Global Scaling Up Rural Sanitation Project

Scaling Up Rural Sanitation:

Findings from the Impact Evaluation Baseline Survey in Indonesia

Lisa Cameron and Manisha Shah

November 2010

wsp
water and
sanitation program

The Water and Sanitation Program is a multi-donor partnership administered by the World Bank to support poor people in obtaining affordable, safe, and sustainable access to water and sanitation services.

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Global Scaling Up Rural Sanitation is a WSP project focused on learning how to combine the approaches of CLTS, behavior change communications, and social marketing of sanitation to generate sanitation demand and strengthen the supply of sanitation products and services at scale, leading to improved health for people in rural areas. It is a large-scale effort to meet the basic sanitation needs of the rural poor who do not currently have access to safe and hygienic sanitation. Local and national governments are implementing the project with technical support from WSP. For more information, please visit www.wsp.org/scalingupsanitation.

This Technical Paper is one in a series of knowledge products designed to showcase project findings, assessments, and lessons learned in the Global Scaling Up Rural Sanitation Project. This paper is conceived as a work in progress to encourage the exchange of ideas about development issues. For more information, please email Lisa Cameron and Manisha Shah at wsp@worldbank.org or visit our website at www.wsp.org.

WSP is a multi-donor partnership created in 1978 and administered by the World Bank to support poor people in obtaining affordable, safe, and sustainable access to water and sanitation services. WSP's donors include Australia, Austria, Canada, Denmark, Finland, France, the Bill & Melinda Gates Foundation, Ireland, Luxembourg, Netherlands, Norway, Sweden, Switzerland, United Kingdom, United States, and the World Bank.

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SANITATION FOR ALL

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Acknowledgements

An integral component of the Water and Sanitation Program's Global Scaling Up Rural Sanitation Project, a cross-country impact evaluation (IE) study is being conducted in India, Indonesia, and Tanzania.

The World Bank's Water and Sanitation Program (WSP) Global Impact Evaluation Team in Washington, DC, leads the study, with the contribution of WSP teams and consultants in each of the participating countries. The baseline data collection for all countries was conducted during 2008 and 2009, and the reports have undergone several peer review processes.

The project's Global IE Team oversees the IE design, methodology and instruments, and manages the country teams. It is led by Bertha Briceno (in its early stages the Global IE was led by Jack Molyneaux), together with Alexandra Orsola-Vidal and Claire Chase. Professor Paul Gertler has provided guidance and advice throughout the project. Global IE experts also include Sebastian Galiani, Jack Colford, Ben Arnold, Pavani Ram, Lia Fernald, Patricia Kariger, Mark Sobsey, and Christine Stauber. In Indonesia, in-country IE design, field activities, and data analysis is led by principal impact evaluation investigators Lisa Cameron and Manisha Shah with research support from Ari Perdana and Ririn Purnamasari. Photographs courtesy of Lisa Cameron.

The task team leader for the project in Indonesia is Almud Weitz and Eduardo Perez is the global task team leader of the project. The country implementation team was led by Nilanjana Mukherjee, followed by the late Ratna Indrawati Josodipoero, and is now headed by Djoko Wartono. Nilanjana Mukherjee continues as an advisor. The country implementation team has benefited from the continuous support of WSP staff.

Peer review support was received from regional and global resource staff. The initial impact evaluation design was presented to the Ministry of Health and the Ministry of Education by the Impact Evaluation team in Jakarta, Indonesia in September 2007. Contributions to the initial impact evaluation concept design were received from the technical body of the National Department for Health Promotion (Ministry of Health) and the Environmental Education Department (Ministry of Education).

Executive Summary

Background

In response to the preventable threats posed by poor sanitation and hygiene, in December 2006 the Water and Sanitation Program (WSP) launched two related large-scale projects, Global Scaling Up Handwashing[1] and Global Scaling Up Rural Sanitation. These hygiene and sanitation interventions are designed to improve the health and welfare outcomes for millions of poor people. Local and national governments are implementing these projects with technical support from WSP.

The goal of Global Scaling Up Rural Sanitation is to reduce the risk of diarrhea and therefore increase household productivity by stimulating demand for sanitation in the lives of people in India, Indonesia, and Tanzania.

The project approach demands involvement from communities, local government, and the private sector. It aims to trigger the desire for an open-defecation free community by raising collective awareness of the open defecation problem. Facilitators are sent to communities to initiate participatory analysis of the communities' existing sanitation practices, and the consequences and implications of such practices for themselves. This process is designed to catalyze collective community desire and action to become open defecation free (ODF). The community must forge their own plan for making this happen with only limited follow-up support and monitoring from the program. Communities claiming to have become ODF are verified by local government agencies. ODF achievement by a community brings recognition and commendation from local and provincial governments. The project also seeks to stimulate the supply of appropriate sanitation products and services by conducting market research and training local artisans to build the relevant facilities.

To measure the magnitudes of the impacts, the project is implementing randomized-controlled trial impact evaluations (IE) study in order to establish causal linkages between the intervention (treatment) and the outcomes of interest. The IE uses household surveys to measure the levels of key outcomes. This report summarizes the findings of the baseline survey conducted in Indonesia and is part of a series of papers analyzing the baseline data from all countries where the project has been implemented.

Indonesia Intervention

WSP's Global Scaling Up Rural Sanitation Project, known as *Sanitasi Total dan Pemasaran Sanitasi* (SToPs) in Indonesia, aims to improve the sanitation practices in Indonesian rural communities, reaching a total of 1.4 million people in 29 rural districts in East Java by project end. The main components of the intervention include:

- **Community-Led Total Sanitation (CLTS)**, which aims to trigger the desire for an open defecation free community by raising collective awareness of the open defecation problem.
- **Social Marketing of Sanitation**, which aims to popularize improved sanitation via extensive consumer and market research that inquires into the sanitation solutions that people desire, the options available to them in the market, and their attitudes and knowledge of sanitation issues.
- **Strengthening the Enabling Environment**, which aims to support the development of policies and institutional practices that facilitate scaling up, program effectiveness, and sustainability on national, state, and local levels.

Methodology and Design

To accurately measure the long-term health and welfare impacts of these sanitation interventions, a proper impact evaluation (IE) methodology that establishes the causal linkages between the intervention and the outcomes of interest is needed. In order to estimate the causal relationship between the project (treatment) and the outcomes of interest, the construction of an accurate counterfactual is required—that is, a comparison group that shows what would have happened to the target group in the absence of the intervention. The IE methodology uses randomization to construct the comparison group. Communities are randomly selected to receive the treatment and the remaining serve as controls. If a non-random control group is used instead, a comparison of treated and untreated areas could confuse the program impact with pre-existing differences between each village, or *desa*. This is a particular problem if communities are chosen purposively as areas with a high

[1] For more information on Global Scaling Up Handwashing, See www.wsp.org/scalinguphandwashing.

likelihood of success because of favorable local conditions (strong leadership, existing water and sanitation infrastructure, highly educated populations, and so forth) or differences in terms of hygiene habits, lower motivation, or other factors that are difficult to observe. This is known as *selection bias*. A random control group avoids these difficulties by ensuring that the communities that receive the program are no different, on average, than those that do not.

In Indonesia, the project is being implemented in 29 rural districts (*kabupaten*) in East Java. Eight of those 29 districts are participants in the impact evaluation—a total of 2080 households in 160 sub-villages (*dusun*). The sample is geographically representative and representative of the households in rural East Java.

The evaluation measures a broad range of health indicators, and intensively studies the developmental, social, and economic welfare impacts of these interventions. The indicators were collected via an extensive baseline survey in September 2008, monthly longitudinal surveys conducted over a 15-month period, and an extensive follow-up survey in mid-2010.

Findings

The main findings of the IE baseline survey in Indonesia include:

- **Household Characteristics:** The average household included in the baseline survey has 4.6 members, and 1.1 children under five years of age. The average age of the household head is 39.3 years. Only 41.3% of household heads have attended school beyond primary school. Ninety-five percent of household heads are employed. The annual per capita income in the sample is approximately 3 million Indonesian *rupiah* (Rp) per annum. More than 80% of households own the house in which they live. The typical house has five rooms, with walls and floors made of concrete and a tile roof. Wood is the main fuel used for cooking.
- **Access to Sanitation:** Only 49% of the households have access to improved sanitation. Fifty-eight percent of households share facilities with other households; 38% of respondents report that they defecate in rivers. Open defecation is practiced in 55% of the poorest households versus 18% of the richest. Where a household does have a latrine, 36% of latrines are characterized as either dirty or very dirty by enumerators. In 13% of cases flooding was observed around the latrine. Fifty-four percent of toilets have a handwashing facility. Fifteen percent of women report feeling unsafe when using the facility at night. Of those who do not have a toilet, 68% of households report the probability of building a toilet in the next twelve months is either low or zero. Cost was reported as the main impediment by 87% of households.
- **Handwashing Behavior:** Ninety-eight percent of respondents self-report to washing their hands after defecating. Seventy percent of households report having a specific place for washing hands. For these households, soap and water were observed at the place in 47% of cases.
- **Access to Drinking Water:** The majority of households (87%) have access to an improved water source. This is high even among the poorest households (85%). The majority of households obtain water from protected dug wells (36%), tube wells (23%) and protected spring water (19%). Some households do, however, consume water from unsafe sources such as unprotected wells (10%). The water source is within their own yard for only 35% of households. Ninety-seven percent of households report that they boil their drinking water prior to drinking.
- **Media and Recall of Campaigns:** Thirteen percent of households recall having heard about a sanitation program. Five percent are able to report that they had heard about the project from the media. This varies from 10% in Ngawi where the program is more advanced to 0% in Banyuwangi, where implementation was yet to begin.
- **Child Care Environment:** Ninety-six percent of children under age two have been breastfed; on average breastfeeding lasts for eight months. Wealthy households breastfeed for three months less than poor households on average. Fifty-seven percent of babies receive a liquid other than breast milk within the first three days of birth. In 83% of cases this liquid is infant formula. Vitamin A supplements are given to 30% of children under two; 3.7% were

given iron pills. Most children (78%) appeared clean at the time of the interview. Only 19% of children have access to books and 77% of children have toys to play with.

- **Child Development:** An index of child development was developed for specific skills for age including communication, social-personal, and gross motor skills. A lower degree of development for every type of skill was systematically observed in children living in households without improved sanitation, without an improved water source, and without soap and water at the place designated for handwashing.
- **Diarrhea Prevalence:** Diarrhea prevalence in the baseline survey is relatively high, with 8.4% of children reporting having had diarrhea in the past two weeks. Prevalence of diarrhea is highest in those households without improved sanitation (6.5% in the previous 14 days versus 10.1%), without an improved water source, and without soap and water at places for washing hands. Diarrhea prevalence is negatively related to income. It also varies significantly across districts, being higher in the eastern part of East Java. Approximately 26% of children with diarrhea did not receive any treatment. Taking a pill or syrup was the most commonly reported treatment (51%), and 15.8% of children were given an oral rehydration solution.
- **Acute Lower Respiratory Infection (ALRI) Prevalence:** Only 2.9% of children had an ALRI in the past two weeks. ALRI prevalence is slightly higher in households without improved sanitation and without soap and water at places for washing hands.
- **Child Growth Measures:** In the participant households, the means of all child growth, or anthropometric measures (weight-for-height, height-for-age, body mass index, weight-for-length, head circumference-for-age) except for arm circumference are lower than the World Health Organization's standard population mean. Measures tend to be worse in households without access to improved sanitation and water sources.
- **Anemia Prevalence:** Almost 71% of children are anemic (having an HB level below 110g/L). Children are more likely to be anemic in households without improved sanitation and water sources.

Abbreviations and Acronyms

ALRI	Acute Lower Respiratory Infection
BCC	Behavior Change Communications
BPS	*Badan Pusat Statistik* (Central Board of Statistics)
C	Counterfactual or Control Group
CLTS	Community-Led Total Sanitation
Desa	Village
DHS	Demographic and Health Survey
Dusun	Sub-village or hamlet
Hb	Hemoglobin
HH(s)	Household(s)
HW	Handwashing
HWWS	Handwashing with Soap
IE	Impact Evaluation
IFLS	Indonesian Family Life Survey
JMP	Joint Monitoring Programme
Kabupaten	District
Kecamatan	Sub-district
MI	Madrasah Ibtidaiyah (Islamic religious education for primary school-age children)
OD	Open Defecation
ODF	Open Defecation Free
PKK	*Pembinaan Kesejahteraan Keluarga* (Family Welfare Movement)
PODES	*Potensi Desa* (Village Potential Survey)
Propinsi	Province
SToPS	*Sanitasi Total dan Pemasaran Sanitasi* (Indonesian translation of project title)
T	Treatment Group (communities who received triggering activities)
UNICEF	United Nations Children's Fund
VIP	Ventilated Improved Pit
WHO	World Health Organization
WSP	Water and Sanitation Program

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I. Overview

1.1 Introduction

In response to the preventable threats posed by poor sanitation and hygiene, in December 2006 the Water and Sanitation Program (WSP) launched two large-scale projects, Global Scaling Up Handwashing and Global Scaling Up Rural Sanitation, to improve the health and welfare outcomes for millions of poor people. Local and national governments are implementing these projects with technical support from WSP.

Global Scaling Up Rural Sanitation aims to improve sanitation for at least 4.5 million people in service to a much larger goal: to develop evidence-based knowledge, tools, and resources that can be used to improve access to sanitation for billions of people. The project has been implemented in two states in India, 29 districts in East Java, Indonesia, and 10 districts in Tanzania. The diversity of the project areas has allowed WSP to learn how to adapt its rural sanitation strategies to a variety of social, economic, political, and cultural contexts.

WSP's approach recognizes that simply improving sanitation infrastructure will not solve the sanitation problems, and that individuals are more likely to demand and use new or improved latrines following a change in perceptions regarding sanitation. Behavioral shifts must precede new infrastructure. Globally, the project approach combines three core programmatic elements: Community-Led Total Sanitation, Behavior Change Communications, and Social Marketing of Sanitation in order to change sanitation-related behaviors and improve access to—and use of—improved sanitation facilities. These elements are designed to promote demand for and supply of sanitation in order to change behaviors, and ultimately, to improve the health and well being of rural families. Through Community-Led Total Sanitation (CLTS), participating communities implement, monitor and enforce total community compliance to appropriate sanitation standards. CLTS projects have already been successfully piloted in Bangladesh, India, and Indonesia. Behavior Change Communications (BCC) can supplement CLTS in motivating communities to become open defecation free, sustain long-term behavior, and move up the sanitation ladder. Social Marketing of Sanitation interventions help develop the capacity of local artisans to efficiently supply and effectively market sanitation facilities that respond to consumer preferences and also meet the total community sanitation technical requirements. Sanitation marketing techniques have been successfully piloted in Vietnam and in Africa.

In addition, WSP supports policy reform at the national government level to create an enabling environment for large scale sustainable sanitation programs, strengthen the capacity of local governments to operationalize the sanitation policies, and assist the local private sector in producing sanitation products and services. WSP is incorporating a rigorous impact evaluation (IE) component to support thoughtful and analytical learning, combined with performance monitoring and evaluation, effective knowledge dissemination, and global advocacy strategies.

The process of learning is critical to the project's success. As part of these efforts, WSP is implementing an IE to document both the magnitude of health and child development impacts and the relevant project costs of the interventions. The IE uses a randomized controlled experimental design in each of the three countries to establish the causal effect of the intervention (treatment) on specific health and welfare outcomes. The IE includes several rounds of household and community surveys: pre-intervention (*baseline*), concurrent (*longitudinal*), and post-intervention (*endline*). The surveys are designed to collect information on the characteristics of the eligible population and to track changes in desired outcomes.

This report is one of a series of reports presenting descriptive findings from the baseline impact evaluation surveys conducted in 2008 and 2009 in each country where the project has been implemented.

Global Scaling Up Projects Impact Evaluation Rationale and Aims

The overall purpose of the IE is to provide decision makers with a body of rigorous evidence on the effects of the handwashing and sanitation projects at scale on a set of relevant outcomes. It also aims to generate robust evidence on a cross-country basis, understanding how effects vary according to each country's programmatic and geographic contexts, and generate knowledge of relevant impacts such as child cognitive development, child growth (anthropometric) measures, anemia, acute lower respiratory disease, and productivity of mother's time, among many others.

The studies will provide a better understanding of at-scale sanitation and hygiene interventions. The improved evidence will support development of large-scale policies and programs, and will inform donors and policy makers on the effectiveness and potential of the Global Scaling Up projects as massive interventions to meet global needs.

1.2 Project Background

In the Indonesian study site of rural East Java about 40% of households defecate in the open, in fields, on beaches, or, most commonly, in rivers. This open defecation means that feces are being tracked through the villages and into people's houses where it is ingested, becoming a root cause of diarrhea. Diarrhea is one of the main causes of death among young children in Indonesia. WSP's Global Scaling Up Rural Sanitation Project, known as *Sanitasi Total dan Pemasaran Sanitasi* (SToPs) in Indonesia, aims to improve sanitation practices in Indonesian rural communities. It is a large-scale, community-targeted and community-driven sanitation intervention, which ultimately aims to improve the health and welfare outcomes for millions of people in rural areas. WSP's approach demands involvement from communities, local and national government, and the local private sector. It is an innovative initiative with the goal to generate sanitation demand at scale and increase the supply of sanitation products and services. The project approach differs from the government's previous established sanitation policies of providing infrastructure and/or subsidies and instead involves sending facilitators to villages to initiate participatory analysis of existing sanitation practices, and the consequences and implications of such practices for themselves.

In Indonesia, the project's programmatic approach consists of three main components:

Community-Led Total Sanitation (CLTS)

The focus of this component is to stop open defecation. It aims to trigger the desire for an open-defecation free community. It does this by raising collective awareness of the open defecation problem. Facilitators are sent to communities to initiate analysis and discussions of the sanitation situation. These discussions are held in public places and are open to all. They involve a "walk of shame" where villagers are asked to provide a tour indicating where people defecate. The facilitator helps people analyze how fecal contamination is spreading from the exposed excreta to their living environments and food and drinking water. A map of the village is drawn on the ground and villagers are asked to indicate where they live, where they defecate, and the routes they take there and back. It soon becomes apparent that everyone is ingesting small amounts of each other's feces (to people's horror and embarrassment). This inevitably leads to personal and collective decisions to be free of the hazard by becoming an open-defecation free (ODF) community. They must forge their own plan for making this happen with only limited follow-up support and monitoring from the program. ODF status is verified by local government agencies. Communities achieving ODF status receive recognition and commendation from local and provincial governments.

Social Marketing of Sanitation

The focus of this component is to popularize improved sanitation. It involves extensive consumer and market research that inquires into the sanitation solutions that people desire, the options available to them in the market, and their attitudes and knowledge of sanitation issues. The component develops targeted communications campaigns and enhances the supply of a range of sanitation goods and services that are responsive to preferences and economic capacities of all consumer segments. The latter component also involves the training of local artisans to meet the increased demand for specific products that is generated as a result of CLTS facilitation sessions.

Co-Principal Investigator Manisha Shah (center) and villagers gather around a latrine they have manufactured

Strengthening the Enabling Environment

This component aims to support the development of policies and institutional practices that facilitate scaling up, program effectiveness, and sustainability. These include national, state, and local government sanitation policies; sanitation program financing, implementation and management practices; fiscal rewards for results consistent with policies; training and accreditation of facilitators, masons, and vendors; and regulation and support of local private sector investment in improving sanitation.

1.3 Objectives of the Study

The overall objective of the project is to improve the health of populations at risk of diarrhea, especially in children under the age of five years, through highlighting the negative health consequences of poor sanitation. The impact evaluation provides a unique opportunity to learn what health and welfare impacts can be expected from sanitation improvements. If, as expected, the evaluation finds strong health and child development impacts of improved sanitation, the study will be an important promotional tool for expanding the program across the nation. But to generate the support needed for a national program, the evidence must be clear and compelling. It is therefore important that the impact evaluation use widely accepted impact evaluation protocols and that it disrupts the planned program as little as possible.

The impact evaluation assesses the effects of the project on individual-level sanitation behaviors, community-level collective behaviors, and the program's impact on the health and welfare of young children (under five years of age). It examines the impact on a broad range of health indicators and intensively studies the developmental, social, and economic welfare impacts of these interventions. Health outcomes that are explicitly planned in the study include:

- Diarrhea prevalence;
- Stunting and wasting;
- Iron deficiency anemia (through minimally invasive finger-prick tests);
- Parasitic infestations (from fecal samples); and
- Cognitive and motor development.

Some of the non-health indicators are:

- School attendance, academic performance, and future earnings;
- Productivity of mother's time for household, market, and social activities; and
- Female empowerment and security due to safer sanitation conditions.

The purpose of this report is to provide baseline information for the selected indicators and outcomes of interest included in the survey.

II. Methodology

2.1 Randomization

To address the proposed research questions, a proper IE methodology that establishes the causal linkages between the intervention and the outcomes of interest is needed. In order to estimate the causal relationship between the project (treatment) and the outcomes of interest, the construction of an accurate counterfactual is required—that is, a comparison group that shows what would have happened to the target group in the absence of the intervention. In the case of the project, which will be implemented and in place over a two-year period, it is possible that factors such as weather, macro-economic shocks, or other new and ongoing public health, nutrition, sanitation, and hygiene campaigns, for example, could influence the same set of outcomes that are targeted by the project (e.g., diarrhea incidence in young children, health, and welfare). To account for factors external to the intervention, counterfactuals are created using comparison groups (control) that are equivalent to the treatment group on every dimension (observed and unobserved) except for the treatment, and thus account for time-varying factors that may affect the target population. Since a good counterfactual approximates what would happen to treated groups in the absence of the treatment, any differences in the average outcome measurements of treatment and control groups following implementation can be understood as the causal effect of the intervention.

The randomization process, by which a random selection of communities receives the treatment and the remaining serve as controls, generates an appropriate counterfactual for the purposes of the impact evaluation. Random assignment of treatment to a sub-set of communities can ensure that the treatment and comparison groups are equal on average, and thus that an appropriate counterfactual can be measured. A randomized experimental evaluation with a comparison group is valuable because it reduces the possibility that observed before-to-after changes in the intervention group are due to factors external to the intervention. If no control group is maintained and a simple pre- to post-assessment is conducted of the project, changes in outcomes cannot be attributed to the intervention with certainty.

The use of a random control group also helps to prevent other problems that affect the inference about the effects of the intervention. For example, communities that are chosen purposively as areas with a high likelihood of success for programs such as the project because of favorable local conditions (strong leadership, existing water and sanitation infrastructure, highly educated population, and so forth) are likely to be different from areas that are considered less desirable for implementation. If a non-random control group is used, a comparison of treated and untreated areas would confuse the program impact with pre-existing differences, such as different hygiene habits, lower motivation, or other factors that are difficult to observe. This is known as *selection bias*. A random control group avoids these difficulties, by ensuring that the communities that receive the program are no different on average than those that do not.

In Indonesia, WSP is working with local and national government and the local private sector to implement the project in rural East Java. East Java's 29 rural districts have been divided into three groups: Phase 1 districts are the first to receive the program, Phase 2 districts receive it next, and Phase 3 districts are the last to receive it. The evaluation is being conducted in Phase 2 districts. Phase 2 was chosen largely on the basis of timing. Evaluating the program in Phase 2 districts provides sufficient time for the baseline survey to be conducted prior to program implementation. Many of the start-up issues confronted in Phase 1 were also sorted out by Phase 2 and so the evaluation will provide an impact estimate which is more representative of what could be expected from a national scaling–up of the program following such large scale piloting. Districts participating in Phase 2 of the project were asked if they were willing to also participate in the evaluation. All of the eleven original Phase 2 districts responded that they were. Eight districts were ultimately chosen,

again on the basis of the timing of the interventions, for a total of 160 sub-villages.[2] The representativeness of these districts is discussed in Section 3.1.

In each of the participating districts, the impact evaluation team randomly selected 10 pairs of villages. Each pair consists of one treatment village and one comparison village from the same *kecamatan* (sub-district). A village in Indonesia has various communities or sub-villages, and the project intervention occurs at the sub-village level. At least one community in the treatment village will receive the full project intervention that has been developed to help communities achieve ODF status. No communities in the comparison villages will receive the project intervention.

The Indonesian administrative structure is shown in Figure 1. Figure 2 shows the administrative structure in relation to the impact evaluation in East Java.

The timeline of the IE is shown in Figure 3. To obtain the information necessary for the evaluation, the impact evaluation team commissions household survey in each sub-village involved in the evaluation. The data collection effort includes extensive baseline household survey and an extensive follow-up endline household survey. A community survey is also collected alongside each of these surveys to collect information about the communities. In addition to these surveys, a series of monthly (approximately) shorter follow-up questionnaires are administered to households for a period of 18 months following the baseline and prior to the endline survey. These focus on a limited number of variables, including diarrhea prevalence and program implementation. Details of the contents of these surveys are provided in Section 2.4. The baseline survey was conducted August–September 2008 before the project was implemented in the treatment sub-villages. The shorter monthly monitoring surveys are currently being conducted. The follow-up post-intervention survey is scheduled for late 2010.

[2] Because some of the funds to be used in the intervention are contributed from district governments' own budgets, the districts have some control over the timing of the intervention. For example, Jember is a Phase 2 district but when they were visited prior to the official start of Phase 2 implementation, they had already implemented the program in many of their villages. For this reason, they were excluded from the sample. Tuban was excluded on the basis that implementation there was delayed due to severe flooding in the region. Districts were allotted to a phase on the basis of their readiness to begin the program as well as geography. This often reflected the financing schedules in the districts, since this determined their ability to gather the requisite funds.

FIGURE 1: INDONESIAN ADMINISTRATIVE STRUCTURE

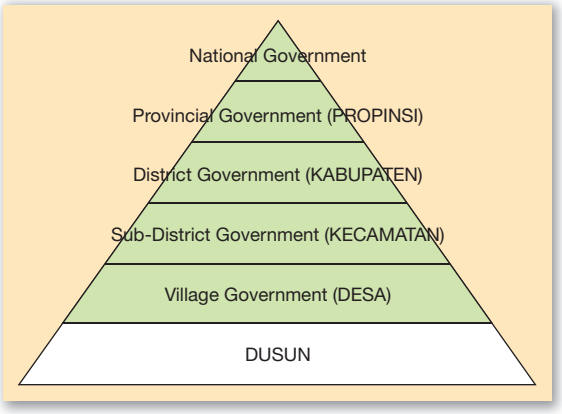
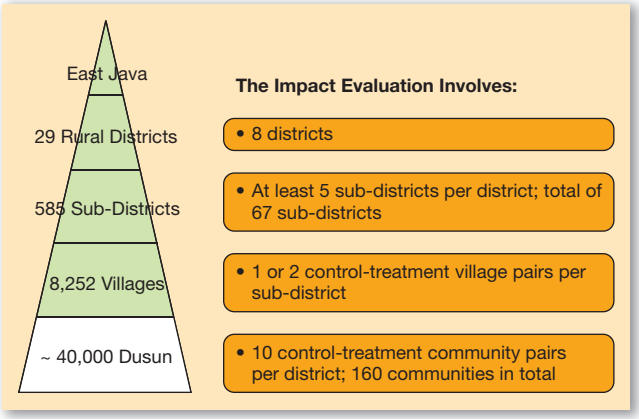


FIGURE 2: EAST JAVA ADMINISTRATIVE STRUCTURE



2.2 Sampling Strategy: Selecting Sub-Villages

A total of 160 sub-villages from eight districts are participants in the IE. From each district, 10 treatment and 10 control villages were randomly chosen to participate in the IE. Local government offices from each district gave the IE team a list of at least 30 villages where the program could be implemented. Most district offices gave the IE teams lists of 40–70 villages. These are villages the districts had chosen to

FIGURE 3: TIMELINE OF THE IMPACT EVALUATION

May–July 2008	August–September 2008	October 2008–December 2009	Late 2010
Participation Agreement from Phase 2 Districts		Baseline Data Analysis	
District Propose Communities	Baseline Survey	Sanitation Triggering Activities	Endline Survey
Random Selection and Assignment		Monitoring Survey	

participate in the project based on sanitation needs, poverty levels, access to water, and so forth.[3] Using a random number generator in STATA, the IE team randomly selected 10 treatment and 10 control villages from each district list. The IE team then sent the list of 20 villages back to the district government office (without telling them which villages had been selected as control and treatment villages). The reason for this is that the project is actually implemented at the *dusun*, or sub-village level. Villages generally have two to three sub-villages. Wanting the same selection criteria to be used for the selection of sub-village for both the treatment and control villages, the IE team asked each district office to provide the sub-village names for all 20 villages. District offices were told that some would be the treatment and others the control. Once the IE team received the sub-village lists from the district offices for all 20 villages, the district offices were told which villages were in the treatment group and which ones were in the control group. The district offices committed that they would do everything possible to make sure the treatment *dusun* were treated and the control *dusun* remained untreated. There was some concern by local program implementers that the program might spread like "wildfire" and that it would be difficult to deny control villages the program. However, sample sizes were selected based on this possibility and it does not appear that many control villages have been contaminated.

2.3 Sampling Strategy: Selecting Households

Listings were done in each sub-village in control and treatment villages to gather information on the universe of households with children under the age of two years. These listings were based on information provided by the community health cadre. Thirteen households were then randomly selected from the listing to participate in the baseline survey. These 13 households were given priority

[3] The IE has internal validity but not external validity in that villages were not randomly chosen from the universe of villages. Different districts chose villages on the basis of different indicators. For example, some districts chose to include villages that had recently participated in water supply programs, whereas other districts explicitly chose to exclude such villages. The sample thus reflects the variety of ways in which government officials generally choose villages for a sanitation program so internal validity is sufficient under these circumstances. That is, the evaluation will provide estimates of the average impact expected given the way governments select villages for such programs. The impact of the different bases for the choices can be examined as part of the evaluation.

rankings so that survey teams knew to interview those households. When one of those 13 households was unavailable to participate, it was replaced by another household chosen randomly from the listing. Detailed replacement methods are described below. In some of the sub-villages, there were not enough households with children under the age of two years. In those cases, information on households with children under age five was also collected. These households were ranked with priority rankings based on the total number of child under the age of two years, under the age of three years, under the age of four years, under the age of five years. Households with younger children were given a higher priority.

Households in the sample are households with at least one living child under the age of two (unless there were not a sufficient number of households with children under two in the sub-village). If the child under age two had died or moved since the listing was conducted, the decision making process was as follows:

1. Are all listed children under age two in this household deceased? If yes, is there another child under age two in this household? If yes, conduct interview. If no, replace the household.
2. If the child under age two is still alive at the listing time, there are three possibilities:
   a. Still alive and at same address for baseline survey: ➡ interview
   b. Household moved but still lives in the same village: ➡ find and interview
   c. Child under age two lives in another household that is in the target household list (and there is no other child under age two in this household): ➡ interview and add this household as replacement to be interviewed.
3. Households with children under age two that have moved out of the village: ➡ replace.
4. Household replacement also applies in these cases:
   a. after four hours, the household still does not have a completed interview. This could happen in households that contain only busy adults.
   b. Household with children under age two refuses to be interviewed. The supervisor must pay a visit to the household reported by interviewer and help solve any problems. If after the supervisor visit, the household still refuses, then replace it.
   c. Duplicate household. A household can be a duplicate if the head of household's name, with the same characteristic shows up more than once on the household list targeted to be interviewed in an enumeration area. In this case, only interview the household with the smallest number and replace the other household.
   d. Household cannot be reached after four hours. This could happen if (i) all household members are out of town; (ii) adult household members are too busy to meet: ➡ replace.
   e. Household on the pre-printed data listing are unknown to village authorities and villagers: ➡ replace.

All replacements must be authorized by a supervisor.

2.4 Sample Size

The sample size calculations used the estimate of intra-cluster correlation in diarrhea prevalence from Luby et al. (2006). This estimate was calculated using data from weekly household surveys in Karachi, Pakistan, over 37 weeks. The mother or other caregiver was asked if the children had diarrhea (three or more loose stools within 24 hours) in the preceding week, and, if so, for how many days. Typically, field workers visited each household twice during the week to ensure that episodes of diarrhea from both early and late in the week were recalled. No such data are available for Indonesia. Access to the Luby data is beneficial, but the sample size calculation is obviously sensitive to the underlying assumption that the intra-cluster correlation in Indonesia is the same as in Pakistan. The calculations also relied on diarrhea prevalence rates calculated from two Indonesian sources—the Indonesian Demographic and Health Survey (DHS) from 2007 and the Indonesian Family Life Survey (IFLS) from 2000.

Repeated observations of diarrhea prevalence is collected before treatment to provide significant efficiency gains by producing a more precise baseline estimate for each

household. If we have four observations for each household before treatment (which is the case in the majority of the villages in the IE),[4] then the calculations suggest that the sample size of 13 households per cluster (80 clusters) should be sufficient to allow the detection of a 20% decrease in diarrhea prevalence (even allowing for non-compliance of 30%). Calculations using the diarrhea prevalence rates from the baseline survey, which are lower than in the DHS and IFLS (and which will be discussed below), also support this.

[4] In approximately seven of the villages, program implementation occurred prior to the third round of the longitudinal survey (which, together with the baseline survey, constitutes four observations). However, even in these villages there were no sanitation improvements prior to the third round of the longitudinal survey.

2.5 Variables for Data Analysis

The IE aims to estimate the effects of the project on sanitation-related behaviors and to document impacts on health and welfare, particularly among young children. In order to capture the intermediate and longer-term effects of the project, the IE is designed to measure a range of outcomes including diarrhea, growth, nutrition, anemia, education, and productivity, to name a few. Box 1 and Box 2 provide an overview of the variables that are being measured in the IE as well as how they are being measured.

2.6 Instruments for Data Collection

The IE requires four data collection activities/instruments in order to accomplish its objectives:

BOX 1: HEALTH AND WELFARE IMPACTS

What Does the Evaluation Measure?	How Is It Measured?	Measuring Instrument
Diarrhea prevalence	Caregiver reported health calendar	Household questionnaire
Productivity of mother's time	Time lost to own and child illness	Household questionnaire
Education benefits	School enrolment and attendance	Household questionnaire
Child Growth and Nutrition	Anthropometric measures: weight; height; arm; head circumference	In-household collection of anthropo-metric measures
Child development	Cognitive and motor development	Ages & Stages Questionnaire
Iron deficiency anemia	Hemoglobin test	In-household collection and analysis (HemoCue)
Environmental contamination *(not collected in baseline, but will most likely be collected in endline survey)*	Prevalence of *E.coli* in: drinking water; hand rinse (of caregiver and children); sentinel toy	In-household collection of samples, and microbiological analysis in lab
Parasite prevalence *(not collected in baseline, but will most likely be collected in endline survey)*	Parasite prevalence on fecal samples	In-household collection of samples, and parasitological analysis in lab

BOX 2: HANDWASHING OUTCOMES

What Does the Evaluation Measure?	How Is It Measured?	Measuring Instrument
Handwashing with soap behavior	Self-report handwashing with soap behavior	Household questionnaire
	Direct observation of access to a place for washing hands with soap and water	Household questionnaire as observed by enumerator

1. A baseline and follow-up household survey
2. Collection of household biometric indicators
3. A high frequency (approximately monthly) survey that revisits households with young children
4. A baseline and follow-up community survey

Household Baseline Survey 2008

A baseline survey was conducted in both treatment and control communities. The household survey instrument required 120 minutes to administer and included:

1. Household roster (including individual demographics)
2. Household economy module (including household income and assets)
3. Household labor force activity for working-age adults
4. School attendance for school-age children
5. A health nutrition and child development module to record recent illness of all household members, household nutrition information, and a young child "Ages & Stages" module used to document cognitive and functional development of children under three years of age
6. Physical characteristics of the household with regard to sanitation, hygiene and water facilities, as well as other major housing facilities and amenities
7. Sanitation and hygiene knowledge, attitudes, and practices designed to document the impact of behavioral change interventions

Household Biometrics

The data collection activities included biometric sampling for:

1. Hematocrit blood iron tests
2. Heights and weights of household members

Monthly Data Collection: Local Health Cadres

All households also participate in the longitudinal survey in order to monitor the diarrheal disease prevalence of household members, as well as several additional household and individual level indicators. Data are collected on:

1. Recent histories of diarrhea and respiratory infections
2. A brief module on knowledge, attitudes and practices related to the sanitation interventions
3. Questions to document the status of the program intervention

Community-Level Surveys

Informed community respondents were interviewed in order to document specific, relevant community activities and facilities. Village heads were asked about the population of the village, village administrative posts, and the plans for the project in the village. *Dusun* heads were asked similar questions about the community. The community Family Welfare Movement (PKK) representative was the respondent for a further section that included questions about community sanitation.[5] Together these three modules document program interventions, environmental and health shocks, community access to transportation, market, health, education, and other relevant infrastructure.

[5] The PKK is a government-sponsored organization that aims to improve family welfare in rural areas with a primary focus on women. The leader is the wife of the most senior male public servant in the community.

An enumerator collects a blood sample from a child in rural East Java

2.7 Field Protocols

Survey Meter was contracted to conduct the fieldwork for the baseline survey. Country investigators, researchers affiliated with the project's global impact evaluation team, and Survey Meter researchers trained field supervisors on all data collection protocols and instruments. Survey Meter researchers and supervisors and the principle investigators then trained field teams. Various field teams, each with three members (one field supervisor and two enumerators) conducted the fieldwork. East Java was split into three regions (east, west, and central) and three to four teams were sent to each region. Two field executives oversaw all of the work in East Java.

The questionnaires and field protocols are available from the authors upon request.

III. Sample Representativeness

3.1 Geographic Representativeness

East Java is a densely populated province, or *propinsi*, with a significant rural population. The majority of East Java is flat (0–500m above sea level) and relatively fertile. About 35 million people live in its 47,000 square kilometers of land. It thus has more than 700 people per square kilometer. Over 70% of the population, or 25 million people, live in rural areas. In almost half of all rural villages, village leaders report that the majority of households do not have access to a toilet and the incidence of diarrhea and related diseases is high.

The location of the eight IE districts is shown in Figure 4. The districts are fairly well spread out through East Java: Probolinggo, Bondowoso, Situbondo, and Banyuwangi in the east of the province and Ngawi, Madiun, Jombang, and Blitar in the west of the province. Table 1 indicates the sample of villages is highly geographically representative of the eight districts from which they are drawn. They are also largely representative of the province of East Java and the whole of Java (where about 60% of Indonesians live) although slightly more likely to be on a river and less likely to have access to sanitation.

In the sample, 76% of communities are on flat ground, 15% are in mountainous areas, and 8% are on the coast. Twenty-two percent of communities are on the edge of forests and 77.5% are outside forests. All of the sample

FIGURE 4: TREATMENT AND CONTROL VILLAGES (DUSUN) IN EAST JAVA

villages are accessible by four-wheeled vehicle which is indicative of the high population density and relatively good transport infrastructure across Java. Ninety percent are located on a river, which is important in terms of sanitation, since rivers are often the main place of defecation if toilets are not available. Table 1 also presents some descriptive statistics on the main type of sanitation in the villages. Again the sample villages are nearly identical to that of all the Phase 2 districts, with slightly poorer sanitation than East Java and Java as a whole, but better than for the whole of Indonesia. According to the 2008 PODES, a nationwide survey of villages, 61% of the villages in the sample use private toilets as their main sanitation facility, 4.9% have shared toilets, and 32.9% of villages have no sanitation facility.

TABLE 1: GEOGRAPHIC REPRESENTATIVENESS (EXPRESSED AS PERCENTAGE OF THE WHOLE)

	Indonesia	Java	East Java	8 Districts	Sample
Geography:					
Coast	14	5.3	7.2	6.4	8.1
Valley	6.7	1	0.94	0.37	0.6
Hills	22.5	23.2	15.7	17.5	15
Flat	56.8	70.4	76.2	75.8	76.3
In forest	3.3	1.4	1.6	2.3	0
On edge of forest	23.4	18.4	18.5	23.1	22.5
Outside forest	73.3	80.2	80	74.6	77.5
On a river	73	81.7	79.7	89.5	90
Main Type of Sanitation:					
Own toilet	54	67.5	68.4	61.4	0.6
Shared toilet	3.8	3.8	4.2	4.9	4.4
Public toilet	4.8	2.8	0.7	0.8	0.0
No toilet	37.4	25.9	26.7	32.9	32.5
Main Religion:					
Islam	73.1	99.67	99.25	99.1	99.1
Accessible by four-wheeled vehicle	88	98.3	98.8	99.3	100.0

Note: The statistics in Table 1 (aside from the project sample data) are calculated using the 2008 PODES *(Potensi Desa)* data. PODES is a village census conducted by the Indonesian Statistical Agency (BPS) every three years.

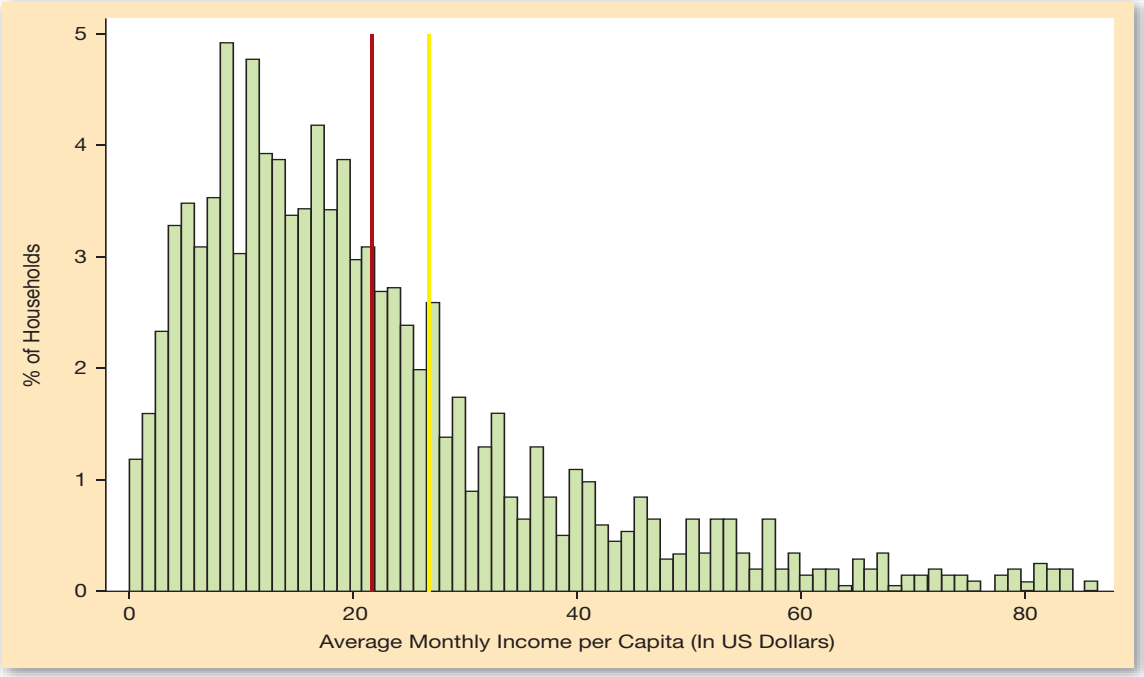
3.2 Household Representativeness

Figure 5 shows the income distribution of the sample population. The sample is relatively poor as it covers only rural areas in East Java. The majority of the sample households live below the national poverty line (shown by the red line in the figure). Average monthly per capita household expenditure in the sample is US$26, only US$5 above the Indonesian poverty line (US$21).

3.3 Comparison Between Baseline Study and DHS Data

In Tables 2 and 3, some basic household characteristics from the project sample are compared with the 2007 Demographic and Household Survey (DHS). The tables also report summary statistics from the DHS for Indonesia as a whole and for East Java separately.[6] On average, the project sample is younger than the DHS—almost 25% of children under age five make up the

FIGURE 5: INCOME DISTRIBUTION OF THE TARGET POPULATION FOR THE SANITATION PROJECT IN INDONESIA



[1] US$1 = 9,225 Indonesian *rupiah* (Rp)

[2] The yellow line (US$26.80) indicates the average monthly household income per capita in the sample.

[3] The red line (US$21.70) indicates the Indonesian poverty line (source: *Protecting Present and Future Generations from Poverty*. The World Bank Office. Jakarta, 2010).

[4] 60% of the households in the sample are below the Indonesian poverty line.

[5] For ease of interpretation, 75 households with per capita income below US$87 are not displayed, however values are included in calculation of mean income per capita for the sample.

[6] An important point to note is that the DHS East Java sample size is relatively small (only 5% of East Javanese households were interviewed in the DHS), and thus is unlikely to be representative of the province.

TABLE 2: AGE DISTRIBUTION OF BASELINE SURVEY AND 2007 DHS

	Project	DHS-Indonesia	DHS-East Java
Age Group:			
0–4	24.6%	10.9%	8.2%
5–9	7.4%	10.9%	8.5%
10–14	5.5%	10.2%	8.8%
15–19	4.3%	8.8%	7.4%
20–24	8.8%	8.3%	7.3%
25–29	11.4%	8.8%	7.9%
30–34	10.1%	8.0%	7.7%
35–39	7.8%	7.5%	8.1%
40–44	5.0%	6.3%	7.3%
45–49	3.9%	5.5%	6.9%
50+	11.2%	14.9%	21.8%
Average age (years)	24.0	27.5	32.2
No. of Children Under Five:			
1	88.1%	56.9%	68.2%
2	11.2%	32.5%	27.7%
3	0.8%	9.2%	3.8%
3+	0.0%	1.4%	0.3%
Average no. of children under five	1.1	0.6	0.4

TABLE 3: EDUCATIONAL ATTAINMENT OF HOUSEHOLD MEMBERS

	Project Sample	DHS-Indonesia	DHS-East Java
Highest Education Achieved (% of HH Members >5 Years Old):			
Less than primary	2.6%	8.1%	14.1%
Primary	52.2%	45.5%	47.8%
Secondary	35.1%	39.4%	32.2%
Higher	3.2%	6.7%	5.7%
Other	6.8%	0.3%	0.2%

project sample in comparison to 11% in the DHS. This difference is due to the fact that the IE survey prioritized households with younger children (since the primary interest is in the impact of sanitation on child health outcomes). To be listed for the project survey, a household had to have at least one child under the age of five. As can be seen from the lower panel of Table 2, 88% of the households in the project sample have children under the age of two and the figures are 57% and 68% in the DHS sample for Indonesia and East Java, respectively.

One important factor influencing many of the outcomes is the level of education of the household members. Table 3 compares level of schooling for individuals age five years and above. The project sample shows a slightly higher

TABLE 4: SELECTED KEY IMPACT EVALUATION VARIABLES OF DHS AND PROJECT SAMPLE

	DHS–Indonesia		DHS–East Java		Project Sample	
	N	Mean	N	Mean	N	Mean
Children Under Five Years Old:						
Diarrhea symptoms—previous two weeks	17,891	0.1369	536	0.1327	2344	0.084
Cough—previous two weeks	17,891	0.3657	536	0.4424	2352	0.290
Children Under Two Years Old:						
Currently breastfed	7,251	0.7851	209	0.7831	2107	.7988
Ever breastfed	7,251	0.9634	209	0.9633	2107	0.964
Given breast milk within one hour of birth	7,251	0.4032	209	0.4545	2107	0.210
Last night given milk from bottle	7,251	0.3113	209	0.3171	2107	0.284
Received Vitamin A supplement in past six months	7,251	0.5227	209	0.5494	2107	0.718
Water and Sanitation in Household:						
Toilet shared with other HH	40,701	0.0923	1,873	0.0554	2087	0.582
Treating water before drinking:	40,701	0.9274	1,873	0.9140		
Boil	37,118	0.9765	1,695	0.9622	1946	0.969
Put chlorine	37,118	0.0120	1,695	0.0036	1935	0.001
Filter	37,118	0.0457	1,695	0.0836	1935	0.011
Let it stand and settle	37,118	0.2562	1,695	0.1660	1938	0.094
Improved sanitation	40,701	0.7615	1,873	0.7650	2087	0.485
Improved drinking water source	40,701	0.5822	1,873	0.6162	2086	0.873

proportion of those with primary schooling than the DHS, while the DHS has higher fractions reporting completed secondary school and higher. Most of the differences in schooling levels are likely to be attributed to the rural nature of the sample, whereas the DHS sample covers both cities and other urban centers in which urban dwellers tend to have higher level of education.

The data provided in Table 4 provides a comparison between the project sample and the DHS for the key impact evaluation variables, namely children's health symptoms, household water sources, sanitation, and breastfeeding behavior. Diarrheal prevalence in the project sample is lower than in the DHS (8.4% versus 13.7% for Indonesia and 13.3% for East Java). The number of children reporting having a cough is also lower in the project sample (29% versus 37% for Indonesia and 44% for East Java).

Households in the sample have poorer sanitation access than is reported in the DHS. The proportion of households with improved sanitation is markedly lower (49% versus 76% in the DHS) and the number of households who have improved sanitation and report sharing a toilet is also much higher. This most likely represents the rural nature of the sample, whereas the DHS sample covers cities and other urban centers that are not part of the sample. This may also explain the difference in the prevalence of symptoms among young children, although this could reflect seasonality in symptoms as the surveys were conducted at different times of the year.

The statistics describing drinking water are very similar in the two data sources. The breastfeeding statistics are also similar. Finally, more children in the sample have received a vitamin A supplement than is reported in the DHS.

The results in this section illustrate that the households in the IE are fairly representative of poor rural households. The IE population is obviously poor in relation to the whole country; however, this is to be expected since this program targets poor communities without access to improved sanitation. This section also speaks to the potential of moving to similar regions in Indonesia if the project were to be scaled up further in the future.

IV. Findings

This section presents the evidence and information related to water and health in a broad sense, encompassing sanitation, drinking water supply, and hygiene. Table 5 presents descriptive statistics for the project sample with regards to improved water supply, sanitation, and hygiene condition disaggregated by geographic region.[7] While the majority of the sample uses drinking water from improved sources, almost 50% of the households do not have access to improved sanitation. Almost 40% of households are still engaged in open defecation. Use of unimproved sanitation is almost two times higher in the eastern districts than the western districts of East Java. With regards to the availability of water and soap at the place for washing hands, 47% of the households reported having both soap and water at the place for washing hands, though there is heterogeneity across different geographic areas. The proportion is higher for those households in the western districts.

Table 6 extends Table 5 by breaking the sanitation and hygiene statistics by income quartile. Income is generated using self-reported income (labor and non-labor income) from all household members. The use of improved sanitation and the availability of water and soap is substantially lower among the poor. Specifically, the proportion of the richest 25% of households who have improved sanitation is 2.6 times higher than the poorest 25% of the sample, while the magnitude is slightly smaller (about two times) with respect to the availability of water and soap. In addition, poorer individuals are more likely to engage in open defecation. To get a sense of whether there is any relationship between these four variables, we construct a correlation matrix for these variables. The results in Table 7 reinforce the relationship between income and access to improved sanitation as well as the availability of water and soap at the place for washing hands. The

[7] The definition of improved sanitation facilities and water source are based on the definition used by the WHO/UNICEF (2008) Joint Monitoring Programme for Water Supply and Sanitation (JMP). Improved sanitation facilities include (i) a flush toilet or latrine that flushes to a sewer, septic tank, or pit; (ii) a ventilated improved pit (VIP) latrine; (iii) pit latrine with the pit well-covered by a slab or composting toilets. Improved drinking water sources includes (i) having piped water in a dwelling plot or yard; (ii) public taps or standpipes; (iii) tube wells or boreholes; (iv) protected wells, and (v) protected springs or access to rainwater.

TABLE 5: DISTRIBUTION OF WATER, SANITATION AND HYGIENE CONDITIONS BY GEOGRAPHIC AREA

	Location		
Percentage of HHs with:	Western Districts	Eastern Districts	Total
Improved sanitation*	63.1%	34.0%	48.5%
Unimproved sanitation	16.8%	7.1%	11.9%
Open defecation	20.1%	58.9%	39.5%
Improved water source*	87.5%	87.1%	87.3%
Water and soap available	60.0%	34.0%	47.0%

* As per JMP definition

TABLE 6: DISTRIBUTION OF WATER, SANITATION AND HYGIENE CONDITIONS BY INCOME QUARTILE

Percentage of HHs with:	Income Quartile				
	1st	2nd	3rd	4th	Total
Improved sanitation*	28.7%	40.9%	52.5%	72.2%	48.5%
Unimproved sanitation	15.9%	13.9%	7.9%	10.0%	11.9%
Open defecation	55.4%	45.2%	39.6%	17.9%	39.5%
Improved water source*	85.1%	84.8%	87.0%	92.3%	87.3%
Water and soap available	31.4%	43.5%	49.0%	64.1%	47.0%

* As per JMP definition

TABLE 7: CORRELATIONS OF WATER, SANITATION, HYGIENE CONDITIONS AND INCOME QUARTILE

	Improved Sanitation	Improved Water Source	Water and Soap Available	Income Quartile
Improved sanitation	1.000			
Improved water source	0.065	1.000		
Water and soap available	0.434	0.060	1.000	
Income quartile	0.318	0.081	0.232	1.000

results also indicate that households with improved sanitation facilities tend to have water and soap at the place for washing hands.

4.1 General Household Characteristics

This section reviews a range of household characteristics including income, assets, education, labor market activity, and hours spent by school-age children. The top panel of Table 8 shows the number of individuals in different age structures by income quartile. In terms of demographic characteristics, there seems to be no substantial difference across different income groups. Table 8 highlights the higher proportion of younger people (those below age 50) in the sample, as expected. A large fraction of heads of households is reported to be male (96%) and the average age of the household head is close to 40 years old. The

TABLE 8: SOCIO-DEMOGRAPHIC CHARACTERISTICS OF THE HOUSEHOLD

	Income Quartile				
Age Group:	**1st**	**2nd**	**3rd**	**4th**	**Total**
0–4	6.3%	6.3%	5.9%	6.1%	24.6%
5–9	2.2%	1.9%	1.7%	1.6%	7.4%
10–14	1.7%	1.5%	1.3%	1.0%	5.5%
15–19	1.2%	1.1%	1.0%	0.9%	4.3%
20–24	1.9%	2.3%	2.3%	2.3%	8.8%
25–29	2.4%	2.8%	3.0%	3.2%	11.4%
30–34	2.5%	2.3%	2.5%	2.7%	10.1%
35–39	2.1%	1.9%	2.1%	1.7%	7.8%
40–44	1.2%	1.3%	1.2%	1.3%	5.0%
45–49	0.9%	0.9%	0.9%	1.1%	3.9%
50+	2.5%	2.8%	2.8%	3.2%	11.2%
Total	24.8%	25.3%	24.7%	25.2%	100.0%
Average age, HH head	39.6	38.4	38.9	40.2	39.3
Average age, other HH members	18.3	19.7	20.1	20.7	19.7
HH heads, % male	94.8%	95.4%	96.9%	95.2%	95.6%
Other HH members, % male	35.4%	34.9%	35.9%	35.1%	35.3%
Household Size:					
2	0.6%	0.0%	0.0%	0.2%	0.2%
3	19.0%	19.8%	21.9%	21.3%	20.5%
4	37.2%	33.7%	33.7%	29.4%	33.5%
5	23.2%	25.5%	24.0%	25.7%	24.6%
6	12.8%	13.5%	12.2%	15.9%	13.6%
7	5.0%	4.8%	6.0%	5.2%	5.2%
8+	2.3%	2.9%	2.3%	2.3%	2.4%
Average HH size	4.5	4.6	4.5	4.6	4.6
No. of Children Under Five:					
1	86.2%	86.3%	91.5%	88.3%	88.1%
2	13.0%	12.5%	8.3%	10.7%	11.2%
3	0.8%	1.1%	0.2%	1.0%	0.8%
Average no. of children under five	1.1	1.1	1.1	1.1	1.1

TABLE 9: INDIVIDUAL'S EDUCATION

	Income Quartile				
	1st	2nd	3rd	4th	Total
Ever attended school (% HH heads)	94.6%	95.4%	95.6%	97.7%	95.8%
Highest Educational Level Achieved (% HH Heads):					
Less than elementary	1.0%	0.8%	0.6%	1.5%	1.0%
Elementary school, MI	69.5%	56.3%	47.9%	36.7%	52.6%
General/vocational junior high	15.1%	19.4%	24.5%	20.3%	19.8%
General/vocational senior high	6.9%	17.5%	18.9%	26.9%	17.5%
University (S1,S2,S3)	1.3%	0.8%	2.9%	11.1%	4.0%
Other	6.1%	5.3%	5.2%	3.5%	5.0%
Ever attended school (% other HH members)	92.7%	91.5%	93.3%	94.7%	93.0%
Highest Educational Level Achieved (% Other HH Members):					
Less than elementary	0.8%	1.1%	0.4%	0.0%	0.6%
Elementary school, MI	48.7%	40.0%	33.3%	24.2%	36.6%
General/vocational junior high	34.5%	31.4%	34.8%	25.2%	31.5%
General/vocational senior high	14.3%	23.6%	26.7%	35.6%	25.0%
University (S1, S2, S3)	1.0%	2.5%	4.1%	14.6%	5.5%
Other	0.8%	1.3%	0.8%	0.4%	0.8%

average household size in the sample is 4.6 and there is no clear pattern of data indicating poorer households tend to have a larger number of individuals in the household. All households in the sample have a child under the age five. The average number of children under five in the sample is 1.1. Of these households, 88% have only one child under age five, 11.2% have two children under five, and only 0.8% of households have three children under age five.

Table 9 indicates that a large proportion of individuals have attended school, even for the poorer households. Fifty-three percent of household heads report they have completed elementary school, while the fraction is smaller for those completing secondary school or more. There seems to be a clear pattern in the data showing richer household heads have a higher level of schooling (38% completed senior high school and above in the richest 25%, while only 8% completed senior high school and above in the poorest 25%).

Table 10 displays the main activities for boys and girls who attended school (5–15 years of age). School attendance is clearly the main activity for children in this group. The household respondent reported that a higher fraction of girls spent time taking care of siblings and doing homework relative to the boys. Market wage work (paid work) is unusual for children, with only 1.1% participating in paid work. About 4% of the children participate in unpaid work, most likely as unpaid family workers. Participation rates are comparable between boys and girls.

The survey also includes information on household income as well as assets and dwelling characteristics. Mean per capita income, in Indonesian *rupiah* (Rp) averages Rp 2.97

TABLE 10: ACTUAL DISTRIBUTION OF STUDENTS' TIME

	Male	Female	Total
School-Age Children Spent Hours in (% HH Children, Ages 5–15):			
School	95.9%	95.1%	95.5%
Studying	80.4%	81.9%	81.1%
Children care	59.2%	75.1%	66.9%
Homework	34.0%	64.8%	48.9%
Paid work	1.1%	1.0%	1.1%
Unpaid work	4.3%	3.7%	4.0%

TABLE 11: HOUSEHOLD ASSETS AND INCOME

	Income Quartile				
	1st	2nd	3rd	4th	Total
Annual Income (Rp):					
Mean wage income	2,654,403	6,470,386	10,849,324	29,906,076	12,453,300
Mean non-wage income	388,945	636,580	705,503	2,662,735	1,097,559
Mean total income	3,043,349	7,106,966	11,554,828	32,568,811	13,550,859
Mean per capita income	664,451	1,549,637	2,544,822	7,131,519	2,968,707
HHs with non-wage income (% HHs)	90.0%	87.3%	88.6%	77.2%	85.8%
Household Assets (% HHs Who Own):					
Land	35.8%	35.2%	29.5%	47.6%	37.0%
Livestock	49.2%	43.0%	44.4%	48.4%	46.2%
Vehicle	66.9%	80.0%	84.4%	91.6%	80.7%
Equipments	89.5%	82.3%	79.5%	75.8%	81.8%
HH appliances	99.2%	98.9%	99.6%	99.2%	99.2%
Jewelry	52.7%	57.0%	68.7%	77.9%	64.1%
Other	4.0%	4.6%	5.6%	11.7%	6.5%

million[8] per annum and as expected varies quite significantly across income distribution, ranging from Rp 660,000 for the poorest 25% to Rp 7,000,000 for the richest 25%. It seems that the share of non-wage income (which includes remittances, interest income, pension, and government subsidy) is higher for the poorer household (13% for the poorest *cf.* 8% for the richest).

In addition to income information, Table 11 also contains information on the household ownership of assets. Among productive assets, 37% of households in the survey own land and 46.2% own livestock. Apart from land and livestock, almost all households have household appliances (TV, radio, refrigerator, sewing machine, or washing machine). More than 80% of the households reported having a vehicle and equipment for farming and non-farming purposes.

Table 12 presents various dwelling characteristics. In more than 80% of the cases, the house is fully owned, in 14% of the cases, the dwelling belongs to relatives. The data seem to suggest that majority of the households live in a detached single-story house, with an average number of five rooms. These figures seem comparable across different income distributions.

Sixty-two percent of the households live in a house with concrete walls. The use of other materials to construct the walls, such as logs or bamboo, is also common for poorer households. In terms of the materials used for the roof of the dwelling, over 90% of the households live in a house made of tiled roof regardless of the income group. Concrete seems to be the most common material for the floor (41.2%), followed by dirt, which is used quite substantially especially among the poorer households.

The last few rows of Table 12 provide information on the sources of cooking fuel and access to electricity. It appears that the majority of the sample relies heavily on wood as their main source of cooking fuel, especially among the poorest (92.3%). Despite the fact that the government of Indonesia

[8] US$1 = Rp 9,200, as of 09 March 2010.

TABLE 12: DWELLING CHARACTERISTICS

	Income Quartile				
	1st	2nd	3rd	4th	Total
Average rooms in dwelling	4.7	5.1	5.3	6.3	5.4
Dwelling Ownership (% HHs):					
Fully owned	84.3%	81.9%	79.5%	84.5%	82.6%
Owned by relative	12.8%	15.2%	16.8%	11.5%	14.1%
Other	2.7%	2.9%	3.5%	4.0%	3.3%
Type of dwelling (%HHs)					
Detached, single story	89.1%	85.9%	88.4%	86.7%	87.5%
Detached, multi-story	4.0%	4.2%	4.1%	5.2%	4.4%
Connected, single story	6.7%	9.9%	7.1%	7.9%	7.9%
Connected, multi-story	0.2%	0.0%	0.4%	0.2%	0.2%
Dwelling Materials—Roof (% HHs):					
Brick	0.6%	1.1%	1.0%	0.6%	0.8%
Roof tile	97.5%	97.3%	97.5%	98.1%	97.6%
Concrete	0.6%	0.4%	0.6%	0.2%	0.4%
Other	1.3%	1.1%	1.0%	1.2%	1.2%
Dwelling Materials—Walls (% HHs):					
Brick	9.4%	8.2%	7.1%	5.0%	7.4%
Concrete	46.6%	56.2%	64.7%	79.0%	61.5%
Wood/logs	25.3%	16.2%	15.1%	11.4%	17.0%
Bamboo	15.3%	15.0%	10.2%	3.1%	10.9%
Unbaked brick, adobe, tin/zinc, other	3.4%	4.4%	2.9%	1.5%	3.1%
Dwelling Materials—Floor (% HHs):					
Parquet	0.2%	0.0%	0.6%	0.0%	0.2%
Ceramic	12.8%	17.3%	26.3%	39.4%	23.9%
Linoleum	1.9%	0.8%	1.5%	1.7%	1.5%
Concrete	37.9%	44.0%	43.2%	39.6%	41.2%
Dirt	41.2%	29.5%	20.5%	8.9%	25.1%
Other	4.4%	6.5%	6.9%	8.5%	6.6%
Tile	1.5%	1.9%	1.0%	1.9%	1.6%
Dwelling Cooking Fuel (% HHs):					
Gas	1.0%	1.0%	4.1%	14.4%	5.1%
Kerosene	6.5%	18.8%	21.4%	34.4%	20.3%
Wood	92.3%	80.2%	74.5%	51.2%	74.6%
Other	0.8%	1.1%	0.6%	0.2%	0.7%
Percentage of HHs with Electricity	98.5%	98.1%	99.4%	99.2%	98.8%

has subsidized kerosene for decades to make it affordable for the poor, only 6.5% of the poorest households in the sample use kerosene for cooking. There is also evidence that a large proportion of richer households use kerosene and gas for cooking (34.4% and 14.4% for the wealthiest, respectively). In terms of access to electricity, over 90% of the sample households are connected to electricity.

Table 13 presents information on labor market activity for the adult population (15 years and above), including type of employment, hours spent working on a weekly basis, and distribution of salary. More than 95% of the household heads have a job, while the number is lower for the rest of the adult household members (52.3%). Unemployed household heads seem to engage in child rearing activities or are retired (43% and 37% respectively).

Self-employed individuals, workers without remuneration, and day laborers represent a higher share of working adults for the poorer households. The data also include information on salaries for employees as well as earnings for the self-employed. Overall, average monthly salary is the highest for employers: Rp 760,000 followed by employees, Rp 600,000. Figure 6 charts the distribution of monthly salaries from the main occupation, disaggregated into two groups: dependent and independent workers. Independent workers include the self-employed and employers, while the rest of the categories are classified as dependent workers. The analysis seems to be in line with Table 13, which suggests that independent workers earn more than dependent workers. The last part of Table 13 reports the number of hours spent per week by individuals in their primary work. It appears that employees and employers work longer hours than those who are self-employed and work as day laborers.

Sickness takes people away from their occupations and daily activities. While regular sickness related to absence from school affects the ability of children to keep up with the curriculum and complete their education, for parents this can be

FIGURE 6: DISTRIBUTION OF MONTHLY SALARIES FROM PRIMARY OCCUPATION

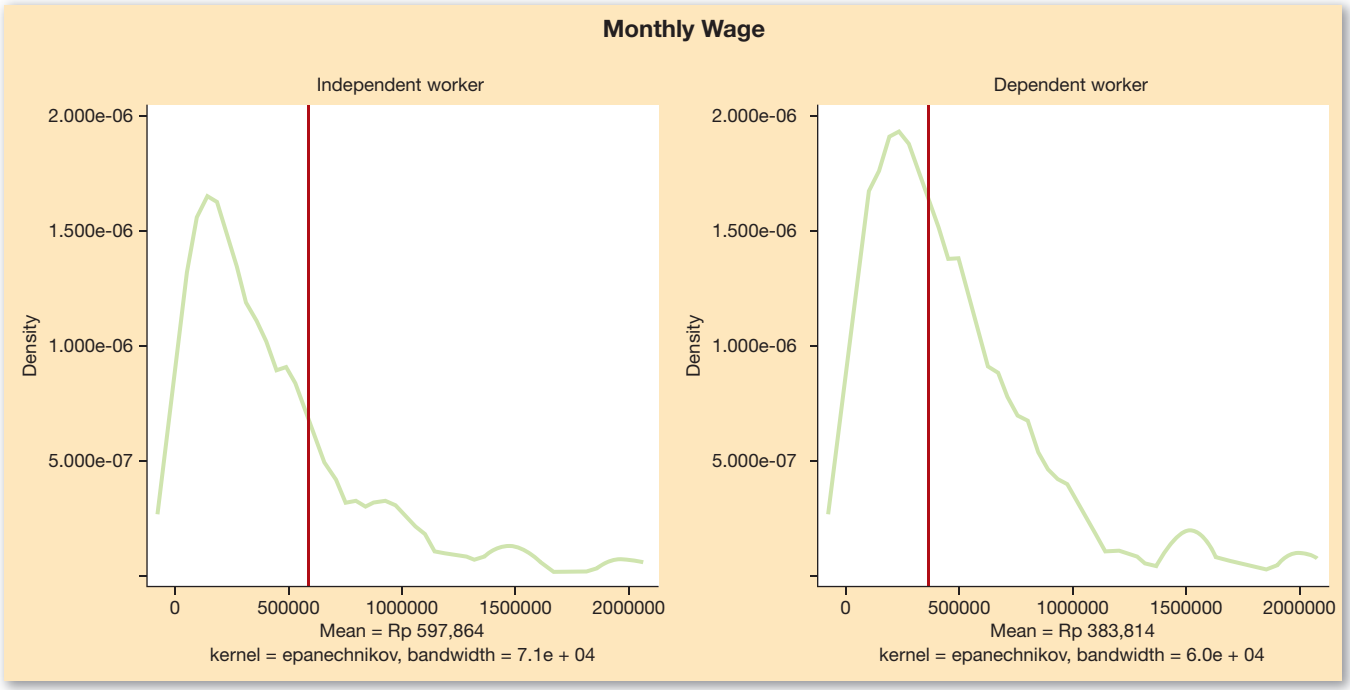


TABLE 13: LABOR MARKET ACTIVITY AND PRIMARY WORK

	Income Quartile				
	1st	2nd	3rd	4th	Total
HH head is employed (% HH heads)	96.0%	96.4%	97.1%	96.5%	96.5%
Other HH member is employed (% other HH members)	44.7%	47.0%	54.0%	62.0%	52.3%
Last Week Activity—HH Head Is Unemployed:					
Looking for work	0.0%	0.0%	0.0%	0.0%	0.0%
Studying	0.0%	0.0%	0.0%	0.0%	0.0%
Taking care of home	0.0%	10.5%	20.0%	5.6%	8.2%
Retired	19.0%	31.6%	40.0%	61.1%	37.0%
Caring for a child	52.4%	47.4%	33.3%	33.3%	42.5%
Other	14.3%	10.5%	0.0%	0.0%	6.8%
Last Week Activity—Other HH Member Is Unemployed:					
Looking for work	1.0%	1.2%	1.1%	1.5%	1.2%
Studying	4.7%	5.1%	6.8%	7.8%	6.0%
Taking care of home	6.1%	6.3%	6.8%	9.8%	7.1%
Retired	9.2%	10.6%	9.5%	12.6%	10.4%
Caring for a child	72.0%	69.6%	71.0%	64.8%	69.5%
Other	5.1%	5.1%	3.3%	3.0%	4.2%
Primary Employment Status (% All Employed):					
Self-employed	24.5%	20.3%	23.2%	22.4%	22.6%
Employee	16.9%	30.1%	33.3%	38.0%	30.3%
Employer or boss	14.8%	13.5%	12.7%	17.5%	14.7%
Worker without remuneration	24.1%	15.5%	15.9%	13.3%	16.9%
Day laborer	19.6%	20.5%	14.9%	8.8%	15.5%
Monthly Salary (Rp):					
Self-employed	140,178	271,345	428,716	999,567	490,819
Employee	168,698	343,835	499,016	1,000,000	605,478
Employer or boss	145,965	335,163	461,172	1,618,613	760,152
Worker without remuneration	1,081	979	5,704	55,188	14,245
Day laborer	157,192	278,086	473,272	678,380	356,882
Hours Worked per Week:					
Self-employed	35.9	39.3	39.7	40.9	39.0
Employee	39.7	43.8	45.9	42.8	43.6
Employer or boss	40.8	42.2	44.2	45.0	43.3
Worker without remuneration	26.5	23.2	25.4	31.3	26.6
Day laborer	31.1	38.8	44.7	44.5	39.0

TABLE 14: HOUSEHOLDS WITH TIME LOSS BY WATER, SANITATION AND HYGIENE CONDITIONS

	Improved Sanitation		Improved Water Source		Soap and Water at Place for Washing Hands	
	No	Yes	No	Yes	No	Yes
Lost hours due to child illness (% HHs)	11.4%	6.6%	9.3%	7.5%	9.7%	7.8%

TABLE 15: HOUSEHOLD WATER SOURCE

	Income Quartile				
	1st	2nd	3rd	4th	Total
Source of Drinking Water (% HHs):					
Piped water into dwelling	4.0%	3.6%	4.8%	6.1%	4.6%
Piped water into yard or plot	1.1%	2.7%	1.9%	0.6%	1.6%
Piped public tap or standpipe	0.8%	0.2%	0.4%	0.0%	0.3%
Tube well, borehole	16.3%	20.2%	25.7%	29.0%	22.8%
Dug well, protected	36.0%	39.2%	36.1%	33.8%	36.3%
Dug well, unprotected	9.6%	13.1%	11.2%	6.3%	10.1%
Spring water, protected	26.2%	16.5%	16.0%	15.5%	18.6%
Spring water, unprotected	4.8%	2.1%	0.8%	1.3%	2.3%
Rainwater	0.0%	0.2%	0.0%	0.0%	0.0%
Tanker truck	0.0%	0.0%	0.6%	0.0%	0.1%
Water vendor	0.0%	0.0%	0.2%	0.0%	0.0%
Bottled water	0.6%	2.3%	1.9%	7.3%	3.0%
Other	0.6%	0.0%	0.4%	0.0%	0.2%
Source of Drinking Water (% HHs):					
In own dwelling	23.4%	31.0%	38.1%	47.5%	35.0%
In own yard, plot	33.9%	40.2%	41.6%	36.0%	37.9%
Elsewhere	42.6%	28.8%	20.3%	16.5%	27.1%
Source of Drinking Water (% HHs):					
Covered	57.0%	57.5%	64.2%	73.6%	63.0%
Open	40.0%	40.2%	34.3%	24.7%	34.9%
Both	3.0%	2.2%	1.5%	1.6%	2.1%

considered an immediate loss in income due to time lost on the job. Four percent of adults reported working fewer than normal hours in the previous week prior to the survey because they were caring for a sick child under the age of five. Table 14 disaggregates the percentage of households reporting this information by sanitary condition of the household. As expected, the better the sanitation condition, the smaller the percentage of households who reported having to work fewer hours.

4.2 Water Source and Safe Water-Use Behavior

The survey asks respondents about the sources of water as well as household water treatment activities. Due to the many pollutants released into water in Indonesia, few surface water sources provide safe drinking water. This implies households have to switch to more costly water sources. Thirty-nine percent of households have access to an improved water source. Results in Table 15 indicate that the majority of the respondents obtain

TABLE 16: SAFE WATER-USE BEHAVIOR

	Income Quartile				
	1st	2nd	3rd	4th	Total
Storage Container: Washing Frequency (% HHs):					
Never	1.2%	0.8%	1.0%	1.9%	1.2%
Rarely	1.0%	1.6%	1.2%	1.9%	1.4%
Once per week	12.2%	8.5%	8.8%	10.5%	10.0%
More than once per week	85.3%	88.2%	88.3%	82.4%	86.0%
How Water Container Is Washed (% HHs):					
Bottled water	0.4%	1.0%	0.8%	3.3%	1.4%
Water only	30.8%	28.1%	27.3%	24.7%	27.8%
Soap, detergent, bleach	67.9%	70.6%	70.6%	74.4%	70.8%
Mud	0.0%	0.0%	0.2%	0.2%	0.1%
Ash	0.4%	0.6%	0.6%	0.4%	0.5%
Hot water	0.8%	0.6%	1.3%	0.2%	0.7%
Water Treatment (Previous Seven Days, % HHs):					
Boil	97.4%	97.4%	97.5%	95.3%	96.9%
Filter	1.0%	1.4%	0.8%	1.1%	1.1%
Strain through a cloth	9.5%	12.2%	12.9%	14.5%	12.2%
Let stand and settle	9.9%	6.9%	10.4%	10.4%	9.4%
Other (chlorine, iodine, solar disinfection, etc)	1.2%	1.2%	1.4%	1.5%	1.3%
Water Treatment: Frequency (Previous Seven Days, % HHs):					
Not in the previous seven days	0.8%	0.2%	0.6%	1.1%	0.7%
Every day	84.8%	82.4%	85.7%	82.7%	83.9%
Every other day	10.9%	14.0%	10.8%	12.8%	12.1%
Once or twice	3.4%	3.4%	2.9%	3.4%	3.3%

water from protected dug wells (36%), tube wells (23%), and protected spring water (19%). Some of the households have little choice but to continue to consume unsafe water, such as from unprotected wells (10.1%). Households reported that 38% of these water sources are located on their own plot, 35% in their own dwelling, and the remaining 27% are located outside the dwelling. Sixty-five percent of these sources are covered, while 35% of them are open.

Unhygienic handling of water can contaminate previously safe water. As a result, a high percentage of people could therefore benefit from effective household water treatment and safe storage practices. Results from the survey show that 99% of the households in the sample reported storing water. Of those who store water, 86% of them wash the storage container more than once per week; only 1.2% reported never washing the container. Seventy-one percent of the households wash the container using soap, detergent, or bleach; about 28% of them rinse the container with water only.

The data seem to suggest that households prepare the water before consuming it (84% did it every day in the week prior to the interview). Results from the survey shows that a variety of treatment methods are used. Ninety-seven percent of households report that they boil the water prior drinking it.

TABLE 17: HOUSEHOLD MAIN SANITATION FACILITY CHARACTERISTICS

	Income Quartile				
	1st	2nd	3rd	4th	Total
Primary Sanitation Facilities (% HHs):					
Flush to piped sewer system	3.4%	6.7%	9.5%	8.3%	6.9%
Flush to septic tank	18.2%	27.8%	39.4%	58.7%	36.0%
Flush to pit latrine	3.3%	4.2%	2.5%	2.7%	3.2%
Flush to elsewhere	0.0%	1.3%	0.6%	1.5%	0.9%
Ventilated improved pit latrine	0.6%	0.6%	0.2%	0.4%	0.4%
Pit latrine with slab	3.1%	1.7%	1.0%	2.1%	2.0%
Pit latrine w/o slab, open pit	15.5%	12.4%	6.9%	8.1%	10.7%
Hanging toilet, latrine	0.2%	0.0%	0.4%	0.0%	0.1%
No facility, bush/river/beach	55.4%	45.2%	39.6%	17.9%	39.5%
Other	0.4%	0.2%	0.0%	0.4%	0.2%
Location of Primary Sanitation Facility (% HHs):					
Inside household	11.7%	18.8%	30.5%	45.3%	26.5%
In household yard	23.9%	26.8%	23.7%	31.3%	26.4%
Less than 10-min. walk	48.9%	42.2%	36.1%	19.8%	36.8%
More than 10-min. walk	13.6%	9.5%	7.9%	1.9%	8.2%
Other or no specific location	1.9%	2.7%	1.7%	1.7%	2.0%
Shared toilet facility	72.6%	66.3%	56.4%	37.4%	58.2%
Percentage of women reporting feeling safe using toilet facility at night	81.6%	84.6%	83.0%	89.8%	84.8%

Some of the households also report that they strain the water through a cloth and let it stand and settle before drinking it.

4.3 Sanitation Facilities

Table 17 highlights the fact that despite 49% of the households in the sample have access to improved sanitation,[9] more than a third of them lack access to adequate sanitation. The use of improved sanitation facilities is substantially lower among the poor (for example, almost 70% of the richest uses flush toilets, while only about a quarter of the poorest households do). In such conditions, many of these households, particularly the very poor, defecate in open spaces. At the time of survey, 55% of the poorest in the sample practiced open defecation. The eradication of open defecation is of fundamental importance to development because of the health hazard this practice poses to anyone living nearby. If some members of a community continue to defecate in the open, then the whole community is at greater risk of diarrheal

[9] Improved sanitation includes flush toilets to a piped sewer system, a pit latrine, a ventilated improved pit latrine, a pit latrine with a slab, a pit latrine without a slab, or a composting toilet.

diseases, worm infestations, and hepatitis compared to people living in communities where open defection is not practiced.

According to the analysis in Table 17, most sanitation facilities are located in the house yard and in the house itself. The data also suggest that 14% of the poorest households have to spend more than 10 minutes to get to the main sanitation facility that they use. The proportion of households using shared sanitation facilities is 58%; the prevalence is higher among the poor than the rich (73% *cf.* 37%). The relatively high portion of households using shared sanitation might lead to welfare losses due to journeying time or waiting due to insufficient number of shared latrines. The survey also asks female respondents whether it is safe to use the toilet facility especially at night; 85% of the respondents feel secure using the facility at night.

The survey also asks respondents the reasons for building or improving a sanitation facility. Among those households who actually built the facility, location (30%) is seen as the principal reason, followed by health consideration (19.7%) and convenience (30.6%). The survey asks respondents to share their opinion about the probability the household would install or build a private toilet facility in the next 12 months (if they do not currently have a private latrine). Forty-eight percent of the households respond that the probability of building a new facility is low. Nearly 20% of households had never thought of building and/or installing the sanitation facility at the time of survey. Although households may be motivated to build or improve the sanitation facility, they may meet some obstacles. For example, the last few rows of Table 18 list the obstacles cited in the East Java study. More than 80% of the households reported perceived high costs as the biggest constraint to building a sanitation facility in the house.

In addition to sanitation facility, respondents in the sample were asked about other sanitary conditions and child defecation disposal practices. There are a large number of households (55%) who reported that they rarely see flies near the sanitation facilities, and only 9.6% of the households responded that flies are always present. With regards to child defecation disposal practices, 42% of the households use the toilet/latrine to dispose feces. At the same time, 33% of the respondents reveal that they dispose of their child's feces in rivers, while about 10% of them dispose it in a pit. The prevalence of unsanitary disposal seems to be higher for the poorer households, indicating poor hygiene practice for this group. As with open defecation, unsafe disposal of child excreta poses a health risk to anyone living or playing nearby. When left in the open or direct vicinity of the household, child feces may pose a particular risk for young children, whose play areas frequently overlap with disposal areas.

The survey also includes enumerators' direct observations of visible animal or human feces inside and/or around the house. The middle panel of Table 19 shows that in 25% of the cases, there are between 1–5 feces lying inside and/or around the dwelling.

Table 20 contains the results of the direct observations of the cleanness of the households by the enumerators. Despite the fact that 71% of households are considered to be living in a clean dwelling, in 25% of the cases, food was found to be uncovered, and in 46% of the sample, garbage was observed in the kitchen. These practices might attract houseflies and mosquitoes, and in some cases these flies may transmit diseases such as salmonella, dysentery, dengue fever, and cholera.

4.4 Handwashing Behavior and Facilities

Improvements in access to safe water and adequate sanitation, along with the promotion of good hygiene practice, especially handwashing with soap at critical times—before handling food and after using the toilet—can help prevent childhood diarrhea. According to a recent study by Smith et al. (2003), an estimated 88% of diarrheal deaths worldwide are attributable to unsafe water, inadequate sanitation, and poor hygiene. Studies have linked handwashing to a reduction in acute lower respiratory infection (Rabie and Curtis 2006; Aiello et al. 2008) as well as a reduction in diarrhea (Ejemot et al. 2008).

To better understand ways to promote hygienic behavior, the survey also asks questions related to hygiene behavior, such as availability of handwashing facilities (such as soap and water) at the place for washing hands in the vicinity of the toilets. In a household setting, the place for washing hands is where hands are usually washed (e.g., after using the toilet or before preparing food), ideally in close proximity to the latrine. While sinks in kitchen and bathrooms are the norm in developed countries, this is not the case in most developing countries. An emerging hypothesis is that convenient and easy access to both water and soap at critical times is a key behavioral determinant of handwashing with soap among household members. If a household member does not have easy access to water and soap after using the

TABLE 18: IMPROVEMENT OF SANITATION FACILITIES

	Income Quartile				
	1st	2nd	3rd	4th	Total
Principal Reason to Build or Improve Toilet (% HHs):					
Convenience or location	33.3%	33.1%	31.6%	23.3%	30.6%
Healthier for the family	19.7%	18.8%	16.4%	24.4%	19.7%
Easier to keep clean	4.9%	11.1%	12.5%	12.2%	10.1%
Privacy, dignity	3.6%	3.5%	4.6%	5.2%	4.2%
Safety, security	6.1%	4.1%	8.9%	4.8%	6.0%
Avoid sharing	5.2%	5.4%	5.6%	5.9%	5.5%
Comfort	21.4%	17.2%	17.4%	17.0%	18.3%
Prestige, pride	1.0%	0.3%	0.3%	0.4%	0.5%
Sewage disposal is full	1.3%	0.6%	0.0%	1.1%	0.8%
Other	3.6%	5.7%	2.6%	5.6%	4.3%
Probability of Future Toilet Installation (% HHs):					
High	8.0%	11.9%	6.3%	19.4%	10.5%
Medium	19.3%	18.6%	25.2%	26.4%	21.8%
Low	55.0%	48.7%	47.6%	37.2%	48.4%
None	17.6%	20.8%	20.9%	17.1%	19.3%
Principal Constraint for Installing Toilet (% HHs):					
High cost	89.50%	88.94%	89.32%	77.52%	87.36%
Competing expenditure priorities	18.22%	18.92%	16.75%	14.96%	17.51%
Limited space	7.20%	4.95%	8.37%	7.09%	6.85%
Materials not available	3.81%	2.70%	3.45%	2.36%	3.17%
Satisfied with current facility	1.27%	1.80%	0.99%	0.79%	1.27%
No one to build it	1.69%	0.45%	0.49%	2.36%	1.14%
Savings, credit issues	0.42%	1.35%	0.99%	0.00%	0.76%
Land condition	0.85%	0.45%	0.49%	1.57%	0.76%
Permit issues	0.85%	0.45%	0.99%	0.79%	0.76%
Water not available	0.42%	0.90%	0.49%	0.79%	0.63%

Note: Households were asked to report the three constraints they face in building toilet facility. The sum of the total does not necessarily add up to 100%.

latrine, then the probability of handwashing with soap actually taking place is lower. In other words, handwashing with soap is positively correlated with having a designated place for family members to wash their hands.

Ninety-eight percent of respondents report that they wash their hands after defecating. On average, only 54% of toilets have a handwashing facility and 47% of places for washing hands provide water and soap. There seems to be a clear pattern in the data indicating richer households have a higher proportion of fully stocked places for washing hands (i.e., soap and water together at a place for washing hands)—64% for the richest 25%, while only 31% for the poorest. In terms of handwashing devices, the

TABLE 19: OTHER CHARACTERISTICS OF HOUSEHOLD SANITARY CONDITION

	Income Quartile				
	1st	2nd	3rd	4th	Total
Flies Near Sanitation Facilities (% HHs):					
Always and many	14.9%	12.5%	6.6%	4.4%	9.6%
Always and some	5.7%	4.0%	3.3%	2.1%	3.8%
Sometimes and many	13.2%	11.2%	8.9%	6.9%	10.1%
Sometimes and few	22.6%	22.2%	22.6%	16.9%	21.1%
Rarely, hardly any	43.5%	50.0%	58.7%	69.7%	55.4%
Visible Feces In/Around HH (% HHs):					
None	44.1%	54.0%	61.4%	66.4%	56.4%
1–5 feces	31.2%	27.2%	22.4%	19.8%	25.2%
More than five feces	21.1%	16.7%	14.9%	11.1%	16.0%
Disposal of Child Feces (% HHs):					
Bushes, ground	4.2%	2.9%	1.9%	2.5%	2.9%
Pit, hole in the ground	13.4%	11.6%	9.1%	8.4%	10.6%
Open sewer, drain	4.4%	4.2%	4.4%	5.2%	4.6%
Toilet, latrine	28.0%	37.8%	45.8%	58.0%	42.4%
Garbage	1.0%	1.9%	1.9%	1.9%	1.7%
River	43.5%	36.3%	33.0%	20.3%	33.3%
Basin, sink	3.8%	3.2%	3.1%	3.1%	3.3%
Other	2.3%	2.5%	1.5%	0.8%	1.8%

TABLE 20: HOUSEHOLD CLEANNESS

	Income Quartile				
	1st	2nd	3rd	4th	Total
HH is clean (% HHs)	61.3%	67.7%	73.7%	80.2%	70.7%
HH has uncovered food (% HHs)	25.7%	24.3%	25.3%	22.1%	24.3%
HH has garbage in kitchen or house (% HHs)	52.5%	46.8%	44.6%	40.7%	46.1%

TABLE 21: OBSERVATION OF PLACE FOR WASHING HANDS AFTER USING TOILET

	Income Quartile				
	1st	2nd	3rd	4th	Total
Water is available at place for washing hands*	44.8%	58.2%	63.7%	81.4%	62.0%
Usual Place for Washing Hands (% HHs):					
Inside toilet facility	37.1%	47.3%	56.2%	75.7%	54.1%
Inside kitchen, cooking place	6.3%	6.3%	5.4%	4.4%	5.6%
In yard, less than three feet from toilet	1.8%	2.9%	1.0%	1.5%	1.8%
Between 3–10 feet from toilet	3.1%	2.5%	1.6%	1.3%	2.1%
More than 10 feet from toilet	7.6%	7.1%	7.0%	3.7%	6.3%
No specific place	44.1%	33.8%	28.8%	13.3%	30.0%
Handwashing Device Near Toilet (% HHs):*					
Tap, faucet	8.4%	10.1%	14.8%	16.0%	12.8%
Basin, bucket	32.2%	24.3%	20.5%	17.8%	22.9%
Water is poured from container	52.8%	61.2%	61.7%	63.6%	60.4%
Other	6.6%	4.3%	3.0%	2.7%	3.9%
Soaps Available at Place for Washing Hands (% HHs):*					
Multipurpose bar soap	24.5%	31.1%	30.6%	34.4%	30.7%
Beauty, toilet bar soap	20.3%	23.8%	27.6%	28.2%	25.4%
Powder soap, detergent	7.0%	7.0%	7.4%	7.6%	7.3%
Liquid soap	0.7%	0.6%	2.2%	3.8%	2.0%
Detergent cream	11.5%	11.9%	13.1%	10.2%	11.6%
No soap observed	38.5%	29.4%	27.6%	23.8%	29.0%
Soap and water is available* (% HHs)	31.4%	43.5%	49.0%	64.1%	47.0%

* For households in which a specific place for washing hands is available and based on enumerator's observations. Enumerators did not observe handwashing behavior, only availability of a place for washing hands and soap.

majority of households wash their hands by pouring the water from a bucket. Only 13% of the households reported washing their hands directly from a faucet. In 62% of these facilities, there was water available at the place for washing hands on the day of the baseline survey.

Almost all of the households have some form of soap at the place for washing hands, such as multipurpose bar soap (31%), beauty soap (25%), and cream detergent (12%). About 29% of the households did not have any soap available at the place for washing hands. This is more pronounced for the poorest households, as 39% of these households wash their hands with water alone.

4.5 Child Care Environment

The survey also asks caregivers of children under the age of two about breastfeeding during the first three days after the childbirth. Almost all of the children in the sample were breastfed (96%) and this fraction is consistent across different income groups. On average, caregiver breastfeeding lasts for about eight months; the richer households spend three months

TABLE 22: BREASTFEEDING (CHILDREN <24 MONTHS)

	Income Quartile				
	1st	2nd	3rd	4th	Total
Ever breastfed	96.4%	97.0%	96.9%	94.9%	96.3%
Still breastfeeding	84.4%	84.6%	77.7%	72.5%	79.8%
Average months of breastfeeding	10.1	8.7	7.2	7.1	8.0
Colostrum given, first three days	81.9%	82.7%	87.9%	83.5%	84.0%
Other liquid given, first three days	44.6%	58.4%	60.1%	65.8%	57.2%
Liquid Other Than Breast Milk Given During First Three Days (% Children):					
Instant formula	72.6%	82.1%	81.8%	91.4%	82.8%
Milk other than breast milk	2.1%	2.6%	1.9%	2.6%	2.3%
Plain water	6.3%	5.5%	5.4%	3.7%	5.1%
Sugar, glucose water	10.1%	6.5%	3.8%	4.9%	6.1%
Gripe water	0.0%	0.6%	0.0%	0.0%	0.2%
Sugar-salt solution	0.4%	0.0%	0.0%	0.3%	0.2%
Fruit juice	0.4%	0.0%	0.0%	0.0%	0.1%
Tea, infusions	0.8%	1.0%	0.0%	0.9%	0.7%
Honey	14.8%	14.0%	21.7%	13.3%	15.9%
Other liquids	5.1%	3.6%	4.5%	2.3%	3.7%

less breastfeeding than poorer households (seven months for the richest 25% *cf.* 10 months for the poorest 25%). During the first three days after birth, 84% of the caregivers reported giving colostrum to the newborn. At the same time almost 60% of the households reported giving liquids other than breast milk to the newborn baby. Instant formula seems to be the most commonly non-breast milk given to the baby in the sample (83%).

The survey also includes a section on child diet. Specifically, caregivers of children under the age of two were asked about liquids and food given to their children on the day prior to the interview. Table 23 indicates that in terms of liquid food, both breast milk (79.4%) and water (72%) were given to the majority of the children. Thirty percent of the caregivers gave caffeine beverages to their kids. On average, kids were fed 2.5 times in a day. A child's diet appears to be quite diversified as a high proportion of children received almost every type of food included in the survey; this is occurring for many children under the age of six months. Grain-based food (71%) makes up the highest proportion in children's diets, followed by food that is rich in Vitamin A (34%), as well as meat (47%) and beans, peas, and lentils (47%).

The last three rows of Table 23 reports the result for dietary supplements given to the children. Only 3.7% of caregivers give iron pills or syrup to their children, while 55% of them report having ever given Vitamin A supplements to their children.

Table 24 presents the analysis of enumerators' direct observations of children under the age of five. According to the data, 78% of the children display clean aspects, while only a small fraction of children have dirty hands, fingernails and face. Only a small fraction of children were seen not wearing clothes (16.5% were wearing dirty clothes) and 45% of the children were seen to wear shoes at the time of interview.

TABLE 23: INFANT/YOUNG CHILD FEEDING (CHILDREN <24 MONTHS)

	Income Quartile				
	1st	2nd	3rd	4th	Total
Liquids Given Yesterday:					
Breast milk	84.4%	84.8%	77.5%	71.0%	79.4%
Plain water	68.4%	74.6%	71.8%	73.6%	72.1%
Infant formula	13.4%	16.7%	27.3%	38.3%	23.9%
Fortified child food	13.7%	17.3%	23.2%	20.5%	18.7%
Homemade gruel	16.6%	19.0%	18.0%	15.7%	17.3%
Other milks	6.8%	4.4%	7.3%	12.3%	7.7%
Fruit juice	2.1%	3.4%	7.3%	7.6%	5.1%
Caffeine beverages	28.8%	29.2%	29.0%	33.2%	30.1%
Other	13.9%	24.7%	26.9%	21.4%	21.7%
Given solid, semi-solid food yesterday (% children)	76.8%	82.7%	84.3%	79.9%	80.9%
Average number of times food was given yesterday	2.4	2.4	2.4	2.5	2.4
Food Given Yesterday:					
Grain-based food	68.2%	73.2%	72.0%	71.2%	71.1%
Vitamin A food	49.0%	56.7%	56.4%	57.9%	55.0%
Roots, potatoes	26.4%	34.5%	38.4%	38.3%	34.4%
Fruits, vegetables	40.5%	43.5%	49.7%	52.4%	46.5%
Meat red, white	40.5%	45.9%	48.0%	54.5%	47.2%
Beans, peas, lentils	43.3%	44.6%	52.0%	49.3%	47.3%
Oil, fats, butter	27.5%	31.7%	36.7%	36.1%	33.0%
Ever received Vitamin A (% children)	49.0%	56.7%	56.4%	57.9%	55.0%
Given iron pills, syrup (% children)	2.4%	4.2%	3.6%	4.6%	3.7%
Self-fed (% children)	65.7%	71.2%	72.0%	68.9%	69.4%

TABLE 24: INFANT/YOUNG CHILD CLEANNESS (CHILDREN <5)

	Income Quartile				
	1st	2nd	3rd	4th	Total
Percentage of Children with:					
Clean appearance	73.7%	75.2%	79.5%	81.7%	77.5%
Dirty hands	22.6%	19.7%	16.0%	13.5%	18.0%
Dirty finger nails	19.7%	19.7%	15.3%	11.9%	16.7%
Dirty face	20.4%	19.9%	13.9%	13.1%	16.9%
Clothes on	92.6%	94.0%	94.5%	96.9%	94.5%
Dirty clothes	22.7%	19.0%	13.3%	10.4%	16.5%
Pot-belly	10.4%	7.5%	7.5%	9.6%	8.7%
Shoes on/available	40.6%	44.4%	45.2%	50.5%	45.1%
Average daily caring hours	10.3	10.5	10.7	10.5	10.5

TABLE 25: INFANT/YOUNG CHILD LEARNING ENVIRONMENT (CHILDREN <2)

	Income Quartile				
	1st	2nd	3rd	4th	Total
Percentage of Children Who:					
Played with HH objects	65.6%	64.9%	68.3%	67.1%	66.5%
Played with toys	69.4%	78.2%	79.5%	82.7%	77.4%
Attended early education	0.6%	2.1%	1.4%	1.9%	1.5%
Number of Books Provided to Child:					
None	86.5%	84.3%	76.4%	75.1%	80.6%
1–3	12.5%	13.0%	20.8%	22.1%	17.1%
More than three	1.0%	2.7%	2.7%	2.9%	2.3%

The last row of Table 24 reports hours spent primarily caring for the child. On average, caregivers in the sample spend about 10 hours (per day) in this activity.

Parents or caregivers were also asked about the support they give to the children under two years of age for learning or stimulating environment. Sixty-seven percent of the caregivers reported that their children played with household objects (such as bowls, baskets, spoons, plates, cups, or pots) and 77% of them reported that their children play with toys that were either bought from a store or received as a gift. Only 1.5% of the caregivers reported that their infants ever attended early education programs. The relatively low percentage of infants attending early childhood education program is not surprising, as most parents in Indonesia have the tendency to look after their own children before they reach school age.

Eighty percent of the caregivers did not provide any children's books to their child. Only 17% of the households reported that they give the children between 1–3 books; wealthier families tend to provide more books relative to poorer households.

4.6 Mass Media Consumption

Households were also asked whether they have heard about sanitation programs through mass media (for example regional campaigns conducted through newspaper, radio advertisements and printed leaflets). Table 26 reports that 13.2% of households in the sample have heard about sanitation programs from the media, while only 5% of them are aware of the specific project campaign. The table also indicates that information about the project seems to differ markedly across the districts. While 10% of the households in Ngawi have heard about the campaign from the media, none of the households in Madiun nor Banyuwangi are aware of the project. This might be because the baseline survey was conducted prior to the intervention occurring.

4.7 Child Development

Parents or caregivers of children ages 3–24 months were asked to complete the Ages & Stages Questionnaire, which measures child development across five domains, namely communication, gross motor skills, fine motor skills, problem solving, and personal-social development. This report focuses on the communication, motor, and social personal skills. These measures are of interest because a child's health status might affect their development. The questions asked of each child were selected according to the child's age in months. In order to make a comparison, the child development index for each skill is standardized by calculating Z-scores.[10] Figure 7 shows the histogram of the Z-score for each of the skills being considered. All of these variables have a mean value equal to zero.

[10]Z-scores standardize the measures so that they have a mean of zero and a standard deviation of 1. The different measures are thus expressed in the same scale and so can be compared with one another.

TABLE 26: MASS MEDIA CONSUMPTION

		Ever Heard about Any Sanitation Program from the Media	Ever Heard about Project Campaign from the Media
Western Districts	Blitar	9.6%	4.0%
	Jombang	13.8%	5.6%
	Madiun	12.3%	0.0%
	Ngawi	14.9%	10.3%
Eastern Districts	Banyuwangi	9.2%	0.0%
	Bondowoso	10.7%	3.6%
	Situbondo	18.5%	6.1%
	Probolinggo	16.2%	7.1%
Total		13.2%	5.1%

Table 27 presents the Z-score disaggregated by sanitary conditions. For each of the skills under consideration, we observe that child development is lower for those who live in premises without improved sanitation, without an improved water source, and without soap and water at the place for washing hands. For example, a Z-score of –0.10 for communication skills implies that a child's communication skills living in a dwelling without improved sanitation is 0.10 below the group mean. Although we cannot infer any causal relationship between the variables from this bivariate analysis, it is consistent with the hypothesis that child health benefits from improved sanitation. Table 28 indicates that the development of children in the eastern districts seem to be consistently below the group average in comparison to their counterparts in the western districts.

4.8 Diarrhea and Acute Lower Respiratory Infection Prevalence

Tables 29 through 34 relate child health to poor sanitation and lack of hygiene behavior for children under the age of five. There is a focus on two selected diseases, namely diarrhea and acute lower respiratory infection (ALRI). The prevalence of diarrhea was constructed on the basis of several symptoms reported by the caregiver. Specifically, a child was diagnosed to have diarrhea when he/she presented the following symptoms: three or more stools per day and stools were loose or watery or blood and/or mucus is visible in the stool. Diarrhea prevalence in the baseline is relatively high. Eleven percent of children under the age of five reported having had diarrhea in the past two weeks. This varies significantly across districts from a high of 17.4% in the past

TABLE 27: CHILD DEVELOPMENT Z-SCORES BY WATER, SANITATION, AND HYGIENE CONDITIONS

	Improved Sanitation		Improved Water Source		Soap and Water at Place for Washing Hands	
Average Z-Scores for:	No	Yes	No	Yes	No	Yes
Communication skills-for-age	–0.10	0.10	–0.09	0.01	–0.06	0.07
Mobility skills-for-age	–0.13	0.14	–0.00	0.00	–0.05	0.06
Social-personal skills-for-age	–0.11	0.11	–0.02	0.00	–0.03	0.04

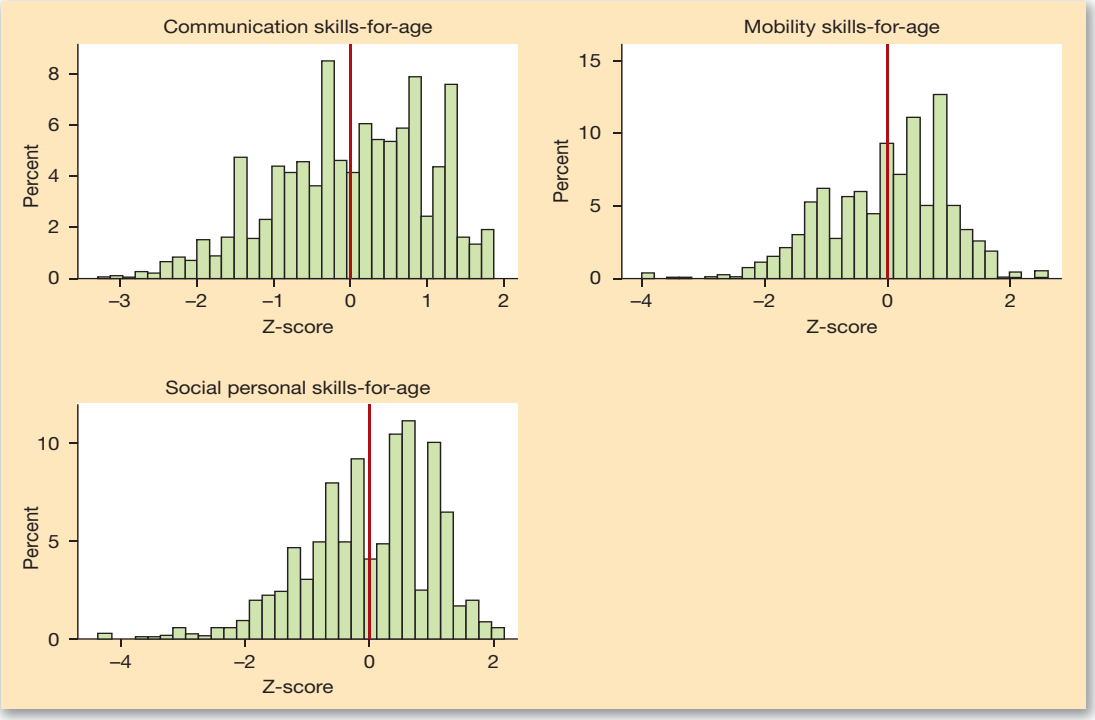
week in Bondowoso to a low of 3.7% in Ngawi. Findings also revealed that households with good sanitation and hygiene practices tend to have lower incidence of diarrhea. When considering a shorter time span (i.e., within 48 hours or a week period) the prevalence of diarrhea is higher for children living in premises with unimproved sanitation.

Diarrhea prevalence is also lower for richer households, which is expected since richer households tend to have better access to sanitation. Thirty percent of the caregivers did not seek any medical advice when their children have diarrhea, and if they did, a higher proportion of them went to the public health providers than to private ones.

TABLE 28. CHILD DEVELOPMENT Z-SCORES BY REGION

		Communication Skills-for-Age	Mobility Skills-for-Age	Social-Personal Skills-for-Age
Western Districts	Blitar	0.10	0.21	0.04
	Jombang	0.13	0.13	0.05
	Madiun	0.16	0.17	0.06
	Ngawi	0.15	0.08	0.16
Eastern Districts	Banyuwangi	–0.17	–0.05	0.00
	Bondowoso	–0.05	–0.20	0.08
	Situbondo	–0.15	–0.04	–0.09
	Probolinggo	–0.15	–0.29	–0.29

FIGURE 7: HISTOGRAM OF CHILD DEVELOPMENT Z-SCORES



How is diarrhea treated? About 26% of children with diarrhea did not receive any treatment. If a child receives treatment, taking a pill or syrup (51%) is the most commonly used remedy in the Indonesian context, followed by oral rehydration solution (16%).

Acute lower respiratory infection (ALRI) is the most common cause of illness in children and a major cause of death for children under five years of age in developing countries. There are a number of factors that affect ALRI rates in young children, including malnutrition, lack of breastfeeding, and the incidence of other diseases that affect susceptibility. The child's environment (such as crowding or air pollution) can also affect the risk of getting ALRI. As discussed earlier, more than 80% of sampled households cook with solid fuels such as wood. These fuels emit substantial amounts of pollutants, which may particularly harm women and young children who spend a large proportion of their time indoors.

For the purpose of this report the WHO definition is used: a child is identified to have ALRI when he/she presented the following symptoms: constant cough or difficulty in breathing and raised respiratory rate.

The prevalence of ALRI was found to be lower than diarrhea's prevalence. Only 2% of children had ALRI symptoms in the past 48 hours and 2.9% in the past two weeks. Table 32 indicates that the ALRI prevalence is slightly lower for children living in a house with improved sanitation. Having access to an improved water source and soap and water at the place for washing hands is, however, associated with slightly higher ALRI prevalence in the sample, but this is mainly driven by Blitar, one outlier in the data. Table 33 summarizes the prevalence of ALRI by districts. ALRI incidence is highest in Blitar (6.9%) and lowest in Situbondo.

About 30% of caregivers reported that they did not seek any medical advice when their child displayed ALRI symptoms. Of those who seek medical advice, higher proportions go to public providers (36%) than private ones (28%). Almost 5% of the caregivers reported that they did not pay out of pocket to treat the symptom. Many children received no treatment for ALRI (15%). Taking a pill or syrup was the most common treatment.

TABLE 29: DIARRHEA PREVALENCE BY WATER, SANITATION AND HYGIENE CONDITIONS

	Improved Sanitation		Improved Water Source		Soap and Water at Place for Washing Hands	
Diarrhea Symptoms in Previous (% Children):	No	Yes	No	Yes	No	Yes
48 hours	5.5%	3.1%	6.4%	4.0%	4.9%	3.7%
Week	8.7%	5.8%	8.8%	7.0%	8.2%	6.2%
14 days	10.1%	6.5%	9.8%	8.2%	9.6%	7.0%

TABLE 30: DIARRHEA PREVALENCE BY REGION

		Percentage of Children with Diarrhea Symptoms in the Past:		
		48 hours	Week	14 days
Western Districts	Blitar	2.3%	5.0%	5.0%
	Jombang	3.8%	7.0%	8.4%
	Madiun	1.4%	3.1%	3.4%
	Ngawi	1.7%	2.7%	3.7%
Eastern Districts	Banyuwangi	5.5%	9.3%	10.7%
	Bondowoso	11.3%	16.0%	17.4%
	Situbondo	3.4%	5.5%	7.6%
	Probolinggo	5.2%	9.7%	11.1%

TABLE 31: DIARRHEA TREATMENT

	Income Quartile				
	1st	2nd	3rd	4th	Total
Diarrhea Symptoms in Previous (% Children):					
48 hours	4.2%	6.0%	4.8%	2.2%	4.3%
Week	7.7%	8.0%	8.0%	5.3%	7.3%
14 days	8.7%	9.5%	8.9%	6.3%	8.4%
Caregiver Sought Medical Advice from (% Caregivers):					
Public providers	53.8%	52.6%	34.0%	59.5%	49.5%
Private providers	11.5%	15.8%	28.0%	21.6%	18.9%
Both	0.0%	1.8%	2.0%	2.7%	1.5%
Did not seek any medical advice	34.6%	29.8%	36.0%	16.2%	30.1%
Did not pay for intestinal treatment (% caregivers)	11.5%	26.3%	30.0%	24.3%	23.0%
Type of Treatment (% Children):					
No treatment	26.9%	24.6%	34.0%	16.2%	26.0%
Pill or syrup	55.8%	54.4%	40.0%	54.1%	51.0%
Injection	0.0%	1.8%	0.0%	2.7%	1.0%
Intravenous	5.8%	3.5%	0.0%	2.7%	3.1%
Traditional remedies	5.8%	7.0%	4.0%	2.7%	5.1%
Oral rehydration solution	15.4%	12.3%	18.0%	18.9%	15.8%
Homemade sugar-salt solution	1.9%	5.3%	2.0%	0.0%	2.6%
Other	3.8%	5.3%	8.0%	27.0%	9.7%

TABLE 32: ALRI PREVALENCE BY WATER, SANITATION AND HYGIENE CONDITIONS

	Improved Sanitation		Improved Water Source		Soap and Water at Place for Washing Hands	
	No	Yes	No	Yes	No	Yes
ALRI Symptoms in Previous (% Children):						
48 hours	2.2%	1.8%	1.7%	2.1%	1.6%	2.4%
Week	2.8%	2.4%	2.4%	2.6%	2.1%	3.2%
14 days	3.1%	2.6%	2.4%	2.9%	2.4%	3.3%

TABLE 33: ALRI PREVALENCE BY REGION

		Percentage of Children with ALRI Symptoms in the Past:		
		48 hours	Week	14 days
Western Districts	Blitar	5.9%	6.9%	6.9%
	Jombang	1.4%	2.4%	2.4%
	Madiun	1.7%	1.7%	2.7%
	Ngawi	1.7%	2.3%	2.7%
Eastern Districts	Banyuwangi	1.0%	1.4%	2.1%
	Bondowoso	1.4%	1.7%	1.7%
	Situbondo	0.0%	0.3%	0.3%
	Probolinggo	2.8%	3.8%	3.8%

TABLE 34: ALRI TREATMENT

	Income Quartile				
	1st	2nd	3rd	4th	Total
ALRI Symptoms in Previous (% Children):					
48 hours	2.5%	2.3%	1.6%	1.5%	2.0%
Week	3.4%	2.5%	2.3%	2.2%	2.6%
14 days	3.4%	2.7%	3.0%	2.4%	2.9%
Caregiver Sought Medical Advice from (% Caregivers):					
Public providers	40.0%	31.3%	29.4%	42.9%	35.8%
Private providers	15.0%	25.0%	47.1%	28.6%	28.4%
Both	5.0%	6.3%	5.9%	7.1%	6.0%
Did not seek any medical advice	40.0%	37.5%	17.6%	21.4%	29.9%
Did not pay for treatment	5.0%	0.0%	5.9%	7.1%	4.5%
Type of Treatment (% Children):					
No treatment	10.0%	25.0%	11.8%	14.3%	14.9%
Pill or syrup	85.0%	68.8%	82.4%	78.6%	79.1%
Traditional remedies	0.0%	0.0%	0.0%	0.0%	0.0%
Other	10.0%	6.3%	11.8%	14.3%	10.4%

Enumerators carry physical health measurement equipment through an East Javanese village

4.9 Child Growth Measures and Anemia

Child growth, or anthropometric measurements (weight, height, arm and head circumferences, body mass index) were taken on all children under two years of age in the surveyed households. One reason for this interest is that child growth measurements provide useful information about living standards. For example, weight (conditional on height and sex) typically varies in the short term, and so is used as a measure of current health status whereas height, given age and sex, is an indicator of longer term health and welfare (Thomas et al. 1991).

To assess the child's growth and general nutritional status for the data, the IE team used a standardized age- and sex-specific growth reference based on the WHO (2006 and 2007) standard to calculate z-scores for (a) weight-for-height (b) height-for-age (c) weight-for-age (d) body mass index (e) head circumference-for-age, and (f) arm circumference-for-age.[11]

[11] For example, a Z-score for height subtracts from the child's height the median height in the reference population for a child of the same gender and age in months, and divides by the standard deviation of height in the reference population, also for a child of the same gender and age in months. A weight-for-height Z-score is defined in an analogous manner, except that the standardization is done using the reference population median and standard deviation of weight for children of a given gender and height. The WHO standards use a U.S. reference population.

FIGURE 8: HISTOGRAM OF CHILD GROWTH MEASURES (Z-SCORES)

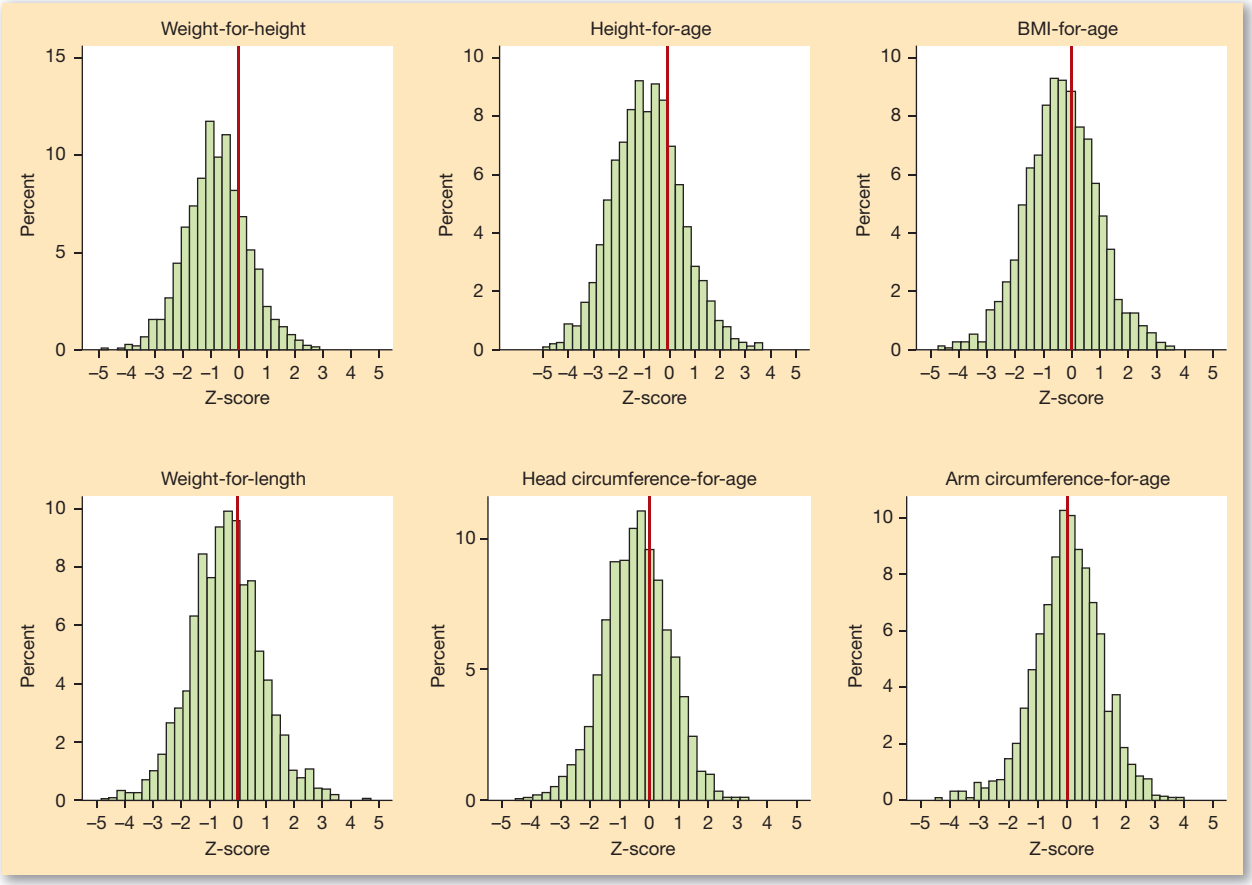


Figure 8 shows the Z-scores for each of the child growth measures of interest. The results highlight that all of the child growth measures (with the exception of upper arm circumference) tend to be lower than the population mean using the WHO standard (negative Z-scores). As expected, the Z-scores for children from richer households tend to be smaller than those from poorer households, indicating better nutritional status for the richer population (Table 35).

TABLE 35: CHILD GROWTH MEASURES (Z-SCORES) BY INCOME QUARTILE

	Income Quartile				
	1st	2nd	3rd	4th	Total
Weight-for-height	–0.85	–0.83	–0.83	–0.60	–0.78
Height-for-age	–0.88	–0.94	–0.99	–0.70	–0.88
Body mass index-for-age	–0.45	–0.36	–0.32	–0.26	–0.35
Weight-for-length	–0.53	–0.44	–0.41	–0.34	–0.43
Head circumference-for-age	–0.44	–0.39	–0.47	–0.30	–0.40
Arm circumference-for-age	0.10	–0.05	0.04	0.03	0.03

TABLE 36: CHILD GROWTH MEASURES (Z-SCORES) BY REGION

		Weight-for-Height	Height-for-Age	Body Mass Index-for-age	Weight-for-Length	Head Circumference-for-Age	Arm Circumference-for-Age
Western Districts	Blitar	–0.50	–0.39	–0.38	–0.45	–0.23	0.30
	Jombang	–0.73	–0.57	–0.53	–0.62	–0.23	0.19
	Madiun	–0.71	–0.79	–0.34	–0.39	–0.81	–0.57
	Ngawi	–0.70	–0.66	–0.44	–0.44	–0.26	0.17
Eastern Districts	Banyuwangi	–0.73	–0.93	–0.25	–0.32	–0.32	0.20
	Bondowoso	–0.99	–1.14	–0.40	–0.52	–0.33	0.08
	Situbondo	–0.93	–1.35	–0.18	–0.32	–0.52	–0.13
	Probolinggo	–0.91	–1.18	–0.29	–0.38	–0.49	–0.01

Table 36 indicates there are spatial disparities in term of nutritional status across districts. Specifically, children who reside in the western districts tend to have lower average Z-scores than those in the eastern districts, indicating that children in western districts have a better nutritional status.

Table 37 presents the average Z-scores for the six child growth measures disaggregated by sanitary condition. On average, children coming from households without improved sanitation, or improved water source or soap and water at the place for washing hands tend to have lower average Z-scores for each of these measures included in the analysis.

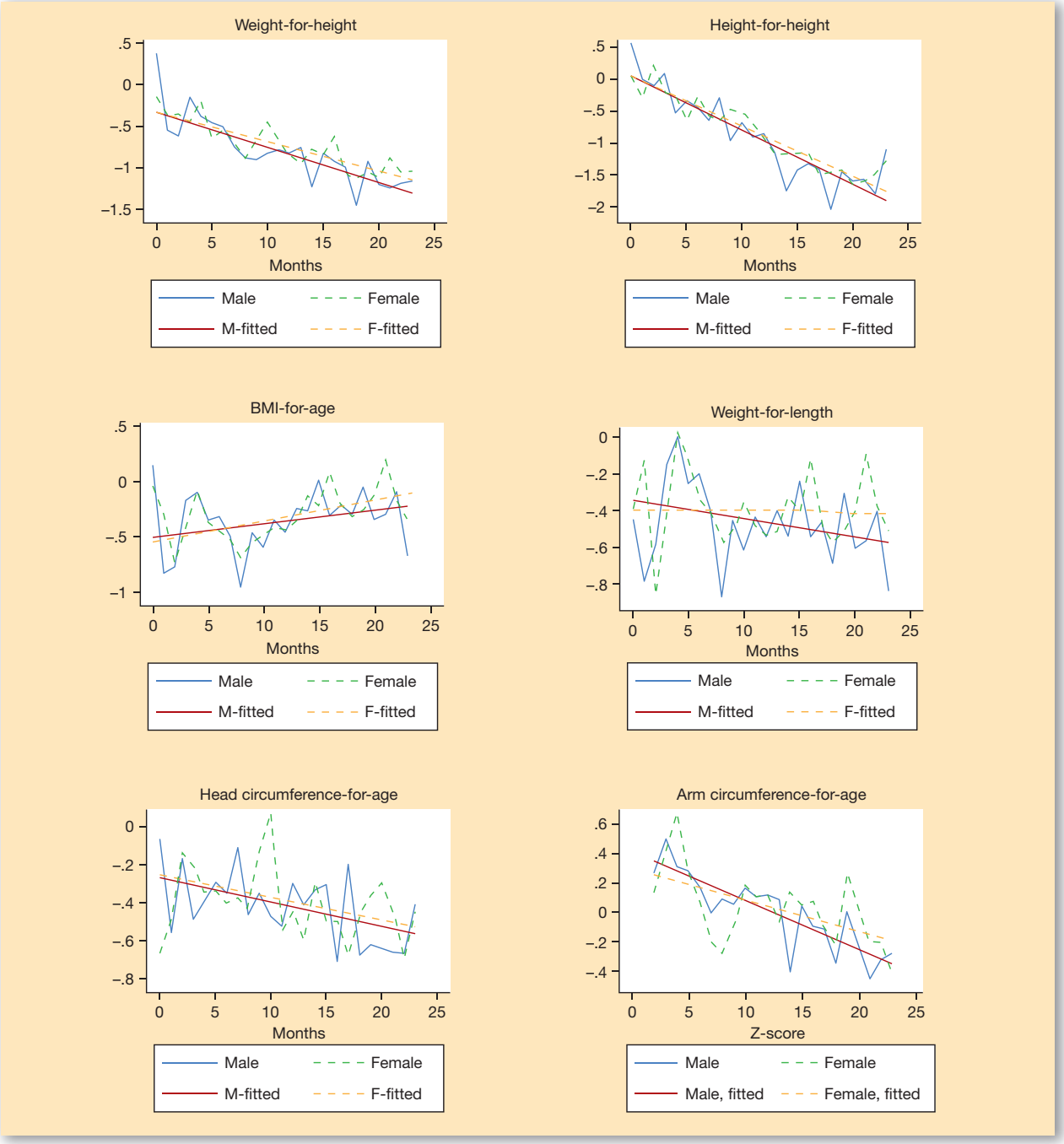
Figure 9 presents the average Z-score corresponding to each variable for boys and girls ages 0–24 months, which can provide a good picture of the child growth measures over early childhood development. The Z-scores appear to begin to decline at around three months, faster at first and then more slowly, although for children in the sample there seems to be no evidence that the Z-scores stabilize over the ages being considered. The average Z-scores for each variable, with the exception of BMI, decrease with age. The decline in the Z-score, which varies by socioeconomic factors, could be attributed to the introduction of water and solid foods into the diet. Both of these tend to introduce impurities such as bacteria into the child's digestive system, inducing illness. The pattern of the Z-scores for boys and girls tend to mirror each other.

Blood hemoglobin levels are of interest because low levels may indicate anemia, or folic acid and other micronutrient deficiencies, which can have various negative

TABLE 37: CHILD GROWTH MEASURES (Z-SCORES) BY WATER, SANITATION AND HYGIENE CONDITIONS

	Improved Sanitation		Improved Water Source		Soap and Water at Place for Washing Hands	
	No	Yes	No	Yes	No	Yes
Z-Score for:						
Weight-for-height	–0.89	–0.66	–0.77	–0.78	–0.83	–0.71
Height-for-age	–1.09	–0.66	–0.76	–0.90	–1.00	–0.74
Body mass index-for-age	–0.33	–0.37	–0.46	–0.33	–0.34	–0.36
Weight-for-length	–0.44	–0.42	–0.51	–0.42	–0.44	–0.42
Head circumference-for-age	–0.41	–0.39	–0.50	–0.38	–0.40	–0.40
Arm circumference-for-age	0.00	0.06	–0.10	0.05	–0.01	0.08

FIGURE 9: CHILD GROWTH MEASURES (Z-SCORES) BY SEX AND MONTHS OF AGE



functional consequences, including consequences on physical activity and on learning. Anemia tests are conducted on children 6–24 months of age. Following WHO guidelines, children are classified as anemic if their hemoglobin concentration is less than 110 g/L. Table 38 shows that the fraction of children below the threshold is very high. Seventy-one percent of children are anemic. Higher household income is also associated with higher hemoglobin levels for children. Table 39 shows that there seems to be strong district effects, with more than 75% of children living in Madiun and Bondowoso having lower hemoglobin levels. The proportion of anemic children is also lower for households with adequate sanitation and good hygiene practice (Table 40).

TABLE 38: ANEMIA BY INCOME QUARTILE

	Income Quartile				
	1st	2nd	3rd	4th	Total
Percentage of children with Hb<110 g/L	73.1%	74.1%	69.8%	66.2%	70.9%

TABLE 39: ANEMIA BY REGIONW

		Percentage of Children with Hb<110 g/L
Western Districts	Blitar	70.8%
	Jombang	74.1%
	Madiun	75.1%
	Ngawi	56.0%
Eastern Districts	Banyuwangi	73.6%
	Bondowoso	76.2%
	Situbondo	72.8%
	Probolinggo	66.8%

TABLE 40: ANEMIA AND WATER, SANITATION AND HYGIENE CONDITION

	Improved Sanitation		Improved Water Source		Soap and Water at Place for Washing Hands	
	No	Yes	No	Yes	No	Yes
Percentage of children with Hb<110 g/L	72.8%	68.7%	73.0%	70.5%	72.1%	69.4%

V. Future Directions

The baseline survey conducted in Indonesia captures a representative sample of households living in rural East Java with young children. These households are poor relative to the national average. Only 49% of households have access to improved sanitation and 55% of the poorest households defecate in the open, often in rivers. Although most people report washing their hands after defecating, handwashing facilities are often not available. Access to improved drinking water is relatively high at 87%, even among the poor, but the remaining population consumes water from unsafe sources. Amidst these conditions, 8.4% of children under five years of age are reported as having had diarrhea in the past two weeks.

In addition to providing useful information for the design of the intervention, the data presented here will be used to evaluate the impact of the Indonesia rural sanitation project on child health and caretaker productivity. The evaluation study hopes to measure and learn about the impact of the intervention on sanitation use that will be used to guide future projects and policy both in Indonesia and globally.

The subsequent collection and analysis of the post-intervention data, in conjunction with the longitudinal data, will enable a close examination of the links between poor sanitation, poor health, and longer-term child development. The baseline survey identifies large proportions of children in East Java as being underweight, stunted, and with below average head and arm circumference for their age. Anemia is common, and the child population demonstrates poor cognitive and physical development. The impact evaluation aims to identify to what extent these outcomes are attributable to poor sanitation and to quantify the extent to which the project is able to improve these vital aspects of child health.

As outlined in the methodology section, the impact evaluation study utilizes a series of household and community surveys. These include the baseline, approximately 18 waves of longitudinal monitoring, and post-intervention follow-up questionnaires. At the time of this report's publication, longitudinal data collection is completed, and post-intervention data collection is scheduled to be completed by the end of 2010. Data analysis and impact assessments will be conducted soon after, and a full impact evaluation report of the Global Scaling Up Rural Sanitation Project will be published by the end of 2011.

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Annex 1: Baseline Comparison of Means Tests for Balance

As mentioned in Section II: Methodology, a critical requirement of the IE methodology is that a robust counterfactual for the treatment group can be approximated. The households surveyed possess many characteristics that are either unobservable, or for which data were not collected, and thus balance between the groups on these unobservable characteristics cannot be tested. However, if a sufficiently large number of observed characteristics are found to be balanced across the treatment and control groups, then we can be reasonably confident that the unobserved characteristics are balanced as well.

The following table presents a series of mean comparison tests across treatment and control groups for key variables. A variable is "balanced" if the mean differences between the treatment and control groups are not statistically different from zero (the p-value is higher than 10%). We use simple mean and standard error calculations across all observations.

Overall, 229 variables were tested for balance across treatment and control groups in the Indonesia sample. Statistically significant differences found at $\alpha = 0.1$ level are boldfaced and italicized in the tables that follow.

The null hypothesis of mean equality at the 10% level was rejected in 27 of the 229 variables tested, with 11.8% of responses showing statistically significant differences between the treatment and control groups (at $\alpha = 0.1$ level).

The table shows that for the key outcome variables (household water and sanitation condition, as well as children's disease and health variables), balance is achieved. In general, there are no significant differences in most demographic and socio-economic characteristics between treatment and control groups. One key difference to note: on average, the treatment group has a slightly higher number of household members and children under five. In addition, the treatment group also has more household members with tertiary degrees, although this may have been due to very few observations. On the other hand, the share of households in the treatment groups with access to piped water is lower than the control groups, but the share of households that use spring water as their main source of drinking water is higher. Again, this may be due to sample size becoming too small when we break down into specific sources of water.

TABLE 41: BASELINE COMPARISON OF MEANS TESTS FOR BALANCE

	Total			Treatment			Control			Difference			
Variables	N	Mean	Std Error	N	Mean	Std Error	N	Mean	Std Error	T-C	Std Error	Z-score	P-value
HOUSEHOLD COMPOSITION													
Age Group (% Individuals):													
0–4	9546	0.246	0.004	4808	0.247	0.006	4738	0.246	0.006	0.001	0.008	0.118	0.453
5–9	9546	0.074	0.003	4808	0.072	0.004	4738	0.075	0.004	–0.003	0.006	–0.530	0.298
10–14	9546	0.055	0.002	4808	0.055	0.003	4738	0.054	0.003	0.001	0.004	0.236	0.407
15–19	9546	0.043	0.002	4808	0.045	0.003	4738	0.041	0.003	0.004	0.004	0.943	0.173
20–24	9546	0.088	0.003	4808	0.087	0.004	4738	0.089	0.004	–0.002	0.006	–0.354	0.362
25–29	9546	0.114	0.003	4808	0.113	0.005	4738	0.115	0.005	–0.002	0.007	–0.283	0.389
30–34	9546	0.101	0.003	4808	0.101	0.004	4738	0.100	0.004	0.001	0.006	0.177	0.430
35–39	9546	0.078	0.003	4808	0.082	0.004	4738	0.075	0.004	0.007	0.006	1.237	0.108
40–44	9546	0.050	0.002	4808	0.050	0.003	4738	0.050	0.003	0.000	0.004	0.000	0.500
45–49	9546	0.039	0.002	4808	0.037	0.003	4738	0.041	0.003	–0.004	0.004	–0.943	0.173
50+	9546	0.112	0.003	4808	0.112	0.005	4738	0.113	0.005	–0.001	0.007	–0.141	0.444

	Total			Treatment			Control			Difference			
Variables	N	Mean	Std Error	N	Mean	Std Error	N	Mean	Std Error	T-C	Std Error	Z-score	P-value
Average Age (Years):													
HH heads	2087	39.278	0.254	1042	39.341	0.361	1045	39.215	0.357	0.126	0.508	0.248	0.402
Other HH members	7461	19.697	0.226	3767	19.700	0.316	3694	19.694	0.322	0.006	0.451	0.013	0.495
Percentage of Males Among:													
HH heads	2087	0.956	0.004	1042	0.955	0.006	1045	0.957	0.006	–0.002	0.008	–0.236	0.407
Other HH members	7462	0.353	0.006	3767	0.356	0.008	3695	0.350	0.008	0.006	0.011	0.530	0.298
Household Size (% HHs):													
2	2086	0.002	0.001	1042	0.001	0.001	1044	0.003	0.002	–0.002	0.002	–0.894	0.186
3	2086	0.205	0.009	1042	0.196	0.012	1044	0.214	0.013	–0.018	0.018	–1.017	0.154
4	2086	0.335	0.010	1042	0.331	0.015	1044	0.338	0.015	–0.007	0.021	–0.330	0.371
5	***2086***	***0.246***	***0.009***	***1042***	***0.259***	***0.014***	***1044***	***0.233***	***0.013***	***0.026***	***0.019***	***1.361***	***0.087***
6	***2086***	***0.136***	***0.008***	***1042***	***0.126***	***0.010***	***1044***	***0.147***	***0.011***	***–0.021***	***0.015***	***–1.413***	***0.079***
7	***2086***	***0.052***	***0.005***	***1042***	***0.060***	***0.007***	***1044***	***0.044***	***0.006***	***0.016***	***0.009***	***1.735***	***0.041***
8+	2086	0.024	0.003	1042	0.027	0.005	1044	0.022	0.005	0.005	0.007	0.707	0.240
Average no. of HH members	***2086***	***4.564***	***0.027***	***1042***	***4.602***	***0.039***	***1044***	***4.527***	***0.038***	***0.075***	***0.054***	***1.377***	***0.084***
Average no. of children <5	***2087***	***1.127***	***0.008***	***1042***	***1.138***	***0.011***	***1045***	***1.116***	***0.011***	***0.022***	***0.016***	***1.414***	***0.079***
Average no. of children <2	2087	1.009	0.004	1042	1.009	0.005	1045	1.009	0.006	0.000	0.008	0.003	0.499
EDUCATION													
Highest Educational Level Achieved (% HH Heads):													
Less than elementary	2087	0.010	0.002	1042	0.010	0.003	1045	0.010	0.003	0.000	0.004	0.000	0.500
Elementary school, madrasah ibtidaiyah	2087	0.526	0.011	1042	0.535	0.015	1045	0.518	0.015	0.017	0.021	0.801	0.211
General/ vocational junior high	2087	0.198	0.009	1042	0.190	0.012	1045	0.207	0.013	–0.017	0.018	–0.961	0.168
General/ vocational senior high	2087	0.175	0.008	1042	0.170	0.012	1045	0.181	0.012	–0.011	0.017	–0.648	0.258
University (S1,S2,S3)	2087	0.040	0.004	1042	0.039	0.006	1045	0.041	0.006	–0.002	0.008	–0.236	0.407

	Total			Treatment			Control			Difference			
Variables	N	Mean	Std Error	N	Mean	Std Error	N	Mean	Std Error	T-C	Std Error	Z-score	P-value
Highest Educational Level Achieved (% Other HH Members):													
Ever attended school	5107	0.930	0.004	2580	0.931	0.005	2527	0.930	0.005	0.001	0.007	0.141	0.444
Less than elementary	2081	0.006	0.002	1039	0.008	0.003	1042	0.004	0.002	0.004	0.004	1.109	0.134
Elementary school, madrasah ibtidaiyah	2081	0.366	0.011	1039	0.353	0.015	1042	0.378	0.015	–0.025	0.021	–1.179	0.119
General/ vocational junior high	2081	0.315	0.010	1039	0.318	0.014	1042	0.312	0.014	0.006	0.020	0.303	0.381
General/ vocational senior high	2081	0.250	0.009	1039	0.252	0.013	1042	0.249	0.013	0.003	0.018	0.163	0.435
University (S1,S2,S3)	***2081***	***0.055***	***0.005***	***1039***	***0.063***	***0.008***	***1042***	***0.048***	***0.007***	***0.015***	***0.011***	***1.411***	***0.079***
INCOME (Rp PER YEAR)													
Mean wage income	2087	12,453,300	452,970	1042	12,145,007	609,479	1045	12,760,708	670,261	–615,701	905,933	–0.680	0.248
Mean non-wage income	2087	1,097,559	89,780	1042	1,039,542	106,173	1045	1,155,410	144,743	–115,868	179,508	–0.645	0.259
Mean total income	2087	13,550,859	468,272	1042	13,184,549	625,818	1045	13,916,118	696,678	–731,569	936,487	–0.781	0.217
Mean per capita income	2087	2,968,707	97,839	1042	2,881,310	122,551	1045	3,055,853	152,484	–174,543	195,627	–0.892	0.186
Percentage of HHs with non-wage income	2087	0.858	0.008	1042	0.867	0.011	1045	0.849	0.011	0.018	0.016	1.157	0.124
HOUSEHOLD ASSET TYPE (% HHs WHO OWN)													
House	***2087***	***0.851***	***0.008***	***1042***	***0.864***	***0.011***	***1045***	***0.837***	***0.011***	***0.027***	***0.016***	***1.736***	***0.041***
Land	2087	0.370	0.011	1042	0.373	0.015	1045	0.367	0.015	0.006	0.021	0.283	0.389
Livestock	2087	0.462	0.011	1042	0.471	0.015	1045	0.454	0.015	0.017	0.021	0.801	0.211
Vehicle	2087	0.807	0.009	1042	0.797	0.012	1045	0.817	0.012	–0.020	0.017	–1.179	0.119
Equipment	***2087***	***0.818***	***0.008***	***1042***	***0.832***	***0.012***	***1045***	***0.804***	***0.012***	***0.028***	***0.017***	***1.650***	***0.049***
HH appliances	2087	0.992	0.002	1042	0.993	0.003	1045	0.991	0.003	0.002	0.004	0.471	0.319
Jewelry	2087	0.641	0.011	1042	0.628	0.015	1045	0.654	0.015	–0.026	0.021	–1.226	0.110
Other asset	2087	0.065	0.005	1042	0.062	0.007	1045	0.067	0.008	–0.005	0.011	–0.470	0.319
DWELLING (% HHs)													
Average no. of rooms	2086	5.377	0.044	1041	5.334	0.062	1045	5.419	0.063	–0.085	0.088	–0.962	0.168
Dwelling Type:													
Detached, single story	2083	0.875	0.007	1042	0.878	0.010	1041	0.872	0.010	0.006	0.014	0.424	0.336
Detached, multi-story	2083	0.044	0.004	1042	0.046	0.006	1041	0.041	0.006	0.005	0.008	0.589	0.278
Connected, single story	2083	0.079	0.006	1042	0.073	0.008	1041	0.085	0.009	–0.012	0.012	–0.997	0.159
Connected, multi-story	2083	0.002	0.001	1042	0.003	0.002	1041	0.001	0.001	0.002	0.002	0.894	0.186

	Total			Treatment			Control			Difference			
Variables	N	Mean	Std Error	N	Mean	Std Error	N	Mean	Std Error	T-C	Std Error	Z-score	P-value
Materials of Wall:													
Brick	2083	0.074	0.006	1042	0.073	0.008	1041	0.076	0.008	–0.003	0.011	–0.265	0.395
Concrete	2083	0.615	0.011	1042	0.621	0.015	1041	0.610	0.015	0.011	0.021	0.519	0.302
Wood/logs	***2083***	***0.170***	***0.008***	***1042***	***0.157***	***0.011***	***1041***	***0.183***	***0.012***	***–0.026***	***0.016***	***–1.597***	***0.055***
Bamboo	2083	0.109	0.007	1042	0.116	0.010	1041	0.103	0.009	0.013	0.013	0.966	0.167
Unbaked brick, other	2083	0.031	0.004	1042	0.033	0.006	1041	0.029	0.005	0.004	0.008	0.512	0.304
Materials of Floor:													
Parquet	2083	0.002	0.001	1042	0.001	0.001	1041	0.003	0.002	–0.002	0.002	–0.894	0.186
Ceramic	2083	0.239	0.009	1042	0.250	0.013	1041	0.229	0.013	0.021	0.018	1.142	0.127
Linoleum	2083	0.015	0.003	1042	0.015	0.004	1041	0.014	0.004	0.001	0.006	0.177	0.430
Concrete	2083	0.412	0.011	1042	0.411	0.015	1041	0.413	0.015	–0.002	0.021	–0.094	0.462
Dirt	2083	0.251	0.009	1042	0.247	0.013	1041	0.255	0.014	–0.008	0.019	–0.419	0.338
Tile	***2083***	***0.066***	***0.005***	***1042***	***0.059***	***0.007***	***1041***	***0.073***	***0.008***	***–0.014***	***0.011***	***–1.317***	***0.094***
Other	2083	0.016	0.003	1042	0.018	0.004	1041	0.013	0.004	0.005	0.006	0.884	0.188
Percentage of HHs with electricity	2087	0.988	0.002	1042	0.989	0.003	1045	0.987	0.004	0.002	0.005	0.400	0.345
LABOR MARKET													
HH head is employed (% HH heads)	***2087***	***0.965***	***0.004***	***1042***	***0.971***	***0.005***	***1045***	***0.959***	***0.006***	***0.012***	***0.008***	***1.536***	***0.062***
Other HH member is employed (% other HH members)	3883	0.523	0.008	1967	0.523	0.011	1916	0.523	0.011	0.000	0.016	0.000	0.500
Percentage of Unemployed Non-HH Heads Who Were:													
Looking for work	1852	0.012	0.003	939	0.014	0.004	913	0.010	0.003	0.004	0.005	0.800	0.212
Studying	1852	0.060	0.006	939	0.065	0.008	913	0.055	0.008	0.010	0.011	0.884	0.188
Taking care of home	1852	0.071	0.006	939	0.073	0.009	913	0.069	0.008	0.004	0.012	0.332	0.370
Retired	1852	0.104	0.007	939	0.103	0.010	913	0.104	0.010	–0.001	0.014	–0.071	0.472
Caring for a child	1852	0.695	0.011	939	0.683	0.015	913	0.709	0.015	–0.026	0.021	–1.226	0.110
Other	1852	0.042	0.005	939	0.042	0.007	913	0.043	0.007	–0.001	0.010	–0.101	0.460
Occupation:													
Self-employed	***4049***	***0.226***	***0.007***	***2041***	***0.215***	***0.009***	***2008***	***0.237***	***0.009***	***–0.022***	***0.013***	***–1.728***	***0.042***
Employee	***4049***	***0.303***	***0.007***	***2041***	***0.316***	***0.010***	***2008***	***0.289***	***0.010***	***0.027***	***0.014***	***1.909***	***0.028***
Employer or boss	4049	0.147	0.006	2041	0.150	0.008	2008	0.144	0.008	0.006	0.011	0.530	0.298
Worker without remuneration	4049	0.169	0.006	2041	0.169	0.008	2008	0.169	0.008	0.000	0.011	0.000	0.500
Day laborer	4049	0.155	0.006	2041	0.150	0.008	2008	0.160	0.008	–0.010	0.011	–0.884	0.188

	Total			Treatment			Control			Difference			
Variables	N	Mean	Std Error	N	Mean	Std Error	N	Mean	Std Error	T-C	Std Error	Z-score	P-value
Wage:													
Self-employed	896	490,819	24,732	429	462,156	31,421	467	517,150	37,653	–54,993	49,042	–1.121	0.131
Employee	1203	605,478	17,602	634	600,795	24,499	569	610,695	25,313	–9,900	35,228	–0.281	0.389
Employer or boss	591	760,152	94,049	303	699,586	110,232	288	823,872	154,384	–124,286	189,698	–0.655	0.256
Worker without remuneration	676	14,245	6,090	341	16,439	10,069	335	12,012	6,794	4,427	12,147	0.364	0.358
Day laborer	***625***	***356,882***	***13,076***	***305***	***379,353***	***21,241***	***320***	***335,465***	***15,508***	***43,888***	***26,300***	***1.669***	***0.048***
Lost Hours, Caring for Sick HH Member:													
Lost hours (% HHs)	2087	0.256	0.010	1042	0.247	0.013	1045	0.266	0.014	–0.019	0.019	–0.995	0.160
SOURCE OF DRINKING WATER (% HHs)													
Improved drinking water source	2086	0.873	0.007	1042	0.872	0.010	1044	0.874	0.010	–0.002	0.014	–0.141	0.444
Location:													
Inside own dwelling	1957	0.350	0.011	1019	0.352	0.015	938	0.346	0.016	0.006	0.022	0.274	0.392
In own yard, plot	1957	0.379	0.011	1019	0.381	0.015	938	0.377	0.016	0.004	0.022	0.182	0.428
Elsewhere	1957	0.271	0.010	1019	0.267	0.014	938	0.276	0.015	–0.009	0.021	–0.439	0.330
Source of Water Is:													
Covered	***1951***	***0.630***	***0.011***	***1015***	***0.645***	***0.015***	***936***	***0.614***	***0.016***	***0.031***	***0.022***	***1.413***	***0.079***
Open	1951	0.349	0.011	1015	0.339	0.015	936	0.359	0.016	–0.020	0.022	–0.912	0.181
Both	***1951***	***0.021***	***0.003***	***1015***	***0.016***	***0.004***	***936***	***0.027***	***0.005***	***–0.011***	***0.006***	***–1.718***	***0.043***
SAFE WATER-USE BEHAVIOR (% HHs)													
Frequency of Washing Container:													
Do not wash, never	2061	0.012	0.002	1028	0.010	0.003	1033	0.015	0.004	–0.005	0.005	–1.000	0.159
Rarely	2061	0.014	0.003	1028	0.011	0.003	1033	0.017	0.004	–0.006	0.005	–1.200	0.115
Once per week	2061	0.100	0.007	1028	0.097	0.009	1033	0.103	0.009	–0.006	0.013	–0.471	0.319
More than once per week	2061	0.860	0.008	1028	0.869	0.011	1033	0.852	0.011	0.017	0.016	1.093	0.137
Method of Washing:													
Bottled water	2061	0.014	0.003	1028	0.014	0.004	1033	0.014	0.004	0.000	0.006	0.000	0.500
Water only	1879	0.278	0.010	934	0.276	0.015	945	0.279	0.015	–0.003	0.021	–0.141	0.444
Soap, detergent, bleach	1879	0.708	0.010	934	0.710	0.015	945	0.707	0.015	0.003	0.021	0.141	0.444
Mud	1879	0.001	0.001	934	0.001	0.001	945	0.001	0.001	0.000	0.001	0.000	0.500
Ash	1879	0.005	0.002	934	0.005	0.002	945	0.005	0.002	0.000	0.003	0.000	0.500
Hot water	1879	0.007	0.002	934	0.007	0.003	945	0.007	0.003	0.000	0.004	0.000	0.500

	Total			Treatment			Control			Difference			
Variables	N	Mean	Std Error	N	Mean	Std Error	N	Mean	Std Error	T-C	Std Error	Z-score	P-value
Drinking Water Preparation:													
Boil	***1945***	***0.969***	***0.004***	***978***	***0.975***	***0.005***	***967***	***0.963***	***0.006***	***0.012***	***0.008***	***1.536***	***0.062***
Chlorine	1945	0.001	0.001	978	0.001	0.001	967	0.001	0.001	0.000	0.001	0.000	0.500
Filter	1945	0.011	0.002	978	0.013	0.004	967	0.008	0.003	0.005	0.005	1.000	0.159
Strain through a cloth	***1945***	***0.122***	***0.007***	***978***	***0.108***	***0.010***	***967***	***0.137***	***0.011***	***–0.029***	***0.015***	***–1.951***	***0.026***
Let it stand and settle	1945	0.094	0.007	978	0.087	0.009	967	0.101	0.010	–0.014	0.013	–1.041	0.149
Frequency of Water Preparation:													
Not in the previous seven days	1945	0.007	0.002	978	0.007	0.003	967	0.006	0.003	0.001	0.004	0.236	0.407
Every day	1945	0.839	0.008	978	0.848	0.011	967	0.830	0.012	0.018	0.016	1.106	0.134
Every other day	1945	0.121	0.007	978	0.117	0.010	967	0.126	0.011	–0.009	0.015	–0.605	0.272
Once or twice	1945	0.033	0.004	978	0.029	0.005	967	0.037	0.006	–0.008	0.008	–1.024	0.153
SANITATION FACILITY													
Improved sanitation (% HHs)	2087	0.485	0.011	1042	0.495	0.015	1045	0.476	0.015	0.019	0.021	0.896	0.185
Unimproved sanitation (% HHs)	2087	0.119	0.007	1042	0.116	0.010	1045	0.122	0.010	–0.006	0.014	–0.424	0.336
Open defecation (% HHs)	2087	0.395	0.011	1042	0.389	0.015	1045	0.402	0.015	–0.013	0.021	–0.613	0.270
Location of Toilet (% HHs with Toilet):													
Inside household	2087	0.265	0.010	1042	0.254	0.013	1045	0.277	0.014	–0.023	0.019	–1.204	0.114
In household yard	***2087***	***0.264***	***0.010***	***1042***	***0.279***	***0.014***	***1045***	***0.250***	***0.013***	***0.029***	***0.019***	***1.518***	***0.065***
Less than 10-min. walk	2087	0.368	0.011	1042	0.356	0.015	1045	0.379	0.015	–0.023	0.021	–1.084	0.139
More than 10-min. walk	2087	0.082	0.006	1042	0.088	0.009	1045	0.077	0.008	0.011	0.012	0.914	0.180
Other or no specific location	2087	0.020	0.003	1042	0.022	0.005	1045	0.018	0.004	0.004	0.006	0.625	0.266
Latrine Materials (% HHs):													
Porcelain	1259	0.651	0.013	634	0.661	0.019	625	0.642	0.019	0.019	0.027	0.707	0.240
Cement	1259	0.138	0.010	634	0.128	0.013	625	0.149	0.014	–0.021	0.019	–1.099	0.136
Bamboo	***1259***	***0.090***	***0.008***	***634***	***0.071***	***0.010***	***625***	***0.109***	***0.012***	***–0.038***	***0.016***	***–2.433***	***0.007***
Brick, stone	1259	0.055	0.006	634	0.058	0.009	625	0.051	0.009	0.007	0.013	0.550	0.291

	Total			Treatment			Control			Difference			
Variables	N	Mean	Std Error	N	Mean	Std Error	N	Mean	Std Error	T-C	Std Error	Z-score	P-value
Materials in Latrine Area (% HHs):													
Tile	1262	0.208	0.011	637	0.212	0.016	625	0.203	0.016	0.009	0.023	0.398	0.345
Cement	1262	0.539	0.014	637	0.524	0.020	625	0.554	0.020	–0.030	0.028	–1.061	0.144
Wood	1262	0.023	0.004	637	0.020	0.006	625	0.026	0.006	–0.006	0.008	–0.707	0.240
Bamboo	1262	0.058	0.007	637	0.052	0.009	625	0.064	0.010	–0.012	0.013	–0.892	0.186
Land	1262	0.143	0.010	637	0.152	0.014	625	0.134	0.014	0.018	0.020	0.909	0.182
IMPROVEMENT OF TOILET FACILITY													
Principal Reason for Having Toilet (% HHs with Latrine):													
Convenience or location	1197	0.306	0.013	627	0.319	0.019	570	0.291	0.019	0.028	0.027	1.042	0.149
Healthier for the family	1197	0.197	0.012	627	0.191	0.016	570	0.204	0.017	–0.013	0.023	–0.557	0.289
Easier to keep clean	1197	0.101	0.009	627	0.093	0.012	570	0.111	0.013	–0.018	0.018	–1.017	0.154
Privacy, dignity	1197	0.042	0.006	627	0.043	0.008	570	0.040	0.008	0.003	0.011	0.265	0.395
Safety, security	1197	0.060	0.007	627	0.054	0.009	570	0.067	0.010	–0.013	0.013	–0.966	0.167
Avoid sharing	1197	0.055	0.007	627	0.049	0.009	570	0.061	0.010	–0.012	0.013	–0.892	0.186
Comfort	1197	0.183	0.011	627	0.193	0.016	570	0.172	0.016	0.021	0.023	0.928	0.177
Prestige, pride	1197	0.005	0.002	627	0.003	0.002	570	0.007	0.003	–0.004	0.004	–1.109	0.134
Sewage disposal is full	1197	0.008	0.002	627	0.006	0.003	570	0.009	0.004	–0.003	0.005	–0.600	0.274
Other	1197	0.043	0.006	627	0.048	0.009	570	0.039	0.008	0.009	0.012	0.747	0.227
Likeliness to Build/Improve (% HH without Latrine):													
High	799	0.105	0.011	411	0.114	0.016	388	0.095	0.015	0.019	0.022	0.866	0.193
Medium	799	0.218	0.015	411	0.200	0.020	388	0.237	0.022	–0.037	0.030	–1.244	0.107
Low	799	0.484	0.018	411	0.499	0.025	388	0.469	0.025	0.030	0.035	0.849	0.198
None	799	0.193	0.014	411	0.187	0.019	388	0.198	0.020	–0.011	0.028	–0.399	0.345
Principal Constraint to Build/Improve (% HHs without Latrine):													
High cost	799	0.874	0.012	411	0.878	0.016	388	0.869	0.017	0.009	0.023	0.386	0.350
No one to build it	799	0.006	0.003	411	0.007	0.004	388	0.005	0.004	0.002	0.006	0.354	0.362
Materials not available	***799***	***0.004***	***0.002***	***411***	***0.000***	***0.000***	***388***	***0.008***	***0.004***	***–0.008***	***0.004***	***–2.000***	***0.023***
Too complex to build	799	0.001	0.001	411	0.000	0.000	388	0.003	0.003	–0.003	0.003	–1.000	0.159
Savings, credit issues	799	0.006	0.003	411	0.007	0.004	388	0.005	0.004	0.002	0.006	0.354	0.362
Competing priorities	799	0.029	0.006	411	0.024	0.008	388	0.034	0.009	–0.010	0.012	–0.830	0.203
Tenancy issues	799	0.004	0.002	411	0.002	0.002	388	0.005	0.004	–0.003	0.004	–0.671	0.251

	Total			Treatment			Control			Difference			
Variables	N	Mean	Std Error	N	Mean	Std Error	N	Mean	Std Error	T-C	Std Error	Z-score	P-value
Limited space	799	0.028	0.006	411	0.034	0.009	388	0.021	0.007	0.013	0.011	1.140	0.127
Permit problems	799	0.001	0.001	411	0.000	0.000	388	0.003	0.003	–0.003	0.003	–1.000	0.159
Satisfied w/ current	799	0.006	0.003	411	0.010	0.005	388	0.003	0.003	0.007	0.006	1.200	0.115
Other or no constraints given	799	0.041	0.007	411	0.036	0.009	388	0.046	0.011	–0.010	0.014	–0.704	0.241
HOUSEHOLD CLEANNESS (% HHs)													
Flies Around the House:													
Always and many	2087	0.096	0.006	1042	0.096	0.009	1045	0.097	0.009	–0.001	0.013	–0.079	0.469
Always and some	***2087***	***0.038***	***0.004***	***1042***	***0.045***	***0.006***	***1045***	***0.031***	***0.005***	***0.014***	***0.008***	***1.793***	***0.037***
Sometimes and many	2087	0.101	0.007	1042	0.104	0.009	1045	0.098	0.009	0.006	0.013	0.471	0.319
Sometimes and few	2087	0.211	0.009	1042	0.207	0.013	1045	0.214	0.013	–0.007	0.018	–0.381	0.352
Rarely, hardly any	2087	0.554	0.011	1042	0.548	0.015	1045	0.561	0.015	–0.013	0.021	–0.613	0.270
Visible Feces In/Around HH:													
None	2087	0.564	0.011	1042	0.555	0.015	1045	0.574	0.015	–0.019	0.021	–0.896	0.185
1–5	2087	0.252	0.010	1042	0.260	0.014	1045	0.243	0.013	0.017	0.019	0.890	0.187
More than five	2087	0.160	0.008	1042	0.157	0.011	1045	0.162	0.011	–0.005	0.016	–0.321	0.374
General Observation:													
Clean dwelling	2087	0.707	0.010	1042	0.717	0.014	1045	0.698	0.014	0.019	0.020	0.960	0.169
Food uncovered	2087	0.243	0.009	1042	0.247	0.013	1045	0.240	0.013	0.007	0.018	0.381	0.352
PLACE FOR WASHING HANDS (% HHs)													
Water available	2087	0.620	0.011	1042	0.631	0.015	1045	0.609	0.015	0.022	0.021	1.037	0.150
Water and soap available	2087	0.470	0.011	1042	0.478	0.015	1045	0.462	0.015	0.016	0.021	0.754	0.225
Location of Place for Washing Hands:													
Inside toilet facility	2065	0.541	0.011	1030	0.533	0.016	1035	0.550	0.015	–0.017	0.022	–0.775	0.219
Inside kitchen, cooking place	2065	0.056	0.005	1030	0.060	0.007	1035	0.052	0.007	0.008	0.010	0.808	0.210
Yard, less than three feet from toilet	2065	0.018	0.003	1030	0.017	0.004	1035	0.018	0.004	–0.001	0.006	–0.177	0.430
Between 3–10 feet from toilet	***2065***	***0.021***	***0.003***	***1030***	***0.030***	***0.005***	***1035***	***0.013***	***0.003***	***0.017***	***0.006***	***2.915***	***0.002***

	Total			Treatment			Control			Difference			
Variables	N	Mean	Std Error	N	Mean	Std Error	N	Mean	Std Error	T-C	Std Error	Z-score	P-value
More than 10 feet from toilet	2065	0.063	0.005	1030	0.068	0.008	1035	0.059	0.007	0.009	0.011	0.847	0.199
No specific place	2065	0.300	0.010	1030	0.291	0.014	1035	0.308	0.014	–0.017	0.020	–0.859	0.195
Handwashing with soap observed (% HHs)	1446	0.290	0.012	730	0.285	0.017	716	0.295	0.017	–0.010	0.024	–0.416	0.339
PROJECT CAMPAIGN (% HHs)													
Ever heard of project campaign	2087	0.132	0.007	1042	0.131	0.010	1045	0.132	0.010	–0.001	0.014	–0.071	0.472
If yes, % heard from media	275	0.051	0.013	137	0.044	0.018	138	0.058	0.020	–0.014	0.027	–0.520	0.301
BREASTFEEDING (% CHILDREN <2)													
Ever been breastfed	2106	0.963	0.004	1052	0.961	0.006	1054	0.965	0.006	–0.004	0.008	–0.471	0.319
Still breastfeeding	2106	0.798	0.009	1052	0.787	0.013	1054	0.809	0.012	–0.022	0.018	–1.244	0.107
Average mo. of breastfeeding	348	7.971	0.379	183	7.574	0.514	165	8.412	0.561	–0.838	0.761	–1.101	0.135
Colostrum given, first three days	2106	0.840	0.008	1052	0.844	0.011	1054	0.836	0.011	0.008	0.016	0.514	0.304
INFANT/YOUNG CHILD CLEANNESS (% CHILDREN <5)													
Children with:													
Clean appearance	2350	0.775	0.009	1184	0.770	0.012	1166	0.780	0.012	–0.010	0.017	–0.589	0.278
Dirty hands	2350	0.180	0.008	1184	0.187	0.011	1166	0.173	0.011	0.014	0.016	0.900	0.184
Dirty finger nails	2350	0.167	0.008	1184	0.175	0.011	1166	0.160	0.011	0.015	0.016	0.964	0.167
Dirty face	2350	0.169	0.008	1184	0.167	0.011	1166	0.171	0.011	–0.004	0.016	–0.257	0.399
Clothes on	***2350***	***0.945***	***0.005***	***1184***	***0.951***	***0.006***	***1166***	***0.939***	***0.007***	***0.012***	***0.009***	***1.302***	***0.097***
Dirty clothes	2350	0.165	0.008	1184	0.165	0.011	1166	0.165	0.011	0.000	0.016	0.000	0.500
Pot-belly	2350	0.087	0.006	1184	0.090	0.008	1166	0.084	0.008	0.006	0.011	0.530	0.298
Shoes on/ available	2350	0.451	0.010	1184	0.458	0.014	1166	0.445	0.015	0.013	0.021	0.634	0.263
LEARNING ENVIRONMENT (% CHILDREN <5)													
Play with HH objects	***2092***	***0.665***	***0.010***	***1046***	***0.650***	***0.015***	***1046***	***0.680***	***0.014***	***–0.030***	***0.021***	***–1.462***	***0.072***
Play with toys	2092	0.774	0.009	1046	0.771	0.013	1046	0.778	0.013	–0.007	0.018	–0.381	0.352
Number of Books Provided to Child:													
None	2092	0.806	0.009	1046	0.811	0.012	1046	0.801	0.012	0.010	0.017	0.589	0.278
1–3	2092	0.171	0.008	1046	0.169	0.012	1046	0.173	0.012	–0.004	0.017	–0.236	0.407
More than three	2092	0.023	0.003	1046	0.020	0.004	1046	0.026	0.005	–0.006	0.006	–0.937	0.174

	Total			Treatment			Control			Difference			
Variables	N	Mean	Std Error	N	Mean	Std Error	N	Mean	Std Error	T-C	Std Error	Z-score	P-value
CHILD DEVELOPMENT Z-SCORE (% CHILDREN <5)													
Mobility	1762	0.000	0.024	884	0.010	0.033	878	–0.010	0.034	0.020	0.047	0.422	0.336
Communication	1761	0.000	0.024	883	0.013	0.033	878	–0.013	0.035	0.026	0.048	0.540	0.294
Social	1762	0.000	0.024	884	0.022	0.034	878	–0.022	0.034	0.044	0.048	0.915	0.180
DIARRHEA PREVALENCE (% CHILDREN <5)													
Incidence in the Previous:													
48 hours	2344	0.043	0.004	1182	0.038	0.006	1162	0.048	0.006	–0.010	0.008	–1.179	0.119
Week	2344	0.073	0.005	1182	0.070	0.007	1162	0.075	0.008	–0.005	0.011	–0.470	0.319
14 days	2344	0.084	0.006	1182	0.080	0.008	1162	0.088	0.008	–0.008	0.011	–0.707	0.240
Caregiver Sought Treatment from (% Caregivers):													
Public	196	0.495	0.036	94	0.532	0.052	102	0.461	0.050	0.071	0.072	0.984	0.163
Private	196	0.189	0.028	94	0.181	0.040	102	0.196	0.040	–0.015	0.057	–0.265	0.395
Both	196	0.015	0.009	94	0.021	0.015	102	0.010	0.010	0.011	0.018	0.610	0.271
Did not seek	196	0.301	0.033	94	0.266	0.046	102	0.333	0.047	–0.067	0.066	–1.019	0.154
Did not pay for treatment	196	0.230	0.030	94	0.191	0.041	102	0.265	0.044	–0.074	0.060	–1.230	0.109
Type of Treatment (% Children):													
No treatment	196	0.260	0.031	94	0.234	0.044	102	0.284	0.045	–0.050	0.063	–0.794	0.213
Pill or syrup	***196***	***0.510***	***0.036***	***94***	***0.574***	***0.051***	***102***	***0.451***	***0.050***	***0.123***	***0.071***	***1.722***	***0.043***
Injection	196	0.010	0.007	94	0.011	0.011	102	0.010	0.010	0.001	0.015	0.067	0.473
Intravenous	196	0.031	0.012	94	0.032	0.018	102	0.029	0.017	0.003	0.025	0.121	0.452
Traditional remedies	196	0.051	0.016	94	0.043	0.021	102	0.059	0.023	–0.016	0.031	–0.514	0.304
Oral rehydration solution	196	0.158	0.026	94	0.149	0.037	102	0.167	0.037	–0.018	0.052	–0.344	0.365
Homemade sugar-salt water	***196***	***0.026***	***0.011***	***94***	***0.043***	***0.021***	***102***	***0.010***	***0.010***	***0.033***	***0.023***	***1.419***	***0.078***
Other	196	0.097	0.021	94	0.096	0.031	102	0.098	0.030	–0.002	0.043	–0.046	0.482
ALRI PREVALENCE (% CHILDREN <5)													
Incidence in the Previous:													
48 hours	2344	0.020	0.003	1182	0.019	0.004	1162	0.022	0.004	–0.003	0.006	–0.530	0.298
Week	2344	0.026	0.003	1182	0.025	0.005	1162	0.027	0.005	–0.002	0.007	–0.283	0.389
14 days	2344	0.029	0.003	1182	0.028	0.005	1162	0.029	0.005	–0.001	0.007	–0.141	0.444
Caregiver Sought Treatment from (% Caregivers):													
Public	67	0.358	0.059	33	0.394	0.086	34	0.324	0.081	0.070	0.118	0.593	0.277
Private	67	0.284	0.055	33	0.303	0.081	34	0.265	0.077	0.038	0.112	0.340	0.367
Both	67	0.060	0.029	33	0.030	0.030	34	0.088	0.049	–0.058	0.057	–1.009	0.156
Did not seek	67	0.299	0.056	33	0.273	0.079	34	0.324	0.081	–0.051	0.113	–0.451	0.326
Did not pay	67	0.045	0.025	33	0.030	0.030	34	0.059	0.041	–0.029	0.051	–0.571	0.284
Type of Treatment (% Children):													
No treatment	67	0.149	0.044	33	0.152	0.063	34	0.147	0.062	0.005	0.088	0.057	0.477
Pill or syrup	67	0.791	0.050	33	0.758	0.076	34	0.824	0.066	–0.066	0.101	–0.656	0.256
Other	67	0.104	0.038	33	0.121	0.058	34	0.088	0.049	0.033	0.076	0.435	0.332

	Total			Treatment			Control			Difference			
Variables	N	Mean	Std Error	N	Mean	Std Error	N	Mean	Std Error	T-C	Std Error	Z-score	P-value
CHILD GROWTH Z-SCORES AND ANEMIA (% CHILDREN <5)													
Anemia, Hb<110	1592	0.709	0.011	788	0.714	0.016	804	0.703	0.016	0.011	0.023	0.486	0.313
Child Growth Z-Score:													
Weight-for-height	2082	–0.776	0.025	1041	–0.759	0.036	1041	–0.793	0.036	0.034	0.051	0.668	0.252
Height-for-age	2090	–0.878	0.030	1045	–0.888	0.043	1045	–0.869	0.042	–0.019	0.060	–0.316	0.376
Body mass index-for-age	2072	–0.349	0.029	1039	–0.327	0.040	1033	–0.371	0.041	0.044	0.057	0.768	0.221
Weight-for-length	2077	–0.429	0.028	1042	–0.404	0.039	1035	–0.455	0.041	0.051	0.057	0.901	0.184
Head circumference-for-age	2079	–0.400	0.025	1037	–0.427	0.035	1042	–0.372	0.036	–0.055	0.050	–1.095	0.137
Arm circumference-for-age	1922	0.029	0.027	965	0.059	0.039	957	–0.001	0.037	0.060	0.054	1.116	0.132

wsp
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sanitation program