



# FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative



**Ghana**

Feed the Future Zone of Influence Indicator Assessment Report

March 2018



**USAID**  
FROM THE AMERICAN PEOPLE

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## Table of Contents

Table of Contents .....	i
List of Tables .....	iii
List of Figures .....	iv
List of Acronyms .....	v
Executive Summary.....	1
Background .....	1
Interim Assessment Indicators .....	2
Interim Assessment Data Sources.....	2
Summary of Key Findings.....	3
1. Background .....	9
1.1 Feed the Future Overview .....	9
1.2 Feed the Future ZOI Profile.....	10
1.2.1 Rationale for ZOI Selection .....	11
1.2.2 Demography of the ZOI.....	11
1.2.3 Agriculture in the ZOI .....	13
1.3 Purpose of the Study.....	15
2. Methods for Obtaining Interim Values for Feed the Future Indicators.....	16
2.1 Data Sources.....	16
2.1.1 Primary Data: The ZOI Interim Survey in Ghana .....	17
2.2 Measures and Reporting Conventions Used Throughout This Report.....	21
2.2.1 Standard Disaggregates .....	21
2.2.2 Reporting Conventions .....	23
3. ZOI Interim Survey Population .....	25
3.1 Demographics.....	25
3.2 Living Conditions .....	28
3.3 Education .....	29
4. Household Economic Status .....	31
4.1 Daily Per Capita Expenditures.....	31
4.2 Prevalence and Depth of Poverty in the ZOI .....	33
4.2.1 The \$1.25 Poverty Threshold.....	34
4.2.2 The National Absolute Poverty Threshold .....	36
4.2.3 The National Extreme Poverty Threshold .....	37
5. Women’s Empowerment in Agriculture.....	40
5.1 Overview .....	40
5.2 Agricultural Production .....	42
5.3 Productive Resources.....	45
5.4 Leadership in the Community.....	48
5.5 Time Use.....	49
6. Hunger and Dietary Intake.....	51
6.1 Household Hunger .....	51
6.2 Dietary Intake .....	52

6.2.1	Dietary Diversity among Women Age 15-49 Years.....	52
6.2.2	Infant and Young Child Feeding.....	56
6.2.3	Consumption of Targeted Nutrient-Rich Value Chain Commodities.....	60
7.	Nutritional Status of Women and Children.....	64
7.1	Body Mass Index of Women Age 15-49 Years.....	64
7.2	Stunting, Wasting, and Underweight among Children Under 5 Years .....	66
7.2.1	Stunting (Height-for-Age).....	66
7.2.2	Wasting (Weight-for-Height) .....	67
7.2.3	Underweight (Weight-for-Age).....	70
8.	Summary and Conclusions .....	72
8.1	Summary of Key Findings.....	72
8.2	Conclusions.....	73
	References	75
	Appendix 1. Supplementary Data and Figures.....	78
A1.1	Interim Feed the Future Indicator Estimates.....	78
A1.2	Poverty at the \$1.90 (2011 PPP) per person per day threshold.....	81
A1.3	Mean difference t-test results between the baseline 2012 and 2015 ZOI level indicators .....	82
	Appendix 2. Methodology .....	83
A2.1	Sampling and Weighting .....	83
A2.2	Poverty Prevalence and Expenditure Methods .....	87
A2.3	Criteria for Achieving Adequacy for Women’s Empowerment in Agriculture Indicators .....	90
	Appendix 3. Test on the Interim Dataset and Robustness of the Estimates.....	94
	Conclusion.....	98

## List of Tables

Table 0.1: Feed the Future Zone of Influence Indicator Estimates: GHANA.....	6
Table 1.1: Projected Population of individuals, by category, in the ZOI, Ghana, 2015 .....	12
Table 1.2: Estimated households by gendered household type in the ZOI, Ghana 2015 .....	13
Table 1.3: Agro-ecological Zones and Crops Produced in the ZOI.....	14
Table 2. 1: Data sources and dates of the Baseline and Interim Feed the Future indicators.....	16
Table 2. 2: Results of the household and individual interviews for the ZOI Interim survey in Ghana, 2015.....	21
Table 3. 1: Household demographic characteristics .....	26
Table 3. 2: Characteristics of the primary male and female adult decision-makers .....	27
Table 3. 3: Household dwelling characteristics.....	28
Table 3. 4: School attendance, educational attainment, and literacy.....	30
Table 4. 1: Daily per capita expenditure by household characteristic (in 2010 USD).....	32
Table 4. 2: Poverty at the \$1.25 (2005 PPP) per person per day threshold.....	35
Table 4. 3: Poverty at the national absolute threshold of GHS 3.60 per day per adult equivalent (2012/13).....	37
Table 4. 4: Poverty at the national extreme threshold of 2.17 GHS per adult per day 2012/13) .....	38
Table 5. 1: Adequacy in different domains by women and men using the Women's Empowerment in Agriculture Indicators .....	41
Table 5. 2: WEAI and Related Indexes in the ZOI of Ghana <sup>1</sup> .....	42
Table 5. 3: Economic activities and input in decision-making on production among surveyed women .....	43
Table 5. 4: Input in decision-making on use of income among surveyed women.....	44
Table 5. 5: Decision-making on production among surveyed women .....	45
Table 5. 6: Household ownership and surveyed women's control over productive resources..	46
Table 5. 7: Credit access among surveyed women.....	47
Table 5. 8: Comfort with speaking in public among surveyed women.....	48
Table 5. 9: Group membership among surveyed women .....	49

Table 5. 10: Time allocation among surveyed women.....	50
Table 6. 1: Household hunger.....	52
Table 6. 2: Women's dietary diversity score.....	54
Table 6. 3: Women's minimum dietary diversity.....	55
Table 6. 4: Consumption of foods by women's minimum dietary diversity status.....	56
Table 6. 5: Prevalence of exclusive breastfeeding among children under six months old.....	57
Table 6. 6: Percentage of children age 6-23 months who receive a minimum acceptable diet ...	58
Table 6. 7: Components of a minimum acceptable diet among children age 6-23 months.....	60
Table 6. 8: Women's consumption of targeted nutrient-rich value chain commodities.....	61
Table 6. 9: Children's consumption of targeted nutrient-rich value chain commodities.....	63
Table 7. 1: Prevalence of underweight, normal weight, overweight, and obese women.....	65
Table 7. 2: Stunting (height-for-age) among children under 5 years old.....	67
Table 7. 3: Wasting (weight-for-height) among children under 5 years old.....	69
Table 7. 4: Underweight (weight-for-age) among children under 5 years old.....	71

## List of Figures

Figure 1.1: Administrative Map of the Feed the Future ZOI in Ghana.....	10
Figure 4.1: Distribution of consumption by quintiles in Ghana's Feed the Future ZOI.....	33

## List of Acronyms

5DE	Five Domains of Empowerment
ANOVA	Analysis of Variance
BFS	USAID Bureau for Food Security
BMI	Body Mass Index
CAPI	Computer Assisted Personal Interview
CPI	Consumer Price Index
DHS	Demographic and Health Survey
DRIC	Directorate of Research, Innovation & Consultancy
DRIC-UCC	Directorate of Research, Innovation and Consultancy of the University of Cape Coast
EA	Enumeration Area
FEEDBACK	Feed the Future FEEDBACK
FTFMS	Feed the Future Monitoring System
GDHS	Ghana Demographic and Health Survey
GHS	Ghanaian Cedi
GoG	Government of Ghana
GSS	Ghana Statistical Service
GPI	Gender Parity Index
HDI	Human Development Index
HHS	Household Hunger Scale
IFPRI	International Food Policy Research Institute
ISSER	Institute of Statistical, Social and Economic Research
KSU	Kansas State University
LCU	Local Currency Unit
LSMS	Living Standards Measurement Survey
MAD	Minimum Acceptable Diet
METSS	USAID-Ghana Monitoring Evaluation and Technical Support Services
MDD-W	Women's Minimum Dietary Diversity
MDG	Millennium Development Goal
MOFA	Ministry of Food and Agriculture
NRVCC	Targeted Nutrient-Rich Value Chain Commodity
ODK	Open Data Kit
PAFD	Primary Adult Female Decision-maker
PBS	Population Based Survey
PCC	Per Capita Consumption

PBS	Population Based Survey
PPP	Purchasing Power Parity
PPS	Probability Proportional to Size
UCC	University of Cape Coast
USDA	United States Department of Agriculture
USAID	United States Agency for International Development
USD	United States Dollar
USG	United States Government
WEAI	Women's Empowerment in Agriculture Index
WDDS	Women's Dietary Diversity Score
ZOI	Zone of Influence



# Executive Summary

## Background

Feed the Future, led by the U.S. Agency for International Development (USAID), seeks to reduce poverty and undernutrition in 19 developing countries, including Ghana. The initiative will achieve this objective by focusing on accelerating growth of the agriculture sector, addressing root causes of undernutrition, and reducing gender inequality.

Feed the Future monitors its performance in part by periodic assessments of a number of standardized indicators. These indicators reflect data collected through population-based surveys in the geographic areas targeted by Feed the Future interventions, known as the Feed the Future Zones of Influence (ZOI). This document reports the results of the first interim assessment of these indicators in Ghana.

The Feed the Future initiative started in Ghana in mid-2011 and focused its ZOI on the three northernmost regions of the country – Upper West Region, Upper East Region, and Northern Region – and selected areas in Brong Ahafo Region lying above Latitude 8°N. The ZOI was selected based on national estimates that indicated disproportionately higher incidences of poverty, malnutrition, and stunting among children aged less than five years compared to the rest of the country.

An initial population-based survey was conducted in 2012 to develop baseline estimates for the standardized performance indicators of the Feed the Future. These indicators encompassed per capita expenditures, prevalence of poverty, nutritional status, women's empowerment, household hunger, dietary diversity and infant and young child feeding behaviors using data collected through a population-based survey. The data focused on the following key elements: comprehensive household demographic information, dwelling characteristics, consumption expenditure, food security, women's dietary diversity, women's anthropometry, women's empowerment in agriculture, exclusive breastfeeding, minimum adequate diet and children's anthropometry. The 2012 survey was conducted by the University of Ghana's Institute of Statistical, Social and Economic Research (ISSER), in collaboration with USAID-Ghana Monitoring Evaluation and Technical Support Services (METSS), and the support of Ghana Statistical Service (GSS).

This first interim assessment provides the U.S. Government (USG) interagency partners – USAID Bureau for Food Security (BFS), USAID Missions, the Government of Ghana, and development partners – with information about short-term progress in the performance indicators in the ZOI. The assessment is designed for use as a monitoring tool, providing point estimates of the indicators with an acceptable level of statistical precision. Therefore, the indicators do not establish causality or program attribution. It is also not designed to measure changes from the baseline estimates.

## Interim Assessment Indicators

There are 27 performance indicators, organized into four groups:

- Economic Wellbeing (2):
  - Per capita daily expenditure;
  - Prevalence of poverty; and Depth of poverty
- Hunger and Diet Diversity (7):
  - Household hunger measured using the Household Hunger Scale;
  - Consumption of a minimally acceptable diet by children; Prevalence of exclusive breastfeeding of children under the age of six months; Women's Dietary Diversity Score (WDDS); Minimum Women's Minimum Dietary Diversity Score (MDD-W);
  - Women's consumption of targeted Nutrient-Rich Value Chain Commodities (NRVCC); and Children's consumption of targeted NRVCC
- Women and Children Anthropometry (4):
  - Women's anthropometry – Prevalence of underweight women;
  - Children's anthropometry – Prevalence of underweight children; Prevalence of stunted children; and Prevalence of wasted children
- Women's Empowerment (9):
  - Production – Input into production decisions
  - Resources – Ownership of assets; Purchase, sale or transfer of assets; Access to and decisions on credit
  - Income – Control over and use of income
  - Leadership – Group member; Speaking in public
  - Time – Workload; Leisure

## Interim Assessment Data Sources

Data were collected from households that participated in the 2012 population baseline survey (Zereyesus et al. 2014). These households were listed and verified with the help of the Ghana Statistical Service (GSS) and surveyed using a standardized questionnaire similar to the 2012 instrument. Data collection occurred between July and August, 2015, maintaining the same survey period as in 2012.

The field work was conducted by the Directorate of Research, Innovation and Consultancy of the University of Cape Coast (DRIC-UCC). They were supported in this effort by Kansas State

University (KSU) and USAID- METSS staff. Listing and respondent verification support were provided by the GSS. District assembly representatives and staff facilitated community entry for enumerators, improving household participation and response rates.

## Summary of Key Findings

The key findings of the Interim Indicator Assessment study are summarized below under five headings: Household Demographics; Economic Wellbeing; Women and Children Anthropometry; Hunger and Dietary Diversity; and Women's Empowerment.

**Household demographics:** The average size of a household in the ZOI is six members. The average household has more female members than males. Within these households, the mean percentage of adults with primary education and at least secondary education is 8.0 percent and 12.1 percent, respectively. The literacy rate among all primary adult decision-makers is 17.5 percent, compared to 24.5 percent for male adult decision-makers and 10.9 percent for female adult decision-makers. While 10.3 percent of all primary adult decision-makers have secondary or more educational attainment, 15.2 percent of male primary adult decision-makers and 5.7 percent of female primary adult decision-makers have secondary or more educational attainment. Nearly three-quarters of households have improved water sources but less than a quarter have improved sanitation. Male and female adults gendered households account for approximately 82.1 percent of all households. About 11.5 percent of male and female adults gendered households have a secondary education level or higher as the highest educational attainment among adults compared to 10.5 percent for female adult only gendered households and 20.1 male adult only households.

**Economic wellbeing:** The average household per capita daily expenditure is \$4.80. However, the average for the bottom 10 percent is \$0.63 compared to \$22.00 for the top 10 percent. Average household per capita daily expenditure for male adult only gendered household is \$12.18, more than 3 times higher than the \$3.92 estimated for male and female adults gendered households and about 86 percent higher than the \$6.55 estimated for female adult only gendered households. Average household per capita daily expenditures are positively associated with households' educational attainment and negatively associated with household size.

The prevalence of poverty for households in the ZOI is 19.6 percent using the international extreme poverty threshold of \$1.25. The associated depth of poverty is 7.2 percent. The national poverty estimates use adult equivalent in counting household size. The poverty rate of the Ghana national absolute poverty threshold of GHS 3.60 daily per adult equivalent expenditure is 49.5 percent. The prevalence of poverty, using the Ghana national extreme poverty threshold of GHS 2.17 daily per adult equivalent expenditure, is 26.5 percent. The depth of poverty under the two measures is respectively 21.5 percent and 9.8 percent.

**Women's Empowerment:** The majority of women indicate adequacy level exceeding 50 percent in eight out of the ten indicators: productive input decisions (82.9 percent); purchase,

sale or transfer of assets (72.4 percent); group member (72.6 percent); speaking in public (72.7 percent); workload (72.1 percent); autonomy in production (67.7); leisure (60.8 percent); and ownership of assets (51.5 percent). Only 17.6 percent of women indicated they are adequate in access to and decision about the use of credit and 40.6 percent of women indicated adequacy in control over use of income. The 5DE and GPI indexes are estimated to be 0.6 and 0.8, respectively. The overall WEAI is 0.6.

**Hunger and dietary diversity** encompasses household hunger scale and women and children's dietary diversity. Approximately seventy percent of the households in the ZOI had little or no hunger and approximately 2 percent of households experience severe hunger in the four weeks prior to being interviewed.

The mean Women's Dietary Diversity Score for women between the 15 and 49 years is 3.7 out of the possible score of 9 food groups. The WDDS for women in male and female adults gendered households is 3.7 compared to 3.5 for women in female adult only households. The WDDS for women with secondary or more educational attainment is 4.3.

To attain the Women's Minimum Dietary Diversity (MDD-W) threshold, a woman has to consume foods from a minimum of five of the 10 food groups in the 24 hours prior to the interview. While only 40.4 percent of women between 15 and 49 years achieve the MDD-W threshold, 48.1 percent and 59.4 percent of women with primary education and secondary or more educational attainment respectively attain the MDD-W threshold. Less than a third of women in households that experience moderate or severe hunger attain the MDD-W threshold. Among women achieving the MDD-W threshold, only 17.4 percent and 31.9 percent consume meat and organ meats and dairy products, respectively.

The prevalence of exclusive breastfeeding among children under 6 months is 50 percent. The percentage of male children being exclusively breastfed is 55.4 percent compared to 45.3 percent for female children.

The Minimum Acceptable Diet (MAD) is a composite indicator measuring the minimum feeding frequency and minimum dietary diversity of children based on the caregiver's report. The percentage of all children aged 6-23 months old receiving a MAD is 13.7 percent. Disaggregated by the child's sex, the percentage of children receiving a MAD is 11.7 percent for males and 16.6 percent for females. About 20.6 percent of children age 18-23 months receive a MAD compared to 9.8 percent for children 6-11 months.

Among breastfed children, 41.6 percent achieve the minimum meal frequency and 29.0 percent achieve the minimum dietary diversity. With regard to foods consumed, 86.9 percent of all children consume grains, roots and tubers. Only 5.8 percent consume eggs and 17.2 percent consume dairy products. Approximately fifty-eight percent consume Vitamin A-rich fruits and vegetables while only 20.3 percent consume legumes and nuts.

**Women and children anthropometry** indicators are defined to include underweight women and three indicators for children – underweight children, children with stunting and children with wasting. Underweight indicator for women is measured by Body Mass Index (BMI). To qualify as underweight, the BMI must be less than 18.5. The average BMI of all women between 15-49 years is 22.5. While 12.2 percent are underweight, 66.3 percent of them fall in the normal BMI range, and 15.7 percent are overweight. The proportion of women classified as obese is 5.9 percent.

Among children under 5 years in the ZOI, 29.9 percent are stunted while 13.8 percent are severely stunted. Stunting and severe stunting among children 24-35 months are 36.8 percent and 18.7 percent, the highest among all the age groups considered. While stunting in children whose caregivers have no education is 30.0 percent, it is 34.1 percent for those whose caregivers have primary educational attainment and 21.8 percent for those whose caregivers have secondary or more educational attainment. The prevalence of wasted children is 13.8 percent while the prevalence of underweight children is 19.0 percent. While about 16.2 percent of children in female adult only gendered households are underweight, 19.2 percent of children in male and female adults gendered households are underweight.

Table I provides the summary of the indicators estimates. In addition, it provides the 95 percent confidence interval for these indicator estimates and disaggregates. The results are contextualized with the estimates and 95 percent confidence intervals for the baseline estimates from a study conducted in 2012.

**Table 0.1: Feed the Future Zone of Influence Indicator Estimates: GHANA**

Feed the Future Indicator	Baseline (2012)			Interim (2015)		
	Estimate	95% CI <sup>1</sup>	n	Estimate	95% CI	n
<b>Daily per capita expenditures (as a proxy for income) in USG-assisted areas</b>						
All households <sup>*a</sup>	4.01	3.66-4.35	4,365	4.80	4.23-5.36	3,988
Male and female adults	3.23	2.99-3.47	3,628	3.92	3.46-4.38	3,248
Female adult(s) only	5.01	4.29-5.72	329	6.55	4.86-8.24	357
Male adult(s) only	9.58	8.01-11.16	408	12.18	7.88-16.48	327
<b>Prevalence of Poverty: Percent of people living on less than \$1.25/day</b>						
All households <sup>*a</sup>	22.2	19.2-25.2	4,365	19.6	17.1 – 22.1	3,988
Male and female adults	25.4	22.0-28.8	3,628	20.3	17.5 – 23.1	3,248
Female adult(s) only	10.8	6.2-15.3	329	15.9	11.3 – 20.6	357
Male adult(s) only	5.7	3.1-8.4	408	9.5	5.7 – 13.3	327
<b>Depth of Poverty: Mean percent shortfall relative to the \$1.25/day poverty line</b>						
All households	6.7	6.2- 7.3	4,365	7.2	6.1 – 8.3	3,988
Male and female adults	7.8	7.2-8.3	3,628	7.4	6.2 – 8.6	3,248
Female adult(s) only	3.0	1.9-4.1	329	5.7	3.8 – 7.6	357
Male adult(s) only	1.5	0.8-2.2	408	4.0	2.0 – 6.1	327
<b>Percent of women achieving adequacy on Women's Empowerment in Agriculture Index Indicators<sup>2</sup></b>						
Input in productive decisions <sup>*a</sup>	66.6	64.5-68.6	3,089	82.9	80.5-85.4	2,698
Autonomy in production <sup>*a</sup>	74.8	73.0-76.7	3,331	67.7	64.4-70.9	2,511
Ownership of assets <sup>*a</sup>	62.3	60.3-64.3	3,341	51.5	48.8-54.2	2,667
Purchase, sale or transfer of assets <sup>*a</sup>	33.5	31.6-35.5	3,341	72.4	68.5-76.3	2,660
Access to and decisions on credit <sup>*a</sup>	22.3	20.6-24.0	3,312	17.6	14.7-20.5	2,336
Control over use of income <sup>*a</sup>	77.6	75.8-79.3	3,375	40.6	37.5-43.7	2,727
Group member	71.2	69.1-73.2	2,686	72.6	69.6-75.7	2,246
Speaking in public <sup>*</sup>	70.2	68.4-72.2	3,283	72.7	70.3-75.1	2,521
Workload <sup>*a</sup>	58.1	56.1-60.1	3,407	72.1	68.9-75.4	2,116
Leisure <sup>*a</sup>	85.3	83.8-86.8	3,269	60.8	57.2-64.3	2,736
SDE	0.70	-	2,316	0.62	-	1,115
GPI	0.81	-	2,556	0.78	-	659
WEAI	0.71	-	-	0.64	-	-
<b>Prevalence of households with moderate or severe hunger</b>						
All households <sup>*a</sup>	39.4	35.8-43.1	4,388	29.6	26.2 – 33.1	3,720
Male and female adults	39.5	35.8-43.2	3,653	28.9	25.0 – 32.7	3,096
Female adult(s) only	42.3	34.6-49.9	327	35.5	28.8 – 42.3	308
Male adult(s) only	36.4	30.5-42.3	408	25.0	18.7 – 31.4	276
<b>Women's Dietary Diversity: Mean number of food groups consumed by women of reproductive age</b>						
All women age 15-49 <sup>*a</sup>	4.00	3.87-4.12	4,320	3.65	3.54 – 3.77	3,828
<b>Prevalence of exclusive breastfeeding among children under 6 months of age</b>						
All children <sup>*a</sup>	60.5	54.5-66.5	333	50.0	41.2 – 58.8	261
Male children	62.1	52.7-71.5	175	55.4	43.9 – 66.8	129

Feed the Future Indicator	Baseline (2012)			Interim (2015)		
	Estimate	95% CI <sup>1</sup>	n	Estimate	95% CI	n
Female children	58.9	50.1-67.7	158	45.3	34.0 – 56.7	132
<b>Prevalence of children 6-23 months receiving a minimum acceptable diet</b>						
All children	15.5	12.5-18.7	851	13.7	10.2 – 17.1	772
Male children	13.0	9.7-16.4	430	11.7	7.7 – 15.7	392
Female children	18.2	13.2-23.1	421	16.6	11.2 – 22.0	303
<b>Prevalence of women of reproductive age who consume targeted nutrient-rich value chain commodities (NRVCC)<sup>4</sup></b>						
NRVCC 1: All women age 15-49	n/a	n/a	n/a	11.0	8.6 – 13.3	3,876
<b>Prevalence of women of reproductive age who consume at least one targeted nutrient-rich value chain commodity<sup>4</sup></b>						
All women age 15-49	n/a	n/a	n/a	11.0	8.6 – 13.3	3,876
<b>Prevalence of children 6-23 months who consume targeted nutrient-rich value chain commodities<sup>4</sup></b>						
NRVCC 1: All children	n/a	n/a	n/a	7.5	4.8 – 10.2	821
<b>Prevalence of children 6-23 months who consume at least one targeted nutrient-rich value chain commodity<sup>3</sup></b>						
All children	n/a	n/a	n/a	7.5	4.8 – 10.2	821
Male children	n/a	n/a	n/a	5.4	2.8 – 8.0	419
Female children	n/a	n/a	n/a	10.6	5.4 – 15.7	325
<b>Prevalence of underweight women</b>						
All non-pregnant women age 15-49	12.0	10.3-13.7	4,120	12.2	10.2 – 14.2	3,560
<b>Prevalence of stunted children under 5 years of age</b>						
All children <sup>*a</sup>	36.1	32.9-39.2	2,960	29.9	27.0 – 32.8	2,318
Male children	38.2	34.9-41.4	1,500	32.6	29.3 – 35.9	1,192
Female children	34.0	29.7-38.4	1,460	27.0	23.1 – 30.8	1,126
<b>Prevalence of wasted children under 5 years of age<sup>4</sup></b>						
All children <sup>*a</sup>	11.0	9.4-12.6	2,960	13.8	10.9 – 16.7	2,281
Male children	11.3	9.3-13.3	1,500	14.2	10.2 – 18.3	1,182
Female children	10.7	8.6-12.7	1,460	13.3	10.1 – 16.4	1,099
<b>Prevalence of underweight children under 5 years of age</b>						
All children	18.4	15.8-21.0	2,960	19.0	16.4 – 21.6	2,318
Male children	18.2	15.5-20.8	1,500	21.7	17.3 – 26.1	1,192
Female children	18.7	14.6-22.7	1,460	16.0	12.9 – 19.2	1,126

n/a – Not available

\* Significance tests were performed to evaluate statistical differences between baseline and interim values at the 95 percent confidence level. The full results are reported in Appendix A1.3.

<sup>1</sup> Confidence intervals (CIs) demonstrate the reliability of estimated values. While interim surveys were not designed to capture change over time, non-overlapping CIs do indicate significant differences between the two estimates. However, if CIs do overlap, the reader cannot conclude whether there is or there is not a significant difference between baseline and interim estimates.

<sup>2</sup> The Baseline report presented censored headcounts of inadequate achievement for these empowerment indicators, while this Interim report presents uncensored headcounts of adequate achievement for both Baseline and Interim reporting periods. Censored headcounts present the percent of women who are disempowered and achieve adequacy (or inadequacy) in each indicator, while uncensored headcounts present the percent of women who achieve adequacy (or inadequacy) in each indicator regardless of empowerment status.

<sup>3</sup> The indicators for women and children's consumption of targeted nutrient-rich value chain commodities were not collected during the baseline round of data collection.

<sup>4</sup> The n value for wasting is less than for stunting and underweight as an additional 31 observations were converted to missing by the WHO's igrowup macro software as being outside the range of the reference values.

<sup>a</sup> Significance tests of differences between the baseline 2012 and interim 2015 ZOI level indicators were performed. When differences are found to be significant ( $p < 0.05$ ), a superscript is noted next to the ZOI level indicator. Please refer to Appendix A1.3 for details on the t-values, mean difference values, and p-values of these tests.  
Source(s): PBS GHANA 2012; ZOI Interim Survey, GHANA 2015



## I. Background

The Feed the Future initiative aims to sustainably reduce global hunger and poverty by tackling their root causes and employing proven strategies for achieving large scale and lasting impacts (<http://www.feedthefuture.gov>). It encourages improved agricultural productivity in participating countries by supporting better government response to anticipated climate changes, better nutrition (especially for women and children), and enhanced economic development through gender equity and regional balance (especially in agricultural activities). Performance under the Feed the Future is tracked through a number of indicators organized into four major groups: Economic Wellbeing; Hunger and Dietary Diversity; Women and Children Anthropometry; and Women's Empowerment.

This document presents the Zone of Influence (ZOI) interim assessment report for Ghana. The document is organized into nine sections, including the executive summary, this background section, a methods section (Section 2), and the ZOI Population Characteristics (Section 3). The remaining sections are devoted to each of the principal indicator groups: Household Economic Status; Women's empowerment in Agriculture; Hunger and Dietary Intake; Nutritional Status of Women and Children; and Summary and Conclusions. This background section provides an overview of the Feed the Future initiative and a profile of Ghana's ZOI. It concludes with a statement of the specific objectives of the report.

### I.1 Feed the Future Overview

Feed the Future is the US Government's approach to achieving its commitments under the Global Hunger and Food Security Initiative (GHFSI), which sought to increase agricultural growth and expand staple food production and supply in developing countries. These expansions must also support market-driven economic development and growth. Ghana is one of 19 countries in Africa, Asia and South America forming the focus countries of the Feed the Future. As a focus country, the U.S. Government committed to support the Government of Ghana in attaining and sustaining its vision of becoming a middle-income economy.<sup>1</sup> In sustaining and growing its economic status, Ghana would need to pursue the development and implementation of prudent policies, the institution of better policy coordination and fostering better management of its national economy.

Ghana's Feed the Future strategy was developed by USAID/Ghana and initiated in 2011. It built on the Agency's long-standing involvement in agriculture, concentrating on enhancing the commercialization of two key staple crops – maize and rice – and one strategic crop – soya beans. The initial intervention efforts focused on enhancing yields for these crops with the view of bringing them in line with what has been demonstrated in other countries. Achieving this focus

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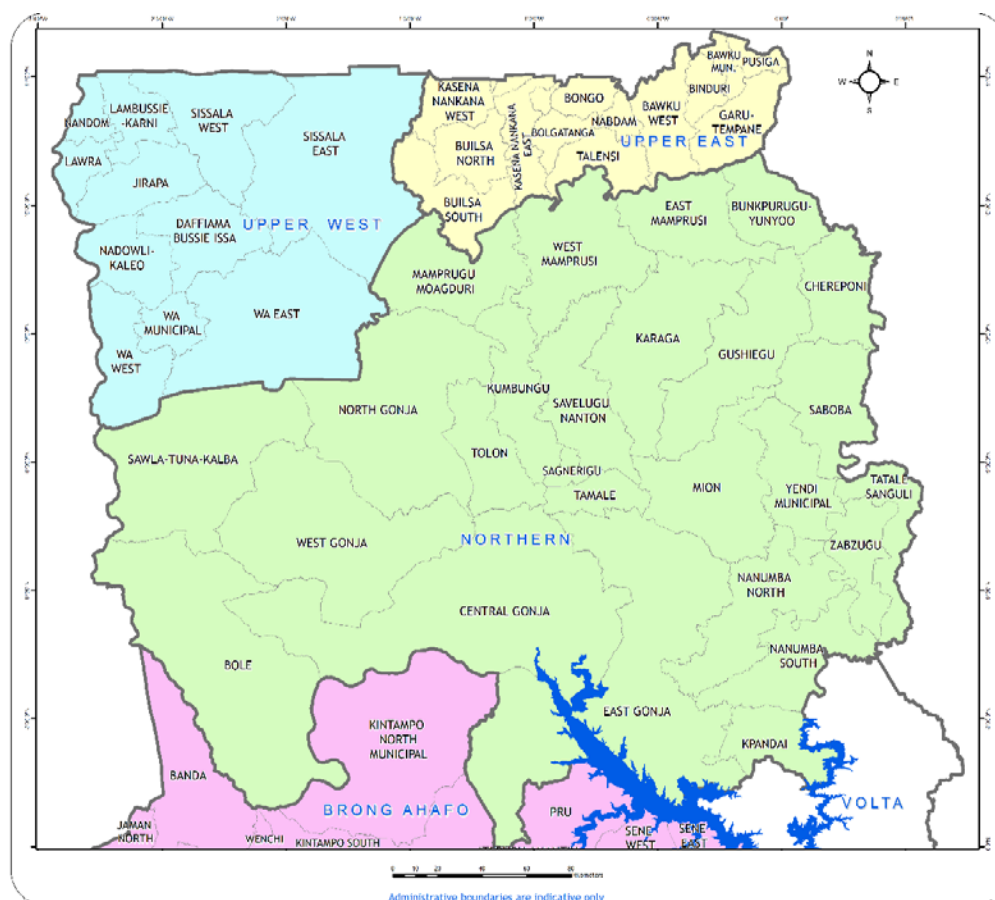
<sup>1</sup> Ghana attained a middle-income status in July 2011, according to the World Bank Country Classifications (<http://www.worldbank.org/en/news/feature/2011/07/18/ghana-looks-to-retool-its-economy-as-it-reaches-middle-income-status>).

is expected to contribute directly to reducing hunger by enhancing household consumption and alleviating poverty by increasing income through the marketing of surplus production. The strategy also envisaged the possibility of enhancing livestock production through increased availability of feed and feed ingredients. The strategy envisaged increasing availability and affordability of nutritious food and dietary diversity among the most vulnerable segments of the population.

## 1.2 Feed the Future ZOI Profile

The Zone of Influence (ZOI) for Feed the Future intervention activities in Ghana is concentrated in the area above Latitude 8°N, encompassing all of the three northernmost regions (Northern, Upper East, and Upper West) and some parts of Brong Ahafo Region (Figure 1.1). The ZOI did not include the northern Volta Region which fell above Latitude 8°N because of sparseness of the population in that area.

**Figure 1.1: Administrative Map of the Feed the Future ZOI in Ghana**



Source: USAID-METSS, 2015

Ghana's regions are organized into administrative districts for local government activities. These districts were reorganized in 2015, leading to the number of districts in the ZOI increasing from

45 in 2012 to 59 in 2015. Because the ZOI boundary was defined by the area above Latitude 8°N, the changes had no effect on the ZOI definition.

### 1.2.1 Rationale for ZOI Selection

It became evident in 2010 that the three northernmost regions were lagging behind the rest of the country in many indicators of economic and social wellbeing. They included economic growth, Human Development Index (HDI), prevalence of poverty and food security. For example, USAID|Ghana (2012) reported that food insecurity in the ZOI was about seven times the national average of 5 percent in 2010. Similarly, the World Bank (2012a and 2012b) reported that while the number of the poor in southern Ghana declined by 2.5 million, it increased by nearly 1 million in northern Ghana.

A major factor driving the differences between the ZOI and the rest of the country may be the ZOI's low population, vast land mass and the relatively poor infrastructure – roads, health care, electrification, etc. The average population density for the three northernmost regions is approximately 43 people per square kilometer compared to 145 for the rest of the country (Ghana Statistical Service 2012). The low population density and poor infrastructure contribute to the isolation of households and communities, decrease individuals' accessibility to resources and markets, and exacerbate risks of food insecurity and poverty (Zereyesus et al. 2014). Environmental characteristics in the ZOI, including edaphic and climatic conditions, have also been identified as presenting additional challenges to its socio-economic situation by their direct adverse effects on agricultural production and productivity.

Ghana's unequal economic development and the stark disadvantage of the northern regions presented not only human but potential security risks to the nation, prompting a concerted effort from Canada, the U.S. and several European countries and various development agencies to prioritize the area for intervention activities (CIA 2013, USAID 2013a). The selection of the ZOI was, therefore, premised on the foregoing with the objective of investing in initiatives that could contribute to overcoming the chronic challenges preventing the accelerated socio-economic development in the ZOI.

### 1.2.2 Demography of the ZOI

Ghana Statistical Service projected the population growth rate for the whole country at 2.5 percent per annum from 2010.<sup>2</sup> Without any information on the growth rates at the regional or disaggregated levels, the government growth rate is applied to all sub-populations in the ZOI.

**Table I.1** presents demographic characteristics in the ZOI based on the population-based survey conducted on the 2012 (Zereyesus et al. 2014) and the foregoing assumptions about growth rates.

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<sup>2</sup> Ghana Web. Ghana's population hits 27.9 million. September 10, 2015. Available at <http://www.ghanaweb.com/-GhanaHomePage/NewsArchive/Ghana-s-population-hits-27-9-million-381041>. Accessed March 23, 2016.

**Table 1.1: Projected Population of individuals, by category, in the ZOI, Ghana, 2015**

<b>Category of Individuals</b>	<b>Estimated Number</b>
<b>Total population</b>	<b>5,558,602</b>
<b>Total population, by sub-population</b>	
Women of reproductive age (15-49 years)	1,280,025
Children 0-59 months	785,301
Children 0-5 months	80,051
Children 6-23 months	200,042
Children 6-59 months	705,250
Youth 15-29 years	1,402,893
<b>Total population, by area type</b>	
Urban	1,230,897
Rural	4,327,706
<b>Total population, by gendered household type</b>	
Male and female adult(s)	5,114,246
Female adult(s) only	269,693
Male adult(s) only	174,663
Child(ren) only (no adults)	NA
<b>Women of reproductive age, by pregnancy status</b>	
Women of reproductive age	1,188,630
Pregnant	98,317
Non-pregnant	1,079,986
<b>Children 0-59 months, by child sex</b>	
Male	362,133
Female	367,097
<b>Children 0-5 months, by child sex (As less than one year old by GSS)</b>	
Male	38,222
Female	36,113
<b>Children 6-23 months, by child sex</b>	
Male	96,049
Female	89,710
<b>Children 6-59 months, by child sex</b>	
Male	323,911
Female	330,984
<b>Youth 15-29 years, by sex</b>	
Male	703,501
Female	599,225

Source: ZOI Interim Survey, Ghana 2015.

The sub-population categories correspond to the disaggregates for the Feed the Future indicators, encompassing children by age, locale of households, gendered household types and women of reproductive age. The table shows the estimated population of the ZOI in mid-year

2015 is about 5.6 million people, equivalent to approximately 20 percent of Ghana’s population. While 1.2 million people in the ZOI are estimated to live in urban areas, about 4.3 million live in rural areas<sup>3</sup>. Total population by gendered household type show that about 5.1 million people are projected to live in male and female adults households compared to about 270,000 and 175,000 in female adult only and male adult only gendered households. Approximately one quarter of the ZOI population is projected to be between 15 and 29 years old and women of reproductive age account for 23.0 percent of the total ZOI population.

**Table 1.2** shows the projected distribution of households in the ZOI based on the foregoing assumptions about growth rates and the estimated average household sizes. The projected share of male and female adults gendered households in the ZOI is 85.6 percent compared to about 7.8 percent for female adult only gendered households and 6.6 percent for male adult only gendered households.

**Table 1.2: Estimated households by gendered household type in the ZOI, Ghana 2015**

Category of Households	Estimated Population
<b>Total number of households in ZOI</b>	<b>916,540</b>
<b>Number of households, by gendered household type</b>	
Male and female adult(s)	784,394
Female adult(s) only	71,918
Male adult(s) only	60,229
Child(ren) only, (no adults)	n/a

Source: ZOI Interim Survey, Ghana 2015.

### 1.2.3 Agriculture in the ZOI

Ghana’s land area classified as agricultural is about 155,000 square kilometers or 68 percent of total land area (World Bank 2013). Approximately 51 percent of the agricultural land is under cultivation with about 80 percent of it controlled by smallholder producers using rain-fed farming techniques to produce food crops essentially for consumption. Larger farms tend to produce cash crops, such as cocoa, oil-palm, rubber and coconut, and to a lesser extent, cereals and pineapples (MoFA 2011). MoFA (2013) states that about 90% of farm holdings are less than 2 hectares in size. .

Ghana has six distinct agro-ecological zones. The Evergreen Rain Forest, Deciduous Rain Forest, Transition and Coastal Savannah zones, with their bimodal rainfall patterns, are in the south. The Guinea and Sudan Savannah agro-ecological zones are found in the north (the ZOI) and they have a unimodal rainfall pattern. The southern portion of the ZOI expresses characteristics of the Transition zone. Table 1.3 shows the characteristics of the agro-ecological zones within the ZOI

<sup>3</sup> The Ghana Statistical Service (GSS 2012) classifies ‘urban’ and ‘rural’ localities based on the population size. Localities with less than 5,000 persons are classified as rural, while localities with 5,000 persons or more are classified as urban.

and the principal crops produced within these zones. The principal crops are cereals, starchy crops, legumes, vegetables, and tree crops.

**Table 1.3: Agro-ecological Zones and Crops Produced in the ZOI**

Variables	Agro-Ecological Zone		
	Transition Zone	Guinea Savannah	Sudan Savannah
Area (km <sup>2</sup> )	8,400	147,900	2,200
Mean rainfall (mm)	1,300	1,100	1,000
Major Rains	March-July	May-September	May-September
Duration of Major Growing Period	200-220 days	180-200 days	150-160 days
Minor Rains	September-October		
Duration of Minor Growing Period	60 days		
Cereals	Maize, rice, sorghum	Maize, rice, sorghum, millet	Maize, rice, sorghum, millet
Starchy crops	Cassava, cocoyam, plantain, yam	Cassava, yams	Sweet potato
Legumes	Cowpea, groundnut	Cowpea, soybean, groundnut, Bambara nut	Cowpea, soybean, groundnut, Bambara nut
Vegetables	Pepper, okra, eggplant	Tomato, pepper	Tomato, onion
Tree crops	Citrus, coffee, cashew	Shea nuts, cashew	

Source: MoFA 2011 and FAO 2005

The three focus crops under Ghana's Feed the Future initiative are maize, rice and soybeans, and they are already being produced in the ZOI (Table 1.3). While maize and rice are staple crops, forming the first and second most important cereals in the ZOI, soybeans have been introduced as a potential strategic crop to enhance smallholder producers' cash flow situation.

Ghana's small and large ruminant livestock production is predominantly found in the northern regions, and therefore within the ZOI. Additionally, farmers in the ZOI undertake some production of chickens and guinea fowls. These livestock are most produced in a mixed farming system, in which farmers produce crops along the livestock. Livestock often serve multiple purposes for smallholder producers – providing food and draft power and serving as a wealth reserve, credit collateral and insurance against financial risks. All livestock also provide smallholder producers with manure, which may be used in enhancing soil fertility.

The traditional land preparation technique in the ZOI is the use of hoe and cutlass for flat or ridge cultivation. Mechanical power, through the use of tractors with ploughs and discs, is

becoming increasingly popular even though it still accounts for a small proportion of total cultivated area (Amanor-Boadu et al. 2015). Although intercropping with shifting cultivation is the main cropping system for staple crops, land pressure and increasing availability of inorganic fertilizer and improved seeds are reducing this practice. Mono-cropping in the ZOI is traditionally employed for cash crops, such as cotton, tobacco, and cashew, but is also being used in the production of staple food crops as farmers' confidence in market participation improves (Barry et al. 2005, Oppong-Anane 2006, Amanor-Boadu et al. 2015).

### **I.3 Purpose of the Study**

The purpose of this interim assessment is to provide the United States Government interagency partners, USAID BFS, the USAID Missions, the host country government, and development partners with information about the current status of the ZOI indicators. The assessment is designed for use as a monitoring tool. As such, it provides point estimates of the indicators with an acceptable level of statistical precision. These estimates are not designed to support conclusions of causality or program attribution. They are also not designed to measure change from the baseline with any statistical precision.

## 2. Methods for Obtaining Interim Values for Feed the Future Indicators

This section describes the methods utilized to obtain the indicators used in this report. It presents the sampling, data collection and indicator estimation processes used. It also provides information on the reporting conversions used in the report.

### 2.1 Data Sources

**Table 2.1** presents the data sources and data collection dates for the baseline and interim Feed the Future indicators. The table shows that all data for the Ghana Feed the Future indicators were collected using the PBS survey conducted in 2012 and 2015 in the ZOI. Consumption of Nutrient-Rich Value Chain Commodities was not an indicator in the baseline and was therefore not collected in 2012, but is included in the 2015 indicators.

**Table 2. 1: Data sources and dates of the Baseline and Interim Feed the Future indicators**

Indicator	Baseline		Interim	
	Data source	Date collected	Data source	Date collected
Daily per capita expenditures (as a proxy for income) in USG-assisted areas	ZOI Survey	July-August, 2012	ZOI Survey	July-August, 2015
Prevalence of Poverty: Percent of people living on less than \$1.25 per day	ZOI Survey	July-August, 2012	ZOI Survey	July-August, 2015
Depth of Poverty: Mean percent shortfall relative to the \$1.25 per day poverty line	ZOI Survey	July-August, 2012	ZOI Survey	July-August, 2015
Women's Empowerment in Agriculture Index indicators	ZOI Survey	July-August, 2012	ZOI Survey	July-August, 2015
Prevalence of households with moderate or severe hunger	ZOI Survey	July-August, 2012	ZOI Survey	July-August, 2015
Women's Dietary Diversity: Mean number of food groups consumed by women of reproductive age	ZOI Survey	July-August, 2012	ZOI Survey	July-August, 2015
Prevalence of exclusive breastfeeding among children under 6 months of age	ZOI Survey	July-August, 2012	ZOI Survey	July-August, 2015
Prevalence of children 6-23 months receiving a minimum acceptable diet	ZOI Survey	July-August, 2012	ZOI Survey	July-August, 2015
Prevalence of women of reproductive age who consume targeted nutrient-rich value chain commodities	n/a	n/a	ZOI Survey	July-August, 2015
Prevalence of children 6-23 months who consume targeted nutrient-rich value chain commodities	n/a	n/a	ZOI Survey	July-August, 2015
Prevalence of underweight women	ZOI Survey	July-August, 2012	ZOI Survey	July-August, 2015



Indicator	Baseline		Interim	
	Data source	Date collected	Data source	Date collected
Prevalence of stunted children under 5 years of age	ZOI Survey	July-August, 2012	ZOI Survey	July-August, 2015
Prevalence of wasted children under 5 years of age	ZOI Survey	July-August, 2012	ZOI Survey	July-August, 2015
Prevalence of underweight children under 5 years of age	ZOI Survey	July-August, 2012	ZOI Survey	July-August, 2015

n/a – Not available

## 2.1.1 Primary Data: The ZOI Interim Survey in Ghana

This section describes the ZOI interim survey, including discussion of the sample design (including targeted sample size), questionnaire customization, fieldwork, limitations of the survey, and response rates.

### Survey Sample Design

The survey and sample design for the interim assessment were based exclusively on the survey and sample design for the baseline study conducted in 2012 (Zereyesus et al. 2014). Doing this involved identifying and verifying households and participants in the original survey and identifying the attrition rates for specific categories of respondents. For example, the number of women of reproductive age is expected to change, as they would all have aged by three years since the baseline survey. Thus, women who were between 12 and 14 years and were not included in the reproductive age category in 2012 would qualify in 2015 while those who were 47 years or older in 2012 would no longer qualify. Similarly, children under the age of 60 months in the baseline study and the general composition of adults and children would shift as people age. Other changes are births and deaths, migrations and changes in marital status. The sampling method and related approaches are discussed in Appendix 2.1.

### Questionnaire Design

The standard Feed the Future questionnaire was adapted to the Ghanaian context for the 2012 PBS using the Ghana Living Standard Measurement Survey (GLSMS) and the Demographic and Health (GDHS) questionnaires. The same adapted questionnaire was used for the 2015 interim assessment, but was modified to include all changes proposed by BFS since the baseline survey to improve its implementation (USAID 2014a). The main revisions included the incorporation of a revised WEAI instrument (supplied by International Food Policy Research Institute (IFPRI)) and the modification of the dietary diversity questions of both children and women of reproductive age to include the new food groups and the consumption of targeted nutrient-rich value chain commodities.

As was done in 2012, the questionnaire was organized to be administered in two visits. Visit I included Modules 1-10 (i.e. Household Identification Module to Women’s Empowerment in

Agriculture modules, while Visit II focused on Module II – Household Consumption Expenditure. The length and expected duration of Module II necessitated this approach as it asked respondents to recall quantities, prices and total expenditure on more than 200 consumption items.

As done for the baseline survey, the enumerators were trained to develop a good translation of the English questionnaire in the vernacular to allow them to engage potential respondents effectively. The approach used to ensure consistency in enumerator understanding of the questionnaire in the vernacular is discussed in more detail below.

### *Preparation for Survey Fieldwork*

Fieldwork for the survey started with a two-week intensive enumerator residential training in both 2012 and 2015. For 2015, the training was conducted by the staff of DRIC-UCC, the consultants hired to oversee the fieldwork, and by the staff of USAID-METSS, including USAID-METSS staff located at Kansas State University. The training, which occurred from June 15-30, 2015, was preceded by the listing and verification of the 2012 PBS participating households in May 2015. This activity was conducted under contract by Ghana Statistical Service (GSS).

The enumerator training started with building an in-depth understanding of the English survey instrument, emphasizing its nuanced demands in certain circumstances. Enumerators had been recruited from a list of people who work full time or part-time in enumeration, an activity that has become a growing “industry” with the increasing number of development partners working in the ZOI. DRIC-UCC recruited 140 enumerators, organized to cover the language diversity of the ZOI<sup>4</sup>. Organizing them by language competence during the training session, enumerators were able to develop consensus translation of the survey instrument as well as build competence of the nuances associated with some of the questions through sharing cultural sensitivity about certain questions. Enumerator consensus and understanding and/or appreciation of the nuances were tested with the help of individuals who were fluent in the language and culture of the people who spoke the language, helping the enumerator group further refine their understanding of the questions and how they may be presented. Additionally, each language team participated in field-testing of the survey instrument in communities not included in the survey to further test enumerators’ abilities under field conditions. This helped define and refine the composition of the enumerator teams sent into the field.

Enumerators were organized into groups of five, with one person having supervisory responsibilities. On average, each team was responsible for three to five Enumeration Areas (EAs). The expected daily average workload per enumerator determined the estimated number of days spent by each team in an EA. Significant redundancies were built into the process to allow for

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<sup>4</sup> Of the 11 official languages spoken in Ghana, five are used in the ZOI. These are: Dagbani and Gonja spoken in Northern Region; Kaseem spoken in Upper East Region; Dagaare and Waale (often regarded as one language) spoken in Upper West region; and Akan (Bono) spoken in Brong Ahafo Region.

multiple visits to the same household if it became necessary due to respondent availability. Enumerators were expected to make at least three no contact visits to their assigned households before the household could be declared “unavailable”. Also, as indicated, enumerators were expected to make at least two visits to each contacted household to complete the interview to avoid respondent fatigue and enhance response accuracy. They were expected to complete Modules I through IO during the first visit and Module II during the second visit.

The survey was conducted using a Computer Assisted Personal Interview (CAPI) approach, which formed the foundation of the enumerator training. The approach involves enumerators reading the questions from and entering responses directly into a computer. The interface tool used drop-down and button menus wherever possible to speed up enumeration, providing typed input only where necessary. The purpose of this approach was to minimize input errors, including spelling and case sensitivity of entries.

### **Field Work**

Survey execution occurred between July 9 and August 23, 2015 with 25 enumeration teams distributed across the ZOI according to the number of EAs to be surveyed in each region. The extra 15 enumerators who had completed the enumerator training were retained as potential replacement if it became necessary.

The field-work was managed by DRIC-UCC, supported by USAID-METSS throughout the field work period. The management teams visited enumeration teams regularly to observe their activities, and discuss and troubleshoot any identified problems. The survey management team also visited local political and community leaders who had provided support for enumerators’ entry into communities to thank them and build goodwill for the end line survey.

Explicit and detailed data assemblage protocols were developed to ensure data transfer, security, completeness, and accuracy. For example, data collected by enumerators were consolidated on a daily basis by their supervisors, who inspected the data for potential errors and discussed them with the enumerators. Upon completing the consolidation, supervisors backed up their data to flash drives provided for that purpose as well as transmit them to the database systems on servers at DRIC, USAID-METSS, and Kansas State University to minimize data loss risks and facilitate continuous quality monitoring by Kansas State University researchers. Thus, at the end of each day, data were stored in five places: the supervisor’s computer, the supervisor’s flash drive, DRIC, METSS, and KSU. These redundancies in storage provided extra security against risk of data loss.

### **Limitations of the Survey**

There are a number of limitations with this survey, some due to issues related to field implementation and some due to issues related to data cleaning and analysis.

#### Attrition rate

Because the survey was done as a panel, the sampling required relocating the households who participated in the 2012 baseline. As it is to be expected in a panel, a number of households could not be relocated because they had moved or the main respondent had died, making it impossible to verify the household. In this case, only 60 households from the original sample could not be relocated, producing an attrition rate from migration or death over three years of less than 2 percent, and hence relatively low. In addition, three enumeration areas were not visited during fieldwork: two were missed entirely by the field team even though they were listed and one was under security issues. As a result, of the 4,350 households that were listed, 4,293 were visited. Of those, 74 refused to participate in the survey or did not complete the household demographic module. At the end, 4,219 households were interviewed, for an overall response rate of 97 percent (see Table 2.2), although the response rate for certain modules were lower, as discussed below. During analysis, 141 households could not be matched with the baseline sample and therefore could not be assigned a sampling weight. These households were removed from the sample and are not included in the estimates.

### Individual Module Response Rates

Although the field team was trained extensively in how to administer the questionnaire and in interviewing methods, the survey suffered from a high level of partially completed questionnaires. The difficulties faced by the field teams were not identified immediately or well documented and supervisory teams could not intervene to improve interviewing techniques and possibly re-visit households with incomplete questionnaires. Instead, the problems were identified only during data analysis when it could no longer be corrected. The anthropometry module was the most seriously affected by fieldwork issues. Although close to 85 percent of eligible mother/caretakers were interviewed (see Table 2.2), of the 3,187 children under five who were measured, 742 cases had to be removed from the sample during analysis because the measurements fell outside of the plausible range (as determined by the WHO *igrowup* software), 77 cases were excluded because the module was incomplete (incomplete measurements, age, or gender), and 50 cases were excluded because they belonged to the 141 households that could not be matched with the baseline dataset and hence their sample weight could not be calculated. At the end, the usable sample included 2,318 children for stunting and underweight and 2,281 for wasting, or between 61 and 62 percent of the eligible sample (see Appendix 1).

Because of this large loss in effective sample size from what was planned, further analysis were conducted to ensure that the interim estimates were robust. It was found that the effective sample sizes used for analyses were large enough to produce sufficiently robust indicator estimates. For more details, see Appendix 3.

## ZOI Interim Survey Response Rates

**Table 2.2** presents the response rates for the interim ZOI survey for Ghana. The components and the response rates for the sampled households, women of reproductive age (15-49 years), primary adult female decision-makers (for the Women’s Empowerment in Agriculture module), as well as children under 5 years are presented.

**Table 2. 2: Results of the household and individual interviews for the ZOI Interim survey in Ghana, 2015**

Response Rates and Components	Residence		Total
	Urban	Rural	
<b>Households</b>			
Households selected (baseline sample)	1,093	3,317	4,410
Households occupied relocated*	1,088	3,263	4,350
Households interviewed	1,055	3,164	4,219
Household response rate <sup>1</sup> (%)	97.0	97.0	97.0
<b>Women of reproductive age (15-49 years)</b>			
Number of eligible women	1,235	3,861	5,095
Number of eligible women interviewed	1,035	2,945	3,980
Eligible women response rate <sup>2</sup> (%)	83.8	76.3	78.1
<b>Primary adult female decision-makers (age 18+ years)</b>			
Number of eligible women	951	2,835	3,786
Number of eligible women interviewed	745	2,460	3,205
Primary adult female response rate <sup>2</sup> (%)	78.3	86.8	84.7
<b>Children under 5 years of age</b>			
Number of eligible children	729	3,040	3,769
Number of eligible children based on interviewed caregivers	584	2,603	3,187
Eligible children response rate <sup>2</sup> (%)	80.2	85.6	84.6

<sup>1</sup> Household response rates are calculated based on the result codes of the household roster, and are defined as the number of households interviewed divided by the number of households occupied. Unoccupied households were excluded from the response rate calculations. The unoccupied households were those that were found to be vacant, not a dwelling unit, dwelling unit destroyed, with an extended absence, or other result code.

<sup>2</sup> Individual response rates are calculated based on the result codes in the relevant individual modules. These rates are defined as the number of eligible individuals interviewed divided by the number of eligible individuals. Note that for children under 5 years of age, the primary caregivers of the children served as the respondents, not the children directly.

\* Because this survey was done as a panel, the households that participated in the baseline had to be relocated. The difference between the households selected and households relocated is the attrition rate due to migration or death.

Source: ZOI Interim Survey, Ghana 2015.

## 2.2 Measures and Reporting Conventions Used Throughout This Report

### 2.2.1 Standard Disaggregates

A standard set of disaggregate variables are used in tables throughout this report. This section lists and describes each of the standard disaggregate variables and how they are calculated.

### **Age in Months**

The age of children in months is collected in the child nutrition-focused module of the questionnaire, rather than in the household roster, so that the child's parent or primary caregiver can be prompted to provide the most accurate age possible. Children's age in months is presented by monthly age groups as appropriate for the children's dietary intake and anthropometry tables. For example, the Minimum Acceptable Diet for children focused on children aged between six and 23 months, but they were disaggregated into three groups: 6-11 months; 12-17 months; and 18- 23 months. For the children's anthropometry, the focus is on children less than 60 months old and the disaggregation is over five groups: 0-11 months; 12-23 months; 24-35 months; 36-47 months; and 48-59 months.

### **Age in Years**

Data on respondent's age in years is collected in the household roster. For women age 15-49 and children under age 6, more detailed age data is collected in subsequent questionnaire modules to confirm eligibility to respond to the module questions; these more detailed age data are used where available. Age is generally presented in the tables in 5- or 10-year age groups.

### **Child Sex**

Whether a child is male or female is a standard disaggregate for reporting all indicators related to children, including those for children's anthropometry (Tables 7.2, 7.3, and 7.4).

### **Educational Attainment (Household)**

Household educational attainment reflects the highest level of education attained by any member of the household, as reported in the household roster of the corresponding questionnaire. This variable is used in tables that present household-level data, and is comprised of four categories: no education (households where no member has received any formal education); less than primary (households with at least one member who has entered the formal schooling system, but with no member who has completed primary); primary (households with at least one member whose highest educational attainment is completed primary, but with no member who has completed secondary); and secondary or more (households with at least one member whose highest educational attainment is completed secondary education or more). Households are categorized in only one of the four categories.

### **Educational Attainment (Individual)**

Educational attainment at the individual level reflects the highest level of education attained by individual household members, as reported in the household roster of the corresponding questionnaire. This variable is comprised of four categories: no education (those who have not received any formal education), less than primary (those who have entered the formal schooling system but whose educational attainment is less than completed primary); primary (those who

have completed primary but have not completed secondary); and secondary or more (those who have completed secondary education or more).

### **Gendered Household Type**

*Feed the Future Monitoring and Evaluation Guidance Series Volume 6: Measuring the Gender Impact of Feed the Future* notes that household-level indicators should be disaggregated by *gendered household types* (USAID 2014b). They are: (1) households where members include both male and female adults; (2) households where members include male adult(s), but no female adults; (3) households where members include female adult(s), but no male adults; and (4) households with only members under age 18 (children), i.e., households with children only and no adult members. Adults are people 18 year and older throughout this document.

Using gendered household types to conceptualize household types is distinct from the traditional *head of household* approach, which has presumptions about household gender dynamics and may perpetuate existing social inequalities and prioritization of household responsibilities that may be detrimental to women (USAID 2014b). This variable is calculated using data on age and sex collected in the household roster of the survey questionnaire.

### **Household Hunger**

As described in greater detail in Section 6.1 of this report, the Household Hunger Scale (HHS) characterizes households according to three categories of hunger severity: little to no household hunger, moderate household hunger, and severe household hunger. For the purposes of serving as a disaggregate in selected tables, the HHS is converted to a dichotomous measure reflecting households that report little to no household hunger, and households that report moderate or severe household hunger.

### **Household Size**

The specific definition of household size, as used in the ZOI surveys, is the total number of people who: (1) are reported to be usual members of the household; and (2) who have spent at least one night in the household within the past six months. This may differ from the definition used in other household surveys and hence care must be used when conducting comparisons. The ordinal household size variable obtained using the foregoing definition is recoded into a categorical variable as follows: small households (1-5 members); medium households (6-10 members); and large households (11 or more members).

## **2.2.2 Reporting Conventions**

The Feed the Future interim assessment reports are primarily descriptive in nature. This section provides an overview of the conventions used in reporting these descriptive results.

- In the tables throughout this report, weighted point estimates and unweighted sample sizes (denoted by  $n$ ) are presented.
- Most estimates are shown to one decimal place, with the specific exceptions of all currency estimates (e.g., per capita expenditures), the women's dietary diversity indicators, and the WEAI, GPI, and 5DE indices, which are shown to two decimal places. Unweighted sample sizes in all tables and the population estimates in Tables I.1 and I.2 are shown as whole numbers.
- Values in the tables are suppressed when the unweighted sample size is insufficient to calculate a reliable point estimate ( $n < 30$ ); this is denoted by the use of the symbol  $\wedge$  in the designated row and an explanatory footnote.

Bivariate relationships are described using cross tabulation, and the strength and direction of the relationships are assessed through the use of statistical tests. All analyses were performed using Stata 14 and employing its `svy` commands to handle features of data collected through the use of complex survey designs, including sampling weights, cluster sampling, and stratification.

Statistical significance ( $p < 0.05$ ) is denoted with matched superscripted letters attached to the row (usually the disaggregate variable) and column (usually the outcome variable) headings. Explanatory footnotes following each table clarify the meaning of the significance test annotation, and statistically significant relationships are highlighted in the narrative throughout the report.



### 3. ZOI Interim Survey Population

This chapter describes the background characteristics of the ZOI population using data from the 2015 interim ZOI Survey. The description covers household demographics, adult decision-maker characteristics, dwelling characteristics and educational background of household members.

Estimated indicators may or may not be associated with particular disaggregates. For example, the prevalence of poverty (indicator) for female adults (characteristic) may or may not be associated with female adult only gendered households. Using chi-square ( $\chi^2$ ) for categorical variables and Analysis of Variance (ANOVA) for continuous variables, these tests of associations are reported throughout the report, wherever appropriate. The tests are based on the hypothesis that the characteristic and the disaggregate are independent of each other, i.e., their estimated indicator is not statistically different from zero. The alternative hypothesis is that they are, indeed, associated, and hence their estimated indicator is statistically different from zero. The test of significance is evaluated at the 5 percent level throughout the document. The foregoing may be formally presented as follows:

$$H_0 : \beta_{ij} = 0$$

$$H_1 : \beta_{ij} \neq 0$$

Where  $\beta_{ij}$  is the estimated indicator for characteristic  $i$  and disaggregate  $j$ . For example, the mean household size may be hypothesized to be independent of gendered household types. The alternative is that there is an association between mean household size and gendered household types at the 5 percent level of significance. Whenever a null hypothesis is rejected, i.e., there is a statistically significant association between the characteristic and a column, then that column and row are assigned the same superscript in small case letter  $a, b, c$ , etc. Rows and columns with the same letter indicate estimated indicators that are statistically different from zero, suggesting the existence of an association between the row and the column.

#### 3.1 Demographics

**Table 3.1** presents demographic characteristics of the households in the ZOI. Values are shown for all households, as well as by categories of gendered household type. This table presents the average household size, and highlights the average number of female adults and children within the household. Household education, defined as the highest level of education attained by any member of the household, is also presented.

The average household size is 6.0 members. The composition of the average household consists of 1.5 females, 0.9 children aged 0-4 years and 2.2 children aged 5-17 years. Male and female adult gendered households are the largest (6.7 members) followed by female adult only

households (3.7 members) and male adult households (2.5 members). Male and female adults gendered households have more children and youth members than the other gendered household types. On average, adult females account for 51.3 percent of all households and 51.1 percent of male and female adults gendered households. Male adult only gendered households do not have any adult females.

In all households, 8.0 percent of adults have a primary education as their highest education level. It is also 8.0 percent in male and female adults gendered households and 9.0 percent in female adult only gendered households. However, the average percent of adults in male adult only gendered households with secondary or more level of education is 20.1 percent compared to 10.5 in female adult only gendered households and 11.5 percent in male and female adult gendered households.

In Table 3.1, it is hypothesized that the characteristics defined in the rows are associated with the gendered household types at the 5 percent level. The results show that all the characteristics are indeed associated with gendered household types at the 5 percent level of significance.

**Table 3. 1: Household demographic characteristics**

Characteristic	Total (All households)	By gendered household type <sup>a</sup>			
		Male and female adults	Female adult(s) only	Male adult(s) only	Child only
Mean household size <sup>a</sup>	6.0	6.7	3.7	2.5	2.1
Mean number of adult female household members <sup>1,2,a</sup>	1.5	1.7	1.5	0.0	0.0
Mean number of children (<2 years) <sup>1,a</sup>	0.3	0.4	0.2	0.1	0.1
Mean number of children (0-4 years) <sup>1,a</sup>	0.9	1.0	0.5	0.4	0.7
Mean number of children (5-17 years) <sup>1,a</sup>	2.2	2.5	1.6	0.8	1.3
Mean percentage of adults who are female <sup>1,2,a</sup>	51.3	51.1	100.0	0.0	^
Highest education level attained					
Mean percentage of adults who have no education <sup>a</sup>	79.6	80.3	80.3	72.2	^
Mean percentage of adults with primary education <sup>a</sup>	8.0	8.0	9.0	6.8	^
Mean percentage of adults with secondary or more education <sup>a</sup>	12.1	11.5	10.5	20.1	^
<b>n<sup>3</sup></b>	<b>4,168</b>	<b>3,420</b>	<b>366</b>	<b>367</b>	<b>^</b>

<sup>^</sup> Results not statistically reliable, n<30.

<sup>1</sup> The count is based on household members with known age.

<sup>2</sup> Feed the Future defines adult as an individual age 18 or older. Females age 15-17 are of reproductive age, but are not considered adults by this definition.

<sup>3</sup> Sample n is the unweighted count of all households that responded to the survey.

<sup>a</sup> Significance tests were performed for associations between household characteristics and gendered household type. For example, a test was done between the mean household size and gendered household type. When an association is found to be significant (p<0.05), a superscript is noted next to the household characteristic.

Source: ZOI Interim Survey, Ghana 2015.

Primary male or primary female adult decision-makers are household members aged 18 or over who self-identify as the primary adult male or primary adult female responsible for both social and economic decision-making within the household. When they co-exist within a single household, primary male and female adult decision-makers are typically, but not necessarily, husband and wife. **Table 3.2** shows characteristics of the primary male and female adult decision-makers in the sampled households. It shows the age group, literacy status, and educational attainment for these household members. These characteristics are shown for all primary adult decision-makers, and for male and female primary adult decision-makers.

Approximately seven percent of total primary adult decision-makers in the ZOI are between 18 and 24 years, compared to 26.8 percent between 30 and 39 years. About 4.4 percent of male and 9.6 percent of female primary adult decision-makers are in the 18 to 24-year cohort while 25.1 percent of male and 28.4 percent of female primary adult decision-makers are in the 30 to 39-year age cohort. The association between the age of primary adult decision-makers and their sex is statistically significant at the 5 percent level.

**Table 3. 2: Characteristics of the primary male and female adult decision-makers**

Characteristic	Total (All primary adult decision-makers)		By primary adult decision-maker sex <sup>a</sup>			
	Percent	n	Male		Female	
	Percent	n	Percent	n	Percent	n
<b>Age<sup>a</sup></b>						
18-24	7.1	504	4.4	164	9.6	340
25-29	10.8	832	8.0	287	13.5	545
30-39	26.8	2,102	25.1	971	28.4	1,131
40-49	20.7	1,573	23.1	873	18.6	700
50-59	15.8	1,190	16.2	594	15.4	596
60+	18.8	1,296	23.3	800	14.6	496
<b>Literacy<sup>a</sup></b>						
Literate <sup>1</sup>	17.5	7,459	24.5	3,667	10.9	3,786
<b>Educational attainment<sup>a</sup></b>						
No education	85.1	6,451	80.1	2,981	89.8	3,470
Primary	4.6	304	4.7	169	4.5	135
Secondary or more	10.3	726	15.2	527	5.7	199

<sup>1</sup> The percent that are literate comprises those who report that they can both read and write.

<sup>a</sup> Significance tests were performed for associations between the sex and background characteristics of the decision-maker. For example, a test was done between sex and age of the decision-maker. When an association is found to be significant ( $p < 0.05$ ), a superscript is noted next to the characteristic.

Source: ZOI Interim Survey, Ghana 2015.

**Table 3.2** also shows that 17.5 percent of all primary adult decision-makers are literate. However, 24.5 percent of male and 10.9 percent of female primary adult decision-makers are literate, respectively. The association between literacy and the sex of primary adult decision-makers is determined to be statistically significant at the 5 percent level. While 85.1 percent of all primary adult decision-makers indicate having no education, 80.1 percent of male and 89.8

percent of female adult primary decision-makers indicate the same. About 15 percent of all primary adult decision-makers indicate having at least primary education. This compares to 19.9 percent of male adult primary decision-makers and 10 percent of female primary decision-makers. The association between educational attainment and the sex of primary adult decision-makers is determined to be statistically significant at the 5 percent level. Information on people with less than primary educational attainment was not collected and is therefore not reported in this report.

## 3.2 Living Conditions

**Table 3.3** shows dwelling characteristics of the households in the ZOI based on definitions presented in the 2015 Millennium Development Goals (MDG) (UNDP 2003). The table presents the percentage of households with access to an improved water source, improved sanitation, electricity, and solid cooking fuel. The average number of people per sleeping room, as well as roof, exterior wall, and floor materials are also presented. Values are shown for all households.

The table shows that 74.3 percent of the households have access to improved water sources but only 22.4 percent have access to improved sanitation and only half of the households have access to electricity. The average number of people per sleeping room is 1.9 and more than 95 percent of the households use solid sources of fuel for cooking (e.g., charcoal, wood, crop residues and/or animal waste).

**Table 3.3: Household dwelling characteristics**

Characteristic	Total (All households)	
	Estimate	n
Percent with improved water source <sup>1</sup>	74.3	3,654
Percent with improved sanitation <sup>2</sup>	22.4	3,685
Mean persons per sleeping room <sup>3</sup>	1.9	3,695
Percent using solid fuel for cooking <sup>4</sup>	95.7	3,637
Percent with access to electricity	50.6	3,686
<b>Household roof materials (%)<sup>5</sup></b>		
Natural	23.0	3,701
Rudimentary	0.4	3,701
Finished	76.6	3,701
<b>Household exterior wall materials (%)<sup>6</sup></b>		
Natural	26.8	3,699
Rudimentary	24.1	3,699
Finished	49.2	3,699
<b>Household floor materials (%)<sup>7</sup></b>		
Natural	27.8	3,711
Rudimentary	n/a	n/a
Finished	72.2	3,711

n/a Not applicable – No observations for rudimentary floor materials.

<sup>^</sup> Results not statistically reliable, n<30.

- <sup>1</sup> Improved water sources include *piped water into the dwelling, piped water into the yard, a public tap/standpipe, a tube well/borehole, a protected dug well, a protected spring, and rainwater* (WHO and UNICEF 2006). The proportion of the population with sustainable access to an improved water source is the 2015 MDG indicator #30 (UNDP 2003); however, as in most major international survey programs, the measure reported here reflects only access to an improved water source, and not the sustainability of that access.
- <sup>2</sup> Improved sanitation facilities are those that separate human excreta from human contact and include the categories *flush to piped sewer system, flush to septic tank, flush/pour flush to pit, composting toilet, ventilated improved pit latrine, and a pit latrine with a slab*. Because shared and public facilities are often less hygienic than private facilities, shared or public sanitation facilities are not counted as improved (WHO and UNICEF 2006). The proportion of the population with access to improved sanitation is the 2015 MDG indicator #31 (UNDP 2003).
- <sup>3</sup> The average number of persons per sleeping room is a common indicator of crowding (UNDP 2003).
- <sup>4</sup> Solid fuel is defined as *charcoal, wood, animal dung, and agriculture crop residue*. The proportion of the population using solid fuels is MDG indicator #29 (UNDP 2003). The *other* and *no food cooked in household* categories are removed from percentages.
- <sup>5</sup> Natural roofs include *no roof, thatch/palm leaf, and sod*. Rudimentary roof includes *rustic mat, palm/bamboo, wood planks, and cardboard*. Finished roofs include *metal, wood, calamine/cement fiber, ceramic tiles, cement, and roofing shingles*. The *other* category is removed from percentages.
- <sup>6</sup> Natural walls include *no walls, cane/palm/trunks, and dirt*. Rudimentary walls include *bamboo with mud, stone with mud, uncovered adobe, plywood, cardboard, reused wood, and metal sheeting*. Finished walls include *cement, stone with lime/cement, bricks, cement blocks, covered adobe, and wood planks/shingles*. The *other* category is removed from percentages.
- <sup>7</sup> Natural floors include *earth/sand and dung*. Rudimentary floors include *wood planks and palm/bamboo*. Finished floors include *parquet/polished wood, vinyl or asphalt strips, ceramic tiles, cement and carpet*. The *other* category is removed from percentages.

Source: ZOI Interim Survey, Ghana 2015.

### 3.3 Education

**Table 3.4** presents school attendance, educational attainment, and literacy in the ZOI. The table presents the percent of male, female, and all household members under 25 years who are currently attending school. It also presents the percent of household members older than nine years who have attained primary education level, as well as the percent of household members who are literate. Sex ratios in school attendance, attainment of primary education, and literacy are also presented. These measures align with MDG education indicators. The focus of the indicators is on school-age children only, i.e., people aged between 5 and 24 years.

School enrolment levels seem to be similar for males and females aged between 5 and 14 years. The hypothesis that the percentage of attainment of primary education level is independent of age groups is rejected as is the hypothesis that literacy is independent of age groups. Similarly, the hypothesis that the percentage of school attendance is independent of age groups is rejected.

About 69.7 percent of females between five and nine years old are attending school, as are 71.2 percent of males of the same age group. For the 20-24-year group, the proportion of female and male attending school is respectively 20.3 percent and 32.1 percent. The hypothesis that the sex and school attendance is independent across age groups is rejected at the 5 percent level. The same conclusion is reached for the proportion of different age groups by sex on the one hand and attainment of primary level of education and literacy on the other hand.

**Table 3. 4: School attendance, educational attainment, and literacy**

Characteristic	Percent			Female to male ratio			n
	Attending school <sup>1,a</sup>	Attained a primary level of education <sup>2,b</sup>	Literate <sup>3,c</sup>	Attending school <sup>1</sup>	Attained a primary level of education <sup>2</sup>	Literate <sup>3</sup>	
<b>Age group<sup>a,b,c</sup></b>							
<b>5-9</b>	70.5	n/a <sup>1</sup>	8.4	0.9	n/a <sup>1</sup>	0.9	4,341
<b>10-14</b>	77.5	2.6	38.5	1.0	1.0	1.0	3,537
<b>15-19</b>	59.0	29.1	65.7	0.7	0.7	0.7	2,464
<b>20-24</b>	27.0	46.5	57.6	0.8	0.8	0.8	1,681
<b>25-29</b>	n/a <sup>2</sup>	31.2	35.5	n/a <sup>2</sup>	1.3	1.3	1,434
<b>30-34</b>	n/a <sup>2</sup>	18.0	19.6	n/a <sup>2</sup>	1.4	1.4	1,307
<b>35-54</b>	n/a <sup>2</sup>	12.3	14.2	n/a <sup>2</sup>	1.1	1.1	3,894
<b>55+</b>	n/a <sup>2</sup>	8.7	11.3	n/a <sup>2</sup>	0.9	0.9	2,290
<b>Sex</b>							
<b>Female</b>							
<b>Age group<sup>a,b,c</sup></b>							
5-9	69.7	n/a <sup>1</sup>	8.3	n/a <sup>3</sup>	n/a <sup>3</sup>	n/a <sup>3</sup>	2,086
10-14	75.8	2.7	38.9	n/a <sup>3</sup>	n/a <sup>3</sup>	n/a <sup>3</sup>	1,742
15-19	56.2	30.5	66.4	n/a <sup>3</sup>	n/a <sup>3</sup>	n/a <sup>3</sup>	1,004
20-24	20.3	38.5	46.2	n/a <sup>3</sup>	n/a <sup>3</sup>	n/a <sup>3</sup>	750
25-29	n/a <sup>2</sup>	20.5	21.0	n/a <sup>3</sup>	n/a <sup>3</sup>	n/a <sup>3</sup>	808
30-34	n/a <sup>2</sup>	12.3	11.8	n/a <sup>3</sup>	n/a <sup>3</sup>	n/a <sup>3</sup>	771
35-54	n/a <sup>2</sup>	5.6	5.9	n/a <sup>3</sup>	n/a <sup>3</sup>	n/a <sup>3</sup>	2,064
55+	n/a <sup>2</sup>	4.2	5.1	n/a <sup>3</sup>	n/a <sup>3</sup>	n/a <sup>3</sup>	1,105
<b>Male</b>							
<b>Age group<sup>a,b,c</sup></b>							
5-9	71.2	n/a <sup>1</sup>	8.4	n/a <sup>3</sup>	n/a <sup>3</sup>	n/a <sup>3</sup>	2,254
10-14	79.2	2.4	38.2	n/a <sup>3</sup>	n/a <sup>3</sup>	n/a <sup>3</sup>	1,795
15-19	61.0	28.1	65.2	n/a <sup>3</sup>	n/a <sup>3</sup>	n/a <sup>3</sup>	1,460
20-24	32.1	52.7	66.3	n/a <sup>3</sup>	n/a <sup>3</sup>	n/a <sup>3</sup>	931
25-29	n/a <sup>2</sup>	44.5	53.6	n/a <sup>3</sup>	n/a <sup>3</sup>	n/a <sup>3</sup>	626
30-34	n/a <sup>2</sup>	26.3	31.0	n/a <sup>3</sup>	n/a <sup>3</sup>	n/a <sup>3</sup>	536
35-54	n/a <sup>2</sup>	20.1	23.7	n/a <sup>3</sup>	n/a <sup>3</sup>	n/a <sup>3</sup>	1,830
55+	n/a <sup>2</sup>	13.0	17.4	n/a <sup>3</sup>	n/a <sup>3</sup>	n/a <sup>3</sup>	1,185

n/a<sup>1</sup> Not applicable – Children in the age group 5-9 years are not yet old enough to have attained a primary level of education.

n/a<sup>2</sup> Not applicable – Current school attendance applies to school-age children and youth only, ages 5-24.

n/a<sup>3</sup> Not applicable – Female to male ratios cannot be calculated for male-only and female-only disaggregates.

<sup>1</sup> The 2015 PBS survey was conducted when schools were in session (July to August).

<sup>2</sup> The goals of achieving universal primary education and achieving gender equity with respect to education are assessed by multiple MDG indicators, typically using administrative school data. This table presents respondent-reported school attendance, primary educational attainment, and literacy, as well as the ratio of females to males on these measures (UNDP 2003).

<sup>3</sup> The MDG indicators for universal primary education and gender equity within education are assessed through the literacy rate (MDG indicator #8) and the ratio of literate women to men (MDG indicator #10) among young adults, age 15-24 years (UNDP 2003).

<sup>a-c</sup> Significance tests were performed for associations between the indicator in the column heading, and age and sex. For example, a test was done for school attendance by sex, and a test was done for school attendance by age. When an association is found to be significant (p<0.05), the superscript of the column heading will appear next to the sex row heading and/or next to the age group row heading.

Source: ZOI Interim Survey, Ghana 2015.

## 4. Household Economic Status

Household economic status is measured by per capita household expenditures and prevalence of poverty, using the consumption expenditure method. The Household Consumption Expenditure module of the population-based survey questionnaire was used to collect the data necessary to calculate the per capita expenditures and prevalence of poverty indicators. This module is similar to that in the World Bank's Living Standards Measurement Survey (LSMS). The module collected information on households' consumption expenditure on various food and non-food items and used the total expenditure on these items as a proxy for household income. Deaton (2008) has argued that expenditure data are less prone to error, easier to recall in survey situations, and more stable over time than income data.<sup>5</sup> After estimating total household expenditure on an annual basis, it is converted into a daily and per capita basis by dividing by 365 days and then by the number of household members.

### 4.1 Daily Per Capita Expenditures

**Table 4.1** presents average household per capita daily expenditures in 2010 U.S. dollars (USD) after adjusting for the 2005 Purchasing Power Parity (PPP). This indicator is the Feed the Future indicator providing primary information on household economic well-being. Table 4.1 shows that the average household per capita daily expenditure is \$4.80 in 2015. It also shows that the average household daily per capita expenditure for the 10<sup>th</sup> percentile is \$0.63 compared to \$22.00 for the 90<sup>th</sup> percentile. The median household daily per capita expenditure is \$2.15.

While the average household daily per capita expenditure is \$3.92 for male and female adults gendered households, it is respectively \$6.55 and \$12.18 for female adult only and male adult only gendered households. The table shows that the 75<sup>th</sup> percentile for female adult only gendered households' daily per capita household expenditure is \$13.71 compared to \$10.35 and \$19.19 for male and female adults and male adult only gendered households. Similarly, the 90<sup>th</sup> percentile for female adult only households' daily per capita expenditure is \$24.45 while for male and female adults is \$19.26 and male adult only gendered households is \$25.42.

**Table 4.1** also shows that in households where the highest level of educational attainment is secondary or higher, the average household daily per capita expenditure is \$6.19. On the other hand, households in which no adult has any education, the average household daily per capita expenditure is \$4.19. The average household daily per capita expenditure for large households – those with 11 or more members – is \$2.11 compared to \$6.88 for small households, i.e., those with no more than five members. The average household daily per capita expenditures for the 75<sup>th</sup> and 90<sup>th</sup> percentiles of medium households are \$9.57 and \$20.96, respectively.

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<sup>5</sup> These observations are valid and using expenditures as a proxy for income may be fairly accurate for poor people because the income elasticity of consumption is near unity. However, the effectiveness of the proxy deteriorates as incomes increase and the income elasticity of consumption ceases to be unity.

**Table 4. 1: Daily per capita expenditure by household characteristic (in 2010 USD)**

Characteristic	Estimate (weighted)						n <sup>2</sup>
	Mean <sup>a</sup>	Percentile					
		10 <sup>th</sup>	25 <sup>th</sup>	50 <sup>th</sup>	75 <sup>th</sup>	90 <sup>th</sup>	
<b>Total (All households)</b>	<b>4.80</b>	<b>0.63</b>	<b>1.03</b>	<b>2.15</b>	<b>12.50</b>	<b>22.00</b>	<b>3,988</b>
<b>Gendered household type<sup>a</sup></b>							
Male and female adults	3.92	0.62	1.04	2.15	10.35	19.26	3,248
Female adult(s) only	6.55	0.69	1.04	2.12	13.71	24.45	357
Male adult(s) only	12.18	0.58	0.90	2.09	19.19	25.42	327
Child(ren) only (no adults)	^	^	^	^	^	^	^
<b>Household size<sup>a</sup></b>							
Small (1-5 members)	6.88	0.65	1.06	2.19	13.45	22.19	1,912
Medium (6-10 members)	3.03	0.63	1.04	2.13	9.57	20.96	1,692
Large (11+ members)	2.11	0.58	0.90	2.15	6.84	13.59	384
<b>Household educational attainment<sup>a</sup></b>							
No education	4.19	0.64	1.02	2.14	10.62	17.36	2,523
Primary	5.03	0.63	1.11	2.17	15.10	27.78	568
Secondary or more	6.19	0.60	0.96	2.17	14.90	27.69	897

^ Results not statistically reliable, n<30.

<sup>1</sup> Records missing information for the disaggregate variables that have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, disaggregates' sample sizes may not total to the aggregated sample size.

<sup>a</sup> Significance tests were performed for associations between per capita expenditures and household characteristics. For example, a test was done between per capita expenditures and gendered household type. When an association is found to be significant (p<0.05), the superscript is noted next to the household characteristic.

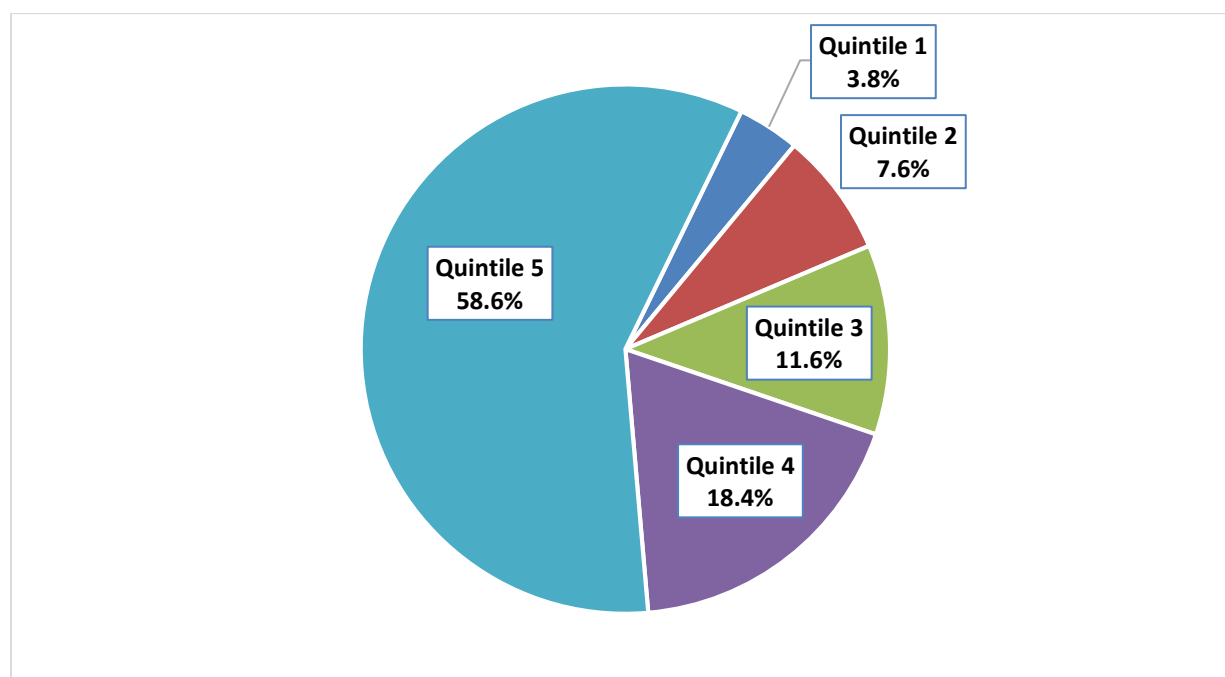
Source: ZOI Interim Survey, Ghana 2015.

The hypothesis that the characteristics in **Table 4.1** are independent of the average household per capita daily expenditure is rejected for gendered household types, household size and household educational attainment. The associations between the household average daily per capita expenditure and gendered household types, household size and household educational attainment are all statistically significant at the 5 percent level.

**Figure 4.1** further confirms the skewness in the distribution of expenditure and consumption towards the top-end consumers. The top 20 percent of households by consumption expenditure account for nearly 59 percent of total consumption expenditure compared to the bottom 20 percent accounting for less than 4 percent. This is in line with observations from other studies, which show that the top end of the consumption spectrum controls a larger share of total consumption than the bottom end.



**Figure 4.1: Distribution of consumption by quintiles in Ghana's Feed the Future ZOI**



Source: ZOI Interim Survey, Ghana 2015.

## 4.2 Prevalence and Depth of Poverty in the ZOI

The prevalence of poverty, also called the poverty headcount ratio, is measured by determining the percent of individuals living below an established poverty threshold.<sup>6</sup> The defined poverty threshold defines the poverty prevalence. The standard poverty threshold of \$1.25 daily per capita expenditure measured in 2005 PPP (Purchasing Power Parity) is used in this report.<sup>7</sup> However, the recent World Bank threshold of \$1.90 daily per capita expenditure based on the 2011 PPP is estimated and presented in Appendix A1.2.<sup>8</sup> Establishing standardized poverty thresholds allows for the tracking of changes in poverty across countries and over time. Poverty estimates may also be presented for an individual country's absolute poverty and extreme poverty thresholds, independent of international references or comparisons.

Although the poverty prevalence indicates how *many* households (or individuals) are below the poverty threshold, it does not speak to how *much* those below the poverty line are impacted by

<sup>6</sup> Note that expenditure data are not collected at the individual level but rather at the household level; individuals' per capita expenditures are then derived by dividing total household expenditures by the number of household members.

<sup>7</sup> Adjustments are made according to PPP conversions. These conversions are established by the World Bank to allow currencies to be compared across countries in terms of how much an individual can buy in a specific country. The \$1.25 in 2005 PPP means that \$1.25 could buy the same amount of goods in another country as \$1.25 could in the United States in 2005.

<sup>8</sup> The World Bank recently issued 2011 PPPs (see <http://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD>) and a revised standardized poverty threshold of \$1.90 per person per day in 2011 PPP.

poverty. The depth of poverty, often called the poverty gap, measures the average gap between consumption levels and the poverty line, with the non-poor counted as having a gap of zero. The measure is expressed as a proportion of the poverty line. The depth of poverty represents the entire ZOI population. The average consumption shortfall of the poor, in contrast, is estimated for only those individuals living below the poverty line.

#### 4.2.1 The \$1.25 Poverty Threshold

**Table 4.2** presents poverty estimates at the \$1.25 per day (2005 PPP) threshold. The prevalence of poverty and depth of poverty at the \$1.25 per day poverty line are Feed the Future indicators. Similar to the per capita expenditures table, this table presents poverty estimates for all households in the ZOI, as well as disaggregated by household characteristics, including gendered household type, household size, and household educational attainment.

**Poverty Prevalence.** Table 4.2 shows that 19.6 percent of the households in the ZOI live below the \$1.25 poverty threshold. When disaggregated by gendered household types, the poverty prevalence of female adult only and male adult only gendered households falls below the ZOI average, at 15.9 and 9.5 percent, respectively. However, the poverty prevalence for male and female adults gendered households is almost the same as the average for the ZOI. The hypothesis that prevalence of poverty is independent of gendered household is rejected at the 5 percent level. When disaggregated by household size, larger sized households exhibit a higher prevalence of poverty (41.2 percent) than their medium and small sized counterparts. The hypothesis that the prevalence of poverty is independent of household size is rejected, indicating that the association between prevalence of poverty and household size is statistically significant at the 5 percent level. The poverty prevalence for households in which the highest educational attainment of at least one member is secondary education or more, is 17.7 percent compared to 18.9 percent for households in which at least one member's highest educational attainment is primary education, and 20.6 percent on households with no education. The hypothesis that the prevalence of poverty and educational attainment are independent cannot be rejected at the 5 percent level.

**Depth of Poverty.** The depth of poverty in the ZOI stands at approximately 7.2 percent of the \$1.25 poverty line, indicating that the average gap between consumption levels of the population and the poverty line is approximately \$0.0903. This provides the average amount of money that each individual in a household would need to reach the poverty line. Given the ZOI population of about 5.2 million, the estimated cost of bringing everyone below the poverty line to the poverty line, i.e., bringing the prevalence of poverty to zero, is estimated at \$466,103.86 per day (in 2005 PPP). The annual cost of maintaining a zero poverty prevalence is approximately \$170.1million (in 2005 PPP).

The poverty depth varies across the different household educational attainment levels, gendered household types, and household sizes. Therefore, the null hypotheses of no association between

the poverty depth and these disaggregation characteristics are rejected at the 5 percent level. Large households record a depth of poverty of 16.9 percent compared to 3.8 percent for small household.

**Table 4. 2: Poverty at the \$1.25 (2005 PPP) per person per day threshold**

Characteristic	Prevalence of Poverty <sup>2</sup>		Depth of Poverty <sup>3</sup>		Average consumption shortfall of the poor <sup>4</sup>		
	Percent population <sup>a</sup>	n <sup>5</sup>	Percent of poverty line <sup>b</sup>	n <sup>5</sup>	In USD 2005 PPP <sup>c</sup>	Percent of poverty line <sup>c</sup>	n <sup>5</sup>
<b>Total (All households)</b>	<b>19.6</b>	<b>3,988</b>	<b>7.2</b>	<b>3,988</b>	<b>0.46</b>	<b>36.54</b>	<b>803</b>
<b>Gendered household type<sup>a,b</sup></b>							
Male and female adults	20.3	3,248	7.4	3,248	0.45	36.3	662
Female adult(s) only	15.9	357	5.7	357	0.45	36.0	55
Male adult(s) only	9.5	327	4.0	327	0.53	42.3	31
Child(ren) only (no adults)	^	^	^	^	^	^	^
<b>Household size<sup>a,b,c</sup></b>							
Small (1-5 members)	10.9	1,912	3.8	1,912	0.44	35.0	199
Medium (6-10 members)	24.9	1,692	9.0	1,692	0.45	36.2	413
Large (11+ members)	41.2	384	16.9	384	0.51	40.9	161
<b>Household educational attainment</b>							
No education	20.6	2,523	7.4	2,523	0.45	36.0	496
Primary	18.9	568	6.7	568	0.44	35.3	121
Secondary or more	17.7	897	7.1	897	0.50	40.2	156

<sup>^</sup> Results not statistically reliable, n<30.

<sup>1</sup> The Feed the Future poverty indicators are based on the poverty threshold of \$1.25 (2005 PPP) per person per day.

<sup>2</sup> The prevalence of poverty is the percentage of individuals living below the \$1.25 (2005 PPP) per person per day threshold. Poverty prevalence is sometimes referred to as the poverty incidence or poverty headcount ratio.

<sup>3</sup> The depth of poverty, or poverty gap, is the average consumption shortfall multiplied by the prevalence of poverty.

<sup>4</sup> The average consumption shortfall of the poor is the average amount below the poverty threshold of a person in poverty. This value is estimated only among individuals living in households that fall below the poverty threshold.

<sup>5</sup> Records with missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, disaggregates' sample sizes may not sum up to the total sample size.

<sup>a-c</sup> Superscripts in the column heading indicate that significance tests were performed for associations between the indicator in the column heading and each of the variables in the rows. When an association between the column indicator and row variable is found to be significant (p<0.05), the superscript for the indicator in the column heading is noted next to the row variable. For example, the test done between prevalence of poverty and household size was found significant, as shown in the superscript included next to the column and row headings.

Source: ZOI Interim Survey, Ghana 2015.

**Average Consumption Shortfall of the Poor.** The average per capita household expenditure shortfall for poor households is estimated \$0.46 (2005 PPP), equivalent to approximately 36.5 percent of the poverty threshold of \$1.25. It is estimated by taking the average household per capita daily expenditure of all households falling below the poverty line

(consumption shortfall in 2005 PPP U.S. dollars) and dividing it by the poverty threshold of \$1.25 (2005 PPP) to obtain the average consumption shortfall for those below the poverty threshold.

#### 4.2.2 The National Absolute Poverty Threshold

Current national poverty lines for Ghana are based on the Ghana Living Standards Survey 6 (GLSS6) conducted in 2012/2013 (GSS 2014). Using adult equivalent instead of simple count household size as used in this and other studies, GSS (2014) established a lower poverty (Ghana national extreme poverty) line of GHS 792.05 per adult equivalent per year and an upper poverty (Ghana national absolute poverty) line of GHS 1,314. These are equivalent to GHS 2.17 and GHS 3.60 per adult equivalent daily expenditure, respectively. Individuals consuming above the upper poverty line are assumed to be capable of procuring enough food to meet their nutritional and basic non-food needs while those consuming at or below the lower poverty line are assumed to be unable to procure enough food to meet their nutritional needs. GSS estimated that the national extreme poverty line and the national absolute poverty line are, respectively, 27 percent and 45 percent of the average 2012/2013 consumption level.

**Poverty Prevalence.** Using the national absolute poverty line, 49.5 percent of households in the ZOI are determined to fall below the GHS 3.60 daily per capita expenditure threshold. Households with 11 or more members have the highest poverty prevalence (74.2 percent) followed by medium sized households with 6 to 10 members (62.2 percent). Households with secondary or more education have relatively the lowest poverty prevalence compared to other educational attainment categories. The associations between the prevalence of poverty using the national absolute poverty line and gendered household types, household size and education are all determined to be statistically significant at the 5 percent level.

**Depth of Poverty.** The depth of poverty for the ZOI stands at approximately 21.5 percent of the national absolute poverty line. This is much higher than the 7.2 percent estimated using the \$1.25 poverty threshold. Depth of poverty is 12.9 percent for small households compared to 27.5 percent for medium households and 38.1 percent for large households. The depth of poverty is significantly different across the gendered household types, household's sizes types and household educational attainment levels at the 5 percent level.

**Average Consumption Shortfall of the Poor.** The average consumption shortfall of the poor is estimated to be \$1.50 (2005 PPP). Male and female adult gendered households have both the highest prevalence of poverty (53.5 percent) and depth of poverty (23.0 percent) in relation to the other gendered household types. Again, large households have higher prevalence of average consumption shortfalls. The associations between the average consumption shortfall of the poor using the national absolute poverty line and household size is determined to be statistically significant at the 5 percent level.

**Table 4. 3: Poverty at the national absolute threshold of GHS 3.60 per day per adult equivalent (2012/13)**

Characteristic	Prevalence of Poverty <sup>2</sup>		Depth of Poverty <sup>3</sup>		Average consumption shortfall of the poor <sup>4</sup>		
	Percent population <sup>a</sup>	n <sup>5</sup>	Percent of poverty line <sup>b</sup>	n <sup>5</sup>	In USD 2005 PPP <sup>c</sup>	Percent of poverty line <sup>c</sup>	n <sup>5</sup>
<b>Total (All households)</b>	<b>49.5</b>	<b>3,988</b>	<b>21.5</b>	<b>3,988</b>	<b>1.5</b>	<b>42.4</b>	<b>2,050</b>
<b>Gendered household type<sup>a,b</sup></b>							
Male and female adults	53.5	3,248	23.0	3,248	1.5	42.9	1,751
Female adult(s) only	36.1	357	15.5	357	1.5	42.9	130
Male adult(s) only	30.7	327	12.9	327	1.5	42.1	85
Child(ren) only (no adults)	^	^	^	^	^	^	^
<b>Household size<sup>a,b,c</sup></b>							
Small (1-5 members)	33.5	1,912	12.9	1,912	1.4	37.9	626
Medium (6-10 members)	62.2	1,692	27.5	1,692	1.6	43.8	1,061
Large (11+ members)	74.2	384	38.1	384	1.9	51.3	289
<b>Household educational attainment<sup>a,b</sup></b>							
No education	50.6	2,523	21.7	2,523	1.5	42.7	1,268
Primary	53.5	568	22.6	568	1.5	41.7	319
Secondary or more	44.4	897	20.2	897	1.6	44.4	389

<sup>1</sup> Results not statistically reliable, n<30.

<sup>2</sup> The prevalence of poverty is the percentage of individuals living below the national poverty line. Poverty prevalence is sometimes referred to as the poverty incidence or poverty headcount ratio.

<sup>3</sup> The depth of poverty, or poverty gap, is the average consumption shortfall multiplied by the prevalence of poverty.

<sup>4</sup> The average consumption shortfall of the poor is the average amount below the poverty threshold of a person in poverty. This value is estimated only among individuals living in households that fall below the poverty threshold.

<sup>5</sup> Records with missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations, therefore disaggregates' sample sizes may not total to the aggregated sample size.

<sup>a-c</sup> A superscript in the column heading indicates significance tests were performed for associations between the indicator in the column heading and each of the variables in the rows. For example, a test was done between prevalence of poverty and gendered household type. When an association between the column indicator and row variable is found to be significant (p<0.05), the superscript for the indicator in the column heading is noted next to the row variable.

Source: ZOI Interim Survey, Ghana 2015.

### 4.2.3 The National Extreme Poverty Threshold

**Table 4.4** presents poverty estimates at the extreme poverty threshold for Ghana. Similar to prior expenditures and poverty tables, this table presents poverty estimates for all households in the ZOI, as well as disaggregated by household characteristics, including gendered household type, household size, and household educational attainment.

**Poverty Prevalence.** The prevalence of poverty at the national extreme poverty threshold of GHS 2.17 daily per adult equivalent expenditure is 26.5 percent for all households in the ZOI.

The poverty prevalence using the national extreme poverty threshold paints a similar picture as found in the international \$1.25 daily expenditure extreme poverty threshold. Male and female adults gendered households have higher poverty prevalence than the other types of households. Large sized households have higher poverty prevalence than small sized households. Households with more education have lower poverty prevalence (23.7 percent) compared to those with primary education or no education at all (27.7 percent and 27.3 percent, respectively). The association between the prevalence of poverty using the national extreme poverty threshold on the one hand and gendered household type, educational attainment and household size on the other is determined to be statistically significant at the 5 percent level.

**Table 4. 4: Poverty at the national extreme threshold of 2.17 GHS per adult per day 2012/13)**

Characteristic	Prevalence of Poverty <sup>2</sup>		Depth of Poverty <sup>3</sup>		Average consumption shortfall of the poor <sup>4</sup>		
	Percent population <sup>a</sup>	n <sup>5</sup>	Percent of poverty line <sup>b</sup>	n <sup>5</sup>	In USD 2005 PPP <sup>c</sup>	Percent of poverty line <sup>c</sup>	n <sup>5</sup>
<b>Total (All Households)</b>	<b>26.5</b>	<b>3,988</b>	<b>9.8</b>	<b>3,988</b>	<b>0.80</b>	<b>36.7</b>	<b>1,074</b>
<b>Gendered household type<sup>a,b</sup></b>							
Male and female adults	28.5	3,248	10.5	3,248	0.80	36.7	912
Female adult(s) only	19.7	357	6.8	357	0.75	34.7	71
Male adult(s) only	16.6	327	6.0	327	0.79	36.4	47
Child(ren) only (no adults)	^	^	^	^	^	^	^
<b>Household size<sup>a,b,c</sup></b>							
Small (1-5 members)	15.0	1,912	5.2	1,912	0.74	34.3	281
Medium (6-10 members)	34.4	1,692	12.3	1,692	0.77	35.5	561
Large (11+ members)	50.1	384	22.1	384	0.95	44.0	194
<b>Household educational attainment<sup>a</sup></b>							
No education	27.3	2,523	9.9	2,523	0.78	35.9	663
Primary	27.7	568	9.5	568	0.73	33.8	167
Secondary or more	23.7	897	9.9	897	0.89	41.0	206

<sup>1</sup> The poverty prevalence is the percentage of individuals living below the national extreme poverty line. Poverty prevalence is sometimes referred to as the poverty incidence or poverty headcount ratio.

<sup>2</sup> The depth of poverty, or poverty gap, is the average consumption shortfall multiplied by the prevalence of poverty.

<sup>3</sup> The average consumption shortfall of the poor is the average amount below the poverty threshold of a person in poverty. This value is estimated only among individuals living in households that fall below the poverty threshold.

<sup>4</sup> Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations, therefore disaggregates' sample sizes may not total to the aggregated sample size.

<sup>a-c</sup> A superscript in the column heading indicates significance tests were performed for associations between the indicator in the column heading and each of the variables in the rows. For example, a test was done between prevalence of poverty and gendered household type. When an association between the column indicator and row variable is found to be significant ( $p < 0.05$ ), the superscript for the indicator in the column heading is noted next to the row variable.

Source: ZOI Interim Survey, Ghana 2015.

**Depth of Poverty.** The depth of poverty based on the national extreme poverty threshold is 9.8 percent for the ZOI level. Male and female adult households have higher poverty depth than other gendered household types, and the large sized households have more than four times the poverty depth (22.1 percent) than small sized households (5.2 percent). It is determined that, at a 5 percent level, both gendered household types and household size types are significantly associated with the depth of poverty using the national extreme poverty line.

**Average Consumption Shortfall of the Poor.** Ghana's extreme poverty threshold is established at GHS 2.17 (in 2013 prices) per adult equivalent per day. It focuses on meeting the nutritional requirements of household members. Individuals whose total expenditure falls below this line are considered to be in extreme poverty threshold. The average consumption shortfall of those falling below the national extreme poverty threshold is \$0.80, with a prevalence of 36.7 percent (Table 4.4). Average consumption shortfall of the poor is \$0.74 for small households compared to \$0.95 for large households with a prevalence of about 34 percent and 44 percent, respectively. The associations between the average consumption shortfall of the poor and its prevalence on the one hand and household size on the other are found to be statistically significant at the 5 percent level.

## 5. Women's Empowerment in Agriculture

While women in the ZOI play a prominent role in agriculture, they face persistent economic and social constraints. Thus, women's empowerment is being considered an important indicator under the Feed the Future initiative. Empowering women is particularly important to achieving the Feed the Future objectives of inclusivity in the benefits from agricultural sector growth and achievement of improved nutritional status. The Women's Empowerment in Agriculture Index (WEAI) was developed to track changes in women's empowerment occurring as a result of interventions under the Feed the Future initiative, and as a programming tool to identify and address the constraints that limit women's full engagement in the agriculture sector (Alkire et al. 2013). More information on the WEAI is available at <http://feedthefuture.gov/lp/womens-empowerment-agriculture-index>.

### 5.1 Overview

The WEAI measures empowerment in five domains. The *Production* domain assesses the ability of individuals to provide input and autonomously make decisions about agricultural production. The *Resources* domain reflects individuals' control over and access to productive resources. The *Income* domain monitors individuals' ability to direct the financial resources derived from agricultural production or other sources. The *Leadership* domain reflects individuals' social capital and comfort speaking in public within their community. The *Time* domain reflects individuals' workload and satisfaction with leisure time. The WEAI aggregates information collected for each of the five domains into a single empowerment indicator.

The Index is composed of two sub-indices: The Five Domains of Empowerment sub-index (5DE), which measures the empowerment of women in the five empowerment domains, and the Gender Parity Index (GPI), which measures the relative empowerment of men and women within the household. The WEAI questionnaire is directed at the primary adult male and female decision-makers in each household and compares the 5DE profiles of women and men in the same household. Primary adult decision-makers are individuals age 18 or older who self-identify as the primary male or female adult decision-maker.

**Table 5.1** presents the five empowerment domains, their definitions under the WEAI, ten indicators, and the percentage of women and men who indicated adequacy in the ten indicators. The measures represent the proportion of all surveyed women and surveyed men with adequacy in the individual indicators regardless of their empowerment status.<sup>9</sup>

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<sup>9</sup> See Appendix 2.3 for the criteria for achieving adequacy in each WEAI indicator.



**Table 5. I: Adequacy in different domains by women and men using the Women’s Empowerment in Agriculture Indicators**

Domain	Definition of domain	Indicators	Women		Men	
			Percent with adequate achievement	n	Percent with adequate achievement	n
<b>Production</b>	Sole or joint decision-making over food and cash crop farming, livestock, and fisheries, and autonomy in agricultural production	Input in productive decisions	82.9	2,698	92.6	2,551
		Autonomy in production	67.7	2,511	74.8	2,368
<b>Resources</b>	Ownership, access to, and decision-making power over productive resources such as land, livestock, agricultural equipment, consumer durables, and credit	Ownership of assets	51.5	2,667	94.5	2,522
		Purchase, sale or transfer of assets	72.4	2,660	88.8	2,458
		Access to and decisions on credit	17.6	2,336	21.9	2,195
<b>Income</b>	Sole or joint control over income and expenditures	Control over use of income	40.6	2,727	80.2	2,576
<b>Leadership</b>	Membership in economic or social groups and comfort in speaking in public	Group member	72.6	2,246	72.5	2,169
		Speaking in public	72.7	2,521	93.1	2,399
<b>Time</b>	Allocation of time to productive and domestic tasks and satisfaction with the available time for leisure activities	Workload	72.1	2,116	85.2	1,884
		Leisure	60.8	2,736	65.5	2,550

Source: ZOI Interim Survey, Ghana 2015.

Nearly 83 percent of the women achieve adequacy in providing input into production decisions, while 67.7 percent achieve autonomy in production and 72.4 percent of women indicate achieving adequacy in the purchase, sale or transfer of assets indicator. Over 70 percent of the women achieve adequacy in the two indicators in the Leadership domain: group membership and speaking in public. About seventy-two percent and 40.6 percent of the women indicate adequacy in workload and control over use of income indicators, respectively. For the leisure time indicator, approximately 61.0 percent of the women indicate adequacy while only 51.5 percent of the women indicate adequacy in asset ownership. Only 17.6 percent of the women indicate adequacy in the access to and decisions about credit. On the other hand, Table 5.I shows that the majority of men are adequate in the ten indicators, except for access to and decision on credit for which only about 22 percent of surveyed men indicate adequacy. This contrasts with ownership of assets, input into production decisions and speaking in public, for all of which more than 90

percent of surveyed men indicate adequacy. The rest of the discussion focuses only on women's attainment of adequacy in the different indicators.

**Table 5.2** presents the results of the 5DE, the GPI, and the WEAI indexes. The results indicate that 86.0 percent of women in the ZOI are not yet empowered compared to 36.7 percent of men. The average inadequacy score of disempowered women is about 44.1 percent, which means that women experience adequate achievement in 55.9 percent of the domains in the 5DE index. On average, 78.4 percent of the women experience gender parity and the average empowerment gap is 28.6 percent. From the survey sample, the average WEAI is estimated at 0.64.

**Table 5. 2: WEAI and Related Indexes in the ZOI of Ghana<sup>1</sup>**

Indexes	Overall ZOI	
	Women	Men
<b>5DE Index</b>		
Disempowered Headcount (H)	86.0%	36.7%
Empowered Headcount (I-H)	14.0%	63.3%
Average Inadequacy Score (A)	44.1%	34.2%
Average Adequacy Score (I - A)	55.9%	65.8%
Disempowerment Index (M0 = H x A)	37.9%	12.5%
5DE Index (I-M0)	0.62	0.91
No. of observations used	1,115	1,053
<b>GPI</b>		
% of women without gender parity (HGPI)	75.4%	
% of women with gender parity (I-HGPI)	24.6%	
Average Empowerment Gap (IGPI)	28.6%	
GPI (I - HGPI x IGPI)	0.78	
No. of observations used	659	
<b>WEAI</b>		
WEAI (0.9 x 5DE + 0.1 x GPI)	0.64	

<sup>1</sup> Indices are calculated based on weighted samples.

Source: ZOI Interim Survey, Ghana 2015.

## 5.2 Agricultural Production

**Table 5.3** presents economic activities (including agricultural activities) among surveyed women. This table presents the percentage of surveyed women who are involved in agricultural activities (food crop farming, cash crop farming, livestock raising, or fishing), non-farm economic activities, and wage or salaried employment. This table also presents the percentage of women who have input into the decisions made regarding a specific activity.

**Table 5. 3: Economic activities and input in decision-making on production among surveyed women**

Activity	Participates in activity		Has input <sup>1</sup> into decisions about activity	
	Percent	n <sup>2</sup>	Percent	n <sup>1,3</sup>
<b>Type of activity</b>				
Food crop farming	77.1	2,666	26.2	2,037
Cash crop farming	48.3	2,665	22.5	1,391
Livestock raising	43.3	2,664	19.7	1,097
Fishing or fishpond culture	37.4	2,664	68.4	921
Non-farm economic activities	9.7	2,663	59.2	221
Wage or salaried employment	2.5	2,662	25.4	73

<sup>1</sup> Having input means that a woman reported having input into most or all decisions regarding the activity.

<sup>2</sup> Estimates exclude households who have no primary adult female decision-maker (PAFD) or whose data are missing/incomplete.

<sup>3</sup> Estimates excludes women who do not participate in an activity or report that no decision was made.

\* There were 29 responses for the 'has input into decisions about activity' that were not clearly indicated in the response for 'participates in activity' and hence the difference between n for these two activities.

Source: ZOI Interim Survey, Ghana 2015.

More than three quarters of the surveyed women (77.1 percent) participate in food crop farming but only 26.2 percent have input into decisions about food crop farming. On the other hand, while almost half of the women participate in cash crop farming, only 22.5 percent have input in the decision-making about cash crop farming. Although 43.3 percent of women participate in livestock raising, only 19.7 percent have input into decisions about livestock raising. Finally, while less than 3 percent of women are involved in wage or salaried employment, more than 25 percent of them believe they have input into decision-making about wage or salaried employment in their household.

**Table 5.4** shows the percentage of surveyed women who have input into the decisions made regarding the use of income derived from an activity. Almost 69 percent of women have input into the use of income from fishing or fishpond culture compared to 63 percent for non-farm economic activities. A fifth of women indicate having some level of input into the use of income from livestock raising while approximately 24 percent of women have input into the use of income generated from two important activities in the ZOI: food crop and cash crop farming.

**Table 5. 4: Input in decision-making on use of income among surveyed women**

Activity	Has input <sup>1</sup> into use of income from activity	
	Percent	n <sup>2,3</sup>
<b>Type of activity</b>		
Food crop farming	24.6	1,889
Cash crop farming	23.7	1,364
Livestock raising	20.1	1,053
Fishing or fishpond culture	68.5	912
Non-farm economic activities	63.1	217
Wage or salaried employment	24.0	72

<sup>^</sup> Results not statistically reliable, n<30.

<sup>1</sup> *Having input* means that a woman reported having input into most or all decisions regarding the use of income generated from the activity.

<sup>2</sup> Estimates exclude households who have no primary adult female decision-maker or whose data are missing/incomplete.

<sup>3</sup> Estimates excludes women who do not participate in an activity or report that no decision was made.

\* There were 58 responses for the 'has input into use of income from activity' that were not clearly indicated in the response for 'participates in activity' and hence the difference between n for these two activities.

Source: ZOI Interim Survey, Ghana 2015.

In addition to women's decision-making on a host of agricultural and economic activities, the WEAI module collected information on the extent to which women contribute to specific agricultural and economic activities. **Table 5.5** presents the distribution of surveyed women's perceived ability to make their own agricultural production decisions. The table shows that livestock raising is the production activity with the highest proportion of women (16.5 percent) perceiving they have no ability to make their own decisions. This contrasts with decisions related to inputs for agricultural production with only 3.3 percent of women interviewed indicating an inability to make their own decisions and decisions related to taking crops to market where 5.3 percent of them indicate an inability to make their own decisions. Half of women surveyed who earned a wage or salary indicated they felt they could to a high extent make their own decisions in relation to their wages. This compares with 34.4 percent and 34.7 percent saying they could to a high extent make their own decisions related to getting agricultural production inputs and taking crops to the market.

Almost 10 percent of the surveyed women do not believe that they have any decision-making ability with regard to their own wage or salary employment. Nearly 12 percent of them feel that they do not have any ability to make major household expenditures on their own compared to nearly 30 percent who believe that they have a high decision-making ability for these expenditures. In contrast, the majority of women believe they have more freedom making minor household expenditures with approximately 78 percent indicating having medium or high

decision-making ability and only 3.4 percent believing that they have no input on these minor expenditure decisions.

**Table 5. 5: Decision-making on production among surveyed women**

Activity	Extent to which respondents feel they can make their own decisions (percent) <sup>1,2</sup>				n
	Not at all	Small extent	Medium extent	High extent	
Getting inputs for agricultural production	3.3	20.8	41.5	34.4	2,519
The types of crops to grow	6.8	30.1	27.9	35.2	2,363
Whether to take crops to the market	5.3	25.8	34.2	34.7	2,154
Livestock raising	16.5	29.7	24.7	29.2	1,855
Her own wage or salary employment	10.3	13.9	23.9	52.0	932
Major household expenditures	11.8	30.8	27.6	29.8	1,251
Minor household expenditures	3.4	18.4	32.9	45.3	2,515

<sup>1</sup> Estimates exclude households who have no primary adult female decision-maker or whose data are missing or incomplete. Women who do not participate in an activity, or who report that no decision was made, are excluded from these percentages.

<sup>2</sup> When a primary adult female decision maker reports that she alone makes decisions about the specified activities, she is not asked any further questions, and is categorized during analysis as making her own decisions “to a high extent.” When she reports making decisions about the specified activities in conjunction with other individuals, she is asked an additional question about the extent to which she feels she could make her own personal decisions on the specified matters, with possible response options being “not at all,” “to a small extent,” “to a medium extent,” or “to a high extent.” Responses are recoded accordingly.

Source: ZOI Interim Survey, Ghana 2015.

### 5.3 Productive Resources

Ownership of assets is one of the 10 WEAI indicators and one of three within the *Resource* domain. **Table 5.6** presents households’ ownership of productive resources, as reported by surveyed women, along with the percentage of surveyed women who can make a decision to purchase, and to sell, give, or rent the items they own.

Women are counted as having the ability to make such decision if they can solely make a decision or if they can make these decisions with others with any degree of input. About eighty-four percent of the surveyed women report that someone in the household owned agricultural land. About 22 percent of them indicate an ability to decide to purchase agricultural land while 24.3 percent indicate an ability to decide to sell, give away, or rent owned land.

**Table 5. 6: Household ownership and surveyed women's control over productive resources**

Type of resource	Someone in the household owns item		Woman can decide to purchase items		Woman can decide to sell/give/rent owned items	
	Percent	n <sup>1,*</sup>	Percent	n <sup>1,*</sup>	Percent	n <sup>1,*</sup>
Agricultural land	84.3	2,573	21.7	2,672	24.3	2,229
Large livestock	18.7	2,531	16.5	597	26.3	556
Small livestock	54.4	2,601	23.8	1,823	29.3	1,557
Chickens, ducks, turkeys, and pigeons	60.3	2,627	23.7	2,078	33.3	1,776
Fish pond or fishing equipment	3.2	2,506	19.0	131	28.4	138
Non-mechanized farm equipment	73.6	2,639	26.9	2,618	37.8	2,040
Mechanized farm equipment	2.9	2,501	8.4	85	29.2	97
Nonfarm business equipment	8.7	2,513	n/a		n/a	
House or other structures	32.6	2,559	n/a		n/a	
Large consumer durables	15.0	2,534	n/a		n/a	
Small consumer durables	54.9	2,593	n/a		n/a	
Cell phone	69.9	2,595	n/a		n/a	
Non-agricultural land	8.6	2,520	n/a		n/a	
Means of transportation	69.6	2,629	n/a		n/a	

<sup>1</sup> Estimates exclude households that have no primary adult female decision maker or in which Module G data are missing/incomplete. Those who indicate "Not applicable" are excluded from estimates.

n/a: Questions regarding who can decide to purchase, sell, give or rent the item were not included in the ZOI interim surveys.

\* Differences between the n sizes are due to varying patterns in the responses for each of these activities.

Source: ZOI Interim Survey, Ghana 2015.

About three-quarters of women interviewed indicate their households owned non-mechanized farm equipment while about 69.6 percent of them indicate owning some means of transportation. It is not surprising, because of the location, that such a small proportion of women indicate owning fish pond or fishing equipment. It is also not surprising, because of the income conditions, that mechanized farm equipment is owned by only 2.9 percent of households. About seventy percent of the women report that someone in the household owns a cell phone and 60.3 percent that someone owns some type of poultry. For all of the resources except for fish pond or fishing equipment, a higher percentage of women are involved in the decision-making to sell, give away, or rent the owned item compared to the percentage involved in the purchasing decision. Large livestock and agricultural land are two resources where women have the least decision-making ability to sell, give away or rent.

**Table 5.7** shows the third indicator of the *Resource* domain, access to and decision-making on credit. The table presents the proportion of surveyed women who report that a member of the household has in the past 12 months received any loan, either in-kind (such as food items or raw materials) or cash loan. These categories are not mutually exclusive. The table presents also for women living in households where a household member has received a loan, the percentage that reports having contributed to the decision to take the loan and the subsequent decisions on how to use the loan. These figures are disaggregated by the source of the loan.

About thirty percent of the surveyed women receive a loan from some source, with the majority of the loans being cash loans (25.9 percent) from friends or relatives and group-based microfinance organizations. Friends or relatives are also the major source of in-kind loans. Overall, more than 60 percent of women contribute to the decisions concerning taking the loan and how to use the loan.

**Table 5. 7: Credit access among surveyed women**

Estimate	Any source (percent)	Credit source (percent) <sup>1</sup>				
		Non-governmental organization	Informal lender	Formal lender	Friends or relatives	Group-based micro-finance
<b>Total receiving a loan (All surveyed women)</b>	<b>30.2</b>	<b>2.8</b>	<b>2.1</b>	<b>3.8</b>	<b>19.3</b>	<b>7.8</b>
<b>Type of loan</b>						
Any loan	30.2	2.8	2.1	3.8	19.3	8.7
In-kind loan	2.8	0.4	0.3	0	2.1	0.1
Cash loan	25.9	2.2	1.6	3.8	14.6	7.6
<b>n<sup>2,*</sup></b>	<b>2,562</b>	<b>2,572</b>	<b>2,565</b>	<b>2,565</b>	<b>2,562</b>	<b>2,563</b>
<b>Total contributing to a credit decision (All surveyed women)</b>	<b>78.1</b>	<b>73.0</b>	<b>77.0</b>	<b>73.3</b>	<b>74.8</b>	<b>76.8</b>
<b>Type of decisions</b>						
On whether to borrow	61.6	59.0	62.1	50.4	59.6	66.8
On how to use loan	70.8	64.4	64.6	71.4	65.9	65.5
<b>n<sup>2</sup></b>	<b>566</b>	<b>65</b>	<b>62</b>	<b>85</b>	<b>458</b>	<b>132</b>

<sup>1</sup> Percentages sum to more than 100 because loans may have been received from more than one source.

<sup>2</sup> Estimates exclude households who have no primary adult female decision-maker or whose data are missing/incomplete.

\* The slight differences in n between 'any source' and the other individual credits sources is due to varying response patterns in these activities.

Source: ZOI Interim Survey, Ghana 2015.

## 5.4 Leadership in the Community

The *Leadership* domain measures an individual’s influence and involvement with community organizations and issues impacting her community and includes two indicators. The first indicator is an individual’s ease of speaking in public, which is measured by three questions related to the level of difficulty individuals face when voicing their opinion regarding community decisions and is presented in **Table 5.8**. Nearly 73 percent of surveyed women in the ZOI indicate achieving adequacy in voicing their opinions on community matters. More than two thirds of them feel comfortable voicing their opinion regarding decisions involving the construction of infrastructure in their community, and close to 60 percent indicate being comfortable to protest misbehavior of elected officials or other authorities.

**Table 5. 8: Comfort with speaking in public among surveyed women**

Topics for public discussion	Percent	n <sup>1</sup>
	Comfortable speaking in public about selected topics	
<b>Total (All surveyed women)</b>	<b>72.7</b>	<b>2,526</b>
<b>Topics</b>		
To help decide on infrastructure to be built in the community	69.4	2,508
To ensure proper payment of wages for public works or other similar programs	63.8	2,036
To protest the misbehavior of authorities or elected officials	59.6	2,415

<sup>1</sup> Estimates exclude households who have no primary adult female decision-maker or whose data are missing/incomplete.

Source: ZOI Interim Survey, Ghana 2015.

The second indicator of the *Leadership* domain is an individual’s participation in a community organization. **Table 5.9** shows the percentage of surveyed women who report the existence of an organization in their community and the percentage of women who are active members of the organization. The table shows that about 73 percent of surveyed women in the ZOI indicate being active members in at least one community organization. About 57 percent of them are members of a religious group. Fifty percent of surveyed women are active members of credit or microfinance group compared to 45.2 percent for mutual help or insurance group. Approximately a quarter of the women are involved in agricultural producer’s group while about 31 percent are involved in water user’s group. The surveyed women are less likely to be active members of local government and forest users’ groups. Finally, 54.8 percent of the surveyed women indicate being active members in “other” groups, separate from the ones explicitly identified in Table 5.9. Group name or purpose for the “other” group were not available from the survey.



**Table 5. 9: Group membership among surveyed women**

Group type	Percent <sup>1</sup>	n <sup>2</sup>
	Is an active group member	
<b>Total (All surveyed women)</b>	<b>72.6</b>	<b>2,247</b>
<b>Group type</b>		
Agricultural producers' group	24.5	1,140
Water users' group	31.2	722
Forest users' group	9.8	197
Credit or microfinance group	49.6	1,028
Mutual help or insurance group	45.2	692
Trade and business association	32.8	470
Civic or charitable group	36.7	465
Local government	5.0	1,191
Religious group	56.8	1,425
Other	54.8	749

<sup>1</sup> The denominator for this percentage includes all surveyed women, even those who reported that no group exists or that she is unaware of the existence of a group in her community. Women who report that no group exists or who are unaware of a group are counted as having inadequate achievement of this indicator.

<sup>2</sup> Estimates exclude households who have no primary adult female decision-maker or whose data are missing/incomplete.

Source: ZOI Interim Survey, Ghana 2015.

## 5.5 Time Use

The *Time use* domain assesses women's workload measured through a time allocation log, and their satisfaction with their leisure time. The time allocation log allowed respondents to identify two activities that may be undertaken simultaneously within the same 15-minute time period. One of the activities is classified as primary activity while the other is classified as secondary. Whether a particular activity is primary or secondary is determined by the respondent, based on how they listed them in their response. For example, house cleaning and cooking may be performed simultaneously because the food may be put on the stove and the cleaning undertaken while the food is cooking. One respondent may choose to identify cooking as the primary activity while another would identify it as the secondary activity. It is important to note that not all respondents identify multiple activities in one or more 15-minute time slot.

**Table 5.10** shows the proportion of women identifying particular activities as primary or secondary activities performed within the 24 hours prior to the interview and the average hours spent on them. The average hours spent performing an activity is based on all women, assigning zero to women not performing an activity. The average time spent on primary activities is higher than the average time spent on secondary activities.

Nearly 95 percent of all of the surveyed women report sleeping and resting as a primary activity while approximately 88 percent identify eating and drinking as a primary activity. They spend on average about seven hours sleeping and resting and about an hour eating and drinking. Another

30.7 percent identify sleeping and resting as a secondary activity, spending less than an hour on it. Only 39 respondents identify school and homework as an activity, and 90.3 percent of them class it as a primary activity while 20.8 percent say it is a secondary activity. As a primary activity they spend an average of 2.4 hours on it but only 0.2 hour on it as a secondary activity. With more than 1,000 respondents, 92.2 percent of them identify farming, livestock, and fishing activities as their primary activity while 17.8 percent class it as a secondary activity. On average, they spend about four hours on it as a primary activity and only 0.4 hour as a secondary activity. About eighty-eight percent of women indicate spending an average of 4.1 hours on their own business work as a primary activity. As a secondary activity, 20.4 percent of women select own business work, spending an average of 0.5 hour on it.

**Table 5. 10: Time allocation among surveyed women**

Activity	Primary activity		Secondary activity <sup>1</sup>		n
	Percent of women	Mean hours devoted	Percent of women	Mean hours devoted	
Sleeping and resting	95.4	6.9	30.7	0.9	2,142
Eating and drinking	88.0	1.0	36.2	0.3	2,066
Personal care	87.0	0.7	23.3	0.2	1,985
School and homework	90.3	2.4	20.8	0.2	39
Work as employed	79.0	2.4	28.6	0.5	91
Own business work	87.6	4.1	20.4	0.5	498
Farming/livestock/fishing	92.2	4.0	17.8	0.4	1,192
Shopping/getting services	81.0	1.9	24.9	0.5	115
Weaving, sewing, textile care	72.0	3.8	38.1	0.6	41
Cooking	90.6	1.7	24.9	0.3	1,821
Domestic work (fetching food and water)	89.2	1.7	21.1	0.3	1,596
Care for children/adults/elderly	82.3	1.0	35.7	0.4	969
Travel and commuting	86.0	1.3	22.7	0.3	863
Watching TV/listening to radio/reading	74.3	1.1	33.5	0.5	291
Exercising	^	^	^	^	^
Social activities and hobbies	82.0	2.1	21.0	0.5	353
Religious activities	85.0	1.3	31.0	0.3	878
Other	83.5	2.8	21.0	0.3	97

^ Results not statistically reliable, n<30.

<sup>1</sup> Respondents were allowed to report up to two activities per time use increment (15 minutes) in the prior 24 hours. If two activities were reported, one was designated as a primary and the second as a secondary activity. Some women may not have reported secondary activities for each fifteen-minute period.

Source: ZOI Interim Survey, Ghana 2015.

## 6. Hunger and Dietary Intake

This chapter presents findings related to hunger in the ZOI as well as women's and children's dietary intake. Findings on household hunger are presented first, followed by dietary intake by women and children.

### 6.1 Household Hunger

The Household Hunger Scale (HHS) is used to calculate the prevalence of households experiencing moderate or severe hunger. The HHS was developed by the USAID-funded Food and Nutrition Technical Assistance II Project (FANTA-2/FHI 360) in collaboration with the United Nations Food and Agriculture Organization. It has been cross-culturally validated to allow comparison across different food-insecure contexts. The HHS is used to assess, geographically target, monitor, and evaluate settings affected by substantial food insecurity. The HHS is used to estimate the percentage of households affected by three different severities of household hunger: little to no household hunger (HHS score 0-1); moderate household hunger (HHS score 2-3); and severe household hunger (HHS score 4-6).<sup>10</sup>

Food supplies in developing countries, such as Ghana, tend to be seasonal, particularly in rural communities. In the ZOI, November/December are the main harvest months for cereals, mainly maize, millet and sorghum. As subsistence farmers, most smallholder farmers in the ZOI store cereals to ensure their families have food supplies throughout the year. In general, most households begin to experience acute shortage of food supplies towards the end of the dry season in April. By the beginning of the rainy season in May, food supplies are at their lowest in most of these farming households and hunger risk is at its peak. Incidentally, this is also the period where most energy is required to undertake farm work to produce the new crop. The situation begins to abate in June and July when early cereals are harvested (Deker 2008, Wood 2013). It is important to recognize that the 2015 Interim Assessment survey was conducted between July and August 2015, after the harvest of early millet and in the middle of early sorghum but before the harvest of maize.

**Table 6.1** presents estimates of average household hunger for all households and by gendered household type, household size, and household educational attainment. About 70 percent of the households experience little or no hunger and only 1.8 percent of households experience severe hunger four weeks preceding their participation in the survey. About 28 percent of households indicate experiencing moderate hunger during the same period. The percentage of households with moderate to severe hunger is relatively the same across gendered household types. Large and medium-sized households and households in which all adults have less than secondary education have higher proportions of moderate to severe hunger.

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<sup>10</sup> For further description of the household hunger indicator and its calculation, please refer to the Feed the Future Indicator Handbook, available at <http://feedthefuture.gov/resource/feed-future-handbook-indicator-definitions>.

**Table 6. 1: Household hunger**

Characteristic	Percent			n <sup>1</sup>
	Little to no hunger	Moderate hunger	Severe hunger	
<b>Total (All households)</b>	<b>70.4</b>	<b>27.8</b>	<b>1.8</b>	<b>3,720</b>
<b>Gendered household type</b>				
Male and female adults	71.1	27.3	1.6	3,096
Female adult(s) only	64.5	31.4	4.1	308
Male adult(s) only	75.0	23.7	1.3	276
Child(ren) only (no adults)	^	^	^	^
<b>Household size</b>				
Small (1-5 members)	74.0	24.3	1.8	1,741
Medium (6-10 members)	66.6	31.5	1.9	1,582
Large (11+ members)	69.5	28.9	1.7	397
<b>Household educational attainment</b>				
No education	67.9	30.1	2.1	2,365
Primary	67.4	30.9	1.8	531
Secondary or more	78.8	20.1	1.2	824

^ Results not statistically reliable, n<30.

<sup>1</sup> Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, disaggregates' sample size may not total to the aggregated sample size.

Source: ZOI Interim Survey, Ghana 2015.

## 6.2 Dietary Intake

Women of reproductive age (15-49 years) tend to be at risk of multiple micronutrient deficiencies, which can affect their health, their ability to care for their children and their effective participation in income-generating activities (Darnton-Hill et al. 2005). The Feed the Future women's dietary diversity indicator is a proxy for the micronutrient adequacy in women's diets. It reports the mean number of food groups consumed the day prior to interview by non-pregnant women of reproductive age.

This section presents results of dietary diversity among women of reproductive age and for infants and young child in the ZOI in 2015. The section also presents the indicators disaggregated by age, educational attainment, gendered household type, household size, and household hunger.

### 6.2.1 Dietary Diversity among Women Age 15-49 Years

For the ZOI Interim Survey, two dietary diversity indicators for women are calculated: Women's Dietary Diversity Score (WDDS); and Women's Minimum Dietary Diversity (MDD-W). The WDDS is based on nine food groups: (1) Grains, roots, and tubers; (2) Legumes and nuts; (3) Dairy products; (4) Organ meat; (5) Eggs; (6) Flesh food and small animal protein; (7) Vitamin A-rich dark green leafy vegetables; (8) Other vitamin A-rich vegetables and fruits; and (9) Other

fruits and vegetables. It is the count of the number of food groups consumed by the women of reproductive age in the sample. The mean of this count across respondents produces the average WDDS.

The MDD-W indicator is a new Feed the Future measure introduced with the 2015 interim assessments. It is based on a ten-food group categorization and is defined as the proportion of women having consumed a minimum of five of the 10 food groups in the 24 hours preceding the interview (USAID 2014b). The MDD-W is a dichotomous indicator (i.e., yes/no). The difference between the two indicators is as follows:

- Legumes, beans, nuts, and seeds is in one category, Group 2, in the WDDS, while they are split into 2 groups in the MDD-W, as Group 2 legumes and beans, and Group 3 nuts and seeds.
- Dairy products become Group 4 in the MDD-W.
- Organ meat is included in flesh foods in the MDD-W (Group 6) as a collective instead of as its own food group
- Group 9 in the WDDS is broken into two groups to form Group 9 and Group 10 in the MDD-W – i.e., other fruits and other vegetables respectively.

### *1. Women's Dietary Diversity Score - WDDS*

**Table 6.2** shows the mean and median WDDS for all women of reproductive age in the ZOI, and by individual-level and household-level characteristics. Mean WDDS is the Feed the Future high-level indicator. Individual-level characteristics include women's age groups and educational attainment. Household-level characteristics include categories of gendered household type, household size, and household hunger. The association between WDDS and age and educational attainment are determined to be statistically significant at the 5 percent level.

The average number of food groups consumed by women is 3.65 out of the 9 food groups. Women in age groups younger than the 35-39 category have an average WDDS higher than the overall average WDDS, while those in age groups older than the 35-39 group appear to score lower than the average. For women in age groups older than the 20-24 group, the average WDDS decline with increasing age categories. Women with secondary or more educational attainment have higher average WDDS than those with primary education who themselves have a higher average WDDS than those without any education. The hypothesis that there is an association between age and mean WDDS is shown to be statistically significant at the 5 percent level. Women with educational attainment at the secondary level or higher present an average WDDS of approximately 4.30. The associations between the mean WDDS and women's educational attainment, household size, and household hunger are statistically significant at the 5 percent level. The mean WDDS is determined to be independent of the gendered household type.

**Table 6. 2: Women's dietary diversity score**

Characteristic	Mean <sup>a</sup>	Median	n <sup>1</sup>
<b>Total (All women 15-49)</b>	<b>3.65</b>	<b>4.00</b>	<b>3,828</b>
<b>Age<sup>a</sup></b>			
15-19	3.71	4.00	611
20-24	3.80	4.00	550
25-29	3.71	4.00	667
30-34	3.73	4.00	628
35-39	3.66	4.00	610
40-44	3.46	3.00	439
45-49	3.33	3.00	300
<b>Educational attainment<sup>a</sup></b>			
No education	3.58	3.00	3,256
Primary	3.74	4.00	291
Secondary or more	4.30	4.00	252
<b>Gendered household type</b>			
Male and female adults	3.67	4.00	3543
Female adult(s) only	3.50	3.00	250
Male adult(s) only	^	^	^
Child(ren) only (no adults)	^	^	^
<b>Household size<sup>a</sup></b>			
Small (1-5 members)	3.69	4.00	1,095
Medium (6-10 members)	3.54	3.00	1,901
Large (11+ members)	3.88	4.00	809
<b>Household hunger<sup>a</sup></b>			
Little to no hunger	3.86	4.00	2,697
Moderate or severe hunger	3.15	3.00	1,037

<sup>^</sup> Results not statistically reliable, n<30.

<sup>1</sup> Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, disaggregates' sample sizes may not total to the aggregated sample size.

<sup>a</sup> Significance tests were performed for associations between mean women's dietary diversity score and individual/household characteristics. For example, a test was done between mean women's dietary diversity score and age. When an association is found to be significant (p<0.05), the superscript is noted next to the characteristic.

Source: ZOI Interim Survey, Ghana 2015.

## 2. Women's Minimum Dietary Diversity - MDD-W

**Table 6.3** shows the percentage of all women of reproductive age in the ZOI who have achieved the Minimum Dietary Diversity threshold (MDD-W). It is disaggregated by household characteristics and by respondent characteristics, which includes respondents' age group and educational attainment.

**Table 6. 3: Women's minimum dietary diversity**

Characteristic	Percent <sup>a</sup>	n <sup>1</sup>
<b>Total (All Women 15-49)</b>	<b>40.4</b>	<b>3,828</b>
<b>Age</b>		
15-19	45.4	611
20-24	44.4	550
25-29	41.4	667
30-34	40.9	629
35-39	37.4	610
40-44	37.7	439
45-49	30.5	300
<b>Educational attainment<sup>a</sup></b>		
No education	37.6	3,257
Primary	48.1	291
Secondary or more	59.4	252
<b>Gendered household type</b>		
Male and female adults	40.4	3,544
Female adult(s) only	39.8	250
Male adult(s) only	^	^
Child(ren) only (no adults)	^	^
<b>Household size</b>		
Small (1-5 members)	40.4	1,096
Medium (6-10 members)	39.9	1,901
Large (11+ members)	41.5	809
<b>Household hunger<sup>a</sup></b>		
Little to no hunger	45.8	2,697
Moderate or severe hunger	27.2	1,038

<sup>^</sup> Results not statistically reliable, n<30.

<sup>1</sup> Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, disaggregates' sample sizes may not total to the aggregated sample size.

<sup>a</sup> Significance tests were performed for associations between women's minimum dietary diversity and individual/household characteristics. When an association is found to be significant (p<0.05), the superscript is noted next to the characteristic. For example, the test done between women's minimum dietary diversity and age was found to be significant as shown by the superscript "a" next to the row heading.

Source: ZOI Interim Survey, Ghana 2015.

Table 6.3 shows that the overall MDD-W is 40.4 percent, and ranges from about 45.4 percent for women 15-19 years to 30.5 percent for 45-49 years old. The table also shows that the MDD-W increases with education and increasing food security as defined by the household hunger scale. Thus, as found with the WDDS, the average MDD-W declines with age for women 20 years old and over and increases with education. The percentage of women achieving MDD-W is the highest (41.5 percent) for women in large households and the lowest for women in medium (39.9 percent) and small households (40.4 percent). It is not surprising that a higher proportion of women (45.8 percent) in households that experience little or no hunger have a higher average

MDD-W than the proportion of women (27.2 percent) in households that experienced moderate to severe hunger. It has been found that the association between educational attainment and household hunger, on the one hand, and the proportion of women achieving the MDD-W are statistically significant at the 5 percent level.

**Table 6.4** shows the percentage of women age 15-49 years consuming each of the 10 food groups by MDD-W status. The results show that with the exception of nuts and seed, dairy products, meat and organ meats, and other fruits and vegetables rich in Vitamin A, more than 50 percent of the women achieving a minimum dietary diversity consume each of the other food groups. On the other hand, The main food groups consumed by women who did not achieve a minimum dietary diversity is Grain, roots, and tubers (97.6 percent), Vitamin A-rich dark green leafy vegetables” (62.3 percent), and eggs (61.4 percent). These are also the main food groups consumed by women who achieve a minimum dietary diversity. . The associations between the achievement status and the consumption of specific food groups are statistically significant at the 5 percent level.

**Table 6. 4: Consumption of foods by women's minimum dietary diversity status**

Category	Percent of women according to achievement of a minimum dietary diversity <sup>a</sup>	
	Achieving	Not achieving
<b>Women consuming a specific food group</b>		
Grains, roots and tubers <sup>a</sup>	99.7	97.6
Legumes and beans <sup>a</sup>	53.7	12.2
Nuts and seeds <sup>a</sup>	47.1	5.5
Dairy products <sup>a</sup>	31.9	7.7
Meat and organ meats <sup>a</sup>	17.4	2.9
Eggs <sup>a</sup>	92.1	61.4
Vitamin A-rich dark green leafy vegetables <sup>a</sup>	85.4	62.3
Other Vitamin A-rich vegetables and fruits <sup>a</sup>	42.5	11.5
Other fruits <sup>a</sup>	77.2	9.8
Other vegetables <sup>a</sup>	77.2	9.8
<b>n</b>	<b>1,558</b>	<b>2,271</b>

<sup>a</sup> Significance tests were performed for associations between women's achievement of minimum dietary diversity and consumption of a specific food group. For example, a test was done between women's achievement of minimum dietary diversity and consumption of grains, roots and tubers. When an association is found to be significant (p<0.05), a superscript is noted next to the food group.  
Source: ZOI Interim Survey, Ghana 2015.

## 6.2.2 Infant and Young Child Feeding

This section presents exclusive breastfeeding among infants 0-5 months old and the Minimum Acceptable Diet (MAD) indicators for children 6-23 months. The World Health Organization (2011) recommends that children under six months be breastfed exclusively because of significant health and nutrition benefits, including protection from gastrointestinal infections and reduced risk of mortality due to infectious disease. There are benefits for breastfeeding mothers too:



more rapid postnatal maternal weight loss and a delayed return of menstrual periods, implying a longer period between potential pregnancies in case of absence of artificial birth control. Exclusive breastfeeding means feeding an infant exclusively with breast milk (directly or pumped). Receiving oral rehydration salts, vitamins, minerals, and/or medicines does not negate exclusive breastfeeding but receiving any other food or liquid negates it.

### 3. Exclusive Breastfeeding

The exclusive breastfeeding indicator measures the percentage of children 0-5 months of age who were exclusively breastfed during the day preceding the survey. Estimates are shown for all children, as well as by children's sex and by caregivers' educational attainment. While a primary caregiver and biological mother may be the same individual, this is not always the case. The data used into the estimation of the exclusive breastfeeding indicator are based on self-reports by primary caregivers.

**Table 6. 5: Prevalence of exclusive breastfeeding among children under six months old**

Characteristic	Percent <sup>a</sup>	n <sup>1</sup>
<b>Total (All children under 6 months)</b>	<b>50.0</b>	<b>261</b>
<b>Child sex</b>		
Male	55.4	129
Female	45.3	132
<b>Caregiver's educational attainment<sup>2</sup></b>		
No education	49.7	239
Primary	^	^
Secondary or more	^	^

<sup>a</sup> Results not statistically reliable, n<30.

<sup>1</sup> Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, disaggregates' sample sizes may not total to the aggregated sample size.

<sup>2</sup> The ZOI interim survey identifies the primary caregiver of each age-eligible child, who is likely, but not necessarily, the child's biological mother.

<sup>a</sup> Significance tests were performed for associations between exclusive breastfeeding and child/caregiver characteristics. When an association is found to be significant (p<0.05), the superscript is noted next to the characteristic.

Source: ZOI Interim Survey, Ghana 2015.

**Table 6.5** shows the prevalence of exclusive breastfeeding among children 0-5 months in the ZOI. The table shows that the prevalence of exclusive breastfeeding in the ZOI during the study period is 50 percent. Disaggregated by the child's sex, the prevalence of exclusive breastfeeding among male children is 55.4 percent compared to 45.3 percent for female children. There are no significant statistical associations between child's sex and caregiver's educational attainment on one hand, and the prevalence of exclusive breastfeeding for children younger six months on the other hand.

#### 4. Minimum Acceptable Diet

The Minimum Acceptable Diet (MAD) is a composite indicator measuring the minimum feeding frequency and minimum dietary diversity based on caregiver reports of the frequency with which the child was fed the different food groups in the 24 hours preceding the interview. Estimating the indicator requires data on children’s age in months, breastfeeding status, dietary diversity, number of semi-solid or solid feeds, and number of milk feeds.

**Table 6.6** presents the Feed the Future MAD indicator for children between 6 and 23 months old in the ZOI. The average estimates are shown for all children, and by children’s characteristics, their caregiver’s educational attainment, and their household characteristics, defined to include gendered household type, household size, and household hunger. Children’s characteristics include sex and age group.

The percentage of all children aged 6-23 months old receiving a MAD is relatively low, at 13.7 percent. The prevalence rate remains low across all categories of children, caregiver, and household characteristics. Children aged 6-11 months have the lowest prevalence rates. The proportion of male children (11.7 percent) receiving a MAD is lower than for females (16.6 percent). The associations between the percentage of children between 6-23 months receiving a minimum acceptable diet and the child’s sex, child’s age and household hunger are determined to be statistically significant at the 5 percent level.

**Table 6.7** presents the percentage of children achieving the MAD components (e.g., minimum meal frequency, minimum dietary diversity) and consuming each of the food groups of the minimum dietary diversity indicator. The children included in the analysis have all received some form of breastfeeding.<sup>11</sup> Estimates are shown for all children that are breastfed, as well as by specific age groups.

Among breastfed children, 41.6 percent achieve the minimum meal frequency and 29.0 percent achieve the minimum dietary diversity. The percentage of children achieving minimum meal frequency and minimum dietary diversity increases with increasing age categories. Only 15.4 percent of children between 6-11 months achieve the minimum dietary diversity, the lowest of all age groups.

**Table 6. 6: Percentage of children age 6-23 months who receive a minimum acceptable diet**

Characteristic	Percent <sup>a</sup>	n <sup>l</sup>
<b>Total (All children 6-23 months)</b>	<b>13.7</b>	<b>772</b>
<b>Child sex<sup>a</sup></b>		
Male	11.7	431
Female	16.6	341

<sup>11</sup> Few children 6-23 months old (n<30) were completely non-breastfed and hence a separate Table for these group of children was not prepared.

Characteristic	Percent <sup>a</sup>	n <sup>1</sup>
<b>Child age<sup>a</sup></b>		
6-11 months	9.8	265
12-17 months	15.5	291
18-23 months	20.6	182
<b>Caregiver's educational attainment<sup>2</sup></b>		
No education	13.5	726
Primary	^	^
Secondary or more	^	^
<b>Gendered household type</b>		
Male and female adults	13.8	743
Female adult(s) only	^	^
Male adult(s) only	^	^
Child(ren) only (no adults)	^	^
<b>Household size</b>		
Small (1-5 members)	12.2	221
Medium (6-10 members)	12.7	388
Large (11+ members)	17.8	163
<b>Household hunger<sup>a</sup></b>		
Little to no hunger	14.6	546
Moderate or severe hunger	11.6	209

<sup>a</sup> Results not statistically reliable, n<30.

<sup>1</sup> Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, disaggregates' sample sizes may not total to the aggregated sample size.

<sup>2</sup> The ZOI interim survey identifies the primary caregiver of each age-eligible child. This person is likely, but not necessarily, the child's biological mother.

<sup>a</sup> Significance tests were performed for associations between children receiving a minimum acceptable diet and each of the child, caregiver, and household characteristics category. When an association is found to be significant (p<0.05), the superscript is noted next to the characteristic.

Source: ZOI Interim Survey, Ghana 2015.

With regard to the foods consumed, 17.2 percent of the children aged 6-23 months consume dairy products, 48.8 percent consume flesh foods, and 86.9 percent consume grains, roots, and tubers. We find that 36.5 percent of the children aged 6-11 months, 51.9 percent of the children aged 12-17 months, and 62.8 percent of the children age 18-23 months consume flesh foods. The lowest rate of consumption of dairy products is for children age 6-11 months. The percentage of children consuming legumes and nuts and eggs is low overall, with 20.3 percent consuming legumes and nuts and only 5.8 percent consuming eggs. Across the age categories, the percentage of children consuming foods from these two food groups is consistently low. Most of the children (57.5 percent) consume Vitamin A-rich fruit and vegetables with the percentage of children consuming these Vitamin A-rich fruits and vegetables increasing with age.

**Table 6. 7: Components of a minimum acceptable diet among children age 6-23 months**

MAD components and food groups	Percent			
	All children	By child age (in months) <sup>a</sup>		
		6 to 11	12 to 17	18 to 23
Achieving minimum meal frequency	41.6	38.2	37.2	53.4
Achieving minimum dietary diversity <sup>a</sup>	29.0	15.4	35.1	42.1
<b>Consuming:</b>				
Grains, roots, and tubers	86.9	81.9	89.4	94.1
Legumes and nuts	20.3	12.0	24.3	29.6
Dairy products	17.2	12.1	20.7	17.7
Flesh foods	48.8	36.5	51.9	62.8
Eggs	5.8	3.4	8.6	5.3
Vitamin A-rich fruits and vegetables	57.5	43.3	62.6	73.6
Other fruits and vegetables	21.4	13.3	24.0	28.9
<b>N</b>	<b>772</b>	<b>265</b>	<b>291</b>	<b>182</b>

Source: ZOI Interim Survey, Ghana 2015.

### 6.2.3 Consumption of Targeted Nutrient-Rich Value Chain Commodities

U.S. Government-funded programming supports nutrition-sensitive agricultural value chain interventions to achieve the dual purpose of enhancing economic and nutritional outcomes (Webber and Labaste 2010, Kaplinsky and Morris 2002). The Feed the Future ZOI interim assessment measures the degree to which respondents in the ZOI are consuming nutrient-rich commodities or products made from Nutrient-Rich Value Chain Commodities (NRVCC) being promoted by these value chain activities.

There are three criteria for a food commodity to be considered an NRVCC:

- 1) Increased production of the commodity must be promoted through a U.S. Government-funded value chain activity.
- 2) The value chain commodity must have been selected for nutrition objectives, in addition to any poverty-reduction or economic-growth related objectives.
- 3) The commodity must be considered nutrient-rich, defined as meeting any one of the following criteria: It is bio-fortified; a legume, nut or seed; an animal-sourced food, including dairy products (milk, yogurt, cheese), eggs, organ meat, flesh foods, and other miscellaneous small animal protein (e.g. grubs, insects); a dark yellow or orange-fleshed root or tuber; or a fruit or vegetable that meets the threshold for being a “high source” of one or more micronutrients on a per 100-gram basis.

This section presents the ZOI Interim Assessment’s findings on the consumption of targeted nutrient rich value chain commodities among women age 15-49 and children age 6-23 months. The targeted nutrient-rich commodity in Ghana is soya beans because it is a legume. The other

two crops (maize and rice), while supported by the US Government to enhance economic wellbeing and reduce poverty of the program participants, they fail the nutrient-rich test.

### 1. Women's Consumption of Targeted Nutrient-Rich Value Chain Commodities

**Table 6.8** presents women's consumption of the targeted Nutrient-Rich Value Chain Commodity. Estimates are shown for all reproductive age women, as well as by women's individual and household characteristics (age, educational attainment, gendered household type, household size, and household hunger). Only 11 percent of all women of reproductive age consume soya beans. The proportion does not vary much by age group. The percentage of women consuming soya beans in large households is 16 percent while in small households the rate is 9.3 percent. The percentage of women consuming soya beans is higher in households with moderate to severe hunger than those with little or no hunger. The table shows that the association between the proportion of women consuming soya beans and educational attainment, household size, and the household hunger status are statistically significant at the 5 percent level.

**Table 6. 8: Women's consumption of targeted nutrient-rich value chain commodities**

Characteristic	Percent Soya beans <sup>a</sup>	n <sup>1</sup>
<b>Total (All women 15-49)</b>	<b>11.0</b>	<b>3,876</b>
<b>Age</b>		
15-19	11.8	621
20-24	8.1	560
25-29	10.9	670
30-34	12.2	649
35-39	13.1	620
40-44	11.1	448
45-49	8.7	308
<b>Educational attainment<sup>a</sup></b>		
No education	11.8	3,320
Primary	8.3	293
Secondary or more	6.0	257
<b>Gendered household type</b>		
Male and female adults	11.3	3,593
Female adult(s) only	6.9	257
Male adult(s) only	^	^
Child(ren) only (no adults)	^	^
<b>Household size<sup>a</sup></b>		
Small (1-5 members)	9.3	1,119
Medium (6-10 members)	9.8	1,940
Large (11+ members)	16.0	817
<b>Household hunger<sup>a</sup></b>		
Little to no hunger	9.8	2,739

Characteristic	Percent	n <sup>1</sup>
	Soya beans <sup>a</sup>	
Moderate or severe hunger	13.8	1,066

<sup>^</sup> Results not statistically reliable, n<30.

<sup>1</sup> Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, disaggregates' sample sizes may not total to the aggregated sample size.

<sup>a-e</sup> A superscript in the column heading indicates significance tests were performed for associations between the indicator in the column heading and each of the variables in the rows. When an association between the column indicator and row variable is found to be significant (p<0.05), the superscript for the indicator in the column heading is noted next to the row variable.

Source: ZOI Interim Survey, Ghana 2015.

## 2. Children's Consumption of Targeted Nutrient-Rich Value Chain Commodities

The results showing the proportion of children consuming soya beans and soya products as the targeted nutrient-rich commodity by age, sex, caregiver's education, household hunger status and gendered household type are presented in **Table 6.9**. Only 7.5 percent of all children between 6 and 23 months consume soya beans. However, the proportion of children under a year-old and between 18 and 23 months consuming soybeans is smaller than the average. A larger proportion of female children (10.6 percent) than male children (5.4 percent), and a larger proportion of children in households with moderate to severe hunger (13.4 percent) consume soya beans. However, the associations between the proportion of children between 6-23 months consuming soya beans with child's age and household hunger is determined to be statistically significant at the 5 percent level.

**Table 6. 9: Children's consumption of targeted nutrient-rich value chain commodities**

Characteristic	Percent	n <sup>1</sup>
	Soya Beans <sup>a</sup>	
<b>Total (All children 6-23 months)</b>	7.5	821
<b>Child sex</b>		
Male	5.4	458
Female	10.6	363
<b>Child age<sup>a</sup></b>		
6-11 months	5.0	249
12-17 months	11.9	272
18-23 months	5.5	176
<b>Caregiver's educational attainment</b>		
No education	7.8	767
Primary	^	^
Secondary or more	^	^
<b>Gendered household type</b>		
Male and female adults	7.6	788
Female adult(s) only	^	^
Male adult(s) only	^	^
Child(ren) only (no adults)	^	^
<b>Household size</b>		
Small (1-5 members)	7.7	234
Medium (6-10 members)	5.0	406
Large (11+ members)	12.6	181
<b>Household hunger<sup>a</sup></b>		
Little to no hunger	5.6	583
Moderate or severe hunger	13.4	221

<sup>^</sup> Results not statistically reliable, n<30.

<sup>1</sup> Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, disaggregates' sample sizes may not total to the aggregated sample size.

<sup>2</sup> The ZOI interim survey identifies the primary caregiver of each age-eligible child. This person is likely, but not necessarily, the child's biological mother.

<sup>a-e</sup> A superscript in the column heading indicates significance tests were performed for associations between the indicator in the column heading and each of the variables in the rows. For example, a test was done between any targeted commodity and the woman's age. When an association between the column indicator and row variable is found to be significant (p<0.05), the superscript for the indicator in the column heading is noted next to the row variable.

Source: ZOI Interim Survey, Ghana 2015.

## 7. Nutritional Status of Women and Children

The results of the women and children's anthropometry are presented in this section. The women's anthropometry covers the Feed the Future indicators of women's body mass index (BMI) – (underweight, normal, overweight, obese) and children's anthropometry (stunting, wasting, and underweight).

### 7.1 Body Mass Index of Women Age 15-49 Years

**Table 7.1** presents women's mean Body Mass Index (BMI) as well the BMI categories of underweight (BMI < 18.5), normal weight (18.5 ≤ BMI < 25.0), overweight (25.0 ≤ BMI < 30.0), and obese (BMI ≥ 30.0). Estimates are shown for all non-pregnant women age 15-49, as well as disaggregated by individual-level and household-level characteristics. Individual characteristics include age and educational attainment. Household characteristics include gendered household type, household size, and household hunger.

The mean BMI of women ages 15-49 is 21.4, which falls within the normal weight range for BMI in the ZOI. The mean BMI is greater than 21 across all the individual and household characteristics. Approximately twelve percent of women fall in the underweight range, 66.3 percent have a normal weight, 15.7 percent are overweight, and 5.9 percent are obese. In general, the proportion of overweight and the proportion of obese women increase with age. The proportion of underweight women varies with age groups, and the association between the prevalence of underweight and age is statistically significant at the 5 percent level. A relatively higher percentage of women with secondary level education or more are found to be overweight or obese compared to other education levels. The opposite is true for underweight and normal weight women. The results show that the association between BMI and educational attainment, gendered household types, household size, and hunger scale are also statistically significant at the 5 percent level.



**Table 7. 1: Prevalence of underweight, normal weight, overweight, and obese women**

Characteristic	Mean BMI <sup>a</sup>	Body Mass Index (BMI) category (percent) <sup>b</sup>				n <sup>1</sup>
		Under-weight <sup>c</sup>	Normal weight	Over-weight	Obese	
<b>Total (All women age 15-49)</b>	<b>22.5</b>	<b>12.2</b>	<b>66.3</b>	<b>15.7</b>	<b>5.9</b>	<b>3,560</b>
<b>Age<sup>a,c</sup></b>						
15-19	21.4	17.4	69.6	10.8	2.3	611
20-24	22.4	12.8	65.8	16.4	5.0	513
25-29	22.8	8.7	67.8	17.6	5.9	592
30-34	22.7	13.3	62.8	17.2	6.7	558
35-39	23.2	10.1	64.7	18.4	6.8	531
40-44	22.9	8.2	67.9	17.3	6.7	418
45-49	22.8	13.9	63.1	13.1	9.9	285
<b>Educational attainment<sup>a</sup></b>						
No education	22.4	12.5	67.1	14.6	5.8	3,057
Primary	22.9	9.3	67.5	19.3	3.9	273
Secondary or more	23.3	11.3	56.8	23.0	8.9	224
<b>Gendered household type<sup>a</sup></b>						
Male and female adults	22.5	11.6	67.1	15.8	5.6	3,289
Female adult(s) only	22.7	18.2	57.4	15.0	9.4	245
Male adult(s) only	^	^	^	^	^	^
Child(ren) only (no adults)	^	^	^	^	^	^
<b>Household size<sup>a</sup></b>						
Small (1-5 members)	22.9	11.0	64.6	17.8	6.6	962
Medium (6-10 members)	22.5	11.7	67.2	15.9	5.3	1,799
Large (11+ members)	22.3	14.7	65.9	12.9	6.5	799
<b>Household hunger<sup>a</sup></b>						
Little to no hunger	22.5	12.5	65.8	16.1	5.6	2,471
Moderate or severe hunger	22.6	11.0	68.5	14.6	6.0	995

^ Results not statistically reliable, n<30.

<sup>1</sup> Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, disaggregates' sample sizes may not total to the aggregated sample size.

<sup>a-c</sup> A superscript in the column heading indicates significance tests were performed for associations between the indicator in the column heading and each of the variables in the rows. For example, a test was done between BMI and the woman's age. When an association between the column indicator and row variable is found to be significant (p<0.05), the superscript for the indicator in the column heading is noted next to the row variable.

Source: ZOI Interim Survey, Ghana 2015.

## 7.2 Stunting, Wasting, and Underweight among Children Under 5 Years

This section reports on three anthropometric measurements of undernutrition among children under 5 years of age in the ZOI: stunting (height-for-age), wasting (weight-for-height), and underweight (weight-for-age).

### 7.2.1 Stunting (Height-for-Age)

Stunting is a height-for-age measurement that reflects chronic undernutrition. It is an indicator of linear growth retardation, most often due to a prolonged inadequate diet and poor health. Reducing the prevalence of stunting among children, particularly age 0-23 months, is important because linear growth deficits accrued early in life are associated with cognitive impairments, poor educational performance, and decreased work productivity as adults (Black et al. 2008, Victora et al. 2008).

Stunting measures the percentage of children 0-59 months who are stunted. Z-score means are calculated and presented as summary statistics representing the nutritional status of children in a population. These mean scores describe the nutritional status of the entire population without the use of a cutoff. A negative mean Z-score suggests that, on average, children in the population of interest are less well-nourished than children in the WHO (2006) Multicenter Growth Reference Study (GSS, GHS, and ICF International 2015). The stunting measures presented below include the Feed the Future stunting indicator of combined moderate or severe stunting ( $<-2SD$ ) and the indicator for severe stunting ( $<-3SD$ ).

**Table 7.2** shows the prevalence of stunting, severe stunting, and mean Z-scores for children under 5 years in the ZOI. Estimates are presented for all children and by characteristics of the child, caregiver, and household. Children's characteristics include sex and age. Caregivers' characteristics include educational attainment. Household characteristics include gendered household type, household size, and household hunger.

The prevalence of stunting among children under 5 years of age in the ZOI is 29.9 percent. It is above 20 percent for all disaggregated categories – child's sex, age, caregiver's educational attainment, gendered household type, household size, and household hunger, under all disaggregated considerations – except for children under a year old.

Table 7.2 also shows the prevalence of severely stunted children, at 13.8 percent overall. About 15 percent of male children compared to 12.1 percent of female children are severely stunted. While about 17 percent of children aged between 48-59 months are severely stunted, only 4.8 percent of children under a year old suffer this condition. Severe stunting is the highest among children 24-35 months old, with 18.7 percent of children in this age category exhibiting severe stunting. The mean Z-Score for the ZOI is -1.0. It is determined that the association between mean Z-scores and the child's age as well as the caregiver's educational attainment are statistically significant at the 5 percent level.

**Table 7. 2: Stunting (height-for-age) among children under 5 years old**

Characteristic	% Stunted (<-2 SD) <sup>a</sup>	% Severely stunted (<-3 SD)	Mean Z-score <sup>b</sup>	n <sup>i</sup>
<b>Total (All children under 5 years)</b>	<b>29.9</b>	<b>13.8</b>	<b>-1.0</b>	<b>2,318</b>
<b>Child sex<sup>a</sup></b>				
Male	32.6	15.2	-1.1	1,192
Female	27.0	12.1	-.9	1,126
<b>Child age<sup>a,b</sup></b>				
0-11 months	11.9	4.8	.2	461
12-23 months	35.6	14.2	-1.1	417
24-35 months	36.8	18.7	-1.3	446
36-47 months	33.5	13.3	-1.3	484
48-59 months	30.6	16.7	-1.3	507
<b>Caregiver's educational attainment<sup>2,b</sup></b>				
No education	30.0	14.2	-1.0	2,189
Primary	34.1	7.1	-1.1	70
Secondary or more	21.8	10.7	-0.6	59
<b>Gendered household type</b>				
Male and female adults	30.2	14.0	-1.0	2,216
Female adult(s) only	24.3	7.6	-0.8	94
Male adult(s) only	^	^	^	^
Child(ren) only (no adults)	^	^	^	^
<b>Household size</b>				
Small (1-5 members)	31.5	12.0	-1.0	564
Medium (6-10 members)	28.7	13.9	-1.0	1,189
Large (11+ members)	31.1	15.7	-0.9	565
<b>Household hunger</b>				
Little to no hunger	30.7	15.1	-1.0	1,605
Moderate or severe hunger	29.1	11.2	-0.9	644

<sup>^</sup> Results not statistically reliable, n<30.

<sup>1</sup> Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, disaggregates' sample sizes may not total to the aggregated sample size.

<sup>2</sup> The ZOI interim survey identifies the primary caregiver of each age-eligible child. This person is likely, but not necessarily, the child's biological mother.

<sup>a</sup> A superscript in the column heading indicates significance tests were performed for associations between the indicator in the column heading and each of the variables in the rows. For example, a test was done between percent stunted and the child's sex. When an association between the column indicator and row variable is found to be significant (p<0.05), the superscript for the indicator in the column heading is noted next to the row variable.

Source: ZOI Interim Survey, Ghana 2015.

## 7.2.2 Wasting (Weight-for-Height)

Wasting is an indicator of acute malnutrition. Children who are wasted are too thin for their height and have a much greater risk of dying than children who are not wasted. Wasting may have a short duration, reversing once wasting children are fed nutritious food on a frequent and

consistent basis. The wasting indicator measures the percentage of children 0-59 months who are acutely malnourished, as defined by a weight-for-height Z-score more than two standard deviations below the median of the 2006 WHO Child Growth Standard. The wasting measures presented below include the Feed the Future wasting indicator of moderate or severe wasting combined ( $<-2SD$ ) as well as the indicator for severe wasting ( $<-3SD$ ), and the percentage of children who are overweight ( $>2SD$ ) and obese ( $>3SD$ ). Mean Z-scores are also presented.

**Table 7.3** shows the prevalence of wasting, severe wasting, overweight, obesity, and mean Z-scores for children under 5 years in the ZOI. Estimates are presented for all children and by characteristics of the child, caregiver, and household. Children's characteristics include sex and age. Caregivers' characteristics include educational attainment. Household characteristics include gendered household type, household size, and household hunger.

About 14 percent of children under 5 in the ZOI are wasted. The proportion of wasted children generally decreases as the age group increases. There is significant association between the percentage of wasted children and the household hunger types and the age of the child. However, there seems to be no association between the prevalence of wasting and the sex of the child, caregiver's educational attainment, gendered household type, and household hunger type. The prevalence of wasting drops as the child's age increases. Only 5.1 percent of the children in the ZOI are severely wasted. All the results for the different characteristics for severely wasting are in single digits, with children aged 0-11 months showing the highest rate of severe wasting at 8.9 percent. Six percent of the children in the ZOI are overweight and 2.4 percent are considered obese. The mean Z-Score for the ZOI is -0.4, with the lowest score (-0.7) being for children aged 12-23 months, followed by children living in female adult only households and children with caregiver's primary education (-0.6). The associations between wasting and the mean Z-scores and age are statistically significant.

**Table 7. 3: Wasting (weight-for-height) among children under 5 years old**

Characteristic	% Wasted (<-2 SD) <sup>a</sup>	% Severely wasted (<-3 SD)	% Overweight (> +2SD) <sup>b</sup>	% Obese (> +3SD)	Mean Z-score <sup>c</sup>	n <sup>i</sup>
<b>Total (All children under 5 years)</b>	<b>13.8</b>	<b>5.1</b>	<b>6.0</b>	<b>2.4</b>	<b>-0.4</b>	<b>2,281</b>
<b>Child sex</b>						
Male	14.2	6.5	6.1	2.6	-0.5	1,182
Female	13.3	3.6	5.8	2.2	-0.4	1,099
<b>Child age<sup>a,b,c</sup></b>						
0-11 months	19.6	8.9	8.4	4.8	-0.5	455
12-23 months	20.5	6.3	6.6	1.6	-0.7	416
24-35 months	11.9	4.3	3.4	2.0	-0.4	443
36-47 months	10.0	3.6	6.1	2.7	-0.2	479
48-59 months	8.2	3.0	5.6	1.0	-0.3	483
<b>Caregiver's educational attainment<sup>2</sup></b>						
No education	13.4	5.1	5.6	2.1	-0.4	2,154
Primary	26.9	6.1	7.2	5.5	-0.6	69
Secondary or more	6.3	2.5	16.2	6.4	0.2	58
<b>Gendered household type</b>						
Male and female adults	13.8	5.2	5.9	2.5	-0.4	2,180
Female adult(s) only	14.5	3.2	6.4	0.0	-0.6	93
Male adult(s) only	^	^	^	^	^	^
Child(ren) only (no adults)	^	^	^	^	^	^
<b>Household size<sup>a,b</sup></b>						
Small (1-5 members)	16.3	5.5	8.6	2.3	-0.4	551
Medium (6-10 members)	13.3	5.0	5.4	2.5	-0.4	1,173
Large (11+ members)	12.0	4.9	4.2	2.4	-0.4	557
<b>Household hunger</b>						
Little to no hunger	13.1	5.3	6.2	2.5	-0.4	1,579
Moderate or severe hunger	15.4	4.6	5.4	2.3	-0.5	634

<sup>^</sup> Results not statistically reliable, n<30.

<sup>i</sup> Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, disaggregates' sample sizes may not total to the aggregated sample size.

<sup>2</sup> The ZOI interim survey identifies the primary caregiver of each age-eligible child. This person is likely, but not necessarily, the child's biological mother.

<sup>a</sup> A superscript in the column heading indicates significance tests were performed for associations between the indicator in the column heading and each of the variables in the rows. For example, a test was done between the percent wasted and the child's sex. When an association between the column indicator and row variable is found to be significant (p<0.05), the superscript for the indicator in the column heading is noted next to the row variable.

Source: ZOI Interim Survey, Ghana 2015.

### 7.2.3 Underweight (Weight-for-Age)

Underweight is a weight-for-age measurement and is a reflection of acute and/or chronic undernutrition. This indicator measures the percentage of children 0-59 months who are underweight as defined by a weight-for-age Z-score of more than two standard deviations below the median of the 2006 WHO Child Growth Standard. The underweight measures presented below include the Feed the Future underweight indicator of moderate or severe underweight combined ( $<-2SD$ ) as well as the indicator for severe underweight ( $<-3SD$ ). Mean Z-scores are also presented.

**Table 7.4** shows the prevalence of underweight, severe underweight, and mean Z-scores for children under 5 in the ZOI. Estimates are presented for all children and by characteristics of the child, caregiver, and household. Children's characteristics include sex and age. Caregivers' characteristics include educational attainment. Household characteristics include gendered household type, household size, and household hunger.

Nineteen percent of children under five are underweight. The prevalence of underweight is higher among male children (21.7 percent) than female children (16.0 percent). The prevalence of underweight children in female adults only gendered households and male adults only gendered households are 16.2 percent and 19.2 percent, respectively. The prevalence of severe underweight is 5.4 percent across the ZOI. The prevalence of severe underweight is higher among children whose caregivers' have primary educational attainment (17.0 percent) and it is lower among those children whose caregivers' have no education at all. The mean Z-Score is -1.0, with observed variations for children between 0-11 months (0.2) and 24-59 month olds (-1.3). The associations between the mean Z-scores on one hand and child's age and caregivers' educational attainment on the other are statistically significant at the 5 percent level. Similarly, the association between the prevalence of underweight children and child's sex are statistically significant at the 5 percent level.

**Table 7. 4: Underweight (weight-for-age) among children under 5 years old**

Characteristic	% Underweight (<-2 SD) <sup>a</sup>	% Severely underweight (<-3 SD)	Mean Z-score <sup>b</sup>	n <sup>i</sup>
<b>Total (All children under 5 years)</b>	<b>19.0</b>	<b>5.4</b>	<b>-1.0</b>	<b>2,318</b>
<b>Child sex<sup>a</sup></b>				
Male	21.7	5.4	-1.1	1,192
Female	16.0	5.3	-0.9	1,126
<b>Child age<sup>b</sup></b>				
0-11 months	16.7	3.6	0.2	461
12-23 months	25.3	9.3	-1.1	417
24-35 months	21.0	7.2	-1.3	446
36-47 months	13.7	2.5	-1.3	484
48-59 months	18.9	4.5	-1.3	507
<b>Caregiver's educational attainment<sup>2,b</sup></b>				
No education	19.1	5.0	-1.0	2,189
Primary	25.0	17.0	-1.1	70
Secondary or more	8.3	0.0	-0.6	59
<b>Gendered household type</b>				
Male and female adults	19.2	5.4	-1.0	2,216
Female adult(s) only	16.2	5.6	-0.8	94
Male adult(s) only	^	^	^	^
Child(ren) only (no adults)	^	^	^	^
<b>Household size</b>				
Small (1-5 members)	18.0	6.5	-1.0	564
Medium (6-10 members)	18.8	4.3	-1.0	1,189
Large (11+ members)	20.6	6.5	-0.9	565
<b>Household hunger</b>				
Little to no hunger	18.4	5.3	-1.0	1,605
Moderate or severe hunger	20.9	5.8	-0.9	644

<sup>^</sup> Results not statistically reliable, n<30.

<sup>i</sup> Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, disaggregates' sample sizes may not total to the aggregated sample size.

<sup>2</sup> The ZOI interim survey identifies the primary caregiver of each age-eligible child. This person is likely, but not necessarily, the child's biological mother.

<sup>a-b</sup> A superscript in the column heading indicates significance tests were performed for associations between the indicator in the column heading and each of the variables in the rows. For example, a test was done between the percent underweight and the child's sex. When an association between the column indicator and row variable is found to be significant (p<0.05), the superscript for the indicator in the column heading is noted next to the row variable.

Source: ZOI Interim Survey, Ghana 2015.

## 8. Summary and Conclusions

### 8.1 Summary of Key Findings

The purpose of this report is to provide assessment of the Feed the Future indicators using the interim 2015 Population Based Survey conducted in the Feed the Future Initiative's ZOI in Ghana. The study uses essentially the same survey instrument as for the baseline study conducted in 2012 and the same respondent households. However, the interim assessment results are treated as point estimates and, hence, not used for comparing results from the baseline or for establishing causal effects of interventions.

The indicators of interest are organized into four major groups: Economic status and prevalence of poverty; women's empowerment; children's and women's nutrition and anthropometry; and household hunger. In this section, a summary of the study's results is reported using the major grouping of indicators as a reporting frame.

**Economic status:** The average household per capita daily expenditure is \$4.80, with the lowest decile at \$0.63, the median at \$2.15 and the 90<sup>th</sup> percentile at \$22.00. This shows the significant loading of the population at the lower end of the expenditure scale, indicative of the challenge of distribution seen in numerous countries, including advanced countries.

Using the international poverty threshold of \$1.25 (2005 PPP), it is determined that the prevalence of poverty is approximately 19.6 percent. The depth of poverty is 7.2 percent. In addition to the foregoing, the prevalence of poverty is estimated under two alternative poverty lines: the Ghana extreme poverty line; and the absolute poverty lines. These lines use GHS 2.17 and GHS 3.60 per adult equivalent daily expenditure, respectively. The estimated prevalences of poverty are 26.5 percent and 49.5 percent, respectively. The depths of poverty are 9.8 percent and 21.5 percent, respectively.

**Women's Empowerment:** The proportion of women indicating adequacy is above 50 percent in eight out of the ten indicators: productive input decisions (82.9 percent); autonomy in production (67.7 percent); purchase, sale or transfer of assets (72.4 percent); group member (72.6 percent); speaking in public (72.7 percent); workload (72.1 percent); leisure (60.8 percent); and ownership of assets (51.5 percent). Only 17.6 percent of women indicate adequacy in access to and decisions about credit and 40.6 percent of women indicate adequacy in control over use of income.

In contrast, the proportion of men indicating adequacy is above 50 percent in nine of the ten indicators, the only exception being credit access and credit use. Only 21.9 percent of adult male decision-makers responding to the empowerment module indicate being adequate in access to and decisions about credit. In this sense, men are not very different from women.

**Household Hunger:** Hunger is not a major challenge in the interim survey because about 70.4 percent of households have little or no hunger while only 1.8 percent of households experience



severe hunger. A higher percentage of female adult only gendered households and households without any educational attainment exhibit higher association with severe hunger than other households.

**Diet and Nutrition:** The mean number of food groups consumed by women is 3.65 out of the possible nine food groups. There is not much variation in this result across the household characteristics analyzed. The standard deviation from this mean is 1.56. The only groups of women with a mean dietary diversity score above 4.00 are those who have attained at least secondary education level.

Only 40.4 percent of the women achieve the Minimum Dietary Diversity threshold. However, more than half of the women with secondary or more educational attainment achieve the MDD-W threshold. In households that experience moderate or severe hunger, only 27.2 percent of women achieve their MDD-W.

The prevalence of exclusive breastfeeding is estimated at 50.0 percent among children under six months in the ZOI which is lower than the WHO recommended 100 percent. Additionally, the percentage of all children aged 6-23 months old receiving a MAD is 13.7 percent. The prevalence rate remains low across all categories of children, as well as caregiver and household characteristics. Children aged 6-11 months exhibit the lowest MAD levels.

Among breastfed children, 41.6 percent achieve the minimum meal frequency and 29.0 percent achieve the minimum dietary diversity. With regard to the foods consumed, 86.9 percent of all children consume grains, roots and tubers. Only 5.8 percent of the children consume eggs while more than 50 percent of them consume Vitamin A-rich fruits and vegetables.

**Women and Children Anthropometry:** Body Mass Index (BMI) is used as the principal indicator for women's anthropometry. The overall average BMI for women of reproductive age is about 22.5. However, it has been discovered that 12.2 percent of women surveyed are underweight while 15.7 percent are overweight and 5.9 percent are obese.

For children under five years old, the prevalence of stunting is about 30 percent, with about 14 percent being severely stunted. The prevalence of wasting is about 14 percent and prevalence of underweight is 19.0 percent. Only 5.4 percent of children in the ZOI are projected to be severely underweight. These children anthropometric indicators are found to associate with child's age and sex, caretaker's educational attainment and household hunger status.

## 8.2 Conclusions

The interim assessment report's purpose is to provide information about the status of the Feed the Future indicators in the ZOI in Ghana to USAID and its interagency, national, and international partners. It is designed for use as a monitoring tool and the focus is to estimate

indicators that offered statistical precision. The report's purpose is not to provide a foundation for causal relationships between USAID investments in interventions and indicator levels. Furthermore, the study is not designed to facilitate comparison between the interim assessment indicator estimates and those of the baseline, although ZOI level comparisons are presented in the appendix.

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## Appendix I. Supplementary Data and Figures

### AI.1 Interim Feed the Future Indicator Estimates

Unweighted sample sizes, point estimates, standard deviations, confidence intervals, Design Effects (DEFF), and nonresponse rates for the interim Feed the Future indicators for the Zone of Influence.

Feed the Future indicator	Estimate				Non-response rate <sup>1</sup>	n
	Indicator <sup>a</sup>	SD	95% CI	DEFF		
<b>Daily per capita expenditures (as a proxy for income) in USG-assisted areas (2010 USD)<sup>a</sup></b>						
All households	4.80	10.75	4.23-5.36	2.89	8.3	3,988
Male and female adults	3.92	6.24	3.46-4.38	6.76	7.9	3,248
Female adult(s) only	6.55	14.91	4.86-8.24	1.69	5.4	357
Male adult(s) only	12.18	31.09	7.88-16.48	1.96	13.6	327
Child(ren) only (no adults)	^	^	^	^	^	^
<b>Prevalence of Poverty: Percent of people living on less than \$1.25 per day (2005 PPP)<sup>a</sup></b>						
All households	19.6	39.6	17.1-22.1	4.41	8.3	3,988
Male and female adults	20.3	0.4	17.5-23.1	4.41	7.9	3,248
Female adult(s) only	15.9	0.4	11.3-20.6	1.44	5.4	357
Male adult(s) only	9.5	0.3	5.7-13.3	1.44	13.6	327
Child(ren) only (no adults)	^	^	^	^	^	^
<b>Depth of Poverty: Mean percent shortfall relative to the \$1.25 per day (2005 PPP) poverty line<sup>a</sup></b>						
All households	7.2	17.9	6.1-8.3	4	8.3	3,988
Male and female adults	7.4	0.2	6.2-8.6	4	7.9	3,248
Female adult(s) only	5.7	0.2	3.8-7.6	1.21	5.4	357
Male adult(s) only	4.0	0.2	2.0-6.1	1.69	13.6	327
Child(ren) only (no adults)	^	^	^	^	^	^
<b>Percent of women achieving adequacy on Women's Empowerment in Agriculture Index Indicators<sup>2</sup></b>						
Input in productive decisions	82.9	37.5	80.5-85.4	3.24	28.7	2,698
Autonomy in production	67.7	47.8	64.4-70.9	5.29	33.7	2,511
Ownership of assets	51.5	50.0	48.8-54.2	2.25	29.6	2,667
Purchase, sale or transfer of assets	72.4	42.6	68.5-76.3	6.25	29.7	2,660
Access to and decisions on credit	17.6	38.5	14.7-20.5	3.61	38.3	2,336
Control over use of income	40.6	48.7	37.5-43.7	2.89	28.0	2,727
Group member	72.6	45.8	69.6-75.7	2.89	40.7	2,246
Speaking in public	72.7	45.8	70.3-75.1	1.96	33.4	2,521
Workload	72.1	43.9	68.9-75.4	5.29	44.1	2,116
Leisure	60.8	48.6	57.2-64.3	6.25	27.7	2,736

Feed the Future indicator	Estimate				Non-response rate <sup>1</sup>	N
	Indicator <sup>a</sup>	SD	95% CI	DEFF		
<b>Prevalence of households with moderate or severe hunger<sup>a</sup></b>						
All households	29.6	45.4	26.2-33.1	5.76	14.5	3,720
Male and female adults	28.9	45.3	25.0-32.7	5.76	12.2	3,096
Female adult(s) only	35.5	48.0	28.8-42.3	1.69	18.4	308
Male adult(s) only	25.0	43.4	18.7-31.4	1.69	27.1	276
Child(ren) only (no adults)	^	^	^	^	^	^
<b>Women's Dietary Diversity: Mean number of food groups consumed by women of reproductive age</b>						
All women age 15-49	3.7	1.6	3.5-3.8	5.76	24.9	3,828
<b>Prevalence of exclusive breastfeeding among children under 6 months of age</b>						
All children	50.0	50.1	41.2-58.8	1.96	8.1	261
Male children	55.4	50.1	43.9-66.8	1.69	8.5	129
Female children	45.3	49.9	34.0-56.7	1.69	7.7	132
<b>Prevalence of children 6-23 months receiving a minimum acceptable diet<sup>a</sup></b>						
All children	13.7	32.9	10.2-17.1	2.25	26.8	772
Male children	11.7	31.2	7.7-15.7	1.96	25.4	392
Female children	16.6	36.5	11.2-22.0	1.96	28.4	303
<b>Prevalence of women of reproductive age who consume targeted nutrient-rich value chain commodities</b>						
NRVCC I: All women age 15-49	11.0	31.5	8.6-13.3	5.76	23.9	3,876
<b>Prevalence of women of reproductive age who consume at least one targeted nutrient-rich value chain commodity</b>						
All women age 15-49	11.0	31.5	8.6-13.3	5.76	23.9	3,876
<b>Prevalence of children 6-23 months who consume specific targeted nutrient-rich value chain commodities</b>						
NRVCC I: All children	7.5	26.0	4.8-10.2	2.25	22.1	821

Feed the Future indicator	Estimate				Non-response rate <sup>1</sup>	n
	Indicator <sup>a</sup>	SD	95% CI	DEFF		
<b>Prevalence of children 6-23 months who consume at least one targeted nutrient-rich value chain commodity</b>						
All children	7.5	26.0	4.8-10.2	2.3	22.1	821
Male children	5.4	21.5	2.8-8.0	1.0	20.8	419
Female children	10.6	29.9	5.4-15.7	1.0	23.7	325
<b>Prevalence of underweight women</b>						
All non-pregnant women age 15-49	12.2	32.1	10.2-14.2	3.6	30.1	3,560
<b>Prevalence of stunted children under 5 years of age<sup>a,3</sup></b>						
All children	29.9	45.3	27.0-32.8	2.6	38.5	2,318
Male children	32.6	46.4	29.3-35.9	1.7	38.5	1,192
Female children	27.0	44.3	23.1-30.8	2.3	38.5	1,126
<b>Prevalence of wasted children under 5 years of age<sup>3</sup></b>						
All children	13.8	34.6	10.9-16.7	4.4	39.5	2,281
Male children	14.2	35.0	10.2-18.3	4.4	39.0	1,182
Female children	13.3	34.0	10.1-16.4	2.6	40.0	1,099
<b>Prevalence of underweight children under 5 years of age<sup>a,3</sup></b>						
All children	19.0	34.6	16.4-21.6	2.9	38.5	2,318
Male children	21.7	41.1	17.3-26.1	4.0	38.5	1,192
Female children	16.0	36.5	12.9-19.2	2.3	38.5	1,126

n/a – Not available.

<sup>^</sup> Results not statistically reliable, n<30.

<sup>1</sup> Non-response rates for each indicator are derived by the difference between the number of eligible cases and the number of observations available for analysis divided by the number of eligible cases. The total number of eligible households is 4,350, of which 4,219 had full information on household members' gender and age (131 households refused to answer partially or completely). To calculate non-response rates at the disaggregate level, the same distribution of the 4,219 households by gendered household type was used for the 131 households with no or incomplete information. This implicitly assumes that households who refused to be interviewed follow the same gendered household type distribution as those who accepted to be interviewed, which may or may not be true.

<sup>2</sup> Data relevant for the Women's Empowerment in Agriculture Index (WEAI) were collected from 3,205 women, for an overall non-response rate of 15.3%. However, each of the 10 indicators of the WEAI is computed by aggregating responses to a specific set of questions. If one response is missing, the indicator cannot be calculated and the respondent is excluded from the estimate. As a result, the useable sample size for each indicator varies and is generally much lower than reflected in the overall non-response rate.

<sup>3</sup> Data on anthropometric measurements were collected from 3,187 children. Of these, the WHO's igrowup software flagged 742 cases as being outside the range of acceptable Z-scores for stunting and underweight and 779 for wasting. An additional 127 cases had to be excluded because of missing age, height, weight, sex, or necessary information for weighting.

<sup>4</sup> The n value for wasting is less than for stunting, and underweight by 37, because these observations are converted to missing by the WHO's igrowup macro software as being outside the range of the reference values.

<sup>a</sup> Significance tests were run for associations between each indicator (bold text title in the rows) and the disaggregate variable below the indicator title. For example, a test was done between per capita expenditures and gendered household type. When an association between the indicator and disaggregate variable is found to be significant (p<0.05), the superscript is noted next to the indicator.

Source: ZOI Interim Survey, Ghana 2015.



## AI.2 Poverty at the \$1.90 (2011 PPP) per person per day threshold

Characteristic	Prevalence of Poverty <sup>1,4</sup>		Depth of Poverty <sup>2,4</sup>		Average consumption shortfall of the poor <sup>3,4</sup>		
	Percent population <sup>a</sup>	n <sup>5</sup>	Percent of poverty line <sup>b</sup>	n <sup>5</sup>	In USD 2011 PPP <sup>c</sup>	Percent of poverty line <sup>c</sup>	n <sup>5</sup>
<b>Total (All households)</b>	<b>30.8</b>	<b>3,988</b>	<b>11.6</b>	<b>3,988</b>	<b>0.7</b>	<b>37.4</b>	<b>1,247</b>
<b>Gendered household type</b>							
Male and female adults	32.2	3,248	11.9	3,248	0.7	37.1	1,040
Female adult(s) only	25.5	357	9.2	357	0.7	36.2	90
Male adult(s) only	16.7	327	6.1	327	0.7	36.5	48
Child(ren) only (no adults)	^	^	^	^	^	^	^
<b>Household size<sup>a,b,c</sup></b>							
Small (1-5 members)	18.2	1,912	6.4	1,912	0.7	35.3	331
Medium (6-10 members)	40.4	1,692	14.7	1,692	0.7	36.3	668
Large (11+ members)	52.8	384	24.1	384	0.9	45.6	208
<b>Household educational attainment<sup>a</sup></b>							
No education	31.6	2,523	11.9	2,523	0.7	37.6	777
Primary	33.4	568	11.6	568	0.7	34.6	194
Secondary or more	27.3	897	10.8	897	0.8	39.4	236

^ Results not statistically reliable, n<30.

<sup>1</sup> The prevalence of poverty is the percentage of individuals living below the \$1.90 (2011 PPP) per person per day threshold. Poverty prevalence is sometimes referred to as the poverty incidence or poverty headcount ratio.

<sup>2</sup> The depth of poverty, or poverty gap, is the average consumption shortfall multiplied by the prevalence of poverty.

<sup>3</sup> The average consumption shortfall of the poor is the average amount below the poverty threshold of a person in poverty. This value is estimated only among individuals living in households that fall below the poverty threshold.

<sup>4</sup> A significance test was performed for associations between the indicator in the column heading and each of the variables in the rows. For example, a test was done between prevalence of poverty and gendered household type. When an association between the column indicator and row variable is found to be significant (p<0.05), the superscript for the indicator in the column heading is noted next to the row variable.

<sup>5</sup> Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, disaggregates' sample sizes may not total to the aggregated sample size.

<sup>a-c</sup> Superscripts in the column heading indicates significance tests were performed for associations between the indicator in the column heading and each of the variables in the rows. For example, a test was done between prevalence of poverty and gendered household type. When an association between the column indicator and row variable is found to be significant (p<0.05), the superscript for the indicator in the column heading is noted next to the row variable

Source: ZOI Interim Survey, Ghana 2015.

## AI.3 Mean difference t-test results between the baseline 2012 and 2015 ZOI level indicators

Feed the Future Indicator	Baseline 2012 Value	Interim 2015 Value	Mean difference (t-value)	p-value
Daily Per Capita Expenditure (USD)	4.01	4.80	0.79* (3.0)	0.003
Prevalence of Poverty (%)	22.2	19.6	-2.6* (-2.4)	0.018
Poverty Depth (%)	6.7	7.2	0.5 (1.1)	0.262
Prevalence of Household Hunger Scale (%)	39.4	29.6	-9.8* (-7.7)	0.000
Women dietary diversity: mean number of food groups consumed by women of reproductive age	4.0	3.7	-.4* (-8.1)	0.000
Prevalence of exclusive breastfeeding among children under 6 months of age(%)	60.5	50.0	-10.5* (-2.1)	0.038
Prevalence of children 6-23 months receiving a minimum acceptable diet (%)	15.5	13.7	-2.1 (-1.0)	0.317
Prevalence of underweight women (%)	12.0	12.2	0.2 (0.2)	0.878
Prevalence of stunted children under 5 years of age (%)	36.1	29.9	-0.6* (-3.7)	0.000
Prevalence of wasted children under 5 years of age (%)	11.0	13.8	2.8* (2.4)	0.017
Prevalence of underweight children under 5 years of age (%)	18.4	19.0	0.6 (0.4)	0.667
<b>Women's Empowerment in Agriculture Index Indicators</b>				
Input in productive decisions	66.6	82.9	16.3* (11.8)	0.000
Autonomy in production	74.8	67.7	-7.2* (-4.9)	0.000
Ownership of assets	62.3	51.5	-10.8* (-6.9)	0.000
Purchase, sale or transfer of assets	33.5	72.4	38.9* (25.8)	0.000
Access to and decisions on credit	22.3	17.6	-4.7* (-3.6)	0.000
Control over use of income	77.6	40.6	-36.9* (-25)	0.000
Group member	71.2	72.6	1.4 (0.9)	0.348
Speaking in public	70.2	72.7	2.4* (1.7)	0.092
Workload	58.1	72.1	14.1* (8.7)	0.000
Leisure	85.3	60.8	-24.5* (-17.4)	0.000

\* Significant at 95 percent confidence level.

Source(s): PBS GHANA 2012; ZOI Interim Survey, GHANA 2015.

## Appendix 2. Methodology

### A2.1 Sampling and Weighting

#### *Sampling*

The 2012 baseline study sample was used for the 2015 interim assessment study, although the data was not analyzed as a panel study. The description of the 2012 baseline study sampling process is reproduced here. The 2012 baseline study used a two-stage sampling approach to draw the sample households. The first stage involved the selection of Enumeration Areas (EAs) based on the 2010 Ghana Census using the Probability Proportional to Size (PPS) method. The second stage involved a simple random sampling approach to select households from the selected EAs based on a household listing done in the EAs selected in the first stage.<sup>12</sup>

The sampling process was built around the objectives of the Ghana country strategy. The prevalence rates for poverty, stunting and underweight specifically for the ZOI in Ghana, available from the Ghana Living Standards Survey Rounds 3 through 5 (GLSS V) and the Ghana Demographic and Health Survey (GDHS) of 2008, provided the data for designing the sampling strategy of the survey. At the time of the baseline survey, the overarching focus was on the RING (Resilience in Northern Ghana) project and this focus defined the structure of the survey strata to ensure observations in each stratum were large enough to provide statistical viability. The focus for the 2015 interim study was broader and RING was no longer a focus. However, because the sample used in 2012 was used in 2015, this RING-non-RING strata structure is inherently embedded.

The following section describes the development of the survey design and the calculations used to derive a sample size sufficient to produce accurate estimates of the three goal-level indicators: prevalence of poverty and prevalence of stunting and underweight among children under five years.

Let  $i = 1, 2, 3$  define the indicators being estimated for poverty, stunting, and underweight. To position for adequate sample size in 2012, assumptions had to be made about the beginning and ending values for the three indicators in the ZOI. Using GLSS V estimates as reference, the estimated prevalence rates in 2012 and assumptions about their ending rates in 2017 were as follows:

1. Initial prevalence rate of poverty ( $p_{11}$ ) = 0.567. Assuming -1.0 percent per annum growth rate between 2012 and 2017, the ending prevalence rate of poverty ( $p_{21}$ ) in 2017 = 0.517.
2. Initial prevalence rate of stunting for children younger than 60 months ( $p_{12}$ ) = 0.322. Assumed growth rate = -1.32 percent per annum. Ending prevalence of stunting rate ( $p_{22}$ ) = 0.256.

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<sup>12</sup> The remainder of this section is drawn from the sampling section presented in Zereyesus et al. (2014).

- Initial prevalence of underweight children under 60 months ( $p_{13}$ ) = 0.219. Assumed growth rate = -0.86 percent per annum. Ending prevalence of underweight ( $p_{23}$ ) = 0.176.

The assumptions about Type I and Type II errors are as follows:

- Type I error ( $\alpha$ ) is assumed at 5 percent.
- Type II error ( $\beta$ ) is assumed at 20 percent.

Based on the foregoing assumptions, Equation (1) was used to estimate the sample size for each of the indicators,  $n_i$ :

$$n_i = \left\{ \left[ \frac{(p_{1i}q_{1i}) + p_{2i}q_{2i}}{p_{2i} - p_{1i}} \right] \times (Z_{1-\alpha} + Z_{1-\beta})^2 \right\} \times Deff_i \forall_i = 1, 2, 3 \quad (A2.1.1)$$

where  $q_{1i}$  is  $1-p_{1i}$  and  $q_{2i}$  is  $1-p_{2i}$  and  $Z_{1-\alpha}$  and  $Z_{1-\beta}$  measure the standard Z-scores at the 95 percent and 80 percent levels respectively.  $Deff_i$  is the design effect for the sampling design for indicator  $i$ . It is estimated at 3.40, 1.21 and 1.25 for the prevalence of poverty, stunting and underweight, respectively. Applying these estimates produces nominal sample sizes of 4,164 for prevalence of poverty, 702 for prevalence of stunting, and 1,321 for prevalence of underweight indicators. The nominal sample sizes based on the stunting and underweight indicators were inflated to account for households without children in the required age group of 0-59 months, and the inflated figures were further inflated by 10 percent to account for potential non-response. Thus, the effective sample sizes for prevalence of poverty, prevalence of stunting, and the prevalence of underweight children were 4,580, 1,254, and 2,358, respectively.

The largest estimated sample size becomes the selected sample size, i.e., 4,580. It was sufficient for estimating the poverty indicator across the RING and non-RING strata. Given that both the stunting and underweight indicators are for children, the estimated sample size for underweight, being the largest, i.e., 2,358. To obtain sufficient power and statistical significant, the  $\beta$  (Type II) and  $\alpha$  (Type I) were adhered to in the sample size estimation. The estimated sample size was rounded up to 4,600 (Zereyesus et al. 2014).

The sample size was determined at baseline using design effects from the Ghana Living Standards Survey, round 5 (GLSS V, 2005-06). The GLSS V produced design effects of 15.92 for Northern Region, 5.26 for Upper East Region and 3.41 for Upper West Region. The estimates for the Northern and Upper East Regions yielded very large and practically challenging sample sizes and therefore, the lowest design effects (3.41) was used (Zereyesus et al. 2014).

The effective sample size in 2012 was 4,410 households. 4,350 households were relocated in 2015, producing an attrition rate over three years of 1.4 percent<sup>13</sup> due to migration and death. However, three enumeration areas were not visited during fieldwork: two were missed entirely by the field team even though they were listed and one could not be reached because of security

<sup>13</sup> Lee (2003), reviewing the literature on attrition rate in panel data, notes that rates as high as 50 percent are not uncommon.

issues. As a result, of the 4,350 households that were listed, 4,293 were visited. Of those, 74 refused to participate in the survey or did not complete the household demographic module. At the end, 4,219 households were interviewed, for an overall response rate of 97 percent. During data analysis, however, 141 households interviewed could not be matched with the baseline sample and therefore could not be assigned a sample weight. These households were removed from the analysis.

The response rates on individual modules were lower, yielding useable sample sizes for analysis sometime much smaller than predicted, although still sufficient to produce precise estimates.

Data on anthropometric measurements were collected from 3,187 children under five, out of 3,769 eligible children in the sample. However, during the analysis, an additional 869 observations for stunting and underweight and 906 observations for wasting had to be removed from the analysis: 50 cases were excluded because these children belonged to the 141 households that could not be reconciled with the baseline dataset and hence the weights could not be calculated; 77 cases were excluded because of missing age, gender, or a combination of these two variables; and 742 cases for stunting and underweight and 779 cases for wasting were flagged as outside the range of acceptable Z-scores by the WHO igrowup software used to calculate the indicators and had to be removed. Altogether this represented a significant loss of sample cases (see Table A1.1), and further testing was conducted to try to assess the impact of excluding these observations.

Ideally, the sample loss should have been examined for any geographic or other systematic patterns (if they could be found concentrated in some EAs for instance or could be attributed to specific interviewing teams) to see if there were possibility of bias. Unfortunately, this was not possible because of insufficient information on field activities and procedures. Instead the data was examined to assess the extent to which adding data changed the estimation. See Appendix 3: Sensitivity Analysis of the Anthropometry Data for more details on the test performed and their results. These analyses showed that the estimates as presented in this report are relatively robust to changes in specifications. Sample sizes remain large even after removing the outliers and non-responses, allowing for good precision in the estimates.

### **Weighting**

Data required for weighting of survey data were collected throughout the sampling process, and included: (1) EA measure of size (where size is in terms of number of population or number of households) used for selection of EAs; (2) measure of size of strata from which EAs are drawn; (3) measure of size of EAs at time of listing; and (4) response rates among households, women, and men. Weights were calculated for households, women, men, and children in the sample.

Design weights were calculated based on the separate sampling probabilities for each sampling stage and for each cluster. We have:

$P_{1hi}$  = first-stage sampling probability of the  $i$ -th cluster in stratum  $h$ .

$P_{2hi}$  = second-stage sampling probability within the  $i$ -th cluster (household selection).

The probability of selecting cluster  $i$  in the sample is:

$$P_{1hi} = \frac{m_h \times N_{hi}}{N_h}$$

The second-stage probability of selecting a household in cluster  $i$  is:

$$P_{2hi} = \frac{n_{hi}}{L_{hi}}$$

Where:

$m_h$  = number of sample clusters selected in stratum  $h$ .

$N_{hi}$  = total population in the frame for the  $i$ -th sample cluster in stratum  $h$ .

$N_h$  = total population in the frame in stratum  $h$ .

$n_{hi}$  = number of sample households selected for the  $i$ -th sample cluster in stratum  $h$ .

$L_{hi}$  = number of households listed in the household listing for the  $i$ -th sample cluster in stratum  $h$ .

The overall selection probability of each household in cluster  $i$  of stratum  $h$  is the product of the selection probabilities of the two stages:

$$P_{hi} = P_{1hi} \times P_{2hi} = \frac{m_h \times N_{hi}}{N_h} \times \frac{n_{hi}}{L_{hi}}$$

The design weight for each household in cluster  $i$  of stratum  $h$  is the inverse of its overall selection probability:

$$W_{hi} = \frac{1}{P_{hi}} = \frac{N_h \times L_{hi}}{m_h \times N_{hi} \times n_{hi}}$$

The sampling weight was calculated with the design weight corrected for non-response for each of the selected clusters. Response rates were calculated at the cluster level as ratios of the number of interviewed units over the number of eligible units, where units could be household or individual (e.g., woman, child).

## A2.2 Poverty Prevalence and Expenditure Methods

### Data Source

The Household Consumption Expenditure modules of the questionnaire are used to calculate the per capita expenditures and prevalence of poverty indicators. The household consumption expenditure module is similar to the LSMS, where households' consumption of various food and non-food items is measured to infer household income and well-being. Individuals' per capita expenditures are then derived by dividing total household expenditures by the number of household members. From this data, household expenditure totals are calculated and used as a proxy for household incomes, based on the assumption that a household's consumption is closely related to its income. Household consumption and expenditures are often preferred to income when measuring poverty due to the difficulty in accurately measuring income. According to Deaton (2008), expenditure data are less prone to error, easier to recall, and more stable over time than income data.

### Data Preparation

**Monetary Valuation of Durable Goods:** Consumer durables, unlike food and non-food items, are not exhausted in consumption and provide repeated service. As such, it is important to value them over their duration of use instead of in the period of acquisition, as for food and non-food items.

The valuation of the durable goods is based on extracting the “user cost or value” generated from its use during the time period of analysis. The PBS did not collect data on the purchase value of the durable goods. The data collected encompassed the quantity, age, and current value of durable goods owned by the household.

Following Deaton and Zaidi (2002), the “user cost” for durable goods may be estimated using the following equation:

$$P_t = (r_t - \pi_t + \delta) \quad (\text{A2.2.1})$$

where  $P_t$  is the current value of the durable good,  $(r_t - \pi_t)$  is the real rate of interest,  $r_t$  is the general nominal rate at time  $t$ ,  $\pi_t$  is the rate of inflation for each durable good at time  $t$ ,  $\delta$  is the rate of depreciation for the durable good, and  $t$  represents time in years. Since the depreciation rate is not available for each durable good registered in the survey, Equation (A2.2.2) was used to estimate the depreciation rate for each durable good:

$$\delta - \pi = 1 - \left( \frac{P_t}{P_{t-T}} \right)^{\frac{1}{T}} \quad (\text{A2.2.2})$$

where the current value of the durable good is  $P_t$ , and the age of the item is  $t$  while its useful lifespan is  $T$  years. Taking the natural log of Equation (A2.2.2) and rearranging the results produces Equation (A2.2.3):

$$\ln(P_t) = \ln(P_{t-T}) - T \ln(1 - \delta + \pi) \quad (\text{A2.2.3})$$

$\delta - \pi$  may be estimated by regressing the current value of the durable good on the age of the durable good in  $T$  years. The constant is the value of the durable good when it was newly purchased. Once  $\delta - \pi$  is computed, this information can be used with the nominal interest rate to derive the  $(r_t - \pi_t + \delta)$ . For the purpose of this current analysis, the Bank of Ghana's stated nominal interest rate of 15 percent is used. Finally, the "user cost" of the good is calculated by multiplying  $(r_t - \pi_t + \delta)$  by the current value of each of the durable good owned by the household.

**Monetary Valuation of Housing:** Housing data was collected on different types of tenancy: owned, rented, borrowed or other arrangement. If the dwelling was rented, then the rental price was reported. If respondents indicated owning the dwelling, they were asked to provide an estimate of the current value of their dwelling, its age, and its current estimated rental price had they been renting.

Missing data in each of the consumption sub-aggregates were replaced with the sample mean. Data were also inspected for outliers in each of the consumption sub-aggregates to minimize the potential introduction of bias in the estimates due to unusually extreme values. An observation was flagged as an outlier if its value was  $\pm 3$  SDs away from the mean of the value including the potential outliers. Whenever an outlier was detected, a mean value of the observations excluding the outliers was used to replace the outlier value.

**Consumption Aggregates Summary:** The food, nonfood, consumer durables, and housing components are aggregated to estimate the total consumption for each household. These figures were then converted to annual consumption aggregates for each household. These values were then divided by household size to generate the per capita aggregate consumption indicator value, and the prevailing exchange rate at the time of the survey was used to convert the indicator values into 2010 USD basis.

The calculation of money metric utility requires that the nominal consumption aggregate be deflated by a Paasche price index, which adjusts for cost of living across households by varying the household weights. For this analysis, the Paasche price index,  $P_p^h$ , is defined as:

$$P_p^h = \frac{p^h \times q^h}{p^0 \times q^h} \quad (\text{A2.2.4})$$

where  $p^h$  and  $q^h$  are the price and quantity faced by the household and  $p^0$  is the household's reference price. Since the weights for the price index are based on the quantities consumed by



the household, they can differ from one household to another. The above equation can be rewritten and approximated in logs as follows:

$$P_p^h = \left( \sum w_k^h \left( \frac{p_k^0}{p_k^h} \right) \right)^{-1}$$

$$\ln P_p^h \cong \sum w_k^h \ln \left( \frac{p_k^h}{p_k^0} \right) \quad (\text{A2.2.5})$$

where  $w_k^h$  is the share of household  $h$ 's budget devoted to good  $k$ . The reference price vector,  $p^0$ , is the median of the prices observed from the individual households. The Paasche Index for food consumption was developed to adjust for cost-of-living differences due to the relatively smaller data variability in the food expenditure records as compared to the other sub-aggregates, especially durable goods and housing, which were prone to outliers and extreme data points.

Expenditures results are presented in 2010 USD constant prices. To obtain these figures, expenditure data collected in 2015 was deflated to the 2005 equivalents using the Ghanaian July 2015 CPI (637.2). The July CPI is used to correspond with the July CPI used in the baseline 2012 analysis. The deflated expenditures were converted to 2005 USD using the purchasing power parity exchange rate. The conversion rate used is 0.45. The third step inflated the expenditures in 2005 USD to 2010 levels using the U.S. CPI of 1.11.

## A2.3 Criteria for Achieving Adequacy for Women's Empowerment in Agriculture Indicators

The below table presents the Women's Empowerment in Agriculture five dimensions of empowerment, their corresponding empowerment indicators, the survey questions that are used to elicit the data required to establish adequacy or inadequacy for each empowerment indicator, and how adequacy criteria are defined for each empowerment indicator.

Dimension	Indicator name	Survey questions	Aggregation of adequacy criteria	Inadequacy criteria
<b>Production</b>	Input in productive decisions	G2.02 A-C, F How much input did you have in making decisions about: food crop farming, cash crop farming, livestock raising, fish culture; G5.02 A-D To what extent do you feel you can make your own personal decisions regarding these aspects of household life if you want(ed) to: agriculture production, what inputs to buy, what types of crops to grow for agricultural production, when or who would take crops to market, livestock raising	Must have at least some input into or can make own personal decisions in at least two decision-making areas	Inadequate if individual participates BUT does not have at least some input in decisions; or she does not make the decisions nor feels she could.
	Autonomy in production	G5.03- G5.05 My actions in [DOMAIN] are partly because I will get in trouble with someone if I act differently. Regarding [DOMAIN] I do what I do so others don't think poorly of me. Regarding [DOMAIN] I do what I do because I personally think it is the right thing to do. Agricultural production, inputs to buy, crops to grow, take to market, livestock	Achievement in any	Inadequate if individual does not have RAI above one in at least on production activity

Dimension	Indicator name	Survey questions	Aggregation of adequacy criteria	Inadequacy criteria
Resources	Ownership of assets	G3.02 A-N Who would you say owns most of the [ITEM]? Agricultural land, Large livestock, Small livestock, chicks etc.; Fish pond/equip; Farm equipment (non-mechanized); F arm equip (mechanized); Nonfarm business equipment ;House; Large durables; Small durables; Cell phone; Non-agricultural land (any); Transport	Must own at least one asset, but not only one small asset (chickens, non-mechanized equipment, or small consumer durables)	Inadequate if household does not own any asset or only owns one small asset, or if household owns the type of asset BUT she does not own most of it alone
	Purchase, sale, or transfer of assets	G3.03-G3.05 A-G Who would you say can decide whether to sell, give away, rent/mortgage [ITEM] most of the time? G3.06 A-G Who contributes most to decisions regarding a new purchase of [ITEM]? Ag land; Large livestock, Small livestock; Chickens etc; Fish pond; Farm equipment (non-mechanized); Farm equipment (mechanized)	Must be able to decide to sell, give away, or rent at least one asset, but not only chickens and non-mechanized farming equipment	Inadequate if household does not own any asset or only owns one small asset, or household owns the type of asset BUT she does not participate in the decisions (exchange or buy) about it

Dimension	Indicator name	Survey questions	Aggregation of adequacy criteria	Inadequacy criteria
	Access to and decisions on credit	G3.08-G3.09 A-E Who made the decision to borrow/what to do with money/item borrowed from [SOURCE]? Non-governmental organization (NGO); Informal lender; Formal lender (bank); Friends or relatives; ROSCA (savings/credit group)	Must have made the decision to borrow or what to do with credit from at least one source	Inadequate if household has no credit OR used a source of credit BUT she did not participate in ANY decisions about it
<b>Income</b>	Control over use of income	G2.03 A-F How much input did you have in decisions on the use of income generated from: Food crop, Cash crop, Livestock, Non-farm activities, Wage & salary, Fish culture; G5.02 E-G To what extent do you feel you can make your own personal decisions regarding these aspects of household life if you want(ed) to: Your own wage or salary employment? Minor household expenditures?	Must have some input into decisions on income, but not only minor household expenditures	Inadequate if participates in activity BUT she has no input or little input on decisions about income generated
<b>Leadership</b>	Group member	G4.05 A-K Are you a member of any: Agricultural / livestock/ fisheries producer/ market group; Water, forest users', credit or microfinance group; Mutual help or insurance group (including burial societies); Trade and business association; Civic/charitable group; Local government; Religious group; Other women's group; Other group.	Must be an active member of at least one group	Inadequate if not an active member of a group or if unaware of any group in the community or if no group in community

Dimension	Indicator name	Survey questions	Aggregation of adequacy criteria	Inadequacy criteria
	Speaking in public	G4.01 – G4.03 Do you feel comfortable speaking up in public: To help decide on infrastructure (like small wells, roads) to be built? To ensure proper payment of wages for public work or other similar programs? To protest the misbehavior of authorities or elected officials?	Must feel comfortable speaking in at least one public setting	Inadequate if not at all comfortable speaking in public
<b>Time</b>	Workload	G6 Worked more than 10.5 hours in previous 24 hours.	Total summed hours spent toward labor must be less than 10.5	Inadequate if works more than 10.5 hours a day
	Leisure	G6.02 How would you rate your satisfaction with your available time for leisure activities like visiting neighbors, watching TV, listening to radio, seeing movies or doing sports?	Must rate satisfaction level as at least five out of 10	Inadequate if not satisfied (<5)

## Appendix 3. Test on the Interim Dataset and Robustness of the Estimates

Robustness tests were performed to further analyze the effect of significant reduction in the children's anthropometry sample due to errors in measurements, non-responses, and missing information. In particular, tests were performed on the sensitivity of the mean values of the anthropometry indicators to excluded observations.

Three separate tests were done. First, a comparative analysis of the results of indicator values with and without the outlier observations was done. Outlier observations refer to those observations of children under 5 years of age flagged as outside the normal range. Second, the indicator values of 'panel sample' households and 'extended sample' households were compared. "Panel sample" households are those that constituted the original baseline population-based survey sample (4,410) and were used in producing the interim report. The "extended sample" households are those used for over-sampling and compute district-level estimates. The same instrument was used in interviewing the extended sample of 3,010. Third, we compared the results with and without applying sampling weights. The sampling weights are used to correct for lack of self-weighting in the survey design used.

The results of each of these analyses are presented in the following three sections of this report.

### **I. Comparison of children's anthropometric Interim indicator values estimated with and without outliers**

Data on anthropometric measurements were collected from 3,187 children. Of these, 742 observations for stunting and underweight and 779 for wasting were determined to be outside the range of acceptable Z-scores<sup>14</sup> by the WHO's igrowup software and were excluded from the analysis as outliers. Additional 127 observations were excluded from the analysis due to missing data on age, gender, weight, height or lack of sampling weights from three Interim Enumeration Areas (EAs). As a result, the sample size available for estimation of the stunting and underweight indicators was reduced to 2,318 observations and to 2,281 for the wasting indicator.

Analysis of the 2,318 valid observations shows that 6.6%, 71.5%, 11.7% and 10.2% are from the Brong Ahafo, Northern, Upper East, and Upper West regions, respectively. Regional analysis of the entire dataset, including the 742 observations considered as outliers, shows that 8.4%, 71.3%, 11.1%, and 9.2% of the observations are from the Brong Ahafo, Northern, Upper East, and Upper West regions, respectively.

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<sup>14</sup> Z-scores are considered outliers according WHO's igrowup software if z-scores are < -5 or >5, <-6 or >6, and <-6 or >5, for weight-for-height (wasting), height-for-age (stunting), and weight-for-age (underweight), respectively.

Investigation of the excluded 742 observations revealed that the main reason as to why the observations were flagged as outliers by the igrowup software was the mismatch between the children’s age and their corresponding weight and height measurements. The data were investigated to find alternative ways that could be used to recover and verify gender, age, weight, and height measurements. Among many verification conditions, the survey had an alternative birthdate recorded that was designed to verify and double-check the reported dates of birth. The difference between the recorded birthdate and the survey date gives the age of the child. Using this information, birth dates were recovered for these outliers. Of the 742 observations tagged as outliers, 481 (65%) observations had their ages different from the reported age. Anthropometric z-scores were recalculated and updated for these observations using the recovered ages. Out of 481 observations, 282 (59%) observations were found to be within the acceptable range of z-scores.

These 282 observations were pooled with the 2,318 observations used to produce the interim estimates. Using these pooled data, the three anthropometric indicators were reestimated and the sample-weighted results are presented in Table I. For example, the prevalence of stunting with and without the recovered data were 30.5 and 29.9 , respectively. The 95% confidence intervals for the stunting, wasting, and underweight indicators overlapped.

**Table I: Feed the Future 2015 Interim Indicators Values for Households with and without Age Recovered Data**

Feed the Future Indicator	Sample without recovered data			Sample with recovered data		
	Estimate	95% CI	n	Estimate	95% CI	n
<b>Prevalence of stunted children under 5 years of age</b>						
All children	29.9	27.0 - 32.8	2,318	30.5	27.6-33.4	2,600
<b>Prevalence of wasted children under 5 years of age</b>						
All children	13.8	10.9 - 16.7	2,281	13.7	11.0-16.4	2,563
<b>Prevalence of underweight children under 5 years of age</b>						
All children	19.0	16.4 - 21.6	2,318	18.9	16.4-21.5	2,600

## 2. Comparison of estimated indicator values between the “original sample” households and “extended sample” households

This second robustness test examines whether increasing the number of observations for estimating individual indicators would have a statistically significant effect on the estimates. Our ability to increase the number of observations arises from having collected additional data during the interim survey to generate district level estimates. To this end, not only were new EAs included in the survey but new households were added to those districts within the original Zone of Influence that had fewer than 150 observations. This created essentially two datasets: “original sample” households and “extended sample” households datasets. The “extended sample” encompasses the original baseline sample (4,410 households) and additional households that were not part of the baseline sample (3,010 households), for a total sample of 7,420 households.

The Interim report was prepared using data on the “original sample” households. For the sensitivity analysis, indicators were re-estimated using the “extended sample” households dataset and compared with the “original sample” estimates. These estimates are presented in Table 2. The usable sample size for the estimation of poverty and per capita income indicators increased from 3,988 for the “original sample” to 6,853 for the “extended sample”. Similarly, the sample size for women’s anthropometry increased from 3,560 to 6,362 and that for children’s anthropometry increased from 2,318 to 3,986. We note that the 95 % confidence intervals of the two sample estimates overlap in all cases, indicating that the differences between the two sets are not statistically different.

**Table 2: Feed the Future 2015 Interim Indicators Values for Original Sample and Extended Sample Households**

Feed the Future Indicator	Original Sample			Extended Sample		
	Estimate	95% CI	n	Estimate	95% CI	n
<b>Daily per capita expenditures (as a proxy for income) in USG-assisted areas</b>						
All households	4.80	4.23-5.36	3,988	4.89	4.65-5.14	6,853
<b>Prevalence of Poverty: Percent of people living on less than \$1.25/day</b>						
All households	19.6	17.1 - 22.1	3,988	19.1	18.2-20.1	6,853
<b>Depth of Poverty: Mean percent shortfall relative to the \$1.25/day poverty line</b>						
All households	7.2	6.1 - 8.3	3,988	6.9	6.5-7.3	6,853
<b>Prevalence of households with moderate or severe hunger</b>						
All households	29.6	26.2 - 33.1	3,720	30.6	29.5-31.7	6,563
<b>Women's Dietary Diversity: Mean number of food groups consumed by women of reproductive age</b>						
All women age 15-49	3.65	3.54 - 3.77	3,828	3.60	3.57-3.64	6,905
<b>Prevalence of exclusive breastfeeding among children under 6 months of age</b>						
All children	50	41.2 - 58.8	261	56.7	52.0-61.4	427
<b>Prevalence of children 6-23 months receiving a minimum acceptable diet</b>						
All children	13.7	10.2 - 17.1	772	10.0	8.4-11.6	1,379
<b>Prevalence of women of reproductive age who consume targeted nutrient-rich value chain commodities (NRVCC)</b>						
NRVCC 1: All women age 15-49	11	8.6 -13.3	3,876	10.1	9.4-10.8	6,975
<b>Prevalence of women of reproductive age who consume at least one targeted nutrient-rich value chain commodity</b>						
All women age 15-49	11	8.6 - 13.3	3,876	10.1	9.4-10.8	6,975
<b>Prevalence of children 6-23 months who consume targeted nutrient-rich value chain commodities</b>						
NRVCC 1: All children	7.5	4.8 - 10.2	821	5.9	4.7-7.1	1,476
<b>Prevalence of children 6-23 months who consume at least one targeted nutrient-rich value chain commodity</b>						
All children	7.5	4.8 - 10.2	821	5.9	4.7-7.1	1,476
<b>Prevalence of underweight women</b>						
All non-pregnant women age 15-49	12.2	10.2 - 14.2	3,560	11.0	10.2-11.8	6,362
<b>Prevalence of stunted children under 5 years of age</b>						



All children	29.9	27.0 - 32.8	2,318	27.6	26.2-29.0	3,986
<b>Prevalence of wasted children under 5 years of age</b>						
All children	13.8	10.9 - 16.7	2,281	12.5	11.5-13.6	3,929
<b>Prevalence of underweight children under 5 years of age</b>						
All children	19.0	16.4 - 21.6	2,318	16.4	15.2-17.5	3,962

### 3. Comparison of indicator values estimated with and without the application of sampling weights

Weighting is an essential exercise in survey data collection and analysis. It ensures that the sample is representative of the population of interest. Indicators are presented in the interim report and in the tables above after applying sample weights and are representative of the entire population of the ZOI. In table 3, these same estimates are presented as sample estimates (before applying sample weights) to see the extent to which use of sampling weights could affect the results. The table shows that not only do the 95% confidence intervals of the mean indicator values overlap, but also the mean values for all the indicators are remarkably similar with and without sample weights. For example, the prevalence of poverty are 19.6% and 19.4 % for the Interim estimates with and without sampling weights, respectively. The Women's Dietary Diversity Score (WDDS) values are 3.65 and 3.66, respectively, for the Interim results with and without sampling weights. Similarly, the prevalence of wasted children was 13.8% under both estimation scenarios. While the prevalence of underweight for children under 5 years was 19.0% for the weighted sample and 17.5 for the unweighted sample, the 95% confidence interval for the former was 16.4% to 21.6% and 15.9% to 19.0% for the latter.

**Table 3: Feed the Future 2015 Interim PBS Indicators Values with and without the Application of Sampling Weights**

Feed the Future Indicator	Sample-Weighted Estimates			Sample Estimates (no weights)		
	Estimate	95% CI	n	Estimate	95% CI	n
<b>Daily per capita expenditures (as a proxy for income) in USG-assisted areas</b>						
All households	4.80	4.23-5.36	3,988	4.81	4.47-5.15	3,988
<b>Prevalence of Poverty: Percent of people living on less than \$1.25/day</b>						
All households	19.6	17.1 - 22.1	3,988	19.4	18.2-20.7	3,988
<b>Depth of Poverty: Mean percent shortfall relative to the \$1.25/day poverty line</b>						
All households	7.2	6.1 - 8.3	3,988	7.0	6.4-7.5	3,988
<b>Prevalence of households with moderate or severe hunger</b>						
All households	29.6	26.2 - 33.1	3,720	29.3	27.8-30.7	3,720
<b>Women's Dietary Diversity: Mean number of food groups consumed by women of reproductive age</b>						
All women age 15-49	3.65	3.54 - 3.77	3,828	3.66	3.61-3.71	3,828
<b>Prevalence of exclusive breastfeeding among children under 6 months of age</b>						
All children	50	41.2 - 58.8	261	51.0	44.7-57.4	261

Feed the Future Indicator	Sample-Weighted Estimates			Sample Estimates (no weights)		
	Estimate	95% CI	n	Estimate	95% CI	n
<b>Prevalence of children 6-23 months receiving a minimum acceptable diet</b>						
All children	13.7	10.2 - 17.1	772	12.9	10.5-15.3	772
<b>Prevalence of women of reproductive age who consume targeted nutrient-rich value chain commodities (NRVCC)</b>						
NRVCC 1: All women age 15-49	11	8.6 - 13.3	3,876	11.2	10.2-12.2	3,876
<b>Prevalence of women of reproductive age who consume at least one targeted nutrient-rich value chain commodity</b>						
All women age 15-49	11	8.6 - 13.3	3,876	11.2	10.2-12.2	3,876
<b>Prevalence of children 6-23 months who consume targeted nutrient-rich value chain commodities</b>						
NRVCC 1: All children	7.5	4.8 - 10.2	821	7.4	5.6-9.2	821
<b>Prevalence of children 6-23 months who consume at least one targeted nutrient-rich value chain commodity</b>						
All children	7.5	4.8 - 10.2	821	7.4	5.6-9.2	821
<b>Prevalence of underweight women</b>						
All non-pregnant women age 15-49	12.2	10.2 - 14.2	3,560	11.5	10.4-12.5	3,560
<b>Prevalence of stunted children under 5 years of age</b>						
All children	29.9	27.0 - 32.8	2,318	28.6	26.7-30.4	2,318
<b>Prevalence of wasted children under 5 years of age</b>						
All children	13.8	10.9 - 16.7	2,281	13.8	12.4-15.3	2,281
<b>Prevalence of underweight children under 5 years of age</b>						
All children	19.0	16.4 - 21.6	2,318	17.5	15.9-19.0	2,318

## Conclusion

The purpose of this analysis was to assess the effect of alternative estimation approaches on the robustness of the results presented in the 2015 Interim Assessment report. The sensitivity analyses presented here indicate that the sample estimates are relatively robust to changes in sample definitions and that adding observations or applying sample weights does not change significantly mean values. The original sample size of this survey appears to be large enough to provide good precision for the estimates. Although these tests do not rule out the possibility of bias after dropping a relatively large number of observations from the anthropometry dataset, the apparent stability of the estimates are clearly a good sign of the validity of the estimates.