

Nepal Sunaula Hazar Din Community Action for Nutrition Project

Endline Report

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List of Acronyms

DDC	District Development Committee
DHS	Demographic and Health Survey
DIME	Development Impact Evaluation
HH	Household
IFA	Iron and Folic Acid Supplements
IYCF	Infant and Young Child Feeding
KAP	Knowledge, Attitudes and Practices
PDO	Project Development Objective
RCT	Randomized Controlled Trial
RRA	Rapid Results Approach
RRNI	Rapid Results for Nutrition Initiative
SHD	Sunaula Hazar Din (means golden 1000 days in Nepalese)
VDC	Village Development Community
WHO	World Health Organization

Executive Summary

Sunaula Hazar Din Community Action for Nutrition Project was implemented by the Nepalese government with support from the World Bank from 2014 to 2017 in order to improve child and maternal nutrition in Nepal.

“Sunaula Hazar Din” (SHD) translates into English as the “golden 1000 days”. It refers to the period from conception to 24 months of age, when children are most vulnerable to malnutrition. The overall objective of the SHD program is to enable the most vulnerable communities in Nepal to develop better knowledge, attitudes and practices (KAP) to improve nutritional outcomes among children during these first 1000 days. SHD is a particular type of community-driven development program in which communities choose certain goals or focus areas relating to improved nutrition, formulate plans to help achieve the goals, and are granted funds to implement these plans. The focus areas cover a variety of factors affecting nutrition: health practices of pregnant mothers, children’s food intake, sanitation facilities, age of marriage, etc.

The impact evaluation team has conducted a rigorous evaluation in order to examine the impact of the SHD program on uptake of nutrition-enhancing practices. Following the impact evaluation study design, 141 Village Development Communities (VDCs) were randomly selected to start the SHD implementation in 2014 (early starter VDCs) and the other 141 VDCs begin project activities only in 2016 (late starter VDCs) comprising of 282 VDCs in total. By the time of the endline survey which took place in April – July 2017, early starter communities had completed up to seven cycles¹, while late starter communities completed up to four cycles. The most common goals selected by communities are using clean and safe water, followed by and increasing consumption of animal protein among pregnant women and young children, and maintaining adequate weight and regular eating among pregnant women and young children.

The main results of the report are as follows:

- The result related to access to improved toilet is striking since the percentage of households reporting to have access to improved toilet has increased by three-folds from 26% at baseline to 78% at endline. Also, lower percentage of households (10%) reported observing human feces around the house at endline, compared to 30% at baseline.
- Overall, the percentage of children under 2 suffer from different types of illness, including coughing, diarrhea and vomiting has decreased after four years of implementation of the SHD project. Also, the project area has lower percentage of children under two who are stunted, wasted and underweight compared to the baseline.

¹ A cycle is a period of 100-days during which a goal is meant to be completed.

1. Introduction

A. Malnutrition in Nepal

While Nepal was able to meet the Millennium Development targets relating to the Infant Mortality Rate, Nepal has a very high rate of child malnutrition with 37 per cent of children under five stunted, 11 per cent wasted and 30 per cent underweight (Central Bureau of Statistics 2015).²

The human development and economic costs of malnutrition are very high – an estimated 2-3 per cent of GDP (US\$250 to 375 million) is lost every year in Nepal on account of vitamin and mineral deficiencies alone (World Bank 2012).³ Improving nutrition contributes to productivity, economic development, and long-term poverty reduction by improving physical work capacity, cognitive development, school performance, and health through reducing disease and mortality.

The 1000 days from the first day of pregnancy through the first two years of life are widely recognized as an important period with potential long-term effects. The damage to physical growth, brain development, and human capital formation that occurs during this period due to inadequate nutrition is extensive and largely irreversible (Grantham-McGregor et al. 2007).⁴ The main focus in Nepal on improving nutrition therefore is to accelerate the reduction of chronic child malnutrition. Interventions must focus on the risk factors that influence nutritional outcomes during this critical period.

These risk factors arise from a combination of individual and community level knowledge, attitudes, and practices (KAP). They include such practices as eating down during pregnancy, smoking during pregnancy, insufficient intake and absorption of nutrients, lack of knowledge about the nutritious value of foods and which foods are required at specific times, including pregnancy and early childhood, poor economic and social access to food and poor feeding practices for children. Community-wide supply-side factors are also important - for instance the availability and cost of appropriate foods is problematic in many districts, and poor access to safe drinking water and poor hygiene and sanitation practices affect the disease burden of communities and nutrition, particularly of young children. Cultural practices also perpetuate the intergenerational problem of malnutrition. In this context, Sunaula Hazar Din Community Action for Nutrition Project was implemented to target these risk factors to improve child and maternal nutrition in Nepal.

² Central Bureau of Statistics, 2015. *Nepal Multiple Indicator Cluster Survey 2014, Final Report*. Kathmandu, Nepal: Central Bureau of Statistics and UNICEF Nepal.

³ World Bank, 2012. *Nutrition in Nepal: A National Development Priority*.

⁴ Grantham-McGregor, Sally, Yin Bun Cheung, Santiago Cueto, Paul Glewwe, Linda Richter, and Barbara Strupp. 2007. 'Developmental Potential in the First 5 Years for Children in Developing Countries'. *Lancet* 369 (9555): 60–70. doi:10.1016/S0140-6736(07)60032-4.

B. Program Description

“Sunaula Hazar Din” (SHD) translates into English as the “golden 1000 days”. It refers to the period from conception to 24 months of age, when children are most vulnerable to malnutrition. The overall objective of the SHD program is to enable the most vulnerable communities in Nepal to develop better knowledge, attitudes and practices (KAP) in order to improve nutritional outcomes among children during these first 1000 days. Changes in KAP would address the key risk factors for child malnutrition and create demand for nutrition-related services and products. SHD is a particular type of community-driven development program in which communities choose certain goals relating to improved nutrition, formulate plans to help achieve the goals, and are granted money to implement these plans.

The SHD program is implemented using the “rapid results” approach, or RRA. The approach encourages communities to achieve a self-selected goal in 100 day cycles. First, communities form a “Rapid Results for Nutrition Initiative” (RRNI) team comprising between 8 and 10 individuals. Second, each team is assigned a “coach”, who helps the team select one nutrition-related “focus area” from a menu of 15 (see Appendix A). The focus areas cover a variety of factors affecting nutrition: health practices of pregnant mothers, food intake of children, sanitation facilities, age of marriage, etc. Third, the community develops a detailed work plan to help achieve the selected goal, and the budget required to execute the work plan. Fourth, the work plan and budgets are approved by the local government⁵ and released to the communities. Fifth, communities start to execute their plan, aiming to achieve their goal within 100 days. Finally, at the end of the cycle, the coach (and sometimes also an outside monitor) assesses whether or not the goal has been achieved. If the community has been unsuccessful, it can apply for another cycle to try to achieve the same or another goal. If the community has been successful, it can apply for two additional goals at once.

The program was implemented in 15 districts out of the total of 75 districts in Nepal. Fifteen districts were selected based on a) stunting levels of children; b) population size; c) poverty levels; and d) the absence of interventions by other partner that focus on social mobilization. These 15 districts were divided into three clusters, each made of five contiguous districts to facilitate knowledge transmission, communication, and lower administrative and operational burdens. Each cluster was designed such that supervision of each cluster was logistically feasible, while still including both hill and terai districts.

Cluster 1	Cluster 2	Cluster 3⁶
Udayapur	Siraha	Rautahat
Sunsari	Dhanusha	Makawanpur
Okhaldhunga	Mahottari	Parsa
Khotang	Sindhuli	Sarlahi
Saptari	Ramechhap	Bara

⁵ Approval was granted by village level government for projects below \$1,000, and by district level government for projects above \$1000.

⁶ Please refer to Appendix Table 1 for the full list of 282 VDCs.

There are approximately 1,100 Village Development Committees (VDCs) in these 15 districts. The program targets 25% of the most disadvantaged VDCs -in total approximately 280 VDCs and operates in all wards of the selected VDCs.⁷

For the sake of evaluation, 141 VDCs were randomly selected to start the SHD implementation in 2014 (early starter VDCs) and the other 141 VDCs begin project activities only in 2016 (late starter VDCs) comprising of 282 VDCs in total.

C. Impact Evaluation Design

The impact evaluation as a whole addresses whether participation in the SHD program can improve uptake of nutrition-enhancing attitudes practices. We also assess impact on anthropometric indicators and child morbidity as these are some ultimate goals of the program, but with the drawback that changes in these indicators might take longer to realize.

The evaluation is a randomized controlled trial (RCT) that uses a randomized phase-in approach. Of 282 VDCs slated for participation in the project, 141 were randomly selected to begin operations at the beginning of the project (“early starter” VDCs), while 141 were selected to begin midway through the project (“late starter” VDCs).

The main difficulty in evaluating a project like SHD is that communities choose different sub-projects, and therefore expect to change different outcome variables. For analysis we must choose one of two strategies: either we look at specific outcomes and accept lower effect sizes (as only a subset of early starters chose goals relating to that outcome) or we use aggregate indicators. In this report we do both. The aggregate indicators we look at are anthropometric indicators (stunting/wasting/underweight) as well as an index of key outcome variables. We also look at individual outcome variables for the whole sample, but these need to be interpreted with caution, as some goals were rarely chosen by communities.

SHD program implementation variation evaluation

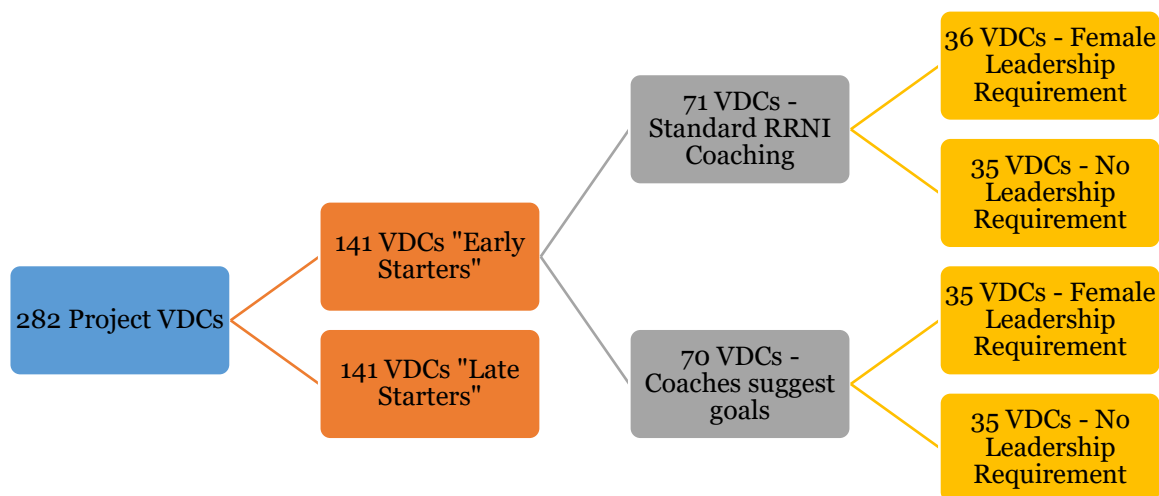
Additionally, the evaluation was designed to tests specific variations of the program design to see which are most effective. This was meant to answer the following questions:

- (i) How does goal choice and outcomes change **if the community is encouraged to select particular goals deemed by external experts** to be most appropriate to the community based on information obtained from a nutrition profile?
- (ii) How does goal choice and outcomes change **if the Rapid Results for Nutrition Initiative (RRNI) teams have a female leader?**

⁷ Nepal is administratively organized into units of decreasing size: regions, districts, sub-districts (illakas), municipalities (VDCs), and wards. Nepal has 75 districts, each of which is divided into a number of VDCs, the number depending on the population size. There are 3,914 VDCs nationwide and every VDC has 9 wards. Below the ward level are settlements. The project districts are in the central Tera area: Parsa, Bara, Rautahat, Sarlahi, Mahottari and Dhanusa; in the Central Hills: Makwanpur, Sindhuli and Ramechhap; in the Eastern Terai: Siraha, Saptari and Sunsari; in the Eastern Hills: Okhaldunga, Khotang and Udayapur.

These questions were addressed using two sub-treatment arms, described below.

Figure 1: Impact Evaluation Design



Treatment 1: Providing Guidance on Goal Choice

This treatment is designed to test whether providing advice from experts on community goal choices can shift community choices to more high-impact goals, resulting in larger overall project impact. For each district, three priority focus areas were chosen considering the baseline and input from nutrition experts. All guidance groups were recommended two focus areas - (i) focus area 2 (Increase consumption of animal protein among pregnant women and young children) and (ii) focus area 6 (Regular de-worming and utilization of iron supplements by young women) and an additional focus area of either (i) focus area 3 (Practice proper and consistent breast-feeding) or (ii) focus area 11 (End open defecation).⁸

In order to test the effectiveness of providing this additional information to RRNI groups, the RRNI coach in half (71) of the “early start” VDCs suggests to the RRNI teams that they implement a goal corresponding to one of these selected focus areas. The half of VDCs that receive the extra guidance on goals are randomly selected from the entire set of the early start VDCs. We then compare these “extra guidance” VDCs to “standard” VDCs that followed the standard procedure of selecting among the set of 15 focus areas.

Treatment 2: Requiring Female Leadership

⁸ Appendix B shows a sample goal selection table provided to coaches on providing guidance. The choice of goals to recommend was based on advice of nutrition experts from the world bank, using baseline values of indicators as an input. Each VDCs was recommended three focus groups. The three recommendations were chosen from proper breastfeeding, IFA supplementation, maintaining weight of infants, and ending open defecation.

The second variation is designed to test whether stronger requirements are necessary to ensure adequate female empowerment in goal selection. Standard practice for organization of community groups in Nepal requires that one third of the group is women. In this test, a randomly selected subset of the RRNI teams are required to have a female leader, while other groups could pick a leader of any gender. This requirement would be instituted at the VDC level. Half of the early-start VDCs are randomly selected to have a female leadership for their RRNI groups, while the other half could choose a leader of any gender. Comparison of goal choice between the VDCs with the female leadership requirement and those with standard requirements shows the impact of female leadership.

In this report, we will focus simply on the results of the overall impact evaluation of the program.

D. Data and Sampling

1. Survey Instrument

The baseline, midline, and endline surveys consist of three data collection instruments below:

Rapid House Listing:

To effectively measure the impact of the SHD project, the sample must include mothers with children under the age of 24 months who are most likely to receive the benefits of the project as well as pregnant women. In order to identify households with our target population, we conducted a rapid house listing to determine household composition in the two most disadvantaged wards within each VDC (roughly 90 households per ward on average). The listing identified households with small children and/or pregnant women for sampling and collected basic information on them. The results from this listing was used to construct a sampling frame. Using this sampling frame, the survey firm randomly selected households with children under the age of 24 months and pregnant women from each VDC for the main household questionnaires.

Main Household Questionnaire:

The main household questionnaire was applied to randomly selected households through the rapid house listing exercise. In the Main Household Questionnaire, households were asked about questions on labor supply, illness in the past, housing conditions and physical assets, expenditure and food consumption, adverse shocks and transfers, trust and solidarity, collective action and cooperation, social cohesion and inclusion, empowerment and political action, and community opinion.

Women & Children Questionnaire:

In the Women & Children Questionnaire, questions were asked about the health and nutrition of women and children in the household, including measurement of height and weight of children. From the Rapid House Listing, two groups of households were randomly sampled for the household survey:

Baseline:

- **Group 1:** 15 households with at least one child under two years of age

- **Group 2:** 10 households with a married woman aged 15-25

Midline:

- **Group 1:** 15 households with at least one child under two years of age
- **Group 2:** 5 households with a pregnant woman⁹

Endline:

- **Group 1:** In 100 VDCs, 25 households with children under 48 months. In 30 VDCs, 15 households with children under 24 months.
- **Group 2:** 5 households with a pregnant woman

Households in Group 1 were asked both the Main Household Questionnaire and modules on maternal and child health practices in the Women and Children Questionnaire. Households in Group 2 were asked the Main Household Questionnaire and specific modules on pregnant women's health and nutrition and family planning. Therefore, indicators in this report pertaining to the general household outcomes come from both households in Group 1 and Group 2. Indicators on maternal and child health practices come from Group 1, and are therefore representative of households with children under two in our included wards. Indicators on pregnant women's dietary diversity and IFA tablet consumption come from Group 2, and are therefore representative of pregnant women.

Respondents in all the households interviewed in any VDC were also invited to participate in the Behavior Game exercise which measured social cohesion and cooperation. Of all eligible people who accepted this invitation, 8 were randomly selected to participate. The behavior games were played in the same 100 VDCs at baseline, midline, and endline, though the participating households were not necessarily the same.

2. Survey Activities

The report draws on data from three rounds of household surveys and administrative data on RRNI project implementation. The timeline of the three rounds of household surveys is as follows:

1. Baseline: August 2013 – January 2014

The baseline survey was implemented in 282 VDCs in all 15 SHD participating districts, 141 early starter VDCs and 141 late starter VDCs. In each ward, a census was conducted to understand basic demographics characteristics of each household. From this census, two groups of households were randomly sampled for the household survey: 4965 households with at least one child under the age of 24 months and 337 households with pregnant

⁹ Since only a few teams had selected family planning focus area by the time of the mid-term review, the project decided to drop the PDO indicator for family planning. Hence, for the midline and endline survey, pregnant women were sampled instead of married woman aged 15-25.

woman¹⁰. The behavioral games were conducted to measure social capital in the 100 VDCs selected from the 282 VDCs. For each VDC, one ward is selected to conduct the game which consists of randomly selected eight adults from the household roster.

2. Midline: September – December 2015

The midline household survey was conducted in the same 282 VDCs from the baseline between September and December 2015. It was used to assess the effect of SHD after approximately 2 years of project implementation. At this point, only the 141 early starter VDCs implemented the project and therefore, 141 late starter VDCs form a counterfactual. The survey covered 5539 households of which 4215 households with at least one child under the age of 24 months and 1409 households with pregnant woman. The behavioral games were conducted in the same 100 VDCs from the baseline.

3. Endline: April – July 2017

The endline survey was administered across 130 sample VDCs between April and July 2017. The survey covered 3659 households of which 1923 households with at least one child under the age of 24 months. The endline sample includes 3052 households from the 100 VDCs, 50 early starter VDCs and 50 late starter VDCs and 607 households from the 30-additional early starter VDCs to have a representative sample. We also collected data from 649 households with pregnant woman across 130 VDCs. The behavioral games were conducted in the same 100 VDCs from the baseline and midline.

Table 1 shows the detailed sample size by survey round:

Table 1: Sample (number of households) by survey round

	Baseline	Midline	Endline
VDC	282	282	130
number of HH	7049	5539	3659
pregnant woman ¹¹	337	1409	649
HH with child under 24 months	4965	4215	1923
HH with child 24-48 months	2545	1313	1528 ¹²
number of child under 24 months	5526	4429	2053
number of child under 48 months	8294	5790	3511

¹⁰ For the baseline, we targeted married women as opposed to pregnant women since the family planning practice was one of the PDO indicator. Not sure how to explain it here, but it's good to mention.

¹¹ As explained in the sampling design section, we specifically sampled 5 households with pregnant women per VDC during the midline and endline survey.

¹² As explained in the sampling design section, we sampled 25 households for 100 VDCs during the endline survey. This was decided to try to get a sample of children who most benefitted from the project which means they were born one year before the program started.

2. Implementation

A. Goal Selection

The goal selection and implementation was monitored by the SHD project team. Based on the monitoring data, we compiled the goal selection information between February 2014 and December 2017. There were 9,073 goals selected and approved during this period in 2,321 wards of 258 VDCs in total.

The project implementation started in February 2014 for the early starter VDCs, while implementation started in April 2015 for early starter VDCs in Cluster 2 due to the implementation delays. In total, early starter communities have completed up to 7 cycles. Implementation for the late starter VDCs started in January 2016 and communities have completed up to 4 cycles.

Table 2: Number of Cycles Completed by Wards

Number of cycles	Early Starter	Late Starter	Total
1	63	19	82
2	38	487	516
3	178	70	248
4	109	521	630
5	550	0	550
6	56	0	56
7	230	0	230
Total	1,224	1,097	2,321
Average number of cycles completed	4.74	3.01	3.91

Table 3 shows the number and percentage of wards selecting each goal by treatment status. The most commonly selected goal is using clean and safe water (70%) where 1,616 out of 2,321 wards selected this goal at least once. Also, almost half of the wards selected goals related to (i) maintaining adequate weight and regular eating among pregnant women and young children (42%); increasing consumption of animal protein among pregnant women and young children (43%); and 38% of total wards selected a goal related to ending open defecation.

Table 4 shows the implementation status of each goal at the VDC level. This is the number and percentage of VDCs with at least one ward from the VDC selecting the goal in any cycle. For example, the goal of use clean and safe water, 91% of the SHD VDCs had at least one ward selecting the goal at any point, meaning that roughly 10% of the VDCs implemented SHD, which is about 28 VDCs and 252 wards, did not implement the interventions targeting at improving access to clean and safe water at all.

Table 3: Number and Percentage of Wards Selecting Each Focus Area

	Before midline		After Midline				Total	
	Early Starter		Early Starter		Late Starter		N	%
	N	%	N	%	N	%		
Maintain adequate weight and regular eating among pregnant women and young children	196	16%	346	33%	462	42%	965	42%
Increase consumption of animal protein among pregnant women and young children	330	27%	327	31%	393	36%	1005	43%
Practice proper and consistent breast-feeding	26	2%	58	5%	48	4%	130	6%
Use clean and safe water	569	46%	548	52%	697	64%	1616	70%
Delay marriage and pregnancy for young girls	19	2%	88	8%	85	8%	190	8%
Regular de-worming and utilization of iron supplements by young women	65	5%	25	2%	4	0%	93	4%
Extend education of young girls	92	8%	265	25%	171	16%	502	22%
Utilize family planning methods to avoid unwanted pregnancies	8	1%	28	3%	12	1%	48	2%
Practice proper and consistent handwashing	323	26%	317	30%	266	24%	857	37%
Ensure immunization of all children	4	0%	34	3%	7	1%	45	2%
End open defecation	654	53%	78	7%	202	18%	878	38%
Ensure prompt medical treatment of chest infection, fever, and diarrhea in young children	17	1%	106	10%	96	9%	214	9%
Reduce workload of pregnant women	39	3%	50	5%	61	6%	144	6%
Improve school sanitation	69	6%	126	12%	67	6%	241	10%
Reduce exposure to indoor smoke for pregnant women and young children	190	16%	257	24%	247	23%	660	28%
Total number of wards	1224		1062		1097		2321	

Table 4: SHD Goal Selection by Treatment Status at VDC-level

<i>Number of VDCs selecting each goal</i>	Early Starter		Late Starter		Total	
	N	%	N	%	N	%
Maintain adequate weight and regular eating among pregnant women and young children	98	72%	86	70%	184	71%
Increase consumption of animal protein among pregnant women and young children	103	76%	80	66%	183	71%
Practice proper and consistent breast-feeding	33	24%	18	15%	51	20%
Use clean and safe water	128	94%	108	89%	236	91%
Delay marriage and pregnancy for young girls	39	29%	22	18%	61	24%
Regular de-worming and utilization of iron supplements by young women	28	21%	4	3%	32	12%
Extend education of young girls	83	61%	56	46%	139	54%
Utilize family planning methods to avoid unwanted pregnancies	11	8%	6	5%	17	7%
Practice proper and consistent handwashing	96	71%	61	50%	157	61%
Ensure immunization of all children	11	8%	4	3%	15	6%
End open defecation	102	75%	34	28%	136	53%
Ensure prompt medical treatment of chest infection, fever, and diarrhea in young children	43	32%	40	33%	83	32%
Reduce workload of pregnant women	36	26%	27	22%	63	24%
Improve school sanitation	65	48%	33	27%	98	38%
Reduce exposure to indoor smoke for pregnant women and young children	83	61%	53	43%	136	53%
Total number of VDCs	136		122		258	

B. Implementation Challenges

We also interviewed each coach assigned to treatment wards to understand the challenges at implementation. Local elite capture was the most common challenge faced by many of the coaches. Many of the coaches mentioned that cash was not disbursed in time and that District Development Committee tried to get commission from the budget. In addition, impact of the 2015 earthquake in Nepal, illiteracy of community members, mistrust towards women leaders were also cited as one of the challenges in implementing the SHD project.

Implementation challenges were also examined by the SHD qualitative team by conducting focus group interviews with the SHD project's key stakeholders, including DDC officials, VDC officials, RRNI coaches, Ward Citizen Forum chairpersons, RRNI team members, and beneficiaries. Implementation challenges raised during the qualitative study are consistent with the comments made by coaches during the midline survey. Key implementation challenges cited in the qualitative report are listed in box 1.

Box 1: Key Implementation Challenges from SHD Qualitative Report

1. Slow implementation: As opposed to the rapid results design, there were delays in project approval and grant disbursement which created frustration among project implementers and beneficiaries.

2. Capture by small group: When there was low participation in the beginning of the cycle, a small group of individuals dominated the decision-making step and other community members were not included until the end.

3. Unequal gender norm: Even when women were included in the RRNI team, their voices were unheard, and they were not given decision-making power. Inclusion of women were difficult due to cultural norms, time constraint with household chores, and resistance by men.

4. Forming RRNI members: It was challenging to find the nine members required for each project-based RRNI team, and oftentimes, members were “selected” without being informed, resulting in confusion and inefficiency.

3. Project Achievement

In this section, we present the project achievement by comparing the baseline, midline and endline values for the main outcomes of interest. We use both the early and late starter VDCs for the baseline dataset since neither group had benefitted from the project at the time of the baseline interview. For the midline, we use data for only early starter VDCs to show the progress two-year after implementation. For the endline, we use only the early starter VDCs to show progress four-year after implementation.

For this reason, sample size is not comparable across three rounds of the survey. *Table 5* shows the sample size for each round of survey. Within this section, we report the evolution of key indicators over time, so the reported changes (or lack of) cannot be attributed to the program, and could instead be due to pre-existing time trends, and aggregate shocks.

Table 5: Sample Size for Each Round

	Baseline	Midline	Endline
VDC	282	141	80
number of HH	7049	2767	2140
pregnant woman	337	704	399
HH with child under 24 months	4965	2107	1171
HH with child 24-48 months	2545	657	811
number of child under 24 months	5526	2226	1236
number of child under 48 months	8294	2904	1976

A. Project Development Objectives

Table 6 presents the change in project development indicators over the course of project implementation. Each indicator is discussed in detail throughout this section of the report. Note that these numbers are calculated using all VDCs, regardless of the chosen goal. The PDO targets were determined under the assumption that the PDO indicators would be measured using all VDCs. In line with the observation that safe water and sanitation were the most popular goals chosen, the project met (and exceed by a large margin) the target in these areas. The targets related to pregnant women were either met or missed by a narrow margin. The targets related to child nutrition (diet and exclusive breastfeeding) were missed by a larger margin.

Table 6: Project Development Objectives

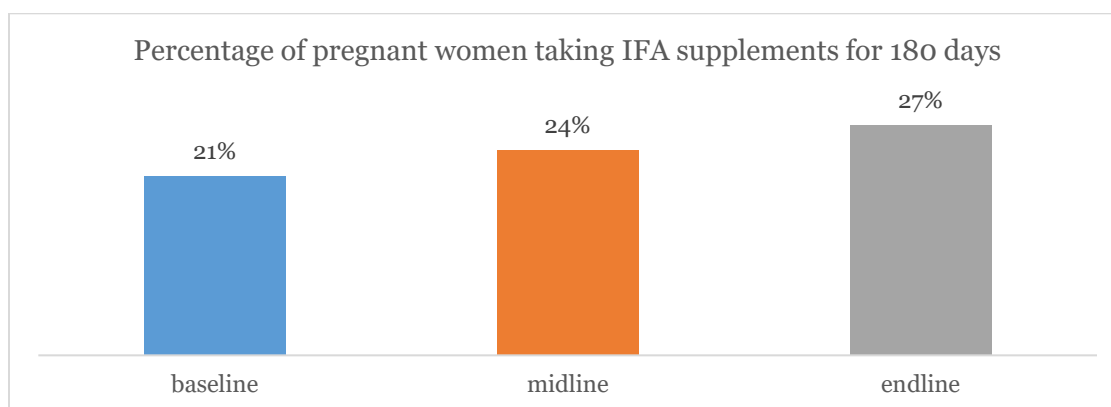
Project Development Indicators		Baseline	Midline	Endline	Target
Percentage of pregnant women taking IFA supplements for 180 days		21%	24%	27%	30%
Percentage of children 0-6 months age who are exclusively breastfed		69%	69%	58%	80%
Percentage of children 6-24 months age who consume a minimum acceptable diet		9%	13%	15%	25%
Percentage of households reporting no smoke in the room while cooking		35%	43%	39%	45%
Percentage of pregnant women reporting consuming animal-sourced protein in the previous day		60%	72%	76%	75%
Percentage of households reporting using improved toilet facilities (flush toilet, covered pit within household, community latrine)		25%	52%	80%	35%
Percentage of mothers (of children aged 0-2) reporting always washing hands at critical times	<i>After defecation</i>	71%	77%	85%	80%
	<i>After cleaning a child's bottom</i>	53%	56%	62%	70%
	<i>Before eating</i>	17%	24%	38%	25%
	<i>Before feeding children</i>	10%	14%	22%	20%

B. Pregnant Women Taking Iron and Folic Acid (IFA) Supplement

Anemia (lack of sufficient iron) increases risk of perinatal and maternal mortality. Adequate micronutrient intake can prevent anemia during pregnancy. According to the nationally representative Nepal DHS (2011), the percentage of women age 15-49 who took the recommended

dose of IFA during pregnancy rose from 7% in 2006 to 38% in 2011.¹³ Using iron supplements for young women is one of the focus areas of the SHD project but only 4% of total wards selected this focus area. Our survey posed a question to mothers of children under two in the sample if they took the recommended dose of IFA during their most recent pregnancy. At the endline, 27% of mothers in the sample reported taking IFA supplements for the recommended duration of 180 days during their last pregnancy, compared to 21% at baseline and 24% at midline.

Figure 2: Pregnant Women Taking IFA Supplements



C. Breastfeeding Practices

The WHO recommends exclusive breastfeeding (no other liquid, solid food or plain water) for children under 6 months of age, followed by introduction of solid or semi-solid foods at 6 months along with continued breastfeeding until 2 years of age. While practicing a proper and consistent breastfeeding was one of the focus areas of the SHD project, only 6% of the total wards selected this focus area at least once during the project cycles.

Figure 3 shows the proportion of children put to the breast within one hour of birth. It is recommended that children be fed with the first liquid to come from the breast, known as colostrum, within this first hour. 39% of children from the baseline sample were put to the breast within one hour of birth, and the percentage increased to 46% after two-year of project implementation, and 75% after four-year of project implementation.

¹³ Ministry of Health and Population (MOHP) [Nepal], New ERA, and ICF International Inc. 2012. Nepal Demographic and Health Survey 2011. Kathmandu, Nepal: Ministry of Health and Population, New ERA, and ICF International, Calverton, Maryland.

Figure 3: Early Initiation of Breastfeeding

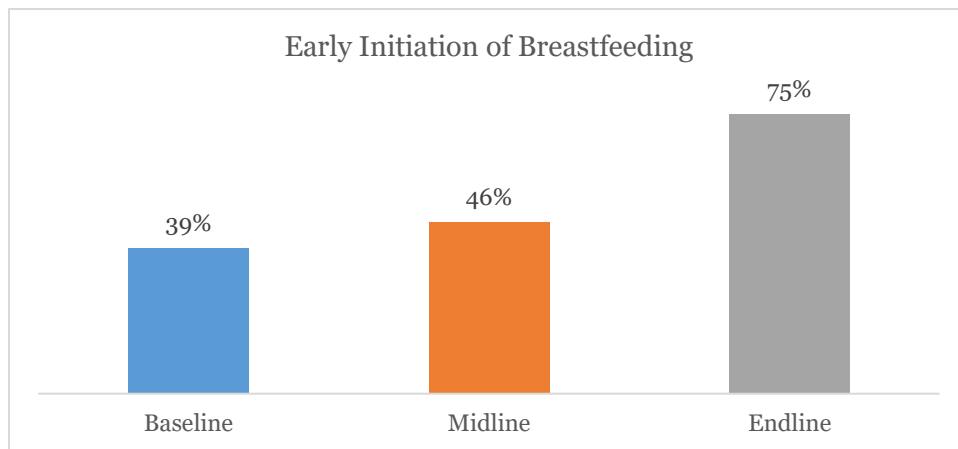
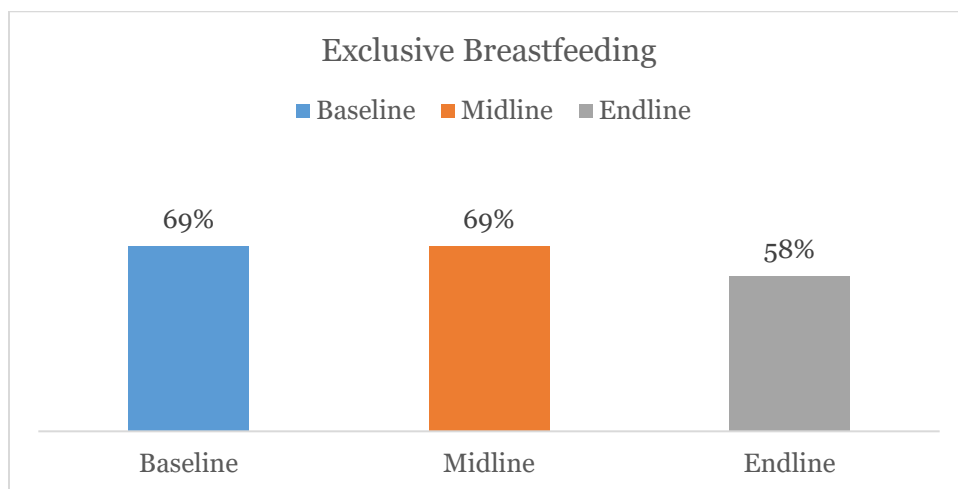


Figure 4 shows the percentage of children under six months who are exclusively breastfed. 58% of children under 6 months were exclusively breastfed at endline compared to 69% for both baseline and endline. Many of the children under six months who were not exclusively breastfed were fed with plain water at the endline. 80% of children under 6 months were fed with only breastmilk and plain water, and the percentage is comparable to the baseline and midline values. It is unclear what could explain the increase of water intake in children under 6 months. One possibility is that mothers fed their children under 6 months with plain water due to increased access to clean water from project implementation. However, other explanations are also possible. For instance, Table 5 shows an increase in the number of households with children 24 to 48 months. It could also be that mothers find it more challenging to have the time to breastfeed when they have other small children in the household.

Figure 4: Percentage of children under 6 months exclusively breastfed



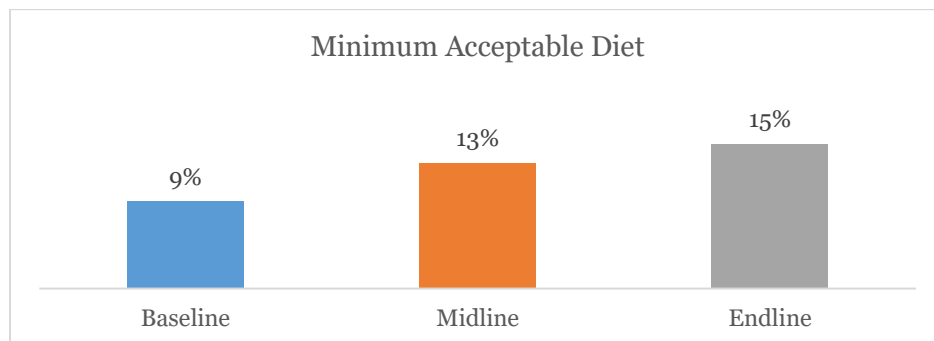
D. Complementary Feeding Practice

The third project development indicator tracks the improvement of child feeding practices in households with children 6 to 24 months of age. This section analyzes the sample according to the IYCF guideline on minimum acceptable diet for children in this age group. Guidelines stipulate that complementary foods (solid, semisolid or soft) be fed to children along with breast milk starting at 6 months of age.

Minimum acceptable diet is the proportion of children who meet the minimum dietary diversity and minimum meal frequency. Minimum dietary diversity indicates the proportion of children 6-24 months of age who receive foods from at least 4 different food groups. According to the WHO (2008) Report,¹⁴ dietary diversity is a proxy for adequate micronutrient-density of foods, since consumption of foods from at least 4 food groups implies that the child had a high likelihood of consuming at least one animal-source food and one fruit or vegetable per day. Minimum meal frequency measures the proportion of breastfed and non-breastfed children 6-24 months of age who receive solid, semi-solid, or soft foods (including milk for non-breastfed children) the minimum number of times or more in the previous day. Minimum is defined as 2 times for breastfed infants 6-8 months, 3 times for breastfed children 9-24 months and 4 times for non-breastfed children 6-24 months.

While higher percentage of children 6-24 months of age at endline met the standard for minimum acceptable diet compared to the baseline, this number is still low at 15%. This indicator relates to two focus areas. The first is “Maintain adequate weight and regular eating among pregnant women and young children”, and 42 percent of wards chose this goal at least once during the project cycle. The second is “Increase consumption of animal protein among pregnant women and young children”, and 43% of wards chose this focus area at least once.

Figure 5: Complementary Feeding Practices



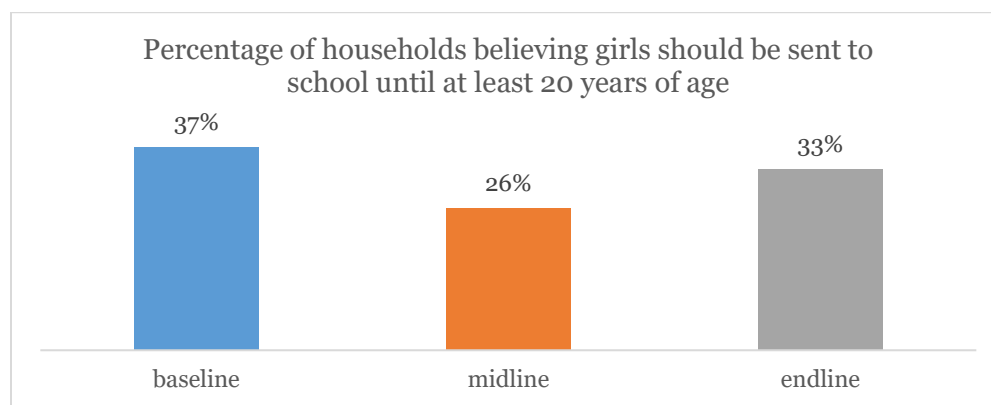
¹⁴ WHO (2008) Indicators for assessing infant and young child feeding practices: conclusions of a consensus meeting held 6–8 November 2007 in Washington D.C., USA. <http://www.who.int/nutrition/publications/infantfeeding/9789241596664/en/>

E. Attitudes of Household and Community Members

Community-wide characteristics also hold implications for malnutrition, and the project aims to improve community attitudes towards practices known to improve nutritional outcomes of women of reproductive age and children under age 2. This project mainly focuses on improving (i) community attitude towards the importance of keeping girls at school until age 20, (ii) community attitude towards the importance of reducing indoor air pollution, and (iii) attitude of community towards dietary needs of pregnant women. 22% of wards selected a focus area to extend education for young girls, 28% of wards selected a focus area to reduce exposure to indoor smoke for pregnant women and young children, and 42% of wards selected a focus area to maintain adequate weight and regular eating among pregnant women and young children. The project decided to measure success on each of these focus areas through improving community attitudes.

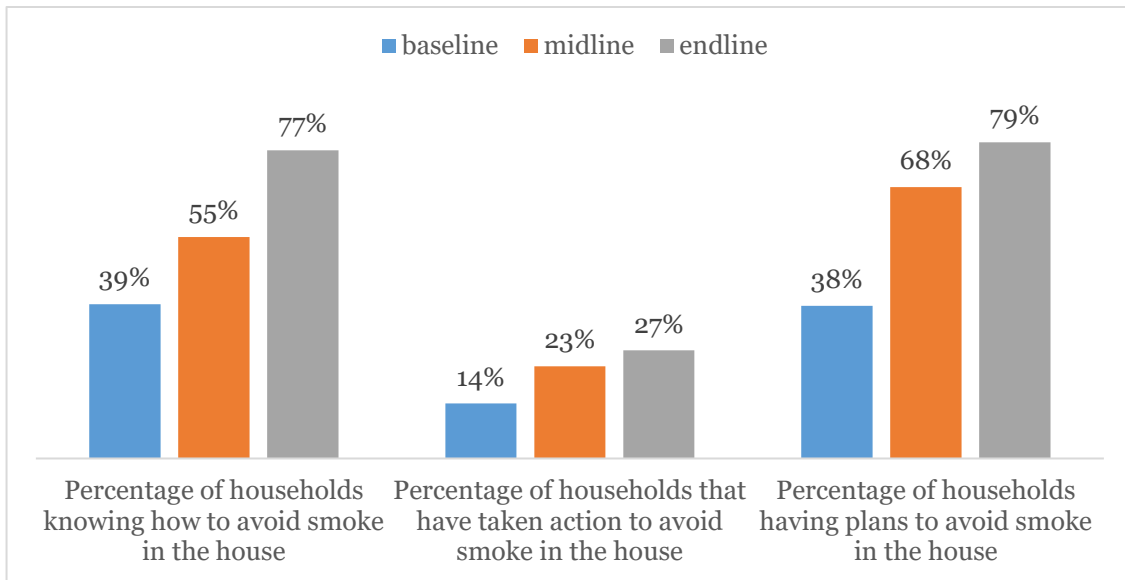
According to the 2011 Nepal DHS, women who are more educated are more likely to be knowledgeable about the use of health facilities, contraceptives and health of their children. Even though female education in Nepal has improved, the level of educational attainment is still a significant factor for malnutrition in Nepal. As shown in Figure 6, only one third of household heads (33%) in the endline sample believe girls should be sent to school until at least 20 years of age.

Figure 6: Community attitude towards the importance of keeping girls at school until age 20



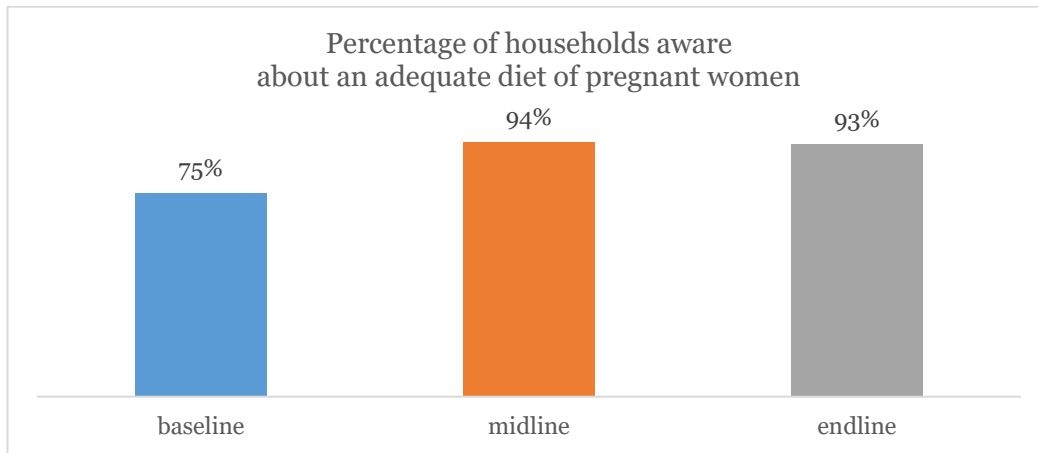
Households were asked if they knew what should be done to avoid smoke inside the house, if they employed methods to avoid smoke, and if they have plans to avoid smoke inside the house. As shown in Figure 7, 77% of surveyed households at endline, compared to 39% at baseline and 55% at midline, responded that they know how to avoid smoke in the house. At the same time, only 27% reported to have taken action to avoid smoke in the house. This shows that the improved knowledge didn't necessarily translated into improved practice. 79% of the surveyed households at endline answered that they have plans to avoid smoke in the house compared to 38% at baseline and 68% at midline.

Figure 7: Community Attitudes on Reducing Indoor Air Pollution



Household heads were asked about the food that should be consumed by pregnant women. They were asked about both the frequency and the types of foods they should consume, and the response is coded as an adequate diet if they indicated eating three or more meals per day, including one animal-sourced food. As shown in Figure 8, most of the household heads in the endline sample (93%) are aware about an adequate diet of pregnant women, compared to 75% at baseline.

Figure 8: Attitudes toward Pregnant Women's Dietary Needs



F. Water, Sanitation and Hygiene

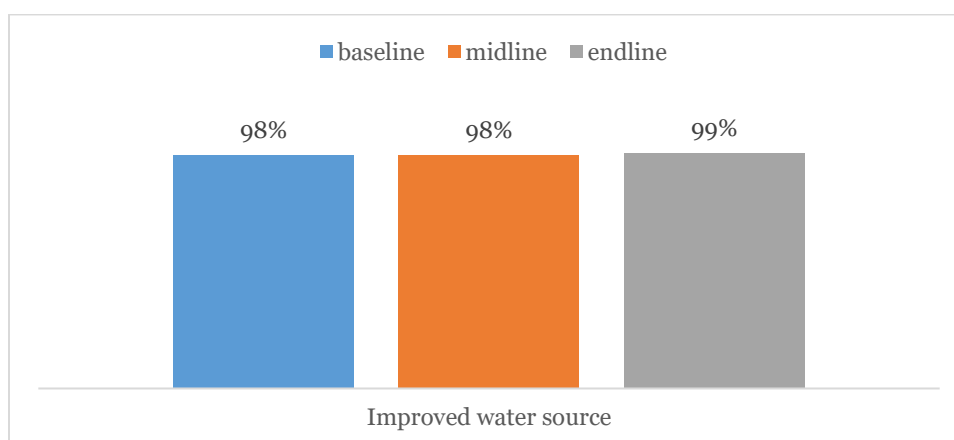
Water and sanitation are directly linked to children's health, and inadequate access to water or sanitation facilities can cause illness, such as diarrhea, which increases risk of malnutrition. 70%

of wards selected a goal related to improving access to improved source of water, and 38% of wards selected a goal related to eradicating open defecation. This section focuses on access to water and sanitation for households in the sample as well as hygiene behaviors such as hand-washing.

Access to Improved Water Source

As shown in *Figure 9*, majority of households in the sample (99%) have access to an improved water source.¹⁵ Since many of the wards selected a goal related to improving access to clean water, we expect higher percentage of households with access to clean water at endline. However, there is little difference in access to water throughout the project. In fact, the communities selecting this focus area did not actually construct water sources, but rather received filters, buckets, and storage tanks. For this reason, this particular question on access to improved water source does not reflect the impact of the project for communities selecting this focus area.

Figure 9: Access to Improved Water Source

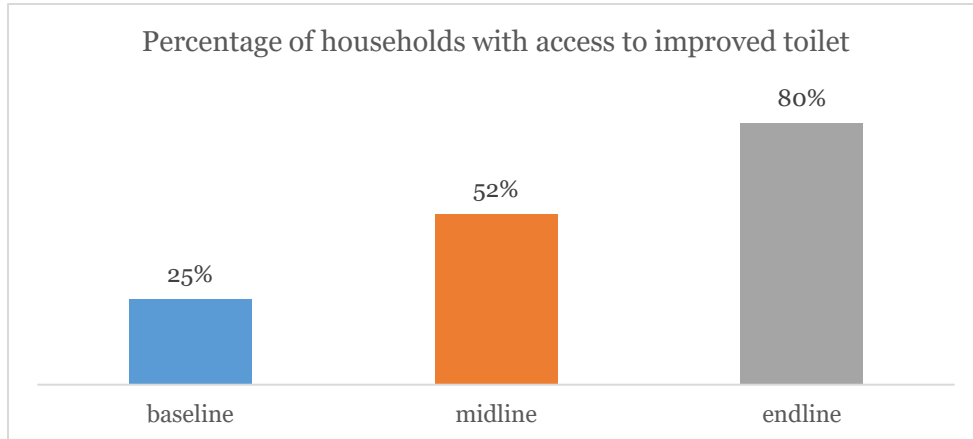


Access to Improved Toilet

Figure 10 shows the change in access to improved toilet over the course of project implementation. As shown in Figure 10, 80% of households reported to have access to improved toilet after four years of project implementation, compared to 25% at baseline and 52% at midline. This finding is striking since the percentage of households with access to improved toilet have increased by three-folds over four years and is consistent since more than a third of wards implemented a goal related to building toilet.

¹⁵ Access to clean water is defined as having the main source of drinking water from one of the followings: (i) piped water directly to the household/ compound, (ii) piped water from a public water tap, (iii) private hand-pump (shallow), (iv) private hand-pump (deep), (v) public hand-pump (shallow), (vi) public hand-pump (deep), (vii) private well, or (viii) public well.

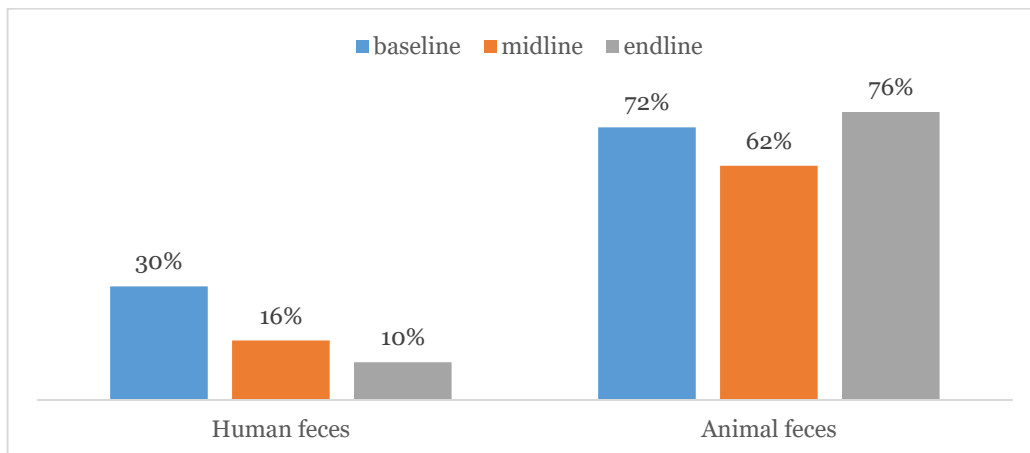
Figure 10: Access to Improved Toilet



Household Sanitation

As reported in Figure 11, 10% of households at endline reported observing human feces in or around their house compared to 30% at baseline and 16% at midline. We conjecture that increased access to improved toilet is the main reason for lower percentage of households observing human feces at endline. At the same time, there is no change in the percentage of households observing animal feces around the household.

Figure 11: Household Sanitation by Treatment Status



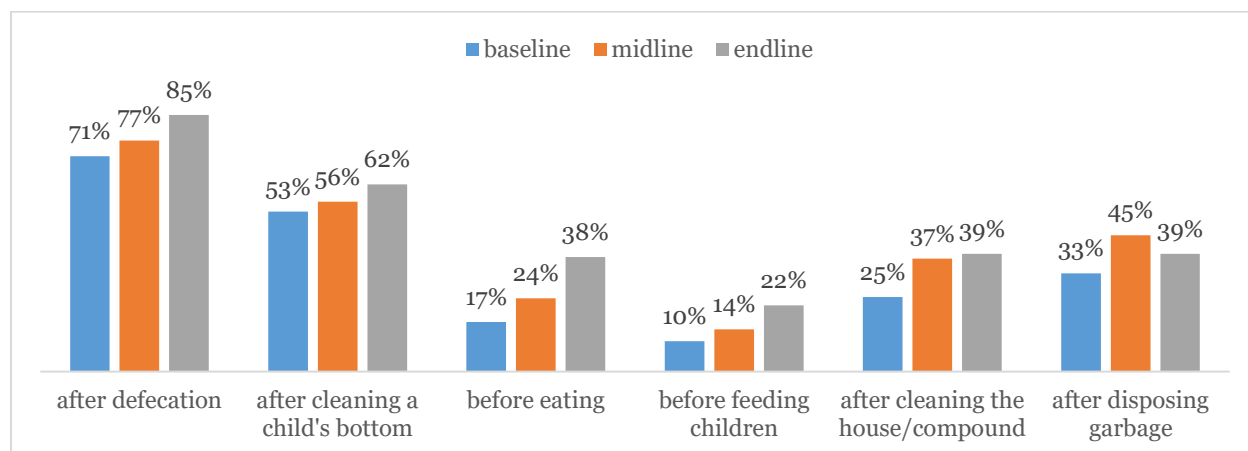
Mother's Handwashing Behavior

37% of wards selected a focus area related to practicing proper and consistent handwashing. Mothers of children under age 2 in the sample were asked about hand-washing behavior using soap and Figure 12 shows the percentage of mothers washing hands in relation to the following six activities: (i) after defecation, (ii) after cleaning a young child's bottom, (iii) before eating; (iv)

before feeding children, (v) after cleaning the house or compound, and (v) after disposing of garbage.

As shown in Figure 12, most mothers in the sample at endline responded that they wash hands with soap after defecation (85%), and 62% report that they wash hand after cleaning a child’s bottom. Overall, higher percentage of mothers at endline reported always washing hands after different activities compared to the baseline.

Figure 12: Percentage of Handwashing after Activities



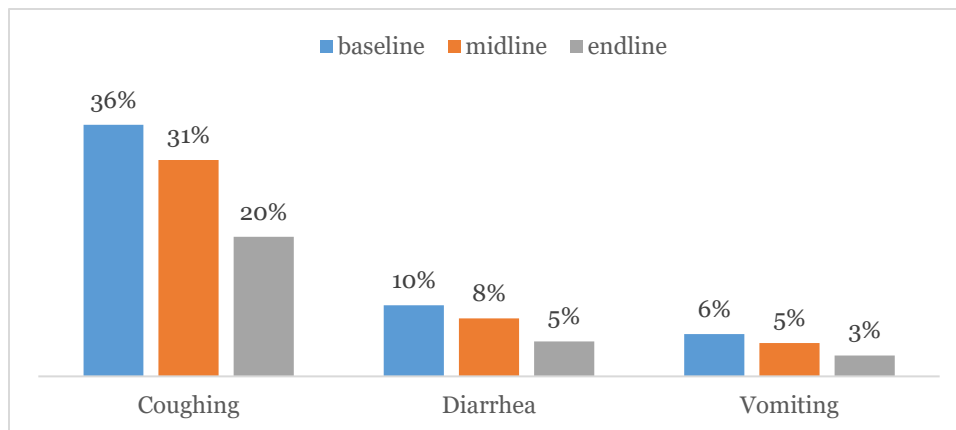
G. Child Malnutrition and Illness

One of the ultimate goals of the SHD project is to improve nutrition for children under 2. Standard anthropometric measurements of childhood nutrition include stunting, wasting, and being underweight. We also assess changes in self-reported disease incidence, as proper diet can help children ward off disease.

Child Illness

The main caregiver of children under age 2 in our sample were asked if the child had an illness in the 15 days prior to the interview. As shown in Figure 13, less children at endline suffered from coughing, diarrhea, and vomiting compared to the baseline and midline. At endline, 20% of children under age 2 had a cough in the 15 days prior to the interview, compared to 36% at baseline. Also, 5% of children under age 2 in our sample suffered from diarrhea for more than 3 days compared to 10% at baseline, and 3% of children suffered from vomiting compared to 6% at baseline.

Figure 13: Child's Illness in the Past 15 Days



Child Malnutrition

The rate of stunting, or chronic malnutrition, is the percentage of children whose height is more than two standard deviations less than the median height of children of the same age and gender, as per the WHO Child Growth Standards¹⁶. Stunting suggests that a child was not provided with adequate nutrition and/or has suffered from illness over a long period of time. The rate of wasting, or acute malnutrition rate, is the percentage of children whose weight is more than two standard deviations below the median weight of children of the same height and gender as per the Child Growth Standards. Finally, children whose weight is more than two standard deviations below the median weight of children of the same age and gender as per the WHO Child Growth Standards are classified as underweight.

As shown in Table 7, the overall anthropometric indicators have improved over the course of the project. The rate of wasting has decreased from 21% at baseline, to 16% at both midline and endline. While almost one-third of the children under 2 were underweight at baseline (32%), this percentage decreased to 21% at midline, and 15% at endline. Stunting rate has also decreased from 38% to 27% at midline, but increased to 33% at endline.

Table 7: Anthropometric Measures for Children under 2

		Baseline	Midline	Endline
Child malnutrition	<i>Stunting</i>	38%	27%	33%
	<i>Wasting</i>	21%	16%	16%
	<i>Underweight</i>	32%	21%	15%
Child Growth Z-Scores	<i>Weight for age</i>	-1.38	-0.91	-0.77
	<i>Height for age</i>	-1.41	-0.99	-1.27
	<i>Weight for height</i>	-0.75	-0.46	-0.17

¹⁶ <http://www.who.int/childgrowth/en/>

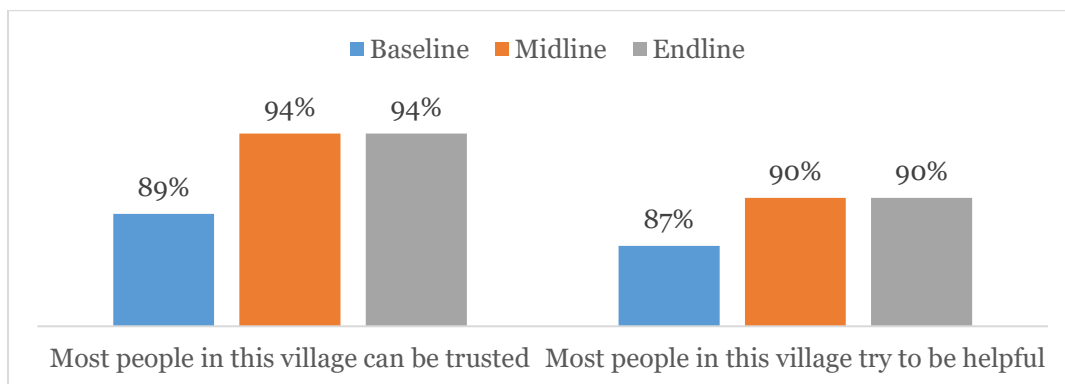
H. Social Capital

Since the SHD project takes a Rapid Results Approach where communities are encouraged to select goals and formulate plans to achieve the goals, social cohesion is an important factor that may affect the outcome of the project. Additionally, it has been hypothesized that this project could help build social capital. In order to measure the social capital in the sample, the impact evaluation uses two mechanisms: (i) respondents were asked questions about trust, collective action, empowerment and political action during each round of survey; and (2) several behavioral games were conducted to indirectly assess and quantify these same social capital factors. The behavioral games were conducted in a subsample of 100 VDCs, and were constrained to VDCs with less than 100 households.

Trust

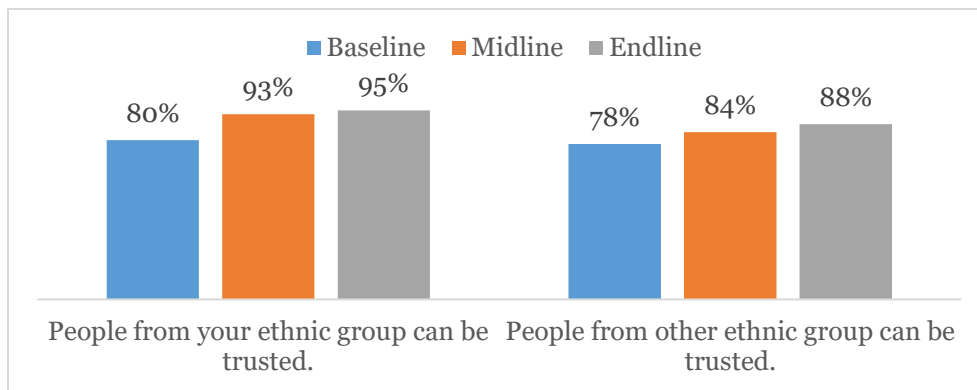
As shown in Figure 14, it seems that trust level has moderately increased throughout four years of project implementation – 89% of respondents stated that most people in their village can be trusted during the baseline, while 94% of respondents stated that most people in their village can be trusted during the midline and endline. Also, 87% of respondents stated that most people in their village try to be helpful during the baseline, and this percentage increased to 90% for both midline and endline.

Figure 14: Trust Level



According to Figure 15, 93% of respondents during the midline and 95% of respondents during the endline stated that they trust people from their ethnic group, compared to 80% during the baseline. Similarly, 84% of respondents during the midline and 88% of respondents during the endline stated that they trust people from other ethnic group, compared to 78% during the baseline.

Figure 15: Trust Level II



Trust and trustworthiness were also measured by a trust game played between two people from the same communities during each round of the survey.¹⁷ In the trust game, one of the players becomes a “sender” and the other a “receiver,” but neither of them knows who the other player is. Both the sender and the receiver get 32 rupees to start, and the sender decides how much of his 32 rupees to send to the receiver.¹⁸ The amount sent by the sender will be given to the receiver, and the receiver will decide how much to send back to the sender. The amount sent by the sender serves as a proxy for the trust level towards community members and amount sent back by the receiver indicates the trustworthiness level.

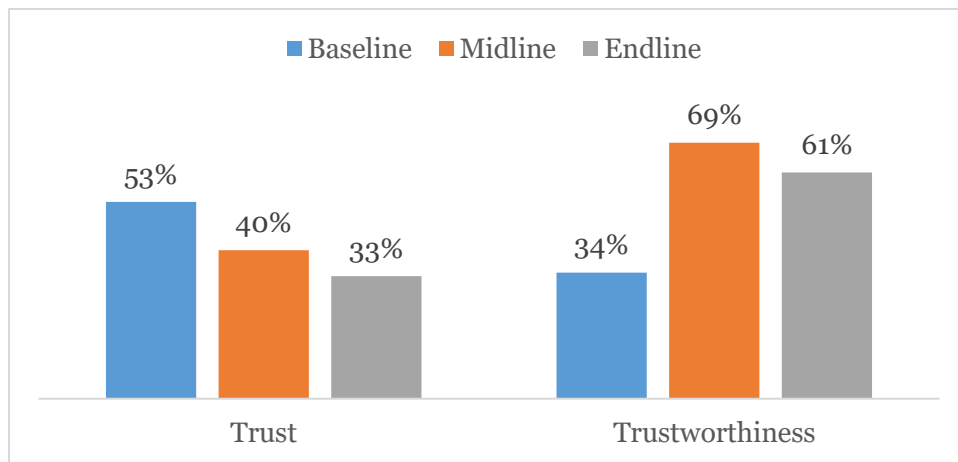
As shown in Figure 16, among those who participated in the behavioral game during each round of survey, senders sent on average 53% out of 12 rupees during the baseline, 40% out of the 32 rupees during the midline and 33% out of the 32 rupees during the endline. Receivers sent back 34% of the money they received during baseline, 69% during midline, and 61% during the endline.¹⁹ However, the results should be interpreted with caution since the game structure changed from the baseline to midline (explained in footnote 16.) Also, it is very important to understand that we are reporting time trends rather than changes that can solely be attributed to the program. The time trends that we observe could well be due to aggregate shocks unrelated to the program, such as the earthquake or political elections. Another explanation is that, as more times the games are played in the wards, players understand better the incentives embedded in the game and they behave more strategically.

¹⁷ The behavioral games are based on those found in: Cardenas, J. C., & Carpenter, J. (2008). Behavioural development economics: Lessons from field labs in the developing world. *The Journal of Development Studies*, 44(3), 311-338. <http://www.tandfonline.com/doi/abs/10.1080/00220380701848327>

¹⁸ This is equal to around .30 USD, and is equivalent to around 12% of the daily minimum wage.

¹⁹ There are two major differences in the game structure between baseline and midline/endline. During the baseline behavioral game, the amount sent back was tripled, while this part of the game was removed for the midline and endline games. The second difference is that during the baseline, each player played either the sender or receiver role, while the game was played twice in order to have both measures per individual during the midline and endline.

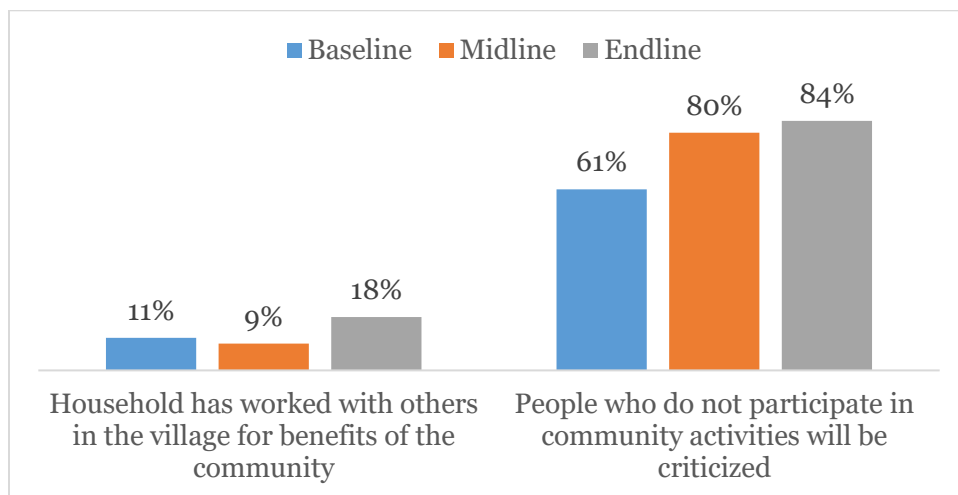
Figure 16: Trust and Trustworthiness from Behavioral Game



Collective Action

As shown in Figure 17, higher percentage of households reported that they have worked with others in the village for benefits of the community during the endline (18%), compared to the baseline (11%) or midline (9%). Also, higher percentage of households during the midline (80%) and endline (84%) reported that people who do not participate in community activities will be criticized or sanctioned, compared to the baseline (61%).

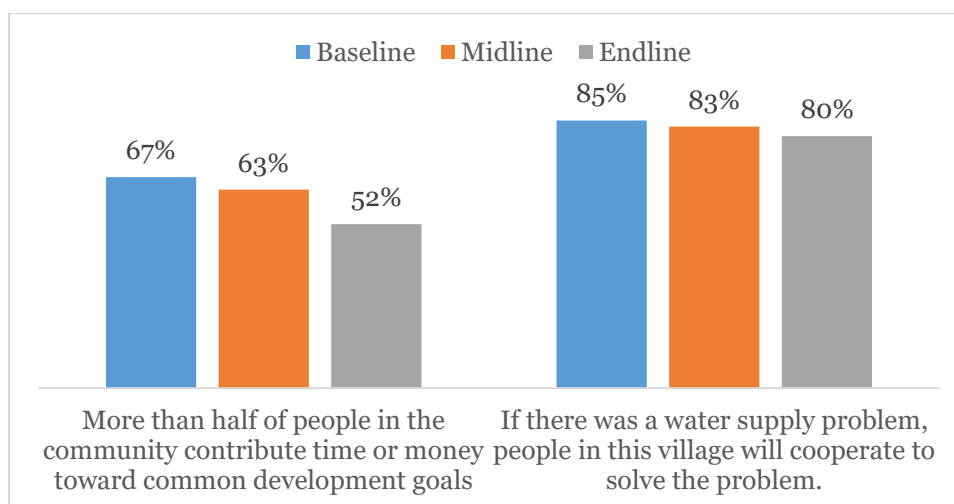
Figure 17: Collective Action I



At the same time, lower percentage of respondents during the endline (52%) believe more than half of people in their village contribute time or money towards common development goals, compared to 67% during the baseline and 63% during the midline. As shown in Figure 18, 80% of

respondents during the endline believe that people will cooperate to solve a water supply problem, compared to 85% during the baseline and 83% during the midline.

Figure 18: Collective Action II



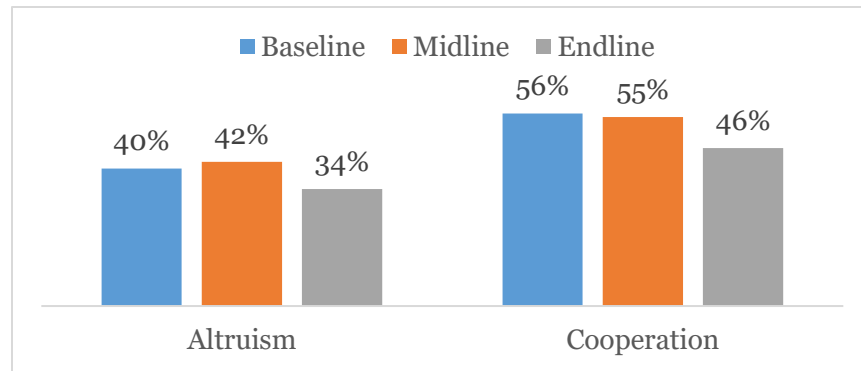
In order to measure the altruism level in each community a dictator game was conducted. In the game, each player is given 40 rupees and decides how much of the amount they will donate to a needy family in the community. As shown in *Figure 19*, players contributed on average 40% during the baseline, 42% during the midline, and 34% during the endline.

In another game, cooperation level was measured by how much each player was willing to contribute to public goods of the community. Each player receives 5 cards (representing public goods), and can (secretly) contribute as many cards as they want to a public pot, and the rest will go to a private pot. For each card that is turned in every person in the group receives three rupees. For each card in the private pot, however, they receive 12 rupees in addition to the amount determined by the number of cards turned in to the public pot.²⁰ In other words, everyone benefits if more cards are contributed to the public pot, but an individual player is better off by not contributing to the public pot.

However, the game structure during the baseline differs from that during the midline or endline, so the measures of cooperation is not comparable between baseline and midline/endline. As shown in *Figure 18*, players contributed to the public goods 56% during the baseline, 55% during the midline and 46% during the endline.

²⁰ During the baseline, individuals faced a binary decision: they either cooperate or not to a common pool. During the midline and endline, individuals can choose among cooperation levels (6 possibilities). Thus, the measures of cooperation cannot be directly compared between baseline and midline/endline.

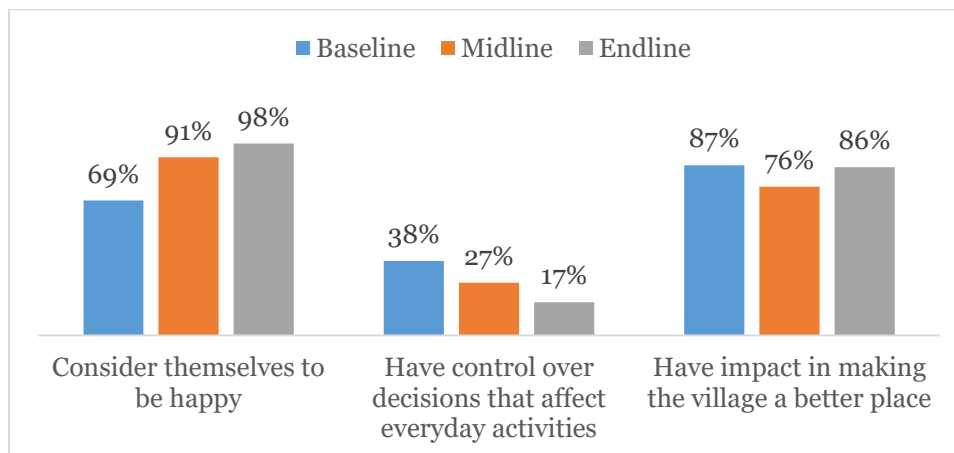
Figure 19: Altruism and Cooperation from Behavioral Game



Empowerment

During each round of the survey, respondents were also asked how they feel about life in general. Higher percentage of households during the endline (98%) respond that they consider themselves to be happy, compared to the baseline (69%) and midline (91%). At the same time, lower percentage of households during the endline (17%) believe that they have control over decisions that affect everyday activities, compared to 38% at baseline and 27% at midline. Also, the majority of households believe that they have impact in making the village a better place across three rounds of the survey (87% at baseline; 76% at midline; 86% at endline.)

Figure 20: Empowerment Level



4. Conclusion and Policy Recommendations

This report summarizes the SHD project implementation, achievement and results over the course of 2013 – 2017. During this period, there were 9,073 goals selected and approved in 2,321 wards of 258 VDCs in total.²¹ The most common goals selected by communities are using clean and safe water (70%), followed by increasing consumption of animal protein among pregnant women and young children (43%), and maintaining adequate weight and regular eating among pregnant women and young children (42%). Overall, the project achieved original and revised Development Objectives. Especially, it is worth noting that access to improved toilet increased from 26% at baseline to 78% at endline. We also observe modest improvement on anthropometric indicators over the course of the project. The rate of wasting has decreased from 21% at baseline, to 16% at endline. While almost one-third of the children under 2 were underweight at baseline (32%), this percentage decreased to 15% at endline. Stunting rate has also decreased from 38% to 33%.

Despite the implementation challenges due to the novelty of the project design and geographic coverage, in addition to the external factors such as the 2015 earthquake and political blockade, the project recorded substantial achievements overall. Based on the lesson learned from a CDD intervention and evaluation, we would like to point out several operational and research implications:

Operational implications

- **Target focus area:** the project offered 15 focus areas (see Appendix A) to choose from to the communities, covering multiple sectors and area of interests (Health, Nutrition, Water and Sanitation, Handwashing, Education, etc.) As summarized above, some of the focus area were selected by many communities such as using clean and safe water (70%) and increase in consumption of animal protein among pregnant women and young children (43%). On the other hand, some of the other focus areas were hardly selected by the communities – for example, utilizing family planning methods to avoid unwanted pregnancies (2%), ensuring immunization of all children (2%) and regular de-worming and utilization of iron supplements by young women (4%). In order to provide a list of focus area that are most relevant to the needs of the communities, project teams should work with the government and communities from the design stage and clearly identify the demands from the communities.
- **Define PDO indicators carefully:** due to the nature of CDD projects, project teams do not know which focus area beneficiary communities will be choosing ex-ante. Therefore, it is risky to set PDO indicators which are focus area specific. For example, only 6% of communities selected “practicing proper and consistent breast-feeding” and as a result the project was not able to achieve the target related to exclusive breastfeeding at the endline. However, it is misleading to conclude that the project failed to achieve the target since the relevant focus area was not selected by communities.
- **Monitor the progress of implementation:** The impact evaluation included in this study measured the overall impact of the project after 2 years of project implementation. As highlighted by other study (Wong 2012), evaluating impact of intervention poses conflicting dilemma: a) project teams need to obtain results and impacts quickly in order to make course correction or to inform future projects, and b) sometimes it takes longer to materialize the

²¹ The project was implemented in 282 VDCs, but we were able to collect goal selection information for only 258 VDCs.

impacts of intervention by its nature. It is important to study the long term impact of interventions to facilitate better decision making. At the same time, it is also important to monitor the progress of interventions during the project cycle. To do so, project team needs to invest in capacity building of project staffs and develop relevant information system to manage the project, and monitor its progress.

Research Implications

Sustainability of intervention effectiveness on outcomes: The project adopted Rapid Results Approach, which has a 100-day project cycle to create motivation and confidence within a short period of time among community members. Since the communities received consumable goods (e.g. eggs and water filter) rather than long-lasting facilities (e.g. sanitation facilities) for some of the focus areas, the exact time of the implementation of a specific focus area relative to the time of the data collection can be an important factor in observing the impact of the intervention on specific outcomes. In this regard, we would like to study how the intensity of interventions has a short-term as well as long-term impact in achieving the project objectives.

Social cohesion: Recent study published by Zie (White et al. 2018) suggested to abandon building social cohesion from CDD type project objectives. However, social cohesion is an important factor that may affect the outcome of the project for community-based projects and need to be analyzed with more attention. Therefore, we propose to continue our research on measuring the social capital to answer if CDD projects build social cohesion.

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5. Appendix

A. List of Focus Area

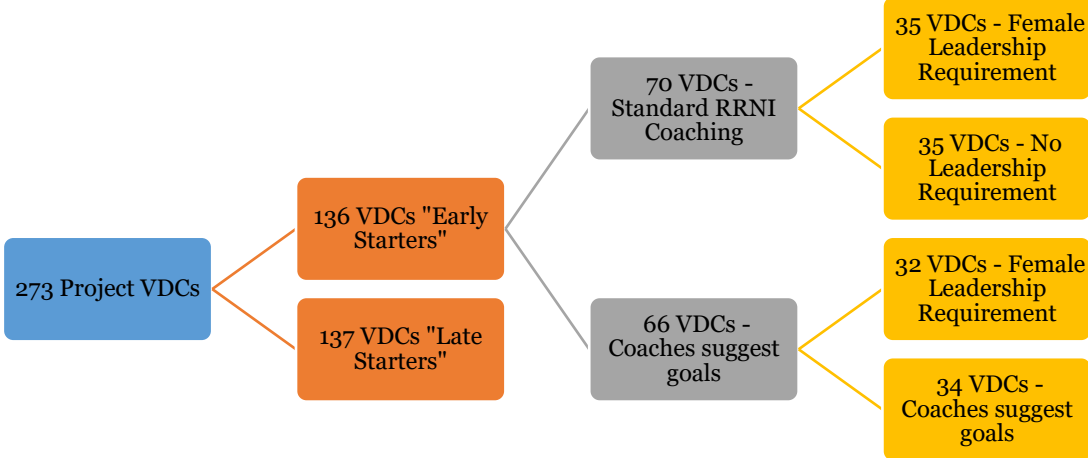
	Focus Area
1	Maintain adequate weight and regular eating among pregnant women and young children
2	Increase consumption of animal protein among pregnant women and young children
3	Practice proper and consistent breastfeeding
4	Use clean and safe water
5	Delay marriage and pregnancy for young girls
6	Regular de-worming and utilization of iron supplements by young women
7	Extend education of young girls
8	Utilize family planning methods to avoid unwanted pregnancies
9	Practice proper and consistent handwashing
10	Ensure immunization of all children
11	End open defecation
12	Ensure prompt medical treatment of chest infection, fever, and diarrhea in young children
13	Reduce workload of pregnant women
14	Improve school sanitation
15	Reduce exposure to indoor smoke for pregnant women and young children

B. Sample Goal Recommendations by Coaches

District Impact Evaluation Profile SUNSARI	VDCs selected for the IE			
	Group 1	Group 2	Group 3	Group 4
		<ul style="list-style-type: none"> Barahachhetra Bokhaha Mahendranagar 	<ul style="list-style-type: none"> Gautampur Madhuban 	<ul style="list-style-type: none"> Ramnagar-bhutaha
Recommendation for selection of focus area				
No.	Focus Area	Reason for recommendation		
१	Adequate Weight and Regular Eating	<ul style="list-style-type: none"> The baseline survey data indicate that among the nutrition indicators, “Percentage of children 6-24 months of age who consume a minimum acceptable diet” is only 11%. In addition, the indicator “Percentage of children 6-24 months who consumed animal protein” is also very weak. Pregnant mothers need to eat regular meals and maintain adequate weight to support her growing baby and to maintain good health during pregnancy. Young children need to eat regularly to grow well, to develop strong bodies and smart minds, and to protect them from illnesses. Therefore, to improve the nutritional status of your district, it is important for pregnant women and young children to maintain adequate weight and develop regular and proper eating habits. 		
२	Deworming and Iron Supplements for Young Women	<ul style="list-style-type: none"> The baseline survey data indicate that among the nutrition indicators, “Percentage of pregnant women who took iron folic acid for 180 days” is only 22%. In addition, the indicator “Percentage of women who took deworming drugs” is only 75%. Pregnant women or those women who want to get pregnant must take iron folic acid (IFA) and deworming drugs. Especially it helps to reduce anemia levels, the risk of low birth weight, early delivery, and perinatal deaths. Therefore, to improve the nutritional status of your district, it is important for pregnant women and women who want to get pregnant to take iron folic acid supplements and deworming drugs. 		
३	End Open Defecation	<ul style="list-style-type: none"> The baseline survey data indicate that only 42% use latrines. Open defecation increases the chances of illness, such as diarrhea, cholera, and worm infestation among everyone in the community. When germs that are in excreta make it into our water that we use for washing, cooking and drinking, or through the medium of flies into our food, then the germs enter our body and make us ill. Illnesses such as diarrhea cause young children to lose important nutrients and it greatly inhibits child growth and development. 		

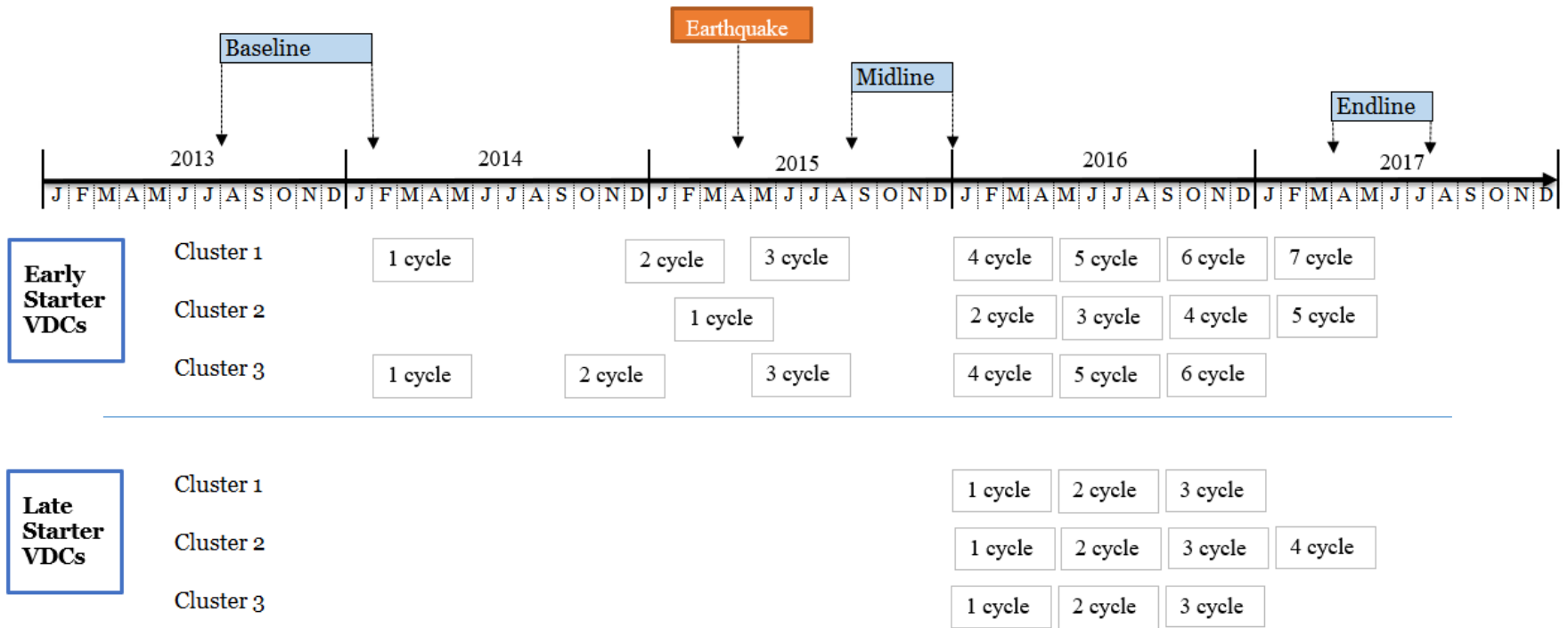
• Therefore, to improve the nutritional status of your district, it is important for your community to end open defecation and promote hygienic practices.

C. Sample Goal Recommendations by Coaches



Actual implementation differed from planned implementation in a handful of VDCs. The main reason for this deviation was due to VDCs either splitting or combining as administrative divisions in the region tend to change over time.

D. SHD IE Timeline



E. Weighting of Endline Sample

In the endline, data was collected in 100 VDCs for which network and behavioral games had been collected at midline. This was a random sample of 50 treated and 50 control VDCs that included wards that had between 60 and 120 households. To be able to obtain estimates representative of the universe of Early Starters VDCs that entered into the program, data from additional 30 VDCs was also collected in a boost sample of smaller and larger Early Starters wards. This was a sample stratified wards by zone (terai and mountain), cluster (1-3 and 2) and size (largest ward in the VDC below 60 individuals, and above 120) to make sure that all environments were represented. The table below provides the correspondence between wards in the original sample of Early Starters and in the endline sample, by strata 1. Clearly, the VDCs with wards between 60 and 120 are overrepresented in the endline sample, and it is necessary to re-weight it to get estimates that are representative of the original sample of Early Starters.

Region	Cluster	Size	Baseline		Endline	
			VDCs	%	VDCs	%
-	-	Medium	84	59.6%	53	66.3%
Terai	1 or 3	Small	2	1.4%	1	1.3%
Terai	1 or 3	Large	20	14.2%	9	11.3%
Terai	2	Large	15	10.6%	7	8.8%
Hill	1 or 3	Small	8	5.7%	4	5.0%
Hill	2	Small	6	4.3%	3	3.8%
Hill	1 or 3	Large	1	0.7%	1	1.3%
Hill	2	Large	5	3.5%	2	2.5%

Size categories: Small: 1-59, Medium: 60-120, Large: 121 or more

The weights are calculated as the inverse of the probability of selecting a unit (child, mother or pregnant woman) in the sample. Such probability is the product of:

- the number of VDCs in the original sample of Early Starters in the strata divided by the total number of VDCs in the original sample of Early Starters (141)
- the number of VDCs in the endline sample of Early Starters in the strata divided by the total number of VDCs in the original sample of Early Starters in the strata
- the number of units of interest (children, mothers, or pregnant women) sampled in the VDC divided by the total number of units of interest that exist in that VDC

F. List of 282 VDCs

Appendix Table 1: List of 282 VDCs

District Name	VDC Name	Treatment Status
Bara	Balirampur	Treatment
Bara	Basantapur (Bhaganpur)	Control
Bara	Bharatgunj sigaul	Treatment
Bara	Bisunpur	Control
Bara	Bisunpurwa	Control
Bara	Vediya	Control
Bara	Devapur	Control
Bara	Hariharpur	Treatment
Bara	Inarwa sira	Treatment
Bara	U. bhitkaiya	Treatment
Bara	Kawahi gotha	Treatment
Bara	Kawahi jabdi	Control
Bara	Madhuri jabdi	Treatment
Bara	Manarwa	Treatment
Bara	Matiarwa	Control
Bara	Prasaunna	Treatment
Bara	Parsurampur	Control
Bara	Raghunathpur	Treatment
Bara	Sihorwa	Control
Bara	Sishaniya	Control
Bara	Tedhakatti	Treatment
Bara	Telkuwa	Control
Bara	Tetariya	Control
Bara	Uchidiha	Treatment
Dhanusha	Ahurahi	Treatment
Dhanusha	Baheda bela	Control
Dhanusha	Bahuawa	Treatment
Dhanusha	baswitti	Treatment
Dhanusha	Bateshowar (Bateswor)	Treatment
Dhanusha	bharatpur	Control
Dhanusha	bhuchakrapur	Treatment
Dhanusha	Bhutahi patewa	Treatment
Dhanusha	Winhi	Control
Dhanusha	Dhawauli	Control
Dhanusha	Dubarkot hathaletawa	Control
Dhanusha	Ekrahi	Treatment
Dhanusha	Tallo godar	Control

Dhanusha	kajara ramaul	Control
Dhanusha	Kanakpatti	Treatment
Dhanusha	kharihani	Control
Dhanusha	pra.khe.mahuwa	Control
Dhanusha	makhnaha	Control
Dhanusha	Machijhitkaiya	Control
Dhanusha	Mithileshwar nikas	Treatment
Dhanusha	Mukhiya patti musaharniya	Treatment
Dhanusha	Nagarain	Control
Dhanusha	Singhyahi madan	Control
Dhanusha	sinurjoda	Treatment
Dhanusha	Umaprempur	Treatment
Khotang	Bahunidanda	Treatment
Khotang	Baspani	Control
Khotang	Chasmitar	Control
Khotang	Dhitung	Treatment
Khotang	Dikuwa	Control
Khotang	Dipsung	Treatment
Khotang	Faktang	Control
Khotang	Jyamire	Treatment
Khotang	Khartanchha	Treatment
Khotang	Mauwabote	Control
Khotang	pauwasera	Treatment
Khotang	Phedi	Treatment
Khotang	Maheshwori	Control
Khotang	Rakha wangdel	Control
Khotang	Sapteshwori	Treatment
Khotang	Sungdel	Treatment
Khotang	Suntale	Control
Khotang	Bopung	Control
Mahottari	Balawa	Control
Mahottari	Banouli Danouli	Control
Mahottari	Bardibas	Treatment
Mahottari	Basbitti	Control
Mahottari	Bathnaha	Treatment
Mahottari	Dhirapur	Control
Mahottari	Phulhatta	Control
Mahottari	Goushala	Control
Mahottari	Gonarpura	Treatment
Mahottari	Hariharpur Harinmara	Treatment
Mahottari	Hatariswa	Treatment
Mahottari	Khopi	Control
Mahottari	Loharpatti	Treatment

Mahottari	Matihani	Control
Mahottari	Nigoul	Treatment
Mahottari	Pigouna	Treatment
Mahottari	Ramgopalpur	Treatment
Mahottari	Sitapur Bhaganha	Control
Makawanpur	Beteni	Control
Makawanpur	Bharta Pundyadevi	Treatment
Makawanpur	Dandakharka	Treatment
Makawanpur	Dhiyal	Treatment
Makawanpur	Faparbari	Control
Makawanpur	Kalikatar	Control
Makawanpur	Kankada	Treatment
Makawanpur	Khairang	Control
Makawanpur	Manthali	Treatment
Makawanpur	Raigaun	Control
Makawanpur	Raksirang	Control
Okhaldhunga	Balakhu	Treatment
Okhaldhunga	Bhadaure	Control
Okhaldhunga	Bilandu	Control
Okhaldhunga	Diyale	Control
Okhaldhunga	Jantarkhani	Treatment
Okhaldhunga	Khijikati	Treatment
Okhaldhunga	Mamkha	Control
Okhaldhunga	Mulkharka	Control
Okhaldhunga	Palapu	Treatment
Okhaldhunga	Patle	Control
Okhaldhunga	pokali	Treatment
Okhaldhunga	Ranagdeep	Treatment
Okhaldhunga	Shreechaur	Treatment
Okhaldhunga	Unbu	Control
Parsa	Amarpatti	Treatment
Parsa	Bagahi	Treatment
Parsa	Bagwana	Control
Parsa	Bahuari Pidari	Control
Parsa	Basdilwa	Control
Parsa	Belwa	Treatment
Parsa	Bairiyabirta da.pu.	Control
Parsa	Gamhariya	Treatment
Parsa	Ghoddauda pipara	Treatment
Parsa	Harpur	Treatment
Parsa	jhauwaguthi	Treatment
Parsa	Lalparsa	Control
Parsa	lipanibirta	Treatment

Parsa	Madhuwan Mathwal	Control
Parsa	Vikhampur	Control
Parsa	Mirjapur	Control
Parsa	Pancharukhi	Control
Parsa	samjhauta	Treatment
Parsa	Udayapur ghurmi	Treatment
Parsa	Vauratar	Control
Ramechhap	Bhatauli	Control
Ramechhap	Daduwa	Treatment
Ramechhap	Dimipokhari	Control
Ramechhap	Pharpu	Treatment
Ramechhap	Goswara	Treatment
Ramechhap	Gumdel	Treatment
Ramechhap	Gupteshor	Treatment
Ramechhap	Himganga	Control
Ramechhap	Khandadevi	Treatment
Ramechhap	Kubukasthali	Control
Ramechhap	Naghdaha	Control
Ramechhap	Namadi	Control
Ramechhap	Rakathum	Control
Ramechhap	Tokarpur	Treatment
Rautahat	Badharwa	Control
Rautahat	Banjaraha	Treatment
Rautahat	Bishrampur	Treatment
Rautahat	Brahmapuri	Treatment
Rautahat	Dumariya (Matiauna)	Control
Rautahat	Fatuha Maheshpur	Treatment
Rautahat	Gamhariya Parsa	Treatment
Rautahat	Hadiry Paltuwa	Control
Rautahat	Inarbari Jyutahi	Treatment
Rautahat	Inaruwa	Control
Rautahat	Jowaha(Jokaha)	Control
Rautahat	Kakanpur	Control
Rautahat	Laxmipur Belbichawa	Treatment
Rautahat	Madhopur	Treatment
Rautahat	Maryadpur	Control
Rautahat	Mudwalawa	Control
Rautahat	Pipara Pokhariya	Control
Rautahat	Pipariya(Paroha)	Treatment
Rautahat	Pipra Bhagwanpur	Treatment
Rautahat	Pipra Rajbara	Treatment
Rautahat	Santpur(Matiaun)	Control
Rautahat	Shitalpur Bairgania	Control

Rautahat	Simara Bhawanipur	Control
Saptari	Ko.Barshain	Treatment
Saptari	Basbitti	Control
Saptari	Bhardaha	Control
Saptari	Bramhapur	Control
Saptari	Dadha	Control
Saptari	Deuribharuwa	Control
Saptari	Dhangadhi	Treatment
Saptari	Farseth	Treatment
Saptari	Gamhariya Parwaha	Control
Saptari	Hanumannagar	Treatment
Saptari	Haripur	Control
Saptari	Inarwa Fulbariya	Control
Saptari	Joginiya-1	Treatment
Saptari	Launiya	Control
Saptari	Madhawapur	Control
Saptari	Mahadeva	Treatment
Saptari	Mainakaderi	Treatment
Saptari	Malhanma	Treatment
Saptari	Malhaniya	Treatment
Saptari	Pakari	Control
Saptari	Paterwa	Control
Saptari	Portaha	Control
Saptari	Rampurmalhaniya	Control
Saptari	Simraha singyaun	Treatment
Saptari	Siswa Belhi	Treatment
Saptari	Tikuliya	Treatment
Saptari	Tilathi	Treatment
Saptari	Trikaula	Treatment
Sarlahi	Barahathawa	Control
Sarlahi	batraul	Control
Sarlahi	Belwajabdi	Control
Sarlahi	Bhadsar	Treatment
Sarlahi	Bhawanipur	Treatment
Sarlahi	Chatauna	Treatment
Sarlahi	Dhankaul Paschim	Treatment
Sarlahi	Dhangada	Treatment
Sarlahi	Pharhadawa	Treatment
Sarlahi	Phullparasi	Treatment
Sarlahi	Gadhiya	Treatment
Sarlahi	hathiaual	Control
Sarlahi	Kabilasi	Control
Sarlahi	khairwa	Treatment

Sarlahi	Khutauna	Control
Sarlahi	kisanpur	Control
Sarlahi	Laxmipur Sukhachaina	Treatment
Sarlahi	Madhuwangoth	Treatment
Sarlahi	madhuwani	Control
Sarlahi	Manpur	Treatment
Sarlahi	Mirjapur	Control
Sarlahi	Pidari	Control
Sarlahi	Pipariya	Control
Sarlahi	Simara	Treatment
Sarlahi	Sundarpur chuhariya	Control
Sindhuli	Amale	Control
Sindhuli	Bastipur	Control
Sindhuli	Bitijor	Treatment
Sindhuli	Kalpa brishykha	Control
Sindhuli	Khangasang	Treatment
Sindhuli	Kuseswar Dumja	Control
Sindhuli	Kyaneshwor	Treatment
Sindhuli	Mahadevsthan	Treatment
Sindhuli	Nipane	Control
Sindhuli	Pipalmadi	Treatment
Sindhuli	Ranichuri	Treatment
Sindhuli	Ratanchura	Treatment
Sindhuli	Santeshwori	Control
Siraha	Ashopur balkawa	Treatment
Siraha	Aurahi	Control
Siraha	Belhi	Control
Siraha	Bhawanipur	Treatment
Siraha	Chandra ayodhyapur	Control
Siraha	Chandra udayapur	Treatment
Siraha	Chikana	Control
Siraha	Devipur	Control
Siraha	Dumri	Treatment
Siraha	Durgapur	Treatment
Siraha	Gadha	Treatment
Siraha	Harkatti	Treatment
Siraha	Itatar	Treatment
Siraha	Kabilasi	Control
Siraha	KachAnari	Control
Siraha	Laxmipur patari	Treatment
Siraha	Maheshpur Gamharia	Control
Siraha	Maheshpur Patari	Treatment
Siraha	Bhadaiya	Control

Siraha	Pokharbhinda	Treatment
Siraha	Sanhaitha	Treatment
Siraha	Sikron	Control
Siraha	Sitapur Pra. Da.	Control
Siraha	Sitapur Pra. Ra.	Treatment
Siraha	Sukhipur	Control
Siraha	Tulsipur	Control
Sunsari	Barahachetra	Treatment
Sunsari	Bharoul	Control
Sunsari	Bhokraha	Treatment
Sunsari	Dewangunj	Control
Sunsari	Ghuski	Control
Sunsari	Gautampur	Treatment
Sunsari	Madhuban	Treatment
Sunsari	Madhyaharsahi	Control
Sunsari	Mahendranagar	Treatment
Sunsari	Rajgunj Sinwari (Ramganjsenuwari)	Control
Sunsari	Ramnagar Bhutaha	Treatment
Sunsari	Saterjhora	Control
Udayapur	Baraha	Control
Udayapur	Bashbote	Treatment
Udayapur	Chaudandi	Control
Udayapur	hardeni	Treatment
Udayapur	Katunjababala	Treatment
Udayapur	mainamaini	Control
Udayapur	Nametar	Control
Udayapur	Sorungchabise	Control
Udayapur	Tamlicha	Treatment
Udayapur	Thanagaun	Treatment
Udayapur	Mayankhu	Treatment

G. Additional Tables

Appendix Table 2: Nutritional Status by Age Group

Age in Months	Baseline			Endline		
	Stunting	Wasting	Underweight	Stunting	Wasting	Underweight
0-2	23%	23%	24%	29%	49%	20%
3-4	26%	19%	32%	23%	16%	26%
5-6	20%	28%	29%	37%	29%	34%
7-8	23%	17%	25%	11%	18%	19%
9-10	26%	24%	29%	22%	6%	8%
11-12	34%	22%	34%	25%	22%	18%
13-14	38%	27%	37%	25%	20%	6%
15-16	46%	22%	35%	49%	12%	22%
17-18	44%	23%	38%	51%	9%	14%
19-20	54%	19%	35%	39%	3%	3%
21-22	57%	21%	36%	33%	1%	3%
23-24	51%	16%	34%	51%	5%	6%

Appendix Table 3: Child Health

		Baseline	Endline
Child illness	Coughing	36%	20%
	Diarrhea	10%	5%
	Vomiting	6%	3%
Child malnutrition	<i>Stunting</i>	38%	33%
	<i>Wasting</i>	21%	16%
	<i>Underweight</i>	32%	15%
Child Growth Z-Scores	<i>Weight for age</i>	-1.38	-0.77
	<i>Height for age</i>	-1.41	-1.27
	<i>Weight for height</i>	-0.75	-0.17

Mothers of children up to 2 years old were asked about the foods consumed the day before the survey. Based on the answer, Appendix Table 4 shows the proportion of mothers who consumed any foods in the food group, and the dietary diversity score by summing the number of food groups consumed. Compared to the 9 food groups used in the FAO guideline on Individual Dietary Diversity, the score ranges from 0 to 8 since our survey did not differentiate consumption of organ meat from meat in general.

Appendix Table 4: Maternal Nutrition

	Baseline			Endline		
	Mean	SD	N	Mean	SD	N
Starchy staples	1	0.05	4250	1	0.03	1908
Dark green leafy vegetables	0.47	0.5	4250	0.49	0.5	1908
Vitamin A rich fruits and vegetables	0.16	0.37	4250	0.1	0.3	1908
Other fruits and vegetables	0.48	0.5	4250	0.56	0.5	1908
Meat and fish	0.3	0.46	4250	0.49	0.5	1908
Eggs	0.06	0.23	4250	0.09	0.29	1908
Legumes, nuts and seeds	0.47	0.5	4250	0.68	0.47	1908
Milk and milk products	0.42	0.49	4250	0.35	0.48	1908
Dietary Diversity Score (0-8)	3.36	1.44	4250	3.75	1.2	1908

Appendix Table 5: IYCF Indicators

IYCF Indicators	Baseline			Endline		
	Mean	SD	N	Mean	SD	N
Early Initiation of Breastfeeding	0.39	0.49	4557	0.75	0.44	1220
Exclusive Breastfeeding under 6 Months	0.69	0.46	1021	0.57	0.5	329
Continued Breastfeeding at 1 Year	0.92	0.28	779	1	0	180
Introduction of Solid, Semi-solid, or Soft Foods	0.66	0.47	511	0.8	0.4	176
Minimum Dietary Diversity	0.14	0.34	3536	0.19	0.39	892
Minimum Meal Frequency	0.6	0.49	3536	0.77	0.42	892
Minimum Acceptable Diet	0.09	0.29	3379	0.15	0.35	892

Appendix Table 6: Household Characteristics

Household Characteristics	Baseline			Endline		
	Mean	SD	N	Mean	SD	N
Number of children age 0-17	1.16	1.25	7038	2.32	1.52	2140
Number of HH members	5.98	2.01	7038	5.44	2.35	2140
Household head attended school	0.41	0.49	7037	0.50	0.50	1927
Household head's literacy	0.42	0.49	7037	0.51	0.50	1927
Distance to road head	6.73	10.79	6227	5.32	7.88	1483
Distance to health institutions	8.2	10.57	6521	6.44	6.00	1483
Distance to government hospital	22.58	21.58	6811	23.42	17.12	1483
Ownership of house	1.00	0.07	7038	1.00	0.05	1480
Access to clean water	0.98	0.15	7038	0.99	0.10	1480
Usage of toilet	0.26	0.44	7035	0.86	0.34	1930
Separate Kitchen	0.46	0.5	7038	0.51	0.50	1930
Stove Channel	0.31	0.46	7038	0.52	0.50	1930
Open window for cooking room	0.3	0.46	7038	0.65	0.48	1930
Smoke inside when cooking	0.66	0.47	7038	0.61	0.49	1930

Anyone smoking inside the house	0.38	0.49	7038	0.28	0.45	1930
Human Feces in/near the house	0.31	0.46	7037	0.08	0.27	1930
Animal Feces in/near the house	0.72	0.45	7038	0.76	0.43	1930
Land Owner	0.69	0.46	7038	0.80	0.40	1480
Land Size (Hectare)	0.58	0.77	4863	0.58	0.70	1006
Livestock Owner	0.76	0.43	7035	0.82	0.38	1480
Cow, Bull, Buffalo	0.83	0.374	5349	0.84	0.37	1137
Goat, Sheep	0.68	0.47	5346	0.70	0.46	1137
Pig	0.15	0.36	5342	0.23	0.42	1137
Chicken	0.38	0.49	5344	0.62	0.49	1137

Appendix Table 7: Type of Toilet

Type of Toilet (%)	Baseline	Endline
Use toilet		
Flush to municipal sewer system	0.01	0
Flush to septic tank	17.35	71.20
Covered pit	8.09	15.04
Community latrine	0.04	0
Other type of latrine	0.19	0
No toilet		
Open pit	1.12	1.15
Forest, farm	63.24	12.11
Riverbank	9.95	0.46
Total	100	100
Number of Observations	6883	1930

Appendix Table 8: Source of Drinking Water

Water (%)	Baseline	Endline
Source of drinking water		
Direct piped water	3.86	4.73
Piped water from public tap	20.2	38.42
Shallow/private pump	34.93	32.45
Deep/private pump	18.17	5.35
Shallow/public pump	9.18	12.16
Deep/public pump	7.09	0.97
Private well	0.52	3.09
Public well	3.78	1.75
Open water	1.48	0.76
Other	0.8	0.28
