of the intervention was measured by level of understanding and level of adoption of behavior on sanitation, personal hygiene, and food hygiene, as well as incidence of diarrhea. The study found that involving primary members of the target group and opinion leaders was important for tailoring health messages to the population at risk. However, they did not monitor any participation-related indicators, and were therefore unable to empirically correlate the relationship between natural leaders and impact on hygiene and sanitation.

Lee et al. (1991) evaluated a six month health education intervention in southern Thailand using a quasi-experimental mixed-methods design. The intervention trained many groups that would now fit under the CLTS definition of a “natural leader”—Village Health Communicators (VHCs), Village Health Volunteers (VHVs), religious leaders, and village heads—on basic public health measures. Monthly meetings on health education messages were led by the local health officer and included these participants and village residents. The evaluation used focus group discussions, baseline and follow-up structured surveys, and diarrhea monitoring conducted by village teachers. Preventive behaviors that were measured included boiling water and hand washing. The program was evaluated partly by counting the number of home visits made by the VHVs and VHCs over the six-month period and attendance of mothers at monthly meetings (Lee et al. 1991). The study suggested that their intervention was successful in maintaining and improving effectiveness of certain types of preventive behavior that were already being practiced in the communities. According to the study, the percentage of mothers who were visited at home by the trained village health volunteers and communicators at least four times during the intervention increased by 72% in the intervention group and decreased by 21% in the control group. Incidence of diarrheal disease reduced by two-thirds in the intervention group and reduced by only one-third in the control group. However, limitations in study design prevent generalization of results.

Onyango et al. (2005) explored the potential of children as “health change agents” within school and home environments in rural Kenya, much like CLTS advocates for children to serve as natural leaders (Kar et al. 2008). The intervention involved training teachers, who then trained students in the fifth grade on health education messages surrounding malaria, diarrhea and hygiene. Using a quasi-experimental study design in two schools with purposive sampling techniques, surveys were conducted at baseline, four months, and 14 months to evaluate effectiveness of the program. Indicators included measures of knowledge, practices, and influence on recipient groups. The intervention saw significant improvement in knowledge of health behavior in all groups, from the teachers and student communicators to the student recipients and parents/family members. Behavioral changes were more prominent in children rather than in adults, with the greatest change occurring up until the four-month follow-up survey, after which point improvements were sustained till the 14-month follow up period. Hygiene practices in the school environment saw a marked improvement, especially with regard to cleanliness of latrines and implementation of hand-washing facilities outside latrines. However, water shortages remained an important problem in school settings. With regard to the home environment, the intervention did not have a significant impact on latrine construction; only five new latrines were built in 70 homes surveyed, and only four homes put pit lids on their latrines during follow-up. Latrine ownership remained at 49%, with some families beginning construction, but stopping early on because of lack of money or time. The study found that children were strong change agents overall, but more so among their peers than with adults.

Teachers and sanitation/hygiene

A recent systematic review from the Water Institute by Jasper et al. (2012) reviewed the literature on health and educational outcomes as a result of water and sanitation in schools. The review found a reported decrease in diarrheal and gastrointestinal diseases with increased access to adequate sanitation facilities in schools (Jasper et al. 2012). This report refers readers to the full publication (Appendix 5) for further reference. The focus in this section will be specifically on the impact of teachers on sanitation and hygiene interventions, which has yet to be studied. Seven studies were included as a result.

All seven studies focused on health education as the primary method of promoting behavior change in schools by training teachers, but three studies also trained students as part of the intervention (Onyango-Ouma et al. 2005; Blanton et al. 2010; Freudenthal et al. 2006). Four studies focused on schistosomiasis or helminth infections (Freudenthal et al. 2006; Lansdown et al. 2002; Magnussen et al. 2001; Ulukanligil et al. 2006), while the remaining three studies related to hand hygiene (Lang et al. 2012), hand washing (Blanton et al. 2010), and broader preventive hygiene and sanitation behaviors (Onyango-Ouma et al. 2005). Four studies contained purposive sampling (Onyango-Ouma et al. 2005; Blanton et al. 2010; Lang et al. 2012; Magnussen et al. 2001), either because they were evaluating recipients of specific trainings (Onyango-Ouma et al. 2005; Lang et al. 2012; Magnussen et al. 2001] or because of convenience (Blanton et al. 2010); therefore, findings from these cannot be generalized, but certain findings may be transferable to a broader context. Another study was descriptive (Freudenthal et al. 2006), while two studies used simple (Magnussen et al. 2001) and stratified random sampling (Ulukanligil et al. 2006).

Blanton et al. (2010) found that the water treatment and hygiene education intervention significantly increased households' knowledge of disinfectants, but not their use of disinfectants. They also observed a 15% increase in washing hands after using the toilet between baseline and the first follow-up, but this percentage dropped 5% at second follow-up a year later. Authors found that the main information source on water treatment cited by students and their caregivers was schools, suggesting an important role for teachers in the information sharing process. This study did not look specifically at sanitation, so its findings must be viewed outside this prism (Blanton et al. 2010).

Lang's (2012) hand hygiene intervention in Ghana began with low baseline indicators, but the study found that the intervention was successful in bringing running water, soap and towels to all schools during follow-up. The study also reported that teachers noticed improvement in their own hand hygiene practices and also noticed improvements in their students' behavior following the intervention (Freudenthal et al. 2006).

Lansdown et al.'s (2002) formative research found some improvement in knowledge and health-seeking behavior of students at the 12-month follow-up. More importantly, they discovered that health education activities increased after teachers trained in participatory approaches took charge of the intervention themselves (Lang et al. 2012). Onyango-Ouma et al. (2005) saw similar results and recommended that teachers be encouraged to try participatory approaches for health education. Although the main focus of their study was on children as change agents, they highlighted the importance of teachers in hygiene and sanitation interventions and concluded that more research is needed to understand the most appropriate methods for teachers to use to promote health. The study highlighted the important role of teachers in supporting and stimulating kids to become change agents.

The four studies on schistosomiasis or helminth infections all emphasized the importance of "highly committed" teachers in imparting hygiene education and changing behavior. Freudenthal et al. (2006) observed that once teachers took charge of sanitation activities such as surveys, they made more progress. In this study teachers were able to not only mobilize children but also the communities at large. Magnussen et al. (2001) found that coverage of latrines went from 68% to 80% five years after the intervention, and that the prevalence of disease-related indicators dropped significantly. Most schools did not have latrines at baseline, and at the end of the 5-year period all schools had at least two latrines. The study found that "with a minimum of training and support, school teachers were able to implement a schistosomiasis morbidity-control program" (Magnussen et al. 2001). Finally, Ulukanligil from Turkey reported parents' perceptions of teachers and found that most parents believe in the important role of teachers in their children's lives. They felt that since teachers spend so much time with their children, that their children would trust the teachers more to dispense medication than anyone else (Ulukanligil et al. 2006).

District/local governmental actors and sanitation/hygiene

The review did not find any studies focusing on district or local governmental actors to improve sanitation or hygiene outcomes. Two studies described below broadly explored the role of local government in sanitation provision or health education.

Allison et al. (2002) used a multiple case study approach to analyze the roles of local government and community-based organizations in sanitation provision in two urban neighborhoods in Cape Town, South Africa. The aim of the study was to understand factors that may promote or inhibit the roles of these two entities and to understand the relationship between rights and responsibilities (Allison 2002). A key problem that communities identified was a lack of communication from the local government, preventing the communities from making informed decisions about the type of sanitation system most appropriate for them. The author found that local government, therefore, had an important role to play as “information providers and facilitators” (Allison 2002). Allison highlights the importance of understanding the nuances of culture and race, as well as “behavioral patterns around the responsibility for sanitation provision.” The study found that it was favorable for communities to take the lead in implementing their own sanitation foundation, but that local government had to be involved for maintenance of systems. Therefore, buy-in was required from both the communities and local government actors to ensure successful adoption and maintenance of sanitation systems (Allison 2002).

Lee et al. (1991) has already been described earlier regarding for its use of women as natural leaders. The six-month health education intervention also used local health officers to lead monthly group meetings on hygiene behavior, but the study did not discuss the impact of using these local government actors. The most one can conclude from study findings is that involving multiple leaders from different parts of the community, including local governmental actors, contributed to a reduction in diarrheal disease over the course of six months. However, limitations in study design, and the lack of direct association between local government actors and outcome measures make it difficult to draw relevant conclusions.

4.3 Conclusions from Peer-reviewed Scientific Literature

This systematic review highlights the gaps in peer-reviewed published evidence surrounding CLTS interventions and the role of internal actors such as natural leaders, teachers, and local government. Most studies did not use methods that permitted impact evaluation, yet still made strong statements about the impact of their interventions on sanitation and/or hygiene. Conclusions in some studies were based on inappropriate data analysis given the reported study design and sampling frames. Results from most studies contribute to the understanding of interventions in their local contexts, but for the purpose of this systematic review, could not be extrapolated to sanitation and hygiene interventions in other contexts.

Nevertheless, five important conclusions emerged from the review:

- There are few rigorous studies that address
 1. the effectiveness of CLTS and related approaches; or
 2. the impact of internal actors, specifically natural leaders, teachers, and local government.
- Most studies used latrine ownership and use to evaluate outcomes. A broader range of outcome indicators must be considered to evaluate the impact of CLTS interventions such as change in

social standing, cleanliness, and both positive and adverse effects of behavior change techniques.

- More studies need to be conducted to determine the impact of school sanitation programs on health and educational outcomes.
- Children can be effective health change agents and natural leaders for improving hygiene and sanitation behavior of their peers in the school environment, while teachers can be important agents to accelerate the progress of school sanitation activities.
- Qualitative research methods can be important to guide training assessments of CLTS leaders.

One scientifically rigorous study showed a significant increase of 19% in latrine ownership and use attributable to the total sanitation campaign in India (Pattanayak et al. 2009). Another rigorous secondary analysis revealed significant time savings as a result of latrine construction from total sanitation campaigns (Whittington et al. 2012) world-wide. A commentary by Bartram et al. 2012 emphasized the need for systematic analysis of motivational techniques such as shaming and disgust, both to investigate and guide training of CLTS leaders, as well as to safeguard individuals from ethical violations.

Peer-reviewed academic evidence on the impact of “natural leaders,” other community leaders, and local/district governmental actors on sanitation and hygiene outcomes is sparse and of doubtful quality. Only one study had findings of relevance to the Ghana TCAS study on natural leaders, concluding that children can be effective health change agents and improve hygiene and sanitation behavior of their peers in the school environment, and to some extent their families (Onyango-Ouma et al. 2005). Analyzing the types of natural leaders in the Ghanaian context and which subsets of the population they influence the most can be a useful impact evaluation tool and help understand scalability of CLTS methods.

Evidence on school sanitation was more robust, but a systematic review on school water and sanitation interventions concluded that additional studies are still needed to examine the impact that these programs have on health and educational outcomes (Jasper et al. 2012). Available evidence on the role of teachers highlights their importance, but so far no study has attempted to attribute changes in sanitation or hygiene outcomes specifically to teacher inputs, further emphasizing the importance of the TCAS evaluation based in Ethiopia.

Finally, evidence on the impact of local governmental actors on sanitation and hygiene interventions is especially limited. Allison’s (2002) study suggests that local government employees—especially those responsible for sanitation maintenance—may also need to be triggered and convinced of the benefits of CLTS prior to their engagement with the community (Allison 2002), which is of direct relevance to the TCAS study based in Kenya. Training of these government actors must build on developing interest and buy-in from them as a primary step in the CLTS implementation process. This study also highlights the value of qualitative research methods to explore the role of local government in sanitation provision, and can be a useful methodology for the Kenya-based TCAS study, which is assessing the effect of training of local government actors on CLTS.

5. Part 2 – Systematic Review of Grey Literature

5.1 Methods

Search Strategy

Table 3 lists the 11 international organizations and sanitation knowledge hubs that were searched based on their involvement in CLTS projects or their ability to document grey literature on CLTS. The IDS Knowledge Hub on CLTS contained literature from multiple organizations in addition to the ones selected in this search and was therefore a comprehensive resource on CLTS grey literature. Search terms were limited to “community led total sanitation” and “CLTS” in light of the large number of available grey literature documents on the topic. Additional relevant articles not found in these searches were also recommended by experts in the field.

Table 3. Databases and websites used for review of grey literature

Organization/Database	URL
Bill and Melinda Gates Foundation (BMGF)	http://www.gatesfoundation.org/Pages/home.aspx
Plan International	http://plan-international.org/
Institute of Development Studies (IDS) – Univ. of Brighton, UK	http://www.communityledtotalsanitation.org
IRC International Water and Sanitation Centre	http://www.irc.nl/
SNV World	http://www.snvworld.org/
United Nations Children’s Fund (UNICEF)	http://www.wateraidamerica.org/
CARE	http://www.care.org/
WaterAid	http://www.unicef.org/
Water Engineering and Development Centre (WEDC) Knowledge Base – Univ. of Loughbrough, UK	https://wedc-knowledge.lboro.ac.uk/
Water and Sanitation Program of the World Bank (WSP)	http://www.wsp.org/
World Health Organization (WHO)	http://www.who.int/

Inclusion/Exclusion Criteria

We restricted our search to documents posted on these online databases or provided to us by experts prior to November 9, 2012. The primary inclusion criteria for this review were reports, field notes, and case studies on CLTS in English. Although manuals and guidebooks often represent an accumulation of experiences and evidence on a topic, they were excluded from this review as the focus here was on experiences from specific projects. PowerPoint presentations, conference proceedings, blogs, news articles, and press releases on websites were also excluded from this review to limit duplication of information from reports, field notes, and case studies. Documents not written in English were also excluded.

Documents pertaining to other community-based approaches similar to CLTS, including TSC and CATS were included if they also referred to CLTS. Multiple documents that referred to the same data sources (e.g., technical reports, learning notes, and research briefs from the same study or project) were included as separate sources, but results were only used once during analysis.

Screening Process

Two researchers reviewed titles of all records identified through the 11 databases. Records relevant to CLTS based on the inclusion and exclusion criteria were selected. Abstracts or full texts were reviewed if the relevance of the record could not be determined based on the title alone. The researchers performed a full-text review of selected documents using Atlas.ti, a qualitative data analysis program, for identification of major themes. Figure 2 details the screening process.

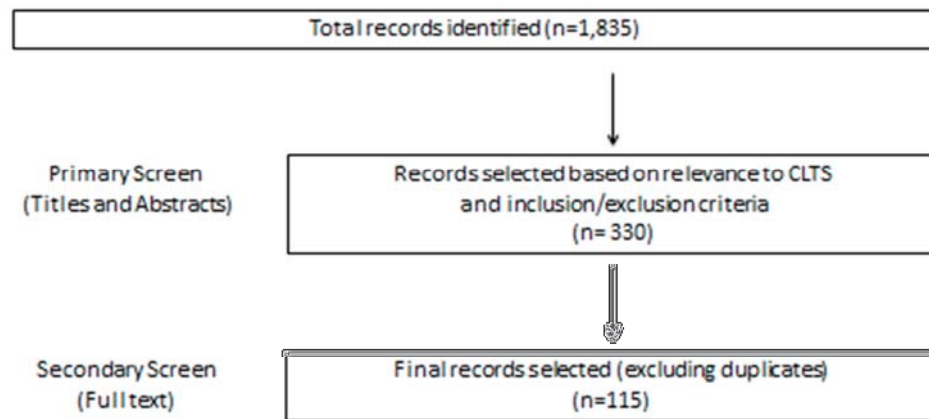


Figure 2. Screening process for grey literature

5.2 Results

Description of Grey Literature

A total of 115 documents were selected for review (refer to Appendix 3 for a full list of documents and references). All documents for which dates were known were published in 2005 or later, with almost half (45%) published between 2010 and 2012. The majority of documents were based in rural areas, while four documents discussed experiences with CLTS in urban areas (Sierra Leone, Ghana, Zambia, and India). Figure 3 shows the geographic distribution of the search; experiences from 32 countries were represented, almost entirely from Asia and Africa. 50 percent of documents were published in or by organizations based in the United States, United Kingdom, Canada, and Ireland, 8% in the Netherlands, 23% in Africa, 18% in Asia, and one document each from Australia and Papua New Guinea.

Table 4 presents the number of documents by organization (or grouping) and type of document. The majority of results were technical reports, followed by case studies and learning notes or briefs. Twenty-percent of documents were either produced by IDS or posted on their CLTS Knowledge Base (www.communityledtotalsanitation.org) without another organizational affiliation. Plan International, WaterAid, IDS, UNICEF, and WSP were responsible for two thirds (66%) of all grey literature found through this review.

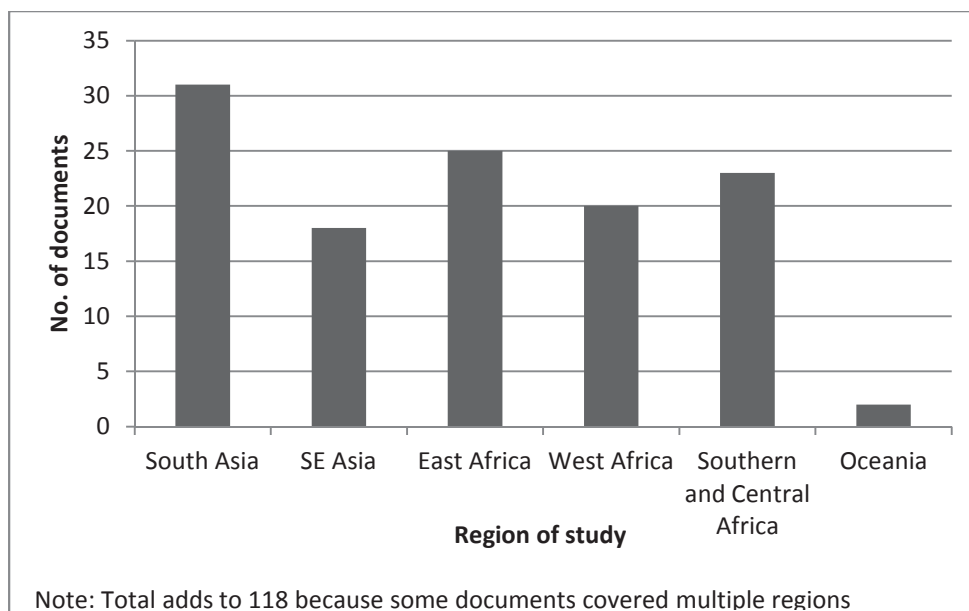


Figure 3. Geographic distribution of selected documents

Table 4. Documents organized by type and organization

Organization	Technical Reports	Individual Case Studies	Learning Notes and Briefs	Working Papers	Annual Reports	Total
WSP	15	1				16
IDS	3	2	9	8		22
Plan	5	4	4		2	15
WaterAid	8	1	2			11
UNICEF	3	3	3		3	12
SNV	2	3				5
Other Int'l NGOs	9		2	2		13
Local CBO/Research Orgs.	8	4	1			13
Governments	3	2				5
Academic Institutions	3					3
Total	59	20	21	10	5	115

Indicators used to monitor or evaluate CLTS

Evidence on the process and outcomes of CLTS is not viable for meta-analysis of effect size as information was presented in varying formats, from evaluations to case studies to anecdotes from villagers. Some indicators such as latrine use and number of triggered communities were explicitly stated and measured in some reports, while many indicators such as incorporation of CLTS into a district health plan and improvement in health outcomes were presented indirectly as evidence or factors for success or failure of CLTS projects. The only uniform data available from the grey literature was on

number of triggered communities and number of communities declared open defecation-free (ODF). A few reports presented evaluation data, such as an impact evaluation of CATS in Mozambique, which reported a 13.6% increase in latrine ownership due to CATS, but found that only 1.4% of households in CATS communities had latrines that qualified as safe sanitation according to Mozambique's national standards (UNICEF 2011). Data from Ethiopia on a CLTS plus hygiene promotion intervention also showed an increase in latrine coverage (from 5% to 100%) and a decrease in open defecation from 64% to 40% from 2005 to 2009 (Faris et al. 2011).

The indicators in Table 6 were commonly seen across the grey literature and could be categorized into eight categories: costs, triggering and follow-up, access, ODF, sanitation/hygiene behavior, perceived impact, structural/institutional, and health outcomes. They could also be grouped into the levels of inputs, process, outputs and outcomes. However, there was some inconsistency in the latter grouping of indicators. For example, triggering-related indicators were referred to as process indicators in some documents and as output indicators in other documents. ODF indicators were considered to be output indicators in some documents, whereas other documents referred to them as outcome indicators.

Table 5. Aggregated list of CLTS indicators from grey literature

Type of Indicator	Indicator	Category
Inputs	Program cost (\$/person or \$/household)	Costs
Process/Output	No. of communities triggered	Triggering and Follow-up
Process/Output	No of follow-up visits till ODF achieved	Triggering and Follow-up
Output/Outcome	No. of people with access to latrines in community	Access
Output/Outcome	No. of people using latrines in community	Access
Output/Outcome	No. of toilets : no. of households in community	Access
Output/Outcome	No. of communities declared ODF	ODF
Output/Outcome	No. of people living in ODF environment	ODF
Output/Outcome	No. of communities regularly monitoring ODF status	ODF
Output/Outcome	No. of people washing hands at appropriate times	Sanitation/hygiene behavior
Output/Outcome	No. of households disposing child feces in latrine	Sanitation/hygiene behavior
Output/Outcome	No. of people aware of good sanitation/hygiene behavior	Sanitation/hygiene behavior
Output/Outcome	Spread of CLTS to neighboring communities	Perceived impact (qualitative)
Output/Outcome	Individual sense of security from owning latrine	Perceived impact (qualitative)
Output/Outcome	Ability to defecate at any time of day	Perceived impact (qualitative)
Output/Outcome	Reported odor level in community	Perceived impact (qualitative)
Output/Outcome	Reported presence of flies in community	Perceived impact (qualitative)
Output/Outcome	No. of people trained in CLTS	Structural/ Institutional
Output/Outcome	Local government expenditure on sanitation	Structural/ Institutional
Output/Outcome	No. of communities with sanitation committees	Structural/ Institutional
Output/Outcome	CLTS incorporated into District Action Plan (p4)	Structural/ Institutional
Output/Outcome	No. of cases of diarrheal disease	Health outcomes
Output/Outcome	Household health expenditure on diarrheal disease	Health outcomes

The following excerpts exemplify the nature of qualitative indicators reported in the literature:

- “Members of the local water and sanitation committee report that health among the villagers in Dadin Sarki has improved. ... Health records testify to the success of CLTS in reducing sanitation and water-related diseases. Within just one month of engaging the community to end open defecation, the incidence of diarrhoeal diseases dropped to almost zero” (“Young Child Survival” 2011).
- “Evidence of increased awareness post CLTS has emerged, in particular through legal enforcement activities. In many cases, people are now demanding for sanitation and hand washing for instance at Health Centres ... and there are now examples where the public has brought orders against Local Authorities, bars, restaurants or schools to construct sanitation facilities. There are now several radio programmes, where people call in and report or complain against institutions that do not have sanitation facilities” (Zulu n.d.).

Importance of monitoring and evaluation

Expressed in the literature was a widespread need for standardized monitoring mechanisms, rigorously evaluating CLTS projects, and appropriately using data that is already being collected. It was evident that data collection is on-going in all CLTS projects, but differences in indicators and reporting structures, along with decentralization of data management, challenge the appropriate use of data for decision making. Based on its experience with CLTS in Indonesia, WSP recommended that “post-triggering processes should be given a verifiable structure by establishing and periodically checking for desired progress quality indicators/milestones for success in triggered communities in order to improve institutional accountability for and the quality of follow-up. Institutional adoption of a structured follow-up process also makes it more likely to be adequately funded” (Mukherjee 2012). This need for a reporting structure was echoed in reports from Kenya (Tiwari 2011) and Ghana (Magala et al. 2009) among others. Furthermore, community-level monitoring was often described as the key to sustainability in monitoring CLTS. The only working example from the grey literature was of community-based registers in Tanzania, which were found to be vastly under-used (Coombes et al. 2011). The need to generate value for collecting monitoring data and using it to improve CLTS outcomes was also expressed frequently (Coombes et al. 2011; Tiwari 2011). A successful example of overcoming this obstacle was presented by practitioners in Kenya, who reported that participatory workshops at the district level allowed teams to analyze their data and learn how to improve their progress through discussions with their peers, thereby increasing the value of monitoring data and subsequently, the quality of the data as well (Tiwari 2011).

Importance of triggering and follow-up

All documents in this review discussed experiences with pre-triggering, triggering, and follow-up activities. The importance of follow-up was highlighted as a crucial step in achieving and sustaining ODF status. Sixteen documents specifically wrote of experiences with pre-triggering activities, which in CLTS literature is the introduction and rapport building period. Most documents mentioned the importance of pre-triggering efforts in order to have a successful triggering experience, but the location of pre-triggering varied across projects. A CLTS project in Zimbabwe, for example, described the pre-triggering

exercise as a meeting with the District Water and Sanitation Sub-committee, while projects in India, Mozambique, Ghana, and Uganda focused pre-triggering activities at the village level. Key elements of pre-triggering were rapport-building, “understanding power relationships and leadership in the local context,” and conducting baseline surveys (Zulu n.d.).

In Vietnam, a key short-coming identified in a CLTS project was the lack of pre-triggering and baseline surveys: “important indications of influential people to be harnessed and included in the triggering event were unaccounted for” (Brown 2009). WSP’s recommended from its Indonesian CLTS experience that pre-triggering and triggering should be conducted by local organizations rather than the WSP or larger facilitating organizations. Furthermore, their report concluded that triggering should only occur where village leaders express a demand for CLTS during the pre-triggering process (Mukherjee 2012). With regard to the benefits of pre-triggering, an evaluation of CLTS in Ghana found that participatory data collection during the pre-triggering process was a successful factor in a) allowing community members who participated in pre-triggering “to do some ‘soul searching’ prior to triggering” and b) helping facilitation teams develop strategies based on valuable baseline data on sanitation behavior and where communities fell on the sanitation ladder (Magala et al. 2009).

Various triggering techniques were described in the grey literature, often a direct reflection of CLTS training documents and manuals. Some documents referred to adaptations of traditional triggering efforts, such as “cluster triggering” in Liberia, which involved triggering a cluster of communities to encourage competition between the communities and accelerate the pace of change (Phillips n.d.).

Only one study assessed the impact of triggering on CLTS outcomes; WSP reported that in Ethiopia, “the chances of owning a latrine were about nine times higher in households located in villages that participated in a walk of shame” than those that did not participate in this triggering activity (Faris et al. 2011). However, a qualitative study on social norms with CLTS in India found “little evidence to support the claim that the ‘triggering’ strategy, by itself, is sufficient for establishing perceived or collective norms [or for leading] to collective action that culminates in changing sanitation behaviours in a community” (Dyalchand et al. 2009). The researchers found early adopters (natural leaders) were more important for “communicating” and persuading the remaining members of the community over a period of six months, thereby establishing a “collective norm” (Dyalchand et al. 2009).

Timing of triggering activities was another factor identified by various organizations for success or failure of CLTS in a community. A few documents mentioned triggering during or immediately after harvest time, when people had the most disposable income (“Shit in emergencies” n.d.), while in Kenya, it was suggested that triggering coincide with the availability of natural resources required for latrine construction, for example, choosing coconut harvesting time for coconut palm poles for latrine flooring (Chambers 2009).

Plan Uganda wrote that triggering without adequate follow-up for two years after declaring a community as ODF was seen as counterproductive, “undermining CLTS results.” The focus, they argued, should be on ODF and not on triggering. In communities where other hygiene interventions exist, Plan Uganda also suggested that CLTS could act as a “post-trigger.” Nevertheless, they cautioned that

triggering itself should not be mixed with other approaches, suggesting that PHAST could be used as a pre-trigger or baseline, CLTS used for triggering, and sanitation marketing used as a post-trigger ("Good Practices" 2011).

With regard to follow-up activities, there was a widespread emphasis on the need for regular and systematic follow-up mechanisms. In Malawi, "it was observed that villages with fewer follow-ups have slower progression of CLTS and higher percentage of natural leader inactivity, as compared to those with frequent follow-ups" (Hockin 2011). An assessment from Kenya reported that across six districts, each triggered village needed an average of five follow-up visits before it could be declared ODF (Tiwari 2011). A report from India on the Total Sanitation Campaign also noted that three to five follow-up visits were required after triggering activities to achieve ODF status (Mehta n.d.).

However, the lack of adequate resources for follow-up activities was repeatedly highlighted as a challenge facing CLTS practitioners. This resource gap took the form of staff shortages, poorly trained staff, and little to no budget for follow-up activities. Limited follow-up was especially problematic in monitoring maintenance of ODF status once communities were declared ODF ("Uganda-Situational Analysis" 2009).

A recommendation from Malawi suggested creativity in addressing challenges with follow-up. For example, training natural leaders to identify only those households that were lagging behind would reduce the burden on those external actors in charge of follow-up activities so that they could efficiently concentrate their time on the slowest adopters in the community (Redick 2011). Another recommendation included training and using local health extension workers for follow-up activities with natural leaders to ensure that natural leaders' needs are understood and that they are doing the CLTS-related work to which they have committed (Hockin 2011).

Follow-up visits by outsiders were seen largely as a positive motivator in communities. In Ethiopia and Kenya, these visits reinforced and "sustained" shame at open defecation sites and "retriggered" communities to end open defecation (Otieno n.d.). Furthermore, these visits established a sense of pride in communities as they were "eager to show the positive change they make" (Tsegaye et al. 2009). In Madagascar, frequent visits by outsiders "significantly boosted community motivation, with a public 'walk of praise' increasing the esteem of those households in the process of building their latrines" (Azafady 2011). The Ethiopian experience concluded that even though CLTS is a community-led process, it requires outsiders to sustain shame and motivate change in the community (Tsegaye et al. 2009).

Harmonized approach

In order to scale-up CLTS at the national level, a number of documents emphasized the need for a harmonized approach across implementing organizations and with the government. A 2009 meeting of the East Africa units of organizations such as BMGF, IDS, IRC, Plan, UNICEF, WaterAid, WSP and WSSCC agreed that not harmonizing their sanitation efforts would duplicate work and lead to reduced joint impact. A WSP study on sustainability in Vietnam also concluded that the larger organization, UNICEF, had to coordinate its rural sanitation strategy with other NGOs working in the area to achieve maximum impact (Sijbesma et al. 2010). Lessons from Plan Uganda's CLTS experience specifically focused on

getting commitment from all actors to not use subsidies or incentives to attain ODF ("Good Practices" 2011). Nepal's experience with CATS, for example, found "significant variation between organizations regarding subsidies for household latrine construction; this makes building the momentum for community-led sanitation more difficult" ("CATS" 2011). Furthermore, in Zimbabwe, "the exercise of rallying the community behind the CLTS program was made difficult because neighboring communities were being assisted by Plan International in the construction of toilets" (Sigauke 2009), while the community under study was left on their own per CLTS guidelines.

Behavioral techniques

Behavior change techniques used in CLTS are meant to ignite "a sense of disgust and shame" in the community about open defecation practices. The review found that these techniques were almost always described as effective in the grey literature. In schools in Bangladesh, disgust was reported as the most effective motivator for children, and in Uganda, community mapping, the walk of shame, and photographs of "shit eaters" were effective tools in igniting action during the triggering process. In Indonesia, competition among communities led to those lagging behind being shamed by neighboring communities, who offered to help them dig holes.

However, an anthropological study of CLTS in Vietnam found a generational difference in the effect that shaming and embarrassment had on changing people's behavior, with young people more easily embarrassed about open defecation, and old people more stuck to their ways. The author recommended identifying "other motivating factors besides embarrassment, which has been found to be a relatively weak motivator, hampering (but not stopping) the practice of open defecation" (Brown 2009).

Where market research has been conducted prior to CLTS (such as with sanitation marketing approaches), WSP's Indonesian experience suggests that facilitators should adjust their triggering approach based on people's "motivations, abilities, and opportunities to change" (Mukherjee 2012). There was no evidence from the literature review of examples where triggering approaches were specifically modified based on a prior researched understanding of the local context; however, this absence of documentation does not imply lack of adaptation.

Sustaining behavior change

Although shaming was often used to trigger communities to change their behavior, post-triggering incentives and motivators for behavior change most often rested on praising people and capitalizing on the pride felt by communities that succeeded in ending open defecation. In Nepal, the SLTS approach used a "praise walk" to counter the "shame walk" used in triggering activities, in order to motivate communities to build more latrines ("CATS" 2011). Similarly, in Zimbabwe, community members cited visits by outsiders where they were able to get their respect and praise as a key benefit of CLTS (Sigauke 2009). In Malawi, it was observed that "sanitation leaders often become more motivated when they present the progress of their village to authority figures and they can be praised for their hard work" (Hockin 2011).

CLTS aims to move from latrine building to sustained hygiene and sanitation behavior change. However, few projects described in the grey literature provided evidence of measuring sustained changes in behavior. An evaluation report from Mozambique highlighted the need for much more evidence on “CLTS-induced behavior,” namely understanding the effect that CLTS techniques have on behavior change (UNICEF 2011). Furthermore, the focus on achieving ODF may fail to recognize other factors required for sustained behavior change. As expressed by Kamal Kar, a leader of CLTS: “Often declarations and certifications of ‘open defecation-free’ (ODF) status are seen as an endpoint instead of the start of a new process. After the initial momentum dies out, some people can slip back to old patterns of open defecation, defying the component of ‘total’ in CLTS. Thus, it is important to both understand post-ODF dynamics in CLTS communities and how and whether communities have moved up the sanitation ladder” (Kar 2012).

Children as natural leaders

Most documents that discussed natural leaders mentioned the important role that children play in mobilizing communities toward behavior change and ending open defecation. There was limited discussion on measured impact of using children as natural leaders, but anecdotes of children taunting, shaming, and blowing whistles at people defecating in the open were widespread. For example, Plan Nepal described how children monitored progress towards ODF in one village: “Child club members monitored open defecation places in the early morning. When they caught anyone red-handed, they whistled, clapped or shined their torch lights, forcing the offender to run away in shame. Afraid of being detected and humiliated, people stopped defecating in the open” (“Evaluation of CLTS” 2007).

However, in some countries, the involvement of children as natural leaders for CLTS had to be reconsidered based on local context:

“Children in Uganda culturally do not have voices to speak out publicly and there is a lot to be done to have meaningful participation of children. There is the challenge of child rights advocates who state that the language used is not appropriate for children especially in the Ugandan context and may create disrespect among parents when children start using ‘bad’ words openly. The suggestion is that there was need to carry out a risk assessment before starting to use such words among children” (“Uganda-Situational Analysis” 2009).

Women as natural leaders

A number of documents referred to the importance of training women as natural leaders, while three documents in particular provided relevant examples. A village in West Sumatra in Indonesia only had female natural leaders who visited each household to conduct triggering exercises instead of a collective community-level triggering process (Jamasy et al. 2008), while in Uganda, it was reported that although men and women emerged as natural leaders, women were more effective natural leaders because open defecation reportedly played a more important role in their lives. Finally, in Kenya women were specifically empowered by Ministry of Public Health staff, leading to their prominent role in triggering and leading the CLTS process (Tiwari 2011).

However, a cautionary message from Bangladesh also emphasized that female participation in triggering does not always lead to their empowerment. Plan Bangladesh reported that even if women participated in triggering, they did not often have control over toilet construction. Furthermore, use of a pour-flush toilet increased women's workload because they would have to bring more water home for latrine use (Mahbub 2008). A project in India also reported that it was a challenge to involve women because their families would not allow them to participate in CLTS activities.

Role of teachers and schools

School-led total sanitation (SLTS), a variant of CLTS started in Nepal in 2005, places schools at the center of sanitation behavior change in communities. The approach combines UNICEF's School Sanitation and Hygiene Education (SSHE) programme, participatory techniques of CLTS, and reward/recognition approaches ("CATS" 2011). SLTS was frequently referred to in conjunction with CLTS and was mentioned in nearly 30% of documents selected for review. An IRC concept note suggested that schools were an appropriate "alternative entry point" for CLTS in complex social situations, with the initial goal of making the home villages of the school children ODF ("CLTS-Plus" 2008). However, Kar and Milward (2011) worried that SLTS might create a more "watered-down" approach to CLTS, limiting opportunities for other natural leaders to emerge (apart from teachers) and missing "the potential for total community behaviour change" by only focusing on children in schools.

It was not possible to ascertain any reported differences between CLTS and SLTS in the grey literature. There was no discussion about the specific nature of triggering campaigns through SLTS (e.g., number and frequency of school triggering activities, age of students, number and frequency of triggering activities in nearby communities). A Plan International Pan-African CLTS project report even referred repeatedly to "CLTS/SLTS," implying that the two approaches were closely related (Singeling et al. 2011). Therefore, SLTS experiences that were found in the selected grey literature are reported below with the caveat that SLTS can differ substantially from a traditional CLTS approach which focuses on the entire community.

Three documents presented some data on progress with SLTS, but did not comment on impact on sanitation and hygiene outcomes ("CATS" 2011; Wicken et al. 2008; Singeling et al. 2011).

One document on the SLTS experience in Nepal reported 90,000 households and 300 schools reached, 730 child health clubs formed, and over 1,000 school teachers and headmasters trained on SLTS ("CATS" 2011). Another document described teachers as "barefooted consultants" in Azad Jammu and Kashmir, who were given Rs.5000 (US\$50) for each village they converted to ODF status. While hailing these teachers and their School Management Committees for their achievements, the document highlighted the need for more training and capacity building of these barefooted consultants in order to improve their effectiveness at mobilizing change (Wicken et al. 2008).

Plan Ethiopia and Plan Zambia's SLTS projects were highlighted in a document discussing experiences from the Pan-African CLTS project, where using school teachers as facilitators reportedly increased the number and improved the quality of triggering and facilitation. Plan Ethiopia reported that villages reached ODF status faster when they used teachers for facilitation and monitoring versus the standard

CLTS approach, but did not provide relevant evidence to support this claim. Plan Zambia provided schools with building material for latrines in exchange for labor and remaining construction materials, but reported that budget and transport issues dominated their experience with school sanitation. By involving the government (Department of Education), they decided to “improve coordination and arrange for some funding,” and this also gave teachers a greater role in coordination because SLTS was now officially approved by the government (Singeling et al. 2011).

Two documents from the same country held opposing viewpoints on the role of teachers in the triggering process of school sanitation. In India, one CLTS project observed that in SLTS, keeping teachers out of the triggering process “enhances the quality of children’s involvement” (Mehta n.d.). However, another example from India observed the contrary, and that success in SLTS depended on the “understanding and knowledge of teachers.” This project recommended triggering teachers and children simultaneously so that teachers could then “effectively inspire enough confidence in the children or community at large to mobilize them to take action” (Verma 2010). Oxfam Uganda also expressed concerns with ownership of the process by both teachers and students (Sanchez 2011).

Role of local government actors

As governments adopt CLTS into their national sanitation plans, district health officials take on a greater role not only for facilitating CLTS but also for monitoring progress towards ODF. Therefore, many CLTS projects have reported training district health officials as trainers for other facilitators. In Sierra Leone, Plan reported that training district councils and NGO partners on CLTS allowed them to lead the process of triggering and monitoring. District health officials were noted as a “link” between communities and the Ministry of Health and Sanitation in Sierra Leone, which increased their ability to serve as advocates for CLTS (“CATS” 2011). There was no evidence from the literature on the impact that training local governmental actors on CLTS has on sanitation or hygiene outcomes. There was also no discussion on the potential conflict of interest that could emerge from using governmental actors for implementation and monitoring CLTS progress.

Decentralization, such as in Indonesia, places increased power at the district and local levels, which means that district health officials’ ability to petition their superiors influences funding for CLTS (Mukherjee et al. 2008). However, Plan Uganda reported that in a more centralized environment, coordination between national governmental actors, district actors, and NGOs was necessary but lacking when it came to implementation. Districts not only required more training on CLTS, but also required a larger budget to implement CLTS (“Good Practices” 2011). In this instance, Plan Uganda worked directly with sub-county staff and bypassed the District Health Inspector.

5.3 Conclusions from Grey Literature

This systematic review characterized the extent and diversity of grey literature on CLTS. However, most documents contained reports and case studies from agencies describing their own experiences with CLTS. A few external evaluation reports were also produced jointly with the implementing agencies. The only evidence of peer-review was in WSP products, which were also reviewed by internal staff.

Therefore, interpretation of findings from the grey literature must be made with the understanding that there was largely no evidence of external review, as is the case with peer-reviewed literature.

This report presented an aggregated list of indicators that were referred to in the grey literature as one way to start addressing the expressed need for structured and consistent monitoring and evaluation mechanisms. The importance of monitoring and evaluation, especially to sustain behavior change and scale-up CLTS activities, was emphasized in most documents selected for review. Triggering in the absence of a detailed plan, budget, and resources for structured follow-up activities was discouraged. Frequent follow-up visits by outsiders were also considered as effective motivators for people to stop open defecation.

As multiple international, national, and local organizations work on total sanitation in a given country, the grey literature also frequently cited the need for a harmonized approach across these organizations. The approach was expected to be framed by a national CLTS strategy in order to scale-up the impact of CLTS in a given country.

Behavioral techniques used during the triggering process—primarily shaming and inciting disgust to trigger change—were described largely as effective tools to motivate communities to end open defecation, but not necessarily to sustain behavior change. An evaluation report from Mozambique highlighted the need for more evidence on “CLTS-induced behavior,” namely understanding the effect that CLTS techniques have on behavior change. A commentary by Bartram et al. (2012) also highlighted the lack of self-critical reflection in the grey literature on the effect of these techniques, and emphasized the need for more systematic evaluation (discussed in Part 1 of this report).

With regard to the role of key actors, children emerged as the most cited natural leaders, mobilizers, and change agents, especially with regard to post-triggering monitoring of communities. Evidence was scarce on the impact of using children for these activities on sustained behavior change. Teachers were viewed as key community leaders for CLTS, but were primarily used in the process of SLTS. Their role appeared to be to facilitate action by children and spread the message of CLTS across the community. There were no reports of the specific impact of training teachers on CLTS outcomes. Finally, local government actors such as district health officials had an increasingly important role to play, especially in decentralized institutions. Training of these actors in CLTS was emphasized across the majority of documents so that they could advocate for additional resources, adequately train facilitators, and ensure routine and structured follow-up and monitoring of ODF communities. There were no reports on the impact of training local government actors on CLTS outcomes.

6. Conclusions and Implications from Systematic Review

The grey literature on CLTS was more extensive than peer-reviewed literature. While peer reviewed studies were more likely to focus on the impact of sanitation and hygiene interventions, grey literature focused on processes, such as triggering, the role of key actors, and harmonization of strategies across organizations and governments. CLTS practitioners may be more likely to refer to grey literature than to scientific literature because of the focus on processes as well as easy and free access to grey literature compared to paid scientific journals. Therefore, the potential impact of grey literature on decision-making surrounding CLTS is significant. It would be important in future work to develop quality criteria for CLTS grey literature to better gauge the rigor and generalizability of material being used by people—from local facilitators to policy makers to donors—to make decisions on CLTS.

The need expressed in the grey literature for rigorous and systematic evaluation of CLTS was confirmed by the absence of such studies in the scientific literature. Most peer-reviewed studies identified in this review, except for Pattanayak et al. (2009) and Huda et al. (2010), did not utilize methods that permitted impact evaluation, yet they still drew conclusions about the impact of their interventions on sanitation and hygiene. The grey literature also reported conclusions about the outcomes of CLTS programs that were inappropriate given the monitoring data used to measure change in communities following interventions. Examples from the grey literature instead highlighted case studies of CLTS successes and, in a few cases, examples of CLTS failures, primarily measured by the number of communities triggered and declared ODF. Only a small number of studies, namely WSP and UNICEF evaluations, were conducted in a rigorous manner. Anecdotal qualitative findings were more common, featuring community-reported improvements in their physical environment, household standing, and health outcomes.

Internal actors that are the focus of the TCAS study—natural leaders, teachers, and local government actors—were identified as change agents in both peer-reviewed and grey literature, but primarily through case studies and descriptions of CLTS projects. Children and women were most often cited as the most effective natural leaders in communities, and teachers were reported to play an important role in facilitating CLTS. Local government actors, especially in countries with decentralized governing systems, are being trained to facilitate and monitor CLTS, but care must be taken to minimize conflicts of interest when the same actors are responsible for implementing and evaluating an intervention.

Both peer-reviewed and grey literature will influence the types of indicators included in different parts of the TCAS study. This study also addresses knowledge gaps common to both sets of literature by looking at various stages of CLTS, from inputs and processes to outputs and outcomes, in a more systematic and rigorous manner than the existing body of evidence.

- The lack of evidence on the specific role of natural leaders on CLTS outcomes will be addressed by the Ghana TCAS study, and may also help identify the impact of other natural leaders in addition to children and women.

- The Ethiopia TCAS study, with its focus on the role of teachers on CLTS outcomes, will help address the gap revealed by this review in understanding the impact of training teachers on CLTS or SLTS.
- Finally, the Kenya TCAS study will also address a key gap in the evidence base by improving our understanding of the effect of training local government actors for CLTS programs. By utilizing qualitative methods, the study can help answer questions generated from findings in this review on the exact nature of the role of district health officials in CLTS advocacy, implementation, and follow-up. Decentralization of governments may be an important factor to consider when assessing the role of local government actors.

The findings presented in this report demonstrate the value of evaluating both peer-reviewed and grey literature to understand the breadth and nature of presently available evidence on CLTS. The review also consolidated the future research and evaluation needs expressed by the CLTS practitioner community, which is of importance to funding agencies, other practitioners, researchers, and governments.

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List of Appendices

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- Appendix 2: Full list of peer-reviewed literature
- Appendix 3: Full list of grey literature
- Appendix 4: CLTS grey literature “word cloud”
- Appendix 5: Jasper et al. 2012 [attached as separate document]

Appendix 1: Detailed search strategy for peer-reviewed literature

- If database did not return results with both British and American spellings, separate searches were conducted and combined.
- Dashes indicate the search terms were not used in the respective database.
- Some searches were modified if there were too few or too many results to ascertain accuracy of literature capture.

Focus	Search Terms	Database					
		Cochrane Library	Embase	Global Health	Web of Science	Science Direct	PubMed
CLTS	Community AND led AND total AND sanitation / "Community led" AND total AND sanitation	1 (1)	74 (3)	22 (14)	15 (7)	70 (15)	31 (3)
	'Participatory sanitation' OR 'participatory hygiene' OR 'total sanitation'	4 (0)	12 (9)	66 (29)	10 (6)	48 (7)	(too many results; see below)
	('sanitation "[MeSH Terms] OR "hygiene "[MeSH Terms]) AND (Participatory[All Fields] OR "total sanitation "[All Fields])	-	-	-	-	-	119 (20)
	'open defecation' OR 'defecation free'	0	21 (7)	33 (13)	1 (1)	108 (19)	16 (5)
	'Social marketing' AND (sanitation OR hygiene OR defecation)	1 (1)	146 (3)	160 (23)	24 (9)	595 (14)	123 (30)
	'Sanitation marketing'	0	0	3 (3)	2 (1)	7 (3)	0
	'behavior change' AND (sanitation OR hygiene OR defecation)	2 (0)	175 (24)	203 (19)	49 (13)	418 (22)	83 (20)
	'participatory approaches' AND (sanitation OR hygiene OR defecation)	1 (1)	25 (1)	2 (2)	8 (1)	476 (7)	11 (3)
	'demand led' AND (sanitation OR hygiene OR defecation)	0	3 (0)	2 (2)	3 (0)	67 (2)	2 (0)
	'demand creation' AND (sanitation OR hygiene OR defecation)	0	0	3 (2)	0	19 (0)	0
	'Behavioural intervention' AND (sanitation OR hygiene OR defecation)	4 (0)	14 (0)	15 (0)	7 (0)	28 (5)	34 (0)
	'behavior change' OR 'participatory approaches' AND (trachoma OR 'E. coli' OR cholera)	1 (0)	16 (8)	6 (2)	4997	145 (0)	166 (8)
	'demand led' OR 'demand creation' AND (trachoma OR 'E. coli' OR cholera)	1 (0)	0	7 (2)	91 (2)	0	0

Focus	Search Terms	Database					
		Cochrane Library	Embase	Global Health	Web of Science	Science Direct	PubMed
CLTS	'Behavioural intervention' AND (trachoma OR 'E. coli' OR cholera)	0	1 (0)	1 (0)	0	0	1 (0)
	'Social marketing' AND (trachoma OR 'E. coli' OR cholera)	0	1 (1)	1 (1)	3 (3)	0	3 (2)
Natural Leaders	(Community OR tribal OR elected) AND leaders AND (sanitation OR hygiene OR defecation)	3 (3)	145 (5)	1 (0)	26 (9)	283 (10)	104 (21)
	'natural leaders' AND (sanitation OR hygiene OR defecation)	0	2 (1)	24 (1)	4 (1)	34 (1)	0
	'social cohesion' AND (sanitation OR hygiene OR defecation)	0	16 (2)	59 (3)	5 (2)	8 (3)	4 (2)
	'community dynamics' AND (sanitation OR hygiene OR defecation)	0	331 (1)	4 (0)	2 (0)	10 (0)	3 (0)
	'natural leaders' AND (trachoma OR 'E. coli' OR cholera)	0	0	0	0	44 (0)	3 (0)
	'social cohesion' OR 'community dynamics' AND (trachoma OR 'E. coli' OR cholera)	0	5 (0)	173 (3)	0	0	8 (0)
	(Community OR tribal OR elected) AND leaders AND (trachoma OR 'E. coli' OR cholera)	0	7 (0)	2 (1)	0	0	6 (0)
Teachers / Schools	(Teachers OR educators OR 'head master' OR school OR student) AND (sanitation OR hygiene OR defecation)	5 (2)	105 (37)	911 (134)	2206 (74)	2270	646 (110)
	(Teachers OR educators OR 'head master' OR school OR student) AND (trachoma OR 'E. coli' OR cholera)	23 (3)	8 (4)	173 (56)	1 (0)	0	52 (10)
Local Gov't	('Institutional champion' OR 'district officials') AND (sanitation OR hygiene OR defecation)	1 (0)	7 (0)	5 (2)	12 (2)	44 (8)	5 (1)
	('regional officials' OR 'provincial officials') AND (sanitation OR hygiene OR defecation)	0	0	0	11 (0)	41 (1)	0
	district officers AND (sanitation OR hygiene OR defecation)	-	-	22 (7)	-	-	-
	('Institutional champion' OR 'district officials' OR 'regional officials' OR 'provincial officials') AND (trachoma OR 'E. coli' OR cholera)	0	0	0	10 (1)	10	7 (0)

Appendix 2 – Full list of peer-reviewed literature

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Appendix 3 – Full list of grey literature

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Appendix 4 – CLTS grey literature “word cloud”

