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The true costs of participatory sanitation: Evidence from community-led total sanitation studies in Ghana and Ethiopia

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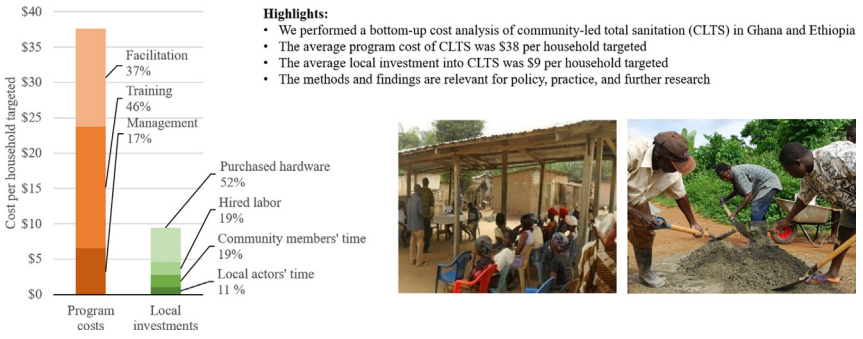
HIGHLIGHTS

- Bottom-up cost analysis of community-led total sanitation in Ghana and Ethiopia
- The program cost was $30–82 per household targeted in Ghana, and $14–19 in Ethiopia.
- Local investments were $8–22 per household targeted in Ghana, and $2–3 in Ethiopia.
- The findings are relevant for policy, practice, and further research.

GRAPHICAL ABSTRACT



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ABSTRACT

Evidence on sanitation and hygiene program costs is used for many purposes. The few studies that report costs use top-down costing methods that are inaccurate and inappropriate. Community-led total sanitation (CLTS) is a participatory behavior-change approach that presents difficulties for cost analysis. We used implementation tracking and bottom-up, activity-based costing to assess the process, program costs, and local investments for four CLTS interventions in Ghana and Ethiopia. Data collection included implementation checklists, surveys, and financial records review. Financial costs and value-of-time spent on CLTS by different actors were assessed. Results are disaggregated by intervention, cost category, actor, geographic area, and project month. The average household size was 4.0 people in Ghana, and 5.8 people in Ethiopia. The program cost of CLTS was $30.34–$81.56 per household targeted in Ghana, and $14.15–$19.21 in Ethiopia. Most program costs were from training for three of four interventions. Local investments ranged from $7.93–$22.36 per household targeted in Ghana, and $2.35–$3.41 in Ethiopia. This is the first study to present comprehensive, disaggregated costs of a sanitation and hygiene behavior-change intervention. The findings can be used to inform policy and finance decisions, plan program scale-up, perform cost-effectiveness and benefit studies, and compare different interventions. The costing method is applicable to other public health behavior-change programs.

1. Introduction

Cost evidence informs policies, program design and scale-up, and research. Such evidence is lacking for water, sanitation, and hygiene (WaSH) programs that are participatory, involve capacity building, or target behavior-change. Improving this evidence is a priority, as

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meeting the Sustainable Development Goals (SDGs) will necessitate both a scale-up of efforts to meet universal targets, and a shift in the means of implementation toward capacity building, local participation, and behaviors (UN General Assembly, 2015).

WaSH and other public health programs have characteristics that make costing difficult: complex institutional arrangements, cross-subsidies, flexible implementation, and local investments. Complex institutional arrangements spread costs across organizations, resulting in inconsistent and incomplete financial tracking. Cross-subsidies arise when programs share resources (such as vehicles or training). Participatory, behavior-change programs are inherently flexible, extensively adapted, and field activities often do not match workplans or budgets. Local actors and communities contributing time or money ("local investments") is common in participatory behavior-change programs.

Community-led total sanitation (CLTS) epitomizes these costing challenges. CLTS is a participatory approach in which facilitators visit villages and trigger awareness of sanitation issues during a community meeting. Facilitators then perform follow-up visits to villages to generate a community-wide effort to become open defecation free (ODF). Eliminating open defecation is included in the SDGs (UN General Assembly, 2015), as open defecation can cause malnutrition (Dangour et al., 2013), child stunting (Spears, 2013), and death (Prüss-Ustün et al., 2014). CLTS has spread to over 60 countries since 2000, in part because of perceived low cost: it rarely includes subsidized latrines (Institute of Development Studies, 2016; Kar and Chambers, 2008).

Costing methods are either top-down or bottom-up. Top-down costing (TDC) involves dividing a program's budget or total expenditures by the number of units (villages, households, individuals) targeted or reached. It is appealing due to its use of minimal, routinely collected data (budgets, expenditures, population targeted or reached), simple analysis, and that it can be retrospective. TDC can be accurate when: budget and expenditures represent *all* program costs, and *only* that program's costs, and the population served is unambiguous; conditions uncommon for WaSH programs. When cross-subsidies exist, TDC will under- or over-estimate costs depending on which program purchased shared resources. Neglecting local investments leads to underestimated total costs, leaves potentially disadvantaged beneficiaries out of cost considerations, and contributes to poorly informed policy (Garber and Phelps, 1997). In the absence of these conditions, one advantage of TDC is that it can capture management and overhead costs better than bottom-up costing (BUC). TDC does not allow disaggregation of costs by category (e.g. management, training, hardware), actor (e.g. government, non-governmental organization, community), time (e.g. by month), or by project or setting (Chapko et al., 2009). It is inappropriate when these factors are of interest, as is frequent in WaSH.

BUC involves careful tracking and analysis of implementation to calculate costs and assign them to activities. Regular program activities (timesheets, household surveys) can be adapted to collect the data needed for BUC. However, many cost analyses are done retrospectively, which precludes BUC. Additionally, the analysis is time consuming, complex, and expensive (Carey and Burgess, 2000), which could explain BUC's scarcity. BUC is more appropriate than TDC for the complexity of WaSH. BUC overcomes the main sources of error and bias (Adam et al., 2003), and enables analysis of variation in cost, economies of scale, and comparison of interventions (Chapko et al., 2009), which are valuable for program design and management.

While there is a growing body of evidence on the effectiveness of sanitation interventions (Garn et al., 2017), cost evidence is lacking. Several authors have compiled secondary data to model the costs and benefits of achieving global WaSH targets (Haller et al., 2007; Hutton and Varughese, 2016), or to compare different interventions (Hutton et al., 2007; Whittington et al., 2012). They emphasize that low quality or lacking cost evidence forces assumptions and excluding cost categories, resulting in incomplete and potentially misleading results. There is also lacking evidence for water supply programs (Hunter et al., 2009). The few studies with primary cost data for sanitation and hygiene behavior-change omit management and other software costs, use broad assumptions to fill data gaps, rely on recall by few respondents, and sample non-representative respondents, all problems that the authors acknowledge (Borghi et al., 2002; Briceño and Chase, 2015; Burr and Fonseca, 2011; Evans et al., 2009; Robinson, 2005; Trémolet et al., 2010). Importantly, these studies all use TDC methods. One study presents a BUC analysis of a WaSH program (Briceño and Chase, 2015). However, data were non-representative, costs were not disaggregated beyond program and household, and some local investments were omitted. Another study presents costs and benefits of latrine construction (Dickinson et al., 2015), though they focused on household costs.

We performed a BUC process and cost analysis of four CLTS interventions in Ghana and Ethiopia. We chose to present costs per population *targeted* rather than per population *reached* to focus this paper on our costing methods, findings, and implications. Converting to cost per population reached adds another layer of complexity, as there are multiple reasonable outcomes that can be used for this conversion, and the number of households reaching any given outcome depends on context. However, it is fine to convert to cost per household reached, which is done by dividing by the program costs by the percent of program households that reached the desired outcome.

We disaggregated results by intervention, geographic area, actor, time, and cost category to enable assessment of what drives variability, and how costs would transfer to other programs and settings. This study was implementation research conducted by Plan International USA and The Water Institute at UNC.

2. Methods

2.1. Program description

The four interventions were: in Ghana, (1) NGO-facilitated CLTS, and (2) NGO-facilitated CLTS with additional training for natural leaders; and in Ethiopia, (3) health extension worker (HEW) and kebele leader-facilitated CLTS, and (4) teacher-facilitated CLTS. Natural leaders are motivated community members who encourage others to construct and use latrines. A kebele is the lowest administrative unit in Ethiopia, comprising approximately 20–30 villages and 5000 people in rural areas. Implementation activities, actors, and timeline for the four interventions analyzed here are in the supplement. Project evaluations and implementation narratives are presented elsewhere (Crocker et al., 2017, 2016a, 2016b; Plan International Ethiopia, 2015; Plan International Ghana, 2015). Facilitation has three stages: *pre-triggering* - building a rapport and buy-in with community members; *triggering* - meeting with communities to conduct group activities that elicit emotional reactions, such as shame and disgust, to generate motivation to eliminate OD; and *follow-up* - monitoring a community's progress and guiding them toward eliminating OD. Further details on the CLTS approach can be found in the CLTS Handbook (Kar and Chambers, 2008).

For all four interventions, implementation began with an orientation workshop for district government officials. For intervention 1 (Ghana), implementation proceeded with CLTS facilitation by Plan International and local NGO (LNGO) staff (Table 1) with no formal training of local actors. Henceforth, Plan International and their contracted LNGOs are referred to as "Plan". Intervention 2 (Ghana) included all the activities of intervention 1, with the addition of Plan training natural leaders to support CLTS. For interventions 3 and 4 (Ethiopia), Plan trained kebele leaders, and either HEWs or teachers, as facilitators. LNGOs were not contracted in Ethiopia. The four CLTS interventions cover a range of implementation arrangements and modalities as practiced in other organizations and countries (Venkataramanan, 2016, 2012), so the findings are relevant beyond this project.