

**Outcome Survey Report**  
Of  
**Food Security for Ultra Poor Nutrition (FSUP-N) Project**  
  
**5 Unions of Sirajognj District**



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## **Acronyms**

ACF	Action Contre la Fiam
ASEAB	Association for Socio-Economic Advancement of Bangladesh
BCC	Behaviour Chane Communication
BDHS	Bangladesh Demographic and Health Survey
CMAM	Community based Management of Acute Malnutrition
CNV	Community Nutrition Volunteer
CNW	Community Nutrition Worker
CNO	Community Nutrition Organizer
DID	Difference in Difference
EBF	Exclusive Breast Feeding
FCS	Food Consumption Score
GOB	Government of Bangladesh
GUK	Gram Unnayan Karma
HH/hh	Household
IYCF	Infant and Young Children Feeding
MAN	Moderate Acute Malnutrition
MO	Medical Officer
MUAC	Mid-Upper Arm Circumference
NDP	National Development program
NGO	Non Governmental Organization
PLW	Pregnant and Lactating Women
SAM	Severely Acute Malnutrition
UHFPO	Upazila Health and Family Planning Officer
UP	Union Parishad

This study was carried out in late 2015 to evaluate the attainment of expected outcomes of the FSUP-N project in five unions of Sadar upazila of Sirajgonj district. For this; we conducted a cross-sectional survey at household level with a total of 2622 randomly selected respondents in Sirajgoj sadar (intervention area, n=1333) and Shazadpur upazila (control area, n-1289). The survey included interview, anthropometric measurement and estimation of haemoglobin among participants. The survey was supplemented by qualitative investigations that included in-depth interviews with purposively selected beneficiaries of FSUP-N project, key informant interviews with service providers and a number of relevant document/record reviews.

It is notable that the control area was found economically better-off compared to the intervention area both in baseline (2012) and end line (2015). Contrary to control, our findings revealed better educational level of mothers and household heads in the intervention area. Hence, there are at least two important social determinants of health and nutrition (i.e. better income in control area and better education in intervention area) prevailed in the study areas that may have jointly influenced some of the FSUP-N outcomes positively. It is most likely that the predecessor project (FSUP) that had focus on poverty alleviation through income generation activities in both the study areas has impacted improvement in income which was relatively higher in the intervention area at the end line. FSUP model also had nutrition, hygiene, health and homestead gardening training alongside life skill training in both of our study areas. Thus FSUP-N had an advantage of getting a nutrition sensitive environment in Sirajgonj sadar upazila that facilitated the implementation of its nutrition specific interventions and their achievements.

Our survey findings showed that 40% of the sampled households in the intervention area were food secured which was 10% higher in the control area. However; both were below the national estimate (BDHS 2011). Severe food insecurity has relatively decreased in intervention areas compared to control at the end line. It indicates relative improvement in household food security in the intervention area compared to prevalence of 35% food secure households at the baseline. Majority of the households (73-90%) had acceptable food consumption score (>42) in both the areas with very few households remaining at poor score. Proportion of households with food consumption score<42 has decreased at the end line (27% in intervention and 10%in control) compared to corresponding baseline (40% and 18%). Combined effect of FSUP and FSUP-N could be attributable to increase in household income and homestead food production respectively that ultimately contributed to this improvement in FCS and food security.

Prevalence of stunting among children has decreased in both the study areas (31.7% in intervention, 33.7% in control) – which is even less/better than the national estimate (36% BDHS 2014). This is indicative of reduction in chronic malnutrition among children. Underweight has also decreased compared to baseline but the rate of improvement was higher in the control area (26.8%) which was again less than the national estimate (32.6%). Prevalence of underweight in the intervention area (31.6%) during the end line survey was near to national estimate (32.6%, BDHS 2014). These findings are consistent with our end line findings on improvement in income in the study areas, household food security and food consumption score compared to the baseline survey. However; wasting representing current nutritional status did not show improvement in the intervention area (18.5%) compared to control (12.2%) at the end line-but the proportion in control was less than the national estimate (14.3% BDHS 2014).

There has been relative decrease in prevalence of anaemia (table-6) among 6-59 month children, pregnant and lactating women in the end line at intervention area compared to baseline but the rate of decrease (including adolescent girls) was much higher in the control area. Greater decrease of anaemia in control area could be attributable to wealthier households in the control area as appeared in baseline - having better means to control anaemia.

Exclusive breastfeeding has decreased at the end line (41%) compared to baseline (49%). This is consistent with the national decreasing trend in exclusive breastfeeding over the last few years (BDHS 2011: 64%, 2014: 55%). However; feeding newborn with colostrums within one hour of birth has increased in the intervention area at end line compared to baseline.

Prevalence of total normal BMI among mothers of <5 children/lactating mothers in intervention and control area at the end line was close to and higher/better than the national estimates respectively for ever-married women (BDHS 2014). Proportions of overweight and obese women were less than the national estimates for ever-married women.

Large majority of adolescent girls (>90%) and pregnant women (73 -80%) had no chronic energy deficiency at the end line.

Prevalence of minimum dietary diversity with at least 4 food groups among children aged 6-23 months has increased in both the study areas (24 and 33%) compared to baseline (13.8 and 20.5%). Proportion of breastfed children aged 6-8 months having minimum acceptable diet in

last 24 hours improved in the intervention area (11.5%) compared to control (9.6%) at the end line. This improvement is better than the national estimate for this age-group. However, among 9-23 months old breastfed children improvement occurred more in the control area compared to intervention area. Similar improvement was found among non-breastfed children aged 6-23 months and among all children in the control area – all of which are better than corresponding national estimates (BDHS 2014). These findings are suggestive of improvement in complementary feeding both in terms of quantity and quality. These findings are also consistent with better income and better food security in the control households and overall improvement of mother's knowledge on complementary feeding practice.

Improvement in mothers and adolescent girl's knowledge and practice on food groups, mother's knowledge on causes and prevention of diarrhoea, pneumonia and hygiene was notable – which actually contributed to decrease in childhood diarrhoea and pneumonia and improvement in nutritional status of target children, mothers of <5 children, PLW and adolescents.

Project database showed that more than 90% of the enrolees in all target groups were successfully graduated from moderate acute malnutrition (MAM) during the project period. This indicates that the staff members of GOB organization and partner NGOs who were directly involved in identification, management and upward referral of acute malnutrition among children were technically competent, particularly in managing MAM cases.

Our qualitative findings revealed that FSUP-N had created a widespread demand for super-cereal (wheat soya blend) and logistical support for homestead food production - for these were distributed free of cost and the community was largely benefited from these supplies. Therefore; provision of a super-cereal or a local made RUTF is necessary to sustain expected outcomes in the post-project period and or post-disaster period. Integration/mainstreaming of FSUP-N and FSUP models into the upazila development programs engaging all stakeholders is essential to achieve and sustain improvement in household food security, nutrition, health and hygiene of the target population in rural areas.

## **Background**

The World Food Program, Bangladesh in association with its partner organizations (National Development Program, Action Contre la Fiam and Government of Bangladesh) has implemented a project titled 'Food Security for Ultra Poor- Nutrition' (FSUP-N) in the five unions of Sadar upazila of Sirajgonj district during 2012 through 2014. This multi-dimensional project was aimed at addressing gaps in resources, capacity and practice in the area of household food security, nutrition, health and hygiene- through promoting homestead food production, supplementary feeding, behaviour change communication and training. The project targeted households having malnourished children <5, their mothers/lactating women, pregnant women and adolescent girls through active anthropometric screening across the area and identified those households for interventions. The FSUP-N interventions were nutrition specific that included supplementary feeding of target populations according to need with a super-cereal (wheat-Soya Blend+) and Super-cereal plus (Wheat Soya Blend ++) and their follow-up, seasonal blanket supplementary feeding, homestead gardening, poultry rearing, fish culture, training on homestead food production, courtyard meetings on health, nutrition and hygiene behaviour change communication, community level advocacy workshops and referral of cases of severely acute malnutrition with complications to Sirajgonj sadar hospital. The project provided all necessary logistic supports free of cost to the target population and households.

The expected results/outcomes of FSUP-N included – 1) Reduced moderate acute malnutrition and anaemia among young children, pregnant and lactating women and adolescent girls in Sirajgonj sadar 2). Increased vegetable consumption through homestead vegetable production 3) Improved nutritional behaviour resulting from BCC 4) Improved technical capacity of local NGO and UHC staff at community level to prevent and manage moderate acute malnutrition.

Prior to FSUP-N, WFP in association with ASEAB, NDP and GUK implemented an umbrella project in disaster prone areas of Pabna, Sirajgonj and Bogra during 2009 – 2012 titled 'Food Security for the Ultra Poor' (FSUP) under funding support of the European Union. The FSUP interventions were nutrition sensitive that was aimed at improving the food security and nutritional well-being of 150, 000 ultra-poor beneficiaries through promoting sustainable livelihoods. It provided monthly subsistence allowance of Tk. 500-1000, cash grant, training on life skills; income generating activities, homestead gardening and nutrition, health and hygiene topics. In 2012, the nutrition component was added to FSUP project that evolved as FSUP-N with an aim to further improve the nutritional status of women and children in one of the FSUP upazila of Siragonj (Sadar upazila of Sirajgonj). The purpose of our study is to conduct an

evaluation of FSUP-N project with respect to attainment of the above-mentioned expected results/outcomes.

**General objectives:** 1.To assess the outcomes of FSUP-N project and compare to targets set for the project, 2. To assess the synergy of a linkage between a nutrition specific intervention (such as FUSP-N) and a nutrition sensitive intervention (such as FSUP) and 3. To assess the operational efficiencies under the FSUP-N project that may have/have not contributed to improved nutrition in the project area

**Specific objectives:**

1. To assess the nutritional status of under-five children, adolescent girls, pregnant and lactating women through anthropometric measurements and anaemia assessment based on blood haemoglobin level and compare with the baseline and/or national estimates
2. To assess knowledge and practices of the project beneficiaries (mothers of <5 children, adolescent girls, pregnant and lactating women) on nutritional issues and nutritional behavior (including IYCF practices) and compare with baseline and/or national estimates
3. To assess homestead food production and its association with consumption of vegetables and poultry in the beneficiary households
4. To assess dietary intake of the FSUP-N beneficiaries vis-à-vis control area, sorted by wealth quintiles and compare with the baseline and/or national estimates
5. To appraise the technical capacity of the government (upazilla health systems) and NGO health personnel in relation to control of under-nutrition in the project area
6. To assess synergistic outcome of the nutrition specific and nutrition sensitive interventions, (such as, FSUP-N and FSUP, respectively), comparing outcomes for the beneficiaries participating to both the programs versus those who participated in the FSUP-N only, e.g. recovery rate from moderate acute malnutrition, length of stay in the program etc.
7. To identify the best practices, lessons learned areas for future improvement and overall recommendations in relation to FSUP-N program.

**Research design and methods:**



A mixed method design was applied to address the objectives using quantitative and qualitative techniques. A cross-sectional survey was conducted at the household level in 5 intervention unions of Sirajgonj sadar upazila (FSUP-N intervention area) and in 5 control unions of Shahzadpur upazila during September 16 through October 26, 2015.

The survey participants included, <5 Children and their mothers, lactating and, pregnant women and adolescent girls (10-19 years of age). Alongside interview; necessary anthropometric measurements and blood sample were taken from the participants to evaluate the impacts of the FSUP-N interventions upon their nutritional status and anemia.

The survey was complemented and supplemented by qualitative investigations which included in-depth interviews with purposively selected beneficiaries of FSUP-N project, key informant interviews with the service providers and a number of relevant document/record review. icddr, b's IRB approval for the study was obtained prior to implementation of the survey.

**Sampling procedure:** a multi-stage random sampling strategy was employed. In the first stage of sampling, two wards were selected randomly from each of the selected unions. In the second stage, each ward was divided into several segments of 400 households. From there a 400-household segment was selected randomly. Household listing was conducted in the selected 400-households enlisting eligible young children and their mothers, adolescent girls, pregnant and lactating women. This household listing was the definitive sampling frame for the final stage of sampling. In the final stage, required number of study participants of different target groups was selected randomly. The required number of lactating women, young children and adolescent girls were obtained from the selected segment; however it did not always house the required number of pregnant women. The shortfall in number was collected from the nearest segment.

**Estimated and actual Sample size for the survey:** Sample size was estimated for the cross-sectional survey using the following formula:

$$n = Z_{\alpha}^2 p (1-p) / \text{precision} (d^2) \times \text{Design Effect (DE)}.$$

$Z_{\alpha}$  is set at 1.96 for 95% confidence level and other assumptions with sample sizes that are shown in Table 1.

**Table- 1: Estimated sample sizes for different target groups by key indicators**

\*BDHS 2011; #ever married women, BDHS 2011; \$calculated based on proportion of target groups in the

Indicator	Target pop.	Prevalence (p)	Precision (d)	Design Effect (DE)	Estimated sample size (n)		\$No. of subjects in the HH	Response rate	No. of required HHs	
					Program	Control			Program	Control
Stunting (HAZ<-2SD)	U-5 children	*41%	5%	*1.43	531	531	0.5	0.9	1180	1180
Underweight (WAZ<-2SD)	U-5 children	*36%	5%	*1.47	519	519	0.5	0.9	1154	1154
Wasting (WHZ<-2SD)	U-5 children	*16%	5%	*1.3	268	268	0.5	0.9	596	596
Exclusive breastfeeding	Children 0-5m	*64%	10%	1.5	133	133	0.08	0.95	1750	1750
Solid/semi solid/soft food	Children 6-8m	*62%	10%	1.5	136	136	0.05	0.95	2864	2864
Minimum dietary diversity	Children 6-23m	*24%	5%	1.5	420	420	0.15	0.95	2948	2948
Minimum meal frequency	Children 6-23m	*64%	5%	1.5	531	531	0.15	0.95	3726	3726
Minimum acceptable diet	Children 6-23m	*21%	5%	1.5	383	383	0.15	0.95	2688	2688
BMI (<18.5)	Lactating women	50	6%	#1.6	426	426	0.2	0.95	2242	2242
BMI (<18.5)	Adolescent girls (10-19 years)	50	6%	#1.6	426	426	0.4	0.95	1121	1121
Anaemia	Children 6-59 m	*51%	6%	*1.2	320	320	0.4	0.9	889	889
Anaemia	Pregnant women	50%	10%	#1.4	144	144	0.05	0.9	3200	3200
Anaemia	Lactating women	50%	6%	#1.4	373	373	0.2	.9	2072	2072
Anaemia	Adolescent girls (10-19 y)	50%	6%	#1.4	373	373	0.4	.9	1036	1036

population

However; the actual sample size we had for the outcome survey is shown below in table-2.

**Table-2: Actual sample size of different target groups by survey area**

<b>Sirajonj Sadar (Intervention area)</b>															
Union Sl. No.	Name of Union	# of ward	Total HH	Sampled Household			Mothers of <5, Lactating women			Pregnant			Adolescent girls		
				Target	Interviewed	Absent	Target	Interviewed	Absent	Target	Interviewed	Absent	Target	Interviewed	Absent
1	Ratankandi	Ward-5	400	136	126	10	93	88	5	14	13	1	43	39	4
		Ward-9	404	136	129	7	91	87	4	15	14	1	43	41	2
2	Soydabad	Ward-1	402	144	142	2	98	96	2	15	15	0	42	42	0
		Ward-3	406	136	129	7	88	84	4	15	13	2	43	42	1
3	Kaliahoripur	Ward-5	412	145	136	9	97	93	4	15	11	4	43	42	1
		Ward-6	407	152	148	4	101	98	3	15	14	1	43	43	0
4	Songasa	Ward-2	406	147	136	11	99	93	6	15	12	3	43	41	2
		Ward-4	401	145	137	8	101	95	6	14	14	0	43	40	3
5	Khokshabari	Ward-1	407	137	123	14	87	77	10	15	11	4	43	41	2
		Ward-2	393	143	128	15	97	86	11	15	11	4	43	42	1
Total		10	4038	1421	1334	87	952	897	55	148	128	20	429	413	16
<b>Shahzadpur (Control area)</b>															
Union Sl. No.	Name of Union	# of ward	Total HH	Sampled House hold			Mothers of <5, Lactating women			Pregnant			Adolescent girls		
				Target	Interviewed	Absent	Target	Interviewed	Absent	Target	Interviewed	Absent	Target	Interviewed	Absent
1	Narina	Ward-2	405	142	134	8	97	89	8	14	13	1	43	42	1
		Ward-3	406	124	114	10	82	78	4	14	9	5	43	36	7
2	Khukni	Ward-4	401	145	129	16	102	92	10	15	11	4	42	37	5
		Ward-6	405	143	133	10	97	90	7	15	12	3	43	39	4
3	Garadaha	Ward-2	413	140	131	9	95	88	7	15	12	3	43	41	2
		Ward-4	403	133	128	5	88	82	6	13	13	0	43	41	2
4	Koijhuri	Ward-2	406	142	132	10	92	87	5	15	13	2	43	40	3
		Ward-6	407	141	124	17	97	84	13	13	10	3	44	39	5
5	Jalalpur	Ward-4	406	148	138	10	98	89	9	15	13	2	42	41	1
		Ward-5	405	135	126	9	88	81	7	15	12	3	43	41	2
Total		10	4057	1393	1289	104	936	860	76	144	118	26	429	397	32

**For qualitative interviews** (in-depth and key informant interview) sample size was determined through an iterative process of information saturation i.e. continued to interview purposively selected respondents until no new information was obtained from the respondents. Following this procedure we took in-depth interview of 33 beneficiaries of FSUP-N (with 28 exposed to homestead gardening, 27 exposed to poultry and 33 exposed to food supplementation program). Similarly; key informant interview was conducted with 19 service provider and or manager (e.g. 10 CHCPs of Sirajgonj sadar community clinics, 8 NDP staff, and 1 WFP's local staff).

**Research tools:** Four sets of questionnaires were used for the household survey e.g. (1) household questionnaire to capture its characteristics (socio-economic condition, homestead gardening, food security, food consumption and dietary diversity at hh level), (2). questionnaire *for mothers of <5 children and lactating mothers* to collect information on their knowledge and practice of IYCF, knowledge of childhood illnesses, personal hygiene, mothers food frequency during last 24 hours, knowledge about locally available health care and nutrition program, (3) questionnaire for pregnant women to collect information on their nutritional knowledge and practice, knowledge of IYCF, food frequency over last 24 hours (4) questionnaire for adolescent girls to capture their knowledge and practice of nutrition, personal hygiene, knowledge of anaemia, worm infestation, common illnesses, dietary diversity, and 24-hour food frequency.

For estimating hemoglobin level of study participants HemoCue device (HemoCue AB 301, Angleholm, Sweden) was used while electronic scale (Tanita Inc. Japan, HD 661), wooden length/height board, and MUAC tape were used for collecting anthropometric measurements of the study participants.

Two separate guidelines were developed for qualitative interviews (in-depth and key informant interview) highlighting key areas of interest (e.g. homestead food production, supplementary food distribution and consumption, knowledge and practice of health, nutrition and hygiene, technical capacity of service providers) Besides; a structured check list was used to document service delivery records of FSUP-N project.

**Data Collection:** Thirty two trained Field Research Assistants (FRA) with prior experience of survey data collection took part in conducting household interviews, anthropometry and hemoglobin estimation simultaneously at intervention and control areas. They were supervised

by 2 Senior Field Research Supervisors in both the sites. Prior to field work they were given a 7-day hands-on training on data collection including procedure of hemoglobin estimation and anthropometry. Informed written consent of all adult respondents and consent (assent) of parent/guardians for minor participants as well as ascent of adolescents were obtained prior to taking interviews and procedures - using IRB approved forms.

HemoCue rapid testing methodology was applied to measure hemoglobin level of the study participants (6-59 month old children, adolescent girls, pregnant and lactating women). A finger prick blood sample was drawn using a single-use disposable retractable lancet. The first drop of blood was wiped away with a dry, lint free tissue to reduce admixture of tissue fluid. A micro-cuvette was tucked onto the second drop of blood to allow capillary action to draw the blood sample in. The micro-cuvette was then placed on to the cuvette holder, and hemoglobin measure (gm/dl) shown on the digital screen was recorded in the marked area of the questionnaire. All used lancets and micro-cuvettes were disposed of safely.

Calibration of the weighing scales was checked before the start of every day, using the same known weights (5 kg standard weight). Length/height was measured on a locally made standardized wooden length/height board. Bathroom scale was used to measure weight of adolescent girls, and mothers of <5 children/lactating women. Weight taken was divided by height squared to Calculate BMI. BMI <18.5 was considered as the cutoff point for chronic energy deficiency. MUAC was measured for pregnant women using TALC tape for assessing nutritional status of pregnant women using appropriate cut-off points for interpretation.

In-depth and key informant interviews were conducted by two experienced Senior Field Research Supervisors assisted by two FRAs using specific guidelines in the intervention area only. Respondents were selected purposefully based on his/her role in the project activities and availability for interview. Responses were recorded and transcripts prepared for analysis Project documents, service record and annual reports related to FSUP-N were also collected by them for review.

**Data Analysis:** Quantitative data were processed through office editing, coding of open-ended questions, data entry, and editing of inconsistencies. Data were analyzed using the statistical software- STATA 13.0 SE (Stata Corp, College station, Texas). Proportions were calculated with a 95% confidence interval and means with standard deviation. To see any significant difference between FSUP-N (intervention area) and FSUP (control area) chi-square test for the

proportions was employed. Based on the availability of baseline data Difference-in-Difference (DID) technique was used for selected outcome indicators to demonstrate the effect of the FSUP-N intervention on those outcomes (e.g. nutritional status of children, anemia, child feeding practices, etc) by comparing the average change over time in the outcome variables for the project intervention area (FSUP-N) to the average change over time for the control area (FSUP). National estimates for general population as shown in BDHS 2011 and 2014 were compared with the survey outcomes wherever possible.

Thematic analysis was followed for qualitative information collected through in-depth interviews; key informant interviews, and document review. Qualitative data were organized around the areas of key interests (e.g. supplementary food distribution and consumption, homestead food production, knowledge of beneficiaries on health, nutrition and hygiene, technical capacity of service providers in control of MAM), best practices, challenges and lessons learned for future improvement. Transcripts were prepared for interviews where responses were coded manually according to themes (*a priori issues*), sub themes and emergent issues, if any. Triangulation of data derived from different methods was carried out to validate qualitative information.

**Outcome indicators:**

Followings are the indicators considered to assess effect of the FSUP-N project activities compared to the control (FSUP) on the key outcome variables.

<b>Nutritional status</b>
Difference in % of stunting between baseline and end line and or DID for prevalence of stunting (HAZ score<-2) among children under-5
Difference in % of wasting between base line end line and or DID for prevalence of moderate wasting (WHZ score -3 to<-2) in children under-5
Difference in % of underweight between baseline and end line and or DID for prevalence of underweight (WAZ score <-2) in children under-5
<b>Anemia</b>
Difference in prevalence of anemia between baseline and end line and or DID for prevalence of anemia (Hb<11 gm/dl)
Difference in prevalence of anaemia between baseline and end line and or DID for prevalence of anemia (Hb <11gm/dl) in pregnant women
<b>IYCF practices</b>

Difference in % of early initiation of breastfeeding, exclusive breast feeding up to six months, and minimum dietary diversity of children aged 6-23 months
<b>Knowledge &amp; Practice of nutrition and food</b>
Difference between baseline and end line of knowledge on food groups and practice of hygiene, complementary feeding etc.
Difference between baseline and end line of knowledge of vitamin & mineral rich food
<b>Technical capacity of the local health systems to tackle moderate acute malnutrition</b>
Recovery rate from acute malnutrition, referral of SAM cases, screening rate by target groups

### **Limitations of the survey:**

1. This outcome survey was conducted after one year of completion of the FSUP-N project. *(FSUP-N project ended in November 2014 while this evaluation was conducted in September-October 2015)*
2. Usable full data set of the baseline survey was not available for calculating DID of all outcome indicators. However; aggregate data as shown in the baseline report were used as proxy to calculate DID of selected indicators and to compare the baseline with the end line.
3. For time and budgetary constrains two wards were randomly selected from each union out of nine wards per union.

### **Results of survey findings**

**Household characteristics:** Sampled households in the intervention area were largely male headed that showed no difference with the control and baseline status. Average household size at the end line in intervention area was 5.1 compared to 4.9 in baseline. Median of household income during the outcome survey increased  $\geq$  double compared to baseline. Ownership of agricultural land has also increased at the end line compared to baseline. Proportion of poorest households by asset quintiles has reduced at the end line in intervention area compared to baseline. Consequently, proportion of least poor and less poor households has increased at the end line in the intervention area compared to baseline. Improvement in household income in both the study areas may have link with the FSUP's income generating activities.

Table-1: Household Characteristics of study areas

Background characteristics	Baseline		End line (outcome survey)	
	Intervention	Control	Intervention	Control
<b>Household head</b>	n (%)	n (%)	n (%)	n (%)
Male	1384 (95.6)	1440 (97)	1274 (95.6)	1237 (96)
Female	64 (4.4)	45 (3)	59 (4.4)	52 (4)
Mean HH size	4.9	4.8	5.1	5.2
<b>Household monthly income (Taka)</b>				
<1500	14 (1)	16 (1.1)	4 (0.3)	5 (0.39)
1500-2999	153 (10.6)	85 (5.7)	14 (1.05)	7 (0.54)
3000-4499	794 (54.8)	682 (45.9)	122 (9.15)	110 (8.53)
4500-5999	259 (17.9)	327 (22)	168 (12.6)	156 (12.1)
6000+	227 (15.7)	377 (25.4)	1025 (76.89)	1011 (78.43)
Mean ± SD	4212± 1652	4755± 2080	10130±7277	12672±12611
Median hh income	4000	4000	<b>8000</b>	<b>10000</b>
<b>Land ownership (in acres)</b>				
<0.5	1416 (97.8)	1400 (94.3)	1090 (81.77)	1002 (77.73)
0.5-0.99	22 (1.5)	55 (3.7)	129 (9.68)	114 (8.84)
1.00-2.49	6 (0.4)	27 (1.8)	89 (6.68)	132 (10.24)
>2.50 acres	4 (0.3)	3 (0.2)	25 (1.88)	41 (3.18)
<b>Household wealth quintile</b>				
Poorest	407 (28.1)	227 (15.3)	228 (17.1)	299 (23.2)
Poorer	256 (17.7)	276 (18.6)	262 (19.59)	261 (20.25)
Poor	259 (17.9)	333 (22.4)	268 (20.12)	256 (19.86)
Less poor	281 (19.4)	307 (20.7)	296 (22.22)	228 (17.69)
Least poor/richest	245 (16.9)	342 (23)	279 (20.95)	245(19.01)
<b>Source of drinking-water</b>	<b>Intervention</b>	<b>Control</b>	<b>Intervention</b>	<b>Control</b>
Tube well	1446 (99.9)	1479 (99.6)	1333 (100)	1289 (100)
Others	1 (0.1)	6 (0.4)	-	-
<b>Source of water for cleaning utensils</b>				
Tube well	1442 (99.6)	1450 (97.7)	1333 (100)	1282 (99.4)
Others	12 (0.8)	59 (4)	-	-
<b>Colour of head of the tube well (red refers to arsenic in tube-well water and green refers to no arsenic in water)</b>				
Head was marked green	501 (34.6)	676 (45.5)	224 (41.4)	236 (36.5)
Head was marked red	61 (4.2)	52 (3.5)	21 (3.9)	25 (3.9)
Head was not marked	886 (61.2)	759 (51.1)	296 (54.7)	386 (59.7)



Type of toilet				
Modern water sealed toilet with septic tank	29 (2)	71 (4.8)	144 (10.73)	80 (6.21)
Slab latrine - water sealed	290 (20)	223 (15)	225 (16.88)	156 (12.1)
Slab latrine – not water sealed	644 (44.5)	650 (43.8)	839 (70.37)	726 (56.32)
Open latrine( bush/ field, pit, hanging)	489 (33.8)	546 (36.8)	125 (9.38)	327 (25.36)

Tube-well remained the main source of drinking water and cleaning utensils in the households that had similarity in both the sites. However; more than half of the tube-wells (51-61%) were unmarked for Arsenic contamination. More than 41% of the tube wells in the end line of intervention area were found marked with green colour indicating safe compared to 35% in the baseline. Although the use of open latrine has remarkably decreased particularly in intervention area between baseline and end line survey (34% vs. 9.38%) - majority of the households (56-70%) in the end line had toilets that were not properly water sealed.

**Characteristics of household heads** (annexed table-1a): Thirty nine percent of these household heads had no formal schooling and it was almost same in both the areas at the end line. Proportions of hh heads with schooling below SSC and above SSC level were higher (34% and 13% respectively) in the intervention area compared to control during this survey – indicating better educational level in the intervention area. Overall 24% of them were engaged in small business with higher proportions (27%) in the control area compared to intervention (21%). Around 23% of the hh heads were agriculture farmer in the intervention area compared to 16% in the control. The control area had lots of traditional handloom factories that have resulted in higher proportion of household heads (22%) working as weaver compared to intervention area (8%). Overall; only 8% of hh heads participated in skill development programs conducted by the government and local NGOs- with higher proportion from the intervention area (15%). Majority of the hh heads in intervention area received skill development training on homestead gardening, and poultry from NDP.

**Characteristics of mothers of <5 children/lactating women** (annexed table-1b): More than 60% of the mothers interviewed were in the age group of 20 to 30 years followed by less than 20 years in both the areas. Majority of them were not engaged in income generating activities at the time of survey. In the intervention area mothers were found better educated compared to control. Percentage of no schooling among them in the intervention area (12%) was close to half than that of the control area (23%) with 11% studied up to SSC and above.

**Characteristics of pregnant women** (annexed table-1c): Sixty percent of the pregnant women fell into the age group of 20-30 years in both the areas. Their educational level was better in the intervention area compared to control particularly in terms of higher proportions of pregnant women had studied up to SSC, passed SSC or studied above SSC level in the intervention area.

**Mother's knowledge about children's diarrhoea and pneumonia** (annexed table- 1d): Majority of mothers of <5 children/lactating women (61% in intervention and 71% in control) correctly mentioned that drinking of contaminated water is one of the main causes of diarrhoea. Not washing hands before taking food and after defecation was mentioned by 52% and 37% of mothers in the intervention area opposed to 26% and 13% respectively in the control area.

Use of safe water for drinking and hand wash before eating and after using toilet was mentioned by the majority of mothers in the intervention area as key to prevent diarrhoea in children. Similarly; majority of mothers in the intervention area could correctly mentioned the symptoms of pneumonia in children opposed to control area.

It is evident that mothers in intervention area had better knowledge about diarrhoea and pneumonia compared to control. This is probably linked to better education of mothers in the intervention area who were more receptive to health and hygiene messages disseminated by the FSUP-N project.

**Child's morbidity in last two weeks** (annexed table- 1e): More than half of the children (57%) suffered from seasonal common cold in the intervention area compared to 48% in the control. Diarrhoeal infection was less in intervention area than the control while prevalence of pneumonia among children was less than one percent in both the areas. These findings may be attributable to better practice of hand wash in the intervention area (*see table- 12 on hand wash*) and effective campaign on health and hygiene to prevent diarrhoea, pneumonia and other childhood illness.

Table-2 shows that at the time of this survey; only 27.7% of households in the intervention area had been maintaining homestead food production (homestead gardening, poultry rearing and fish culture) compared to 27.1% in the control area depicting almost no difference. This could be linked with the flooding that occurred prior to this survey (late August-Sep 2015).

Table-2: Distribution of homestead food production across study area

Existence of homestead food production	End line		
	Intervention area N = 1333 (%)	Control area N = 1289 (%)	Total N= 2622 (%)
Has homestead food production currently	369 (27.7)	341 (26.5)	710 (27.1)
No homestead food production currently	964 (72.31)	948 (73.54)	1912 (72.92)

Table-3: Forty percent of the sampled households in the intervention area were food secured which was 10% higher in the control area. However; both were far below the national estimate (BDHS 2011). Severe food insecurity has relatively decreased in intervention areas compared to control at the end line. It indicates relative improvement in HH food security in the intervention area compared to prevalence of 35% food secure households at the baseline (Source: Baseline report, annexed table- 2a).

Table-3: Household food security

Food security access scale	End line % (95% CI)			BDHS 2011
	<b>Intervention</b> (N=1333)	<b>Control</b> (N=1289)	<b>p-value</b>	
Food secured households	39.9 [37.3,42.6]	50.5 [47.8,53.2]	0.000	64.9
Mildly food insecure	20.9 [18.8,23.2]	10.2 [8.7,12.0]	0.000	25
Moderately food insecure	28.4 [26.1,30.9]	25.8 [23.5,28.3]	0.135	8.5
Severely food insecure	10.7 [9.2,12.5]	13.4 [11.7,15.4]	0.034	1.6

Table-4: Majority of the households had acceptable food consumption score in both the areas with very few households remaining at poor score. Proportion of households with FCS<42 has decreased at the end line (27% in intervention and 10%in control) compared to corresponding baseline (40% and 18%, baseline report, annexed table-4a). Combined effect of FSUP and FSUP-N could be attributable to increase in hh income and homestead food production respectively that ultimately contributed to this improvement in FCS and food security.

Table-4: Household food consumption score

Food Consumption Score	End line % (95% CI)		P-value
	Intervention (N=1333)	Control (N=1289)	
Poor (<28)	2 [1.3,2.9]	1.2 [0.7,1.9]	0.102
Borderline (28-42)	24.8 [22.6,27.3]	8.5 [7.1,10.1]	0.000
Acceptable (>42)	73.2 [70.7,75.5]	90.4 [88.6,91.8]	0.000

Table-5 depicts that proportion of stunting and underweight in <5 children have decreased in the intervention area compared to baseline. However; these decreases were relatively high in the control area - for which impact of the project on these improvements in the intervention area is not statistically conclusive. Although DID of underweight is statistically significant at 10% level, the rate of change in the control area was higher than that in the intervention area. However; the proportion of stunting in both the study areas was less than the national estimates (36.1%) for the general child population while proportion of underweight among children was close to the national estimate and even less in the control at the end line (BDHS 2014).

Wasting did not show improvement in the end line assessment compared to baseline in both the areas. Proportion of wasting at the end line in the intervention area was higher than the national estimate while in the end line -control area it was less than the national estimate for the general child population. Age stratified stunting, wasting, underweight and anaemia among all sample children and among poorest quintile of the sample at the end line is attached in the annexed table- 5a, 5b.

Table-5: Nutritional status of 6-59 months old children

Target group	Outcome indicator	Intervention area			Control area			D-i-D	P-value	BDHS 2014
		Baseline	End line (outcome survey)	$\Delta^1$	Baseline	End line outcome survey)	$\Delta^2$	$\frac{\Delta^1 - \Delta^2}{2}$		
< 5 Children	Stunting	468 (55.3)	271 (31.7)	- 23.6	498 (60.1)	275 (33.7)	-26.4	+2.8	0.490	36.1
	Wasting	72 (8.5)	158 (18.5)	10.0	63 (7.6)	100 (12.2)	4.6	+5.4**	0.014	14.3
	Underweight	311	270		322	219				

		(36.6)	(31.6)	-5.0	(38.1)	(26.8)	-11.3	+6.3*	0.051	32.6
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$\Delta^1$  = intervention area in end line – intervention area in baseline

$\Delta^2$  = control area in end line –control area in baseline

\*Significant at 10% level

\*\*Significant at 5% level

Table-6: Similar pattern was observed in case of anaemia. Proportion of anaemia (Hb<11g/d) among <5 children (6-59 months) decreased in the intervention area compared to baseline but higher decrease was found in the control area with DID significant at 5% level. With this decrease in prevalence in the intervention area at the end line –it was still higher than the national estimate for <5 child population (BDHS 2011). However; the % in end line control was close to the national estimate. Relatively greater reduction of child anamia in control area could be linked to wealthier households at the control since baseline.

Anaemia among adolescent girls decreased at the end line in control area while it increased in intervention area by around 1.5 percentage point which is negligible. Anaemia has decreased among mothers of <5 children/lactating mothers in the intervention area compared to baseline which is statistically insignificant and higher than national estimate for ever-married women (BDHS 2011). Decrease in proportion of anaemia among pregnant women was found at end line in the control area only.

Table-6: Prevalence of anaemia among study participants

Outcome indicator	Study participants	Intervention area			Control area			D-i-D $\Delta^1 - \Delta^2$	P-value	BDHS 2011
		Baseline	End line (outcome survey)	$\Delta^1$	Baseline	End line (outcome survey)	$\Delta^2$			
Anaemia	<5 Children	40 (75.5)	169 (62.4)	-13.1	51 (83.6)	138 (50.2)	-33.4	+20.3**	0.040	51.3
	Adolescent girls	17 (53.1)	197 (54.6)	1.5	22 (71)	156 (44.8)	-26.2	+24.7**	0.035	--
	Pregnant women	33 (84.6)	89 (73)	11.6	33 (86.8)	81 (69.8)	-17	+5.4	0.637	--

	Mothers of <5 children Lact..mothers	24 (75)	182 (59.87)	-15.1	28 (71.8)	155 (51.84)	-19.9	+4.8	0.697	42.4
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△1 = intervention area in end line – intervention area in baseline

△2 = control area in end line –control area in baseline \*\* Significant at 5% level

Table-7: Decreasing trend has been observed between baseline and end line both in intervention and control area in practicing exclusive breastfeeding. This reflects the decreasing national trend of breastfeeding practice over the past few years as shown in BDHS 2011 (64%) and BDHS 2014 (55%). Reduction of EBF was much more in the control area – that may be linked with the greater number of wealthier households in the control area switching over to formula milk for their babies. However; Initiation of feeding of *colostrum* has increased in intervention area compared to control at the end line which may have resulted from extensive BCC sessions conducted at the courtyards during FSUP-N project.

Table-7: Exclusive breastfeeding practice of mothers of 0-6 month children

Study participants	Intervention area			Control area			D-i-D △1 – △2	p-value	BDHS 2014
	Baseline	End line (outcome survey)	△1	Baseline	End line outcome survey)	△2			
Initiation of breastfeeding with <i>Colostrum</i> within 1 hour of birth	362(66.9)	370 (61.87)	-5.03	374 (68.9)	304 (53.52)	-15.38	10.35	0.011	-
Exclusive breastfeeding (0-6 months)	41(48.8)	42 (40.78)	-8.02	78(66.1)	21 (18.75)	-47.35	39.33***	0.000	55

△1 = intervention area in end line – intervention area in baseline

△2 = control area in end line –control area in baseline

\*\*\*Significant at 1% level

Table-8 shows that prevalence of total normal BMI in intervention and control area at the end line was close to and higher than the national estimates respectively for ever-married women (BDHS 2014). Severe to moderate and mild under-nutrition were higher in the intervention area compared to national estimates. However; proportions of overweight and obese women were less than the national estimates for ever-married women.

Table-8: Nutritional status of mothers of under-5 children by BMI

Maternal BMI	End line % (95% CI)		P-value	BDHS 2014
	Intervention (N=844)	Control (N=849)		
Severe-moderate under-nutrition (BMI<17)	8.5 [6.8,10.6]	7.1 [5.5,9.0]	0.2617	7.2
Mild under-nutrition /Thin (BMI 17-18.49)	13.7 [11.6,16.2]	13.5 [11.4,16.0]	0.9052	11.4
Overweight (BMI 25-30)	18.6 [16.1,21.4]	15.3 [13.0,17.9]	0.0715	19.4
Obese (BMI>30)	2.3 [1.4,3.5]	2.4 [1.5,3.6]	0.8861	4.4
Total normal BMI (18.5 – 24.49)	56.9 [53.5,60.2]	61.7 [58.4,64.9]	0.0426	57.6

Table-9: Large majority of adolescent girls (>90%) had no chronic energy deficiency at the end line. It shows improvement in prevalence of chronic energy deficiency with 6% adolescent girls in intervention area and 8% in control area (having chronic energy deficiency) at the end line compared to 10% and 2% in baseline (Baseline report, annexed table- 9a).

Table-9: Nutritional status of adolescent girls and pregnant women

BMI of adolescent girl	End line % (95% CI)		P-value
	Intervention (N=408)	Control (N=395)	
BMI-for-age-Z score<-2	6.4 [4.4,9.2]	8.1 [5.8,11.2]	0.3447
<b>MUAC of pregnant women</b>			
MUAC<23 cm	21 [14.6,29.1]	19.5 [13.3,27.7]	0.7758

Although majority of the pregnant women (79 - 80.5%) had no chronic energy deficiency at the end line- it increased from previous 9% and 6% at baseline (baseline report) to 21% and 19.5% in intervention and control area at the end line respectively.

Table-10: Prevalence of minimum dietary diversity with at least 4 food groups among children aged 6-23 months has increased in both the study areas (24 and 33%) compared to baseline (13.8 and 20.5%, baseline report, annexed table-10a). However; it was low in intervention area compared to national estimate (26.4%) by 2.2 percentage points. Proportion of breastfed children aged 6-8 months having minimum acceptable diet in last 24 hours improved in the intervention area (11.5%) compared to control (9.6%) at the end line. This improvement is better than the national estimate for this age-group. However, among 9-23 months old breastfed

children improvement occurred more in the control area compared to intervention area. Similar improvement was found among non-breastfed children aged 6-23 months and among all children in the control area – all of which are better than corresponding national estimates (BDHS 2014). These findings suggest that complementary feeding has improved both in terms of quantity and quality. These findings are also consistent with better income and better food security in the control households and overall improvement of mother’s knowledge on complementary feeding practice.

Table-10: Complementary feeding practice

Complementary food intake	End line % (95% CI)		p-value	BDHS 2014
	Intervention (N=495)	Control (N=456)		
Received at least four food groups: Minimum dietary diversity in 6-23 months children	24.2 [20.7,28.2]	33.1 [28.9,37.6]	0.003	26.4
<b>Minimum acceptable diet in last 24 hours</b>				
Age group 6-8 of BF children	11.5 [6.1,20.8]	9.6 [4.6,18.9]	0.699	7.1
Age group 9-23 of BF children	25.9 [21.6,30.7]	35.7 [30.8,40.9]	0.005	29.4
Age group 6-23 of non- BF children	27.4 [17.6,40.0]	46.3 [31.6,61.7]	0.003	19.6
All children	23.8 [20.3,27.8]	32.5 [28.3,36.9]	0.003	22.8

Table-11 depicts that adolescent girl’s knowledge of vitamin and mineral rich food has improved in the intervention area compared to control area which is statistically significant.

Table-11: Adolescent girl’s knowledge of vitamin and mineral rich food items

Study participants	Intervention area			Control area			D-i-D $\Delta 1 - \Delta 2$	p-value
	Baseline	End line (outcome survey)	$\Delta 1$	Baseline	End line outcome survey)	$\Delta 2$		
Vegetables	226 (58.4)	294 (72.1)	13.7	287 (72.5)	240 (60.6)	-11.9	25.6***	0.000
Fruits	104 (27)	195 (47.8)	20.8	155 (39.1)	162 (40.9)	1.8	19***	0.000

$\Delta 1$  = intervention area in end line – intervention area in baseline



△ 2 = control area in end line –control area in baseline

\*\*\*Significant at 1% level

Table-12 shows that knowledge and reported practice of hand wash with soap increased significantly in the intervention area compared to control at the end line. The differences were statistically significant.

Table-12: Knowledge and reported practice of hand wash by mothers

Hand washing with soap	End line % (95% CI)		p-value
	Intervention (N=888)	Control (N=859)	
Before making food	42.6 [39.3,45.9]	26.3 [23.5,29.4]	0.000
Before eating	33.2 [30.2,36.4]	19.4 [16.9,22.2]	0.000
Before child feeding	40.8 [37.6,44.0]	25 [22.2,28.0]	0.000
After cleaning child defecation	82.1 [79.4,84.5]	63 [59.7,66.2]	0.000
After coming from toilet	79.5 [76.7,82.0]	58.6 [55.2,61.8]	0.000

Table-13: Mother’s knowledge about energy-dense food items has improved in both the areas compared to baseline and the difference in changes in intervention and control area regarding meat, and fish were statistically significant.

Table-13: Mother’s knowledge of energy rich foods

Mother’s knowledge about energy dense foods	End line % (95% CI)		P-value
	Intervention (N=888)	Control (N=859)	
Rice	53.7 [50.4,57.0]	49.2 [45.9,52.6]	0.074
Fruit	34.7 [31.6,37.9]	44.7 [41.4,48.1]	0.000
Oil	1.4 [0.8,2.4]	9.3 [7.5,11.4]	0.000
Bread	8.7 [7.0,10.7]	14.3 [12.1,16.8]	0.001
Fish	60 [56.8,63.2]	52.4 [49.0,55.7]	0.001
Meat	57.4 [54.1,60.7]	50.1 [46.7,53.4]	0.002
Egg	74 [71.0,76.8]	70.5 [67.4,73.5]	0.101
Milk	1.5 [0.9,2.5]	3.3 [2.3,4.7]	0.000
Spinach	66.4 [63.3,69.5]	71.6 [68.5,74.5]	0.055
Vegetable	64.3 [61.1,67.4]	68.7 [65.5,71.7]	0.118
Lentil (dal)	15.5 [13.3,18.1]	23.2 [20.5,26.1]	0.000

Table-14 Mother’s knowledge of protein-rich food items improved compared to baseline. Difference in proportions in intervention area for fish and meat were statistically significant.

Table-14: Mother’s knowledge of protein rich foods

Mother's knowledge about protein rich foods	End line % (95% CI)		P-value
	Intervention (N=888)	Control (N=859)	
Fish	48.3 [45.0,51.6]	33.4 [30.3,36.6]	0.000
Meat	37.6 [34.5,40.9]	24 [21.2,27.0]	0.000
Egg	22.7 [20.1,25.6]	21.8 [19.1,24.7]	0.716
Milk	73.3 [70.3,76.1]	76.5 [73.5,79.2]	0.208
Fruit	9.1 [7.4,11.2]	13.6 [11.5,16.1]	0.003
Dal	12.5 [10.5,14.8]	18 [15.6,20.8]	0.001

Table-15: Mother's knowledge about sources of selected micronutrient and vitamins has improved in intervention area compared to control at the end line and the differences in proportions regarding salt as source of iodine, spinach and vegetables as source of iron vitamin were statistically significant.

Table-15: Mother's knowledge of micronutrient and vitamin rich foods

	End line % (95% CI)		P-value
	Intervention (N=888)	Control (N=859)	
<b>Knowledge of mother about iron rich foods</b>			
Fruit	11.3 [9.3,13.5]	16.4 [14.1,19.0]	0.000
Spinach	50.8 [47.5,54.1]	35 [31.9,38.3]	0.000
Vegetable	73.4 [70.4,76.2]	67.2 [64.0,70.2]	0.000
Fish	5.2 [3.9,6.8]	11.8 [9.8,14.1]	0.000
Meat	4.3 [3.1,5.8]	11.2 [9.2,13.5]	0.000
Milk	5 [3.7,6.6]	14 [11.8,16.5]	0.000
<b>Knowledge of mother about iodine rich foods</b>			
Iodized/packet salt	54.6 [51.3,57.9]	36.7 [33.5,40.0]	0.000
Fish/sea fish	5.7 [4.4,7.5]	3.6 [2.5,5.1]	0.000
<b>Knowledge of mother about vitamin and mineral rich foods</b>			
Fruit	38 [34.8,41.2]	40.3 [37.0,43.6]	0.006
Spinach	77.4 [74.5,80.0]	73.7 [70.6,76.5]	0.000
Vegetable	17.9 [15.5,20.6]	28.2 [25.3,31.3]	0.000

## Qualitative findings

**Supplementary Food Distribution: Super-cereal Plus (WSB++), Super-cereal (WSB+) and Vegetable oil:** Triangulated response revealed that supplementary feeding with wheat-soya blend (WSB+ mixed with vegetable oil and WSB++) was well received by all categories of beneficiaries. All respondents of in-depth interviews (33 beneficiary mothers) opined that WSB++ (*'pusti powde'r or pusti chatu as they called it*) along with vitamin fortified oil was distributed free of cost for their malnourished children aged 6-59 months and adolescent girls while children aged 6-23 months received blanket feeding of WSB++ that was very useful to combat malnutrition among children. A ready-to-use type of supplement WSB+ was distributed through community clinics to pregnant and lactating women - that was also very well consumed by this group. Mixing and cooking of the food product was demonstrated by the project workers at the community clinics during distribution. Besides; they also reported that they learned quite a lot about homestead food production, nutrition, child feeding, health and personal cleanliness through courtyard meetings. The in-depth respondents however; expressed concern over no-supply of wheat-soya blend over the last one year and non-availability of the product in the market. Twenty nine of them (out of 33) mentioned that they did not face any difficulty to feed their children with WSB. Flavor and amount were fair enough. A few however; complained of sweet-less taste, loose motion or gas in abdomen after feeding their children with WSB supplement and reported that the blended food supplied in plastic container (WSB++) was better in taste and flavor compared to the open one (WSB+). Twenty three respondents out of 33 opined that it would have been very helpful for maintaining good nutritional status of the community- if the supply of food supplement in plastic container were sustained for longer period of time.

All key informants interviewed (10 CHCPs, 8 NDP workers and 1 WFP staff at Sirajgonj) have mentioned that households belonged to the target groups (<5 children, PLWS and adolescent girls) were extensively visited by trained project workers (CNV) who conducted active screening for identification of under nutrition and their referral to the community clinics for confirmation by trained CHCPs. Those confirmed with moderate acute under-nutrition by anthropometry (MUAC) were enrolled (children-8675, adolescent girls-11268, PLWs-5511, blanket beneficiaries- 11942) for food supplementation and their household enlisted for nutrition sensitive interventions of the project (i.e. homestead food production support, BCC).

Children identified with severe acute malnutrition (SAM 45 cases over the project period) with associated medical complications were referred to Government Health facilities in Sirajgonj/UHC for intensive treatment. Other SAM cases without complications were provided with take-home ration of WSB+. More than 90% of the enrollees in all target groups were successfully graduated from moderate acute malnutrition (MAM) during the project period. These facts and figures suggest that the staff members of GOB organization and partner NGOs who were directly involved in identification, management and upward referral of acute malnutrition among children were technically competent, particularly in managing MAM cases.

However, there were around 5% defaulters in supplementary feeding program- they added. The key informants also pointed out that WSB+, WSB++ and a contingent of trained motivated workforce was instrumental in achieving >90% cure rate of MAM during the project period. They further added that advocacy workshop with Government officials and male sensitization meeting at the community level positively contributed to such achievement of the project.

More than half of the key informants (11 out of 19 ) reported that although the WSB supplement was well consumed by the target groups, the cooking procedure was not correctly practiced by all mothers as expected. NDP respondents (8) reported that during home visit they observed some mothers adding sugar with WSB - for babies consuming sweetened blend food was better (although it is not harmful). The key informants further added that a total of 11942 children aged <2 years were covered by the blanket feeding programme. The majority of the targeted women (PLW) showed up at community clinics fortnightly for WSB+ ration with around 5% absentees (mostly pregnant women) who were later contacted and given their food supplement. The KII respondents opined that the project had created multiple demands - one of which was free supply of WSB.

*“People still do inquire about restart of FSUP-N project”*

- A CHCP in KII

### **Homestead Food Production:**

**Homestead vegetable gardening, poultry rearing, fish culture:** All respondents of in-depth interview on homestead food production (28 out of 28) reported that they benefited of homestead food production (vegetable gardening and chicken/duck rearing) program of the project - which actually met their household demand for 4-5 persons daily including children.

Half of them (14 out of 28) reported that they sold out vegetables and /or eggs after meeting their household requirements. The home grown leafy vegetables included *pui sak, lal sak, lao sak, palang sak, barboti, mula, data*, lemon, carrot, brinjal, country bean, bottle gourd and tomato - which actually increased their consumption of vegetables compared to previous years. They also mentioned about receipt of fruit saplings e.g. Guava, Amla, Hog palm sapling. Home grown vegetables and fruits were used for preparing vegetable curry/fry, fish/ beef curry, salad, *khichuri* and often cooked with *shutki* or lentil as family food. Majority of the respondents (26 out of 28) could correctly say about benefits of eating vegetables and fruits daily while half of them (14 out of 28) could mention about availability of natural vitamins in the vegetables/fruits they produced.

They further mentioned that around 4000 households were provided with poultry rearing support – each receiving ten vaccinated chicken/duck with one month feed –all free of cost. Chicken eggs (average 4-7 eggs per week) were either cooked as family food or sold out. Around one-third (9 out of 28) said that sometimes they consumed eggs 3-4 days per week. Others mentioned they consumed eggs 1-2 days per week. Majority of the respondents (22 out of 28) could mention the benefit of eating egg as it contains calcium needed for physical growth and strength.

*“If the project could help us again with poultry feed, vaccine and hen’s cage/coop we can continue chicken/duck rearing”.* - A beneficiary in in-depth

Only two respondents out of 28 mentioned about support received for fish culture with *rui, sorputi, katla, mregel, silvercarf* etc. at their homestead pond. They pointed out that the number of privately owned ponds in their area was low - for which fish culture initiative could not be expanded by the project beyond 9 households only.

All in-depth respondents highly appreciated hands-on training, model garden demonstration, spot supervision and logistical support extended by the project through NDP and partner organizations for vegetable gardening and poultry rearing. Majority of these respondents more or less correctly described the procedures of kitchen gardening and chicken/duck rearing with reference to NDP and other project workers as their source of information and support. However; only half of them (14 out of 28) were found continuing with gardening and one-third (9 out of 28) with only 4-6 chicken/duck rearing at the time of this evaluation. Others mentioned about non-availability of free logistical support (seed, fertilizer, net, agro tools, insecticide,

chicken/duck, feed, vaccine, cage etc) that was provided free of cost earlier by the project, limited land space, excessive rain and flush flood of September 2015 as their main reasons for discontinuation. One-third of these respondents mentioned that logistics for gardening and poultry rearing were not provided to all households because the selection of households was need based. Free distribution of logistics was purposefully targeted to households with family member(s), a child, adolescent or pregnant and lactating women in the CMAM programme. Members of the remaining households that did not get free supplies for gardening or poultry rearing were disappointed and less attracted to other interventions offered by the project.

*“Many people received training on homestead vegetable gardening and chicken/duck rearing. They practically benefited from doing that - but now- a-days many of them do not have vegetable garden or chicken at home. They need logistic support and supervision until they get fully motivated to invest in home gardening and chicken/duck rearing for better nutrition”.*

- An NDP worker in KII

**Health, nutrition and hygiene awareness:** All respondents of KII from partner NGO NDP (8) added that besides attending training on homestead food production - courtyard meetings on health, nutrition and hygiene awareness were provided to the beneficiaries who received logistic support for home gardening and chicken rearing. It worked as an incentive for them to attend courtyard meetings and learn more about linkages of nutrition sensitive interventions (e.g. homestead food production) with nutrition specific interventions (e.g. breast feeding, complementary feeding, wheat-soya blend, dietary diversity etc.) alongside knowing about health, hygiene, water and sanitation messages. These meetings were facilitated by CNVs under supervision of CNWs. Separate meetings were also organized to sensitize male members of the households as their participation in the courtyard meetings were low– the respondents added. Mother-in laws were also targeted for they needed attitudinal change regarding food, breastfeeding and nutrition of their daughter-in-laws during pregnancy and following childbirth. Attendance in these meetings was relatively low during monsoon and harvesting seasons. All CHCPs interviewed mentioned that the BCC campaign of the project has contributed to important behavior changes in the community including feeding newborn with colostrum, wearing sandal, hand wash, and washing vegetable after cutting instead of washing before cutting.

*“People now wear sandal while using toilet, feed babies with shal-dudh (colostrum) they wash hands as we suggested and wash vegetables after cutting instead of washing beforehand. Mother-in laws are now more supportive of nutrition of their daughter in laws”.*

*- CHCPs in KII*

In addition to courtyard meetings demonstration sessions with 8-12 PLW and/or caregivers of children on mixing WSB+ with oil and cooking the WSB++ and the premix (WSB+ and oil) were regularly organized by project’s female CNVs at each of the 27 community clinics- the key informants added. These demonstration sessions helped PLW improving on the preparation of the WSB and feeding practice of children. Other sessions focused on Infant and Young Child Feeding including exclusive breast feeding practice, particularly initiation of breast feeding with *colostrum*, timely initiation of child’s complementary feeding, knowledge about dietary diversity, common childhood illnesses and source of treatment, hand wash, safe water and sanitation. They further informed that many of the adolescent girls missed out courtyard BCC sessions for its timing coincided with their school hours. Teen-age marriage also hampered follow-up of adolescent girls enrolled in the programme.

The key informants opined that very few FSUP households met the screening criteria for inclusion into FSUP-N project- which indicates better nutrition in FSUP households (i.e. our control area was previously included in FSUP project) compared to households that participated in FSUP-N only. As the ‘nutrition’ component was introduced at the later stage of FSUP – there was little scope to assess the complementary effect of the projects on each other. However; all key informants mentioned that a combined/ synergistic effect of FSUP on improved household income and FSUP-N on food and nutrition knowledge, homestead food production and supplementary/blanket feeding of target groups have resulted in improved nutritional status of the community during the project period.

The key informants of NDP (8) finally mentioned that they were not aware of current scenario of nutrition knowledge and practice in the community attributable to the project - for the FSUP-N project has ended a year ago.

**Technical capacity of GOB-NGO personnel:** ACF (*Action Contare la Faim*) Bangladesh led the capacity development initiative for the relevant officials and staff members of the partner

organizations. Key government officials of the upazila (UHFPO, MOs, Agriculture officer, Livestock officer and Fisheries officer) were oriented with the project interventions prior to training sessions. Key informants of NDP mentioned that they were given basic ToT on home gardening, poultry rearing, fish culture, BCC, anthropometry and community based management of acute malnutrition- facilitated by resource persons from Civil Surgeon's office, UHC, upazila agriculture, livestock and fisheries offices. CHCPs also received hands-on training on nutrition, hygiene and anthropometry. Subsequently trained NDP staff facilitated basic and refresher training for project field staff (CNOs, CNWs, CNVs,) and the community. All key informants could describe the major steps of identification, management and referral for MAM cases. ACF Bangladesh developed several training manuals, flipcharts, posters in *bangla* for the field workers that were used in community based management of acute malnutrition (MAM and SAM) and BCC campaign on infant and young child feeding practices. Other manuals were used in homestead gardening and poultry management. NDP respondents further added that the GoB officials who worked as resource persons in the training sessions were technically competent in their respective field. The elected representatives at the lowest administrative tier of the government - Chairman and Members of *Upazila Parishad* – were involved in the union level Nutrition Development Committees and extended their full cooperation in implementing the project. Other government officials at the upazila level provided valuable technical inputs in the field work and coordination meetings.

However; most of those GoB officials have been transferred to another place as part of their routine administrative procedure. On the other hand, retention of experienced local field staff (non-government) was not possible for NDP with the closure of the project.

The key informants finally opined that closure of project or transfer of GoB officers is not uncommon –but the concerned GoB-NGO organizations still possess the institutional memories of FSUP-N that can be applied to provide the services through public-private partnership.

## **Discussion**

There are at least three different factors that need to be kept in mind while discussing the results of this outcome survey- 1). This evaluation was conducted after one year of closing of FSUP-N project that might have diluted/diffused some of its outcomes 2). There was lagging of a complete baseline dataset 3) Control area was found economically better-off compared to the intervention area both in baseline (2012) and end line (2015).



In the context of the above-mentioned scenario, we adopted different approaches in analyzing data. We tried to see difference in difference (DiD) between intervention and control area using aggregate data from the baseline report as proxy, alongside comparing proportions with the national estimates of BDHS-2014 and 2011 wherever possible. We also presented point estimates of outcome indicators at the end line intervention and control only with confidence interval in the population and p-value and compared proportions of outcomes in baseline and end line as far as possible. Findings in the control when found better (compared to the intervention) have been explained in the context of its better economic condition.

Contrary to control, our findings have shown better educational level of mothers in the intervention area. Hence, there are at least two important social determinants of health and nutrition (i.e. better income in control area and better education in intervention area) prevailed in the study areas that may have jointly and positively influenced some of the FSUP-N outcomes. It is most likely that the predecessor project (FSUP) that had focus on poverty alleviation through income generation activities in both the areas has impacted improvement in income which was relatively higher in the intervention area at the end line. FSUP model also had nutrition, hygiene, health and homestead gardening training alongside life skill training in both of our study areas. Thus FSUP-N had an advantage of getting a nutrition sensitive environment in the intervention area (Sirajgonj) that facilitated its implementation and achievements.

Triangulated findings (household survey and qualitative investigation) reveal that the number of households with kitchen garden and poultry rearing has decreased substantially in the intervention area following the closure of FSUP-N project. One of the main reasons of this discontinuation was non-availability of free supply of agro and poultry logistics from the project. Such a gap in supply could have addressed effectively - if the project's homestead food production model were functionally integrated with the local level GOB functionaries i.e. upazila agriculture, livestock and fisheries department and or local NGOs.

It appears from our qualitative findings that the FSUP-N project had created a widespread demand for free supply of WSB, and logistical support for homestead food production. Free supply of consumable or non-consumable product(s) is often necessary for an intervention to get the target groups habituated with the best practices and benefits it advocate. With the withdrawal of free supply from the project - concurrent introduction of similar product at affordable price is necessary to sustain the outcomes during post-project period. It did not

happen in case of FSUP-N project for no WSB prototype was available in the intervention area during the post-project period. With the closure of FSUP-N in late 2014, free supply of WSB and other supports were no more there until this evaluation. No local substitute of WSB was available to the target groups after 2014. Such a withdrawal of WSB might have resulted in relapse of MAM found among target children (and others) during this outcome survey. Therefore; we think it is really important to consider the introduction of a locally made low-cost RUTF and or RUCF to run the CMAM programme effectively through the community clinics and NGO channels.

However; it is good to see that prevalence of stunting (table-5) has decreased in both the study areas –which is even less than the national estimate. This is indicative of reduction in chronic malnutrition among children. Underweight (table-5) has also shown improvement compared to baseline but the rate of improvement was higher in the control area (26.8%) which was even less than the national estimate (32.6%). Prevalence of underweight in the intervention area (31.6%) during end line survey was almost similar to national estimate. These findings are consistent with our end line findings on improvement in income in both the areas, household food security (table-3) and food consumption score (table-4) compared to the baseline survey. However; wasting representing current nutritional status did not show improvement in the intervention area (18.5%) compared to control (12.2%) at the end line-but the proportion in control was less than the national estimate (14.3% BDHS 2014).

A recently disseminated study (*Prothom Alo*, 28 March 2016) titled “Food Security and Nutritional Surveillance Project” (FSNSP), Bangladesh-2014 funded by European Union and implemented by BBS, BRAC University and Helen Keller International has found that- although food security at household level in Bangladesh has improved in 2014 compared to 2011; the nutritional status of <5 children did not improve- particularly stunting was quite high (42%) among <5 children. This study has similarities as well as a contrast with our outcome survey. Like FSNSP our survey also found improvement in household food security and food consumption score in the study areas (table-3, 4)- but interestingly; our finding on stunting (31.7 – 33.7%) was less than the FSNSP (42%) and national estimate of BDHS 2014 (36%). This clearly indicates positive impact of FSUP-N project in reducing stunting. The aforesaid FSNSP study further revealed that exclusive breast feeding has come down to 42% in 2014 compared to 52% in 2010. We also have found similar finding in our survey with reduction in exclusive breastfeeding in the intervention area from 49% in the baseline to 41% in the end line (table-7).

Moreover; our survey has found marked deterioration of exclusive breastfeeding in the control area from 66% in the baseline to only 19% in the end line (table-7). It could be linked with higher income of the control households compared to intervention- that encouraged lactating mothers to switch over to formula feeding for their babies.

Improvement in complementary feeding practice with minimum dietary diversity and minimum acceptable diet in last 24 hours among breastfed and non-breastfed children in both the areas is suggestive of improvement in child feeding practice both in terms of quantity and quality. This is one of the good examples of improvement in knowledge and practice in the study areas. This improvement was much more prominent in the control area compared to baseline and national estimates (table-10) – which is again consistent with better income and better food security in the control households.

There has been relative decrease in prevalence of anemia (table-6) among 6-59 month children, pregnant and lactating women in the end line at intervention area compared to baseline but the rate of decrease (including adolescent girls) was much higher in the control area. Greater decrease of anemia in control area could be attributable to wealthier households in the control area as appeared in baseline - having better means to control anaemia.

Improvement in mothers and adolescent girl's knowledge and practice on food intake, mother's knowledge on causes and prevention of diarrhoea, pneumonia and hygiene was notable – which actually contributed to decrease in childhood diarrhoea and pneumonia and improvement in nutritional status of mothers of <5 children, PLW and adolescents.

Nutritional status of non-pregnant mothers of <5 children by total normal BMI was nearly close to the national estimate (table-8) in the intervention area while it was much better in control area than the national estimate (BDHS 2014). Other indicators by BMI among mothers including obesity and overweight were also less/better than the national estimate. Majority of pregnant women and adolescent girls did not suffer from chronic energy deficiency (table-9, 10). These findings are consistent with our above-mentioned end line results related to improvement of maternal knowledge on food (energy, protein, vitamin, iron, iodine rich food: table-14-16), household food consumption score (table-4) and homestead food production.

Although income in control area was higher compared to intervention area, it is indicative that a combined/synergistic effect of FSUP and FSUP-N has contributed to overall improvement in household income, food security, knowledge on food and nutrition and nutritional status of target groups compared to baseline. These positive effects could have more clearly captured if this outcome evaluation were conducted immediately after the closing of FSUP-N project in late 2014.

## **Conclusions**

1. Proportions of stunting and underweight among <5 children have reduced in both intervention and control area at the end line compared to baseline and national estimates for <5 child population (BDHS 2014).
2. Although proportion of wasting among <5 children in the control area was less than the national estimate (BDHS 2014) at the end line, it has increased both in intervention and control area compared to baseline.
3. Proportion of anaemia among <5 children decreased at the end line compared to baseline, but higher decrease was found in control area. Anaemia among adolescent girls decreased at the end line in the control area with negligible increase in the intervention area. It has decreased among mothers of <5 children/lactating women in both the areas compared to baseline but still higher than national estimate (BDHS 2011) for ever-married women. Decrease in proportion of anaemia among pregnant women was found at end line in the control area only.
4. Exclusive breastfeeding has decreased at the end line (41%) compared to baseline (49%). This is consistent with the national decreasing trend in exclusive breastfeeding over the last few years (BDHS 2011: 64%, 2014: 55%). However; feeding newborn with colostrums within one hour of birth has increased in the intervention area at end line compared to baseline.
5. Improvement in uptake of minimum dietary diversity and minimum acceptable diet in last 24 hours in both the areas is suggestive of improvement in quantity and quality of complementary feeding.
6. Majority of pregnant women and adolescent girls did not suffer from chronic energy deficiency at the end line

7a). Mother's knowledge and reported practice of hand wash with soap increased in the intervention area compared to control which is statistically significant at the end line.

b). Mother's knowledge about energy and protein-rich food, micro-nutrient and vitamin rich food improved in both the areas at the end line compared to baseline. Differences in proportions between intervention and control are statistically significant at the end line.

c). Adolescent girl's knowledge about vitamin and mineral rich food improved in intervention compared to control which is statistically significant at the end line .

8. Targeted BCC campaign through courtyard meetings and community clinics has improved knowledge and awareness on childhood diarrhoea, pneumonia and hand wash among target mothers/PLW in the intervention area. Consequently, it has contributed to attainment of better nutritional status and reduction of childhood diarrhoea and pneumonia in the intervention area compared to control at the end line.

9. More than 90% of the enrolees in all target groups were successfully graduated from moderate acute malnutrition (MAM) during the project period. This indicates that the staff members of GOB organization and partner NGOs who were directly involved in identification, management and upward referral of acute malnutrition among children were technically competent, particularly in managing MAM cases.

10. A combined/ synergistic effect of FSUP and FSUP-N on improved household income, food and nutrition knowledge, homestead food production and supplementary/blanket feeding of target groups have resulted in better nutritional status of the community during the project period.

### **Best practices of FSUP- N:**

1. Food security support for beneficiaries through provision of training and logistical support to enhance homestead food production at household level.

2. Most of the beneficiaries and their household members consumed home grown vegetables, fruits and eggs.

3. Supplementary feeding of target groups with and super-cereal (WSB+) and super-cereal plus (WSB++ plus).
  4. BCC sessions on health, nutrition and hygiene through courtyard meetings and community clinics involving beneficiaries, mother-in-laws and male members of the households.
  5. Active screening of malnutrition (MAM and SAM) among all categories of target population with referral of SAM children to Sirajgonj Sadar hospital for management.
  6. All the concerned GOB staff at community clinics and FWcs and partner NGO workers received training on community based management of acute malnutrition (CMAM).
- ddd

**Lessons learned:**

1. Supplementary feeding with super-cereal (WSB+ and WSB++), health and nutrition education alongside homestead food production contributed to improving the nutritional status of the target population in Sirajgonj Sadar.
2. Provision of a super-cereal or a local made RUTF is necessary to sustain expected outcomes in the post-project period and or post-disaster period.
3. Provision of tools and training for homestead gardening and poultry rearing contributed to improve food security and nutrition in the intervention area.
4. Better income and better educational level of the target population (as appeared in the end line at control and intervention area respectively) helped improving compliance, awareness on nutrition, health and hygiene with consequent reduction in childhood diarrhoea and pneumonia.
5. Involvement of upazila level GOB officials (UHFPO, MOs, Agriculture, Livestock and Fisheries officer), health and family planning field workers, NGO workers, UP Chairman, members and local leaders facilitated implementation and acceptance of FSUP-N project at the field level.

6. Integration of FSUP-N and FSUP models into the upazila development programs engaging all stakeholders is essential to sustain improvement in nutrition, health and hygiene.

7. Timely implementation of this outcome survey (just after closure of FSUP-N) could have captured outcomes better.

### **Remaining challenges:**

1. Despite extensive BCC- exclusive breastfeeding did not improve.

2. Need to introduce a local RUTF for community based management of acute malnutrition particularly moderate acute malnutrition.

3. Mainstreaming FSUP-N model in to the rural development program through public-private partnership.

4. people.

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## Annexure

**Table-1a: Characteristics of household heads**

Education of household head	End line %		
	Intervention (n=1333)	Control (1289)	Total (2622)
No schooling	517 (38.8)	507 (39.4)	1024 (39.1)
Primary incomplete	193 (14.5)	308 (23.9)	501 (19.1)
Below SSC	456 (34.2)	353 (27.4)	809 (30.9)
SSC and above	167 (12.5)	120 (9.3)	287 (11)
<b>Occupation of household head</b>			
Farmer	301 (22.6)	207 (16.1)	508 (19.4)
Unemployed	137 (10.3)	109 (8.5)	246 (9.4)
Small business	277 (20.8)	344 (26.7)	621 (23.7)
Mason/carpenter	192 (14.4)	132 (10.2)	324 (12.4)
Driver	128 (9.6)	109 (8.5)	237 (9)
Weaver	112 (8.4)	277 (21.5)	389 (14.8)
Service	166 (12.5)	80 (6.2)	246 (9.4)
Others	20 (1.5)	31 (2.4)	51 (2)
	<b>Intervention (1333)</b>	<b>Control (1289)</b>	<b>Total (2622)</b>
<b>Participated in skill development program</b>	199 (14.9)	18 (1.4)	217 (8.3)
<b>Areas of skill development training received</b>	<b>Intervention (200)</b>	<b>Control (18)</b>	<b>Total (218)</b>
Poultry	54 (27)	3 (16.7)	57 (26.2)
Domestic animal	15 (7.5)	5 (27.8)	20 (9.2)
Home gardening	176 (88)	1 (5.6)	177 (81.2)
Fish farming	3 (1.5)	0 (0)	3 (1.4)
Handicrafts	4 (2)	3 (16.7)	7 (3.2)
Others	0 (0)	9 (50)	9 (4.1)



<b>Source of training</b>			
From NDP	179 (89.5)	8 (44.4)	187 (85.8)
Other NGOs	1 (0.5)	4 (22.2)	5 (2.3)
Youth training centre	4 (2)	1 (5.6)	5 (2.3)
Other private organization	0 (0)	5 (27.8)	5 (2.3)

**Table-1b: Characteristics of mothers of <5/lactating mothers**

	<b>End line %</b>		
	<b>Intervention (852)</b>	<b>Control (842)</b>	<b>Total (1694)</b>
<b>Age group</b>			
Bellow_ 20 years	174 (20.4)	165 (19.6)	339 (20)
20_ to_ 30 years	516 (60.6)	524 (62.2)	1040 (61.4)
30_ to_ 40 years	158 (18.5)	148 (17.6)	306 (18.1)
Above_ 40 years	4 (0.5)	5 (0.6)	9 (0.5)
<b>Education</b>			
No schooling	105 (12.3)	194 (23)	299 (17.7)
Primary incomplete	301 (35.3)	347 (41.2)	648 (38.3)
Below SSC	353 (41.4)	225 (26.7)	578 (34.1)
SSC and above	93 (10.9)	76 (9)	169 (10)
<b>Occupation</b>			
Currently engaged in IGA and housewife	67 (7.6)	88 (10.2)	155 (8.9)
Currently not engaged in IGA but housewife	821 (92.5)	771 (89.8)	1592 (91.1)

**Table-1c: Characteristics of pregnant women**

	<b>End line %</b>		
	<b>Intervention (124)</b>	<b>Control (118)</b>	<b>Total (242)</b>
<b>Age group of pregnant woman</b>			
Below_ 20	28 (22.6)	18 (15.3)	46 (19)
20_ to_ 25	38 (30.7)	44 (37.3)	82 (33.9)
25_ to_ 30	36 (29)	27 (22.9)	63 (26)
above_ 30	22 (17.7)	29 (24.6)	51 (21.1)
<b>Education of pregnant woman</b>			
No schooling	12 (9.7)	17 (14.4)	29 (12)
Primary incomplete	15 (12.1)	41 (34.8)	56 (23.1)
Below SSC	74 (59.7)	46 (39)	120 (49.6)
SSC and above	23 (18.6)	14 (11.9)	37 (15.3)

**Table-1d: Mother's/lactating mother's knowledge about child's diarrhoea, and pneumonia**

<b>Knowledge of Diarrhea</b>	<b>End line %</b>		
	<b>Intervention (888)</b>	<b>Control (859)</b>	<b>Total (1747)</b>
<b>Cause of diarrhea</b>			
Dirty of contaminated Water/liquid	538 (60.6)	611 (71.1)	1149 (65.8)
Spoiled, stale food	709 (79.8)	735 (85.6)	1444 (82.7)
Not washing hand before taking meal	457 (51.5)	225 (26.2)	682 (39)
Not washing hands with soap after defecating	332 (37.4)	114 (13.3)	446 (25.5)
Not washing hands with ash/mud after defecating	85 (9.6)	35 (4.1)	120 (6.9)
Not using sanitary latrine	51 (5.7)	19 (2.2)	70 (4)
Not continuing breastfeeding up to years	1 (0.1)	4 (0.5)	5 (0.3)
Not giving immunization properly	1 (0.1)	3 (0.4)	4 (0.2)
Do not know	()	()	()
Others	88 (9.9)	45 (5.2)	133 (7.6)
<b>Prevention of diarrhea/ food born illness</b>			
Use of safe food	639 (72)	608 (70.8)	1247 (71.4)
Use of safe fluids	530 (59.7)	470 (54.7)	1000 (57.2)
Washing hand before taking meal	479 (53.9)	265 (30.9)	744 (42.6)
Washing hands with soap after defecating	341 (38.4)	113 (13.2)	454 (26)
Washing hands with ash/mud after defecating	103 (11.6)	51 (5.9)	154 (8.8)
Using sanitary latrine	66 (7.4)	25 (2.9)	91 (5.2)
Continuing breastfeeding up to 2 years	1 (0.1)	3 (0.4)	4 (0.2)
Proper immunization	7 (0.8)	22 (2.6)	29 (1.7)
Do not know	()	()	()
Others	94 (10.6)	87 (10.1)	181 (10.4)

<b>Knowledge of pneumonia</b>			
	<b>Intervention (888)</b>	<b>Control (859)</b>	<b>Total (1747)</b>
Have you heard about pneumonia?	845 (95.2)	819 (95.3)	1664 (95.3)
<b>major symptoms of pneumonia?</b>			
	<b>Intervention (844)</b>	<b>Control (820)</b>	<b>Total (1664)</b>
Cough and cold	750 (88.9)	709 (86.5)	1459 (87.7)
Fever	382 (45.3)	204 (24.9)	586 (35.2)
Rapid breathing	624 (73.9)	341 (41.6)	965 (58)
Chest in-drawing	244 (28.9)	137 (16.7)	381 (22.9)
Inability to suck breast milk	84 (9.9)	33 (4)	117 (7)
Do not know	()	()	()
Others	29 (3.5)	9 (1.1)	38 (2.3)
<b>Prevention of pneumonia</b>			
Keep baby warm	694 (82.1)	571 (69.6)	1265 (76)

Exclusive breastfeeding	45 (5.3)	23 (2.8)	68 (4.1)
Continuing breastfeeding up to 2 years	5 (0.6)	2 (0.2)	7 (0.4)
Proper immunization	63 (7.5)	139 (17)	202 (12.1)
Do not know	1 (0.1)	0 (0)	1 (0.1)
Others	122 (14.4)	58 (7.1)	180 (10.8)
Have you heard of post part partum vitamin A supplementation	462 (54.2)	399 (47.4)	861 (50.8)
Have you received any vitamin A supplementation	276 (32.4)	201 (23.9)	477 (28.2)

**Table-1e: Child morbidity during last 2 weeks and source of treatment**

<b>Morbidity</b>	<b>End line %</b>		
	<b>Intervention (888)</b>	<b>Control (859)</b>	<b>Total (1747)</b>
Common cold	508 (57.2)	415 (48.3)	923 (52.8)
Diarrhea	40 (4.5)	51 (5.9)	91 (5.2)
Dysentery	26 (2.9)	33 (3.8)	59 (3.4)
Pneumonia	5 (0.6)	6 (0.7)	11 (0.6)
Ear infection	1 (0.1)	3 (0.4)	4 (0.2)
Skin diseases	55 (6.2)	31 (3.6)	86 (4.9)
Others	28 (3.2)	34 (4)	62 (3.6)
	<b>Intervention (590)</b>	<b>Control (496)</b>	<b>Total (1086)</b>
<b>Sought treatment for child's illnesses?</b>	451 (76.4)	401 (80.7)	852 (78.4)
<b>Source of treatment</b>	<b>Intervention (451)</b>	<b>Control (401)</b>	<b>Total (852)</b>
Government hospital/medical college	18 (4)	5 (1.2)	23 (2.7)
Family welfare centre/FWV	30 (6.7)	15 (3.7)	45 (5.3)
Thana Health complex	15 (3.3)	7 (1.7)	22 (2.6)
Satellite Clinic/EPI outreach cent	0 (0)	4 (1)	4 (0.5)
Maternal and child Welfare Centre	1 (0.2)	8 (2)	9 (1.1)
Community Clinic	24 (5.3)	14 (3.5)	38 (4.5)
Govt field worker	1 (0.2)	0 (0)	1 (0.1)
NGO field worker	1 (0.2)	0 (0)	1 (0.1)
Private hospital/clinic	7 (1.6)	22 (5.5)	29 (3.4)
Private practitioner	45 (10)	20 (5)	65 (7.6)
Traditional doctor	129 (28.6)	126 (31.3)	255 (29.9)
Kabiraj	7 (1.6)	8 (2)	15 (1.8)
Pharmacy	139 (30.8)	166 (41.3)	305 (35.8)
Community Nutrition Centre	1 (0.2)	0 (0)	1 (0.1)
Homeopath	68 (15.1)	30 (7.5)	98 (11.5)
Others	1 (0.2)	1 (0.3)	2 (0.2)

**Table-2a: Distribution of homestead food production across study area**

Existence of homestead food production	Base line (%)		End line (%)	
	Intervention N=1448	Control N=1485	Intervention N=1333	Control N=1289
Has homestead food production currently	21.5	14.6	27.7	26.5
No homestead food production currently	78.5	85.4	72.3	73.5

**Table-4a: Household food consumption score**

Food consumption score	Base line (%)		End line (%)	
	Intervention N=1448	Control N=1485	Intervention N=1333	Control N=1289
Poor or borderline(<=42)	40.4	18	27.31	9.93
Acceptable low (43-52)	32.1	29	23.86	11.87
Acceptable high (>52)	27.5	53	48.84	78.2
Poor (<28)	-	-	2	1.2
Borderline (28-42)	-	-	24.8	8.5
Acceptable (>42)	-	-	73.2	90.4

**Table- 5a: Nutritional status of <5 Children by age group.**

Stunting End line % (95% CI)			
Age groups in months	Intervention ( N=855 )	Control (N=817)	p-value
0-5	25.3 [17.6,34.8]	13.2 [7.9,21.2]	0.0296
6-8	15.8 [8.3,27.9]	9.3 [3.5,22.6]	0.3443
9-11	22.7 [14.5,33.6]	18.1 [10.7,28.8]	0.4906
12-17	23.6 [18.0,30.4]	35.5 [28.3,43.5]	0.0178
18-23	38.3 [30.2,47.0]	43.6 [35.6,51.9]	0.3809
24-35	33.8 [26.3,42.3]	40.6 [32.7,49.0]	0.2528
36-47	48.4 [38.2,58.6]	46.3 [36.5,56.4]	0.7819
48-59	42.7 [32.8,53.3]	40.8 [30.0,52.7]	0.8144
Overall	31.7 [28.7,34.9]	33.7 [30.5,37.0]	0.3923

<b>Wasting</b> End line % (95% CI)			
<b>Age groups in months</b>	<b>Intervention</b> (N=855)	<b>Control</b> (N=817)	<b>p-value</b>
0-5	13.1 [7.7,21.4]	7.5 [3.8,14.4]	0.1902
6-8	19.3 [10.9,31.8]	7 [2.2,19.8]	0.0834
9-11	14.7 [8.3,24.7]	16.7 [9.7,27.2]	0.74
12-17	15.4 [10.8,21.4]	17.1 [11.9,24.0]	0.6713
18-23	20.3 [14.2,28.2]	13.6 [8.8,20.3]	0.1422
24-35	30.8 [23.5,39.2]	9.4 [5.5,15.6]	0
36-47	18.7 [11.9,28.1]	10.5 [5.7,18.6]	0.1172
48-59	11.2 [6.1,19.8]	12.7 [6.7,22.7]	0.7807
Overall	18.5 [16.0,21.2]	12.2 [10.2,14.7]	0.0004
<b>Underweight</b> End line % (95% CI)			
<b>Age groups in months</b>	<b>Intervention</b> ( N=855 )	<b>Control</b> (N=817)	<b>p-value</b>
0-5	24.2 [16.8,33.7]	12.3 [7.2,20.1]	0.0273
6-8	19.3 [10.9,31.8]	9.3 [3.5,22.6]	0.171
9-11	18.7 [11.3,29.2]	19.4 [11.8,30.3]	0.9049
12-17	27.5 [21.5,34.4]	27.6 [21.1,35.3]	0.9742
18-23	31.3 [23.8,39.8]	27.9 [21.0,35.9]	0.5441
24-35	42.9 [34.7,51.4]	29.7 [22.6,37.9]	0.0254
36-47	44 [34.1,54.4]	40 [30.6,50.2]	0.5863
48-59	37.1 [27.6,47.7]	39.4 [28.7,51.3]	0.7614
Overall	31.6 [28.5,34.8]	26.8 [23.9,30.0]	0.0322
<b>Anaemia</b> End line % (95% CI)			
<b>Age groups in months</b>	<b>Intervention</b> ( N=271)	<b>Control</b> (N=275)	<b>p-value</b>
6-8	81 [57.4,93.1]	58.3 [29.4,82.5]	0.1765
9-11	78.3 [56.4,90.9]	87.5 [70.4,95.4]	0.3694
12-17	69.7 [57.5,79.7]	66.2 [53.7,76.7]	0.6659
18-23	54.3 [39.7,68.3]	50 [35.4,64.6]	0.6824
24-35	57.1 [43.8,69.5]	21.4 [12.5,34.3]	0.0002
36-47	58.6 [39.9,75.1]	41.5 [27.3,57.3]	0.1646
48-59	44.8 [27.6,63.4]	31.8 [15.6,54.2]	0.3552
Overall	62.4 [56.4,67.9]	50.2 [44.3,56.1]	0.0043

**Table-5b: Child under-nutrition and anaemia among poorest quintile of the study participants**

	End line % (95% CI)		p-value	BDHS 2014
	Intervention (N=151)	Control (N=183)		
<b>Child under nutrition</b>				
Stunted	32.5 [25.4,40.4]	44.8 [37.7,52.1]	0.0221	50.2
Wasted	16.6 [11.4,23.4]	17.5 [12.6,23.7]	0.8225	17.5
Underweight	33.1 [26.0,41.0]	40.4 [33.5,47.7]	0.1695	45.8
<b>Child anaemia</b>	Intervention (n=48)	Control (n=67)		BDHS 2011
Anaemia	56.3 [41.9,69.6]	55.2 [43.1,66.8]	0.9136	56.1

**Table-9a: Nutritional status of adolescent girls and pregnant women**

<i>BMI-for-age-Z score of adolescent girl</i>	Base line (%)		End line (%)	
	Intervention N=121	Control N=122	Intervention N=408	Control N=395
BMI-for-age-Z score<-2	9.8	12.4	6.4	8.1
<i>MUAC of pregnant women</i>				
MUAC<21.0 cm	9.1	6.6	3.23	3.39
MUAC<23 cm	-	-	21	19.5

**Table-10a: Complementary feeding practice of 6-23 months children**

<b>Complementary food intake</b>	Base line (%)		End line (%)	
	Intervention (N=450)	Control (N=409)	Intervention (N=495)	Control (N=456)
Received at least four food groups: Minimum dietary diversity in 6-23 months children	13.8	20.05	24.2	33.1
<b><i>Minimum acceptable diet in last 24 hours</i></b>				
Age group 6-8 of BF children	-	-	11.5	9.6
Age group 9-23 of BF children	-	-	25.9	35.7
Age group 6-23 of non- BF children	-	-	27.4	46.3
All children	-	-	23.8	32.5

Table- 14a: Mother's knowledge of nutritious food stuff

Response category	Baseline %		End line %	
	Intervention N=938	Control N=967	Intervention N=888	Control N=859
<b>Name of energy dense food items</b>				
a) Rice	53.8	24	53.7	49.2
b) Chapati	11.3	4.7	8.7	14.3
c) Oil	2.1	0.7	1.4	9.3
<b>Name of protein rich food item*</b>				
a) Vegetable protein (pulse)	18.8	10.8	17.9	28.2
b) Animal Protein (fish)	38.5	28	48.3	33.4
c) Animal Protein (meat)	37.3	26.5	37.6	24
d) Animal Protein (egg)	41.2	26.6	22.8	21.8
e) Milk and milk products	35.9	29.1	17.5	20.6
<b>Name of vitamin and mineral rich food items*</b>				
a) Vegetables	52.7	44.4	73.4	67.2
b) Leafy vegetables	48.6	42.6	9.5	18.3
c) Fruits	22.1	17	38	40.3
<b>Name of iron rich food item*</b>				
a) Leafy vegetables	47.2	22	35.5	25
b) Vegetables	41.4	24.8	2	7.6
c) Animal protein (fish)	16.3	13.4	5.2	11.8
d) Animal protein (meat)	17.1	11.9	4.3	11.2
e) At least one food item	66.1	35.7	3.9	11.6
<b>Name of iodine rich food item*</b>				
a) Iodized salt	46.8	29.3	54.6	36.7

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END