Sustainable Total Sanitation - Nigeria

Baseline Report

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Executive Summary

This report presents a detailed description of the baseline data collected as part of the Formal Research Component of WaterAid UK's Project "Sustainable Total Sanitation Nigeria -implementation, learning, research, and influence on practice and policy" (STS Nigeria), funded by the Bill and Melinda Gates Foundation. WaterAid Nigeria (WANG) is undertaking this project through its implementing partners, Local Government Areas (LGAs) as well as Non-Governmental Organisations (NGOs), in three Nigerian states: Jigawa, Ekiti and Enugu. WANG's objective is two-fold: (i) to increase the demand for private sanitation solutions and their usage by households and (ii) to foster the supply of better quality private sanitation solutions that meet the local needs at a more affordable price, in rural communities. In order to achieve this, WANG is implementing two distinct but closely connected and expected to be complementary interventions: Community-Led Total Sanitation (CLTS), which is a community mobilization intervention, and Sanitation Marketing (SanMark), which targets suppliers of sanitation materials.

The overall purpose of the Formal Research Component is to shed light on the effectiveness of the main two interventions implemented as part of the STS Nigeria in eliminating open defecation (OD), with a focus on Ekiti and Enugu, but aiming to learn lessons that are applicable to the rest of Nigeria and to other low and middle income countries. In particular, this project aims to (i) establish the effectiveness of the CLTS intervention in terms of adoption of sanitation practices by rural households; (ii) understand changes in outcomes before and after the implementation of SanMark at the level of: (a) the supplier, i.e. analysing the adoption of SanMark specific products and activities on the supplier side and related changes in business outcomes; and (b) the households, i.e. analysing the adoption of improved sanitation products and practices by rural households; and (iii) establish whether there are interacting effects of the CLTS and the SanMark interventions in terms of adoption of improved sanitation practices by households. A secondary objective is to understand whether there are health impacts if improved sanitation practices are observed as a result of the interventions.

The research component on the CLTS intervention is based on a randomised control trial (RCT) design, which will allow us to rigorously study the effectiveness of the intervention over a broad range of outcome indicators (with a primary focus on sanitation uptake). The methodology for the analysis of the SanMark component is designed in parallel with the development of the intervention which is itself not yet finalised.

The three overarching aims of this report are (1) to provide an interesting snapshot of our study population, serving as a useful tool to understand the context in which the interventions are taking place, (2) to formally test whether we see any systematic

differences between CLTS treatment and control groups, prior to the CLTS intervention starting, and (3) to use the snapshot information about suppliers, households and villages to better inform the design of the SanMark intervention as well as the best way to understand its impact and its interaction with CLTS.

Overall, data collection was successfully implemented and data quality according to standards. The report discusses some of the challenges faced during this phase of the research, related to survey practicalities as well as to intervention implementation.

We summarise our findings for each of the objectives of this report.

Snapshot of our study population: We show that the prevalence of OD is very high at on average 60% in both study states, with Enugu showing higher OD rates than this average and Ekiti lower ones. Ekiti is in general a wealthier state than Enugu, partly reflected in the main economic activities conducted. While farming is the predominant source of income in our study villages in both states, the overall percentage is lower in Ekiti, and more households report a positive income from white-collar activities, such as teaching. In line, we also find higher levels of infrastructure and services available to households in Ekiti than in Enugu, as well as better self-reported health outcomes but surprisingly slightly worse anthropometric indicators for children under the age of six years in Ekiti relative to Enugu.

For households that do have a latrine, most of them report to have an improved one[1], which they also report to use. This indicates that the main challenge to tackle is sanitation uptake rather than moving households up the sanitation ladder. The main reason for not having a toilet is that it is too expensive, according to households that do not own a latrine. In Enugu 88% of households report this reason and 63% of non-latrine owners in Ekiti do so. The second most important reason reported in Ekiti is that households stay in a rented house, with 16% households choosing this option.

Comparing treatment and control villages and households for the CLTS impact evaluation: The comparison of eligible villages and households randomly allocated between CLTS treatment and control is very encouraging. The number of imbalances found fall well within the expected proportion of 5 to 10% (depending what significance level one chooses) and those imbalances observed are for the most part significant only at the 10% significance level, with a few exceptions at the 5% level.. We further find no noteworthy significant differences in key variables across treatment

[1] We follow the definition of WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation.

and control units, particularly in terms of sanitation situation and health outcomes. This is important since it implies that our treatment and control households are not significantly different in terms of their sanitation practices and initial health status before the start of the intervention. One noteworthy exception is access to improved drinking water in Ekiti, where we find that households in treatment TUs seem to have significantly lower access. It will therefore be important to account for this (as well as other) characteristics for which imbalances are observed when we conduct the impact analysis, making sure they are robust.

This report also analyses whether the villages selected for the CLTS study (i.e. that were not triggered before using CLTS) differ in their characteristics from villages that were selected previously for triggering. This is important in terms of being able to generalise our findings. We observe that, especially in Enugu, there are no systematic differences between villages previously triggered and villages selected for this study. In Ekiti on the other hand we find that our study villages are larger on average in terms of their population. Most likely correlated with the village size is our finding that study villages have on average lower access to services and infrastructure. It will be important to keep this in mind when putting our finding into a wider context.

SanMark intervention: The research methodology for this component includes randomization of suppliers as well as of communities. The supplier randomization is yet outstanding so that we cannot discuss the results in this report. The randomization of communities however, was largely successful and leaves us with two comparable groups. The primary difference will hence then be that (a) one set of communities will be subject to village level consumer awareness creation activities and that (b) suppliers will receive information on the same set of villages which might induce them to market their newly adopted SanMark product (if applicable) in these villages (first).

Contents

1 Introduction

This report presents a detailed description of the baseline data collected as part of the Formal Research Component of WaterAid UK's Project "Sustainable Total Sanitation Nigeria – implementation, learning, research, and influence on practice and policy" (hereinafter, STS Nigeria). It is the second product of an ongoing impact evaluation by the Institute of Fiscal Studies (IFS) of the STS Nigeria project's two interventions in rural Nigeria directed at improving sanitation practices and incentivizing higher levels of private investment in sanitation.[2] The interventions are implemented by WaterAid Nigeria (WANG) through their local implementing partners, which are a number of Local Government Areas (LGAs) as well as NGO partners.

Understanding whether the current approach to improving Nigeria's sanitation situation works and identifying some mechanisms behind impacts is crucial in this setting: Nigeria belongs to the group of 45 countries in which less than 50% of the population has access to improve sanitation facilities and of the 37 sub-Saharan countries and hence will fail to meet the Millenium Development Goal on sanitation. Nigeria is the fourth country in the world with the highest number of people practicing OD after India, Indonesia and Pakistan, according to the most recent JMP report and pictured in Figure 1. In 2012, it had an estimated 39 million people practising OD, or around 23% of its total population (JMP, 2014)[3]. These OD practices are more prevalent in rural areas, where 31% of the population declare to be regular open defecators, whilst this number shrinks to 15% in urban areas. But perhaps the statistic that speaks most loudly about the seriousness of the challenge in Nigeria is its slow pace of improvement: between 2000 and 2012 only 4% of the population gained access to improved sanitation facilities. Nigeria has hence a challenging way ahead in meeting the post-2015 UN Sustainable Development Goals (SDGs) that focus on water and safe sanitation to everyone, everywhere by 2030.

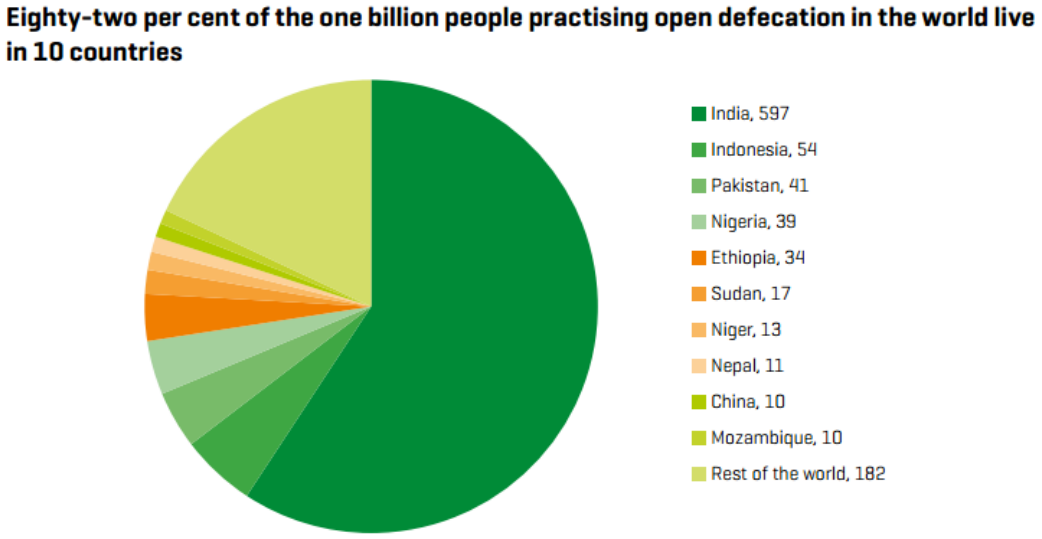
The benefits from reducing OD in Nigeria are expected to be substantial and range from individual health, privacy and safety improvements to increased levels of human capital accumulation and economic growth. OD allows for a multiplicity of potential channels through which fecal mater can enter the human food chain such as water, flies and crops, and also fosters the growth of insects that spread other diseases.[4] For this reason, the costs of OD lie beyond the individual or household practicing it and reverting these negative externalities is a prime concern to governments, NGO's and

[2]The first output was a mapping report which we summarize in Section 4.2.2.

[3]WHO/UNICEF Joint Monitoring Progress Report. Progress on sanitation and drinking water: 2014 update. 2014.

[4]For a more detailed discussion of the potential benefits of reducing OD, see the IFS Proposal.

Figure 1: Top 10 countries with the most people practicing OD (in millions)



Source: JMP 2014

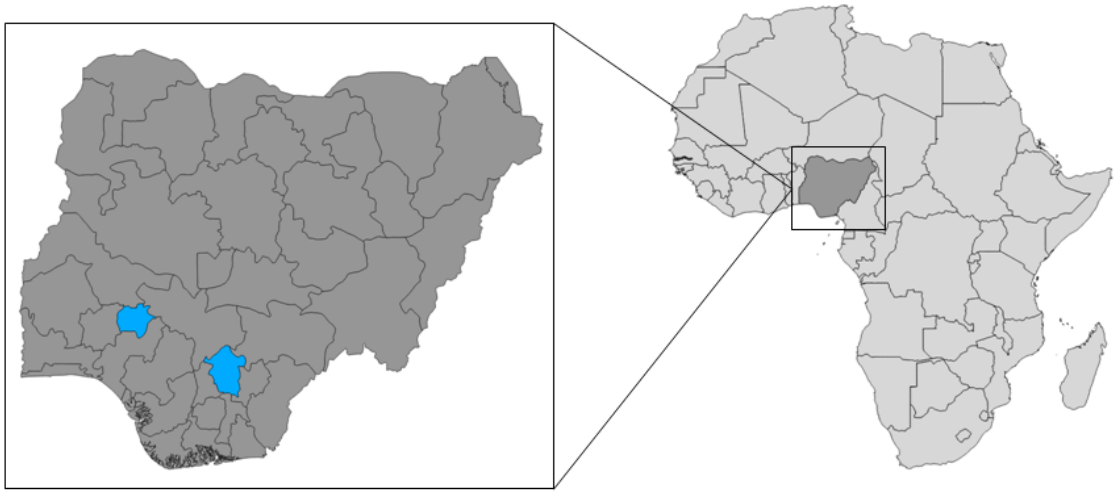
international aid organizations in Nigeria and elsewhere.

The STS Nigeria project focuses on improving the effectiveness, efficiency, inclusion and sustainability of total sanitation approaches in rural communities of three States of Nigeria (Jigawa, Ekiti and Enugu) and contribute to wider national and regional good practice. The project uses two interventions to achieve its aim: community-led total sanitation (CLTS) and sanitation marketing (SanMark). Both aim at increasing the uptake of toilet ownership and its sustained usage, especially by households of the most vulnerable rural communities, with the final goal of eliminating community-wide OD.

The research component that accompanies the STS Nigeria project and is conducted by the IFS will analyse both of these interventions -CLTS and SanMark- as well as their interactions in rural communities of the Nigerian states of Ekiti and Enugu. Ekiti and Enugu are two of the smallest states in Nigeria, located in South and South West of the country, as indicated in Figure 2. Jigawa was excluded from the research for practical and budgetary considerations driven primarily by the security challenges faced in the North of the country.[5]

[5]While Jigawa is seen as relatively safe, travel to and from the state poses considerable security risks.

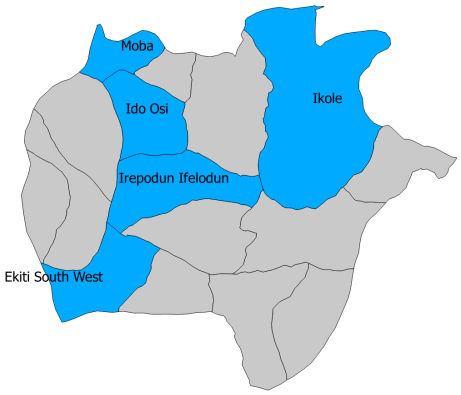
Figure 2: Nigerian States of Ekiti (left) and Enugu (right)



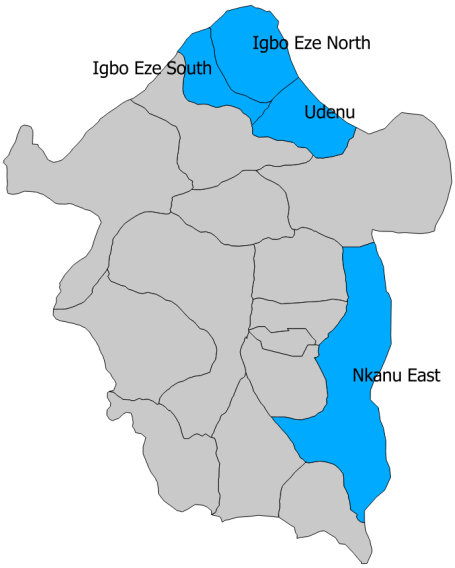
Enugu and Ekiti state are sub-divided into LGAs. The research component takes place in 5 out of Ekiti's 16 LGAs and in 4 out of Enugu's 17 LGAs. These are mapped in Figure 3.

Figure 3: Study LGAs in Ekiti and Enugu

(a) Ekiti



(b) Enugu



The research will focus on analysing the uptake of latrine ownership and its sustained usage by rural households, including the most vulnerable, with the final goal of eliminating OD. It will consist of three interrelated research components:

- Establishing the effectiveness of the CLTS intervention in terms of adoption of improved sanitation practices by rural households.
- Understanding changes in outcomes before and after the implementation of SanMark at the level of:
  - the supplier, i.e. analysing the adoption of SanMark specific products and activities on the supplier side and related changes in business outcomes; and
  - the households, i.e. analysing the adoption of improved sanitation products and practices by rural households.
- Establishing whether there are interacting effects of the CLTS and the SanMark interventions in terms of adoption of improved sanitation practices by rural households.

The research component on the CLTS intervention is based on a randomised control trial (RCT) design, which will allow us to rigorously study the effectiveness of the intervention over a broad range of outcome indicators (with a primary focus on sanitation uptake). The methodology for the analysis of the SanMark component is designed in parallel with the development of the intervention itself and not yet finalised. We discussed the approaches to answer our primary reserach questions for each intervention in separate sections of this report.

The collection of primary data was identified as a needed input for both impact evaluations at the outset of the project. We work with four primary data sources to answer the research questions of this study: household survey data, village (and LGA) survey data, supplier survey data and information on the CLTS facilitators.[6] We are not aware of any secondary data sources suitable to answer our research questions, which would avoid collecting these primary data. The data collection and processing in the field was led by Indepth Precision Consult (IPC) in close collaboration with the IFS. Table 1 provides an overview of all the survey instruments, including a brief summary of the contents, information on the targeted respondent and approximate duration of

[6]We in addition collect a village census of households, which is primarily used to select respondents for the household survey. Details on this exercise are provided in Appendix B.

the survey. It also provides information on the targeted numbers of respondents and the actual achievements. We provide more details on these instruments in Appendix A and in the sections to follow.

The three overarching aims of this report are (1) to provide an interesting snapshot of our study population, serving as a useful tool to understand the context in which the interventions are taking place, (2) to formally test whether we see any systematic differences between the treatment and control group that are part of the CLTS impact evaluation, prior to the CLTS intervention starting, and (3) to use the snapshot information about suppliers, households and villages to better inform the design of the SanMark intervention as well as the best way to understand its impact and its interaction with CLTS.

We start by presenting the CLTS research component (Section 2). We describe the intervention, the research methodology and challenges and continue with describing the study population. In Section 3 we compare the study population with the population of villages that were previously selected for triggering. Section 4 then moves to discussing the SanMark research component. Section 5 concludes and we end this report by presenting the risks and next steps for this project in Section 6.

Table 1: Survey instruments

Instrument	Approx. duration per survey	Specifics	Sample Size			
			Targeted		Achieved	
			Enugu	Ekiti	Enugu	Ekiti
Household listing	10-15min per HH	HH demographics, povert indicator, sanitation, GPS, Respondent: Informed HH member above the age of 18.	160TUs * 180 HHs = 28,800	160TUs * 180 HHs = 28,800	27,888 HHs (97%)	20,005 HHs (70%)
Village survey	3hrs per village	Village infrastructure, institutions and sanitation facilities, info on vommunity leader etc. Respondent: Key informants (village leader).	160 TUs in 100 villages	160 TUs in 75 quarters	160 TUs (100%) in XX villages	156 Tus (98%) in XX quarters
Household Survey	1hr50min	Wide array of household characteristics, composition, demographics, wealth (assets, income, credit and saving), dwelling info (including sanitation), consumption expenditures, sanitation behaviour. Respondent: HH head or other knowledgeable household member.	160*20 = 3,200	160*20 = 3,200	3,161 (98.8%)	3,169 (99%)
		Anthropometrics: Height and weight of all children <6yrs of the surveyed HHs, following WHO standards	2,400 children, revised: 1,327	2,400 children, revised: 1,461	1,461 children (86%)	1,139 children (97%)
Supplier survey	1hr	Information on business owner, business characteristics, including sales, products, information on innovation, lending etc. Respondent: Owner or manager	30	110	41	110
Facilitator survey	30 min	Background information on facilitators (age, marital status, education, attitudes towards sanitation etc)	40	60	21	19

2 Community-Led Total Sanitation (CLTS) research component

2.1 Intervention description (CLTS)

CLTS aims at changing social norms and increasing the demand for sanitation. It promotes a collective sense of disgust and shame about OD (making evident that 'open shit goes to open mouth'), and community pressure to change social norms and trigger change in defecation and hygiene behavior of each of its members. Community level activities conducted under CLTS are typically referred to as 'triggering activities'. CLTS improves the understanding that so long as a small number of people in the community continues to open defecate all community members are at risk of contracting sanitation related diseases. This understanding is expected to lead to community members coming up with a coordinated solution to increase the ownership and the sustainable usage of toilets.

CLTS is the approach approved by the Nigerian Government in the Strategy for Scaling up Rural Sanitation in the country. WaterAid, along with UNICEF and LGAs jointly conducted the piloting activities. The scaling up of CLTS in Nigeria commenced in 2008 coinciding with the International Year of Sanitation.

Within the study states, and as part of the STS Nigeria Project, WANG has been implementing CLTS in selected rural communities since 2012.

Triggering teams (also referred to as 'facilitators') will typically consist of an environment setter, a note taker and four government officials or 'facilitators' belonging to the village's corresponding LGA's water, sanitation and hygiene (WASH) unit.[7] Facilitators are trained by Government, WANG and other civil society organizations, and will usually participate in the triggering of several villages in their given LGA. Finally, Local Government Steering Committees (LGSC) were formed at the LGA level to support facilitators and communities in the triggering process.

The first stage in the implementation of CLTS in a given community consists of an advocacy and sensitisation visit in which facilitators meet with community leaders, village chiefs or other important local decision makers. The potential benefits of CLTS in achieving sustainable behavioural change and its health implications are presented and other sanitation information is distributed. Facilitators and civic leaders will then arrange an appropriate date and time for the triggering meeting to take place. One such sensitisation meeting is pictured in Figure 4.

[7]Each LGA has its own WASH unit that receives support, financial or otherwise, from WANG.

Figure 4: Sensitization Meeting with a Village Leader in Udenu, Enugu

Cooperation with local leaders at this stage provides WANG two significant advantages in the implementation. First, it helps facilitators know the time and date at which CLTS will not interfere with work or other community specific activities, thus guaranteeing a clear schedule. This ensures a degree of attendance to the triggering meeting that will be proportional to the leader's clout in the village, since it is with their cooperation that the village will be mobilized to attend. Given that leaders are strong figures in small rural villages as many of the ones reached by this evaluation, this guarantees a high turnout which is a desired condition for a successful CLTS program.

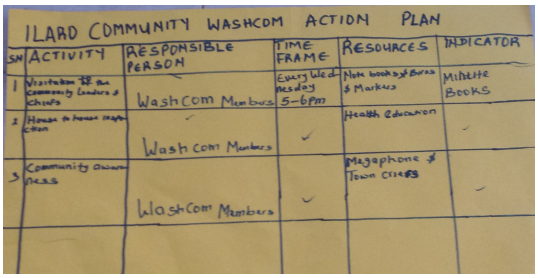
Triggering meetings take place on the arranged date and time and will be run by the team of facilitators with the help of the village leaders. Facilitators will engage attendees with a series of activities aimed to inform but also involve as many members of the community as possible. The first step will be a mapping of the village in which each attendee will mark their household, and then their regular OD site, if any. This leads naturally to the following activities in which facilitators trace the contamination paths of human feces into water supplies and food in a crude fashion. They might even rely on examples using fresh stool to contaminate a bottle of sparkling water, to make the point as graphic as possible. During the meeting, natural leaders (NLs) emerge that will cooperate with facilitators in the following steps of the implementation.

Attendees are then asked to draw a community action plan that is determined using the contributions of as many members possible. The plan's objective is for the village to achieve open-defecation-free (ODF) status. The plan is written down by a volunteer with the assistance of facilitators, NLs and village leaders, and then posted

Figure 5: CLTS Triggering Meeting

(a) Mapping of households and OD sites

(b) Example of a Community Action Plan



ILARO COMMUNITY WASHCOM ACTION PLAN

SN	ACTIVITY	RESPONSIBLE PERSON	TIME FRAME	RESOURCES	INDICATOR
1	Visitation of community leaders & chiefs	WashCom Members	Every Wednesday 5-6pm	Note books & Biros & Markers	Minute Books
2	House to house sensitization	Wash Com Members	✓	Health Educators	✓
3	Community declaration	Wash Com Members	✓	Megaphone & Town criers	✓

in a public spot that will make it visible to all village members. This volunteer will also be responsible for making sure that the commitments each attendee made towards the plan are enforced in the following months. Figure 5 shows pictures from a mapping exercise and a snapshot of the created action plan in one of or study communities.

Finally, in order to ensure the community's ongoing support for CLTS, facilitators engage NLs, existing volunteer health promoters (VHPs) and local artisans separately. LGA facilitators provide them with training and support to continue the activities necessary to keep up with the community action plan, and they are reminded of their key role in helping the community to achieve ODF status.[8]

During the months after the triggering, facilitators will keep in contact with NLs to follow up on the community's advances. The natural leaders are expected to to visit each household in the community and encourage them to take responsibility for the collective decision of achieving OD that was taken during the triggering process. Households that are in the process of constructing a latrine are encouraged to complete them. Given the importance that is placed on follow-up activities, WANG and its partners adopted the CLTS Rapid Adoption of Sanitation Followup Approach (CARSFA), which lays out the sequences of actions that should be taken during followup activities.

[8]A village will be declared ODF once all the households and institutions have a latrine of some kind and no more members practice OD. This is informed by the village to the LGA and WANG. ODF status will later be verified by the LGA's WASH unit, the national Rural Water Supply and Sanitation Agency (RWASSA) and the National Task Group on Sanitation (NTGS), successively.

2.2 Research methodology: a cluster RCT design

We will employ a cluster RCT design at the community level to address the first component of the research. In practical terms, this means that a pool of eligible communities for CLTS are randomly allocated in one of two groups: One group of communities which will receive CLTS (also typically referred to as the 'treatment' group), and one not receiving the intervention (typically referred to as the 'control' group). Such a random allocation provides a suitable comparison group to solve the counterfactual question. It ensures that those communities exposed to the intervention are comparable, on average, along key observable and unobservable dimensions to communities not exposed to the intervention. This is particularly important for outcomes of interest (such as - in the context of this study - toilet ownership and usage, OD practices, or access to retailers selling latrines or inputs to construct latrines).

Randomisation can happen at different levels. Researchers might decide to randomise individuals to receive or not receive an intervention, households or geographical unit. The choice is driven by a number of considerations, but is primarily determined by the nature of the intervention under study and the questions one wants to address. Improvements in sanitation practices are believed to have community-wide benefits as fewer members of the community are exposed to potentially infectious agents. Benefits that come from the changes in sanitation practices of one household might spill over into the rest of the community, generating what economists call a positive externality. This was the reason why in this particular case the unit of randomisation (and indeed the intervention implementation) is defined at the group or cluster level instead of at the individual or household level: to be able to capture any evidence of positive or negative externalities coming from improved sanitation practices at the local level.

Our geographical unit of choice is what we call a 'triggerable unit' (TU). TUs are comprised of villages or neighbourhoods (or quarters) depending the type of settlement. This choice was driven by the characteristics of the CLTS implementation and to minimise spillovers effects across units. In our study states, households live in villages or quarters that are often part of big communities or small towns respectively. Given its community-led nature, there are constraints on the minimum and the maximum number of households that can be 'triggered' at the same time in an effective manner. Some of the big communities or small towns are too big to be effectively triggered simultaneously. In light of this, WANG usually divides large communities (or small towns) into smaller units, or triggerable units.[9] Importantly, a triggerable study unit is

[9]A brief note on the terminology used in this Section. The term 'community' will refer to the third level administrative division, sometimes called settlement. The term 'village' will be used for the

a collection of quarters/villages that can be seen as one single unit in the sense that if these are triggered independently of the other villages/quarters in the same community or small town, this will not have any significant impact on the remaining units within the community or small town. With "significant impact" we mean that:

1. Other villages in the community (that have not been triggered) will not be inspired to construct sanitation due to the CLTS in the triggered villages. It might still be that some households decide to construct a toilet, but this would not be because of the triggering in the other villages in the same community (those that are part of this impact study).

2. The effect of triggering of the remaining villages at a later point in time (approximately 1.5 years later) is not expected to be affected by early triggering of the TU that are part of this impact study.

These TUs were defined by WANG in collaboration with their local implementing partners and the list then provided to IFS. This list then formed the basis for the randomization. We show in Table 2 the number of TU allocated to the treatment group (those communities selected to receive the intervention), and the control group (those not receiving the intervention for the time of the study period).

Table 2: Number of TUs per study arm and state

	C	CLTS	Total
Enugu	59	59	118
Ekiti	51	62	113
Total	110	121	231

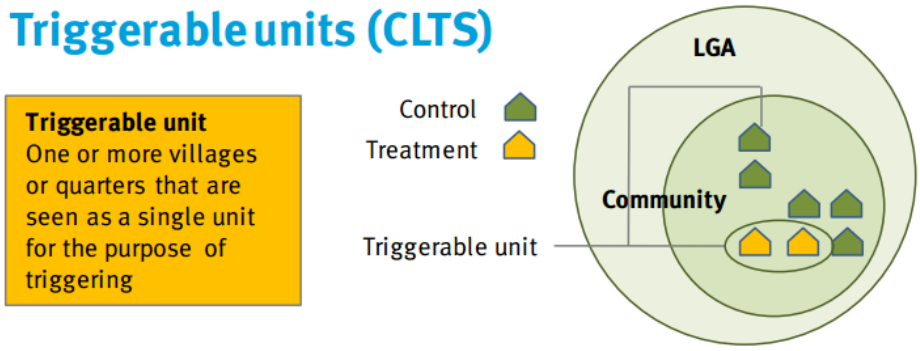
C: Control group, CLTS: group allocated to receive the CLTS intervention. TU stands for 'triggerable unit', the unit of observation.

Figure 6 shows a hypothetical example for an LGA composed of one community which is again composed of two TUs. One of these TUs is of two villages and assigned to treatment (yellow) and the second composed of five villages and assigned to control (dark green).[10]

following level, to refer to both villages and, in the case of the state of Enugu, quarters.

[10]This apparent imbalance in the number of villages assigned to treatment and control can be for a number of reasons: for example, it can be because treatment villages are assumed to contain more households than control villages (so that overall the number of households are balanced across treatment and control), so that the control villages can in fact be divided again in more than one TU. This scheme is meant to provide a representation of reality, not to reflect it accurately.

Figure 6: Treatment and Control Triggerable Units (Source: WaterAid)



This allocation to treatment and control is typically (and also in this study) done after the baseline data collection. This ensures that interviewers are blind as to whether a household they interview will be exposed to the intervention ot not. This precaution is taken to once again ensure that the two study groups (treatment and control) are observationally equivalent before intervention start. In the next section, we will set out to test - based on all observable characteristics - whether the two groups are indeed the same, statistically speaking. This is also often referred to as checking whether the randomization was successful.

2.3 Comparison between CLTS treatment and control samples

This section tests whether the randomization of CLTS eligible communities to the treatment and the control group was successful and will, at the same time, provide a description of the study TUs. We present the results for each state separately and pooling both states.

A standard way to check that the randomisation was successful and that the two sets of data are not significantly different is to conduct a Student's t-test. In short, the t-test will compare the means of the two populations and return a value known as a *p-value*, which is a measure of the probability that an outcome as the one observed is the result of randomly generating samples under the assumption that both means are identical. Therefore, a low *p-value* means that there is a low probability that the the hypothesis that both means are equal is true. For example, a p-value of 0.05 means that one has to reject the hypothesis that both means are identical with a 95% degree of confidence. Conventional levels of confidence regularly used in the literature are 10%, 5% and 1% so we will present those in the Tables below. For ease of reading, we additionally add stars to the p-values: three stars (***) indicate a p-value of 1% or less, two stars (**) indicate a p-value of between 1 and 5% and one star (*) indicates a p-value in the range of 5-10%.

Typically, a p-value of below 5% (0.05 in the tables) is seen as indicating statistically significant differences. We will therefore primarily discuss when we observe differences that are significant at the 5% level (or lower), i.e. those marked with two or three stars. It is worth noting that we expect some variables to show significant imbalances (about 5%) simply by chance.

We will start by discussing village level characteristics, i.e. information collected as part of the community survey and then move to information collected through the household survey. We refer the interested reader back to Table 1 for information about targeted and achieved sample sizes and further information on these survey instruments.

2.3.1 Villages

All the tables presented in this section provide information on the study villages and are structured in the same way: The first column gives a brief description of the variable examined. In Table 3 the first variable would for example be the percentage of villages that have any type of school. The next two columns provide information on all villages in Enugu state, the following two on villages in Ekiti state, the last two on the overall sample (i.e. Enugu and Ekiti combined). Looking for now at Enugu, column labeled "C" provides the mean of the relevant variable for the villages allocated to the control group. We can see, that in Enugu, 52.4 percent of villages have a school. The next column presented for Enugu provides information on the similarity of our study groups along a series of observable characteristics. "C-T" is the difference between villages in the control group and villages in the treatment group. In Enugu, this difference is about two percent (1.8). The fact that this number if positive tells us that more control villages have a school than treatment villages. If this number was negative (as for example in Ekiti) then this would imply that more treatment villages report to have a school than control villages.

Table 3: Village level Infrastructure and Services

	Enugu		**Ekiti**		**All**		
	C	**C-T**	**C**	**C-T**	**C**	**C-T**	**N**
Has a school (%)	52.4	1.8	83.3	-1.0	65.0	-2.3	345
Has a hospital (%)	4.8	4.8*	20.8	-0.9	11.4	0.6	343
Has a maternity centre (%)	22.1	-4.9	62.5	9.5	38.6	-1.2	344
Has administrative office (%)	38.5	2.7	13.9	7.7	28.4	7.2	341
Has LGA office (%)	6.7	4.3	13.9	-0.6	9.7	1.3	343
Has a security post (police, other) (%)	27.9	4.1	18.1	-6.0	23.9	-0.1	343
Has a bank (%)	1.9	0.7	11.1	-0.9	5.6	-0.9	345
Has graded internal roads (%)	20.0	2.4	66.7	2.8	39.0	-1.5	345
Has a hotel (%)	3.8	1.5	23.6	-7.7	11.9	-4.8	345

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations.
Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Village Questionnaire, Baseline.

Any stars in this "C-T" column indicate whether differences between treatment and control villages are statistically significant. As described above, three stars indicate a statistically speaking highly significant difference (at the 1% level), and two stars indicate a significant difference at 5%. A statistically significant difference does not always necessarily also translate into economic significance and we will point this out where appropriate. However, whether statistically and/or economically significant differences,

this exercise gives a guidance on what variables will be important to account for in the endline data analysis. In this first Table, we do not see any significant differences (hence no stars). In terms of our example of schools, no stars are shown, implying that statistically speaking, control and treatment villages are the same in terms of their schooling access.

Other information provided in Table 3 inform us further about infrastructure in the study villages. In Enugu, access is overall relatively low: We can see that only about 5% of villages have a hospital, 22% a maternity center, 28% a security post, less than two percent a bank, and 20% graded internal roads. Higher access is observed for administrative offices (38.5%). In Ekiti, we see overall higher access statistics for these services, reflecting the more urban setting of the state. Here, about 83% of villages have a school, 21% a maternity center and 20% a hospital and access is through internal graded roads for 67% of communities. Bank access is about five times higher than in Enugu, with 10% of villages having a bank. Except for a very small imbalance (statistically significant only at the 10% level) all of these access statistics are balanced between treatment and control communities in both states.

Table 4: Village level Water and Sanitation facilities

	Enugu		**Ekiti**		**All**		
	C	**C-T**	**C**	**C-T**	**C**	**C-T**	**N**
At least half the village with pipe-borne water (%)	6.7	0.8	15.3	0.8	10.2	0.1	345
At least half the village with sewage system (%)	0.0	0.0	0.0	-11.9	0.0	-7.9	133
Improved drinking water available (%)	99.1	-0.9	98.6	-1.4	98.9	-1.1	347
At least 1 primary school (pub/priv) (%)	49.5	0.1	75.0	2.7	59.9	-0.8	345
with sanitation facilities (%)	32.7	3.4	48.1	-13.5	40.6	-7.9	207
with SF available for children (%)	28.8	6.9	37.0	-11.3	33.0	-4.6	207
with improved water in SF (%)	11.5	4.2	33.3	-5.0	22.6	-3.1	207
with SF specific for girls (%)	9.6	4.7	27.8	-8.9	18.9	-4.9	207
At least 1 secondary school (pub/priv) (%)	20.0	3.5	44.4	4.7	29.9	2.0	345
with sanitation facilities (%)	23.8	-26.2	71.9	-3.9	52.8	-15.3	100
with SF available for children (%)	9.5	-19.0	53.1	-7.5	35.8	-15.2	100
with improved water in SF (%)	4.8	-2.4	40.6	-13.9	26.4	-14.0	100
with SF specific for girls (%)	9.5	-11.9	37.5	-11.0	26.4	-14.0	100

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations.
Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Village Questionnaire, Baseline.

The next table, Table 4, shows additional information on infrastructure at the village level, focusing now no water and sanitation. Access to pipe-borne water is low. On average, only 10% of all study communities have access to piped water to half or more of their population. This percentage is higher in Ekiti (15%) than in Enugu (7%).

However, close to 100% of the villages report to have some kind of access to improved drinking water sources in both our study states.

In terms of sanitation infrastructure, basically none of the villages has access to a sewage system. Villages in Ekiti are more likely to have a primary school than in Enugu, both for primary and secondary schools. The much higher percentages of schooling infrastructure in Ekiti reflect its nickname as "The Fountain of Knowledge". The schools in Ekiti are considerably more likely to have sanitation facilities than in Enugu: for example, over 70% of secondary schools in Ekiti have sanitation facilities, compared to less than 25% in Enugu. All of these variables are balanced across treatment arms.

Table 5: Village level Economic Activity, Land Ownership and Labour

	Enugu		**Ekiti**		**All**		
	C	**C-T**	**C**	**C-T**	**C**	**C-T**	**N**
Farming most important economic activity (%)	67.9	3.2	63.0	-9.3	65.9	-2.5	347
At least half the village own their farm land (%)	91.5	-6.1	95.9	7.9*	93.3	0.4	347
Individuals hire pit-digging labour (%)	98.1	-0.7	94.4	10.1*	96.6	4.9*	345
from within the village (%)	69.8	0.4	53.4	19.7**	63.1	11.3	347
Individuals hire brick laying labour (%)	99.0	0.2	97.2	2.0	98.3	1.3	345
from within the village (%)	67.0	5.8	78.1	11.8	71.5	7.8	347
Individuals hire carpentry labour (%)	99.0	3.8	97.2	2.0	98.3	3.1	345
from within the village (%)	70.8	4.9	80.8	17.0**	74.9	10.0	347
Individuals hire plumbing labour (%)	79.0	0.2	90.3	12.0*	83.6	5.0	345
from within the village (%)	41.5	10.9	52.1	12.3	45.8	10.7*	347

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations.
Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Village Questionnaire, Baseline.

We next turn to some information on economic activities in the villages as well as access to labour that is typically required for the construction of a toilet. In terms of land ownership, we see in Table 5 that in both study states, farming is the most important economic activity according to the respondent to the village survey, which was predominantly the village head. 68% of villages in Enugu and 63% of villages in Ekiti are considered to primarily benefit from farming as their income source. Remaining variables presented however show that also activities related to sanitation construction are commonly available and availed in the villages: In most villages, households would hire pit-digging labour, brick laying labour, carpentry labour and plumbing labour. The extent to which these different workers are hired from within the villages varies somewhat across occupations and state, however, there are no differences between treatment and control groups.

The table also shows us that in almost all villages, at least half of the households

own their own farm land. This percentage is slightly higher in Ekiti than in Enugu. In Ekiti, the statistical analysis also suggests that we observe a small imbalance between the treatment and control villages, however only significant at the 10% significance level.

Table 6: Village level Gatherings and ODF Status

	Enugu		**Ekiti**		**All**		
	C	**C-T**	**C**	**C-T**	**C**	**C-T**	**N**
Monthly political/social meetings held (%)	80.2	3.7	65.8	-15.0*	74.3	-4.3	347
Sanitation activities carried out (last year) (%)	80.2	-1.0	47.9	4.6	67.0	4.5	347
Village had CLTS activities (%)	19.0	-3.3	12.5	-3.2	16.4	-2.7	345
Village achieved ODF status (%)	0.0	-5.3	11.1	11.1	3.3	0.2	62

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations.
Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Village Questionnaire, Baseline.

We finally consider information on gatherings and sanitation related activities conducted in our study population. Table 6 shows that such communal activities are more prevalent in Enugu than in Ekiti: Respondents report that 20% of villages in Enugu and 12% in Ekiti had received CLTS activities before. This is not consistent with the information WANG provided IFS with, which was used to identify eligible triggerable units for the CLTS evaluation study. One explanation could be that sanitation related activities are confused with CLTS activities in some villages. This is important to follow-up on. In any case, there are no imbalances between treatment and control.

These tables provided a very rough first snapshot of our study areas. In the following sections, we will make use of the household survey to give a much more detailed picture of our study population.

2.3.2 Households - General

The household survey was a comprehensive survey administered to a targeted 20 households per TU. Appendix C provides detailed information on the number of interviews conducted. Overall, with 6,330 respondent households, we achieved to reach 98.8% of our targeted household interviews in Enugu and 99% in Ekiti. These households have on average around 5 household members, as we will see below, providing us with a picture of more than 36,000 individuals in our two study states.

We start by discussing the typical household composition we observe. We can see in Table 7 (which is set up in the same way as the village level tables presented above), that the household head is on average 56 years old in Enugu and close to the same age (55.7 years) in Ekiti. These household heads are typically male (˜64%) and about 56% finished at a maximum primary school. About 23% completed secondary school. About two thirds (78%) are employed, many in the agricultural sector: About 45% of the households report agricultural activities[11] as their main economic activity, which reflects the highly rural character of our sample. This is particularly prevalent in Enugu, where this figure is 55%. In Ekiti, the percentage is lower at 33%. However, the information provided by the village heads (presented in the previous section), gives an indication that agricultural activity is still the predominant source of household income in Ekiti as well.

All these characteristics are very similar in the two study states, except for education levels. In Ekiti a larger percentage completed secondary school than in Enugu. However, the percentage of household heads able to write is similar in both states at around 55%.

In Enugu, the majority of household heads are Igbo (99%) and households are either Catholic (64%) or 'Other Christian' (25%). In Ekiti household heads are Yoruba (89%) and classify their religion in the majority of cases as 'Other Christian' (70%) and some as Catholic (11%). Overall, these variables are quite balanced across treatment and control, particularly when poling both states together (second to last column). We only see some imbalance in the gender of the household head in Enugu and in Yoruba households in Ekiti.

Table 8 shows more details on the study households' compositions. Households in Enugu are slightly larger than those in Ekiti with 6 (5.7) and 4 household members on average respectively in the two states. In both states, there are on average more females in the households. The Table provides some more details on the number of children and elders in the household. In Ekiti, we do not find any differences in household

[11]These agricultural activities lump together farming on own land, animal husbandry and any other agricultural work.

Table 7: Characteristics of the Head of Household (HH head)

	Enugu		Ekiti		All		
	C	**C-T**	**C**	**C-T**	**C**	**C-T**	**N**
HH head age	56.0	1.0	55.7	2.1	55.9	1.6*	4,425
HH head male (%)	62.2	4.2**	65.5	-1.2	63.7	1.4	4,425
HH head finished primary school (%)	61.0	0.2	50.4	-0.1	56.2	0.4	4,422
HH head finished senior secondary school (%)	16.9	0.7	30.2	0.1	23.0	0.0	4,422
HH head knows how to write (%)	53.3	3.9*	55.8	0.2	54.4	2.1	4,281
HH head employed (%)	77.7	0.5	75.5	1.0	76.7	0.8	4,425
HH primary activity is farming (%)	56.8	-0.1	33.3	-5.4	46.1	-1.9	4,388
HH head Igbo (%)	98.6	-0.6	2.0	-3.8*	54.5	1.2	4,490
HH head Yoruba (%)	0.0	-0.2	88.9	9.0**	40.6	1.3	4,490
HH head Catholic (%)	63.6	-2.0	11.2	2.1	39.7	1.8	4,490
HH head Other Christian (%)	25.2	-0.4	70.2	-3.7	45.7	-3.6	4,490
HH head Islamic (%)	1.8	1.3	16.4	0.8	8.5	0.5	4,490

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations.
Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Household Data, Baseline.

composition between the treatment (CLTS) and control areas. We do however find differences in household size across treatment groups, significant at the 5% level. This difference comes mainly from the number of male members in each household which is higher in the control group, and is also significant at the 5% level. The subsequent rows of the Table show how this difference is driven by differential numbers of male and female children between the ages of 11 and 16 and seniors. In both these categories there is a statistically significantly higher number of males in the control group than in the treatment group. These differences remain when we pool both study states together. We will account for these imbalances in our endline analysis.

The difference in gender composition across groups is, however, also worth looking into in more detail.To uncover where these imbalances are coming from, we removed the households from each of the LGAs, one LGA at a time. After several iterations, we found that running the same analysis over a subsample that excludes observations from Igbo Eze South (Enugu) and Moba (Ekiti) completely eliminates the gender imbalance previously found, leaving only a small difference in the number of female children from 11 to 16 significant at the 10% level (e.g. in the opposite direction as the original imbalance).[12]

These differences could arise for several reasons, most likely by chance or also due

[12]Additionally, excluding observations from Udenu effectively removes all statistically significant differences in household composition. Tables showing these findings are available upon request.

Table 8: Household Composition

	Enugu		Ekiti		All		
	C	**C-T**	**C**	**C-T**	**C**	**C-T**	**N**
Household size	4.6	0.5***	3.3	0.1	4.0	0.3**	4,460
of which male	2.1	0.2***	1.7	0.1	1.9	0.2**	4,490
of which female	2.5	0.2**	1.6	-0.0	2.1	0.1*	4,460
Children under the age of 6	0.6	0.1	0.4	-0.0	0.5	0.0	4,490
of which male	0.3	0.0	0.2	-0.0	0.3	0.0	4,490
of which female	0.3	0.0	0.2	-0.0	0.2	0.0	4,490
Children between 6 and 10	0.6	0.1*	0.5	0.0	0.6	0.0*	4,490
of which male	0.3	0.0*	0.2	0.0	0.3	0.0	4,490
of which female	0.3	0.0	0.2	0.0	0.3	0.0	4,490
Children between 11 and 16	0.7	0.1**	0.5	0.0	0.6	0.1**	4,490
of which male	0.4	0.1**	0.2	0.0	0.3	0.0**	4,490
of which female	0.4	0.0	0.2	0.0	0.3	0.0	4,490
Members over 65	0.3	0.0	0.4	0.0	0.4	0.0	4,490
of which male	0.2	0.0**	0.2	0.0*	0.2	0.0***	4,490
of which female	0.2	-0.0	0.2	-0.0	0.2	-0.0	4,490

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations. Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Household Data, Baseline.

to exceptional events in certain TUs in these particular LGAs. These could be related to, for example, epidemics, conflicts, or celebrations that could temporarily be affecting household structures and therefore driving these differences. At the TU level, we identified the 9 units that drive this difference in male senior members of a household. They belong to the Igbo Eze South, Moba and Udenu LGAs, and removing them from the sample eliminates any statistically significant difference in senior household members across treatment groups. These results are available upon request.

It is not clear why this difference arises in our sample. Nonetheless, we do not expect this to affect our results. We will focus on health and sanitation practices of the whole household in general. The main specific group of household members that will be analysed is that of children under the age of 6 and this group is evenly distributed across both treatment groups. In addition, we will test the robustness of the impact results at endline by restricting the sample to those areas where these initial differences in household composition were not present, to confirm that they are not driving our results.

In short, we find that households in our sample are identical in most demographic characteristics including ethnicity, religion, age, literacy rates and education achievement. Households are also comparable in terms of employment status of the head of

household and farming being the main household economic activity. Significant differences in household composition, particularly in the senior male category, are present, especially in our Enugu subsample, and will be accounted for in the following steps of the research's analysis.

2.3.3 Households - Income and consumption expenditures

This section turns to households income and consumption expenditures. Following common practice when dealing with self reported income and expenditure data, we exclude 2% of the observations as outliers.[13] Table 9 shows households' yearly typical income[14] and splits it in income in cash and non-cash (or in kind). Typical income is around 100,000 Nairas (545 USD)[15] on average when pooling both states and is similar across treatment and control groups. The level of income seems higher in Ekiti than in Enugu, driven mainly by income in cash. Furthermore, there seems to be a statistically difference in the level of total income between treatment and control households in Ekiti, with households in treatment groups reporting an income over 20% relative to the control group average. But this difference disappears if 3% of the outliers are excluded.

Table 9: Household Income (in ₦)

	Enugu		**Ekiti**		**All**		
	C	**C-T**	**C**	**C-T**	**C**	**C-T**	**N**
Tot HH income, last yr	87,634	-526	115,990	-22,921**	100,524	-12,330	4,396
Tot HH cash income, last yr	77,523	-2,211	110,835	-16,907	92,679	-10,415	4,407
Tot HH non-cash income, last yr	5,809	574	5,661	-1,783	5,741	-578	4,405

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations.
Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Household Data, Baseline.

[13]This is to account for measurement error arising from two potential sources: over/underreporting on the side of the interviewee, and/or inputing errors during the data collection excercise.

[14]Households are asked about their income from different sources in the last year. These incomes are then added up and the respondent is asked whether this is a typical yearly income for the household and if not, what a typical income would be. We report here the typical yearly total household income.

[15]Using the exchange rate corresponding to January 1st, 2015 (1 U$D = 183.59 ₦). During the remainder of the report we will use this as a representative rate given that household interviews were carried out during the months of December 2014 and January 2015.

Table 10: Household expenditures (in ₦)

	Enugu		Ekiti		All		
	C	**C-T**	**C**	**C-T**	**C**	**C-T**	**N**
Amount spent on food, last week	4,920	248	3,905	-82	4,444	118	3,825
as above, per capita	983	-32	990	-69	986	-51	3,840
Value of total food consumed last week	5,552	170	4,744	-181	5,180	24	4,400
as above, per capita	1,130	-20	1,192	-87	1,159	-55	4,383
Other Nondurable exp., last month	17,069	1,601	18,316	731	17,638	1,129	4,399
as above, per capita	3,367	249	4,214	-54	3,753	72	4,373
Durable expenditure, last yr	28,858	-2,772	39,562	-1,008	33,725	-2,261	4,404
as above, per capita	5,697	-596	9,468	-1,011	7,415	-916	4,383

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations.
Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Household Data, Baseline.

The next tables look at consumption expenditures for different type of goods and services. First note that we find that total yearly consumption expenditure (calculated from food expenditure last week, other non-durable expenditure last month and durable expenditure last year) is significantly higher than income last year. It is quite common to observe measurement errors in these variables, and in particular for income figures to be under-reported. However, the difference is quite large and we need to investigate this further and understand the contribution of (a) under-reported income, (b) over-reported consumption expenditures, (c) other measurement issues, (d) genuine differences to explaining this gap between income and consumption. Because of this, at the moment we display the expenditure figures as they were reported over different periods, without aggregating across different categories to calculate an yearly total expenditure at the household level. In any case, the measurement issues seem to be similar across states and importantly across treatment groups as reflected by the lack of imbalances between treatment and control. Table 10 shows the amount spent on food last week and expenditure on food per capita in the first two rows. In Enugu, on average a household spends 4,920 nairas (26.80 USD) on food in a week, or 983Nairas (5.35 USD) per capita. In Ekiti, total expenditure on food is lower at 3,905 Nairas (21.27 USD), but expenditure on food per capita is similar to the level in Enugu.

Table 11: Household expenditures, last month, by category (in ₦)

	Enugu		Ekiti		All		
	C	**C-T**	**C**	**C-T**	**C**	**C-T**	**N**
Transport	2,569	2	2,836	-144	2,695	-80	4,012
Drinking water	323	55	149	10	240	37	4,179
Water for sanitation needs	371	96	11	-7	199	54	4,206
Electricity (inc fuel for generator)	405	-41	1,078	143	718	29	4,214
Sanitation Maintenance	1	-0	1	-1	1	-1	4,258
Telecommunications (exc internet)	1,149	92	1,464	-62	1,295	5	4,098
Subscription to Internet connection	3	-1	4	1	3	0	4,224
Fuel for cooking	751	125*	1,079	7	903	56	4,190
Salaries for workers, household aid, etc	352	7	276	21	317	17	4,232
Education (school fees, books, etc.)	4,411	665	5,833	469	5,067	517	4,145
Health expenses	2,803	418	1,446	236	2,155	345*	3,992
Other services	856	117*	1,019	36	932	72	4,023
Personal hygene products	730	38	714	-21	723	9	3,982

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations.
Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Household Data, Baseline.

Table 12: Household expenditures, last 12 months, by category (in ₦)

	Enugu		Ekiti		All		
	C	**C-T**	**C**	**C-T**	**C**	**C-T**	**N**
Clothes and Shoes	12,530	1,357	15,446	-1,169	13,946	-38	3,645
Transfers to family or friends	2,185	543	5,383	-490	3,650	-30	4,015
Household repairs and maintenance	2,501	259	1,780	-2	2,165	148	3,982
Household construction/extensions	1,010	24	648	138	844	89	4,084
Weddings and funerals	4,461	221	4,933	-532	4,683	-169	3,958
Festivals and other entertainment	2,246	-168	2,233	58	2,240	-57	3,922
Other (inc. debt repayment)	407	-203	330	-65	370	-132	3,973

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations.
Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Household Data, Baseline.

Finally, households in CLTS and Control TUs are similar in terms of their wealth (we constructed a wealth index based on a combination of assets, not shown in the tables).

2.3.4 Households - Savings and Credit

Given the fact that toilets are typically perceived as expensive, or at least costs are mentioned as a major reason for not owning a toilet, it is interesting to get an idea of the financial situation of households. In this section, we look at savings and credit of the study households.

Table 13: Household Savings

	Enugu		**Ekiti**		**All**		
	C	**C-T**	**C**	**C-T**	**C**	**C-T**	**N**
Household has some kind of savings (%)	16.7	-1.6	30.0	1.4	22.8	-0.5	4,405
in a bank (%)	76.6	0.1	81.4	-3.6	79.5	-2.1	1,015
in a traditional coop (%)	4.7	-4.3	15.8	4.9	11.4	1.2	1,015
in a microfinance institution (%)	2.1	-1.2	3.4	2.8**	2.9	1.2	1,015
at home (%)	31.8	3.0	10.7	-3.4	19.0	-0.9	1,015

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations.
Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Household Data, Baseline.

Table 13 shows that only a relatively small percentage of households in our study area have any type of savings and households in Ekiti are more likely to have savings and use formal saving instruments than those in Enugu. In Enugu, 17% of households report to have some kind of savings. Around 77% of these households use banks, 4.7% use a traditional coop, 2.1% use microfinance institutions and almost 32% hold savings at home. In Ekiti 30% hold any type of savings. Of these households, 81% report having savings in a bank, 15.8% also report using traditional cooperatives, 3.4% use microfinance institutions, and only 10.7% report having savings at home.[16] As with some other imbalances reported, this one is also likely to be driven by the small percentage of households falling within this category (less than 1%).

In terms of credit, we can see in Table 14 that about one fifth of the sample had debt outstanding at the time of the baseline survey, with a similar level in both states (21% in Enugu and 20% in Ekiti). As with savings, informal instruments are more prevalent in Enugu than in Ekiti. In Enugu, the three most common sources of credit are friends/acquaintances (29%), traditional coops (20%) and relatives (18%). In Ekiti, the three most common sources are the same, but traditional coops are more important (33%), followed by friends/acquaintances (18%), and relatives (14%). Furthermore,

[16]Note that percentages of saving sources used do not add up to 100% since households could mention more than one source. The same holds for credit discussed below.

Table 14: Household Credit

	Enugu		Ekiti		All		
	C	**C-T**	**C**	**C-T**	**C**	**C-T**	**N**
Household has some kind of debt (%)	21.3	-0.4	19.6	2.0	20.5	0.8	4,490
with a bank (%)	4.8	-0.7	13.4	1.4	8.5	0.2	901
with a microfinance institution (%)	1.6	0.4	5.2	-0.3	3.1	0.1	901
with an NGO (%)	0.0	0.0	0.5	-1.5	0.2	-0.7	901
with a traditional coop (%)	19.5	-6.3	33.0	-1.0	25.4	-4.0	901
with a moneylender (%)	10.8	1.0	11.9	1.9	11.2	1.4	901
with a relative (%)	17.9	-2.8	14.4	7.9**	16.4	1.9	901
with a friend/acquaintance (%)	29.1	1.0	18.0	0.0	24.3	0.6	901
with work (%)	2.8	-1.1	5.7	0.2	4.0	-0.6	901
with a local shop (%)	8.4	1.3	6.2	-2.8	7.4	-0.5	901
other (%)	22.3	5.9	3.6	-2.4	14.2	2.3	901

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations.
Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Household Data, Baseline.

13% of households with any credit have a debt with a bank in Ekiti, and only 5% hold a debt with a bank in Enugu. . These are overall nicely balanced across treatment arms in both states.

2.3.5 Households - Shocks

Households were also asked whether they suffered any negative shocks on the last twelve months: 27% of households responded they did in Enugu and 11% responded they did in Ekiti. When households declared to have suffered more than one negative shock in the past 12 months, the interviewers inquired which of the different shocks hit the household the hardest. Bad harvest was cited most frequently, followed by the death of a household member. In Enugu, 14 percent of all households suffered from one household member dying. Other shocks, while very infrequently mentioned, include job loss, serious robbery or theft, drought or flooding or things like fire, accidents etc. These shocks happened to the same degree in treatment and control communities in both states.

Households were also asked whether their food was sufficient to feed all adults in the households as well as all children at some point over the past year. In Enugu, almost 60% of respondent households report to have had adults go hungry at some point in the last year and 41% of their children. We see here an imbalance between treatment

Table 15: Negative Shocks to the Household

	Enugu		Ekiti		All		
	C	**C-T**	**C**	**C-T**	**C**	**C-T**	**N**
Negative shock in the last year (%)	27.1	1.1	11.0	0.9	19.7	1.6	4,486
job loss (%)	13.8	5.6	6.4	1.2	11.9	4.6	849
serious robbery or theft (%)	11.6	-0.5	13.0	-6.2	11.9	-2.1	848
drought or flooding (%)	6.6	-0.6	6.5	2.1	6.6	0.1	848
bad harvest (%)	50.5	-1.5	40.7	-1.9	48.0	-1.4	848
death of member (%)	41.5	-2.0	39.8	0.7	41.1	-1.2	847
other (fire, accidents, etc) (%)	13.2	-1.9	9.3	0.6	12.2	-1.1	846
Not enough food for adults in the past year (%)	58.4	7.6*	26.9	-1.4	44.2	4.3	4,365
Not enough food for children in the past year (%)	40.6	8.4**	15.6	-2.2	29.3	4.2	4,281

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations.
Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Household Data, Baseline.

and control, with control households reporting their children to have gone hungry more frequently. In Ekiti, the percentages are lower, but still high: We find that in this state, 27% of adults did not have sufficient food at some point during the last year and 16% of children. These indicators are balanced.

2.3.6 Households - Sanitation Infrastructure and Practices

This section presents more detailed information regarding sanitation practices at the household level drawn from the baseline survey. Access to improved sanitation and water sources was determined using the criteria established by WHO/UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation.[17]

Table 16: Access to improved sanitation and water sources

	Enugu		**Ekiti**		**All**		
	C	**C-T**	**C**	**C-T**	**C**	**C-T**	**N**
HH has a functioning latrine (%)	37.6	5.4	34.2	-4.8	36.0	0.5	4,449
Improved sanitation (functioning) (%)	31.8	4.3	32.5	-5.3	32.1	-0.4	4,449
Improved sanitation water - dry season (%)	66.6	4.2	79.2	10.2*	72.3	6.7	4,452
Improved sanitation water - rainy season (%)	86.0	2.8	81.3	8.4	83.8	5.7*	4,452
Improved drinking water - dry season (%)	65.0	3.9	75.1	11.9**	69.6	7.5*	4,452
Improved drinking water - rainy season (%)	84.1	3.2	77.8	10.3**	81.2	6.9**	4,452

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations.
Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Household Data, Baseline.

From Table 16 we learn that, overall, 36% of the households included in our baseline survey own some kind of functioning latrine[18], and this proportion is consistent across treatment and control in both states.[19]

Access to improved sanitation refers to the proportion of households that own a latrine which "hygienically separates human excreta from human contact" (JMP definition - more details below). The average - as can be seen in Table 17 - across groups is not far from that of latrine ownership meaning that proportion of households with unimproved latrines is relatively small compared to those with improved facilities. This is important because it is informative about what the STS project's target households look like: they are not households that have an unimproved toilet and are looking to upgrade, but they are households that do not have sanitation and are likely to have a preference to adopt an improved toilet rather than taking up any type of facility.

[17]Available here: http://www.wssinfo.org/definitions-methods/watsan-categories/. Last accessed April 7th, 2015.

[18]Non-functioning toilets were found to be a negligible percentage.

[19] The proportion of sanitation ownership is slightly higher than our estimate from the listing exercise (29%). This is something we plan to analyse in more detail going forward to gain a better understanding of this non-trivial difference.

This is relevant because it suggests that the hardest step in the ladder towards better sanitation in the context of this study is not to move households from unimproved to improved facilities, but to increase their levels of latrine ownership.

Table 17: Type of latrine/toilet (households with latrine)

	Enugu		Ekiti		All		
	C	**C-T**	**C**	**C-T**	**C**	**C-T**	**N**
Improved latrine/toilet (%)	84.2	-1.6	95.2	-1.2	89.1	-2.5	1,637
Pit latrine with slab (%)	61.3	2.3	46.2	1.6	54.6	3.5	1,637
Flush to septic tank/Soak away (%)	15.1	-1.5	35.3	-1.7	24.0	-3.8	1,637
Flush/pour flush to pit latrine (%)	3.6	-3.8**	10.5	0.4	6.7	-2.2	1,637
Flush to piped sewer system (%)	2.5	1.2	1.7	-1.1	2.1	0.0	1,637
Ventilated improved pit latrine (VIP) (%)	1.6	0.3	0.6	-0.9	1.1	-0.3	1,637
Other (improved) (%)	0.2	-0.0	0.9	0.6	0.5	0.3	1,637
Unimproved latrine/toilet (%)	15.8	1.6	4.8	1.2	10.9	2.5	1,637
Pit latrine without slab/open pit (%)	15.5	1.3	4.6	0.9	10.7	2.3	1,637
Other (unimproved) (%)	0.2	0.2	0.3	0.3	0.3	0.3	1,637

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations.
Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Household Data, Baseline.

Furthermore, when studying health and sanitation practices, different sanitation systems are believed to result in different outcomes according to how effective they are at separating waste from other human activities. This view led to the distinction between "improved" and "unimproved" sanitation, terms coined by the JMP in 2002. For example, a pit latrine is considered as an improved sanitation installation by these JMP standards when it includes a slab to separate faeces from flies or other insects, otherwise it is classified as an unimproved toilet and largely deemed unsafe. So if our control and treatment groups had similar rates of latrine ownership but these were of very different quality across groups, health outcomes could evolve differently in each group, but this would be unrelated to the treatment.[20]

We show more detailed information on the types of toilets owned in Table 17. In both states, the majority of households own a pit latrine with slab (61% in Enugu and 46% in Ekiti). The second most common improved latrine model is a flush to a septic tank or soak away - 15% of households in Enugu and 35% of households in Ekiti own such a model. The most common unimproved toilet is again a pit latrine, but either an open pit or one without a slab. Almost 16% of study households with a toilet own this type in Enugu and almost 5% in Ekiti. The types of toilets owned are largely balanced

[20]The same argument can be made for factors such as animal waste in the vicinity of a household.

across our treatment arms in the two states (as can be seen in the Table, only one sub-category, 'flush/ pour flush to pit latrine' is imbalanced in Enugu, which is likely driven by the small percentages observed in this category).

Referring back to Table 16, we also get information on water access of our study households. 67% of households in Enugu and 79% in Ekiti report to have access to water for sanitation from improved water sources in the dry season and the percentages increase to 86% and 81% in the respective states in the rainy season. The percentages are closely comparable for access to improved drinking water sources (slightly lower in Ekiti). There appears to be a difference across our study groups in Ekiti in the level of access to improved sources of drinking water (both during the rainy and the dry season), with around 10% of control households exhibiting better access than treatment groups.[21] These differences disappear when we exclude Ekiti South West from the analysis, the LGA in which we had most trouble in defining and later identifying TUs.

Table 18: Sanitation practices (households with latrine)

	Enugu		**Ekiti**		**All**		
	C	**C-T**	**C**	**C-T**	**C**	**C-T**	**N**
All HH members use the latrine (%)	92.2	-0.0	95.5	0.1	93.7	-0.3	1,590
if pit latrine w/slab (%)	89.9	-1.0	96.1	2.3	92.2	-0.1	839
if flush to septic tank (%)	95.5	3.6	95.0	-0.9	95.2	0.4	415
if flush to pit latrine (%)	87.5	-5.4	100.0	4.5	96.2	1.8	125
if flush to piped sewer (%)	100.0	20.0	80.0	-20.0	93.8	-0.7	34
if ventilated improved pit latrine (%)	85.7	5.7	100.0	0.0	87.5	-4.2	20
if other (improved) (%)	100.0	0.0	66.7	-33.3	75.0	-25.0	6
if pit latrine wøslab (%)	84.8	-9.5*	93.8	-6.3	86.6	-8.9**	149
Household performs OD (%)	2.3	-1.4	3.0	0.7	2.6	-0.4	1,591
Household performs OD close by (%)	1.8	-0.0	1.5	1.3*	1.7	0.7	1,591
Household performs OD far away (%)	0.5	-1.7	1.8	-0.3	1.0	-1.0	1,591

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations.
Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Household Data, Baseline.

Importantly, reported latrine usage, among those households that own them, is high and balanced across treatment groups as seen in Table 18. Reported usage of sanitation facilities is generally very high: 90% of households in Enugu and 96% of households in Ekiti use their toilet if they own it. We find variation of usage by the type of toilet owned: Sample sizes for some of the latrine types are small (in particular flushes to

[21]Equivalent comparisons were also carried out using the Listing Data, which contains less detail much is composed of a much larger sample. Results for latrine type and ownership do not differ significantly from those presented in the this chapter. Results are available upon request.

piped sewer, VIP latrine and other improved), so we will not go into detail for these options. Otherwise we observe that improved toilets are more likely to be used. The model with highest usage rates is the septic tank and the one with lowest is a pit latrine without a slab. This is consistent across states.

If we look closer at those households where at least one household member is reported not to use the toilet (results presented in Table 19), we find that among adults, women are more likely *not* to use the toilet than men. This might at first seem counter intuitive as males are typically blamed for not using toilets. However, when we go into reasons for not using the toilets, we will see in Table 21 that fear of contracting a disease is among the main factors, and this could be behind this difference by gender. Indeed a very common belief in Nigeria is that the warm air coming up from the pit makes women vulnerable to diseases.

Table 19 also shows that a high proportion of households in which not all members use the household toilet declare that it is young boys who do not use it (almost 50%), as well as young girls (almost 30%). Most importantly, there seems to be a relationship between the type of toilet owned and the likelihood of it being used by all households members. While 89% of the households that own a latrine have improved facilities (see Table 17), this number falls to 81% if we restrict the sample to those households that declared that at least one member does not use the latrine. In other words, there is a larger proportion of households with unimproved toilets among those that state that not all the household members use the toilets, hinting at the relative unattractiveness of using unimproved facilities.

Among the subsample of households where women and young boys don't use the latrine, only 75% and 76%, respectively, own improved toilets. Surprisingly, this share increases for households that declared that young girls do not use the latrine, at 94%, but this could be driven by a small number of observations, particularly in Ekiti. These numbers are comparable in both states and highly balanced between treatment and control, save for cases where the number of observations was small, as in the case of young girls. .

Going back to Table 18, we see that in both study states, not using their own toilet does not translate directly into members going for open defecation. While in Enugu, 10% of households report not to use their toilet, only slightly above 2% say they go for OD conditional of having a toilet. Remaining households state primarily to use public toilets. In Ekiti, 4.5% of toilet owners do not use the toilet and two thirds of these go for open defecation.

Table 20 shows where the members of households without a toilet perform OD. Before discussing these statistics, it is worth noting though that not all households who

Table 19: Members of the household that do not use the latrine/toilet

	Enugu		Ekiti		All		
	C	**C-T**	**C**	**C-T**	**C**	**C-T**	**N**
At least one member does not use latrine (%)	9.3	1.0	4.4	-0.5	7.2	0.7	1,633
of which % have improved toilets (%)	76.2	-14.4	93.3	-2.1	80.7	-11.9*	111
Who does not use the toilet?							
Women don't use it (%)	19.0	6.5	26.7	17.6	21.1	9.9	111
of which % have improved toilets (%)	62.5	-37.5*	100.0	0.0	75.0	-25.0*	18
Men don't use it (%)	0.0	-6.3	13.3	-0.3	3.5	-5.8	111
Boy less than 10 years don't use it (%)	45.2	4.6	40.0	-10.0	43.9	-0.6	111
of which % have improved toilets (%)	73.7	-10.9	83.3	-7.6	76.0	-11.5	49
Girls less than 10 years don't use it (%)	31.0	2.8	20.0	-2.7	28.1	2.1	111
of which % have improved toilets (%)	92.3	3.4	100.0	0.0	93.8	0.9	30
Elderly men don't use it (%)	0.0	-3.1	0.0	0.0	0.0	-1.9	111
Elderly women don't use it (%)	4.8	-4.6	0.0	-4.5	3.5	-3.9	111

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations.
Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Household Data, Baseline.

do not have a toilet perform OD - in Enugu, 2.5% of households without a toilet do not do OD and in Ekiti the percentage is 6.5%. These households mostly use their neighbour's toilets or a portable potty.

In terms of OD practices, Table 20 shows that about three in four households that perform OD report to do it far away from the own dwelling, the percentage being slightly lower in Ekiti, but still at 70%. Both categories (far away and close by) do not add up to 100% since some households reported to perform both types of OD (3.28% of the non-owners).

We already mentioned a relatively large gender divide regarding the reported use of latrines. Taking both study states together, adult women are reportedly three times more likely to avoid using the household's latrine than adult men (18.06% vs 5.56%, percentages not presented in the Tables above).

Overall, variables related to sanitation ownership and practices are well balanced between treatment and control TUs in both states.

We asked households for reasons why they do not use their toilet. Results are presented in Table 21. As mentioned above, one major deterrent for women is the fear of contracting diseases, which is relevant in both study states. Interestingly, although we observe that children under the age of 10 are likely not to use a latrine in both states, only in Enugu do respondents state "too young" as an important reason for not using

Table 20: Sanitation practices (without latrine)

	Enugu		Ekiti		All		
	C	**C-T**	**C**	**C-T**	**C**	**C-T**	**N**
Household performs OD (%)	97.5	-0.5	93.5	3.4	95.6	1.3	2,858
Household performs OD close by (%)	25.2	-2.8	26.9	6.6*	26.0	1.6	2,858
Household performs OD far away (%)	75.5	1.3	70.5	-1.6	73.1	-0.1	2,858

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations.
Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Household Data, Baseline.

the toilet (21%). Preferences are in general an important motivating factor to continue OD despite owning a latrine, with 17% of households that own a toilet in Enugu and 27% in Ekiti stating this as a reason. In addition, we find that a significant portion of respondents selected the "Other" option and did not specify what their concerns or reasons were. We will aim to unpack this further at the time of the endline survey.

Table 21: Reason for not using household own latrine

	Enugu		Ekiti		All		
	C	**C-T**	**C**	**C-T**	**C**	**C-T**	**N**
Household members prefer to go somewhere else (%)	16.7	-14.6	26.7	17.6	19.3	-2.9	111
Too young to use it (%)	21.4	12.1	0.0	-4.5	15.8	8.4	111
Smelly/flies/heat (%)	0.0	0.0	0.0	-13.6*	0.0	-5.6*	111
Other cultural reasons (%)	0.0	0.0	13.3	8.8	3.5	1.7	111
Fear of contracting a disease (%)	16.7	13.5**	13.3	-0.3	15.8	8.4	111
Lack of privacy (%)	0.0	0.0	0.0	-4.5	0.0	-1.9	111
Other (%)	40.5	-12.6	40.0	-10.0	40.4	-11.5	111
Don't know (%)	7.1	4.0	6.7	6.7	7.0	5.2	111

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations.
Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Household Data, Baseline.

We note that these reasons are generally balanced between the two study arms in both states. We expect that the few imbalances observed (only one significant at the 5% level) are driven by the relatively small sample size of 111 households in both states where the owned toilet is not used by all members.

Households with no latrines were asked to explain the interviewer the main reason why they do not have one, and their answers were very clear, as seen in Table 22. The cost of construction is reported to be the main obstacle in the acquisition of latrines.

Given that the pure form of CLTS does not focus on providing financial support or reducing the cost of toilets, this finding suggests a possible overestimation of the potential impact of behavioural change treatments such as CLTS. It does however suggest that complementary interventions such as SanMark, that facilitate the supply of simpler, cheaper sanitation modules could have large order effects in latrine take up. Importantly, both the reasons referred to by respondents are also balanced across treatment status groups, suggesting no selection on this dimension.

Table 22: Reasons for not having a latrine/toilet

	Enugu		**Ekiti**		**All**		
	C	**C-T**	**C**	**C-T**	**C**	**C-T**	**N**
No need (%)	1.9	0.2	2.5	0.6	2.2	0.4	2,788
Too expensive (%)	87.6	-0.3	63.4	-1.9	76.3	-1.3	2,788
No space (%)	2.5	0.7	4.5	0.0	3.4	0.4	2,788
Never thought about it (%)	1.5	-0.8	2.4	-1.4	1.9	-1.1	2,788
Stay in rented house (%)	1.4	-0.0	16.1	3.7	8.2	1.9	2,788
Other (%)	5.0	0.2	11.1	-1.0	7.9	-0.3	2,788

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations. Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Household Data, Baseline.

Overall, treatment and control groups for CLTS are nicely balanced in terms of sanitation practices and infrastructure, which proves a solid base for future analysis.

2.3.7 Households - Actual and Expected Construction Costs of Latrines

Before continuing with the comparison between the CLTS treatment and control groups, we make a brief note on the cost expectations held by the respondents in our sample. Since the cost of construction of a latrine seems to be the main impediment in the expansion of private latrine construction, it seems necessary to take a moment to understand what is behind this answer.

A toilet can be declared as "too expensive" for one, or a combination, of two reasons:

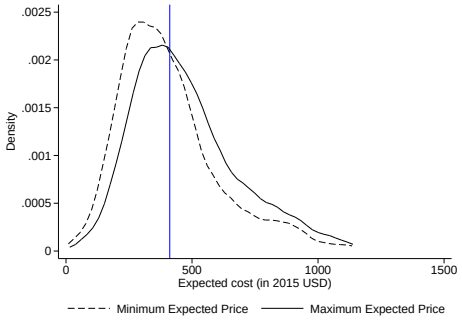
1. Households without a toilet understand the costs and gains of the investment but are not able to afford it, that is, they face a liquidity constraint;

2. Households without toilets underestimate returns or over-estimate costs and hence do not consider a toilet a worthwhile investment.

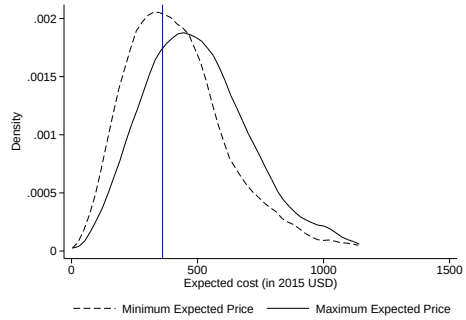
In order to check whether there might be an under or over-estimation of costs underlying respondents' beliefs, a question asked them to estimate the minimum and maximum expected costs of constructing four different types of toilets. We calculate the average minimum and maximum costs across type of toilets for each household without a latrine and plot the distribution of the averages across houeholds in Figure 7. At the same time, we asked latrine owners how much did it cost them to build their actual toilet, and we took the average across households to determine the actual average cost (blue vertical line). [22]

Figure 7: Actual v. expected costs - all latrine types (in 2015 USD)

(a) Ekiti - blue line indicates actual construction cost



(b) Enugu- blue line indicates actual construction cost



From Figure 7 it is clear that the expectations of costs held by non-owners are fairly in line with the actual constructions costs declared by latrine owners, suggesting households have a good idea of the cost of building a latrine on average, although there is some variation within each state as the distribution curves show, which assimilates a normal distribution. Furthermore, it seems that in Ekiti households without a latrine are more likely to undersetimate costs than in Enugu. However, since respondents might have not been familiar with some of the types presented in the questionnaire, or might not ever consider to construct some of them, the interest lies in how well non-owners estimate the cost of the most popular and accessible option available to them. The most common latrine type in both Ekiti and Enugu is a pit latrine with no slab, similar (albeit not identical) to the second type described in the questionnaire (VIP latrine). We thus repeated the previous excercise but keeping the answers for expected and actual costs corresponding to this type of latrines. The results are shown in Figure

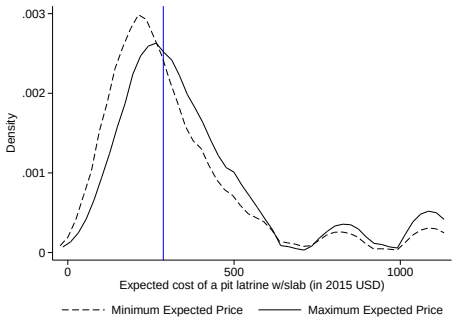
[22]The four types aimed to capture the observed variety in quality that are available to households when making the construction decision. They are: a) a hole dug out to be a pit with no lining, no slab nor roof; b) a ventilated improved latrine with a cement slab and a single, lined pit and roof; c) a pour flush toilet (squat) connected to a septic tank; and d) a flush WC (sit on) connected to a septic tank.

8, and again confirm the lack of a clear over-estimation on behalf of the households, if anything there seems to be a slightly underestimation on average.

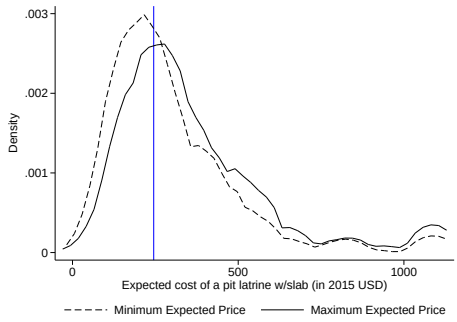
At the same time, even though the mean expected costs appear to be in line with actual costs, there is still a significant variation across households. In this variation, we find that a sizeable share of households indeed overestimate the minimum construction cost of toilets, as seen in the right tail of the graphs in Figures 7 and 8. This share is of 42% of all non latrine owners in the case of Ekiti, and of 56% in the case of Enugu.

Figure 8: Actual v. expected costs - pit latrine with slab (in 2015 USD)

(a) Ekiti- blue line indicates actual construction cost



(b) Enugu- blue line indicates actual construction cost

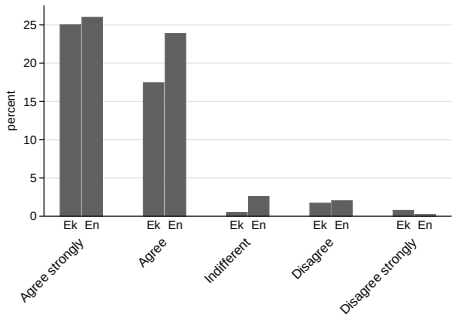


If it is the case, as it seems, that households have a fairly accurate estimation of the costs of construction, then we should turn to their expectations on the benefits from the construction of toilets, to verify whether it is the fact that they might be underestimating their benefits. Figure 9 shows the answers to a question on the expected benefits that a household might experience from constructing a toilet, conditional on it not having one before. The answers shown are for non-latrine owners. Apart from the question regarding status, which did not seem to raise the same consensus, the rest show that households agree that toilets are associated with better health status for all members and increased safety for women.

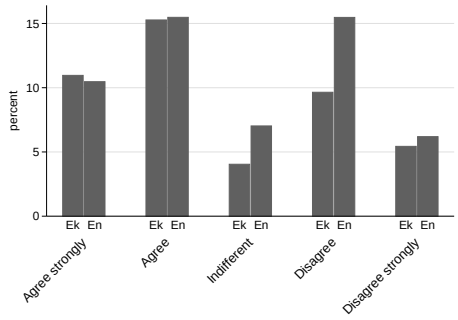
Therefore households seem to both appreciate the benefits of constructing toilets and, on average, estimate their costs correctly. Although, we cannot calculate net private returns for each household since we don't have a monetary measure of expected or real returns to sanitaiton. In light of this, the answer to why only around 35% of household own a toilet in both states could be related to the relative magnitude of the investment compared to the households income. In effect, the average toilet construction cost in Ekiti and Enugu, 382 USD and 396 USD respectively, represent 33% and 47% of the yearly income of a household that owns a toilet, but a 44% and 77%, respectively, of the typical yearly income of a family that does not own a latrine.

Figure 9: If your neighbour did not have a latrine and eventually constructed one:

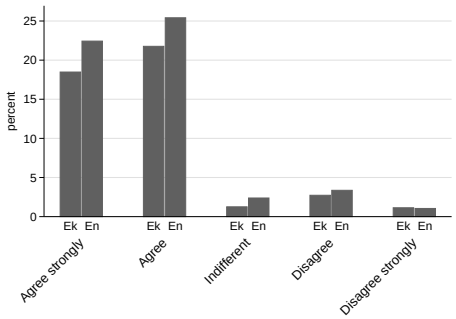
(a) Their family would be healthier



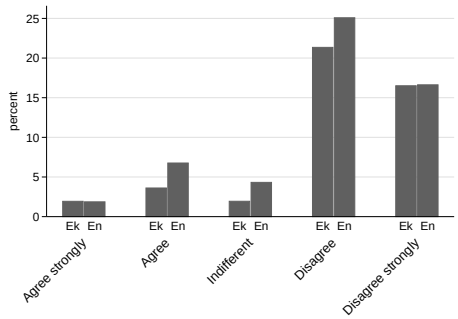
(b) Their family would enjoy a higher status



(c) The women in their family would be safer



(d) The family could get sick more often



This provides some ground to believe that the tallest hurdle is not a misestimation of costs and benefits but it could be related to a liquidity constraint. However, it could also be the case that private net returns to sanitation vary across households (maybe positively correlated with household income) and could be negative in some cases (even if social returns are positive). If the latter is the main reason why households are not investing in a toilet then lifting credit constraints will not incentivize these households to invest in sanitation. .

2.3.8 Households - Hygiene Practices

The last section in our household questionnaire concentrates on hygiene practices, about health of children under the age of six years in the household and about the care-givers knowledge regarding feeding and care of young children. This section is administered to the biological mother of the youngest child of the household (˜86% of cases) or the main caregiver (14% of cases) - we will refer to them jointly as mothers in the description.

We look first at hand-washing practices of these mothers. There are five critical times in washing hands is advised: before handling food, cooking and eating, and after defecating and changing diapers. In addition, it is also advised to wash hands before and after tending to a sick person, which reduces the spread of germs. Not only is it important to wash hands at these times, but also to wash them with soap.

Table 23: When do mothers typically wash their hands?

	Enugu		**Ekiti**		**All**		
	C	**C-T**	**C**	**C-T**	**C**	**C-T**	**N**
Before eating (%)	93.6	-1.5	92.2	-3.1*	93.0	-2.2	4,414
if respondent female (%)	93.3	-1.7	92.0	-2.8	92.7	-2.2	2,495
Before cooking/feeding (%)	51.9	-3.3	56.8	7.8*	54.1	2.0	4,378
if respondent female (%)	55.2	-4.8	58.5	8.0*	56.7	1.2	2,474
After eating (%)	0.0	0.0	2.4	1.5*	1.1	0.6	4,414
if respondent female (%)	0.0	0.0	1.9	1.1	0.8	0.5	2,495
After cleaning toilet/latrine (%)	79.1	-2.2	74.7	-5.5	77.1	-3.6	4,394
if respondent female (%)	79.2	-4.2	75.3	-3.2	77.5	-3.6	2,483
After defecation/cleaning someone else (%)	27.2	-1.2	30.8	3.4	28.9	0.9	4,350
if respondent female (%)	26.5	-4.0	32.7	4.4	29.2	-0.2	2,455
When taking care of a sick person (%)	18.7	-1.7	17.8	0.9	18.3	-0.4	4,346
if respondent female (%)	17.6	-5.1	18.9	3.4	18.2	-1.2	2,452
Always/all the time (%)	0.0	0.0	1.3	1.0*	0.6	0.4*	4,414
if respondent female (%)	0.0	0.0	1.3	1.0	0.6	0.4	2,495

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations.
Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Household Data, Baseline.

In Table 23, we present the average statistics on self-reported hand-washing behavior of mothers (hand washing in general, not specific with soap) in our study states. We see that self-reported hand-washing is extremely high for the critical time 'before eating': 93% of all respondent mothers in both states. The percentages drop for self-reported hand-washing at other critical times: While still more than 70% of respondents in both states report to wash their hands after cleaning the toilet, only 30% report to clean their hands after going to the toilet/for OD (or cleaning someone else, i.e. children or elders). Slightly more than half of respondents report to wash their hands before eating and a bit less than 20% report to wash their hands when taking care of a sick person. It is worth noting that over-reporting is extremely common in self-reported hand-washing behavior, implying that these percentages have to be interpreted with caution. Particularly the extremely high reported percentage of handwashing after going to the toilet might reflect knowledge rather than actual behaviour. However, it is worth noting that we asked mothers a question on what they think can be done to

prevent household members from getting diarrhoe (results not shown) and handwashing was not mentioned particularly frequently: The most commonly mentioned hanwashing was before eating (mentioned by 18% of the mothers), followed by handwashing after defecating (17%).

Importantly, for looking at impacts of the intervention on handwashing behavior, such over-reporting becomes less of a problem as long as we expect the over-reporting to be unaffected by the intervention. In that case (i.e. if treatment and control households over- or under-report to the same extent), this is differenced out in the analysis and one is left with the difference which is triggered by the intervention under consideration. It is then important though that the indicators are balanced between the evaluation groups, which we find to be the case. Some slight imbalances are suggested, but these are only significant at the 10% significance level.

We also asked the mother of small children (under the age of 6 years) how they deal with and dispose of their children's faeces.

Table 24: What did the youngest child (under 6) wear yesterday?

	Enugu		**Ekiti**		**All**		
	C	**C-T**	**C**	**C-T**	**C**	**C-T**	**N**
Non-disposable napkin (%)	29.9	0.1	33.2	2.7	31.2	1.1	1,299
Piece of cloth (%)	31.5	-5.1	40.0	1.2	34.8	-2.8	1,292
Disposable nappy (pampers) (%)	19.4	8.8***	23.0	-7.5*	20.8	1.4	1,291
Nothing, without pants (%)	12.9	-1.6	17.7	3.7	14.7	0.5	1,284
Nothing, with pants (%)	50.8	-0.6	46.9	5.5	49.3	2.3	1,286
Other (%)	12.7	-27.2	7.2	2.2	10.5	-14.0	1,230

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations.
Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Household Data, Baseline.

Table 24 reports what these young children were wearing the day before the interview. Half of the children in Enugu and 47% of children in Ekiti wore nothing that could classify as some form of diaper but only pants. Most common in both states is to use a piece of cloth wrapped around the child's bottom (32% in Enugu and 40% in Ekiti), followed by non-disposable napkins 30% Enugu, 33% Ekiti) and disposable nappies (19% Enugu, 23% Ekiti). A non-negligible percentage of children simply wears nothing, no nappy, no pants (13% in Enugu, 18% Ekiti). We observe slight differences in the percentage of children wearing disposable nappies, a difference that disappears when considering the whole sample. All other variables are balanced

Table 25 shows how households report to dispose of the cloth/diaper used and the predominant mean in both states is washing it with soap or detergent (71% of households in Enugu report this and 68% in Ekiti). Washing them with water only is also relatively common with 9% of households in Enugu and 13% of households in Ekiti doing so.

Table 25: What do you use to wash a dirty cloth?

	Enugu		**Ekiti**		**All**		
	C	**C-T**	**C**	**C-T**	**C**	**C-T**	**N**
With water only (%)	8.9	2.5	13.2	-1.7	10.6	0.4	1,311
With boiling water only (%)	4.3	0.0	2.8	2.1*	3.7	1.0	1,311
By using water and soap/detergent (%)	71.0	-8.4**	68.0	2.9	69.8	-3.2	1,311
By using boiling water and soap/detergent (%)	3.8	1.4	0.0	-1.0*	2.3	0.5	1,311
By using bleaching powder (%)	0.5	0.2	0.0	-0.3	0.3	0.0	1,311
Doesn't use non-disposables (%)	9.9	4.6	14.4	-2.2	11.7	1.3	1,311
Other (%)	1.5	-0.3	1.6	0.2	1.6	-0.1	1,311

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations.
Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Household Data, Baseline.

In terms of disposal of the faeces, we find that it is most common in these two states to throw them away in the field (42% in Enugu and 46% in Ekiti). These numbers are reported in Table 26. For households that have a latrine, it is also common to throw the faeces into the latrine (21% of households in Enugu report to do so and 26% households in Ekiti). More common in Enugu is to throw them into the compound or yard/garden, reported by 27% of households in Enugu and only half of that in Ekiti, probably driven by the fact that Enugu is more rural. A disposal mean that is more commonly reported in Ekiti is to throw the faeces away along with other rubbish from the house (13% in Ekiti and only 4% in Enugu). None of these variables differs statistically significantly between treatment and control groups.

Table 26: The last time you disposed of the faeces, how did you do it?

	Enugu		Ekiti		All		
	C	**C-T**	**C**	**C-T**	**C**	**C-T**	**N**
I threw it in the toilet/latrine pit (%)	21.2	3.9	25.7	-5.2	22.9	0.0	1,167
I threw it in our yard/garden (%)	27.1	0.8	12.6	4.5	21.7	2.8	1,167
I buried it in our yard/garden (%)	1.4	-1.1	0.0	-0.8	0.9	-1.0	1,167
I threw it away in the field (%)	42.1	-1.5	46.3	2.0	43.7	-0.2	1,167
I dug a hole and buried it in the field (%)	1.4	-0.0	0.0	-1.2	0.9	-0.5	1,167
I threw it with the rest of the rubbish (%)	4.2	-3.1	13.1	0.9	7.6	-1.8	1,167
I gave it to the animals (%)	0.3	0.3	0.5	0.1	0.4	0.2	1,167
I put it into drain or ditch (%)	0.6	0.3	0.0	-0.4	0.4	0.0	1,167
Other (%)	1.7	0.6	1.9	0.2	1.8	0.4	1,167

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations.
Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Household Data, Baseline.

2.3.9 Households - Health

The household questionnaires also captured a couple indicators that provide a snapshot on the health status of the study households. We refrained from collecting extensive measures of health as the primary foscus of the study is uptake and health impacts are expected to - if at all - occur rather over a longer time period than covered in this study. Furthermore, recent evidence from studies looking at interventions to eliminate open defecation presented in Gertler et al (2015)[23] conclude that modest reductions in OD that leave villages with a substantial share of households practicing OD are expected to have modest impact on health, since negative externalities prevail. OD needs to be reduced below a small threshold to be able generate meaningful improvements in health, such as child height.

Table 27 gives the averages per household for those indicators that we nevertheless collected. We start by noting the percentage of households that have a pregnant women amongst their household members, which is 3% and 1% in Enugu and Ekiti respectively. 7% of households in Enugu have at least one household member with a chronic disease and 6% with a household member that has a physical disability. These percentages are significantly lower in Ekiti with 2% of households having at least one of their

[23] http://www.nber.org/papers/w20997.pdf, last accessed 23 May 2015.

household members with a chronic disease and also 2% with a physical disability. Mental disabilities are reported in 1% of all study households.

Table 27: HH health characteristics - disabilities and hospitalisation

	Enugu		**Ekiti**		**All**		
	C	**C-T**	**C**	**C-T**	**C**	**C-T**	**N**
At least 1 member pregnant (%)	2.6	-0.3	1.3	-0.8	2.0	-0.5	4,490
At least 1 member w/chronic disease (%)	6.9	-0.9	1.8	0.2	4.6	-0.2	4,490
At least 1 member w/physical disability (%)	6.2	-0.3	2.3	-0.7	4.4	-0.3	4,490
At least 1 member w/mental disability (%)	1.1	-1.7***	0.7	0.1	0.9	-0.8**	4,490
Hospitalized for at least a night (past year) (%)	13.9	-1.0	4.6	0.0	9.6	-0.2	4,453
due to digestive problems (%)	22.2	6.7	11.1	-20.3**	19.8	0.7	432

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations.
Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Household Data, Baseline.

We further ask households whether any of their household members was hospitalised for at least one night in the last year. In Enugu, 14% of households experiences at least one such incidence and in 22% of the cases someone was hospitalised, this was due to digestive problems (including diarrhoea). In Ekiti, the percentage is much lower. We find that in this state, 5% of households had a household member hospitalsed in the last year for at least one day, 11% of these hospitalisations being due to digestive problems. Generally speaking, these variables are broadly balanced. We see a significant imbalance in the frequency of hospitalisations due to digestive problems in Ekiti, but we note that the sample is significantly reduced, which can drive such imbalances.

As with hospitalisations and disabilities, we also observe that visits to/from health care providers (doctors, nurses, healer, etc.) are much more frequent for households in Enugu than in Ekiti. This is shown in Table 28. In Enugu, 35% of households had at least one visit to/from such a provider in the last month. Five percent of these visits were due to diarrhoea. In Ekiti, these percentages are 11 and two percent respectively. The last two variables provide information on the number of visits in the last month, which was almost two for adults in Enugu, and slightly over two in Ekiti. For children the number was less than one in both states. All of this information is balanced between treatment and control in both states separately as well as combined.

In addition to information on all household member, we ask a set of questions for children under the age of 6 years in the household (if there is more than one child of this age bracket in the household then the question is asked about the youngest of these).

The questions asked about this child are asked to the mother or main caregiver and

Table 28: HH health characteristics - visits to health providers (in last month)

	Enugu		Ekiti		All		
	C	**C-T**	**C**	**C-T**	**C**	**C-T**	**N**
At least 1 visit to/by doctor/nurse/healer (%)	35.1	-3.6	11.0	-0.2	24.1	-1.1	4,490
due to diarrhoea (%)	4.9	0.1	1.9	-2.4	4.3	-0.4	1,078
Number of visits by/to children under 6	0.4	-0.1	0.2	-0.1	0.4	-0.1	1,042
Number of visits by/to adults	1.7	-0.3	2.2	0.3	1.8	-0.2	1,100

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations.
Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Household Data, Baseline.

findings are presented in Table 29. Early on, the main caregiver is asked to give a subjective rating of the child's health by judging whether he/she is more or less healthy than children of the same age and socioeconomic background in the community. We find that hardly any respondents - in Enugu or Ekiti alike - believe that their child is less healthy than its peers.

Table 29: Health characteristics of youngest child in the household

	Enugu		Ekiti		All		
	C	**C-T**	**C**	**C-T**	**C**	**C-T**	**N**
Female child (%)	51.4	1.4	46.2	-0.6	49.4	0.8	1,311
Less healthy than his/her peers (%)	3.8	2.2*	0.8	0.5	2.6	1.6*	1,311
Took deworming drugs in the last 6 months (%)	34.1	1.3	52.6	-6.4	41.3	-3.1	1,311
Vaccinated against BCG (%)	92.5	-2.8	92.7	0.5	92.6	-1.4	1,161
Vaccinated against polio (%)	89.3	-3.9*	88.3	-2.3	88.9	-3.2	1,159
Vaccinated against DPT (%)	85.7	-1.0	78.9	-7.3	83.2	-3.4	1,129
Vaccinated against measles (%)	79.0	-2.8	74.4	-8.3*	77.3	-4.9	1,131
Vaccinated against hepatitis (%)	74.8	1.1	69.4	-11.6**	72.7	-4.1	1,099
Vaccinated against yellow fever (%)	74.9	0.4	70.4	-8.5	73.3	-3.2	1,106
Ever seeked diarrhoea treatment (%)	44.2	-1.0	33.3	-4.6	40.0	-2.0	1,300

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations.
Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Household Data, Baseline.

In terms of more objective health indicators, the respondents were asked about the vaccination status and deworming drugs the child received. 34% of kids in Enugu and 52% of kids in Ekiti are reported to have taken deworming drugs in the last six months. As for vaccinations, the majority of children in both states (93%) is said to have been vaccinated against tuberculosis (BCG). Proportions of vaccinated children for other

illnesses decease slightly and are always about 1-6 percentage points higher in Enugu than in Ekiti. The averages across states are as follows: 89% of children are reported to be vaccinated against polio, 83% against DPT, 77% against measles, 73% against hepatitis, and 73% against yellow fever.

Finally, the table reports that in Enugu for 44% of these children diarrhea treatment was sought and for 33% of the children in Ekiti.

These percentages are well balanced in both states. Only Ekiti shows a slight imbalance in percentage of children vaccinated against hepatitis.

Caregivers are further asked about any symptoms these children age 0-5 years experienced in the last 7 days. Averages are reported in Table 30. Very few children in Ekiti (never more than two percent) experienced any of the symptoms we asked about. Percentages are higher in Enugu, in line with other health outcomes reported: The most commonly reported symptoms are fever (with headache: 19%, with shivers: 17%, other: 17%) and abdominal pain (16%), all symptoms of diseases such as yellow fever, but also malaria, dengue, influenza, dengue etc. 14% of children experienced diarrhea, 12% cough with short breath and 10% other respiratory problems. About 7% experienced skin and sight problems and acute pain.

Table 30: Symptoms experienced during the past 7 days

	Enugu		**Ekiti**		**All**		
	C	**C-T**	**C**	**C-T**	**C**	**C-T**	**N**
Stomach/abdominal pain, vomiting (%)	16.3	2.3	2.0	0.7	10.8	2.3	1,306
Diarrhoea (%)	14.0	1.1	1.6	-0.8	9.2	1.0	1,306
Fever with headache (%)	18.9	1.9	1.2	-0.5	12.1	1.8	1,303
Fever with shivers (%)	16.8	-0.7	0.4	-1.0	10.5	0.1	1,304
Fever, other (%)	16.5	1.4	2.4	0.4	11.1	1.8	1,304
Cough with short breath (%)	12.0	-2.6	2.0	-0.7	8.1	-1.2	1,304
Other, respiratory (%)	10.4	-2.5	0.4	-1.6	6.6	-1.5	1,304
Skin problem (%)	7.4	-1.0	1.2	1.2*	5.0	0.3	1,304
Sight problem (%)	7.1	-1.2	0.0	-0.3	4.4	-0.4	1,303
Other acute pain (%)	7.1	-0.7	0.4	0.4	4.5	0.2	1,303

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations.
Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Household Data, Baseline.

No imbalances are observed at the 5% level (and only one at the 10% level in Ekiti) and we conclude again that the randomisation appears successful in ensuring similar treatment and control groups at baseline.

We finally consider the most objective measure of health, namely anthopometric

measures. We collected height and weight of children under the ageof 6 years using Seca scales and following WHO recommendations. The measured children are on average 2.5 years old (Table 31), weighing 12kilos and being 84 centimeters in height. Children living in control communities in Ekiti are significantly shorter than those in treatment (on average 2.4cm), which we will see drives further significance imbalances in measures calculated using height, weight and age, particularly height for age an indicator used to measure stunting in children. We also see a slight imbalance in weight, which is only significant at the 10% level, but translates into more significant imbalances of severe underweight as we will show in the next. This data allows us to calculate the three most common measures to asses the nutritional and health level of children:

- **Weight for age** (Underweight). This is probably the most common assessment of child nutrition status. It represents a suitable combination of both linear growth and body proportion and thus can be used for the diagnosis of underweight children.
- **Weight for height** (Wasting). This is a measure of current body mass. It is generally seen as a measure of acute or short-term inadequate nutrition and/or poor health status. It is the best index to use to reflect wasting malnutrition, when it is difficult to determine the exact ages of the children being measured.
- **Height for age** (Stunting). This is a measure of linear growth. Stunting refers to shortness. A deficit in height for age is generally assumed to indicate exposure to an unhealthy environment, such as poor nutrition, unhygienic environment or disease in the past and hence captures long-term, cumulative effects.

We calculate and present z-scores of these measures. A z-score describes a point (for example the height-for-age of a child) in relation to the distribution of that measure in some reference population. In this case the reference population is a population of infants that the WHO deemed to be healthy and raised in environments that do not constrain growth, as documented in the WHO Child Growth Standards.[24] More specifically a z-score tells us how many standard deviations (measured in standard deviations of the reference population) the point is away from the mean of the reference

[24]Details on these standards and how they were constructed can be found in publications by the WHO Multicentre Growth Reference Study Group (2006). The WHO macro and global reference datasets are available at: http://www.who.int/childgrowth/software/en/

population. Therefore, a z-score of -1 on height for age would tell us that that child is one standard deviation smaller than the mean child in the reference population of healthy children.

We can see at the end of Table 31 that, on average, the children in our study population are a bit more than one standard deviation (of the reference population) shorter (1.2 in Enugu and 1.6 in Ekiti) and a bit less than one standard deviation lighter (0.4 in Enugu and 0.8 in Ekiti) than children of their age from the WHO reference population.

Table 31: Anthropometric indicators for children under the age of 6

	Enugu		**Ekiti**		**All**		
	C	**C-T**	**C**	**C-T**	**C**	**C-T**	**N**
Age (years)	2.6	-0.0	2.4	-0.1	2.5	-0.0	1,167
Weight (kg)	12.4	-0.4	11.3	-0.6*	12.0	-0.4*	1,167
Height (in cm)	85.4	-1.9	82.3	-2.7**	84.1	-2.1**	1,167
Body Mass Index (BMI)	16.7	0.0	16.5	0.2	16.6	0.1	1,167
Weight-for-height z-score	0.4	-0.0	0.2	0.1	0.3	0.0	1,167
BMI for age z-score	0.5	0.0	0.3	0.1	0.4	0.1	1,167
Height-for-age z-score	-1.2	-0.2	-1.6	-0.5***	-1.4	-0.3***	1,167
Weight-for-age z-score	-0.4	-0.1	-0.8	-0.2*	-0.6	-0.2*	1,167

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations.
Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Household Data, Baseline.

Table 32: Prevalence Analysis (excluding biologically unfeasable values)

	Enugu		**Ekiti**		**All**		
	C	**C-T**	**C**	**C-T**	**C**	**C-T**	**N**
Underweight (-3 SD <weight-for-age <-2 SD) (%)	7.2	0.0	7.7	0.3	7.4	0.1	1,167
Severely underweight (weight-for-age <-3 SD) (%)	2.9	1.3	8.6	6.3***	5.2	3.3**	1,167
Stunted (-3 SD <length-for-age <-2 SD) (%)	16.8	0.8	15.5	-2.5	16.2	-0.6	1,167
Severely stunted (length-for-age <-3 SD) (%)	17.9	5.1*	24.0	10.2***	20.4	7.1***	1,167
Wasted (-3 SD <weight-for-height <-2 SD) (%)	3.5	-0.6	6.9	3.5*	4.8	1.1	1,167
Severely wasted (weight-for-height <-3 SD) (%)	3.8	1.9	5.2	1.8	4.3	1.8	1,167

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations.
Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Household Data, Baseline.

We can use these indicators to calculate the percentage of children that would be classified as underweight, stunted and wasted in our sample. Table 32 includes the

results of the anthropometric measurements of the whole sample of children, excluding only those which are considered to be "biologically unfeasable", and compares it with the WHO global database average values (see fn. 24). We can see that about 7% of children are underweight, 16% stunted and 5% wasted. These percentages are roughly similar across both states. In Ekiti, however, we find larger percentages of children severely underweight, stunted and wasted. We note that in Ekiti, more children in control communities are severely underweight and stunted, which we anticipated due to some imbalances in height and weight reported above. It will hence be important to account for baseline values when using these variables in the endline analysis. Further, the robustness analysis excluding our 'trouble-LGA' Ekiti South West will be important given that the observed imbalanced become insignificant almost entirely when excluding this state from the analysis of anthropometric measures.

2.3.10 Households - Knowledge

The last set of data collected during the household baseline survey we will discuss in this report is a set of knowledge questions asked to the caregiver of the youngest child in the household.

The first set of questions relate to knowledge about what to do when the child has diarrhea.

We can see in Table 33 that the majority of caregivers in both states gives their child less to drink when he/she has diarrhea. 25% in Enugu and 35% in Ekiti even report to give much less to drink.

Table 33: How much liquid do you give children when they suffer from diarrhea?

	Enugu		**Ekiti**		**All**		
	C	**C-T**	**C**	**C-T**	**C**	**C-T**	**N**
Nothing to drink (%)	0.7	0.1	1.5	-2.0**	1.0	-1.0*	4,413
Much less to drink (%)	24.5	0.7	34.9	-0.8	29.2	-0.4	4,413
Somewhat less to drink (%)	23.9	3.0	22.5	5.4*	23.3	4.2*	4,413
About the same to drink (%)	18.1	0.1	13.1	-0.7	15.8	-0.1	4,413
More to drink (%)	25.8	-2.8	15.5	0.5	21.1	-0.8	4,413
Don't know (%)	7.0	-1.1	12.7	-2.4	9.6	-1.9	4,413

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations. Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Household Data, Baseline.

The second set of questions relate to the causes of diarrhea. The respondent is asked "It happens that children sometimes have diarrhea. According to you, what are the causes of diarrhea?". Eighteen different options are then read out and the respondent is asked to mention the three most common ones. The reported reasons are shown in Table 34. The most common ones cited correspond to the same ones in both states. They are: dirty water, teething/new teeth arriving and eating food touched by flies.

Overall, we observe again balancedness across study groups.

Table 34: What are the main causes of diarrhea

	Enugu		Ekiti		All		
	C	C-T	C	C-T	C	C-T	N
Dirty water (%)	56.0	-0.4	61.0	-1.2	58.3	-0.9	4,431
Eating spoiled/rotten food (%)	40.8	-0.5	32.0	-1.5	36.8	-0.7	4,431
Eating food touched by flies (%)	35.2	1.1	34.4	-2.2	34.9	-0.5	4,431
An unbalanced diet (%)	8.9	1.2	10.4	3.4*	9.6	2.3	4,431
Not washing one's teeth (%)	17.0	0.7	10.4	-1.0	14.0	0.1	4,431
Teething/New teeth arriving (%)	45.7	5.3	39.4	-7.4**	42.8	-0.7	4,431
Exposure to the sun (%)	0.8	0.3	1.3	0.9*	1.0	0.5*	4,431
Certain types of vaccinations (%)	0.9	0.3	0.1	-0.4*	0.5	-0.1	4,431
Unwashed food (%)	6.1	0.7	5.5	1.0	5.8	0.9	4,431
Changing weather (%)	2.4	0.3	4.5	1.5	3.4	0.9	4,431
Mother's milk (%)	1.4	0.3	4.5	1.8	2.8	1.0	4,431
Bottle feeding (%)	0.3	-0.2	1.3	0.1	0.7	-0.1	4,431
Eating raw food (%)	3.5	0.3	2.3	-0.9	3.0	-0.3	4,431
Using dirty latrines (%)	3.0	-0.8	2.2	0.5	2.7	-0.1	4,431
Open defecation (%)	2.2	0.3	2.5	-0.5	2.4	-0.1	4,431
Dirtiness of house (%)	8.0	-1.4	12.0	2.6	9.8	0.4	4,431
Dirtiness of neighbours/area (%)	0.9	-1.5**	6.4	2.4**	3.4	0.2	4,431
Witchcraft (%)	0.2	-0.2	0.2	-0.2	0.2	-0.2	4,431
Don't know (%)	3.1	-0.4	3.5	0.4	3.3	0.0	4,431

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations.
Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Household Data, Baseline.

2.4 Using baseline data to update the power analysis of the CLTS research component

We conducted a power analysis to determine the minimum detectable effects we could achieve given reachable sample sizes (based on implementation and resource constraints). For this power analysis, which was done at the time of writing the proposal, we had to make a number of assumptions, some of which we are now able to refine and update with baseline data on our study population at hand. The key outcomes discussed in the power analysis in the submitted proposal was uptake of (improved) latrine ownership, and that all members of a household use a latrine, so that communities become ODF and we also presented minimum detectable effects for handwashing behaviour.

We will use the same approach as followed for and presented in the proposal, computing minimum detectable effects (MDEs) for a power of 0.8 and 0.9, and a significance level of 0.05, assuming two-sided t-tests.

The information we update is:

1. Our sample size assumptions, i.e. exact numbers for triggerable-units and respondents.

2. Baseline means of outcomes (for the control group, which, given balancedness of the sample is representative for the whole sample);

3. Intra-cluster correlation for outcomes.

Table 35: Updated power analysis

	(1)	(2)	(3)	(4)	(5)	(6)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	PROPOSAL							UPDATED					
Outcome	Mean/sd/ICC			MDE (in ppt) for power of				Mean/sd/ICC				MDE (in ppt) for power of	
	mean	sd	ICC	0.8	0.9	0.8	0.9	mean	sd	ICC-raw	ICC-resid	0.8	0.9
EKITI													
				120 clusters (20 HH per cluster) Sample: 2,400		80 clusters (30 HH per cluster) Sample: 2,400						113 clusters (20 HH per cluster) Sample: 2,600	
Household owns any type of latrine [Yes=1]	0.28	0.45	0.167	0.113	0.13	0.133	0.154	0.390	0.488	0.255		0.143	0.165
Household owns an improved latrine [Yes=1]	0.255	0.436	0.153	0.107	0.124	0.127	0.146	0.378	0.485	0.248		0.141	0.165
All HH members use a latrine [Yes=1]	0.233	0.423	0.152	0.106	0.122	0.125	0.144	0.951	0.215	0.133	0.044	0.031	0.028
Respondent washes with water and soap [Yes=1]	0.575	0.495	0.00	0.058	0.067	0.058	0.067						
HH head washes hands w water and soap [Yes=1]								0.374	0.382	0.167		0.120	0.139
ENUGU													
				120 clusters (20 HH per cluster) Sample: 2,400		100 clusters (30 HH per cluster) Sample: 2,400						118 clusters (20 HH per cluster) Sample: 2,360	
Household owns any type of latrine [Yes=1]	0.459	0.499	0.163	0.117	0.135	0.124	0.143	0.321	0.467	0.155	0.147	0.115	0.133
Household owns an improved latrine [Yes=1]	0.374	0.484	0.248	0.136	0.157	0.146	0.169	0.275	0.447	0.143		0.114	0.131
All HH members use a latrine [Yes=1]	0.409	0.492	0.049	0.08	0.092	0.08	0.093	0.915	0.279	0.024		0.028	0.032
Respondent washes with water and soap [Yes=1]	0.453	0.498	0.14	0.111	0.128	0.116	0.134						
HH head washes hands w water and soap [Yes=1]								0.242	0.341	0.176	0.050	0.082	0.095
BOTH STATES COMBINED													
				240 clusters (20 HH per cluster) Sample: 4,800		180 clusters (30 HH per cluster) Sample: 4,800						240 clusters (20 HH per cluster)	
Household owns any type of latrine [Yes=1]	0.389	0.488	0.151	0.08	0.092	0.088	0.102	0.355	0.479	0.207		0.131	0.151
Household owns an improved latrine [Yes=1]	0.327	0.469	0.203	0.088	0.101	0.098	0.113	0.326	0.469	0.204		0.130	0.150
All HH members use a latrine [Yes=1]	0.34	0.474	0.086	0.065	0.075	0.07	0.081	0.935	0.247	0.076		0.036	0.042
Respondent washes with water and soap [Yes=1]	0.501	0.5	0.068	0.062	0.072	0.067	0.077						
HH head washes hands w water and soap [Yes=1]								0.307	0.368	0.193		0.127	0.147

We present in Table 35 a summary of assumptions made and MDEs calculated in the proposal (columns (1) to (8)) and updated information (columns (9) to (14)).

We start by discussing updated of points 1.-3. above:

1. In the proposal, we presented two scenarios, one based on the assumption that we would be able to get to a sample of 120 clusters (triggerable units), interviewing 20 respondents in each cluster; and a second, more conservative assumption of 80 clusters and 30 respondents in each cluster. This was done due to uncertainty around the number of triggerable units at the time. We managed to get close to the first scenario, the one which gives us greater power, having in the end 113 clusters and almost 20 households per TU in Ekiti and TUs, with the same number of respondents in Enugu.

2. Our baseline data has information which allows us to construct the first three outcomes in line with the definition presented in the proposal (household owns

any type of latrine, household owns an improved latrine, all household members use the latrine). The fourth outcome, which measures hand-washing is slightly different.[25] In the proposal, we use a variable measuring whether the respondent uses water and soap for handwashing after defecation. From the baseline data, we can be a bit more precise and calculate whether the household head washes hands with water and soap after defecation (we also calculate the percentage of household members washing hands with water and soap after defecation but do not present the findings given similar results). Overall, the means from the data used in the proposal and the baseline data are quite different. For example, toilet ownership was estimated to be 28% in Enugu and 34% in Ekiti, whereas our study communities have a baseline sanitation coverage of 39% and 32% for the two states respectively. A much more striking difference is found for usage: The data collected during the WANG baseline survey suggested usage rates of 23% in Ekiti and 41% in Enugu. Our baseline data suggest that this percentage is much higher with 95% and 92% respectively. Handwashing is on the other hand lower in our baseline survey than statistics presented in the proposal (37% versus 58% in Ekiti and 24% versus 45% in Enugu), which could to an extent be driven by the variable definition, but also by the fact that previously triggered communities are simply different.

3. In line with differing means (and standard deviations, which are presented in columns (2) and (10)), ICC also differ. We present in the table two baseline ICCs: The first one (column (11)) is the ICC estimated on the raw outcome variables as they were measure in the survey. The second one (12) is estimates on the residual of a regression of the outcome on a number of household and household head characteristic. Doing so can sometimes improve the precision and hence improve power. We note that we are not always able to reduce the ICC through this process, particularly when pooling the two states together. In Ekiti, we find that ICCs in the proposal were much lower than what we find in our study communities for both toilet ownership and hand-washing behaviour. For usage it is on the other hand considerable lower in our sample. In Enugu, the ICCs for outcomes in our study communities are throughout lower than estimated in the proposal, implying a gain in power from this perspective in Enugu.

With updated information we set out to calculate the minimum detectable effects (MDE), which are presented in column (13) for a power of 0.8 and in column (14)

[25] We note that at this stage, WaterAid is unsure about possible impacts on hand-washing behaviour given limited focus on this during triggering and follow-up activities. We keep this variable for consistency with the baseline report and given that activities do not ignore hand-washing completely.

for a power of 0.9 (corresponding proposal estimates are presented in columns (4) and (5) for the sample size of 120 TUs per state and in columns (6) and (7) for the smaller number of TUs).

In Ekiti, given the higher sanitation coverage and ICC, we have lower power to detect impacts than anticipated. Our data and calculations suggest that we will be able to detect changes in uptake of (improved) sanitation of 14.3-16.5 percentage points (ppts) or more (compared to 11.3-13ppts expected under the scenario of more TUs, which is the reference set of MDEs we will refer to from now on). In terms of usage, we on the other hand gained in power, being now able to suggest changes of around 3 percentage points - compared to around 10ppts previously. We note though that while this is a much smaller impact we can detect, the percentage change that needs to be achieved is at the same time considerably higher, given that the starting point is now is already very high usage rates (of 95%). For hand-washing behaviour, our data suggests that we can detect minimum changes of about 12-13.9 ppts.

In Enugu, detectable MDEs for (improved) sanitation uptake are almost identical with those expected at the time of writing the proposal, hovering around 11.4-13.3 percentage points. For usage the situation is comparable to Ekiti, where we can detect smaller impacts, expect though that it will be at the same time more difficult to achieve these impacts given high baseline values in usage rates. For hand-washing, we will be able to detect an increase of about 8-9 percentage points from a baseline value of 24% of household heads washing their hands with water and soap after defecating.

The lower panel of Table 35 presents numbers for both states together. Pooling the two states increases the sample size and and thereby increasing our sample size (and hence power). Under this scenario we have 80 treatment communities and 40 control. With this increased sample size, the MDEs we are able to detect decrease by roughly 1-2 percentage points. However, we note an important caveat: The two treatments are likely to have differential impacts, which would imply different variances in our two treatment samples, which would change the exact MDE we are able to detect.

2.5 New challenges for the CLTS impact evaluation study

There are two new challenges that became clearer due to analysing the baseline data and as CLTS triggering started to take place in Ekiti.

- Eligible triggerable units for the CLTS study report to have received CLTS treatment before baseline was collected. Conversations with WANG indicate that we can assume that this is a reporting issue and in any case we can account for this in our endline analysis.

- Some of the triggerable units thought to be eligible for CLTS in Ekiti resulted to be too urbanised and populated, affecting the possibility of organising triggering activities in these villages. There are specific observable characteristics that WANG has identified among the TUs assigned to treatment that can predict whether these TUs are actually triggerable or not. We will try to accommodate for this in the analysis, but at a first stage, we will conduct an intention-to-treat (ITT) analysis, keeping these TUs in the sample. This is due to the fact that we cannot with certainty identify which communities in the control group fall within this "un-triggerable" category. In addition to the ITT analysis, we can look at heterogeneous impact by rural and urban status (the exact proxy for this will need to be determined). To increase our power for the analysis, we will aim to include back-up TUs at follow-up that WANG will now treat/trigger. We still need to determine whether budget can be used to collect baseline information (and if so how much) on these TUs and households within the TUs.

3 Communities previously triggered with CLTS

The triggering conducted in villages selected for this study are not the first activities WANG is implementing in the study states. Some communities were previously triggered. We collected data on such communities as part of this study for two main reasons:

1. For one, we would like to learn whether villages chosen for triggering activities at initial stages differ from those that form part of the study. This is important with the view of generalizing our findings for the study states as a whole. It is also interesting when learning about how interventions are rolled out in this context.

2. Second, we are interested to learn in this research - to the extent possible - whether supply side interventions are more fruitful when implemented at a similar time than activities focusing on demand creation, or whether it is useful to create the demand already early on.

In this section, we conduct a first analysis as to whether households and villages triggered initially (Tr in the tables of this section) are different along observable characteristics to villages that are triggered only now under this project (NTr in the tables). The Tables we present are structured as previous ones except that we are not comparing communities allocated to treatment with those allocated to control, but communities previously triggered with those not yet triggered. The information we present is a sub-set of that discussed above.

At a first instance, we are of course interested to see whether more sanitation related activities took place in the previously triggered villages and then, whether we see differences in the sanitation situation.

Table 36 shows information on whether sanitation-related activities were carried out in the villages within the last year (as reported by the village head), whether the village had ever any CLTS conducted and whether the village achieved ODF status. As one would expect - there are significant differences in reported sanitation related activities, including CLTS activities, across NTr and Tr, with villages previously triggered being more likely to have been exposed to these activities (indicated by a negative value for the difference "NT-Tr"). This is however only the case in Enugu and not in Ekiti. However, there is no difference in whether villages achieved ODF status between NTr and Tr villages. The fact that not all villages classified as 'previously triggered' report to have had sanitation actitities and/or CLTS can be due to a number of reasons, including that these activities might have been too long ago, that the respondent to the survey (typically the village head) was not aware or not in the village at the time, or of course also that the initial classification was not perfectly accurate.

Table 36: Previously triggered: Sanitation activities

	Enugu		Ekiti		All		
	NTr	**NT-Tr**	**NTr**	**NT-Tr**	**NTr**	**NT-Tr**	**N**
Monthly political/social meetings held (%)	78.5	-6.0	74.0	-3.6	76.4	-5.6	523
Sanitation activities carried out (last year) (%)	80.6	-12.2**	46.3	-3.7	64.1	-12.6**	523
Village had CLTS activities (%)	20.5	-22.6**	16.0	-4.7	18.4	-16.3**	518
Village achieved ODF status (%)	2.5	2.5	3.6	-21.4	2.9	-2.7	121

NTr: averages of communities not previously triggered. NTr-Tr: avg difference between those not previously triggered and those previously triggered. Stars indicate statistically significant differences. *p <0.10, ** p <0.05, *** p <0.01.

N: total number of observations. Standard errors clustered at the TU level.

Source: Village Questionnaire, Baseline.

The next Tables we show look at whether the (water and) sanitation situation differs between these two types of villages. We look in Table 37 and village level information (particularly institutional latrines) and in Table 38 at household level sanitation ownership.

Table 37: Previously triggered: Village level Water and Sanitation facilities

	Enugu		Ekiti		All		
	NTr	**NT-Tr**	**NTr**	**NT-Tr**	**NTr**	**NT-Tr**	**N**
At least half the village with pipe-borne water (%)	6.3	4.2	15.4	6.8	10.7	6.1**	518
At least half the village with sewage system (%)	0.0	-3.1	6.3	3.2	3.6	0.6	202
Improved drinking water available (%)	99.5	1.5	98.9	-1.1	99.2	0.5	523
At least 1 primary school (pub/priv) (%)	49.5	-15.7**	73.7	-5.6	61.1	-9.6	515
with sanitation facilities (%)	31.2	-0.5	55.0	-5.8	45.0	0.7	328
with SF available for children (%)	25.8	0.8	41.1	-4.6	34.7	0.7	328
with improved water in SF (%)	9.7	-10.3	34.1	-0.7	23.9	-2.5	328
with SF specific for girls (%)	7.5	-7.5	31.8	-18.2**	21.6	-8.6	328
At least 1 secondary school (pub/priv) (%)	18.4	-8.8	43.4	-4.8	30.4	-4.9	515
with sanitation facilities (%)	34.3	22.3**	68.4	22.0**	57.7	27.5***	164
with SF available for children (%)	17.1	9.1	52.6	24.1**	41.4	22.6***	164
with improved water in SF (%)	5.7	1.7	43.4	14.8	31.5	14.6**	164
with SF specific for girls (%)	14.3	10.3	39.5	7.3	31.5	12.7*	164

NTr: averages of communities not previously triggered. NTr-Tr: avg difference between those not previously triggered and those previously triggered. Stars indicate statistically significant differences. *p <0.10, ** p <0.05, *** p <0.01.

N: total number of observations. Standard errors clustered at the TU level.

Source: Village Questionnaire, Baseline.

Considering the village level water and sanitation facilities, Table 37 shows that in terms of access to water and sewage system, there are no differences between triggered and non-triggered villages in general, except when both states are pooled that indicates that non-triggered villages are more likely to have at least half of their population with access to pipe-borne water. Virtually all households have access to drinking water in the villages in our sample, and this is similar across states and across Tr and NTr villages.

In terms of schooling infrastructure, villages that were previously triggered in Enugu are more likely to *have* at least 1 primary school but we do not see differences in sanitation infrastructure between villages previously triggered or not. This is also applicable to Ekiti. In terms of secondary schools on the other hand we see that primary schools in villages previously triggered are *less* likely to have sanitation facilities (indicated by the positive difference "NT-Tr"). This is the case in both study states. Not only do we find this unexpected difference, but it is also ver large. In both states, primary schools in villages previously triggered are about 20% less likely to have sanitation facilities than in non-triggered communities. It is worth noting that from this information, we cannot conclude that whatever CLTS activities were conducted, were not efficient. For one, we do not have information on whether the activities did target school infrastrutcure and, importantly, we do not have baseline information on these villages. It is therefore possible that villages selected for early triggering started out at a much lower sanitation level. We cannot say anything about that with out data.

Table 38: Previously triggered: Sanitation situation of households

	Enugu		**Ekiti**		**All**		
	NTr	**NT-Tr**	**NTr**	**NT-Tr**	**NTr**	**NT-Tr**	**N**
HH has a functioning latrine (%)	34.8	2.7	37.4	-1.4	36.1	0.7	6,334
Improved sanitation (functioning) (%)	29.6	3.2	36.1	-1.6	32.9	0.8	6,334
All HH members use the latrine (%)	90.8	-1.0	95.9	-0.4	93.5	-0.8	2,298
Household performs OD (%)	64.2	-1.5	57.8	2.5	61.0	0.4	6,395
Handwashing (mothers):							
Before eating (%)	94.4	-0.8	94.5	0.4	94.4	-0.2	6,287
Before cooking/feeding (%)	53.5	-6.8	52.3	-0.5	52.9	-3.7	6,251
After eating (%)	0.0	0.0	1.8	1.3**	0.9	0.6**	6,287
After cleaning toilet/latrine (%)	80.1	7.4**	78.2	0.1	79.2	3.8*	6,266
After defecation/cleaning someone (%)	27.8	-8.3*	28.7	1.3	28.3	-3.5	6,223
When taking care of a sick person (%)	19.6	-3.7	16.4	-3.1	18.0	-3.4	6,217
Always/all the time (%)	0.0	0.0	0.8	0.0	0.4	0.0	6,287

NTr: averages of communities not previously triggered. NTr-Tr: avg difference between those not previously triggered and those previously triggered. Stars indicate statistically significant differences. **p <0.10, ** p <0.05, *** p <0.01.*

N: total number of observations. Standard errors clustered at the TU level.

Source: Household Data, Baseline.

It is however still interesting to observe that also at the household level, no differences in sanitation ownership and to an extent habits is observed for households living in villages previously triggered and in villages not triggered at the time the baseline data was collected. This can be seen in Table 38. The percentage of households owning a toilet, owning an improved toilet and performing OD is statistically speaking not different between triggered and non-triggered villages. Again, we do not know the baseline levels of these outcomes, but we can say that the activities did not seem to

have pushed villages selected for early triggering above levels observed in villages left for later triggering. Our evaluation design above is designed to answer more clearly the impact of triggering on outcomes.

Table 38 also shows information on hand-washing behaviour of caregivers of young children in the households. Here we do observe some differences between previously triggered and non-triggered villages. Interestingly though, these are not systematic. In Ekiti, mothers living in villages previously triggered are less likely to report washing their hands after cleaning the toilet, but more likely to report washing them after defecating. In Ekiti, we see some difference in reported handwashing after eating, which seems to be lower in previously triggered villages.

The following tables will provide more information on the general status and infrastructure of the villages, to see whether previously triggered villages are for example on average poorer villages or with less infrastructure etc.

The most striking differences we find are in terms of village level infrastructure and services, particularly for Ekiti. This can be seen in Table 39. We find that villages previously triggered are less likely to have a hospital, less likely to have a security post, less likely to have a bank and less likely to have a hotel.

Table 39: Previously triggered: Village level Infrastructure and Services

	Enugu		**Ekiti**		**All**		
	NTr	**NT-Tr**	**NTr**	**NT-Tr**	**NTr**	**NT-Tr**	**N**
Has a school (%)	51.6	-16.8**	83.4	-8.0	66.8	-10.3**	518
Has a hospital (%)	2.7	-2.8	21.1	12.5**	11.6	4.9	513
Has a maternity centre (%)	24.3	2.4	57.1	-4.9	40.1	2.5	513
Has administrative office (%)	37.2	4.3	9.3	-7.9	23.9	-3.0	509
Has LGA office (%)	4.8	-0.6	15.4	12.0***	9.9	5.3*	513
Has a security post (police, other) (%)	26.1	6.3	23.4	14.8***	24.8	9.4*	512
Has a bank (%)	1.6	-0.5	11.4	8.0**	6.3	3.7*	517
Has graded internal roads (%)	18.9	10.5**	64.6	12.8	40.8	16.0***	518
Has a hotel (%)	3.2	1.0	30.9	11.9*	16.4	7.8**	516

NTr: averages of communities not previously triggered. NTr-Tr: avg difference between those not previously triggered and those previously triggered. Stars indicate statistically significant differences. *p <0.10, ** p <0.05, *** p <0.01.

N: total number of observations. Standard errors clustered at the TU level.

Source: Village Questionnaire, Baseline.

All of these indicators are likely driven by the fact that villages previously triggered are on average smaller. We show this in Table 40: Villages that were *not* previously triggered in Ekiti have on average 104 households in the village (a population of 408) as compared to villages that were triggered early, which have on average 56 household (population of 237). These are considerable size differences. We do not see such differences in Enugu and, in line, we also do not see such significant differences in in-

frastructure access. The main difference we see in Enugu is that previously triggered villages are less likely to have graded internal roads.

Table 40: Previously triggered: Village population and HHs

	Enugu		Ekiti		All		
	NTr	**NT-Tr**	**NTr**	**NT-Tr**	**NTr**	**NT-Tr**	**N**
Village population	344.5	55.5	408.5	171.1**	371.6	98.5***	636
No of households per village	73.6	6.2	104.1	47.7***	86.5	22.5***	636

NTr: averages of communities not previously triggered. NTr-Tr: avg difference between those not previously triggered and those previously triggered. Stars indicate statistically significant differences. *p <0.10, ** p <0.05, *** p <0.01.
N: total number of observations. Standard errors clustered at the TU level.
Source: Listing Questionnaire.

We check for differences along a large set of other margins, in line with those presented in the previous section. We generally do not find systematic differences between villages that were selected to be triggered previously. We show a set of relevant tables in Appendix D of this report. To summarize, we look at characteristics of the household heads, their age, gender, etc and find some indication that households living in previously trigegred villages in Ekiti are more educated and more likely to be employed that household heads in not yet triggered villages (Table 57). This difference however, does not translate into higher incomes or consumption (Table 59). In Enugu, we see some differences in the religion of the household heads, but again, no differences in economic status of the households, as measured by income and consumption expenditures.

We also check whether villages that were previously triggered have potentially a larger percentage of the population with disabilities (Table 58), but do not find any evidence of this.

Overall, it hence seems that village size was the predominant criteria for selection of villages for early triggering in Ekiti, which correlates with infrastructure access. In Enugu, no clear difference could be identified in this analysis. In both states consistently do we find that there is currently no difference in the level of sanitation coverage, particularly at the household level.

4 Sanitation Marketing research component

4.1 Intervention description (SanMark)

SanMark is a relatively new market-based approach that aims to sustainably increase improved sanitation practices by addressing demand and supply. As described in Jenkins and Pedi (2013) SanMark works with the private sector and focuses on the 4Ps of the marketing mix – product, place, promotion and price – to connect people to sanitation products they want. The idea is that a supply of suitable products and services are ready and accessible before or at the time of stimulating demand through promotional activities fostered by the SanMark intervention. This allows households within each community to afford a toilet or upgrade their existing facilities, increasing the probability of communities to build improved latrines and then to use these sustainably over time. SanMark uses social and commercial marketing techniques to persuade individual households to invest in and use a latrine, by highlighting the private benefits and aspirational drivers. SanMark can be used in conjunction with CLTS, and when done so, it is believed that the supply side should be in place prior to conducting CLTS triggering in order to maximise success. However, there has been no impact evaluation about the effectiveness of SanMark and how it interacts with CLTS.

Within the context of the STS Nigeria Project (and in fact the Nigerian context), SanMark had yet to be developed and the process is currently still ongoing. However, some key stages have been completed and future activities have been identified and defined:

- SanMark sanitation products (toilet models) and service models were designed after gaining in-depth insights into the supply chain and consumer needs and preferences. Two key outcomes are that (i) six different products, constituting of a mixture of concrete and plastic solutions (the latter one however only at a later, currently undefined point) will be used for the intervention in Ekiti and Enugu, and (ii) tooling equipment has been designed and priced.

- Stakeholders to be engaged are identified and will include: concrete block producers (hereinafter referred to as CBPs or suppliers), hardware retailers (plumbing stores) and artisans:

  – CBPs (or suppliers) are expected to produce the concrete-based product and sell it to the final consumers;

  - Plumbing stores will be selling the plastic pans (at a later stage in the project);
  - Artisans (or natural leaders or other interested individuals) are envisioned to become commission/sales agents, working closely with the block business.

- CBPs (or suppliers) are encouraged to follow a one-stop-one-shop business model, where the toilet product as well as services required for the customer to construct the toilet are offered.

- Business development support will be provided to suppliers.

- A communication and consumer awareness campaign is currently being developed, which WANG will help suppliers to implement.

4.2 Research methodology and challenges faced

4.2.1 Main challenge in evaluating SanMark

A natural first intuition in deciding on the SanMark research design would be to treat individual suppliers and communities they serve as the unit of observation and hence randomise which suppliers becomes subject of the intervention. However, the methodology is flawed if suppliers interact in common local markets, serving an overlapping set of communities and are hence competitors. In such a case, comparing for example toilet sales of a supplier who received the intervention and one who did not, would potentially lead us to wrong conclusions, particularly due to general equilibrium effects: Imagine that a treated supplier and a control supplier serve the same market and, due to the SanMark intervention, the treated supplier has now a competitive edge and all customers who would have otherwise constructed toilets with materials from the control supplier, get these from the treated supplier. By naively comparing toilet sales of suppliers, we would conclude that the intervention increase toilet sales significantly. This is however only partially true: the intervention increased toilet sales but *only* for the treated suppliers. In this example, the overall number of toilets remains the same and the intervention had a negative impact on the control suppliers. Similarly, one could think of an example where the intervention has positive spillover effects on control suppliers and a naive comparison would lead us to underestimate the impact of the intervention.

Therefore, as a first step in deciding on the research methodology for SanMark, we conducted a mapping exercise. This mapping exercise was designed to (i) understand the type of markets concrete block producers (hereinafter referred to as CBPs or suppliers) operate in and, if several suppliers do work in the same local market (as one would expect), (ii) whether one could identity sufficient distinct local markets to potentially randomise local markets to receive and do not receive the SanMark intervention.

4.2.2 The mapping exercise

The mapping exercise consisted of two main survey tools a CBPs (or suppliers) survey and a community or small town survey. Suppliers were interviewed and asked about their business, the types of products they sell and - most importantly - which communities their customers live in. Suppliers were asked whether they deliver to these communities and/or whether households come to their shop. The second survey instrument was at first administered to community leaders, primarily to identify local masons or artisans, who were then questioned about where community members get their building and sanitation materials from. These two survey instruments provided us with information on the commercial links and relationships relating CBPs and local villages. We pooled and mapped this information to visualize the commercial links in both Ekiti and Enugu.

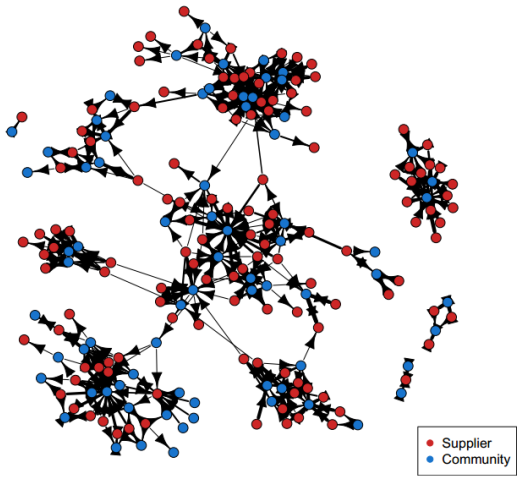
The main result of the analysis was that suppliers operate in densely interconnected, overlapping markets, with more than one of them serving the same locations, implying that suppliers are competing with each other.[26] Albeit some stark differences in terms of supplier density and turnover (both significantly higher in Ekiti than in Enugu), both states showed similar patterns in terms of the amount of links between suppliers and consumers, and on the impossibility of drawing more than a small number of separate, isolated markets. This can be seen in Figure 10, where the dense networks of suppliers and communities being served are mapped for each state.

This finding is a significant hurdle in the evaluation of SanMark's impact on sanitation practices.

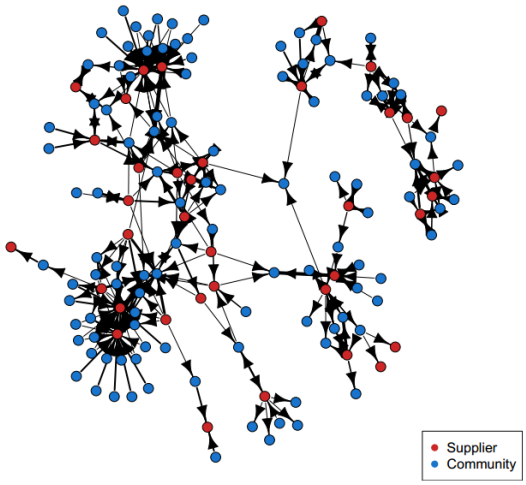
[26] A detailed analysis is provided in the Mapping Report (2014), available from the authors upon request.

Figure 10: Cement Block Transaction Networks (from Mapping Report)

(a) Ekiti



(b) Enugu



4.2.3 Current thinking

At the time of writing this baseline report, the clarity around what activities would be conducted under SanMark had come a long way. We described these above in section 4.1. A decision had also been made to concentrate the research around the last two of the listed activities, namely:

1. Business development services of suppliers (primarily in the form of a workshop), and

2. Communication and consumer awareness campaign in villages (or quarters).

Given resource and time constraints, WANG would not be able to conduct workshops and awareness campaigns with all suppliers and in all the villages and quarters in the study LGAs within the timeframe of the STS Nigeria project. Therefore, it was decided to randomly select which suppliers will be invited to the workshop and which quarters/villages will be targeted with the marketing campaign.

This will allow us to answer the following questions:

Supplier randomisation: Given that suppliers work in integrated local markets (as established through the mapping exercise), we have to be careful in the types of questions we consider. For example, we cannot easily compare profits between treated and control suppliers given possible (positive or negative) spillover effects. However, we

can learn more about the impact of SanMark on suppliers' technology adoption since spillovers affecting technology adoption are easier to observe and, therefore, to measure. One of the major focuses of SanMark is to make suppliers understand that there is a large market for toilets out there and to encourage them to include in their product range the newly designed SanMark toilet. This toilet is a result of detailed research on what types of toilets households would desire and what they would be willing and able to pay. These SanMark toilets have unique features and would be made through a specific mould. These aspects make it easy to measure whether suppliers adopt this new technology. In the supplier survey after SanMark intervetion implementation, we will ask questions and collect observations on whether this new technology was indeed adopted. We will further collect data which allows us to understand (i) how the technology was adopted (examples include whether the supplier took a loan to make the investment) and (ii) if applicable, why it was not adopted (possible reasons including resource constraints, no interest, etc.). This information will help WANG to refine the intervention. Furthermore, the data will allow us to measure spillovers from treatment to control suppliers (i.e. whether suppliers that were not subject to the SanMark intervention learned about the SanMark product and possibly adopted it as well).

Awareness Campaign randomisation: In terms of the second component of SanMark, the community and consumer awareness campaigns at the village level, the current plan is to take all villages/quarters within an LGA and randomly divide it into two groups. One group will be subject to these awareness creation activities and the other one will not. Comparing outcomes (such as sanitation uptake) in these two groups of villages will allow us to learn about the impact awareness creation activities have on outcomes. At the same time, there will be an overlapping effect with the ongoing CLTS activities, so our sample will be such that in both treament and control Sanmark groups, we will be including similar proportions of treatment and control CLTS villages, as well as pre-triggered CLTS villages. This way we will be able to analyze the effects of all the possible CLTS-SanMark treatment combinations.

"Steering" of suppliers: What we are ultimately interested in is the combined impact of supplier engagement and community mobilisation activities under SanMark. To get at this impact, one would ideally like to ensure that suppliers work only in the randomly selected villages/quarters for awareness creation activities. This is however at the same time undesirable, since it goes against the idea of working with the private sector, which needs to respond to demand and ensure that they have sufficient customers

to survive and strive. Hence, instead of putting unrealistic and undesirable constraints on suppliers, the plan is to try and "steer" suppliers to the selected villages. This will be done in the following way: a list of villages (the same list of villages where community and consumer awareness campaigns will be conducted) will be drawn up. The list will include the names and geographical information as well as a set of key indicators, which are believed to proxy possible sanitation demand. This list will be used in the supplier workshops and later provided to the suppliers for their reference. Information will include whether CLTS was conducted in the village and the level of sanitation coverage, among other. Suppliers will be trained on how to read these lists and interpret the information, hoping to encourage them to use quantitative information to make informed business decisions.

If suppliers use only the information provided to them by the intervention, they will concentrate on these selected treatment villages/quarters for their sales. This implies that we could have a random set of villages in our study LGAs in which all SanMark activities take place (trained suppliers work there and awareness was created) and villages where none of these happened. We stress that supliers will not, at any stage or in any way, be encouraged to *only* market the SanMark product in the villages on the list.

The random allocation is done at the TU level and stratified by LGA, but village level information will be given to suppliers. This will allow us to compare six types of villages: (i) those that were exposed to CLTS before this study started and exposed to SanMark awareness campaign; (ii) those that were exposed to CLTS before and not exposed to SanMark; (iii) those that were exposed to CLTS as part of this study and exposed to SanMark awareness campaign; (iv) those that were exposed to CLTS as part of this study and not exposed to SanMark; (iv) those not exposed to CLTS at all and exposed to SanMark awareness campaign; and those not exposed to CLTS nor to SanMark - as shown in Table 41.

Table 41: Village study types

	SanMark	C (SanMark)
Pre-CLTS	(i)	(ii)
CLTS	(iii)	(iv)
C (CLTS)	(v)	(vi)

4.2.4 Next steps

A second supplier survey is scheduled to be fielded just before the implementation of SanMark activties and a third one about three months after the activities took place (expected to be in November/December 2015). The main purpose of this latter survey is to assess technology adoption by suppliers. It is expected that within this timeframe of about three months, suppliers would have made measurable steps towards adopting the technology promoted through SanMark (this would include taking up of credit for purchase of mould, purchase of the mould, purchase of other materials, interaction with local artisans, etc.). It is further expected that suppliers would have started entering villages/quarters to market and sell their product within this timeframe. The second purpose of this survey is to assess which villages/quarters the suppliers entered into. If we find evidence that suppliers have primarily entered the villages/quarters they were "steered" towards (in the sense of information provision of these specific villages), then we would like to suggest a short rapid assessment of toilet acquisition intention and action as well as usage and behaviour. We condition this rapid assessment on suppliers having entered almost exclusively villages/quarters they were provided information on as this will allow us to attribute changes in sanitation uptake at the village/quarter level to the complete set of SanMark activities. This will be possible since the list of villages/quarters the suppliers receive information about is a random subset of the ones located in the same LGA each supplier is located.

Approximately three months later we suggest conducting the fourth supplier survey, which would be around March 2016 and hence possibly in conjunction with the endline survey. The purpose of this survey will be to monitor technology adoption, particularly from non-treated suppliers, i.e. assessing spill-over impacts of the SanMark supplier intervention. We will further collect information on sales, employment, etc., to observe changes over time. This information, together with the rapid assessment previously conducted, will help us judge the timing of the final household survey.

In any case, we would like to conduct this endline household survey once a significant increase in toilet ownership (particularly improved sanitation) is expected as this would be a necessary condition for other impacts to unfold. We currently expect to conduct the endline survey around June/July 2016.

4.3 Description of suppliers

This section describes the CBPs (or suppliers), which are going to be the target of the SanMark intervention in detail. We have also collected information on plumbing businesses and businesses selling construction materials, since they also sell sanitation-related inputs. Table 42 describes all businesses for which we have information. It shows that 56% of all businesses are CBPs in Enugu, and almost 83% are in Ekiti. Businesses are on average 4-7 years in existence and hire somwhere around 4-7 full-time eployees. Businesses are older, larger in terms of employees, more likely to be formal, more likely to have their own transport means and more likely to have households as their main customers in Ekiti than in Enugu.

Table 42: Characteristics of businesses (CBPs and plumbing businesses)

	Enugu			**Ekiti**			**All**		
	Mean	**SD**	**N**	**Mean**	**SD**	**N**	**Mean**	**SD**	**N**
Cement Block Producer (%)	56.1	50.2	41	82.7	38.0	89	75.6	43.2	151
Age (years)	4.31	3.01	32	7.28	7.11	98	6.55	6.47	130
Size (FT employees)	3.62	2.38	32	5.27	4.34	98	4.86	4.00	130
Sales quintile (1-Lowest)	2.52	1.48	25	2.97	1.43	110	2.83	1.44	83
Formal (%)	51.6	50.8	31	84.2	36.7	95	76.2	42.8	126
Ever received a loan (%)	64.5	48.6	31	32.6	47.1	95	40.5	49.3	126
Own Transport (%)	87.1	34.1	31	95.8	20.19	95	93.7	24.5	126
HHs main customers (%)	58.1	50.1	31	76.8	42.4	95	72.2	45.0	126
Sales increased in past year (%)	83.9	37.4	31	89.5	30.9	95	88.1	32.5	126

Source: Supplier Data, Baseline.

Table 43 focuses on CBPs exclusively and provides information about a wider range of characteristics. On average, CBPs have been in operation around 4.5 years in Enugu and 6.7 years in Ekiti, and have 4 and 5.4 employees respectively. More than half of the suppliers have a sales book, and this figure is higher in Enugu than in Ekiti. Over half of the suppliers are registered at some level of government in Enugu and over 85% are in Ekiti. In terms of infrastructure, less than 10% of these suppliers are connected to a local power grid and over half have their own generator in Enugu. These figures are 2% and 42% in Ekiti respectively. Access to improved water is much higher in Ekiti than in Enugu. Most suppliers use cell phones for work-related communications, but rarely have access to internet, or use email or online banking for businesses transactions. The indicators related to the type of market they serve and how they serve show that for the majority of suppliers, households are their main customers. Almost all suppliers own a transport mean to serve their customers and experience increases in sales in the last year compared to previous years. Suppliers in Ekiti are more likely to serve customers within their same community relative to those in Enugu, this is consistent with the

fact that there are more suppliers in Ekiti than in Enugu. Finally, the variables related to expenses show that suppliers in Enugu are twice as likely to have ever recieved a loan than in Ekiti (68% versus 33%). On average, wages and materials account for half of the suppliers' expenses in the last month, and very few suppliers report positive expenses on machinery, machinery rental or training.

Table 43: Cement Block Producers' Characteristics

	Enugu			Ekiti			All		
	Mean	**SD**	**N**	**Mean**	**SD**	**N**	**Mean**	**SD**	**N**
Basic Firm Characteristics									
Age (years)	4.5	3.1	23	6.7	6.3	91	6.3	5.8	114
Size (FT employees)	3.9	1.9	23	5.4	4.2	91	5.1	3.9	114
Sales quintile (1-Lowest)	2.7	1.5	18	3.0	1.4	56	2.9	1.4	74
Has a sales book (%)	73.9	44.9	23	62.6	48.6	91	64.9	47.9	114
Formal (%)	54.5	51.0	22	85.7	35.2	91	79.6	40.4	113
Sell bricks in 100's	91.3	28.8	23	96.7	18.0	91	95.6	21.6	114
Infrastructure									
Connected to local power grid (%)	9.1	29.4	22	2.2	14.7	91	3.5	18.6	113
Own a generator (%)	54.5	50.9	22	41.8	49.6	91	44.2	49.9	113
Access to improved water (%)	27.3	45.6	22	64.8	48.0	91	57.5	49.7	113
Use cell phones (%)	95.7	20.9	23	95.6	20.6	91	95.6	20.6	114
Have internet connection (%)	0	0	23	3.3	18.0	91	2.6	16.1	114
Use email (%)	9.1	29.4	22	13.2	34.0	91	12.4	33.1	113
Use online banking (%)	13.0	34.4	23	20.9	40.9	91	19.3	39.6	114
Market									
HHs main customers (%)	63.6	49.2	22	76.9	42.4	91	74.3	43.9	113
Own Transport (%)	90.9	29.4	22	97.8	14.7	91	96.5	18.6	113
Sales increased in past year (%)	81.8	39.4	22	89.0	31.4	91	87.6	33.1	113
Customers from same community (%)	49.3	14.9	22	62.1	26.0	91	59.6	24.7	113
Capital & Expenses									
Ever received a loan (%)	68.2	47.7	22	33.0	47.3	91	39.8	49.2	113
Wages (% of expenses)	21.5	14.4	19	15.4	11.1	81	16.5	11.9	100
of which 0%			1			6			7
Materials (% of expenses)	31.1	18.9	19	31.7	18.7	81	31.6	18.6	100
of which 0%			2			5			7
Machinery (% of expenses)	2.4	4.5	19	5.4	5.5	82	4.8	5.4	101
of which 0%			13			29			42
Rentals (% of expenses)	1.8	3.4	19	0.7	2.1	82	0.9	2.4	101
of which 0%			14			71			85
Training (% of expenses)	0.3	1.1	19	1.6	4.5	82	1.3	4.1	101
of which 0%			18			70			88

Source: Supplier Data, Baseline.
Formality is an indicator that the firm has formal registration at some level of government.
Internet, cell phone and online banking usage are assumed 0 if missing

As a next step, a random sub-set of these suppliers will be allocated to be invited to the SanMark supplier level workshops. Once that is done, we will conduct an analysis to check that the randomisation was successful in creating two observationally equivalent sets of suppliers.

4.4 Balancedness of communities for consumer awareness creation

Supplier engagement and workshops are one set of SanMark activties and the second one is communication and awareness campaigns within villages. Since we randomly allocate villages in our study LGAs to be exposed to these activities, we check again, as for the CLTS randomisation, whether communities allocated to receive SanMark consumer awareness activities are statistically speaking equivalent on observable characteristics. We note that we now have a larger set of villages we consider than in the CLTS comparison. This is because we include here the villages that were previously triggered. Since, however we did not find large differences between previously triggered and study villages, and since we again randomly allocate, we can refrain from discussing the characteristics of the two randomisation groups in this section and concentrate on the balancedness of characteristics. For the same reason, we also show only a snapshot of the results. Additional tables are available upon request.

Table 44: SanMark villages/quarters - Characteristics of HH head

	Enugu		**Ekiti**		**All**		
	$\mathbf{C}^{SM}$	$\mathbf{C}^{SM}$-$\mathbf{T}^{SM}$	$\mathbf{C}^{SM}$	$\mathbf{C}^{SM}$-$\mathbf{T}^{SM}$	$\mathbf{C}^{SM}$	$\mathbf{C}^{SM}$-$\mathbf{T}^{SM}$	**N**
HH head age	55.2	-0.4	54.4	0.1	54.8	-0.2	6,280
HH head male (%)	63.2	5.5***	67.9	0.1	65.6	3.0*	6,280
HH head employed (%)	75.7	-3.4	76.7	0.3	76.2	-1.5	6,280
HH head prim. school (%)	61.5	2.1	54.4	3.8	57.9	2.8	6,272
HH head sr. sec. school (%)	16.9	1.8	30.9	1.7	24.1	2.1	6,272
HH head Igbo (%)	98.7	-0.3	4.1	1.4	50.3	-1.8	6,396
HH head Yoruba (%)	0.1	-0.1	85.6	-2.2	43.8	1.0	6,396
HH head Catholic (%)	63.3	1.4	10.3	2.0	36.2	0.4	6,396
HH head Other Christian (%)	27.3	-1.1	72.4	-1.1	50.4	-0.0	6,396
HH head Islamic (%)	0.7	-0.4	15.4	-1.4	8.2	-0.5	6,396

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations.
Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Household Data, Baseline.

The first two tables we present, Tables 44 and 45 provide information on the household head and on disabilitiesof household members.

Table 45: SanMark villages/quarters - HH Disabilities

	Enugu		Ekiti		All		
	$\mathbf{C}^{SM}$	$\mathbf{C}^{SM}$-$\mathbf{T}^{SM}$	$\mathbf{C}^{SM}$	$\mathbf{C}^{SM}$-$\mathbf{T}^{SM}$	$\mathbf{C}^{SM}$	$\mathbf{C}^{SM}$-$\mathbf{T}^{SM}$	**N**
At least 1 HH member with chronic disease (%)	7.8	1.3	1.5	-1.2**	4.6	-0.1	6,396
At least 1 HH member with physical disability (%)	6.4	0.1	2.4	-0.4	4.4	-0.3	6,396
At least 1 HH member with mental disability (%)	1.8	-0.2	0.5	-0.3	1.1	-0.3	6,396

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations.
Standard errors clustered at the TU level.
*$p < 0.10$, ** $p < 0.05$, *** $p < 0.01$*
Source: Household Data, Baseline.

As we would expect for the reason just discussed, the averages of the characteristics are in line with those presented in Section 2.3: Household heads are in the majority of cases male, around 55 yars of age, about two-thirds having either primary or secondary education and a similar percentage being employed. Importantly for the purpose of the analysis, all, except for the gender of the household head in Enugu, are balanced between treatment and control. This significance is reduced when considering the whole sample, i.e. both study states combined.

In terms of disabilities in the households, we find again that households in Enugu are more likely to have members with some form of disability than households in Ekiti. We observe again one imbalance, this time in Ekiti, which however also becomes insignificant when considering the pooled sample.

Table 46 presents information on the economic status of the households. In general, we see no differences between households in treatment and control villages[27], except for a substantial and statistically significant difference in household expenditure on durable goods in Ekiti that also affects the comparison between treatment and control when pooling both states together. It will be important to control for this imbalance in our impact analysis (and check robustness of findings to the in- and exclusion of this variable) since expenditures on building materials would fall under this category.

Considering savings and debt (same table), we also see no differences between treatment and control households, and households in these two groups also do not differ in

[27]Note that three extreme outliers were excluded in the income variable, one in Enugu and two in Ekiti.

Table 46: SanMark villages/quarters - HH Economic status

	Enugu		Ekiti		All		
	$\mathbf{C}^{SM}$	$\mathbf{C}^{SM}$-$\mathbf{T}^{SM}$	$\mathbf{C}^{SM}$	$\mathbf{C}^{SM}$-$\mathbf{T}^{SM}$	$\mathbf{C}^{SM}$	$\mathbf{C}^{SM}$-$\mathbf{T}^{SM}$	**N**
Total HH income	188,556	63,872*	417,392	155,792	307,731	118,017	5,116
Total HH expenditure	727,145	-9,955	653,058	-26,259	686,001	-21,337	4,917
Durable expenditure	51,124	-7,154	56,931	-26,707***	54,287	-16,882**	5,396
Non-durable expenditure	267,251	-1,839	280,218	4,442	274,126	1,731	5,888
Food expenditure	385,336	10,817	302,953	-13,808	342,219	-4,001	5,541
HH has any savings (%)	19.6	3.0	26.8	-2.2	23.3	0.6	6,272
HH has any debt (%)	21.4	0.8	18.5	-0.5	19.9	0.1	6,396
Negative shock in the last year (%)	27.4	-1.0	11.0	-0.8	19.0	-1.3	6,390

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations.
Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Household Data, Baseline.

the extent to which they were hit by negative shocks in the year previous to the baseline survey.

The final table we present in the context of the SanMark village/quarters randomisation relates to the sanitation status of households in these settlements, presented in Table 47. As we already know, about 35% of households do own a toilet and for most, this is a toilet classified as improved acording to the JMP definition. Most household members that live in a households with a toilet also use it. We see that the randomisation left us with a small imbalance in toilet usage in Ekiti, where in treatment areas, an additional three percent of household use toilets compared to control communities. Again, this is an imbalance that disappears once we consider both states pooled together. In terms of hygiene habits (bottom panel of Table 47), we see no imbalances in the two states.

Overall, we only see some minor imbalances in all variables considered (including those not displayed here), putting us in a good position for the research analysis to follow.

Table 47: SanMark villages/quarters - Sanitation

	Enugu		Ekiti		All		
	C	**C-T**	**C**	**C-T**	**C**	**C-T**	**N**
HH has a functioning latrine (%)	35.7	3.2	35.4	-5.2	35.5	-0.9	6,335
Improved sanitation (%)	29.6	1.6	34.2	-5.0	32.0	-1.5	6,335
All HH members use the latrine (%)	91.9	1.9	94.4	-3.1**	93.2	-0.9	2,300
Household performs OD (%)	62.8	-3.6	59.4	4.7	61.1	0.4	6,396
Before eating (%)	95.3	1.5	94.4	0.0	94.8	0.7	6,288
Before cooking/feeding (%)	54.7	-1.1	52.0	-0.8	53.3	-1.1	6,252
After eating (%)	0.0	0.0	1.5	0.1	0.8	0.1	6,288
After cleaning toilet/latrine (%)	76.6	-3.2	77.7	-1.1	77.2	-2.2	6,267
After defecation/cleaning someone else (%)	27.6	-5.1	29.5	2.3	28.5	-1.5	6,224
When taking care of a sick person (%)	19.4	-2.4	18.8	3.3	19.1	0.4	6,218

C: control group average. C-T: control minus treatment group average, stars indicate statistically significant differences. N: total number of observations.
Standard errors clustered at the TU level.
**p <0.10, ** p <0.05, *** p <0.01*
Source: Household Data, Baseline.

5 Conclusion

This baseline report has provided an overview of the data collection activities of the formal component of the STS Nigeria Project implemented by WaterAid. Overall, data collection was successfully implemented and data quality according to standards. The report discusses some of the challenges found while collecting the data in detail, related to survey practicalities as well as to intervention implementation.

We have further shown formal tests comparing all important characteristics collected at baseline across treatments and control groups. This is an important exercise since it allows us to see whether we have an appropriate basis to address our research questions. This exercise provides at the same time a comprehensive snapshot of our study population - villages, household and suppliers.

We show that the prevalence of OD is on average 60%, and latrine ownership is below 40% in both states. Dis-aggregating this average we find that latrine ownership is lower in Enugu than in Ekiti. Ekiti is in general a wealthier state than Enugu, partly reflected in the main economic activities conducted. While farming is the predominant source of income in study villages in both states, the overall percentage is lower in Ekiti, and more household gain income from more white-collar type of activities, such as teaching. In line, we also find higher levels of infrastructure and services available to households in Ekiti than in Enugu, as well as better self-reported health outcomes (lower prevalence of self-reported illnesses in the last 7 days) but surprisingly slightly worse anthropometric indicators for children under the age of six years in Ekiti relative

to Enugu.

For households that do have a latrine, most of them report to have an improved latrine, which they also report to use.[28] This indicates that the main challenge to tackle is sanitation uptake rather than moving households up the sanitation ladder. Interestingly, the main reason for not having a toilet is that it is too expensive, according to households that do not own a latrine. In Enugu 88% of households report this reason and 63% of non-latrine owners in Ekiti do so. The second most important reason reported in Ekiti is that households stay in a rented house, with 16% households choosing this option.

One of the main objectives of the baseline report was to check whether we have a sound basis for our upcoming analysis. For the question on effectiveness of CLTS, this boils down to checking whether triggerable units allocated to treatment are comparable in observable characteristics to triggerable units allocated to control. We look at village and household characteristics

Our results from this treatment versus control comparison are generally very encouraging. The number of imbalances found fall well within the expected proportion of five to ten percent (depending what significance level one chooses) and those imbalances observed are for the most part significant only at the 5 or mostly at the 10% significance level. We further find no noteworthy significant differences in key variables across treatment and control units, particularly in the sanitation situation and health outcomes. This is important since it implies that our treatment and control households were not significantly different in terms of their sanitation practices and starting level of their health status before the start of the intervention. One noteworthy exception is access to improved drinking water in Ekiti, where we find that households in treatment TUs seem to have significantly lower access.

It will therefore be important to account for this (as well as other) characteristics for which imbalances are observed when we conduct the impact analysis and check for robustness of findings to the in- and ex-clusion of these variables.

This report also analyses whether the villages selected for the study differ in their characteristics from villages that were selected previously for triggering. This is important for generalizability of our findings. We observe that, especially in Enugu, there are no systematic differences between villages previously triggered and villages selected for this study. In Ekiti on the other hand we find that our study village are larger on average in terms of their population. Most likely correlated with the village size is our

[28] As mentioned before in this report, improved latrine is characterized using the definition of WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation

finding that study villages have on average lower access to services and infrastructure, It will be important to keep this in mind when putting our endline findings in context.

We finally describe the second main component of this research study which focuses on Sanitation Marketing.

We describe the current status of the intervention, which - at the time of writing - was not completely determined, and the research design chosen at this stage. In line, we compare villages that will be subject to village level sanitation marketing activities and check that these villages are comparable to those not selected to be exposed to these activities. As with the CLTS component, results are encouraging and villages look observationally equivalent.

The second part of the sanitation marketing focuses on suppliers, primarily concrete block producers. These are relatively small businesses with on average four full-time employees in Enugu and 5 in Ekiti that have been in existence for around 4-6 years. Most of them cater to households rather than the government or organisations, most of which reside in the same community where also the business is based. We observe important differences in suppliers between Enugu and Ekiti: suppliers in Enugu are smaller, younger, less likely to be formal, are less focused in households customers within their same community, less likely to have their own transport means, though more likely to have a sales book and to have received a loan than those in Ekiti. The use of cell phones for business operation is highly prevalent in both states. In terms of production technology, it is difficult to assert differences between states since respondents failed to answer questions about capital in many cases, the only information we have consistently for most suppliers is the number of full-time employees and the breakdown of expenses in the last months across different input categories. Further work on this project will include more detailed analysis of this to gain a deeper understanding of other dimensions of suppliers' behaviour that could be important for how they will react to the SanMark intervention.

As a next step, a random sub-set of these suppliers will have to be selected to be allocated to the intervention group.

6 Risks, and next steps

At this stage of the project we perceive that the risks to the research design are low on the data collection side: We were able to collect our key indicators satisfactorily, and we have a high response rate to our surveys. We identified some issues around measurement of income and consumption expenditures[29], which we have to analyse in more detail.

In terms of risk factors affecting the design of our study, we identify the following:

1. **Compliance with the randomisation:** An important precondition for the formal research is compliance to the control-treatment allocation. We do not perceive significant risks to this. This assessment is based on the frequent interaction we have with WaterAid UK and WANG as well as based on initial analysis of monitoring forms for triggering activities. Sanitation marketing activities do yet have to start, but we expect equally good communication and collaboration here.

2. **Power of the study**: We might have a threat to our power given unanticipated difficulties in triggering some of the TUs. As discussed in Section XX, not all TUs identified can be triggered given their urban status. This will have impact on the power of our study. We are currently in discussion with WaterAid and WANG to identify ways of dealing with this challenge. We are also identifying approaches that will allow us to zoom in on only triggered TUs.

3. **Contamination**: Contamination in our CLTS component design might arise through sanitation information spilling over to neighbouring villages, which may be control villages. While measures were taken to minimize this from happening (i.e. in the definition of TUs), we will also collect information on possible interactions between neighbouring villages through for example distance measures to be able to account for this - if it happens. Collection of such information will be particularly important for the supplier research component, where such spillovers are expected (and in fact hoped for from an intervention perspective).

In terms of next steps the following will be done in the coming months:

CLTS research component: The upcoming work on this component is monitoring of intervention implementation as well as identifying ways to deal with the non-triggerable TUs (see point 2 above). We decided with WaterAid UK and WANG that

[29]The problem we face is that reported consumption expenditures are much larger than reported income. While such measurement issues are not uncommon, they are higher in this survey than we would have expected.

back-up TUs should definitely be triggered in the affected state Ekiti and a decision will need to be taken as to whether some baseline data will be collected in these additional villages. The decision will be primarily driven by budget implications. The next big decision point for this component will then be around when to field the follow-up survey.

SanMark research component: As a first step, we need to finalise the randomisation of suppliers to receiving the supplier level intervention and not receiving it. This is expected to happen in the coming week (i.e. to be completed in May 2015). We can then conduct a small analysis to check that this randomisation was successful. We then plan to conduct the second supplier survey shortly before the start of activities with suppliers, which is expected to happen in fall of this year. We are then considering a rapid assessment survey in study areas, focusing on sanitation up-take. We would collect information on uptake (and hence feeding into the decision on when to conduct the follow-up survey for the CLTS component) but also more specifically on uptake of SanMark products, which will feed into decisions regarding the timing of data collection for the SanMark research component.

7 Appendix A: Survey Instruments

We provide a brief overview of the purpose of each of these instruments and a broad idea of how expectations laid out in the study proposal match with ground realities:

1. **Household listing**: The purpose of this instrument was to serve as a sampling frame for our baseline household survey. Estimated number of households to be listed were quite accurate in Enugu, where the achieved sample size is 97% of the expected one outlined at the proposal stage. In Ekiti, this percentage is significantly lower at 70%, which is primarily driven by a lower number of study clusters than anticipated. We discuss the definition of these study clusters (triggerable units or TUs) in Section 2.2. The target number of TUs to be included in the study was guided by the power analysis for the CLTS research component conducted at the proposal stage using secondary data and specific assumptions about expected effects. More details about the power analysis are provided in Section 2.4 of this report. Targeted and achieved numbers are discussed in detail in Section 8.

2. **Village survey**: The main purpose of this instrument is to collect information on factors that are expected to facilitate or potentially constrain the uptake and success of the interventions we study. Our data collection partner was able to collect this type of information in all but four villages/quarters.

3. **Household survey**: The household survey was designed to provide us with information on the baseline levels of the outcomes of interest for the study: This provides an important tool to be able to assess whether the intervention was effective and also how large any effect is relative to the situation before any intervention was implemented. Our study design targeted to interview 20 households in each TU and this target was almost perfectly achieved (99% in both states). The household survey also included the collection of anthropometric measures of children under the age of six years. The proposal had suggested to collect data on all children aged less than 6 years in our study population, budget permitting. It was later decided to only collect anthropometric data from the two youngest children under the age of 6 years in each household, which considerably reduced the targeted number of children. Of those targeted, 86% were measured in Enugu and 97% in Ekiti.

4. **Supplier survey**: Similar to the household survey, the purpose of the supplier survey is to gather information on the SanMark targeted suppliers in our study

area. The target number of suppliers is determined by the population of firms that are the target of the SanMark intervention. We describe in detail in Section 4 how this number was determined.

5. **Facilitator survey**: This data will be used in understanding the CLTS intervention implementation and possibly how impacts vary by different background characteristics of those facilitating the intervention. The number of facilitators (individuals delivering the CLTS triggering) successfully interviewed is much lower than the target number. This is because WANG expected to implement the CLTS intervention in the study LGAs using a higher number of facilitators (40 in Enugu and 60 in Ekiti) ex-ante than the number it actually hired. The survey successfully interviewed all the facilitators that attended the CLTS triggering training sessions in each state previous the starting of the intervention, with the exception of 1 in Enugu.

8 Appendix B: Household listing

The main purpose of the listing exercise was to have a sampling frame for our baseline household survey. It was deemed necessary to collect primary data given the importance of getting a representative sample of households within our self-defined study units, including all vulnerable populations. No secondary data source could be identified that was comprehensive and up-to-date enough to serve for this purpose. The listing data has two additional purposes. First, the data collected provides us with a snapshot of the study population, enabling us to get accurate village-level information on key outcomes. Second, the listing data included the collection of GPS data, which allows us to (i) check that all households interviewed are indeed in the selected TUs, which makes it easier to identify correct households during the endline survey round; (ii) calculate distances between TUs, which will facilitate assessing potential spillovers across treatment and control TUs; and (iii) GPS data can be used to construct measures to assess for example the role of neighbours in sanitation uptake decisions. The listing exercise was carried out between October 2014 and January 2015. A brief questionnaire surveyed households in the TUs on basic individual level characteristics of the household head, household size, structure and basic sanitation practices and infrastructure (the latter reported by respondents and observed by the interviewer). It also collected information on household construction characteristics and basic assets.

The listing exercise was organised as follows. Based on WANG information, the initial estimate of TU size used for budgeting purposed was around 150 households per TU. It turned out that the TUs were larger on average. Given limited budget, we could list only an average of 180 households per TU. To be able to list households in each TU within the available budget we adopted the following approach: For each TU, we randomly ordered the villages/quarters and started the listing exercise in the first one on the list. This village/quarter was listed completely, independent of its size (i.e. going above 180 households threshold if needed). If the number of households was smaller than 150 within this village/quarter, and the TU consisted of more than one village/quarter, data collection would continue in the next village/quarter on the list, again listing every household in this village/quarter. This process continued until either all villages/quarters were listed in each TU, or until around 180 households were reached, while at the same time ensuring that all households in villages included in the census exercise were listed. This approach ensured that we have listing data from each of the study TUs, that our overall sample remains representative for the study area (since the ordering of village/quarter listing was randomly determined), and furthermore that

whole villages and quarters were listed while remaining under budget. Having said this, there is significant variation in the composition of TUs in terms of number of villages or quarters within and across states, we provide evidence further below.

The number of TUs to be included in the impact study was guided by the power analysis conducted at the proposal stage using secondary data and specific assumptions about expected effects (more details about the power analysis are provided in Section 2.4) as well as the actual number of TUs in each state. TUs are grouped first in two categories: 1) those TUs that have not been triggered before (hereafter referred to as "NTr")[30] and 2) those that have been triggered before through CLTS ("Tr"). To look at the impact of the CLTS intervention, NTr TUs are randomly allocated to two treatment arms: (a) those to be triggered ("CLTS") and (b) those not to be triggered ("Control"). The aim was to have 120 NTr TUs (randomly allocated to 60 CLTS and 60 Control) and 40 Tr TUs in each state. The collection of data in Tr TUs was done to support the analysis of the SanMark intervention in communities that have been exposed to CLTS sometime before.

Before the start of the impact study and the data collection exercise (listing and baseline collection), WANG provided IFS with a list of existing TUs in each of the LGAs in Ekiti and Enugu, classifed in NTr and Tr. Table 48 shows the distribution of TUs across categories and states. In total there were 263 NTr TUs in the two states and 134 Tr TUs (see panel (A)). IFS randomly assigned NTr to CLTS and Control and randomly selected the TUs in each category to be part of the study if the existing TUs in each category exceed the desired sample sized, stratifying by LGA. The target was to collect data in 120 NTr and 40 Tr in Ekiti and 118 NTr and 42 Tr in Enugu. The remaining TUs were kept as back-up. The randomisation of NTr TUs to treatment arms (CLTS and Control) had to be done previously to the listing data collection for intervention planning purposes, to implement an initially planned phased-in approach of data collection and intervention roll-out.

However, during this listing exercise it turned out that some TUs in the state of Ekiti did actually not exist and hence had to be dropped. These issues happened almost exclusively in Ekiti South West and to a lesser extent in Ido Osi. In some cases we had back-up TUs (previously allocated to CLTS and Control) available to replace these in each of the LGAs, but not in all cases. As a result, the actual number of study TUs in Ekiti in each category differs from the initial plans. This can be seen in panel (B) of Table 48, which shows the actual number of study TUs (where data has been collected) in each of the states. In Ekiti data was collected in 113 NTr TUs instead of

[30]We discuss the purpose of these villages in Section 3.

the planned 120. Furthermore, non-existing TUs were more likely to be control TUs, implying that we have more TUs allocated to treatment than to control. Hence, the allocation between CLTS and Control is not exactly 50:50 in Ekiti.

Table 48: Triggerable units in study LGAs

(A) All TUs

	NTr	Tr	Total
Enugu	118	57	**175**
Ekiti	145	77	**222**
Total	**263**	**134**	**397**

(B) Study TUs

	NTr	Tr	Total
Enugu	118	42	**160**
Ekiti	113	42	**155**
Total	**231**	**84**	**315**

	Control	CLTS	Tr	Total
Enugu	59	59	42	**160**
Ekiti	51	62	42	**155**
Total	**110**	**121**	**84**	**315**

Table 49 shows the break-down of TUs by LGA. For example, in Ekiti South West, we have 7 Control TUs and 11 CLTS ones. This is important for the purpose of the research analysis since it can introduce some imbalances in our sample.[31] While in every RCT one expects about 5% of tested variables not to be balanced, we note that some of the imbalances observed and discussed in subsequent sections are driven by the imbalances in TUs across treatment arms in Ekiti South West and Ido Osi. Where applicable, we will point these out in the discussion below. More importantly, when working on our main analysis with the endline survey, we will account for these (and other random) baseline imbalances and conduct robustness checks on our findings by excluding these two LGAs from the analysis. We will describe the listing data collection exercise and provide more detailed information on the study TUs, including number of villages/quarters per TU and household/population sizes in subsequent sections.

There is considerable variation in size (measured by number of villages or quarters) across TUs. Table 50 shows the distribution of TUs according to the number of villages or quarters they have. In Enugu 31 of all the 160 study TUs (˜19%) consist of one village only: 14 are allocated to Control, 12 to treatment (CLTS) and 5 are Tr (row

[31]Imbalances mean that - statistically speaking - our treatment and control TUs are not identical anymore. We discuss this concept in more detail in Section 2.3.

Table 49: Triggerable Units included in the study by LGA

	Treatment status (inc. prev. triggered Tr)							
	Control		**CLTS**		**Tr**		**Total**	
	Freq	%	Freq	%	Freq	%	Freq	%
Enugu								
Igbo-Eze North	15	25.4%	15	25.4%	6	14.3%	36	22.5%
Igbo-Eze South	20	33.9%	20	33.9%	1	2.4%	41	25.6%
Nkanu East	7	11.9%	7	11.9%	20	47.6%	34	21.3%
Udenu	17	28.8%	17	28.8%	15	35.7%	49	30.6%
Total	59	100.0%	59	100.0%	42	100.0%	160	100.0%
Ekiti								
Ekiti South West	7	13.7%	11	17.7%	9	21.4%	27	17.4%
Ido Osi	12	23.5%	15	24.2%	6	14.3%	33	21.3%
Ikole	10	19.6%	10	16.1%	20	47.6%	40	25.8%
Moba	11	21.6%	13	21.0%	7	16.7%	31	20.0%
Irepodun Ifelodun	11	21.6%	13	21.0%	0	0.0%	24	15.5%
Total	51	100.0%	62	100.0%	42	100.0%	155	100.0%

Source: Listing Data

1). Around 80% of TUs have 5 villages or less but the number of villages per TUs in Enugu goes up to 29. In Ekiti, TUs are generally made up of less quarters. 105 of 155 (˜68%) TUs consist of one quarter only, and the maximum number of quarters per TU is 8.

We show the number of all villages/quarters in our study TUs by LGA in Table 51. For example in Igbo-Eze North (first row), there are 152 villages (Table 49 above shows that there are 36 TUs in Igbo Eze North).

Next, table 52 shows the number of villages that belong to the TUs inlcuded in our study, those with household survey available and those with village survey available. The difference in the last two categories is because some villages share some infrastructure and crucially their chief, so only one survey was administered.

Table 50: TUs by Number of Villages/Quarter and Treatment Status

	Treatment status (inc previously triggered, Tr)			
Villages in TU	**Control**	**CLTS**	**Tr**	**Total**
Enugu				
1	14	12	5	31
2	6	17	6	29
3	7	13	3	23
4	12	5	4	21
5	7	4	3	14
6	6	1	8	15
7	1	2	2	5
8	3	3	1	7
9	2	2	0	4
10	0	0	4	4
12	0	0	3	3
14	0	0	2	2
20	1	0	0	1
29	0	0	1	1
Total	59	59	42	160
Ekiti				
1	35	43	27	105
2	8	7	8	23
3	6	5	4	15
4	1	3	0	4
5	1	1	2	4
6	0	1	0	1
7	0	2	0	2
8	0	0	1	1
Total	51	62	42	155

Source: Listing Data

Table 53 shows the proportion of TUs that were listed exhaustively by LGA and treatment status. On average, around 60% of all study TUs were listed completely in Enugu and around 86% were listed completely in Ekiti. There is some variation across LGAs within each state and across treatment arms within each LGA. By definition of our listing approach, those TUs comprised of only one village or quarter were listed exhaustively. The probability of a TUs to be listed exhaustively decreased with its number of villages or quarters as well as with the average number of households of its sub-units.

Table 51: Villages/Quarters by LGA

	Treatment status (inc. prev. triggered Tr)							
	Control		**CLTS**		**Tr**		**Total**	
	Freq	%	Freq	%	Freq	%	Freq	%
Enugu								
Igbo-Eze North	56	23.8%	49	26.2%	47	13.7%	152	19.8%
Igbo-Eze South	112	47.7%	76	40.6%	2	0.6%	190	24.8%
Nkanu East	24	10.2%	13	7.0%	170	49.4%	207	27.0%
Udenu	43	18.3%	49	26.2%	125	36.3%	217	28.3%
Total	235	100.0%	187	100.0%	344	100.0%	766	100.0%
Ekiti								
Ekiti South West	8	10.1%	12	11.1%	16	11.8%	36	11.1%
Ido Osi	18	22.8%	20	18.5%	23	16.9%	61	18.9%
Ikole	19	24.1%	24	22.2%	59	43.4%	102	31.6%
Moba	16	20.3%	25	23.1%	38	27.9%	79	24.5%
Irepodun Ifelodun	18	22.8%	27	25.0%	0	0.0%	45	13.9%
Total	79	100.0%	108	100.0%	136	100.0%	323	100.0%

Source: Listing Data

Table 52: Number of Villages/Quarters by LGA

		Villages/quarters		
	LGA	in study TUs	Household survey available	Village survey available
Enugu	Igbo-Eze North	152	63	51
	Igbo-Eze South	190	99	78
	Nkanu East	207	125	94
	Udenu	217	79	65
Ekiti	Ekiti South West	36	29	28
	Ido Osi	61	43	42
	Ikole	102	65	62
	Moba	79	55	50
	Irepodun Ifelodun	45	32	32
Total		1,089	590	502

Table 53: Proportion of Completely Listed TUs by LGA

	Treatment status (inc. prev. triggered Tr)			
	Control	**CLTS**	**Tr**	**Total**
	%	%	%	%
Enugu				
Igbo-Eze North	50.0%	51.0%	21.3%	41.4%
Igbo-Eze South	47.3%	69.7%	100.0%	56.8%
Nkanu East	95.8%	84.6%	61.8%	67.1%
Udenu	58.1%	59.2%	21.6%	37.3%
Total	54.9%	63.1%	41.9%	51.0%
Ekiti				
Ekiti South West	100.0%	91.7%	56.3%	77.8%
Ido Osi	94.4%	85.0%	43.5%	72.1%
Ikole	100.0%	79.2%	45.8%	63.7%
Moba	87.5%	92.0%	47.4%	69.6%
Irepodun Ifelodun	88.9%	59.3%		71.1%
Total	93.7%	79.6%	47.1%	69.3%

Source: Listing Data

Table 54 gives the resulting number of listed households per LGA in the two study states per TU type. In light of the previous discussion, we note, however, that these numbers of listed respondents are not equivalent to the total population size in the TUs (which is an unknown figure). In total, 47,893 households across 315 TUs were listed. Of these, 17,179 households in 121 TUs were assigned to the Treatment and 17,396 households in 110 TUs to the Control group. Further 13,318 households were listed in villages belonging to the 84 Tr study TUs. As noted in section 7, the number of achieved household listed is considerable lower than the original target in Ekiti, and this is related to the realities encountered mainly in Ekiti South West and Ido Osi at the time of the listing and the divergence with the ex-ante assumptions used to calculate the target number of listed households.

Table 54: Households Listed by LGA

	Treatment status (inc. prev. triggered Tr)			
	Control	**CLTS**	**Tr**	**Total**
	No.	No.	No.	No.
Enugu				
Igbo-Eze North	2,675	2,639	1,223	6,537
Igbo-Eze South	3,207	3,133	189	6,529
Nkanu East	1,521	881	5,650	8,052
Udenu	1,879	2,248	2,643	6,770
Total	9,282	8,901	9,705	27,888
Ekiti				
Ekiti South West	1,455	345	565	2,365
Ido Osi	1,156	1,791	563	3,510
Ikole	2,027	2,119	1,781	5,927
Moba	1,407	2,517	704	4,628
Irepodun Ifelodun	2,069	1,506	0	3,575
Total	8,114	8,278	3,613	20,005

Source: Listing Data

9 Appendix C: Household survey - brief overview

Baseline collection was implemented in a phase-in approach along the listing exercise and also collection took place between October 2014 and January 2015 (detailed information about the listing exercise can be found in the Appendix). Once listing was finished in a TU, we were able to randomly select households for the baseline survey. We selected 20 households from each TU to be interviewed and provided 5 back-up households.

Table 55: TUs by No of respondents in a TU

		Number of respondents:							
		<10	11	12	14	15	17	18	20
Enugu	Igbo-Eze North								36
	Igbo-Eze South								41
	Nkanu East								34
	Udenu							1	48
Ekiti	Ekiti South West	10	1	1	1	1	1		15
	Ido Osi					1			32
	Ikole								40
	Moba			1				1	29
	Irepodun Ifelodun	1							23

We can see from table 55 that in the great majority of cases, the target of 20 households respondents was met in each TU. This target was achieved in every LGA of Enugu, except for Udenu, where in one TU only 18 households were interviewed. In Ekiti, the targeted number was not achieved in one TU for all LGAs but Ekiti South West, where many TUs were extremely small and hence did not have enough households that could be interviewed. Table 55 shows that in ten TUs less than ten households could be interviewed.

Table 56: Outcome of household interviews

Outcome of visit	**Total**		**Ekiti**		**Enugu**	
	Freq.	%	Freq.	%	Freq.	%
Interview completed	6,330	98.97	3,169	99.09	3,161	98.84
Interview incomplete	29	0.45	15	0.47	14	0.44
Respondent refused	9	0.14	4	0.13	5	0.16
Respondent away/not available	28	0.44	10	0.31	18	0.56
Total	6,396		3,198		3,198	

The response rate was very high. Non-response or refusals were extremely rare as can be seen in Table 56. Less than one percent of households was not available for

the interview (0.44%) or refused to take part (0.14%). To an extent this low response rate is driven by the fact that the listing data collection (our sampling frame) and the household data collection went hand in hand.

10 Appendix D: Additional tables on previously triggered villages

This Appendix displays additional tables for Section 3, where we look at differences between villages selected for early triggering (i.e. where CLTS was conducted in the past) and villages selected to be part of the CLTS assessment study.

Table 57: Previously triggered: Characteristics of household head

	Enugu		**Ekiti**		**All**		
	NTr	**NT-Tr**	**NT-Tr**	**NT-Tr**	**NTr**	**NT-Tr**	**N**
HH head age	55.5	0.1	54.5	0.3	55.0	0.2	6,282
HH head male (%)	60.1	-1.9	66.5	-5.2**	63.3	-3.6**	6,282
HH head employed (%)	77.5	0.7	75.2	-5.1**	76.3	-2.2	6,282
HH head finished prim. school (%)	61.0	1.9	51.3	-5.1*	56.1	-1.6	6,274
HH head finished sr. sec. school (%)	16.5	2.0	30.2	0.4	23.4	1.2	6,274
HH head Igbo (%)	98.9	0.2	3.8	1.0	51.2	0.1	6,398
HH head Yoruba (%)	0.1	-0.0	85.3	-5.1*	42.8	-2.0	6,398
HH head Catholic (%)	64.6	7.4*	10.2	3.1	37.3	5.0	6,398
HH head Other Christian (%)	25.4	-9.4**	71.4	-5.8	48.5	-7.3*	6,398
HH head Islamic (%)	1.1	1.1**	16.6	2.4	8.9	1.8	6,398
HH head main activity is farming (%)	55.3	-4.7	35.7	-6.0	45.5	-5.4	6,350
HH head knows how to write (%)	0.5	0.0**	0.6	-0.0	0.5	0.0	6,095

NTr: averages of communities not previously triggered. NTr-Tr: avg difference between those not previously triggered and those previously triggered. Stars indicate statistically significant differences. *p <0.10, ** p <0.05, *** p <0.01.

N: total number of observations. Standard errors clustered at the TU level.

Source: Household Data, Baseline.

Table 58: Disabilities of household members

	Enugu		Ekiti		All		
	NTr	**NT-Tr**	**NT-Tr**	**NT-Tr**	**NTr**	**NT-Tr**	**N**
At least 1 member pregnant (%)	2.8	0.5	1.6	-0.5	2.2	0.0	6,398
At least 1 member w/chronic disease (%)	7.3	0.6	1.7	-1.3*	4.5	-0.4	6,398
At least 1 member w/physical disability (%)	6.3	-0.2	2.5	-0.3	4.4	-0.3	6,398
At least 1 member w/mental disability (%)	2.0	0.0	0.6	0.1	1.3	0.1	6,398
At least 1 visit to/by doctor/nurse/healer (%)	36.9	2.9	10.5	-2.5	23.7	0.0	6,398
due to diarrhoea (%)	4.9	2.4	3.0	-0.1	4.5	1.8	1,467
due to digestive problems (%)	18.8	-9.1	20.8	6.5	19.2	-4.3	590

NTr: averages of communities not previously triggered. NTr-Tr: avg difference between those not previously triggered and those previously triggered. Stars indicate statistically significant differences. *p <0.10, ** p <0.05, *** p <0.01.

N: total number of observations. Standard errors clustered at the TU level.

Source: Household Data, Baseline.

Table 59: Previously triggered: Economic status of households

	Enugu		Ekiti		All		
	NTr	**NT-Tr**	**NT-Tr**	**NT-Tr**	**NTr**	**NT-Tr**	**N**
Total HH income, last year	119,884	29,939	177,497	401	148,794	15,693	6,395
Typical yearly HH income	165,449	31,886	396,813	187,833	280,092	108,594	5,118
Total HH expenditure	736,874	18,300	655,010	-38,924	692,802	-12,724	4,919
Food expenditures	381,667	6,073	307,680	-6,171	343,892	-787	5,543
Non-expenditures	276,946	33,623	267,933	-39,055	272,318	-3,645	5,890
Durable expenditure	48,459	-23,064	70,921	6,327	60,354	-7,555	5,398
HH has any savings (%)	20	0	30	0	20	0	6,271
HH has any debt (%)	20	0	20	0	20	0	6,395
HH had negative shock in the last year (%)	30	-10*	10	-1**	20	-1**	6,389

NTr: averages across households in communities not previously triggered. NTr-Tr: avg difference between those not previously triggered and those previously triggered. Stars indicate statistically significant differences. *p <0.10, ** p <0.05, *** p <0.01.

N: total number of observations. Standard errors clustered at the TU level.

Source: Household Data, Baseline.