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AN EXAMINATION OF CLTS'S CONTRIBUTIONS TOWARD UNIVERSAL SANITATION

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ACRONYMS

CLTS	Community-Led Total Sanitation
CHOBA	Community Hygiene Output-Based Aid (a program of East Meets West)
DHS	Demographic and Health Survey
FSM	Fecal Sludge Management
HAZ	Height-for-Age Z-Score
JMP	Joint Monitoring Programme of WHO and UNICEF
LG	Local Government
LMIC	Low and Middle-Income Country
MDG	Millennium Development Goal
MICS	Multiple Indicator Cluster Survey
M2W	Mobile-to-Web
M&E	Monitoring and Evaluation
OBA	Output-Based Aid
OD	Open Defecation
ODF	Open Defecation Free
OMI	One Million Initiative of the Government of Mozambique
O&M	Operation and Maintenance
PHAST	Participatory Hygiene and Sanitation Transformation
PhATS	Philippines Approach to Total Sanitation
RA	Resource Agency
RCT	Randomized Controlled Trial
SARAR	Self Esteem, Associative Strengths, Resourcefulness, Action Planning and Responsibility
SanMark	Sanitation Marketing
SDG	Sustainable Development Goal
SES	Socioeconomic Status
SNT	Social Norms Theory
SSH4A	Sustainable Sanitation and Hygiene for All (a program of SNV)
STH	Soil-Transmitted Helminths
TSSM	Total Sanitation and Sanitation Marketing (a program of World Bank WSP)
TSC	Total Sanitation Campaign
UN	United Nations
UNICEF	United Nations International Children's Emergency Fund
US	United States
USAID	United States Agency for International Development
WASH	Water, Sanitation, and Hygiene
WASHPaLS	Water, Sanitation, and Hygiene Partnerships and Learning for Sustainability
WHO	World Health Organization
WSP	Water and Sanitation Program of the World Bank
ZOD	Zero Open Defecation

PREFACE

USAID's Water, Sanitation and Hygiene Partnerships and Learning for Sustainability (WASHPaLS) project is a 5-year task order awarded to Tetra Tech on 16 September 2016 under USAID's Water and Development Indefinite Delivery Indefinite Quantity Contract (WADI). Tetra Tech implements the project in collaboration with several non-governmental organizations and small-business partners—Aquaya Institute, Family Health International (FHI 360), FSG, and Iris Group—that contribute expertise in state-of-the-art WASH programming and research. Distinguished academics, practitioners, and policy makers from across the WASH sector regularly provide expert perspectives to the project through an internal research working group and an external Advisory Board.

The project supports the Agency's goal of reducing morbidity and mortality in children under five as part of the Ending Preventable Child and Maternal Deaths initiative by ensuring USAID programming employs high-impact, evidence-based environmental health and WASH interventions. The project identifies and shares best practices for achieving sustainability, scale, and impact by generating evidence to support the reduction of open defecation and movement of communities up the sanitation ladder while also focusing on novel approaches for reducing feces exposure to infants and young children (IYC). Specifically, the project:

1. offers USAID missions and technical bureaus ready access to thought leaders and analytical expertise across a wide range of WASH themes in response to their needs (Component 1);
2. generates evidence through implementation research to increase the sector's understanding of and approaches to sustainable WASH services, the effectiveness of behavioral and market-oriented approaches to sanitation, and measures to disrupt pathways of fecal exposure to infants and young children (Component 2); and
3. administers a small grants program on innovations in hygiene behavior change (Component 3); and
4. engages and partners with national and global stakeholders to promote the use and application of project-generated evidence and global best practices by practitioners and policy makers, tapping into broad coalitions and dynamic partnerships (Component 4).

Among the project's initial tasks is the production and dissemination of three in-depth desk reviews focusing on community-led total sanitation (CLTS), market-based approaches for sanitation, and hygienic environments for IYC.

EXECUTIVE SUMMARY

Community-led Total Sanitation (CLTS) is a revolutionary idea and an inspiring practice. The enthusiasm of its many adherents in government and civil society is understandable. This desk review examines the refereed and gray literature on CLTS,[1] with the central objective of assessing the knowledge base on best practices and identifying evidence gaps to inform the project's research agenda (to generate findings that improve policy and practice).

The review offers a description of the CLTS intervention, tracing its evolution in theory and practice from Southeast Asia to its current place as a global phenomenon. It explores the open defecation free (ODF) concept (including varying definitions from country to country) and analyzes its strengths and weaknesses. It also highlights the disconnect between the independent monitoring and analysis of CLTS program results on the one hand and internal performance reports released by implementing organizations or their donors on the other. In compiling this information, we considered the challenges of measuring open defecation and suggest potential solutions that may lie in the more straightforward measure of private latrine ownership.

This review also seeks to assess (1) circumstances in which CLTS works best, (2) the most promising implementation modalities, and (3) instances where CLTS may not be suitable. CLTS should not be judged as a stand-alone intervention, but rather as a powerful option among an array of sanitation interventions whose limitations in selected circumstances must be recognized to best adapt it to diverse contexts and optimize its integration with other measures.

Highlights of this review include the following:

There is not enough reliable information on CLTS performance with respect to open defecation (OD) reduction and latrine adoption. Though it is a comparatively low-cost intervention, the expense of executing CLTS triggering and supporting the kinds of follow-up activities increasingly believed to be necessary to sustain reductions in OD is high enough to make a genuine understanding of its effectiveness at achieving and sustaining behavior change (as well as latrine purchase, maintenance, and use decisions) essential. Internal performance monitoring by implementing non-governmental organizations (NGOs) and governmental institutions must continue, but ultimately independent data collection and analysis must complement that internal monitoring and evaluation (M&E). Making official verification and certification protocols as independent, efficient, and cost-effective as possible should be a priority. Without reliable information, it is impossible to draw conclusions about the best ways to employ and adapt CLTS to maximize its effectiveness.

The behavior change brought about by the best of the CLTS deployments, even when short of the installation of hygienic latrines, may be sufficient to improve health; however, further research is needed. An important area of CLTS-related public health research moving forward is to determine whether unimproved latrines—which are overwhelmingly the ones installed as a result of CLTS programs—are sufficient to achieve and sustain health gains. At the moment there is a single high-quality health study of CLTS in Mali that provides a first encouraging hint that the approach can address child growth faltering. Also, while rigorous evidence is limited, unimproved latrines and stopping OD alone is believed to reduce diarrhea in some circumstances. To replicate these results elsewhere, attention should be paid to answering the question of whether rudimentary pits can be kept clean and fly-free enough to achieve (and sustain) those health gains.

[1] The literature review portion of this study is supplemented by 23 key informant interviews with sector experts, present and former managers of large CLTS programs, and district-level personnel involved in day-to-day CLTS operations.

CLTS works, but not necessarily for everyone, everywhere, or all the time. Keeping in mind the relative paucity of strong evidence for the effectiveness of CLTS programs, this review considers the hypothesized conditions that lend themselves to program success, with a focus on sustaining significant reductions in open defecation behaviors and elevating households and communities up the sanitation ladder. There is some reason to believe that the most disadvantaged within a given community do not benefit from CLTS as much as others, particularly those with the most limited financial means (as they are the least able to invest in durable latrines), but even on this question, the evidence is mixed. The integration of CLTS with market-based supply-side interventions is also explored, as are subsidy options to facilitate investments in improved sanitation among those suffering from affordability and/or liquidity constraints. CLTS appears to have a performance envelope, which varies geographically and contextually. Constraints on CLTS potential include, but are not limited to, situations where OD is already low, full toilet subsidies have been offered previously, soils are challenging for excavation, and social cohesion is poor. Still, a careful examination of the contours of this envelope is very much worth pursuing, in the interests of implementation adaptation.

CLTS can and should be integrated with other measures, and that integration can be done in a careful way that avoids disrupting the collective action process. Arguments that CLTS must function as a stand-alone intervention, lest its core principles be violated, are unconvincing. The immediate goals of CLTS may be limited to community achievement of ODF status, but the broader public health and development objective should be to drive communities up the sanitation ladder. Efforts must be made to help communities gain access to products, services, and information (often accomplished through market-based approaches like sanitation marketing) and increasing communities' ability to purchase those products and services (including via carefully designed and carefully timed provision of subsidies to the poorest households). CLTS must be integrated in a larger development program and sequenced with other interventions because, as noted, it does not work everywhere and often does not work in isolation.

CLTS is less expensive than programs that provide full subsidy of hardware, but its costs are generally comparable with market-based approaches or targeted subsidies. Recent CLTS cost estimates must be considered carefully, not so much as an argument to curtail programs, but instead to help governments and major funders decide how to allocate resources among behavioral, supply-side, and measures that target the poor specifically. Along with sequencing and integrating CLTS with other interventions, it also should be targeted where it can be cost-effective.

We must be clear about the original goals of CLTS and be careful about critiquing it for failing to achieve goals for which it was not initially intended. Our overarching aim is to assess (1) the circumstances in which (and for whom) CLTS works best, (2) the best implementation modalities, and (3) instances where CLTS may not be suitable. We conclude that CLTS should not be judged as a stand-alone intervention, but rather as a powerful option among an array of sanitation interventions whose limitations in selected circumstances must be recognized to best adapt it to diverse contexts and optimize its integration with other measures. CLTS was conceived to bring about the rapid elimination of open defecation, and the available, albeit limited, evidence suggests that it can be effective at achieving dramatic short- and medium-term OD reductions that are sufficient to result in health benefits. It is less clear that the behavior changes achieved by CLTS are regularly sustained over time; there are well-documented examples of significant slippage and reversions to OD, but also powerful examples of impressive sustainability. The balance of the current evidence points to underwhelming results with respect to improved sanitation adoption, but again, CLTS was not designed with that objective in mind.

In many ways, two fundamental questions about CLTS remain unanswered. There is suggestive evidence that transformed mind-sets and changed behaviors are sustained following triggering, but also many

examples in which they are not. Where they are not, the inability to sustain the behavioral gains of CLTS may be closely linked to a question about whether CLTS regularly leads to the creation of permanent facilities and improved levels of service.

The sanitation sector's focus must be on sustaining behavior change and driving movement up the ladder, but the evidence base remains too thin and too fragmented to yet understand how those objectives are best achieved; hence the dire need for better, more independent monitoring. Researchers and practitioners alike have their work cut out for them.

1.0 INTRODUCTION

On March 29, 2017, the global community of Water, Sanitation, and Hygiene (WASH) practitioners and researchers lost a seminal figure: the South African former senior official of the World Bank's Water and Sanitation Program (WSP), Piers Cross. Piers was a self-described "promoter of innovation, sector activist, and communicator." His dust-jacket praise of a recent volume dedicated to Community-Led Total Sanitation (CLTS) offers a cogent framing of the motivation for the support of CLTS:

> *CLTS was an unpredicted phenomenon that changed the way governments, civil society and external agencies approach improving sanitary conditions for the poor; and brought hope to a depressing era of neglect and stagnation in sanitation thinking … the next frontier: how to sustain the transformed mind-set, the facilities triggered by CLTS and the new patterns of defecation behavior, which changed age-old traditions, now made more treacherous by population growth … [and] how to utilize the power of CLTS to create permanent facilities and improved service levels.* (CLTS Knowledge Hub 2016).

In 1999, Indian consultant Dr. Kamal Kar was contracted by WaterAid, the UK-based international non-governmental organization (NGO), to evaluate a subsidized sanitation program executed by the Village Education Resource Center (VERC), one of its Bangladeshi implementing partners (Kar and Chambers 2008). Working in the Mosmoil village of Rajshahi district, Dr. Kar's assessment of VERC's performance led to his delineation of a systematic process for reducing (indeed, eliminating) open defecation (OD). The process, whose foundation is the Participatory Rural Appraisal (PRA) concept (Kar and Chambers 2008),[2] maintains the explicit objective of fully eliminating OD, replacing direct sanitation subsidies to households with activities intended to change communal behaviors from the grassroots. It represents a very specific form of engagement whereby carefully selected and trained facilitators seek to inspire collective action of a community's own design: local people are encouraged to analyze their own defecation behaviors, realize a sense of shame and disgust, and then formulate and embark upon a plan to cease defecating in the open, with the ultimate goal of "open defecation free" (ODF) status.

This approach is now well known as CLTS, and has the support of an array of donors and implementers, including UNICEF, WaterAid, Plan International (Plan), CARE, Concern Worldwide, the World Bank, Department for International Development (DFID), the United States Agency for International Development (USAID), and the Water Supply and Sanitation Collaborative Council's Global Sanitation Fund, to name just a few. CLTS has become one of the most widely deployed interventions to address sanitation gaps in the developing world, having been incorporated into national policy for rural sanitation in some 30 countries, with a distinct presence in some form or another in an additional 30 countries (see Figure 1). USAID itself has directly supported CLTS deployments in more than 20 countries across Africa and Asia, and it explicitly recognizes CLTS as a means of "increasing first time and improved sustainable access to improved sanitation services" as a part of its 2013-2018 Water and Development Strategy (USAID 2013; USAID 2016). USAID's commitment to and investments in the CLTS approach to date motivate this review of its effectiveness and future potential in the context of the suite of measures employed to reduce open defecation and increase the quality and sustainability of sanitation services.

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[2] PRA, an idea inspired in part by the work of the Brazilian educator and philosopher Paolo Freire (Chambers 1997), is an approach to development in which local people and their opinions, knowledge, and aspirations are given primacy. In addition to its origins in PRA, CLTS is also sometimes grouped with earlier participatory approaches such as Self Esteem, Associative Strengths, Resourcefulness, Action Planning, and Responsibility (SARAR) and Participatory Hygiene and Sanitation Transformation (PHAST). See Peal et al. (2010) for a comprehensive summary of these and other "software" tools. Robert Chambers emphasizes that, PRA/CLTS is distinct from (and outperforms) SARAR/PHAST because of its flexibility and open-ended nature in the interest of appealing to the most compelling motivations to end OD (disgust, self-respect, and convenience, as opposed to disease risk) (Greaves 2012).

Following recognition of its potential in Bangladesh, CLTS began to spread initially in Asia. The approach was introduced in Cambodia in 2004 and in Indonesia the following year. By 2009, the approach was being executed at varying scales in China, Lao People's Democratic Republic (PDR), Myanmar, Papua New Guinea, the Philippines, Timor-Leste, and Vietnam (UNICEF 2015). Meanwhile, in Africa, Kar and Milward (2011) report initial CLTS experiments in Ethiopia, Uganda, and Zambia between 2001 and 2006, with "large-scale roll out" having been either planned or already in progress for an additional 15 African countries by 2011. CLTS "institutionalization" in Africa was initially spearheaded by Plan's Region of Eastern and Southern Africa (RESA) operations, UNICEF, and DFID (Kar and Milward 2011). Figure 1 offers a broad approximation of how CLTS adoption in policy and practice has tracked published rates of open defecation.

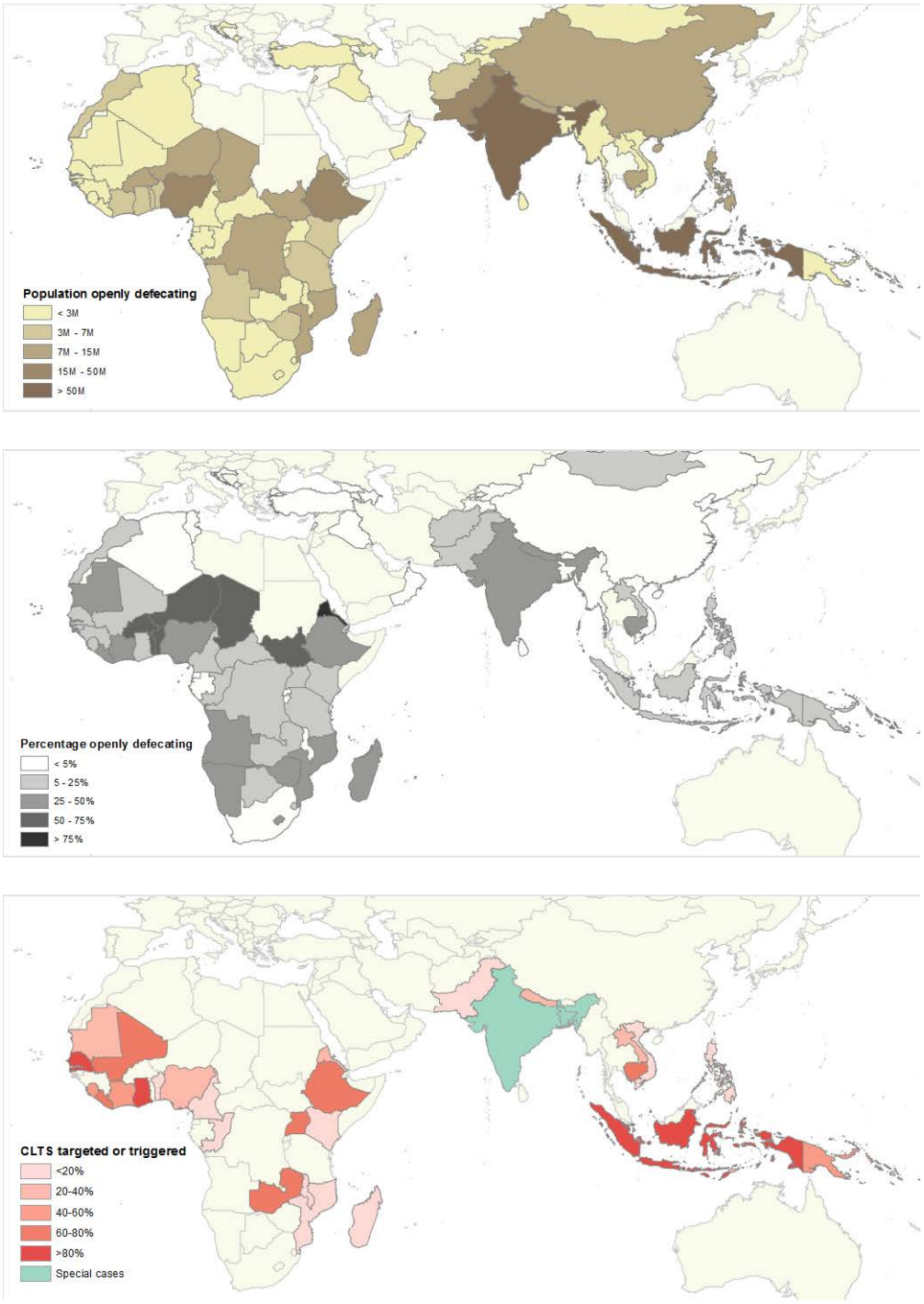
The comparatively rapid mainstreaming of the CLTS approach has been explained as the understandable response to a narrative combining "provocative language, the promise of quick results, low cost and the potential for self-help among the poor" (Bardosh 2015). A few other factors also worked in CLTS's favor:

- Its appearance coincided with a rapid increase in information sharing as the Internet and broadband communications matured in the global South (something that the Self Esteem, Associative Strengths, Resourcefulness, Action Planning and Responsibility [SARAR] and Participatory Hygiene and Sanitation Transformation [PHAST] concepts before it did not enjoy).
- It benefited from the addition of basic sanitation to the Millennium Development Goal (MDG) targets in 2002 where its lack of progress was gaining increasing attention.
- It was championed by an energized group of committed intellectuals.

It is possible to think of CLTS as not just a behavioral intervention, but a "movement": Robert Chambers of the University of Sussex' Institute of Development Studies (IDS), whose name and institutional home have become synonymous with the dissemination of CLTS-related information, describes himself as "a participant-observer-activist in the growth and spread of CLTS since its early days" who early on felt compelled to "hold firmly to the core revolutionary principles" of the approach (Chambers 2016). Meanwhile, as the original pioneer of the CLTS concept, Kamal Kar has visited dozens of countries promoting CLTS best practices to governments, civil society organizations, and donors.

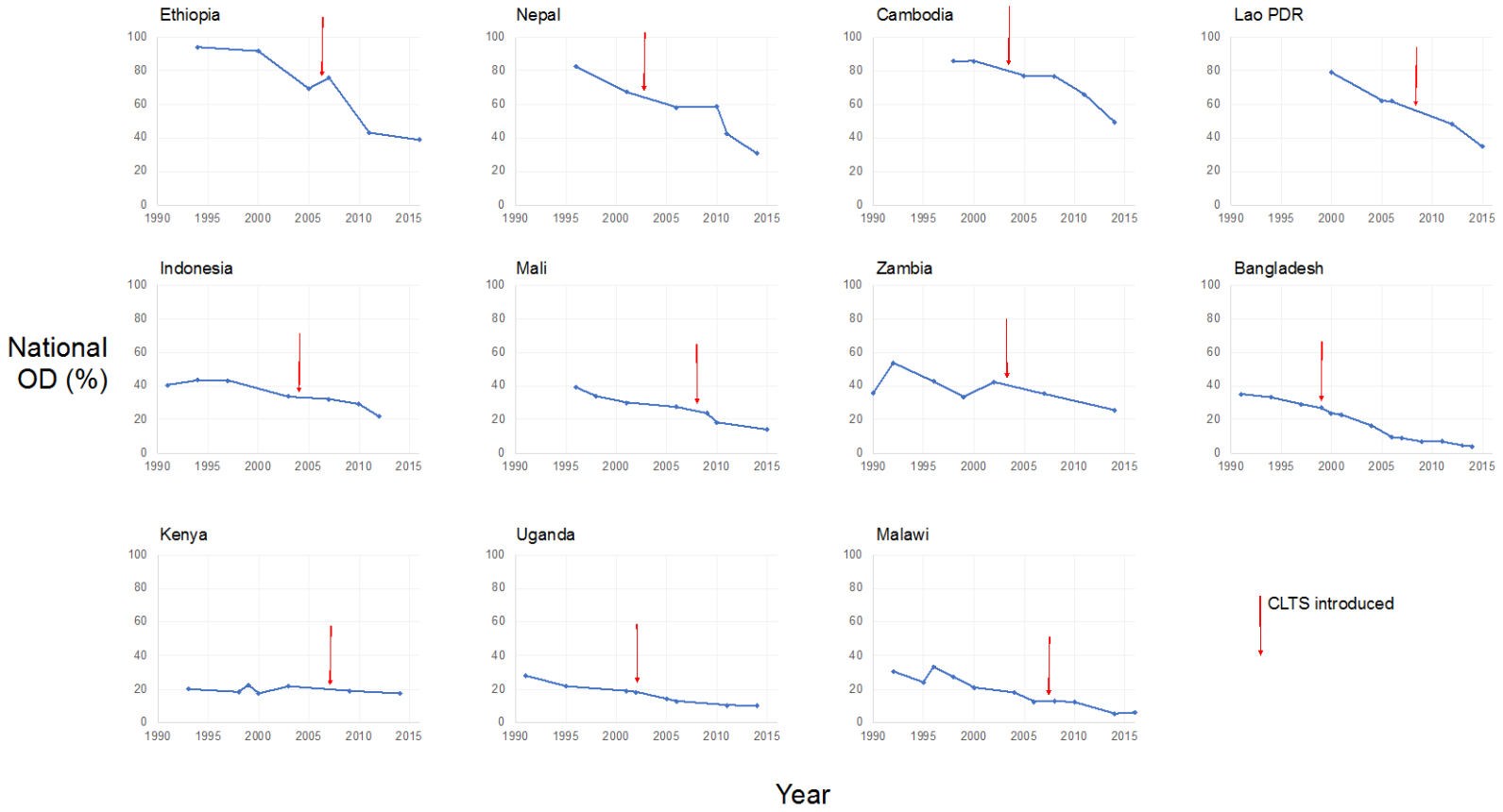
Though its global reach is truly impressive, CLTS cannot yet be linked causally to national declines in open defecation. Figure 2 introduces OD trends for 11 countries drawn from discrete source data used to compute national estimates by the Joint Monitoring Programme (JMP) of the World Health Organization and UNICEF. (These are not the only countries in which CLTS has been implemented widely, but we exclude others because there are either insufficient post-CLTS data to even suggest a signal related to CLTS implementation, or else because – like India and Tanzania – CLTS was employed as a part of an integrated policy that expressly includes other supply-side elements, such as market enhancements or large-scale direct government provision of toilets.) The inability to draw a causal connection is related to three factors: 1) a general lack of a clear "inflection" post-CLTS introduction among any of the countries we examined, 2) the reality that "introduction" of CLTS can mean many things, and that widespread implementation so as to affect national statistics can take years to occur, and 3) that even while CLTS has been incorporated into national policy, it has not been *implemented nationally* during the period of record such that there are post-implementation data that would point to a causal effect anywhere.

Figure 1. Open defecation and the global reach of CLTS. Estimates of the overall population (top) and population percentages (middle) openly defecating, according to 2015 data from the Joint Monitoring Programme (WHO/UNICEF JMP 2015); and estimates of the fraction of a given country targeted or triggered under CLTS (bottom, based on a desk scan of the gray literature – see Annex 1).[3]



[3] Even rough estimates of CLTS coverage in both Bangladesh and India pose a challenge. Both countries are home to massive rural sanitation campaigns and programs of which CLTS or CLTS-like elements have been a significant part. For this reason we display them as "special cases" and offer no numerical estimate of coverage.

Figure 2. Estimated national-level open defecation trends for selected countries, 1990-2015. Data points include only Demographic and Health Surveys (DHS), Multiple Indicator Cluster Surveys (MICS), and national census data, as referenced by JMP, but are *not* JMP statistical trend estimates (WHO/UNICEF JMP 2015).



At the same time, even staunch advocates of CLTS recognize that the approach is, as of 2018, approaching a moment of transition in its trajectory towards a consensus view that it is an effective public health intervention throughout the developing world independent of other measures. Specifically, there appears to be growing acceptance that some elements of CLTS dogma may need to be reconsidered in the interest of adapting and evolving the approach to fit national and local conditions, most obviously with respect to concerns about the sustainability of CLTS-driven behavior change and its ability to move the poor up the sanitation ladder (Chambers 2016).

This desk review is intended to consolidate CLTS-related knowledge and best practices in the context of national efforts to change sanitation behavior and deliver improved sanitation services. It identifies knowledge gaps and informs future research to fill those gaps where both robust literature and feedback from experienced participants warrant it.

Specifically, the review attempts to shed light on the following key questions, which also are used as the basis for structuring the document:

- What qualifies as CLTS? In its widespread implementation globally, CLTS has taken varying forms in different settings.
- How is ODF status defined and certified, and how well is the information supporting ODF assessments typically collected?
- What is known about CLTS's impacts on behavior, toilet ownership, and public health?
- What factors internal and external to CLTS implementation drive performance?
- What is known about the approach's ability to sustain behavior change?
- How well does CLTS serve to propel households and communities up the sanitation ladder?
- What other measures should accompany CLTS to increase progression up the sanitation ladder, reach to the most vulnerable, and ensure sustainability of OD reduction?
- What is known about the true costs of CLTS implementation?
- Does CLTS foster gender equality and social inclusion, and what measures can be reasonably taken to improve its effectiveness in this regard?

This is not a formal systematic review. (We direct readers to Venkataramanan et al. (2018), whose systematic review was conducted independently of this desk review over roughly the same period, and whose findings are largely consistent with our own.) Rather than select articles based on a strictly defined keyword search and inclusionary criteria, we have taken an expansive view of the evidence base and incorporate elements of the gray literature as well. Furthermore, we rely on both an analysis of the literature and interviews with key sector participants. Our literature collection was developed via the integration of a number of pre-existing libraries integrated on the Mendeley platform and with further source-gathering via snowballing. Our survey of the grey literature includes such aggregation sites as the resources pages of the CLTS Knowledge Hub, IRC, the SuSanA Sanitation Library, and the World Bank document repository, among others.

We conducted phone interviews with 23 individuals selected for their current or past role in design and/or implementation of CLTS in 10 countries (see Annex 4). Interviewees were identified through consultations with international and in-country experts; interviews were conducted in English, Portuguese, or French, depending on the preference of the interviewee, and generally lasted between 50 and 90 minutes.

Our audience includes CLTS practitioners and funders, policymakers, and researchers, and our analytical intention is very much in line with Piers Cross' encouragement to harness CLTS's significant potential for fostering long-term change while recognizing its limitations.

2.0 WHAT QUALIFIES AS CLTS?

KEY TAKEAWAYS

- The original CLTS concept identifies multiple core elements, which, in practice, are emphasized and de-emphasized to adjust to local contexts.
- This local adaptation, while likely a sensible practice, makes analyses of CLTS performance more difficult, insofar as it may hinder the process of identifying deficiencies in execution of the model rather than the characteristics of the CLTS model itself.

CLTS must be understood as a process with the narrowly defined objective of ending open defecation. The *Handbook on Community-Led Total Sanitation*, co-authored by Dr. Kar and jointly published in 2008 by Plan UK and Sussex/IDS, is likely the closest thing to a standard articulation of the approach. It posits that "[CLTS] focuses on igniting a change in sanitation behavior rather than constructing toilets. It does this through a process of social awakening that is stimulated by facilitators from within or outside the community" (Kar and Chambers 2008). With that said, the *Handbook* also makes the case that "ODF is an excellent basis for progress up the sanitation ladder, hygiene and behavior change, creating a healthy environment, and the generation of livelihoods" (Kar and Chambers 2008). (We suggest reframing this assertion as a hypothesis to be tested.)

CLTS represents a dramatic paradigm shift away from centralized, top-down facilities-focused measures for addressing OD. Rather than delivering hardware, subsidizing construction or other financial or in-kind inputs, or prescribing particular designs or models that may not be locally available, CLTS is design-neutral and is receptive to very-low cost installations, including rudimentary pit latrines designed by community members and made of local materials. It is an approach that explicitly targets the whole community rather than individual households, and is shaped by previous difficulties encountered when subsidies or free provision of toilets had been introduced in the absence of local demand for them and/or recognition of the dangers of OD.

The main principles of CLTS are:

1) The avoidance of monetary or in-kind hardware subsidies to households;
2) The avoidance of prescriptions of any particular latrine hardware designs or models; and
3) The employment of such emotional drivers such as dignity, pride, disgust, or shame to trigger behavior change.

While it is not distinctly a CLTS principle, the establishment of sanctions to cease OD often is used as an indicator of the kind of social norms shift that is expected (but not necessarily proven) to lead to sustained, community-wide behavior change. This type of behavior change is reflected in instances where households quickly rebuild failing pits or make successive improvements, such as the addition of a slab, reinforcing pits with brick or concrete, paying for pit-emptying, and so forth.

The *Handbook* prescribes three stages of CLTS:

- ***Pre-triggering preparations***, in which communities are assessed as to "challenge level" for CLTS engagement. During this stage, government and/or NGO implementers convene meetings to secure permissions and cooperation from local leaders to conduct a triggering event and learn of any prior experiences with sanitation subsidy. "Challenge" is described as a function of community size; remoteness; cultural and socioeconomic heterogeneity; social cohesion;

ecological conditions such as vegetative cover, aridity, soils, and topography; water supply; and pre-existing hygiene conditions.

- ***The triggering event***, a public gathering and set of communal activities designed to "stimulate a collective sense of disgust." This event includes a community-led tour of OD sites known as a transect walk; a follow-on rudimentary OD mapping exercise; identification and ranking of neighborhood cleanliness (or rather, "dirtiness"); calculations of individual and community-wide excreta volumes as well as medical expenses for diarrheal illness in the community; a specific activity to demonstrate fecal-oral transmission pathways (e.g., "when there is open defecation, you are effectively eating each other's shit"), and finally, facilitation of a community action plan.
- ***Post-triggering***, in which CLTS implementing personnel visit triggered communities 1-2 times during the first week, and then at increasingly wider intervals to offer "encouragement and support" as well as to remind the community about commitments it has made with respect to an ODF target date. The *Handbook* states explicitly that follow-ups are not to be "too frequent" as the process is designed to be "community-led" rather than "outside institution-led." At the same time, it stresses the importance of this follow-up phase for the encouragement of "participatory monitoring and indicators," the emergence of natural leaders, fostering help for the most vulnerable populations, and involvement of children as behavior change agents.

During post-triggering, access to sanitary hardware can be facilitated through the establishment of "linkages with local markets" (Kar and Chambers 2008). While not specifically employing the term "sanitation marketing," or "SanMark," the *Handbook* references several activities that are typically undertaken in sanitation marketing programs, including inviting traders to community meetings as well as encouraging and training local product and service providers.

The division of CLTS program roles and responsibilities has varied both within and across countries. While the intellectual groundwork for CLTS was driven by Kamal Kar and Robert Chambers (and his colleagues at the Sussex/IDS CLTS Knowledge Hub), field implementation was initially led by Plan International, UNICEF, and WaterAid, working in varying degrees of coordination with local, regional, and national governments. Over the past several years, a single executing agency—often an NGO selected by a government or multilateral donor through a competitive process—has been designated in a number of countries to lead implementation activities; in some cases, UNICEF or the sovereign government itself acts as an implementer (Milward et al. 2014).

Assumption by governments of the responsibility for executing development interventions is frequently put forth as the logical progression for achieving scale and sustainability, but the global CLTS experience has yet to reveal a consistent model for the respective roles of governments (at various levels), NGOs, and others.

Implementation Fidelity

Enthusiastic CLTS proponents suggest that low program performance is often a function of poor execution rather than poor design: there has been a lot of "bad CLTS practice" despite good faith (Vernon and Bongartz 2016a). While elements of the *Handbook* read as fairly strict prescription (most notably the zero subsidy element), one of the document's most significant (and sometimes overlooked) passages is its instruction to readers—prospective CLTS implementers—to be pragmatic:

> *Users of this handbook must feel free to use its guidelines in the way they find best. The methods described are not the only ones for implementing CLTS. Users are encouraged to explore different ways of preparing for CLTS, for triggering, for post-triggering follow-up, and for supporting and spreading CLTS that fit with local conditions, cultures and opportunities. Facilitators must feel free to be inventive and adaptive, and to use their own best judgment in*

> *deciding what to do. The ideas and advice that follow have been tried and tested, but it is for facilitators themselves to decide what works for them.* ***The basic principle is the empowerment of local communities to do their own analysis and take their own action to become open defecation free*** (Kar and Chambers 2008, emphasis added)**.**

In effect, the *Handbook* presents guidance, not standards. Given the vast variation in local conditions across the developing world, this appeal for flexibility seems essential, but such flexibility also makes it difficult to isolate what is meant by "bad practice." Such flexibility has been observed in the field, at least when it comes to the emphasis of different elements of the approach, the activities performed, the definitions of ODF used, and the verification and certification processes implemented (Kar and Chambers 2008).

Unsurprisingly, surveys of CLTS practitioners reveal that selected components of the approach are bestowed with differing levels of emphasis by different groups operating in differing locales. For example, Venkataramanan (2016) reports that triggering tools are not applied uniformly across seven countries, but are instead "adapted;" the transect walk was reported as abandoned by some practitioners in Cambodia due to the observation that villagers would use the walk as an opportunity to sneak away from the triggering exercise.

In Cambodia, Lao, and Niger, shaming is routinely de-emphasized for cultural reasons (Venkataramanan 2016). While it is central to the earliest CLTS approach, the use of shaming has drawn criticism on ethical (Engel and Susilo 2014) and human rights (Bartram et al. 2012) grounds, but other observers question shaming's efficacy relative to other motivators (Gertler et al. 2015). Meanwhile, the sanctions, compulsions, and threats that often stem from shaming have generated concerns about their particularly harsh effects on the most vulnerable and disadvantaged subpopulations within communities (e.g., disabled, elderly, women and girls, and the poorest of the poor) (R. Chambers, personal communication).

Another survey of CLTS implementers found a consistently high application of the transect walk and fecal calculations, but somewhat less reliance on the other elements; similarly, it identified "regular follow-up and monitoring" as by far the most important CLTS implementation priority reported by implementers, with other elements (ODF verification and declaration, fecal calculations, OD mapping, and fecal-oral transmission pathway demonstrations, among others) closely grouped but receiving far lower importance ratings (Sigler et al. 2015). The implication of these findings is that the context-specific nature of CLTS activities makes attribution of outcomes to programs not readily comparable, and thus it becomes challenging to compare results from different programs even when implemented in the same countries, as practices may differ so significantly.

CLTS implementation "intensity" can vary greatly from program to program, with respect to time and resources dedicated to pre-triggering, facilitation itself, and the number of follow-up visits. We consider some recent analysis of the effects of implementation intensity in Indonesia in Section 5 of this review.

A number of our own key informant interviews indicate that even the core CLTS principle of staying silent or neutral on hardware design should be considered an option to be modified or discarded. Multiple interviewees stated that presenting households with latrine options—either during triggering or soon after—would serve to better sustain OD reductions. One interviewee, however, cautioned that presenting options should not turn into prescription and that "setting the bar too high" could demoralize poorer households. In some settings, communities are already presented with options. In Nigeria, for example, the government prepared a brochure of latrine options and designs to be used during triggering, in response to widely observed reversion to OD and perceived frustration on the part of households with low-quality latrines that did not make it through the rainy seasons (though it offers no evidence of whether it resulted in sustained OD or progression up the ladder).

On one hand, the adaptation of CLTS to local circumstances is what the movement's founders have long advocated and represents an advantage of this approach. On the other, it makes it challenging to compare results from different programs implemented even within the same countries, as implementation fidelity may differ so significantly (and begs the question of the degree to which program performance is a function of execution or design).

3.0 THE ODF CONCEPT AND THE "DATA PROBLEM"

KEY TAKEAWAYS

- There is no single fixed definition and measure of ODF status in practice.
- Monitoring of changes in OD and toilet coverage accompanying CLTS implementation is variable and often inadequate.
- CLTS performance reporting often involves self-declarations of ODF status, "verification" of declarations by selected oversight authorities, and/or official "certification" and formal recognition of achievement.
- A number of national monitoring systems are in place, but the quality of the data embedded in these systems is often difficult to assess (particularly where the data input into these systems is performed by those with a stake in reporting good results).

3.1 THE CONCEPT OF ODF STATUS AND ITS VARYING DEFINITIONS

The ODF concept is among the most important elements of the CLTS approach. The *Handbook* defines ODF at the level of the household:

> ***ODF*** *means open defecation free, that is, when no faeces are openly exposed to the air. A direct pit latrine with no lid is a form of open defecation (fixed point open defecation), but with a fly-proof lid (with or without the use of ash to cover the faeces after defecation) qualifies as ODF. Defecating into a trench and covering the faeces can be part of the transition from OD to ODF* (Kar and Chambers 2008).

Even with this definition, demonstrating that a household is ODF is not particularly straightforward. ODF determination requires establishing where each member of a household defecates each time, measuring consistent usage of a qualified ODF fecal capture facility by every member of the household, and verifying that none of the members of the household OD. (Convincingly demonstrating that an entire community is ODF is a far more complex undertaking, as we discuss below.) Community-wide achievement of ODF status—the collective elimination of OD—is unquestionably the most fundamental objective of CLTS. On its face, an ODF community is one where no feces are exposed to the air, which is to say every resident defecates in a latrine with either a fly-proof lid or some covering. Thomas and Bevan (2013) acknowledge that the basic meaning of ODF is the absence of open defecation in a specific jurisdiction (village, district, etc.), but also draw the connection to latrine coverage. They write, "implicitly [ODF] means that all members of that community have access to and are using a latrine. *The translation of the definition into monitorable indicators is where we see the reflection of priorities and nuances*" (emphasis added).

Encouragingly, many national governments have put in place protocols and monitoring mechanisms for tracking the progress of CLTS and related interventions, such as market-based sanitation programs (Pasteur 2017; Thomas and Bevan 2013). These protocols vary considerably from country to country to accommodate differing national ODF definitions; meanwhile, the ODF concept itself has evolved and sometimes grown more ambitious to accommodate other sanitation and hygiene goals.

Countries that have incorporated CLTS into their national sanitation policies define ODF as part of their general CLTS policy or else in verification and certification protocols, and usually require, at minimum, that there are no feces in the open environment and that every household has access to a fly-proof

latrine. Language referencing "access" to and "availability" of latrines leaves open the possibility of shared or communal facilities (even explicitly so, as in Ghana), whereas some countries, such as Indonesia, Mali, the Philippines, and Zambia, specify ownership of private latrines (see Annex 2).

In some cases, guidelines and protocols provide specific technical requirements for constructed latrines. In Ethiopia, ODF status can be achieved only if all latrines in the community have a pit cover (Federal Democratic Republic of Ethiopia and Ethiopian Ministry of Health 2012). In Zambia, latrines are required to have a superstructure providing privacy and a smooth/cleanable floor in addition to a pit cover (Government of Zambia 2013). In Tanzania, recognition for ODF status requires the construction of an improved latrine per the definition of the UNICEF/WHO Joint Monitoring Programme (JMP) (Government of Tanzania 2016).

Responding to a perceived public health imperative, several countries include in their ODF definition requirements such as safe water storage and the provision of sanitation facilities in public spaces, schools and health facilities. In Kenya, Mali, Nigeria, Tanzania, and Zambia, a handwashing station with water and soap/ashes is required. In Zambia, households are also required to have a dish rack and refuse pit (see Annex 2), though in other countries, these additional, non-toilet-specific criteria lead to a "post-ODF" designation sometimes coined "total sanitation." The Philippines Approach to Total Sanitation (PhATS) offers an illustrative example of how communities are recognized as they proceed upwards through increasing levels of safety and WASH service delivery (Robinson and Gnilo 2016b).

In an assessment of Plan's CLTS efforts across four countries, inferences about ODF sustainability are quite sensitive to the ODF definition in different settings (Tyndale-Biscoe et al. 2013). The authors point out that when ODF status is measured strictly by counting latrines, Plan's programs suffered from only a 13 percent decline between an initial certification of ODF status and the independent re-verification visits several years later. In other words, 87 percent of nearly 5,000 re-verified households continued to possess a functioning latrine (Tyndale-Biscoe et al. 2013). However, when secondary parameters were included (e.g., the existence of superstructure, sealed covers for fly control, absence of observed excreta around the house, handwashing facilities with water and soap or soap-substitute such as ash, and evidence that the latrine and handwashing facilities were being used), "slippage" rates increased dramatically. Using only the criterion of visible signs of OD around the house, only 8 percent of sampled households could be described as backsliding from ODF status; using the presence of handwashing facilities with soap, that number rises to 25 percent; and if all of the aforementioned criteria were included, slippage rises to over 90 percent (Tyndale-Biscoe et al. 2013).

Among our key informants, some did argue for being more aggressive with ODF criteria, particularly with respect to households installing superstructure and slabs, for example. While we did not observe a clear consensus, a number of interviewees did suggest that evidence of slippage resulting from low-quality latrines should stimulate at least a reflection on, if not revision of, the ODF definition in areas where they worked.

3.2 MONITORING, VERIFICATION, AND CERTIFICATION OF ODF STATUS AND THE CLTS "DATA PROBLEM"

In the CLTS space, the terms "monitoring," "verification," and "certification" are distinct concepts and it is important to distinguish among them. For this review, "monitoring" is defined as the measurement of activities and outcomes, whether conducted as internal performance tracking by an implementing organization, inspection and oversight by regulatory institutions, or as part of third-party evaluations. "Verification" and "certification" have come to mean distinct things with regard to CLTS, but there are instances in which monitoring activities may feed into verification or certification processes.

In summarizing international practices, Pasteur (2017) describes a sequence in which self-declarations of ODF status by communities are followed by *verification,* and ultimately, an official *certification* from either

a higher jurisdictional authority or a dedicated third-party institution: "verification is the process of assessing ODF and hygiene behavior change in a community for the purposes of certification." Certification is the official recognition resulting from the full achievement of ODF, or else the satisfaction of specific sanitation-related goals such as household toilet ownership, minimum latrine quality criteria (including, in some settings, a properly fitting latrine cover, presence of handwashing facilities, and institutional indicators such as the existence of WASH committees or action plans). The sequence of community self-declaration, verification, and official certification is embedded in many of the national CLTS policies. Annex 3 presents verification and certification processes in selected countries.

In line with what is suggested in the *Handbook*, verification is often performed by a team of diverse members that might include staff from government departments at different levels, staffs of NGOs, community, traditional, and/or natural leaders, teachers, and members of the public. In some cases, all members of the verification or certification teams must sign any relevant inspection documents, women must be involved, and ODF status is re-checked multiple times at varying intervals (see Annex 3). There does not appear to be a dominant convention with respect to full census vs. subset sampling of communities or households. Household visits, visits to defecation sites and public spaces including markets, schools and health centers, and conversation with local leaders may all be used in combination during verification and certifications.

Third-party certification is still not widespread. One of the rare exceptions is Kenya. Sara (2016) reports on the ambitious protocol put in place by the Kenyan government, whereby communities self-declare ODF status, following which they place a claim with the local public health team (District Public Health Officers) for a verification assessment. A positive determination from local authorities then results in an official certification review by a third-party, which in the Kenyan case was executed by a Kenyan NGO unconnected to any CLTS implementation in the country (Sara 2016). This approach was said to be unique in Africa at the time of its initiation; however, it faced the immediate problem of straining the management capacity of a single small third party organization to manage, and cost (roughly $85/village certification) also was identified as a constraint (Sara 2016). In recent years the Kenyan certification model has been adjusted to reflect both these challenges as well to maintain consistency with the government's more general decentralization policies, with the single certifying NGO transitioning from certifier to recruiter/trainer of "master certifiers" (Sara 2016). Challenges associated with the revised approach are ongoing, yet it is worthy of examination as a potential model for other countries and programs.

The very existence of these national verification and certification protocols for CLTS and related programs is encouraging, especially where the protocols are sufficiently well executed as to result in rejections of ODF status applications, rather than rubber stamping self-declarations. Still, a great deal of caution must be taken in the interpretation of their results. The problem is not strictly gaming or inaccurate reporting; there is a broader, fundamental data problem, best encapsulated in a report by UNICEF published in 2013 that focused on CLTS in East Asia and the Pacific. Its top-line conclusion is that "CLTS works" in the East Asia and Pacific regions, having triggered community-level sanitation activities in 12,000 communities, resulting in over 3 million individuals living in 2,300 communities declared open defecation free (UNICEF 2013). Yet in the very next section, the report declares that "basic CLTS data [are] not readily available:"

> *CLTS monitoring remains a significant weakness, at both national and project levels…few countries have mechanisms that require routine reporting or analysis of monitoring data, thus there is little demand for the data. As a result, monitoring systems are rarely maintained or sustained, and the reliability of monitoring data is rarely checked. In part, this weakness reflects the lack of CLTS or sanitation-related objectives in national plans and strategies, which limit high-level interest or the need for regular reporting of CLTS progress and outcomes. [UNICEF's] country CLTS review teams often had to collect data directly from implementation agencies in*

> *order to compile national summaries of CLTS progress, and there remain questions about the reliability and accuracy of some of the data reported.* (UNICEF 2013)

Two years later, an update to this report included familiar themes. The report update stated:

> *Basic CLTS monitoring data were not readily available at either national or programme levels. Ten out of 12 review countries struggled to provide current CLTS progress data. By asking countries to report on triggered and ODF communities (as core indicators of progress), the difficulty in collecting this data was more revealing about country monitoring systems than the data itself, as the data collection process was complicated despite the best efforts of review teams.* (UNICEF 2015)

In short, CLTS has a data problem: CLTS-related statistics tend to be inflated (Robinson 2016; Chambers 2016), and just as importantly, the statistical measures used to assess CLTS program performance are not consistently applied or presented. This concern has been on the minds of thoughtful implementers and observers for some time. A systematic review of the grey literature in CLTS (Venkataramanan 2012) identified the problem in slightly different terms, noting "a widespread need for standardized monitoring mechanisms, rigorously evaluating CLTS projects, and appropriately using data that is already being collected … the need to generate value for collecting monitoring data and using it to improve CLTS outcomes was also expressed frequently."

A recent evaluation commissioned by Plan, together with the Dutch Foreign Affairs Ministry (Robinson 2016), is remarkable for the transparency exhibited by a pioneering implementing organization deeply invested in the CLTS approach. The report includes the heading "Over reporting of ODF results," with accompanying text that reads:

> *Until the final evaluation, the Plan program monitoring system reported that the ODF population achieved was 2.48 million people, or 108 percent of the program ODF target. It was only when the evaluation team reviewed the ODF population data, and insisted on checking village names and populations against ODF verification records, that the extent of the over-reporting of ODF progress became apparent* (Robinson 2016).

The evaluation goes on to note that four countries (Kenya, Malawi, Niger, and Zambia) were found to over-report results by between 200 percent and 500 percent, attributing the error to government partners conflating self-declared and independently verified ODF communities as well as over-estimating the populations of triggered communities (Robinson 2016).

It also highlights a systemic weakness of the use of "number of ODF communities" as a performance indicator, insofar as it may incentivize implementers to target smaller, and thus less challenging, communities, as well as to incentivize unreasonably rapid achievements of ODF status at the expense of latrine quality and sustainability, according to several key informants we interviewed. Because of the differing definitions of ODF status as well as the uneven reliability of programmatic self-reports, we too do not have particularly high confidence in estimates of so-called ODF "hit rates" (the proportion of triggered communities that eventually are designated open defecation free), but an examination of some the publicly available data is still illuminative. The Global Sanitation Fund (GSF) reports hit rates for each its 14 country programs on its website as of the end of 2016. The median reported national hit rate is 69 percent, with a range from 2 percent in Benin to 85 percent in Ethiopia (with India at 21 percent, Tanzania at 24 percent, Nepal at 55 percent, and Senegal at 76 percent, to name a few select data points).[4] Among the 14 GSF countries, there is no clear univariate relationship between the reported hit rate and GSF program disbursements (either in aggregate or per community triggered), nor is there a

[4] http://wsscc.org/global-sanitation-fund/

relationship between hit rate and the scale of the program (the overall number of communities triggered). Reported performance is widely variable, and even with possible inflation of results, it is thus highly likely that there are countries and programs where conversion of households to ODF status is facing considerable difficulty.

With the goal of enhancing data quality, facilitating data use, and ultimately improving monitoring, a number of countries have begun to employ smartphone and mobile-to-web (M2W) enabled data collection, processing, and reporting tools in support of their CLTS deployments. The Zambia case is particularly intriguing, with reports of nearly unparalleled gains in latrine coverage resulting from M2W support of CLTS in roughly two thirds of rural Zambia, with 1.5 million new users of household toilets brought online over a one-year period (Markle et al. 2017), and other reports pointing to a 88 percentage point increase in latrine coverage achieved over eight months and sustained over another 12 months (Zimba et al. 2016).

More generally, we suggest that a systematic, independent assessment of the reliability of national monitoring protocols is an important research priority if countries are to rely on these systems for decision-making regarding program design and analyses, CLTS implementation fidelity, and program success. In some circumstances, independent proxies can offer a reliability measure. In India, for example, JMP data provides a useful set of data points to match against sanitation coverage numbers reported by the Indian government's Department of Drinking Water and Sanitation, the lead executing organization for India's Total Sanitation Campaign (Hueso 2013).

A recent Learning Brief from the CLTS Knowledge Hub dedicated to monitoring, verification, and certification argues that in addition to seeking reliability and managing cost, "these processes should be participatory, positive experiences, encouraging pride and self-respect, ensuring acceptance of findings, and reinforcing sustainability of positive achievement" (Pasteur 2017). Following this logic, the ultimate evaluation and verification tool would enable robust CLTS "audits" without alienating local communities and the various stakeholder groups already bought in to the CLTS approach.

4.0 WHAT IS KNOWN ABOUT CLTS IMPACTS?

KEY TAKEAWAYS

- ODF status and OD rates are more difficult to measure than toilet coverage.
- In some contexts, toilet ownership may offer a reasonable proxy for OD rates, but local validation of the relationship is essential.
- The nature of monitoring (independent vs. implementer-driven) appears to influence the degree of success reported.
- Evidence of the benefits of CLTS accruing to the lowest-income segments in a community are mixed.
- One high-quality study of a robust CLTS program in rural Mali indicates that the approach can reduce child growth faltering (as well as improving equity in toilet coverage), but broader inferences about the health benefits of CLTS require replication of these results in other settings.
- There is growing evidence of the herd protection afforded by latrine coverage, which is supportive of CLTS's focus on communities (as opposed to individual households).
- Further examination is warranted to determine whether clean, well-maintained, unimproved toilets (of the kind built under some of the allegedly more successful CLTS programs) may offer protective effects.

After almost 20 years of CLTS implementation in an array of geographies and contexts, a strong case can be made that knowledge of its effectiveness, in general terms, is still lacking. This broad knowledge gap is a function of two problems: (1) there is consensus on neither the optimal performance parameters nor how, by whom, and with what frequency those parameters should be measured; and (2) the parameters that are measured, when they are measured, often lack both internal and external validity.

4.1 OD OR TOILET COVERAGE?

What to measure is not as straightforward as it may seem. According to the *Handbook*, CLTS is expressly an intervention intended to inspire collective action to end open defecation: it "focuses on igniting a change in sanitation behavior rather than constructing toilets" (Kar and Chambers 2008).

This is an essential point that is frequently reiterated by the CLTS advocates: the benefits of CLTS to individual community members are driven by actions of the full community, hence the drive to achieve the total elimination of OD. The impetus behind the approach is participation and community empowerment, but the logic of the approach is actually reinforced by important new evidence on both the drivers of OD behavior and herd benefits of community-level increases in toilet coverage. In rural India, the fraction of households in a community that report practicing untouchability (abiding by and reinforcing the "contaminating" status of a shunned social caste, or group) is highly correlated with the practice of open defecation by a household within that community—more so than whether the household itself reports the untouchability practice (Spears and Thorat 2016). The authors add: "once village untouchability is added to the model, the coefficient on own household practice of untouchability becomes much smaller and not statistically significantly different from zero" (Spears and Thorat 2016). Rural Indian households appear to be responding to a strong cultural norm in a way that overrides even their individual notions of purity. On the health side, two recent papers demonstrate that with respect to child growth, latrine coverage across a defined area surrounding a household is more important than

individual ownership by a particular household (Harris et al. 2017; Fuller et al. 2016), though both were situated in rural, highly isolated populations.

At the same time, this focus on collective action and the achievement of ODF status means that "counting toilets" is sometimes disparaged as misdirecting emphasis away from behavior change (UNICEF 2013), with arguments that household ownership and usage are distinct (Vernon and Bongartz 2016a), and thus full-latrine coverage might not correspond to the ending of OD. The unforeseen cost of this occasional aversion to counting toilets is a de-emphasis of baseline surveys (Robinson 2016), a dynamic that renders programmatic impact evaluation considerably more difficult.

Regardless of how its advocates may conceive of it, CLTS is often viewed by implementers, researchers, and policymakers as an intervention that must ultimately result in the installation of toilets as a means of facilitating the sustained ending of open defecation. Piers Cross was strategic in his choice of words, referring to CLTS changing the way the world seeks to "improve sanitary conditions for the poor" (CLTS Knowledge Hub 2016).

If one accepts the argument that CLTS expressly focuses on the elimination of OD, the challenge of reliably evaluating CLTS program performance becomes a thorny problem, since counting latrines is considerably easier and less expensive (Chambers and Myers 2016) than determining what fraction of a community openly defecates. While there are studies in which self-reported open defecation tracks logically with objective measures of latrine coverage (Crocker, Geremew, et al. 2016; Arnold et al. 2010; Briceño et al. 2015; Pickering et al. 2015), data from other sources suggest a relationship between OD and latrine coverage that is both complex and geographically dependent.

The JMP publishes national-level water and sanitation coverage estimates for any given year, estimated from temporal lines-of-best-fit among results from available censuses, administrative reports, and an array of household surveys (such as the Demographic and Health Survey [DHS], the Multiple Indicator Cluster Survey [MICS], and others) (WHO/UNICEF JMP 2015). The data published by JMP do not include open defecation and toilet coverage statistics collected independently; instead, open defecation is a category along a sanitation "ladder" that also includes, in increasing levels of quality, "unimproved," "shared," and "improved" facilities, such that the percentages of these categories sum to unity. However, these numbers do not account for toilet usage; in some geographies (most notably rural India), toilet ownership distinctly does not correspond with exclusive use; OD can persist even in the face of full coverage (see Figures 3 and 4).

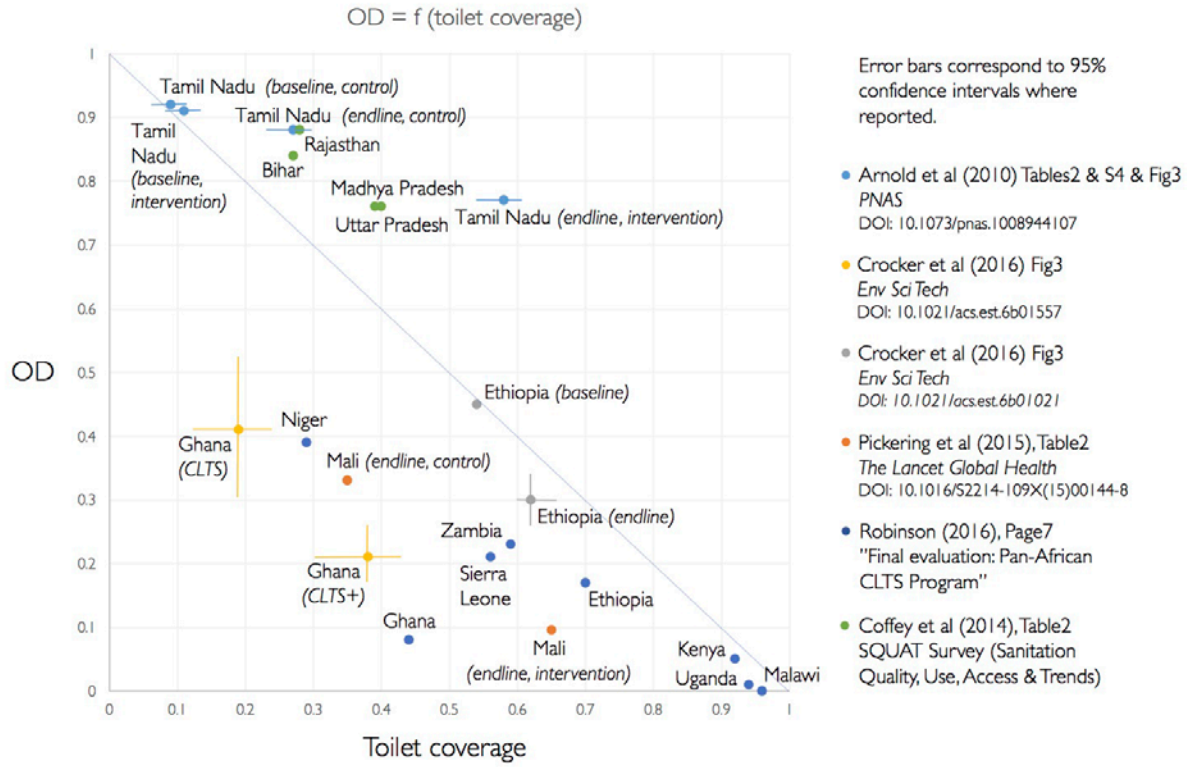
In addition, the varying prevalence and reporting of shared sanitation must be considered carefully not only because of how they complicate the prospect of inferring open defecation from household sanitation coverage, but also because there is suggestive evidence of reliance on shared latrines exposing populations to elevated diarrhea and intestinal worm infection (Heijnen et al. 2014).[5]

The relative ease (and low cost) of counting toilets makes understanding the relationship between reported OD and toilet coverage important; if the relationship is clear enough, OD may be able to be inferred from toilet coverage in some, if not all, settings. Figure 3 summarizes data from several studies (both from refereed journals and two articles from the gray literature which include third-party data collection and/or analysis), with intriguing results. There are two obvious clusters: one consisting of the African countries and the second consisting of data from a number of Indian states. In Africa, with the

[5] The authors note, however, that the strength of that evidence is weak and must be interpreted with caution pending research accounting for confounders. Meanwhile, it has been argued that the JMP's exclusion of shared sanitation from the "improved" classification fully explains the apparent lag in global sanitation behind progress in safe water supply provision (Cumming et al. 2014), making the case that future national estimates of WASH service delivery performance must rely on a household-level benchmark for water in addition to sanitation. JMP-reported prevalence in communal or shared toilet usage is notably high in West Africa; elsewhere, local custom may prohibit sharing between selected members of a single extended family (such as between sons and daughters-in-law and parents-in-law in parts of Kenya and Zambia), necessitating the construction of additional latrines for a particular household.

exception of data from Ethiopia reported by Crocker, Geremew, et al. (2016), self-reported OD seems to be somewhat underreported: OD percentages reported from studies in which household toilet coverage is low are considerably below where they should be if presence of a household toilet were to correspond to zero open defecation by that household. (In that case, we would expect all data points to lie on the reference line with a slope of -1.)

Figure 3. OD as a function of household toilet coverage. (Data sources listed at the right.)



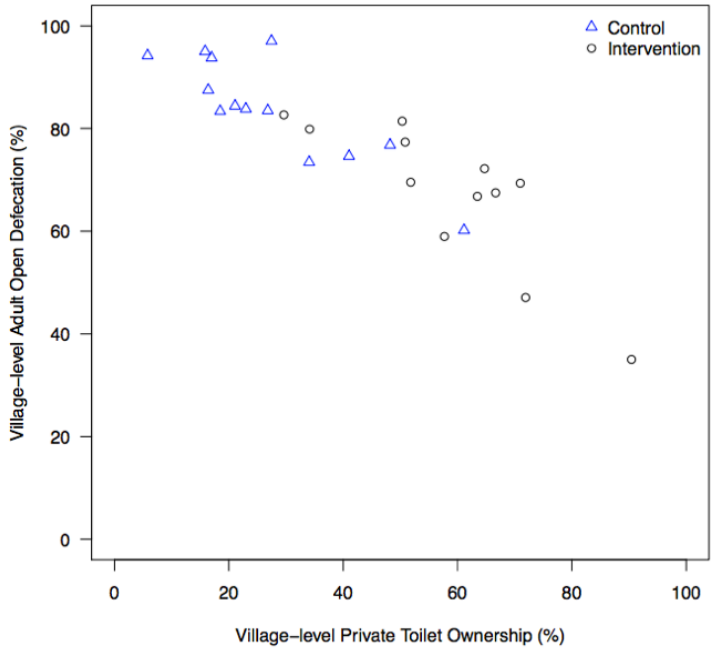
Shared sanitation prevalence varies widely across countries, and the JMP numbers offer another possible explanation to why the Ghana, Mali, and Sierra Leone data points in Figure 3 are so far removed from the 1:1 line.

Meanwhile, India represents a unique case, as has been increasingly noted (Hathi et al. 2016). Under-reporting of OD seems not to be happening in the available published reports from different parts of rural India; indeed, there is a clear pattern of OD being reported by households in possession of an improved toilet. Both of the major published evaluations of India's Total Sanitation Campaign note very high percentages of self-reported OD by households with government-delivered JMP-defined improved toilets, with numbers above 50 percent in the state of Orissa (Barnard et al. 2013) and on the order of 40 percent for the state of Madhya Pradesh (Patil et al. 2014).

While the country-level patterns offered in Figure 3 offer a helpful first approximation, making use of all available village or cluster-level data on the OD vs. latrine coverage relationship will be invaluable to explore the ways in which such patterns hold up in specific local or regional contexts. Figure 4 provides the village-level OD and toilet coverage percentages from which the four "Tamil Nadu" data points in Figure 3 are derived (Arnold 2009). These present a compelling relationship that appeared to be in place in the study area in Tamil Nadu in 2008, in which even 100 percent toilet coverage would not prevent a significant fraction (30–50 percent) of open defecation within the population (because of the well-known lack of exclusive use observed in rural India), a village-level finding that is consistent with the same

study's household survey results; 39 percent of surveyed households reported that adults practice daily OD and 52 percent reported that under 5 year old children practice daily OD.

Figure 4. Village-level adult open defecation prevalence in Tamil Nadu state as a function of village-level private toilet ownership. Data include 900 households measured in 25 villages (Arnold 2009). Reprinted with permission.



The pattern in Figure 4 is notable on several levels. First, there is higher cultural acceptance of open defecation in rural India than elsewhere, particularly among adherents to Hindu conceptions of the practice of purity (Spears and Thorat 2016). Second, the data were collected as part of an evaluation of an integrated WASH program that employed multiple elements of CLTS – including shaming, a measure that in many geographies would make respondents less likely to honestly report open defecation. Rural India may be the only setting in which the OD vs. private toilet ownership distribution lies almost fully above the 1:1 line (in other words, where OD persists even when the household private ownership is total within a community).

Broadly, however, these data speak to how important it is to address two related questions for reliable measurement of changes in OD for a given field deployment of CLTS: first, how does OD vary with toilet coverage, and second, how honestly households report their own OD? At least one study (Gertler et al. 2015) attempts to quantify these relationships for four countries where large trials were conducted: Mali (where the installation of a private toilet reduced household OD rates by 29 percent), Tanzania (36 percent), India (37 percent), and Indonesia (61 percent). With analyses like these in hand, it may be possible to infer changes in OD from surveys of toilet coverage, which in addition to being an objective performance parameter, is vastly easier to measure, regularly, at scale and on reduced budgets.

4.2 INDEPENDENT ANALYSIS YIELDS DIFFERENT RESULTS FROM PROGRAMMATIC REPORTING

A number of researchers examine latrine ownership as a key performance metric for CLTS programs, for reasons that include those explored above.

In one peer-reviewed systematic review, CLTS resulted in a statistically insignificant average 12 percentage-point increase in latrine coverage and a statistically insignificant average 14 percentage-point

increase in latrine use, though in both cases there was wide heterogeneity among studies (I^2 = 94% and 98%, respectively) (Garn et al. 2016).[6] When other interventions are integrated with the deployment of CLTS, the pooled estimates yield even lower average benefits (a statistically significant six percentage point increase in coverage and seven percentage point increase in use, with considerably lower heterogeneity; I^2 = 82% and 78%, respectively). Garn et al. (2016) rely on a total of only 5 published papers for these estimates. A sixth, high-quality study (Cameron and Shah 2017), detecting only a 3.3 percentage point increase in latrine coverage resulting from a large CLTS program in East Java, Indonesia, would have lowered the overall effectiveness estimate by Garn et al. (2016), but it was published too late to be included.

Garn et al. (2016) do offer the caveat that the inclusion of two excluded papers (Harvey 2011; Sah and Negussie 2009) would have raised their estimate of the CLTS effect to an average 31 percentage point increase in latrine coverage, but they excluded these two papers because they had "inadequate reporting of a measure of variation."

Finally, an article by Pattanayak et al. (2009) included in Garn et al. (2016)'s systematic review, but not categorized as a CLTS intervention – thus falling outside of the overall effectiveness value estimated by the authors' meta-analysis – is worthy of mention here. The random assignment study examines "an intensified version" of India's Total Sanitation Campaign (TSC) in the state of Odisha that "draws on" CLTS, described by the authors as "a promising but untested" model (Pattanayak et al. 2009). Using a difference-in-difference (DiD) estimator, the authors suggest a 29 percentage point increase in toilet ownership attributable to the intervention, with a more pronounced (34 percentage point) effect on below-poverty-line (BPL) households.[7]

In their analysis of teacher involvement in CLTS activities in Ethiopia, Crocker, Geremew, et al. (2016) did not observe changes in the percentages of ownership of improved latrines (or latrines more generally) attributable to the intervention, but did find reductions in OD as well as improvements in latrine quality and maintenance.[8] The authors hypothesized that households may have prioritized maintenance and care over new investments in hardware, possibly due to a lack of market availability of materials and parts (Crocker, Geremew, et al. 2016).

Sah and Negussie (2009) describe a 49 percentage-point increase in latrine coverage in a single Tanzanian village over a three-month period as reported by the implementer, Plan Tanzania. There is no control group and no apparent independent verification of the result. Similarly, the examination in Harvey (2011) that presents an overall latrine coverage increase of 58 percentage points for an intervention area encompassing some 500 villages in Zambia is authored by a representative of UNICEF, reporting on a project for which UNICEF provided both funding and technical support, and did not include explanations of how data were collected or by whom.

The grey literature is generally aggressive in its reports of CLTS successes. In preparation for this review, we conducted short summaries of the large-scale sanitation programs in several dozen countries, relying almost entirely on program reports from the gray literature. Many of the assessments on which these summaries rely are produced by the institutions implementing the programs in question without third-party verification. An early assessment performed by WSP reported nearly 50,000 latrines constructed in the three months following a CLTS triggering in Mozambique (A. Godfrey 2009). Another assessment (Milward et al. 2014) executed by the CLTS Foundation reported 840,000

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[6] The duration between baseline and end-line data collection in these studies varies considerably.

[7] Importantly, however, this CLTS deployment also included some poverty-targeted subsidy. We address that aspect of the study's results in Section 8.2.

[8] This study models open defecation rates based on both survey responses ("Sanitation outcomes were assessed by asking heads-of-households where they primarily defecated") and latrine observations.

individuals in Madagascar ceasing open defecation after three years of CLTS. The CLTS Knowledge Hub reports a statistic attributed to the Ethiopian Ministry of Health of some 24.6 million individuals living in over 4,900 ODF-declared villages that were triggered by the country's Community-Led Total Sanitation and Hygiene (CLTSH) program.

There are, of course, exceptions in both the refereed and grey literatures. If meeting the inclusion criteria, a recent peer-reviewed article (Zimba et al. 2016) released too late for consideration by Garn et al. (2016) would have likely raised the pooled estimate of CLTS effectiveness, as it reports an unparalleled 88 percentage point increase in latrine coverage for an entire Zambian district between January 2014 and September 2015. And in the opposite direction, a non-peer-reviewed report produced as part of the Gates-funded Triple-S project (Pendly et al. 2013) cites a UNICEF assessment pointing to an anticipated modest 8 percentage-point increase in coverage in three Mozambican provinces under the One Million Initiative (OMI) in that country.

Again, however, the results put forth by independent studies and reports of CLTS program performance diverge widely from those released by individuals and institutions with a stake in reporting successes. This is clearly not a problem that is unique to CLTS, nor to sanitation programs more generally. However, we suggest that carefully thought-out, concerted effort to reconcile the two "poles" of CLTS performance evidence, perhaps through novel forms of data collection and monitoring responsibilities (and associated incentives), is warranted.

4.3 DOES CLTS BENEFIT THE POOR?

The idea that CLTS is an approach intended to achieve the total cessation of open defecation in the rural communities in the developing world, and is thus, by construction, a measure that benefits the poor, is certainly a defensible position. Along these lines, it can be argued that the fundamental strength of CLTS is that it is designed to reach *everyone*, because ODF achievement requires eliminating the practice of open defecation by *everyone*. As compared to prior rural sanitation interventions targeted at more incremental expansions in coverage via penetration of easier-to-reach populations (which in turn would – eventually – increase toilet affordability and accessibility to the disadvantaged), CLTS was conceived specifically to inspire communities themselves to figure out how to reach *all* households (Robinson, 2017, personal communication).

Still, one must recognize that communities are often economically heterogeneous, and it is reasonable to ask how well CLTS has demonstrably addressed the needs of the most vulnerable.

Robinson and Gnilo (2016a) argue that the poorest segments of CLTS-triggered communities are frequently the first to revert back to open defecation, noting that the latrines they install tend to be the most likely to collapse or discourage usage (Coombes 2016; Munkhondia et al. 2016). They add that the energetic drive to quickly and completely end OD in a community "can leave these poor households with sanitation facilities that they do not like or want, and are not willing to use or maintain" (Robinson and Gnilo 2016a).

In a review of CLTS implementation by Plan in seven countries, Venkataramanan (2016) highlights characteristics of CLTS that both advantage and disadvantage the poor. On the one hand, she introduces the Nepali concept of *daanaveer*, in which wealthier families assist the poorest to install sanitation facilities in a form of cross-subsidy strongly encouraged by the CLTS advocates (it is only external subsidies that they find objectionable). On the other, she notes that the sanctions that sometimes emerge from CLTS triggerings—often a hoped-for indication of a social norms shift—tend to disproportionately target the poor, as they are often the slowest (and least able) to join the community effort to end open defecation (Venkataramanan 2016).

Garn et al. (2017) present results of an evaluation of the equity implications of a multi-faceted rural sanitation program implemented across 11 countries by the Dutch NGO SNV, finding gains in latrine coverage between 2014 and 2016 among the lowest-quintile in 7 out of 10 countries evaluated. The gains ranged from 10 to 44 percentage points, but must be read with two important caveats: first, results of a multivariate regression suggested a slight (but statistically significant) underperformance among lowest socioeconomic status (SES) quintiles, female-headed households, and beneficiaries with disabilities (Garn et al. 2017); and second, the evaluated program encompasses more than CLTS, including supply side enhancements as well (see Section 8.1 for further discussion of that program).

The few rigorous studies addressing this question suggest that the extent to which CLTS benefits the poor varies depending on the program. In the case of Mali, where wealth is measured by the number of assets owned, latrine ownership in poorer households increased by 39 percentage points, versus only 26 percentage points in the case of wealthier households (Pickering et al. 2015). By contrast, in East Java, Indonesia, Cameron and Shah (2017) found that while the non-poor did accelerate toilet construction as a result of CLTS, the poorest households in CLTS intervention villages were no more likely to build toilets than the poorest households in control villages.

Meanwhile, our interviews with key informants reveal some disagreement about the extent to which the poor are targeted by CLTS as well as how little robust evidence is available to support their positions. Some interviewees made the case that CLTS is indeed poor-oriented, and in fact that the very "beauty of the strategy" is that the "CLTS philosophy of 'just make do'" is intrinsically an argument targeting the poor, pointing to the major OD reductions achieved even in the absence of substantial household investments in latrine hardware. One interviewee stressed that CLTS builds on the ingenuity of those who are accustomed to creatively solving their own problems with few resources. Others argued that "CLTS is not working for the bottom 5–10 percent, maybe even more" and that "improved latrines are only for the wealthy," begging the broader question of CLTS's ability to push households and communities up the sanitation ladder (a subject we address below). Though these are anecdotal claims, there is certainly published evidence of poorer income segments facing real financial constraints on installing toilets in the context of CLTS programs (see, for example, Cameron and Shah 2017). In Mali, however, the CLTS intervention did have clear pro-poor benefits (Pickering et al. 2015), as discussed further below.

Ultimately, conclusions about CLTS' success at reaching the poor must be considered with respect to the development objective in question: for sustained cessation of OD, the evidence appears mixed; with regard to the purchase and installation of improved toilets and other sanitation-related assets (and expenditures, such as pit-emptying), the shortcomings of CLTS for the poor are fairly obvious. This is not intended to single out CLTS among sanitation measures in this way; indeed, there is a growing recognition that SanMark interventions tend to concentrate toilet sales among the wealthiest segments of a given community (Rivera et al. 2016). Nonetheless, as we explore below, it is important to acknowledge that investing in installations superior to rudimentary pit latrines is a sufficiently major economic obstacle to the rural poor (Peletz et al. 2017) that some kind of intervention that "flattens the demand curve"—whether credit, or a carefully designed subsidy—must be considered seriously.

4.4 DOES CLTS ADEQUATELY ADDRESS GENDER AND SOCIAL INCLUSION?

As a participatory, "whole of community" process, CLTS has the potential to both elevate the inclusion of socially disadvantaged groups and to unintentionally exacerbate imbalances.

There are some very encouraging examples. In Bangladesh, Kullmann et al. (2011) report that female-headed households were *more* likely to have an improved or shared latrine than households headed by males following CLTS implementation, which the authors explain as potentially a function of the ability that a private toilet gave women to adhere to the practice of *purdah,* as well as additional latent demand connected to cultural drivers. An assessment of CLTS programs in Madagascar found that reversion to

open defecation after ODF declaration was significantly lower in female-headed households (USAID Water CKM Project 2017). Arnold et al. (2010) found significant improvements in perceived safety among women and girls from an integrated WASH intervention of which CLTS elements were a key component in Tamil Nadu, India.

On the other hand, it has been argued that the participatory paradigm of CLTS presupposes that all individuals are included and are able to represent their needs or that the community will come together to recognize and support them. Experience suggests that without purposeful design followed by carefully integrated implementation (including follow-up), CLTS may not engage all individuals equally, equitably, or meaningfully.

In many communities where CLTS has been implemented, men are central to decision-making and toilet construction while women, who are often excluded from these processes, are responsible for keeping toilets clean and usable (Adeyeye 2011; Arandan 2016; Burt et al. 2016). A study by Plan Uganda (2012) found that while women considered themselves leaders in implementing CLTS activities and achieving ODF, men continued to self-identify as "monitors" and "supervisors" of sanitation and hygiene conditions. These dynamics are supported by norms or customs that ascribe particular roles and responsibilities for women and men, and efforts intended to bring about the equal participation of women (such as quotas mandating equal representation of women and men as leaders) may fall short at making that participation *meaningful* because they do not address such norms.

Sex-disaggregated data showing high attendance of women at CLTS triggering events suggest that women are meaningfully participating, but high attendance may not translate into power or influence over decision-making, especially as women are typically excluded from leadership positions (Adeyeye 2011; Arandan 2016; Burt et al. 2016). Even when programs mandate equal representation of women and men in leadership positions, male leaders may in some cases dominate meetings of water and sanitation committees (Adeyeye 2011). In Bangladesh, a woman may not be able to participate in public meetings at all (or else, only with the permission of her husband), even while maintaining important influence within the household, including the ability to negotiate with her husband (Mahbub 2008). Community- and household-level gender relations and decision-making structures can differ substantially, and as a community-based intervention, CLTS may not capture the elevated agency that women may enjoy at home as compared to public, community settings (even as the decision to cease open defecation via the installation or improvement of a toilet is often made at the level of the household).

It is important for CLTS programs to engage and include women fully in design, implementation, and monitoring because (a) women and girls have specific sanitation and hygiene needs that can be ignored or sidelined without their meaningful participation in the process and (b) gendered social norms place the onus of many of basic WASH functions on women (Burt et al. 2016). Latrines that are constructed with doors facing the street can make women feel uncomfortable and insecure while using them (Arandan 2016). Women and girls may have different concerns and motivations, such as privacy and reducing vulnerability to gender-based violence (Movik and Mehta 2011), as well as specific needs relating to menstruation, pregnancy, and motherhood that require intentional design to meet those needs (Cavill et al. 2016).

Like fetching water, maintaining sanitary and hygienic home environments is almost uniformly considered women's work in low-income settings; it is thus unsurprising that women assume the responsibility for cleaning and maintaining the new toilets installed as part of CLTS (Cavill et al. 2016). The lack of involvement of women in decision-making processes can further increase their workload as they are not able to provide input into developing solutions that can be easily maintained (Plan Uganda 2012). Increasing women's work is concerning not only from a gender equity perspective, but it also has implications for the sustainability of the CLTS programs. If women are not able to manage the work

required with new sanitation and hygiene infrastructure, it is unlikely that these households will be able to maintain their position on the sanitation ladder or move upwards (Davis 2016). In Uganda, households in which only women were responsible for sanitation struggled with maintaining cleanliness (Plan Uganda 2012).

In the form of an implementation guidance document, recent attention also has been dedicated to how, as a participatory process, CLTS can adequately address the needs of other disadvantaged subpopulations, including the elderly and those with physical and mental disabilities (House et al. 2017). We are unaware, however, of rigorous evaluations of any programs that direct focus at such subpopulations in the context of CLTS.

4.5 DOES CLTS IMPROVE HEALTH?

The primary motivation of CLTS for triggering collective action to eliminate OD is the belief in its health consequences. Dignity, privacy, safety, and convenience are certainly additional goals, and indeed, it is sometimes argued that the latter three are the main drivers of household investments in improved toilets. Still, the provocation of disgust that is the centerpiece of the triggering exercise is underlain by both a health concern and the assumption that total sanitation will reduce disease and impart other benefits.

The evidence connecting sanitation improvements more generally with indicators of improved health is still evolving. While a Cochrane Review of interventions to improve disposal of human feces found evidence of a protective effect from sanitation on diarrheal illness, it bases its conclusion "primarily on the consistency of the evidence of beneficial effects. The quality of the evidence is generally poor and does not allow for quantification of any such effect" (Clasen et al. 2010). Sanitation improvements may vary from the brick reinforcement of an existing open pit to the transition from open defecation to piped sewer network with wastewater treatment. While Wolf et al. (2014) estimate a roughly 16 percent reduction in diarrhea resulting from the basic transition from unimproved to improved (but non-sewered) sanitation, they find much larger benefits with progression up the sanitation ladder, with risk reductions in the order of 60–70 percent from the introduction of piped sewerage (though the number of studies considered was quite small).

An evaluation of a WASH intervention in Tamil Nadu with CLTS elements included found reductions in neither child diarrhea nor growth faltering (Arnold et al. 2010). Two studies of India's Total Sanitation Campaign, which relied heavily on government-delivered toilets and distinctly did *not* employ CLTS on any widespread basis, showed no impact on diarrhea, gastrointestinal illness, helminthic infection, growth and anemia in rural Madhya Pradesh (Patil et al. 2014) or on fecal contamination of the household, diarrhea, STHs and child height-for-age Z score (HAZ) in Odisha (Clasen et al. 2014). Two other studies did detect benefits of the same program on parameters ranging from toilet ownership and use, growth faltering, and infant mortality (Dickinson et al. 2015; Spears 2012).

Few studies assess the impact of CLTS on health, and the results of these rare studies are variable in terms of study rigor, data quality, and findings of effect. In a study that specifically examined the impact of CLTS on health in Mali, Pickering et al. (2015) found no effects on diarrhea but did detect important benefits with respect to child growth, reporting increased HAZ scores and decreased stunting likelihood among CLTS villages as compared to controls, and moreover that the children under the age of two at the time of enrollment showed greater increases in height and weight than older children. In Indonesia, Cameron and Shah (2017) found a CLTS intervention to be associated with a 44 percent decrease in round-worm infestation, but had no significant impact on hemoglobin concentrations, weight-for-age Z score (WAZ), or HAZ among children.

4.5.1 HERD EFFECTS

Improvements in health may not be observable below a certain threshold of community-wide reduction in open defecation because there may be herd protection at play (in which a health intervention benefits even those who do not receive it directly). Herd "immunity" arises when a disease does not spread because a substantial portion of the population is immune, but non-immunizing interventions, such as insecticide-treated bed nets and deworming drugs, have shown similar herd-protective effects (Fuller and Eisenberg 2016).

Analyzing DHS data from 29 developing countries, (Jung, Lou, et al. 2017) examined the relationship between neighborhood-level coverage of improved household sanitation and two-week incidence of diarrhea among children less than five years of age, and their exposure-relationship analysis identified a sanitation coverage threshold of 60 percent for reducing the odds of disease. A field trial from Tanzania offers a reinforcing example: wards targeted under a Total Sanitation and Sanitation Marketing (TSSM) intervention integrating CLTS with supply-side strengthening were found to report open defecation at a rate of 11 percent, as compared to 23 percent in control villages, and latrine construction in intervention wards increased from 39 to 51 percent during the year following implementation; still, no differences in health response parameters (diarrhea, anemia, and child growth faltering) were observed (Briceño et al. 2015).

The herd effects hypothesis is also supported strongly by two recent field studies (in small villages in isolated rural settings) as well as by a systematic review and meta-analysis. The first, from Mali, found that the proportion of household toilet ownership within a 200-meter radius of a household was closely associated with child growth, even as household toilet ownership itself was not (Harris et al. 2017). The second, from Ecuador, determined that sanitation coverage within a 500-meter radius of a household to be a vastly superior predictor of child stunting than the household's own sanitation status (Fuller et al. 2016). The systematic review and meta-analysis finds comparable associations of household and neighborhood sanitation conditions with diarrheal illness, with odds reductions of 36 percent to 44 percent, respectively (Jung, Hum, et al. 2017).

4.5.2 ARE RUDIMENTARY, UNIMPROVED LATRINES EVER "GOOD ENOUGH"?

Evidence for the ability of CLTS to move participants up the sanitation ladder (in the absence of other interventions, such as supply-side programs or poverty-targeted subsidies) is considered in Section 7. In brief, with the exception of a single study (Russpatrick et al. 2017), the current consensus is that CLTS is generally not well-suited for that objective as opposed to the originally-stated goal of OD elimination. With that in mind, it is reasonable to ask whether at least in shorter time frames, sustained reductions in OD may be "good enough" to result in health improvements. An earlier study of the OMI in Mozambique detected an eight percentage point reduction in diarrhea incidence among all age groups attributable to CLTS, despite the fact that the newly constructed latrines were nearly universally unimproved pit latrines (Elbers et al. 2012). Clearly, where newly constructed latrines fail, fill, or go un-used because of their unhygienic character (or the dangers of pit collapse), there is no biologically plausible mechanism for a health improvement. However, if the unimproved pits are covered and can be kept relatively clean and free of flies, they may still offer a significant form of health protection. At least one study found no significant difference in indicator bacteria concentrations on surfaces comparing households with and without concrete slabs in Tanzania (Pickering et al. 2012). This question has considerable importance: Robinson (2016) reported that Plan's CLTS programming in Ethiopia—a country reporting some of the highest OD reductions from CLTS globally—resulted in effectively universal coverage with unimproved pits that third-party inspection determined to be "relatively clean." Meanwhile, Crocker, Saywell, and Bartram (2017) reported 45 percent of sampled Ethiopian households repairing or re-building latrines over the course of a one-year follow-up.

None of the preceding discussion is meant to suggest that progression up the sanitation ladder ought to be in any way minimized as a development objective (especially in the context of the transition from Millennium Development Goals to Sustainable Development Goals). However, insofar as CLTS programs may be proven effective to generate rapid (and sustained) reductions in OD without increases in improved household toilet coverage, it will be helpful to confirm the purported health benefits that are often attributed to CLTS anecdotally. We are unaware of any health trials that compare protective effects of improved vs. unimproved latrines; a study of this sort would have clear policy relevance in the sector.

5.0 HYPOTHESIZED CONDITIONS FOR CLTS SUCCESS

KEY TAKEAWAYS

- Success of CLTS programs is likely to be a function of the implementation modality, as well as both physical environmental and contextual factors. While such factors are cited frequently as crucial, they are not usually well defined.
- Though there is considerable anecdotal attention dedicated to the quality of facilitation, frequency of visits and follow-up, and other factors, compelling evidence of the merits of each specific aspect of implementation quality is limited.
- Two of the highest-quality studies of CLTS performance are indicative of "heavier touch" implementation (more active engagement, more follow-up visits) resulting in superior outcomes.
- Various implementation platforms for CLTS, whether through training natural leaders or incentivizing traditional leaders, have shown promise, but their success and appropriateness appears highly context-specific.
- There is some initial evidence that a specific, well-defined measure of social cohesion can be correlated with CLTS success (as defined by changes in latrine coverage), and indeed that the sanitation status of low "social capital" villages can actually be worsened by CLTS.

The 2008 CLTS *Handbook* identifies two essential programmatic conditions for the success of CLTS programs: the quality of facilitation (of the triggering event) and "sensitive support of institutions," referring to a gentle touch and avoidance of prescription and over-budgeting, in "a form of restraint that is difficult in many bureaucracies" (Kar and Chambers 2008). With respect to the community conditions that lend themselves to success, Kar and Chambers (2008) run through a set of criteria pertinent to the program/policy environment, most notably:

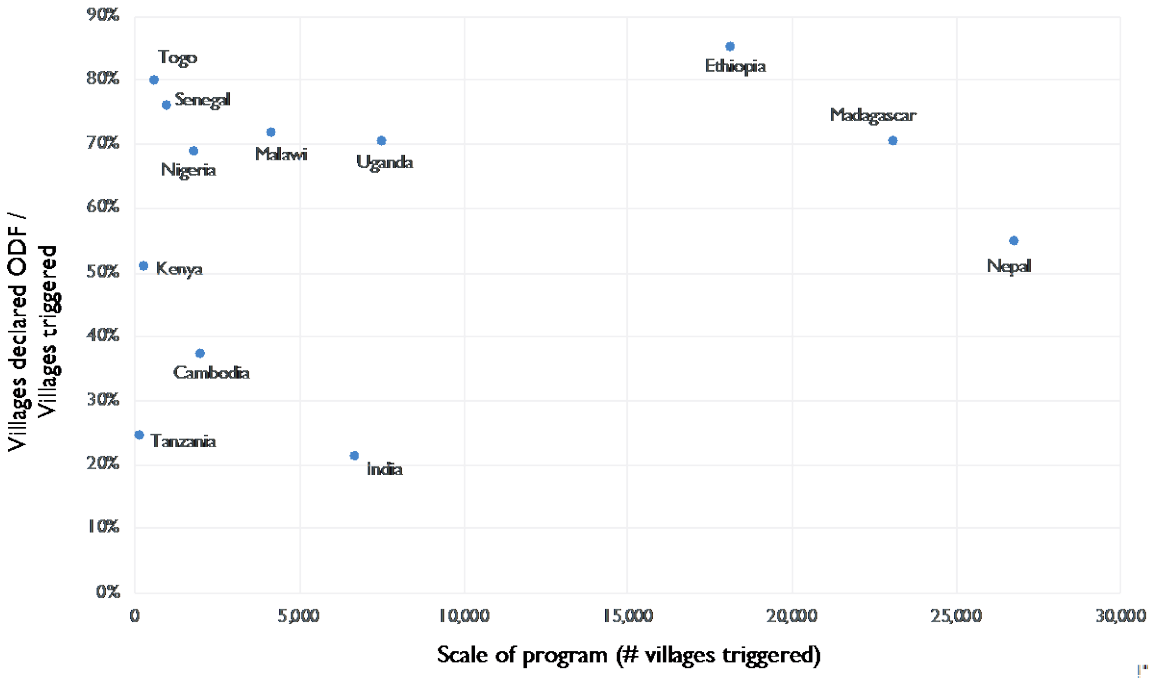
- No present or prior subsidy programs and supportive political leadership
- Current conditions and practices (elevated pre-existing levels of OD, low commercial use of excreta)
- Physical conditions (manageable soil properties for pit excavation and vulnerable water supplies)
- Social/cultural conditions (small, remote, homogenous communities with a well-functioning social fabric and a tradition of social action, progressive local leadership, and tradition of empowering women).

This list should remind the community of practice that even as a measure intended explicitly to inspire collective action to eliminate open defecation (as distinct from propelling individual households up the sanitation ladder), some communities are simply not well suited to CLTS. In some cases, the response of some CLTS proponents to questions about performance is to focus on implementation fidelity, even with the recognition that some amount of flexibility must be employed to accommodate local physical, environmental, and cultural contexts. Indeed, in 2008 UNICEF ultimately coined the umbrella term "Community Approaches to Total Sanitation" or CATS (UNICEF 2014), in part to embrace the notion of flexibility (as well as to incorporate other sanitation measures, including school-focused approaches, supply-side interventions and targeted subsidies).

Clearly, performance is hugely variable, even within broad program categories. One indicator of program success is the so-called "conversion rate," which compares the number of ODF-achieving

communities as a fraction of the total number triggered. In Figure 5, we plot publicly reported conversion rates of individual country programs supported by the Global Sanitation Fund as a function of overall program size (expressed as the number of programs triggered).

Figure 5. GSF country program ODF "conversion rates" as a function of program scale. Data are from http://wsscc.org/global-sanitation-fund/, accessed 08 Nov 2017, referencing data from 31 Dec 2016.



At the macro level, there is no obvious univariate scale dependence of conversion rates, at least using the GSF sample. What is most notable is how wide the variation is, with reported rates as low as 20-25 percent in India and Tanzania and as high as 75-85 percent in small programs (in Senegal and Togo) and very large programs (such as in Ethiopia).

In Section 2, we identified the components that together constitute the CLTS model (pre-triggering, triggering, post-triggering), noting the adaptations that are sometimes employed. Below, we consider results of field research into what variations and emphasis of different components within the broader CLTS approach may drive performance. We discuss these in terms of programmatic conditions and community conditions.

5.1 PROGRAMMATIC CONDITIONS

5.1.1 QUALITY OF AND RESPONSIBILITY FOR IMPLEMENTATION

Implementation quality encompasses a number of elements, including the persuasiveness of facilitators of triggering events, "intensity"—as defined by frequency of facilitator visits, which can vary greatly from program to program—and a multitude of other factors.

Several recent studies by the Water Institute at the University of North Carolina Chapel Hill together with Plan International, within the "Testing CLTS Approaches for Scalability" program, have attempted to isolate the relative effectiveness of different facilitator arrangements. Relying in part on the hypothesis that an individual's peers have greater influence on defecation behavior than the community as a whole

(Shakya et al. 2015), Crocker, Abodoo, et al. (2016) test dedicated training for influential community members ("natural leaders") to determine whether training may enhance CLTS benefits. In a single cross-sectional survey across 29 intervention and control villages in Ghana, communities in which recruited natural leaders received dedicate training exhibited from 11 to 39 percentage points less open defecation than those exposed to conventional CLTS that did not recruit and train natural leaders (Crocker, Abodoo, et al. 2016). As to what about natural leaders led to their superior performance, the authors pointed to more time spent reinforcing CLTS messages than control facilitators, who were more likely to be focused on meetings and latrine construction itself.

A second study, focused on utilization of teachers trained to facilitate CLTS processes in Ethiopia, determined that conventional CLTS was considerably more effective 12 months after baseline, suggesting that rural Ethiopian teachers' existing responsibilities may hinder their ability to oversee targeting, triggering, and follow-up (Crocker, Geremew, et al. 2016). However, a second follow-up wave of data collection presented a vastly different picture, with teacher-led CLTS showing dramatic improvements during the second year of data collection, and effectively catching up with triggerings executed by health extension workers (Crocker, Saywell, and Bartram 2017).

Research within the same UNC/Plan program also examined the role of recruited volunteers in CLTS deployments across a number of countries, noting that though they have the potential to increase engagement and lower costs for implementers, reliance on volunteers may inappropriately shift burdens and pose sustainability challenges (Venkataramanan 2016).

There is some evidence that engagement of traditional leaders and authority figures may serve to improve outcomes as well. In Zambia, where local chiefs are incentivized by competition through exposure to the OD reductions achieved in their communities, truly dramatic toilet coverage gains have been reported (Russpatrick et al. 2017; Tiwari et al. 2017; Markle et al. 2017; Zimba et al. 2016) though we note that additional verification of these results is likely warranted.

In the Mali program that resulted in significant child growth and equity gains, facilitators in the Koulikoro region visited triggered communities every 2-4 weeks to monitor progress until ODF certification was granted (Pickering et al. 2015), with visits routinely continuing for up to three months (Alzua et al. 2015). Gertler et al. (2015) contrast this intensity with a general routine of single follow-up visits occurring in the government-led (as opposed to NGO-led) CLTS deployment in East Java, Indonesia and Tanzania, respectively, and no post-triggering follow-ups whatsoever in Madhya Pradesh, in India.[9]

Within the East Java CLTS program, however, even as Gertler et al. (2015) refer to single follow-ups, there was variation in engagement intensity between government- and NGO- facilitated triggering and follow-up in different communities. "Intensity" was defined in an East Java evaluation as an index measure of the number of facilitators attending triggerings, visit frequency, and a ranking of facilitator charisma. Unsurprisingly, household latrine coverage increased at a faster rate among the villages exposed to high-intensity facilitation (Cameron and Shah 2017).

Notably, intensity of facilitation was not initially positioned as a variable in the East Java evaluation; instead, its effect was discernable due to the superior outcomes from NGO-supported villages (termed "Resource Agencies," or RAs, in the paper) as compared to those supported by local government (LG) institutions (Cameron and Shah 2017). Indeed, Cameron and Shah (2017) argue that "implementation agent effects" are pronounced, noting that "in RA-triggered villages toilet construction increases significantly by 6 percentage points, whereas in LG-triggered villages the increase is not statistically

[9] A long-time observer and experienced third-party evaluator of rural sanitation programs urges caution over these particular numbers from India and Indonesia, making the case that the particular areas in which the evaluations took place were the poorest performing within broader CLTS programs, and thus are unlikely to be representative of how implementation took place in those countries more generally (A. Robinson, personal communication).

significant … [also], intolerance of open defecation increases in RA villages but not in LG villages." There are multiple factors at play related to intensity, and notably, facilitation quality may not be the most important:

> *In the field one hears a lot about the importance of the "quality" of the facilitator. In order to test whether the RA facilitators are "better" than the LG facilitators, we collected information from respondents on their perceptions of how charismatic/persuasive the facilitators were … there is no significant difference in the average reported persuasiveness of the facilitators* (Cameron and Shah 2017).

In spite of these reported perceptions of facilitator quality, the authors conclude that "the systematic finding of significance for RA implementation and insignificance for LG implementation across the range of outcome variables is however strongly suggestive of RA implementation being superior to that of LG" (Cameron and Shah 2017). The authors control for the fact that implementation "adherence" (the degree to which villages even get triggered at all) was considerably higher for RAs. The factors that appear to be significant are:

- **Engagement with local counterparts**. RAs were more likely to consult with village health and office staff than LGs.
- **Community participation**. RAs were able to secure greater awareness and attendance of CLTS-related events than their government counterparts.
- **Visit frequency**. Villages exposed to RA-led CLTS were visited 47 percent more than those exposed to LG-led CLTS.

This difference in implementation performance begs the question of the proper division of roles and responsibilities with CLTS programming. While the role of government in ensuring the enabling environment (discussed below) is obvious, its role in field-level execution of CLTS triggering and follow-up clearly must be accompanied by the financial resources required to build and sustain the capacity for estimating triggering "challenge levels," facilitating triggering activities, and conducting follow-up to guide communities toward OD reduction goals. Few governments have been able to manage and sustain these functions independent of the support of project implementers.

5.1.2 A FAVORABLE "ENABLING ENVIRONMENT"

Assumption by governments of the responsibility for executing development interventions is frequently put forth as the logical progression for achieving scale and sustainability, but the CLTS experience globally has yet to reveal a consistent model for the respective roles of governments (at various levels), NGOs, and other actors. A common refrain in the CLTS-related literature is the importance of the "enabling environment," though the meaning of the term is far from precise:

> *The enabling environment is the topic of NGO conferences, World Bank training programs, and USAID and other donor-supported technical assistance projects. It appears repeatedly in analytic studies, policy briefs, and reports. However, like much of the vocabulary of international development and assistance discourse, the term exhibits an apparent clarity that masks the underlying complexity inherent in the conceptual territory it subsumes. In some formulations, the enabling environment is defined so expansively that it becomes nearly synonymous with socio-economic development itself. In others, it is treated so narrowly as to be clearly inadequate to stimulate sufficient response absent the presence of additional factors* (Brinkerhoff 2004).

In concrete terms, the elements of an enabling environment are (1) sound policy, legal, and regulatory frameworks; (2) the development of institutional capacity across sectors and at various levels; (3) consultation with and responsiveness to citizens' needs and preferences; (4) establishment and

maintenance of a range of oversight, accountability, and feedback mechanisms; and (5) mobilization and allocation of public resources and investments (Brinkerhoff 2004). With respect to the government role in fostering a supportive enabling environment for NGO involvement in meeting development objectives, Brinkerhoff (2004) offers an even more streamlined description: "mandating, facilitating, resourcing, partnering, and endorsing" (though we question the notable absence of regulatory, oversight, and accountability functions in this list).

In his evaluation of Plan International's Pan African CLTS Program, Robinson (2016) argues that a favorable enabling environment was a significant factor in the comparative success and sustainability of CLTS outcomes (vast reductions in OD that persisted over the course of years). In the high-performing cases that he identified (Malawi, Uganda, Kenya, Ethiopia, and Zambia), Robinson (2016) asserts that the respective national governments made the achievement of ODF communities a national priority and "adopted supportive polices and institutional arrangements," in stark contrast to poorly performing countries, though specifics of the supportive environments are lacking. The first assessment of UNICEF's East Asia CLTS efforts is more specific, breaking the enabling environment down into constituent components of "policy, plans, finance, integration, and monitoring" (UNICEF 2013), and goes so far as to argue that in some settings in East Asia, the deployment of CLTS programs actually improved the enabling environment for sanitation more generally.

The suggestion that countries in which national governments have made explicit endorsements of CLTS as national rural sanitation policy (or at least, playing a central role within a suite of programs) are best positioned to make gains in reducing OD makes intuitive sense. What is lacking in the literature is a systematic analysis of which elements of the enabling environment are most closely tied to program performance. There is little research we could find making the case for which among "mandating, facilitating, resourcing, partnering, endorsing and regulating" are most essential or whether the de-emphasis of any of these elements is limiting. One commentator questions the nature of the enabling environment in Zambia, pointing out that the rapid scale-up of the CLTS approach there threatened its grassroots, community-driven nature, making implementation "piecemeal, top-down, and narrow" (Bardosh 2015), though without linking this analysis to objective measures of performance we are reluctant to accept this argument on its face.

In any case, an in-depth analysis of the aspects of the enabling environment to discern which tend to drive some objective measure of performance (whether changes in OD or improved toilet coverage) would be a valuable contribution to the community of practice.

5.1.3 SUPPORTIVE LOCAL POLITICAL LEADERSHIP

The presence of supportive political leaders committed to sanitation and the goal of ending OD, and zero-subsidy approaches, as well as being engaged in triggering and post-triggering follow up, has been identified as essential to ODF achievement (Mukherjee 2011; UNICEF 2014). This assertion was reinforced by our interviews with key informants, and this commitment and involvement of local political leadership is particularly important in countries that are highly decentralized. For example, in Kenya, sanitation (and sanitation financing) is now the responsibility of county governments. In Zambia, "chiefs are the champions of CLTS" and without the buy-in of the chief—who is well known and exerts major influence— "there is little that can be done."

In some specific circumstances, however, local government support may occasionally be counter-productive, particularly in countries with a history of authoritarian control and political violence. In Cambodia, CLTS came to be viewed as a top-down rather than grassroots-driven process in which village and commune chiefs were ultimately responsible for (and incentivized toward) achieving ODF status in villages under their jurisdiction (UNICEF 2013).

5.2 COMMUNITY CONDITIONS

5.2.1 BASELINE OPEN DEFECATION AND/OR LATRINE COVERAGE

CLTS does not appear particularly well suited for communities that have low levels of OD (and correspondingly, high levels of latrine coverage) to begin with (Crocker, Geremew, et al. 2016; Venkataramanan 2016). An analysis of CLTS deployment in Ethiopia yielded vastly differing performance in the Oromia region as compared to the Southern Nations, Nationalities, and Peoples' (SNNP) region of the country. CLTS resulted in a 23 percentage-point reduction in self-reported OD between baseline and follow-up in Oromia, as compared to having no statistically significant effect in SNNP (Crocker, Geremew, et al. 2016), which was followed by significant increases in OD a year later (Crocker, Saywell, and Bartram 2017). Notably, well over 60 percent of households in Oromia reported open defecation at baseline, as compared to between 20 percent and 30 percent in SNNP (Crocker, Geremew, et al. 2016). Gertler et al. (2015) reaffirm this argument, and these findings are broadly consistent with those of (Garn et al. 2016), who report that across multiple rural sanitation interventions, "communities with the largest coverage gains often had the lowest baseline [latrine] coverage levels."

5.2.2 PRIOR OFFERS OF SANITATION SUBSIDY

There is a broad consensus among implementers that a previous history of subsidized latrine construction often renders communities less receptive to CLTS triggering (Venkataramanan 2016; Harvey 2011; Sah and Negussie 2009). This is consistent with the position articulated by Kar and Chambers (2008) in the *Handbook*, and a central motivation for the development of CLTS to begin with. Some careful attention to the definition of subsidy is important. Crudely designed subsidies (including government construction of toilets or other forms of full assumption of costs by governments) differ dramatically from more carefully targeted forms of support. The magnitude of a subsidy relative to overall latrine costs, whether the subsidy is offered in cash or in-kind (in the form of a constructed subsurface assembly or else a fully completed installation with superstructure), whether the subsidy is offered as an upfront discount or a post-installation rebate, to whom the subsidies are targeted, and how differing forms of subsidy are timed relative to a CLTS triggering process, are all essential considerations. We also note that reports on the effects of prior subsidy, while widespread, are generally anecdotal in nature, which is unsurprising as the impact of prior subsidy impacts on demand for toilets (or defecation behaviors) would be exceedingly difficult to test experimentally.

It is important to avoid confusing the related but distinct goals of reducing OD and increasing improved sanitation coverage. As noted, the primary objective of CLTS as envisioned by the originators is expressly the former, and the zero-subsidy orthodoxy of the approach is very much a result of widely observed experience of government- or NGO-delivered toilets inhibiting the collective decision of communities to cease open defecation. Achievement of improved latrine coverage is another matter, and the case of subsidy interactions with sanitation marketing is illuminative in this regard. Concerns about the introduction of subsidies for toilets dampening demand for market-rate products in Cambodia have not been borne out by experimental results. On the contrary, targeted, market-compatible/ stimulating, pro-poor subsidies have been shown to have positive spillover effects on coverage, whereby households both eligible and ineligible for subsidy increase latrine adoption in the context of sanitation marketing programs (Guiteras et al. 2015; Rivera et al. 2016; Nicoletti et al. 2017).

5.2.3 SOCIAL COHESION AND NORMS

Societal-level determinants of individual behavior are increasingly being recognized as important variables that drive the success of WASH programs (Dreibelbis et al. 2013), including the specific role of social norms (Dooley et al. 2016). Actual measurement of social cohesion is rare in sanitation programming (Pasteur 2017), but in at least one case in which an attempt has been made to quantify pre-intervention social cohesion, its importance appears to be dramatic. In the context of the large randomized field experiment of CLTS in East Java, Cameron et al. (2015) conducted targeted analysis of

initial community conditions that may influence CLTS success. They constructed a household survey-based "social capital" index measure consisting of questions on participation and networks, trust and cohesion, and crime and corruption, and determined not only that villages with high initial social capital scores saw greater OD reductions from CLTS than others, but also that villages with low initial social capital scores were actually damaged by CLTS, insofar as CLTS resulted in OD changes measurably worse than in control villages that were not triggered (Cameron et al. 2015).

Social Norms Theory (SNT) as a means of understanding how to change behavior has gained great interest among major sanitation donors and implementers, most notably UNICEF (Dooley et al. 2016). SNT distinguishes a social norm from a "custom" or "moral rule" based on the perception of whether a behavior is dependent on social expectations. In other words, a *custom* is a pattern of behavior that an individual chooses to follow irrespective of what others do, whereas a *norm* is one that is followed because of the belief that others follow it - and expect everyone else to follow it as well (Bicchieri 2006).

Singh and Balfour (2015) argue that a particular pre-existing social *norm*–specifically, the practice of latrine use by children above age three–is an essential predictor of the sustainability of OD elimination in Kenya, but in practice measuring the importance of social norms change is likely to be challenging. An evaluation of the SuperAmma handwashing intervention in India measured perceptions of social norm change among respondents in addition to objective measures of behavior change, but was not able to attribute the program's successes at increasing handwashing behaviors to increases in a perceived social expectation in favor of handwashing as opposed to other some other element(s) of the intervention (Biran et al. 2014; Rajaraman et al. 2014).

CLTS is unquestionably an intervention designed to bring about a change in social norms, even if it was not initially couched in the language of social norms at its inception. Members of a triggered community optimally should feel some pressure not to openly defecate because they suspect that others have come to oppose the practice. Much of the attention that has been paid to social norm change with respect to implementation and practice of CLTS has been with respect to sanction: if communities design sanctions to disincentivize or penalize individual behaviors, it is interpreted as a change in the expectation of others with regard to individual behavior. Whether sustainability of OD reductions and progress up the ladder can and do occur in the absence of sanctions has not been investigated empirically.

The setting in which SNT stands to be most critical to attain ODF goals is India. As mentioned in our discussion of OD self-reporting and its limitations, rural India's strong cultural traditions of purity and pollution are perhaps the most important "baseline condition" with which any kind of behavior change intervention needs to contend, especially as India is host to 60 percent of the global population that openly defecates (Spears and Thorat 2016). The culture of purity and pollution based in the Indian caste system functions as a social norm. The Hindu religious context in rural India is one of practice and belief in untouchability, and one which "coheres" with open defecation, such that individuals respond to a norm against polluting the purity of the home by defecating outside (Spears and Thorat 2016).

5.2.4 PHYSICAL AND ENVIRONMENTAL CHARACTERISTICS OF A TARGET COMMUNITY

While the *Handbook* describes physical remoteness as characteristic that makes communities more suitable to triggering (perhaps due to co-variants such as size and homogeneity), there also is reason to believe that remoteness can make the operational and logistical costs of triggering and follow-up prohibitive. An evaluation of Plan's work in Ethiopia highlights that the sustainability problems (notably slippage rates of upwards of 30 percentage points, based on the narrow definition of private toilet ownership) were largely in remote communities where monitoring and follow-up are more expensive (Robinson 2016).

Community size (with respect to both geographic extent and population) is also a key variable. Clearly, there are physical limits to how many community residents can attend a single triggering event, and how

much of a community can be covered by a transect walk and fecal mapping exercise. One of Oxfam's internal programmatic CLTS reviews recommends attempting triggering activities only in communities below 770 inhabitants unless multiple CLTS convenings are made across the village (Sanchez 2011). Beyond logistical and cost constraints, the inverse co-variants with size (social cohesion, homogeneity) are also likely to bear upon both ODF achievement and sustainability, though we have not seen research attempting to isolate community size from other variables affecting CLTS performance.

Finally, both soil and water supply conditions of communities appear to be associated with the likelihood of ODF achievement. Tyndale-Biscoe et al. (2013) found that households practicing OD were more likely to be located on either soft soils that, while easier to excavate, are more prone to collapse, or else in hard-to-excavate rocky soils. ODF households, by contrast, are much more likely to enjoy the benefits of harder, rock-free soils that self-support and require minimal effort and expense reinforcement. The importance of favorable soil conditions was also described by Venkataramanan (2016) and confirmed by our key informant interviewees. Mukherjee (2011) argues that community location adjacent to water bodies pose a challenge to CLTS interventions. In Indonesia, focus group participants living near abundant surface water described OD as "clean, hygienic, pleasant, convenient and free of cost" (UNICEF 2013), an unfortunate reality given the fact that poor sanitation and hygiene practices pose a water quality threat to both surface waters and shallow, high hydraulic conductivity groundwater.

6.0 SUSTAINABILITY AND SLIPPAGE

KEY TAKEAWAYS

- Results of ex-post evaluations that visit sample communities in different settings and at some period following ODF declarations to measure whether changes in behavior or sanitation status persist offer a range of results, from modest slippage from ODF status on the order of 10%, to others in which slippage approaches 90%.
- The literature remains thin on the drivers of sustainability. The most frequently hypothesized factor is follow-up, which raises the question of the sustainability of CLTS *programs* (as opposed to the behaviors they seek to influence), insofar as follow-up may add significantly to implementation costs.
- Another hypothesized variable is latrine quality and durability (related to progression up the sanitation ladder).
- Extended follow-up in particular is increasingly recognized and formally incorporated into large CLTS programs as means of both ODF achievement and sustainability.
- Sovereign governments must be willing and able to absorb the cost of follow-up over time or ensure other mechanisms are in place for CLTS to be a scalable long-term rural sanitation solution.

Perhaps the most widely highlighted concern expressed about CLTS is whether the approach can result in sustained change in community and individual behaviors. Indeed, the question of the **sustainability** of ODF status achieved via CLTS triggering is the central driver of a recent critical volume prepared by the CLTS Knowledge Hub (2016) in which Chambers (2016) describes a consensus view of "sustainability as the most burning issue facing CLTS." Meanwhile, a recent report issued by the Water Supply and Sanitation Collaborative Council (Jerneck et al. 2016) sets out to capture the "nuances" of **slippage** from ODF status based on the Madagascar experience.

For all the increasing attention to the questions of sustainability and slippage, we were not able to identify a clear, uniform definition of either term in the literature, in part because there is a divergence between analyses of likelihood of sustainability on the one hand, and those that actually measure some outcome variable—such as OD or private toilet ownership—over time, on the other.[10]

Vernon and Bongartz (2016a) present an array of concerns that are framed as sustainability obstacles to CLTS encompassing enabling conditions, physical sustainability of installed facilities, and sustained changes in social norms. Another example from the "likelihood of sustainability" category is UNICEF's Sustainability Check (S. Godfrey et al. 2009), a weighted index measure that encompasses not only physical measures of household sanitation coverage and hygienic behaviors but also institutional, social, technical, and financial measures. While ambitious and comprehensive, index measures like these (as well as others, including the Dutch FIETS Sustainability Approach and WaterAid's Sustainability Framework, among others) can be problematic insofar as they may involve subjectivity in both scoring and weighting.[11] In addition, measures of "likelihood of sustainability" have rarely been validated against actual measures of persistence of OD reductions or latrine ownership. Indeed, application of the Sustainability Check technique to the Mozambique OMI (S. Godfrey et al. 2014) did not highlight that

[10] USAID (2014) defines sustainability as having been achieved when country partners and communities take ownership of the service and there are local systems to deliver inputs needed to maintain results and deliver impacts beyond the life of USAID projects. We will rely on a far narrower definition in our discussion in this chapter.

[11] See (Schweitzer et al. 2014) for an overview of these kinds of sustainability assessment tools developed for WASH programs.

latrine coverage dropped on the order of 5 percent from full coverage in the one-year period between baseline and endline.

For the purposes of this review, we make the following distinctions:

- ***Sustainability*** is defined as the persistence of OD reductions attributable to a CLTS intervention *or* private latrine ownership increases measured over time after the "end" of CLTS intervention (however defined by the local implementer).
- ***Slippage*** (or "backsliding") is defined as the percentage of households found to have reverted to the practice of OD, or the percentage of households no longer served by a household latrine measured at some monitoring interval following an ODF declaration.

Examples of the assessments that represent actual (rather than theoretical predictive) measures of sustainability and slippage (as we have defined them) include Tyndale-Biscoe et al. (2013), Singh and Balfour (2015), USAID Water CKM Project (2017), Crocker, Saywell, and Bartram (2017), Russpatrick et al. (2017), and Tiwari et al. (2017).

Plan International is one of the most experienced of the CLTS implementing organizations, and it has dedicated resources to an aforementioned careful examination of the sustainability of its programs in four African countries: Ethiopia, Kenya, Sierra Leone, and Uganda (Tyndale-Biscoe et al. 2013). The study assessed nearly 120 villages previously certified ODF by Plan and conducted nearly 5,000 visits to randomly selected households across four countries and nearly 120 villages to measure indicators of returns to open defecation. Relying on the more limited ODF indicator of private household toilet ownership, Tyndale-Biscoe et al. (2013) found only 13 percent loss in household latrine ownership several years after triggering and ODF declaration in those communities. As a single cross-sectional study, this report is valuable, but ideally these kinds of third-party assessments should be carried out in a systematic way over time (and better yet, with counterfactuals) such that reliable estimates of changes in OD attributable to CLTS programs can be inferred. A limitation of the assessment put forth by Tyndale-Biscoe et al. (2013) is that the baseline condition (120 villages certified ODF) was not independently measured (or measured by the same researchers).

A recent follow-up of earlier evaluations in Ghana and Ethiopia saw effectively no slippage in three of four interventions studied one year later, with eight percent slippage in the fourth (Crocker, Saywell, and Bartram 2017). While the proponents of the "total sanitation" aspects of CLTS (e.g., full elimination of OD) may be disturbed by reports of any slippage from ODF status, the recent (and again, limited) literature on health impacts of sanitation gains suggest that this minimal reversion to OD may not be of much health consequence given the threshold level of coverage that has been determined to have been maintained is above that hypothesized to be necessary for herd protection (Jung, Hum, et al. 2017; Fuller and Eisenberg 2016). Of course, we caution that most follow-up sustainability studies rely on two data points alone and often lack baseline data, rather than more frequent longitudinal trends. Because of the limited timeframe of sampling, it may be difficult to infer in many circumstances whether declines in toilet coverage are a function of what is sometimes coined "acceptable slippage"—small amounts of decline attributable to deterioration of low-cost unimproved facilities and in-migration of households who did not attend triggering events—or whether declines are a consistent downward trend associated with wholesale reversion to OD practices (UNICEF 2014).

Meanwhile, however, other evaluations have uncovered backsliding to open defecation in such diverse settings as Ethiopia, Ghana, Kenya, Madagascar, Niger, Sierra Leone, and Zambia, (USAID Water CKM Project 2017; Robinson 2016; Singh and Balfour 2015). The evaluation of the four-year (2009-2013), $8.5 million RANO-HP project, funded largely by USAID, is particularly sobering, and the implementing organizations (Catholic Relief Services and CARE) deserve recognition for their willingness to expose the program to review (also funded by USAID). The evaluation sampled 20 of 241 villages that obtained

ODF status[12] by the end of RANO-HP in 2013, and found that only two (10 percent) of the sampled villages remained ODF three years later, and in the four regions sampled, latrine usage declined by 29, 43, 27, and 9 percentage points, respectively, over the same time three-year period following the end of the program (USAID Water CKM Project, 2017).

In a UNICEF-funded evaluation of the CLTS experience in Kenya (which has been supported in part by UNICEF since 2011), Singh and Balfour (2015) report as their "main finding on ODF sustainability" that over 95 percent of roughly 2,000 households surveyed maintained "access" to a latrine in a UNICEF survey across 42 Kenyan villages (corresponding to what the authors conclude is a 5 percent return to OD). This topline finding is of course encouraging, but given the geographic dispersion of these sampled households, the implication for community-wide ODF is that there was some degree of slippage in more than 60 percent of villages surveyed (Singh and Balfour 2015). Perhaps more importantly, however, the study revealed that *under* 50 percent of sampled households were using "functioning, clean, and private toilets" at the time of the survey.

Russpatrick et al. (2017) and Tiwari et al. (2017) make use of the extensive Zambian digital village-level sanitation surveillance system (with over two years of monthly reports) to examine sanitation coverage trends under one of the countries CLTS deployments. Of nearly 13,700 villages in the surveillance database, roughly one third reported achieving full household latrine coverage over a 26-month period between July 2013 and August 2015; of these, some 42 percent exhibited some amount of backsliding from full coverage, with roughly half of the slippage occurring with five months of the attainment of full coverage (Russpatrick et al. 2017). Both achievement of coverage and likelihood of slippages were higher in larger villages; seasonal effects (higher slippage during the rainy season) was also observed. Tiwari et al. (2017) use the same dataset to analyze the role of formal engagement of chiefs in CLTS execution, finding that it increased the probability of achievement of full latrine coverage by 23 percent (using a Cox proportional hazard test). The authors also assess the data via an interrupted time series analysis after accounting for temporal trend, finding that chiefdom orientations were associated with a roughly 30 percent increase in household-level latrine access (Tiwari et al. 2017).

In their sustainability study, Tyndale-Biscoe et al. (2013) were careful to seek responses from women and men separately at both the community leader and household level to evaluate whether there were gendered dimensions to the factors that affected ODF sustainability, as well as to make sure that a representative fraction of female-headed households were included in their samples. Notably, privacy and security were *not* found to have a gendered dimension (Tyndale-Biscoe et al. 2013). The two identified gendered factors (in which there was a significant difference between male and female responses) were 1) the absence of ongoing financial support from within the community (they write: "reversion to OD [occurred] because of a sense that households had not continued to receive support to maintain or improve their latrine from within their community); and 2) the availability of land, materials, and labor" (Tyndale-Biscoe et al. 2013).

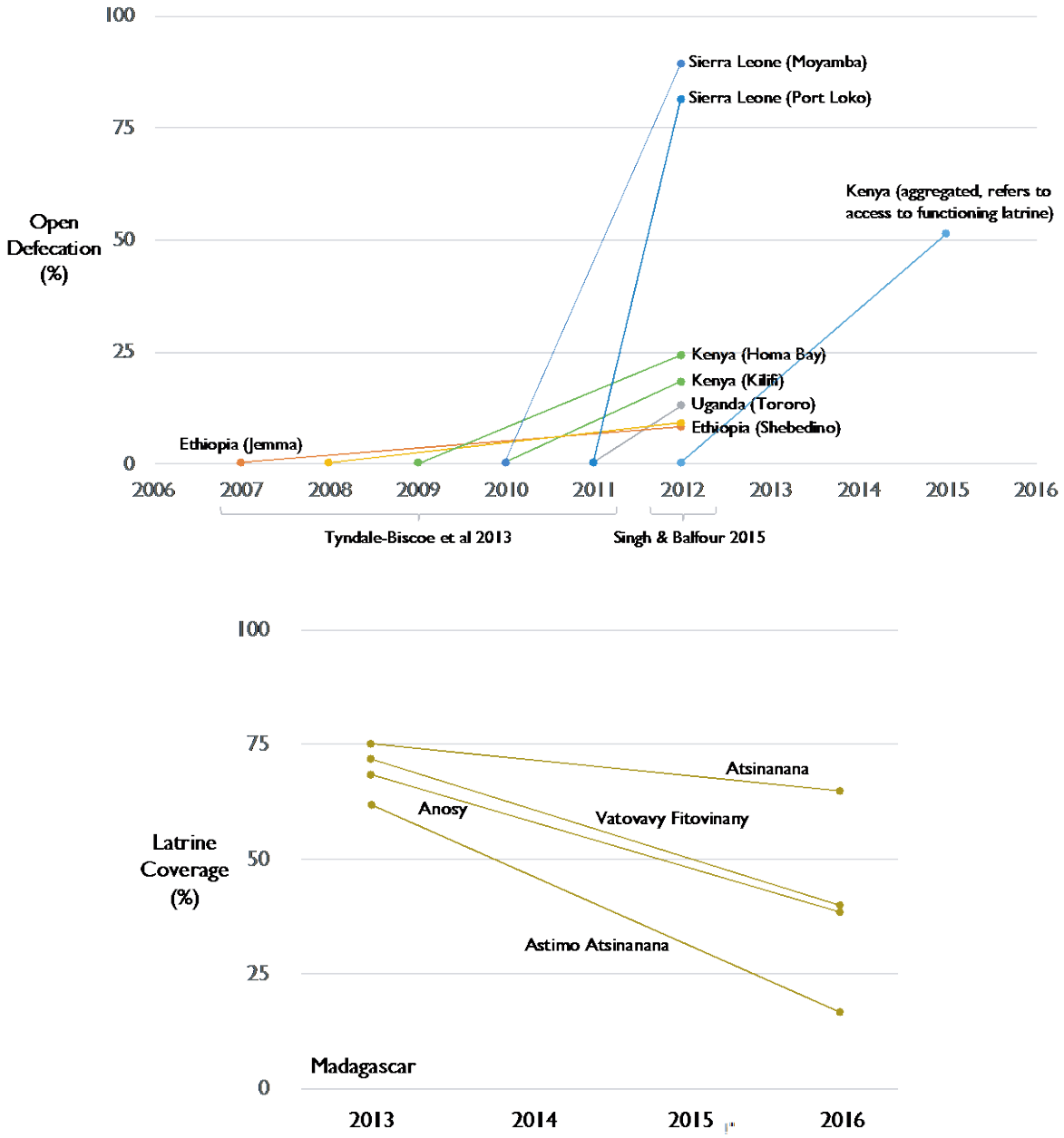
A recent cross-sectional study of nearly 600 households from Nusa Tengara Timor province in Indonesia found weak social norms, lack of water access, and low wealth to be associated with slippage, measured to be approximately 15 percentage points over a four-year period (Odagiri et al. 2017).

In Figure 6, we offer comparative plots of several of slippage results from the studies listed above, with the initial data points representing the achievement of a given CLTS outcome (whether an ODF declaration or the achievement of an elevated level of latrine coverage, as is the case in Madagascar). Slippage is indicated by an upward sloping curve for the OD results and by a downward sloping curve

[12] In this context, ODF verification is based on a weighted index score combining 16 different criteria. See Table 5b of USAID Water CKM Project (2017).

for the sanitation coverage results (in Madagascar). The steeper the curve, the more rapidly it has occurred over time.

Figure 6. Slippage curves for selected countries. Slippage parameter is OD in the upper plot and sanitation coverage in the lower plot. Data source for the lower plot is USAID CKM Project (2017).



We also note those cases in which there is a longer duration between baseline and follow-up, particularly the Ethiopia data presented by Tyndale-Biscoe et al. (2013) and the Madagascar evaluation by the USAID Water CKM Project (2017).

Regional differences can also be pronounced; in Ethiopia, for example, dramatic, sustained results were shown to have occurred in the Oromia Region that stand in contrast to fairly rapid slippage in the SNNP Region (Crocker, Saywell, and Bartram 2017). In the same country, Tyndale-Biscoe et al. (2013) uncover comparatively slow and mild slippage in Jimma and Shebedino.

Another other notable aspect of the updated results from Crocker, Saywell, and Bartram (2017) is that a second year of follow-up yielded dramatic improvement in the areas where teachers were the CLTS facilitators; at the initial follow-up in 2014, the teacher-facilitated communities sampled lagged far behind those triggered by NGOs, but by 2015 these communities enjoyed effectively equal (and sustained) outcomes.

Hulland et al. (2015) argue that frequent personal contact between villagers and health promoters as well as "accountability over a period of time" are the most important variables bearing on sustained adoption of WASH behaviors, adding that "personal follow-up in conjunction with other measures like mass media advertisements or group meetings may further increase sustained adoption." This is broadly consistent with the appeals within the programmatic literature for post-triggering follow-up (Singh and Balfour 2015; Tyndale-Biscoe et al. 2013; UNICEF 2013; Vernon and Bongartz 2016a), even as it is pointed out that CLTS programmatic budgets for post-triggering follow-up are often lacking (Mukherjee 2016; UNICEF 2013). Meanwhile, the gains in private latrine coverage observed after a comparatively "heavy touch" CLTS deployment in Mali (with most respondents reporting multiple follow-up visits) largely persisted one year past triggering, even with civil unrest occurring in the interim (Alzua et al. 2015).

In sum, slippage to open defecation is clearly observed in the independent evaluations of CLTS programs, and in some cases it appears to be by significant amounts. Whether modest slippage from the complete or near-elimination of OD translate into significant health costs is uncertain, and likely a function of whether it is a rise in OD from near zero to 5–10 percent, for example, or from 20 percent to 30–35 percent.

The most widely cited solution to sustaining OD behavior change is follow-up (Tyndale-Biscoe et al. 2013; Singh and Balfour 2015; Mukherjee 2016; Thomas 2016; Vernon and Bongartz 2016a; Wamera 2016; Odagiri et al. 2017). The four-country evaluation of the sustainability of Plan International's program includes the following:

> *The conclusions and recommendations [fall] into two categories: (i) strengthening and supporting households and villages that have maintained their ODF status to both continue investing in latrines as well as improving them and enhancing improved hygiene behavior; and (ii) addressing the issues that influence households to abandon their latrines.*

Singh and Balfour (2015) report that "follow-up and support are needed after ODF certification to support the most vulnerable households to build safe, functional toilets and ensure that all households have sustained, secure and easy access to latrines."

In Madagascar, a variant of CLTS known as "Follow-up MANDONA" has been developed by the local Executing Agency for the Global Sanitation Fund specifically in the interests of continuing engagement with communities over the long term and preventing backsliding (England 2016), though it is unclear in what manner the MANDONA process specifically accentuates post-triggering activities.

For years now, it has been suggested that follow-up is essential to CLTS success, and that realization appears to be manifesting itself in practice. The Koulikouro, Mali CLTS program for which child growth benefits were detected involved 6-12 follow-up visit per village (Alzua et al. 2015; Pickering et al. 2015). Crocker, Abodoo, et al. (2016) report averages of >12 visits per triggered village in Ghana. The findings of a performance monitoring report of a CLTS program implemented by SNV in partnership with the

Kenyan government and UNICEF indicated that in its western Kenya activities, ODF declarations only began to occur when the triggering of new villages ceased and programmatic activity focused exclusively on follow-ups to previously triggered villages; at the time of the evaluation the reported average follow-up frequency was greater than three visits per triggered village, and nearly five per ODF-declared village (Government of Kenya et al. 2011).

At the same time, follow-up "fidelity" (the adherence to and completion of the process of follow-up and monitoring visits as required by the project/program in all communities) is sometimes low, and long-term budget and capacity for follow-up and sustainability monitoring is often lacking (A. Robinson, personal communication). Two key informants we interviewed reported that in both Zambia and in Uganda, villages that did not achieve ODF after triggering were routinely left behind so that staff could give priority to trigger new villages, given the political pressures to quickly scale-up CLTS implementation.

Reinforcing this point, one of the findings of the multi-country CLTS research program conducted jointly by UNC and Plan was that "in most study countries, the research revealed that the capacity of local government to carry out follow-up activities was weak due to financial constraints. Programs had to rely on routine follow-up by village volunteers, who are reported to not follow up as consistently or effectively as paid government staff" (Crocker and Bartram 2015). This was also confirmed by a key informant, who reported that government staff are often not incentivized properly enough to perform follow-up activities. In Indonesia, for example, government sanitarians are responsible to visit communities and enter information about their visits into an online monitoring system, but many the villages continue to lack updated information in the system, as sanitarians have little motivation to revisit them.

It is important to recognize that to be truly sustainable, follow-up activities or other reinforcement mechanisms must occur independently of external donor support. Moreover, *if* long-term follow-up is indeed essential to preserving CLTS outcomes over time (which we caution has not yet been definitively established), the costs of that follow-up must be well accounted-for when CLTS is considered as a core element of government policy. It follows that, if sovereign governments are not willing or able to absorb the cost of that follow-up (or other complementary activities, such as the fostering of private sector sanitation product and service delivery, or carefully targeted subsidies), then the value of CLTS as a scalable long-term rural sanitation solution comes into question.

However, that there is likely more to sustainability of CLTS outcomes than follow-up alone. We hypothesize that another variable bearing on sustainability is movement up the sanitation ladder, insofar as higher quality, properly managed latrines serve to perpetuate the behavior change motivated by CLTS. In the USAID-funded Madagascar evaluation, over 40 percent of respondents reported "difficulty saving money for latrine building" as the main challenge preventing latrine construction (and thereby progressing up the ladder) (USAID Water CKM Project 2017).

Meanwhile, Singh and Balfour (2015) report that "households revert to OD when their latrines collapse; are too difficult to use for the elderly and/or children; are shared with neighbors; and are not close enough to be convenient." Each of these variables is an indication of the failure of ladder progression in triggered communities. An examination of CLTS's strengths and weaknesses with regard to ladder progression—what we argue to be an essential criterion for sustainability—follows in Section 7.

7.0 FROM MDGS TO SDGS: CLTS AND PROGRESSION UP THE SANITATION LADDER

KEY TAKEAWAYS

- Evidence of CLTS programs resulting in the installation of improved toilets is limited, and the lack of high-quality durable toilets resulting from CLTS poses a risk to the sustainability of CLTS-driven behavior change
- The motivational aspects of CLTS are focused on OD elimination, rather than investment in improved facilities
- Progression up the ladder involves addressing affordability and liquidity constraints as well as market access which are distinctly outside of the CLTS equation (with its zero-subsidy orientation and avoidance of specific product prescriptions)

The transition from Millennium Development Goals (MDGs) to the Sustainable Development Goals (SDGs)—specifically, Goal 6[13]—has elevated emphasis of both sustainably and safely managed water and sanitation services, and correspondingly focused attention on the delivery of improved sanitation and fecal sludge management (FSM). Though there may be reason to be cautiously optimistic about the ability of some CLTS programs to sustain enough of the reductions in OD to result in a health improvement, progression up the sanitation ladder is another matter. Indeed, the absence of evidence for the ability of CLTS to drive households up the ladder, along with sustainability, are among the most widely referenced drawbacks of the approach (Vernon and Bongartz 2016b). As mentioned in the previous section, only just under half of the surveyed household latrines in UNICEF's Kenyan CLTS sustainability assessment were reported to be "functional, clean, and private" (Singh and Balfour 2015). This is consistent with other findings that the elimination of OD via CLTS programs tends to result in construction of low-quality, traditional pit latrines that may be prone to collapse (Whaley and Webster 2011; Crocker, Geremew, et al. 2016; Tyndale-Biscoe et al. 2013; Venkataramanan 2016):

> *The first [concern] was an inability to move up the sanitation ladder… in the vast majority of cases this referred to the cost of cement, which was beyond what most rural Zimbabweans could afford and greatly diminished the possibility of constructing a permanent latrine. A number of interviewees referred to their dislike of temporary latrines because they break and fill up quickly. There was a general desire to own a permanent structure, and it was clear that when a temporary latrine becomes unusable there is not always the will to construct a new one. A number of people surveyed had reverted to cat sanitation[14] or even open defecation. This suggests that for an approach that may at first encourage simple measures such as cat sanitation or temporary latrines, the capacity of a community to move up the sanitation ladder is vital if sustainability is to be achieved, as one respondent put it: 'If you say dig the holes they will dig the holes, they will mold the bricks, they will build their own toilets. But the challenge is cement. So I think you can support them with cement so that we reach the ZOD[15] that we want. There is no way we can achieve 100 percent ZOD if we don't have permanent structures.'"* (Whaley and Webster 2011)

[13] https://sustainabledevelopment.un.org/sdg6

[14] "Cat method sanitation" is the practice of digging a small hole and covering feces with soil or ash.

[15] ZOD is Zero Open Defecation, a local variation on ODF used in some countries.

Poor quality of initial construction due to poor quality materials, pressure to build quickly, and lack of knowledge about how to build to a good standard were cited as critical barriers to progression up the ladder in Kenya, Ethiopia, Uganda, and Sierra Leone (Tyndale-Biscoe et al. 2013).

Similarly, in Ghana, Crocker, Abodoo, et al. (2016) found that latrines built after CLTS triggering were typically less likely to be made of durable materials such as concrete or wood (including flooring or doors), to have a fully intact superstructure, and to qualify as JMP-improved than those that had already been put in place prior to CLTS triggering. At the same time, however, the authors concede that latrines installed after triggering were comparable with respect to observed cleanliness, employment of covers, and presence of flies, suggesting that they were similarly maintained. Moreover, post-triggering installed toilets were *more* likely to have water or cleansing material for hand washing (Crocker, Abodoo, et al. 2016). A similar analysis in Ethiopia found—in contrast to Ghana—that latrines built after CLTS intervention were *more* likely to have stable and safe flooring and a protective roof, but no more likely to be improved (according to the JMP definition) than those built before CLTS interventions (Crocker, Geremew, et al. 2016).

Bangladesh is one of the few countries where CLTS implementation has led to the construction of improved sanitation facilities. Kullmann et al. (2011) report that in communities where the CLTS approach was implemented, roughly 50 percent of the latrines were improved. On many levels, however, Bangladesh is a special case: it is the birthplace of CLTS and has been host to monumental rural sanitation efforts spearheaded by a large, well-networked, highly effective implementing organization.[16] In this regard, it is noteworthy that at least 95 percent of households reported access to latrine materials and skilled masons in a local market, and 74 percent of the households knew where to find a latrine pit cleaner (Kullmann et al. 2011). The active development during the 1990s of the private sector in Bangladesh has meant that market forces have allowed most households to access affordable sanitation-related parts and services.

Numerous obstacles to progressing up the sanitation ladder following CLTS-driven reductions in OD have been discussed. Reporting on a study of latrine adoption in rural Benin, Jenkins (2004) lays out a concise theory on the drivers of sanitation demand: motivation, ability, and opportunity. Devine (2009) builds upon this theory in her elucidation of the SaniFOAM Framework for understanding behavior and behavior change.

Motivation: CLTS is focused on motivating a specific change in behavior (ending OD), but the degree to which it motivates parting with hard-earned cash, as opposed to their time and labor, is less clear. This is particularly important with respect to the transition from rudimentary pits to improved latrines, insofar as latrine adoption is rarely motivated by the health considerations that are at the center of CLTS. The immediate and direct benefits that improved toilets provide with respect to convenience, comfort, privacy, safety, and prestige tend to play an equal or more important role (Jenkins 2004).

A number of our key informants noted that in its traditional orientation, CLTS rarely provides incentives for communities to go up the ladder (with some exceptions, like PhATS in the Philippines, which offers progressive "grades" for ladder progression (Robinson and Gnilo 2016b), and the Indian government's "ODF Plus" category (Government of India Ministry of Drinking Water and Sanitation 2015)). Multiple interviewees suggested altered messaging during the CLTS triggering, whereby ODF status is presented as only the first milestone in a progression, rather than the singular, terminal goal of collective action.

In addition, our interviews suggested that CLTS is problematic on another motivational level with respect to the ladder: triggered participants may become "too tired" to continue their focus on sanitation improvements, or else feel sufficiently accomplished after having played a role in achieving

[16] *BRAC WASH achieves change "beyond excellent" says donor*. https://www.ircwash.org/news/brac-wash-achieves-change-"beyond-excellent"-says-donor

ODF status. One government field manager of CLTS programs reported that "ODF is now perceived as the end of the road, and we need to communicate better and say that this is just part of the journey." Multiple interviewees suggested that in their experience it can be difficult to mobilize communities with a revised message of "now you have to invest in better latrines." Another offered that by the end of the initial CLTS process, individuals "may feel that they have worked on sanitation enough, and have other things to do."

Ability: Jenkins (2004) and Devine (2009) both emphasize that "ability" is about more than money; it is also about knowledge, skill, time, geographic mobility, and social support.

Affordability has been offered as a key challenge to moving up the sanitation ladder, particularly for the poor (Jenkins and Scott 2007; Vernon and Bongartz 2016a; Whaley and Webster 2011). Affordability does not enjoy a consensus definition—indeed, an analysis spelling out options for a standard WASH affordability statistic was submitted to the United Nations Office of the High Commission for Human Rights (Hutton 2012). Still, there is little disagreement that household expenditures for installation of an improved latrine can routinely exceed monthly incomes for rural families (Trémolet et al. 2010), and depending upon the setting, toilet and superstructure design, can even approach annual incomes.

One can argue about what price constitutes an affordability threshold for an improved toilet (and other sanitation improvements, such as de-sludging). In Vietnam and Cambodia, for example, surprising numbers of the rural poor have demonstrated a willingness to spend upwards of $200-300 on improved latrines, all the more remarkable insofar as a toilet is not an income-generating asset (Nguyen et al. 2016). Perhaps more relevant is the question of household demand for sanitation services in a given context at a given price. A recent analysis of consumer valuation of concrete, plastic, and ceramic sanitation platform models via a voucher-based real money sales trial in Tanzania found remarkably weak demand for the products at commercial prices, even among populations that had been exposed to the country's total sanitation and sanitation marketing (TSSM) campaign (Peletz et al. 2017), with a similar study currently underway in Kenya.

Affordability does appear to be a constraint, though Trémolet et al. (2010) also point to a liquidity constraint as opposed to an affordability constraint in some cases, pointing to the potential of affordable consumer credit to increase demand; others (Yishay et al. 2017) have made the case that credit availability can raise consumer willingness-to-pay). In Vietnam, East Meets West's CHOBA program directed households to government-subsidized loans for toilets, and at least 30,000 households are believed to have accessed them to complete improved toilet purchases between 2012 and 2016 (Hien Vo, personal communication). By contrast, CHOBA's activities in Cambodia did not have subsidized credit available, and household borrowing options were limited to existing MFIs at market microloan interest rates; utilization was considerably lower (on the order of 17 percent), with informal borrowing from familial social networks likely more common (Rivera et al. 2016).

With respect to the knowledge component of the "ability" determinant, triggered households often do not understand what is meant by an improved latrine nor why it is important. Coombes (2016) reports that few households that participated in their study in Kenya were aware of the importance of a lid on the latrine, or what the attributes of an improved latrine are, in both CLTS and non-CLTS communities. This was confirmed by our own key informant interviews, in which one pointed out that health extension workers themselves may not understand improved vs. unimproved sanitation, having been informed during their CLTS training that their exclusive goal was to end OD.

Non-CLTS programs that have been successful at driving large numbers of the poor up the sanitation ladder (particularly BRAC's WASH in Bangladesh and East Meets West's CHOBA in Cambodia and Vietnam) have focused on putting in place the various measures that address mobility, skill, time, and knowledge constraints (Karim et al. 2012; Rivera et al. 2016; Nguyen et al. 2016) are not typically features of product/service neutral CLTS triggerings.

Opportunity: Opportunity refers to access to product information, builders, materials, and operation and maintenance (O&M) services (Jenkins 2004).

Many beneficiaries of sanitation interventions such as CLTS are not reached by sanitation product and service supply chains. Indeed, one of the most compelling elements of the CLTS approach is that it is intended to function outside or in the absence of those supply chains; whether they can easily find slabs or plumbing or concrete rings, communities are still empowered to end open defecation by collective action and the installation of rudimentary latrines that prevent excreta from being exposed to the air. Clearly, though, any transition from rudimentary pits to improved facilities requires that there are product and service suppliers in or near the communities and that households know where and how to find them. Supply chains are often fragmented, and in the many circumstances in which a "one-stop shop" option is not available, the skills and production means to transform these basic components and materials into a product or service for the rural poor are lacking (Thomas 2014). It is important to recognize emerging evidence that improvements to rudimentary pits are indeed valued by the communities targeted by CLTS (Beyene 2016; Vernon and Bongartz 2016a), and thus measures taken to (1) make the products and services necessary for improvements commercially available and (2) bring demand functions into alignment with pricing (such as via subsidy) are important options for moving communities up the ladder.

8.0 CLTS+: THE COUPLING OF CLTS WITH OTHER MEASURES

KEY TAKEAWAYS

- A basic, functioning commercial supply chain at the time of CLTS triggering is a necessary condition for translating OD reductions into increases in improved toilet ownership.
- Carefully designed subsidies can demonstrably increase toilet ownership among the poor and should be considered in the context of CLTS programs. Evidence on the interactions between subsidy and CLTS is largely absent and a worthwhile area of further study.

Concern about the challenges faced by CLTS in movement up the sanitation ladder was perhaps best captured by one of our key informants, a district-level government official, who lamented, "we are kind of stuck in 'unimproved' right now" and "we should have gone directly from OD to improved" because "it is now difficult to go from low-quality to higher-quality latrines." Another interviewee cautioned that "we can't burden communities with building latrines all the time. They should get a proper latrine so that they are not having to re-engage with the issue." Several interviewees suggested that slow movement up the ladder might be more expensive over the long term than making sure improved facilities are installed to begin with, because the occasion of community-wide engagements represents a significant opportunity not only to motivate households but also to link them with suppliers and information.

The CLTS community has come to recognize that other measures can add significant value with respect to sustainability and movement up the ladder, typically expressed as methods intended for the "post-ODF" environment (Vernon and Bongartz 2016a). The two obvious additional categories of intervention are (1) market-based interventions like SanMark and (2) measures intended to ease the financial burden on household sanitation improvements, such as subsidies and consumer credit.

8.1 CLTS + SANMARK

Though CLTS is now formally part of rural sanitation policy in many countries and is implemented as a stand-alone intervention in discrete regional or local contexts, many of the largest national or multi-country rural sanitation programs specifically integrate CLTS with supply-side activities (as well as other elements, such as enabling environment enhancements and behavior change communication). A selection of these includes BRAC WASH I and II in Bangladesh, managed by BRAC from 2006-2015; SNV's Sustainable Sanitation and Hygiene for All (SSH4A) project across 15 African countries as well as Nepal from 2014-2018; and the Total Sanitation and Sanitation Marketing (TSSM) Project in India, Indonesia, and Tanzania managed by the World Bank Water and Sanitation Program from 2007-2011.

Pedi and Jenkins (2013) offer a comprehensive summary of the key considerations for designing and evaluating programs that integrate CATS with SanMark, making the strong case that the two interventions are mutually reinforcing while challenging the assumptions that SanMark is necessarily a threat to the "social change process."

Munkhondia et al. (2016) provide an in-depth examination of CLTS-SanMark coupling, drawing on experiences in Malawi, Tanzania, and Zambia. Primary among the considerations they highlight for integrating demand and supply-side interventions is "phasing," which asks the question: when should market-based interventions be introduced relative to the CLTS pre-triggering, triggering, and follow-up activities?

Phasing is indeed an important implementation variable. Some CLTS "purists" may become a bit uncomfortable with supply-side interventions interfering with the collective action process intended to eliminate OD as it is occurring, but Munkhondia et al. (2016) point to programs introducing supply-side interventions years after triggering as largely failing to move communities up the ladder, citing experiences in Malawi (GSF 2014) and Tanzania (Briceño et al. 2015).

In Uganda, Plan International phased SanMark immediately following ODF achievement to avoid undermining the CLTS process of collective action (Nabalema 2011), though no operational performance data are publicly available. Meanwhile, Munkhondia et al. (2016) highlight examples of SanMark occurring in parallel with CLTS triggering out of the recognition that some households are loathe to invest in low-quality latrines in the near-term only to re-invest again to put in place an improved facility or upgrading a pit that is already partially filled with excreta. The caveat, of course, is that this preference is likely limited to households with relatively more financial means.

SNV's SSH4A program, developed over the course of several years through a series of comparative case studies and 12 e-discussions and learning events (with inputs from the University of Technology in Sydney, the London School of Hygiene and Tropical Medicine, and IRC International Water and Sanitation Centre), combines demand creation elements of CLTS with supply chain and finance/value chain development elements of SanMark (with governance system strengthening as well as capacity building for long-term hygiene behavior change communication) (Baetings 2017 and A. Kome, personal communication). Notably, the program's supply chain development activities occur *prior* to demand creation to be sure that there is a quick market response.

The idea of coupling CLTS with market and supply-chain support appears to have consensus support, but we were not able to locate meaningful evidence of the relative advantages of different phasing schemes. This is certainly an area worthy of careful field investigation, including the possibility of random assignment experiments to move the discourse past the realm of hypothesis and anecdote. Concerns about the introduction of local market players "distorting" or "corrupting" the triggering of collective action appear not to be based on any real monitoring information (while the empirical case for the costs of long lags between triggering and supply chain interventions may be stronger). Indeed Pedi and Jenkins (2013) point to the experiences of TSSM program in Indonesia and Bangladesh's "Social Mobilization" program of the mid-1990s as compelling examples of the utility of having healthy commercial supply chains in place *prior* to engaging in CATS activities, "in order to achieve optimal conversion of the generated demand into sustainable sanitation improvement."

8.2 CLTS + SUBSIDY

The avoidance of subsidies is perhaps the most fundamental tenet of CLTS. Its logic is understandable, but it must be recognized that subsidies for other basic human services (including piped wastewater collection and treatment) are widespread globally in developing and developed economies.

Vernon and Bongartz (2016a) write that while subsidy has long been a source of controversy within the CLTS community, "it is becoming increasingly evident that the poorest and most marginalized people will not necessarily be able to access sustained improved sanitation and climb the sanitation ladder without some form of external assistance." We go further, suggesting that in many cases subsidy may be necessary for a population much wider than the "the poorest and most marginalized" to progress up the ladder. As we assert above, even while CLTS may well reduce open defecation, it is far from clear that it succeeds at moving any populations up the ladder, given the paucity of evidence.

The deployment of subsidy for sanitation can occur in many ways. It can be provided in the form of cash or materials, as a rebate or an upfront price discount, paid to households directly or instead to a supplier who passes savings on to customers. The subsidy amount can be adjusted to cover any percentage of overall product and installation costs. Implementers of subsidy programs may choose to

restrict eligibility to the poorest of the poor, to the lowest income quintiles, or else to expand the eligible pool as widely as they choose.

The question of phasing subsidy with CLTS was a central point of debate at a workshop sponsored by the CLTS Knowledge Hub in the Philippines in May 2017. Should subsidies to drive households up the ladder be conditioned on ODF achievement and paid out only after certification? Other questions included the size and modality of support and how best to identify and target needy subpopulations.

The closest thing to published evidence of the interactions between subsidy programs and CLTS is offered by Pattanayak et al. (2009), though the intervention considered was arguably a variant of India's Total Sanitation Campaign that employed CLTS elements. Subsidies were not included as an experimental intervention, but the Indian government's social insurance program targeted at below-poverty-line households provided a "quasi-experimental backdrop" to the study, which inferred that a third of the program's treatment affect was attributable to reducing toilet costs from $50 to under $8 for poor households (Pattanayak et al. 2009). A randomized trial of CLTS combined with an integrated poverty-targeted subsidy program is currently underway in Laos (H. Nguyen, personal communication, May 2017). Studies like this will provide important insight into whether specific poverty-targeted, results-based, partial subsidies tend to improve or hinder the CLTS approach. In a random assignment study in Bangladesh, Guiteras et al. (2015) tested CLTS, SanMark, and subsidies independently, and found that 75 percent price discounts distributed via lottery as vouchers to the lowest three income quartiles results in a 22 percentage point increase in private hygienic toilet ownership, whereas the other two measures had no statistically significant effect on ownership at all. Notably, the subsidies produced a positive spillover effect, insofar as an 8.5 percentage point increase in hygienic toilet ownership was observed among households in the subsidy cohort that did not receive the subsidy (Guiteras et al. 2015).

The subsidy examined by Guiteras et al. (2015) is fairly large relative to the price of a hygienic toilet (75 percent of the cost), and it is offered to a comparatively large fraction of the population (all but the top income quartile). By comparison, the CHOBA program (a close variant of which is being evaluated in Laos) deploys a much smaller subsidy (generally 10–20 percent of the commercial price, depending upon the scale of investment chosen by the beneficiary household), paid on a results basis to either Vietnamese households (in the form of a post-installation rebate) or Cambodian latrine suppliers (also in the form of a post-installation rebate, allowing the offer of an upfront discount to households). CHOBA's subsidies are directed exclusively at the poorest 40 percent of the population (upon verification of installation) and coupled with a heavily modified version of a CLTS triggering event—one which seeks to inspire disgust with open defecation but avoids other CLTS program elements such as the transect walk and fecal calculation, and formation of a community plan to end OD. (One of the target CHOBA countries, Vietnam, has minimal open defecation to begin with; indeed, the CHOBA program has as its prime focus the elevation of households and communities up the sanitation ladder.) CHOBA also employed community-wide incentives (for the achievement of a 30 percentage point increase over baseline community coverage and 95 percent overall community coverage, respectively). Nearly 200,000 latrines were installed by the rural poor in Cambodia and Vietnam over the course of the program, with an independent evaluation attributing a 17 percentage-point increase in hygienic toilet ownership to the program (Nguyen et al. 2016).

An attempt to replicate the program's success in other settings, especially in Africa, is worth investigating, given the program's comparatively low donor costs (about $50 per toilet installed, as compared with on the order of $15-30 per household targeted under CLTS programs as described in Section 9). No convincing case has been made that progression up the ladder will occur in Africa without addressing the disconnect between consumer demand and price. Targeted output-based subsidies to bring the demand and price into sufficient alignment may result in significant adoption.

9.0 WHAT DOES CLTS COST AND WHO PAYS?

KEY TAKEAWAYS

- Recent analysis offers updated and more refined information on CLTS implementation costs, which appear to range between roughly $15 and $30 per household targeted (as opposed to successfully triggered) in sub-Saharan Africa. Other costs (including that of latrine construction) are not included, as they are borne by households.
- Enhancements of traditional CLTS, such as the initiation of hygiene promotion or recruitment and training of natural leaders, pushes these costs up considerably, toward $80 per household targeted.
- CLTS implementation costs are overwhelmingly financed by external donors.

9.1 COMPARATIVE COST ESTIMATES

Comparatively low program costs (especially in relation to programs directly constructing toilets with full or close to full subsidy) are one of the most compelling characteristics of CLTS, and a quality which is further accentuated by the approach's zero-subsidy orientation. Still, execution of CLTS programs requires management resources that may be costly. Management involves applying best practices in pre-triggering (to understand which communities lend themselves to the participatory, collective action approach and which may be better reached through other interventions), insuring that facilitation of triggering activities is executed by well-trained, persuasive, and motivated field personnel, and supporting the kind of follow-up that is generally thought necessary to sustain reductions in OD, let alone drive progression up the sanitation ladder. Information on the costs of achieving ODF communities is sparse (UNICEF 2015). Sara (2016) cites a figure of $60 per triggered village in Kenya (as compared to $85 per village for third party certification of ODF status), while Sah and Negussie (2009) offer an estimate of $1/household reached in Ethiopia, entirely in facilitation costs, but in neither case do the authors offer a cost breakdown nor an indication of how cost data were collected or calculated. Evans et al. (2009) report $6-7 per household targeted in Bangladesh, $30 per household targeted in Nigeria, and between $58 and $84 per household targeted in Nepal.

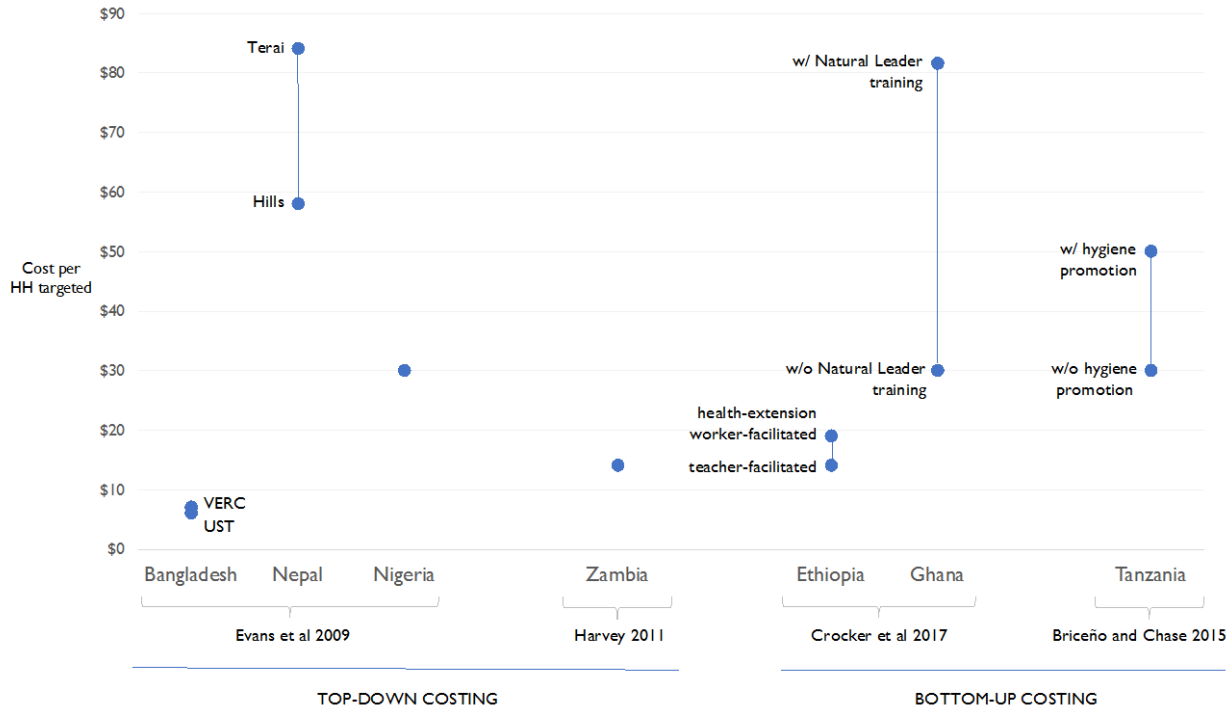
A far more careful and detailed recent estimate from both Ethiopia and Ghana (Crocker, Saywell, Shields, et al. 2017) indicates some convergence with other more recent published estimates of aggregated costs, as well as an illuminating disaggregation of costs in each country. In Ghana, the aggregated cost estimate of approximately $30 per household targeted by NGO-facilitated CLTS is nearly equivalent to those disaggregated costs reported for CLTS in Tanzania by Briceño and Chase (2015). Importantly, both estimates employ bottom up costing, which Crocker, Saywell, Shields, et al. (2017) argue is a more robust technique for estimating specific cost components, as compared to top down costing in which overall program cost is divided by the number of households targeted, or reached.

The $30 programmatic cost per targeted household in Ghana rises dramatically to over $80 when natural leader training is introduced; meanwhile, in Ethiopia, costs are considerably lower – between $14 and $20 per targeted household depending upon whether teachers or health workers are tasked with facilitation of CLTS triggering (Crocker, Saywell, Shields, et al. 2017). These numbers are comparable to the reported costs of CLTS in Choma district, in Zambia at $14 per household, reported as all "software costs" (Harvey 2011).

Crocker, Saywell, Shields, et al. (2017) also attempt to quantify community costs – or more specifically, those borne by individual households, and report aggregated investments from just over $2 per targeted household in Ethiopia under teacher-facilitated triggering to over $22 per targeted household in Ghana under trained natural leader triggering. The authors note that expenditures on the construction portion of their investments in Ghana was 30 times the average amounts spent in Ethiopia, attributable to both Ghanaian purchases of materials for construction (as compared to Ethiopian reliance largely on existing local materials) as well as a higher utilization rate of paid labor in Ghana.

We offer a comparative illustration of some CLTS cost estimates in Figure 7. It is worth noting that the Ethiopian and Ghanaian numbers were estimated in the context of field research examining other aspects of CLTS implementation modalities (Crocker, Saywell, Shields, et al. 2017).

Figure 7. CLTS cost estimates (per household targeted), as reported by multiple studies.



9.2 PAYING FOR CLTS

Examined in the aggregate, these cost estimates are sobering. Consider the case of Ghana: according to the most recent JMP data (WHO/UNICEF JMP 2015), approximately 4.2 million people, or roughly 844,000 rural households practice open defecation. (This assumes an average family size of 5 individuals per rural household, higher than the overall national average of 4.1 individuals per households, which includes urban areas.[17]) Assuming further a best-case hypothetical that all these rural, OD-practicing Ghanaian households were sequestered in the smallest possible number of communities, the cost of *targeting* this population via CLTS is on the order of $25 million, relying on the cost estimates from Crocker, Saywell, Shields, et al. (2017). By contrast, the entire Ghanaian government expenditure for

[17] Ghana Statistical Services (2012), Population and Housing Census 2010. http://www.statsghana.gov.gh/docfiles/2010phc/Census2010_Summary_report_of_final_results.pdf, accessed 18 September 2017.

sanitation in 2014 (both rural and urban populations, and including the full array of sanitation-related services) was only $7 million (WSUP and IRC 2016).

Ghana is not a unique case (WSUP and IRC 2016; UN-Water Global Analysis and Assessment of Sanitation and Drinking Water 2017); sovereign government support for rural sanitation generally and for CLTS in particular has thus far been quite limited.

The bulk of the financing for CLTS comes from external donors, including bilateral funders like USAID and multilaterals like UNICEF and the Water Supply and Sanitation Collaborative Council, which administers the GSF). A centerpiece of UNICEF's sanitation approach is CATS, of which CLTS is an important element, and UNICEF's 2016 budget was $58.4M for programs focused on OD elimination in both rural and urban contexts, with another $35.4M set aside to support sanitation marketing (UNICEF 2016). Meanwhile, the GSF, established in 2007, had as of 2015 disbursed roughly $75M of $112M in grant commitments to 13 participating countries in sub-Saharan Africa as well as India, Nepal, and Cambodia (GSF and WSSCC 2015). In eight of its 13 countries, an international NGO (e.g., WaterAid, Plan, Concern) is the lead executing agency; in two (Ethiopia and Uganda), the government is the lead; in another two, a UN agency (UNICEF in Togo and UN Habitat in Nepal), and in one (India), a private consultancy leads.

In short, CLTS is not currently an intervention that is widely financed by sovereign governments, nor can its costs be expected to be widely assumed by them in the immediate future. Given the not-insignificant costs of CLTS and the relatively small water and sanitation outlays in domestic government budgets, attention must be focused on increasing the intervention's cost-effectiveness to the greatest degree possible and targeting it where it is most likely to achieve sustained results (including integrating it with other measures as appropriate).

10.0 CONCLUSIONS

Community-led Total Sanitation is a revolutionary idea and an inspiring practice. The enthusiasm of its many adherents in governments and civil society is understandable. As a matter of research, however, there remains a great deal to be learned about how CLTS functions within the broader set of interventions to accelerate sanitation improvements in developing country settings. We offer the following analytical highlights from our review, keeping in mind where the evidence base is strongest and where the gaps in knowledge are most glaring:

- *We must be clear about the original goals of CLTS, and be careful about critiquing it for failing to achieve goals for which it was not initially intended.* CLTS was conceived to bring about the rapid elimination of open defecation, and the available (albeit very limited) evidence suggests that it can be effective at achieving dramatic short-to-medium term OD reductions that are sufficient to result in health benefits. It is less clear that the behavior changes achieved by CLTS are regularly sustained over time; there are certainly well-documented examples of significant slippage and reversions to OD, but other equally powerful examples of impressive sustainability. The balance of the current evidence points to underwhelming results with respect to improved sanitation adoption, but again, CLTS was not designed with that objective in mind.
- *There is not nearly enough reliable information on CLTS performance with respect to OD reduction and latrine adoption*. Internal performance monitoring by implementing NGOs and governmental institutions must continue, but ultimately independent data collection and analysis must complement that internal M&E. Making official verification and certification protocols as independent, efficient, and cost-effective as possible, should be a priority. Without reliable information, it is impossible to draw conclusions about how best to employ and adapt CLTS to maximize its effectiveness, including decisions regarding where it should be avoided.
- *CLTS can work well, but not everywhere, all the time, or for everyone.* CLTS has a performance envelope. The limits on CLTS potential appear to include where OD is already low, where full toilet subsidies have already been offered, where soils are challenging for excavation, and where social cohesion is poor. These constraints should not be thought of as "go vs. no-go" determinations of where to deploy, but instead considerations to note when prioritizing CLTS programs and when to make modifications or to combine it with other measures. Furthermore, CLTS doesn't always reach everyone within communities where it is successful as it is not specifically designed to address established uneven power relations between men and women, nor to guarantee inclusion among all marginalized groups.
- *CLTS deployments, even when short of the installation of hygienic latrines, may be sufficient to improve health*. An important area of CLTS-related public health research moving forward is to determine whether un-improved latrines – which are overwhelmingly the ones installed as a result of CLTS programs – are sufficient to achieve and sustain health gains. At the moment there is a single high-quality health study of CLTS in Mali that provides a first encouraging hint that the approach can address child growth faltering. As we look to replicate those results elsewhere, attention should be paid to answering the question of whether rudimentary pits can be kept clean and fly-free enough to achieve (and sustain) those health gains.
- *Follow-up appears to be a strong determinant of both significant OD reductions sustained behavior change*. As compared to early CLTS efforts, follow-up is increasingly mainstreamed into CLTS programs implemented by the large international NGOs, but the degree to which it actually occurs in practice – especially after the assumption of CLTS activities by governments – is uncertain.
- *CLTS can and should be integrated with other measures, and that integration can be done in a careful way that avoids disrupting the collective action process.* Arguments that CLTS must function as a stand-alone intervention, lest its core principles be violated, are unconvincing. Indeed, most

large donor-funded programs now integrate CLTS with SanMark, measures to improve the enabling environment, strengthen governance, as well as more conventional behavior change communication activities – particularly those targeted at handwashing. The immediate goals of CLTS may be limited to community achievement of ODF status, but the broader public health and development objective should be to drive communities up the sanitation ladder. That necessarily means that efforts must be made to get communities *access* to products, services and information (often accomplished through market-based approaches like SanMark) and increasing communities' *ability* to purchase those products and services (including via carefully designed and carefully timed provision of subsidies).

- *CLTS is clearly less costly than programs that provide full subsidy of hardware, but its cost range is comparable with market-based approaches or even targeted subsidies*. Well-executed SanMark and OBA subsidy programs from SE Asia deliver improved latrines unit costs that are on par with those of African CLTS programs for each household targeted. Recent CLTS cost estimates must be considered carefully, not so much as an argument to curtail CLTS, but instead to help governments and major funders decide how to allocate resources among behavioral, supply-side, and pro-poor measures – and especially how and when to integrate these measures.
- *Government commitment is essential.* Though much financial support of CLTS has come from bilateral and multilateral institutional donors, sovereign governments must be willing to contribute personnel time and other resources to support national programs (as a necessary, but not sufficient, condition of performance). Moreover, donor largesse in support of CLTS is time-limited, and the future of these programs will rely in part on the willingness to governments to assume much if not all of the full implementation costs.

Returning to the sentiments of Piers Cross we presented at the beginning of this review: in many ways, the two fundamental questions he poses about CLTS remain unanswered. There is suggestive evidence that the so-called "transformed mind-set" and "new patterns of defecation behavior" are sustained, following triggering, but there are also many examples in which they are not. Where they are not, the inability to sustain the behavioral gains of CLTS may be closely linked to Piers' second question about creation of permanent facilities and improved services levels (hence the dire need for better, more independent monitoring). Researchers and practitioners alike have their work cut out for themselves.

ANNEX 1: APPROXIMATION OF CLTS SCALE ACHIEVEMENT FOR COUNTRIES THAT HAVE INCORPORATED CLTS INTO NATIONAL SANITATION POLICY

REGION	COUNTRY	EXTENT OF TRIGGERING	YEAR	SOURCE	REMARKS
East Africa	Eritrea	33% of villages triggered	2014	CLTS Knowledge Hub	*As of May 2014, 869 villages out of 2,644 have been triggered in the six regions of the country*
East Africa	Ethiopia	80% of woredas have adopted	2011	UNC Brief	*http://waterinstitute.unc.edu/files/2015/03/situational-assessment-ethiopia-2015-02.pdf In 2011, CLTS had reached all 9 regions and was supported in 439 of 550 woredas*
East Africa	Kenya	15% of villages triggered	2014	CLTS Knowledge Hub	*According to a MOH-UNICEF report, out of 59,915 villages in Kenya, 9,126 had been triggered and 2,567 declared ODF by March 2014*
East Africa	Madagascar	6% of fokontanys targeted	2014	Milward 2014	*As of May 2014, Madagascar has 9059 ODF villages, 1082 ODF fokontany and 34 ODF communes (Wikipedia: total number of fokontany = 16,969)*
East Africa	Malawi	Over 1 million people targeted	2016	Mukhondia 2016	
East Africa	Mozambique	1 million people targeted	2013	Pendly 2013	
East Africa	Uganda	72% of districts have adopted	2015	CLTS Knowledge Hub	*80 districts out of a total of 111 have adopted CLTS as an approach for improved sanitation.*
East Africa	Zambia	79% of districts have adopted	2015	CLTS Knowledge Hub	*The harmonized programme is now active in 73 districts of the 92 rural districts in Zambia.*
		3 million people targeted	2016	CLTS Knowledge Hub	*The programme's target was to reach 3 million people with improved sanitation by 2015. So far, over 2.5 million people have been reached. (3 million confirmed by a UNICEF report)*
West Africa	Republic of Congo	14% of villages triggered	2014	CLTS Knowledge Hub	*In 2011 and 2012 scaling-up of CLTS in Congo, 200 villages out of 5000 existing villages were targeted; 200 villages in 2013, and 300 villages in 2014.*
West Africa	Côte d'Ivoire	42% of regions have adopted	2015	CLTS Knowledge Hub	*Through July 2015 361 new villages were declared ODF in 13 regions (out of 31 total regions).*
West Africa	Ghana	90% of regions have adopted	2015	CLTS Knowledge Hub	*To over 5,000 communities in 9 (out of 10 total) regions in 2015.*
West Africa	Liberia	Approx 80%+ of villages declared ODF	n/a	ESRI Web Map	*Liberian government data at http://www.arcgis.com/apps/StoryMapBasic/index.html?appid=effbf9d0587e44deabcfec09575bede6*
West Africa	Mali	63% of regions have adopted	2015	CLTS Knowledge Hub	*Currently, CLTS covers five regions out of eight.*
West Africa	Mauritania	Over 33% of villages triggered	2016	CLTS Knowledge Hub	*Mauritania boasted 2,443 ODF villages, or more than a third of the total number of rural villages, covering a population of 800,000 or roughly 40% of Mauritania's rural population.*
West Africa	Nigeria	39% of LGAs have adopted	2015	CLTS Knowledge Hub	*As of August 2014, over 20,000 communities in 301 LGAs in 36 States are implementing CLTS (Wikipedia: total number of LGAs=774)*
West Africa	Senegal	100% of regions have adopted	2015	CLTS Knowledge Hub	*CLTS has been implemented in all 14 regions of Senegal.*
West Africa	Sierra Leone	43% of districts have adopted	2012	CLTS Knowledge Hub	*CLTS is being implemented in six districts (Wikipedia: total number of districts = 14)*
SE Asia	Cambodia	76% of provinces have adopted	2016	CLTS Knowledge Hub	*In 2012, CLTS had spread to 11 out of 23 provinces in Cambodia (introduced in 48 per cent of the provinces), and is now currently in 19 out of 25 provinces and the capital (increasing spread to 76 per cent).*
SE Asia	Indonesia	96% of districts have adopted	2015	CLTS Knowledge Hub	*as of mid 2015 it has spread to 492 out of 514 rural and urban districts across all 34 provinces.*
SE Asia	Lao PDR	22% of districts have adopted	2016	CLTS Knowledge Hub	*CLTS has since spread to 31 districts out of 143 nationally, in 10 out of the 17 provinces in Lao PDR (59 per cent nationally)*
SE Asia	Papua New Guinea	55% of provinces have adopted	2016	CLTS Knowledge Hub	*Currently CLTS is supported in around 12 of the 22 provinces in Papua New Guinea, but only in selected districts within those provinces.*
SE Asia	Philippines	18% of provinces have adopted	2016	CLTS Knowledge Hub	*CLTS has spread to 15 out of 82 provinces and cities in the Philippines (18 % geographical coverage).*
SE Asia	Timor Leste	26% of sucos have adopted	2016	CLTS Knowledge Hub	*CLTS has spread to all 13 districts in Timor-Leste (100 per cent geographical spread), and to approximately 80-128 sucos (villages) out of 401 rural sucos (20-30 per cent).*
SE Asia	Vietnam	15% of districts have adopted	2016	CLTS Knowledge Hub	*CLTS has since spread to 20 out of 64 provinces in Viet Nam (31 per cent nationally) in 2015, although in most provinces only selected districts are supported – representing about 15 per cent of the country.*
South Asia	Nepal	40% of districts have adopted		CLTS Knowledge Hub	*CLTS has been implemented in 30 of Nepal's 75 districts.*
South Asia	Pakistan	Over 5 million people targeted	2015	CLTS Knowledge Hub	*It has been reported that these two programmes alone have helped more than 5 million people achieve ODF status.*

ANNEX 2: CRITERIA FOR ODF AND IMPROVED SANITATION STATUS IN SELECTED COUNTRIES

COUNTRY	ODF STATUS CRITERIA	IMPROVED SANITATION STATUS CRITERIA (IF EXISTING)
Ethiopia	• No open defecation practice • Availability of latrines meeting minimum standards which are in use • Cover for latrine drop-holes • Separate blocks or rooms for males and females	• Handwashing facilities attached/adjacent to latrines which are in use • Availability of water (3-5 liters) in the hand washing station • Availability of soap or soap substitute within 3 meters of handwashing facility • Safe storage and collection of water (separate containers for drinking water versus water for other uses) • Cleanliness of water storage and placement (clean container at least 30cm over the floor) • Water storage type and management (with lid and easy to clean storage device) • Use of safe water at the household level • Condition of water at the sources
Ghana	• There are no visible signs of human excreta within the community, including in toilet facilities. • All community members including children dispose of their fecal matter in an acceptable matter that does not perpetuate fecal-oral transmission. • Acceptable manner in this context means feces should be: – Covered – Not accessible to flies – Put in a latrine (can be shared) – Buried deep enough to prevent animals from exposing it – Feces should not be stored in polythene bag • The community has developed and is implementing a strategy that ensures the sustainability of their ODF status (e.g., local regulation to discourage OD, promote the construction and use of latrines). • A clean action plan exists towards improving sanitation coverage, hand washing with soap and other hygiene practices.	• At least 90% of the houses in the community should have an improved latrine. • An increase in hand-washing practice (evidenced by hand washing facilities with soap or other agent) close to toilet facilities in institutions such as schools and health posts • An improvement in general environmental sanitation in the community (evidenced by maintenance of refuse dump sites, waste water management, clearing of bushes, absence of animal droppings and clean lanes and alleys) • Evidence of initial rudimentary latrines moving up the sanitation ladder
Indonesia	• 100% of the community has access to and is using the toilet (1 house at least 1 toilet, with all members using it). • The toilet has a cover to prevent insects from touching the feces/excrement. • Distance of disposal pit into wells/shallow wells is more than 10 m. • Feces from babies and elder people are disposed in the toilet. • Access to anal cleansing is available. • No feces seen in the houses, garden, or river.	• Pillar 2: Handwashing with soap – Equipment to wash hands, flowing water, and soap are available. – All house members are aware of when critical times to wash hands with soap. (e.g., able to mention at least 2 of the 5 critical times) • Pillar 3: Household Proper Drinking Water and Food Management – Water is properly treated before use. – Food must be covered. – Drinking water container is cleaned regularly and has a lid. • Pillar 4: Household solid waste management – Household waste is not scattered inside or outside ▪ There is safe treatment of solid waste (hole in the ground, compost, reuse, or other treatment). • Pillar 5: Household liquid waste manage – There is no stagnant water (liquid waste including of kitchen and washing activities, not just bathroom) around the house.

COUNTRY	ODF STATUS CRITERIA	IMPROVED SANITATION STATUS CRITERIA (IF EXISTING)
		– Liquid waste has been treated safely before being disposed (covered soak away pit, to water plants, to go into a ditch).
Kenya	• There are no visible signs of human excreta within the community. • All households have access to a latrine (private or shared) which should not facilitate fecal-oral transmission: – The squat hole should be covered. – The floor should be free of feces and urine. – Superstructure should provide privacy. • All households have a hand-washing facility near the latrine that: – Are in use – Show evidence of soap/ash and water	
Mali	• Every family has a latrine that is designed to prevent flies from entering it. • Every member of the family uses this latrine. • Every latrine has a handwashing station with water and soap/ashes. • The specific criteria evaluated are: – Absence of any trace of feces in the village – Every household uses an hygienic latrine – Every latrine has a handwashing station – Latrine pit is covered – Infant feces are properly disposed – Schools are equipped with latrines and handwashing stations – Hands are washed with water and soap/ashes at critical times – Food is covered – Potable water sources are protected from contamination of animals – Potable water sources are well maintained – Solid and liquid waste is properly disposed, including animal waste – Latrines are at least 15 meters away from the water source and far from the kitchen	
Madagascar	• Use of latrine by 100% of adults and infants – No fecal material outside or around the latrine – No open defecation areas (old ones are closed/transformed) • Latrine is clean and covered, without holes/spaces – Latrine cover is fly proof, and latrine is clean of paper/objects • Practice of handwashing with soap or ash is established • Existence of a handwashing station near the latrine, which is accessible to all, including infants	
Nigeria	• No feces are openly exposed to the environment. • Latrines (private or shared) exist and are in use • Handwashing materials are available in or near the latrines	• All households use hygienic latrines • Always keep latrines clean • Latrine, hand washing facilities, and urinals are provided and being used in school, health centers, markets, and other public places where available

COUNTRY	ODF STATUS CRITERIA	IMPROVED SANITATION STATUS CRITERIA (IF EXISTING)
	• Distance between drinking water source and latrine is 30 meters and latrine is down-hill of water points. • No defecation in the open in areas of the communities or close to it. • Schools have separate toilets, handwashing facilities, and urinals. • Community has a market with a public toilet and handwashing facility. • Health center in the community has a toilet.	• Washing hand properly with soap, ash and water at critical times (after defecating, before eating and feeding children, after packing children feces, before preparing good, and after coming in contact with dirt). • Always keep food covered. • Always keep drinking water covered. • Always keep water points surroundings sanitary. • Always keep households, abattoirs, and community environment sanitary. • Proper disposal of solid and liquid waste including animal waste. • Proper disposal of waste water. • Safe location of latrines, at least 30 meters away and downhill of groundwater sources.
Philippines	• Excreta-free open spaces, drains, and water bodies • 100% use of a functional toilet • 100% availability of water and soap at or nearby toilet • Safe disposal of child and elderly excreta • Community plan to get to sustainable sanitation (G2)	• Sustainable Sanitation (G2) – 100% of the households use their own toilets with the following characteristics: ▪ Toilet facility can be used safely for a number of years, and is designed for safe emptying and disposal. ▪ The toilet is designed to prevent contact with feces ▪ Toilet is sealed. ▪ Toilet incorporates a solid, raised platform (housing the pan or pedestal). ▪ There are no open holes or gaps that expose excreta to animals and insects. ▪ The toilet should be constructed in a manner that prevents smell. – 100% availability of handwashing facility with soap and water – Safe disposal of child and elderly excreta – 100% sustainable toilets in institutions such as schools, day care centers, health posts (with handwashing facilities with soap and water available, with at least one toilet for boys/men and another one for girls/women) – Sustainability monitoring in place on the use of toilets at the village level – Community plan to get to Total Sanitation (G3) • Total Sanitation (G3): – 100% solid waste and wastewater management (including drainage) and backyard gardening – 100% sanitary toilet coverage – Safe management of animal excreta – Protected water sources and water points – Regular water quality testing – Sustainability monitoring – Comprehensive wash plan
Tanzania	• All households have access to improved latrines. • All households have functional hand washing points.	• Universal coverage of basic sanitation at household level • All institutions within the community have improved and properly managed sanitation and hygiene facilities • No signs of OD around farmland, bushes, water points, etc.

COUNTRY	ODF STATUS CRITERIA	IMPROVED SANITATION STATUS CRITERIA (IF EXISTING)
	• All institutions within the community including schools, churches, mosques, health facilities, market places have functional improved toilets. • No signs of OD in all open spaces in the community. • Existence of clear strategy to ensure ODF status is sustained (e.g., enforcement of by-laws, close and regular follow up). • Clear commitments of the community to maintain ODF status.	
Uganda	• All households defecate only in latrines and dispose of babies' feces only into latrines. • No human waste is seen around the environment. • There are by-laws, rules, or other safeguards imposed by the community to prevent open defecation • There is a monitoring mechanism established by the community to track progress towards 100% ownership of improved latrines. • Efforts are under way to convert all existing latrines to improved latrines and polarize other key behavioral change towards total sanitation.	• Have access to and use improved latrines for all excreta disposal. • Wash hands with soap properly before eating, after defecating, after cleaning up babies' excrement, and before touching food. • Use safe practices for handling and storing drinking water and food. • Use safe practices for disposing of household waste (liquid and solid).
Zambia	• There is no sign of open defecation in the village. • Each household has a latrine and use it. • The latrines have the following elements: – Superstructure providing privacy – A smooth/cleanable floor – A lid to prevent fly from entering the pit • Each household latrine is equipped with a hand-washing device with water and soap/ash. • During monitoring, household will be encouraged to construct a dish rack and refuse pit	

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ANNEX 3: VERIFICATION AND CERTIFICATION PROCESSES IN SELECTED COUNTRIES

COUNTRY	VERIFICATION	CERTIFICATION
Ethiopia	• Health Development Army (volunteers, at village level) or village CLTS coordination committee perform verification at the village level, and subsequently invite Kebele-level verification. • Kebele WASH team verifies the status of the villages. Woreda WASH team verifies the status of Kebeles. Zonal and regional wash team verify the status of woredas. The regional and national team verifies at the zonal level. The national verification team conducts regional verification. • Composition of the verification team: WASH team and other stakeholders of the level above to the level who requested verification (e.g., if the verification requested by a village, it will be done by the WASH team and other stakeholders at the kebele level). Other stakeholders can include Health Extension workers, teachers, other stakeholders working in the same woreda (like CBOs and NGOs), natural leaders from randomly selected villages, etc.	• Certification will be granted by the verification team after it has completed two visits (the second visit will be done 3 months after the first one by a team of the same level). • Certification is awarded at two levels: (1) Primary Certification (to recognize ODF status), (2) Secondary Certification (to recognize safe sanitation and hygiene practices that include ODF with minimum latrine standards) • Primary and secondary certification are awarded by the kebele (if the certification is of the village), by the woreda (if the certification is of the kebele), by the zones or region (if the certification is of the woreda, or of regions) • During the second visit of the verification team, only a subset of households will be verified (30 households in each village will be verified, or 30 villages in a kebele).
Ghana	• A community self-assessment is conducted by elected representatives with the support of the Environmental Health assistant (EHA). The EHA will then request district-level verification. • District-level verification occurs with as little notice as possible. All public spaces and a sample of households are verified. • Regional Level verification: After district-level verification, regional-level verification is performed upon request of the District Environmental Health Officer. • Composition of the district verification team: District Environmental Health Office, Representative of the District Water and Sanitation Team (DWST), Representative of the Department of Community Development, District School Health Education Programme (SHEP) coordinator. • Composition of the regional team: Regional Water and Sanitation Team, RWST (CWSA), representative from the Department of Community Development, Regional SHEP Coordinator, Representative from the RCC.	• Certification is awarded by the Regional Verification Team after its work is complete. • Second-level certification: can be obtained only by communities who have been ODF for 1 year, and performed by a national-level assessment team composed of representatives of: Environmental Health and Sanitation Directorate, Department of Community Development, Ministry of Local Government and Rural Development, Metropolitan Municipal District Assembly (MMDA) in which the community is located, Community Water and Sanitation Agency (CWSA).
Indonesia	• Verification is either requested by a community after a self-assessment or—at least once in 2 years—is part of periodic monitoring. • Verification teams are responsible for the assessment. • To verify ODF status, all households have to be visited. To verify the Total sanitation status (pillar 2-5), at least 30% of the households need to be sampled. • Composition of the verification team: Environmental Health officer of the level organizing the verification (village-level verification by district officers, district-level verification is done by the provincial Environmental Health officer).	• Certification of Village Level ODF status is awarded by the Primary Health center of the village. • The certificate should be signed by the Mayor/Head of the District, or Head of District Health Department.
Kenya	Community does a self-assessment with support of the Public Health Officer. • Verification team needs to perform its assessment within 1 month from the community's assessment. • Verification team includes: district public health officer, representative of the provincial administration, representative of a local NGO, representative of the implementing	• Certification of all verified communities is done by a list of external organizations (third-party certification) accredited to perform this task, and trained by a third-party organized named Kenya Water and Health Organization (KWAHO) (NGO). These organizations will be engaged directly by implementing agencies.

COUNTRY	VERIFICATION	CERTIFICATION
	organization if applicable, representative of Ministry of Education, representative of Ministry of Health, Representative of the Ministry of Social Service, representative of religious institutions. Any 3 of these 6 need to be present.	• Certification must be carried out 2 months after verification. • Quality control of the certification work performed by accredited organizations will be done in 10% of the certified villages, selected randomly, by KWAHO. Only a random sample of households will be visited at this stage.
Mali	• Verification is done by a verification team after the community self-assessment. Depending on the size of the village, either 100%, 75%, 50%, or 25 households need to be visited during verification. • Verification team members: The regional director of Sanitation or a representative; The head of SACPN (*Service de l'Assainissement et du Contrôle des pollutions et des Nuisances*); Head Doctor of the Health Center; The Mayor or her/his representative; The coordinator of the NGO responsible for the project implementation	• Certification team members: same as verification team but with the governor or the prefect rather than the regional director of sanitation.
Madagascar	• After a self-assessment of the volunteer community members, a verification team from the Fokontany level and neighborhood villages conduct a thorough verification of the status. • For a Fokontany to be ODF, the verification needs to be at the Commune level, and for a Commune to be declared ODF, the verification team must be at the district level.	• Once the decision to declare a village ODF is made by the verification team, verbal proceedings are done to the Commune and to the *Direccion Régionale de l'Eau, de l'Assainissement et de l'Hygiène*. Ultimately the decision is registered in a database. No certification is awarded.
Nigeria	• After self-assessment of the village WASH committee, WASH committee informs the WASH Unit/Department of the Local Government (LGA) or designed NGO (and NGO will inform LGA). • Verification occurs in two steps: First step of verification is responsibility of the Local Government: WASH Unit/Department of the LGA visit the village to verify that the community has attained ODF status. If the village is ODF, LGA has to do 3 more unannounced visits, one per month. • Second step of verification is responsibility of the State Government: once those visits confirm ODF status, LGAWASH Unit/Department should share the information with the state Rural Water Supply & Sanitation Agency (RUWASA). RUWASA should conduct further verification visits in conjunction with LGA. • Verification of total sanitation status follows the same procedure.	• Certification is awarded by the State Task Group on Sanitation. Before the State Task Group decides to certify a certain village, it will perform another unannounced visit to the village. • No official certification can be done unless ODF has been sustained for at least 6 months. • Certification of total sanitation status follows the same procedure.
Philippines	• Communities do a self-assessment under the leadership of community leaders, sanitation inspector, and village sanitation volunteer. They visit 100% of the households. • Verification team: established at the Municipality/City Level, and will visit at least 10% of the household at the village level. The team will declare the village ODF. • Verification team members: members of the Municipality/City, Sanitation Inspector, DOH Representative, Representative of the Provincial Health Office, and from any government office at the municipal/city level, civil society organization, NGO, district. • Sustainable Sanitation and Total Sanitation status. • Verification should also be done by a verification team established at the Municipality/City Level (this only occurs in the one region of the Philippines were the guidelines for second and third-level certification were applied).	• Certification is awarded by the verification team, at the same time of the verification. Same occurs with second and third-level certification.

COUNTRY	VERIFICATION	CERTIFICATION
Tanzania	• After self-assessment of the community is done (when the self-pledged date for ODF is approaching), and the community has achieved ODF status, the community requests external verification. • The number of households to be sampled for verification purposes depend on availability of financial resources, staff available, and time to carry out the exercise. • Verification team composition: team of staff appointed by the District Health Officer, under his/her supervision, and which includes Regional and District representatives, including from districts NGOs, and members of the district CLTS facilitation team.	• Verification team decides whether the community should be certified ODF during verification. Regional Secretariat awards certification. • ODF certificates will be formally issued by the Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC).
Uganda	• Verification is done subsequently at 3 levels: Parish level, Subcounty level, and National level. • After verifying the status of their community 3 times in a period of 3 months, community facilitators and the CLTS committee notify the parish team that visits the community to verify ODF status. The parish team informs the county team, who does a verification and then inform the district team which conducts the final verification process. • Verification team composition at the different levels: – Community level: community facilities, CLTS committee, Village Health Team (VHT), and CBOs – Parish level: Parish development committee, health assistant, Coordinator of VHT, Health Center II in charge of Health – Sub-County level: health assistant, community development assistant, LCII chairperson and LCIII Secretary in charge of Health – National level: District Water and Sanitation Coordination Committee, district Health Inspector, NGO/Partner rep, LCV secretary for Health, TSU • All members of the verification teams need to sign off on verification.	• All members of the committee must sign any certification. • No official certification can be given unless the status has been sustained for 6 months. • If communities pass district-level verification, they will be certified ODF.
Zambia	• After a community self-assessment, Champion or community leader require verification to the Council Secretary. • At the village level, verification is done by the Council Secretary (Principal Officer) with the support of the RWSS Unit based on the report by champions and sub-district staff. • At the district level, verification will be done by 3 professionals (one member from any line ministry at the district/administration, one member of the District Joint Monitoring Program Team and one member of the District Water, Sanitation and Hygiene Education Committee). • At least 20 households will be inspected. If more than 20 are in a village, 20 should be randomly selected	• Certification is awarded by the Provincial Department of Housing and Infrastructure Development (P-DHID). • Certification process will happen in each district at least twice a year. The certification includes (1) desk review based on monthly reports of the P-DHID and minutes of D-WASH and of the DDCC, (2) a field visit in 10% of the sample villages. • The certification of the district results is obtained if 90% of the results meet the set ODF criteria.

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Ministry of Local Government and Housing. No date. Certification Procedure. http://www.sanitationmonitoringtoolkit.com/images/SMTdocuments/8_Zambia_MLGH%20Certification%20procedure.pdf

ANNEX 4: KEY INFORMANTS INTERVIEWED

BANGLADESH
Jess MacArthur, International Development Enterprises (iDE)

ETHIOPIA
Oliver Jones, World Bank

INDONESIA
Kristin Darundiyah, Government of Indonesia
Devi Setiawan, World Bank

KENYA
Catherine Mwango, Kenya Water and Health Organization (KWAHO)
Lewnida Sara, World Bank

MALI
M. Moussa Cissoko, Government of Mali
Kalifa Keita, UNICEF
Nicolas Osbert, UNICEF

MOZAMBIQUE
Luis Macario, World Bank
Raul Mutevuie, Government of Mozambique

NIGERIA
Folake Aliu, (formerly) WaterAid
Ogochukwu Chisom Adimorah, UNICEF
Michel Duret, World Bank

TANZANIA
Kaposo Mwambuli, Innovex Tanzania
Ajit Kumar, World Bank

UGANDA
Umar Masereka, Government of Uganda
Harriet Nattabi, World Bank

UK
Robert Chambers, Institute of Development Studies
Peter Hawkins, (formerly) World Bank

ZAMBIA
Laurie Markle, Akros
Selenia Matimelo, Government of Zambia
Odete Muximpua, World Bank

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