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Jibon o Jibika Program

End-line Survey Report

Mark Langworthy & Richard Caldwell
TANGO International
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Acronyms

ARI	Acute Respiratory Infection
CHV	Community Health Volunteer
CPP	Cyclone Preparedness Programme
CSI	Coping Strategy Index
DAP	Development Assistance Program
DDS	Diet Diversity Score
EPI	Expanded Program on Immunization
FAST	Food Access Survey Tool
FCS	Food Consumption Score
GB	Graduated Beneficiary (survey or sample)
GOB	Government of Bangladesh
HAZ	Stunting (variable name)
HFP	Homestead food production
HKI	Helen Keller International
JoJ	Jibon o Jibika ("Life and Livelihood" in Bangla)
MCHN	Maternal and Child Health and Nutrition
NGO	Non Governmental Organization
PDA	Personal Digital Assistant
PPS	Probability Proportional to Size (technique)
SC	Save the Children USA
SO	Strategic Objective
U2	(Survey or sample of) Women with Under-Two Children
VMF	Village Model Farm
WASH	Water, Sanitation and Hygiene
WAZ	Underweight (variable name)
WFP	World Food Programme
WHZ	Wasting (variable name)

Executive Summary

Save the Children USA (SC) was awarded a Title II Development Assistance Program that promotes food security in three highly vulnerable southern coastal districts of Barisal, Bhola and Patuakhali. This program is entitled *Jibon o Jibika* (JoJ)[4] and is being implemented in Bangladesh in collaboration with Helen Keller International, the NGO Forum for Drinking Water Supply and Sanitation, the Cyclone Preparedness Programme of the Bangladesh Red Crescent Society and 14 local NGO partners. The program implements activities in 13 upazilas of these districts. The JoJ program has targeted a total population of over 2,600,000 individuals, with a specific focus on 180,000 children under two years of age and over 72,000 pregnant women.

The JoJ program seeks to reduce high levels of food insecurity and malnutrition with the stated goal of ***decreased household food insecurity in three districts of Bangladesh's Barisal division.*** The program is based on three interrelated strategic objectives (SOs) serving vulnerable households in the target area, especially those households with children under the age of two years. The SOs, as articulated by the program, are:

SO1: Food availability and purchasing power at the household level will have increased. This strategic objective is pursued through the Homestead food production (HFP) component, which supports households to apply improved home gardening, agricultural, and poultry practices. The support is intended to provide households with a wider diversity of foods in their diets, as well as to enhance household income through increased sales of crop and livestock products.

SO2: The health and nutrition of pregnant women and children under the age of two will have improved. Two program components support this strategic objective: Maternal and Child Health and Nutrition (MCHN), and Water and Sanitation (WASH). The MCHN component works with mothers of under-2 children to promote appropriate antenatal practices, infant and child feeding practices, and effective health-seeking behaviors for children in the household.

SO3: Households will be more resilient to shocks that threaten their livelihoods. The activities under this strategic objective are mostly directed toward improving local and community preparedness for emergencies, but also include provision of support to households affected by emergencies.

While the program activities under SO1 and SO2 are directed toward mothers with children under 2 years of age and their households, the SO3 activities are directed to entire communities. The SO1 activities are implemented in only 440 communities.

The end-line survey of JoJ aims to: (i) assess the extent to which JoJ accomplished its stated goals and objectives; (ii) assess the effectiveness of program activities; (iii) obtain answers to key questions related to lessons learned, best practices, sustainability, and recommendations for future programming; and (iv) document/summarize the overarching lessons learned to a wider audience including partner organizations, donors, Government of Bangladesh (GOB) and other stakeholders.

[4] "Life and Livelihood" in Bangla.

Methodology

The end-line survey was designed with two overall objectives in mind. The first objective was to obtain information that can be directly compared with the results from the baseline survey (and where possible with the mid-term as well). To address this objective the end-line questionnaire included the same questions and response categories as the baseline survey, to ensure that the same information was captured. Some additional questions were included to measure additional indicators of household food security. The required information and procedures for calculating these additional indicators are described more fully below. To be consistent with the baseline, a sample of households with children under two years of age was drawn and interviewed. The second, and more general, overall objective of the end-line survey was to quantitatively measure as fully as possible the ways that JoJ program activities have affected beneficiaries (children, mothers, and their households). In order to assess the extent to which each of the program components have provided these longer-term benefits, a second sample was drawn from households that have "graduated" from direct program support. These households had previously participated directly in some or all of the program interventions, but they no longer participated directly in the MCHN component of the program at the time of the survey. Interviews of these households were designed to capture household knowledge, attitudes, practices, and food security status after they have completed their direct participation with the program. This information can be used to assess the long-term and cumulative impacts of the program.

The first sample (U2) is population-based, drawn randomly from all households in selected mouzas that have children under two years of age. This sample includes households that currently participate in the program (as well as households that do not participate in any program activities [non-participants]). A total of 2,821 households are included in the U2 sample. The second sample (GB) has been randomly drawn from the list of all graduated beneficiaries. Graduated beneficiaries participated in MCHN and possibly other activities until their children reached two years of age. If they became pregnant again, they could still participate in program activities but would no longer receive any food aid incentives provided for mothers participating for the first time. A total of 897 households were selected for the GB sample.

Main Findings

Homestead food production (HFP)

The Homestead food production component of JoJ provides technical assistance to households in homestead gardening, agricultural practices, and poultry production. In homestead gardening, the percentage of households using improved techniques in the U2 sample was very similar to the baseline value. The GB sample, however, exhibited a significantly higher percentage of households using improved garden techniques, suggesting that the support to gardening has a positive impact on practices, but the changes take place only over a period of time. The use of improved techniques was also much more widespread for households that participated in the HFP than those that did not participate directly. However, use of improved techniques was also very high for households not in the HFP, and significantly higher than the baseline figures. Production of dark green leafy vegetables increased from baseline to end-line, again with the most pronounced increases found in the GB sample.

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Household Food Consumption and Food Security

Two dimensions of household food security were measured in the JoJ quantitative surveys: measures of the quality of current food consumption (at the time of the survey) in terms of number of different food categories eaten, and ii) measures of longer-term food security conditions, namely vulnerability to food insecurity in times of stress or shock. Comparison of end-line with baseline figures shows that household current consumption, as measured by household Diet Diversity Score (DDS), has increased. However, the Food Consumption Score (FCS), which weights different food categories based on their nutritional values, did not show a measurable increase from the baseline to the end-line survey rounds. The longer-term food security conditions of households improved somewhat, with the percentage of households categorized as severely food-insecure falling from 44 percent in the baseline to 33-40 percent in the end-line samples. The HFP component of JoJ is supposed to improve households' access to a wider variety of foods, and households in unions where HFP has been implemented had greater diet diversity, with DDS of 5.8, compared with 5.4 in unions where the HFP component has not been implemented.

Maternal and Child Health and Nutrition (MCHN)

The MCHN component has supported a wide range of messages to mothers about antenatal care practices, appropriate infant and child feeding practices, and health-seeking behaviors for their children. Overall, the reported changes in awareness of health and nutrition issues increased, with significant increases in the percentages of mothers, their husbands and their mothers-in-law (husbands and mothers-in-law considered to be individuals with strong influence on mothers' decisions) that reported awareness of appropriate antenatal practices.

Actual practices also exhibited improvements from the baseline to the end-line rounds, with substantial increases in the percentages of mothers receiving antenatal checkups, eating more during pregnancy, exclusive breastfeeding, vaccinations of children, and use of recommended remedies for diarrhea. However, comparison of results between the U2 and GB samples showed that the households in the GB sample had lower rates of adoption of improved practices than in the U2 sample, particularly percentages of mothers receiving antenatal checkups, increased food consumption during pregnancy, percentage of children with full vaccinations, and percentage of children with diarrhea taken for treatment. These findings suggest that the use of MCHN practices observed for households currently receiving program support tends to diminish after direct support has ended.

Water, Sanitation and Hygiene (WASH)

The WASH component is directed toward improving household access to clean water and improving household sanitation facilities and hygiene practices. There has been very little change in the source of water for drinking – over 90 percent of all households get drinking water from deep tubewells – and this was true even at the time of the baseline. The percentage of households with ring slab latrines increased from 36 percent in the baseline to 74 percent in the end-line round. However, about 80 percent of all ring slab latrines had broken seals at the time of the end-line. Many of these seals may have been broken by Cyclone Sidr, but the reasons for the broken seals are not known. Dramatic increases in awareness of appropriate handwashing techniques are also evident from the baseline to the end-line. However, this information represents the respondents' *awareness* of appropriate practice, not actual practice.

The survey results provide evidence of the health benefits of improved water and sanitation. Households with awareness of appropriate hygiene practices and access to adequate water and sanitation facilities have lower incidence of diarrhea and Acute Respiratory Infections (ARI) among children. The factors most strongly associated with lower incidence of these illnesses were access to sanitary latrines and use of hygienic latrine practices.

Anthropometric Indicators

The baseline and end-line survey rounds collected anthropometric information about children to assess their nutritional status. Three indicators were measured: wasting (low weight for height), which measures the acute, or current undernutrition; stunting (low height for age), which indicates long-term, or chronic undernutrition; and underweight (low weight for age), which indicates both acute and chronic undernutrition. The percentage of under-2 children suffering from all three types of undernutrition declined significantly from the end-line to the baseline survey rounds. Comparison of results between SO1 unions (unions where SO1 activities are being supported) and non-SO1 unions shows that the percentages of children suffering from all three dimensions of undernutrition are significantly lower in SO1 unions than non-SO1 unions, suggesting that the SO1 activities have in fact led to improved nutritional status of children, in part as a result of more diverse diets, as described previously.

Linear regression models were computed to analyze the causes of differences in the anthropometric measures of children across households in the U2 and GB samples. In the U2 sample, the model results indicate that the MCHN, WASH, and HFP components each individually contributed to the improved nutritional status of children. However, when the models were estimated on the GB sample, which includes children aged 24 to 59 months and households that no longer receive direct program support through MCHN, the results provided no indication of any impacts of program components on the nutritional status of the older children. The lack of statistically significant results on the sample of older children raises concerns about the sustainability of program interventions on children's long-term nutritional status.

Emergency Preparedness and Response

The baseline and end-line surveys obtained information from interviewed households about the types of services and support they received during emergencies. It should be emphasized that at the time of the baseline survey, households in the program intervention areas had not suffered major emergencies for several years, while the end-line round questions referred to support received after Cyclone Sidr, one of the most severe cyclones ever to hit the program areas. Because the conditions were so different, direct comparison of results from the baseline and end-line survey rounds must be interpreted with some caution, understanding that the demand for emergency services during the respective reference periods was much lower in the baseline than the end-line. With this caveat in mind, comparison of results between the two survey rounds suggests that emergency preparedness has improved over the course of the program. In the baseline, only one third of surveyed households had received advance warning of the cyclone that hit prior to the baseline survey, compared with over 90 percent in the end-line round. A much higher percentage of households moved to shelters in the end-line than in the baseline, but this difference may reflect the less severe nature of the emergencies referred to in the baseline. Another important finding from the end-line survey is the very high percentage of households, over 95 percent, that received water during the last emergency.

Targeting

Economic status of households has been measured on the basis of income per household member, expenditures per household member, and household wealth, measured as the number of different types of assets that the household possesses. There are no important differences in economic status of non-participants, current participants, and graduated participants in the MCHN component of JoJ. In particular there is not strong evidence that program participation is biased toward households of either higher or lower economic status. This is not surprising, since in fact, over 90 percent of all eligible households in program areas currently participate in the MCHN component, so the participating households are likely to be representative of the whole spectrum of economic conditions. Also, there are no statistically significant differences in the economic status measures between HFP participants and non-participants.

Sustainability

The differences between the U2 and GB samples reveal some distinct patterns across the different program categories. On the one hand, the utilization of improved gardening practices is even higher in the GB sample than the U2 sample, suggesting that the adoption of these practices is sustainable. The fact that a high percentage of households that does not participate directly in HFP utilizes the recommended practices also suggests that farmers generally perceive the benefits of these practices, and take them up even without direct program support. On the other hand, the percentage of mothers following recommended MCHN practices is lower in the GB than the U2 sample. These results suggest that MCHN attitudes and practices tend to be given up after households lose direct program support, and raise concerns about the sustainability of the MCHN interventions.

1. Introduction

Food insecurity continues to be a major problem in Bangladesh. Although production of food crops has increased dramatically, and overall food availability in the country is not as severe a problem as in the past, poverty continues to restrict access to food for many households throughout the country. The coastal area was historically a major food-producing area of the country, but this area has suffered from river erosion, salinity, and repeated natural disasters, and these areas are now highly food-insecure. According to WFP, the districts of the Barisal, Bhola, and Patuakhali divisions in particular are suffering from very high levels of food insecurity.

Food aid has played an important role in the past. Food aid deliveries have historically been provided for relief, and distributed directly to beneficiaries. However, with increased domestic production and the perception that direct transfers of food did little to address the underlying causes of poverty and food insecurity, the role of food aid has shifted from general relief to focused development assistance, targeting the most vulnerable in society.

In this context, Save the Children USA (SC) was awarded a Title II Development Assistance Program (DAP) that promotes food security in three highly vulnerable southern coastal districts of Barisal, Bhola and Patuakhali. This program is entitled *Jibon o Jibika* (JoJ)[5] and is being implemented in Bangladesh in collaboration with Helen Keller International (HKI), the NGO Forum for Drinking Water Supply and Sanitation, the Cyclone Preparedness Programme (CPP) of the Bangladesh Red Crescent Society and 14 local NGO partners. The program implements activities in 13 upazilas of these districts. The JoJ program has targeted a total population of over 2,600,000 individuals, with a specific focus on 180,000 children under two years of age and over 72,000 pregnant women.

The JoJ program seeks to reduce high levels of food insecurity and malnutrition with the stated goal of ***decreased household food insecurity in three districts of Bangladesh's Barisal division.*** The program is based on three interrelated strategic objectives (SOs) serving vulnerable households in the target area, especially those households with children under the age of two years. The SOs, as articulated by the program, are:

SO1: <u>Food availability and purchasing power at the household level will have increased</u>. This strategic objective is pursued through the Homestead food production (HFP) component, which supports households to apply improved home gardening, agricultural, and poultry practices. The support is intended to provide households with a wider diversity of foods in their diets, as well as to enhance household income through increased sales of crop and livestock products.

SO2: <u>The health and nutrition of pregnant women and children under the age of two will have improved.</u> Two program components support this strategic objective: Maternal and Child Health and Nutrition (MCHN), and Water and Sanitation (WASH). The MCHN component works with mothers of under-2 children to promote appropriate antenatal practices, infant and child feeding practices, and effective health-seeking behaviors for children in the household.

SO3: <u>Households will be more resilient to shocks that threaten their livelihoods.</u> The activities under this strategic objective are mostly directed toward improving local

[5] "Life and Livelihood" in Bangla.

and community preparedness for emergencies, but also include provision of support to households affected by emergencies.

Under SO1, HKI has responsibility for implementing a homestead horticulture and agro-forestry component. Under SO2, SC has been directly implementing a maternal and child health and nutrition (MCHN) component while at the same time the NGO Forum has been implementing a water and sanitation (WASH) component. Under SO3, SC works with the CPP to implement an emergency preparedness component. JoJ officially began operations on October 1, 2004, with an initial completion date of September 30, 2009. However, following Cyclone Sidr, which traveled directly through a significant part of the JoJ program area, the DAP was amended to include cyclone recovery activities as well as an extension of development operations through May 2010.

Table 1.1 presents the program indicators that are measured on the basis of household-level information. The end-line survey has been designed to provide the necessary information to measure these indicators. The indicators are broken down by strategic objective. The end-line survey is designed to provide the necessary information to measure these indicators at the end of the program and to measure changes from the baseline values.

Table 1.1 JoJ program indicators

Homestead Food Production Indicators **SO1: Food availability and purchasing power at the household level will have increased**
1. % of the population groups (reproductive-age women and children <2 yrs) of participating HHs that consume the following foods regularly: dark green leafy vegetables; pulses, animal sources of food
2. Average household net production from leafy vegetables (in kg during last 2 months)
3. % of eligible households with productive homestead gardens
4. % poultry-raising HHs successfully increasing egg production
5. % of households adopting improved production practices
6. % HHs knowing where and when to obtain technical guidance for food production
7. % HHs with poultry knowing when and how to vaccinate
8. % program participants using production practices based on up-to-date knowledge of market opportunities
9. % HH knowing how to use market price and demand information
10. Increase in diet diversity per household
Health Indicators **SO2. Health and nutrition of pregnant women and children under the age of two will have improved**
1. % children between 6 and 23.9 months stunted
2. % children between 6 and 23.9 months underweight
3. % children under the age of 2 years with diarrhea in past two weeks
4. % children 6-23.9 months being fed complementary foods in addition to breastmilk at age 6 months
5. % child caregivers with children <2 with appropriate hand washing behavior
6. % children <2 continuously fed during diarrhea
7. % children <2 years ill with ARI who were served by an IMCI-competent CHV or provider
8. % children 9-23.9 months immunized for measles at 12 months
9. % women with children <2 years who received at least 3 antenatal checkups by a qualified provider
10. % children <6 months given only breast milk
Emergency Preparedness and Responses **SO3: Households will be more resilient to shocks that threaten their livelihoods**
1. % of people in target areas with access to emergency relief supplies

2. End-line Survey Objectives

2.1 Objectives

The end-line survey of JoJ aims to: (i) assess the extent to which JoJ accomplished its stated goals and objectives; (ii) assess the effectiveness of program activities; (iii) obtain answers to key questions related to lessons learned, best practices, sustainability, and recommendations for future programming; and (iv) document/summarize the overarching lessons learned to a wider audience including partner organizations, donors, Government of Bangladesh (GOB) and other stakeholders.

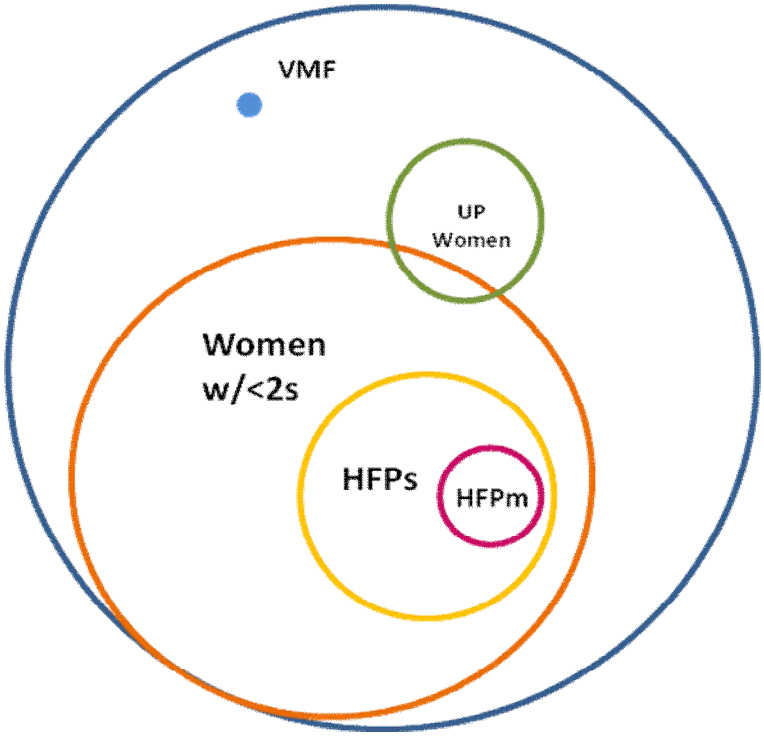
The end-line survey will support the final evaluation by: (i) providing data for key program outcome indicators; (ii) providing temporal and geographical comparisons of key indicators; and (iii) document conclusions based on quantitative results.

2.2 Program Populations

The core target population for JoJ is households with pregnant and lactating women and with children under two years of age. The program works with this population to address SO2. Activities supporting SO1 are undertaken with sub-groups of this core target population, while activities to support SO3 are directed toward communities at large within the program area. Thus, the different program components work with different sub-populations within the program area. The sub-populations of interest for the final evaluation are identified in Figure 1.

In order to provide relevant quantitative data to support the objectives of the final evaluation, representative samples of relevant JOJ sub-populations will be needed. Figure 1 illustrates the ‘universe’ of sub-populations in a village where all JoJ activities are present.

Figure 2.1. Sub-populations in a JoJ-supported village



In the figure, the largest circle represents all village households. This circle includes the beneficiaries of the WASH and the SO3 emergency preparedness program components. The next largest circle (orange) (Women w/<2s) represents all pregnant women and women with children under two years of age at any given time. These women and their households are the target beneficiaries for the MCHN component under SO2. The third largest circle (yellow) (HFPs) is a sub-set of this group and composed of women with children under two years of age who participate in homestead food production (HFP) activities under SO1, and the smaller (pink) circle within this sub-population (HFPm) is composed of women participating in marketing groups for homestead food production. The HFP activities are undertaken in 440 villages. Outside of women with children under two years of age (green circle) is a small population of ultra-poor women (a small proportion of which could also be women with children under two years of age). Finally, 440 villages throughout the program area , represented by a solid blue circle, have one household that is a Village Model Farm (VMF). Note that not all villages with MCHN programs have HFPs or VMFs.

The final evaluation is concerned with measuring changes to all sub-populations that participated in each of the components of JoJ. Therefore, the end-line survey is designed to capture changes in different sub-groups. However, not all groups require a quantitative survey. Two quantitative surveys were designed to capture changes among the major sub-populations: a Survey of Women with Under-Two Children (U2); and a Graduated Beneficiary (GB) Survey. The design of each of these two surveys is described in the following sections.

3. Types of Surveys

The end-line survey was designed with two overall objectives in mind. The first objective was to obtain information that can be directly compared with the results from the baseline survey (and where possible with the mid-term as well). To address this objective the end-line questionnaire included the same questions and response categories as the baseline survey, to ensure that the same information was captured. Some additional questions were included to measure additional indicators of household food security. The required information and procedures for calculating these additional indicators are described more fully below. To be consistent with the baseline, a sample of households with children under two years of age was drawn and interviewed.

The second, and more general objective of the end-line survey was to quantitatively measure the ways that JoJ program activities have affected beneficiaries (children, mothers, and their households) as fully as possible. The JoJ program is designed to actively support households with pregnant mothers or children under the age of two years. After children reach two years of age, their households "graduate" from the program and no longer receive direct support. However, the intention is that the support provided by the program lead to permanent behavior changes that would lead to continuing and cumulative benefits to children and households. In order to assess the extent to which program interventions have in fact provided these longer-term benefits, a second sample was drawn from households that have "graduated" from direct program support. These households participated directly in some or all of the program interventions, and their children were supported until they reached two years of age, and so have received a complete "cycle" of support from the program. They no longer participated directly in the MCHN component of the program at the time of the survey. Interviews of these households were designed to capture household knowledge, attitudes, practices, and food security status after they have completed their direct participation with the program. This information can be used to assess the long-term and cumulative impacts of the program.

The two samples explore changes in i) households with children under two years who currently participate in the MCHN program component and ii) women who participated in the past (that is, were pregnant or had children under two years of age and participated in the program). The first sample (U2) is population-based, drawn randomly from all households in selected mouzas that have children under two years of age. This sample includes households that currently participate in the program (as well as households that do not participate in any program activities (non-participants). The second sample (GB) has been randomly drawn from the list of all graduated beneficiaries. Graduated beneficiaries participated in MCHN and possibly other activities until their children reached two years of age. If they became pregnant again, they could still participate in program activities but would no longer receive any food aid incentives provided for mothers participating for the first time.

The U2 sample is a population-based survey. The sample was drawn from the target population of all households in the program area that have children under the age of two. The U2 survey addresses two issues. First, because it is a population-based survey – specifically, a random sample of households selected from the target population – the results provide an estimate of the proportion of all eligible households that actually participated in JoJ. Comparison of program registration rosters with census information suggests that the level of participation of eligible individuals was very high: at least 90 percent of all women with under-two children apparently

participated in JoJ. One of the objectives of the U2 survey was to independently confirm program participation rates using primary data.

The second issue to be addressed by the U2 survey was comparison of results from earlier survey rounds. The sample frame for the U2 survey is identical to those for the baseline and mid-term surveys, so the results from this survey are directly comparable with those from the earlier survey rounds.

The purpose of the GB survey was to measure the longer term impacts of program interventions on women, children, and households that have previously participated in JoJ, but have now graduated from direct program support. This survey focuses on measuring outcome indicators, particularly measures of behavioral changes, and also on respondents' assessments of the strengths and weaknesses of the various program interventions.

3.1 Women with Under-Two Children (U2) Sample

Study Population:	Households of women with children under two years of age
Inclusion Criteria:	All households of women with children under two years of age, residing in selected mouzas
Strata:	Districts
Sampling Frame:	Households with children under two years of age
Sample Design:	Stratified (by district), multi-stage clustered random sample (12 unions/district; 4 mouzas/union) without replacement

The survey was designed to cover the population of women with children under two years of age, and measure the proportion of women who participated in SO2 activities aimed at improving mother and child health and nutrition. The sample includes women from three categories: i) those who did not participate in any JoJ component, ii) those who participated in the MCHN component only, and iii) those who participated in both the MCHN and Homestead food production. The study compares the results across households of women in these three categories and also compares them with results from the baseline population.

Topics:	Maternal and Child Health Care Practices Nutrition and Food Security HFP (including agriculture and poultry) Anthropometrics for all children 6-24 months WASH Disaster Risk Reduction

3.2 Graduated Beneficiary (GB) Sample

The sample for this survey includes all women, and their households, who have participated and graduated from the MCHN program. The outcome indicators from this survey can be compared with those from the U2 survey, to see how differences observed against the baseline for women who have graduated from the program compare to those for current program participants (U2). The sample was designed based on the assumption that little impact on stunting would be observable in active beneficiaries because not enough time had elapsed since the last survey. The best way to measure impact thus was to assess households that had completed the whole

cycle of support of the MCHN interventions. The measured children in those households are by definition older than two years. However, it is important to note that because the children in these households are older than two years, the anthropometric measurements, with the exception of weight-for-height (which is not age-specific), are not directly comparable with either the baseline or the end-line U2 samples.

Study Population:	Households that have graduated from the MCHN program
Inclusion Criteria:	Participated in the growth monitoring and have records available through the program or center
Sampling Frame:	Households of women who participated in the program between an entry date of January 1, 2006 and an exit date of March 31, 2009
Sample Design:	Multistage Clustered Sample (30 unions; two mouzas/union; 15 households/mouza) without replacement

This sample is designed to obtain information about conditions of households that have received a complete cycle of support through the program. Because they are no longer receiving direct support, this sample provides information about the sustained impacts of program interventions on households' attitudes, practices and conditions after the interventions with the sampled households have been completed. All households selected in this sample have participated in the MCHN component. A subset of the sampled households has also participated in the HFP activities. Another objective of this sample is to assess the complementary impacts of participating in both program components by comparing the results of households that participated in both MCHN and HFP with those households that participated in MCHN only.

Topics:	Maternal and Child Health Care Practices Nutrition and Food Security WASH HFP Anthropometrics for all children 6-59 months Disaster Risk Reduction

4. Questionnaire/Tools

During the preparation for the end-line survey, the questionnaires for the U2 and GB surveys underwent extensive review by SC staff and TANGO to ensure questions were relevant (linked to program interventions), culturally appropriate, and comparable to the baseline survey. While the results of the baseline survey confirmed the relevancy of the majority of questions, post-baseline reflection suggested the need for additional exploration of factors such as reasons for participation and post-intervention outcomes.

Results of the baseline were also used to eliminate questions where the baseline results suggested that no further gains would be achieved, usually due to already high awareness in the baseline. During survey training, the end-line survey questionnaires were again pre-tested in approximately 35-50 households at the community level, using actual household interviews. A structured pre-test guide sheet was used to collect feedback, after which the questionnaire was

modified as appropriate. A final version in Bangla and English was made available after survey training.

The end-line quantitative survey is a household-level, multi-indicator survey designed to explore changes from the baseline survey regarding diverse issues related to livelihoods and well-being of those individuals and households that participated in program activities. The survey utilizes the household as the unit of analysis and, therefore, provides comparisons that can be attributable to household and community-level interventions undertaken by SC. The survey uses random selection criteria and generates results that can be generalized to the household level across the strata surveyed.

Below are the specific components of the surveys.

Demographics: Basic background information on respondent and family, including: level of education; livelihoods and income; specific information on children under 24 months of age (U2 Survey) or 24-59 months of age (GB Survey).

Homestead Food Production: Detailed information on homestead agricultural activities; improved cultivation practices; household production of fruits and vegetables; and poultry raising.

Household-level Food Security: This section provides details on diet diversity and quality. In addition to the indicators reported in the baseline survey, categories based on the Food Access Survey Tool (FAST) and the Diet Diversity Score (DDS), two additional indicators of household food security are also measured in the end-line survey: the Food Consumption Score (FCS) and the Coping Strategy Index (CSI). The FCS provides a more accurate measure of the quality of the household diet, and the CSI provides information about household vulnerability to food insecurity during times of stress.

Maternal and Child Health Care Practices: This section includes information about antenatal care, breastfeeding and infant feeding practices, child vaccination coverage, prevalence and treatment of common childhood illnesses, and care-seeking practices for those illnesses.

Anthropometrics: Weight, height and age measurements for children 6-24 months (information collected in the survey of households with under-2 children) and 24-59 months (collected in the survey of households of graduated beneficiaries).

Water and Sanitation: Access to and use of safe water sources and sanitation facilities; hand-washing behaviors.

Disaster Preparedness and Response: Includes information on disaster preparedness and response: experiences with early warning systems; flood disaster; and access to disaster shelters.

5. Sampling Methodology

Multi-stage sample designs were used for the end-line household-level surveys. The sample design for the U2 sample followed that of the baseline to ensure that the results are comparable. The GB sample was designed to capture information about graduated beneficiaries, so its sample frame is different from the other two surveys.

5.1 U2 Survey

The first stage of the survey of women with under-two children (U2) is a stratification of the area by the three districts (Barisal, Bhola and Patuakhali). This stratification is justified based upon

the diverse geographical and cultural conditions of the JoJ operational area, which makes resources available to households sufficiently different to expect a geographical variation in livelihoods and resources. This stratification is the same used in the baseline survey, so temporal comparisons can be disaggregated by district. The second stage was the selection of unions within the three districts. The number of unions selected per district was 12, due to expected magnitude of intra-union variation being relatively large compared to inter-union variation, thus minimizing sampling error. Unions were selected using the probability-proportional-to-size (PPS) technique.

The third stage of sampling was the random selection of four mouzas within selected unions. The final stage of the sampling process was the selection of women with children under two years of age. In each mouza, a fixed number of women with children U2 was selected using the systematic random sampling method. Details of sample selection are provided below.

Number of Clusters and Planned Respondents per Cluster

A minimum required sample size of 897 households per stratum was computed. Annex 1 provides details for the computation of the minimum required sample size. Within each of the three districts (strata), 12 unions were selected as clusters within the districts. The unions were selected using the PPS technique. Within each selected union, four mouzas were randomly selected from the list of all mouzas in the union.

Table 5.1 Sample design characteristics

	Number
Calculated Minimum Sample Size per Stratum	897
Number of Strata	3
Minimum Total Sample Size Required	2,690
Planned Sample Size per Stratum (includes 5 percent for non-response)	941
Planned Total Sample Size	2,824
Number of unions/district	12
Number of mouzas per union	4
Households with under-two children selected per mouza	20

Union and Mouza Selection

For the end-line survey, all unions were selected using PPS. Annex 2 provides details of the union selection for the U2 Survey.

A total of four mouzas was selected randomly from the list of all mouzas in the selected unions. Annex 2 provides details of the mouza selection for the U2 Survey.

Household (Mother) Selection

Within the selected mouzas, households with under-two children represent the target population from which households were selected. Since there is no list of all such households per mouza that could serve as a sample frame, the selection of households was made within the mouzas by following a variant of systematic random sampling, based on geographic ordering of the households. Because there was no list of individual households, the number of households with under-two children was approximated by using the number of households registered in the

MCHN program, which is available at the mouza level. Using this information, an interview skip value (k) was calculated by dividing the estimated total number of households in the mouza with under-two children by 20. The survey team entered the selected mouza from the main road entrance. The first household to be selected was chosen by randomly selecting a number between one and k, and counting to this household from where the team enters the mouza. If the selected household had an under-two child, it was interviewed. If the household did not have an under-two child, the adjacent houses were contacted sequentially until a house was found with an under-two child, and this would be the first household interviewed. After interviewing the first household, k-1 households were skipped, and the kth household was selected if it had an under-two child. If not, the adjacent households were contacted sequentially until a household with an under-two child was found. This procedure was followed until 20 households with under-two children were selected and interviewed. By using the skip value of k, the total number of households with under-two children was spanned in the selection process. Annex 3 shows the selection process schematically. Following this process, each household with an under-two child has an equal probability (1/k) of being selected (see Annex 4).

Potential Problems / Challenges with Household (Mother) Selection:

1. No one is at home
2. Male spouse at is home but mother is not at home
3. Only a grandmother or other relative is at home
4. Mother refuses to participate in the survey

If a household was selected and confirmed to have an under-two child, but the mother was not present, the interviewer left a message and returned to interview the mother later in the day. If it was not possible to interview the mother during the time the team was in the mouza, the household was counted as a non-response, and not replaced.

5.2 GB Survey

The GB survey was not stratified by district, since the objective of the survey was to measure changes in behaviors and household conditions after a household exits the program, and these changes were not expected to vary systematically across the districts.

Sample Size

The estimation of the minimum required sample size was the same as the procedure used for the U2 sample, described in Section 5.1 above. The only difference was that, because the survey is not stratified by district, only one comparison group was relevant, representing the three districts of the program intervention area. Thus, the minimum sample size required for the GB survey was 897 households.

For this survey, a modified 30 X 30 cluster sample strategy was developed, to provide a total planned sample of 900 households. The first stage of sampling was to select 30 unions from the three districts of the program area using the PPS selection procedure. In the second stage, two mouzas were randomly selected in each of the 30 selected unions. The third stage of sampling was the random selection of women that had ‘graduated’ from the MCHN activities. The women were systematically randomly sampled from lists of women that previously participated in JoJ,

but were currently graduated from receiving direct assistance (because their children were older than two).

Union and Mouza Selection

For the GB survey, the 30 unions were selected using PPS from a complete list of all the unions in the three program districts. The mouzas were selected randomly from the list of mouzas in the selected Unions. Annex 2 provides details of the union and mouza selection for the GB Survey.

Household (Mother) Selection

Households (mothers) were selected randomly, using a systematic random sampling procedure from beneficiary lists of women who participated in JoJ but exited the program on or before March 31, 2009. Based on initial field experience during field testing, it was found that many of the households on the participant lists had either moved or were not at home during the time of the survey. In order to address this situation, a total of 25 names were selected for each mouza, and the survey teams were instructed to work down the list until they had completed 15 household surveys in each mouza.

Potential Problems / Challenges with Household (Mother) Selection:

1. No one is at home
2. Male spouse at is home but mother is not at home
3. Only a grandmother or other relative is at home
4. Mother refuses to participate in the survey

If any of the above situations or any other problems were encountered, the household was skipped, and the interviewers were instructed to continue to the next household on the list. A record was kept of how many households were skipped and for what reason.

6. Survey Implementation and Logistics

Save the Children USA in Bangladesh contracted TANGO International to undertake the quantitative household end-line survey. TANGO International contracted a local consultant to act as the quantitative survey manager. The survey manager, with final approval of TANGO International, hired a team of interviewers. A total of seven interview teams were formed: five to conduct the U2 survey, and two to conduct the GB survey. The U2 teams were comprised of one supervisor, four household interviewers and two anthropometric measurers. The GB teams were made up of one supervisor, three interviewers and two anthropometric measurers. The interviewers and anthropometric measurers recorded all information directly into personal digital assistants (PDAs).

7. Survey Results

The following section reports results from the two samples of the end-line survey: U2 and GB. Where available, the baseline results are also reported for purposes of comparison. The baseline provides information about household characteristics, knowledge and practices prior to program interventions. The U2 sample results represent the characteristics of households that are currently participating in the program, and the GB results characterize households that had previously participated in the program and had graduated from the program at the time of the

survey. Comparison across these groups thus provides some insight into program impacts on households over time.

First, information about household participation in the program components in the two samples will be presented, broken down by different categories of household economic status. Then general household demographic characteristics will be presented and compared with the baseline results. Next, results will be presented following the order of the strategic objectives: homestead food production, food security and nutrition (SO1); maternal and child health care practices, water and sanitation, and anthropometric indicators (SO2); and disaster preparedness and response (SO3).

7.1 Program Participation

Table 7.1 provides a breakdown of the surveyed households by participation in JoJ component activities, MCHN and HFP. In all, the U2 sample includes 2,821 households. Of these households, selected randomly from the population of households with under-two children, over 90 percent participated in the MCHN program, and 14 percent also participated in the VMF program. Since this is a random sample, these proportions are statistically representative estimates of the overall participation rates in the program area. In fact, the level of coverage in the MCHN was extremely high, and consistent with secondary population information and program records. In the GB sample, all selected households were necessarily graduated participants of the MCHN program. Within this sample, about 13 percent also participated in the VMF program, roughly the same as in the U2 sample.

Table 7.1 Number of households participating in JoJ program components

	Number	%
U2 Sample		
Total Sample	2,821	100.0
Non-participant	244	8.6
Current participant – MCHN	2,577	91.4
Current Participant - HFP	387	13.7
GB Sample		
Total Sample	897	100.0
Participant – HFP	113	12.6

Figures 7.1 a-c present information about the economic status of households by category of household participation. These figures address two issues: i) the degree to which program interventions were targeted toward households of lower economic status, and ii) the extent to which participation in program activities improved the economic status of households. The survey provides information to construct three different measures of household economic status:

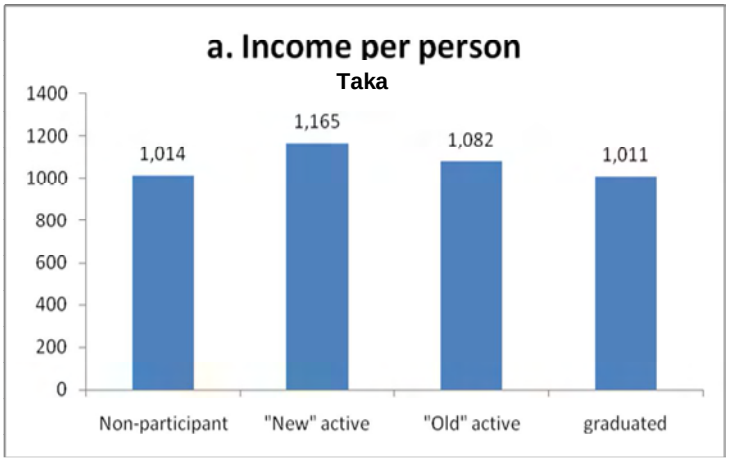
- Monthly household income per household member: This information was obtained from a question asking how much money the household earned in a month from all activities of the husband, wife and other household members. This amount is then divided by the number of household members to compute the monthly income per family member.
- Total monthly household expenditures per household member: Households were asked to report their monthly expenditures in eight categories (housing, food, utilities, education, transport, medical, loan repayment, others). Total monthly household

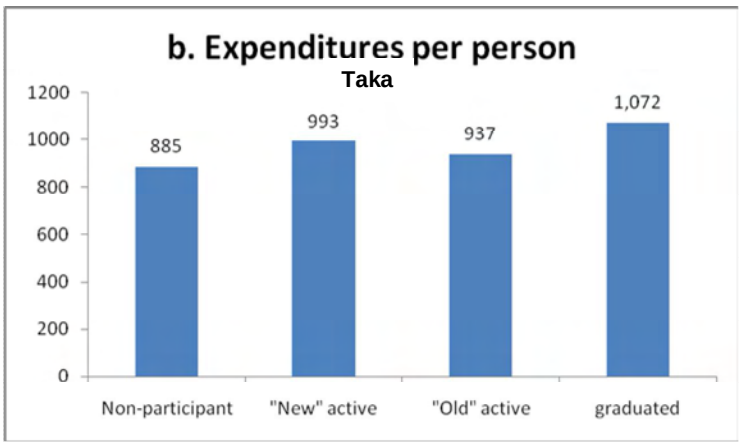
expenditures were computed by adding these categories, and then dividing by the number of household members.

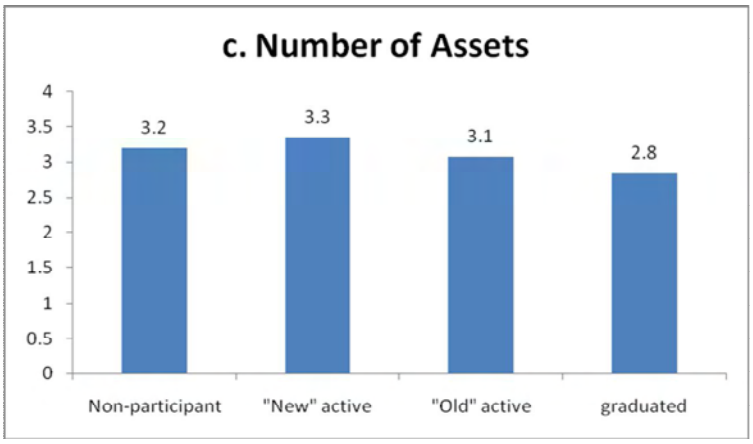
- Number of different types of assets possessed by the household: Households were asked if they possessed any of a list of eleven household assets (wardrobe, table/chair/bench, clock, bed, radio, television, bicycle, motorcycle, telephone, rickshaw/van). The number of types of assets possessed by a household was computed by adding up the unique types of asset possessed by the household.

Conceptually, household income and expenditures are normally very closely related, although consumption may show less variation than income over time, as households save income in good times, and draw down savings in bad times to smooth out consumption over time. Operationally, both these measures are difficult to measure accurately, since they are both based on recall of factors that may fluctuate greatly over time, and the interview respondent may not be aware of all the sources of income or the expenditure patterns of all other household members. In addition, there is often concern that responses may be biased, especially concerning household income, as respondents may wish to exaggerate their level of economic distress or hide their level of economic activity. Generally, information on expenditures is considered to be more accurate than incomes, although there are also serious concerns about the accuracy of expenditure information based on respondent recall. Both the income and expenditures are measured per household member. This is to adjust for the different consumption needs of households of different sizes.

Figure 7.1 a-c. Economic status variables by category of program participant, end-line survey







Notes: "New" active – joined in 2008 or 2009. "Old" active – joined prior to 2008.
Income and expenditures per person: reported monthly amounts by respondents.

The number of household assets, as opposed to current income, is used as a measure of household wealth. This indicator provides an indication of the longer-term economic condition of the household. Households that have been able to accumulate a large number of assets have enjoyed substantial periods of income greater than that needed to meet the basic consumption needs of household members. Alternatively, households with few assets have income that normally just meets basic subsistence requirements, or have recently suffered economic shocks that required them to dispose of assets to meet their consumption needs.

In general, there are no important differences in economic status of non-participants, current participants, and graduated participants. In particular there is not strong evidence that program participation is biased toward households of either higher or lower economic status. This is not surprising, since in fact, over 90 percent of all eligible households in program areas currently participate, at least in the MCHN component, so the participating households must include most of the entire spectrum of economic conditions. Figures 7.1 a-c show the relationship between these economic status indicators and the duration of participation in the program. In the figures, "New" active participants are those that have joined MCHN in 2008 or 2009. "Old" active participants are those that joined MCHN in 2007 or 2008. "Graduated" are those that have left the program before March 2009. Overall, the indicator values are quite similar across the participation categories, and there are no clear patterns of differences. Income per person is higher for participants than non-participants, but shows a general decline with increased duration of participation in the program. Expenditures are also somewhat higher for participants than non-participants, but show no clear relationship with duration of program participation. Number of assets also shows a general pattern of decline with duration of program participation.

Overall these results suggest that program participants have a slightly better economic status than non-participants, but the difference is very small. (The differences in household income and expenditures between non-participants and participants are statistically significant at the 0.1 level, but the number of assets is not significantly different across the groups.) There is no clear indication of increase in economic status with duration of program participation.

The program activity that can be expected to affect household incomes most directly is the homestead food production component. Table 7.2 presents the differences in the economic status variables broken down by participation in the HFP component. This table also shows that there is no increase in the economic status indicator values associated with participation in this component. It should be emphasized that the benefits from the HFP program may not show up as increased cash income from sales of agricultural or livestock products, but rather in improved household food consumption patterns from products produced by the households.

Table 7.2 Economic status variables by HFP participation

	U2			GB		
	Participant	**Non-participant**	**All**	**Participant**	**Non-participant**	**All**
Expenditures per person (taka)	930	959	955	996	1013	1011
Income per person (taka)	1116	1112	1113	1042	1077	1072
Number of assets	3.2	3.2	3.2	2.7	2.9	2.8
N	387	2434	2821	113	784	897

7.2 Household Demographics and Characteristics

Table 7.3 and Figures 7.2 and 7.3 show the distributions of individuals in the surveyed households by gender and age category. The proportion of individuals in the different age categories does not follow the pattern of the population of Bangladesh, which has a smoothly (exponentially) decreasing proportion of individuals in each age category. The pattern in both the U2 and GB samples is quite different, with a relatively small proportion of older children and young adults age 11 - 20, a large proportion of women in the 21 - 30 age category, and a large proportion of men in the 31 - 40 age category. This pattern is a result of the selection process for the two samples. Only households with young children were selected for both samples: children under two years in the U2 sample, and children two to five years in the GB sample. Because of this selection process, households having only older children were excluded. The mothers of young children fall predominantly in the 21 - 30 age category, while their husbands tend to be older, with a large proportion falling into the 31 - 40 age category. Also, Table 7.3 reveals that Bhola has a significantly higher percentage of children 10 and under than the other two districts.

Education levels of all individuals in the surveyed households over 15 years of age are reported in Table 7.3. Overall over half of these individuals have less than a complete primary education, with the percentage higher in the GB sample, at just over 60 percent. Within the U2 sample, the percentage of individuals with less than primary education is highest in Bhola and lowest in Barisal. There are not marked differences in education achievement between males and females, and in fact a slightly higher percentage of females has primary or higher education than males. Education attainment has improved somewhat since the baseline survey round, wherein 31.2 percent of individuals reporting having no education, 28.2 percent reported primary incomplete, 15.1 percent had completed primary education, and 25.5 percent had achieved secondary level or more. The geographic pattern of variation in education levels was similar in the baseline, with Bhola having the lowest level of education achievement, and Barisal the highest.

The end-line survey obtained information about income-earning activities of all individuals in the surveyed households by category of activity. Figure 7.4 shows the percentage of households engaged in a specified list of occupations for both the U2 and GB samples. Note that individuals could report more than one occupation, and more than one individual in a household can be engaged in an activity, so the proportions can add to more than 100 percent.

Table 7.3 Age distribution and education level of individuals in U2 and GB samples

	End-line - U2								End-line - GB	
	Barisal		Bhola		Patuakhali		All			
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
%	48.4	51.6	49.3	50.7	49.1	50.9	48.9	51.1	49.2	50.8
Age Categories (% of individuals)										
<= 10	36.8	37.6	40.2	40.2	35.8	36.7	37.6	38.2	39.8	39.9
11 - 20	12.0	15.4	12.6	17.2	11.6	14.9	12.0	15.8	13.5	13.1
21 - 30	16.5	23.1	16.8	22.0	18.2	24.4	17.1	23.2	13.6	24.6
31 - 40	18.0	8.5	16.2	8.0	18.0	7.5	17.4	8.0	18.7	9.6
41 - 50	6.2	37.6	5.7	3.5	5.2	4.9	5.7	4.4	6.6	4.0
51 - 60	3.8	5.7	2.9	5.2	4.6	6.8	3.8	5.9	2.8	4.7
61 - 70	4.4	3.7	3.7	3.2	5.1	3.2	4.4	3.4	3.0	2.8
> 70	2.3	1.4	1.7	0.8	1.6	1.5	1.9	1.2	2.0	1.4
Education Categories (% of individuals)										
Illiterate	15.2	21.3	33.3	36.2	17.6	24.0	21.7	26.9	20.3	25.1
Can sign	24.0	21.4	32.3	28.9	31.1	28.9	29.1	26.3	35.3	35.4
Primary	21.7	24.8	13.8	17.8	18.3	22.3	18.1	21.8	19.5	19.1
Under SSC	20.7	21.8	10.9	12.3	17.7	17.8	16.6	17.5	16.4	16.2
SS/Dhakhil or higher	18.4	10.6	9.7	4.8	15.3	7.0	14.6	7.6	8.5	4.2

Figure 7.2 Population Pyramid – U2 sample

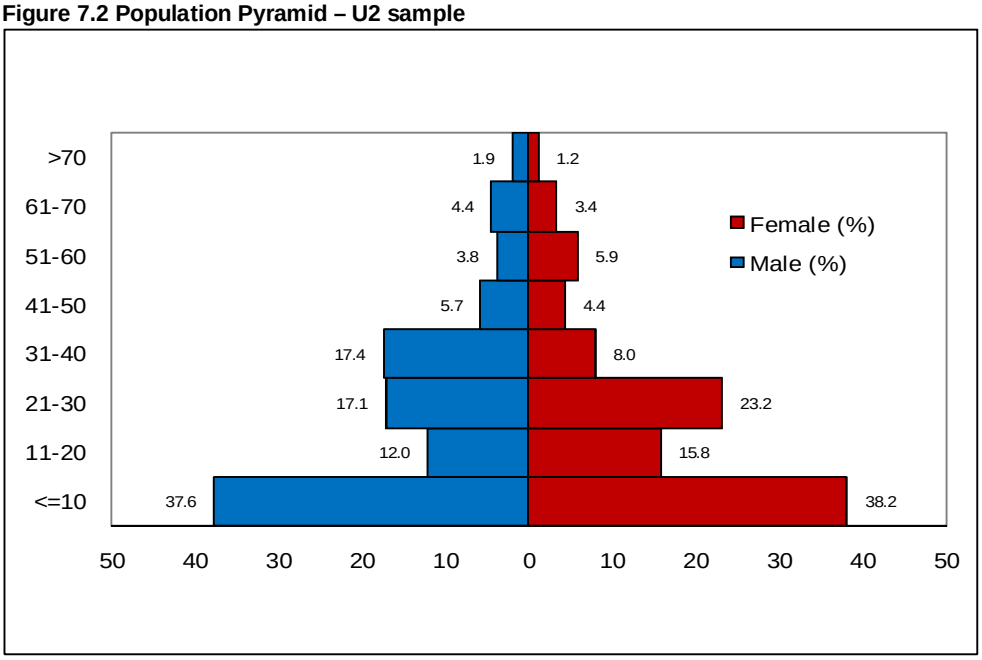


Figure 7.3 Population Pyramid – GB sample

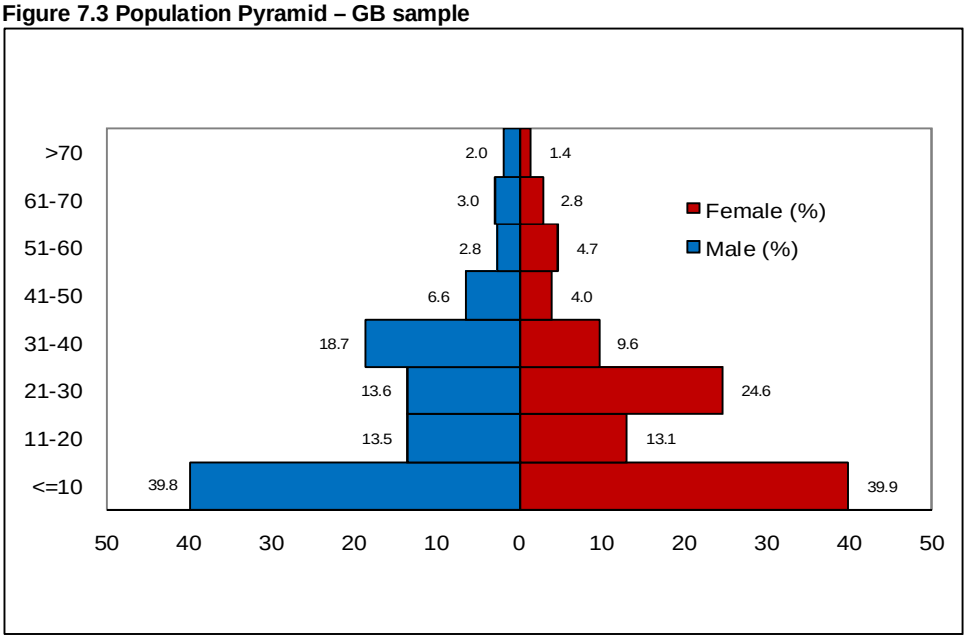


Figure 7.4 Percent of households reporting members engaged in selected occupations

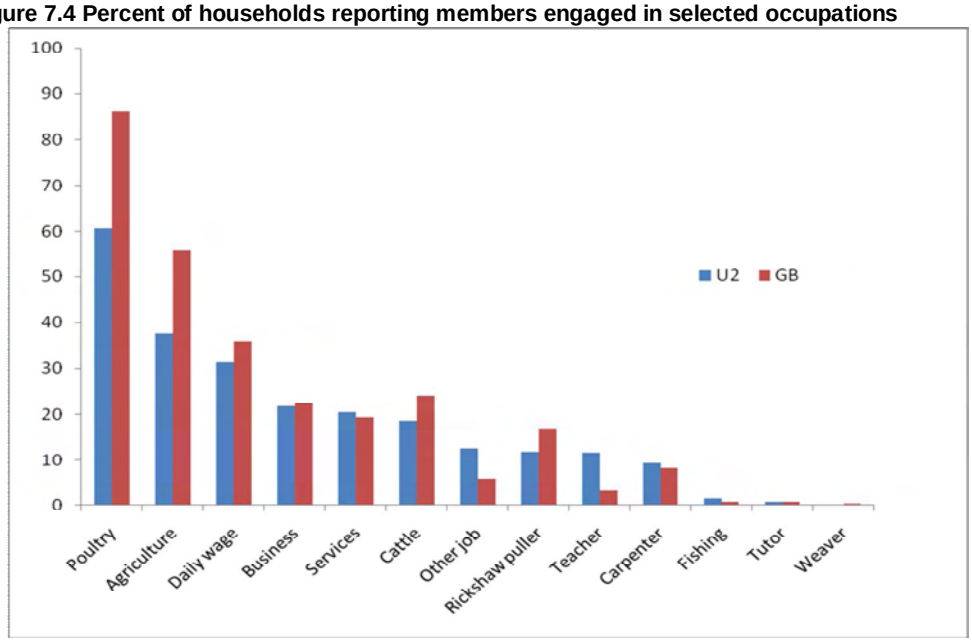
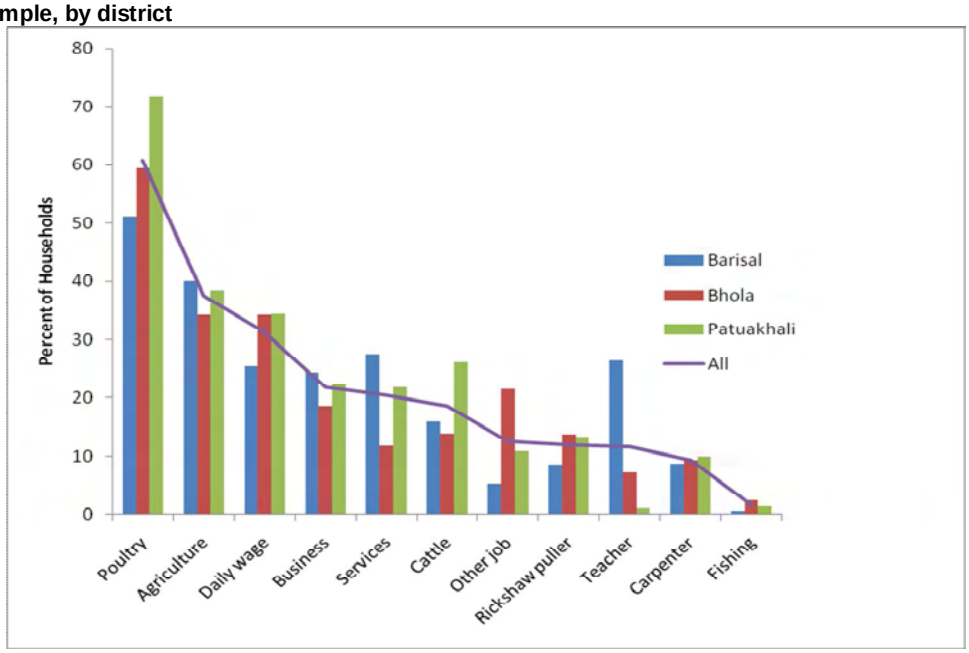


Figure 7.5 Percent of households reporting members engaged in selected occupations in U2 sample, by district



The most widely cited activity is raising poultry, which was reported by 60 percent of households in the U2 sample and 85 percent in the GB sample. The next most common activity is agriculture, but as with poultry, there are marked differences between the U2 and GB samples. Slightly under 40 percent of households in the U2 sample reported agriculture, compared with almost 60 percent in the GB sample. Over 30 percent of households in both samples reported that some household member engaged in daily wage labor. Twenty to twenty-five percent of households reported that a household member was engaged in business, services and cattle. The remaining activities were reported by fewer than 20 percent of the surveyed households. Rickshaw pulling is a relatively important occupation, especially in the GB sample, and 12 percent of households in the U2 sample had a teacher. Figure 7.5 shows the geographic variation in the frequencies of reported occupations from the U2 sample.

The percentages of households broken down by strata of household income level from both the baseline and end-line rounds are reported in Table 7.4. The income categories for the end-line were increased by a factor of 1.4 to account for inflation from the time of the baseline to the end-line survey round. The percentage of households in the different categories is quite stable from the baseline to the end-line. The average income in the U2 sample increased by 34 percent from the baseline, and for the GB sample the increase was only 19 percent. These increases in the nominal income were less than the aggregate inflation of 40 percent over the four years between survey rounds, so real (inflation-adjusted) household incomes actually decreased slightly.

7.3 Homestead food production

The JoJ program operates in rural areas, where agricultural activities play a critical role in household livelihoods. The program has undertaken a series of interventions to support improved agricultural, gardening, and poultry production activities. Support has focused on increasing household production of agricultural and livestock products that can improve the diets of the households as well as provide additional cash income through market sales. Overall, the results show substantial uptake of messages about improved gardening and poultry practices. A large portion of households that do not or did not participate directly in HFP now report utilizing practices recommended in that program component. In addition, the graduated beneficiary households generally show an even higher rate of utilization of recommended practices than current program participants.

Land is an extremely scarce resource in Bangladesh. As shown in Table 7.5, over half of the surveyed households in the baseline survey had no land and an additional 20 percent had 50 decimals or less of cultivable land. Access to land was most restricted in Bhola, and relatively more households had access to land in Patuakhali, where over 40 percent of households had more than 50 decimals of land. The pattern of household access to land showed a slight deterioration from the baseline to the end-line. In both the U2 and GB end-line samples, about 57 percent of sampled households had no cultivable land, compared with 51 percent in the baseline. Conversely, the percentage of households with 50 decimals or more of cultivable land decreased relative to the baseline. These changes in land access over time are not surprising, and reflect the growing population pressure on the limited resource base in Bangladesh.

Table 7.4 Percent of households by income category, baseline and end-line surveys

Income Categories (Taka)	Baseline	Income Categories (Taka)	End-line U2	End-line GB
<=1000	0.8	<=1,400	0.4	1.0
1,001-2,500	22.1	1,401-3,500	25.2	24.3
2,501-5,000	50.0	3,501-7,000	50.2	59.5
5,001-7,500	11.9	7,001-10,500	15.0	8.6
7,501-10,000	9.8	10,501-14,000	3.7	3.0
10,000+	5.4	14,000+	5.6	3.6
Average HH Income (Taka)	4,670		6,260	5,570
% change from baseline			34.0	19.3

Notes:
Income categories have been increased by a factor of 1.40 to account for inflation from 2004 to mid-2009.
Frequency distributions of the U2 and GB samples are different from the baseline at the 0.01 significance level.

Table 7.5 Percent of Households possessing cultivable land, homestead gardens, and other specific types of gardens

	Baseline				End-line – U2				End-line GB
	Barisal	**Bhola**	**Patuakhali**	**Total**	**Barisal**	**Bhola**	**Patuakhali**	**Total**	
Ownership of cultivable land									
No cultivable land	41.3	73.3	38.4	51.4***	48.4	72.3	51.3	57.3***	56.9***
<50 decimals cultivable land	28.7	12.0	20.4	20.1	22.9	14.4	22.9	20.1	23.6
50+ decimals cultivable land	29.8	14.4	41.0	28.3***	28.8	13.3	25.7	22.6***	19.5***
N[1]	*1,506*	*1,665*	*1,636*	*4,807*	*949*	*939*	*933*	*2,821*	*897*
% with homestead garden	66.8	47.1	78.3	63.9	66.5	44.6	69.3	60.2***	64.8
Of which, have "developed" garden									
<50 decimals cultivable land	21.9	1.4	10.0	11.2	28.8	25.1	31.0	28.6***	42.5***
50+ decimals cultivable land	28.5	5.5	12.1	16.3	30.2	34.1	34.2	32.4***	51.8***
All	24.4	2.4	11.0	13.2	29.3	27.0	32.0	29.8***	44.8***
N[2]	*1,005*	*784*	*1,282*	*3,071*	*631*	*419*	*647*	*1,697*	*581*

N^1 is all surveyed households; N^2 is all households with a homestead garden.
* end-line value different from baseline value at .10 significance level
** end-line value different from baseline value at .05 significance level
*** end-line value different from baseline value at .01 significance level

The JoJ program has emphasized support to garden production as a means to increase household incomes and provide access to more varied and nutritious foods for household consumption. Overall, there was not much change in the percentage of households having gardens from the baseline to the end-line survey rounds. Sixty-four percent of households had gardens in the baseline, almost identical to the 65 percent in the end-line GB sample. The percentage of households with gardens was somewhat lower in the U2 sample, at 60 percent. The survey also recorded, based on observation of the interviewers, whether or not the garden could be classified as "developed." A homestead garden is defined as "developed" if it has a designated, fenced-off area of land and has at least some production year round. Table 7.5 shows the percentage of households with developed gardens (out of households that have gardens), broken down by categories of cultivable land. Overall there has been a large increase in the percentage of households that have developed gardens, from 13 percent in the baseline to 30 percent in the U2 sample and 45 percent in the GB sample.

Table 7.6 shows the percentage of households that utilize one or more of a range of improved gardening techniques (bed system, quality seed, organic fertilizer, and organic pesticide).[6] In the U2 sample, about three-quarters of all households with gardens reported utilizing at least one of the improved techniques, and over 20 percent reported using three or more techniques. Use of improved techniques is quite similar between the baseline and U2 samples. The percent using at least one technique is slightly lower than in the baseline, but the percent using three or more is the same. In contrast, the GB households have significantly higher utilization rates than households in either the baseline or the U2 samples, suggesting that farmers adopt the improved gardening techniques only after some time lag after receiving support from JoJ. The change in the percent of households using three or more improved techniques is particularly marked, from less than 20 percent in the baseline to almost one half in the GB sample. Rates of utilization of improved techniques are higher in Patuakhali compared to the other two districts. There is little difference in utilization rates between larger and smaller famers.

Table 7.7 compares the utilization of improved gardening techniques of households that participated in HFP with those that did not. Not surprisingly, utilization rates are very high for HFP participants: over 90 percent in the U2 sample use at least one technique and 40 percent use three or more. More interestingly, the table results suggest a process of diffusion of these techniques over space and over time. The use of improved techniques is also quite high among the households that did not participate in HFP, suggesting that even households that do not participate directly in the program are finding out about the new techniques and adopting them.

Comparing the GB results with the U2 results in Table 7.7 emphasizes that utilization rates are higher for the GB households that have participated in the HFP for a longer time than the households in the U2 sample, suggesting that adoption of the techniques occurs with some

[6] Intensive land use was included in the baseline report and the end-line questionnaires. However, this technique was excluded from the analysis in Table 7.6, because the definition of this technique was vague, and up to the interpretation of the interviewer. In addition, the percentage of households reporting intensive land use was over 90 percent in the baseline, which suggests that the interviewers used a very broad definition of this technique.

Table 7.6 Percent of households using improved production techniques

	Baseline				End-line U2				
	Barisal	Bhola	Patuakhali	Total	Barisal	Bhola	Patuakhali	Total	GB
< 50 decimals of land									
1+ improved techniques	86.4	60.5	88.5	79.1	68.7	75.2	87.3	77.6	85.5***
3+ improved techniques	17.8	11.8	26.0	18.9	12.1	19.9	30.4	21.2	49.5***
N[1]	*623*	*585*	*681*	*1889*	*406*	*331*	*448*	*1185*	*440*
>= 50 decimals of land									
1+ improved techniques	89.8	67.8	92.3	87.4	72.9	76.1	81.9	77.0***	92.9*
3+ improved techniques	21.1	15.6	33.4	26.5	13.3	26.1	34.2	23.6	52.5***
N[2]	*383*	*199*	*601*	*1183*	*225*	*88*	*199*	*512*	*141*
All HH with Gardens									
1+ improved techniques	87.7	62.4	90.3	82.3	70.2	75.4	85.6	77.4***	87.3***
3+ improved techniques	19.1	12.8	29.5	21.8	12.5	21.2	31.5	21.9	50.3***
N[3]	*1006*	*784*	*1282*	*3072*	*631*	*419*	*647*	*1697*	*581*

Notes:
N^1 is the number of households with less than 50 decimals of land and a garden; N^2 is the number of households with over 50 decimals of land and a garden; N^3 is the number of households with a homestead garden.
1+ improved techniques: households that have adopted at least one of the following improved gardening techniques: bed system, quality seed, organic fertilizer and organic pesticides.
3+ improved techniques: households that have adopted three or more of the improved techniques.
n/a: data not available in JoJ Baseline Survey Report
* end-line value different from baseline value at .10 significance level
** end-line value different from baseline value at .05 significance level
*** end-line value different from baseline value at .01 significance level

Table 7.7 Percent of households adopting improved gardening techniques by HFP participation

	End-line - U2		End-line - GB	
	HFP participant	**Non-participant**	**HFP participant**	**Non-participant**
1+ improved techniques	90.6***	74.6	99.0***	84.9
3+ improved techniques	39.6***	18.2	77.3***	44.8
Developed Homestead Garden	46.0***	26.3	67.0***	40.3
N	*298*	*1399*	*97*	*484*

Notes:
N is the number of households with a garden.
1+ improved techniques: households that have adopted at least one of the following improved gardening techniques: intensive land use, bed system, quality seed, organic fertilizer and organic pesticides.
3+ improved techniques: households that have adopted three or more of the improved techniques.
* HFP participant value different from non-participant value at .10 significance level.
** HFP participant value different from non-participant value at .05 significance level.
* ** HFP participant value different from non-participant value at .01 significance level.

delay from the time when households begin to receive training on the techniques. Overall the utilization of improved techniques is higher in the GB sample than the U2 sample, with the utilization rates significantly higher for participants compared with the rates for non-participants in both samples.

Information about production of fruits and vegetables is provided in Tables 7.8 – 7.10. Overall, there is not much variation in the percentage of households growing fruits and vegetables in the two months prior to the survey, either across districts or across the two samples (Table 7.8). Average production of dark green leafy vegetables, shown in Table 7.9, has increased for small farmers in the U2 sample compared with the baseline, while production of larger farmers has not changed much. Interestingly, the graduated households reported significantly higher production than either the baseline or the U2 samples. This result is consistent with the greater use of improved techniques by households in this sample compared with the U2 sample.

Table 7.10 shows that a higher percentage of HFP participants grew dark green leafy vegetables and achieved higher production than non-participants, although the difference in production between HFP and non-HFP participants is not statistically significant in the U2 sample. Again, the difference in production levels is most marked in the GB sample.

Tables 7.11 and 7.12 report the uses of fruit and vegetables produced by the households. In the case of fruits, a somewhat smaller percentage of households in the U2 sample sold fruits, and the percentages that sold vegetables are quite similar between the baseline and U2. The percentage of households in the GB sample that sold both fruits and vegetables is higher than the U2 sample, and for vegetables it is significantly higher than the baseline as well.

Tables 7.13 and 7.14 provide information about poultry. Recall from above that poultry raising was the most frequently cited economic activity by households in both of the end-line survey samples. This is reflected in Table 7.13. Overall over 80 percent of households in the U2 sample and almost 90 percent in the GB sample raised poultry. There is a somewhat greater tendency for larger farms to have poultry, but even among households without any agricultural land, 80 – 85 percent have poultry. This is an activity that even resource-poor households can engage in. There is not much variation across the districts, with Bhola the lowest at 79 percent raising poultry, and Patuakhali the highest at 86 percent. Adoption of improved poultry varieties is generally quite low – the proportions in the U2 sample are even lower than in the baseline. However, the GB sample shows a significantly higher proportion of households adopting improved breeds compared with the baseline, even though the absolute values are still quite low, less than five percent overall. As with fruits and vegetables, there is not much difference in the uses of eggs produced by the households between the baseline and U2, but the percentage of households in the GB sample selling eggs is markedly higher than either the baseline or the U2 sample (Table 7.14).

Table 7.8 Percent of households growing vegetables and fruits

	End-line – U2				End-line
	Barisal	**Bhola**	**Patuakhali**	**Total**	**GB**
< 50 Decimals of Land					
% producing fruit in last two months	53.0	58.2	45.7	51.0	44.8
% producing vegetables in last two months	87.2	87.3	87.7	87.4	63.2
N[1]	*149*	*79.0*	*162*	*390*	*212*
≥ 50 Decimals of Land					
% producing fruit in last two months	64.9	70.5	63.3	65.2	54.9
% producing vegetables in last two months	80.0	76.1	87.9	82.4	72.0
N[2]	*225*	*88*	*199*	*512*	*175*
All HH with gardens					
% producing fruit in last two months	55.2	56.6	50.1	53.6	58.2
% producing vegetables in last two months	76.9	74.7	80.7	77.8	80.2
N[3]	*631*	*419*	*647*	*1697*	*581*

Notes:
N^1 is the total number of households with less than 50 decimals of land; N^2 is the total number of households with over 50 decimals of land. N^3 is the total number of households with gardens.

Table 7.9 Average household production of dark green leafy vegetables

	Baseline				End-line – U2				End-line
	Barisal	**Bhola**	**Patuakhali**	**Total**	**Barisal**	**Bhola**	**Patuakhali**	**Total**	**GB**
< 50 Decimals of Land									
Vegetable Production (kg)	8.6	8.9	11.4	9.7	12.2	18.2	16.5	15.2	31.8
N[1]	*623*	*585*	*681*	*1889*	*120*	*58*	*126*	*304*	*134*
≥ 50 Decimals of Land									
Vegetable Production (kg)	16.4	33.2	26.2	24.2	25.1	29.6	24.7	25.6	40.2
N[2]	*383*	*199*	*601*	*1183*	*180*	*67*	*175*	*422*	*126*
All HH with gardens									
Vegetable Production (kg)	11.6	15.1	18.3	15.3	16.7	19.6	17.9	17.8	37.9
N[3]	*1006*	*784*	*1282*	*3072*	*485*	*313*	*522*	*1320*	*467*

Notes:
N^1 is number of households with under 50 decimals of land that produce vegetables; N^2 is the number of households with over 50 decimals of land that produce vegetables, N^3 is the total number of households that produce vegetables.

Table 7.10 Dark green leafy vegetable (DGLV) production in previous 2 months, by HFP participation

	End-line - U2		End-line - GB	
	HFP participant	**Non-participant**	**HFP participant**	**Non-participant**
Percentage that produce DGLV	81.9*	76.9	85.6**	79.3
N[1]	*298*	*1399*	*97*	*484*
DGLV production (kg)	20.8	17.2	53.1**	34.6
N[2]	*244*	*1076*	*83*	*384*

N[1] is all households with a homestead garden. N[2] is all households that produce DGLV.
* HFP participant value different from non-participant value at .10 significance level.
** HFP participant value different from non-participant value at .05 significance level.
* ** HFP participant value different from non-participant value at .01 significance level.

Table 7.11 Percent of household reporting selected uses of household fruit production

	Baseline				End-line – U2				End-line
	Barisal	**Bhola**	**Patuakhali**	**Total**	**Barisal**	**Bhola**	**Patuakhali**	**Total**	**GB**
< 50 Decimals of Land									
Consume	99.5	99.2	99.3	n/a	97.5	100.0	98.6	98.5	100.0
Sell	7.3	17.8	19.1	n/a	1.3	17.4	12.2	9.0	22.1
Give Away	47.0	27.5	40.0	n/a	17.7	15.2	29.7	21.6	24.2
N[1]					*79*	*46*	*74*	*199*	*95*
≥ 50 Decimals of Land									
Consume	98.4	100.0	99.8	n/a	98.6	98.4	100.0	99.1	100.0
Sell	6.9	20.7	13.9	n/a	6.8	9.7	12.7	9.6	17.7
Give Away	52.4	38.4	48.6	n/a	30.1	19.4	31.0	28.4	36.5
N[2]					*146*	*62*	*126*	*334*	*96*
All HH producing fruits									
Consume	n/a	n/a	n/a	n/a	98.3	98.7	99.4	98.8	99.7
Sell	n/a	n/a	n/a	n/a	8.6	9.7	11.4	9.9	24.6
Give Away	n/a	n/a	n/a	n/a	21.0	24.1	26.2	23.7	27.5
N[3]					*348*	*237*	*324*	*909*	*338*

Notes:
N[1] is the number of households with under 50 decimals of land that produce fruit; N[2] is the total number of households with over 50 decimals of land that produce fruit; N[3] is the number of households producing fruit.
Since multiple responses can be given, the columns may add to over 100%.
n/a: data not available in JoJ Baseline Survey Report
Respondents could provide multiple responses, so percentages of categories may add to more than 100%

Table 7.12 Percent of households reporting selected uses of household vegetable production

	Baseline				End-line				End-line
	Barisal	**Bhola**	**Patuakhali**	**Total**	**Barisal**	**Bhola**	**Patuakhali**	**Total**	**Graduated**
< 50 Decimals of Land									
Consume	100.0	99.5	99.7	n/a	99.2	100.0	99.2	99.4	100.0
Sell	2.4	11.1	9.8	n/a	9.0	16.9	13.3	12.3	23.4
Give Away	19.3	16.5	31.2	n/a	25.4	30.5	28.9	27.9	50.4
N[1]					*122*	*59*	*128*	*309*	*137*
≥ 50 Decimals of Land									
Consume	99.6	98.0	99.8	n/a	100.0	100.0	99.4	99.8	100.0
Sell	4.4	17.0	13.1	n/a	11.8	12.7	15.9	13.6	20.3
Give Away	25.9	23.0	34.4	n/a	39.0	26.8	34.7	35.3	50.8
N[2]					*187*	*71*	*176*	*434*	*128*
All HH Producing vegetables									
Consume	n/a	n/a	n/a	n/a	99.6	100.0	99.4	99.6	99.8
Sell	n/a	n/a	n/a	n/a	10.7	11.8	13.6	12.1	26.6
Give Away	n/a	n/a	n/a	n/a	28.2	30.0	29.3	29.1	48.2
N[3]					*485*	*313*	*522*	*1320*	*467*

N^1 is the total number of households with under 50 decimals of land that produce vegetables; N^2 is the total number of households with over 50 decimals of land that produce vegetables; N^3 is the total number of households that produce vegetables.
n/a: data not available in JoJ Baseline Survey Report
Respondents could provide multiple responses, so percentages of categories may add to more than 100%

Table 7.13 Households with poultry by category of cultivable land

	Baseline				End-line – U2				End-line GB
	Barisal	**Bhola**	**Patuakhali**	**Total**	**Barisal**	**Bhola**	**Patuakhali**	**Total**	
% HH raising poultry									
No cultivable land					78.0	75.0	80.4	77.4	86.1
<50 decimals of cultivable land[a]	84.3	80.9	82.9	82.5	86.2	87.4	90.2	88.0	92.5
50+ decimals of cultivable land	91.1	92.1	93.1	92.3	91.9	88.8	92.5	91.5	92.0
All HH	n/a	n/a	n/a	n/a	83.9	78.6	85.7	82.7	88.7
% among poultry-raising HH with improved varieties									
No cultivable land					0.4	1.2		0.6	3.9
<50 decimals of cultivable land	0.8	0.8	1.8	1.0	0.5	1.5	0.5	0.7	4.7
50+ decimals of cultivable land	2.2	3.3	2.2	2.4	0.4	0.8	0.8	0.6	5.7
All HH	n/a	n/a	n/a	n/a	0.4	1.2	0.3	0.6	4.5

Notes:
[a] In the baseline, the category <50 decimals of cultivable land includes HH with no cultivable land.
n/a: data not available in JoJ Baseline Survey Report

Table 7.14 Uses of eggs from poultry in last two months

	Baseline				End-line – U2				End-line
	Barisal	**Bhola**	**Patuakhali**	**Total**	**Barisal**	**Bhola**	**Patuakhali**	**Total**	**GB**
< 50 Decimals of Land % HH reporting:									
Consume	80.2	57.8	73.0	n/a	94.0	88.5	93.0	92.4	91.4
Sell	15.1	9.5	16.4	n/a	18.0	31.3	22.8	22.8	37.1
Hatch	-	-	-	-	56.3	80.2	77.8	70.0	62.3
Other[a]	55.6	73.0	66.7	n/a	0.0	0.0	1.2	0.5	0.0
N[1]					*167*	*96*	*171*	*434*	*175*
≥ 50 Decimals of Land % HH reporting:									
Consume	89.5	79.2	87.0	n/a	95.2	93.7	97.1	95.6	93.4
Sell	12.0	10.9	18.7	n/a	16.7	17.9	19.0	17.8	26.3
Hatch	-	-	-	-	55.9	73.7	75.6	66.8	72.4
Other[a]	49.6	69.3	65.8	n/a	0.9	0.0	1.5	0.9	0.0
N[2]					*227*	*95*	*205*	*527*	*152*
All HH with Poultry % HH reporting:									
Consume	n/a	n/a	n/a	n/a	91.6	85.3	92.8	90.2	90.8
Sell	n/a	n/a	n/a	n/a	21.6	21.2	20.0	20.9	36.3
Hatch	n/a	n/a	n/a	n/a	54.5	74.2	78.0	68.6	65.5
Other[a]	n/a	n/a	n/a	n/a	0.7	0.0	1.7	0.9	0.3
N[3]					*679*	*565*	*690*	*1934*	*684*

Notes:
N^1 is the total number of households with under 50 decimals of land that produce poultry; N^2 is the total number of households with over 50 decimals of land that produce poultry; N^3 is the total number of households that produce poultry.
[a] Hatching was included in the "other" category in the baseline, since the baseline questionnaire did not include "hatching" as an option.
n/a: data not available in JoJ Baseline Survey Report

Tables 7.15 – 7.17 provide information about agricultural practices: soil improvement techniques and pest management practices. With respect to soil improvement practices, application of animal manure is by far the most widely practiced, with almost two thirds of the U2 sample and three quarters of the GB sample using this technique. Manure use ranges from 73 percent in Patuakhali to 54 percent in Bhola. Compost and chemical fertilizer are the other soil improvement techniques that are relatively widely adopted. The percentages of households using all the soil improvement techniques are significantly higher in the GB sample compared to the U2 sample. In terms of pest management practices, chemical and organic methods are the most common. The percentage of households using organic practices is almost as high as that of households using chemicals. Table 7.17 shows that HFP participants use more of all soil improvement practices, but especially composting and crop rotation. Use of all forms of pest control is higher for HFP participants and non-participants, and a much higher percentage of HFP participants is aware of where to get technical advice.

Respondents in the GB sample were asked for their assessments of the support they received in the HFP activities. Figure 7.6 shows the percentage of responses (very useful, useful, somewhat useful, not useful, no opinion) for the HFP overall as well as gardening and poultry production. Most respondents found all the components at least somewhat useful. The percentage of respondents that found poultry production either very useful or useful was relatively lower than for homestead gardening. Respondents were also asked about what they learned in the HFP training. Table 7.18 summarizes the responses, ranked by the frequency that they were cited.

Figure 7.6 GB sample: perceptions of usefulness of program agricultural training

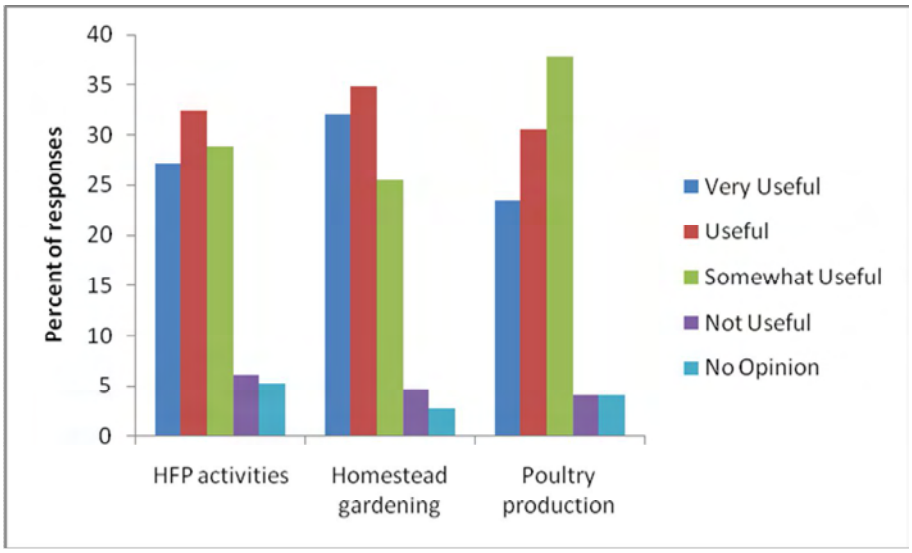


Table7.15 Percent of households utilizing specified soil improvement practices

Type of Practice	End-line – U2				End-line
	Barisal	Bhola	Patuakhali	Total	GB
Animal Manure	62.7	53.5	72.7	64.5	74.4***
Compost	34.5	33.1	41.6	36.9	57.1***
Chemical Fertilizer	37.1	40.8	46.3	41.4	56.6***
Crop Rotation	5.1	8.8	9.9	7.7	20.2***
Nothing	4.3	3.1	3.7	3.8	0.8***
Other	0.4	0.4	0.4	0.4	3.4***
N	*490*	*460*	*454*	*1204*	*387*

Notes:
N is all households with cultivable land.
* GB value different from U2 value at .10 significance level.
** GB value different from U2 value at .05 significance level.
*** GB value different from U2 value at .01 significance level.

Table 7.16 Percent of households utilizing specified pest management practices

Type of practice	End-line – U2				End-line
	Barisal	Bhola	Patuakhali	Total	Graduated
Chemical	39.0	44.2	40.5	40.7	50.1***
Organic	30.6	26.2	47.6	36.0	40.3
Nothing	18.4	13.8	18.1	17.3	15.5
Mechanical	4.9	5.0	14.3	8.5	13.2***
Biological	0.8	1.2	1.3	1.1	0.0
N	*490*	*460*	*454*	*1204*	*387*

Notes:
N is all households with cultivable land.
* GB value different from U2 value at .10 significance level.
** GB value different from U2 value at .05 significance level.
*** GB value different from U2 value at .01 significance level.

Table 7.17 Percent of households adopting specified soil improvement practices and pest management practices by HFP participation

	End-line - U2		End-line - GB	
	HFP participant	Non-participant	HFP participant	Non-participant
Soil Improvement Practices				
Animal Manure	76.2***	61.9	87.5**	71.9
Compost	53.6***	33.8	72.9**	54.3
Chemical Fertilizer	44.0	40.4	77.1***	53.7
Crop Rotation	13.7***	6.5	29.2	19.6
Nothing	1.8	4.1	0.0	0.9
Other	0.6	0.4	2.1	3.4
Pest Management Practices				
Chemical	51.2***	38.4	75.0***	46.6
Organic	44.6***	34.6	50.0	38.6
Mechanical	15.5***	7.1	6.3	14.5
None	13.1	17.5	8.3	15.9
Biological	1.2	1.1	0.0	0.0
N^1	*168*	*1066*	*48*	*352*
Know where to get technical advice for homestead gardening	77.5***	36.5	90.7***	30.0
N^2	*298*	*1399*	*97*	*484*

Notes:
N^1 is all households with cultivable land; N^2 is all households with a homestead garden.
* HFP participant value different from non-participant value at .10 significance level.
** HFP participant value different from non-participant value at .05 significance level.
*** HFP participant value different from non-participant value at .01 significance level.

Table 7.18 GB sample: practices learned from homestead garden and poultry production training

Homestead Garden	% Response[a]	Poultry Production	% Response[b]
Organic Fertilizer	93.4	Improved poultry feeding	87.8
Improved Production	84.9	Healthy living place for poultry	78.6
Improved Variety	84.0	Poultry Vaccination	75.5
Nutritional Knowledge	56.6	Poultry Diseases	64.3
Organic Pest Control	39.6	Poultry Rearing	53.1
Marketing	29.2	Poultry Consumption	44.9
IPM	23.6	Other	10.2
Other	17.0		

Notes:

[a]Percent of households receiving training in homestead gardening

[b]Percent of households receiving training in poultry production

7.4 Household Level Food Consumption and Food Security

Information was collected to measure several dimensions of current household food consumption patterns as well as households' levels of vulnerability to reductions in food consumption during times of stress or shock. In the baseline, current household consumption of different food categories was summarized using the diet diversity score (DDS). The Food Access Survey Tool (FAST), a series of questions about household strategies to ensure adequate food access in difficult times during the previous twelve months, provided information about household longer-term food security status. Two additional indicators have been calculated in the end-line surveys, the food consumption score (FCS) to measure the quality of current household food consumption, and the coping strategy index (CSI) to measure household vulnerability to food insecurity in times of stress.

Table 7.19 provides information about the percentages of households that reported consuming different food categories in the 24-hour period prior to the interview. From the baseline to the end-line, there were reductions in the percentages of households that consumed roots/tubers, milk/milk products, sugar, honey, and fruits. There was also a big reduction in eggs/poultry consumption, but this was due to the fact that the category was "eggs" in the baseline and "poultry" in the end-line. Egg consumption is likely to be much more frequent than poultry consumption, especially for poorer households. A higher proportion of households consumed legumes/pulses, meat, fish, oils/fats, and vegetables in the end-line compared with the baseline. Oil/fat consumption has also increased dramatically from the baseline to the end-line survey rounds.

Two summary indicators of household nutrition are constructed on the basis of the information about household consumption of the food categories reported in Table 7.20. The first is the diet diversity score (DDS). This indicator was computed in the baseline. The DDS is computed by adding up the number of different food categories that the household reported consuming in the previous day. For example if the household reported eating cereals, legumes, fish, and oil, the DDS for that household would be four. Table 7.20 reports the average DDS by sample, further broken down by region in the baseline and U2 samples. The DDS has increased from an overall value of 5.2 in the baseline to 5.7 in the U2 sample and 5.8 in the GB, an increase of 10-11 percent over the life of the project. These increases are statistically significant at the .01 level of confidence. In terms of geographic variation, Bhola shows a lower average DDS value than the other two districts, both in the baseline and in the end-line U2 samples.

The DDS is a measure of diet "quality": a higher DDS value represents a more varied diet. The food consumption score is a modification of this basic indicator of diet quality in which different types of food are assigned weights based on their respective nutritional values. Because the FCS accounts for nutritional value of food in addition to simply the number of different types of food consumed, it is expected to be a more accurate measure of dietary quality. This indicator is reported and analyzed in this report, to assess whether it provides a clearer indication of dietary quality than the DDS, which is one of the project indicators.

The specific weights used to compute the FCS are as follows:

Food Item	Weight in FCS
Cereals	2
Roots/tubers	2
Legumes/pulses	3
Milk/milk products	4
Eggs/poultry	4
Meat	4
Fish/sea food	4
Oil/fat	0.5
Sugar/honey	0.5
Fruits	2
Dark green leafy vegetables	3
Other vegetables	2

The FCS thus gives greater weight to more nutritious foods, such as high-protein animal products. The FCS was calculated for the baseline by applying the weights presented above to the baseline information about household consumption of each of the food categories. As seen in Table 7.20, the FCS score is generally slightly more than double the value of the DDS. However, the pattern of change of the FCS from the baseline to the end-line samples is quite different from that of the DDS. Whereas the DDS shows an increase over the life of the program, the FCS is essentially constant, and the small differences are not statistically significant. The differences in the patterns of change of these two indicators are explained by the fact that, while the overall number of foods eaten by the household has grown, the increase has been in foods with relatively low nutritional value (oil/fat), and offset by a decrease in high-value foods (eggs/poultry).

In addition to these two indicators of current household food consumption patterns, two other food security indicators measure households' resiliency (or alternatively, vulnerability) over time to deal with economic or other shocks that can suddenly disrupt household access to food. Both indicators are computed on the basis of households' responses to a series of questions about their food consumption patterns over time and during times of stress. The two indicators are the Food Access Survey Tool (FAST) score and the Coping strategy Index (CSI). The FAST was included in the baseline, while the CSI is an additional indicator that has become widely used in food security studies around the world.[7] As with the FCS, the CSI is analyzed in this report in order to assess whether it measures food security more accurately, or captures other dimensions of food security. Details of how these indicators are computed are provided in Annex 5. Note that in this report, the CSI is calibrated so that the maximum possible value is 100. A zero value indicates high food security (no coping strategies were used), and a value of 100 indicates extreme food insecurity (all coping strategies were used very frequently).

[7]Maxwell, Daniel, Richard Caldwell and Mark Langworthy. " Measuring food insecurity: Can an indicator based on localized coping behaviors be used to compare across contexts?" *Food Policy*, Volume 33, Issue 6, December 2008

Table 7.19 Percentages of households reporting the consumption of foods from a specific group

Food groups	Baseline				End-line – U2				End-line GB
	Barisal	Bhola	Patuakhali	Total	Barisal	Bhola	Patuakhali	Total	
Cereals	99.9	99.1	99.9	100.0	99.4	99.7	100.0	99.7	99.8
Roots/tubers	64.6	64.1	72.3	67.1	65.5	53.5	59.4	59.5	58.6
Legumes/pulses	64.6	62.2	50.4	58.9	71.5	71.9	63.2	68.9	64.8
Milk/milk products	55.0	38.7	57.9	50.3	44.2	24.9	46.9	38.7	33.4
Eggs/Poultry	23.8	21.7	19.5	21.6	3.2	2.6	0.9	2.2	2.3
Meat	11.1	14.2	11.7	12.4	33.4	19.5	22.9	25.3	25.6
Fish/sea food	46.7	47.9	48.8	47.9	58.9	54.8	59.0	57.6	54.2
Oil/fat	1.0	2.2	2.2	1.8	83.4	90.1	29.4	89.4	92.2
Sugar/honey	39.3	32.2	36.3	35.8	30.5	19.8	36.7	26.6	26.9
Fruits	51.9	48.7	58.5	53.0	36.4	22.0	36.7	31.7	43.0
Vegetables	66.0	61.5	72.6	66.7	68.2	70.1	79.5	72.6	75.6
Others	49.1	27.8	23.7	33.1	9.4	17.1	30.2	18.8	21.4
N	*1506*	*1665*	*1636*	*4807*	*949*	*939*	*932*	*2820*	*897*

Notes:
All values for U2 Total and GB are different from the Baseline Total value at the .01 significance level.
Eggs/ poultry was listed as eggs in baseline, and poultry in end-line.
N is all households reporting on food consumption.
Meat: Liver/beef/poultry meat/meat/offal.

Table 7.20 Household food security indicators - Diet Diversity Score (DDS), Food Consumption Score (FCS), Food Access Survey Tool (FAST) categories and Coping Strategy Index (CSI), by district

	Baseline				End-line - U2				End-line
	Barisal	**Bhola**	**Patuakhali**	**All**	**Barisal**	**Bhola**	**Patuakhali**	**All**	**GB**
Indicators of Current consumption									
Diet Diversity Score (DDS)	5.7	5.2	5.5	5.5	6.0	5.5	6.2	5.9***	5.9***
Food Consumption Score (FCS)	13.6	12.7	13.7	13.3	14.0	12.0	13.6	13.2	13.1
Indicators of Food Security / Vulnerability									
% HH in FAST Food security Categories									
Food Secure	54.4	26.8	57.0	45.4	60.5	49.3	59.8	56.5***	46.9
Moderately Food Insecure	11.3	10.7	11.1	11.0	9.9	9.9	10.9	10.2	12.6
Severely Food Insecure	34.3	62.5	31.9	43.6	29.6	40.8	29.3	33.2***	40.5*
Coping Strategy Index (CSI)					7.9	9.9	6.3	8.0	12.4

Notes:
* end-line value different from baseline value at .10 significance level
** end-line value different from baseline value at .05 significance level
*** end-line value different from baseline value at .01 significance level

The FAST results show a general trend of improvement in long-term food security conditions of households. Overall, the percentage of food-secure households, as measured by the FAST score, increased, from 45 percent in the baseline to 57 percent, and the percentage of severely food insecure fell from 43 percent to 33 percent in the U2 sample. However, the percentages in the GB sample are quite similar to those in the baseline sample, although the percentage of severely food insecure decreased slightly. While Bhola exhibited a much higher percentage of severely food-insecure households in the baseline relative to other districts, the variation across districts was not as extreme in the end-line U2 sample.

The necessary information to compute the CSI is not available in the baseline survey, so this indicator is only computed for the end-line samples, and changes over time cannot be measured. In the end-line samples, the values of the CSI are overall quite low, ranging from 6.3 in Patuakhali to a high of 12.4 in the GB sample. The pattern of variation of the CSI across the districts is similar to that of the FAST categories. For example, Bhola has the highest percentage of severely food insecure, and this district also has the highest CSI value. Thus, the CSI and the FAST scores generally provide the same results about the patterns of food security conditions in the end-line samples.[8] The mutual correspondence between these two different measures suggests they are both accurately capturing household food security conditions.

Table 7.21 provides information about the food security indicators broken down by participation in different program components, and includes as a category households that did not participate in either MCHN or HFP (found in U2 only). The HFP is expected to affect household food security by providing households with access to a greater variety of foods from their home gardens, so HFP participants are expected to exhibit higher values for DDS and FCS than non-participants. Indeed, the results show that, the values of DDS for participants are higher than those for non-participants, and these difference are statistically significant for both categories of project participant. However, there is no statistically discernible difference in any of the food security indicators when comparing households that participated in MCHN only, and those that participated in both MCHN and HFP. Thus, participation in JoJ has led to improvements in diet diversity, and this improvement is observed across participants in all program components.

On the face of it, these results suggest that there is no incremental impact of HFP on food consumption patterns or food security levels. One possible explanation for this may be that many households in unions receiving SO1 support may have adopted improved agricultural, gardening and poultry practices, even if they have not participated directly in the HFP. Evidence to support this hypothesis is provided in the figures in Table 7.7, which show that the use of improved gardening practices is quite high, even among households that did not participate directly in HFP. The demonstration effects from HFP participants to their neighbors may have diffused the impacts of this program component to other households within the communities in SO1 districts. Thus, within SO1 unions, differences may not be great between households that participate in HFP and those that do not participate, but the important differences would be between unions where SO1 activities are supported and unions not providing support for SO1 activities. Table 7.21 provides evidence to support this hypothesis in relation to the food security indicators. The indicators are disaggregated into unions where HFP

[8] The correlation coefficient between the CSI and the FAST score , -.745, is very high in absolute value. The correlation coefficient is negative because higher values of FAST score correspond to greater food security, while higher values of CSI correspond to lower food security.

Table 7.21 Household food security indicators - Diet Diversity Score (DDS), Food Consumption Score (FCS), Food Access Survey Tool (FAST) categories and Coping Strategy Index (CSI), by participation in MCHN and FHP

	End-line U2					End-line GB	
	Non-participant	MCHN only	MCHN+HFP	Non-SO1 Unions	SO1 Unions	MCHN only	MCHN+HFP
Indicators of Current consumption							
Diet Diversity Score (DDS)	5.3	5.9[a]	6.1[b]	5.6	6.0[e]	5.9	6.2[c]
Food Consumption Score (FCS)	12.1	13.3[a]	13.5[b]	12.5	13.5[e]	13.0	13.6[c]
Indicators of Food Security / Vulnerability							
% HH in FAST Food security Categories							
Food Secure	59.4	56.2	56.7[f]	60.9	54.6[g]	50.2	50.5[f]
Moderately Food Insecure	8.6	10.7	8.9[f]	9.6	10.5[g]	12.0	12.4[f]
Severely Food Insecure	32.0	33.2	34.4[f]	29.5	34.8[g]	37.8	37.1[f]
Coping Strategy Index (CSI)	9.2	7.8	8.3	10.3	11.4[e]	12.9	8.9[d]

Notes:
[a]MCHN only different from non-participants at the .01 significance level.
[b]MCHN+HFP different from non-participants at the .01 significance level; **not** different from MCHN only at the .10 significance level
[c]MCHN+HFP **not** different from MCHN only at the .10 significance level
[d]MCHN+HFP different from MCHN only at the .01 significance level
[e]SO1 unions different from non-SO1 unions at the .01 significance level
[f]Distributions of FAST food security categories are **not** different across the program participation categories (Non-participant, MCHN only, MCHN+HFP) at the .10 significance level in either the U2 or GB samples.
[g]Distributions of FAST food security categories are significant across SO1 and non-SO1 unions at the .01 significance level.

activities have been supported (SO1 unions) and those where HFP activities have not been supported (non-SO1 unions) in the U2 sample.[9] Measures of current household food consumption (DDS and FCS) are higher for households in SO1 communities, while the longer-term indicators (FAST score and CSI) show that households in SO1 communities are more food- insecure than those in non-SO1 communities. The fact that households in SO1 communities have more diverse diets suggests that the SO1 interventions have provided all households in communities where these interventions have been implemented with a wider range of foods to eat. This is true even though the households in the SO1 unions generally have lower levels of long-term food security (that is, are more vulnerable) than those in the non-SO1 unions.

Table 7.22 reports the food security indicators broken down by three categories of economic status: income per household member, expenditures per household member, and number of household assets. This table shows that there is a very strong relationship between economic status and food security. That is, households with higher per-capita income and expenditures and a greater number of assets have better quality diets, are more food-secure, and utilize coping mechanisms less frequently than do households of lower economic status. The fact that this positive relationship between food security and economic status is strongly supported by the results raises confidence in the overall accuracy of the information obtained in the survey. Note that the patterns of change for DDS and FCS are quite similar, as well as for the CSI and the FAST severely food-insecure category. Thus, the expected relationship between economic status and food insecurity is captured equally by both measures of current food consumption as well as vulnerability.

7.5 Maternal and Child Health Care Practices

The MCHN component of JoJ promotes improved antenatal care, infant feeding practices, and child health care, particularly related to immunization and treatment of diarrhea and acute respiratory infection (ARI). The baseline and end-line surveys obtained detailed information about knowledge and practices in these health seeking behaviors.

Table 7.23 provides information about antenatal checkups by pregnant women. Overall there has been a very large increase in the percentage of pregnant women having antenatal checkups from the baseline to the end-line. In the baseline, only slightly over one-third of pregnang women reported having three or more antenatal checkups, compared with almost 90 percent in the end-line U2. However, the percentage of pregnant women having checkups in the GB sample, while also much higher than the baseline, is lower than the U2 sample. Pregnant women have increased visits to facilities in the public and NGO sectors while decreasing those to the private medical sector. Within the public sector, the percentage of pregnant women visiting satellite/EPI outreach centers has increased dramatically, while the percentage going to other public sector facilities has generally declined. Within the NGO sector, satellite clinics and visits with NGO field workers have increased markedly.

[9] All unions in the GB sample are SO1 unions, so the comparison between SO1 unions and non-SO1 unions is not possible in the GB sample.

Table 7.22 Food Security Indicators, Diet Diversity Score (DDS), Food Consumption Score (FCS), and Coping Strategy Index (CSI) by economic status categories (number of assets, income per person, and expenditures per person)

	End-line – U2				End-line – GB			
	DDS	FCS	CSI	Severely Food Insecure -FAST[a]	DDS	FCS	CSI	Severely Food Insecure -FAST[a]
Number of Assets								
0-1	5.0	11.1	14.3	58.9	5.0	10.9	20.5	68.2
2	5.4***	12.3***	10.2***	41.1***	5.5***	12.6***	13.6***	48.2***
3	5.5	12.6	7.7***	34.0**	5.7	13.0	11.3	34.8**
4	6.0***	13.9***	5.9***	24.1***	6.1	13.7	8.0***	24.3*
5	6.4***	15.0***	3.5***	15.2***	6.7***	15.7***	3.7***	11.4**
6+	6.9***	16.6***	1.3***	4.7***	7.1	17.0**	2.2	2.1**
Income per person (taka)								
< 600	5.5	12.6	14.9	56.1	5.0	11.1	23.1	78.3
600 - 849	5.4	12.2	10.8***	45.7***	5.4**	11.9*	15.2***	51.2***
850 - 1,149	5.7***	13.0***	7.4***	32.7***	5.9***	13.3***	11.5***	37.3***
1,150 +	6.1***	14.4***	3.3***	13.8***	6.6***	15.4***	3.8***	9.0***
Expenditures per person (taka)								
< 600	5.3	12.3	9.9	41.3	5.7	12.6	11.4	52.1
600 - 849	5.6***	12.9***	9.6	40.0	5.6	12.5	13.4	45.0
850 - 1,149	5.8**	13.4**	7.4***	32.4***	5.7	13.1	13.6	43.8
1,150 +	6.1***	14.4***	5.0***	18.6***	6.0	13.8	11.1***	28.2***
All	5.7	13.2	8.0	33.2	5.8	13.1	12.4	40.5

Notes:
[a]percent of households in the severely food insecure category based on FAST score.
* category value different from previous category value at .10 significance level.
** category value different from previous category value at .05 significance level.
*** category value different from previous category value at .01 significance level.

Table7.23 Percent of women receiving antenatal checkups and percent reporting selected facilities for antenatal checkups

	Baseline				End-line – U2				End-line
	Barisal	**Bhola**	**Patuakhali**	**All**	**Barisal**	**Bhola**	**Patuakhali**	**All**	**GB**
Received at least one antenatal check-up[1]	38.8	33.5	39.1	37.1	92.6	94.2	97.4	94.8	78.6
3 or more visits[2]	39.3	32.5	37.5	36.5	87.2	87.0	90.9	88.4	70.2
Facilities for antenatal check-ups[2]									
Public Sector	**52.2**	**50.8**	**41.4**	**47.9**	**62.5**	**56.3**	**68.2**	**62.4**	**51.6**
Hospital/Medical college	10.1	4.7	5.9	6.9	2.4	0.8	1.4	1.5	8.1
Upazila Health Complex	22.7	25.2	10.7	19.2	2.8	4.4	5.5	4.3	7.8
Satellite/EPI outreach centre	2.1	7.3	8.0	5.8	38.5	40.0	52.1	43.6	29.2
MCWC	1.9	3.6	8.6	4.9	1.5	0.5	3.7	1.9	1.0
FWC	15.0	9.3	8.1	10.8	18.2	10.6	14.5	14.4	7.8
FWV	1.9	1.8	2.2	2.0	8.9	19.5	27.5	18.7	2.1
NGO Sector	**9.9**	**12.2**	**24.3**	**15.8**	**53.6**	**72.5**	**70.8**	**65.7**	**51.6**
Static clinic	6.6	3.6	5.6	5.3	2.4	7.8	3.7	4.6	3.4
Satellite clinic	2.3	8.2	17.6	9.6	28.0	50.9	42.9	40.6	45.0
Field worker	2.4	3.8	3.7	3.3	29.9	40.5	48.7	39.8	3.0
Hospital	1.0	0.4	1.4	1.0	1.1	0.7	3.3	1.7	2.4
Private medical sector	**39.6**	**36.8**	**34.8**	**37.0**	**13.4**	**8.9**	**11.9**	**11.4**	**15.8**
Clinic/Hospital	21.3	12.4	17.1	17.0	9.3	4.1	8.0	7.1	7.1
MBBS Doctor	14.3	20.3	14.2	16.1	3.9	3.3	2.9	3.3	6.2
Village doctor	3.5	4.4	3.4	3.7	0.9	1.7	1.1	1.2	0.7
Homeopathic doctor	0.3	-	0.5	0.3	0.2		0.1	0.1	
Pharmacy	1.2	1.3	0.6	1.0	0.2	0.1	0.2	0.2	4.0
Other Sector	**1.0**	**2.7**	**-**	**1.2**	**0.3**	**0.5**	**0.1**	**0.3**	**1.0**
Trained Traditional Birth Assistant (TTBA)	0.3	0.4	-	0.2	0.1	0.2	0.1	0.1	-
Untrained Traditional Birth Assistant (UTBA)	-	-	-	-	0.1	0.1	-	0.1	0.1
Others	0.7	2.4	-	1.0	0.2	0.1	-	0.1	1.0
Antenatal check-ups from medically trained provider	**90.9**	**87.8**	**89.5**	**89.4**	**99.3**	**99.4**	**99.9**	**99.6**	**99.2**

Notes:
[1] Percent of all women who gave birth in two years prior to survey
[2] Percent of all women who received antenatal checkups
All values for U2 All and GB are different from Baseline All at the 0.01 significance level

Tables 7.24 – 7.26 provide information about women's attitudes and actual behaviors regarding practices during pregnancy, and on advice they receive from their husbands and mothers-in-law about appropriate practices during pregnancy. Generally the information in these tables shows substantial increase in awareness of appropriate practices by mothers, husbands, and mothers-in-law. For example, Table 7.24 shows that the percentage of mothers aware that they should eat more food during pregnancy increased from 77 percent in the baseline to over 90 percent in the end-line (specifically, to 96 percent in U2 and 93 percent in GB). The actual pattern of food consumption during pregnancy also increased, from 18 percent in the baseline to over 60 percent in the end-line U2 sample. Again, however, the percentage of women eating more food during pregnancy in the GB sample, while higher than the baseline, is only 38 percent, or about 60 percent of the U2 sample. Information on taking rest shows the same pattern, with substantial increases from the baseline to the end-line, but the percentage of mothers taking more rest in the GB sample is much lower than in the U2 sample. Tables 7.25 and 7.26 show that the reported awareness of husbands and mothers-in-law about appropriate pregnancy practices has also improved from the baseline, but again the percentages reporting the appropriate responses (antenatal visits, more food, more rest) are much higher in the U2 sample than the GB sample.

Information about infant nursing and feeding practices is provided in Table 7.27 and Figure 7.7. Overall, almost two thirds of children under six months of age are reported as exclusively breastfed, with the proportion in Bhola almost 70 percent. At six months of age, over 90 percent of infants are receiving supplemental foods with nursing, and the percentage is highest in Patuakhali. Figure 7.7 shows the percentages of children being provided with supplementary foods by the age of the child, comparing the baseline and end-line figures (for U2 only, as the children in the GB sample are not of nursing age). The figure shows that the percentage of children under six months of age who receive supplementary foods has fallen significantly from the baseline to the end-line, but by six months of age the percentages are nearly identical. This means that a higher proportion of children under six months of age are exclusively breastfed now than at the time of the baseline.

Table 7.28 reports immunization rates of children from the baseline and end-line surveys. The overall immunization rates have increased from the baseline to the end-line, particularly for measles. The percentage of children that have been fully immunized with all vaccines increased from 70 percent in the baseline to over 90 percent in the end-line. One clear trend in the figures is that the percentage of children with registration cards has increased. The percentages of vaccinations reported by mothers rather than observed from registration cards are actually highest in the GB sample, and also higher in the baseline than in the U2 sample, which is logical, given that these children are older..

Table7.24 Mothers' attitudes and practices of food consumption and rest during pregnancy, by district (percent)

	Baseline				End-line				
	Barisal	**Bhola**	**Patuakhali**	**Total**	**Barisal**	**Bhola**	**Patuakhali**	**Total**	**Graduated**
Attitudes of women about taking food during pregnancy									
More Food	85.6	71.0	74.4	76.7	94.9	96.1	98.2	96.4	92.8
Same Amount	7.2	8.2	11.1	8.9	4.5	1.8	1.1	2.5	3.6
Less Food	5.7	18.7	10.6	11.9	0.5	2.1	0.8	1.1	3.5
Quantity of food consumption during last pregnancy									
More Food	21.8	12.5	21.4	18.4	57.5	57.1	72.8	62.4	38.2
Same Amount	42.6	22.2	33.9	32.6	26.0	24.1	19.0	23.0	26.3
Less Food	35.6	65.3	44.8	49.0	16.4	18.8	8.3	14.5	35.5
Amount of rest during last pregnancy									
More Rest	35.6	51.9	48.8	45.7	94.9	96.1	98.2	96.4	67.0
Same Amount	43.9	27.1	30.0	33.4	4.5	1.8	1.1	2.5	20.5
Less Rest	20.4	21.0	21.2	20.9	0.5	2.1	0.8	1.1	12.5
N	*1479*	*1635*	*1601*	*4715*	*949*	*939*	*933*	*2821*	*897*

Notes:
N is all households with recorded responses.
All values for U2 All and GB are different from Baseline All at the 0.01 significance level

Table 7.25 Beliefs of respondents' husbands regarding pregnancy care practices, as reported by respondents, by district (percent)

	Baseline				End-line – U2				End-line
	Barisal	**Bhola**	**Patuakhali**	**All**	**Barisal**	**Bhola**	**Patuakhali**	**All**	**GB**
Antenatal sessions									
Should attend	47.4	31.7	37.4	38.6	81.9	80.5	91.0	84.4	64.4
Should not attend	52.6	68.3	62.6	61.5	2.4	4.7	2.1	3.1	13.0
No Advice	-	-	-	-	15.5	14.5	6.6	12.2	22.3
Eating									
More than usual	54.4	39.3	42.5	45.1	83.6	80.0	90.7	84.7	69.1
Less than usual	0.4	0.5	0.7	0.5	0.1	0.0	0.0	0.0	0.6
The same amount as usual	2.1	4.9	2.7	3.3	3.0	3.1	1.8	2.6	3.9
No advice	43.1	55.4	54.1	51.1	13.1	16.6	7.3	12.3	26.2
Daytime rest									
More than usual	48.3	28.0	35.8	37.0	80.1	73.6	86.9	80.2	61.9
Less than usual	0.9	4.0	1.7	2.2	0.2	3.1	1.7	1.7	2.2
The same amount as usual	4.1	5.8	3.3	4.4	4.7	5.6	2.6	4.3	6.0
Nothing	46.6	62.2	59.3	56.3	14.6	17.4	8.6	13.5	29.3
N	*1479*	*1635*	*1601*	*4715*	*949*	*939*	*933*	*2821*	*897*

Notes:
N is all households with recorded responses.
All values for U2 All and GB are different from Baseline All at the 0.01 significance level

Table 7.26 Beliefs of respondents' mothers-in-law regarding pregnancy care practices, as reported by respondents (percent)

	Baseline				End-line – U2				End-line
	Barisal	**Bhola**	**Patuakhali**	**All**	**Barisal**	**Bhola**	**Patuakhali**	**All**	**GB**
Antenatal sessions									
Should Attend	27.3	19.9	24.5	23.7	49.7	47.3	53.7	50.2	33.1
Should not attend	72.7	80.1	75.5	76.3	2.3	5.0	2.9	3.4	11.1
No Advice	0.0	0.0	0.0	0.0	32.1	26.8	20.3	23.4	33.2
Not Applicable	0.0	0.0	0.0	0.0	24.9	20.9	23.2	23.0	22.5
Eating									
More than usual	31.8	25.9	28.8	28.7	48.4	44.1	53.8	48.8	37.0
Less than usual	0.4	1.2	0.9	0.8	0.0	0.6	0.2	0.3	0.2
The same amount as usual	1.2	2.6	0.9	1.6	4.1	3.6	2.3	3.3	3.7
Nothing	66.7	70.4	69.4	68.9	22.2	30.6	20.4	24.4	36.8
Not Applicable	0.0	0.0	0.0	0.0	25.3	21.0	23.3	23.2	22.3
Daytime rest									
More than usual	27.5	17.4	24.2	22.8	43.8	38.5	49.0	43.8	34.1
Less than usual	1.4	6.7	3.0	3.8	1.1	5.2	2.1	2.8	2.6
The same amount as usual	2.9	3.8	1.2	2.6	6.2	4.4	3.8	4.8	2.8
Nothing	68.2	72.1	71.6	69.9	24.0	31.1	21.9	25.7	38.2
Not Applicable	0.0	0.0	0.0	0.0	24.9	20.8	23.3	23.0	22.3
N	*1082*	*1233*	*1255*	*3570*	*949*	*939*	*933*	*2821*	*897*

Notes:
N is all households with recorded responses.
All values for U2 All and GB are different from Baseline All at the 0.01 significance level.

Table 7.27 Children under six months exclusively breastfed and six-month old children with supplemental foods, by district (percent)

	Baseline				End-line – U2			
	Barisal	**Bhola**	**Patuakhali**	**All**	**Barisal**	**Bhola**	**Patuakhali**	**All**
Children under 6 months exclusively breastfed	15.8	50.2	17.7	29.5	61.7	69.9	62.3	64.4***
N[1]	*354*	*470*	*412*	*1236*	*206*	*183*	*215*	*604*
6 month old children receiving supplemental foods	96.8	59.3	91.7	81.6	88.3	86.0	96.4	90.6**
N[2]	*94*	*113*	*109*	*316*	*60*	*43*	*56*	*159*

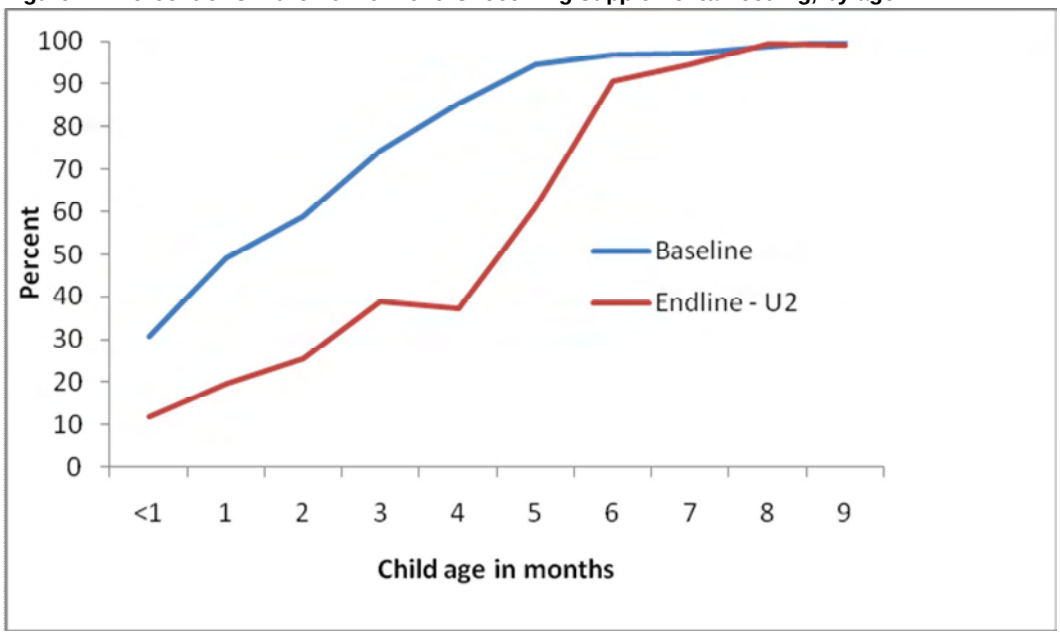
Notes:
N[1] is the number of children under six months who are breastfed. (All Children <6 months)
N[2] is the number of children six months old who are breastfed. (All children six months old)
* end-line value different from baseline value at .10 significance level
** end-line value different from baseline value at .05 significance level
*** end-line value different from baseline value at .01 significance level

Table 7.28 Children 12-23 months who received specific vaccines at any time before the survey, by district and source of information (health card or mother's report) (percent)

Source of information	Baseline					End-line – U2					End-line - GB				
	BCG	Polio[a]	DPT[a]	Measles	All	BCG	Polio[a]	DPT[a]	Measles	All	BCG	Polio[a]	DPT[a]	Measles	All
Barisal															
Vaccination card	65.1	61.1	63.3	49.9	49.9	80.4	80.1	79.8	77.8	77.1	n.a.	n.a.	n.a.	n.a.	n.a.
Mother's report	32.9	28.7	28.2	25.1	24.6	18.8	18.5	18.1	18.8	16.5	n.a.	n.a.	n.a.	n.a.	n.a.
Either source	**98.0**	**89.9**	**91.5**	**75.1**	**74.5**	**99.2**	**98.6**	**97.9**	**96.6**	**93.6**	n.a.	n.a.	n.a.	n.a.	n.a.
Bhola															
Vaccination card	53.4	50.2	52.6	39.1	38.9	69.9	68.9	68.9	67.7	67.3	n.a.	n.a.	n.a.	n.a.	n.a.
Mother's report	45.2	36.9	34.6	30.2	27.4	29.1	27.5	27.9	28.5	25.3	n.a	n.a.	n.a.	n.a.	n.a.
Either source	**98.6**	**87.1**	**87.2**	**69.3**	**66.2**	**99.0**	**96.4**	**96.8**	**96.2**	**92.6**					
Patuakhali															
Vaccination card	65.1	59.4	62.9	48.0	47.7	71.8	71.4	71.0	69.7	69.5	n.a.	n.a.	n.a.	n.a.	n.a.
Mother's report	32.7	26.7	26.1	21.8	20.7	27.8	28.0	28.0	.28.0	26.9	n.a.	n.a.	n.a.	n.a.	n.a.
Either source	**97.8**	**86.1**	**88.9**	**69.8**	**68.4**	**99.6**	**99.4**	**99.0**	**97.7**	**96.4**					
All															
Vaccination card	61.2	56.9	59.6	45.7	45.5	74.1	73.5	73.3	71.8	71.4	47.5	46.8	46.4	43.6	42.9
Mother's report	36.9	30.8	29.6	25.7	24.2	25.2	24.6	24.6	25.0	22.8	51.8	52.1	48.6	51.6	47.5
Either source	**98.1**	**87.7**	**89.2**	**71.4**	**69.6**	**99.3**	**98.1**	**97.9**	**96.8**	**94.2**	**99.3**	**98.9**	**95.0**	**95.2**	**90.4**

Notes:
N is the number of children 12-23 months.
[a]Polio and DPT data represent the percent of children recorded or reported to have received at least three rounds of the vaccines.
n.a. – not applicable
All values for U2 All and GB are different from Baseline All at the 0.01 significance level.

Figure 7.7 Percent of Children 0 – 9 months receiving supplemental feeding, by age



The percentage of children over six months of age who had diarrhea during the two weeks prior to the survey declined somewhat, from 30 percent in the baseline to 22 percent in the U2 sample and 24 percent in the GB sample (Table 7.29). The percentage of children that had diarrhea who were taken for treatment increased from the baseline value of 70 percent. Again, however, the increase was somewhat less in the GB sample (80 percent in the end-line) than the U2 sample (85 percent in the end-line). Table 7.30 provides information about where children were taken for treatment. The only big difference from the baseline is the high percentage treated by Community Health Volunteers (CHV) – a category of service provider established by the program, and that did not exist at the time of the baseline. Overall, almost one-fifth of households with cases of children's diarrhea in the U2 sample were treated by CHVs. However, in the GB sample the percentage of cases treated by CHVs was less than one percent.

There have been some notable changes in remedies provided for diarrhea since the time of the baseline (Table 7.31). Use of labon-gur saline and no treatment has gone down, while provision of packet saline (oral rehydration salts), pill/capsule/syrup, and especially water, has increased in the end-line survey round. The percentages of households using each type of remedy are very similar in the U2 and GB samples. The percentage of children with diarrhea that were given the same or more food is substantially higher in the U2 sample than the baseline (80 percent compared with 57 percent), but the figure in the GB sample is almost identical to the baseline.

Table 7.29 Children > 6 months with diarrhea and children > 6 months with diarrhea taken for treatment, by district (percent)

	Baseline				End-line				End-line
	Barisal	**Bhola**	**Patuakhali**	**Total**	**Barisal**	**Bhola**	**Patuakhali**	**Total**	**Graduated**
Children > 6 mos. with diarrhea in last two weeks	22.4	40.9	25.8	29.8	16.1	29.6	19.3	21.8***	24.1***
N[1]	*1152*	*1194*	*1225*	*3571*	*737*	*753*	*714*	*2204*	*897*
Children > 6 mos. with diarrhea in last two weeks taken for treatment	63.8	80.6	59.0	70.1	76.5	90.6	82.6	84.8***	79.6***
N[2]	*258*	*488*	*316*	*1064*	*119*	*223*	*138*	*480*	*216*

Notes:
N^1 is all children 6-23 months (Baseline, U2), 24-59 months (GB); N^2 is all children 6-23 months with diarrhea in the last two weeks.
All values for U2 All and GB are different from Baseline All at the 0.01 significance level.
* end-line value different from baseline value at .10 significance level
** end-line value different from baseline value at .05 significance level
*** end-line value different from baseline value at .01 significance level

Table 7.30 Children 6-23 months who had had diarrhea during the two weeks preceding the survey, and who received advice and treatment from a provider while suffering from diarrhea, by district

	Baseline				End-line – U2				End-line
Source of care	**Barisal**	**Bhola**	**Patuakhali**	**Total**	**Barisal**	**Bhola**	**Patuakhali**	**Total**	**GB**
Hospital/Medical college	3	0.8	0.5	1.2	3.2	0	0	0.7**	0.6
Upazila Health complex	1.8	4.6	1.1	3.1	3.2	3.5	5.3	3.9	2.3
Satellite/EPI outreach center	0	0.3	0	0.1	0	1	0	0.5***	0.6
FWC	1.8	0.3	3.7	1.5	5.4	1	0.9	2.0	0.6
FWV	0	0	0.5	0.1	0	0.5	0.9	0.5	0
FWA	0	0	0	0	1.1	1	2.6	1.5***	0.6
NGO Satellite clinic	0	0	0.5	0.1	0	0	1.8	0.5	0
NGO Field worker	0	0	0.5	0.1	0	3	1.8	2	0.6
NGO Hospital	-	-	-	-	1.1	0	0.9	0.5	0
CHV	-	-	-	-	24.7	17.3	13.2	17.8	0.6
Private clinic/Hospital	0	0	1.6	0.4	1.1	1	1.8	1.2	0
MBBS doctor	10.8	6.9	9.6	8.4	9.7	5.9	11.4	8.3	2.3***
Village doctor	29.5	35	31.6	32.9	36.6	60.4	37.7	48.7***	52.0***
Homeopathic doctor	8.4	5.6	3.7	5.8	2.2	5.9	1.8	3.9	1.7**
Pharmacy	46.4	47.2	55.1	49.0	36.6	48	54.4	49.1	68.8***
Friends/relatives	0	0.5	1.6	0.7	5.4	16.8	26.3	16.9***	1.2
Neighbor	0.6	6.6	1.1	3.9	6.5	7.9	10.4	8.3***	0
Others	6.6	3.8	3.7	4.4	1.1	2	0	1.2***	1.7*
N	*165*	*394*	*187*	*746*	*93*	*202*	*114*	*409*	173

Notes:
N is all households with a child who had diarrhea who received advice from one of these providers
* end-line value different from baseline value at .10 significance level
** end-line value different from baseline value at .05 significance level
*** end-line value different from baseline value at .01 significance level

Table 7.31 Children 6-23 months who had had diarrhea during the two weeks preceding the survey, by type of treatment received, by district (percent)

	Baseline				End-line – U2				End-line
Source	**Barisal**	**Bhola**	**Patuakhali**	**Total**	**Barisal**	**Bhola**	**Patuakhali**	**Total**	**GB**
Labon-gur saline	13.8	14.7	12.0	13.7	6.6	11.2	7.2	8.9***	13.8
Packet Saline (ORS)	50.0	51.7	50.8	51.0	84.3	72.2	77.5	76.8***	81.6***
Rice poser	0.8	0.8	0.3	0.7	0.8	1.3	0.7	1.0	6.9***
Pill/Capsule/Syrup	38.8	60.7	48.6	51.8	50.4	78.0	63.0	66.8***	62.7***
Injection	0.4	1.2	0.3	0.8	0.0	0.9	0.0	0.4	0.5
Intravenous	0.0	0.4	0.0	0.2	0.8	0.9	1.4	1.0*	0.5
Home remedies/Herbal	8.5	5.1	5.7	6.1	8.3	6.7	5.1	6.6	4.6
Water	7.3	1.8	6.6	4.6	34.7	38.6	31.9	35.7***	41.5***
Do not give anything	18.1	12.7	19.2	15.9	5.8	3.1	2.9	3.7***	5.1***
Others	6.5	11.2	5.7	8.4	2.5	3.6	7.2	4.4***	2.3***
Given same or more food	52.4	59.1	63.8	57.2	78.2	77.6	86.2	80.2***	56.9
N	*259*	*489*	*317*	*1065*	*121*	*223*	*138*	*482*	*476*

Notes:
N is all children with diarrhea given one of these treatments.
* end-line value different from baseline value at .10 significance level
** end-line value different from baseline value at .05 significance level
*** end-line value different from baseline value at .01 significance level

Table 7.32 presents information about children suffering from ARI and where treatment was sought. The most significant difference from the baseline to the end-line was the increase in the percentage of children that suffered from ARI, from only one quarter of the children in the baseline, to 55 - 60 percent in the end-line. This increase may be the result of increased awareness of the signs of ARI at the time of the end-line survey. However, the information available from the questionnaire does not provide insight into whether the change is due to increase in actual incidence of illness or increased awareness of the symptoms. The percentage of sick children that received treatment for ARI in the U2 sample was quite similar to the baseline value: about 74 percent of children with ARI received some form of treatment in both the baseline and the U2 samples. In the GB sample the percentage was a bit lower, at 70 percent. The types of facilities used for treatment in the end-line samples are quite similar to the baseline, with the exception of the U2 sample, in which about 16 percent of ARI cases were treated by CHVs. Thus, as with diarrhea cases, there has been an important shift toward using the CHVs established by the program. Again, the shift is not evident in the GB sample of former program participants.

7.6 Household Water and Sanitation

The WASH component of JoJ is concerned with improving household access to clean water and improving household sanitation and hygiene practices. Access to a clean, protected water supply and appropriate sanitation facilities is very important to household health. This section will examine changes in hygiene and sanitation practices. Generally, there has been an improvement in latrine facilities, and large reported improvements in hygiene practices. These improvements are associated with lower incidence of diarrhea and ARI in children.

Table 7.33 provides information about the sources of water for drinking and household use in the baseline and end-line survey rounds. There has been little change in the sources of water from the time of the baseline survey. The most significant change has been the increase in the percentage of tubewells tested for arsenic, from about 50 percent in the baseline to about 80 percent in the end-line. Of those tested, about two-thirds in the baseline had acceptable levels of arsenic, compared with 60 percent in the U2 end-line sample, and only 42 percent in the GB end-line sample.

The distribution of different types of sanitation facilities in the baseline and end-line survey rounds is provided in Table 7.34. The biggest changes are the increase in the number of ring slab latrines, from 36 percent of all facilities in the baseline to 74 percent in the end-line round. However, in the end-line round, a high percentage of these ring slab latrines have broken water seals: whereas in the baseline, about 65 percent of households with ring slab latrines had broken seals, in the end-line over 80 percent of the ring slab latrines had broken seals. Many of the water seals may have been broken in Cyclone Sidr, however the survey does not provide information about the reasons for why they were broken. Ownership of latrines has not changed much between the baseline and end-line rounds. However, there have been substantial changes in reported hygienic practices regarding latrines. The percentage of women reporting using hygienic sanitation practices (flushing latrines) was less than five percent for households

Table 7.32 Children who were ill with ARI during the two weeks preceding the survey, children receiving treatment, and type of facility where treatment was sought (percent)

	Baseline				End-line – U2				End-line
	Barisal	**Bhola**	**Patuakhali**	**All**	**Barisal**	**Bhola**	**Patuakhali**	**All**	**GB**
Number HH with children suffering from ARI	233	614	345	1192	529	573	462	1564	526
% of HH	15.5	36.9	21.1	24.8	55.7	61.0	49.5	55.4	58.5
% received treatment[a]	70.0	80.9	63.2	73.7	72.8	81.2	67.7	74.4	70.0
Treatment from:[b]									
Public Sector	**6.7**	**7.4**	**12.4**	**8.5**	**11.7**	**4.1**	**10.9**	**8.4**	**6.8**
Hospital/Medical college	0.6	0.6	4.1	1.5	1.3	0.4	2.5	1.3	3.0
Upazila Health Complex	1.2	6.1	2.3	4.2	4.7	3.0	4.8	4.0	1.4
Satellite/EPI outreach centre	-	0.2	0.9	0.3	0.3	0.2	0.3	0.3	0.3
MCWC	-	0.2	1.8	0.6	0.0	0.0	0.3	0.1	0
FWC	4.3	0.4	2.7	1.7	4.7	0.6	2.2	2.4	2.5
FWV	0.6	-	0.5	0.2	0.8	0.0	1.3	0.6	0
FWA	0.6	-	-	0.1	0.8	0.0	0.0	0.3	0
NGO Sector	**0.6**	**0.2**	**1.8**	**0.7**	**16.4**	**19.4**	**18.2**	**18.1**	**1.1**
Static clinic	0.6	-	0.5	0.2	0.8	0.4	0.6	0.6	0.3
Satellite clinic	-	0.2	0.9	0.3	0.5	1.3	0.6	0.9	0
Field worker	-	-	-	-	2.1	3.2	1.0	2.2	0
Hospital	-	-	0.5	0.1	0.8		1.3	0.6	0.5
CHV					13.8	16.8	16.2	15.6	0.3
Private medical sector	**93.3**	**90.9**	**83.0**	**89.4**	**82.6**	**92.9**	**83.1**	**86.8**	93.5
Clinic/Hospital	2.5	0.4	1.4	1	3.1	0.6	4.8	2.6	0.3
MBBS Doctor	27.8	12.5	13.7	15.6	14	9.5	16.6	12.9	9.5
Village doctor	25.9	37.8	38.4	35.7	43.1	50.8	43.3	46.2	58.3
Homeopathic doctor	8.6	10.5	15.5	11.4	6.5	7.7	3.5	6.2	2.5
Pharmacy	39.5	35.6	26.5	34	24.4	44.1	34.7	35.1	56.7
Other Sector	**3.1**	**5.2**	**6.4**	**5.1**	**7.8**	**16.8**	**22.4**	**15.3**	0.8
Friend/Relative	-	0.4	1.4	0.6	3.1	11	17.5	10.1	0.5
Neighbor	-	1.2	0.9	0.9	3.9	8	7.6	6.5	0
Others (Specify)	3.1	3.6	4.1	2.7	1.3	0.2	1.3	0.9	16.9
Received treatment from a health facility or a medically trained provider	**24.9**	**16.8**	**18.0**	**18.7**	**39.7**	**32.0**	**40.9**	**37.0**	**10.1**

Notes:
[a]Percent of HH with children suffering from ARI.
[b]Percent of HH seeking treatment for children with ARI.

Table 7.33 Percent distribution of households by main source of water and by distance to the main source, percentage of tubewells tested for levels of arsenic contamination, and percentage of tested tubewells bearing green or red marks

	Baseline								End-line – U2								End-line GB	
	Barisal		Bhola		Patuakhali		All		Barisal		Bhola		Patuakhali		All			
	Drinking	Domestic use	Drinking	Domestic use	Drinking	Domestic use	Drinking	Domestic use	Drinking	Domestic use	Drinking	Domestic use	Drinking	Domestic use	Drinking	Domestic use	Drinking	Domestic use
Main sources of water																		
Deep tubewell	92.7	13.3	94.2	19.5	98.7	18.2	95.3	17.1	97.7	23.1	99.8	34.1	99.5	15.1	99.0	24.1	98.8	24.7
Pond sand filter	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0		0.2		0.4		0.0		0.2	0.0	0.1
Rain water harvesting system	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rainwater	0.1	0.3	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pond	0.3	64.9	0.2	69.0	0.2	68.3	0.2	67.5	0.0	55.6	0.1	58.3	0.2	74.9	0.1	62.9	0.1	66.6
River/canal	0.3	17.8	0.6	9.2	0.2	13.0	0.4	13.2	0.2	19.7	0.0	6.6	0.0	9.8	0.1	12.1	0.1	7.8
Traditional well	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.3	0.0	0.1	0.0	0.1	0.0	0.0
Tubewell (shallow)	6.5	3.7	4.5	1.9	0.9	0.2	3.9	1.9	1.9	1.4	0.1	0.3	0.3	0.1	0.8	0.6	1.0	0.8
Others	0.1	0.0	0.5	0.3	0.0	0.0	0.2	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.1		0.0	0.0
Distance water sources																		
<500 m	98.6		98.9		96.5		98.0		100.0		100.0		100.0		100.0		100.0	
500-1000 m	1.1		0.9		2.6		1.5		0.0		0.0		0.0		0.0		0.0	
1000 m+	0.3		0.2		0.9		0.5		0.0		0.0		0.0		0.0		0.0	
N[2]	*1502*		*1664*		*1635*		*4801*		*924*		*910*		*879*		*2713*		*883*	
% of tubewell tested	79.4		55.5		20.7		51.1		81.1		86.0		73.4		80.2		79.2	
N[3]	*1497*		*1645*		*1630*		*4772*		*912*		*917*		*912*		*2741*		*895*	
Green mark	74.7		67.0		32.3		66.0		55.8		66.5		61.1		61.3		42.2	
Red mark	5.2		2.6		2.1		3.8		0.3		0.0		0.1		0.1		0.0	
No mark	20.1		30.3		65.6		30.2		43.9		33.5		38.7		38.6		57.8	
N[4]	*1188*		*913*		*337*		*2438*		*740*		*789*		*669*		*2198*		*708*	

Notes:
N^1 is all households, N^2 is all households whose water source was measured, N^3 is all households with a tubewell, N^4 is all households whose tubewell was tested
Green mark indicates acceptable level of arsenic. Red mark indicates unacceptable level of arsenic

Table 7.34 Percent distribution of household sanitation facilities by type; and percentage of women employing hygienic practices

	Baseline				End-line – U2				End-line GB
	Barisal	**Bhola**	**Patuakhali**	**All**	**Barisal**	**Bhola**	**Patuakhali**	**All**	
Type of toilet facility used by household members									
Ring-slab/offset latrine (water seal)	8.3	4.9	24.7	12.7	18.9	6.6	14.8	13.4	11.5
Pit latrine (covered)	0.4	1.6	3.5	1.9	1.2	0.9	1.9	1.3	0.2***
Ring-slab/offset latrine (water seal broken)	23.6	14.5	30.5	22.8	63.2	62.4	57.8	61.1***	62.8***
Pit latrine (uncovered)	43.8	21.6	6.8	23.5	5.3	2.1	2.5	3.3***	7.1***
Septic latrine	1.3	0.2	0.2	0.5	3.2	1.3	2.9	2.4***	1.9***
Hanging/open latrine	19.4	48.3	30.4	33.2	7.5	21.0	19.5	16.0***	15.9***
No toilet facility	3.3	8.9	3.9	5.5	0.8	5.8	0.6	2.4***	0.6***
Ownership of a latrine									
Owning a latrine[a]	91.3	92.0	96.5	93.4	93.9	89.2	95.0	92.9	89.6***
Owning a hygienic latrine[b]	9.0	6.4	27.3	14.3	21.9	8.1	19.5	16.5**	12.7
Women employing hygienic practices among households with any type of latrine	3.4	2.6	7.2	4.4	100.0	99.3	99.7	99.7***	84.5***
N[1]	*1164*	*711*	*1075*	*2950*	*879*	*688*	*745*	*2303*	*749*
Women employing hygienic practices among households with a hygienic type of latrine	34.0	40.0	25.5	29.5	100.0	98.8	100.0	99.8***	99.2***
N[2]	*150*	*111*	*464*	*725*	*220*	*82*	*183*	*485*	*122*

Notes:
[a] Ownership of latrine includes: ring-slab/offset latrine (water seal), pit latrine (covered), ring-slab/offset latrine (water seal broken), pit latrine (uncovered), septic latrine.
[b] Hygienic latrine is defined as one of the following: ring slab / offset (water seal), or covered pit latrine, or septic latrine.
N^1 is all households with a latrine (ring-slab/offset latrine (water seal), pit latrine (covered), ring-slab/offset latrine (water seal broken), pit latrine (uncovered), septic latrine)
N^2 is all households with a hygienic latrine ring slab / offset (water seal), or covered pit latrine, or septic latrine
* end-line value different from baseline value at .10 significance level
** end-line value different from baseline value at .05 significance level
*** end-line value different from baseline value at .01 significance level

with any type of latrine, and 30 percent for households with hygienic latrines (ring slab/offset with water seal, covered pit latrine, septic latrine). By the end-line survey round, essentially all women with latrines were employing hygienic practices.

Table 7.35 shows a dramatic increase in the percentage of women that demonstrated awareness of appropriate hand washing behavior. The percentage of women who achieved scores of eight or higher out of a maximum of 12 on hand washing behavior[10] increased from less than 20 percent in the baseline to 74 percent in the end-line U2 sample and 97 percent in the GB sample.

Provision of access to safe water and promotion of improved sanitation and hygiene practices are undertaken in order to improve health conditions. Table 7.36 compares the incidence of diarrhea and ARI in children during the two weeks prior to the survey with households' access to clean water and adoption of appropriate sanitation facilities and hygiene practices. Access to water from a tubewell that has been tested for arsenic has no statistically discernible impact on either diarrhea or ARI. Households with access to a sanitary latrine and follow hygienic latrine practices (flushing with water) have a significantly lower incidence of both diarrhea and ARI. Households following recommended handwashing practices actually have a somewhat higher incidence of diarrhea than those that do not, while there is no significant impact on ARI incidence. Finally, those households that utilize the whole range of recommended facilities and practices have significantly lower incidence of both illnesses than households that do not. In the U2 sample 10.9 percent of all households utilized the complete package of sanitation and hygiene facilities and practices. In the GB sample the percentage is 9.4 percent.

[10] The score is the sum of the number of critical times for hand washing and the number of appropriate hand washing techniques correctly identified by the respondents.

Table 7.35 Percentages of mothers of children under two years of age with appropriate hand-washing behavior and overall score

	Baseline				End-line – U2				End-line
	Barisal	**Bhola**	**Patuakhali**	**All**	**Barisal**	**Bhola**	**Patuakhali**	**All**	**GB**
Critical times for hand washing									
Before food preparation	51.1	35.2	61.2	49.1	70.9	66.6	71.6	69.7	80.2
Before eating	91.5	84.8	87.1	87.7	94.5	96.0	98.9	96.5	97.0
Before feeding children	42.7	16.5	28.6	28.8	77.1	83.9	89.6	83.5	57.4
After defecation	90.8	84.9	88.9	88.1	97.6	99.6	99.6	98.9	98.7
After cleaning babies bottom	38.8	18.7	30.2	28.9	72.1	76.1	79.3	75.8	43.3
Other					2.4	1.2	0.4	1.3	36.6
Hand washing techniques									
Uses water	96.4	95.0	96.3	95.9	98.3	97.9	98.9	98.4	99.0
Uses soap or other cleaning agents	27.5	19.7	27.4	24.7	54.3	53.0	67.6	58.3	38.9
Ash	8.2	3.4	4.0	5.1	4.5	6.2	8.1	6.3	10.1
Washes both hands	79.6	78.4	72.9	76.9	88.8	92.8	90.8	90.8	94.4
Rubs hands together at least 3 times	86.9	77.3	78.7	80.8	85.2	91.4	94.4	90.3	94.2
Dries hands with clean cloth	39.9	51.5	39.4	43.8	27.1	31.7	33.3	30.7	37.8
Dries hands with air	0.0	0.0	0.0	0.0	38.1	37.3	49.5	41.6	31.0
Other	0.0	0.0	0.0	0.0	1.8	3.6	1.9	2.4	24.1
Refuses to Demonstrate	0.0	0.0	0.0	0.0	0.6	1.5	0.5	0.9	0.5
Scores for hand washing behavior									
0	-	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
1	0.5	0.8	0.3	0.5	0.0	0.0	0.0	0.0	0.0
2	0.7	3.2	1.4	1.8	0.0	0.0	0.0	0.0	0.0
3	2.7	5.2	3.5	3.8	0.4	0.6	0.1	0.4	0.0
4	6.0	10.9	7.8	8.3	0.9	0.7	0.2	0.6	0.0
5	13.5	23.6	17.7	18.4	5.6	2.2	1.6	3.2	0.0
6	25.1	28.4	30.8	28.2	11.2	11.8	4.9	9.3	0.0
7	24.2	16.6	20.6	20.3	14.9	14.2	9.9	13.0	3.0
8+	27.4	11.2	17.9	18.5	67.0	70.4	83.3	73.6	97.0
N	*1506*	*1665*	*1636*	*4807*	*949*	*939*	*933*	*2821*	*897*

Table 7.36 Percent of households reporting children with diarrhea, ARI in past two weeks, by use of selected sanitation and hygienic practices or facilities

		End-line U2		End-line GB	
		Diarrhea	**ARI**	**Diarrhea**	**ARI**
Tested Tubewell	Yes	17.2	55.3	23.1	58.4
	No	17.0	55.9	27.7	59.1
Sanitary Latrine	Yes	12.0***	44.9***	13.1***	48.4**
	No	18.3	57.6	25.8	60.1
Proper Handwashing	Yes	18.0*	54.6	26.6**	56.5
	No	15.0	57.8	20.3	61.6
Hygienic latrine practices	Yes	12.1***	45.7***	12.7***	50.0**
	No	18.0	57.4	25.8	59.8
All of above	Yes	14.7***	45.8***	14.3**	47.6**
	No	22.6	57.0	25.1	59.7
N		*2821*		*897*	

Notes:
* value different from households without the practice/facility at the .10 significance level
** value different from households without the practice/facility at the .05 significance level
*** value different from households without the practice/facility at the .01 significance level

7.7 Anthropometric Indicators

As in the baseline survey, a major focus of the JoJ end-line survey was on assessing the anthropometric status of children. These anthropometric indicators are general indicators that should reflect the combined impacts of all program interventions other than disaster preparedness. In the end-line survey, children 6-59 months of age were measured (6-23 months in the U2 sample and 24-59 months in the GB sample), in terms of the three standard indices of physical growth: height for age, weight for height, and weight for age. These indices are widely used to assess the general nutritional status of an individual or a population group. These measures provide the following specific information about the nutritional status of children:

Height for age: This index identifies whether a child is short for her/his age or stunted, a condition reflecting the effect of previous under-nutrition or chronic malnutrition. It cannot measure short-term changes in malnutrition. Stunting is associated with a number of long-term factors such as chronic insufficient protein and energy intake, frequent infection, sustained inappropriate feeding practices, and poverty.

Weight for height: This index identifies whether a child has low weight for her/his height (wasting), and thereby helps identify children suffering from current or acute malnutrition or wasting. Weight for height is appropriate for examining short-term effects such as those from seasonal changes in food supply or short-term nutritional stresses brought about by illness.

Weight for age: This index identifies whether a child is underweight for her/his age. It is a composite index of weight for height and height for age. It reflects both chronic and acute malnutrition, and is a useful indicator in assessing changes in the magnitude of malnutrition over time. However it is not useful in distinguishing between stunting and wasting. (A child can be underweight for his/her age because he/she is stunted or wasted, or both stunted and wasted.)

Table 7.37 presents results for these three anthropometric indicators from the baseline and end-line survey rounds. The first section of this table report results based on the WHO 2006 Growth Standards reference population. The WHO has adopted this new standard to better reflect children's growth patterns across the globe, and recommends that government agencies, donors, and NGOs also adopt the new standards in nutritional assessments.[11] It is important to note that stunting and underweight are both age-dependent indicators: the results from the GB sample are not directly comparable with those of the baseline and U2 samples because the children in the GB sample are older. Only wasting is directly comparable across the three samples. Stunting has declined by almost 8 percent, from 39 percent in the baseline to 36 percent in the U2 sample. Stunting rates are higher in the GB sample than either U2 or baseline but this difference is explained at least in part by the fact that children are older in the GB than the other two samples. Wasting rates are significantly lower in both the U2 and GB samples compared to the baseline, from 40 percent lower in the U2 sample to 45 percent lower in the GB sample. The percentage of underweight children is 25 percent lower in the in the U2 sample compared to the baseline. Again, the GB sample is not directly comparable to the baseline and U2 samples for this measure, because the children are older than those in the other two samples. All the anthropometric indicators have improved from the baseline to the end-line survey round. Also, the regional patterns of variation in the anthropometric indicators are similar over the two survey rounds; Bhola has a markedly higher incidence of children with all three measures of undernutrition than the other two districts. With the exception of stunting in the GB sample, a slightly higher percentage of boys exhibit under-nutrition than girls in all the samples.

Anthropometric Indicators based on the 1978 NCHS reference population are provided in the second section of Table 7.37. The baseline results with the U2 sample of the end-line. These results are consistent with the computations provided in the JoJ Baseline Report. Using this earlier reference population, stunting rates have decreased by over 11 percent (from 35.6 percent to 31.5 percent). Incidence of underweight has decreased by 10 percent (from 52.3 percent to 46.9 percent).

Figures 7.8 a-c show graphically the changes in the anthropometric indicators over time, based on the WHO 2006 Growth Standards reference population. These figures include findings from the JoJ mid-term survey. They also show the general trend of improvement across all three anthropometric measures.

The anthropometric indicators for children are broken down by household participation in different program components in Table 7.38. In the U2 sample, there are no statistically detectable differences in any of the nutritional indicators when comparing non-participants, households that participated in MCHN only, and those that participated in both MCHN and HFP. As discussed in the analysis of food security indicators, one explanation for this lack of difference in indicators between households that participated in HFP compared with households that participated only in MCHN may be that, through demonstration effects from HFP participants to neighboring households, many households in SO1 unions have adopted improved gardening and farming practices even though

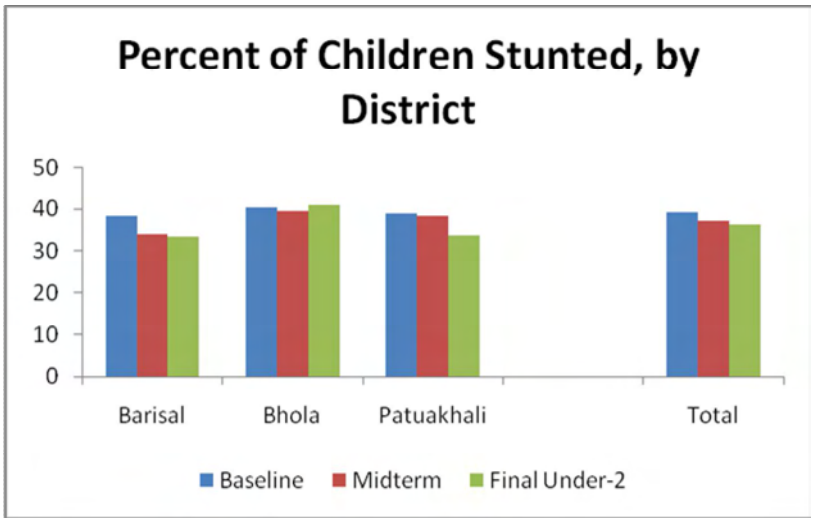
[11] IASC Global Nutrition Cluster, March 2009. *Fact Sheet on the Implementation of the 2006 WHO Child Growth Standards for Emergency Nutrition Programmes for Children aged 6-59 Months.*

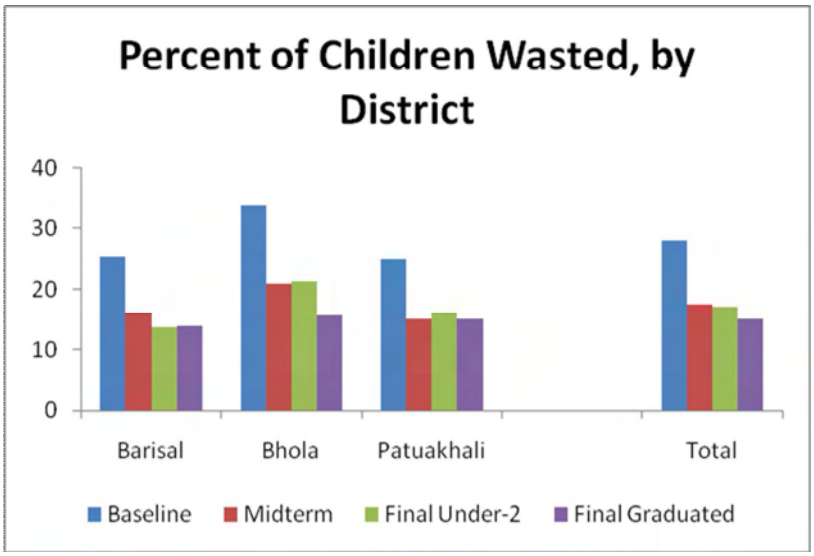
Table 7.37 Anthropometric indicators, by district and by sex of the child

	District			Gender of CHild		
	Barisal	**Bhola**	**Patuakhali**	**Male**	**Female**	**All**
I. Computed based on WHO 2006 Reference Population						
Stunting (height for age) % <-2SD						
Baseline	38.3	40.3	38.9	42.9	35.2	39.2
U2	33.6	41	33.8	40.6	31.6	36.2***
	(30.2-37.0)	*(37.5-44.5)*	*(30.3-37.3)*	*(37.8-43.5)*	*(28.8-34.3)*	*(34.2-38.2)*
GB	49.7	67.5	50.2	56.8	59.9	58.3***
	(42.2-57.2)	*(63.0-71.9)*	*(44.5-55.9)*	*(52.2-61.3)*	*(55.2-64.5)*	*(55.0-61.5)*
Wasting (weight for height) % <-2SD						
Baseline	25.2	33.7	24.8	30.5	25.1	27.9
U2	13.8	21.4	16.2	19.4	14.8	17.1***
	(11.3-16.3)	*(18.4-24.3)*	*(13.5-18.9)*	*(17.1-21.8)*	*(12.7-16.9)*	*(15.6-18.7)*
GB	13.9	15.8	15.1	15.5	14.8	15.2***
	(8.7-19.1)	*(12.3-19.2)*	*(11.0-19.1)*	*(12.2-18.8)*	*(11.5-18.2)*	*(12.8-17.5)*
Underweight (weight for age) % <-2SD						
Baseline	43	51.7	43.8	49.1	43.1	46.2
U2	31.4	40.3	32.4	39.1	30.3	34.8***
	(28.1-34.8)	*(36.8-43.8)*	*(29.0-35.8)*	*(36.2-42.0)*	*(27.6-33.1)*	*(32.8-36.8)*
GB	45.1	58.1	45.5	51	51.9	51.4***
	(37.6-52.6)	*(53.4-62.8)*	*(39.8-51.2)*	*(46.4-55.5)*	*(47.1-56.6)*	*(48.1-54.7)*
II. Computed based on NCHS 1978 Reference Population						
Stunting (height for age) % <-2SD						
Baseline	34	37.5	35.1	37.7	33.6	35.6
	(31.2-36.8)	*(34.7-40.3)*	*(32.4-37.8)*	*(35.4-39.8)*	*(30.5-36.3)*	*(34.0-37.2)*
U2	28.9	35.3	30.3	33.5	29.5	31.5***
	(25.6-32.2)	*(31.8-38.7)*	*(26.9-33.6)*	*(30.7-36.3)*	*(26.8-32.2)*	*(29.6-33.5)*
Wasting (weight for height) % <-2SD						
Baseline	22.1	28.4	24.7	27.6	22.3	25.1
	(19.6-24.5)	*(25.8-31.0)*	*(22.2-27.1)*	*(25.5-29.6)*	*(20.3-24.3)*	*(23.5-26.5)*
U2	14.4	21.9	18.5	20.8	15.8	18.3***
	(11.9-17.0)	*(18.9-24.8)*	*(15.6-21.3)*	*(18.4-23.1)*	*(13.6-17.9)*	*(16.7-19.9)*
Underweight (weight for age) % <-2SD						
Baseline	47.6	56.2	53.1	53.1	51.4	52.3
	(44.6-50.5)	*(53.2-59.1)*	*(50.2-55.9)*	*(50.8-55.4)*	*(49.0-53.8)*	*(50.6-53.9)*
U2	42.1	53.3	45.2	49.4	44.4	46.9***
	(38.5-45.7)	*(49.8-56.9)*	*(41.6-48.9)*	*(46.5-52.4)*	*(41.4-47.3)*	*(44.9-49.0)*

Numbers in parentheses below the values are the 95% confidence intervals.
* end-line value different from baseline value at .10 significance level
** end-line value different from baseline value at .05 significance level
*** end-line value different from baseline value at .01 significance level

Figure 7.8 a-c Anthropometric indicators by survey round, by district





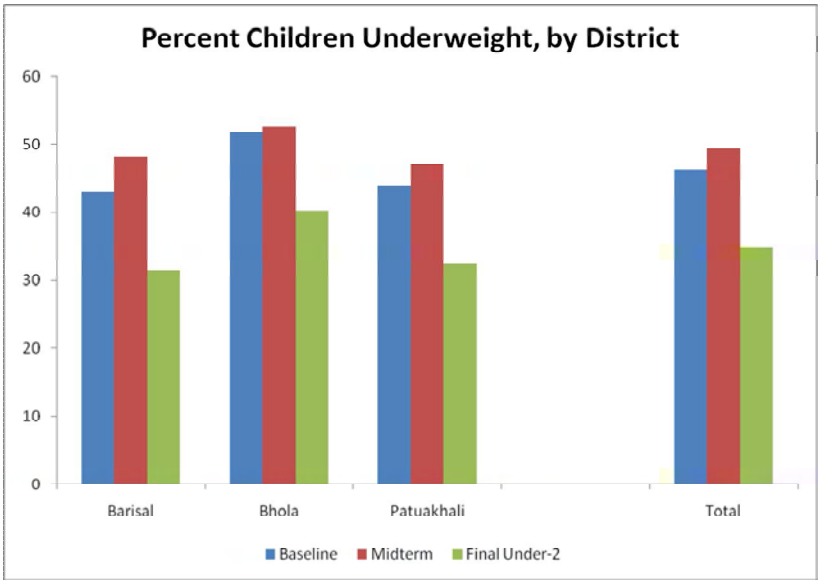


Table 7.38 Anthropometric Indicators by program participation categories, end-line samples

	End-line U2					End-line GB	
	Non-participant	MCHN only	MCHN+HFP	Non-SO1 Union	SO1 Union	MCHN only	MCHN+HFP
Stunting (< -2 SD)	32.2	36.0	39.0	*40.6*	*34.3****	59.6	48.7**
Wasting (< -2 SD)	16.3	17.0	18.5	*19.4*	*16.2***	15.1	15.9
Underweight (< -2 SD)	36.1	34.0	38.5	*38.7*	*33.1***	52.7	42.5***

Notes:
SO1 us – unions where SO1 activities are supported, Non-SO1 Unions – unions were SO1 activities not supported.
* MCHN+HFP / SO1 union value different from MCHN only / non-SO1 union value at .10 significance level
** MCHN+HFP / SO1 union value different from MCHN only / non-SO1 union value at .05 significance level
*** MCHN+HFP / SO1 union value different from MCHN only / non-SO1 union value at .01 significance level

they did not participate directly in HFP. The values for indicators of undernutrition are significantly lower in SO1 unions than in non-SO1 unions. These results suggest that HFP activities within the SO1 unions have improved the nutritional status of children in all households in those areas, whether or not the households participated directly in HFP.

In the GB sample, the measures of longer-term undernutrition (stunting and underweight) are lower in the households that have participated in HFP compared with those that participated in MCHN only. The fact that these differences are significant in the GB sample while they are not significant in the U2 sample suggests that the participation in the HFP affects the long-term nutritional status of children only after a lag in time from when households initially received support from HFP.

A series of linear regressions was calculated to analyze the factors that affect the anthropometric indicators of children. Among other factors, these regressions examine the impacts of various program components (MCHN, WASH, FHP) on children's nutritional status. Explanatory variables in the models include characteristics of the measured children (age, gender, whether the child suffered from diarrhea or ARI in the two weeks prior to the survey), measures of household economic status (income per family member, number of assets), food security indicators (FAST score, DDS)[12], whether or not the household utilizes a package of sanitation and hygiene facilities and practices (water from a tested tubewell, uses an improved latrine, practices appropriate sanitation procedures, and practices appropriate handwashing procedures), and whether or not the household is in an SO1 union. Note that the DDS is positively associated with support provided by HFP in the SO1 unions (as demonstrated in Table 7.21). Thus, the model can identify impacts of the HFP on undernutrition in through two causal pathways: i) whether or not the child's household is in an SO1 union, and ii) the indirect impact of HFP on the household's diet diversity.

Regressions were run on both the U2 and GB samples. However, the regression models performed very poorly in the GB samples, with the models explaining only six percent or less of the variation in the anthropometric measures of children. The implication of these results is that, for the older children in the GB sample, none of the variables included in the model explained variations in the anthropometric measurements of the children. In particular, none of the variables related to JoJ program activities explained any of the variations in the anthropometric status of these older children. Because the regressions on the GB sample provided no conclusive results, the estimated parameters from these regressions are not reported.

In contrast, the results from the regressions on children 6-23 months of age explained a larger portion of the variation in the anthropometric indicators, and many of the explanatory variables included in the model were found to be statistically significant. The results of these regression models on the 6-23 month old children in the U2 sample are reported in Tables 7.39a-c. Separate regressions were estimated on the Z-scores of the three measures: wasting (WHZ), stunting (HAZ), and underweight (WAZ). For each explanatory variable, the tables report elasticity values and the significance level of the coefficient, based on the T-test for the hypothesis that the coefficient is zero. Elasticity values are computed from the linear regression coefficients. They are interpreted as the percentage change in the dependent variable of the model for a one percent change in the particular explanatory variable. For example, in Table

[12] The CSI indicator was also tried in the regressions, but the FAST score performed better.

39a, the elasticity value of 0.080 for income per person means that if income per person increases by one percent, the predicted WHZ score for the child will increase by 0.080 percent. (For dummy variables that take a 0 or 1 value only, the elasticity value represents the percentage change in the dependent variable if the dummy variable changes from 0 to 1.) The elasticity value is independent of the units of measure for the variables, and so can be compared directly across the variables. The elasticity values give a direct measure of the relative importance of the different explanatory variables in explaining variation in the dependent variable.

The adjusted R^2 and F values are measures of how well the data fit the model. The adjusted R^2 of 0.128 for the model in Table 39a means that the model explains about 13 percent of the variation in the observed WHZ scores. The F value relates to the hypothesis test that all the coefficients of the model are zero. A low significance value for the F value means that we can reject the hypothesis that all the coefficients are zero, that is, the model as a whole explains some of the variation in the dependent variable. The significant variables, those with significance levels below 0.10, are marked in bold in the tables. Note that all of the models estimated on the U2 sample have quite low adjusted R^2 values. This means that, even in the U2 sample, much (most) of the variation in the Z scores is explained by factors not included in the models. However, based on the F values, we can reject the hypothesis that the models do not explain any of the variation in the anthropometric variables, and many of the individual coefficients in the models are statistically different from zero.

Table 39a reports the results for wasting (WHZ), which measures short-term, or acute undernutrition. The results show that the likelihood of wasting increases with the age of the child, that girls have slightly higher WHZ scores than boys, and that incidence of diarrhea and ARI significantly lowers the WHZ score. Children in households of higher economic status (higher expenditures per person, and more assets) have higher WHZ scores. With respect to program interventions, children in households that have adopted the full package of hygiene and sanitation facilities and practices (water from a tested tubewell, use of a sanitary latrine, awareness of appropriate washing practices and hygienic latrine practices) have higher WHZ scores than do children in other households. The MCHN indicator which is positively associated with WHZ is whether or not the mother had antenatal checkups. The DDS is statistically significant and positive, although quite small in magnitude (a one percent increase in the DDS is associated with a 0.03 percent increase in the WHZ value). This indicates a small indirect impact of the HFP program component on children's weight for height measures. The other variables were not statistically significant. Children of households in SO1 unions do not have significantly different WHZ scores than those in non-SO1 unions.

The regression model for stunting (HAZ) shows the same general pattern of coefficients for child characteristics (age, sex, had ARI or diarrhea in past two weeks) and household economic status (income per person, number of assets) as the previous model, although the elasticity values for these variables are somewhat smaller than in the WHZ model. The sanitation package variable is not significant in this equation. Of the MCHN variables, the dummy variables for whether the mother had antenatal checkups and whether the mother ate more during the child's pregnancy are both positively related to the child's height-for-age measurement. Of the HFP variables, both the food security indicators and the dummy variable for whether the household was in an SO1 union positively affect the HAZ value. Thus, both the MCHN and HFP program components contribute positively to this longer-term nutritional

indicator, while the WASH component does not have a statistically significant impact. Finally, the results for the model of underweight (WAZ) are reported in Table 7.39c. For this indicator, which measures both long-term and current dimensions of the child's nutritional status, all program components contribute positively to children's nutritional status.

While the regression results from the U2 sample reveal that JoJ interventions have impacts on the nutritional status of children under two years of age, the inconclusive results from the regressions on the GB sample suggest that the impacts of the program interventions are not evident in older children. This may be because as children get older, the effects of antenatal care and current hygiene and sanitation conditions become relatively less determinant factors in children's growth. Also note that some of the children in the GB sample may have received program support only some time after they had already been born, so that they may have already been on a lower growth trajectory by the time that they began to receive benefits from the program. In these cases, even though the children may have benefited from program interventions, their long-term anthropometric measurements (HAZ, WAZ) will be low, simply because they started from a lower point when they began to receive services.

Another possible explanation is that the awareness and practices promoted by the various program components are not sustained after direct program support ends. As described above, there is evidence that awareness and practices of appropriate MCHN behaviors are in fact lower in the GB sample than in the U2 sample. The general conclusion from the regression results is that the JoJ interventions have statistically measurable positive impacts on nutritional status of children of households that are currently being supported by the program, particularly the longer-term measures of HAZ and WHZ. However, program interventions do not have any measurable impacts on the nutritional status of children in households that are no longer actively participating in the MCHN component. These results raise concerns about the capacity of the program to sustainably improve the nutritional status of children.

Table7.39a Regression results for WHZ (wasting) from U2 sample

Dependent Variable: WHZ for children 6-23 months		
Explanatory Variables	**Elasticity**	**Significance level**
Age	**-0.513**	**0.000**
girl	**0.092**	**0.015**
Income per person	**0.080**	**0.006**
# assets	**0.211**	**0.000**
sanitation & hygiene package	**0.113**	**0.056**
Antenatal checkup	**0.183**	**0.049**
Eat more during pregnancy	0.055	0.165
Knowledge eat more during pregnancy	-0.141	0.160
Child has diarrhea	**-0.242**	**0.000**
Child has ARI	**-0.250**	**0.000**
DDS	**0.034**	**0.003**
FAST score	0.040	0.357
SO1 union	0.051	0.225
Adjusted R^2	0.128	
F Value	25.802	0.000

Notes:
Coefficients in bold significant at the .10 level.
Hygiene and sanitation package: tested tubewell + sanitary latrine + score ≥ 8 on washing practices + hygienic practices.

Table 7.39b Regression results for HAZ (stunting) from U2 sample

Dependent Variable: HAZ for children 6-23 months		
Explanatory Variables	**Elasticity**	**Significance level**
Age	**-0.593**	**0.000**
girl	**0.107**	**0.000**
income per person	**0.058**	**0.008**
# assets	**0.123**	**0.000**
Sanitation Package	0.060	0.171
Antenatal checkup	**0.167**	**0.016**
Eat more during pregnancy	**0.111**	**0.000**
Knowledge eat more during pregnancy	-0.104	0.166
Child has diarrhea	**-0.098**	**0.004**
Child has ARI	**-0.051**	**0.071**
DDS	**0.115**	**0.021**
FAST score	**0.071**	**0.028**
SO1 union	**0.053**	**0.090**
Adjusted R^2	0.155	
F Value	32.038	0.000

Notes:
Coefficients in bold significant at the .10 level.
Hygiene and sanitation package: tested tubewell + sanitary latrine + score ≥ 8 on washing practices + hygienic practices

Table 7.39c Regression results for WAZ (underweight) from U2 sample

Dependent Variable: WAZ for children 6-23 months		
Explanatory Variables	**Elasticity**	**Significance level**
Age	**-0.427**	**0.000**
girl	**0.080**	**0.002**
expenditures per person	**0.068**	**0.001**
# assets	**0.169**	**0.000**
Sanitation Package	**0.083**	**0.041**
Antenatal checkup	**0.181**	**0.005**
Eat more during pregnancy	**0.081**	**0.003**
Knowledge eat more during pregnancy	-0.106	0.126
Child has diarrhea	**-0.157**	**0.000**
Child has ARI	**-0.152**	**0.000**
DDS	**0.158**	**0.001**
FAST score	**0.060**	**0.045**
SO1 union	**0.051**	**0.075**
Adjusted R^2	0.169	
F Value	35.595	0.000

Notes:
Coefficients in bold significant at the .10 level.
Hygiene and sanitation package: tested tubewell + sanitary latrine + score ≥ 8 on washing practices + hygienic practices

7.8 Emergency Preparedness and Response

JoJ has worked to improve disaster preparedness and response in program communities. It should be noted that there were no serious cyclones or flooding events in the program areas for many years prior to the baseline, whereas the information in the end-line survey is in reference to cyclone Sidr. Thus, the results from the two rounds are based on very different conditions, and so direct comparisons must be interpreted with caution. With this caveat in mind, Table 7.41 reveals that emergency preparedness has improved substantially from the time of the baseline survey. In the baseline, for example, only one-third of surveyed households had received advance warning of the cyclone that hit prior the baseline survey. By contrast, in the end-line survey over 90 percent of households received advance warning of the cyclone (91 percent in U2 and 95 percent in GB). However, in the U2 sample, a higher percentage of households, almost 20 percent, did not receive advance warning in Barisal district, compared with Bhola and Patuakhali. The sources of the warning messages changed in important ways from the baseline to the end-line. Specifically, CPP volunteers, television, and especially mosque microphones increased in relative importance in the end-line. Warnings from the Union Parishad also increased from almost nil to reaching almost 13 percent of households that received warning. Conversely, radio diminished somewhat in importance as a source of information. Also noteworthy is the very high percentage of responses for "friends/neighbors/relatives" as sources of emergency warning information in the U2 end-line. This category was not included in the GB questionnaire, so friends, neighbors, and relatives were counted in the "other" category in the GB sample.

The percentage of households that moved to a shelter during an emergency increased from less than four percent of surveyed households to over 20 percent in the end-line (over 25 percent in the GB sample). Again, note that the answers from the end-line surveys refer to Cyclone Sidr, one of the most severe to strike the program area in many years. There was not much change in the types of shelter that people moved to from the baseline to the end-line survey rounds.

A much larger percentage of households reported having received assistance in the end-line (after Cyclone Sidr), over 50 percent, compared with only two percent in the baseline. There was also substantial variation in the percentage of households receiving assistance across the districts – 83 percent in Patuakhali compared with 33 percent in Bhola. These regional variations presumably reflect the differences in how badly different program areas were affected by Sidr. In terms of the types of assistance received there was essentially a complete reversal of households receiving food versus water in the two survey rounds. In the baseline, 93 percent of households reported receiving food and less than five percent received water. Conversely, in the end-line, less than 5 percent of households reported receiving food (less than one percent in the GB sample) and over 96 percent received water. The percentages of households receiving other types of assistance are not much different between the baseline and U2 samples. However, a smaller percentage of households in the GB sample reported receiving clothing, housing, and money than in the U2 sample.

Table7.41 Percent of households receiving warning messages and assistance from last cyclone (Sidr)

	Baseline				End-line – U2				End-line
Responses	**Barisal**	**Bhola**	**Patuakhali**	**All**	**Barisal**	**Bhola**	**Patuakhali**	**All**	**GB**
Warning message									
Received	18.8	50.6	27.3	32.7	81.5	94.7	98.5	91.4	95.2
Did not receive	81.2	49.4	72.7	67.3	18.5	5.3	1.5	8.6	4.8
N[1]	*1506*	*1665*	*1636*	*4807*	*949*	*909*	*907*	*2765*	*897*
Source of messages									
CPP Volunteers	0.4	18.4	45.4	22.8	0.3	47.4	46.7	32.8	22.2
Radio	68.2	42.6	46.3	48.3	33.6	41.2	47.5	41.1	41.2
Television	47.0	20.2	21.3	25.3	51.7	34.8	44.8	43.5	48.2
Union Parishad	-	0.2	0.4	0.3	4.8	13.3	19.0	12.7	18.1
NGOs	0.4	0.5	0.9	0.6	2.5	7.4	3.4	4.5	1.1
Mosque microphones	-	5.6	2.2	3.6	19.0	45.2	46.6	37.7	38.4
Neighbors/Friends/ Relatives	-	-	-	-	83.2	93.5	95.9	91.2	0.0
Others	11.7	44.1	12.1	29.2	0.9	1.5	1.6	1.3	87.5
N[2]	*283*	*843*	*447*	*1573*	*773*	*862*	*893*	*2528*	*855*

Notes:
N^1 is all households with a cyclone, N^2 is all households who received warning message of the last cyclone, N^3 is all households who moved during last cyclone, N^4 is all households who received assistance during the last cyclone
All values for U2 All and GB are different from Baseline All at the 0.01 significance level.

Table 7.41 (continued). Percent of households receiving warning messages and assistance from last cyclone

	Baseline				End-line – U2				End-line
	Barisal	**Bhola**	**Patuakhali**	**All**	**Barisal**	**Bhola**	**Patuakhali**	**All**	**GB**
Moved to a shelter									
Moved	0.8	3.8	6.1	3.6	11.8	22.6	28.8	20.9	25.5
Did not move	99.2	96.2	93.9	96.4	88.2	77.4	71.2	70.1	74.5
N[1]	*1506*	*1665*	*1636*	*4807*	*949*	*909*	*907*	*2765*	*897*
Type of shelter									
Pacca house	16.7	11.1	5.1	8.0	16.9	4.3	9.0	9.0	15.0
Kacha house	58.3	58.7	37.4	46.6	74.6	28.8	33.1	39.9	46.7
Cyclone/flood center	0.0	20.6	36.4	28.2	4.2	50.0	41.4	37.0	19.3
Union Parishad building	-	-	-	-	1.7	1.4	1.1	1.7	0.4
School building	0.0	3.2	2.0	2.3	0.8	10.6	3.8	5.6	7.3
Boat	0.0	0.0	1.0	0.6	0.0	0.5	0.4	0.3	0.0
Highways/embankment	-	-	-	-	0.0	1.9	4.5	2.7	1.7
Raised hillock	16.7	4.8	14.1	10.9	0.8	1.0	5.6	3.0	3.0
Mosque	-	-	-	-	0.0	1.4	1.1	1.0	1.3
Other	8.3	1.6	4.0	3.4	0.8	0.0	0.0	0.2	4.3
N[3]	*12*	*63*	*99*	*174*	*118*	*208*	*266*	*592*	*233*
Received assistance	0.7	1.1	4.0	2.0	46.2	32.5	82.8	53.7	57.4
N	*1506*	*1665*	*1636*	*4807*	*949*	*909*	*907*	*2765*	*897*
Type of assistance received									
Food	100.0	89.5	92.4	92.6	2.7	3.1	5.7	4.3	0.6
Water	-	-	6.1	4.2	95.0	96.3	97.1	96.3	97.2
Clothing	-	26.3	22.7	21.1	10.7	11.5	19.0	15.1	6.0
Housing	-	5.3	22.7	16.8	12.6	6.4	15.0	12.6	6.2
Money	-	-	1.5	1.1	5.3	8.1	14.0	10.2	6.8
Medicine	-	5.3	3.0	3.2	0.9	1.0	9.2	5.1	5.2
Other	-	-	6.1	4.2	4.1	3.1	5.3	4.5	20.8
N[4]	*10*	*19*	*66*	*95*	*438*	*295*	*751*	*1484*	*515*

Notes:
N^1 is all households with a cyclone, N^2 is all households who heard of the last cyclone, N^3 is all households who moved during last cyclone, N^4 is all households who received assistance during the last cyclone.
All values for U2 All and GB are different from Baseline All at the 0.01 significance level.

8. Summary and Discussion

The findings from the two samples of the end-line survey provide evidence of many changes in the levels of awareness, practices, and conditions of households in the JoJ program area since the time of the baseline survey. Comparison of results from the baseline and end-line samples provides an indication of how these factors have changed over the course of the project. Comparison between the U2 and GB samples offers some insights into the sustainability of the program interventions. Discussion of findings will first summarize impact and outcome level indicators, followed by discussion of individual program components; finally, program implementation issues of targeting and sustainability will be addressed in the context of survey findings.

Anthropometric Indicators

Looking first at the impact level indicators of household conditions, all anthropometric measures of undernutrition have decreased from the baseline to the end-line U2 sample. Regression analysis reveals that the HFP, MCHN and WASH components all have positive impacts on all three measures of undernutrition for under-2 children. However, the regression results do not show any significant impacts on older children in households that participated in the program activities at an earlier time.

Food Security Indicators

Measures of household food security show mixed results over the life of the project. Measures of the quality of diet in current household consumption showed improvement, both from the baseline, and comparing program participants with non-participants in the U2 sample. The broader indicator of household security, the FAST score, which measures longer-term food security and vulnerability, did not change significantly from the baseline to the end-line. Participants in the HFP component do not show any improvement in either current food consumption measures or longer-term food security in comparison with households that have not participated in this component. Also, the additional indicators that were measured in the end-line, the Food Consumption Score and Coping Strategy Index, showed similar patterns as the similar indicators (DDS and FAST scores) that were computed in the baseline. Thus, these additional indicators help to confirm the overall picture of food security conditions, but do not provide more accurate measuresor additional insights about food security conditions as compared to the original indicators. In the regression analysis, the FAST score actually performed slightly better than the CSI. Since DDS and FAST score are indicators normally used to assess Title II projects, continuation of use of these indicators of food security is recommended.

Homestead food production (HFP)

There is strong evidence of increased awareness of appropriate or improved practices in all areas of HFP, including agriculture, gardening and poultry production. Improvements in homestead agriculture have been particularly notable. Adoption of improved gardening techniques has been very high among participants in FHP, but also among the wider population in the sampled communities. This suggests that these techniques provide real improvements, and are therefore perceived by many households to be advantageous. In addition, the adoption rates are generally as high among the smaller farmers as larger farmers, suggesting

that the benefits from these improvements can reach even households of lower economic status.

One very important finding with respect to agriculture is the general tendency that the adoption rates are even higher in the households in the GB sample than among the sample that includes current program participants. This suggests that the improvements are sustainable, as households continue to practice the techniques even after they no longer have direct support from the program.

Households in SO1 unions have more diverse diets than those in non-SO1 unions. Thus, the SO1 interventions appear to have successfully improved the diets of all households within the SO1 intervention areas, not only those that participate directly in HFP. This finding also suggests that the support provided to HFP households is diffused to other households within the same communities. Increased diet diversity, which is related to SO1 support, is also correlated with improved nutritional indicators of under-2 children.

Maternal and Child Health and Nutrition (MCHN)

In the area of MCHN there is evidence of widespread improvement in awareness of appropriate practices and changes in behaviors. In all areas covered by the survey – antenatal care, infant feeding, immunization and child health care – awareness of appropriate practices and reported behaviors has increased substantially from the baseline. However, comparison of results from the GB sample with those of the U2 sample reveals a decline in levels of awareness and practices for households that previously received MCHN support in relation to those currently receiving support. The percent of women receiving antenatal checkups, the percent reporting eating more during pregnancy, and vaccination rates of children are all lower in the GB sample than the U2 sample.

One negative trend observed across the survey rounds is the quite dramatic increase in incidence of ARI among children. One possible explanation is that parents are now more aware of the signs of ARI, and thus the actual incidence has not increased, but rather awareness has increased. However, the information available in the survey cannot reveal whether the increase in the reported incidence is due to greater awareness or to an increase in the actual incidence. The reasons for this change should be further investigated.

Water, Sanitation and Hygiene (WASH)

The promotion of appropriate hygiene and sanitation practices has shown a marked improvement in reported practices of participating households since the baseline. There has been a dramatic increase in the percentage of homes with improved latrines, but the percentage of ring slab latrines with broken seals has also increased significantly. The higher proportion of broken seals may be the result of damage incurred by Cyclone Sidr. The reported use of improved handwashing techniques has also improved dramatically, as has the use of hygienic sanitation practices. Households that utilize these practices, especially those that use the entire set of practices, have lower incidence of diarrhea and ARI in children than households that do not follow the recommended practices.

Emergency Preparedness and Response

The reported level of support provided in response to emergencies is overall quite high in the end-line survey round. The levels of support increased from the baseline, but it should be noted

that the information collected in the end-line survey was in reference to Cyclone Sidr, one of the worst storms to hit the program intervention area in recent years, whereas the storms in the years prior to the baseline survey were not so severe. Thus the results from the two survey rounds are not directly comparable: the lower levels of response in the baseline may be partly due to the lower severity of emergencies compared with the end-line.

Targeting

Economic status of households has been measured on the basis of income per household member, expenditures per household member, and household wealth, measured as the number of different types of assets that the household possesses. There are no important differences in economic status of non-participants, current participants, and graduated participants in the MCHN component of JoJ. In particular there is not strong evidence that program participation is biased toward households of either higher or lower economic status. This is not surprising, since in fact, over 90 percent of all eligible households in program areas currently participate in the MCHN component, so the participating households are likely to be representative of the whole spectrum of economic conditions. Also, there are no statistically significant differences in the economic status measures between HFP participants and non-participants.

Sustainability

Comparison of results between the U2 and GB samples provides some insights into the extent to which program interventions have achieved sustainable changes in attitudes, practices and household conditions. If the percentage of households reporting certain attitudes, behaviors, or conditions remains constant, or even increases in the GB sample compared with the U2 sample, this indicates that the program has made lasting changes in these areas. However, lower percentages in the GB sample compared to the U2 sample would indicate that the proportion of households with the desired attitudes, behaviors, and conditions declines after the households no longer have direct program support. The differences between the U2 and GB samples reveal some distinct patterns across the different program categories. On the one hand, the utilization of improved gardening practices is even higher in the GB sample than the U2 sample, suggesting that adoption of these practices is sustainable. The fact that a high percentage of households that do not participate directly in FHP also utilize the recommended practices also suggests that farmers generally perceive the benefits of these practices, and take them up even without direct program support.

In contrast, the proportion of mothers following recommended MCHN practices is lower in the GB than the U2 sample. Specifically, the percentages of mothers receiving antenatal visits, vaccinated children, and children with diarrhea who are taken for treatment are all significantly lower in the GB compared with the U2 samples. Attitudes about proper antenatal care also show declines in the graduated households. These results suggest that MCHN attitudes and practices tend to be given up after households lose direct program support, and raise concerns about the sustainability of the MCHN interventions.

Annexes

Annex 1. Sample Size Computations for JoJ End-line Survey

For surveys designed to measure change over time or differences between comparison groups, precision is specified in terms of the smallest change or comparison group difference that it is desired to be able to reliably measure.

Sample Size Calculation:

$$\mathbf{n = D\ [(Z_1 + Z_2^2 * (P_1\ (1 - P_1) + P_2\ (1 - P_2))\ /(P_2 - P_1)^2]}$$

Where:
n = required minimum sample size per survey round

D= design effect

P_1 = the estimated level of an indicator measured as a proportion at the time of the baseline survey

P_2 = the *expected* level of the indicator at the time of the end-line survey for the program area such that the quantity (P_2 - P_1) is the size of the magnitude of change it is desired to be able to detect

Z_1 = the Z-score corresponding to the degree of confidence with which it is desired to be able to conclude that an observed change of size (P_2 - P_1) would not have occurred by chance (the level of statistical significance), and

Z_2 = the z-score corresponding to the degree of confidence with which it is desired to be certain of detecting a change of size (P_2 - P_1) if one actually occurred (statistical power).

Z_1 and Z_2 have "standard" values depending on the reliability desired. This formula takes into account the magnitude of change that can be detected with 95 percent confidence given the *expected* standard deviations for the indicator of interest. The indicator used from the baseline to calculate sample size is the proportion of children between 6 and 23 months stunted. This indicator is chosen because a) it embodies much of the aims of the Title II program, and b) it is indicative of the magnitude of change the program seeks at the impact level.

At the time of the baseline survey, 35.6 percent of children between 6 and 23 months old were below -2 standard deviations for height-for-age. Save the Children Bangladesh expects this proportion to decrease by 20% with the assistance it provides in MCHN and food security. In this case then, the value of P1 = .356 and P2 = .285. Using standard parameters of 95 percent level of significance (Z_1) and 80 percent power (Z_2), so Z_1 = 1.645 and Z_2 = 0.840 are chosen. Inserting these values in the above formula yields the following result:

$$\mathbf{n} = 1.7\ [(1.645 + 0.840)^2 * ((.356)(.644) + (.285)(.715))]\ /\ (.285 - .356)^2]$$

$$= 1.7\ [(6.175 * (0.432953\ /0.005069)]$$

$$= 1.7\ [(6.175) * 85.40449] = 1.7\ (527) = 897 \text{ households per strata.}$$

Since it will be difficult to resample households that are not available, a non-replacement rate of 5 percent will be built into the sample. Thus, by multiplying 897 households per strata by 1.05[13], a final sample size of 941 households per strata. Applying the results to each of the three strata, the required sample size for the end-line survey is 2,823 households. This is a significant decrease over the baseline survey sample size of 1,500 households per site, and is a result of the original proportion of children 6-23 months old that were stunted.

[13] In the baseline survey, non-response averaged approximately 5%, and this is not expected to change in the end-line survey.

Design Effect

The equation above includes the coefficient D for design effect. This provides a correction for the loss of sampling efficiency resulting from the use of cluster sampling instead of simple random sampling, and the gain of sampling efficiency resulting from stratification. It is the factor by which the sample size must be multiplied by in order to produce survey estimates with the same precision as a simple random sample.

Estimates of design effect were calculated from key continuous variables in the baseline survey. The estimated design effect of the baseline survey is 1.7, largely due to the offsetting of stratification (which lowers the design effect coefficient) and clustering of villages (which increases the design effect coefficient) to derive the needed sample.

Annex 2. Cluster (Mouza) Selections

U2 Sampled Clusters

District	Upazila	Union	Children U2	Cluster No.	Cluster (randomly selected mouza)	Sample size
Barisal	Babuganj	Chand Pasha	1541	8	Arazi Kalikapur	20
Barisal	Babuganj	Chand Pasha			Gazipur	20
Barisal	Babuganj	Chand Pasha			Banshgari	20
Barisal	Babuganj	Chand Pasha			Bayelakhali	20
Barisal	Babuganj	Kedar Pur	1305	9	Kismat Thakur Mallik	20
Barisal	Babuganj	Kedar Pur			Bhutardia	20
Barisal	Babuganj	Kedar Pur			Purba Bhutardia	20
Barisal	Babuganj	Kedar Pur			Paschim Bhutardia	20
Barisal	Bakerganj	Char Amaddi	877	10	Badal Para	20
Barisal	Bakerganj	Char Amaddi			Paschim char Amaddi	20
Barisal	Bakerganj	Char Amaddi			Satikhola	20
Barisal	Bakerganj	Char Amaddi			Dakshin Katadia	20
Barisal	Bakerganj	Darial	1498	11	Bamnikathi Charkhanda	20
Barisal	Bakerganj	Darial			Uttampur	20
Barisal	Bakerganj	Darial			Uttar Kajlakati	20
Barisal	Bakerganj	Darial			Andhar Manik	20
Barisal	Bakerganj	Farid Pur	956	12	Mangalsi	20
Barisal	Bakerganj	Farid Pur			Faridpur	20
Barisal	Bakerganj	Farid Pur			Paschim Char Raghunathdi	20
Barisal	Bakerganj	Farid Pur			Char Bhatsala	20
Barisal	Bakerganj	Garuria	1424	1	Kati Para	20
Barisal	Bakerganj	Garuria			Junia	20
Barisal	Bakerganj	Garuria			Helencha	20
Barisal	Bakerganj	Garuria			Meur	20
Barisal	Bakerganj	Kalash Kathi	1390	2	Bebaz	20
Barisal	Bakerganj	Kalash Kathi			Diatali	20
Barisal	Bakerganj	Kalash Kathi			Purba Durgapur	20
Barisal	Bakerganj	Kalash Kathi			Sadish Amtali	20
Barisal	Bakerganj	Padre Shivpur	1470	3	Arai Beki	20
Barisal	Bakerganj	Padre Shivpur			Bara Puiautha	20
Barisal	Bakerganj	Padre Shivpur			Padri Shibpur	20
Barisal	Bakerganj	Padre Shivpur			Dakshin Kati	20
Barisal	Bakerganj	Vor Pasha	879	4	Paschim Lakshmi Pasha	20
Barisal	Bakerganj	Vor Pasha			Bara Krishnakati	20
Barisal	Bakerganj	Vor Pasha			Dudhal Mou	20
Barisal	Bakerganj	Vor Pasha			Kanki	20
Barisal	Muladi	Char Kale Khan	1310	5	Kayetmara	20
Barisal	Muladi	Char Kale Khan			Kolchar	20
Barisal	Muladi	Char Kale Khan			Purba Bani Mardan	20
Barisal	Muladi	Char Kale Khan			Dakshin Gachhua	20
Barisal	Muladi	Kazir Char	1362	6	Kazir Char	20
Barisal	Muladi	Kazir Char			Char Michua	20
Barisal	Muladi	Kazir Char			Decreer Char	20
Barisal	Muladi	Kazir Char			Commissionerer Char	20
Barisal	Muladi	Shafi Pur	2782	7	Baliatali	20
Barisal	Muladi	Shafi Pur			Brajamohan	20
Barisal	Muladi	Shafi Pur			Safipur	20
Barisal	Muladi	Shafi Pur			Char Malia	20
Barisal Total			**16794**	**12 unions**	**48 mouza villages**	**960**

District	Upazila	Union	Children U2	Cluster No.	Cluster (randomly selected mouza)	Sample size

District	Upazila	Union	Children U2	Cluster No.	Cluster (randomly selected mouza)	Sample size
Bhola	Bhola Sadar	Chor Samiya	1429	12	Purba Char Kali	20
Bhola	Bhola Sadar	Chor Samiya			Char Chhifali	20
Bhola	Bhola Sadar	Chor Samiya			Char Samaia	20
Bhola	Bhola Sadar	Chor Samiya			Chhota Char Samaia	20
Bhola	Bhola Sadar	Illisha	3563	1	Char Ananda Part-2	20
Bhola	Bhola Sadar	Illisha			Char Illisha	20
Bhola	Bhola Sadar	Illisha			Char Kalupara	20
Bhola	Bhola Sadar	Illisha			Murad Chhabulla	20
Bhola	Bhola Sadar	Rajapur	3359	2	Ganeshpura	20
Bhola	Bhola Sadar	Rajapur			Char Sitaram	20
Bhola	Bhola Sadar	Rajapur			Jazira Majidpur	20
Bhola	Bhola Sadar	Rajapur			Ramdaspur	20
Bhola	Bhola Sadar	Vaduria	2431	3	Char Bhedaria	20
Bhola	Bhola Sadar	Vaduria			Char Ramesh	20
Bhola	Bhola Sadar	Vaduria			Char Chatkimara	20
Bhola	Bhola Sadar	Vaduria			Char Karimaddin	20
Bhola	Borhan Uddin	Hasan Nagar	959	4	Hassan Nagar	26
Bhola	Borhan Uddin	Hasan Nagar			Sudharampur	26
Bhola	Borhan Uddin	Hasan Nagar			Dakshin Char Lamchhidhali	28
Bhola	Borhan Uddin	Hasan Nagar				
Bhola	Borhan Uddin	Sachra	1728	5	Gazipur Char	20
Bhola	Borhan Uddin	Sachra			Gobindapur	20
Bhola	Borhan Uddin	Sachra			Bathanbari	20
Bhola	Borhan Uddin	Sachra			Deula Shibpur	20
Bhola	Doulatkhan	Charpata	1691	6	Bara Char Lamchhi Pata	20
Bhola	Doulatkhan	Charpata			Uttar Char Lamchhi Pata	20
Bhola	Doulatkhan	Charpata			Char Pata	20
Bhola	Doulatkhan	Charpata			Dakatia Megara	20
Bhola	Doulatkhan	Uttar Joynagar	1702	7	Uttar Joynagar	40
Bhola	Doulatkhan	Uttar Joynagar			Madhya Joynagar	40
Bhola	Doulatkhan	Uttar Joynagar				
Bhola	Doulatkhan	Uttar Joynagar				
Bhola	Lal Mohon	Dhali Gaurnagar	2778	8	Dhali Gaurnagar	20
Bhola	Lal Mohon	Dhali Gaurnagar			Karimganj	20
Bhola	Lal Mohon	Dhali Gaurnagar			Chatila	20
Bhola	Lal Mohon	Dhali Gaurnagar			Char Mollaji	20
Bhola	Lal Mohon	Kalma	2921	9	Lej Chhakina	20
Bhola	Lal Mohon	Kalma			Char Lakshmi	20
Bhola	Lal Mohon	Kalma			Balur Char	20
Bhola	Lal Mohon	Kalma			Char Chhakina	20
Bhola	Lal Mohon	Ramganj	2123	10	Purba Char Umed	20
Bhola	Lal Mohon	Ramganj			Roychand	20
Bhola	Lal Mohon	Ramganj			Uttar Ramgonj	20
Bhola	Lal Mohon	Ramganj			Daskhin Roychand	20
Bhola	Tazomuddin	Shomvhupur	2607	11	Shibpur	20

District	Upazila	Union	Children U2	Cluster No.	Cluster (randomly selected mouza)	Sample size
Bhola	Tazomuddin	Shomvhupur			Golakpura	20
Bhola	Tazomuddin	Shomvhupur			Char Koralmara	20
Bhola	Tazomuddin	Shomvhupur			Char Lamchhi Koralmara	20
Bhola Total			**27291**	**12 unions**	**45 mouza villages**	**960**

District	Upazila	Union	Children U2	Cluster No.	Cluster (randomly selected mouza)	Sample size
Patuakhali	Bauphal	Bauphal	1510	3	Bauphal	20
Patuakhali	Bauphal	Bauphal			Kayna	20
Patuakhali	Bauphal	Bauphal			Dakshin Hosnabad	20
Patuakhali	Bauphal	Bauphal			Jauta	20
Patuakhali	Bauphal	Dhulia	1053	4	Basudebpasha	20
Patuakhali	Bauphal	Dhulia			Char Basudebpasha	20
Patuakhali	Bauphal	Dhulia			Tentulia	20
Patuakhali	Bauphal	Dhulia			Aloki Chandkati	20
Patuakhali	Bauphal	Kanakdia	1599	5	Baultali	20
Patuakhali	Bauphal	Kanakdia			Amirabad	20
Patuakhali	Bauphal	Kanakdia			Ayla	20
Patuakhali	Bauphal	Kanakdia			Hogla	20
Patuakhali	Bauphal	Najirpur	1977	6	Bakla Taterkati	20
Patuakhali	Bauphal	Najirpur			Nimdi	20
Patuakhali	Bauphal	Najirpur			Algi	20
Patuakhali	Bauphal	Najirpur			Char Wadel	20
Patuakhali	Golachipa	Amkhola	2118	7	Ramdula	20
Patuakhali	Golachipa	Amkhola			Nijsuhati	20
Patuakhali	Golachipa	Amkhola			Ramananda	20
Patuakhali	Golachipa	Amkhola			Guchchhagram	20
Patuakhali	Golachipa	Char Kajol	2281	8	Bara Char Kajal	20
Patuakhali	Golachipa	Char Kajol			Bara Shibar Char	20
Patuakhali	Golachipa	Char Kajol			Chhota Shibar Char	20
Patuakhali	Golachipa	Char Kajol			Char Kapalbera	20
Patuakhali	Golachipa	Choto Baishdia	1416	9	Char Emarson	20
Patuakhali	Golachipa	Choto Baishdia			Tilla	20
Patuakhali	Golachipa	Choto Baishdia			Char Tozammel	20
Patuakhali	Golachipa	Choto Baishdia			Haridrakhali	20
Patuakhali	Golachipa	Golkhali	1902	10	Suhari (1St Part I)	20
Patuakhali	Golachipa	Golkhali			Golkhali	20
Patuakhali	Golachipa	Golkhali			Badura	20
Patuakhali	Golachipa	Golkhali			Bhadachar	20
Patuakhali	Golachipa	Ranga Bali	2111	11	Bhar Char	20
Patuakhali	Golachipa	Ranga Bali			Rangabali	20
Patuakhali	Golachipa	Ranga Bali			Char Jamuna	20
Patuakhali	Golachipa	Ranga Bali			Sener Haola	20
Patuakhali	Patuakhali Sadar	Badarpur	1122	12	Gabua	20
Patuakhali	Patuakhali Sadar	Badarpur			Khalisakhali	20
Patuakhali	Patuakhali Sadar	Badarpur			Mithapur	20
Patuakhali	Patuakhali Sadar	Badarpur			Tengrakhali	20
Patuakhali	Patuakhali Sadar	Jainkathi	984	1	Char Jainkati	20

District	Upazila	Union	Children U2	Cluster No.	Cluster (randomly selected mouza)	Sample size
Patuakhali	Patuakhali Sadar	Jainkathi			Purba Jainkati	20
Patuakhali	Patuakhali Sadar	Jainkathi			Sehakati	20
Patuakhali	Patuakhali Sadar	Jainkathi			Fedainagar	20
Patuakhali	Patuakhali Sadar	Lohalia	1257	2	Kuripaika	20
Patuakhali	Patuakhali Sadar	Lohalia			Lohalia	20
Patuakhali	Patuakhali Sadar	Lohalia			Idrakpur	20
Patuakhali	Patuakhali Sadar	Lohalia			Kakrabania Lohalia	20
Patuakhali Total			**19330**	**12 unions**	**48 mouza villages**	**960**

Grand Total	**63415**	**36 unions**	**141 mouza villages**	**2880**

GB Survey Selected Clusters (Mouzas)

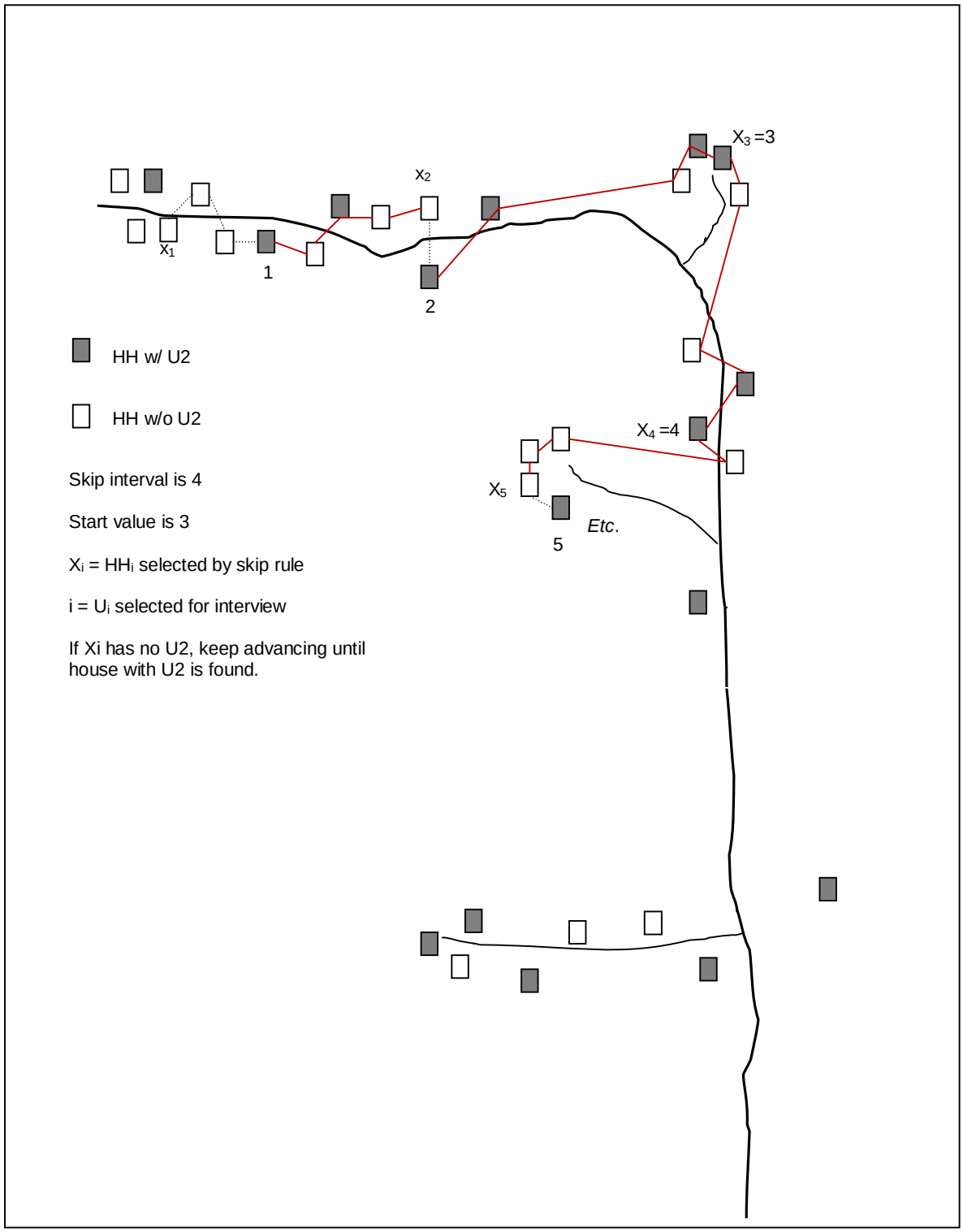
District	Upazila	Union	Children 24-59 months on July 1st	Cluster No.	Cluster (randomly selected mouza)	Sample size
Barisal	Babuganj	Madhop Pasha	1010	30	Rabindranagar	15
Barisal	Babuganj	Madhop Pasha			Goaldi Musuria (Part Ii)	15
Barisal	Bakerganj	Char Amaddi	629	1	Char Amaddi	15
Barisal	Bakerganj	Char Amaddi			Katadia	15
Barisal	Bakerganj	Nyamoti	785	2	Purba Maheshpur	15
Barisal	Bakerganj	Nyamoti			Paschim Krishnanagar	15
Barisal	Bakerganj	Ranga Sree	823	3	Nanda Para	15
Barisal	Bakerganj	Ranga Sree			Lochanabad	15
Barisal	Muladi	Gasua	619	4	Sreemati	15
Barisal	Muladi	Gasua			Char Decree	15
Barisal	Muladi	Muladi	765	5	Uttar Galuibhanga	15
Barisal	Muladi	Muladi			Bhangarmona	15
Barisal Total	**3 upazilas**	**6 unions**	**4631**		**12 mouzas**	**180**

District	Upazila	Union	Children 24-59 months on July 1st	Cluster No.	Cluster (randomly selected mouza)	Sample size
Bhola	Bhola Sadar	Bapta	1092	6	Char Potka	15
Bhola	Bhola Sadar	Bapta			Char Napta	15
Bhola	Bhola Sadar	Dhania	949	7	Guli	15
Bhola	Bhola Sadar	Dhania			Nabipur (Part)	15
Bhola	Bhola Sadar	Illisha	1728	8	Purba Char Illisha	15
Bhola	Bhola Sadar	Illisha			Char Illisha	15
Bhola	Bhola Sadar	Shibpur	665	9	Shibpur Guchchhagram	15
Bhola	Bhola Sadar	Shibpur			Char ratanpur	15
Bhola	Borhan Uddin	Boro Manika	1115	10	Uttar Batamara	15
Bhola	Borhan Uddin	Boro Manika			Dakshin Batamara	15
Bhola	Borhan Uddin	Pakxia	539	11	Batamara	15
Bhola	Borhan Uddin	Pakxia			Madhyam Lamchhi Dhali	15
Bhola	Borhan Uddin	Tabgi	1038	12	Tabgi	15
Bhola	Borhan Uddin	Tabgi			Mulai Pattan	15
Bhola	Doulatkhan	Charpata	1134	13	Char Dakshin Lamchhi Pata	15
Bhola	Doulatkhan	Charpata			Dakatia Megara	15
Bhola	Doulatkhan	Uttar Joynagar	967	14	Uttar Joynagar	15
Bhola	Doulatkhan	Uttar Joynagar			Madhya Joynagar	15
Bhola	Lal Mohon	Badar Pur	1667	15	Char Titia	15
Bhola	Lal Mohon	Badar Pur			Nazirpur	15
Bhola	Lal Mohon	Lal Mohon	473	16	Char Lalmohan	15
Bhola	Lal Mohon	Lal Mohon			Peshker Hawla	15
Bhola	Lal Mohon	Paschim Char Umed	2799	17	Paschim Char Umed	15
Bhola	Lal Mohon	Paschim Char Umed			Pangashia	15
Bhola	Lal Mohon	Ramganj	739	18	Purba Char Umed	15
Bhola	Lal Mohon	Ramganj			Roychand	15
Bhola	Tazomuddin	Shomvhupur	827	19	Char Lamchhi Koralmara	15
Bhola	Tazomuddin	Shomvhupur			Shambhupur	15
Bhola Total	**5 upazilas**	**14 unions**	**15732**		**28 mouzas**	**420**

District	Upazila	Union	Children 24-59 months on July 1st	Cluster No.	Cluster (randomly selected mouza)	Sample size
Patuakhali	Bauphal	Boga	807	20	Banajora	15
Patuakhali	Bauphal	Boga			Paschim Kayna	15
Patuakhali	Bauphal	Kalaiya	915	21	Diarakachua	15
Patuakhali	Bauphal	Kalaiya			Saula	15
Patuakhali	Bauphal	Keshobpur	927	22	Bazemahal	15
Patuakhali	Bauphal	Keshobpur			Zafrabad	15
Patuakhali	Bauphal	Surjomoni	673	23	Goaliabagha	15
Patuakhali	Bauphal	Surjomoni			Saneshwar	15
Patuakhali	Golachipa	Dakua	572	24	Chhota Chatra	15
Patuakhali	Golachipa	Dakua			Phulkhali	15
Patuakhali	Golachipa	Golkhali	811	25	Chhota Gabua	15
Patuakhali	Golachipa	Golkhali			Badura	15
Patuakhali	Golachipa	Ranga Bali	1239	26	Jogir Haola	15
Patuakhali	Golachipa	Ranga Bali			Sener Haola	15
Patuakhali	Patuakhali Sadar	Itbaria	685	27	Bhajna Joar	15
Patuakhali	Patuakhali Sadar	Itbaria			Itabaria	15
Patuakhali	Patuakhali Sadar	Komolapur	821	28	Kamalapur	15
Patuakhali	Patuakhali Sadar	Komolapur			Dakshin Chauddaburia	15
Patuakhali	Patuakhali Sadar	Madar Bunia	718	29	Nandipara	15
Patuakhali	Patuakhali Sadar	Madar Bunia			Uttar Birajala	15
Patuakhali Total	**3 upazilas**	**10 unions**	**8168**		**20 mouzas**	**300**

Grand Total	**11 upazilas**	**30 Unions**	**28531**		**60 mouzas**	**900**

Annex 3. Schematic Map of Mouza Showing Households with and without U2 Children



Annex 4. Probability of Selecting Households under U2 Technique

HH_i= Household (i=1 to N_{HH}) *All households within a mouza*

$U2_j$ = {all HH_i = U_2; j=1 to N_{U2}} *All households with under-2 children within a mouza*

Probability that $U2_j$ will be chosen
Procedure for selecting $U2_1$

1. Randomly select number (q) between 1 and k.
2. Starting from HH_q, find the first household that has an under-2 ($HH_{s1} = U2_1$)

What is the probability that any household with under-2 children ($U2_i$) will be chosen?

Two possibilities for selecting $U2_j$

i) $HH_{j-k} = U_2$, or
ii) $HH_{j-1} \neq U_2$

where k is the skip interval between selected HH.

$Pr(HHi = U_2) = N_{U2}/N_{HH}$
$Pr(HHi \neq U_2) = 1 - N_{U2}/N_{HH}$

Suppose q U_2 Households will be chosen.

Then the probability that any household with under-2 children, $U2_j$ will be chosen is:

$$q/N_{U2} * Pr(HH_{i-k}=U_2) + q/N_{U2} * Pr(HHj_{-1}\neq U_2) =$$

$$q/N_{u2} [N_{U2}/N_{HH} + (1 - N_{U2}/N_{HH})] =$$

$$q/N_{U2} \rightarrow \text{same for all } U2_j.$$

Annex 5. Procedures for Computing Food Security Indicators

1. Food Access Security Tool (FAST)

FAST[14] consists of nine questions constructed for use in surveys in Bangladesh, as well as instructions to the interviewer on how to provide his/her own rating of the household's food insecurity status. Some of the questions ask about the respondents' perceptions of food vulnerability and stress (e.g. how often did you worry about where food would come from?) and others ask about the respondents' behavioral responses to insecurity (e.g. how often did you yourself skip entire meals due to scarcity of food?). All of the questions ask how often the respondent either felt a certain way or performed a particular behavior over the previous 12 months. The FAST nine questions are listed below.

1. How often have you eaten three 'square meals' (full stomach meals) a day in the past 12 months (not including festival days)?
2. In the past 12 months, how often have you or your family had to eat wheat (or another grain) although you wanted to eat rice (not including when you were sick)?
3. In the past 12 months, how often have you skipped entire meals due to scarcity of food?
4. In the past 12 months, how often have you eaten less food in a meal due to scarcity of food?
5. In the past 12 months, how often has the food that was stored in your home run out when there was no money to buy more that day?
6. In the past 12 months, how often have you worried about where food would come from?
7. In the past 12 months, how often has your family purchased rice?
8. In the past 12 months how often has your family purchased food (rice, lentils etc.) on credit (or loan) from a local shop?
9. In the past 12 months how often has your family had to borrow food from relatives or neighbors to make a meal?

Each individual question is followed by a set of possible responses for the interviewer to choose from after asking the question. These possible responses are expressed as relative frequencies, meaning that they do not seek to capture exactly how many times a respondent did something, but rather the approximate number of times. The possible responses are 'never', 'rarely', 'sometimes', 'often', or 'mostly'.

In order to ascertain how food secure a household has been over the past 12 months, the responses to each question are ''dichotomized" (turned into "yes" or "no" answers and scored). Any response of 'rarely' or 'never' is given a code of "1." Any response of 'sometimes,' 'often,' or 'mostly' is given a code of "0." This coding scheme applies to all questions except for the first one, where answering "rarely" or "never" represents a less, rather than a more, food secure situation. For this question, the coding is reversed: any response of 'sometimes,' 'often,' or 'mostly' is given a code of "1," and any response of 'rarely' or 'never' is given a code of "0." Once the coding is complete, the responses for each household are tallied. The maximum score for a household is nine points; the minimum score is zero. The household with higher score is considered more food secure.

2. Coping Strategy Index (CSI)

The coping strategy index is computed on the basis of a series of questions asked to respondents about how frequently they utilize a list of 12 possible strategies.[15] The twelve strategies are the following:

1. Limit portion size at meal times
2. Reduce number of meals eaten per day?
3. Borrow food or rely on help from friends or relatives?
4. Rely on less expensive or less preferred foods?
5. Purchase/borrow food on credit?
6. Gather unusual types or amounts of wild food / hunt?
7. Have household members eat at relatives or neighbors?
8. Reduce adult consumption so children can eat?
9. Rely on casual labor for food?
10. Abnormal migration for work
11. Skip entire day without eating
12. Consume seed stock to be saved for next season

[14] Guidelines For Applying the Food Access Survey Tool (FAST) for Food Security Program Evaluation in Bangladesh" adapted from: Coats, Jennifer, Patrick Webb and Robert Houser. Measuring Food Insecurity: Going Beyond Indicators of Income and Anthropometry. Washington, D.C.: Food and Nutrition Technical Assistance Project, Academy for Educational Development, 2003.

[15] Maxwell, Daniel, Richard Caldwell and Mark Langworthy. " Measuring food insecurity: Can an indicator based on localized coping behaviors be used to compare across contexts?" *Food Policy*, Volume 33, Issue 6, December 2008

The frequency of adoption of each category is coded according to the following categories:

0 = never
1=seldom
2=sometimes
3=often
4=daily

The coded frequency response for each strategy is then weighted by the severity weight of each strategy. Average severity weights across several coping strategies conducted in countries around the world[i] are then applied to each coping strategy, using the following formula:

$$CSI = \Sigma(\text{frequency category}_i * \text{severity weight}_i) \quad i=1 \text{ to } 12$$

The severity weights are as follows:

Strategy	Severity weight
Limit portion size at meal times	2.3
Reduce number of meals eaten per day?	2.7
Borrow food or rely on help from friends or relatives?	2.5
Rely on less expensive or less preferred foods?	1.8
Purchase/borrow food on credit?	2.9
Gather unusual types or amounts of wild food / hunt?	2.9
Have household members eat at relatives or neighbors?	3.3
Reduce adult consumption so children can eat?	2.6
Rely on casual labor for food?	3.4
Abnormal migration for work	3.4
Skip entire day without eating	4.6
Consume seed stock to be saved for next season	3.6

In this study the CSI is adjusted so that 100 represents the maximum possible value that could be attained. Note that if the frequency categories to all of the strategies were 4 (daily), the total, unadjusted, CSI value would be 144, which represents the maximum possible value of the unadjusted score. The adjusted CSI score is computed by multiplying by (100/144).