Global Scaling Up Rural Sanitation

Scaling Up Rural Sanitation:

Findings from the Impact Evaluation Baseline Survey in Madhya Pradesh, India

Alicia L. Salvatore and Sumeet R. Patil

March 2011

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water and sanitation program

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

Alicia L. Salvatore
Stanford University

Sumeet R. Patil
Network for Engineering and Economics Research and Management (NEERMAN)

Global Scaling Up Rural Sanitation is a WSP program 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 program 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 program findings, assessments, and lessons learned in the Global Scaling Up Rural Sanitation Program. This paper is conceived as a work in progress to encourage the exchange of ideas about development issues. For more information, please email Alicia L. Salvatore and Sumeet R. Patil at wsp@worldbank.org or visit our website at www.wsp.org.

WSP is a multidonor 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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Acknowledgements

An integral component of the Water and Sanitation Program's Global Scaling Up Rural Sanitation initiative, 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 program 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 India, the IE design, field activities, and data analysis are led by Alicia Salvatore (principal investigator) and Sumeet Patil (co-principal investigator).

The India IE benefited from support from Eduardo Perez, the program's global task team leader; C. Ajith Kumar, the task manager for the program in India; Upneet Singh, K. Arokiam, and Anjali Jain, also on the program team in India, as well as Lira Suri and S.V. Raman. In Madhya Pradesh, important inputs for the IE design and implementation were provided by the IE Advisory Committee and government partners at the state, district, and block levels.

Executive Summary

Background

In response to the preventable threats posed by poor sanitation and hygiene, the Water and Sanitation Program (WSP) launched two large-scale projects, Global Scaling Up Handwashing[1] 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.

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 program approach demands involvement from communities, local government, and the private sector. It aims to trigger the desire for an open-defecation free (ODF) 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 ODF. The community must forge its 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 program also seeks to stimulate the supply of appropriate sanitation program and services by conducting market research and training local artisans to build the relevant facilities.

To measure the magnitudes of the impacts, the program is implementing a randomized-controlled trial impact evaluation (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 and community surveys conducted in Madhya Pradesh (MP), India, and is part of a series of papers analyzing the baseline data from all countries where the program has been implemented.

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

India Intervention (Madhya Pradesh)

In India, WSP's Global Scaling Up Rural Sanitation Program is supporting the Government of India's (GoI) Total Sanitation Campaign (TSC) in two States: Himachal Pradesh and Madhya Pradesh. TSC is an ambitious countrywide, scaled-up rural sanitation program launched by the GoI in 1999, which seeks to attain an ODF India by 2012. In contrast to earlier, hardware-centric supply approaches to rural sanitation, TSC aims to generate demand for and adoption of improved sanitation at the community level. This program focuses on creating ODF communities rather than bringing about incremental individual changes. The TSC aims not only to achieve ODF communities but also focuses on hygiene, waste management, and sanitation in schools and institutions. The main components of the intervention include:

- **Community-Led Total Sanitation (CLTS)**, which aims to trigger the desire for an ODF 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.
- ***Nirmal Gram Puraskar* (NGP) Awards**, which provide a cash prize along with a recognition certificate to *Gram Panchayats* that are not only ODF but also practice environmental cleanliness, appropriate waste management, and school sanitation. *Gram Panchayats* that apply for an NGP award are verified by an independent audit agency.

The potential for TSC to transform rural sanitation in Madhya Pradesh is significant. According to the National Family and Health Survey (NFHS), 27 percent of the households in MP had toilets in 2005–06 (NFHS 2007). The online monitoring system set up by Department of Drinking Water and Sanitation (DDWS) indicates that as of 19 November 2010,

54 percent of the households in MP had toilets, while more than 3 million households still lacked basic sanitation facilities (DDWS 2010).[2] As of 2009, 1,512 (7 percent) of the 22,029 *Gram Panchayats* in MP had received the NGP award.

Methodology and Design

The IE study in MP employs a community-randomized-controlled design to measure the causal effects of TSC on a broad range of health, social, economic, and welfare impacts. It is comprised of a series of complementary data collection activities including: a baseline survey conducted in June–July 2009, monthly longitudinal surveys conducted over an 18-month period, and an extensive follow-up survey to be conducted in early 2011. The baseline survey, detailed in this report, includes an in-depth household survey, biometric measurements of children (anthropometric measurements, anemia testing, and stool sampling), source- and household-level drinking water sampling, and community surveys.

In collaboration with the state government of MP, two districts—Dhar and Khargone—were selected for this IE. In each district, 80 *Gram Panchayats* were selected and randomized into two groups: 1) treatment group (to receive TSC immediately following the baseline survey) or 2) control group (to receive TSC after follow-up data collection). Approximately, 1,000 households (HHs) were sampled in each district to achieve a total sample size of 2,000 HHs for the IE in MP.

Findings

The main findings of the baseline household and community surveys conducted in MP are presented below.

Household Demographics

Size, age, education, and income—On average, households were comprised of 6.9 members with 1.7 children under five per household. Household (HH) heads in the baseline IE sample had a mean age of 44.2 years and other HH members were, on average, 18.5 years. The majority of HH heads (94%) were male and 38% of other HH members were male. Just over half of HH members (age five years and more) reported ever attending school (51% of HH heads and 55% of other HH members) with most attending primary (23% and 37% of HH head and HH members, respectively) or secondary school (68% and 55% of HH head and HH members, respectively). More than 82% of the HH heads and 59% of other HH members were employed in the week prior to the interview. The average monthly per capita income reported was Rs 1617 (US$36).[3]

Water, Sanitation, and Hygiene

Access to improved water—Tube wells (hand pumps) were the main water source for most HHs (51%). Private piped water (24%) and unprotected dug wells (13%) were most common. Private piped water use was substantially higher among richer HHs and hand pump use was higher among poorer HHs. The vast majority of respondents (97%) used a water source located outside of their own dwelling or yard. The richest HHs were more likely to report having a water source in their dwelling or yard than the poorer ones. Many HHs (72%) reported using a covered water source; however, almost a quarter (24%) reported using open water sources.

Access to improved sanitation—More than 80% of the HHs in the overall sample reported that they openly defecate. Open defecation was more common in poorer income groups: 87% percent of HHs from the poorest group reported open defecation compared to only about 60% of the HH from the richest income group. After open defecation, pit latrines were the most commonly used sanitation facility (10% reported using some type of pit latrine). Most of the sanitation facilities reported by HHs (toilets or open defecation) were located more than 10 minutes walk (54%) from the HH or in "no designated place" (27%).

Access to improved handwashing—Almost all persons reported that they wash hands after going to the toilet and before preparing food or feeding children (99.7% and 96.6% respectively). The most widely used handwashing device was a container from which water is poured. Water was more likely to be present at places for washing hands, as

[2] This status is based on self reporting by *Gram Panchayats* and districts, and is thus not verified. TSC focuses on ensuring that an entire *Gram Panchayat* is ODF and accordingly, Nirmal Gram Puraskat (NGP) is awarded to *Gram Panchayats* that are not only ODF but also practices good community sanitation and hygiene.

[3] 46.5 Indian Rupees (Rs) are equivalent to one U.S. Dollar (US$), as of September 6, 2010.

assessed by observation, in wealthier HHs. Richer HHs were also observed to have soap more often than poorer ones across all soap types. The use of ash and/or mud for handwashing was more common in poorer HHs.

Household sanitary condition—Based on enumerator observation, more than half of the sample (60%) had some visible animal or human feces inside and/or around the household. Almost half of HHs (46%) disposed of child feces in bushes or on the ground. Visible feces were detected more frequently in HHs from the lowest income group (65% vs. 58% of the richest income group). A substantial percentage (38%) of HHs did not cover or only partially covered their food and 41% stored garbage in their kitchen or house. Recommended sanitation conditions (i.e., covering food, not storing garbage in the HH, cleanliness) were more commonly observed in richer HHs.

Water microbiology—The presence of *Escherichia coli* (*E. coli*) and *Salmonella* Enteritidis (SE) was measured in a subset of HH drinking water and community water sources. Almost all (97%) HH drinking water samples were contaminated with *E. coli*, but none with SE. Levels of *E. coli* contamination were comparable across all income groups (~167 CFU/100 mL). The high contamination levels preclude examining the relationship across sanitary and hygiene conditions. Almost all community water sources (94%) were contaminated with *E. coli* but few (1%) were contaminated with SE.

Child Health

Parasitic infections—Overall, approximately 16% of children under two years old had at least one of the tested parasites—*Giardia*, *Ascaris*, *Entamoeba*, or hookworms—present in their stool. Children in HHs with improved sanitation had lower rates of parasite detection and lower rates of amoebas and *Giardia* than those without. Parasites were detected in 17% of samples from HHs with improved water sources; none were found in those without. Overall parasite prevalence in HH with handwashing (HW) facilities (15%) is comparable to that in HHs without HW facilities (15%). Rates of parasitic infection were similar across income groups.

Diarrhea prevalence—Eight percent of children under five years old had symptoms of diarrhea during the 48 hours prior to their interview; 13% had symptoms in the previous week; and 15% in the previous two weeks. The prevalence of diarrhea was slightly higher in HHs with unimproved sanitation, unimproved drinking water sources, and inadequate handwashing facilities (i.e., without soap and water). Improved sanitation and water seemed to be more strongly linked with diarrhea prevalence than handwashing. A higher percentage of children under five years old in the poorest HHs suffered from diarrhea in the 48 hours prior to the interview, in the previous week, and in the previous two weeks than children in the richest income group.

Acute lower respiratory infections (ALRI) prevalence—About eight percent of children under five years old had symptoms of an ALRI within two days prior to the interview, 11% in the previous week, and 12% in the previous two weeks. The prevalence of ALRI was slightly higher in households with unimproved sanitation and unimproved water sources but similar in HHs with or without handwashing facilities. Children in the poorest income group had a slightly lower prevalence of ALRI than children in the higher income groups.

Anemia—Eighty percent of children under two years old were anemic. No pronounced differences in anemia were observed between those with and without improved sanitation, improved water sources, improved places for washing hands, or in richer and poorer HHs.

Nutrition and Child Development

Nutrition—Almost all caregivers of children under two years old (98.8%) reported breastfeeding their children for three days after childbirth and 90% of children under 18 months were breastfed. On average, 58% of children under two years old received solid or semisolid food about three times a day. Almost all (95%) children under two were fed grain-based foods. About a third (32%) of children received Vitamin A-rich foods. Only 6% of children were fed meat, eggs, or poultry and about 7% were given iron pills or syrup. However, over a third (37%) of caregivers reported that they gave iron supplements to their child.

Growth measures—Using measures of arm circumference, weight, length/height, body mass index, weight for length/height, and head circumference taken during the baseline

survey Z-scores were computed using WHO's population mean and standard deviation estimates (WHO 2006 and 2007). Typically, children from HHs without improved sanitation, improved water sources, or HW stations had lower Z-scores for the anthropometric measures.

Child care environment—Based on direct observations made by enumerators at the time of the interview, more than half of U5 children overall (59%) were found to have a clean aspect; 38% were observed to have dirty hands; 52% dirty finger nails; and 28% an unclean face. Children's cleanness increased with income. About half (52%) of children under two were reported to play with household objects and toys. Approximately 15% of caregivers reported that they read books to their children and 11% said that they tell their children stories. Percentages of children's play and adult engagement with children (e.g., reading and telling stories) increased with income.

Cognitive development—An index of child development was used to assess children's skills for age including communication, personal-social, and gross motor skills. A lower degree of development across different skills in children from HHs without improved sanitation, improved water sources, and improved places for washing hands was observed. In addition there was a lower degree of development across all indices in children in the poorest income group and higher levels among the children in the richest income group.

Community Survey

On average, GPs included in the study consisted of two to three villages. The mean number of HHs per GP was 503 and the average population was 2,770 persons. Approximately 65% of the HHs overall belonged to a Schedule Caste or Schedule Tribe (SC/ST), which are recognized as traditionally marginalized populations by the Government of India. Almost half (46%) of HHs overall were Below Poverty Line (BPL).[4] Almost all GPs (99%) reported having access to primary schools (i.e., within two kilometers). Less than a third (30%) of the GPs, however, reported having similar access to higher secondary schools. About 66% of the GPs had a public piped water system. Public taps (21%) and unprotected dug wells (13%) were the next most commonly reported main drinking water sources in both districts. More than 50% of GPs reported that they bury or burn their solid waste and almost all GPs have open drainage or no organized drainage. On average, community survey respondents reported that only 15% of HHs have their own toilet facilities.

Summary

The statistics generated from the baseline IE data indicate that there is a substantial need for improvements in sanitation and sanitation-related behaviors in MP. Although the data are limited in establishing causality, emerging trends indicate that gains in improved sanitation, likely to be brought about by TSC, could have positive impacts on the health and welfare of rural families, especially young children.

[4] Below Poverty Line (BPL) is an administrative term in India used to identify "poorer" households. The textbook definition of BPL is the amount of money required per capita per day to purchase food that can provide 2400 kcal of energy in rural areas and 2100 kcal of energy in urban India. The original line was set by a planning commission in 1973–74. Every five years the line is updated using consumer price index of certain commodities. Various states have developed further criteria to categorize a family as BPL. Complete criteria can be obtained from district collectors' offices.

Abbreviations and Acronyms

ALRI	Acute lower respiratory infection
BCC	Behavior Change Communication
BPL	Below Poverty Line
CLTS	Community-Led Total Sanitation
DDWS	Department of Drinking Water and Sanitation
DHS	Demographic Health Survey
E. coli	*Escherichia coli*
g	gram
GP	*Gram Panchayat*
Hb	Hemoglobin
HH(s)	Household(s)
HW	Handwashing
HWWS	Handwashing with Soap
IE	Impact Evaluation
IHHL	Individual household latrines
L	Liter
MP	Madhya Pradesh
NFHS	National Family and Health Survey
NGP	*Nirmal Gram Puraskar*
ODF	Open Defecation Free
PCG	Primary caregiver
PPS	Probability proportional to size
RCT	Randomized Controlled Trial
RSM	Rural sanitary marts
Rs	Rupees
SC/ST	Scheduled Caste/Scheduled Tribe
SE	*Salmonella* Enteritidis
SSHE	School sanitation and hygiene education
TSC	Total Sanitation Campaign
TSSM	Total Sanitation and Sanitation Marketing
U2	Under two
U5	Under five
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, the Water and Sanitation Program (WSP) launched the Global Scaling Up Handwashing (HWWS) project and the Global Scaling Up Rural Sanitation program, two large-scale projects aimed at improving the health and welfare outcomes for millions of poor people. Local and national governments are implementing these projects with technical support from WSP.

The Global Scaling Up Rural Sanitation program, also known as the Total Sanitation and Sanitation Marketing Project (TSSM), aims to improve sanitation for 4.5 million people in service of the much larger goal of developing evidence-based knowledge, tools, and resources that can be used to improve access to sanitation for billions of people. The Global Scaling Up Rural Sanitation program was implemented in two states in India, 29 districts in East Java, Indonesia, and 10 districts in Tanzania. The diversity of the project areas 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 world's sanitation problems and that individuals are much more likely to demand *and* use new or improved latrines *after* their perceptions regarding sanitation have changed. Changing sanitation-related behaviors is a necessary precursor to successfully introducing new infrastructure. As such, the Global Scaling Up Rural Sanitation program combines three core interlinked programmatic elements, described in more detail below: 1) Community-Led Total Sanitation, 2) Behavior Change Communications, and 3) Social Marketing of Sanitation to change sanitation-related behaviors and improve access to—*and use of*—improved sanitation facilities.

Community-Led Total Sanitation. At the community level, the project builds on the success of the Community-Led Total Sanitation (CLTS) approach pioneered by Dr. Kamal Kar in Southeast Asia. CLTS relies on feelings of "shame and disgust" to move a community from defecating in the open to fixed-point defecation. A core premise is that "no human being can stay unmoved once they have learned that they are ingesting other people's [waste]" (Kar and Chambers 2008). CLTS is proven to be effective at triggering behavior changes to end open defecation and has spread rapidly, primarily among nongovernmental organizations implementing small-scale sanitation projects in South Asia. However, growing evidence suggests that CLTS alone generally cannot bring about sustained long-term change in sanitation behaviors.

Behavior Change Communications. To supplement the community-level behavior changes triggered by CLTS, the program is employing Behavior Change Communications (BCC) to motivate individuals to become open-defecation free (ODF), to sustain such behavior long-term, and to successfully move up the "sanitation ladder." BCC is best described as the strategic use of communications to promote positive health outcomes. Whereas CLTS focuses on triggering community-level behavior change, BCC is useful for better understanding and changing individual- and household-level behaviors. Channels used to reach targeted groups include interpersonal communication, direct community contact, and mass media (print, radio and television).

Social Marketing of Sanitation. The third strategy employed by the program, Social Marketing of Sanitation, involves work with the private sector to increase the supply of sanitation products that are affordable and meet the needs of the households. This approach builds on formative research findings, incorporates BCC and other marketing elements, and focuses on four key elements—product, price, place, and promotion—to bring about sustained changes in both supply and demand of sanitation.

Additionally, the project's *service delivery model* supports policy reform at the national government level to create an enabling environment for large-scale sustainable sanitation programs, strengthens the capacity of local governments to

operationalize sanitation policies, and assists local private sectors in producing sanitation products and services.

The project includes a rigorous impact evaluation (IE) to support thoughtful and analytical learning and effective knowledge dissemination and global advocacy strategies. The IE aims to document the magnitude of health impacts and relevant project costs of the rural sanitation interventions being conducted in each of the three Global Scaling Up Rural Sanitation program countries. The IE is designed to establish the causal effect of each intervention on specific health and welfare outcomes. Several rounds of household and community surveys comprise the IE: a pre-intervention (*baseline*) survey; concurrent (*longitudinal*) surveys; and a post-intervention (*follow-up* or *endline*) survey. These surveys are designed to measure the characteristics of the eligible population and to track changes in desired outcomes.

This technical paper is part of a series presenting the analysis of baseline data collection conducted in the implementation countries during 2008 and 2009. This report presents descriptive findings from the baseline IE survey conducted in Madhya Pradesh in 2009.

Global Scaling Up Programs 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 scaled-up handwashing and sanitation projects on a set of relevant health and social outcomes. This study also aims to generate robust evidence on a cross-country basis in order to better understand how effects vary according to each country's programmatic and geographic context and to estimate the size of health and social welfare impacts such as improvements in child physical and cognitive development, anemia, acute lower respiratory infection (ALRI), productivity of mother's time, and others.

The improved evidence yielded by the IE will inform donors and policy-makers on the effectiveness and potential of the Global Scaling Up Rural Sanitation and Handwashing projects as large-scale interventions, in turn resulting in the development of more effective policies and programs to meet global hygiene and sanitation needs.

1.2 Program Background

The Water and Sanitation Program's Scaling Up Rural Sanitation program in India aims to support the Government of India's (GoI) Total Sanitation Campaign (TSC) in two states: Himachal Pradesh (HP) and Madhya Pradesh (MP). TSC is an ambitious countrywide, scaled-up rural sanitation program implemented by the GoI that seeks to attain an open defecation free (ODF) India by 2012.

The Government of India's Total Sanitation Campaign (TSC) is a $4 billion program initiated in 1999, with the goal of ending open defecation in the rural areas of the country. Learning from past programs that focused on infrastructure creation, but did not achieve community-wide behavior change, the TSC employs a demand-driven, community-led approach. The TSC focuses on people of rural areas becoming aware of the need for sanitation, leading to toilet usage and thereby ODF communities that are sustainable. It concentrates on software activities (e.g., educational triggering activities) to enable demand creation, but offers limited hardware support (e.g., subsidies for toliet construction) for poor households and for institutional sanitation.

WSP's areas of support to the governments include the promotion of appropriate policies, building of capacities of local governments on community-led implementation methodologies, and designing and putting into operation effective monitoring and evaluation systems that track outcomes. WSP's role has essentially been to support the governments' implementation of TSC in a true community-led spirit.

TSC, launched in 1999 to replace the Central Rural Sanitation Program, differs from earlier approaches to rural sanitation promotion in that it advocates a people-centered, participatory, and demand-driven approach. Key programmatic features of TSC include subsidy and promotion of individual household latrines (IHHL), school sanitation and hygiene education (SSHE), community sanitary complexes, and Anganwadi[5] toilets supported by rural sanitary

[5] Anganwadi is a child-care and mother-care center that is sponsored by the Indian government. These centers focus on children aged 0–6 years. Anganwadi means "courtyard shelter" in Hindi.

marts (RSMs) and production centers. TSC funding and program implementation are managed at the district level and program activities are implemented at the level of the *Gram Panchayat* (GP), the smallest unit of government administration unit that consists of one or more villages.[6]

The potential for TSC to transform rural sanitation in Madhya Pradesh is significant. According to the National Family and Health Survey (NFHS), 27 percent of the households in MP had toilets in 2005–06 (NFHS 2007). The online monitoring system set up by Department of Drinking Water and Sanitation (DDWS)[7] indicates that as of 19 November 2010, 54 percent of the households in MP had toilets, while more than 3 million households still lack basic sanitation facilities (DDWS 2010). As of 2009, 1,512 (7 percent) of the 22,029 *Gram Panchayats* in MP had received the *Nirmal Fram Puraskar* (NGP) award—a cash prize and recognition certificate awarded to *Gram Panchayats* that are not only ODF but also practice environmental cleanliness, appropriate waste management, and school sanitation.

1.3 Project Components

TSC has several unique features that distinguish it from earlier and more traditional approaches to rural sanitation in India including:

- A campaign-mode implementation approach
- A focus on demand generation through BCC campaigns
- A shift from high-subsidy to low-subsidy regimes
- A flexible menu of technology options
- A prize, the *Nirmal Gram Puraskar* (NGP), which is awarded to GPs who are open defecation free (ODF) and who meet all of the other total sanitation requirements. The NGP is intended to serve as a performance incentive to entire communities.

The core elements of the TSC are behavior change and/or demand generation "triggered" by BCC; incentives in the form of hardware subsidies for poor households; and NGP awards for ODF communities. The CLTS approach, which originated in Bangladesh and was originally piloted in Maharastra, has spread to other states in India. The Global Scaling Up Rural Sanitation program supports the TSC to ground its principles and approaches by supporting the following:

- Creation of an enabling environment to facilitate demand-driven approach;
- Strategies at stage level incorporating a community-led approach, including an annual reward program to local governments for promoting sustainability of outcomes; and
- Creation of capacities at the district level for facilitating a CLTS approach in the villages.

Under TSC guidelines, the household-level financial incentives are targeted to BPL households; however, there are a number of different strategies being implemented by districts regarding timing and disbursement of these subsidies at the GP level. Subsidies of approximately Rs 2200 (approximately US$50) are provided in the form of materials and construction costs. Non-BPL households are generally expected to construct toilets using their own funds. States can choose, however, to provide some financial assistance to non-BPL households through other programs. The NGP award ranges from Rs 50,000 (approximately US$1,100), for a GP with a population of 1000 or less, to Rs 500,000 (about US$11,000), for a GP with a population of 10,000 or more. The NGP is also awarded at the block-level (maximum award of Rs 2,000,000 or US$44,500) and district-level (maximum award of Rs 5,000,000 or US$110,000).

1.4 Objectives of the Study

The Global Scaling Up Rural Sanitation IE study aims to document the magnitude of health impacts from total sanitation and estimate the costs of total sanitation interventions. In India, specifically, IE will assess the impact of TSC on individual-level sanitation behaviors, community-level collective behaviors, and the program's impacts on the health and welfare of young children (under five years old). The IE has several key hypotheses:

- Promotion and provision of improved sanitation (mainly focusing on ending open defecation, the use

[6] In this report, a GP is referred to as a "community."

[7] This status is based on self reporting by *Gram Panchayats* and districts, and is thus not verified. TSC focuses on ensuring that an entire *Gram Panchayat* is ODF and accordingly, Nirmal Gram Puraskat (NGP) is awarded to *Gram Panchayats* that are not only ODF but also practices good community sanitation and hygiene.

of toilets, and environmental cleanliness of the community) through TSC will increase the construction and use of toilets by addressing the resource and knowledge constraints and attitudes of the people.
- Improved sanitation behaviors will reduce the pathogenic load in the community environment, which will result in fewer cases of intestinal and respiratory diseases by breaking the fecal-oral transmission pathways, especially in children under five years old.
- Improved health will improve household welfare by increasing productivity, reducing time lost in sickness, and increasing labor market participation.
- In young children, lower disease incidence can result in better physical, motor skill, and cognitive development.

The purpose of this report is to provide an overview of the Global Scaling Up Rural Sanitation IE and to share the descriptive results for key outcomes measured in the pre-intervention (baseline) survey in Madhya Pradesh.

II. Methodology

2.1 Design

A randomized-controlled community-level trial was used to evaluate the impacts of TSC in MP. The study has two groups: a treatment group who will receive the TSC program and a control group who will not receive TSC activities until after the IE has been completed.[8] Participating communities (GPs) were randomly assigned to either a control or the treatment group (see Annex 1). The process followed for the selection of study districts and GP is discussed in more detail in section 2.2. To establish program impacts, household surveys were conducted with families living in the study communities to measure health and social outcomes both *before* the TSC activities began in these communities (these pre-TSC measures are referred to as "baseline") and *after* TSC implementation was completed (these post-TSC measurements are referred to as "follow-up," or "endline").

The use of a randomized-controlled design is critical for reducing the possibility that the changes observed in the treatment group after TSC are due to factors other than the TSC program itself. The use of a control group enables the estimation of what would have happened over time in the study communities in the absence of TSC and the ability to estimate with some certainty which (and to what extent) impacts are due to the program. Because a period of 18 months separates the baseline and follow-up surveys, factors such as changes in weather, the economy, or other ongoing programs (e.g., government nutrition or health campaigns) could influence the impacts measured in the IE. Without a control group it is not possible to estimate the extent to which the impacts observed at follow-up are due to the TSC program or due to other factors. Including a control group that is similar to the treatment group permits the determination of which effects in the treatment communities were due to TSC and which were due to external factors. The random assignment of a set of communities to either a control group or the treatment group ensures that these two groups are more or less similar on observed (and unobserved) factors. Randomly assigning which communities receive TSC during the study period and which will not receive it until after the study has been completed helps to reduce other issues that might affect an accurate estimation of program effects. For example, if treatment was assigned purposively, it is possible that favorable communities (e.g., more motivated communities, communities with stronger leadership, communities that are more geographically accessible) would be selected to receive TSC and less favorable communities would be assigned to the control group. This would result in systematic differences that could bias the IE. Thus, it would not be possible to determine whether the effects observed at follow-up were due to the program itself or to pre-existing differences in the treatment and control communities.

Figure 1 provides an overview of the timing of IE activities. The IE baseline survey was conducted in MP from June to July 2009. TSC activities were initiated in treatment communities shortly after the conclusion of the baseline survey. The IE follow-up survey in MP will be conducted in February 2011.

2.2 Sampling Strategy and Sample Size

The selection of the IE sample in MP was completed in several stages. First, at the design stage of the project, MP was selected a priori as one of two states to participate in the IE. Second, two districts in MP—Dhar and Khargone—were selected by WSP in collaboration with the state government to participate in IE study. Third, within each of these districts, a total of 80 *Gram Panchayats* (GP) were

[8] Active promotion of TSC will not take place in control communities. In the case, however, that a community requests TSC arrangements will be made by government partners to provide TSC to that community.

FIGURE 1: IMPACT EVALUATION TIMELINE

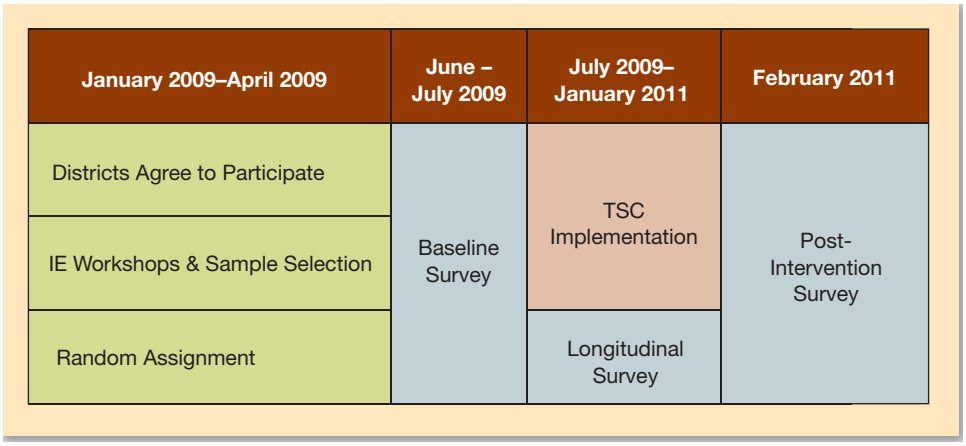

FIGURE 2: IMPACT EVALUATION SAMPLE SCHEMATIC

selected as candidates for TSC implementation. In a fourth stage, one village from each candidate GP was identified by the GP as a community that is suitable for implementing TSC yielding a list of 80 villages in each of the four districts. Within each district, 40 of the candidate GPs (and their appointed village) were randomly assigned to the treatment group, and the remaining 40 were assigned to the control group.

Approximately, 1,000 HHs were sampled in each district to achieve a total sample size of 2,000 HHs for the IE in MP. The final selection of households to participate in the IE survey was carried out by the survey firm contracted to conduct the IE baseline data collection. A household listing of all participating villages was conducted and from this list, 25 households with children under two years old were randomly selected for participation. When 25 eligible households were not available in the listed village, a neighboring village was listed and sampled to achieve the desired number of households in the GP.

2.3 Variables for Data Analysis

The IE aims to measure effects of TSC on the health and welfare of rural families and their young children. The study is designed to measure a range of intermediate and longer-term effects including access to improved sanitation and handwashing facilities; sanitation and hygiene behaviors; child diarrhea, physical growth and cognitive and motor development; child anemia; child parisitosis; environmental contamination and other outcomes. Box 1 provides an overview of the key areas examined in the IE and how they are being measured.

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
Access to improved sanitation and hygiene (a place for washing hands)	Self-report Direct observation by enumerator	Household questionnaire
Sanitation and hygiene behavior	Self-report	Household questionnaire
Child nutrition	Self-reported diet	Household questionnaire
Child development	Physical growth	Anthropometric measurements: weight, height, and arm and head circumference
	Cognitive and motor development	Ages & stages questionnaire
Child anemia	Iron deficiency test in children under two years old	Hemoglobin test (HemoCue™)
Child parasitosis	Collection and sampling of stool in children under two years old	Laboratory presence/absence tests for *Giardia, Ascaris, Blastocystis,* and other parasites
Environmental contamination	Collection and testing of household and community water sources	Laboratory membrane filtration tests for *Escherichia coli (E. coli), Salmonella* Enteritidis (SE), and other coliforms

2.4 Instruments for Data Collection

The IE comprises a baseline household survey (conducted before TSC), a longitudinal household survey (conducted in both treatment and control groups after the baseline survey), and a follow-up survey (conducted after approximately 18 months of TSC implementation). The baseline survey in MP was conducted in June and July 2009 and included the following:

Household Questionnaire: The household questionnaire collected information about household membership and demographics, income, assets, dwelling characteristics, access to water and sanitation, sanitation- and hygiene-related behaviors, maternal depression, mortality, exposure to health interventions, and other outcomes. Enumerators also conducted standardized observations of dwellings and child cleanliness and of sanitation and handwashing facilities at the time of the HH interviews.

Health Questionnaire: The health questionnaire collected information about children's diarrhea prevalence, acute lower respiratory infection (ALRI), other health symptoms, and

child development and growth. As part of this questionnaire, hemoglobin concentrations were measured in children younger than two years of age at the household level using the HemoCue™ Hb201 photometer, a portable device that allows for immediate and reliable quantitative results. Anthropometric (child growth) measures were made according to standardized protocols using portable stadiometers, scales, and measuring tape (Habicht 1974).

Community Questionnaire: The community questionnaire was administered at the GP-level to collect information about GP and district-level characteristics that could influence the intervention or the outcomes of interest (e.g., ongoing health and sanitation programs, connectivity to district headquarters, and other factors).

Water Samples: Water samples were collected from sources at the GP-level and at the household level for a subset of the households (n = X GP-level source samples; n = 354 HH samples). All of the water samples were analyzed by an accredited lab in Indore to determine presence of *E. coli* and other types of coliforms. The samples were collected within the household, inoculated using the Colilert reactive, and transported to a lab. At the lab, samples were incubated at 35 degrees Celsius for 24 hours, and results were read using an ultraviolet lamp. This procedure precluded sampling in areas where a cold chain could not be maintained.

Stool Samples: Stool samples were collected from children to examine the prevalence of parasites. These were collected from a subset of sampled households (n = 216). The same lab in Indore analyzed these samples.

2.5 Field Protocols

Protocols and instruments used for data collection were designed by the WSP global impact evaluation team and adapted and piloted by the India principal investigators. All data collection activities were conducted in Hindi. Study protocols and instruments are available from the authors upon request.

GfK Mode, Ltd. was contracted to conduct the fieldwork for the baseline survey. The India principal investigators, Global Team experts and GfK Mode researchers trained field supervisors on all data-collection protocols and instruments. GfK Mode researchers and supervisors then trained field teams. Four field teams, each with four interviewers, one supervisor, and one editor conducted the fieldwork in MP. Two additional specialized teams collected the anthropometric measurements of children and the fecal and water samples. Two field executives and one field coordinator handled oversight of the work.

III. Sample Representativeness

The primary purpose of the WSP IE was to estimate the impacts of the TSC program. As such, the study was designed to be representative of the population targeted by the intervention rather than to be representative of the population of India or the state of MP. Furthermore, because only two of the 50 districts in MP were selected for the IE, the sample was not representative at the district level. The WPS IE sample is also likely to be limited in its representativeness at the GP and household levels.[9] *Gram Panchayats* included in the WSP IE sample were chosen from a purposive and restricted sampling frame. In each district, GPs were randomly short-listed from a list of approximately 80 GPs provided by the district administration (i.e., not the entire universe of GPs). These 80 GPs represent areas where district officials were indifferent or unable to implement the TSC program in 2009–10. It is therefore possible that GPs included in the IE might be systematically different from other GPs in the district (i.e., GPs that were initially selected for TSC implementation or where TSC implementation was delayed). Furthermore, because the IE required that HHs have at least one child under the age of two years (U2 child) to participate, the sample is only representative of approximately 23% of the HHs in the GPs.[10]

3.1 Comparison Between the Baseline Study and NFHS

This section compares the demographics, education, and economic characteristics of HHs in the WSP IE study sample with the population of India and state of MP as a whole. The 2005–2006 National Family and Health Survey (NFHS) data for India (NFHS-India) and for the state of Madhya Pradesh (NFHS-MP) are used for comparisons.

Table 1 presents the differences in the demographics between WSP and NFHS data for India and for MP. Overall, the WSP IE sample is younger than the NFHS samples, both for India and MP. This is largely due to the fact that the WSP IE sampled HHs with at least one child under the age of two years old. On average, the individuals interviewed in the WSP survey were approximately 22 years old, whereas the average age of population of MP is 26 years and that of India about 27 years. The average number of children between 0–4 years old is much higher in WSP sample than the other two (25% vs. 11% and 10% for the state and

TABLE 1: DEMOGRAPHICS: WSP, NFHS-MP, AND NFHS-INDIA

	WSP	NFHS-MP	NFHS-India
Age:			
0–4	25.2%	11.1%	10.4%
5–9	10.3%	12.1%	11.1%
10–14	4.8%	11.2%	11.4%
15–19	5.4%	10.0%	9.8%
20–24	12.2%	9.4%	9.3%
25–29	12.8%	8.4%	8.6%
30–34	6.8%	7.2%	7.1%
35–39	3.4%	6.6%	6.9%
40–44	2.6%	5.3%	5.4%
45–49	4.0%	4.9%	4.6%
+50	12.4%	13.8%	15.4%
Average age	22.3	25.9	26.8
Total Number of Children Under Five:			
0	32.3%	16.9%	16.9%
1+	29.7%	15.8%	15.9%
2+	9.7%	15.7%	16.4%
3+	16.2%	17.9%	17.3%
4+	12.2%	33.8%	33.5%
Average number of children under five	1.5	2.4	2.3

[9] This cannot be determined because recent, representative, and random district-level secondary data sources are not available.

[10] On average, 200 HHs from each GP were listed, of which approximately 45 had at least one U2 child (eligible HHs).

TABLE 2: EDUCATIONAL ATTAINMENT: WSP, NFHS-MP, AND NFHS-INDIA

	WSP	NFHS-MP	NFHS-India
Highest Educational Level Achieved:			
No education	45.3%	29.7%	26.5%
Some primary	18.3%	26.6%	25.7%
Some secondary	31.1%	33.5%	38.9%
Higher than secondary	4.6%	10.2%	8.9%

TABLE 3: WEALTH INDEX: WSP, NFHS-MP, AND NFHS-INDIA

	WSP	NFHS-MP	NFHS-India
Wealth Index Quintiles:			
1st quintile	38.1%	25.9%	19.9%
2nd quintile	26.2%	22.4%	20.1%
3rd quintile	17.6%	17.5%	20.0%
4th quintile	9.8%	16.8%	20.0%
5th quintile	8.3%	17.4%	20.0%

nation respectively); however, the average number of children under five (U5 children) per HH in the WSP sample (1.5 children) is less than the HH averages for Madhya Pradesh's population (2.4) and that of India as a whole (2.3 children).

Table 2 compares the educational attainment of the household members who are at least 15 years old. Overall, at the lower (no education) and higher (greater than secondary education) ends of the educational spectrum, the WSP sample appears to be worse off in terms of education than the overall population of India and MP. Forty-five percent of the WSP sample reported that they did not have any formal education, compared to about 30% of overall MP population and about 27% nationally. Furthermore, only about five percent of the WSP sample reported achieving higher than secondary educational status, compared to about 10% of the overall state and 9% of the national sample.

In terms of wealth distribution, as seen in Table 3, the WSP IE sample appears to be poorer than the overall population of MP and of India.[11] The WSP sample has a higher proportion of lower income groups than the MP sample and the India sample (e.g., 38% of the WSP population was in the lowest income quartile vs. 26% of the NFHS MP sample and 20% of the NFHS India sample). Third quintiles are comparable for WSP sample and the NFHS samples.

Table 4 compares key IE variables such as prevalence of diarrhea and Acute Lower Respiratory Infections (ALRI) for U5 children, breastfeeding of U2 children, and improved water and sanitation. Diarrheal prevalence in the WSP sample is higher than NFHS (15% vs. 13% for NFHS-MP and 9% for NFHS-India). Similarly, the number of caregivers who reported that their child had a cough was higher in the study sample (12% vs. 6% for NFHS-MP and 9% for NFHS-India). Breastfeeding behaviors appear to be roughly similar in the IE and NFHS. Vitamin A supplementation is much higher in the IE sample.

Households in the IE have substantially poorer access to improved sanitation than NFHS households. The vast majority (87%) of the sample reported sharing a toilet with other HHs, while only 13% of NFHS-MP and 17% of NFHS-India did so. Although a similar proportion of IE HHs reported having access to an improved water source, a much higher percentage of the WSP IE HHs reported filtering their water (98%) than NFHS-MP (73%) and NFHS-India (30%).

[11] For the sake of comparison, a principal component-based wealth index using 23 variables related to household construction and assets, as suggested by NFHS documentation, was created. Only 23 of the 38 variables used by NFHS to construct the index were collected by the WSP survey. These 23 variables included: HH uses toilets; HH uses improved water source in rainy season; HH wall construction is *pucca*; HH floor construction is *pucca*; HH roof constructions is *pucca*; HH uses improved cooking fuel; HH is owned; number of household members per room; has cot/bed; has radio; has black and white television; has color television; has sewing machine; has landline telephone; has a mobile telephone; has computer; has refrigerator; has bicycle; has motorcycle/scooter; has an animal-drawn car; has car; has thresher; and has tractor.

TABLE 4: SELECTED HEALTH, SANITATION, AND HYGIENE VARIABLES FOR WSP, NFHS-MP, AND NFHS-INDIA

	WSP		NFHS-MP		NFHS-India	
	N	Mean	N	Mean	N	Mean
Children Under Five:						
Diarrhea symptoms in past two weeks	3,410	15.2%	2,792	12.5%	48,476	9.2%
ALRI in past two weeks	3,410	12.3%	2,793	6.0%	48,457	8.6%
Children Under Two:						
Currently breastfed	2,075	90.4%	1,075	89.3%	19,087	87.8%
Given breast milk within 1 hour of birth	2,079	37.2%	1,069	32.1%	18,854	43.7%
Last night given milk from bottle	2,102	5.5%	1,073	8.4%	19,045	18.0%
Received Vitamin A supplement in past six months	2,083	30.8%	933	16.1%	17,000	18.8%
Water and Sanitation in Household						
Toilet shared with other HH	1,994	87.0%	27,910	12.6%	534,161	17.1%
Treating water before drinking:	1,994	74.3%	27,910	63.1%	533,906	44.0%
Boil	1,514	0.3%	17,600	3.6%	234,640	47.1%
Chemicals	1,514	0.3%	17,600	6.8%	234,640	5.3%
Cloth filter	1,514	97.6%	17,600	72.5%	234,640	30.4%
Advanced filter	1,514	1.1%	17,600	8.1%	234,640	23.3%
Other method	1,514	1.6%	17,600	22.7%	234,640	12.5%
Improved sanitation	1,994	13.0%	27,910	44.3%	534,161	53.0%
Improved drinking water source	1,994	84.7%	27,910	81.6%	534,161	84.7%

IV. Household Survey Findings

This section presents the summary statistics for key demographic, socio-economic, water-sanitation-hygiene, health, and child development variables collected during the baseline HH survey. Throughout the report, findings are disaggregated by quartiles (four groups of equal frequency) of monthly HH per capita income.[12] Total HH income was estimated by adding the total monthly labor income from primary, secondary, and tertiary jobs of all HH member and total nonlabor transfers (pension, insurance, interests, rents, scholarships, government transfers, donations, remittances, etc.). Monthly HH per capita income was obtained by dividing the total HH income by the total number of HH members. The resulting income quartiles are distributed such that the first income quartile includes those HHs who reported an income of Rs 0 to <312 (approximately US$0–US$7); the second income quartile includes those who reported an income of Rs 312 to <560 (approximately US$7–US$12); the third income quartile includes those who reported an income of Rs 560 to <1041 (approximately US$12–US$22); and the fourth income quartile includes those who reported an income of Rs 1041 to 166,667 (approximately US$22–US$3,584).

In most cases, variables also are cross-tablulated by sanitary conditions (i.e., access to improved sanitation, improved water, and place for washing hands [with soap and water]). In almost all cases, data for Dhar and Khargone districts have been combined for these analyses; however, a few tables have been aggregated by district and GP. These are available as an annex to this report (See Annex 2).

TABLE 5: DISTRIBUTION OF SANITATION AND HYGIENE CONDITIONS BY DISTRICT

	Dhar	Khargone	Average
Percent of HHs with access to improved sanitation facility	13.3	12.7	13.0
Percent of HHs with access to improved drinking-water sources	87.1	82.4	84.7
Percent of HHs with access to soap and water at place for washing hands	36.0	50.3	43.1

Table 5 presents the statistics for access to improved sanitation,[13] improved drinking water, and improved handwashing facilities (i.e., with soap and water)[14] in Dhar and Khargone districts. Access to improved sanitation is similarly low in both districts (approximately 13%). This is to be expected, given that the baseline survey was carried out before the TSC intervention was implemented in study GPs. In contrast, the majority of households in both districts reported having access to improved water sources (87% and 82% in Dhar and Khargone, respectively). The proportion of HHs with a designated place for washing hands with soap and water was greater in Dhar district (50%) than in Khargone (36%).

Table 6 shows the monthly per capita HH income (in Rupees, Rs)[15] and the income distribution by quartile for both Dhar and Khargone districts. The income distributions were similar in both districts; however, the average monthly per capita income in Dhar district was approximately Rs 100 (just over US$2) higher than in Khargone. Dhar's average monthly per capita income was Rs 830 (approximately US$18) and Khargone's was Rs 732 (approximately US$16).

Tables 7 and 8 examine the relationships between improved sanitation and hygiene conditions and income. Table 7 breaks down the sanitation and hygiene statistics in Table 5 by income quartile. Access to improved sanitation and

[12] When analyzing specific modules of questions related to outcomes or impacts of interest such as disease prevalence, or child development, we will cross tabulate these results with the HH´s sanitation, water source, and HW status.

[13] The "Access to Improved Sanitation Facility" and "Access to Improved Drinking-Water Source" variables were created following the definitions and recommendations made by the WHO/UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation (JMP Web site). HHs with improved sanitation use a sealed toilet (without an unorganized effluent). HHs with improved water source use piped water, hand pump, protected dug well, or protected spring.

[14] The "Access to Soap and Water at Place for Washing Hands" corresponds to the number of households with an observed place for washing hands stocked with soap and water that is located within the dwelling or yard premises.

[15] 46.5 Indian Rupees (Rs) is equivalent to one U.S. dollar (US$), as of September 6, 2010.

TABLE 6: MONTHLY PER CAPITA HOUSEHOLD INCOME DISTRIBUTION BY DISTRICT (IN RUPEES)

	Income Quartile				
	1st	2nd	3rd	4th	Per Capita HH Income
Dhar	25	30	28	17	830
Khargone	25	30	27	18	732

TABLE 7: DISTRIBUTION OF SANITATION AND HYGIENE CONDITIONS BY INCOME QUARTILE

	Income Quartile				
	1st	2nd	3rd	4th	Total
Improved sanitation	5.3%	8.9%	10.6%	34.9%	13.0%
Improved water source	80.3%	83.2%	86.8%	90.0%	84.7%
Soap and water at HW station	29.6%	40.6%	45.0%	62.9%	43.0%

TABLE 8: CORRELATIONS BETWEEN SANITATION LEVEL AND INCOME GROUP

	Improved Sanitation	Improved Water Source	Soap and Water at Place for Washing Hands	Income Quartile
Improved sanitation	1			
Improved water source	0.1342	1		
Soap and water at place for washing hands	0.3622	0.0883	1	
Income group	0.2754	0.0887	0.246	1

improved places for washing hands is substantially lower among the poorest HHs in the sample. For example, use of improved sanitation among the richest quarter of the sample (35%) is roughly seven times that of the poorest quarter of the sample (5%). Similarly, income appears to have an important relationship with access to improved places for washing hands (i.e. soap and water). Whereas 63% of the richest 25% of the sample reported had access to an improved place for washing hands, only about 30% of the poorest 25% HHs did.

To further explore the relationship between the improved conditions and HH income, a correlation matrix between these variables was constructed. As shown in Table 8, income (group) was strongly correlated with having improved sanitation and having a HW station (all correlation coefficients are statistically significant [$p < 0.001$]). The relationship between income and improved water source, however, was weak. Water sources are often a public or community resource rather than an individual good and thus less likely to be correlated with income. Results indicate that households with improved sanitation were more likely to have places for washing hands with soap and water.

4.1 General HH Characteristics

This section provides summary statistics for a range of general household characteristics including income, assets, education, dwelling characteristics, and labor market activity.

Table 9 shows the distribution of basic HH demographics variables such as age, gender, and number of HH members, by income quartile. Overall, HH heads in the sample had a mean age of 44.2 years and other HH members were, on average, 18.5 years. The majority of HH heads (94%) were male and 38% of other HH members were male. As expected, due to purposive sampling of HHs with children under 2, approximately a quarter of sample HH members (25%) are between 0–4 years old. The mean HH size is seven

TABLE 9: DISTRIBUTION OF BASIC SOCIODEMOGRAPHIC CHARACTERISTICS

	Income Quartile				
	1st	2nd	3rd	4th	Total
Age:					
0–4	6.7%	7.8%	6.6%	4.1%	25.2%
5–9	3.8%	3.4%	2.0%	1.2%	10.3%
10–14	1.7%	1.5%	1.1%	0.5%	4.8%
15–19	1.0%	1.6%	1.9%	0.8%	5.4%
20–24	2.2%	3.3%	3.9%	2.7%	12.2%
25–29	2.9%	3.9%	3.7%	2.4%	12.8%
30–34	1.8%	2.2%	1.7%	1.0%	6.8%
35–39	1.0%	1.1%	0.8%	0.6%	3.4%
40–44	0.6%	0.6%	0.9%	0.6%	2.6%
45–49	0.7%	1.0%	1.3%	1.0%	4.0%
+50	2.6%	3.7%	3.5%	2.7%	12.4%
Total	25.0%	30.1%	27.3%	17.6%	100.0%
Average age: HH head	41.6	43.7	44.5	48.7	44.2
Average age: Other HH members	16.4	18.1	19.5	20.7	18.5
% of Male: HH heads	94%	96%	94%	93%	94%
% of Male: Other HH members	38%	39%	41%	42%	40%
Size of Household:					
2	0%	0%	0%	0%	0%
3	3.0%	5.4%	7.9%	4.8%	5.4%
4	7.9%	12.6%	13.3%	8.5%	10.9%
5	18.3%	16.4%	16.9%	19.4%	17.5%
6	20.9%	18.8%	14.7%	18.2%	18.1%
7	15.6%	11.7%	14.9%	16.8%	14.5%
8	12.0%	11.4%	10.8%	11.1%	11.3%
9	10.5%	8.6%	8.4%	6.8%	8.7%
10	4.1%	4.4%	3.8%	6.6%	4.5%
11	2.6%	2.9%	4.5%	1.1%	3.0%
12	2.2%	2.9%	1.8%	2.6%	2.4%
13	1.4%	2.0%	1.3%	1.1%	1.5%
14	0.4%	0.7%	0.5%	2.0%	0.8%
15	1.0%	2.3%	1.3%	0.9%	1.5%
Average household size	7.0	6.9	6.7	6.9	6.9
Total Number of Children Under Five:					
0	30%	30%	34%	39%	32%
1	28%	30%	32%	29%	30%
2	9%	11%	10%	8%	10%
3	17%	17%	15%	16%	16%
4	16%	13%	10%	9%	12%
Average number of children under five	1.9	1.8	1.6	1.6	1.7

TABLE 10: DISTRIBUTION OF EDUCATION LEVELS ACHIEVED

	Income Quartile				
	1st	2nd	3rd	4th	Total
Percent of HH heads that ever attended school	41%	49%	52%	68%	51%
Highest Educational Level Achieved (% HH Head):					
Primary or lower	26%	25%	22%	19%	23%
Secondary or lower	69%	67%	68%	66%	68%
Higher secondary or lower	3%	7%	8%	9%	7%
Degree or lower	2%	1%	2%	6%	3%
Percent of other HH members that ever attended school (+5 yrs)	49%	51%	55%	68%	55%
Highest Educational Level Achieved (% Other HH Members):					
Primary or lower	53%	39%	31%	24%	37%
Secondary or lower	42%	54%	61%	63%	55%
Higher secondary or lower	3%	5%	6%	9%	6%
Degree or lower	2%	2%	3%	5%	3%

members across all income groups and the mean number of U5 children per HH was 1.7, with poorer HHs having a slightly higher number of U5 children than wealthier HHs.

Table 10 presents the percent distribution of education for individuals who were at least 5 years old. On average 51% of HH heads and 55% of other HH members reported ever attending school. The majority of HH heads and other HH members attended primary (23% and 37% respectively) or secondary school (68% and 55% respectively). The data seem to indicate that richer HHs have a higher proportion of HH heads and other members who attend school and richer HHs have higher education levels.

Table 11 reports the main activities undertaken by girls and boys between five and 15 years of age who were enrolled as students at the time of the survey. Most of the enrolled students spent time in childcare or housework with girls spending more time on these activities than boys (58% vs. 48% for childcare and 47% vs. 37% for housework for girls and boys respectively). Only 22% of the children reported attending school and approximately 30% spent time studying. Compared to female students, more male students were engaged in paid or unpaid work (13% vs. 10% for unpaid work and 9% vs. 6% for paid work for boys and girls respectively).

Table 12 reports nonlabor income or transfers, HH durable goods, and ownership of farmland and animals. Almost

TABLE 11: ACTUAL DISTRIBUTION OF STUDENTS' TIME

	Male	Female
School	21.9%	21.9%
Studying	29.6%	29.7%
Childcare	48.2%	57.7%
Housework	36.6%	46.8%
Paid work	8.7%	6.2%
Unpaid work	13.1%	10.4%

10% of the HHs declared having income sources other than primary, secondary, or tertiary work in the form of transfers (rent, interest, remittance, pension, insurance, etc.). Richer HHs tended to receive substantially higher amounts of transfers than poorer ones. As expected, richer HHs reported having substantially higher proportions of assets such as TVs, radios, video players, and cell phones. The majority of the HHs owned farmland and animals (63% and 74%, respectively) with a higher proportion of richer HHs owning these goods.

Table 13 presents dwelling characteristics in terms of number of rooms, ownership, and materials used for walls, roof and floor. Almost all HHs in the sample live in detached, independent dwellings. On average, households had 2–3 rooms. More than 90% of the dwellings were fully paid for and owned by a HH member; a few dwellings were still being paid for by a HH member. About 5% of the poorest

TABLE 12: DISTRIBUTION OF HOUSEHOLD ASSETS AND NONLABOR INCOME

	Income Quartile				
	1st	2nd	3rd	4th	Total
Percentage of HH with nonlabor transfers	10.8%	11.4%	10.4%	9.5%	10.7%
Average HHs nonlabor income (Rs, transfers)	2,385	1,756	4,100	22,128	6,201
HHs Assets:					
Radio/CD/cassette	8%	7%	11%	17%	10%
Television	21%	27%	37%	65%	35%
Videocassette, VCD, DVD player	6%	6%	9%	18%	9%
Computer	1%	1%	1%	2%	1%
Bicycle	19%	27%	32%	32%	27%
Motorcycle	9%	13%	20%	46%	19%
Automobile or truck	1%	0%	1%	1%	1%
Refrigerator	1%	2%	3%	11%	4%
Gas stove	5%	10%	12%	31%	13%
Other stove	92%	89%	91%	87%	90%
Blender/mixer	3%	5%	7%	20%	8%
Toaster	0%	0%	1%	2%	1%
Other house/other buildings	4%	3%	5%	10%	5%
Machinery, equipment, or tools for household business (not farm equipment)	1%	2%	2%	5%	2%
Sewing machine	3%	7%	10%	25%	10%
Mosquito nets	6%	7%	16%	31%	14%
Cell phone	17%	27%	39%	62%	34%
Clothes iron (electric)	4%	6%	15%	35%	13%
Bed frame	20%	23%	28%	44%	28%
Landline phone	2%	2%	4%	8%	4%
Electricity generator or invertors	1%	0%	1%	7%	2%
Cable TV/Dish TV	1%	2%	6%	16%	5%
Percent of HHs having another piece of land	55%	58%	65%	78%	63%
Percent of HHs having farm equipment	83%	85%	87%	86%	85%
Percent of HHs having animals	70%	71%	74%	83%	74%
Average number of animals owned	5	5	5	5	5

HHs lived in a rented house. Most HHs have *pucca* (meaning permanent structure) or semi *pucca* (either roof or wall is made of good material) as per the NFHS definition.[16] For example, more than 52% of the houses had walls made of solid material such as brick (35%), concrete (12%), and wood or logs (5%). Roof materials reported were also robust (slate/tiles, 36%; concrete, 10%; metal sheeting, 47%) for most HHs. The most common flooring materials were concrete (16%), clay or earthen floor (77%), and tiles (6%). As expected, richer HHs had a slightly higher proportion of *pucca* houses than poorer ones.

[16] Houses with roofs and walls made from mud, thatch, or other low-quality materials are called *kachha* houses; houses that use partly low-quality and partly high-quality materials in roof and walls are called semi-*pucca;* and houses made with high-quality materials in both roof and wall are called *pucca* houses (NFHS 2007).

TABLE 13: DISTRIBUTION OF DWELLING CHARACTERISTICS

	Income Quartile				
	1st	2nd	3rd	4th	Total
Average number of dwelling's rooms	1.8	2.1	2.2	2.9	2.2
Dwelling Ownership (% HHs):					
HH member, still paying	1.0%	2.0%	1.4%	2.9%	1.8%
HH member, fully paid	91.1%	91.1%	92.1%	92.6%	91.6%
Rented	4.7%	2.4%	3.6%	3.7%	3.5%
Family/friend loan	2.0%	2.2%	1.1%	0.0%	1.5%
Material of Dwelling's Walls (% HHs):					
Brick	26.4%	31.1%	36.7%	50.1%	34.9%
Concrete	10.4%	10.6%	11.5%	16.5%	11.8%
Unbaked brick, adobe	8.7%	12.1%	7.9%	6.0%	9.0%
Wood, logs	6.1%	3.9%	6.1%	2.6%	4.8%
Tin, zinc sheeting	0.2%	0.8%	0.7%	0.6%	0.6%
Mud	46.5%	40.5%	36.9%	23.6%	38.0%
Bamboo	0.8%	0.3%	0.0%	0.3%	0.4%
Dry grass/straw	0.6%	0.2%	0.2%	0.0%	0.3%
Other	0.2%	0.5%	0.0%	0.3%	0.3%
Material of Dwelling's Roof (% HHs):					
Brick	0.2%	0.7%	0.2%	0.3%	0.4%
Concrete	4.5%	6.7%	10.3%	24.8%	10.3%
Unbaked brick, adobe	0.4%	0.3%	0.0%	0.0%	0.2%
Wood, logs	1.6%	0.7%	0.7%	1.1%	1.0%
Tin, zinc sheeting	45.5%	48.6%	46.2%	50.1%	47.4%
Mud	0.2%	0.7%	0.5%	0.3%	0.5%
Bamboo	0.4%	1.2%	0.7%	1.1%	0.9%
Canvas, felt	0.8%	0.7%	0.9%	0.6%	0.8%
Dry grass	3.3%	2.4%	2.5%	0.3%	2.3%
Slate	43.1%	38.0%	37.8%	20.5%	36.1%
Other	0.0%	0.2%	0.2%	0.9%	0.3%
Material of Dwelling's Floor (% HHs):					
Tile	2.4%	3.9%	5.0%	16.5%	6.1%
Concrete	9.8%	13.1%	14.7%	29.1%	15.5%
Clay, earthen floor	87.0%	81.8%	79.0%	52.4%	77.1%
Stone	0.2%	0.7%	0.4%	0.6%	0.5%
Bricks	0.0%	0.0%	0.0%	0.0%	0.0%
Wood	0.2%	0.0%	0.0%	0.0%	0.1%
Other	0.2%	0.2%	0.4%	1.4%	0.5%

TABLE 14: DISTRIBUTION OF SOURCES OF LIGHT AND COOKING FUELS

	Income Quartile				
	1st	2nd	3rd	4th	Total
Dwelling Light Source (% HHs):					
No lighting	0.2%	0.3%	0.2%	0.3%	0.3%
Electricity	75.1%	80.9%	82.3%	89.2%	81.3%
Gas	0.6%	0.8%	0.5%	0.0%	0.6%
Kerosene	23.7%	17.5%	16.6%	10.0%	17.5%
Wood	0.4%	0.2%	0.0%	0.0%	0.2%
Candles	0.0%	0.0%	0.2%	0.0%	0.1%
Solar energy	0.0%	0.0%	0.2%	0.0%	0.1%
Generator/inverter	0.0%	0.0%	0.0%	0.6%	0.1%
Other	0.0%	0.0%	0.0%	0.0%	0.0%
Dwelling Cooking Fuel (% HHs):					
No fuel for cooking	0.4%	0.2%	0.0%	0.0%	0.2%
Electricity	0.6%	0.2%	0.9%	0.3%	0.5%
Gas	2.2%	3.4%	4.3%	15.4%	5.5%
Kerosene	1.2%	0.5%	1.1%	1.7%	1.1%
Coal	1.6%	0.8%	0.5%	0.6%	0.9%
Wood	88.6%	91.2%	85.9%	70.9%	85.5%
Peat/manure	4.9%	3.7%	6.1%	9.7%	5.7%
Other	0.4%	0.0%	0.9%	1.4%	0.6%

Table 14 reports light sources and type of cooking fuel used by the HH. Overall, the most common light source reported was electricity (81%) with richer HHs more likely to have electricity than poorer ones (89% vs. 75%, respectively). Kerosene lamps were the second most common light source (18%). Poorer HHs were more likely to report kerosene as their source of light (24% vs. 10% for richer HHs). The majority of HHs (86%) used wood as their main cooking fuel. A larger proportion of poorer HHs used wood as their main cooking fuels (89% for the lowest income quartile vs. 71% for the highest). Fifteen percent of the richest HHs used gas compared to only 2% of the poorest HHs.

Table 15 presents information about labor market activity for adult HH members (at least 15 years of age) including employment type, monthly salary, and hours spent working. More than 82% of HH heads were employed in the week previous to the interview compared to 59% of other HH members. Level of employment was slightly higher in richer HHs. Most unemployed HH heads were not working or unable to work. The majority of other unemployed HH members reported that they took care of their home (17%) or did not work (16%). The rest of the variables in Table 15 correspond to all employed individuals, whether they were the HH head or not. More than 61% of the employed individuals were self-employed and about a third were day laborers (32%). The average monthly income reported from respondents' primary occupation was Rs 1617 (US$36). The highest income reported for a primary occupation was for an employee (Rs 3685 or US$82), followed by an employer or boss (Rs 2305 or US$51). On average, individuals worked 51 hours a week with no substantial differences by income groups or primary occupations. On average, individuals worked nine months a year, with employers or bosses and employees working year round. Day laborers worked six to nine months a year.

Table 16 reports, by improved sanitation, water source, and HW facilities, the percentage of HHs where the caregivers lost working hours from their primary job because

TABLE 15: DISTRIBUTION OF INDIVIDUALS' ACTIVITIES AND PRIMARY WORK

	Income Quartile				
	1st	2nd	3rd	4th	Total
Percent employed, HH heads	78.9%	81.0%	85.2%	83.4%	82.1%
Percent employed, other HH members	51.6%	58.9%	63.2%	60.7%	59.1%
Last Week Activity: Unemployed HH Head:					
Not working, although had a job	1.0%	1.0%	0.9%	0.9%	1.0%
Looking for work	0.4%	0.2%	0.2%	0.3%	0.3%
Studying	0.0%	0.2%	0.0%	0.0%	0.1%
Taking care of home	2.0%	1.3%	2.0%	1.7%	1.8%
Permanently unable to work	6.5%	5.7%	4.1%	3.7%	5.1%
Retired	0.2%	0.2%	0.4%	0.9%	0.4%
Not working	10.8%	10.4%	7.0%	9.1%	9.4%
Last Week Activity: Unemployed Other Member:					
Not working, although had a job	0.9%	1.0%	0.9%	1.1%	1.0%
Looking for work	0.8%	0.1%	0.1%	0.1%	0.2%
Studying	2.8%	2.8%	1.9%	1.9%	2.4%
Taking care of home	18.5%	17.1%	16.1%	17.4%	17.1%
Rent earner	0.1%	0.0%	0.1%	0.1%	0.1%
Permanently unable to work	5.4%	3.2%	2.5%	2.6%	3.3%
Retired	0.4%	0.6%	1.0%	1.3%	0.8%
Not working	19.5%	16.1%	14.2%	14.8%	16.0%
Primary Work: Position:					
Self-employed	59.7%	57.1%	56.9%	76.5%	61.4%
Employee	1.6%	3.6%	5.2%	8.5%	4.7%
Employer or boss	0.4%	0.6%	0.5%	1.2%	0.7%
Day laborer	37.3%	37.2%	36.1%	12.6%	32.0%
Other	0.9%	1.0%	1.2%	1.0%	1.0%
Primary Work: Monthly Earning:					
Self-employed	427	807	1,246	4,355	1,740
Employee	1,073	1,382	2,461	6,797	3,685
Employer or boss	458	973	2,033	4,522	2,305
Day laborer	604	934	1,243	2,510	1,089
Other	1,078	1,618	1,930	3,645	1,988
Total	516	887	1,320	4,318	1,617
Primary Work: Hours per Week:					
Self-employed	46	50	50	49	49
Employee	51	55	52	50	52
Employer or boss	52	49	63	44	51
Day laborer	53	55	56	56	55
Other	61	44	65	46	55
Total	49	52	53	50	51

TABLE 15: CONTINUED

	Income Quartile				
	1st	2nd	3rd	4th	Total
Primary Work: Months Worked in Last 12 Months					
Self-employed	9	9	9	10	9
Employee	10	11	12	12	11
Employer or boss	10	12	13	12	12
Day laborer	8	9	10	11	9
Other	9	10	11	10	10
Total	8	9	10	10	9

TABLE 16: HOUSEHOLDS WITH TIME LOSS DUE TO CHILD ILLNESS

	Improved Sanitation		Improved Water Source		Soap and Water at Place for Washing Hands		
	Yes	No	Yes	No	Yes	No	Total
Percent of HH with lost hours due to child illness	6.2%	7.5%	7.2%	8.2%	6.5%	7.9%	7.3%

they had to take care of a sick child. The data indicate that improved sanitation and water sources and having a place for washing hands might lessen the amount of caregivers' time lost to illness. Slightly smaller proportions of those with improved sanitation, water, and hygiene (i.e., places for washing hands) reported that they lost working hours due to child illnesses than those without.

4.2 Water Source and Safe Water-Use Behavior

Table 17 shows the types and locations of water sources reported by HHs. In the survey this information was collected by season (i.e., rainy and dry). However, because the majority (80%) of HHs reported that they used the same water source for drinking throughout the year and the survey was conducted predominantly in the monsoon season, only the results for the rainy season are presented here. Tube wells (hand pumps) were the main water source for most HHs (51%). At 24%, private piped water (15% + 9%) was the second most common HH water source, followed by unprotected dug wells (13%). Private piped water use was substantially higher among richer HHs and hand pump use was higher among poorer HHs. The vast majority of respondents (97%) used a water source located outside of their own dwelling or yard. The richest HHs were more likely to report having a water source in their dwelling or yard than the poorer ones. Most HHs (72%) reported using covered water sources; however, almost a quarter (24%) reported using open water sources.

Table 18 summarizes water storage and treatment behaviors reported by HHs. Almost all HHs stored drinking water in containers. Eighty-six percent of HHs said that they washed containers daily and about 10% said that they washed containers more than once a week. Most HHs used only water to wash containers (43%), about 22% used soap, detergent, or bleach; 26% used ash. Poorer HHs used mud or ash for washing slightly more than richer ones. Richer HHs were more likely to use soap, detergent, or bleach than poorer ones.

The majority (75%) of HHs reported that they prepared or treated water in some way before drinking it (every day in the week prior to the interview). This percentage is higher in richer HHs. For example, 87.2% HHs in the richest income group reported treating drinking water. Of those who treated water in any way, more than 90% treated it every day or every other day. About 7% of HHs reported that

TABLE 17: TYPES OF WATER SOURCES

	Income Quartile				
	1st	2nd	3rd	4th	Total
Source of Drinking Water (% HHs):					
Piped water, into dwelling	7.3%	11.9%	16.3%	29.9%	15.2%
Piped water, into yard, plot	6.1%	8.4%	10.8%	12.8%	9.3%
Piped water, public tap, standpipe	7.5%	5.9%	6.3%	5.4%	6.3%
Tube well, borehole (hand pump)	57.4%	54.7%	50.1%	39.3%	51.4%
Dug well, protected	1.8%	2.3%	3.4%	2.6%	2.6%
Dug well, unprotected	16.0%	14.8%	11.1%	9.7%	13.2%
Spring water, protected	0.2%	0.0%	0.0%	0.0%	0.1%
Spring water, unprotected	0.4%	1.0%	0.2%	0.0%	0.5%
Surface water	2.6%	0.8%	1.4%	0.3%	1.4%
Location of Drinking Water Source:					
In own dwelling	0.5%	1.1%	1.7%	2.5%	1.3%
In own yard	0.5%	2.7%	1.5%	6.0%	2.2%
Elsewhere	99.1%	96.2%	96.8%	91.5%	96.5%
Covered Source (% HHs without Private Tap):					
Covered	69.7%	73.7%	72.7%	68.5%	71.6%
Open	25.1%	23.7%	22.6%	24.9%	23.9%
Both covered and open	4.7%	2.4%	4.5%	6.1%	4.1%

they treated their water only occasionally (in the past week). Cloth or net filters were the universally preferred method across all income groups.[17]

4.3 Sanitation Facilities

As shown in Table 19, the most common sanitation practice reported in the sample was open defecation. More than 80% of the HHs in the overall sample reported that they openly defecate. Open defecation was more common in poorer income groups: 87% percent of HHs from the poorest group reported open defecation compared to only about 60% of the HHs from the richest income group. After open defecation, pit latrines were the most commonly used sanitation facility (10% reported using some type of pit latrine). Use of improved sanitation facilities[18] was substantially lower among the poor. For example, 35% of the richest income group reported using improved sanitation facilities while only 5% of the lowest income group did.

Most of the sanitation facilities reported by HHs (toilets or open defecation) were located more than a 10-minute walk (54%) from the HH or in "no designated place" (27%). In a separate analysis (not shown here) it was found that in HHs that used any type of toilet, toilets were located within a 10-minute walking distance (including in the HH's yard) whereas HHs that openly defecated had to walk more than 10 minutes from the HH or to "no designated place." Also, as expected, HHs that used toilets (of any kind) were far more likely to own a toilet (97%).

When asked about their satisfaction with their toilet facility, 19% of respondents indicated that they were very satisfied, 20% were somewhat satisfied, and 44% were completely dissatisfied. Overall, only 23% of HHs believed that their defecation facility or site was safe for female HH members to use at night.

[17] The interviewees were allowed to choose more than one procedure for preparing the drinking water.

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

TABLE 18: SAFE WATER-USE BEHAVIOR

	Income Quartile				
	1st	2nd	3rd	4th	Total
Frequency of Washing Storage Container (% HHs):					
Never wash	0.4%	1.3%	0.9%	1.2%	1.0%
Rarely	0.8%	0.8%	0.7%	1.2%	0.9%
Once per week	2.7%	2.2%	2.5%	3.5%	2.6%
More than once per week	9.8%	7.1%	11.3%	10.7%	9.5%
Daily	86.3%	88.6%	84.6%	83.6%	86.0%
How the Water Storage Is Washed (% HHs):					
Water only	41.4%	40.3%	44.2%	44.9%	42.5%
Soap, detergent, bleach	17.4%	19.9%	21.7%	30.0%	21.5%
Mud	11.7%	9.0%	7.5%	4.7%	8.5%
Ash	27.9%	29.3%	25.1%	19.0%	26.0%
Other	1.6%	1.0%	1.5%	1.5%	1.4%
Prepares Water before Drinking (% HHs):					
Yes	68.1%	70.3%	76.5%	87.2%	74.5%
Sometimes	0.6%	2.9%	1.4%	1.4%	1.7%
No	31.3%	26.8%	22.1%	11.4%	23.9%
Frequency the Water Was Prepared (past week, % HHs):					
Not in the last 7 days	0.3%	0.2%	0.5%	0.0%	0.3%
Every day	89.0%	90.3%	88.9%	87.1%	89.0%
Every other day	3.9%	3.0%	4.2%	3.9%	3.7%
Once or twice	6.8%	5.5%	6.5%	9.1%	6.8%
How Water Was Prepared (past week, % HHs):					
Boil	0.0%	0.5%	0.0%	1.0%	0.3%
Chemicals	0.3%	0.0%	0.0%	1.0%	0.3%
Cloth or net filter	98.5%	96.3%	98.8%	96.5%	97.6%
Other filter	0.3%	1.8%	0.9%	1.3%	1.1%
Other methods	1.8%	1.6%	1.2%	1.9%	1.6%

Table 20 shows the reasons for building or improving their toilet facility cited by HHs that had a toilet facility.[19] The main motivations for toilet construction given were related to convenience, privacy, and safety. The majority (59%) of HHs with toilets cited convenience (or location) as their top reason for toilet construction. Safety or security (44%), family health (35%), and privacy or dignity (23%) were also commonly reported reasons. In spite of expressing complete dissatisfaction with their existing defecation facilities, only 22% of HHs without a toilet said that they were highly likely to build one in the next year. Richer HHs were more likely to reported "high" or "medium" probability of toilet construction. The main barriers to building a private toilet facility were financial: 79% cited high cost and 30% said that savings or credit issues were preventing them from building a private facility. The lack of materials availability (27%), improper water table or soil conditions (17%), and space limitations (12%) were other frequently cited barriers to toilet construction. More than a third of HHs were not able or willing to cite a constraint for not building a toilet.

[19] Each of the HHs were asked to give up to three reasons.

TABLE 19: HOUSEHOLD MAIN SANITATION FACILITY CHARACTERISTICS

	Income Quartile				
	1st	2nd	3rd	4th	Total
Main Toilet Facility (% HHs):					
Flush, to piped sewer system	0.0%	1.2%	0.4%	1.7%	0.8%
Flush, to septic tank	0.8%	1.3%	0.9%	3.7%	1.5%
Flush, to pit latrine	2.0%	4.2%	5.0%	17.1%	6.2%
Flush, to elsewhere	0.0%	0.2%	0.0%	0.3%	0.1%
Flush, don't know where	0.0%	0.0%	0.2%	0.0%	0.1%
Ventilated improved pit latrine	1.4%	0.7%	1.8%	6.0%	2.1%
Pit latrine with slab	0.8%	1.0%	2.2%	4.6%	1.9%
Composting toilet	0.2%	0.5%	0.2%	1.7%	0.6%
Pit latrine without slab, open pit	0.2%	0.0%	1.1%	0.3%	0.4%
Hanging toilet, latrine	0.0%	0.0%	0.0%	0.0%	0.0%
Bucket	0.0%	0.0%	0.2%	0.3%	0.1%
No facilities, bush, field	87.2%	85.4%	81.7%	59.8%	80.3%
Other	7.3%	5.5%	6.5%	4.6%	6.1%
Toilet Facility Public or Private:					
Public	0.0%	5.2%	2.9%	3.2%	3.1%
Private	100.0%	94.8%	97.1%	96.8%	96.9%
Location of Main Toilet Facility (% HHs):					
Inside household	1.0%	2.7%	3.8%	10.9%	4.0%
In household yard	4.3%	6.2%	7.7%	21.8%	8.9%
Less than 10-min. walk	6.1%	5.4%	4.7%	6.3%	5.5%
More than 10-min. walk	56.4%	57.1%	54.2%	45.8%	54.2%
No designated area	32.3%	28.4%	29.4%	14.9%	27.3%
Percent of safe toilet facilities during the night	17.8%	17.6%	18.9%	43.3%	22.6%
Percent of shared toilet facility	94.3%	91.9%	89.0%	67.0%	87.3%
Satisfaction with Toilet Facility:					
Very satisfied	15.0%	12.8%	18.0%	37.1%	19.1%
Somewhat satisfied	21.5%	22.4%	19.3%	16.0%	20.2%
Less than satisfied	16.1%	18.0%	15.7%	16.0%	16.5%
Completely dissatisfied	47.0%	46.7%	46.7%	30.6%	43.9%

Table 21 reports HH cleanliness and child feces disposal practices. In addition asking HHs about their sanitation practices, direct observations were conducted to assess the extent to which feces were visible in/around households. Based on these observations, more than half of the IE baseline sample (60%) had some visible animal or human feces inside and/or around the household. Visible feces were detected more frequently in HHs from the lowest income group (65% vs. 58% of the richest income group). When asked about their child feces disposal practices, 46% of HHs said that they disposed of child feces in bushes or on the ground. Poorer HHs were more likely to report disposing of child feces in the bushes or on the ground (54% vs. 32% from the richest group). Respondents were also asked to characterize the number and frequency of which flies were present near their defecation site. Eighty-five percent

TABLE 20: IMPROVEMENT OF SANITATION FACILITIES

	Income Quartile				
	1st	2nd	3rd	4th	Total
Primary Reason for Building or Improving Toilet (% HHs):					
No reasons given	32.0%	24.0%	26.3%	35.0%	30.5%
Convenience or location	44.0%	62.0%	61.4%	59.8%	59.0%
More healthy for the family	44.0%	28.0%	35.1%	35.9%	34.9%
Easier to keep clean	8.0%	12.0%	7.0%	11.1%	10.0%
Privacy, dignity	24.0%	26.0%	21.1%	21.4%	22.5%
Safety, security	40.0%	64.0%	50.9%	33.3%	44.2%
Avoid sharing with others	4.0%	0.0%	0.0%	0.9%	0.8%
Comfort	8.0%	6.0%	10.5%	5.1%	6.8%
Prestige, pride	0.0%	2.0%	1.8%	0.0%	0.8%
Response to sanitation promotion program	0.0%	0.0%	0.0%	0.9%	0.4%
Neighbor or community member insisted	0.0%	0.0%	0.0%	0.0%	0.0%
GP members, gov't officials, or social workers insisted	4.0%	2.0%	0.0%	0.0%	0.8%
Probability of Future Toilet Installation (% HHs):					
High	20.0%	22.0%	17.4%	31.0%	21.6%
Medium	22.3%	21.4%	30.2%	34.5%	26.1%
Low	37.7%	37.0%	38.3%	25.0%	35.6%
None	20.0%	19.7%	14.1%	9.5%	16.6%
Principal Constraint for Installing Toilet (% HHs):					
No constraints given	37.5%	33.7%	35.8%	34.5%	35.3%
High cost	81.3%	77.3%	83.1%	73.8%	79.3%
No one to build it	3.9%	3.5%	4.1%	6.0%	4.1%
Materials not available	21.9%	29.1%	27.7%	26.2%	26.5%
Water table, soil conditions	17.2%	15.7%	18.9%	14.3%	16.7%
Too complex to build	3.1%	4.1%	7.4%	3.6%	4.7%
Savings, credit issues	38.3%	30.2%	25.7%	22.6%	29.7%
Competing priorities	4.7%	6.4%	5.4%	4.8%	5.5%
Tenancy issues	0.8%	0.6%	0.0%	0.0%	0.4%
Limited space	8.6%	12.2%	14.2%	13.1%	12.0%
Permit problems	0.8%	1.2%	0.7%	0.0%	0.8%
Satisfied with current facility	0.8%	0.6%	1.4%	1.2%	0.9%
Don't like available latrine designs, options	0.0%	0.0%	0.0%	1.2%	0.2%

of HHs said that flies were "always" present and either "many" or "some" in number. The richest quarter of HHs were less likely to report high frequency and number of flies than poorer HHs.

Table 22 summarizes the results of additional direct observations of HH cleanliness and food safety made during the baseline. According to enumerator observations, 66% of HHs were assessed to be clean and 62% completely covered

TABLE 21: OTHER CHARACTERISTICS OF HOUSEHOLD SANITARY CONDITION

	Income Quartile				
	1st	2nd	3rd	4th	Total
Visible Feces In/Around Household (% HHs):					
None	35.8%	42.0%	38.4%	41.9%	39.5%
1 to 5 feces	55.7%	49.7%	48.6%	52.7%	51.4%
5 to 10 feces	6.7%	6.9%	10.5%	4.0%	7.3%
More than 10 feces	1.6%	1.0%	2.2%	1.4%	1.6%
Flies Reported Near Defecation Site (% HHs):					
Always and many	71.8%	72.5%	69.5%	57.6%	68.9%
Always and some	17.8%	16.8%	15.3%	11.2%	15.7%
Sometimes and many	5.3%	3.9%	5.6%	4.3%	4.8%
Sometimes and few	2.8%	4.5%	4.3%	12.3%	5.4%
Rarely, hardly any	2.2%	2.3%	5.2%	14.6%	5.3%
Disposal of Children's Feces (% HHs):					
Bushes, ground	54.0%	49.3%	45.4%	32.2%	46.4%
Pit, hole in the ground	7.5%	10.4%	8.1%	11.1%	9.2%
Open sewer, drain	4.7%	4.7%	4.1%	5.4%	4.7%
Toilet, latrine	2.4%	2.9%	4.5%	16.5%	5.6%
Garbage	19.3%	23.0%	26.6%	26.2%	23.6%
River	1.0%	0.8%	1.6%	0.9%	1.1%
Basin, sink	0.0%	0.0%	0.0%	0.0%	0.0%
Give to animals	0.0%	0.2%	0.0%	0.0%	0.1%
Other	11.2%	9.1%	9.7%	8.0%	9.6%

TABLE 22: HOUSEHOLD CLEANLINESS

	Income Quartile				
	1st	2nd	3rd	4th	Total
Percent of clean HHs	56.1%	64.7%	66.0%	82.6%	66.1%
Covered Food:					
Yes, completely covered	57.2%	59.5%	61.9%	74.4%	62.2%
Yes, partially covered	39.5%	39.0%	36.7%	23.9%	35.8%
Not covered	3.3%	1.5%	1.5%	1.7%	2.0%
Percent of HHs with garbage in kitchen or house	49.8%	41.3%	42.2%	27.4%	41.2%

food as per health recommendations. However, 38% of HHs did not cover or only partially covered their food. A similar percentage (41%) stored garbage in their kitchen or house. Recommended sanitation conditions (i.e., covering food, not storing garbage in HH, cleanliness) were more commonly observed in richer HHs (74% of the richest income group was observed to completely cover their food while 57% of the lowest income group was observed to do so).

4.4 Handwashing Behavior and Facilities

Handwashing behavior and handwashing facilities are important determinants of potential disease transmission and childhood diarrhea. As such, the IE survey included questions to assess handwashing behavior in two critical times: after going to the toilet, and when preparing food or feeding a child.

Table 23 reports the details of handwashing behaviors and the places HH members go to wash their hands after going to the toilet. Across all income groups, almost all persons reported that they wash hands after going to the toilet. The place for washing hands usually used at this time was most often reported to be at a location of more than 10 feet from the toilet (45%) or in no specific place (37%). Overall, only 16.9% (7.7% + 8.7% + 0.5%) of respondents reported washing their hands within 10 feet of the toilet or inside the toilet. A slightly higher proportion of respondents in richer income groups reported washing their hands in their yard (less than three feet from the toilet). The most widely used handwashing device was a container from which water is poured (71%), followed by basin with a bucket of water (16%), and a tap or faucet (12%). At least 73% of the HHs were observed by an enumerator to have water available at the place for washing hands at the time of interview. Richer HHs had better water availability. Soap was observed to be available in approximately 58% of the HHs. Powdered soap or detergent, which was observed to be present in a third of the HHs, was the most commonly observed soap. Like water, soap availability seems to be income dependent. For

TABLE 23: HANDWASHING BEHAVIOR AND FACILITY CHARACTERISTICS (AFTER USING TOILET)

	Income Quartile				
	1st	2nd	3rd	4th	Total
Percent of HH, wash hands	100.0%	99.5%	99.8%	99.7%	99.7%
Place Where Usually Wash Hands (% HH):					
Inside toilet facility	0.4%	0.2%	0.7%	0.9%	0.5%
Inside kitchen, cooking place	1.6%	1.7%	0.4%	5.2%	1.9%
In yard less than 3 feet from toilet	3.1%	4.4%	7.2%	20.3%	7.7%
Between 10 feet and 3 feet from toilet	6.7%	8.1%	9.2%	11.5%	8.7%
More than 10 feet from toilet	44.0%	49.1%	45.5%	36.4%	44.6%
No specific place	44.2%	36.5%	37.0%	25.8%	36.7%
Handwashing Device, Toilet (% HH):					
Tap, faucet	4.4%	10.5%	11.6%	23.0%	12.2%
Tippy Tap	0.8%	0.6%	0.0%	0.4%	0.4%
Basin, bucket	18.1%	13.3%	12.9%	23.4%	16.4%
Container from which water is poured	76.6%	75.6%	75.5%	53.2%	71.0%
Water available at place for washing hands (% HH)	73.3%	77.1%	77.7%	89.1%	78.9%
Soaps Available (% HH):					
Multipurpose bar soap	1.1%	3.7%	4.0%	4.2%	3.3%
Beauty, toilet bar soap	21.5%	17.1%	20.7%	27.4%	21.2%
Powder soap, detergent	20.4%	33.3%	35.6%	42.5%	33.0%
No soap observed	55.8%	44.8%	38.5%	25.5%	41.5%
Ash and/or Mud at Place for Washing Hands (% HH):					
Ash	16.3%	15.8%	18.2%	11.3%	15.7%
Mud	40.7%	37.7%	29.8%	17.2%	31.9%
Ash and mud	13.0%	15.0%	19.7%	20.3%	16.9%
Neither observed	30.0%	31.6%	32.4%	51.2%	35.5%

example, no soap was observed in 56% of HHs in the poorest income group and in 26% of HHs in the highest income group. Richer HHs were observed to have soap more often than poorer ones across all soap types. Ash, mud, or both were observed to be present at places for washing hands in 65% of the total sample (16% had only ash, 32% had only mud, and 17% had both). As expected, cheaper-than-soap alternatives such as ash and mud were observed more often in poorer HHs.

Table 24 reports the details of handwashing behaviors and the use of places for washing hands before preparing food or feeding children. It is noteworthy that 60% of HHs said that the place used for washing hands before preparing food or feeding children was different from the one they used to wash hands after defecation. Almost all (97%) HHs reported washing hands before preparing food or feeding children. Most places for washing hands were reported to be located either within three feet of the kitchen (27%) or between 3 and 10 feet from the kitchen (26%). In 8% of HHs, the place used for washing hands was reported to be inside the kitchen. Twenty-six percent of HHs said that they did not have specific place for handwashing. The most common handwashing device reported was a container from which water is poured (61%) closely followed by a basin with a bucket for water (25%) and a tap or faucet (13%). Water was observed by enumerators to be present at the place for washing hands in 85% of the HHs and soap in 35% of the HHs.

TABLE 24: HANDWASHING BEHAVIOR AND FACILITY CHARACTERISTICS (BEFORE PREPARING FOOD OR FEEDING A CHILD)

	Income Quartile				
	1st	2nd	3rd	4th	Total
Percent of HH wash hands	94.2%	96.6%	97.7%	98.0%	96.6%
Place Where Usually Wash Hands (% HHs):					
Inside toilet facility	0.0%	0.5%	0.4%	0.9%	0.4%
Inside kitchen, cooking place	7.6%	10.0%	4.6%	10.3%	7.9%
In yard less than 3 feet from kitchen	24.9%	23.6%	28.4%	33.1%	27.0%
Between 10 feet and 3 steps from kitchen	21.4%	24.7%	27.9%	28.4%	25.5%
More than 10 feet from kitchen	12.0%	14.5%	13.8%	11.4%	13.2%
No specific place	34.1%	26.6%	24.9%	15.8%	26.0%
Place for washing hands different from place after going to toilet	54.6%	60.0%	57.6%	70.0%	60.2%
Handwashing Device (% HHs):					
Tap, faucet	2.5%	9.8%	13.0%	23.5%	12.6%
Tippy tap	0.6%	1.7%	0.0%	1.5%	1.0%
Basin, bucket	29.9%	25.6%	22.5%	25.0%	25.4%
Container from which water is poured	66.9%	62.8%	64.5%	50.0%	61.0%
Water available at place for washing hands (% HHs)	79.4%	81.0%	87.3%	93.0%	85.3%
Soaps Available (% HHs):					
Multipurpose bar soap	3.0%	2.8%	5.1%	4.0%	3.8%
Beauty, toilet bar soap	24.2%	24.6%	26.4%	26.4%	25.4%
Powder soap, detergent	22.4%	31.1%	40.9%	47.3%	35.9%
No soap observed	50.0%	42.3%	28.0%	20.9%	34.8%
Ash, Mud at Place for Washing Hands (% HHs):					
Ash	17.6%	19.3%	16.9%	15.4%	17.4%
Mud	23.0%	23.2%	14.4%	10.0%	17.6%
Ash and mud	24.2%	21.7%	32.2%	32.3%	27.6%
Neither ash nor mud	35.2%	35.8%	36.4%	42.3%	37.4%

Powdered soap or detergent was the most frequently observed type of soap (36%) followed by beauty or toilet soap (25%). Ash, mud, or both were observed to be present at places for washing hands in 63% of the total sample (17% had only ash, 18% had only mud and 28% had both).

4.5 Child Care Environment

Table 25 shows the reported breastfeeding practices of caregivers of U2 children during the first three days after childbirth. Almost all U2 children caregivers reported breastfeeding during the first three days after childbirth. The majority (67%) gave their child colostrum during the first three days after birth and 48% fed their child a liquid other than breast milk during this time. The most common liquids reported to be given during the first three days after birth were milk (other than breast milk) (23%), plain water (9%), tea or infusions (9%), honey (8%), and Ayurvedic tonics (7%).

Table 26 summarizes the diets of U2 children, as indicated by the liquids and solid foods that the caregiver reported giving to the child on the day before the baseline interview. The vast majority of U2 children were given plain water (94%) and breast milk (91%). Tea or coffee (41%) and milk (other than breast milk) (22%) were among the other most common liquids reported. Richer HHs tended to provide more ready-to-eat liquid food such as powdered milk or instant formula. On average, 58% of the U2 children received solid or semisolid food almost three times a day. No systematic correlations were found between income levels and the percentage of children receiving solid food or between income and the frequency of solid food feeding.

TABLE 25: CHILD BREASTFEEDING (CHILDREN <2)

	Income Quartile				
	1st	2nd	3rd	4th	Total
Percent of children ever breastfed	99.4%	98.7%	98.6%	98.4%	98.8%
Children BF within </= 1 hr of birth	35.1%	36.9%	37.0%	40.4%	37.1%
Colostrum given during first three days	62.2%	64.6%	66.4%	79.1%	67.0%
Exclusive breastfeeding for first six months	93.3%	88.0%	91.5%	92.3%	91.3%
Still breastfeeding (child < 6 months)	97.3%	98.4%	98.5%	98.6%	98.1%
Still breastfeeding (child 6 to <12 months)	97.5%	99.4%	98.2%	96.9%	98.2%
Still breastfeeding (child 12 to <18 months)	88.6%	91.2%	90.9%	89.3%	90.1%
Still breastfeeding(child 18 to <24 months)	68.9%	76.0%	70.2%	70.7%	71.9%
Still breastfeeding (child <24 months)	89.2%	91.3%	90.8%	90.0%	90.4%
Liquid other than breast milk given during first three days	52.2%	47.7%	47.8%	42.9%	48.0%
Liquid other than breast given during first three days:					
Instant formula	1.5%	1.0%	1.4%	1.3%	1.3%
Milk other than breast milk	16.8%	18.8%	27.0%	35.9%	23.2%
Plain water	8.4%	8.6%	7.5%	12.2%	8.8%
Sugar, glucose water	2.9%	2.3%	2.5%	1.3%	2.4%
Gripe water	0.4%	0.0%	0.0%	0.0%	0.1%
Sugar-salt-water solution	1.1%	2.7%	0.7%	0.6%	1.4%
Fruit juice	0.0%	0.0%	0.0%	0.0%	0.0%
Tea, infusions	8.8%	10.0%	5.0%	13.5%	8.8%
Honey	7.3%	5.3%	7.5%	13.5%	7.7%
Ayurvedic Tonic (*Janam Ghutti*)	5.5%	10.0%	5.4%	3.8%	6.5%
Percent of children drinking anything from bottle	3.3%	5.4%	5.8%	8.2%	5.5%

TABLE 26: INFANT/YOUNG CHILD FEEDING (CHILDREN <2)

	Income Quartile				
	1st	2nd	3rd	4th	Total
Liquids Given Yesterday:					
Breast milk	89.7%	91.6%	90.5%	89.9%	90.5%
Plain water	95.2%	93.0%	94.0%	94.2%	94.1%
Instant formula	1.5%	1.3%	0.3%	1.6%	1.1%
Cerelac	1.1%	1.8%	3.4%	5.8%	2.8%
Kheer made in home	1.1%	2.1%	1.5%	1.6%	1.6%
Powder milk, bottled or fresh milk	12.8%	22.0%	24.8%	31.0%	22.0%
Fruit juice	0.8%	2.5%	2.2%	4.4%	2.3%
Tea or coffee	40.5%	43.8%	42.8%	36.0%	41.3%
Other	30.5%	36.9%	32.9%	31.9%	33.3%
Percent of children that were given solid or semi-solid food yesterday	53.2%	59.6%	59.3%	59.3%	57.9%
Average number of times food was given yesterday	3.2	3.0	3.0	3.0	3.0
Food Given Yesterday:					
Grain-based food	93.5%	95.7%	95.1%	93.5%	94.7%
Vitamin A food (6–<24 month children only)	26.0%	35.0%	33.1%	34.7%	32.4%
Roots, potatoes	19.5%	25.7%	27.1%	25.5%	24.6%
Fruits, vegetables	19.9%	30.5%	23.3%	30.4%	26.0%
Meat red or white, fish, eggs (6–<24 month children only)	8.4%	7.1%	5.0%	3.2%	6.1%
Beans, peas, lentils	42.6%	34.5%	44.5%	43.3%	40.8%
Oil, fats, butter	37.2%	35.8%	38.5%	38.7%	37.4%
Percent of children that were given iron pills or syrup	6.2%	6.7%	6.2%	8.0%	6.6%
Percent of children that received deworming in past 6 months	15.7%	15.9%	17.6%	23.5%	17.6%
Percent of children that ever received Vitamin A	31.1%	36.4%	37.9%	43.9%	36.8%
Percent of children that received Vitamin A dose in last 6 months	26.4%	30.4%	31.0%	36.7%	30.6%
Percent of children that feed themselves	66.7%	66.9%	68.2%	63.6%	66.6%

On average, children's reported diets were grain-food rich; 95% of U2 children received grain-based food. About a third of the children received Vitamin A-rich food (32%). Forty-one percent of caregivers reported feeding their child beans, peas, or lentils on the day prior to the interview and 37% reported feeding their child oil, fats, or butter. About a quarter of households reported giving their child roots or potatoes (25%) or fruits or vegetables (26%). Only 6% of children were fed meat, eggs, or poultry and about 7% were given iron pills or syrup. However, more than a third (37%) of caregivers reported that they gave iron supplements to their child.

Table 27 provides a summary of the proportion of HHs, by income quartile, that met DHS Infant and Young Child Feeding (IYCF) indicators.

Table 28 reports the care situation for U5 children, that is, whether and how much they were reported to be left alone or left in the charge of an older child during the week prior to the interview and how clean and clothed they were observed to be at the time of the interview. More than a third of U5 children (36%) were reported to be ever left in the charge of another child. On average, these children were left alone in the charge of another child about 6.5 times during the week

TABLE 27: PROPORTION OF HOUSEHOLDS MEETING DHS INFANT AND YOUNG CHILD FEEDING INDICATORS FOR BREASTFED AND NONBREASTFED CHILDREN (CHILDREN <2)

	Income Quartile				
	1st	2nd	3rd	4th	Total
Percent fed milk or milk products to nonbreastfed children (6 to <24 months)	38.2%	43.1%	45.8%	62.5%	46.2%
Percent meeting minimum recommended frequency of feeding for nonbreastfed children (6 to <24 months)	43.6%	36.2%	28.8%	45.0%	37.7%
Percent meeting minimum recommended dietary (food group) diversity for nonbreastfed children (6 to <24 months)	27.3%	34.5%	52.5%	50.0%	40.6%
Percent meeting minimum recommended frequency of feeding for breast-fed children (6 to <9 months)	98.5%	95.7%	100.0%	90.5%	96.3%
Percent meeting minimum recommended frequency of feeding for breast-fed children (6 to <24 months)	75.5%	69.6%	64.9%	64.4%	68.7%
Percent meeting minimum recommended feeding for breastfed children (6 to<24 months)	80.1%	74.8%	71.7%	70.6%	74.4%
Percent meeting minimum recommended dietary (food group) diversity for breastfed children (6 to <24 months)	99.1%	98.7%	98.0%	98.1%	98.5%

TABLE 28: INFANT/YOUNG CHILD CARE SITUATION (CHILDREN <5)

	Income Quartile				
	1st	2nd	3rd	4th	Total
Percent of children that are ever left in the charge of another child	42.7%	39.6%	30.1%	27.6%	35.6%
Average number of times child was left in the charge of another child (excludes children never left in care of another child)	6.8	6.5	6.6	6.0	6.5
Percent of children that are ever left all alone	27.1%	25.1%	17.5%	13.7%	21.5%
Average number of times child was left alone (excludes children never left alone)	7.1	6.2	6.7	5.4	6.5
Percent of children that are ever left in the charge of another child or all alone	46.2%	43.8%	33.5%	29.2%	39.0%
Percent of children with clean aspect	50.8%	57.1%	60.6%	73.5%	59.0%
Percent of children with dirty hands	43.8%	42.1%	35.7%	26.1%	38.3%
Percent of children with dirty finger nails	59.1%	53.4%	51.1%	41.1%	52.3%
Percent of children with dirty face	34.6%	28.0%	26.5%	18.1%	27.8%
Percent of children with pot-belly	10.6%	8.4%	8.0%	7.9%	8.8%
Percent of children wearing clothes					
Yes, top only	25.2%	22.4%	21.2%	13.1%	21.4%
Yes, bottoms only	10.7%	10.3%	10.2%	9.8%	10.3%
Yes, top and bottom	58.6%	62.9%	63.5%	73.6%	63.6%
Percent of children wearing shoes (or shoes available)	2.0%	1.8%	1.1%	1.5%	1.6%

TABLE 29: INFANT/YOUNG CHILD LEARNING ENVIRONMENT (CHILDREN <2)

	Income Quartile				
	1st	2nd	3rd	4th	Total
Percent of children that play only with HH objects	31.5%	27.6%	24.1%	18.4%	26.0%
Percent of children that play only with toys	1.7%	1.3%	2.2%	3.0%	2.0%
Percent of children that play with HH objects and toys	42.0%	51.7%	54.6%	61.9%	51.9%
Percent of children that don't play with HH objects or toys	24.8%	19.5%	19.1%	16.7%	20.2%
Percent of children with at least one book	7.1%	8.4%	9.7%	17.8%	10.1%
Percent of children that attended early education programs	2.1%	1.9%	3.2%	3.8%	2.7%
Percent of adults that read books with the child	11.8%	12.1%	15.6%	22.7%	14.9%
Percent of adults that tell stories to the child	7.6%	9.4%	10.7%	16.4%	10.5%
Percent of adults that take the child outside the home	69.3%	68.9%	74.0%	77.0%	71.8%
Percent of adults that play with the child	56.7%	60.0%	64.1%	74.3%	62.8%
Number of Activities with Adult:					
None	22.0%	20.5%	18.5%	13.7%	19.1%
1–3 activities	66.3%	65.6%	63.8%	56.7%	63.7%
4–6 activities	11.7%	13.9%	17.8%	29.6%	17.1%
Average number of activities (excludes children with no activity)	2.4	2.5	2.6	3	2.4

TABLE 30: MATERNAL DEPRESSION

	Income Quartile				
	1st	2nd	3rd	4th	Total
Percent of PCGs with depression score > 10 (high)	99.0%	99.3%	99.3%	98.9%	99.2%
Percent of PCGs with depression score >= median score (low)	73.3%	73.9%	71.8%	68.8%	72.3%
Average depression score of PCGs	18.0	18.2	17.7	17.2	17.8

before the interview. Fewer children (22%) were reported to have been left all alone. Those who were reportedly left alone were alone about 6.5 times, on average. Based on direct observations made by enumerators at the time of the interview, more than half of U5 children overall (59%) were found to have a clean aspect; 38% were observed to have dirty hands; 52% dirty fingernails; and 28% an unclean face. Although the majority of children were observed to be wearing clothing on both top and bottom (64%), 21% wore only a top (e.g., a shirt) and 10% wore only bottoms (e.g., pants or shorts). Less than 2% of U5 children were wearing shoes (or other footwear) at the time of the interview.

Table 29 presents information the HH learning environment of children under two years old, as reported by their parent or caregiver. On average, 52% of U2 children were reported to play with household objects and toys. Only about 10% of U2 children overall had at least one book. Approximately 15% of caregivers reported that they read books to their children and 11% said that they tell their children stories. Few (3%) U2 children had attended an early education program (e.g., a nursery). About 63% of caregivers said that they or another HH member play with their child. About 20% of caregivers said that they did not do any activities with their child. Among those who reported that they do activities with their U2 children, parents reported on average doing 2.4 activities in the past three days with their child. Higher proportions of the richer income group reported doing more activities with their child, as well as engaging in developmental activities such as playing with their child and reading.

Finally, the IE survey also measured maternal depression because of its important influence on children's health and development. Table 30 shows that almost all (99%) primary caregivers (PCGs) felt depressed most or all of the time during the last seven days.

4.6 Handwashing Behaviors

Along with good sanitation, handwashing is critical to breaking the fecal-oral transmission pathways for pathogens. Table 31 presents handwashing behaviors reported by the caregivers. Eighty-three percent of the caregivers reported washing their hands with soap within the 24 hours before the interview. Richer HHs reported substantially higher handwashing with soap than poorer HHs. The most commonly reported instances of hands being washed with soap include after using the toilet (56.5%), while bathing (57.1%), while doing laundry (52.1%), and while bathing a child (42.8%).

4.7 Child Development

Caregivers were asked a series of questions related to child development, communication, mobility, and social-personal skills. These questions differed depending on the age groups of the children so that their "degree of development" indices for different skills could be estimated.

Table 32 presents the Z-scores for these indices by sanitation, water, and handwashing conditions. A lower degree of development was systematically observed in children from HHs without improved sanitation, improved water sources, and HW stations across different skills. Acknowledging the limitation of bivariate analysis in establishing causality, the relationship between better child development scores and improved sanitation indicates the possible payoff if rural sanitation interventions, such as TSC, are effective. However, the results also highlight that access to improved water sources and handwashing with soap and water are important factors that can compliment or substitute the gains from improved sanitation.

Table 33 presents the Z-scores for these indices by income quartile. There was a lower degree of development across all indices in children in the poorest income group and higher levels among the children in the richest income group.

Figure 3 shows the histograms for communication, mobility and personal-social skills' Z-score. All these indices have a mean score of 0. The median values for-age Z-scores are –0.068 for communication skills, 0.084 for mobility skills, and –0.048 for personal-social skills.

TABLE 31: SELF-REPORTED HANDWASHING BEHAVIOR WITH SOAP BY INCOME QUARTILE (PREVIOUS 24 HOURS)

	Income Quartile				
	1st	2nd	3rd	4th	Total
Percent of caregivers that washed their hands with soap since yesterday	74.5%	83.0%	86.1%	92.1%	83.4%
Last Moment of Handwash since Yesterday:					
Bathing a child	35.6%	40.9%	44.5%	53.0%	42.8%
Bathing oneself	50.0%	55.5%	58.8%	66.8%	57.1%
Using toilet	48.0%	54.4%	58.3%	68.6%	56.5%
Cleaning baby bottom	19.8%	20.6%	20.6%	28.6%	21.8%
Cleaning latrine	4.8%	5.5%	6.2%	10.8%	6.5%
Returning home	1.2%	2.8%	2.1%	2.2%	2.1%
Preparing food, cooking	4.0%	8.1%	9.3%	13.0%	8.3%
Feeding children	2.0%	3.9%	3.3%	4.9%	3.4%
Washing child's hands	2.4%	3.2%	4.5%	6.2%	3.9%
Cleaning dishes	24.2%	30.9%	38.1%	44.9%	33.8%
Doing laundry	43.6%	50.6%	56.1%	60.0%	52.1%
Because they look dirty	8.4%	9.5%	11.2%	12.2%	10.2%
Before eating	4.2%	5.5%	8.0%	11.1%	6.9%

TABLE 32: CHILD DEVELOPMENT Z-SCORES BY SANITARY CONDITIONS (CHILDREN <2)

	Improved Sanitation		Improved Water Source		Soap and water at HW station		Total
	No	Yes	No	Yes	No	Yes	
Average communication skills-for-age Z-score	–0.1204	0.2697	–0.1327	–0.0571	–0.1935	0.0982	–0.0684
Average mobility skills-for-age Z-score	0.0453	0.3335	0.0528	0.0899	–0.0454	0.2552	0.0844
Average personal-social skills-for-age Z-score	–0.0924	0.2383	–0.0551	–0.0466	–0.1918	0.1412	–0.0479

TABLE 33: CHILD DEVELOPMENT Z-SCORES BY INCOME QUARTILE (CHILDREN <2)

	Income Quartiles				
	1st	2nd	3rd	4th	Total
Average communication skills-for-age Z-score	–0.2031	–0.1444	–0.079	0.2604	–0.0696
Average mobility skills-for-age Z-score	–0.037	0.0401	0.0784	0.3375	0.0838
Average personal-social skills-for-age Z-score	–0.1455	–0.0763	–0.0896	0.1963	–0.0488

4.8 Diarrhea and Acute Lower Respiratory Infection Prevalence

Tables 34 to 38 present the prevalence and treatment of diarrhea and acute lower respiratory infections (ALRI) for U5 children.

A child was considered to be suffering from diarrhea if he/she passed three or more watery stools per day or if blood and/or mucus was reported to be present in his/her stool. Prevalence of diarrhea in U5 children is reported in Table 34. Approximately 8% of U5 children had diarrhea within 48 hours prior to the interview, 13% in the previous week, and 15% in the previous two weeks. The prevalence of diarrhea is slightly higher in the HHs with unimproved sanitation, unimproved drinking water source and inadequate handwashing facilities (i.e. without soap and water). Improved sanitation and water seem to be more strongly linked with diarrhea prevalence than handwashing.

Table 35 shows diarrhea prevalence of U5 children by income quartile. A higher percentage of U5 children in the poorest HHs had diarrhea in the 48 hours prior to the interview, in the previous week, and in the previous two weeks than children in the richest income group.

The guidelines by World Health Organization (WHO 2005) were used to assess if a child suffers from ALRI. A child was considered to have ALRI if he/she had constant cough or difficulty breathing and a raised respiratory rate. As reported in Table 36, the prevalence of ALRI in U5 children was 7.6% in the 48 hours prior to the interview, 10.8% in the previous week, and 12.3% in the previous 14 days. The prevalence of ALRI was slightly higher in households with unimproved sanitation and an unimproved water source. However, ALRI prevalence was comparable in HHs with and without handwashing facilities.

Table 37 shows the prevalence of ALRI in U5 children by income quartile. In contrast to some of the other health indicators, it appears that children in the poorest income group had a slightly lower prevalence of ALRI than children in the higher income groups.

Table 38 reports the treatment given to U5 children suffering from of diarrhea and/or ALRI. In 59% of the cases, caregivers sought medical advice from a day visit to a doctor, 7% sought advice from pharmacists, and 28% did not seek any advice. Richer HHs tended not to seek medical advice. In 80.2% of the cases, the medical facility visited was private. Comparatively, richer HHs had a preference for private facilities whereas poorer HHs used public facilities.

Table 39 reports treatment of diarrhea cases. Eighty-eight percent of the cases were treated with pills or syrup,

FIGURE 3: HISTOGRAMS OF SKILLS-FOR-AGE (Z-SCORES) FOR COMMUNICATION, MOBILITY, AND PERSONAL-SOCIAL FOR CHILDREN <2

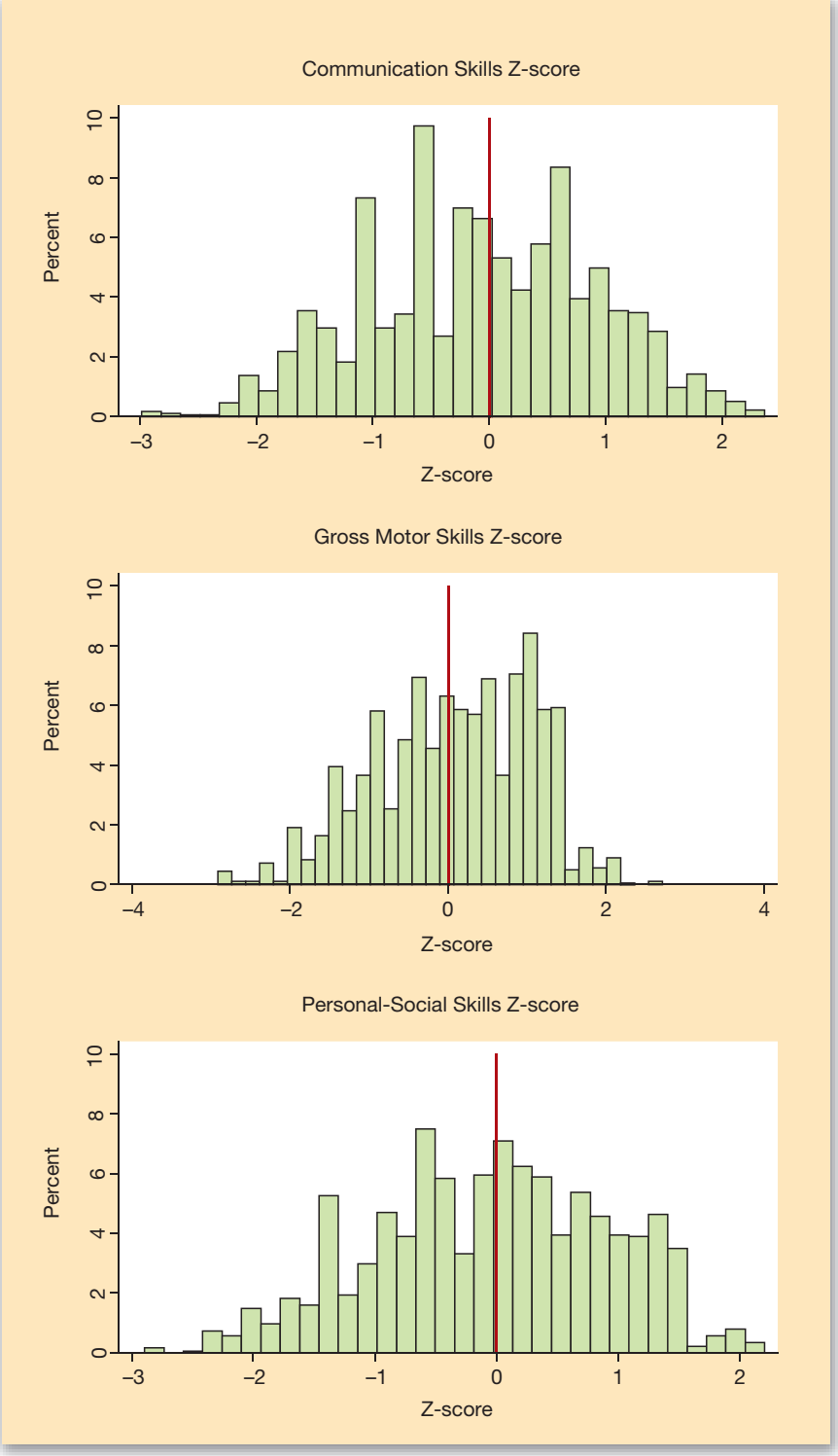

TABLE 34: DIARRHEA PREVALENCE BY SANITATION CONDITION (CHILDREN <5)

	Improved Sanitation		Improved Water Source		Soap and water at HW station		
	Yes	No	Yes	No	Yes	No	Total
Percent of children having diarrhea symptoms in previous 48 hours	5.7%	7.9%	7.2%	9.9%	8.0%	7.2%	7.6%
Percent of children having diarrhea symptoms in previous week	10.1%	13.1%	12.4%	14.4%	12.3%	13.1%	12.7%
Percent of children having diarrhea symptoms in previous two weeks	11.7%	15.7%	14.6%	18.1%	14.6%	15.6%	15.2%

TABLE 35: DIARRHEA PREVALENCE BY INCOME QUARTILE (CHILDREN <5)

	Income Quartiles				
	1st	2nd	3rd	4th	Total
Percent of children having diarrhea symptoms in previous 48 hours	9.3%	7.8%	6.2%	6.7%	7.6%
Percent of children having diarrhea symptoms in previous week	14.0%	13.5%	12.0%	10.5%	12.7%
Percent of children having diarrhea symptoms in previous two weeks	16.9%	16.0%	14.0%	12.6%	15.2%

TABLE 36: ALRI PREVALENCE BY SANITATION CONDITION (CHILDREN <5)

	Improved Sanitation		Improved Water Source		Soap and water at HW station		
	Yes	No	Yes	No	Yes	No	Total
Percent of children having ALRI symptoms in previous 48 hours	6.4%	7.7%	7.4%	8.4%	8.0%	7.2%	7.6%
Percent of children having ALRI symptoms in previous week	9.9%	11.0%	10.7%	11.8%	11.0%	10.7%	10.8%
Percent of children having ALRI symptoms in previous two weeks	11.3%	12.4%	12.0%	13.6%	12.3%	12.2%	12.3%

TABLE 37: ALRI PREVALENCE BY INCOME QUARTILE (CHILDREN <5)

	Income Quartiles				
	1st	2nd	3rd	4th	Total
Percent of children having ALRI symptoms in previous 48 hours	6.4%	8.1%	6.9%	9.4%	7.5%
Percent of children having ALRI symptoms in previous week	9.0%	11.5%	10.7%	12.8%	10.8%
Percent of children having ALRI symptoms in previous 2 weeks	10.5%	13.1%	12.1%	13.9%	12.2%

60.9% with injections, and 16.1% with oral rehydration salts (ORS). In 83% of the cases, HHs paid for diarrhea treatment (an average of Rs 1,007 (US$22) per case). However, this average is skewed due to a few high-end tail values for HHs in the 1st income quartile. Typically, the average treatment and advice cost in other income groups ranged from Rs 154 (US$3.4) to Rs 213 (US$4.7) per case.

TABLE 38: MEDICAL TREATMENT FOR DIARRHEA- AND ALRI-RELATED AILMENTS BY INCOME QUARTILE (CHILDREN <5)

	Income Quartile				
	1st	2nd	3rd	4th	Total
Percent of Caregivers that Sought Medical Advice:					
Did not seek	28.6%	27.0%	29.4%	26.7%	28.0%
Day visit to doctor	55.1%	62.5%	57.1%	61.7%	59.0%
Overnight stay at hospital or clinic	0.9%	0.8%	0.6%	0.5%	0.7%
Pharmacist	9.6%	6.2%	7.0%	4.4%	7.0%
Traditional healer	0.6%	0.5%	2.0%	0.0%	0.9%
Herbalist	0.0%	0.8%	0.3%	0.5%	0.4%
Other	4.8%	1.8%	2.9%	6.3%	3.6%
Type of Medical Facility:					
Public	18.2%	20.9%	13.6%	12.7%	16.9%
Private	78.8%	76.5%	82.2%	86.0%	80.2%
Both types	0.0%	0.7%	0.4%	0.0%	0.3%

Table 40 lists the type of treatments given for ALRI cases and their cost. Seventy-nine percent of the cases were treated with pills or syrup and 47.1% with injections. Caregivers reportedly paid for diagnosis and/or treatment of ALRI in 94.7% of the cases. The average expense per case is Rs 1357 (US$30). However, this average is skewed due to a few high expense cases in the 2nd income quartile group. In other income groups, the average expense per case is between Rs 249 (US$5.5) and Rs 385 (US$8.5).

4.9 Child Growth Measures and Anemia

The survey collected anthropometric measures of U2 children to assess their average growth and development. Measurement and estimates for arm circumference, weight, length/height, body mass index, weight-for-length/height, and head circumference were obtained. For each of these measures the Z-scores were computed using WHO's population mean and standard deviation estimates (WHO 2006 and 2007).

The histograms of the Z-scores for each of the child growth (anthropometric) measures are presented in Figure 4. On average, all anthropometric measures were below the population mean estimated by the WHO (red line is on the left of 0) indicating lower development than typically expected.

Table 41 presents the average Z-scores for the six anthropometric measures by improved sanitation, water, and handwashing facilities. Typically, children from HHs without improved sanitation, water source, or HW station had a lower Z-score for the anthropometric measures. However, out of the six measures, average body mass index-for-age Z-score and average weight-for-length/height Z-score were better for HHs without improved drinking water source. In spite of this contradiction and recognizing the limitation of bivariate analysis in inferring causality, the preponderance of results indicates association between improved sanitation, better handwashing facilities, and child development.

Table 42 presents the average Z-scores for the six anthropometric measures by income quartile.

Figure 5 presents the average Z-scores by age and gender to simulate how the anthropometrics variables may evolve over time in U2 children. Unfortunately, for four out of the six anthropometric measures the evolution of the averages decrease with age, indicating two possible conclusions. First, the gap between the sample mean and the population mean widens during child's growth so that with age the child's physical development may be worsening. Second, the standard deviation in Z-scores decreases with age, which means that the cohort of children is mostly homogenous. If both conclusions are true, the child growth situation is worse than if only the first conclusion was true. However, evolution of the other two important indicators of child development—body mass index and arm circumference—either remain constant with age or increase with age.

TABLE 39: DIARRHEA TREATMENT BY INCOME QUARTILE (CHILDREN <5)

	Income Quartile				
	1st	2nd	3rd	4th	Total
Type of Treatment Given:					
No treatment	0.0%	0.0%	0.0%	0.0%	0.0%
Pill or syrup	86.1%	88.2%	88.4%	89.2%	87.9%
Injection	59.6%	61.1%	62.2%	61.0%	60.9%
Intravenous fluid (IV)	9.0%	6.0%	4.9%	4.3%	6.4%
Traditional remedies	4.1%	0.9%	5.0%	2.2%	3.0%
ORS	15.3%	15.3%	20.9%	11.8%	16.1%
Homemade sugar water	7.9%	5.0%	10.6%	4.3%	7.1%
Other	0.0%	0.0%	1.3%	0.0%	0.3%
% of HH that paid for the treatment	87.9%	80.3%	82.5%	80.6%	83.0%
Average amount spent on treatments and advice (Rs)	2963	191	213	154	1007

TABLE 40: ALRI TREATMENT BY INCOME QUARTILE (CHILDREN <5)

	Income Quartile				
	1st	2nd	3rd	4th	Total
Type of Treatment Given:					
No treatment	0.0%	0.0%	0.0%	0.0%	0.0%
Pill or syrup	78.9%	77.6%	79.9%	80.0%	78.9%
Injection	42.2%	45.2%	50.0%	53.6%	47.1%
Intravenous fluid (IV)	1.7%	1.8%	3.3%	0.0%	1.8%
Traditional remedies	0.0%	1.8%	1.6%	0.8%	1.1%
Other	0.6%	0.0%	1.1%	0.8%	0.6%
Percent of HH that paid for the treatment	95.0%	93.0%	96.2%	95.2%	94.7%
Average amount spend on treatments and advice (Rs)	385	3779	253	249	1357

TABLE 41: CHILD GROWTH MEASURES (Z-SCORES) BY SANITARY CONDITION (CHILDREN <2)

	Improved Sanitation		Improved Water Source		Soap and water at HW station	
	No	Yes	No	Yes	No	Yes
Average arm circumference-for-age Z-score	–1.3922	–0.7743	–1.448	–1.285	–1.3919	–1.2007
Average weight-for-age Z-score	–2.3062	–1.6803	–2.3634	–2.1955	–2.3447	–2.0528
Average length/height-for-age Z-score	–1.8917	–1.371	–2.0477	–1.7828	–1.8317	–1.8116
Average body mass index-for-age Z-score	–1.317	–1.0376	–1.229	–1.2885	–1.3615	–1.1718
Average weight-for-length/height Z-score	–1.4212	–1.1469	–1.314	–1.3954	–1.5215	–1.2062
Average head circumference-for-age Z-score	–1.6387	–1.2565	–1.6805	–1.5724	–1.6393	–1.5237

FIGURE 4: HISTOGRAMS OF CHILD GROWTH MEASURES (Z-SCORES) FOR CHILDREN <2

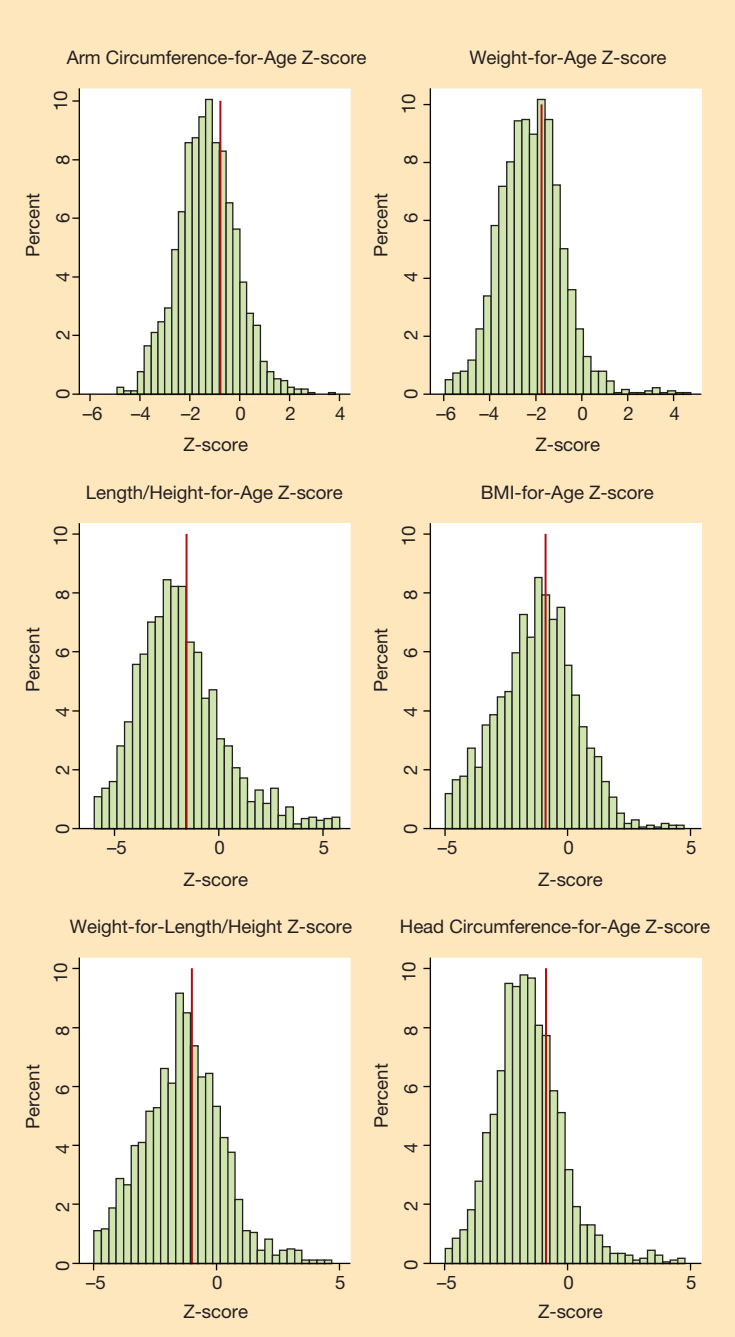

TABLE 42: CHILD GROWTH MEASURES (Z-SCORES) BY INCOME QUARTILE (CHILDREN <2)

	Income Quartiles				
	1st	2nd	3rd	4th	Total
Average arm circumference-for-age Z-score	–1.0314	–1.2721	–0.9745	–0.4718	–0.9903
Average weight-for-age Z-score	–2.2694	–2.2064	–2.2664	–1.8686	–2.1809
Average length/height-for-age Z-score	–2.567	–1.8463	–1.8967	–1.1763	–1.9282
Average body mass index-for-age Z-score	1.1822	–0.7859	–0.2089	2.5432	0.4487
Average weight-for-length/height Z-score	–1.0482	–0.8465	–1.3741	–1.0465	–1.0791
Average head circumference-for-age Z-score	–1.1531	–1.4372	–2.007	–1.07	–1.4583

FIGURE 5: CHILD GROWTH MEASURES (Z-SCORES) BY GENDER AND MONTHS OF AGE FOR CHILDREN <2

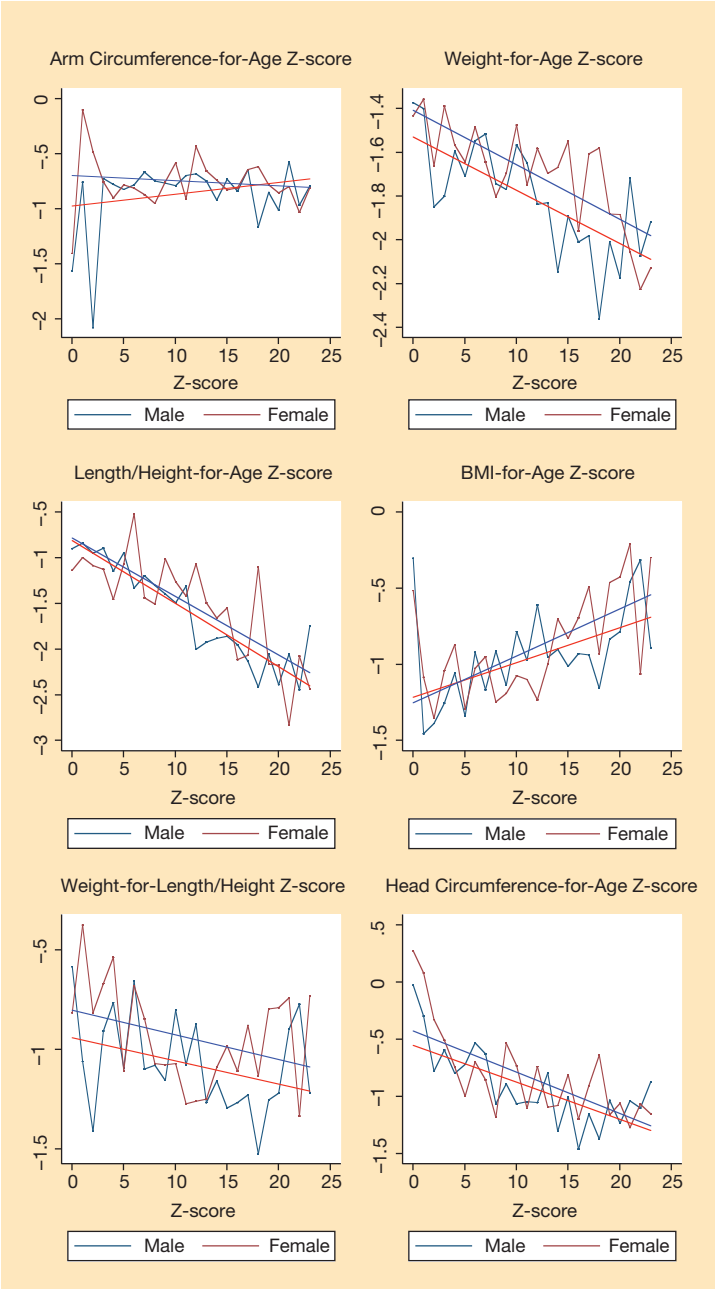

TABLE 43: ANEMIA PREVALENCE BY SANITARY CONDITION (HB <110g/L) FOR CHILDREN <2

	Improved Sanitation		Improved Water Source		Soap and Water at Place for Washing Hands		
	No	Yes	No	Yes	No	Yes	Total
Anemic (Hb <110 g/L)	81%	74%	80%	80%	81%	79%	80%

TABLE 44: ANEMIA PREVALENCE BY INCOME QUARTILE (HB <110g/L) FOR CHILDREN <2

	Income Quartiles				
	1st	2nd	3rd	4th	Total
Anemic (Hb <110 g/L)	85%	79%	80%	75%	80%

TABLE 45: *ESCHERICHIA COLI* AND *SALMONELLA* ENTERITIDIS IN COMMUNITY WATER SOURCES

Average no. of water sources sampled	4.75
Percent of sources with *E. coli*	94.4%
Percent of sources with SE	0.9%

To determine the prevalence of anemia in U2 children, a HemoCue™ was used on-site to measure hemoglobin count. Table 43 presents the results. Overall, 80% of U2 children are anemic. Anemia was higher in HHs with unimproved sanitation, but almost comparable in HHs with and without an improved water source or HW facilities. Note, due to high summer temperature in MP (touching 40° C regularly), the HemoCue equipment often malfunctioned. Therefore, the above findings suffer from measurement bias. Unfortunately, it is not possible to quantify the magnitude or direction of the bias.

Table 44 shows the percent of U2 children who were anemic by income quartile. The majority of children, across all income groups, were anemic. Children in the poorest income group had the highest rates of anemia (85%) and the richest income group, the lowest (75%).

4.10 Water Microbiology and Parasitology

A baseline assessment of bacteria and parasites in the household and the community environment was undertaken in order to understand how the intervention affects the fecal oral transmission pathways. The presence of *Escherichia coli* (*E. coli*) and *Salmonella* Enteritidis (SE) was measured in household drinking water and in community water sources. *E. coli* is an indicator organism for human fecal contamination of drinking water whereas SE indicates contamination of drinking water by animal feces. Stool samples of U2 children were tested for parasites such as *Giardia*, *Ascaris,* and *Blastocystis*. Parasites in stool samples are biomarkers of diarrheal or gastrointestinal diseases. Drinking water and stool samples were taken from 25% of the surveyed HHs. In addition, samples were obtained from four to six community sources from which HHs collect drinking water.

Table 45 presents the results of the community water source sampling. Almost all community water sources (94%) were contaminated with *E. coli* but few (0.9%) were contaminated with SE.

Table 46 presents the water contamination in household drinking water. Almost all (97%) of HH samples were contaminated with *E. coli*, but none with SE. Because of high contamination levels, it is not possible to compare whether HHs with improved sanitation, water sources, or places for washing hands had more or less *E. coli* contamination. Even the level of *E. coli* contamination is comparable across all HHs (~167 CFU/100 mL).

Table 47 presents the water contamination in household drinking water by income quartile. Because, as seen in Table 46, almost all HHs' samples (97%) were contaminated with *E. coli*, there are very few differences based on income group. No samples were contaminated with SE.

Table 48 presents the child stool test results for the parasites by sanitary condition. Tests were done for *Giardia* (a parasite that colonizes and reproduces in the small intestine,

TABLE 46: *ESCHERICHIA COLI* AND *SALMONELLA* ENTERITIDIS IN HOUSEHOLD DRINKING WATER BY SANITARY CONDITION (CHILDREN <2)

	Improved Sanitation		Improved Water Source		Soap and Water at Place for Washing Hands		
	No	Yes	No	Yes	No	Yes	Total
N	300	54	37	317	204	150	354
Percent of HH with *E. coli* in drinking water	96.7%	98.1%	94.6%	97.2%	95.1%	99.3%	96.9%
Average *E. coli* (CFU/100ml) in contaminated samples	165.6	179.7	169.2	167.6	165.6	170.7	167.8
Median *E. coli* (CFU/100ml) in contaminated samples	200	200	200	200	200	200	200
Percent of HH with SE in drinking water	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

TABLE 47: *ESCHERICHIA COLI* AND *SALMONELLA* ENTERITIDIS IN HOUSEHOLD DRINKING WATER BY INCOME QUARTILE (CHILDREN <2)

	Income Quartiles				
	1st	2nd	3rd	4th	Total
Percent of HHs with *E. coli* in drinking water	98.8%	95.0%	98.1%	97.5%	97.0%
Average *E. coli* (CFU/100ml) in contaminated samples	170	168	161	170	167
Percent of HHs with SE in drinking water	0.0%	0.0%	0.0%	0.0%	0.0%

TABLE 48: PARASITE PRESENCE IN STOOL SAMPLES BY SANITARY CONDITIONS (CHILDREN <2)

	Improved Sanitation		Improved Water Source		Soap and Water at Place for Washing Hands		
	No	Yes	No	Yes	No	Yes	Total
N	177	39	22	194	126	90	216
Any parasites detected in HH (percent of HHs)	17.0%	12.8%	27.3%	15.0%	16.7%	15.6%	16.2%
Percent of HHs with *Ascaris lumbricoides*	0.0%	5.1%	0.0%	1.0%	0.0%	2.2%	0.9%
Percent of HHs with *Entamoeba histolytica*	7.3%	5.1%	4.6%	7.2%	7.1%	6.7%	6.9%
Percent of HHs with *Giardia lamblia*	4.5%	2.6%	13.6%	3.1%	4.0%	4.4%	4.2%
Percent of HHs with hookworm	1.1%	0.0%	0.0%	1.0%	0.8%	1.1%	0.9%
Percent of HHs with *H. nana, Taenia,* or *Diphyllobothrium latum*	4.0%	0.0%	9.1%	2.6%	4.8%	1.1%	3.2%
Percent of HH with *Ascaris lumbricoides*, hookworm, and tapeworm	5.1%	5.1%	9.1%	4.6%	5.6%	4.4%	5.1%

causing giardiasis), *Ascaris* (a genus of parasitic worms, which provokes an infection called ascariasis), *Entamoeba* (which can cause amoebiosis), hookworms, and other parasites. Overall, approximately 16% of U2 children had at least one parasite present in their stool. Children in HHs with improved sanitation appear to have lower rates of parasite detection and lower rates of amoebas and *Giardia* than those without improved sanitation. HHs with improved sanitation had lower rates of hookworm and *H. nana*, *Taenia*, or *Diphyllobothrium latum*. However, 25% of these HHs test positive for any parasites compared to 14% HHs without improved sanitation. *Ascaris lumbricoides* was detected in 25% of the HHs with improved sanitation but not detected in HHs without improved sanitation. Parasites were also detected in 17% of samples from HHs with improved water sources, but none in HHs without an

TABLE 49: PARASITE PRESENCE IN STOOL SAMPLES BY INCOME QUARTILE (CHILDREN <2)

	Income Quartiles				
	1st	2nd	3rd	4th	Total
Any parasites detected in HH (% HHs)	13.2%	14.5%	21.7%	14.3%	16.2%
Percent of HHs with *Ascaris lumbricoides*	0.0%	1.3%	0.0%	2.4%	0.9%
Percent of HHs with *Entamoeba histolytica*	5.3%	7.9%	8.3%	4.8%	6.9%
Percent of HHs with *Giardia lamblia*	5.3%	1.3%	6.7%	4.8%	4.2%
Percent of HHs with hookworm	2.6%	1.3%	0.0%	0.0%	0.9%
Percent of HHs with *H. nana, Taenia,* or *Diphyllobothrium latum*	0.0%	2.3%	6.7%	2.4%	3.2%
Percent of HHs with *Ascaris lumbricoides*, hookworm, and tapeworm	2.6%	5.3%	6.7%	4.8%	5.1%

improved water source. Overall parasite prevalence in HHs with HW facilities (15.4%) is comparable to that in HHs without HW facilities (14.8%). HHs with HW facilities had higher proportion of *Ascaris lumbricoides* and hookworm infection, but lower infection of *H. nana*, *Taenia*, or *Diphyllobothrium latum*.

These results indicate that sanitation-, handwashing-, and water source-based interventions can affect different types of parasites differently. However, no clear relationship—or, perhaps, a negative relationship—between improved sanitation, water sources, and place for washing hands and parasite infection emerges. This indicates that exposure factors other than sanitation, handwashing, and drinking water may be important determinants of parasite infections.

Table 49 presents the results of the child stool testing by income quartile. Rates of parasitic infection appear to be similar across income groups.

V. Community Survey Findings

Community surveys were conducted with key informants in each GP to collect information about the socio-demographics of the community, community accessibility and connectivity, community education and health facilities, water and sanitation related facilities, and government assistance or programs related to health, education, cooperatives, agriculture, water, and sanitation. Community surveys were administered to elected leaders of the GP or to GP officials to get as accurate information as possible. However, information gaps and respondent bias remain potential concerns. This section provides a brief description of the study communities broken down by district.

Table 50 lists the positions and educational attainment of the community survey respondents. Typically, one to two key informants were interviewed in each GP. More than a third of respondents were the *Pradhan* (elected head of the GP). Other commonly interviewed persons included other elected GP members (40%) and informal leaders (36%). The majority of respondents had higher than a secondary education.

Table 51 reports some population-related information about study GPs. On average, GPs included in the study consisted of two to three villages. The mean number of HHs per GP was 503 and the average population was 2,770 persons. About 65% of the HHs overall belonged to Schedule castes or tribes, which are recognized as traditionally marginalized populations by the Government of India. Almost half (46%) of HHs overall were Below Poverty Line (BPL). Both SC/ST and BPL categories are often key considerations for government programs. For example, the TSC program provides material subsidy to build toilets only to BPL households.

Connectivity of the GP to the district headquarters (HQ) town is an important consideration because accessibility often determines the extent of government support available to the community. A well-known adage in the development sector is *development travels only as far as the road.* As reported in Table 52, more than 70% of the IE study GPs were connected to the district headquarters by a tar or concrete road and 25% by nontar but *pucca* (permanent) road. Almost all GPs were connected to the district headquarters

TABLE 50: CHARACTERISTICS OF COMMUNITY SURVEY RESPONDENTS BY DISTRICT

	Dhar	Khargone	Total
No. of Respondents	1.6	1.4	1.5
Position of Respondents:			
Elected head of GP (*Pradhan*)	38%	35%	36%
Other elected GP members	30%	50%	40%
Appointed GP officer (*Gram Sevak*)	10%	8%	9%
Degree doctor	3%	0%	1%
School teacher	15%	15%	15%
Informal leader / other key informant	50%	23%	36%
Education of Respondents:			
None, elementary	13%	5%	9%
Primary school	25%	13%	19%
Passed secondary school	38%	38%	38%
Passed higher secondary, junior collage	33%	33%	33%
College degree	35%	38%	36%

TABLE 51: *GRAM PANCHAYAT* POPULATION BY DISTRICT

	Dhar	Khargone	Total
Number of villages per GP	3	2	2
Number of HHs per GP	432	575	503
Population per GP	2418	3121	2770
Percent of scheduled caste/scheduled tribe HHs	74%	57%	65%
Percent of below the poverty line HHs	47%	45%	46%

TABLE 52: *GRAM PANCHAYAT* CONNECTIVITY WITH DISTRICT HEADQUARTERS TOWN BY DISTRICT

	Dhar	Khargone	Total
Type of Road Connecting GP to District HQ:			
Concrete/tar road	70%	73%	71%
Nontar/concrete *pucca* road	28%	23%	25%
Kuccha/dirt road	3%	5%	4%
All weather connectivity by motor vehicles	93%	93%	93%
Distance between GP and district HQ (Km)	85	46	65
Time to travel one way to district HQ (Hrs)	6.4	2.0	4.2
Frequency of Public Transport in GP:			
None	20%	10%	15%
1 per day	8%	13%	10%
2 or more per day	73%	78%	75%

year-round. GPs in Dhar district were substantially further away from the district headquarters than Khargone's GPs (average of 6.4 hours vs. 2.3 hours away for Dhar and Khargone, respectively). Three-quarters of GPs overall reported that they had two or more daily public transportation connections to the district headquarters; 15%, however, reported that there was no available public transportation to the district headquarters.

Table 53 lists key health and education facilities available within two kilometers from the GPs. Almost all GPs (99%) reported having access to primary schools within two kilometers. Less than a third (30%) of the GPs, however, reported having similar access to higher secondary schools. Twenty percent of GPs had a local market within two kilometers. Forty percent of GPs had access to a public health center (PHC) or sub-PHC, which are both key service points of the Indian health care system. Easy access to private clinics, hospitals, and pharmacy was reported to be available to 10–30% of the GPs.

Table 54 reports the water supply situation in the GPs. Community survey respondents reported that approximately 66% of the GPs had a public piped water system. The main source for drinking water was predominantly hand pumps in Dhar district (60%) and private tap connections in Khargone (40%). Public taps (21%) and unprotected dug wells (13%) were the other two most prevalent drinking water sources in both districts. These findings are similar to those in Table 17, which reports drinking water sources used by HHs in the study and shows that hand pumps are the main source for most HHs (51.4%), followed by private piped water (24.5%), and unprotected dug well (13.2%). With the exception of hand pumps, the numbers reported by household survey respondents and in the community survey appear to be consistent. Almost 38% of surveyed HHs in Khargone used hand pumps as the source for their drinking water.

Summary information on sanitation and waste management facilities in the GPs is reported in Table 55. More than 50%

TABLE 53: AVAILABILITY OF HEALTH AND EDUCATIONAL FACILITIES WITHIN 2 KM OF *GRAM PANCHAYAT* BY DISTRICT

	Dhar	Khargone	Total
Primary school (4th grade)	100%	98%	99%
Secondary school (10th grade)	53%	65%	59%
Higher secondary school (12th grade)	25%	38%	31%
Market	15%	25%	20%
PHC or sub-PHC	25%	58%	41%
Private health clinic	30%	30%	30%
Private or public hospital	10%	23%	16%
Pharmacy	13%	20%	16%

TABLE 54: WATER SUPPLY SITUATION IN *GRAM PANCHAYAT* BY DISTRICT

	Dhar	Khargone	Total
GP has public piped water system	65%	67%	66%
Main Sources of Drinking Water:			
Private tap connection	5%	40%	23%
Public tap connection	15%	28%	21%
Protected dug well	8%	0%	4%
Unprotected dug well	10%	15%	13%
Hand pump	60%	13%	36%
Drinking Water Availability:			
5 to 20 liters per capita, per day (LPCD)	20%	33%	26%
20 to 39 LPCD	58%	48%	53%
40+ LPCD	23%	20%	21%
Availability of centralized water treatment system	43%	65%	54%
Availability of water and sanitation committee	53%	73%	63%

of GPs bury or burn their solid waste and almost all GPs have open drainage or no organized drainage at all. Garbage hauling by GP is more prevalent in Khargone district. Community survey respondents reported that only 15% of HHs have their own toilet facilities. This number corresponds well with 80% of HHs reporting open defecation (no toilet facility) in Table 19. Very few GPs reported ever having public toilets. For example, in Khargone only five GPs reported ever having public toilets.

Although the IE baseline surveys were conducted prior to the implementation of TSC, the level of previous exposure to the TSC program was ascertained through community surveys. Close to 90% of the GP respondents were aware of TSC program and/or the award given to ODF GPs (i.e., *Nirmal Gram* Awards). The most common sources of information about the TSC program cited were district and block officials. Knowledge about the type of activities implemented under TSC was also high, with a combined average of 38% for both districts.

Social welfare and public health impacts can arrive through many channels including improved livelihoods, the health care system, and other programs. Communities with social groups or societies are often more successful in implementing community-based programs such as TSC. Table 57, presents government programs and assistance received by the study GPs in the past five years. More than 50% of the

TABLE 55: SANITATION PRACTICES OF *GRAM PANCHAYAT* BY DISTRICT

	Dhar	Khargone	Total
Solid Waste Disposal:			
Garbage hauling	8%	35%	21%
Bury in pit or burn	70%	40%	55%
Other	23%	25%	24%
Wastewater Disposal:			
No organized drainage	48%	20%	34%
Open drainage	53%	75%	64%
Closed/underground drainage	0%	5%	3%
HHs with private toilets	15%	13%	14%
Availability of public toilet complex	3%	13%	8%

TABLE 56: AWARENESS OF AND PRIOR EXPOSURE TO SANITATION PROGRAMS OF *GRAM PANCHAYATS* BY DISTRICT

	Dhar	Khargone	Total
Aware of TSC program or NGP awards	83%	95%	89%
Source of Information on TSC/NGP:			
State government	15%	0%	8%
District officials	20%	40%	30%
Block officers	45%	25%	35%
Radio advertisement	8%	3%	5%
TV advertisement	8%	5%	6%
Newspaper/magazine	8%	20%	14%
Other	30%	30%	30%
Knowledge of Activities Under TSC:			
Make people aware about toilets	50%	33%	41%
Materials for toilet construction	56%	39%	47%
Technical assistance for toilets	50%	17%	32%
Education programs on sanitation	44%	33%	38%
Financial assistance for toilet construction	50%	28%	38%

GPs report receiving some kind of health-related programs or assistance such as healthcare, prenatal care, deworming, or nutrition. Approximately 30% of the GPs reported receiving water- or sanitation-related assistance. More than 60% of the GPs reported that HHs receive cash transfer schemes such as government pensions, scholarships, credits, and others. Forty percent of the GPs reported having credit or agriculture cooperative societies.

TABLE 57: GOVERNMENT PROGRAMS AND ASSISTANCE TO *GRAM PANCHAYAT* BY DISTRICT

	Dhar	Khargone	Total
Received Program/Assistance for:			
Healthcare	43%	50%	46%
Deworming	28%	30%	29%
Nutrition	48%	60%	54%
Prenatal care	63%	43%	53%
Water supply system	25%	30%	28%
Water treatment	30%	30%	30%
Sanitation (supply side)	40%	20%	30%
Sanitation (demand side)	35%	25%	30%
Cash transfers (pension, credits, etc)	65%	60%	63%
Presence of Cooperative Societies in the GP:			
Credit cooperative society (CCS)	38%	43%	40%
Agricultural cooperative society (ACS)	53%	45%	49%
Milk cooperative society (MCS)	23%	18%	20%

VI. Future Directions

The findings from the WSP IE baseline and community surveys conducted in Dhar and Khargone districts of Madhya Pradesh, India and presented in this report provide a snapshot of the behaviors, health, and welfare of a particularly vulnerable population. The rural families with young children who participated in this survey were poorer and worse off in terms of education and key health outcomes (e.g., diarrheal prevalence, acute respiratory infections) than families living in MP at large and nationally. The surveyed population had significantly lower access to improved sanitation than families from the state and nation (87% reported sharing a toilet vs. 13% of MP at large and 17% of India, respectively).

Results indicate a population very much in need of effective sanitation and health improvements. The majority of households (80%) openly defecated and many lacked access to improved sanitation (i.e., access ranged from 35% of households in the highest income quartile to only 5% of those in the lowest). More than half (54%) of households had to walk more than 10 minutes to their toilet/open defection site. Almost all households' (97%) drinking-water sources were contaminated with *E. coli* and similar levels of contamination were found in community sources (94%). About 15% of children under five years old had symptoms of diarrhea within two weeks of the baseline interview and about 16% suffered from some type of parisitosis. Twelve percent had symptoms of acute lower respiratory infections.

Although the baseline data collected are limited in establishing causality some emerging trends in the data suggest that gains in improved sanitation, likely to be brought about by TSC, could have positive impacts on the health and welfare of rural families, especially young children. The collection and analysis of postintervention data will permit us to both more closely examine the links between poor sanitation, poor health, and longer-term child development and to document the extent to which the GoI's TSC improves these vital aspects of child health.

Postintervention data collection in MP is scheduled to be completed in February 2011. A full impact evaluation report of the Global Scaling Up Rural Sanitation program will be published by the end of 2011.

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Annex 1: Baseline Comparison of Means Tests for Balance

This section evaluates the differences in the key covariates between the WSP IE treatment and control groups at baseline. Covariates are factors believed to be correlated with either outcomes of interest or the intervention itself. For example, potential covariates could include individual factors such as demographic characteristics, knowledge, attitudes, and practices; household factors such as socioeconomic characteristics, family composition, and infrastructure; or community factors such as community infrastructure, services and support, and the political or social environment. For reasons explained in Section 2.1 of the main body of this document, measuring pre-existing differences in the treatment and control groups is paramount for a rigorous impact evaluation methodology. By accounting for pre-existing differences or by verifying that no such difference exists between the treatment and control groups, the validity of the control group or the counterfactual increases, thereby strengthening the attribution of observed postintervention differences to the intervention.

This section presents the results of mean comparison tests[20] across treatment and control groups for an exhaustive group of variables with the aim of demonstrating that the difference in these covariates is statistically insignificant (i.e., these tests result in a high P value, such as $p > 0.1$). Although it is not possible to measure all potential covariates, finding balance in a sufficiently large number of observed and measured covariates suggests that unobserved variables are likely to be balanced between the treatment and control groups.

The 15 tables below present the mean comparison tests for a number of key covariates.

Overall, 340 variables were tested for balance across treatment and control groups in both Madhya Pradesh samples. Statistically significant differences found at $\alpha = 0.1$ level are ***boldfaced and italicized*** in the tables that follow. Just 27 of the more than 340 variables tested were found to be statistically significantly different between the treatment and control groups (at $\alpha = 0.1$ level). Because, overall, the observed differences between the treatment and control groups are relatively minor, the treatment and control groups are considered well balanced in the MP sample.

TABLE 58: BASELINE COMPARISON OF MEANS TESTS FOR BALANCE

	Treatment		Control		Sig Diff?
	Mean	SE	Mean	SE	p-value
DEMOGRAPHICS (% HHs)					
Average number of children under five per HH	1.729	0.023	1.745	0.023	0.6204
Average HH size	6.938	0.103	6.799	0.092	0.3173
Gender (Male): HH head	0.938	0.009	0.946	0.009	0.5426
Age: HH head	***45.21***	***0.767***	***42.978***	***0.773***	***0.0404***
Percent of HH heads that ever attended school	0.495	0.033	0.529	0.032	0.4515
Highest Educational Level Achieved, HH Head:					
No education	0.223	0.024	0.24	0.024	0.6142
Primary or lower	0.688	0.027	0.661	0.024	0.4688

[20] The standard errors used in the tests were clustered at the community (GP) level, allowing for the possibility of intra-community correlation.

	Treatment		Control		Sig Diff?
	Mean	SE	Mean	SE	p-value
Secondary or lower	0.063	0.013	0.073	0.012	0.5486
Higher secondary or lower	0.027	0.008	0.026	0.006	0.8789
Percent of Male: Other HH members	0.4	0.005	0.4	0.005	0.9921
Age (Years): Other HH members	18.759	0.338	18.099	0.384	0.1967
Percent of other HH members that ever attended school	0.556	0.024	0.538	0.022	0.5837
Highest Educational Level Achieved, Other HH Members:					
No education	0.359	0.015	0.37	0.02	0.6702
Primary or lower	0.555	0.012	0.549	0.016	0.7549
Secondary or lower	0.057	0.005	0.054	0.007	0.6844
Higher secondary or lower	0.028	0.004	0.027	0.005	0.9017
Percent of Teenagers Who Spent Time on:					
School	0.234	0.047	0.204	0.045	0.646
Studying	0.314	0.039	0.279	0.041	0.5356
Childcare	***0.488***	***0.027***	***0.593***	***0.025***	***0.0047***
Homework	0.425	0.03	0.43	0.023	0.8912
Paid work	0.067	0.022	0.077	0.021	0.7404
Unpaid work	0.131	0.027	0.096	0.026	0.346
Percent of employed HH heads	0.832	0.012	0.802	0.016	0.1305
Work Activity of HH Head:					
Looking for work	0.022	0.01	0.007	0.007	0.2317
Taking care of home	0.086	0.03	0.136	0.039	0.3078
Not working	0.573	0.052	0.524	0.055	0.5151
Percent of employed other HH members	0.314	0.01	0.307	0.009	0.6086
Work Activity of Other HH Members:					
Looking for work	0.007	0.002	0.006	0.003	0.7893
Studying	0.053	0.014	0.066	0.009	0.4535
Taking care of home	0.391	0.039	0.464	0.037	0.1798
Not working	0.44	0.036	0.363	0.037	0.1344
Primary Work Position:					
Self-employed	0.628	0.029	0.6	0.03	0.5044
Employee	0.043	0.005	0.051	0.006	0.2896
Employer or boss	0.006	0.002	0.007	0.002	0.5631
Worker without remuneration	0.001	0.000	0.001	0.001	0.4498
Day laborer	0.315	0.028	0.327	0.03	0.7766
Other	0.007	0.002	0.013	0.003	0.1346
Household total income	1353	206	1464	156	0.6654
Monthly salary in primary work	20575	1841	18481	1353	0.3595
Hours per week in primary work	51.4	0.8	51.7	0.9	0.8130

	Treatment		Control		Sig Diff?
	Mean	SE	Mean	SE	p-value
HOUSEHOLD ASSETS (% HHs)					
Percent of HHs with Incomes other than labor	0.216	0.03	0.183	0.026	0.4053
Household Assets:					
Radio/CD/cassette	0.116	0.014	0.086	0.013	0.1151
Television	0.347	0.036	0.355	0.034	0.8651
Videocassette/VCD/DVD player	0.085	0.01	0.096	0.011	0.4657
Computer	***0.016***	***0.004***	***0.007***	***0.003***	***0.0878***
Bicycle	0.251	0.023	0.295	0.026	0.2049
Motorcycle	0.2	0.021	0.189	0.019	0.7073
Automobile or truck	0.002	0.001	0.008	0.004	0.1148
Refrigerator	0.035	0.007	0.036	0.007	0.9147
Gas stove	0.132	0.02	0.127	0.018	0.8322
Other stove	0.901	0.022	0.9	0.024	0.9733
Blender/ mixer	0.069	0.012	0.083	0.014	0.4352
Toaster	0.005	0.003	0.007	0.002	0.5687
Other house/other buildings	0.046	0.009	0.052	0.009	0.6402
Machinery, equipment for family business	0.025	0.006	0.021	0.006	0.6489
Sewing machine	0.101	0.013	0.098	0.018	0.8953
Mosquito nets	0.14	0.018	0.133	0.018	0.756
Cell phone	0.344	0.03	0.332	0.032	0.7902
Clothes iron (electric)	0.135	0.016	0.126	0.02	0.7074
Bed frame	0.286	0.034	0.263	0.035	0.6428
Landline phone	0.036	0.008	0.035	0.007	0.9279
Electricity generator or inverter	0.015	0.004	0.018	0.005	0.6255
Cable TV/Dish TV	0.053	0.009	0.052	0.015	0.9533
Percent of HHs owning other piece of land	0.644	0.038	0.607	0.039	0.5043
Percent of HHs owning farm equipment	0.867	0.018	0.835	0.028	0.3444
Percent of HHs owning animals	0.764	0.025	0.705	0.03	0.1287
Average no. of livestock owned	1.983	0.106	1.852	0.127	0.4289
DWELLING CHARACTERISTICS (% HHs)					
Dwelling Ownership:					
HH member, still paying	0.022	0.007	0.013	0.004	0.2698
HH member, fully paid	0.911	0.016	0.928	0.014	0.4114
Rented	0.027	0.007	0.043	0.011	0.2269
Family/friend loan	0.019	0.006	0.01	0.004	0.1815
Other	0.02	0.009	0.005	0.002	0.1042
Type of Dwelling:					
Detached house	0.421	0.022	0.441	0.025	0.564
Connected buildings	0.002	0.001	0.002	0.002	0.998
Other	0.57	0.023	0.544	0.025	0.4469

	Treatment		Control		Sig Diff?
	Mean	SE	Mean	SE	p-value
Dwelling Light Source:					
No lighting	0.003	0.002	0.002	0.001	0.7004
Electricity	0.799	0.026	0.827	0.031	0.4841
Kerosene	0.182	0.023	0.168	0.03	0.7064
Dwelling Cooking Fuel:					
No fuel for cooking	0.002	0.002	0.001	0.001	0.653
Gas	0.048	0.01	0.061	0.012	0.3993
Wood	0.87	0.027	0.842	0.032	0.4955
Peat/manure	0.054	0.024	0.06	0.028	0.8679
Dwelling Heat Fuel:					
Do not heat dwelling	0.989	0.003	0.984	0.003	0.3039
Wood stove	0.001	0.001	0	0	0.3147
Other	0.005	0.002	0.007	0.003	0.5663
Material of Dwelling's Walls:					
Brick	0.354	0.032	0.341	0.029	0.7639
Concrete	0.122	0.016	0.115	0.016	0.7288
Unbaked brick, adobe	0.08	0.01	0.101	0.011	0.1616
Wood, logs	0.035	0.009	0.061	0.016	0.1592
Other	0.404	0.035	0.381	0.032	0.6299
Material of Dwelling's Roof:					
Brick	0.005	0.003	0.002	0.001	0.3016
Concrete	0.101	0.015	0.105	0.018	0.8889
Wood, logs	0.012	0.003	0.008	0.003	0.3623
Tin, zinc sheeting	0.47	0.044	0.478	0.043	0.9033
Bamboo	0.013	0.006	0.004	0.002	0.18
Slate	0.351	0.046	0.372	0.048	0.7491
Other	0.022	0.005	0.011	0.005	0.1234
Material of Dwelling's Floor:					
Concrete	0.16	0.019	0.15	0.019	0.6995
Clay, earthen floor	0.767	0.026	0.777	0.028	0.8091
Stone	0.002	0.001	0.007	0.003	0.145
Other	0.067	0.014	0.065	0.015	0.9292
HH has food completely covered	0.154	0.014	0.153	0.013	0.9295
HH is clean	0.666	0.026	0.656	0.028	0.7833
HH with garbage in kitchen or house	0.394	0.024	0.43	0.021	0.2528
IMPROVED SANITATION, WATER SOURCE AND PLACE FOR WASHING HANDS (% HHs)					
Improved water source	***0.895***	***0.027***	***0.799***	***0.037***	***0.0359***
Improved sanitation (toilet use)	0.134	0.023	0.127	0.025	0.8178
Soap and water at place for washing hands	0.404	0.035	0.457	0.038	0.3033

	Treatment		Control		Sig Diff?
	Mean	SE	Mean	SE	p-value
TOILET FACILITIES (% HHs)					
Main Toilet Facility:					
No facilities, bush, field	0.819	0.034	0.786	0.042	0.5352
Hanging toilet, latrine	0.000	0.000	0.000	0.000	0.000
Flush, to piped sewer system	0.011	0.005	0.004	0.002	0.2169
Flush, to other place	0.078	0.014	0.078	0.016	0.9971
Ventilated improved pit latrine	0.023	0.009	0.019	0.009	0.75
Pit latrine with slab	0.014	0.004	0.024	0.006	0.1702
Pit latrine without slab, open pit	0.006	0.003	0.002	0.001	0.2314
Other	0.048	0.021	0.086	0.035	0.3515
Percent of toilet facilities that are public	0.028	0.014	0.034	0.012	0.7449
Location of Main Toilet Facility:					
Inside household	0.039	0.01	0.041	0.011	0.8892
In household yard	0.096	0.016	0.081	0.015	0.4862
Less than 10 minutes walk	0.049	0.009	0.061	0.012	0.4179
More than 10 minutes walk	0.499	0.043	0.584	0.05	0.2065
No designated area	0.315	0.043	0.23	0.048	0.1902
Other	0.001	0.001	0.002	0.001	0.5572
Percent of shared toilet facility	0.866	0.021	0.92	0.048	0.3089
Percent of safe toilet facilities during the night	0.211	0.023	0.241	0.021	0.3378
Disposal of Child Feces:					
Bushes, ground	0.483	0.035	0.444	0.03	0.3968
Pit, hole in the ground	0.101	0.015	0.082	0.016	0.3865
Open sewer, drain	0.054	0.012	0.039	0.008	0.287
Toilet, latrine	0.059	0.013	0.053	0.013	0.7495
Garbage	0.226	0.024	0.247	0.028	0.5769
River	0.007	0.003	0.015	0.006	0.2356
Basin, sink	0.000	0.000	0.000	0.000	0.000
Other	0.073	0.027	0.118	0.033	0.295
HH Satisfaction with Main Sanitation Facility:					
Very satisfied	0.208	0.025	0.176	0.022	0.3316
Somewhat satisfied	0.228	0.026	0.177	0.026	0.1622
Less than satisfied	0.159	0.019	0.173	0.017	0.5992
Completely dissatisfied	***0.405***	***0.026***	***0.475***	***0.029***	***0.0702***
Flies Around Sanitation Facility:					
Always and many	0.691	0.025	0.686	0.03	0.8931
Always and some	0.156	0.017	0.157	0.021	0.9815
Sometimes and many	0.04	0.006	0.055	0.011	0.2138
Sometimes and few	0.05	0.011	0.058	0.011	0.587
Rarely, hardly any	0.062	0.012	0.043	0.009	0.1925

	Treatment		Control		Sig Diff?
	Mean	SE	Mean	SE	p-value
Reasons to Build or Improve a Private Toilet:					
No reasons given	0.062	0.03	0.042	0.028	0.6243
Convenience or location	0.814	0.043	0.707	0.056	0.1301
More healthy for the family	0.058	0.016	0.117	0.037	0.1433
Easier to keep clean	***0.01***	***0.006***	***0.042***	***0.014***	***0.0336***
Privacy, dignity	0.024	0.011	0.013	0.007	0.3658
Likelihood of Building Toilet in Next 12 Months:					
High	0.223	0.036	0.211	0.052	0.8509
Medium	0.277	0.033	0.244	0.041	0.5198
Low	0.36	0.055	0.351	0.059	0.9176
None	0.14	0.024	0.194	0.039	0.2419
Primary Constraint in Installing a Private Toilet:					
High cost	0.815	0.049	0.752	0.066	0.442
No one to build it	0.003	0.003	0.008	0.006	0.468
Materials not available	0.024	0.01	0.038	0.015	0.4478
Water table, soil conditions	0.027	0.018	0.063	0.023	0.2191
Savings, credit issues	0.034	0.019	0.042	0.019	0.7715
WATER SOURCE (% HHs)					
Same sources throughout the year	0.780	0.035	0.803	0.027	0.5908
Source of Drinking Water:					
Surface water	0.015	0.009	0.012	0.007	0.7937
Piped water, into dwelling	***0.194***	***0.037***	***0.109***	***0.023***	***0.0513***
Piped water, into yard, plot	0.078	0.019	0.106	0.024	0.3571
Piped water, public tap, standpipe	0.078	0.015	0.048	0.012	0.1143
Tube well, borehole (hand pump)	0.525	0.049	0.502	0.051	0.7439
Dug well, protected	0.019	0.006	0.032	0.016	0.45
Dug well, unprotected	***0.084***	***0.023***	***0.180***	***0.035***	***0.0229***
Spring water, protected	0.000	0.000	0.001	0.001	0.3142
Spring water, unprotected	0.005	0.005	0.004	0.002	0.8572
Other	0.001	0.001	0.005	0.004	0.3396
Source Location:					
In own dwelling	0.012	0.004	0.013	0.005	0.951
In own yard, plot	0.019	0.006	0.024	0.006	0.5569
Elsewhere	0.968	0.008	0.963	0.008	0.6361
Covered Source:					
Covered	***0.778***	***0.037***	***0.663***	***0.050***	***0.0639***
Open	***0.174***	***0.035***	***0.302***	***0.052***	***0.0414***
Both covered and open	0.048	0.016	0.035	0.014	0.5505

	Treatment		Control		Sig Diff?
	Mean	SE	Mean	SE	p-value
Who Mainly Collects Water from This Source:					
Adult woman	0.928	0.013	0.953	0.009	0.1284
Adult man	0.047	0.01	0.037	0.008	0.4563
Girl (< 15 years)	***0.023***	***0.006***	***0.009***	***0.003***	***0.0372***
Boy (< 15 years)	0.001	0.001	0.001	0.001	0.9577
Satisfied with the quantity of water	0.795	0.018	0.781	0.021	0.601
Does the HH pay for the water	0.287	0.045	0.25	0.043	0.5547
Fixed, limited quantity obtained for the payment	0.559	0.06	0.569	0.061	0.9053
DRINKING WATER SAFETY (% HHs)					
HH stores drinking water in home	0.99	0.004	0.996	0.002	0.2155
No. of Times the Primary Storage Container is Washed:					
Do not wash, never	0.011	0.003	0.008	0.003	0.5048
Rarely	0.009	0.003	0.008	0.004	0.833
Once per week	0.022	0.009	0.03	0.011	0.5586
More than once per week	0.093	0.016	0.097	0.015	0.863
Daily	0.864	0.021	0.857	0.021	0.7958
Primary Storage Container Washed with:					
Water only	0.402	0.045	0.448	0.043	0.4646
Soap, detergent, bleach	0.238	0.02	0.194	0.022	0.1288
Other	0.359	0.038	0.359	0.039	0.9934
HHs Treat Drinking Water:					
Yes	0.756	0.027	0.732	0.032	0.5676
Sometimes	0.017	0.005	0.016	0.005	0.8952
No	0.227	0.026	0.252	0.032	0.5421
Water Treatment (past week):					
Boiling	0.005	0.003	0.001	0.001	0.2661
Chlorine	0.003	0.002	0.003	0.002	0.9699
Strain through cloth	0.969	0.011	0.983	0.01	0.3559
Use advanced filters	***0.018***	***0.008***	***0.004***	***0.002***	***0.0954***
Other method to treat DW	0.014	0.004	0.017	0.01	0.7616
No. of Times HHs Treated Drinking Water (past week):					
Not in the last seven days	0.003	0.002	0.003	0.002	0.9741
Every day	0.894	0.017	0.891	0.02	0.8946
Every other day	0.034	0.008	0.04	0.009	0.5906
Once or twice	0.069	0.015	0.066	0.014	0.8769

	Treatment		Control		Sig Diff?
	Mean	SE	Mean	SE	p-value
HANDWASHING FACILITIES (% HHs)					
Wash hands after going to toilet	0.996	0.002	0.999	0.001	0.1644
Place Where Usually Wash Hands After Using Toilet:					
Inside toilet facility	0.006	0.004	0.004	0.002	0.6303
Inside kitchen, cooking place	0.021	0.007	0.017	0.007	0.6806
In yard less than 3 feet from toilet	0.075	0.015	0.079	0.015	0.8385
Between 10 and 3 feet from toilet	0.089	0.015	0.084	0.015	0.8244
More than 10 feet from toilet	***0.377***	***0.046***	***0.515***	***0.05***	***0.0412***
No specific place	***0.432***	***0.056***	***0.301***	***0.054***	***0.0892***
Handwashing Device, Toilet:					
Tap, faucet	0.152	0.026	0.098	0.023	0.1165
Basin, bucket	0.165	0.03	0.161	0.027	0.9182
Other	0.683	0.044	0.741	0.034	0.2917
Water available at place for washing hands	0.797	0.031	0.784	0.029	0.769
Soaps Available:					
Multipurpose bar soap	0.034	0.009	0.033	0.009	0.9719
Beauty, toilet bar soap	0.236	0.037	0.191	0.029	0.3385
Powder soap, detergent	0.311	0.033	0.347	0.036	0.4532
No soap observed	0.407	0.036	0.421	0.029	0.7575
Ash and/or Mud at Place for Washing Hands:					
Ash	***0.19***	***0.026***	***0.13***	***0.025***	***0.0986***
Mud	0.289	0.044	0.345	0.034	0.3071
Ash and mud	0.147	0.02	0.188	0.019	0.1391
Neither observed	0.375	0.035	0.337	0.033	0.4365
Wash hands before/after cooking, feeding a child	0.957	0.012	0.974	0.009	0.2638
Place Where Usually Wash Hands:					
Inside toilet facility	0.004	0.002	0.004	0.002	0.9814
Inside kitchen, cooking place	***0.102***	***0.019***	***0.057***	***0.014***	***0.053***
In yard less than 3 feet from kitchen	0.238	0.043	0.3	0.045	0.3144
Between 10 and 3 feet from kitchen	0.257	0.034	0.253	0.029	0.9285
More than 10 feet from kitchen	***0.105***	***0.015***	***0.159***	***0.022***	***0.0382***
No specific place	0.295	0.041	0.227	0.043	0.2504
Handwashing Device:					
Tap, faucet	0.158	0.033	0.098	0.032	0.2013
Container from which water is poured	0.581	0.042	0.638	0.044	0.3537
Other	0.261	0.034	0.264	0.037	0.9513
Water available at place for washing hands	0.873	0.024	0.833	0.024	0.2406

	Treatment		Control		Sig Diff?
	Mean	SE	Mean	SE	p-value
Soaps Available:					
Multipurpose bar soap	0.039	0.015	0.036	0.01	0.8677
Beauty, toilet soap	0.277	0.043	0.231	0.039	0.4278
Powder or laundry soap, detergent	0.325	0.044	0.391	0.046	0.3031
No soap observed	0.358	0.032	0.342	0.035	0.7324
Ash and/or Mud at Place for Washing Hands:					
Ash	***0.23***	***0.035***	***0.124***	***0.025***	***0.0139***
Mud	0.147	0.024	0.204	0.027	0.1115
Ash and mud	***0.218***	***0.033***	***0.33***	***0.034***	***0.0185***
Neither ash nor mud	0.404	0.031	0.342	0.036	0.1858
HANDWASHING BEHAVIOR (% CAREGIVERS OF CHILDREN <2)					
Percent of caregivers that washed their hands with soap since yesterday	0.812	0.025	0.858	0.025	0.1964
Last Moment of Hand Wash Since Yesterday:					
Bathing a child	0.412	0.032	0.444	0.039	0.5217
Washing child's hands	0.04	0.011	0.039	0.012	0.9662
Cleaning dishes	***0.3***	***0.024***	***0.376***	***0.027***	***0.0354***
Doing laundry	0.486	0.033	0.557	0.036	0.1465
Because they look dirty	***0.067***	***0.012***	***0.138***	***0.017***	***0.0006***
Bathing oneself	0.547	0.035	0.596	0.035	0.3222
Using toilet	0.544	0.03	0.586	0.029	0.3089
Cleaning baby bottom	0.229	0.025	0.208	0.026	0.5691
Cleaning latrine, bathroom	0.078	0.016	0.065	0.015	0.5518
Preparing food, cooking	0.094	0.015	0.073	0.009	0.2452
Feeding children	0.041	0.011	0.028	0.007	0.3463
Before eating	0.08	0.015	0.057	0.009	0.1899
Best Way to Clean Hands:					
Wipe on cloth	0.006	0.003	0.002	0.001	0.1834
Wash with water alone	0.097	0.018	0.072	0.014	0.2858
Wash with soap	0.808	0.03	0.839	0.029	0.4604
Wash with ash, mud	0.074	0.017	0.071	0.018	0.9035
Caregiver's Fingernails Are:					
Visibly dirty	0.126	0.018	0.113	0.017	0.6022
Unclean in appearance	0.365	0.029	0.324	0.03	0.3241
Clean	0.509	0.04	0.563	0.039	0.3278
Caregiver's Palms Are:					
Visibly dirty	0.083	0.014	0.082	0.013	0.9549
Unclean in appearance	0.328	0.029	0.272	0.029	0.1759
Clean	0.589	0.035	0.646	0.037	0.2592

	Treatment		Control		Sig Diff?
	Mean	SE	Mean	SE	p-value
Caregiver's Finger Pads Are:					
Visibly dirty	0.117	0.02	0.107	0.018	0.7005
Unclean in appearance	0.346	0.03	0.277	0.03	0.1073
Clean	0.537	0.04	0.616	0.039	0.1561
CHILD DEVELOPMENT (% CHILDREN <2)					
Communication skills-for-age Z-score	–0.059	0.049	–0.079	0.044	0.7608
Mobility skills-for-age Z-score	0.045	0.045	0.126	0.053	0.2461
Personal-social skills-for-age Z-score	–0.079	0.054	–0.015	0.049	0.3799
CHILD CARE SITUATION					
Average number of times child under 2 was left in the charge of another child last week (prior to survey)	2.189	0.193	2.463	0.208	0.3352
Average number of times child under 2 was left alone last week (prior to survey)	1.38	0.203	1.425	0.16	0.8604
Percent of children under 5 with clean aspect	0.608	0.038	0.571	0.035	0.4751
Percent of children under 5 with dirty hands	0.391	0.037	0.374	0.038	0.7485
Percent of children under 5 with dirty fingernails	0.544	0.036	0.503	0.036	0.4254
Percent of children under 5 with dirty face	0.283	0.032	0.273	0.03	0.8155
Percent of children under 5 with dirty clothes	0.377	0.039	0.382	0.034	0.9317
Percent of children under 5 with pot-belly	0.09	0.018	0.086	0.019	0.8617
Percent of children under 5 wearing shoes (or shoes available)	0.018	0.005	0.015	0.005	0.6272
Percent of children that play with household objects	0.78	0.014	0.777	0.015	0.8696
Percent of children that play with toys	0.547	0.024	0.531	0.028	0.6722
Average number of children's books or pictures	0.336	0.049	0.342	0.066	0.9418
Percent of children under 2 that attended early education programs	0.031	0.007	0.023	0.007	0.4073
Percent of adults that read books with child under 2	0.136	0.02	0.161	0.024	0.4241
Percent of adults that tell stories to the child under 2	0.1	0.014	0.111	0.013	0.5691
Percent of adults that take the child under 2 outside the home	0.74	0.024	0.697	0.03	0.2758
Percent of adults that play with the child under 2	***0.663***	***0.026***	***0.593***	***0.034***	***0.0955***
Average daily caring time	***32.307***	***1.081***	***28.965***	***1.109***	***0.0309***
CHILD NUTRITION					
Child under 2 ever breastfed since birth	0.99	0.004	0.986	0.004	0.3807
Child under 2 still breastfeeding	0.913	0.009	0.895	0.009	0.1684
Months breastfeeding	10.097	0.656	9.222	0.469	0.2784
Colostrum given during first three days after birth	0.701	0.029	0.652	0.03	0.2416
Liquid other than breast milk given during the first three days after delivery	0.464	0.029	0.496	0.03	0.4392
Age in months when solid or semisolid food is given first time	8.046	0.278	8.391	0.235	0.3422
Food Given to Child Yesterday:					
Grain-based food	0.937	0.011	0.956	0.009	0.1847
Vitamin A food	0.335	0.03	0.311	0.03	0.5845

	Treatment		Control		Sig Diff?
	Mean	SE	Mean	SE	p-value
Roots, potatoes	0.243	0.033	0.25	0.031	0.8863
Fruits, vegetables	0.257	0.021	0.263	0.021	0.8565
Meat red, white	0.061	0.012	0.062	0.013	0.9428
Beans, peas, lentils	0.407	0.042	0.409	0.041	0.9685
Oil, fats, butter	0.357	0.035	0.392	0.039	0.5019
Last week child received Iron pills, syrup	0.074	0.011	0.059	0.009	0.3123
Child ever received Vitamin A dose	0.376	0.02	0.36	0.022	0.5959
ACUTE LOWER RESPIRATORY INFECTION AND DIARRHEA (% CHILDREN <5)					
ALRI in previous 48 hours	0.081	0.016	0.07	0.017	0.6275
ALRI in previous week	0.116	0.021	0.1	0.02	0.5824
Diarrhea in previous 48 hours	0.074	0.009	0.078	0.011	0.8147
Diarrhea in previous week	0.133	0.012	0.121	0.015	0.5344
Household w/ lost hours due to child illness	0.259	0.04	0.208	0.031	0.3119
Diarrhea Treatment:					
No treatment	0.211	0.058	0.295	0.064	0.3314
Pill or syrup	0.816	0.037	0.851	0.034	0.4828
Intravenous	0.031	0.022	0.078	0.043	0.3264
Traditional remedies	0.061	0.038	0	0	0.1063
Oral rehydration solution	0.127	0.049	0.089	0.046	0.5716
Homemade sugar, salt water	0.06	0.047	0.053	0.034	0.9123
Other	0.365	0.086	0.425	0.088	0.6288
Diarrhea Medical Advice Sought:					
None	0.114	0.029	0.176	0.039	0.1999
Day visit to doctor	0.683	0.046	0.626	0.055	0.4257
Other	0.195	0.04	0.183	0.034	0.8192
Visit to public health facility	0.21	0.046	0.168	0.041	0.5045
HH paid for diarrhea treatment	0.782	0.036	0.758	0.048	0.6901
ALRI Treatment Given:					
No treatment	0.133	0.031	0.218	0.05	0.1466
Pill or syrup	0.815	0.041	0.756	0.052	0.3804
Injection	0.563	0.052	0.496	0.062	0.4054
Intravenous	0.015	0.009	0.008	0.008	0.5839
Traditional remedies	0.015	0.01	0	0	0.148
Other	0.007	0.007	0	0	0.3196
CHILD GROWTH MEASURES AND ANEMIA (CHILDREN <2)					
ALRI Medical Advice Sought:					
None	***0.117***	***0.031***	***0.263***	***0.05***	***0.0136***
Day visit to doctor	***0.789***	***0.046***	***0.644***	***0.063***	***0.0635***
Other	0.086	0.029	0.093	0.035	0.8724
Visit to public health facility	0.165	0.04	0.145	0.045	0.7305

	Treatment		Control		Sig Diff?
	Mean	SE	Mean	SE	p-value
HH paid for ALRI treatment	0.97	0.012	0.966	0.011	0.8066
BMI-for-age Z-score	***–1.421***	***0.148***	***–1.119***	***0.088***	***0.0797***
Head circumference-for-age Z-score	–1.6	0.074	–1.57	0.07	0.7648
Length/height-for-age Z-score	–1.657	0.184	–1.997	0.11	0.1133
Arm circumference-for-age Z-score	–1.317	0.092	–1.302	0.083	0.9009
Weight-for-length/height Z-score	**–1.522**	**0.147**	**–1.222**	**0.084**	**0.0762**
Weight-for-age Z-score	–2.252	0.068	–2.195	0.061	0.5365
Anemia (Hb < 110 g/L)	0.746	0.073	0.848	0.042	0.2282
MICROBIOLOGY AND PARASITOLOGY					
Is drinking water contaminated with *E. coli*?	0.961	0.017	0.977	0.013	0.4414
Is drinking water contaminated with *Salmonella*?	0	0	0	0	0
E. coli contamination in drinking water (CFU/100 mL)	162.067	8.654	163.119	5.38	0.9178
Is source water contaminated with *E. coli*?	0.96	0.02	0.94	0.028	0.5552
E. coli contamination in source water (CFU/100 mL)	149.054	9.762	140.652	16.435	0.6603
Stool sample, Entamoeba detected	0.073	0.024	0.066	0.026	0.8502
Stool sample, hookworm detected	0.018	0.012	0	0	0.1455
Stool sample, tapeworm detected	0.027	0.02	0.038	0.017	0.6904
Stool sample, Helminthes detected	0.055	0.025	0.047	0.018	0.8097
Stool sample, *Ascaris* detected	0.009	0.009	0.009	0.009	0.979
Stool sample, *Giardia* detected	0.045	0.018	0.038	0.017	0.7577
Any parasite detected	0.173	0.036	0.151	0.042	0.6916

Annex 2: Selected Variables by District and Block

TABLE 59: MONTHLY PER CAPITA HOUSEHOLD INCOME DISTRIBUTION BY DISTRICT AND BLOCK

	Income Quartile				
	1st	2nd	3rd	4th	Per Capita HH Income (Rs)
Dhar	25	30	28	17	830
Bagh	22	28	31	18	831
Dahi	37	24	33	6	548
Dhar	19	29	22	30	1,225
Gandhwani	30	34	30	6	543
Kukshi	22	32	28	18	1,229
Manawar	25	34	27	14	763
Nalchha	26	34	24	16	635
Nisarpur	26	27	29	19	719
Sardarpur	20	22	33	25	1,165
Tirla	40	26	22	12	564
Umarban	20	37	28	15	664
Khargone	25	30	27	18	732
Barwah	22	30	28	21	850
Bhagvanpura	28	28	35	9	582
Bhikangaon	31	36	21	11	637
Gogawan	20	38	28	14	658
Kasrawad	21	31	29	19	740
Khargone	35	24	20	21	774
Maheshwar	13	27	32	28	867
Ziranya	38	29	22	11	556

TABLE 60: DISTRIBUTION OF SANITARY AND HYGIENE CONDITIONS BY DISTRICT AND BLOCK

Percent of HHs with Improved Sanitation			Average	13.0%
	Dhar	**13.3%**	**Khargone**	**12.7%**
	Bagh	15.2%	Barwah	13.5%
	Dahi	0.0%	Bhagvanpura	7.0%
	Dhar	34.0%	Bhikangaon	2.0%
	Gandhwani	3.0%	Gogawan	13.0%
	Kukshi	2.0%	Kasrawad	16.0%
	Manawar	10.0%	Khargone	11.0%
	Nalchha	11.0%	Maheshwar	28.0%
	Nisarpur	18.4%	Ziranya	1.0%
	Sardarpur	18.0%		
	Tirla	0.0%		
	Umarban	14.0%		
Percent of HHs with Improved Water Sources			Average	84.7%
	Dhar	**87.1%**	**Khargone**	**82.4%**
	Bagh	98.0%	Barwah	78.0%
	Dahi	100.0%	Bhagvanpura	100.0%
	Dhar	100.0%	Bhikangaon	75.8%
	Gandhwani	70.0%	Gogawan	96.0%
	Kukshi	80.0%	Kasrawad	84.7%
	Manawar	66.0%	Khargone	77.0%
	Nalchha	90.0%	Maheshwar	92.0%
	Nisarpur	96.9%	Ziranya	54.0%
	Sardarpur	90.7%		
	Tirla	84.0%		
	Umarban	82.0%		
Percent of HHs with Soap and Water at Place for Washing Hands			Average	43.1%
	Dhar	**36.0%**	**Khargone**	**50.3%**
	Bagh	22.2%	Barwah	62.5%
	Dahi	9.8%	Bhagvanpura	31.0%
	Dhar	45.0%	Bhikangaon	36.4%
	Gandhwani	36.0%	Gogawan	51.0%
	Kukshi	14.0%	Kasrawad	59.3%
	Manawar	48.0%	Khargone	50.0%
	Nalchha	24.0%	Maheshwar	64.7%
	Nisarpur	29.6%	Ziranya	23.0%
	Sardarpur	41.3%		
	Tirla	20.0%		
	Umarban	71.0%		

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