FEED THE FUTURE

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

Feed the Future Liberia 2015

Zone of Influence Interim Assessment Report

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USAID

FROM THE AMERICAN PEOPLE

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List of Acronyms

5DE	Five Domains of Empowerment
BFS	Bureau for Food Security
BMI	Body Mass Index
CAPI	Computer-Assisted Personal Interviewing
CI	Confidence Interval
CPI	Consumer Price Index
DEFF	Design Effect
DHS	Demographic and Health Survey
EA	Enumeration Area
FANTA	Food and Nutrition Technical Assistance Project
FTFMS	Feed the Future Monitoring System
GOL	Government of Liberia
GPI	Gender Parity Index
HAZ	Height-for-age Z-scores
HHS	Household Hunger Scale
IFPRI	International Food Policy Research Institute
LCU	Local Currency Unit
LISGIS	Liberia Institute of Statistics and Geo-Information Services
LSMS	Living Standards Measurement Survey
MAD	Minimum Acceptable Diet
MDD-W	Women's Minimum Dietary Diversity
MDG	Millennium Development Goals
NRVCC	Nutrient-Rich Value Chain Commodity
PPP	Purchasing Power Parity
SD	Standard Deviation
USAID	United States Agency for International Development
USD	United States Dollar
USG	United States Government
WAZ	Weight-for-age Z-scores
WDDS	Women's Dietary Diversity Score
WEAI	Women's Empowerment in Agriculture Index
WHZ	Weight-for-height Z-scores
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 through its focus 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 Feed the Future's population-based indicators for the ZOI in Liberia.

The Feed the Future ZOI in Liberia is comprised of six counties - Bong, Lofa, Nimba, Grand Bassa, Margibi, and rural Montserrado (excluding Monrovia). These counties are located along Liberia's main economic development corridors and collectively include around 48 percent of the Liberian population. Nearly 70 percent of the ZOI is considered rural.

This first interim assessment will provide the U.S. Government (USG) interagency partners, USAID Bureau for Food Security (BFS), USAID Missions, host country governments, and development partners with information about short-term progress of the ZOI indicators. The assessment is designed for use as a monitoring tool, and as such provides point estimates of the indicators with an acceptable level of statistical precision. However, Feed the Future ZOI sample calculations are not designed to support conclusions of causality or program attribution, nor is the interim assessment designed to measure change from the baseline.

Interim Assessment Indicators

Thirteen Feed the Future indicators are included in this assessment: (1) Daily per capita expenditures (as a proxy for income) in USG-assisted areas; (2) Prevalence of Poverty; (3) Depth of Poverty; (4) Prevalence of households with moderate or severe hunger; (5) Women's Dietary Diversity; (6) Prevalence of children 6-23 months receiving a minimum acceptable diet (MAD); (7) Prevalence of exclusive breastfeeding among children under 6 months of age; (8) Prevalence of women of reproductive age who consume targeted nutrient-rich value chain commodities (NRVCC); (9) Prevalence of children 6-23 months who consume targeted NRVCC; (10) Prevalence of underweight women; (11) Prevalence of stunted children under 5 years of age; (12) Prevalence of wasted children under 5 years of age; and (13) Prevalence of underweight children under 5 years of age.

The first interim assessment does not report on the Feed the Future indicator Women's Empowerment in Agriculture Index (WEAI) score, but does report on nine of the ten indicators that comprise the WEAI. These are presented in the Women's Empowerment in Agriculture Section of this report (Section 5). Because adjustments were being made to the WEAI tool at the time of the first ZOI interim survey collection, a streamlined version of the Women's Empowerment in Agriculture module was used that only collected nine of the ten indicators. The full WEAI will be collected during the next interim survey in 2017.

The interim assessment also does not report on the two Feed the Future anemia indicators because changes plausibly associated with Feed the Future's efforts are unlikely given the coverage and focus of nutrition programs at this time, and because they require more intrusive data collection, increase the cost of the survey, and increase the time and complexity of data collection and of obtaining in-country institutional review board approval.

An additional Mission-Specific indicator on Ebola Viral Disease (EVD) is included in the interim assessment. Prevalence of households who report one or more members who died or were sick as a result of Ebola is reported by age and gender of the affected persons, and whether he or she recovered or died. The indicator will help to understand the extent that Ebola has affected households and primary indicators of interest in the Feed the Future ZOI.

Ebola-affected households could be expected to have fewer assets and lower expenditures than non-affected households. This could be caused through two mechanisms: (1) Many Ebola-affected households lost their primary caregivers, such as the female head of household, as well as other income-earning adults. With fewer income-earning adults, the households would not be able to maintain the same level of consumption; (2) When Ebola is detected in a household, most of the household's possessions are burned to prevent the spread of infection. Burned items include mattresses, as well as furniture, clothing, and other belongings. Many Ebola-affected households may not have replaced these destroyed items at the time of the survey.

The survey does not find a statistically-significant relationship between exposure to Ebola and consumption, possibly due to the sample size. Ebola-affected households are, however, significantly more likely to suffer from hunger and food insecurity, which implies the disease does have a long-term economic impact on household well-being, in addition to social and health consequences.

Interim Assessment Data Sources

Data for the Feed the Future ZOI indicators presented in this assessment are drawn from primary data collection. Due to the Ebola crisis, which delayed many national surveys, such as the 2014 Household Income and Expenditure Survey and the National Nutrition Survey, no

secondary data sources were available that meet specific criteria to be used for the interim indicator assessment.

The Liberia ZOI interim survey was conducted by International Development Group LLC (IDG) in conjunction with its data collection partner, African Development Associates (ADEAS). Fieldwork for the ZOI interim survey took place between November and December 2015.

Summary of Key Findings

Household Economic Status

Daily per capita expenditures (as a proxy for income) in USG-assisted areas (R)

Average per capita expenditure is estimated at $1.93 per day (in 2010 USD), although the percentile distribution reveals a highly skewed distribution of wealth: the top 10 percent of the population spends more than nine times as much as the poorest 10 percent. Across the ZOI, larger households consume significantly less, per person, than smaller households. There is no significant variation in daily per capita expenditure based on gendered household type or household educational attainment.

Prevalence of Poverty: Percent of people living on less than $1.25 per day

Forty percent of households in the ZOI fall below the poverty line of $1.25 per day (in 2005 USD). As with per capita expenditures, larger households are more likely to experience poverty than smaller households. Households with only female adults are significantly *less* likely to be impoverished than households with both male and female adults.

Depth of Poverty: The mean percent shortfall relative to the $1.25 poverty line

The depth of poverty in the ZOI is 19 percent, which indicates that the average gap between consumption levels of the population and the poverty line is $0.60 (2005 PPP). If monetary transferred could be perfectly targeted, $432,000 (2005 PPP) per day would be required to bring all households in the ZOI up to the poverty threshold.

Women's Empowerment in Agriculture Index Indicators

Among the nine empowerment indicators assessed in the interim survey, women in the ZOI demonstrated the highest level of achievement in the "Group member" category, with more than 76 percent of women belonging to at least one community, social, or professional organization. The high levels of group membership, however, do not necessarily indicate that women have influence in group decisions: less than half of women report being able to speak in public without a great deal of difficulty. Related to this issue is a lack of input in productive

decisions: only 15.2 percent of women report that they have input into the household's farming, livestock raising, or other activities.

Hunger and Dietary Intake

Prevalence of households with moderate or severe hunger

More than 20 percent of Liberian households suffer from food insecurity, although only 1.3 percent of households experienced severe hunger in the month prior to the survey interview. Household characteristics are not significantly correlated with hunger, although there is some suggestive evidence that larger households suffer greater food insecurity. This lack of relationship is itself interesting: the presence of multiple adults or a relatively educated household member is not enough to ensure food security in Liberia. The dramatic decline in hunger since the baseline survey may be partially explained by climatic variation (a particularly bad harvest in 2012 and/or a particularly good harvest in 2015).

Dietary Intake

- Dietary Diversity among Women Age 15-49 Years

Within the ZOI, women between the ages of 15-49 years consumed an average of 4.63 food groups in the previous 24 hours, on a scale of 0 to 9. Women from larger households and from households who reported little to no hunger consumed a more diverse diet than women from smaller households or from households who experienced moderate or severe hunger. Overall, 56.2 percent of women achieved the minimum dietary diversity and this proportion significantly differed based on educational attainment, gendered household type, household size, and household hunger. Women's diets were most commonly composed of grains, roots, and tubers, meat and organ meats, Vitamin A-rich dark green leafy vegetables, and other vegetables.

- Infant and Young Child Feeding

Analysis of child diet revealed many deficiencies. Within the ZOI, 52.1 percent of infants under-6 months were exclusively breastfed in the previous 24 hours, with no significant differences between male and female infants or by caregiver's educational attainment. This proportion declined to 50.3 percent when considering the infant's mode of feeding since birth. Specifically, inadequacies in child dietary diversity, meal frequency, milk feeds for non-breast fed infants were common. Few children between 6-23 months achieved minimum acceptable diet. Breastfed children were significantly more likely to achieve a minimum acceptable diet than non-breastfed children. Nearly 40 percent of breastfed children achieved adequate meal frequency, less than 5 percent of non-breast fed children achieved this measure. In contrast, more non-breastfed children achieved adequate dietary diversity, compared to breastfed children. Sixty-six percent of non-breastfed children, however, lacked even a single measure of diet adequacy, compared to 51 percent of breastfed children.

- Consumption of Targeted Nutrient-Rich Value Chain Commodities (NRVCC)

Within the ZOI, 96.8 percent of women between the ages of 15-49 years consumed at least one NRVCC, which included biofortified cassava, goat, cabbage, okra, and chili pepper. The most commonly consumed NRVCC was chili pepper, with 95.9 percent of women reporting consumption of this commodity, while the least commonly consumed NRVCC was cabbage with 0.5 percent of women consuming this commodity. Okra was consumed by 51.8 percent of women, biofortified cassava was consumed by 4.6 percent of women, and goat was consumed by 1.5 percent of women.

Among children 6-23 months, 66.2 percent consumed at least one NRVCC and there were no significant differences between male and female children. Child consumption of nutrient-rich value chain commodities was variable. As with women, the most commonly consumed NRVCC was chili pepper, with 60.4 percent of children consuming this commodity, while the least commonly consumed NRVCC was cabbage with 0.4 percent of young children consuming this commodity. Okra was consumed by 37.2 percent of young children, biofortified cassava was consumed by 1.0 percent of young children, and goat was consumed by 0.4 percent of young children.

Nutritional Status of Women and Children

Body Mass Index of Women Age 15-49 Years

Approximately 13.3 percent of women in the ZOI are classified as underweight. Younger women, aged 15-24, are the most likely to be underweight and the least likely to be overweight or obese, which is concerning since these age groups represent the women most likely to become pregnant. Becoming pregnant while underweight is a risk factor for intrauterine growth restriction, low birth weight, and poor growth in infants and children. Middle aged women (25 – 39 years) are most likely to be "normal" weight. Household characteristics, such as household size, are not significantly correlated with women's BMI. Interestingly, the percentage of overweight or obese women is much higher (29.3 percent). This indicates that greater access to food should be paired with a concern for balanced nutrition, as is the case in many developing countries experiencing the "double burden" of malnutrition.

Stunting, Wasting, and Underweight among Children under 5 Years

Children show a high prevalence of malnutrition, both under- and over-nutrition. In general, growth measurements were worse in older children. Longer exposure to a difficult environment (food shortages, infections, stress, etc.) generally results in progressive growth faltering, as seen here.

More than one third of children surveyed were stunted; of these nearly half were severely stunted. Younger children were "relatively protected"; children 0-11 months of age had

comparatively better height-for-age Z-scores and less stunting. This pattern is typical in conditions where children suffer from food shortages and recurrent or chronic infections, both of which contribute to linear growth faltering over time.

About 8 percent of children met the definition for wasting and around 3 percent were severely wasted. Concurrently, more than 11 percent of children were classified as overweight, and 4.56 percent were obese. The "extremes" in weight-for-height Z-scores were more likely to be found among the younger children and those in the smallest households. This may be a result of higher chance of errors in height measurements for infants and younger children.

More than 15 percent of children were underweight; 5 percent were severely underweight, reflecting acute and chronic undernutrition. The youngest children had a higher mean weight-for-age Z-score compared to other age groups. A lower mean weight-for-age Z-score was noted in children whose caregivers had no education, compared to other levels of education.

The rate of overweight and obesity was unexpected. This result may reflect technical difficulties in the field or alternately, may reflect the increasing global trend towards obesity. This trend has been noted even in some resource-poor environments and may reflect complex interactions with epigenetic programming of the fetus during pregnancy and the post-natal environment.

Mission-Specific Indicator

Prevalence of households who report one or more members who died or were sick as a result of Ebola

More than 10 percent of households in the ZOI are estimated to have a family member who either died or was infected by the Ebola virus at some point since the start of the outbreak. Households with less than primary or primary education were slightly more likely to be affected by Ebola than households with no education or those with secondary education or higher. One explanation for this trend could be the concentration of Ebola cases within relatively poor, urban communities. Households in these high risk areas have greater access to schooling than rural households, but perhaps less ability to prevent infection than more educated households (possibly due to poor sanitation or limited education).

Prevalence of households who report one or more members who died or were sick as a result of Ebola in relation to Feed the Future Indicators

Households directly affected by the Ebola virus were more likely to experience food insecurity and hunger than unaffected households. No significant relationship was detected between exposure to Ebola and household consumption or poverty.

Baseline and interim estimates of indicator values in the ZOI are shown in the Feed the Future Zone of Influence Indicator Estimates table on the following page.

Feed the Future Zone of Influence Indicator Estimates: Liberia

Feed the Future Indicator	Baseline (2012-2013)			Interim (2015)			
	Estimate	95% CI[1]	n	Estimate	95% CI	n	P-value
Daily per capita expenditures (as a proxy for income) in USG-assisted areas (2010 USD)							
All households	1.73	1.49 – 1.96	1,639	1.93	1.65 – 2.20	1,817	NS
Male and female adults*	1.32	1.14 – 1.50	639	1.86	1.55 – 2.17	1,571	<0.01
Female adult(s) only	1.95	1.61 – 2.30	639	2.33	1.87 – 2.80	233	NS
Male adult(s) only	2.09	1.69 – 2.48	355	2.02^	1.26 – 2.78^	12	NS
Children only no adults	n/a	n/a	0	n/a	n/a	1	n/a
Prevalence of Poverty: Percent of people living on less than $1.25 per day (2005 PPP)							
All households*	49.4%	42.9 – 55.9%	1,639	39.8%	36.1 – 43.5%	1,817	<0.01
Male and female adults*	56.4%	47.8 – 65.0%	639	41.0%	37.1 – 44.9%	1,571	<0.01
Female adult(s) only*	44.1%	36.6 – 51.6%	639	32.5%	25.9 – 39.0%	233	<0.01
Male adult(s) only	45.8%	37.9 – 53.8%	355	34.0%^	2.4 – 65.7%^	12	NS
Children only no adults	n/a	n/a	0	n/a	n/a	1	n/a
Depth of Poverty: Mean percent shortfall relative to the $1.25 per day poverty line (2005 PPP)							
All households*	21.7%	17.8 – 25.6%	1,639	19.1%	16.8 – 21.4%	1,817	<0.01
Male and female adults*	26.3%	21.3 – 31.3%	639	19.7%	17.1 – 22.2%	1,571	<0.01
Female adult(s) only	18.4%	14.1 – 22.7%	639	15.6%	11.7 – 19.4%	233	NS
Male adult(s) only	19.0%	15.0 – 22.9%	355	12.4%^	0 – 25.8%^	12	NS
Children only no adults	n/a	n/a	0	n/a	n/a	1	n/a
Percent of women achieving adequacy on Women's Empowerment in Agriculture Index Indicators[2,]							
Input in productive decisions*	70.5%	63.5 – 77.5%	1,397	15.2%	11.2 – 19.2%	1,817	<0.01
Ownership of assets*	81.6%	78.9 – 84.3%	1,397	46.9%	44.0 – 49.7%	1,817	<0.01
Purchase, sale or transfer of assets*	54.3%	48.9 – 59.7%	1,397	23.1%	19.8 – 26.3%	1,817	<0.01
Access to and decisions on credit*	41.0%	37.9 – 44.2%	1,397	31.2%	27.5 – 35.0%	1,817	<0.01
Control over use of income*	91.8%	89.4 – 94.1%	1,397	38.5%	32.9 – 44.1%	1,817	<0.01
Group member	80.0%	77.0 – 83.0%	1,397	76.8%	72.0 – 81.5%	1,817	NS
Speaking in public*	88.8%	86.6 – 91.0%	1,397	47.3%	42.9 – 51.7%	1,817	<0.01
Workload	63.9%	59.9 – 67.9%	1,397	66.5%	62.4 – 70.6%	639	NS
Leisure*	87.0%	84.9 – 89.1%	1,397	48.1%	41.4 – 54.8%	1,817	<0.01
Autonomy in production	67.2%	60.8 – 73.6%	1,397	n/a	n/a	n/a	n/a
Prevalence of households with moderate or severe hunger							
All households*	45.2%	41.5 – 48.9%	1,639	20.4%	17.0 – 23.9%	1,817	<0.01
Male and female adults*	44.3%	39.7 – 49.0%	639	19.9%	17 – 23%	1,571	<0.01
Female adult(s) only*	47.5%	42.3 – 52.8%	639	23.0%	15 – 31%	233	<0.01
Male adult(s) only	43.2%	37.0 – 49.5%	355	39.9%^	10 – 70%^	12	NS
Children only no adults	n/a	n/a	0	n/a	n/a	1	n/a

Feed the Future Indicator	Baseline (2012-2013)			Interim (2015)			
	Estimate	95% CI[1]	n	Estimate	95% CI	n	P-value
Women's Dietary Diversity: Mean number of food groups consumed by women of reproductive age[3]							
All women age 15-49	n/a	n/a	n/a	4.63	4.56 – 4.70	2,389	n/a
Prevalence of exclusive breastfeeding among children under 6 months of age[3]							
All children	n/a	n/a	n/a	52.1%	45.1 – 58.9%	250	n/a
Male children	n/a	n/a	n/a	50.0%	39.8 – 60.2%	121	n/a
Female children	n/a	n/a	n/a	54.0%	44.6 – 63.0%	129	n/a
Prevalence of children 6-23 months receiving a minimum acceptable diet[3]							
All children	6.4%	3.3 – 9.5%	365	9.0%	6.4 – 11.5%	490	NS
Male children	6.6%	2.5 – 10.7%	209	7.9%	4.6 – 11.0%	267	NS
Female children	6.2%	1.6 – 10.7%	156	10.3%	6.3 – 14.3%	223	NS
Prevalence of women of reproductive age who consume targeted nutrient-rich value chain commodities[3]							
Biofortified cassava: All women age 15-49	n/a	n/a	n/a	4.6%	3.8 – 5.6%	2,378	n/a
Goat: All women age 15-49	n/a	n/a	n/a	1.5%	1.1 – 2.2%	2,388	n/a
Cabbage: All women age 15-49	n/a	n/a	n/a	0.5%	0.3 – 0.8%	2,387	n/a
Okra: All women age 15-49	n/a	n/a	n/a	51.8%	49.5 – 54.0%	2,387	n/a
Chili Pepper: All women age 15-49	n/a	n/a	n/a	95.9%	95.0 – 96.7%	2,385	n/a
Prevalence of women of reproductive age who consume at least one targeted nutrient-rich value chain commodity[3]							
All women age 15-49	n/a	n/a	n/a	96.8%	96.0 – 97.5%	2,387	n/a
Prevalence of children 6-23 months who consume targeted nutrient-rich value chain commodities[3]							
Biofortified cassava: All children	n/a	n/a	n/a	1.0%	0.4 – 2.5%	490	n/a
Goat: All children	n/a	n/a	n/a	0.4%	0.1 – 1.3%	489	n/a
Cabbage: All children	n/a	n/a	n/a	0.4%	0.1 – 1.7%	486	n/a
Okra: All children	n/a	n/a	n/a	37.2%	32.5 – 42.1%	487	n/a
Chili Pepper: All children	n/a	n/a	n/a	60.4%	55.6 – 65.1%	488	n/a
Prevalence of children 6-23 months who consume at least one targeted nutrient-rich value chain commodity[3]							
All children	n/a	n/a	n/a	66.2%	61.5 – 70.6%	485	n/a
Male children	n/a	n/a	n/a	67.9%	61.7 – 73.6%	262	n/a
Female children	n/a	n/a	n/a	64.2%	56.9 – 70.8%	223	n/a
Prevalence of underweight women[3]							
All non-pregnant women age 15-49	8.4%	n/a	n/a	13.2%	11.8 – 14.7%	2,039	n/a
Prevalence of stunted children under 5 years of age[3]							
All children	43.1%	n/a	n/a	34.3%	32.0 – 36.6%	1,693	n/a
Male children	n/a	n/a	n/a	37.1%	33.9 – 40.4%	851	n/a
Female children	n/a	n/a	n/a	31.6%	28.4 – 34.7%	842	n/a

Feed the Future Indicator	Baseline (2012-2013)			Interim (2015)			
	Estimate	95% CI[1]	n	Estimate	95% CI	n	P-value
Prevalence of wasted children under 5 years of age[3]							
All children	2.3%	n/a	n/a	8.2%	6.9 – 9.5%	1,707	n/a
Male children	n/a	n/a	n/a	8.1%	6.3 – 9.9%	856	n/a
Female children	n/a	n/a	n/a	8.2%	6.3 – 10.0%	851	n/a
Prevalence of underweight children under 5 years of age[4]							
All children	14.7%	n/a	n/a	15.2%	13.5 – 16.9%	1,796	n/a
Male children	n/a	n/a	n/a	15.5%	13.1 – 17.9%	898	n/a
Female children	n/a	n/a	n/a	15.0%	12.6 – 17.3%	898	n/a

Source(s): Comprehensive Food Security and Nutrition Survey (CFSNS) 2010; Liberia Demographic and Health Survey (LDHS) 2013; ZOI baseline survey, Liberia 2012; ZOI interim survey, Liberia 2015
n/a – Not available
NS – Not Significant (p>0.1)
^ Results not statistically reliable, n<30.
* Significant difference (p < 0.05) compared to baseline according to a weighted two-sample t-test with bootstrapped standard errors.

[1] While interim surveys were not designed to capture change over time, additional analysis was performed to test for significant differences between the baseline and interim estimates. When the difference over time is found to be significant (p<0.05), an asterisk is noted next to the household characteristic.
[2] The full WEAI score cannot be calculated because interim data were collected from women only and the autonomy indicator was dropped. The second interim survey (2017) will collect the full set of data from women and men and will report on the full WEAI.
[3] The baseline estimates reported in the interim assessment report are different from the estimates reported in the baseline report released in 2013. Further details on the discrepancies of baseline estimates can be found in Section 2.1.
[4] The indicators for women's and children's anthropometry, food diversity, and consumption of targeted NRVCC were not collected during the baseline round of data collection.

Mission Specific Indicator Estimates: Liberia

Mission Specific Indicator	Estimate	95% CI	n
Prevalence of households who report one or more members died or were sick as a result of Ebola			
All households	10.6%	8.1 – 13.1%	1,250
Male and female adults	10.0%	7.3 – 12.6%	1,061
Female adult(s) only	14.2%	8.0 – 20.3%	150
Male adult(s) only	11.1%^	0.0 – 32.8%^	7
Children only no adults	n/a	n/a	0

Source(s): ZOI interim survey, Liberia 2015
n/a – Not available
^ Results not statistically reliable, n<30

Feed the Future Indicator	Households affected by EVD		Households not affected by EVD		All households[1]	
	Estimate	n	Estimate	n	Estimate	n
Daily per capita expenditures (as a proxy for income) in USG-assisted areas (2010 USD)	$2.06	129	$2.26	1,089	$2.24	1,218
Prevalence of Poverty: Percent of people living on less than $1.25 per day (2005 PPP)	31.4%	129	39.6%	1,089	38.7%	1,218
Depth of Poverty: Mean percent shortfall relative to the $1.25 per day poverty line (2005 PPP)	14.5%	129	19.1%	1,089	18.6%	1,218

Prevalence of households with moderate or severe hunger[a]	49.1%	129	30.6%	1,089	32.6%	1,218

Source(s): ZOI interim survey, Liberia 2015
n/a – Not available
[1] Results differ from headline indicators due to merging of datasets, which excludes some observations.
[a] Significance tests were performed for associations between the households affected by EVD and Feed the Future indicator. When an association is found to be significant ($p<0.05$), a superscript is noted next to the characteristic.

1. Background

This section provides background information on Feed the Future in Liberia, including a description of the program and the ZOI, demographic information on the ZOI population, and a summary of the agriculture situation in the ZOI.

1.1 Feed the Future Overview

The overarching objective of Liberia's Feed the Future program is two-fold: 1) support equitable growth in Liberia's agricultural sector, and 2) improve the nutritional status of Liberians. The strategy is designed around high-impact Feed the Future investments in key agriculture value chains, complemented by strategic synergies with key health interventions. The strategy closely aligns with priorities set by the Government of Liberia (GOL). There are three core Feed the Future programs in Liberia: 1) transforming staple value chains, 2) developing income and diet diversification value chains, and 3) advancing the enabling environment. Integrated into the core programs, the Liberia FTF MYS nutrition intervention strategy proposes a coordinated set of focused interventions directed at addressing each element of availability, access, and utilization of more and better quality food for women, men, and their families.

1.2 Feed the Future ZOI Profile

Six Feed the Future ZOI target counties are Margibi, Grand Bassa, Bong, Lofa, Nimba, and Montserrado (excluding Greater Monrovia District). These counties are located along Liberia's main economic development corridors. The ZOI of the interim assessment is similar to the ZOI at baseline; however, unlike the baseline, the interim survey did not include the Greater Monrovia District of Montserrado County. The change in the ZOI definition between the baseline and the interim assessment is an important distinction given that the Greater Monrovia District includes the nation's capital and much of its large, urban population. Without the Great Monrovia District, the ZOI still includes both urban and rural areas.[1]

A map of the Feed the Future ZOI in Liberia is provided in Figure 1.1.

[1] The interim assessment follows definition of urban and rural areas as determined by the Liberia Institute of Statistics and Geo-Information Services (LISGIS).

Figure 1.1. Map of Liberia: Feed the Future ZOI

1.2.1 Rationale for ZOI Selection

The six Feed the Future ZOI counties comprise priority development corridors designated by the GOL. In addition to aligning with the government's priority, focusing on these counties helps to ensure production from value chain interventions to be close to the main infrastructure and markets of the country.

1.2.2 Demography of the ZOI

Tables 1.1 and 1.2 present individual and household population estimates, respectively, for the ZOI for 2015. Estimates of the total population as well as sub-populations of the ZOI are presented. The sub-population categories correspond to the various sub-populations for the Feed the Future indicators and disaggregates (e.g., children age 6-23 months, number of households). The ZOI estimates for the total population of individuals as well as households are also disaggregated by gendered household type.[2]

The ZOI interim survey provides an opportunity to update the population estimates of the 2008 Population and Housing Census, the last census conducted. The interim survey estimates

[2] See Section 2.2.1 Standard Disaggregates for the definition of gendered household type.

the population of the ZOI at 1,835,425 persons, compared to the 2008 Census estimate of 1,651,403. This represents an annual population growth rate of approximately 1.3 percent. This estimate is lower than the World Bank's estimate of 2.4 percent annual growth rate and the 2008 Census estimate of 2.1 percent.[3] The low estimated growth rate may be explained by the majority rural population of the ZOI, which excludes the country's capital Monrovia. It is plausible that faster population growth is occurring in the capital city, and/or in rural areas outside of the ZOI. The estimates may also reflect an increase in the mortality rate, or increased migration out of the ZOI.

The overwhelming majority of Liberians (90 percent) live in households that include both male and female adults. This statistic, however, is likely to be an overestimate, as certain demographic groups are less likely to be included in the survey sample. This selection bias can be seen by comparing the number of male and female youths: the survey estimates that females comprise 58.6 percent of the youth population between the age of 15 and 29 years (equivalent to a sex ratio of 71), which is not believable. This bias is also seen in the small number of male-only households (12 households) interviewed for the survey. Young men are more likely than women to leave the home and migrate to the capital or other areas for work. Young men are also more likely to be out of the house at the time of contact by survey enumerators or live in households overlooked by survey enumerators (rented rooms within larger houses, for example), and thus are likely to be under-reported in the demographic data.

Outside of this selection bias, however, the data are high quality. For example, the survey recorded more male than female children under the age of 5 (0-59 months), which matches the trend reported in the 2008 Census, and in other developing countries. The survey estimates that children under 5 years represent approximately 17.7 percent of the population, which is similar to the Census' country-wide estimate of 15.4 percent. Interestingly, the survey estimates a higher number of female than male infants under 6 months (sex ratio of 93), but a higher number of male children aged 6-59 months (sex ratio of 101). This could indicate that female infants are more likely to die before reaching the age 5 years.

Table 1.1. Population of individuals, by category, in the ZOI, Liberia 2015

Category of individuals	Estimated population[1]	95% CI
Total population	**1,835,425**	**1,613,355 – 2,057,495**
Total population, by sub-population		
Women of reproductive age (15-49 years)	430,122	376,367 – 483,876
Children 0-59 months	324,737	279,997 – 369,477
Children 0-5 months	44,587	34,842 – 54,331
Children 6-23 months	88,669	76,317 – 101,022

[3] The World Bank's estimate and the 2008 Census estimate fall within the 95% confidence interval of the interim survey population estimate.

Category of individuals	Estimated population[1]	95% CI
Children 6-59 months	282,389	242,801 – 321,978
Youth 15-29 years	424,170	371,541 – 476,799
Total population, by area type		
Urban	749,403	516,287 – 982,521
Rural	1,086,022	807,082 – 1,364,961
Total population, by gendered household type		
Male and female adult(s)	1,650,645	1,457,455 – 1,843,835
Female adult(s) only	180,207	131,160 – 229,255
Male adult(s) only	4,399^	1,644 – 7,155^
Child(ren) only (no adults)	n/a	n/a
Women of reproductive age, by pregnancy status		
Pregnant	48,611	37,193 – 60,029
Non-pregnant	354,678	311,202 – 398,155
Children 0-59 months, by child sex		
Male	162,886	141,221 – 184,551
Female	161,890	137,291 – 186,489
Children 0-5 months, by child sex		
Male	21,519	15,854 – 27,183
Female	23,068	16,504 – 29,632
Children 6-23 months, by child sex		
Male	47,857	41,377 – 54,338
Female	40,812	33,362 – 48,262
Children 6-59 months, by child sex		
Male	142,135	122,467 – 161,803
Female	140,254	118,663 – 161,846
Youth 15-29 years, by sex		
Male	175,602	152,832 – 198,372
Female	248,397	215,236 – 281,558

Source: ZOI interim survey, Liberia 2015.
^ Results not statistically reliable, n<30.
[1] Estimated population size is calculated using the ZOI interim survey. Total populations estimated based on the survey weights attached to the relevant response categories.

Table 1.2. Number of households, by category, in the ZOI, Liberia 2015

Category of households	Estimated number	95% CI
Total number of households in ZOI	**309,622**	**274,544 – 344,701**
Number of households, by gendered household type		
Male and female adult(s)	265,956	237,542 – 294,371
Female adult(s) only	42,287	31,872 – 52,702
Male adult(s) only	1,321^	494 – 2,148^
Child(ren) only, (no adults)	n/a	n/a

Source: ZOI interim survey, Liberia 2015.
^ Results not statistically reliable, n<30.
[1] Estimated population size is calculated using the ZOI interim survey. Total populations estimated based on the survey weights attached to the relevant response categories.

1.2.3 Agriculture in the ZOI

Agriculture is critical to Liberia's livelihood and economic development. It accounted for one half of GDP in the post-war period, and more than two-thirds of Liberians depend on agriculture for their livelihood; women and children are particularly dependent on the sector.[4] However, agricultural productivity is very low and post-harvest losses are exceptionally high, reaching up to 45 percent in some areas, and value chains are severely underdeveloped.[5] In order to meet domestic requirements of staples, vegetables, and meat, Liberia relies heavily on food imports. For instance, Liberia's yield for rice, the staple crop, is the lowest in the West Africa region. Yet, Liberia has a significant productive potential to enhance production and has abundant natural resources.

1.3 Purpose of This Report

The purpose of this interim assessment is to provide the United States Government interagency partners, USAID BFS, USAID Missions, host country governments, and development partners with information about the current status of the ZOI indicators. The assessment is designed for use as a monitoring tool, and as such provides point estimates of the indicators with an acceptable level of statistical precision. However, Feed the Future ZOI sample calculations are not designed to support conclusions of causality or program attribution, nor is the interim assessment designed to measure change from the baseline with statistical precision.

[4] Liberia Feed the Future FY 2011-2015 Multi-Year Strategy, 2011.
[5] Liberia Feed the Future FY 2011-2015 Multi-Year Strategy, 2011.

2. Methodologies for Obtaining Interim Values for Feed the Future Indicators

This section describes the methodology used to obtain the population-based Feed the Future indicators. It provides information on the data sources and describes measures and reporting conventions used throughout the report.

2.1 Data Sources

Table 2.1 presents the data sources and dates of data collection for the baseline and interim Feed the Future indicators.

Table 2.1. Data sources and dates of the Baseline and Interim Feed the Future indicators

	Baseline		Interim	
Indicator	Data source	Date collected	Data source	Date collected
Daily per capita expenditures (as a proxy for income) in USG-assisted areas	ZOI survey	Nov 2012 – Jan 2013	ZOI Survey	Nov - Dec 2015
Prevalence of Poverty: Percent of people living on less than $1.25 per day	ZOI survey	Nov 2012 – Jan 2013	ZOI Survey	Nov - Dec 2015
Depth of Poverty: Mean percent shortfall relative to the $1.25 per day poverty line	ZOI survey	Nov 2012 – Jan 2013	ZOI Survey	Nov - Dec 2015
Women's Empowerment in Agriculture Index indicators	ZOI survey	Nov 2012 – Jan 2013	ZOI Survey	Nov - Dec 2015
Prevalence of households with moderate or severe hunger	ZOI survey	Nov 2012 – Jan 2013	ZOI Survey	Nov - Dec 2015
Women's Dietary Diversity: Mean number of food groups consumed by women of reproductive age	n/a	n/a	ZOI Survey	Nov - Dec 2015
Prevalence of exclusive breastfeeding among children under 6 months of age	n/a	n/a	ZOI Survey	Nov - Dec 2015
Prevalence of children 6-23 months receiving a minimum acceptable diet	LDHS	Mar – Jun 2013	ZOI Survey	Nov - Dec 2015
Prevalence of women of reproductive age who consume targeted nutrient-rich value chain commodities	n/a	n/a	ZOI Survey	Nov - Dec 2015
Prevalence of children 6-23 months who consume targeted nutrient-rich value chain commodities	n/a	n/a	ZOI Survey	Nov - Dec 2015
Prevalence of underweight women	CFSNS	May – Aug 2010	ZOI Survey	Nov - Dec 2015
Prevalence of stunted children under 5 years of age	CFSNS	May – Aug 2010	ZOI Survey	Nov - Dec 2015

Indicator	Baseline		Interim	
	Data source	Date collected	Data source	Date collected
Prevalence of wasted children under 5 years of age	CFSNS	May – Aug 2010	ZOI Survey	Nov - Dec 2015
Prevalence of underweight children under 5 years of age	CFSNS	May – Aug 2010	ZOI Survey	Nov - Dec 2015
Prevalence of households who report one or more members died or were sick as a result of Ebola	n/a	n/a	ZOI Survey	Nov - Dec 2015

Discrepancies in Reported Baseline Estimates

The baseline report released in 2013 reported on four indicators: daily per capita expenditures, prevalence of poverty, prevalence of households with moderate or severe hunger, and WEAI. Hence, the depth of poverty indicator was recalculated for the interim assessment report using the raw data collected during the baseline survey (refer to the **Feed the Future Zone of Influence Indicator Estimates: Liberia** table in the Executive Summary). The baseline indicators reported in the Executive Summary are adjusted estimates from the baseline report. Details of the discrepancies are below:

- **Per capita expenditure:** The baseline report lists per capita expenditure outside of Monrovia at $1.97, while the interim report states a value of $1.73. This discrepancy persists among household types: male and female adult ($1.53 v. $1.32); female only ($2.24 v. $1.95); and male only ($2.35 v. $2.09). This discrepancy is explained by the fact that the baseline report listed values in current 2012 dollars while the interim report follows USAID guidelines and lists values in constant 2010 dollars. A factor of 1.159 was used to convert between 2010 dollars and 2012 dollars, based on reported CPI values for Liberia. It should be noted that the ratios of the different values above are not exactly equal to the conversion factor due to the survey weights and the fact that household type is a subsample of the data.

- **Prevalence of Poverty:** The baseline report lists poverty outside of Monrovia at 50 percent, while the interim report states a value of 49.4 percent. The values for male and female households and female-only households are identical in the two reports. The value for male-only household is listed at 47 percent in the baseline report compared to 45.8 percent in the interim report. These estimates were recalculated and corrected to account for a rounding error in the baseline report.

- **Hunger Index:** The baseline report estimates moderate-severe hunger at 44 percent while interim report states 45.2 percent. The values for male and female households and male-only households are identical in the two reports. The value for female-only household is listed at 46 percent in the baseline report compared to 47.5 percent in the

interim report. These estimates were recalculated and corrected to account for a rounding error in the baseline report.

- **WEAI:** The baseline report included Monrovia in all analyses of the WEAI indicators. WEAI indicators reported in the interim assessment report have been recalculated to exclude Monrovia.

2.1.1 Primary Data: The ZOI Interim Survey in Liberia

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

Survey Sample Design

The ZOI interim survey sample size is calculated to provide point estimates of indicator values rather than to detect changes in indicator values over time. Prevalence of poverty, child underweight, child stunting, daily per capita expenditure, and prevalence of exclusive breastfeeding in children under 6 months are used as primary indicators for calculating the survey sample size. Among these Feed the Future indicators, the prevalence of poverty indicator requires the largest sample size of 1,885. Thus, the targeted sample size of the ZOI interim survey is 1,885 households. Sample size calculations are presented with further details in Appendix 2.1.

The ZOI interim survey revisited the same Enumeration Areas (EAs) that were surveyed during the ZOI baseline survey, excluding those EAs in the Greater Monrovia district. Revisiting the baseline EAs allows for more precise estimates of changes over time by controlling for any biases in the original sample. The interim survey also employed the same population-based two-stage cluster sample method used by the ZOI baseline survey. The first stage involved the selection of clusters, stratified among the six counties. The clusters were defined by the boundaries of the enumeration areas used for the 2008 National Population and Housing Census. Within each county, EAs were selected with probability proportional to the number of households, as recorded in the 2008 Census. Overall, the ZOI interim survey visited a total of 73 EAs.

The second stage involved selecting individual households. Upon reaching each EA, the survey teams counted the number of households located within the EA boundaries, using GPS-enabled tablets to identify those boundaries. All households in each EA had a chance to be included in the survey and 26 households were selected randomly from each EA.

This sampling design is not entirely self-weighting due to the changes in population at the EA level, and thus sampling weights are required to obtain unbiased estimates. These weights account for the probability of selection of each EA, as well as the households. The weights are

also adjusted to account for non-response within each EA, ensuring greater reliability in the results. The formula used to calculate the survey weights is presented in Appendix 2.1.

Questionnaire Design

The ZOI interim survey questionnaire is based on the Volume 11 Annex: Feed the Future Zone of Influence Interim Population-Based Survey Instrument (Oct, 2014)[6]. The questionnaire was customized to fit the Liberian context and to include the additional indicator of interest. Major revisions include:

- Module C on household demographics was customized to reflect Liberia's education level/categories;
- Module D on dwelling characteristics was revised to reflect Liberia's common housing materials as listed in the Demographic and Health Survey (DHS);
- Module E on household consumption was customized to reflect the standard approach to collecting data on consumption expenditures in Liberia, incorporating country-specific lists of items, local units of measure, and conversion rates;
- Questions relating to Motivation for Decision Making in Module G5 were removed and Module G on WEAI did not collect data from men in the same household;
- Food groups listed in Modules H and I (Women's and Child's Anthropometry and Dietary Diversity) were revised to reflect the common foods and infant formulas consumed in Liberia, and the targeted nutrient-rich value chain commodities being promoted for increased production by USAID/Liberia activities (biofortified cassava, goat, cabbage, okra, and chili pepper);
- Mid-Upper Arm Circumference (MUAC) measurement was added to Modules H and Module I;
- Additional questions were added to Module I (Child Anthropometry and Infant and Young Child Feeding) to determine exclusive breastfeeding (EBF) among children under 6 months since birth;
- Questions relating to anemia in Modules H and I were removed; and
- Module J on EVD was added to collect data on the Mission-specific indicator.

[6] Volume 11 Annex: Feed the Future Zone of Influence Interim Population-Based Survey Instrument (http://feedthefuture.gov/resource/volume-11-annex-feed-future-zone-influence-interim-population-based-survey-instrument)

Fieldwork

The ZOI interim survey was conducted with five teams. Each team was comprised of eight members: one supervisor to manage and ensure the accuracy of the data collection processes including household sampling, selection of children and caregivers, and completeness of recording the questionnaires; one anthropometric measurement expert to take anthropometric measurements such as weight, height, and MUAC; and six enumerators to conduct interviews and record responses to the electronic-based questionnaire. The five survey teams were supported by the Principal Investigator, the Senior Field Survey Specialist, and four Computer-Assisted Personal Interviewing (CAPI) Specialists, who provided technical guidance and IT-support to the survey teams as needed.

The survey teams received hands-on training and participated in practice sessions for two weeks (October 26 – November 5, 2015). Training of the supervisors and interviewers included the following topics: introduction to the survey, fieldwork procedures, questionnaire content, data management, and case management. Anthropometry experts received training and serial standardization tests were conducted to evaluate the precision and accuracy of their measurements. All survey teams were trained in human subjects' protection, including a brief history of human subjects' protection, elements of informed consent, and confidentiality.

At the conclusion of the training, a pilot test was conducted to test and verify the survey procedures, logistics, and the revised instrument. The pilot test was conducted on November 6 and November 9 in rural areas of Bomi County, located close to Monrovia but not included in the ZOI. A number of challenges were identified during the pilot test. Locating EA boundaries proved to be difficult given the supervisors were not accustomed to the mobile application used for demarcating the boundaries. Household selection procedure needed more training to clearly communicate the selected households to the enumerators conducting the surveys. Also coordinating the anthropometry experts with the enumerators for each household needed procedural improvements. Based on the pilot test, proposed changes to the survey instrument, procedures, logistics, and systems were prioritized and adopted.

The ZOI interim survey initiated on November 10 in rural Montserrado and advanced to Margibi, Grand Bassa, Bong, and Nimba. The team completed surveying in Lofa on December 15, 2015.

Limitations of the Survey

In Liberia, the ZOI baseline survey was conducted between November 2012 and January 2013. To maintain consistency and compare seasonally-sensitive consumption and expenditure data, the ZOI interim survey was conducted between November and December 2015. It is important to note that the primary harvest season in Liberia is between August and December. Thus, both the baseline and the interim surveys occurred during a period of relative food

availability near the end of the main harvest season and this may be reflected in the consumption, expenditure, and hunger scale data. Also, data collection began at the end of the rainy season and continued into the dry season. Some rural areas in the ZOI were inaccessible during the rainy season.

Another limitation concerns changes in population within the EAs. Although the survey returned to the same locations visited during the baseline, the teams encountered significant changes in population. For instance, in one rural EA, the population had declined to the point where fewer than 26 households remained in the area. These population movements, which reflect economic changes in the country as well as the Ebola crisis, may affect the survey's estimates in ways that are difficult to analyze. For example, if the poorest rural people were more likely to migrate to the capital city since the baseline survey, we would see a decline in the poverty rate in rural areas, whether or not the remaining population experienced a rise in their standard of living. Unfortunately, it is not possible to estimate the bias induced by these population movements within the survey design. When fewer than 26 households were located in the EA, the teams surveyed every household in the EA (in this case, 23 households were surveyed in the particular EA). This situation does not create issues for the reliability of the sampling frame or the data analysis.

ZOI Interim Survey Response Rates

Table 2.2 presents the response rates for the ZOI interim survey for Liberia. The components and the response rates for the sampled households, women of reproductive age (15-49), primary adult female decision-makers (for the Women's Empowerment in Agriculture module), as well as children under 5 years are presented. Response rates are presented by rural/urban residence as well as for the total sample.

Table 2.2. Results of the household and individual interviews for the ZOI interim survey in Liberia 2015

Response rates and components	Residence		Total
	Urban	Rural	
Households			
Households selected	732	1,151	1,883
Households occupied	732	1,151	1,883
Households interviewed	724	1,137	1,861
Household response rate[1]	98.6%	98.8%	98.8%
Women of reproductive age (15-49 years)			
Number of eligible women	1,149	1,679	2,567
Number of eligible women interviewed	1,021	1,352	2,373
Eligible women response rate[2]	91.4%	93.2%	92.4%
Primary adult female decision-makers (age 18+ years)			
Number of eligible women	1,149	1,679	2,828

Number of eligible women interviewed	885	1,264	2,149
Primary adult female response rate[2]	77.0%	75.2%	76.0%
Children under 5 years of age			
Number of eligible children	668	1,236	1,904
Number of caregivers of eligible children interviewed	658	1,209	1,867
Eligible children response rate[2]	98.5%	97.8%	98.1%

[1] Household response rates are calculated based on the result codes of Module C, 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, or with an extended absence, or other result code.

[2] Individual response rates are calculated based on the result codes in the relevant individual modules, i.e., Modules G, H, and I. These rates are defined as the number of eligible individuals interviewed divided by the number of eligible individuals. Eligibility is determined in modules G, H, and I, respectively. (Note that for children under 5 years of age [Module I], the primary caregivers of the children served as the respondents, not the children directly.)

Source: ZOI interim survey, Liberia 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 each of the standard disaggregate variables and defines how the variable is calculated. These variables are coded consistently and noted in the variable descriptions below. The data source used for each Feed the Future indicator is also the data source used to produce the disaggregate variables presented in the associated descriptive tables.

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 could 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, for the MAD table (Table 6.6), which presents the MAD indicator for children age 6-23 months, children's age in months is disaggregated into six-month age groups as follows: 6-11 months, 12-17 months, and 18- 23 months. For the children's anthropometry tables (Tables 7.2, 7.3, and 7.4), which present the prevalence of stunting, wasting, and underweight for all children under 5 years of age, children's age in months is disaggregated into 12-month age groups as follows: 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 are 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

The sex of the child – male or female – is a standard disaggregate for the tables presenting children's indicators, e.g., 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 FTF* notes that household-level indicators should be disaggregated by *gendered household types* – that is: (1) households where members include both male and female adults[7]; (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. This approach to conceptualizing household type is distinct from the standard *head of household*

[7] Adult is defined as age 18 or older.

approach, which is embedded with presumptions about household gender dynamics and may perpetuate existing social inequalities and prioritization of household responsibilities that may be detrimental to women (USAID 2014:1).[8]

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

For the ZOI surveys, household size is defined as the total number of people who: (1) are reported to be usual members of the household; and (2) who have spent the night in the household within the past six months. This ordinal household size variable 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). Note that other household survey programs may use a slightly different definition of household size from that used in the ZOI surveys.

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 per capita expenditures and the women's dietary diversity indicators, which are shown to two decimal places. Unweighted sample sizes in all tables and the population estimates in Tables 1.1 and 1.2 are shown as whole numbers.

[8] United States Agency for International Development (USAID). (2014). Feed the Future M&E Guidance Series. Volume 6: Measuring the Gender Impact of FTF, March. Accessed 27 March 2015 at http://www.feedthefuture.gov/resource/volume-6-feed-future-measuring-gender-impact-guidance.

- 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 ^ 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. Analyses are performed in Stata using *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 section describes the background characteristics of the ZOI population using data from the ZOI interim survey.

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, as well as the average number of female adults and children within the household. Household education, defined as the highest level of education of any member of the household, is also presented in this table.

The average household includes approximately six members. Most households are composed of two or three adults, and three or four children. These are typically nuclear families, although it is common for households to also include one or two extended family members, such as parents, adult siblings, or nieces and nephews.

Households with only female adults are significantly more likely to lack education than households with both male and female adults. Households with only female adults are also less likely to have any family members with a secondary education or higher. Drawing conclusions about male adult-only households is not possible due to small sample size.

Table 3.1. Household demographic characteristics

Characteristic	Total (All households)	By gendered household type[a]			
		Male and female adult	Female adult(s) only	Male adult(s) only	Child only
Mean household size[a]	5.9	6.2	4.3	3.3^	3.0^
Mean number of adult female household members[1,2,a]	1.5	1.5	1.5	0	0
Mean number of children (<2 years)[1]	0.4	0.4	0.4	0.4^	n/a
Mean number of children (0-4 years)[1]	1.0	1.0	1.0	0.9^	n/a
Mean number of children (5-17 years)[1]	2.1	2.2	1.8	0.8^	3.0^
Mean percentage of adults who are female[1,2]	58.4%	52.1%	100%	0%	0%
Highest education level attained[a]					
No education	15.6%	14.1%	24.8%	19.9%	n/a
Less than primary	7.9%	6.8%	15.2%	9.0%	n/a
Primary	33.6%	32.3%	41.8%	39.0%	n/a
Secondary or more	42.9%	46.9%	18.2%	32.1%	n/a
n[3]	**1,817**	**1,571**	**233**	**12**	**1**

^ Results not statistically reliable, n<30.

[1] The count is based on household members with known age.

[2] 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.

[3] Sample n is the unweighted count of all households that responded to the survey.

[a] Significance tests were performed for associations between household characteristics and gendered household type. For example, a test was done between 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, Liberia 2015.

Table 3.2 shows characteristics of the primary male and female adult decisionmakers in the sampled households in the ZOI. The primary male and primary female adult decisionmakers are household members age 18 or over who self-identify as the primary adult male and/or primary adult female responsible for both social and economic decisionmaking within the household. When they exist within a single household, primary male and female adult decisionmakers are typically, but not necessarily, husband and wife. Table 3.2 shows the age group, literacy status, and educational attainment for these household members. These characteristics are shown for all primary adult decisionmakers and for primary adult decisionmakers according to sex.

The table shows that most household decision makers are between the ages of 30-49, and a majority have a primary school education or greater. There are large disparities in education, however, between men and women: while more than 60 percent of male decisionmakers report being able to read and write, only 28.7 percent of female decisionmakers report being literate. Female decisionmakers also tend to be slightly younger than their male counterparts: whereas 15.2 percent of female decisionmakers are aged 18-24, only 3.5 percent of male

decisionmakers fall within this age range. This could indicate that women are more likely to leave the household at a younger age to pursue their own careers or raise a family without male support. But more likely, these differences result from the selection bias in the survey, discussed above: Young men aged 18-24 are difficult for survey enumerators to locate because they are more likely to move in search of work, or rent rooms in houses without being reported as a member of the household.

Table 3.2. Characteristics of the primary male and female adult decisionmakers

	Total (All primary adult decisionmakers)		By primary adult decisionmaker sex[a]			
			Male		Female	
Characteristic	Percent	n	Percent	n	Percent	n
Age[a]						
18-24	7.2%	126	3.5%	43	15.2%	83
25-29	9.3%	183	9.0%	116	10.3%	67
30-39	25.6%	477	26.7%	336	24.1%	141
40-49	26.1%	484	28.8%	373	21.1%	111
50-59	19.0%	363	19.4%	256	19.0%	107
60+	11.7%	224	12.6%	162	10.2%	62
Literacy[a]						
Percent literate[l]	50.3%	1,859	61.2%	1,287	28.7%	573
Educational attainment[a]						
No education	0.2%^	4	0.1%^	1	0.4%^	3
Less than primary	3.8%	76	4.1%	57	3.1%^	19
Primary	22.5%	415	23.6%	296	21.1%	119
Secondary or more	27.6%	503	35.9%	441	10.8%	62

^ Results not statistically reliable, n<30.

[l] The percent who are literate comprises those who report that they can both read and write.

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

Source: ZOI interim survey, Liberia 2015.

3.2 Living Conditions

Table 3.3 shows dwelling characteristics of the households in the ZOI. Many of these measures align with the 2015 Millennium Development Goals (MDG) definitions (UNDP 2003). The table presents the percentage of households who have 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 estimates in Table 3.3 suggest some improvement in household living conditions when compared with DHS estimates from 2013. For example, the interim survey estimates that 75.8 percent of households have access to an improved water source, which includes piped water

and protected wells. Although this is similar to the published DHS estimate of 72.6 percent, which includes the entire country, the DHS estimate for access to an improved water source falls to only 62.3 percent of households when restricted to the ZOI. Similarly, the interim survey estimates 43.2 percent of households have access to improved sanitation, compared to the DHS country-wide estimate of 41.7 percent. When the DHS data are restricted to the ZOI, the estimate for improved sanitation falls to only 24 percent of households. In terms of electricity, the interim survey estimates access at 4.9 percent, more than double the DHS estimate of approximately 2 percent.

Table 3.3. Household dwelling characteristics

	Total (All households)	
Characteristic	**Estimate**	**n**
Percent with improved water source[1]	75.8%	1,229
Percent with improved sanitation[2]	43.2%	1,245
Mean persons per sleeping room[3]	2.4	1,222
Percent using solid fuel for cooking[4]	95.7%	1,253
Percent with access to electricity	4.9%	1,255
Household roof materials (%)[5]		
Natural	13.0%	186
Rudimentary	1.3%^	17
Finished	85.6%	1,056
Household exterior wall materials (%)[6]		
Natural	45.4%	596
Rudimentary	15.2%	192
Finished	39.4%	470
Household floor materials (%)[7]		
Natural	50.4%	672
Rudimentary	0.1%^	2
Finished	49.5%	581

^ Results not statistically reliable, n<30.

[1] 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.

[2] 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).

[3] The average number of persons per sleeping room is a common indicator of crowding (UNDP 2003).

[4] 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.

[5] Natural roofs include *no roof, and thatch/palm leaf.* Rudimentary roof includes *rustic mat, palm/bamboo, wood planks,* and *cardboard.* Finished roofs include *zinc/metal/aluminum, wood, ceramic tiles, concrete/cement,* and asbestos sheets/ *shingles.* The *other* category is removed from percentages.

[6] Natural walls include *mud and sticks, cane/palm/trunks,* and *straw/thatch mats.* Rudimentary walls include *mud bricks, cardboard/plastic, and reused wood.* Finished walls include *cement, stone blocks, bricks, cement blocks, covered adobe,* and *wood planks/shingles.* The *other* category is removed from percentages.

[7] Natural floors include *earth/sand/mud.* Rudimentary floors include *wood planks.* Finished floors include *parquet/polished wood, vinyl or asphalt strips, ceramic tiles, cement/concrete,* and *carpet.* The *other* category is removed from percentages.

Source: ZOI interim survey, Liberia 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 age 25 who are currently attending school. It also presents the percent of household members over age nine that have attained a primary level of education, as well as the percent of household members who are reported as literate. Sex ratios in school attendance, attainment of primary education, and literacy are also presented. These measures align with MDG education indicators.

In Liberia, primary education is defined as six years of elementary school from Grade 1 to Grade 6. The intended age group to receive primary education is between six and eleven.

Table 3.4 reveals that the reported completion of primary school, in general, bears little relationship to literacy in Liberia. The interim survey estimates approximately 95 percent of children under the age of 14 are currently enrolled in school. Yet, the true value is probably lower. This statistic derives from the survey question "Is this person currently attending school?" which is asked for each person listed in the household roster. The results from this question reveal the limitations of self-reported survey data: In this case, respondents felt compelled to answer "Yes" even in cases when the person was not attending school. This response bias may be related to recent government campaigns to encourage families to send children to school in the wake of the Ebola pandemic, or other NGO efforts to increase school attendance. Unfortunately, we have no way of producing a better estimate using the survey data. Other data sources, such as school attendance records, would be required.

Although 90 percent of adults (20 years and above) report obtaining a primary school education, the level of literacy steadily declines among older age groups, from a peak of 65.8 percent among 20-24 year olds, down to only 27.0 percent literacy among Liberians aged 55 years or older. This trend could indicate a steady increase in the availability of primary schooling in Liberia, but this is unlikely due to the interruption caused by war, which would affect the schooling of the cohort aged 20-24 years more than the older age groups. More likely, these trends indicate that schooling is only one way of obtaining literacy, and the increasing availability of alternative options, such as media, has contributed to literacy among younger Liberians.

Female school attendance is generally on par with males, although older women are at a significant disadvantage in terms of literacy. This trend, however, can be taken as an

encouraging sign. While older Liberian women had few opportunities to become literate, younger Liberian women and girls (aged 19 years and below) are on par with males. If this situation continues, there will be no significant discrepancy in education or literacy between men and women in Liberia.

Table 3.4. School attendance, educational attainment, and literacy

Characteristic	Percent			Female to male ratio			n
	Attending school[1,a]	Attained a primary level of education[2,b]	Literate[3,c]	Attending school[1]	Attained a primary level of education[2]	Literate[3]	
Age group							
5-9	**96.5%**	n/a[1]	**17.1%**	**1.0**	n/a[1]	**1.2**	**1,852**
10-14	**94.4%**	**32.0%**	**55.0%**	**1.0**	**1.1**	**1.0**	**1,452**
15-19[a,c]	**79.2%**	**82.9%**	**72.6%**	**0.8**	**1.0**	**0.9**	**1.043**
20-24[a,c]	**43.8%**	**92.2%**	**65.8%**	**0.6**	**1.0**	**0.7**	**767**
25-29[c]	n/a[2]	**91.4%**	**52.7%**	n/a[2]	**1.0**	**0.6**	**733**
30-34[c]	n/a[2]	**92.2%**	**45.2%**	n/a[2]	**1.0**	**0.5**	**608**
35-54[c]	n/a[2]	**90.0%**	**41.2%**	n/a[2]	**0.9**	**0.4**	**1,851**
55+	n/a[2]	**92.0%**	**27.0%**	n/a[2]	**1.0**	**0.2**	**692**
Sex							
Female							
Age group							
5-9	95.8%	n/a[1]	18.4%	n/a[3]	n/a[3]	n/a[3]	981
10-14	94.1%	33.2%	55.3%	n/a[3]	n/a[3]	n/a[3]	726
15-19	72.4%	83.6%	70.4%	n/a[3]	n/a[3]	n/a[3]	566
20-24	35.5%	91.0%	58.2%	n/a[3]	n/a[3]	n/a[3]	476
25-29	n/a[2]	89.4%	42.3%	n/a[3]	n/a[3]	n/a[3]	447
30-34	n/a[2]	89.8%	31.0%	n/a[3]	n/a[3]	n/a[3]	348
35-54	n/a[2]	83.7%	22.2%	n/a[3]	n/a[3]	n/a[3]	963
55+	n/a[2]	89.2%	9.4%	n/a[3]	n/a[3]	n/a[3]	331
Male							
Age group							
5-9	97.5%	n/a[1]	15.8%	n/a[3]	n/a[3]	n/a[3]	871
10-14	94.8%	30.8%	54.7%	n/a[3]	n/a[3]	n/a[3]	726
15-19	86.9%	82.0%	75.1%	n/a[3]	n/a[3]	n/a[3]	477
20-24	55.0%	93.8%	78.4%	n/a[3]	n/a[3]	n/a[3]	291
25-29	n/a[2]	93.4%	68.9%	n/a[3]	n/a[3]	n/a[3]	286
30-34	n/a[2]	94.0%	64.2%	n/a[3]	n/a[3]	n/a[3]	260
35-54	n/a[2]	92.9%	61.9%	n/a[3]	n/a[3]	n/a[3]	888
55+	n/a[2]	92.6%	43.2%	n/a[3]	n/a[3]	n/a[3]	361

n/a[1] 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[2] Not applicable – Current school attendance applies to school-age children and youth only, ages 5-24.

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

[1] Liberia's academic year begins in September and ends in June, and the survey was administered in November and December, and therefore falls within the school year.

[2] 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).

[3] 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).

[a-c] 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, Liberia 2015.

4. Household Economic Status

This section includes a background discussion of monetary poverty in Liberia, including the logic of the Living Standards Measurement Study (LSMS)[9] and consumption expenditure methodology.

The *Household Roster* and *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 these 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, expenditure data are less prone to error, easier to recall, and more stable over time than income data.[10]

Liberia's economic situation has been volatile in the post-war years. The 2012 Feed-the-Future baseline survey was conducted during a period of relative economic growth in Liberia. The World Bank estimated that Liberia's economy grew by 10 percent in 2012, driven by large-scale investments in the natural resource sectors, specifically gold, iron ore, and palm oil. Since 2012, plummeting commodities prices and weakening demand from China has cast a pall over Liberia's future growth prospects.

These economic headwinds were compounded by the Ebola crisis. Beyond the human toll of the disease, the Ebola response led to severe restrictions on trade, as people and goods were prevented from moving around the country and Liberia's land borders were sealed. The crisis also provided a pretext for various resource companies to declare force majeure and suspend their activities in the country. Although the threat from Ebola has passed, the economic consequences continue to linger. Analysts estimate 2014 GDP growth at approximately two percent, with only a slight increase for 2015.

These macroeconomic challenges, however, do not necessarily translate to worse conditions for the rural population, since few rural residents have formal employment or exposure to international markets. The rural economies are driven largely by local trade and subsistence agriculture, sectors that have likely recovered since the Ebola crisis and may have benefitted

[9] Grosh, Margaret and Paul Glewwe. 1995. "A Guide to Living Standards Measurement Study Surveys and Their Data Sets." Living Standards Measurement Study Group. Working paper No. 120. The World Bank, Washington, DC.

[10] Deaton, A. 2008. The Analysis of Household Surveys: A microeconomic approach to development policy. Baltimore: The Johns Hopkins University Press.

from international development support. The interim survey results, therefore, provide valuable insight into the economic conditions faced by the majority of Liberians.

4.1 Daily Per Capita Expenditures

Table 4.1 presents daily per capita expenditures, the Feed the Future indicator that measures average daily expenditures within the ZOI per person in 2010 U.S. dollars (USD) after adjusting for 2005 purchasing power parity (PPP). Daily per capita expenditures serve as a proxy for income. This table includes the mean per capita expenditures, distributional information, and the poorest quintile's share of consumption. The percentiles are shown to provide information on the distribution of expenditures. As is typical of expenditure and income data, these estimates are positively skewed, with the majority of the population consuming/spending very little, and a small portion consuming much more. The share of consumption attributed to the lowest quintile (the bottom 20 percent) is a measure of inequality, and an MDG (see Figure 4.1).

Estimates in Table 4.1 are shown for all households as well as disaggregated by household characteristics, including gendered household type, household size, and household educational attainment. Average per capita expenditures in the ZOI are estimated at $1.93 per day (in 2010 USD), although the percentile distribution reveals a highly skewed distribution of wealth: the top 10 percent of the population spends more than nine times as much as the poorest 10 percent. Interestingly, there is no significant variation in daily per capita expenditure based on gendered household type or household educational attainment.

There is, however, a significant relationship with household size: larger households consume significantly less, per person, than smaller households. This trend is partially caused by economies of scale within the household. Rent, for example, becomes cheaper on a per capita basis as more individuals are added to the household, especially if those additional family members are small children. But this trend also indicates that larger households do not find economies of scale in production: the additional household members do not necessarily contribute more income than their expenses. Again, this is likely due to the fact that larger households contain more children than smaller households.

Table 4.1. Daily per capita expenditures by household characteristic (in 2010 USD[1])

Characteristic	Estimate (weighted)						
	Mean[a]	Percentile					n[2]
		10th	25th	50th	75th	90th	
Total (All households)[3]	**$1.93**	**$0.34**	**$0.72**	**$1.40**	**$2.14**	**$3.11**	**1,817**
Gendered household type							
Male and female adults	$1.86	$0.34	$0.70	$1.35	$2.03	$2.87	1,571
Female adult(s) only	$2.33	$0.44	$0.86	$1.69	$2.68	$4.05	233

Characteristic	Estimate (weighted)						
		Percentile					
	Mean[a]	10th	25th	50th	75th	90th	n[2]
Household size[3]							
Small (1-5 members)	$2.24	$0.45	$0.92	$1.91	$2.61	$3.49	948
Medium (6-10 members)	$1.65	$0.27	$0.58	$1.17	$1.52	$1.95	777
Large (11+ members)	$1.06	$0.33	$0.55	$0.78	$0.92	$1.44	92
Household educational attainment							
No education	$2.00	$0.23	$0.55	$1.61	$2.25	$3.30	306
Less than primary	$1.78	$0.22	$0.40	$1.20	$1.65	$2.70	150
Primary	$2.03	$0.35	$0.77	$1.35	$2.09	$2.90	617
Secondary or more	$1.84	$0.45	$0.78	$1.41	$2.27	$3.18	744

[1] Per capita expenditures measured in both Liberian Dollars (LD) and US Dollars (USD). Expenditures were first converted to current USD and then converted to 2010 USD using the Consumer Price Index (CPI) and the PPP Index estimated by the World Bank. We used the formula (2005 CPI LCU/ 2015 CPI LCU)*1/(PPP 2005)* (2010 USD CPI /2005 USD CPI) where LCU PPP 2005 = 0.52, 2015 CPI LCU = 218.7, 2005 CPI LCU = 100, 2010 USD CPI =111.65, and 2005 USD CPI = 100. The conversion factor was 0.73 for PPP 2010 and 0.79 for PPP 2005.

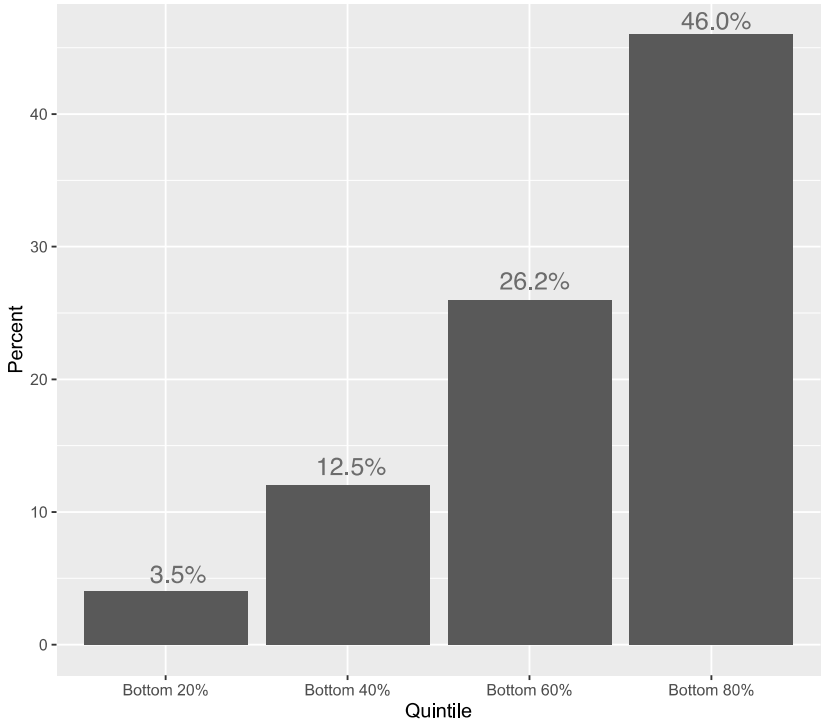
[2] Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore disaggregates' sample sizes may not total to the aggregated sample size.

[3] The estimates for male-headed households and child-headed households are excluded from the table because the sample size is too small to obtain a valid estimate.

[a] 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, Liberia 2015.

Figure 4.1. Share of consumption per quintile: Feed the Future ZOI



[1] Share of the poorest quintile in national consumption is an MDG indicator that provides information on income inequality (UNDP 2003). The poorest quintile is determined as the poorest fifth of the population. The poorest quintile's share of total consumption is calculated by dividing the consumption of the poorest quintile by total consumption within the ZOI.

Figure 4.1 shows the share of total consumption per quintile in the ZOI. The daily consumption of bottom 20 percent of the ZOI's population is only $0.57 per day (constant 2010 USD). This represents only 3.5 percent of total consumption. Indeed, Figure 4.1 reveals a highly unequal distribution of wealth in the ZOI, in which the top 20 percent of the population consumes approximately 54 percent of the total resources.

4.2 Prevalence and Depth of Poverty in the ZOI

The prevalence of poverty, sometimes called the poverty headcount ratio, is measured by determining the percent of individuals living below a poverty threshold.[11] Estimates of poverty prevalence are sensitive to the poverty thresholds used to identify the poor. A standardized poverty threshold of $1.25 per person per day in adjusted[12] 2005 PPP is used to track global changes in poverty across countries and over time, including for the purpose of monitoring progress toward international goals such as the MDG to eradicate extreme poverty and hunger.[13] The $1.25 threshold is in effect the extreme poverty threshold and represents the poverty line typical of the world's poorest countries.[14] Poverty estimates may also be presented for an individual country's own poverty and extreme poverty thresholds. Liberia's Poverty Reduction Strategy (PRS) defines poverty as per capita expenditures of LRD 2,040 per month or below (in 2007 currency). This is equivalent to the international poverty threshold of $1.25 (2005 PPP). Liberia has not defined a threshold for extreme poverty.[15]

Where the poverty prevalence indicates how *many* individuals are impacted by poverty, it does not speak to how *much* people are impacted by poverty. The depth of poverty, often called the poverty gap, is a useful poverty estimate because it captures the extremity of poverty. This measure indicates 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

[11] Note that expenditure data are not collected at the individual level but rather at the level of the household; individuals' per capita expenditures are then derived by dividing total household expenditures by the number of household members.

[12] 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.

[13] 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.

[14] World Bank. 2011. Poverty & Equality Data FAQs. http://go.worldbank.org/PYLADRLUN0. Accessed 15 April 2015.

[15] Republic of Liberia. 2008. Poverty Reduction Strategy. http://www.emansion.gov.lr/doc/Final%20PRS.pdf. Accessed 4 May 2016.

poverty line. The depth of poverty or poverty gap 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[16,17]. 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

Forty percent of individuals in the ZOI live below the $1.25 poverty threshold. Among impoverished households, approximately 56 percent of household members are under the age of 18.

Depth of Poverty

The depth of poverty in the ZOI is 19 percent, which indicates that the average gap between consumption levels of the population and the poverty line is $0.60 (2005 PPP).

The depth of poverty provides an indication of the amount of resource transfers that, if *perfectly* targeted to poor households, would be needed to bring everyone below the poverty line up to the poverty line. With a ZOI population of 1.8 million, a poverty threshold of $1.25 per day, and a poverty gap of 19 percent, $432,000 (2005 PPP) per day would need to be transferred to the poor to bring their income or expenditures up to the poverty threshold.

Average Consumption Shortfall of the Poor

The average *poor* person within the ZOI lives at 52 percent of the poverty line, or 48 percent below the poverty line. The average value of consumption of a *poor* person is $0.65 (2005 PPP) per day.

Significance testing on Table 4.2 reveals that gendered household type is significantly related to the prevalence and depth of poverty, but not to the average consumption shortfall. Interestingly, households with only female adults exhibit less poverty and less depth of poverty, which corresponds to the findings in the baseline survey. Household size is significantly related to all three indicators, with larger households faring worse than smaller households. Educational

[16] **Appendix Table 1.2** presents poverty estimates at the new $1.90 per day (2011 PPP) threshold.

[17] "Liberia's Poverty Reduction Strategy (PRS) defines poverty as per capita expenditures of LD $2,040 per month or below (in 2007 currency). This is equivalent to the international poverty threshold of $1.25 (2005 PPP). The country has not defined a threshold for extreme poverty.

attainment is significantly related to depth of poverty and consumption shortfall, with more educated households faring better.

Table 4.2. Poverty at the $1.25 (2005 PPP)[1] per person per day threshold

Characteristic	Prevalence of Poverty[2,5]		Depth of Poverty[3,5]		Average consumption shortfall of the poor[4,5]		
	Percent popula-tion[a]	n[6]	Percent of poverty line[b]	n[6]	In USD 2005 PPP[c]	Percent of poverty line[c]	n[6]
Total (All households)	**39.8%**	**1,817**	**19.1%**	**1,817**	**$0.60**	**47.9%**	**733**
Gendered household type[3,7,a,b]							
Male and female adults	41.0%	1,571	19.7%	1,571	$0.60	47.9%	658
Female adult(s) only	32.5%	233	15.6%	233	$0.60	47.9%	72
Household size[3,a,b,c]							
Small (1-5 members)	27.8%	948	14.2%	948	$0.64	51.0%	269
Medium (6-10 members)	48.9%	777	23.0%	777	$0.59	46.9%	388
Large (11+ members)	83.6%	92	35.3%	92	$0.53	42.2%	76
Household educational attainment[3,b,c]							
No education	39.6%	306	22.5%	306	$0.71	56.7%	121
Less than primary	47.9%	150	27.4%	150	$0.72	57.3%	70
Primary	39.7%	617	18.4%	617	$0.58	46.4%	260
Secondary or more	38.4%	744	16.8%	744	$0.55	43.6%	282

[1] The Feed the Future poverty indicators are based on the poverty threshold of $1.25 (2005 PPP) per person per day.

[2] 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.

[3] The depth of poverty, or poverty gap, is the average consumption shortfall multiplied by the prevalence of poverty.

[4] 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.

[5] 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.

[6] 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.

[7] The estimates for male-headed households and child-headed households are excluded from the table because the sample size is too small to obtain a valid estimate.

[a-c] 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, Liberia 2015.

5. Women's Empowerment in Agriculture

While women play a prominent role in agriculture, they face persistent economic and social constraints. Because of this, women's empowerment is a main focus of Feed the Future. Empowering women is particularly important to achieving the Feed the Future objectives of inclusive agriculture sector growth and improved nutritional status. The WEAI was developed to track the change in women's empowerment that occurs as a direct or indirect result of interventions under Feed the Future and as a programming tool to identify and address the constraints that limit women's full engagement in the agriculture sector.[18] For more information, the WEAI questionnaires and manual can be found online.[19]

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 subindices: the Five Domains of Empowerment subindex (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 asked of the primary adult male and female decisionmaker in each household and compares the 5DE profiles of women and men in the same household. The primary adult decisionmakers are individuals age 18 or older who are self-identified as the primary male or female decisionmaker during the collection of the household roster.[20] The WEAI score is computed as a weighted sum of the ZOI-level 5DE and the GPI.

The ZOI interim Survey, however, only collects data for nine of the 10 indicators and only for the primary adult *female* decisionmakers, not for primary adult *male* decisionmakers, within sampled households. The data collected during the 2015 interim survey allow calculation of nine of the 10 individual empowerment indicators for primary adult female decisionmakers (referred to hereafter as *surveyed women*), enabling Feed the Future to assess changes in the individual

[18] Alkire, S. Malapit, H., et al. (2013).
[19] IFPRI. (2013). http://feedthefuture.gov/lp/womens-empowerment-agriculture-index
[20] The respondents of the WEAI questionnaire are only the primary decisionmakers in the household and, therefore, may not be representative of the entire female and male populations in the surveyed area.

indicators or constraints that are affecting women's empowerment in countries' ZOIs. This section presents findings on these nine empowerment indicators.

Since data were not collected from men and the *Autonomy in Production* indicator is excluded, the WEAI score cannot be calculated for the interim assessment. Interim WEAI data collection was streamlined to reduce the overall length of the WEAI module and survey questionnaire, and to address concerns over the validity of the *Autonomy in Production* sub-module used in the baseline surveys. Feed the Future is still working with partners to revise the *Autonomy in Production* sub-module. Data to calculate the full WEAI will be collected during the 2017 interim survey.

Table 5.1 presents the five empowerment domains, their definitions under the WEAI, the corresponding 10 indicators, and the percentage of women who achieve adequacy in the nine indicators assessed in the ZOI interim survey. Because it was not possible to calculate whether a woman is empowered or not based on the complete set of indicators that comprises the 5DE, the percentages presented in Table 5.1 reflect the proportion of all surveyed women with adequacy in individual indicators regardless of their empowerment status (i.e., the uncensored headcount) and not the proportion of surveyed women who are disempowered and achieve adequacy in individual indicators (i.e., the censored headcount).[21] The criteria for determining adequacy in each domain are provided in Appendix A2.3.

The table reveals the highest level of adequacy in the "Group member" category, where 76.7 percent of women demonstrate achievement by being a member of a community, social, or professional group. The high levels of group membership, however, do not necessarily indicate that women have much say in group decisions: less than half of women report being able to speak in public without a great deal of difficulty. Related to this issue is a lack of input in productive decisions: only 15.2 percent of women report that they provide input into the household's farming, livestock raising, or other activities. Other categories with a low level of achievement include decision making power over the purchase, sale, or transfer of assets (23.1 percent) and access to and decisions on credit (31.2 percent). On the whole, the WEAI results paint a picture in which women participate in community and social groups, but play a limited role in decision making within the community or household.

[21] See Appendix 2.3 for the criteria for achieving adequacy in each WEAI indicator.

Table 5.1. Achievement of adequacy on Women's Empowerment in Agriculture Index indicators[1]

Domain	Definition of domain	Indicators	Percent with adequate achievement	n
Production	Sole or joint decisionmaking over food and cash crop farming, livestock, and fisheries, and autonomy in agricultural production	Input in productive decisions	15.2%	1,819
		Autonomy in production	n/a	n/a
Resources	Ownership, access to, and decisionmaking power over productive resources such as land, livestock, agricultural equipment, consumer durables, and credit	Ownership of assets	46.9%	1,819
		Purchase, sale or transfer of assets	23.1%	1,819
		Access to and decisions on credit	31.2%	1,819
Income	Sole or joint control over income and expenditures	Control over use of income	38.5%	1,819
Leadership	Membership in economic or social groups and comfort in speaking in public	Group member	76.7%	1,819
		Speaking in public	47.3%	1,819
Time	Allocation of time to productive and domestic tasks and satisfaction with the available time for leisure activities	Workload	66.5%	638
		Leisure	48.1%	1,819

[1] The ZOI interim survey includes an abridged version of the empowerment instrument, and the ZOI interim survey did not include information to measure women's autonomy in agricultural production. Due to this omission, censored headcounts and the 5DE sub-index cannot be calculated.

n/a: Data for this empowerment indicator were not collected for the ZOI interim surveys.

Source: ZOI interim survey, Liberia 2015.

5.2 Agricultural Production

Table 5.2 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.

Not surprisingly, food crop farming is the most common type of economic activity undertaken by women, with 50.3 percent participation. Food crop farming, however, also exhibits one of the lower rates of input from women (51.8 percent). This low level of input could relate to the division of labor within family farms. While the men deal with planting and harvesting, women often focus on weeding and other activities.

The lowest level of female input is observed in livestock raising. Raising cattle and other large animals is relatively rare in Liberia, and is a traditionally male-dominated industry. Women often raise smaller animals, such as chickens, ducks, and goats. Only 12.3 percent of women reported participated in livestock raising. Women have the greatest input in fishing or fishpond culture. This is surprising since fishing is also a male-dominated industry, although perhaps women exert greater influence by selling fish in the markets or managing their own fishponds.

The lowest level of participation is observed in wage or salaried employment. This is not surprising, given the low levels of formal employment in Liberia. What is surprising, however, is the fact that only 58.3 percent of salaried women report having input into decisions related to their employment.

Table 5.2. Economic activities and input in decisionmaking on production among surveyed women

Activity	Participates in activity		Has input[1] into decisions about activity	
	Percent	n[2]	Percent	n[1,3]
Total (All surveyed women)	**71.6%**	**1,250**	**64.1%**	**897**
Type of activity				
Food crop farming	50.3%	1,250	51.8%	646
Cash crop farming	23.0%	1,250	53.7%	294
Livestock raising	12.3%	1,250	49.4%	147
Fishing or fishpond culture	16.2%	1,250	74.0%	196
Non-farm economic activities	22.5%	1,250	65.9%	256
Wage or salaried employment	6.3%	1,250	58.3%	79

[1] *Having input* means that a woman reported having input into most or all decisions regarding the activity.

[2] Estimates exclude households who have no primary adult female decisionmaker (PAFD) or whose data are missing/incomplete.

[3] Women who do not participate in an activity or report that no decision was made are excluded from these percentages.

Source: ZOI interim survey, Liberia 2015.

Table 5.3 shows the percentage of surveyed women who have input into the decisions made regarding the use of income derived from an activity. The highest levels of input are observed in decisions concerning income from wages and non-farm economic activities, which could include selling in the market. This is not surprising as these sources of income rely on individual effort, rather than household-level production. Fishing has by far the lowest levels of female input on the use of income, which is surprising given that fishing was associated with the highest level of input into the activities, among women who participate in fishing. Perhaps women have little say over the income from fishing in cases where men catch the fish and are also in charge of selling the catch. When women are involved in the marketing of the fish, or in the management of fishponds, they have more say (Table 5.2).

Table 5.3. Input in decisionmaking on use of income among surveyed women

Activity	Has input[1] into use of income from activity	
	Percent	n[2,3]
Total (All surveyed women)	**34.7%**	**1,508**
Type of activity		
Food crop farming	53.3%	639
Cash crop farming	56.4%	290
Livestock raising	52.8%	146
Fishing or fishpond culture	14.9%	803
Non-farm economic activities	64.4%	256
Wage or salaried employment	60.8%	80

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

[2] Estimates exclude households who have no primary adult female decisionmaker or whose data are missing/incomplete.

[3] Women who do not participate in an activity or report that no decision was made are excluded from these percentages.

Source: ZOI interim survey, Liberia 2015.

Tables 5.2 and 5.3[22] present information contributing to two indicators of the WEAI. *Input into productive decisions*, one indicator of the *Production* domain, is measured by the extent to which individuals make decisions or feel they can make decisions on the agricultural activities listed in the three tables. The *Income* domain is comprised entirely of a single indicator measuring the control over use of income. This indicator captures individuals' ability to make decisions involving the income generated from their productive activity or the extent to which they feel they can make decisions regarding household expenditure and wage income.

5.3 Productive Resources

One of the 10 indicators of the WEAI is the ownership of productive resources. The ability of women to make decisions on the use of productive resources is a second indicator of the *Resource* domain. **Table 5.4** presents households' ownership of productive resources, as reported by surveyed women. Table 5.4 also presents the percentage of women who can make a decision to purchase or to sell, give away, or rent owned items. Women are counted as having the ability to make a decision if they can solely make a decision or if they can make these decisions with others with any degree of input.

The mostly commonly owned items include mobile phones, non-mechanized farm equipment (such as a cutlass), and small consumer durables (such as kitchen equipment or a radio). These items are generally low-value and are used daily by many families. Not surprisingly, the lowest

[22] Results on Decisionmaking on production among surveyed women are not reported because Module G5: Motivation for Decision Making was excluded from the interim survey as instructed in the Feed the Future Indicator Handbook.

levels of ownership correspond to high-value items, such as large consumer durables or livestock, or specialized equipment.

Among items owned by a household, a woman's ability to make decisions to purchase or dispose of those items reveals her influence in the household. As described above, women have the greatest degree of influence over fish ponds or fishing equipment. This is somewhat surprising, as fishing is generally a male-dominated profession, although women may be more likely to manage fish ponds. Women have the least decision making power when it comes to agricultural land or livestock.

Table 5.4. Household ownership and surveyed women's control over productive resources

	Someone in the household owns item		Woman can decide to purchase items		Woman can decide to sell/give/rent owned items	
Type of resource	Percent	n[1]	Percent	n[1]	Percent	n[1]
Agricultural land	28.1%	1,239	31.9%	338	31.3%	338
Large livestock	10.9%	1,241	24.2%^	15	34.5%^	13
Small livestock	10.8%	1,249	39.5%	122	39.5%	122
Chickens, ducks, turkeys, and pigeons	31.2%	1,854	48.1%	621	49.0%	621
Fish pond or fishing equipment	36.3%	1,853	58.1%	165	61.1%	165
Non-mechanized farm equipment	44.0%	1,393	45.6%	623	45.4%	622
Mechanized farm equipment	0.4%	1,293	41.2%	274	25.4%^	4
Nonfarm business equipment	1.8%	1,514	n/a		n/a	
House or other structures	18.0%	1,505	n/a		n/a	
Large consumer durables	5.5%	1,249	n/a		n/a	
Small consumer durables	40.6%	1,251	n/a		n/a	
Cell phone	42.2%	1,416	n/a		n/a	
Non-agricultural land	10.0%	1,402	n/a		n/a	
Means of transportation	29.6%	1,847	n/a		n/a	

^ Results not statistically reliable, n<30.

[1] Estimates exclude households that have no primary adult female decisionmaker 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.

Source: ZOI interim survey, Liberia 2015.

Table 5.5 shows the third indicator of the *Resources* domain, access to, and decisionmaking on credit. The table presents the percent of surveyed women who report that a member of the household has in the past 12 months received any loan, either an in-kind loan (such as food items or raw materials), or a cash loan. These categories are not mutually exclusive. Further, for women living in households where a household member has received a loan, the table presents the percentage who report 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.

Less than a quarter (24.3 percent) of Liberian women report receiving any kind of loan, and the most common source of funds is friends or relatives. Outside of these social networks, the overwhelming majority of loans are provided by informal lenders or through group-based microfinance. These estimates indicate that Liberian women remain largely excluded from formal access to credit, which likely impedes their ability to pursue economic opportunities and handle unexpected shocks, such as medical expenses. More than 93 percent of these loans are received as cash, rather than in-kind.

Women generally contribute to decision making surrounding loans. 64.3 percent of women report that they have influence on whether to borrow in the first place, and 63 percent of women influence how the funds are used. This influence is fairly consistent across types of loans, and also for borrowing and spending decisions. The exception is formal loans, but the small sample size (only 2 percent of respondents received a formal loan) means that these estimates should not be given much weight.

Table 5.5. Credit access among surveyed women

		Credit source (percent)[1]				
Estimate	Any source (percent)	Non-governmental organization	Informal lender	Formal lender	Friends or relatives	Group-based micro finance
Total receiving a loan (All surveyed women)	**24.3%**	**3.2%**	**11.0%**	**1.8%**	**16.5%**	**5.5%**
Type of loan						
Any loan	24.3%	3.2%	11.0%	1.8%	16.5%	5.5%
In-kind loan	6.7%	3.1%	5.7%	0%^	8.3%	0%
Cash loan	93.4%	96.9%	94.3%	100%^	91.7%	100%

Estimate	Any source (percent)	Credit source (percent)[1]				
		Non-governmental organization	Informal lender	Formal lender	Friends or relatives	Group-based micro finance
n[2]	**334**	**35**	**71**	**22**	**211**	**62**
Total contributing to a credit decision (All surveyed women)	**64.5%**	**57.5%**	**74.6%**	**78.0%**	**57.8%**	**60.4%**
Type of decisions						
On whether to borrow	64.3%	57.8%	73.9%	77.3%	58.2%	60.4%
On how to use loan	63.0%	57.6%	71.4%	37.2%^	57.5%	55.2%
n[2]	**844**	**436**	**181**	**136**	**626**	**62**

^ Results not statistically reliable, n<30.

[1] Percentages sum to more than 100 because loans may have been received from more than one source.

[2] Estimates exclude households who have no primary adult female decisionmaker or whose data are missing/incomplete.

Source: ZOI interim survey, Liberia2015.

5.4 Leadership in the Community

The *Leadership* domain measures an individual's influence and involvement with community organizations and issues impacting her community. The first indicator of the domain is an individual's ease of speaking in public, which is measured by three questions related to the level of difficulty an individual faces when voicing her opinion regarding community decisions. On this indicator, 47.3 percent of surveyed women in the ZOI achieved adequacy in voicing her opinions on community matters (**Table 5.6**).

Table 5.6. Comfort with speaking in public among surveyed women

Topics for public discussion	Percent Comfortable speaking in public about selected topics	n[1]
Total (All surveyed women)	**47.3%**	**1,151**
Topics		
To help decide on infrastructure to be built in the community	44.5%	1,147
To ensure proper payment of wages for public works or other similar programs	40.4%	1,109

Topics for public discussion	Percent Comfortable speaking in public about selected topics	n[1]
To protest the misbehavior of authorities or elected officials	40.6%	1,138

[1] Estimates exclude households who have no primary adult female decisionmaker or whose data are missing/incomplete.

Source: ZOI interim survey, Liberia 2015.

The second indicator of the *Leadership* domain is an individual's participation in a community organization. **Table 5.7** 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.

More than three quarters of Liberian women are involved in some kind of community group, which is the highest level of achievement in any of the WEAI categories. The most common type of group—and the one that claims membership from a majority of women—is a religious group, which includes churches and mosques. Outside of religious activities, women are active in credit or microfinance groups (21.2 percent) as well as local government (18.8 percent). In rural areas, for example, it is common for village officials to include a "Chair lady", and other female-oriented roles.

Table 5.7. Group membership among surveyed women

Group type	Percent[1] Is an active group member	n[2]
Total (All surveyed women)	**76.8%**	**1,245**
Group type		
Agricultural producers' group	11.5%	1,249
Water users' group	3.4%	1,853
Forest users' group	7.2%	1,252
Credit or microfinance group	21.2%	1,421
Mutual help or insurance group	2.4%	1,852
Trade and business association	3.7%	1,258
Civic or charitable group	2.0%	1,524
Local government	18.8%	1,853
Religious group	65.0%	1,480
Other	6.0%	1,852

[1] 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.

[2] Estimates exclude households who have no primary adult female decisionmaker or whose data are missing/incomplete.

Source: ZOI interim survey, Liberia 2015.

5.5 Time Use

The last domain of the WEAI is time use. This domain assesses women's work load as directly measured through a time allocation log, as well as the satisfaction felt by the surveyed woman with her leisure time. **Table 5.8** shows the percentage distribution and average hours spent participating in various activities and chores that women often perform. The percentage of women performing an activity indicates the percentage of women who reported doing an activity within the past 24 hours, irrespective of the length of time spent performing the activity. The average hours spent performing an activity is the average across all women, assigning zero hours to women who did not perform an activity. Both primary and secondary activities are presented in Table 5.8. In the ZOI, 48.1 percent of women reported being satisfied with their leisure time.

Table 5.8. Time allocation among surveyed women

	Primary activity		Secondary activity[1]	
Activity	Percent of women	Mean hours devoted	Percent of women	Mean hours devoted
Sleeping and resting	100%	10.3	n/a	n/a
Eating and drinking	90.2%	1.1	n/a	n/a
Personal care	98.0%	1.2	n/a	n/a
School and homework	8.9%	2.4	n/a	n/a
Work as employed	5.3%	4.0	n/a	n/a
Own business work	22.4%	6.2	n/a	n/a
Farming/livestock/fishing	51.3%	6.3	n/a	n/a
Shopping/getting services	9.4%	2.0	n/a	n/a
Weaving, sewing, textile care	2.7%	1.3	n/a	n/a
Cooking	86.0%	1.4	n/a	n/a
Domestic work (fetching food and water)	70.5%	1.6	n/a	n/a
Care for children/adults/elderly	65.7%	1.2	n/a	n/a
Travel and commuting	47.3%	1.7	n/a	n/a
Watching TV/listening to radio/reading	8.4%	2.2	n/a	n/a
Exercising	2.2%	1.3	n/a	n/a
Social activities and hobbies	56.8%	1.9	n/a	n/a
Religious activities	35.3%	1.1	n/a	n/a
Other	8.0%	2.9	n/a	n/a
n	**701**	**701**	**n/a**	**n/a**

[1] 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, Liberia 2015.

Aside from sleeping, eating, and personal care, the most common activities for women are cooking, domestic work, and child care. These are traditionally considered "women's activities", and take up an average of 4.2 hours per day. Other common activities include tasks related to farming, livestock, or fishing, as well as travel and commuting. More than half of women reported spending time on social activities, and more than a third devoted time to religious activities.

6. Hunger and Dietary Intake

This section presents findings related to hunger in the ZOI as well as women's and young children's dietary intake.

6.1 Household Hunger

The HHS is used to calculate the prevalence of households in the Liberia ZOI 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). The HHS should be measured at the same time each year, and ideally at the most vulnerable time of year (right before the harvest, during the dry season, etc.).[23,24]

The hunger season in Liberia occurs between June and September, during the peak rainy season and before the main rice harvest season which begins in August and ends in December. Data for the HHS were collected in November and December, which is near the end of the main harvest season. Therefore, the HHS may be underestimated because the data were collected during the season of relative food security. However, the ZOI interim survey timing was determined to allow the data to be consistent and comparable with the ZOI baseline survey and also to avoid the rainy season which makes some areas in the ZOI inaccessible.

Table 6.1 presents estimates of household hunger for all households, as well as by household characteristics, including gendered household type, household size, and household educational attainment.

More than 20 percent of Liberian households suffer from food insecurity, although only 1.3 percent of households experienced severe hunger in the month prior to the survey interview. Household characteristics were not found to be significantly correlated with hunger, although there is some suggestive evidence that larger households suffer greater food insecurity, which is consistent with the lower per capita expenditures measured in larger households. This lack of relationship is itself interesting: the presence of multiple adults or a relatively educated household member is not enough to ensure food security in Liberia.

[23] Deitschler, Ballard, Swindale, & Coates (2011).
[24] For further description of the household hunger indicator and its calculation, refer to the Feed the Future Indicator Handbook, available at http://feedthefuture.gov/resource/feed-future-handbook-indicator-definitions.

These estimates represent a dramatic decline in hunger as compared to the baseline survey. According to the interim survey, hunger has declined by half in the three years since the baseline survey. Some of this improvement can be explained by economic growth, which is also reflected in lower poverty estimates. But climatic variation likely also plays a role. A particularly good harvest in 2015, possibly related to El Nino, could explain a fall in hunger—as could an especially poor harvest in 2012. Unfortunately, the effect of climate cannot be estimated through the survey.

Table 6.1. Household hunger

Characteristic	Percent			n[1]
	Little to no hunger[a]	Moderate hunger	Severe hunger	
Total (All households)	**79.7%**	**19.0%**	**1.3%**	**1,817**
Gendered household type[2]				
Male and female adults	79.4%	19.2%	1.3%	1,571
Female adult(s) only	84.7%	14.7%	0.6%	233
Household size				
Small (1-5 members)	80.2%	18.5%	1.3%	948
Medium (6-10 members)	80.4%	18.2%	1.3%	777
Large (11+ members)	73.4%	24.4%	1.8%	92
Household educational attainment				
No education	77.2%	22.4%	0.4%	306
Less than primary	79.5%	18.5%	1.9%	150
Primary	79.5%	18.9%	1.6%	617
Secondary or more	81.8%	16.9%	1.3%	744

^ Results not statistically reliable, n<30.

[1] 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.

[2] The estimates for male-headed households and child-headed households are excluded from the table because the sample size is too small to obtain a valid estimate.

[a] Significance tests were performed for associations between little to no hunger and household characteristics, which is equivalent to testing the association between moderate to severe hunger and household characteristics. For example, a test was done between little to no hunger and gendered household type. When differences were found to be significant ($p<0.05$), the superscript is noted next to the household characteristic. None of the household characteristics was found to be significantly related.

Source: ZOI interim survey, Liberia =2015.

6.2 Dietary Intake

This section presents information on the dietary diversity of women of reproductive age and on infant and young child feeding in the ZOI.

6.2.1 Dietary Diversity among Women Age 15-49 Years

Women of reproductive age (15-49 years) are at risk of multiple micronutrient deficiencies, which can jeopardize their health and their ability to care for their children and participate 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 of women's diets. The dietary diversity indicator reports the mean number of food groups consumed in the previous day by non-pregnant women of reproductive age.

For the ZOI interim survey, two dietary diversity indicators for women are calculated: the Women's Dietary Diversity Score (WDDS) and Women's Minimum Dietary Diversity (MDD-W).

Women's Dietary Diversity Score

The Feed the Future women's dietary diversity indicator, presented in Table 6.2, 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. The number of food groups consumed is averaged across all women of reproductive age in the sample for whom dietary diversity data were collected to produce a 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 a Feed the Future high-level indicator. Individual-level characteristics include women's age group and educational attainment. Household-level characteristics include categories of gendered household type, household size, and household hunger.

Overall, women consumed an average of 4.63 food groups in the previous 24 hours. When stratified by age, the highest dietary diversity score was amongst women 25-29 years of age (4.78 food groups), while women 35-39 had the lowest dietary diversity score (4.52 food groups), however there were no statistically significant differences in dietary diversity score by women's age group. Likewise, there were no differences in dietary diversity score based on educational attainment or gendered household type. Women in small households (1-5 members) consumed significantly fewer food groups than women in larger households, with women in small households consuming 4.56 food groups compared to 4.70 food groups among women from medium-sized households (6-10 members) and 4.76 food groups among women from large households (11+ members). Moderate to severe household hunger was also significantly associated with a decrease in the average number of food groups consumed by women. In households that experienced little to no hunger, women consumed 4.72 food

groups compared to 4.26 food groups consumed by women in households with moderate to severe hunger.

Table 6.2. Women's dietary diversity score

Characteristic	Mean[a]	Median	n[1]
Total (All women 15-49)	**4.63**	**4**	**2,389**
Age			
15-19	4.62	4	497
20-24	4.70	4.5	440
25-29	4.78	4	415
30-34	4.58	4	335
35-39	4.52	4	313
40-44	4.63	4	212
45-49	4.77	5	157
Educational attainment			
No education	4.55	4	349
Less than primary	4.57	4	214
Primary	4.61	4	830
Secondary or more	4.73	5	878
Gendered household type[2]			
Male and female adults	4.67	4	2,083
Female adult(s) only	4.40	4	252
Household size[a]			
Small (1-5 members)	4.56	4	1,005
Medium (6-10 members)	4.70	5	1,102
Large (11+ members)	4.76	5	164
Household hunger[a]			
Little to no hunger	4.72	5	1,867
Moderate or severe hunger	4.26	4	511

[1] 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.

[2] The estimates for male-headed households and child-headed households are excluded from the table because the sample size is too small to obtain a valid estimate.

[a] 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, Liberia 2015.

Women's Minimum Dietary Diversity

The Feed the Future MDD-W indicator is a new measure introduced in the interim assessments and uses the following 10 food groups: (1) grains, roots, and tubers; (2) legumes and beans; (3) nuts and seeds; (4) dairy products; (5) eggs; (6) flesh foods, including organ meat and miscellaneous small animal protein; (7) vitamin A-rich dark green leafy vegetables; (8) other

vitamin A-rich vegetables and fruits; (9) other fruits; and (10) other vegetables.[25] Achievement of MDD-W is defined as having consumed foods from five of the 10 food groups in the past 24 hours. Thus this indicator is a dichotomous variable, and the measure is reported as the percentage of women who achieve a minimum dietary diversity.[26]

Table 6.3 shows the percentage of all women of reproductive age in the ZOI who have achieved the minimum dietary diversity threshold by individual-level and household-level characteristics. Individual-level characteristics include women's age group and educational attainment. Household-level characteristics include categories of gendered household type, household size, and household hunger.

Overall, 56.2 percent of women achieved the minimum dietary diversity threshold. When stratified by age, the highest percentage of women achieving the minimum dietary diversity threshold was amongst women 45-49 years of age (63.0 percent achieving), while women 30-34 were the least likely to achieve the minimum dietary diversity threshold (54.2 percent achieving), however there were no statistically significant differences in achievement of the minimum dietary diversity threshold by women's age group.

There were, however, significant differences in the achievement of the minimum dietary diversity threshold by educational attainment, gendered household type, household size, and household hunger. Women with the highest level of education (secondary or more) were significantly more likely to achieve the minimum dietary diversity threshold (60.3 percent achieving) compared to women with less than a primary school education (51.0 percent achieving). Likewise, women from households with both male and female adults were significantly more likely to achieve the minimum dietary diversity threshold (57.4 percent achieving) than women from households with only female adults (46.9 percent achieving). Women in large households (11+ members) were significantly less likely to achieve the minimum dietary diversity threshold than women in medium-sized households (6-10 members), with 52.0 percent of women in large households achieving the minimum dietary diversity threshold compared to 59.2 percent of women from medium-sized households. Moderate to severe household hunger was also significantly associated with a decrease in the percentage of women achieving the minimum dietary diversity threshold. In households that experienced little to no hunger, 58.0 percent of women achieved the minimum dietary diversity threshold

[25] The differences between the nine food groups used for the WDDS (Table 6.2), which is the current standard Feed the Future indicator, and the 10 food groups used for the new MDD-W measure (Table 6.3) include: (1) legumes and beans are separated from nuts and seeds; (2) meat (flesh foods) and organ meat are combined into one group; and (3) other fruits and other vegetables are separated into two groups.

[26] For more information, refer to Volume 11: Guidance on the First Interim Assessment of the Feed the Future Zone of Influence Population-Level Indicators (October 2014), Section 4.2, available for download at http://www.feedthefuture.gov/sites/default/files/resource/files/ftf_guidanceseries_vol11_interimassessment_oct2014.pdf.

compared to 48.4 percent of women from households experiencing moderate to severe hunger.

Table 6.3. Women's minimum dietary diversity

Characteristic	Percent[a]	n[1]
Total (All Women 15-49)	**56.2%**	**2,389**
Age		
15-19	54.4%	497
20-24	59.2%	440
25-29	56.9%	415
30-34	54.2%	335
35-39	56.0%	313
40-44	56.4%	212
45-49	63.0%	157
Educational attainment[a]		
No education	53.6%	349
Less than primary	51.0%	214
Primary	54.9%	830
Secondary or more	60.3%	878
Gendered household type[a]		
Male and female adults	57.4%	2,083
Female adult(s) only	46.9%	252
Household size[a]		
Small (1-5 members)	54.1%	1,005
Medium (6-10 members)	59.2%	1,102
Large (11+ members)	52.0%	164
Household hunger[a]		
Little to no hunger	58.0%	1,867
Moderate or severe hunger	48.4%	511

[1] 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.

[a] Significance tests were performed for associations between women's minimum dietary diversity and individual/household characteristics. For example, a test was done between women's minimum dietary diversity 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, Liberia 2015.

Table 6.4 shows the percentages of women age 15-49 years who consume each of the 10 food groups by dietary diversity achievement status. The percentages of all women who consume each of the 10 food groups is shown (the *Overall* column), as well as the percentages among women who achieve a minimum dietary diversity and among women who do not achieve a minimum dietary diversity.

Of all the food groups, other vegetables were the most commonly consumed (98.0 percent consuming), while eggs were the least commonly consumed (13.3 percent consuming) by all women. Other commonly consumed food groups were grains, roots, and tubers (96.2 percent consuming) and meat and organ meats (84.4 percent consuming). The high consumption of meat and organ meats is driven by a high percentage of women who consume fish (77.6 percent consuming), as opposed to other animal source foods. Besides eggs, less commonly consumed food groups included legumes and beans (14.4 percent consuming) and dairy products (16.4 percent consuming). There were significant differences in the consumption of each of the 10 food groups based on achievement of a minimum dietary diversity. Across all 10 food groups, a significantly greater proportion of women achieving the minimum dietary diversity consumed foods from a specific group compared with women who did not achieve the minimum dietary diversity. The largest differences in consumption of specific food groups based on the achievement of a minimum dietary diversity were for other Vitamin A-rich vegetables and fruits (55.4 percent vs. 8.1 percent) and other fruits (75.2 percent vs. 9.8 percent).

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 [a]		
	Overall	Achieving	Not achieving
Women consuming a specific food group			
Grains, roots and tubers [a]	96.2%	98.6%	93.1%
Legumes and beans [a]	14.4%	24.1%	2.0%
Nuts and seeds [a]	26.9%	46.0%	2.4%
Dairy products [a]	16.4%	28.2%	1.2%
Meat and organ meats [a]	84.4%	95.0%	70.9%
Eggs [a]	13.3%	22.4%	1.5%
Vitamin A-rich dark green leafy vegetables [a]	75.4%	94.8%	50.5%
Other Vitamin A-rich vegetables and fruits [a]	34.7%	55.4%	8.1%
Other fruits [a]	46.6%	75.2%	9.8%
Other vegetables [a]	98.0%	99.9%	95.7%
n	**2,389**	**1,350**	**1,039**

[a] 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, Liberia 2015.

6.2.2 Infant and Young Child Feeding

This section presents young children's dietary intake measures, including the Feed the Future indicators of exclusive breastfeeding among infants under 6 months and the MAD indicator among children 6-23 months.

Exclusive Breastfeeding

Exclusive breastfeeding provides children with significant health and nutrition benefits, including protection from gastrointestinal infections and reduced risk of mortality due to infectious disease. Exclusive breastfeeding means the infant received breast milk (including expressed breast milk or breast milk from a wet nurse) and may have received oral rehydration salts, vitamins, minerals, and/or medicines, but did not receive any other food or liquid. This indicator measures the percentage of children under 6 months of age who were exclusively breastfed during the day preceding the survey as well as the percentage of children under 6 months who have been exclusively breastfed since birth. Although exclusive breastfeeding status since birth was not a required indicator, it was added to the questionnaire to more accurately represent an infant's exposure to breast milk in the first six months. Breast milk contains a multitude of essential immune factors in addition to macro- and micronutrients necessary for optimal growth and development. This additional indicator also represents an infant's exposure to liquids and foods other than breast milk, which may expose the infant to infectious pathogens. Lastly, the additional indicator allows more direct comparison to estimates from the literature by using the standard WHO definition of exclusive breastfeeding.

Table 6.5 shows the prevalence of exclusive breastfeeding among children under 6 months in the ZOI. Estimates are shown for all children, as well as by children's sex and by educational attainment of the child's primary caregiver. The caregiver's educational categories include no education, less than primary, completed primary, and completed secondary or more. Note that the data are collected for the self-identified *primary caregiver* and not strictly for the biological mother (although it is often the same person).

Overall, 52.1 percent of infants were exclusively breastfed in the previous day, while 50.3 percent of infants had been exclusively breastfed since birth and there were no significant differences based on the sex of the child or the caregiver's educational attainment.

Table 6.5. Prevalence of exclusive breastfeeding among children under 6 months

Characteristic	Percent[a] (day-before)	n[1] (day-before)	Percent[a] (since birth)	n[1] (since birth)
Total (All children under 6 months)	**52.1%**	**250**	**50.3%**	**250**
Child sex				
Male	50.0%	121	48.2%	121
Female	54.0%	129	52.4%	129
Caregiver's educational attainment[2]				
No education	54.4%	142	51.4%	142
Less than primary	22.4%^	4^	22.4%^	4^
Primary	53.4%	70	53.4%	70
Secondary or more	42.4%	31	42.4%	31

^ Results not statistically reliable, n<30.

[1] 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.

[2] 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.

[a] Significance tests were performed for associations between exclusive breastfeeding and child/caregiver characteristics. For example, a test was done between exclusive breastfeeding and the child's sex. When an association is found to be significant ($p<0.05$), the superscript is noted next to the characteristic.

Source: ZOI interim survey, Liberia 2015.

Minimum Acceptable Diet

The prevalence of children 6-23 months receiving a MAD measures the proportion of young children who receive a MAD apart from breastfeeding. This composite indicator measures both the minimum feeding frequency and minimum dietary diversity based on caregiver reports of the frequency with which the child was fed in the past 24 hours, and what foods were consumed during the past 24 hours. Tabulation of 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 in the ZOI. Estimates are shown for all children, as well as by characteristics of the children, caregiver, and household. Children's characteristics include children's sex and age group. Caregivers' characteristics include age and sex categories, as well as caregivers' educational attainment. Household characteristics include gendered household type, household size, and household hunger.

Few children (less than 9 percent) achieved minimum acceptable diet. These striking results relate to deficiencies both in the number of meals eaten, and the quality of the diet (see also Table 6.7). Overall, no significant differences were noted in children who received a minimum acceptable diet related to gender, age group, caregiver's educational attainment, gendered household type, or household size. Nearly twice the percentage of children in "non-hungry" households achieved minimum acceptable diet compared to children in "hungry" households, although the difference was not statistically significant. Not shown in this table is the important finding that breastfed children were significantly more likely to achieve a minimum acceptable diet than non-breastfed children (12 percent vs. 0 percent, $p<.0001$).

Table 6.6. Percentage of children age 6-23 months who receive a minimum acceptable diet

Characteristic	Percent[a]	n[1]
Total (All children 6-23 months)	**9.0%**	**490**
Child sex		
Male	7.9%)	267
Female	10.3%	223

Child age		
6-11 months	10.5%	171
12-17 months	10.3%	174
18-23 months	5.5%	175
Caregiver's educational attainment[2]		
No education	8.4%	275
Less than primary	10.0%^	20
Primary	11.8%	144
Secondary or more	4.1%	49
Gendered household type[3]		
Male and female adults	9.0%)	434
Female adult(s) only	9.3%	54
Household size		
Small (1-5 members)	8.9%	56
Medium (6-10 members)	10.2%	235
Large (11+ members)	7.9%	191
Household hunger		
Little to no hunger	10.0%	392
Moderate or severe hunger	5.1%	98

^ Results not statistically reliable, n<30.

[1] 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.

[2] 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.

[3] The estimates for male-headed households and child-headed households are excluded from the table because the sample size is too small to obtain a valid estimate.

[a] Significance tests were performed for associations between children receiving a minimum acceptable diet and child/caregiver/household characteristics. For example, a test was done between children receiving a minimum acceptable diet and child's sex. When an association is found to be significant ($p<0.05$), the superscript is noted next to the characteristic.

Source: ZOI interim survey, Liberia 2015.

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. Estimates are shown for all children, as well as by specific age groups, and presented separately for breastfed children and non-breastfed children.

Table 6.7. Components of a minimum acceptable diet among children age 6-23 months

	Percent			
		By child age (in months)		
MAD components and food groups	**All children** [a]	**6 to 11**	**12 to 17**	**18 to 23**
Breastfed children [b,c]				
Achieving minimum meal frequency[1,a]	39.8%	42.1%	37.6%	38.7%
Achieving minimum dietary diversity[a]	21.0%	11.8%	25.8%	33.3%

Consuming:				
Grains, roots, and tubers	67.1%	47.1%	76.7%	86.7%
Legumes and nuts	14.0%	6.4%	18.0%	22.7%
Dairy products	6.3%	5.7%	8.3%	4.0%
Flesh foods	50.5%	30.8%	59.4%	76.0%
Eggs	5.0%	4.5%	6.1%	4.0%
Vitamin A-rich fruits and vegetables	17.3%	10.8%	22.6%	21.3%
Other fruits and vegetables	61.0%	36.5%	75.9%	85.3%
n	**367**	**159**	**133**	**75**
Non-breastfed children [b,c]				
Achieving minimum meal frequency[2,a]	4.9%	0.0%^	2.4%	7.1%
Achieving minimum milk feeding frequency	5.7%	8.3%^	7.3%	4.3%
Achieving minimum dietary diversity[a]	31.4%	9.1%^	29.3%	36.2%
Consuming:				
Grains, roots, and tubers	92.7%	58.3%^	100.0%	94.3%
Legumes and nuts	21.1%	8.3%^	14.6%	27.1%
Dairy products	8.1%	16.7%^	7.3%	7.1%
Flesh foods	75.4%	45.5%^	90.2%	71.4%
Eggs	4.9%	0.0%^	4.9%	5.7%
Vitamin A-rich fruits and vegetables	23.0%	8.3%^	22.0%	26.1%
Other fruits and vegetables	95.1%	63.6%^	97.6%	98.6%
n	**123**	**12**	**41**	**70**

^ Results not statistically reliable, n<30.

[1] According to the Feed the Future Indicator Handbook Definition Sheets, achieving minimum meal frequency for breastfed children is defined as ≥2 for age 6-8 months, ≥3 for 9-23 months.

[2] According to the Feed the Future Indicator Handbook Definition Sheets, achieving minimum meal frequency for non-breastfed children is defined as ≥4 for all ages between 6-23 months.

[a] Significance tests were performed for associations between MAD components/food groups for breastfed and non-breastfed children. For example, a test was done for achieving minimum meal frequency and breastfeeding status. When an association is found to be significant ($p<0.05$), a superscript is noted next to the breastfed and non-breastfed row headings corresponding to the MAD component/food group.

[b] Indicates significant difference between breast-fed and non-breast-fed children for minimum meal frequency.

[c] Indicates significant difference between breast-fed and non-breast-fed children for minimum dietary diversity.

Source: ZOI interim survey, Liberia 2015.

The components of a minimum acceptable diet vary related to age and nursing status (e.g., breastfed or not breastfed). For breastfed children, the elements of minimum acceptable diet include: (1) adequate dietary diversity (consumption of ≥4/7 food groups), (2) adequate meal frequency (≥2 for children 6-8 months of age and ≥3 for children 9-23 months of age). For non-breastfed children, the elements of a minimum acceptable diet include: (1) adequate dietary diversity (consumption of ≥4/6 food groups; milk is excluded as a food group to avoid "double-counting" because this measure is included in component 3), (2) adequate meal frequency (≥4), and (3) adequate number of milk feeds (≥2). The stringency of these requirements accounts for the low percentages of children achieving these standards.

There were notable differences between the breastfed and non-breastfed children. For example, although nearly 40 percent of breastfed children achieved adequate meal frequency, less than 5 percent of non-breast fed children achieved this measure. In contrast, more non-breastfed children achieved adequate dietary diversity, compared to breastfed children (31 percent vs. 21 percent). However, 66 percent of non-breastfed children lacked even a single measure of diet adequacy, compared to 51 percent of breastfed children (p=.01, data not shown).

Consumption of the different food groups varied widely. The principal diet components were (1) grains, roots, tubers and (2) fruits and vegetables (specifically, those which are not sources of Vitamin A). This pattern was true regardless of age group and nursing status. The third most common food group was "flesh foods", consisting of meat, offal, and fish. Overall, 57 percent of children consumed such foods. Fish was by far the most common of the flesh foods consumed (53 percent of children); the other items were rarely eaten. Along with dairy products and eggs, "flesh foods" comprise animal-source foods, an important source of micronutrients (zinc, iron) and protein. Less than five percent of children overall consumed eggs; less than 6-8 percent consumed dairy products. Consumption of animal source foods is linked to favorable growth and cognitive development in young children. In this survey, for example, children who consumed flesh foods had significantly higher mean WAZ (-.27 vs. -.65, p=.02) but not HAZ (-1.26 vs. -1.13, p=NS) nor WHZ (.55 vs. .41, p=NS) (data not shown).

It is important to note that the survey did not account for food quantities. For example, a child may have eaten more than three times a day, but the quantities of food ingested may have been insufficient for caloric needs. Similarly, a child may have eaten meat or fish, but in such a small amount as to be nutritionally negligible. In the present survey, it was not possible to include measures of food quantities. The anthropometry results suggest that children were generally deficient in calories (see Tables 7.2, 7.3, and 7.4).

6.2.3 Consumption of Targeted Nutrient-Rich Value Chain Commodities

U.S. Government-funded programming supports nutrition-sensitive agricultural value chain[27] interventions to achieve the dual purpose of enhancing both economic and nutritional outcomes. The Feed the Future ZOI interim assessment measures the degree to which

[27] From Martin Webber and Patrick Labaste, "Building competitiveness in Africa's agriculture : a guide to value chain concepts and applications," published by The World Bank: "The term 'value chain' describes the full range of value-adding activities required to bring a product or service through the different phases of production, including procurement of raw materials and other inputs, assembly, physical transformation, acquisition of required services such as transport or cooling, and ultimately response to consumer demand (Kaplinsky and Morris (2002), "A Handbook for Value Chain Research," p. 46–47)."

respondents in the ZOI are consuming nutrient-rich commodities or products made from nutrient-rich commodities being promoted by these value chain activities.

There are three criteria for a food commodity to be considered a targeted 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 NRVCC among women age 15-49 and children age 6-23 months. The targeted commodities in Liberia include: biofortified cassava, cabbage, okra, chili pepper, and goat.

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

Table 6.8 presents women's consumption of targeted NRVCC. Estimates are shown for all women age 15-49, as well as by women's individual and household characteristics. Women's individual characteristics include age and educational attainment. Household characteristics include gendered household type, household size, and household hunger.

Overall, 96.8 percent of women consumed at least one targeted NRVCC and there was no difference in consumption based on age group, gendered household type or household size. There were, however, significant differences in the consumption of any targeted NRVCC by educational attainment and household hunger. Women with the highest level of education (secondary or more) were significantly less likely to consume any targeted NRVCC (95.3 percent consuming) compared to women with less than a primary school education (98.1 percent consuming). Likewise, moderate to severe household hunger was also significantly associated with a decrease in the percentage of women consuming any targeted NRVCC. In households that experienced little to no hunger, 97.6 percent of women consumed at least one targeted NRVCC compared to 93.6 percent of women from households experiencing moderate to severe hunger.

Table 6.8. Women's consumption of targeted nutrient-rich value chain commodities

Characteristic	Percent						n[1]
	Any targeted commodity [a]	Biofortified Cassava [b]	Okra[c]	Cabbage[d]	Chili Pepper[e]	Goat[f]	
Total (All women 15-49)	**96.8%**	**4.6%**	**51.8%**	**0.5%**	**95.9%**	**1.5%**	**2,387**
Age							
15-19	96.3%	4.4%	51.4%	0.8%	95.9%	1.3%	497
20-24	96.8%	4.6%	51.7%	0.0%	95.4%	1.4%	440
25-29	97.5%	6.1%	53.6%	0.5%	96.2%	1.3%	415
30-34	98.3%	3.3%	53.1%	0.9%	97.1%	1.1%	335
35-39	95.8%	4.7%	50.9%	0.3%	95.1%	2.7%	312
40-44	96.4%	3.3%	48.6%	0.6%	96.4%	1.1%	212
45-49	97.4%	7.1%	53.9%	0.0%	96.1%	2.4%	157
Educational attainment[a]							
No education	97.1%	5.5%	54.4%	0.3%	95.9%	1.1%	349
Less than primary	98.1%	3.9%	51.1%	0.0%	95.8%	2.5%	214
Primary	97.7%	4.5%	51.2%	0.4%	96.9%	2.0%	829
Secondary or more	95.3%	4.5%	51.3%	0.6%	94.7%	1.0%	877
Gendered household type[c]							
Male and female adults	96.6%	4.3%	53.6%	0.4%	95.7%	1.6%	2,081
Female adult(s) only	98.0%	7.0%	40.6%	0.4%	97.0%	0.8%	252
Household size[f]							
Small (1-5 members)	96.6%	4.5%	50.5%	0.2%	95.7%	1.3%	1,005
Medium (6-10 members)	96.8%	4.8%	52.1%	0.7%	95.7%	1.4%	1,101
Large (11+ members)	96.7%	3.6%	57.4%	0.0%	96.7%	4.6%	163
Household hunger[a,b,c,e,f]							
Little to no hunger	97.6%	3.7%	53.2%	0.6%	97.2%	1.7%	1,866
Moderate or severe hunger	93.6%	8.0%	45.8%	0.0%	90.8%	0.4%	510

[1] 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.

[2] The estimates for male-headed households and child-headed households are excluded from the table because the sample size is too small to obtain a valid estimate.

[a-f] 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, Liberia2015.

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

Table 6.9 presents children's consumption of targeted NRVCC. Estimates are shown for all children 6-23 months, as well as by characteristics of the child, caregiver, and household. Children's characteristics include sex and age, and caregivers' characteristics include educational attainment. Household characteristics include gendered household type, household size, and household hunger.

Overall, 66.2 percent of children 6-23 months consumed at least one targeted NRVCC and there was no difference in consumption based on sex of the child, caregiver's educational attainment, gendered household type, household size, or household hunger. There was, however, a significant difference in the consumption of any targeted NRVCC by child age. Children in the youngest age category (6-11 months) were less likely to consume at least one targeted NRVCC (41.8 percent consuming) compared with children 12-17 months (75.4 percent consuming) and children 18-23 months (85.3 percent consuming).

Looking at consumption of each of the five targeted NRVCCs, chili pepper was the most commonly consumed by young children (60.4 percent), followed by okra (37.2 percent), biofortified cassava (1.0 percent consuming), goat (0.4 percent consuming), and cabbage (0.4 percent consuming). There were no significant differences in consumption of individual targeted NRVCCs by child's sex or caregiver's educational attainment. Okra and chili pepper were less commonly consumed by children 6-11 months (22.1 percent and 31.5 percent consuming, respectively) compared to children 12-17 months (45.3 percent and 71.2 percent consuming, respectively) and children 18-23 months (45.8 percent and 83.7 percent consuming, respectively). Children from households with both male and female adults were more likely to consume biofortified cassava (0.9 percent vs. 0.0 percent consuming), cabbage (0.3 percent vs. 0.0 percent consuming), and goat (0.2 percent vs. 0.0 percent consuming) than children from households with only female adults. Children from large households (11+ members) were significantly more likely to consume okra (49.8 percent consuming) than children from small (1-5 members; 30.4 percent consuming) and medium-sized households (6-10 members; 38.7 percent consuming). Additionally, children from households experiencing moderate to severe hunger were less likely to consume okra (22.2 percent consuming) compared to children from households with little to no hunger (41.1 percent consuming).

As previously mentioned, no indication of food quantities was obtained. Thus, the amount of chili pepper (for example) consumed may have been extremely small, and of limited dietary importance.

Table 6.9. Children's consumption of targeted nutrient-rich value chain commodities

Characteristic	Percent						n
	Any targeted commodity [a]	Bio-fortified Cassava [b]	Okra [c]	Cabbage [d]	Chili Pepper [e]	Goat [f]	
Total (All children 6-23 months)	**66.2%**	**1.0%**	**37.2%**	**0.4%**	**60.4%**	**0.4%**	**490**
Child sex							
Male	67.9%	1.3%	34.0%	0.8%	63.4%	0.3%	266
Female	64.2%	0.7%	41.1%	0.0%	56.8%	0.4%	224
Child age [a, c, e]							
6-11 months	41.8%	0.0%	22.1%	0.0%	31.5%	0.0%	174
12-17 months	75.4%	2.1%	45.3%	0.5%	71.2%	0.7%	189
18-23 months	85.3%	0.9%	45.8%	0.9%	83.7%	0.4%	127
Caregiver's educational attainment[2]							
No education	64.2%	1.2%	36.0%	0.7%	57.0%	0.5%	280
Less than primary	82.7%^	0.0%^	40.6%^	0.0%^	77.7%^	0.0%^	21^
Primary	68.1%	0.9%	37.9%	0.0%	63.7%	0.0%	139
Secondary or more	63.4%	0.0%	38.7%	0.0%	60.7%	0.0%	48
Gendered household type [b, d, f]							
Male and female adults	67.2%	0.9%	37.9%	0.3%	61.3%	0.2%	431
Female adult(s) only	58.0%	0.0%	29.5%	0.0%	52.6%	0.0%	57
Household size [c]							
Small (1-5 members)	63.6%	1.2%	30.4%	0.0%	59.4%	0.0%	194
Medium (6-10 members)	65.4%	1.0%	38.7%	0.4%	58.9%	0.4%	230
Large (11+ members)	75.5%	0.0%	49.8%	1.9%	66.9%	1.0%	58
Household hunger [c]							
Little to no hunger	68.5%	0.7%	41.1%	0.5%	62.2%	0.5%	390
Moderate or severe hunger	57.2%	2.3%	22.2%	0.0%	53.4%	0.0%	100

^ Results not statistically reliable, n<30.

[1] 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.

[2] 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.

[3] The estimates for male-headed households and child-headed households are excluded from the table because the sample size is too small to obtain a valid estimate.

[a-f] 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, Liberia.

7. Nutritional Status of Women and Children

This section presents findings related to the Feed the Future indicators of women's underweight 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 as 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.

Approximately 13.3 percent of women in the ZOI are classified as underweight. Interestingly, the percentage of overweight or obese women is much higher (29.3 percent). This indicates that greater access to food should be paired with a concern for balanced nutrition, as is the case in many developing countries experiencing the "double burden" of malnutrition. Younger women, aged 15-24, are the most likely to be underweight and the least likely to be overweight or obese, which is concerning since these age groups represent the women most likely to become pregnant. Becoming pregnant while underweight is a risk factor for intrauterine growth restriction, low birth weight, and poor growth in infants and children. Middle aged women (25 – 39 years) are most likely to be "normal" weight. Household characteristics, such as household size, are not significantly correlated with women's BMI.

Table 7.1. Prevalence of underweight, normal weight, overweight, and obese women

Characteristic	Mean BMI[a]	Body Mass Index (BMI) category (percent)[b]				n[l]
		Under weight[c]	Normal weight	Over weight	Obese	
Total (All women age 15-49)	**22.3**	**13.3%**	**57.4%**	**20.6%**	**8.7%**	**2,060**
Age						
15-19	20.5	17.5%	70.8%	9.6%	2.1%	439
20-24	21.9	17.5%	70.8%	9.6%	2.1%	357
25-29	22.6	10.9%	66.7%	16.0%	6.4%	344
30-34	23.6	10.2%	59.9%	21.2%	8.7%	273
35-39	23.2	8.8%	51.3%	27.8%	12.1%	259
40-44	23.1	13.5%	45.2%	29.0%	12.4%	187
45-49	23.2	13.4%	44.4%	27.3%	15.0%	150
Educational attainment[a]						
No education	22.3	13.0%	60.3%	20.2%	6.5%	247
Less than primary	20.4	20.1%	56.7%	17.2%	6.0%	134

Characteristic	Mean BMI[a]	Body Mass Index (BMI) category (percent)[b]				n[1]
		Under weight[c]	Normal weight	Over weight	Obese	
Primary	22.2	12.2%	59.7%	20.9%	7.2%	665
Secondary or more	22.7	12.7%	55.6%	21.1%	10.7%	948
Gendered household type[2]						
Male and female adults	22.1	13.9%	57.2%	20.5%	8.4%	151
Female adult(s) only	23.5	^	59.1%	20.4%	^	225
Household size						
Small (1-5 members)	22.4	13.3%	57.0%	21.0%	8.7%	882
Medium (6-10 members)	22.2	13.2%	56.8%	20.9%	9.1%	933
Large (11+ members)	21.9	^	60.8%	17.1%	^	181
Household hunger						
Little to no hunger	22.2	13.3%	57.8%	20.5%	8.4%	1,588
Moderate or severe hunger	22.4	13.5%	55.9%	20.8%	9.8%	438

[1] 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.

[2] The estimates for male-headed households and child-headed households are excluded from the table because the sample size is too small to obtain a valid estimate.

[a-c] 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, Liberia 2015.

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

This section reports on three anthropometric measurements of undernutrition among children under five years 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 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 is a height-for-age measurement that reflects chronic undernutrition. This indicator measures the percentage of children 0-59 months who are stunted, as defined by a height-for-age Z-score more than two standard deviations (SD) below the median of the 2006 WHO Child Growth Standard (<-2SD).[28] The

[28] WHO. (2006).

stunting measures presented below include the Feed the Future stunting indicator of moderate or severe stunting combined (<-2SD) as well as the indicator for severe stunting (<-3SD). Mean Z-scores are also presented.

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 child, caregiver, and household characteristics. Children's characteristics include sex and age. Caregivers' characteristics include educational attainment. Household characteristics include gendered household type, household size, and household hunger.

More than a third of children surveyed were stunted; of these nearly half were severely stunted. Boys had a higher rate of stunting than girls, and a lower mean Z-score (-1.39 vs -1.09, p=.0007). Compared to children older than 12 months, younger children (ages 0-11 months) were less likely to be stunted (p<.0001), and had a higher mean Z-score (p<.0001). This pattern is typical in conditions where children suffer from food shortages and recurrent or chronic infections, both of which contribute to linear growth faltering over time. Rates of stunting differed among households based on the caregiver's educational attainment, but no obvious pattern was present. However, severely stunted children were less likely to reside in households where the caregiver's educational attainment was secondary school or more (p=.02). This could reflect a direct effect of the caregiver's educational level, or the educational level may serve as a proxy for household socio-economic status or other indicators. No differences were found related to household size (although the number of large households was small), gendered household type (although the number of male-only households was too small to give meaningful statistical results), nor household hunger level.

Table 7.2. Stunting (height-for-age) among children under 5 years old

Characteristic	% Stunted (<-2 SD)[a]	% Severely stunted (<-3 SD)	Mean Z-score [b]	n[1]
Total (All children under 5 years)	**34.31%**	**16%**	**-1.24**	**1,693**
Child sex [a,b]				
Male	37.13%	18.21%	-1.39	851
Female	31.59%	13.42%	-1.09	842
Child age [a,b]				
0-11 months	14.75%	6.56%	-0.2078	366
12-23 months	42.53%	18.51%	-1.4989	308
24-35 months	47.74%	23.00%	-1.6560	287
36-47 months	37.06%	17.66%	-1.5275	402
48-59 months	33.64%	15.15%	-1.4603	330
Caregiver's educational attainment[2] [a]				
No education	36.65%	17.93%	-1.1236	74

Characteristic	% Stunted (<-2 SD)[a]	% Severely stunted (<-3 SD)	Mean Z-score [b]	n[1]
Less than primary	25.68%	12.16%	-1.2933	1,004
Primary	34.22%	14.22%	-1.2841	450
Secondary or more	24.68%	9.49%	-0.9116	158
Gendered household type[3]				
Male and female adults	34.44%	15.86%	-1.2386	1,475
Female adult(s) only	34.12%	16.11%	-1.3108	211
Household size				
Small (1-5 members)	33.64%	15.21%	-1.3659	193
Medium (6-10 members)	34.26%	15.67%	-1.2983	823
Large (11+ members)	38.34%	17.62%	-1.2792	26^
Household hunger				
Little to no hunger	34.69%	15.16%	-1.2339	1,352
Moderate or severe hunger	33.14%	18.48%	-1.2925	341

^ Results not statistically reliable, n<30.

[1] 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.

[2] 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.

[3] The estimates for male-headed households and child-headed households are excluded from the table because the sample size is too small to obtain a valid estimate.

[a-b] 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, Liberia 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. This 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 SD 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 five years in the ZOI. Estimates are presented for all children and by child, caregiver, and household characteristics. Children's characteristics include sex and age. Caregivers' characteristics include educational attainment. Household characteristics include gendered household type, household size, and household hunger.

About eight percent of children met the definition for wasting (WHZ <-2); and three percent were severely wasted. No differences in these indicators were seen between boys and girls, although boys had a higher mean weight-for-height score (.34 vs. .17, p=.026). The percentage of children with wasting decreased with age, from 13.43 percent in the youngest age group (0-11 months) to 5.01 percent for the oldest age group (48-59 months, p<.0001). No significant differences were seen related to caregiver's educational attainment or gendered household type (although the number of male-only households was too small to be analyzed statistically). Wasting was more common in children living in small households as compared to medium or large households (p=.02); wasting rates did not differ related to household hunger level.

The percentage of overweight and obese children was also determined. More than 11 percent of children were classified as overweight, and 4.56 percent of the children were obese. Paralleling the findings for wasted children, overweight was more common among the youngest age group of children (p<.0001) and those residing within the smallest households (p=.02). Thus, the "extremes" in weight-for-height scores were more likely to be found among the younger children and those in the smallest households. Although the results related to wasting are not unexpected, the prevalence of overweight and obesity are somewhat surprising. One possible explanation for this finding may have to do with the difficulty in accurately measuring an infant's length (0-11 months) compared with measuring a child's height (12-59 months). Infants must be measured using a length board and often are quite active during the measuring process, which may lead to a systematic underestimate of younger children's length compared with older children's height. This possible systematic underestimate of length would inflate the child's weight-for-height Z-score thus inflating the percentage of children classified as overweight or obese.

However, many countries suffer from a dual burden of malnutrition, such as stunting in childhood, and over-nutrition, such as obesity in children as well as adults. Obesity is increasing in rural as well as urban areas worldwide. It is known that obese women tend to have obese children. Obesity rates differ depending on geographic location, with economic opportunities, crop yields, food security, etc. Conditions during pregnancy also contribute to epigenetic programming of the fetus; this may biologically predispose the child to excessive weight gain, even in the presence of stunting. Paradoxically, low birth weight has been linked to subsequent obesity. Obesity and overweight, particularly in childhood, may increase the risk of later hypertension, diabetes, and metabolic syndrome. Such problems represent a major burden of non-communicable diseases in the developing world, and deserve careful monitoring.

Table 7.3. Wasting (weight-for-height) among children under 5 years old

Characteristic	% Wasted (<-2 SD) [a]	% Severely wasted (<-3 SD)	% Overweight (> +2SD) [b]	% Obese (> +3SD)	Mean Z-score [c]	n[1]
Total (All children under 5 years)	**8.20%**	**3.22%**	**11.47%**	**4.56%**	**.25**	**1,707**
Child sex [c]						
Male	8.17%	3.50%	11.92%	5.14%	0.345502	856
Female	8.22%	2.94%	11.05%	4.00%	0.172268	851
Child age [a,b]						
0-11 months	13.43%	6.29%	16.29%	6.29%	0.108457	350
12-23 months	9.52%	3.81%	13.65%	5.40%	0.251683	315
24-35 months	7.26%	2.42%	13.15%	5.19%	0.443322	289
36-47 months	5.39%	1.47%	8.34%	3.19%	0.339020	408
48-59 months	5.01%	2.06%	7.07%	3.24%	0.194071	339
Caregiver's educational attainment[2]						
No education	8.48%	3.80%	10.62%	4.19%	0.174483	1,026
Less than primary	4.17%	0.0%	15.28%	5.56%	0.587222	72
Primary	8.35%	2.71%	11.97%	4.97%	0.352957	443
Secondary or more	7.55%	2.52%	14.47%	5.66%	0.404151	159
Gendered household type[3]						
Male and female adults	8.07%	3.23%	11.84%	4.64%	0.274566	1,487
Female adult(s) only	8.92%	3.29%	9.39%	4.23%	0.157934	213
Household size [a,b]						
Small (1-5 members)	9.58%	4.34%	10.63%	4.79%	0.21063	668
Medium (6-10 members)	7.42%	2.07%	13.12%	4.74%	0.32004	823
Large (11+ members)	5.67%	3.09%	7.22%	2.58%	0.20799	194
Household hunger						
Little to no hunger	8.23%	2.94%	10.73%	4.41%	0.244071	1,361
Moderate or severe hunger	8.10%	4.34%	14.45%	5.20%	0.318410	346

[1] 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.

[2] 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.

[3] The estimates for male-headed households and child-headed households are excluded from the table because the sample size is too small to obtain a valid estimate.

[a-c] 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, Liberia 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 SD 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 years in the ZOI. Estimates are presented for all children and by child, caregiver, and household characteristics. Children's characteristics include sex and age. Caregivers' characteristics include educational attainment. Household characteristics include gendered household type, household size, and household hunger.

More than 15 percent of children were underweight; five percent were severely underweight. No differences in the distribution of this indicator were found related to gender, age group, gendered household type, household size, nor household hunger. Underweight did not relate to caregiver's educational attainment, although children with severe underweight were more commonly found in households with no education (p=.0001, not shown). However, some differences were noted when mean weight-for-age was examined. The youngest children had a higher mean weight-for-age score (p<.0001), compared to other age groups. A lower mean weight-for-age score was noted in children whose caregivers had no education, compared to other levels of education (p=.0021). No differences in weight-for-age scores were found related to child's sex, gendered household type, household size, nor household hunger.

Table 7.4. Underweight (weight-for-age) among children under 5 years old

Characteristic	% Underweight (<-2 SD)[a]	% Severely underweight (<-3 SD)	Mean Z-score[b]	n[1]
Total (All children under 5 years)	**15.31%**	**5.01%**	**-0.48**	**1,796**
Child sex				
Male	15.59%	5.56%	-0.51494	898
Female	15.03%	4.45%	-0.45065	898
Child age[b]				
0-11 months	11.96%	4.07%	0.23074	393
12-23 months	15.90%	5.20%	-0.45924	327
24-35 months	16.12%	4.93%	-0.54918	304
36-47 months	16.15%	5.23%	-0.79914	421
48-59 months	16.81%	5.70%	-0.86672	351

Characteristic	% Underweight (<-2 SD)[a]	% Severely underweight (<-3 SD)	Mean Z-score [b]	n[1]
Caregiver's educational attainment[2,b]				
No education	18.38%	5.76%	-0.59967	1,077
Less than primary	9.33%	2.67%	-0.30440	75
Primary	11.04%	4.03%	-0.34176	471
Secondary or more	9.70%	4.24%	-0.22794	165
Gendered household type[3]				
Male and female adults	15.58%	5.17%	-0.47414	1,566
Female adult(s) only	13.06%	4.05%	-0.56194	222
Household size				
Small (1-5 members)	15.20%	4.49%	-0.46100	691
Medium (6-10 members)	14.64%	4.65%	-0.45233	881
Large (11+ members)	17.33%	8.42%	-0.67079	202
Household hunger				
Little to no hunger	14.99%	5.16%	-0.47630	1,434
Moderate or severe hunger	16.57%	4.42%	-0.50854	362

[1] 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.

[2] 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.

[3] The estimates for male-headed households and child-headed households are excluded from the table because the sample size is too small to obtain a valid estimate.

[a-b] 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, Liberia 2015.

8. Prevalence of Ebola

This section summarizes the prevalence of households affected by EVD and its impact on household food security status. Specifically, a bivariate cross-tabulation between prevalence of households affected by EVD to individual characteristics such as type of household, household hunger, prevalence and depth of poverty.

8.1 Prevalence of households who report one or more members who died or were sick as a result of Ebola

Table 8.1 shows the percentage of households who had household members affected by Ebola. The table also disaggregates this percentage according to household characteristics. Note that this table underestimates the true impact of Ebola. The disease is spread through close contact, and thus the victims tend to be concentrated within households. This means that households affected by the disease likely suffered from infection in multiple household members. The worst-hit households were wiped out entirely by the disease, removing them from the survey sample. The relatively low percentage of survey respondents directly affected by the disease results in large confidence intervals.

Household educational attainment was found to be statistically related to households with one or more members who were either sick or died due to Ebola. Households with less than aprimary education were slightly more likely to be affected by Ebola than households with no education or those with secondary education or higher. One explanation for this trend could be the concentration of Ebola cases within relatively poor, urban communities. Households in these high risk areas have greater access to schooling than rural households, but perhaps less ability to prevent infection than more educated households (possibly due to poor sanitation or limited education). This relationship, however, is merely suggestive and is not robust: the statistical significance between level of education and Ebola disappears when the sample is restricted to households that experienced at least one death from Ebola (thereby excluding households in which all infected family members recovered from the disease).

Table 8.1. Percentage of households who were affected by EVD

Characteristic	Estimate	95% CI	n[1]
Households who report one or more members died or were sick as a result of Ebola			
Total households	**10.6%**	**8.1 – 13.1%**	**1,258**
Gendered household type[2]			
Male and female adults	10.0%	7.3 – 12.6%	1,069
Female adult(s) only	14.2%	8.0 – 20.3%	150
Household size			
Small (1-5 members)	10.6%	7.6 – 13.6%	660

Characteristic	Estimate	95% CI	n[1]
Medium (6-10 members)	10.5%	7.2 – 13.8%	503
Large (11+ members)	9.8%	2.2 – 17.3%	63
Household educational attainment[a]			
No education	8.4%	3.6 – 13.1%	231
Less than primary	15.3%	6.8 – 23.8%	111
Primary	11.5%	8.1 – 15.0%	390
Secondary or more	9.6%	6.3 – 13.0%	494
Households who report one or more members died as a result of Ebola			
Total households	**3.3%**	**1.7 – 5.0%**	**1,277**
Gendered household type[2]			
Male and female adults	3.5%	1.7 – 5.4%	1,085
Female adult(s) only	3.0%	0 – 6.0%	153
Household size			
Small (1-5 members)	2.8%	1.1 – 4.6%	671
Medium (6-10 members)	4.1%	1.8 – 6.3%	511
Large (11+ members)	5.0%	0 – 14.6%	63
Household educational attainment			
No education	1.2%	0 – 2.7%	231
Less than primary	1.9%	0 – 4.6%	112
Primary	4.9%	1.6 – 8.1%	400
Secondary or more	3.5%	1.5 – 5.5%	502

[1] 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.

[2] The estimates for male-headed households and child-headed households are excluded from the table because the sample size is too small to obtain a valid estimate.

[a] Significance tests were performed for associations between Ebola and household characteristics. For example, a test was done between any household members infected by Ebola (whether recovered or died) and gendered household type. When differences were found to be significant ($p<0.05$), the superscript is noted next to the household characteristic. None of the household characteristics was found to be significantly related.

Source: ZOI interim survey, Liberia 2015.

8.2 Prevalence of households who report one or more members who died or were sick as a result of Ebola in relation to Feed the Future Indicators

Table 8.2 compares the welfare of households directly affected by Ebola to households who were not directly affected by the disease. Note that the poverty and hunger estimates will differ from those presented earlier in the report as the data have been merged and subset to include only those surveys with comprehensive data on the Ebola status of the household. Due to the small percentage of households directly affected by Ebola, it is difficult to establish statistical significance. Only household hunger is significantly correlated with Ebola: households that were affected by the disease are significantly more likely to experience moderate-severe hunger.

Table 8.2. Feed the Future ZOI indicator estimates, by EVD indicator

Indicator	Households affected by EVD		Households not affected by EVD		All households	
	Estimate	n	Estimate	n	Estimate	n[1]
Average number of household members	5.7	129	5.9	1,089	5.8	1,218
Daily per capita expenditures (as a proxy for income) in USG-assisted areas (2010 USD)	$2.06	129	$2.26	1,089	$2.24	1,218
Prevalence of Poverty: Percent of people living on less than $1.25 (PPP 2005) per day	31.4%	129	39.6%	1,089	38.7%	1,218
Depth of Poverty: Mean percent shortfall relative to the $1.25 (PPP 2005) per day poverty line	14.5%	129	19.1%	1,089	18.6%	1,218
Prevalence of households with moderate or severe hunger[a]	49.1%	129	30.6%	1,089	32.6%	1,218

[1] 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.

[a] Significance tests were performed for associations between Ebola and household characteristics. For example, a test was done between the daily per capita expenditure and the household's exposure to Ebola. When differences were found to be significant ($p<0.05$), the superscript is noted next to the household characteristic. Only the prevalence of moderate-severe hunger was found to be significantly related.

Source: ZOI interim survey, Liberia 2015.

Summary and Conclusions

Despite economic recession and the devastating effects of Ebola, Liberia continues to demonstrate progress in reducing poverty and hunger. The interim survey estimates a reduction in poverty of approximately 10 percent between 2012 and 2015. Hunger has also fallen dramatically, although the contribution of climatic variation to food security cannot be measured through this survey. Moreover, these improvements in standard of living do not appear to be concentrated among households with high levels of education or stable nuclear families; the general population appears to be benefitting.

Despite this broad-based growth, significant challenges remain. The ZOI exhibits a highly unequal distribution of wealth, and women continue to have fewer opportunities than men. Although households with only female adults are less likely to be in poverty, they also have less access to education. These disparities are particularly stark among older women, who demonstrate much lower levels of literacy and education than their male counterparts. Fortunately, young girls, aged 19 and below, are changing the trend: their level of education and literacy are just as high as boys. To ensure these gains translate into sustained improvements in their lives, it is vital that greater opportunities for employment and economic advancement are open to women (and men) as they complete their education.

Women's dietary diversity is a proxy indicator for micronutrient adequacy of the diet. Overall, a little over half the women surveyed achieved the minimum dietary diversity, suggesting that a

large proportion of women are at risk of micronutrient deficiencies, such as anemia. Both educational attainment and household hunger were associated with women's dietary diversity. Women with more education had more diverse diets, which may be a result of a combination of greater income and access to diverse foods as well as knowledge of the nutritional benefits of a diverse diet. Likewise, women from households who experienced little to no hunger had more diverse diets than women from households who experienced moderate to severe hunger. Households who experience hunger often use coping mechanisms such as reducing the amount and type of foods eaten, which can lead to a less diverse diet and a greater risk of micronutrient inadequacies.

Staple foods, such as grains, roots, and tubers, were consumed by almost all women; likewise non-Vitamin A-rich vegetables were also almost universally consumed. These foods provide calories, but often lack sufficient quantities of micronutrients and protein. Eggs and dairy, which are good sources of micronutrients and protein, were less commonly consumed by women. Consumption of meat products was high and largely driven by the consumption of fish.

Almost all women reported consuming at least one NRVCC, but this finding was largely driven by the consumption of chili pepper. The quantities of chili pepper consumed were not collected and therefore it is unknown if consumption of this commodity had any nutritional relevance. Okra was also a widely consumed NRVCC, likely due to cultural food patterns and acceptability of this commodity in Liberia. Goat and cabbage were rarely consumed by women. Biofortified cassava was also rarely consumed, which may be due to limited accessibility of this particular value chain products within the ZOI. More qualitative research is needed to determine why consumption of these products is low and ways in which they might be incorporated into the local diet.

Greater access to diverse foods for women is required, but this should be paired with a focus on balanced nutrition. Approximately 13 percent of women in the ZOI are classified as underweight, while more than 29 percent of women are either overweight or obese. Younger women are the most likely to be underweight, while older women experience greater rates of obesity. These trends do not significantly depend on household characteristics.

The WHO recommends that all children under six months be exclusively breastfed, yet only approximately half of the children surveyed were still exclusively breastfeeding. Breast milk provides all essential macro- and micronutrients necessary for optimal infant growth and development as well as immune factors (such as antibodies and cytokines), which help to protect the infant from infection. Neither child's sex nor the caregiver's educational attainment were related to exclusive breastfeeding and more detailed investigation into breastfeeding and young child feeding practices in Liberia is warranted.

Analysis of child diet revealed many deficiencies. Specifically, inadequacies in child dietary diversity, meal frequency, and milk feeds for non-breast fed infants were common. Few

children (less than nine percent) achieved a minimum acceptable diet. Non-breastfed children were less likely to achieve a minimum acceptable diet and a large proportion lacked even a single measure of diet adequacy, compared to breastfed children.

Consumption of NRVCC was variable among children. Few children consumed goat meat, biofortified cassava, or cabbage while okra and chili pepper were consumed more widely. The youngest age group (6-11 months) consumed less okra and chili pepper and were less likely to consume any targeted commodity compared to the older children.

In general, children show a high prevalence of malnutrition and growth measurements were worse for older children. More than one third of children surveyed were stunted and of these, nearly half were severely stunted. Younger children between 0-11 months of age showed less stunting. This pattern is typical in conditions where children suffer from food shortages and recurrent or chronic infections, both of which contribute to linear growth faltering over time. About eight percent of children were wasted and around three percent were severely wasted. More than 15 percent of children were underweight and five percent were severely underweight, reflecting acute and chronic undernutrition. Children whose caregivers had no education showed higher rates of underweight. The high rate of overweight and obesity was also surprising but may reflect technical difficulties in the field or alternately, the increasing global trend towards obesity.

Ebola remains a threat to Liberia's continued growth. According to the survey, more than 10 percent of households had at least one family member affected by Ebola, and these households are significantly more likely to face hunger than households that escaped the direct effects of the virus. These numbers, however, understate the true impact of the disease. Ebola-affected households were less likely to be included in the survey, since the disease was concentrated within households. Some households were wiped out entirely, while other households, reduced to just a few surviving members, migrated or reorganized in ways that cannot be measured with this survey design.

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Appendix 1. Supplementary Data and Figures

A1.1. 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					
	Indicator[a]	SD	95% CI	DEFF	Non-response rate[1]	n
Daily per capita expenditures (as a proxy for income) in USG-assisted areas (2010 USD)						
All households	1.93	0.14	1.65 – 2.20	1.13	3.5%	1,817
Male and female adults	1.86	0.16	1.55 – 2.17	1.10	0%	1,571
Female adult(s) only	2.33	0.24	1.87 – 2.80	1.51	0%	233
Male adult(s) only	2.02^	0.39	1.26 – 2.78^	1.26	0%	12
Child(ren) only (no adults)	n/a	n/a	n/a	n/a	n/a	1
Prevalence of Poverty: Percent of people living on less than $1.25 per day (2005 PPP)						
All households	39.8%	0.02	36.1 – 43.5%	2.66	3.5%	1,817
Male and female adults	41.0%	0.02	37.1 – 44.9%	2.56	0%	1,571
Female adult(s) only	32.5%	0.03	25.9 – 39.0%	1.19	0%	233
Male adult(s) only	34.0%^	0.16	2.4 – 65.7%^	1.29	0%	12
Child(ren) only (no adults)	n/a	n/a	n/a	n/a	n/a	1
Depth of Poverty: Mean percent shortfall relative to the $1.25 per day (2005 PPP) poverty line						
All households	19.1%	0.01	16.8 – 21.4%	3.03	3.5%	1,817
Male and female adults	19.7%	0.01	17.1 – 22.2%	3.07	0%	1,571
Female adult(s) only	15.6%	0.02	11.7 – 19.4%	1.22	0%	233
Male adult(s) only	12.4%^	0.07	0 – 25.8%^	1.41	0%	12
Child(ren) only (no adults)	n/a	n/a	n/a	n/a	n/a	1
Percent of women achieving adequacy on Women's Empowerment in Agriculture Index Indicators [2]						
Input in productive decisions	15.2%	0.02	11.2 – 19.2%	5.91	3.5%	1,817
Ownership of assets	46.9%	0.01	44.0 – 49.7%	1.55	3.5%	1,817
Purchase, sale or transfer of assets	23.1%	0.02	19.8 – 26.3%	2.84	3.5%	1,817
Access to and decisions on credit	31.2%	0.02	27.5 – 35.0%	3.07	3.5%	1,817
Control over use of income	38.5%	0.03	32.9 – 44.1%	6.30	3.5%	1,817
Group member	76.8%	0.02	72.0 – 81.5%	6.12	3.5%	1,817
Speaking in public	47.3%	0.03	42.9 – 51.7%	6.39	3.5%	1,817
Workload	66.5%	0.02	62.4 – 70.6%	1.26	66.1%	639
Leisure	48.1%	0.03	41.4 – 54.8%	8.54	3.5%	1,817
Prevalence of households with moderate or severe hunger						
All households	20.4%	0.02	17.0 – 23.9%	3.47	3.5%	1,817
Male and female adults	19.9%	0.02	17 – 23%	2.81	0%	1,571
Female adult(s) only	23.0%	0.04	15 – 31%	2.00	0%	233

Male adult(s) only	39.9%^	0.15	10 – 70%^	1.09	0%	12
Child(ren) only (no adults)	n/a	n/a	n/a	n/a	n/a	1
Women's Dietary Diversity: Mean number of food groups consumed by women of reproductive age						
All women age 15-49	4.63	0.04	4.56 – 4.70	1.25	2.1%	2,389
Prevalence of exclusive breastfeeding among children under 6 months of age						
All children	52.1%	0.04	45.1 – 58.9%	1.25	1.2%	250
Male children	50.0%	0.05	39.8 – 60.2%	1.33	0.0%	121
Female children	54.0%	0.05	44.6 – 63.0%	1.15	2.3%	129
Prevalence of children 6-23 months receiving a minimum acceptable diet						
All children	9.0%	0.01	6.4 – 11.5%	1.14	0.0%	490
Male children	7.9%	0.02	4.6 – 11.0%	1.21	0.0%	267
Female children	10.3%	0.02	6.3 – 14.3%	1.26	0.0%	223
Prevalence of women of reproductive age who consume targeted nutrient-rich value chain commodities						
Biofortified cassava: All women age 15-49	4.6%	0.00	3.8 – 5.6%	1.08	2.5%	2,378
Goat: All women age 15-49	1.5%	0.00	1.1 – 2.2%	1.25	2.1%	2,388
Cabbage: All women age 15-49	0.5%	0.00	0.3 – 0.8%	0.97	2.2%	2,387
Okra: All women age 15-49	51.8%	0.01	49.5 – 54.0%	1.25	2.2%	2,387
Chili Pepper: All women age 15-49	95.9%	0.00	95.0 – 96.7%	1.07	2.3%	2,385
Prevalence of women of reproductive age who consume at least one targeted nutrient-rich value chain commodity						
All women age 15-49	96.8%	0.00	96.0 – 97.5%	1.04	2.2%	2,387
Prevalence of children 6-23 months who consume specific targeted nutrient-rich value chain commodities						
Biofortified cassava: All children	1.0%	0.01	0.4 – 2.5%	1.10	7.8%	490
Goat: All children	0.4%	0.00	0.1 – 1.3%	0.71	8.0%	489
Cabbage: All children	0.4%	0.00	0.1 – 1.7%	1.02	8.6%	486
Okra: All children	37.2%	0.02	32.5 – 42.1%	1.26	8.2%	487
Chili Pepper: All children	60.4%	0.02	55.6 – 65.1%	1.21	8.2%	488
Prevalence of children 6-23 months who consume at least one targeted nutrient-rich value chain commodity						
All children	66.2%	0.05	61.5 – 70.6%	1.19	8.6%	485
Male children	67.9%	0.06	61.7 – 73.6%	1.14	6.0%	262
Female children	64.2%	0.07	56.9 – 70.8%	1.23	5.5%	223
Prevalence of underweight women						
All non-pregnant women age 15-49	13.2%	0.01	11.8 – 14.7%	1.90	14.1%	2,039
Prevalence of stunted children under 5 years of age						
All children	34.3%	0.02	32.0 – 36.6%	1.74	12.1%	1,693
Male children	37.1%	0.02	33.9 – 40.4%	1.35	11.4%	851
Female children	31.6%	0.02	28.4 – 34.7%	1.65	12.7%	842

Prevalence of wasted children under 5 years of age						
All children	8.2%	0.01	6.9 – 9.5%	2.63	11.3%	1,707
Male children	8.1%	0.01	6.3 – 9.9%	1.73	11.2%	856
Female children	8.2%	0.01	6.3 – 10.0%	1.83	11.7%	851
Prevalence of underweight children under 5 years of age						
All children	15.2%	0.01	13.5 – 16.9%	1.78	6.7%	1,796
Male children	15.5%	0.01	13.1 – 17.9%	1.25	6.6%	898
Female children	15.0%	0.01	12.6 – 17.3%	1.47	6.8%	898

n/a – Not available.

^ Results not statistically reliable, n<30.

[1] 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.

[2] The full WEAI score cannot be calculated because interim data were collected from women only and the autonomy indicator was dropped. The second interim survey (2017) will collect the full set of data from women and men and will report on the full WEAI.

[a] 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, Liberia 2015.

A1.2. Baseline and Interim Feed the Future Indicator Estimates

Point estimates, confidence intervals, and sample sizes are reported for the baseline and the interim Feed the Future Indicator. The baseline estimates reported in the Executive Summary uses the Comprehensive Food Security and Nutrition Survey 2010. Appendix 1.2. reports baseline estimates - the prevalence of stunted children, wasted children, underweight children, and underweight women indicators - derived from analyzing the raw dataset of Liberia Demographic and Health Survey (LDHS) 2013. Significance tests were run for association between the baseline and the interim estimates.

	Baseline (2012-2013)			Interim (2015)			
Feed the Future Indicator	**Estimate**	**95% CI[1]**	**n**	**Estimate**	**95% CI**	**n**	**P-value**
Daily per capita expenditures (as a proxy for income) in USG-assisted areas (2010 USD)							
All households	1.73	1.49 – 1.96	1,639	1.93	1.65 – 2.20	1,817	NS
Male and female adults*	1.32	1.14 – 1.50	639	1.86	1.55 – 2.17	1,571	<0.01
Female adult(s) only	1.95	1.61 – 2.30	639	2.33	1.87 – 2.80	233	NS
Male adult(s) only	2.09	1.69 – 2.48	355	2.02^	1.26 – 2.78^	12	NS
Children only no adults	n/a	n/a	0	n/a	n/a	1	n/a
Prevalence of Poverty: Percent of people living on less than $1.25 per day (2005 PPP)							
All households*	49.4%	42.9 – 55.9%	1,639	39.8%	36.1 – 43.5%	1,817	<0.01
Male and female adults*	56.4%	47.8 – 65.0%	639	41.0%	37.1 – 44.9%	1,571	<0.01
Female adult(s) only*	44.1%	36.6 – 51.6%	639	32.5%	25.9 – 39.0%	233	<0.01
Male adult(s) only	45.8%	37.9 – 53.8%	355	34.0%^	2.4 – 65.7%^	12	NS

Feed the Future Indicator	Baseline (2012-2013) Estimate	95% CI[1]	n	Interim (2015) Estimate	95% CI	n	P-value
Children only no adults	n/a	n/a	0	n/a	n/a	1	n/a
Depth of Poverty: Mean percent shortfall relative to the $1.25 per day poverty line (2005 PPP)							
All households*	21.7%	17.8 – 25.6%	1,639	19.1%	16.8 – 21.4%	1,817	<0.01
Male and female adults*	26.3%	21.3 – 31.3%	639	19.7%	17.1 – 22.2%	1,571	<0.01
Female adult(s) only	18.4%	14.1 – 22.7%	639	15.6%	11.7 – 19.4%	233	NS
Male adult(s) only	19.0%	15.0 – 22.9%	355	12.4%^	0 – 25.8%^	12	NS
Children only no adults	n/a	n/a	0	n/a	n/a	1	n/a
Percent of women achieving adequacy on Women's Empowerment in Agriculture Index Indicators[2,3]							
Input in productive decisions*	70.5%	63.5 – 77.5%	1,397	15.2%	11.2 – 19.2%	1,817	<0.01
Ownership of assets*	81.6%	78.9 – 84.3%	1,397	46.9%	44.0 – 49.7%	1,817	<0.01
Purchase, sale or transfer of assets*	54.3%	48.9 – 59.7%	1,397	23.1%	19.8 – 26.3%	1,817	<0.01
Access to and decisions on credit*	41.0%	37.9 – 44.2%	1,397	31.2%	27.5 – 35.0%	1,817	<0.01
Control over use of income*	91.8%	89.4 – 94.1%	1,397	38.5%	32.9 – 44.1%	1,817	<0.01
Group member	80.0%	77.0 – 83.0%	1,397	76.8%	72.0 – 81.5%	1,817	NS
Speaking in public*	88.8%	86.6 – 91.0%	1,397	47.3%	42.9 – 51.7%	1,817	<0.01
Workload	63.9%	59.9 – 67.9%	1,397	66.5%	62.4 – 70.6%	639	NS
Leisure*	87.0%	84.9 – 89.1%	1,397	48.1%	41.4 – 54.8%	1,817	<0.01
Autonomy in production	67.2%	60.8 – 73.6%	1,397	n/a	n/a	n/a	n/a
Prevalence of households with moderate or severe hunger							
All households*	45.2%	41.5 – 48.9%	1,639	20.4%	17.0 – 23.9%	1,817	<0.01
Male and female adults*	44.3%	39.7 – 49.0%	639	19.9%	17 – 23%	1,571	<0.01
Female adult(s) only*	47.5%	42.3 – 52.8%	639	23.0%	15 – 31%	233	<0.01
Male adult(s) only	43.2%	37.0 – 49.5%	355	39.9%^	10 – 70%^	12	NS
Children only no adults	n/a	n/a	0	n/a	n/a	1	n/a
Women's Dietary Diversity: Mean number of food groups consumed by women of reproductive age[3]							
All women age 15-49	n/a	n/a	n/a	4.63	4.56 – 4.70	2,389	n/a
Prevalence of exclusive breastfeeding among children under 6 months of age[3]							
All children*	64.6%	54.6 – 74.5%	119	52.1%	45.1 – 58.9%	250	<0.01
Male children	54.9%	40.8 – 69.0%	48	50.0%	39.8 – 60.2%	121	NS
Female children*	71.5%	60.2 – 82.8%	71	54.0%	44.6 – 63.0%	129	<0.01
Prevalence of children 6-23 months receiving a minimum acceptable diet[3]							
All children	6.4%	3.3 – 9.5%	365	9.0%	6.4 – 11.5%	490	NS
Male children	6.6%	2.5 – 10.7%	209	7.9%	4.6 – 11.0%	267	NS
Female children	6.2%	1.6 – 10.7%	156	10.3%	6.3 – 14.3%	223	NS
Prevalence of women of reproductive age who consume targeted nutrient-rich value chain commodities[3]							
Biofortified cassava: All women age 15-49	n/a	n/a	n/a	4.6%	3.8 – 5.6%	2378	n/a
Goat: All women age 15-49	n/a	n/a	n/a	1.5%	1.1 – 2.2%	2388	n/a
Cabbage: All women age 15-49	n/a	n/a	n/a	0.5%	0.3 – 0.8%	2387	n/a

Feed the Future Indicator	Baseline (2012-2013)			Interim (2015)			
	Estimate	95% CI[1]	n	Estimate	95% CI	n	P-value
Okra: All women age 15-49	n/a	n/a	n/a	51.8%	49.5 – 54.0%	2387	n/a
Chili Pepper: All women age 15-49	n/a	n/a	n/a	95.9%	95.0 – 96.7%	2385	n/a
Prevalence of women of reproductive age who consume at least one targeted nutrient-rich value chain commodity[3]							
All women age 15-49	n/a	n/a	n/a	96.8%	96.0 – 97.5%	2387	n/a
Prevalence of children 6-23 months who consume targeted nutrient-rich value chain commodities[3]							
Biofortified cassava: All children	n/a	n/a	n/a	1.0%	0.4 – 2.5%	490	n/a
Goat: All children	n/a	n/a	n/a	0.4%	0.1 – 1.3%	489	n/a
Cabbage: All children	n/a	n/a	n/a	0.4%	0.1 – 1.7%	486	n/a
Okra: All children	n/a	n/a	n/a	37.2%	32.5 – 42.1%	487	n/a
Chili Pepper: All children	n/a	n/a	n/a	60.4%	55.6 – 65.1%	488	n/a
Prevalence of children 6-23 months who consume at least one targeted nutrient-rich value chain commodity[3]							
All children	n/a	n/a	n/a	66.2%	61.5 – 70.6%	485	n/a
Male children	n/a	n/a	n/a	67.9%	61.7 –73.6%	262	n/a
Female children	n/a	n/a	n/a	64.2%	56.9 – 70.8%	223	n/a
Prevalence of underweight women[3]							
All non-pregnant women age 15-49*	7.0%	5.7 – 8.4%	1491	13.2%	11.8 – 14.7%	2039	<0.01
Prevalence of stunted children under 5 years of age[3]							
All children	31.9%	29.1 – 37.2%	1129	34.3%	32.0 – 36.6%	1693	NS
Male children	34.4%	30.5 – 38.2%	598	37.1%	33.9 – 40.4%	851	NS
Female children	29.1%	25.2 – 32.9%	531	31.6%	28.3 – 34.7%	842	NS
Prevalence of wasted children under 5 years of age[3]							
All children	6.3%	4.8 – 7.7%	1153	8.2%	6.9 – 9.5%	1707	NS
Male children	6.7%	4.7 – 8.6%	611	8.1%	6.3 – 9.9%	856	NS
Female children	5.9%	3.9 – 7.8%	542	8.2%	6.3 – 10.0%	851	NS
Prevalence of underweight children under 5 years of age[3]							
All children	16.6%	14.4 – 18.7%	1162	15.2%	13.5 – 16.9%	1796	NS
Male children	18.9%	15.8 – 21.9%	617	15.5%	13.1 – 17.9%	898	NS
Female children	14.1%	11.4 – 17.3%	545	15.0%	12.6 – 17.3%	898	NS

Source(s): Liberia Demographic and Health Survey (LDHS) 2013; ZOI baseline survey, Liberia 2012; ZOI interim survey, Liberia 2015
n/a – Not available
NS – Not Significant (p>0.1)
^ Results not statistically reliable, n<30.
* Significant difference (p < 0.05) compared to baseline according to a weighted two-sample t-test with bootstrapped standard errors.

[1] While interim surveys were not designed to capture change over time, additional analysis was performed to test for significant differences between the baseline and interim estimates. When the difference over time is found to be significant (p<0.05), an asterisk is noted next to the household characteristic.

[2] The full WEAI score cannot be calculated because interim data were collected from women only and the autonomy indicator was dropped. The second interim survey (2017) will collect the full set of data from women and men and will report on the full WEAI.

[3] The indicators for women's and children's anthropometry, food diversity, and consumption of targeted NRVCC were not collected during the baseline round of data collection.

A1.3. Baseline and Interim Feed the Future Indicator Estimates by county

Appendix 1.3. reports baseline estimates (derived from LDHS, 2013) and the interim assessment estimates by each ZOI county – Bong, Grand Bassa, Lofa, Margibi, Montserrado excluding Greater Monrovia, and Nimba. The sampling frame for the interim assessment was explicitly designed to allow for such a comparison due to the county-level stratification and large sample size. Significance tests were run for association between the baseline and the interim estimates for each county.

	Baseline (2012-2013)			Interim (2015)			
Feed the Future Indicator	Estimate	95% CI	n	Estimate	95% CI	n	p value
Daily per capita expenditures (as a proxy for income) in USG-assisted areas (2010 USD)							
All households	1.73	1.49 – 1.96	1,639	1.93	1.65 – 2.20	1,817	NS
Bong	1.89	1.19 – 2.60	344	1.71	1.50 – 1.91	380	NS
Grand Bassa*	1.52	0.96 – 2.07	191	3.44	1.71 – 5.16	252	0.03
Lofa*	1.70	1.31 – 2.09	259	1.37	1.20 – 1.54	282	0.01
Margibi	1.86	1.41 – 2.31	171	2.01	1.61 – 2.40	252	NS
Rural Montserrado	2.23	1.63 – 2.83	130	2.68	2.08 – 3.29	170	NS
Nimba	1.44	1.07 – 1.80	544	1.44	1.27 – 1.61	481	NS
Prevalence of Poverty: Percent of people living on less than $1.25 per day (2005 PPP)							
All households*	49.4%	42.9 – 55.9%	1,639	39.8%	36.1 – 43.5%	1,817	<0.01
Bong*	48.1%	32.9 – 63.4%	344	39.7%	30.8 – 48.7%	380	0.03
Grand Bassa*	56.8%	39.2 – 74.4%	191	36.6%	28.3 – 44.9%	252	<0.01
Lofa*	49.4%	36.8 – 62.0%	259	39.5%	34.7 – 44.4%	282	0.02
Margibi	42.6%	23.3 – 62.0%	171	38.7%	29.1 – 48.3%	252	NS
Rural Montserrado	32.6%	17.1 – 48.2%	130	36.9%	25.9 – 48.0%	170	NS
Nimba*	57.0%	45.9 – 68.1%	544	43.2%	34.1 – 52.3%	481	<0.01
Depth of Poverty: Mean percent shortfall relative to the $1.25 per day poverty line (2005 PPP)							
All households*	21.7%	17.8 – 25.6%	1,639	19.1%	16.8 – 21.4%	1,817	<0.01
Bong	21.3%	12.1 – 30.4%	344	19.3%	12.7 – 26.0%	380	NS
Grand Bassa*	27.8%	15.5 – 40.0%	191	18.8%	12.0 – 25.5%	252	<0.01
Lofa	24.1%	16.2 – 31.9%	259	19.2%	16.0 – 22.4%	282	NS
Margibi	14.8%	6.3 – 23.3%	171	19.3%	13.6 – 25.0%	252	NS
Rural Montserrado*	10.0%	2.8 – 17.3%	130	16.0%	10.0 – 22.0%	170	0.03
Nimba*	25.9%	18.9 – 32.9%	544	19.8%	14.7 – 24.9%	481	<0.01
Percent of women achieving adequacy on Women's Empowerment in Agriculture Index Indicators							
Input in productive decisions*	70.5%	63.5 – 77.5%	1,397	15.2%	11.2 – 19.2%	1,817	<0.01
Bong*	71.8%	59.7 – 84.0%	328	30.1%	20.3 – 40.0%	380	<0.01
Grand Bassa*	72.1%	52.3 – 92.0%	149	16.4%	6.2 – 26.5%	252	<0.01
Lofa*	74.4%	62.5 – 86.2%	252	0.0%	0.0 – 0.0%	282	<0.01
Margibi*	56.2%	32.9 – 79.5%	146	19.0%	5.5 – 32.5%	253	<0.01

Feed the Future Indicator	Baseline (2012-2013)			Interim (2015)			
	Estimate	95% CI	n	Estimate	95% CI	n	p value
Rural Montserrado*	58.3%	40.6 – 75.9%	117	11.3%	0.8 – 21.7%	171	<0.01
Nimba*	85.3%	75.9 – 94.6%	405	16.1%	7.5 – 24.6%	481	<0.01
Ownership of assets*	81.6%	78.9 – 84.3%	1,397	46.9%	44.0 – 49.7%	1,817	<0.01
Bong*	85.1%	81.7 – 88.5%	328	54.0%	44.1 – 64.0%	380	<0.01
Grand Bassa*	73.8%	65.3 – 82.3%	149	41.6%	33.9 – 49.2%	252	<0.01
Lofa*	77.9%	72.5 – 83.4%	252	50.8%	45.7 – 55.9%	282	<0.01
Margibi*	79.6%	75.7 – 83.6%	146	34.8%	30.0 – 39.7%	253	<0.01
Rural Montserrado*	81.7%	71.6 – 91.8%	117	32.6%	27.8 – 37.5%	171	<0.01
Nimba*	87.7%	81.7 – 93.7%	405	52.3%	47.4 – 57.2%	481	<0.01
Purchase, sale or transfer of assets*	54.3%	48.9 – 59.7%	1,397	23.1%	19.8 – 26.3%	1,817	<0.01
Bong*	56.0%	45.6 – 66.4%	328	34.6%	26.9 – 42.3%	380	<0.01
Grand Bassa*	47.9%	33.4 – 62.5%	149	24.6%	13.7 – 35.6%	252	<0.01
Lofa*	57.0%	52.1 – 61.9%	252	20.6%	14.5 – 26.7%	282	<0.01
Margibi*	41.0%	23.5 – 58.6%	146	11.2%	4.8 – 17.6%	253	<0.01
Rural Montserrado*	38.8%	29.7 – 47.9%	117	8.6%	5.9 – 11.2%	171	<0.01
Nimba*	78.6%	70.6 – 86.6%	405	27.2%	19.8 – 34.6%	481	<0.01
Access to and decisions on credit	41.0%	37.9 – 44.2%	1,397	31.2%	27.5 – 35.0%	1,817	<0.01
Bong*	40.0%	35.0 – 45.0%	328	17.3%	11.2 – 23.4%	380	<0.01
Grand Bassa*	33.4%	23.7 – 43.1%	149	14.2%	6.4 – 22.0%	252	<0.01
Lofa*	42.2%	36.6 – 47.9%	252	58.2%	52.2 – 64.1%	282	<0.01
Margibi*	42.0%	35.0 – 48.9%	146	8.4%	4.3 – 12.6%	253	<0.01
Rural Montserrado*	32.9%	26.8 – 39.0%	117	5.5%	1.3 – 9.8%	171	<0.01
Nimba	54.0%	44.7 – 63.4%	405	47.6%	40.6 – 54.6%	481	0.06
Control over use of income*	91.8%	89.4 – 94.1%	1,397	38.5%	32.9 – 44.1%	1,817	<0.01
Bong*	91.8%	87.6 – 96.0%	328	69.2%	60.6 – 77.8%	380	<0.01
Grand Bassa*	91.4%	83.4 – 99.4%	149	62.4%	53.7 – 71.2%	252	<0.01
Lofa*	90.1%	82.6 – 97.5%	252	0.0%	0.0 – 0.0%	282	<0.01
Margibi*	90.7%	84.8 – 96.6%	146	54.5%	41.3 – 67.8%	253	<0.01
Rural Montserrado*	93.5%	89.3 – 97.7%	117	35.1%	25.5 – 44.6%	171	<0.01
Nimba*	93.2%	88.5 – 97.9%	405	29.9%	17.0 – 42.7%	481	<0.01
Group member	80.0%	77.0 – 83.0%	1,397	76.8%	72.0 – 81.5%	1,817	NS
Bong*	76.2%	69.8 – 82.7%	328	91.1%	87.4 – 94.8%	380	<0.01
Grand Bassa	82.1%	76.5 – 87.6%	149	87.0%	81.9 – 92.1%	252	NS
Lofa*	87.0%	81.9 – 92.1%	252	57.6%	45.8 – 69.5%	282	<0.01
Margibi*	65.9%	58.3 – 73.5%	146	82.1%	73.3 – 90.9%	253	<0.01
Rural Montserrado	80.7%	75.9 – 85.6%	117	77.2%	63.8 – 90.7%	171	NS
Nimba*	89.3%	82.2 – 96.4%	405	74.4%	65.6 – 83.1%	481	<0.01
Speaking in public	88.8%	86.6 – 91.0%	1,397	47.3%	42.9 – 51.7%	1,817	<0.01
Bong*	92.4%	89.5 – 95.2%	328	67.6%	59.3 – 77.3%	380	<0.01

Feed the Future Indicator	Baseline (2012-2013) Estimate	95% CI	n	Interim (2015) Estimate	95% CI	n	p value
Grand Bassa*	79.4%	72.2 – 86.7%	149	59.5%	52.3 – 66.7%	252	<0.01
Lofa*	85.5%	78.6 – 92.4%	252	0.0%	0.0 – 0.0%	282	<0.01
Margibi*	88.1%	80.4 – 95.7%	146	60.5%	51.0 – 70.0%	253	<0.01
Rural Montserrado*	93.0%	88.8 – 97.3%	117	66.7%	57.3 – 76.0%	171	<0.01
Nimba*	91.3%	88.6 – 94.0%	405	28.9%	15.2 – 42.7%	481	<0.01
Workload	63.9%	59.9 – 67.9%	997	66.5%	62.4 – 70.6%	639	p
Bong	57.4%	47.7 – 67.2%	196	67.4%	55.9 – 79.0%	162	0.06
Grand Bassa	64.7%	59.4 – 70.0%	131	61.1%	48.1 – 74.1%	63	NS
Lofa	76.0%	65.3 – 86.6%	172	67.1%	61.0 – 73.2%	114	NS
Margibi	66.2%	58.2 – 74.1%	96	59.4%	47.4 – 71.4%	92	NS
Rural Montserrado*	68.4%	60.3 – 76.5%	97	87.9%	82.2 – 93.6%	46	<0.01
Nimba*	54.2%	40.4 – 68.0%	305	65.4%	58.1 – 72.6%	171	0.02
Leisure*	87.0%	84.9 – 89.1%	1,020	48.1%	41.4 – 54.8%	1,817	<0.01
Bong	86.4%	81.4 – 91.5%	200	84.1%	79.1 – 89.1%	380	NS
Grand Bassa	80.4%	73.3 – 87.5%	132	72.7%	62.7 – 82.7%	252	0.08
Lofa*	89.5%	84.2 – 94.9%	178	0.0%	0.0 – 0.0%	282	<0.01
Margibi*	84.7%	80.9 – 88.5%	106	71.4%	63.5 – 79.4%	253	<0.01
Rural Montserrado*	87.9%	84.6 – 91.2%	98	59.1%	47.6 – 70.5%	171	<0.01
Nimba*	92.9%	89.4 – 96.3%	306	34.9%	18.7 – 51.0%	481	<0.01
Autonomy in production	67.2%	60.8 – 73.6%	1,397	n/a	n/a	n/a	n/a
Bong	68.1%	57.8 – 78.4%	328	n/a	n/a	n/a	n/a
Grand Bassa	72.7%	48.0 – 97.5%	149	n/a	n/a	n/a	n/a
Lofa	66.0%	58.5 – 73.6%	252	n/a	n/a	n/a	n/a
Margibi	53.6%	34.3 – 73.0%	146	n/a	n/a	n/a	n/a
Rural Montserrado	58.9%	41.6 – 76.2%	117	n/a	n/a	n/a	n/a
Nimba	80.8%	73.0 – 88.6%	405	n/a	n/a	n/a	n/a
Prevalence of households with moderate or severe hunger							
All households*	45.2%	41.5 – 48.9%	1,639	20.4%	17.0 – 23.9%	1,817	<0.01
Bong*	42.9%	32.5 – 53.4%	344	35.0%	28.3 – 41.8%	380	0.03
Grand Bassa*	46.1%	34.1 – 58.2%	191	30.7%	21.7 – 39.7%	252	<0.01
Lofa*	35.8%	28.4 – 43.2%	259	0.0%	0.0 – 0.0%	282	<0.01
Margibi*	48.0%	40.8 – 55.2%	171	28.5%	19.1 – 37.9%	252	<0.01
Rural Montserrado	43.2%	36.9 – 49.6%	130	34.9%	26.6 – 43.3%	170	NS
Nimba*	51.3%	45.2 – 57.4%	544	12.9%	6.5 – 19.4%	481	<0.01
Women's Dietary Diversity: Mean number of food groups consumed by women of reproductive age[1]							
All women age 15-49	n/a	n/a	n/a	4.63	4.56 – 4.70	2,389	n/a
Bong	n/a	n/a	n/a	4.80	4.65 – 4.95	496	n/a
Grand Bassa	n/a	n/a	n/a	4.62	4.42 – 4.82	309	n/a
Lofa	n/a	n/a	n/a	4.66	4.47 – 4.86	352	n/a
Margibi	n/a	n/a	n/a	4.25	4.07 – 4.43	361	n/a

Feed the Future Indicator	Baseline (2012-2013) Estimate	95% CI	n	Interim (2015) Estimate	95% CI	n	p value
Rural Montserrado	n/a	n/a	n/a	4.63	4.34 – 4.92	222	n/a
Nimba	n/a	n/a	n/a	4.70	4.58 – 4.82	641	n/a
Prevalence of exclusive breastfeeding among children under 6 months of age[2]							
All children*	64.6%	54.6 – 74.5%	119	52.1%	45.1 – 58.9%	250	0.01
Bong^	62.9%	41.3 – 84.5%	26	51.5%	37.3 – 65.5%	51	NS
Grand Bassa^	48.8%	21.6 – 76.0%	17	29.2%	16.0 – 47.4%	34	NS
Lofa^	67.4%	44.8 – 90.0%	24	47.7%	28.1 – 68.0%	33	NS
Margibi^	63.5%	42.6 – 84.4%	22	54.2%	35.4 – 71.8%	29	NS
Rural Montserrado^	44.9%	34.1 – 55.6%	7	47.4%	25.1 – 70.8%	22	NS
Nimba^	74.4%	53.5 – 95.2%	23	66.1%	54.2 – 76.3%	80	NS
Prevalence of children 6-23 months receiving a minimum acceptable diet[2]							
All children*	6.4%	3.3 – 9.5%	365	9.0%	6.4 – 11.5%	490	<0.01
Bong	3.8%	0.0 – 8.5%	74	7.5%	3.4-15.4%	80	0.06
Grand Bassa	3.1%	0.0 – 7.4%	57	4.9%	1.6-13.5%	61	NS
Lofa*	0.0%	0.0 – 0.0%	66	15.0%	8.0-26.1%	60	0.01
Margibi	1.6%	0.0 – 4.8%	59	2.9%	8.2-10.2%	67	NS
Rural Montserrado	21.5%	1.6 – 41.4%	19	5.2%	1.4-17.2%	38	NS
Nimba	12.4%	5.4 – 19.5%	103	11.9%	8.0-17.4%	184	NS
Prevalence of women of reproductive age who consume targeted nutrient-rich value chain commodities[1]							
Biofortified cassava: All women age 15-49	n/a	n/a	n/a	4.6%	3.8 – 5.6%	2,378	n/a
Bong	n/a	n/a	n/a	5.1%	3.2 – 7.9%	493	n/a
Grand Bassa	n/a	n/a	n/a	11.0%	7.8 – 15.4%	307	n/a
Lofa	n/a	n/a	n/a	2.1%	1.1 – 4.1%	351	n/a
Margibi	n/a	n/a	n/a	4.0%	2.5 – 6.6%	361	n/a
Rural Montserrado	n/a	n/a	n/a	2.8%	1.3 – 6.0%	221	n/a
Nimba	n/a	n/a	n/a	4.0%	2.7 – 5.9%	637	n/a
Goat: All women age 15-49	n/a	n/a	n/a	1.5%	1.1 – 2.2%	2,388	n/a
Bong	n/a	n/a	n/a	0.9%	0.3 – 2.6%	496	n/a
Grand Bassa	n/a	n/a	n/a	0.4%	0.1 – 2.7%	309	n/a
Lofa	n/a	n/a	n/a	2.2%	1.0 – 4.6%	351	n/a
Margibi	n/a	n/a	n/a	1.7%	0.8 – 3.8%	361	n/a
Rural Montserrado	n/a	n/a	n/a	2.0%	0.6 – 6.2%	222	n/a
Nimba	n/a	n/a	n/a	1.6%	0.9 – 3.0%	641	n/a
Cabbage: All women age 15-49	n/a	n/a	n/a	0.5%	0.3 – 0.8%	2,387	n/a
Bong	n/a	n/a	n/a	0.6%	0.2 – 2.1%	496	n/a
Grand Bassa	n/a	n/a	n/a	0.0%	0.0 – 0.0%	309	n/a
Lofa	n/a	n/a	n/a	0.2%	0.0 – 1.7%	351	n/a
Margibi	n/a	n/a	n/a	0.8%	0.3 – 2.3%	361	n/a
Rural Montserrado	n/a	n/a	n/a	0.2%	0.0 – 1.4%	222	n/a

Feed the Future Indicator	Baseline (2012-2013)			Interim (2015)			
	Estimate	95% CI	n	Estimate	95% CI	n	p value
Nimba	n/a	n/a	n/a	0.7%	0.2 – 1.8%	641	n/a
Okra: All women age 15-49	n/a	n/a	n/a	51.8%	49.5 – 54.0%	2,387	n/a
Bong	n/a	n/a	n/a	55.5%	50.8 – 60.2%	495	n/a
Grand Bassa	n/a	n/a	n/a	59.4%	53.5 – 65.1%	309	n/a
Lofa	n/a	n/a	n/a	46.9%	40.8 – 53.0%	351	n/a
Margibi	n/a	n/a	n/a	33.3%	28.5 – 38.5%	361	n/a
Rural Montserrado	n/a	n/a	n/a	22.6%	16.3 – 30.4%	222	n/a
Nimba	n/a	n/a	n/a	68.5%	64.6 – 72.1%	641	n/a
Chili Pepper: All women age 15-49	n/a	n/a	n/a	95.9%	95.0 – 96.7%	2,385	n/a
Bong	n/a	n/a	n/a	93.7%	91.0 – 95.7%	495	n/a
Grand Bassa	n/a	n/a	n/a	96.7%	94.1 – 98.2%	309	n/a
Lofa	n/a	n/a	n/a	98.8%	97.2 – 99.5%	351	n/a
Margibi	n/a	n/a	n/a	91.4%	87.7 – 94.0%	360	n/a
Rural Montserrado	n/a	n/a	n/a	90.0%	84.4 – 93.8%	221	n/a
Nimba	n/a	n/a	n/a	99.0%	97.9 – 99.5%	641	n/a
Prevalence of women of reproductive age who consume at least one targeted nutrient-rich value chain commodity[1]							
All women age 15-49	n/a	n/a	n/a	96.8%	96.0 – 97.5%	2,387	n/a
Bong	n/a	n/a	n/a	95.9%	93.6 – 97.4%	495	n/a
Grand Bassa	n/a	n/a	n/a	98.6%	96.7 – 99.4%	309	n/a
Lofa	n/a	n/a	n/a	98.8%	97.2 – 99.5%	351	n/a
Margibi	n/a	n/a	n/a	92.1%	88.6 – 94.6%	361	n/a
Rural Montserrado	n/a	n/a	n/a	91.8%	86.9 – 95.0%	222	n/a
Nimba	n/a	n/a	n/a	99.2%	98.2 – 99.6%	641	n/a
Prevalence of children 6-23 months who consume targeted nutrient-rich value chain commodities[1]							
Biofortified cassava: All children	n/a	n/a	n/a	1.0%	0.4 – 2.5%	490	n/a
Bong	n/a	n/a	n/a	0.0%	0.0 – 0.0%	82	n/a
Grand Bassa	n/a	n/a	n/a	5.4%	1.7 – 15.5%	66	n/a
Lofa	n/a	n/a	n/a	0.0%	0.0 – 0.0%	62	n/a
Margibi	n/a	n/a	n/a	1.6%	0.2 – 10.4%	67	n/a
Rural Montserrado	n/a	n/a	n/a	1.1%	0.1 – 7.6%	38	n/a
Nimba	n/a	n/a	n/a	0.0%	0.0 – 0.0%	179	n/a
Goat: All children	n/a	n/a	n/a	0.4%	0.1 – 1.3%	489	n/a
Bong	n/a	n/a	n/a	0.0%	0.0 – 0.0%	82	n/a
Grand Bassa	n/a	n/a	n/a	0.0%	0.0 – 0.0%	66	n/a
Lofa	n/a	n/a	n/a	0.7%	0.1 – 4.9%	62	n/a
Margibi	n/a	n/a	n/a	1.6%	0.2 – 10.4%	67	n/a
Rural Montserrado	n/a	n/a	n/a	1.1%	0.1 – 7.6%	38	n/a
Nimba	n/a	n/a	n/a	0.0%	0.0 – 0.0%	178	n/a
Cabbage: All children	n/a	n/a	n/a	0.4%	0.1 – 1.7%	486	n/a

Feed the Future Indicator	Baseline (2012-2013) Estimate	95% CI	n	Interim (2015) Estimate	95% CI	n	p value
Bong	n/a	n/a	n/a	0.0%	0.0 – 0.0%	82	n/a
Grand Bassa	n/a	n/a	n/a	0.0%	0.0 – 0.0%	66	n/a
Lofa	n/a	n/a	n/a	0.0%	0.0 – 0.0%	61	n/a
Margibi	n/a	n/a	n/a	1.6%	0.2 – 10.4%	67	n/a
Rural Montserrado	n/a	n/a	n/a	0.0%	0.0 – 0.0%	38	n/a
Nimba	n/a	n/a	n/a	0.6%	0.1 – 4.3%	176	n/a
Okra: All children	n/a	n/a	n/a	37.2%	32.5 – 42.1%	487	n/a
Bong	n/a	n/a	n/a	33.8%	23.9 – 45.3%	82	n/a
Grand Bassa	n/a	n/a	n/a	36.6%	25.3 – 49.6%	66	n/a
Lofa	n/a	n/a	n/a	28.2%	16.5 – 43.9%	62	n/a
Margibi	n/a	n/a	n/a	21.5%	13.1 – 33.2%	67	n/a
Rural Montserrado	n/a	n/a	n/a	27.9%	12.9 – 50.4%	38	n/a
Nimba	n/a	n/a	n/a	50.1%	42.4 – 57.9%	177	n/a
Chili Pepper: All children	n/a	n/a	n/a	60.4%	55.6 – 65.1%	488	n/a
Bong	n/a	n/a	n/a	57.5%	45.9 – 68.3%	82	n/a
Grand Bassa	n/a	n/a	n/a	58.2%	45.4 – 69.9%	66	n/a
Lofa	n/a	n/a	n/a	45.9%	32.1 – 60.3%	61	n/a
Margibi	n/a	n/a	n/a	51.7%	39.4 – 63.8%	67	n/a
Rural Montserrado	n/a	n/a	n/a	60.0%	41.8 – 75.7%	38	n/a
Nimba	n/a	n/a	n/a	71.8%	64.6 – 78.0%	178	n/a
Prevalence of children 6-23 months who consume at least one targeted nutrient-rich value chain commodity[1]							
All children	n/a	n/a	n/a	66.2%	61.5 – 70.6%	485	n/a
Bong	n/a	n/a	n/a	61.3%	49.6 – 71.8%	82	n/a
Grand Bassa	n/a	n/a	n/a	66.0%	53.4 – 76.7%	66	n/a
Lofa	n/a	n/a	n/a	56.5%	41.7 – 70.2%	61	n/a
Margibi	n/a	n/a	n/a	58.9%	46.3 – 70.4%	67	n/a
Rural Montserrado	n/a	n/a	n/a	62.1%	43.9 – 77.5%	38	n/a
Nimba	n/a	n/a	n/a	75.9%	68.9 – 81.8%	176	n/a
Prevalence of underweight women[2]							
All non-pregnant women age 15-49	7.0%	5.7 – 8.4%	1491	13.2%	11.8 – 14.7%	2,039	NS
Bong	8.1%	5.1 – 11.9%	293	13.1%	10.1 – 16.8%	419	NS
Grand Bassa	8.5%	5.1 – 13.0%	213	18.6%	14.1 – 23.8%	264	NS
Lofa	6.7%	4.1 – 10.3%	284	11.5%	8.3 – 15.8%	304	NS
Margibi	6.4%	3.8 – 10.0%	267	16.8%	13.0 – 21.5%	315	NS
Rural Montserrado	4.4%	1.2 – 10.9%	91	10.3%	6.4 – 15.5%	194	NS
Nimba	6.6%	4.4 – 9.2%	363	10.5%	8.1 – 13.4%	562	NS
Prevalence of stunted children under 5 years of age[2]							
All children	31.9%	29.1 – 37.2%	1129	34.3%	32.0 – 36.6%	1,693	NS
Bong	34.5%	28.7 – 40.9%	231	35.1%	29.9 – 40.7%	296	NS

Feed the Future Indicator	Baseline (2012-2013) Estimate	95% CI	n	Interim (2015) Estimate	95% CI	n	p value
Grand Bassa	35.9%	29.2 –43.2%	178	41.1%	34.9 – 47.6%	231	NS
Lofa	25.9%	20.2 –32.6%	189	27.7%	22.3 –33.9%	227	NS
Margibi	27.6%	21.6 – 34.5%	181	33.0%	27.1 – 39.5%	218	NS
Rural Montserrado	22.4%	13.5 – 34.6%	58	34.1%	26.6 – 42.4%	135	NS
Nimba	35.9%	30.6 – 41.6%	292	34.4%	30.7 – 38.4%	586	NS
Prevalence of wasted children under 5 years of age[2]							
All children*	6.3%	4.8 – 7.7%	1153	8.2%	6.9 – 9.5%	1,707	0.06
Bong	8.0%	5.2 – 12.2%	235	10.2%	7.2 – 14.1%	295	NS
Grand Bassa	7.5%	4.5 – 12.3%	185	9.2%	6.1 – 13.5%	239	NS
Lofa	6.2%	3.5 – 10.5%	193	6.1%	3.7 – 10.0%	229	NS
Margibi	4.4%	2.2 – 8.4%	182	7.4%	4.6 – 11.8%	214	NS
Rural Montserrado*	15.2%	8.2 – 26.5%	59	6.3%	3.4 – 11.7%	141	0.06
Nimba*	3.7%	2.0 – 6.4%	299	8.3%	6.3 – 10.8%	589	0.01
Prevalence of underweight children under 5 years of age[2]							
All children	16.6%	14.4 – 18.7%	1162	15.2%	13.5–16.9%	1,796	NS
Bong	15.6%	11.5 – 20.8%	236	15.9%	12.3 – 20.3%	314	NS
Grand Bassa	18.9%	13.9 – 25.1%	185	25.9%	20.8 – 31.7%	247	NS
Lofa*	14.7%	10.4 – 20.3%	197	8.5%	5.6 – 12.7%	246	0.04
Margibi	12.7%	8.6 – 18.3%	181	15.0%	11.0 – 20.2%	233	NS
Rural Montserrado	11.8%	5.8 – 22.5%	59	13.1%	8.6 – 19.3%	153	NS
Nimba*	20.7%	16.5 – 25.6%	304	14.1%	11.5 – 17.1%	603	0.01

Source(s): Liberia Demographic and Health Survey (LDHS) 2013; ZOI baseline survey, Liberia 2012; ZOI interim survey, Liberia 2015
n/a – Not available
NS – Not Significant (p>0.1)

^ Results not statistically reliable, n<30.
* Significant difference (p < 0.05) compared to baseline according to a weighted two-sample t-test with bootstrapped standard errors.

[1] The indicators for women's and children's food diversity and consumption of targeted NRVCC were not collected during the baseline round of data collection and there are no secondary resources to substitute the data.
[2] The indicators for women's and children's anthropometry, exclusive breastfeeding practices, and children's minimum acceptable diet were recreated were not collected during the baseline round of data collection. Reported estimates are based on analysis of the Liberia Demographic and Health Survey, 2013 dataset.

A1.4. Poverty at the $1.90 (2011 PPP) per person per day threshold

Characteristic	Prevalence of Poverty[1,4] Percent population[a]	n[5]	Depth of Poverty[2,4] Percent of poverty line[b]	n[5]	Average consumption shortfall of the poor[3,4] In USD 2011 PPP[c]	Percent of poverty line[c]	n[5]
Total (All households)	**34.0%**	**1,817**	**16.2%**	**1,817**	**$0.60**	**47.7%**	**627**

Gendered household type[6]							
Male and female adults	34.8%	1,571	16.7%	1,571	$0.60	48.1%	559
Female adult(s) only	29.1%	233	13.1%	233	$0.56	45.2%	66
Male adult(s) only	27.7%^	12	9.2%^	12	$0.42^	33.3%	2
Household size[4,a,b]							
Small (1-5 members)	25.7%	948	12.1%	948	$0.59	47.4%	249
Medium (6-10 members)	38.2%	777	19.7%	777	$0.65	51.9%	305
Large (11+ members)	81.8%	92	27.7%	92	$0.43	34.1%	73
Household educational attainment[4,a,b]							
No education	35.7%	306	20.1%	306	$0.70	56.3%	107
Less than primary	43.5%	150	24.5%	150	$0.70	56.3%	65
Primary	33.5%	617	15.5%	617	$0.57	45.9%	219
Secondary or more	32.0%	744	13.8%	744	$0.54	43.0%	236

^ Results not statistically reliable, n<30.

[1] 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.

[2] The depth of poverty, or poverty gap, is the average consumption shortfall multiplied by the prevalence of poverty.

[3] 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.

[4] 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.

[5] 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.

[6] The estimate for child-headed households is excluded from the table because the sample size is too small to obtain a valid estimate.

[a-c] 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, Liberia 2015.

Appendix 2. Methodology

A2.1 Sampling and Weighting

Sampling

The sample of households for the interim survey followed a two-stage stratified cluster sampling design. In the first stage, 73 enumeration areas (EAs) were selected from 2008 Census frame in 6 districts, excluding the capital city, by probability proportional to size (PPS) sampling. These were the same EAs visiting during the baseline survey.

In the second stage, 26 households were selected for interview at random according to the following process. Upon reaching each EA, the survey teams counted the number of households located within the EA boundaries, using GPS-enabled tablets to identify those boundaries. This counting process was important due to the changes in population that have occurred since the baseline survey. This household count was entered into a tablet, which provided the team with a random start and sampling interval, with the goal of identifying 26 households for the survey. The sampling interval is computed by dividing the total number of households by 26, the target number of surveys. The random start is a random number between 1 and the sampling interval, which is used to select the first household. For example, if the team counts 104 households in the EA, the tablet would provide a sampling interval of 4 and a random start of, for example, 3. The team would select the third household encountered in the EA, and then select every fourth household until all households have been passed. This process ensures that all households in each EA have a chance to be included in the survey.

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 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*.

$N_{hi} =$ number of households in the frame for the *i*-th sample cluster in stratum *h*.

$N_h =$ total number of households 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 (woman, child).

A2.2 Poverty Prevalence and Expenditure Methods

Data Source

The Interim Assessment indicators are all based on the interim survey conducted in 2015.

Data Preparation

Data excluded from analysis:
Expenses below were excluded because they are typically large, infrequent expenses or services that could impose considerable measurement error to the consumption aggregates.

- Council / group membership or community activity fees
- Insurance - health (MASM, etc.), auto, home, life
- Fines or legal fees
- Anniversary or birthday expenses
- Dowry expenses
- Wedding / Marriage ceremony costs
- Funeral costs (household members or non-household members)

Durable goods are deprecated according to the approach in Deaton and Zaidi (2002). This process involves dividing the current value of the good by the estimated age of the item, measured in days.

Housing is included by using the actual or estimated monthly rent, then dividing by 30 to obtain an equivalent daily rent.

Imputations:
An outlier is defined as a price for a given item that is more than two standard deviations above the median unit price paid by other households in the EA. These outliers are often caused by input errors by the enumerators (for example, entering 100 instead of 10).

To improve the quality of the estimates, the outliers are replaced by an imputed value that is simply the median price paid for the item by households in the EA. Analyses were run with and without imputation to ensure that results are stable and not affected by much by the imputation process.

Missing data was marked as NA and not included in the estimates. The extent of missing data is reflected in the sample sizes listed in each table.

Prices:
Market surveys were performed to identify quantity and exchange rate conversions. Prices were adjusted to account for differences in cost of living across the ZOI using a Paasche Price Index. Prices were reported in either Liberian Dollars (LD) or US Dollars (USD). All expenditures were converted into USD during the analysis according to the prevailing exchange rate.

Currency Conversions using CPI and PPP:

Purchasing power parity (PPP) and consumer price index (CPI) values used to calculate statistics in the report:

PPP (Liberia) 2005: 0.52
CPI (Liberia) 2005: 156 (CPI 2005 = 100)
CPI (Liberia) 2011: 280 (179)
CPI (Liberia) 2012: 300 (192)
CPI (Liberia) 2015: 382 (245)

CPI (USA) 2011: 228
CPI (USA) 2012: 230
CPI (USA) 2015: 237

World Bank CPI values are now normalized such that 2010=100. In order to achieve consistency with baseline, normalize all CPI values such that 2005=100.

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
Production	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,	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.

Dimension	Indicator name	Survey questions	Aggregation of adequacy criteria	Inadequacy criteria
		when or who would take crops to market, livestock raising		
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
Income	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
Leadership	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
Time	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)