FEED THE FUTURE

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

SENEGAL

Feed the Future Zone of Influence Indicator Assessment Report

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USAID

FROM THE AMERICAN PEOPLE

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List of Acronyms

5DE	Five Domains of Empowerment
ANSD	Agence Nationale de la Statistique et de la Démographie
BFS	Bureau for Food Security
BMI	Body Mass Index
CI	Confidence Interval
COMFISH	Collaborative Management for Sustainable Fisheries Future in Senegal
CPI	Consumer Price Index
CR	Communautés Rurales
CRDH	Centre de Recherche pour le Développement Humain
DEFF	Design Effect
DHS	Demographic and Health Survey
DR	Districts de Recensement
EA	Enumeration Area
EG	Economic Growth
ERA	Education and Research in Agriculture
FANTA	Food and Nutrition Technical Assistance Project
GOS	Government of Senegal
GPI	Gender Parity Index
HHS	Household Hunger Scale
IFPRI	International Food Policy Research Institute
IYCF	Infant and Young Child Feeding
LCU	Local Currency Unit
LSMS	Living Standards Measurement Survey
M&E	Monitoring and Evaluation
MAD	Minimum Acceptable Diet
MDD-W	Women's Minimum Dietary Diversity
MDG	Millennium Development Goals
MS	Monitoring System
MYS	Multi-Year Strategy
NLA	Nutrition-Led Agriculture
NRVCC	Nutrient-Rich Value Chain Commodity

ORS	Oral Hydration Solution
PAPA	Peace Corps Agriculture Participating Agency Program Agreement
PCE	Economic Growth Project
PPP	Purchasing Power Parity
PPS	Probability Proportional to Size
PSU	Primary Sampling Unit
RF	Results Framework
SD	Standard Deviation
SFZ	Southern Forest Zone
SRV	Senegal River Valley
SSU	Secondary Sampling Units
USAID	United States Agency for International Development
USD	United States Dollar
USG	United States Government
WDDS	Women's Dietary Diversity Score
WEAI	Women's Empowerment in Agriculture Index
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 Senegal.

The Feed the Future ZOI in Senegal is currently defined as 150 *communautés rurales* (CRs) in the following 10 regions: Fatick, Kaffrine, Kaolack, Kedougou, Kolda, Matam, Saint-Louis, Sedhou, Tambacounda, and Ziguinchor. The current ZOI excludes two regions that were in the 2012 baseline sample frame (Diourbel and Louga) and also includes some departments and CRs that were not included in the baseline. An analysis of the baseline dataset yielded corresponding data for 63 of the 150 CRs that make the current ZOI.

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 women achieving adequacy on Women's Empowerment in Agriculture Index indicators; (5) Prevalence of households with moderate or severe hunger; (6) Women's Dietary Diversity; (7) Number of food groups consumed by women of reproductive age; (8) Prevalence of exclusive breastfeeding among children under 6 months of age; (9) Prevalence of children 6-23 months receiving a minimum acceptable diet (MAD); (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 reports on the Feed the Future indicator Women's Empowerment in Agriculture Index (WEAI) score for women per USAID Senegal's request. This is presented in the Women's Empowerment in Agriculture Section of this report (Section 5). Data for men were also collected to calculate the full WEAI indicator score.

The interim assessment 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. These data were not collected at baseline and therefore are not tracked.

Interim Assessment Data Sources

All indicators in the interim assessment are calculated using data collected during the ZOI household survey in December 2015 and January 2016. No secondary data sources are used in the calculation of these indicators.

Summary of Key Findings

Demographics. A majority of surveyed households contain both male and female adults. In general, households in rural Senegal are very large, with an average household size of 11.4 members. Educational level of the population remains low with nearly one-fifth of adults having no education and 30 percent obtaining a primary or less than primary level of education. Religious education is common in Senegal: 44 percent of adults received Koranic schooling. Among females, attainment of a primary level of education reduces as age increases. This association between age group and school attendance is statistically significant, with 44.5 percent of children aged 15-19 years attending school, compared with 20.5 percent of children aged 20-24 years. Similar patterns are observed when the results are disaggregated by gender.

Living conditions and prevalence of poverty. Access to basic amenities such as improved water and improved sanitation is less than optimum, with half of the population having access to improved water and one third having access to sanitation. At the $1.25 poverty threshold, prevalence of poverty is 39 percent, with depth of poverty measured at 14 percent of the poverty line. Prevalence of poverty is significantly lower among male only households (10 percent) and small households (16 percent) than adult male and female households (39 percent) and large households (45 percent), and the average value of consumption of a poor person is $0.84. At the national poverty threshold of $2.22, 77 percent of the ZOI falls below the poverty line, with a

depth of poverty of 35.4 percent of the poverty line. The depth of poverty is significantly lower at the national extreme poverty threshold of $1.38, at 17 percent of the poverty line.

Women's empowerment. In general, Senegal's ZOI shows a low level of women's empowerment in agriculture. The overall WEAI for the full ZOI is 0.692. It is a weighted average of the 5DE sub-index value of 0.679 and the GPI sub-index value of 0.807. As measured by WEAI indicators, surveyed women obtain a high level of achievement in the income domain, with just over 70 percent reporting that they have sole or joint control over income and expenditures. Similarly, approximately 70 percent of surveyed women reported that they are satisfied with their available time for leisure activities. However, only 40 percent of women have ownership, access to, and decision-making power over the purchase, sale, or transfer of productive resources such as land, livestock, agricultural equipment, consumer durables, and credit.

Hunger and dietary intake. One fifth of surveyed households in the ZOI suffer from moderate or severe hunger, with the prevalence of severe hunger measuring at less than 3 percent. The data show that households with more members, with a secondary or higher education level, and which are not experiencing hunger are more food secure, at a statistically significant level. The mean dietary diversity score for women is 4.7. Fifty-eight percent of surveyed women in the ZOI consumed five out of nine food groups in the last 24 hours. The percentage of women achieving minimum dietary diversity is significantly associated with household size, measuring at 46 percent in small households and 60 percent in large households. Less than half (40 percent) of children 0-5 months of age are exclusively breastfed, with no difference by gender. Moreover, less than 10 percent of children aged 6-23 months receive a MAD.

Nutritional status of women. According to the survey data, one in five women is underweight, and this prevalence is highest among women age 15-19 years at 33 percent. Prevalence of overweight and obesity is higher among older women at a statistically significant level, with nearly one in four women aged 45-49 years measuring as overweight and 13 percent measuring as obese. Among 7,407 women between the ages of 15-49 years, the mean BMI is 21.7. There is a significant difference in women's underweight status by household experience of hunger, with 23.2 percent of women in households with moderate to severe hunger measuring as underweight.

Nutritional status of children. Stunting is an indicator of chronic undernutrition and is measured among children 0-59 months of age. The prevalence of stunting among children aged 0-59 months in the ZOI is 25 percent. The prevalence of stunting is higher among male children (27 percent) than female children (23 percent), at a statistically significant level. Stunting also varies significantly with the child's age, increasing threefold between the 0-11 month age bracket and the 12-23 month age bracket.

The wasting indicator measures the percentage of children 0-59 months who are acutely malnourished. The prevalence of wasting among children aged 0-59 months in the ZOI is 8 percent. A higher percentage of male children (9 percent) are wasted than female children (6.5

percent), at a statistically significant level. About 1.5 percent of children of both genders are severely wasted, and wasting is significantly associated with the child's age, with the greatest prevalence in the 48-59 month age bracket.

Underweight is a weight-for-age measurement and is a reflection of acute and/or chronic undernutrition. The prevalence of underweight children aged 0-59 months in the ZOI is 16 percent. As observed in the case of stunting and wasting, the prevalence of underweight children is similarly higher among male children (17.8 percent) than female children (14.6 percent). Prevalence of underweight also varies significantly by caregivers' educational status: it is highest among children whose caregivers do not have any education (17 percent) and lowest among children whose caregivers have a secondary or higher level of education (9.4 percent). Underweight is significantly associated with age, nearly doubling between the 0-11 month age group and the 12-23 months age group.

Summary Tables. The following three tables provide: i) indicator estimates at the time of the baseline and interim assessments; ii) indicator estimates for Senegal's truncated ZOI containing 63 CRs that overlap between the baseline and interim assessments; and iii) indicator estimates at the time of the interim assessment disaggregated by four agro-ecological sub-zones.

1. *Feed the Future Zone of Influence Indicator Estimates: Senegal*

Feed the Future Indicator	Baseline (2012) – 63 CRs			Interim (2015) – Full ZOI		
	Estimate	95% CI[1]	n (unweighted)	Estimate	95% CI	n (unweighted)
Daily per capita expenditures (as a proxy for income) in USG-assisted areas (2010 USD)						
All households	2.2	2.0-2.4	706	2.6	2.4-2.7	3,775
Male and female adults	2.2	2.0-2.4	687	2.5	2.3-2.6	3,538
Female adult(s) only	--	--	16^	3.2	2.7-3.6	171
Male adult(s) only	--	--	3^	5.6	4.3-6.9	65
Children only no adults	--	--	--	--	--	--
Prevalence of Poverty: Percent of people living on less than $1.25 per day (2005 PPP)						
All households	34.3	29.9-38.7	706	41.3	38.0-44.7	3,775
Male and female adults	34.8	30.3-39.3	687	41.8	38.5-45.3	3,538
Female adult(s) only	--	--	16^	27.2	18.8-37.5	171
Male adult(s) only	--	--	3^	7.1	2.4-11.9	65
Children only no adults	--	--	--	--	--	--
Depth of Poverty: Mean percent shortfall relative to the $1.25 per day poverty line (2005 PPP)						
All households	10.7	--	706	13.9	--	3,775
Male and female adults	10.8	--	687	14.1	--	3,538
Female adult(s) only	--	--	16^	10.7	--	171
Male adult(s) only	--	--	3^	3.3	--	65
Children only no adults	--	--	--	--	--	--
Percent of women achieving adequacy on Women's Empowerment in Agriculture Index Indicators[2,3]						
WEAI	0.686	0.670-0.702	1,056	0.692	0.684-0.700	1,694
5DE Index	0.677	0.658-0.696	1,056	0.679	0.670-0.689	1,458
GPI	0.769	0.740-0.798	257	0.807	0.794-0.821	1,694
Input in productive decisions	73.3	69.3-77.4	1,418	45.1	42.1-48.2	3,166
Ownership of assets	77.8	74.7-80.5	1,477	55.6	52.7-58.5	3,242
Purchase, sale or transfer of assets	65.2	60.4-69.8	1,477	40.0	37.1-43.0	3,242
Access to and decisions on credit	28.2	23.8-33.1	1,458	51.0	47.4-54.5	2,105
Control over use of income	81.8	78.3-84.9	1,464	71.4	68.6-74.1	3,131
Group member	73.2	66.8-78.7	1,216	68.7	64.7-72.7	3,242
Speaking in public	73.7	69.1-77.8	1,473	59.7	56.1-63.2	3,242
Workload	83.4	80.3-86.0	1,355	44.0	41.3-46.7	3,235
Leisure	82.6	77.9-86.4	1,465	69.5	66.8-72.1	3,242
Autonomy in production	65.5	60.0-70.6	1,450	65.1	60.7-69.2	2,908
Prevalence of households with moderate or severe hunger						
All households	29.4	23.8-35.1	741	20.9	18.4-23.7	3,801
Male and female adults	30.1	24.2-36.1	697	20.8	18.4-23.5	3,564
Female adult(s) only	13.5	-1.8-28.8	35	24.2	16.0-34.8	171
Male adult(s) only	--	--	9^	17.1	7.5-34.3	66
Children only no adults	--	--	--	--	--	--

Feed the Future Indicator	Baseline (2012) – 63 CRs			Interim (2015) – Full ZOI		
	Estimate	95% CI[1]	n (unweighted)	Estimate	95% CI	n (unweighted)
MDD-W: Minimum Dietary Diversity – Women						
All women age 15-49	40.4	33.1-47.8	1,661	58.0	55.0-61.0	8,056
Women's Dietary Diversity: Mean number of food groups consumed by women of reproductive age						
All women age 15-49	4.2	3.8-4.5	1,661	4.7	4.6-4.8	8,056
Prevalence of exclusive breastfeeding among children under 6 months of age						
All children	48.7	39.9-57.5	155	37.4	36.0-46.2	625
Male children	53.3	37.6-69.0	71	37.0	30.1-45.7	290
Female children	44.9	33.6-55.0	84	38.0	31.0-45.5	335
Prevalence of children 6-23 months receiving a minimum acceptable diet						
All children	9.6	6.3-14.4	423	7.0	5.8-8.5	2,047
Male children	8.8	5.2-14.5	225	9.1*	7.2-11.4	1,020
Female children	10.5	5.7-18.4	198	5.0*	3.7-6.7	1,027
Prevalence of underweight women						
All non-pregnant women age 15-49	20.7	18.0-23.4	1,530	21.7	20.2-23.4	7,133
Prevalence of stunted children under 5 years of age						
All children	23.1	19.7-26.4	1,361	25.0	23.4-26.7	6,886
Male children	25.3	21.3-29.4	684	27.1*	25.2-29.2	3,455
Female children	20.8	16.7-25.0	677	22.9*	21.0-24.8	3,431
Prevalence of wasted children under 5 years of age						
All children	9.9	8.1-11.8	1,361	7.7	6.9-8.6	6,886
Male children	10.2	7.2-13.1	684	8.9*	7.8-10.1	3,455
Female children	9.7	7.2-12.2	677	6.5*	5.5-7.6	3,431
Prevalence of underweight children under 5 years of age						
All children	16.8	14.5-19.1	1,361	16.2	14.9-17.6	6,886
Male children	19.4*	16.3-22.5	684	17.8*	16.4-19.6	3,455
Female children	14.2*	10.4-18.1	677	14.6*	13.4-16.1	3,431

Source(s): ZOI baseline survey, Senegal 2012; ZOI interim survey, Senegal 2015

n/a – Not available

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

[2] The baseline report presented censored headcounts of inadequate achievement for these empowerment indicators, while this interim report presents uncensored headcounts of adequate achievement for the interim reporting period. Censored headcounts present the percent of women who are disempowered and achieve adequacy (or inadequacy) in each indicator, while uncensored headcounts present the percent of women who achieve adequacy (or inadequacy) in each indicator regardless of empowerment status.

^ Results not statistically representative, n<25.

* Statistically significant difference between categories at the P<0.05 level.

II. Feed the Future Senegal Truncated Zone of Influence Indicator Estimates (63 CRs)

Feed the Future Indicator	Baseline (2012) – 63 CRs			Interim (2015) – 63 CRs			Baseline-Interim P-value
	Estimate	95% CI[1]	n (unweighted)	Estimate	95% CI	n (unweighted)	
Daily per capita expenditures (as a proxy for income) in USG-assisted areas (2010 USD)							
All households	2.2	2.0-2.4	706	2.3	2.1-2.4	1,815	0.608
Male and female adults	2.2	2.0-2.4	667	2.2	2.1-2.4	1,714	0.661
Female adult(s) only	--	--	28^	3.0	2.3-3.7	70	--
Male adult(s) only	--	--	11^	5.1	3.4-6.7	30	--
Children only no adults	--	--	--	--	--	--	--
Prevalence of Poverty: Percent of people living on less than $1.25 per day (2005 PPP)							
All households	34.3	29.9-38.7	706	40.5	35.8-45.3	1,815	0.117
Male and female adults	34.8	30.3-39.3	667	40.8	36.1-45.7	1,714	0.139
Female adult(s) only	--	--	28^	32.7	20.1-48.5	70	--
Male adult(s) only	--	--	11^	11.5	3.7-30.4	30	--
Children only no adults	--	--	--	--	--	--	--
Depth of Poverty: Mean percent shortfall relative to the $1.25 per day poverty line (2005 PPP)							
All households	10.7	--	706	13.3	--	1,815	--
Male and female adults	10.8	--	667	13.5	--	1,714	--
Female adult(s) only	--	--	28^	9.1	--	70	--
Male adult(s) only	--	--	11^	4.0	--	30	--
Children only no adults	--	--	--	--	--	--	--
Percent of women achieving adequacy on Women's Empowerment in Agriculture Index Indicators[2,3]							
WEAI	0.686	0.670-0.702	662	0.697	0.686-0.701	742	0.118
5DE Index	0.677	0.658-0.696	662	0.684	0.672-0.697	742	--
GPI	0.769	0.740-0.798	257	0.812	0.798-0.831	1,432	--
Input in productive decisions	73.3	69.3-77.4	1,418	43.4	39.4-47.6	1,572	--
Ownership of assets	77.8	74.7-80.5	1,477	56.7	53.3-60.1	1,600	--
Purchase, sale or transfer of assets	65.2	60.4-69.8	1,477	40.3	36.7-44.0	1,600	--
Access to and decisions on credit	28.2	23.8-33.1	1,458	55.4	50.2-60.5	1,023	--
Control over use of income	81.8	78.3-84.9	1,464	72.3	68.9-75.5	1,551	--
Group member	73.2	66.8-78.7	1,216	71.9	67.1-76.2	1,600	--
Speaking in public	73.7	69.1-77.8	1,473	59.8	54.7-64.7	1,600	--
Workload	83.4	80.3-86.0	1,355	45.1	41.3-49.0	1,597	--
Leisure	82.6	77.9-86.4	1,465	71.7	68.0-75.1	1,600	--
Autonomy in production	65.5	60.0-70.6	1,450	73.8	68.5-78.5	1,432	--
Prevalence of households with moderate or severe hunger							
All households**	29.4	24.1-35.4	741	21.9	18.6-25.6	1,827	0.022
Male and female adults**	30.1	24.5-36.4	700	21.7	18.5-25.3	1,725	0.013
Female adult(s) only	13.5	4.1-36.7	31	21.4	11.3-36.6	70	0.440
Male adult(s) only	--	--	10^	32.4	18.4-50.6	31	--
Children only no adults	--	--	--	--	--	--	--

Feed the Future Indicator	Baseline (2012) – 63 CRs			Interim (2015) – 63 CRs			Baseline-Interim P-value
	Estimate	95% CI[1]	n (unweighted)	Estimate	95% CI	n (unweighted)	
MDD-W: Minimum Dietary Diversity – Women							
All women age 15-49**	40.4	33.3-47.9	1,661	60.1	55.2-64.9	3,843	0.000
Women's Dietary Diversity: Mean number of food groups consumed by women of reproductive age							
All women age 15-49	4.2	3.8-4.5	1,661	4.8	4.6-5.0	3,843	0.000
Prevalence of exclusive breastfeeding among children under 6 months of age							
All children**	48.7	40.1-57.5	155	38.6	31.9-45.8	295	0.074
Male children	53.3	37.8-68.2	71	39.9	30.5-50.7	138	0.154
Female children	44.9	34.0-56.2	84	37.4	28.2-47.7	157	0.333
Prevalence of children 6-23 months receiving a minimum acceptable diet							
All children	9.6	6.3-14.4	423	8.2	6.3-10.7	970	0.549
Male children	8.8	5.2-14.5	225	9.9	7.2-13.5	504	0.685
Female children	10.5	5.7-18.4	198	6.4	4.3-9.3	466	0.207
Prevalence of underweight women							
All non-pregnant women age 15-49	20.7	18.0-23.4	1,530	21.7	19.8-23.7	3,420	0.552
Prevalence of stunted children under 5 years of age							
All children	23.1	19.7-26.4	1,361	25.8	23.6-28.2	3,311	0.174
Male children	25.3	21.3-29.4	684	28.4*	25.7-31.3	1,709	0.203
Female children	20.8	16.7-25.0	677	23.0*	20.4-25.8	1,602	0.379
Prevalence of wasted children under 5 years of age							
All children**	9.9	8.1-11.8	1,361	7.6	6.5-8.9	3,316	0.047
Male children	10.2	7.2-13.1	684	9.2*	7.8-10.8	1,711	0.565
Female children**	9.7	7.2-12.2	677	5.9*	4.6-7.5	1,605	0.012
Prevalence of underweight children under 5 years of age							
All children	16.8	14.5-19.1	1,361	16.7	15.0-18.6	3,318	0.941
Male children	19.4*	16.3-22.5	684	18.7*	16.6-21.1	1,713	0.721
Female children	14.2*	10.4-18.1	677	14.6*	12.6-16.7	1,605	0.881

Source(s): Baseline Survey, Senegal 2012; Interim Survey, Senegal 2015

n/a – Not available

[1] Confidence intervals (CIs) demonstrate the reliability of estimated values. While interim surveys were not designed to capture change over time, non-overlapping CIs do indicate significant differences between the two estimates. However, if CIs do overlap, the reader cannot conclude whether there is or is not a significant difference between baseline and interim estimates. For the following indicators, it cannot be concluded that there are significant differences in estimates over time: [list indicators as appropriate].

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

[3] The statistical significance test was conducted using Monte Carlo simulation for the interim and the baseline overall WEAI indicator.

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

^ Results not statistically representative, n<25.

* Statistically significant difference between household categories at the P<0.05 level.

** Statistically significant difference between the baseline and the interim estimates at the P<0.05 level

III. Feed the Future Senegal Agro-Ecological Sub-Zone Indicator Estimates (2015)

Feed the Future Indicator	South Sine Saloum (2015)			East (2015)			Casamance (2015)			North (2015)		
	Estimate	95% CI	n (unweighted)	Estimate	95% CI	n (unweighted)	Estimate	95% CI	n (unweighted)	Estimate	95% CI	n (unweighted)
Daily per capita expenditures (as a proxy for income) in USG-assisted areas (2010 USD)												
All households	2.6	2.4-2.7	1364	2.9	2.5-3.3	830	2.1	2.0-2.3	1321	3.2	2.8-3.7	260
Male and female adults	2.5	2.4-2.6	1322	2.7	2.4-3.0	734	2.1	1.9-2.3	1232	3.2	2.7-3.7	250
Female adult(s) only	3.7	2.9-4.4	34	3.4	2.9-3.9	63	2.6	1.7-3.4	66	--	--	--
Male adult(s) only	--	--	8	5.7	3.8-7.6	32	--	--	23	--	--	2^
Children only no adults	--	--	--	--	--	1	--	--	--	--	--	--
Prevalence of Poverty: Percent of people living on less than $1.25 per day (2005 PPP)												
All households	36.2	32.0-40.7	1364	37.4	29.9-45.7	830	55.0	49.1-60.9	1321	25.5	16.6-37.0	260
Male and female adults	36.5	32.2-40.9	1322	39.5	31.8-47.9	734	55.2	49.1-61.1	1232	25.6	16.4-37.6	250
Female adult(s) only	18.7	6.6-42.8	34	10.5	4.6-22.5	63	54.9	40.3-68.7	66	--	--	8^
Male adult(s) only	--	--	8^	0.4	0.0-3.5	32	--	--	23^	--	--	2^
Children only no adults	--	--	--	--	--	1^	--	--	--	--	--	--
Depth of Poverty: Mean percent shortfall relative to the $1.25 per day poverty line (2005 PPP)												
All households	9.4	--	1364	13.6	--	830	20.8	--	1321	6.8	--	260
Male and female adults	9.4	--	1322	14.2	--	734	20.9	--	1232	6.80	--	250
Female adult(s) only	5.5	--	34	5.5	--	63	20.8	--	66	--	--	8
Male adult(s) only	--	--	8	0.2	--	32	--	--	23	--	--	2
Children only no adults	--	--	--	--	--	--	--	--	--	--	--	--
Percent of women achieving adequacy on Women's Empowerment in Agriculture Index Indicators												
WEAI	0.691	0.678-0.703	596	0.616	0.600-0.637	263	0.736	0.724-0.748	528	0.666	0.633-0.698	71
5DE	0.679	0.663-0.695	596	0.605	0.576-0.634	263	0.723	0.711-0.736	528	0.648	0.612-0.683	71
GPI	0.795	0.772-0.818	353	0.735	0.681-0.764	127	0.850	0.831-0.867	193	0.835	0.797-0.874	30
Input in productive decisions	51.7	47.1-56.4	1124	27.4	22.3-33.1	659	52.7	48.6-56.8	1145	30.1	21.2-40.7	238
Ownership of assets	54.1	49.4-58.8	1142	54.1	46.3-61.8	688	54.9	50.1-59.6	1172	67.2	62.8-71.3	240
Purchase, sale or transfer of assets	39.0	34.6-43.6	1142	34.6	27.6-42.3	688	44.1	39.4-48.9	1172	42.1	31.7-53.2	240
Access to and decisions on credit	50.7	45.2-56.2	869	39.9	31.9-48.5	418	55.7	50.2-61.0	707	61.7	45.0-76.0	111
Control over use of income	72.7	68.9-76.3	1124	54.5	47.4-61.4	639	81.0	77.0-84.5	1134	68.4	60.8-75.2	234
Group member	71.8	65.8-77.1	1142	62.1	49.8-73.0	688	67.0	61.3-72.3	1172	76.7	63.0-86.4	240

Feed the Future Indicator	South Sine Saloum (2015)			East (2015)			Casamance (2015)			North (2015)		
	Estimate	95% CI	n (unweighted)	Estimate	95% CI	n (unweighted)	Estimate	95% CI	n (unweighted)	Estimate	95% CI	n (unweighted)
Speaking in public	54.0	49.5-58.5	1142	40.8	33.2-48.9	688	78.3	75.0-81.4	1172	59.9	48.4-70.4	240
Workload	47.3	43.1-51.6	1139	36.4	30.9-42.3	685	49.9	45.5-54.3	1170	29.6	25.2-34.39	241
Leisure	64.1	59.5-68.5	1142	80.2	73.7-85.4	688	70.1	66.1-73.8	1172	64.9	57.2-71.9	240
Autonomy in production	74.9	69.0-80.1	1043	49.1	37.5-60.7	628	57.1	50.5-63.4	1037	90.1	81.7-94.9	200
Prevalence of households with moderate or severe hunger												
All households	13.9	11.1-17.3	1373	27.6	20.7-35.9	837	24.9	20.0-30.5	1332	19.4	14.0-26.4	260
Male and female adults	14.0	11.2-17.4	34	28.9	22.4-36.5	741	24.5	19.7-29.9	1243	19.4	13.8-26.7	250
Female adult(s) only	--	--	9	27.0	12.9-48.1	63	32.3	18.7-49.7	66	--	--	8
Male adult(s) only	--	--	1	9.1	2.4-28.9	32	26.6	12.1-48.8	23	--	--	2
Children only no adults	--	--	--	--	--	--	--	--	--	--	--	--
MDD-W: Minimum Dietary Diversity – Women												
All women age 15-49	61.6	56.4-66.5	2981	57.5	51.0-63.8	1970	51.2	46.2-56.1	2594	67.1	55.0-77.2	511
Women's Dietary Diversity: Mean number of food groups consumed by women of reproductive age												
All women age 15-49	4.8 (1.4)	4.7-5.0	2981	4.7 (1.6)	4.4-4.9	1970	4.5 (1.5)	4.3-4.6	2594	5.0 (1.3)	4.6-5.4	511
Prevalence of exclusive breastfeeding among children under 6 months of age												
All children	29.3	21.7-35.7	265	48.1	38.4-57.9	135	41.7	32.6-51.4	187	43.8	25.7-63.8	38
Male children	29.1	20.1-40.0	122	47.6	35.9-59.7	64	45.3	28.4-63.2	87	35.6	11.4-70.6	17
Female children	30.0	19.7-41.8	143	50.3	32.7-67.8	71	38.1	29.9-47.2	100	50.2	23.9-76.4	21
Prevalence of children 6-23 months receiving a minimum acceptable diet												
All children	9.0	7.1-11.8	785	6.0	3.7-10.8	472	5.3	3.6-7.8	675	5.3	1.8-14.2	115
Male children	12.5	9.1-17.1	387	7.3	4.6-12.5	226	6.9	4.2-11.0	349	4.8	1.0-23.5	58
Female children	6.0	3.0-9.1	398	4.7	3.2-9.8	246	3.9	2.0-6.7	326	5.8	1.7-17.9	57
Prevalence of underweight women												
All non-pregnant women age 15-49	22.5	20.6-24.5	2631	22.7	18.8-27.2	1754	20.5	18.1-23.0	2270	19.7	13.7-27.4	478
Prevalence of stunted children under 5 years of age												
All children	26.1	23.6-28.7	2677	23.4	20.4-26.7	1540	26.2	23.2-29.6	2249	18.5	13.7-24.5	395
Male children	28.2*	25.2-31.4	1335	25.4*	21.6-29.5	780	28.7*	25.2-32.6	1137	18.8	12.2-27.8	192
Female children	24.0*	21.1-27.1	1342	21.2*	17.9-25.0	760	23.6*	19.8-27.9	1112	18.1	12.6-25.3	203
Prevalence of wasted children under 5 years of age												
All children	8.1	6.8-9.6	2681	9.0	7.2-11.4	1545	6.0	4.9-7.4	2258	8.1	4.5-14.2	396
Male children	9.6*	7.6-11.6	1336	10.0	7.7-12.8	783	6.9	5.5-8.7	1141	10.9	7.0-16.7	192
Female children	6.9*	5.4-8.7	1345	8.0	7.2-11.4	762	5.1	3.6-7.2	1117	5.4	2.0-13.4	204

Feed the Future Indicator	South Sine Saloum (2015)			East (2015)			Casamance (2015)			North (2015)		
	Estimate	95% CI	n (unweighted)	Estimate		Estimate	95% CI	n (unweighted)	Estimate		Estimate	95% CI
Prevalence of underweight children under 5 years of age												
All children	17.2	15.2-19.6	2681	16.4	13.5-19.8	1545	15.7	13.9-17.7	2260	11.6	7.1-18.3	396
Male children	18.8	16.1-21.9	1336	17.2	13.6-21.5	783	17.7*	15.2-20.5	1142	13.9	9.2-20.3	192
Female children	15.7	13.5-18.1	1345	15.4	12.2-19.4	762	13.6*	11.4-16.2	1118	9.4	4.6-18.5	204

Source(s): ZOI baseline survey, Senegal 2012; ZOI interim survey, Senegal 2015

n/a – Not available

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

[2] The baseline report presented censored headcounts of inadequate achievement for these empowerment indicators, while this interim report presents uncensored headcounts of adequate achievement for the interim reporting period. Censored headcounts present the percent of women who are disempowered and achieve adequacy (or inadequacy) in each indicator, while uncensored headcounts present the percent of women who achieve adequacy (or inadequacy) in each indicator regardless of empowerment status.

^ Results not statistically representative, n<25.

* Statistically significant difference between categories at the P<0.05 level.

1. Background

This section provides background information on Feed the Future in Senegal 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

Senegal is one of the 19 USAID Feed the Future focus countries. As the U.S. Government's global hunger and food security initiative, Feed the Future aims to reduce the prevalence of poverty and the prevalence of stunted children on average by 20 percent in its partner countries. Over the past five years, USAID Senegal has been implementing economic growth and nutrition activities through the Feed the Future Multi-Year Strategy (MYS), reflecting a whole-of-U.S. government (USG) response to food security, poverty, and nutrition challenges. The overarching goal of the Feed the Future initiative in Senegal is to: *sustainably reduce poverty and hunger, to improve equitable growth in the agricultural sector, and to improve the nutritional status of the Senegalese people.*

Feed the Future's strategy is based on the development hypothesis that poverty and hunger can be sustainably reduced by transforming the national agriculture sector and nutritional status of the population, especially women and children, through focused and scaled investment priorities. The Feed the Future Results Framework (RF) provides an overview of the Mission's entire Economic Growth (EG) strategy, demonstrating how Feed the Future intends to reach its objectives and how non-agriculture specific efforts are complementary to achieving USAID Senegal's larger development objective of increased, inclusive economic growth.

USAID Senegal aims to achieve this goal through four inter-related objectives: (1) inclusive agriculture sector growth; (2) increased trade; (3) improved nutritional status, especially of women and children; and (4) improved management of natural resources. The RF for the Senegal Feed the Future strategy can be found in Appendix 3.

The Feed the Future Senegal MYS[1], approved in February 2011, was designed to guide implementation of a value chain approach to increased economic opportunities and focused development interventions on cereal staples (rice, maize, and millet), nutrition-led agriculture (NLA), and sustainable management of natural resources (forestry and fisheries). The Feed the Future Senegal portfolio included the following projects: Economic Growth Project (PCE), Agricultural Development Program in Senegal (Yaajeende), Collaborative Management for Sustainable Fisheries Future in Senegal (COMFISH), Education and Research in Agriculture (ERA) Program, the Peace Corps Agriculture Participating Agency Program Agreement (PAPA), and Agriculture and Natural Resource Management Project (Wulaa Naafa).

The Senegal Feed the Future program was significantly reinforced in 2014 and early 2015 with the launching of Naatal Mbay, a PCE follow-on value-chain development project, and the

[1] The USAID/Senegal Feed the Future strategy can be found here: http://www.feedthefuture.gov/sites/default/files/resource/files/SenegalFeedtheFutureMultiYearStrategy.pdf

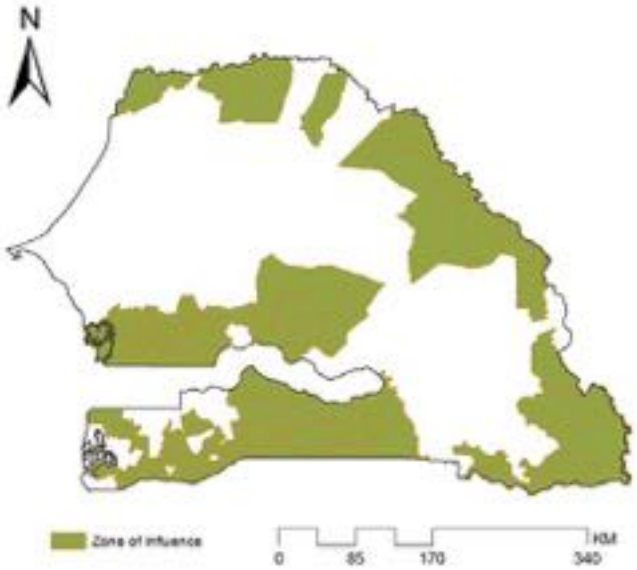
extension of Yaajeende, the primary nutrition project. USAID Senegal also launched a new agricultural policy program with the combined objectives of reinforcing the capacity of key ministries, increasing productivity of selected value chains, and promoting private sector investments in agriculture.

1.2 Feed the Future ZOI Profile

The ZOI is the geographic area where Feed the Future programs are expected to have an impact on poverty and nutrition. Initially in the MYS, the ZOI in Senegal was defined in very general terms as nine administrative regions, including the five poorest in the country. As the implementation of the program progressed, the geographical focus of interventions became clearer and the ZOI was redefined.

The ZOI in Senegal is currently defined as 150 *communautés rurales* (CRs) in the following 10 regions: Fatick, Kaffrine, Kaolack, Kedougou, Kolda, Matam, Saint-Louise, Sedhou, Tambacounda, and Ziguinchor. The current ZOI excludes two regions that were in the baseline frame (Diourbel and Louga) and also includes some departments and CRs that were not included in the baseline ZOI. A comparison of the baseline sample frame and current ZOI indicates that 87 communes (58 percent) of the baseline dataset are also in the current ZOI, although because of some of the baseline data was lost, the usable baseline dataset includes 63 CRs. A list of the communes in the current ZOI is provided in Appendix 4 and a list of the communes in the baseline is provided in Appendix 5. All CRs in the current ZOI, and therefore the sample frame, are in rural areas.

Figure 1.1: Map of Senegal: Feed the Future ZOI[2]



[2] The Map of Senegal: Feed the Future ZOI may not reflect the most updated ZOI.

1.2.1 Rationale for ZOI Selection

USAID Senegal identified two geographic areas that simultaneously promise the highest agricultural potential and have high rates of undernutrition and poverty: the Senegal River Valley (SRV) and the Southern Forest Zone (SFZ).[3] These two areas are vital to Senegal's agriculture and prosperity and comprise the majority of the Feed the Future ZOI.[4] Major crops in ZOI areas are millet, maize, and rice. Rice dominates SRV agricultural production, while maize is relatively more important in the SFZ, with millet produced throughout the country.

Senegal is also divided into 7 agro-ecological sub-zones, based on biophysical and socioeconomic criteria. The ZOI comprises the following four sub-zones: Eastern Senegal, Casamance, Northern Senegal, and South Sine Saloum. These agro-ecological zones are extensive areas with unique potential and vulnerability to ecological and climatic hazards. Eastern Senegal is Senegal's cotton-producing zone covering the districts of Kedougou, Tamba, Velingara and Kolda, and is subjected to rampant rural poverty due in part to heavy population pressure on natural resources. This zone is characterized by shallow soils with increased vulnerability to wind and surface water erosion. Casamance is characterized by lowland soil acidification, water erosion, loss of forest diversity, and acute mangrove degradation. With regard to food crises, the lower and upper Casamance regions are subjected to the highest food insecurity rates in Senegal. Northern Senegal, which overlaps with the Senegal River Valley and districts of Dagana, Podor, Matam, and Bakel, is characterized by sandy uplands. Rainfed farming is almost nonexistent in this area, and most output is derived from irrigation farming due to poor and irregular rainfall. South Sine Saloum is home to many people, and has been subjected to recurrent droughts. Weather conditions in this area have worsened ecosystem degradation and depletion of land resources.[5]

USAID's food security focus deliberately aligns with the Government of Senegal's (GOS) emphasis on strengthening agriculture's role as a driver of national economic growth; however, two additional factors shape USAID's specific Feed the Future implementation choices in Senegal. The Mission's ZOI rationale recognizes that the USG's comparative advantage in expertise and experience at this time does not lie in tackling specific contemporary challenges in the peanut or livestock sectors, although these are value chains of continuing importance to the GOS.[6] Other factors shaping the Mission's food security focus are its track record as a large and consistent

[3] USAID. (2011): 6.

[4] Ibid. The Feed the Future ZOI includes coastal and western areas where the Mission does not necessarily expect to achieve measurable population level change through the current strategy. Other efforts relevant for CRs outside the SRV and SFZ are, for instance, seed technology and research lab activities.

[5] http://siteresources.worldbank.org/EXTSOCIALDEVELOPMENT/Resources/244362-1232059926563/5747581-1239131985528/5999762-1242914244952/Senegal_Report_Final_EN.pdf

[6] Ibid: 8.

donor in community level healthcare and prevention interventions and its strong reputation with the GOS as a research and technology partner.[7]

Mission determined the Feed the Future ZOI boundaries by CRs based on a thorough review.[8] Discussions took into account existing projects, anticipated project extensions or new awards, and reasonable expectations of achieving measurable results in targeted CRs given program objectives, beneficiaries, and predicted resources.

1.2.2 Demography of the ZOI

Tables 1.1 and 1.2 below present individual and household population estimates, for the ZOI in 2013, when the last census was conducted in Senegal[9]. Estimates of the sub-population categories used in the Feed the Future indicators and disaggregates (e.g., children age 6-23 months) are also presented. The ZOI estimates for the total population of individuals as well as households are also disaggregated by gendered household type.

The total population of 150 CRs has been taken from census of Senegal's National Statistical Agency, Agence Nationale de la Statistique et de la Démographie (ANSD). Sub-populations in each category have been estimated using proportional distribution of the surveyed households.

Table 1.1. Population of individuals by category in the ZOI, Senegal 2013

Category of individuals	Estimated population
Total population	**2,755,340**
Total population, by sub-population	**2,358,571**
Women of reproductive age (15-49 years)	599,838
Children 0-59 months	482,460
Children 0-5 months	45,463
Children 6-23 months	136,389
Children 6-59 months	436,997
Youth 15-29 years	657,424
Total population, by area type	**2,755,340**
Urban	--
Rural	2,755,340
Total population, by gendered household type	**2,755,340**
Male and female adult(s)	2,676,262
Female adult(s) only	67,506
Male adult(s) only	11,297
Child(ren) only (no adults)	275

[7] Ibid: 6, 9.

[8] *Communautés rurales* are administrative districts comprised of several villages. Senegal's internal administrative levels from largest to smallest are: *région*, *département*, *arrondissement*, *communauté rurale*.

[9] The last census undertaken in Senegal was conducted in 2013.

Women of reproductive age, by pregnancy status	**599,838**
Pregnant	41,689
Non-pregnant	558,149
Children 0-59 months, by child sex	**482,460**
Male	241,602
Female	240,858
Children 0-5 months, by child sex	**45,463**
Male	22,767
Female	22,697
Children 6-23 months, by child sex	**136,389**
Male	68,040
Female	68,349
Children 6-59 months, by child sex	**436,997**
Male	218,835
Female	218,162
Youth 15-29 years, by sex	**657,424**
Male	301,725
Female	355,699

Source: National Statistics Office data (ANSD) 2013

Table 1.2. Number of households by category in the ZOI, Senegal 2013

Category of households	Estimated population
Total number of households in ZOI	**207,288**
Number of households, by gendered household type[10]	
Male and female adult(s)	194,315
Female adult(s) only	9,321
Male adult(s) only	3,597
Child(ren) only, (no adults)	55

Source: National Statistics Office data (ANSD), 2013

1.2.3 Agriculture in the ZOI

Senegal is a net importer of food and second to Côte d'Ivoire in Africa in rice imports. The north and west of Senegal, including the SRV, lie in the Sahel, a semi-arid region of Africa bordering the Sahara Desert and prone to desertification. The climate of the southern half of the country is less arid although deforestation through human impacts on the environment is a concern. The most important cash crop in Senegal has historically been peanuts, primarily exported for processing although peanuts are also eaten locally and processed into peanut oil for domestic use. Discussion of the political economy background, implications of the Mouride peanut basin, Wolof/French relations, and the implications for other areas and ethnic groups across the country are beyond

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the scope of this report, but these issues are important to understand in the context of assessing barriers and opportunities for developing greater geographic and crop diversity in the country's agricultural sector.[11] Currently, cash cropping of peanuts and cotton dominates the agricultural sector.

Crops grown in the SFZ include peanuts, millet, maize, sorghum, and rice, along with sweet potatoes, beans, and fruit. While perhaps better suited for farming than the Sahelian zone, the SFZ is affected by deforestation. Agricultural development and production in the southernmost part of Senegal has also been challenged since the country's independence due to political unrest and intermittent violence.

Farming in the northern SRV has historically been shaped by seasonal Senegal River floods and recession of the flood waters. Rainfed recession and irrigated agriculture using many different approaches are now practiced throughout the SRV at small, medium, and large scales. Food crops include millet, beans, rice, and various fruits and vegetables. Nearly all of the irrigated rice (also known as paddy rice) produced in Senegal is grown in the SRV.[12]

Agriculture in the delta and coastal regions of Senegal includes farming and fishing. Artisanal fishing in Senegal generates a significant amount of the population's intake of animal protein and employs thousands of Senegalese in various river deltas along the coast and other riparian zones.

While agriculture is vital to Senegal's development and economic future, this sector faces challenges from the national policy environment and is susceptible to global economic shocks. Recent GOS strategic planning, along with investments and cooperation strategies of bilateral and multilateral donors, have renewed the national commitment to prioritize development of Senegal's assets in ways intended to multiply the population's capacity to produce and contribute to strong and sustainable economic ventures in this sector. Feed the Future aligns with these nationally identified priorities.

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.

[11] See, for example, Cruise O'Brien 1971, Villalón 2006, and Golub and Hansen-Lewis 2012.
[12] Hinshaw. (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

Indicator	Baseline		Interim	
	Data source	Date collected	Data source	Date collected
Daily per capita expenditures (as a proxy for income) in USG-assisted areas	Feed the Future FEEDBACK PBS	Dec 2012-Jan 2013	ZOI Survey	Dec 2015 – Jan 2016
Prevalence of Poverty: Percent of people living on less than $1.25 per day	Feed the Future FEEDBACK PBS	Dec 2012-Jan 2013	ZOI Survey	Dec 2015 – Jan 2016
Depth of Poverty: Mean percent shortfall relative to the $1.25 per day poverty line	Feed the Future FEEDBACK PBS	Dec 2012-Jan 2013	ZOI Survey	Dec 2015 – Jan 2016
Women's Empowerment in Agriculture Index indicators	Feed the Future FEEDBACK PBS	Dec 2012-Jan 2013	ZOI Survey	Dec 2015 – Jan 2016
Prevalence of households with moderate or severe hunger	Feed the Future FEEDBACK PBS	Dec 2012-Jan 2013	ZOI Survey	Dec 2015 – Jan 2016
Women's Dietary Diversity: Mean number of food groups consumed by women of reproductive age	Feed the Future FEEDBACK PBS	Dec 2012-Jan 2013	ZOI Survey	Dec 2015 – Jan 2016
Prevalence of exclusive breastfeeding among children under 6 months of age	Feed the Future FEEDBACK PBS	Dec 2012-Jan 2013	ZOI Survey	Dec 2015 – Jan 2016
Prevalence of children 6-23 months receiving a minimum acceptable diet	Feed the Future FEEDBACK PBS	Dec 2012-Jan 2013	ZOI Survey	Dec 2015 – Jan 2016
Prevalence of underweight women	Feed the Future FEEDBACK PBS	Dec 2012-Jan 2013	ZOI Survey	Dec 2015 – Jan 2016
Prevalence of stunted children under 5 years of age	Feed the Future FEEDBACK PBS	Dec 2012-Jan 2013	ZOI Survey	Dec 2015 – Jan 2016

Indicator	Baseline		Interim	
	Data source	Date collected	Data source	Date collected
Prevalence of wasted children under 5 years of age	Feed the Future FEEDBACK PBS	Dec 2012-Jan 2013	ZOI Survey	Dec 2015 – Jan 2016
Prevalence of underweight children under 5 years of age	Feed the Future FEEDBACK PBS	Dec 2012-Jan 2013	ZOI Survey	Dec 2015 – Jan 2016

2.1.1 Primary Data: The ZOI Interim Survey in Senegal

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 area of interest for the interim PBS is the 150 non-contiguous CRs of the ZOI across ten regions. The sample design strategy employed a two-stage cluster sampling method to select a sample of 3,830 households in order to reach a target of 3,192 households, accounting for nonresponse. Similar to the baseline, no stratification was used at either level of sampling. In total, 3,801 households completed surveys.

Sample Size Calculation

Since the purpose of the interim assessment is to provide estimates of the population-based indicators with an acceptable level of statistical accuracy, the sample size was calculated to obtain point estimates of indicator values rather than to detect statistically significant changes in indicator values over time. However, due to changes in the ZOI and challenges in executing the baseline, USAID Senegal requested that a larger sample be drawn in this assessment to improve the precision of interim estimates and increase our ability to detect statistically significant changes over time.

Following the Feed the Future Volume 8 Guidance Report, poverty, child underweight, child stunting, and daily per capita expenditures were the four indicators used to determine sample size for the interim survey. However, due to incomplete baseline data, the final baseline values of these four indicators and the actual design effect observed were not available to calculate the sample size. The survey team instead used preliminary baseline values. Per Feed the Future Guidance, a design effect of 2 was assumed, given the absence of a direct measure from similarly designed surveys in the same area; significance level was set to 0.05 and power was set to 0.80.

Using the above parameters, the sample size was calculated so that the targeted change between baseline and interim for each of these four indicators could be detected (See Appendix 2.1 for sample size formulas). Note that since the daily per capita expenditures indicator is a continuous variable rather than a proportion, the standard deviation of the distribution was needed. Due to the incomplete baseline data, the sample size calculation for this indicator could not be conducted.

The largest of the sample sizes from the other three indicators, in this case prevalence of underweight children, was therefore used as the overall minimum required PBS sample size. Table 2.2 shows that a sample size of 3,192 was needed to detect the targeted changes.

Table 2.2. Sample size calculations based on four primary indicators [13]

Indicator	Baseline Value	Target % Change from Baseline	Target Endline Value	Sample Size Needed	Effective Sample Size
Prevalence of stunted children (under five years)	0.25	-20%	0.20	2,262	2,715
Prevalence of underweight children (under five years)	0.19	-20%	0.15	3,192	3,830
Prevalence of Poverty (less than $1.25/day)	0.34	-20%	0.28	1,470	1,470
Daily per capita expenditures (proxy for income)	2.23	29%	2.88	---	---

In order to collect the required sample, more households were visited to account for households having no children under the age of five (for the application of the child anthropometric module). To compensate for households without children under five, the survey team followed guidance from FANTA-3/FHI-360[14], which recommends inflating the sample by 1.2 to account for the probability of encountering a household with at least one child under five, given the average number of children per household. The approach also includes a deflation factor to account for households with more than one child under five. Thus, the effective sample size was inflated to 3,830 households to ensure that at least 3,192 households would complete surveys. Households were randomly selected from within each DR during the second sampling stage until the inflated sample size was reached (see selection of primary and secondary sampling units below). In total, 3,801 surveys were completed.

The data collection team used the following definitions for completed and partially completed questionnaires to reach the target sample size. Partially completed questionnaires that met the criteria below for at least one household member were included in the final sample.

1) Completed questionnaire: all modules have been completed with respective respondents.

2) Partially completed questionnaire: i) Completion of HH roster (module C); ii) completion of household characteristics (module D); iii) completion women's dietary diversity and anthropometry module for at least one woman (module H); and iv) completion of children's dietary diversity and anthropometry module for at least one child of 0-5 years old (module I).

[13] Note that the missing values could not be calculated without the baseline data. The consultant report, which was the source for the baseline values, does not report standard deviations.

[14] http://www.fantaproject.org/sites/default/files/resources/Sampling-1999-Addendum-2012-ENG_0.pdf

Data required for weighting of survey data were collected throughout the sampling process as well. Detailed information on the formula used for sample weighting is presented in Appendix 2.1.

Selection of Primary Sampling Units

The first stage clusters, or primary sampling unit (PSU), are the census enumeration units, or Districts de Recensement (DRs). The DRs were revised during the 2013 census by ANSD and each has an average population of 100 households[15] spread over two to three villages and hamlets within the same DR.

The PSU frame was made of the DRs exactly overlapping the ZOI (with no overlapping boundaries). This gives exactly 3,301 DRs overlapping exactly 150 CRs. To reach the size of the necessary household sample to be surveyed, 192 DRs were selected based on probability proportional to size (PPS) sampling in 150 CRs. Thus, each CR contained a different number of DRs. Households within each selected DR were selected randomly in the second stage.

Selection of Secondary Sampling Units

In the second stage, twenty households were randomly selected with equal probability within each DR. The sample frame for these secondary sampling units (SSU) is the list of households within each DR (ANSD 2013 census). DRs are made up of villages and hamlets which include concessions (groups of households). For each selected household, ANSD provided the DR identification, the name of concession's chief, and the name of the selected household's head. The concessions were geo-referenced in the DR's map provided by ANSD.

Questionnaire Design

The Senegal interim PBS questionnaire was developed following the template provided in the Feed the Future M&E Interim Guidance Series Volume 11a. The questions and responses are aligned with the DHS and LSMS.

The questionnaire was translated into French, and carefully adapted to the Senegalese context. The questionnaire and informed consent form were translated into four local languages by professional translators in-country. The final survey instrument, in French and in each local language, was programmed into an electronic format using Surveybe Designer software. Once sufficiently tested and corrected for errors, the programmed survey instrument was uploaded onto the tablets for training and surveying.

Below is a summary of each of the nine modules in the survey questionnaire.

Household Identification (Module A). This module helps the enumerators and supervisors to record the identification of the household. This module ensures that a unique identification number is assigned to each contacted household.

[15] It is assumed that, on average, all DRs will have increased or decreased in population at the same rate (i.e. any differences in population growth between the DRs will be random and negligible).

Informed Consent (Module B). This module verifies that respondents have been fully informed of the purpose of the survey and any potential risks to participation. This means that respondents understand their options and can make a decision about whether or not to participate.

Household Roster and Demographics (Module C). This module lists all household members, along with their sex and age, and the duration of stay of any visitors. Data on educational attainment and current enrollment in school of each member, literacy, and relationship of each member to the household head was collected. The module identifies primary decision-makers (both male and female) in the household. In addition, the number of women between 15 and 49 years of age and children 0 to 59 months are identified.

Dwelling Characteristics (Module D). This module includes questions and observations regarding dwelling characteristics including roof and floor materials, exterior wall materials, and information about sleeping rooms, toilet facilities, sources of drinking water, availability of electricity, and sources of cooking fuel.

Household Consumption (Module E). This module gathers information on household food and non-food items. Questions cover household food consumption over the past seven days, types of food items, their quantity, price, source, and who consumed each food item. The non-food expenditure questions focus on non-food items and basic services used over the past week (such as charcoal, kerosene, candles, newspaper, and public transport) including unit prices for the listed items. Questions on non-food expenditures on basic household items over the past three months and 12 months are also included, along with expenditures on durable goods.

Household Hunger Scale (Module F): In this module, households are asked whether they have experienced lack of resources to obtain food and the frequency of such incidents in the past month.

Women's Empowerment in Agriculture Index (Module G): This module was answered by the household's primary female decision-maker (18 years or older) and primary male decision-maker (18 years or older). Questions are asked to measure women's empowerment and inclusion of women in the agriculture sector.

Women's Anthropometry and Dietary Diversity (Module H): This module collects information from every woman between the ages of 15 and 49 years in the household on anthropometry and dietary practice. Weight and height of each consenting woman in this age group was measured to estimate their nutritional status. The women's dietary diversity section focuses on capturing the 12 primary food groups consumed by women of reproductive age.

Child Anthropometry and Infant and Young Child Feeding (Module I): Anthropometric data was collected from all children within the eligible age range (0-59 months)**.** Data collection included:

- **Sex of the child.**
- **Age:** Recorded in reference to a local calendar of events and immunization card.

- **Weight:** Children were weighed to the nearest 100 grams with a digital scale. All scales were checked daily by using a standard weight of 5 kg. Boys were measured undressed. Girls were undressed and redressed with a standard dress before measuring the weight. If the caretaker refused to have the child weighed by this process, the child's own clothes were used to adjust the scale to zero. The child was then redressed to be weighed. Children under 24 months were measured lying down while children 24 months or older were measured standing up.
- **Height:** Children were measured on a measuring board (precision of 0.1 cm). Children less than 85 cm were measured lying down, while those greater than or equal to 85 cm were measured standing up.
- **Bilateral Edema:** Bilateral edema was assessed by the application of moderate thumb pressure for at least three seconds on both feet (upper side). Only children with bilateral edema were recorded as having nutritional edema.

Infant and Young Child Feeding (IYCF) indicators were collected for children under two years of age. The mother or the caretaker were asked whether the child had breastfed or not the previous day. Consumption of other food such as milk, medicines and vitamins, oral rehydration solution (ORS), plain water, and infant formula was also asked.

Fieldwork

All indicators in the Feed the Future survey are likely to vary seasonally. The prevalence of poverty, a major indicator for the Feed the Future funding, is based on household expenditures. As a result, it is very important that the timing of the first interim assessment data collection coincide with the timing of the baseline expenditure data collection. The baseline data were collected from December 2012 to January 2013. Data collection for the first interim assessment took place from December 2015 to January 2016.

The survey team implemented a competitive procurement and selected Centre de Recherche pour le Développement Humain (CRDH) to implement the survey.

Sixty-eight enumerators were divided among 17 teams. Each team comprised of six individuals: one supervisor, one anthropometry expert, and four enumerators. Given the gender-sensitive nature of certain modules of the questionnaire, female enumerators were used to interview female respondents, so each team had at least one female enumerator.

For all survey modules, excluding the anthropometric measurement sections, enumerators asked household members for information and entered responses directly onto the tablets using the electronic questionnaire and Surveybe software. To collect anthropometric measurements, the anthropometry expert on each team took measurements of women and children, and the supervisor recorded these values onto the enumerators' tablets to ensure accuracy and precision in measurement and data entry.

Limitations of the Survey

There are several limitations that must be considered when interpreting the findings of this study. Overall, due to the tight timeline of the survey, questionnaire preparation time was limited. Because the Feed the Future English questionnaire template needed to be translated into French, there was insufficient time for back translations to be conducted. As a result, a few minor errors occurred during translation. First, in the dietary diversity section of the survey, the group "nuts, seeds, and legumes" were grouped together as a single category, rather than separated into two separate categories: "nuts and seeds" and "legumes". Therefore, there are 9 groups in the denominator of this indicator rather than 10, as indicated by the definition, and the indicator may overestimate the achievement of a minimum level of dietary diversity. To facilitate comparison, the baseline data reanalysis conducted using the truncated ZOI (63 CRs) estimates this indicator using the same 9 food groups in the denominator. Similarly, for the calculation of women's dietary diversity (WDDS), "organ meat" was inadvertently included in the "all flesh food" category. Therefore, WDDS is measured using 8 food groups. Since this indicator measures a mean, however, the error should not impact the estimate.

Due to re-zoning of the ZOI prior to the interim survey and data loss during the baseline, only 63 CRs from the baseline zone overlap with the 150 CRs of the interim zone. As such, all comparisons between baseline and interim are limited to the 63 overlapping CRs. The sampling strategy used for the interim survey was the same as at the baseline, using household lists and maps obtained from the ANSD. However, unlike the baseline survey, budget constraints prevented the interim survey team from conducting a mapping exercise of the DRs. In most cases, the maps provide by ANSD provided accurate locations of households.[16]

Another constraint was the large geographic scope of the survey, which was spread across ten regions of Senegal. It was at times challenging to ensure that collected data from all locations be promptly uploaded to the survey team's cloud-based server for regular data monitoring. CAPI experts, who were deployed to provide technical support to enumerators, greatly facilitated this process. While some areas originally targeted for surveying in Casamance were inapproachable due to the presence of rebels, the removal of these areas from the sampling frame did not affect the total sample size, as they were very small.[17]

It is important to note the long survey length. At the beginning of surveying, it took enumerators an entire day to complete one household. Enumerators often waited for long amounts of time to find each of the necessary respondents, such as both male and female primary decisionmakers for the WEAI indicator. In many instances, interviewers returned later in the day or the next day to find these individuals. As a result, the effects of survey fatigue on overall data quality must be

[16] 98 households could not be located from the ANSD maps and marked as missing. The sampling weight was adjusted accordingly.

[17] Casamance area covered two DRs and therefore 40 households were removed from the sampling frame. The sampling weight was adjusted accordingly.

considered. In addition, due to a glitch in the electronic survey, data on meal frequency was incompletely collected. Meal frequency was therefore imputed using best predictors from the baseline survey data, with the primary assumption being that meal frequency is unlikely to have changed between the baseline and interim period.

Finally, the interim PBS ZOI survey was conducted from December 2015 to January 2016. This is a time of the year that the population in Senegal generally experiences more rather than less food security. While household hunger is best measured during the lean season when households are the least food secure, the timing of the interim survey corresponds with the baseline data collection. Therefore, nutrition indicators are comparable between the surveys.

ZOI Interim Survey Response Rates

Table 2.3 presents the response rates for the ZOI interim survey for Senegal. The components and the response rates for the sampled households, women of reproductive age (15-49), primary adult female decisionmakers (for the WEAI module), and children under 5 years are presented.

Table 2.3. Results of the household and individual interviews for the ZOI interim survey in Senegal 2015

Response rates and components	Total
Households	
Households selected	3,901
Households occupied	3,803
Households interviewed	3,801
Household response rate[1]	100.0%
Women of reproductive age (15-49 years)	
Number of eligible women	9,679
Number of eligible women interviewed	8,056
Eligible women response rate[2]	83.2%
Primary adult female decisionmakers (age 18+ years)	
Number of eligible women	3,737
Number of eligible women interviewed	3,253
Primary adult female response rate[2]	87.7%
Children under 5 years of age	
Number of eligible children	7,784
Number of caregivers of eligible children interviewed	6,954
Eligible children response rate[2]	89.3%

[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. 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, Senegal 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 can be prompted to provide the most accurate age possible. Children's age in months is presented by monthly age groups as appropriate for the children's dietary intake and anthropometry tables. For example, 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 five categories: no education (households where no member has received any formal education); primary or less (households with at least one member who has entered the formal schooling system, but with no member who has completed primary, and households with at least one member whose highest educational attainment is completed primary, but with no member who has completed secondary); medium (households with at least one member whose highest educational attainment is completed middle school, but with no member who has completed secondary); secondary or more (households with at least one member whose highest educational attainment is completed secondary education or more), and religious school (households with at least one member whose highest educational attainment is Koranic school). It is important to note that in rural Senegal, education is broadly divided into two categories: regular education and religious (Koranic) school, which falls outside of the standard schooling system.

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 five categories: no education (households where no member has received any formal education); primary or less (households with at least one member who has entered the formal schooling system, but with no member who has completed primary, and households with at least one member whose highest educational attainment is completed primary, but with no member who has completed secondary); medium (households with at least one member whose highest educational attainment is completed middle school, but with no member who has completed secondary); secondary or more (households with at least one member whose highest educational attainment is completed secondary education or more), and religious school (households with at least one member whose highest educational attainment is Koranic school).

Gendered Household Type

Feed the Future Monitoring and Evaluation Guidance Series Volume 6: *Measuring the Gender Impact of Feed the Future* notes that household-level indicators should be disaggregated by *gendered household types* – that is: (1) households where members include both male and female adults[18]; (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* approach, which is embedded with presumptions about household gender dynamics and may

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

perpetuate existing social inequalities and prioritization of household responsibilities that may be detrimental to women (USAID 2014:1).[19]

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 member 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.

[19] United States Agency for International Development (USAID). (2014). Feed the Future M&E Guidance Series. Volume 6: Measuring the Gender Impact of Feed the Future 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<25); 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. Student t-tests, Fisher's exact tests, and chi-square tests were conducted as appropriate for statistical significance.

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 mean household size of the 3,801 households in the ZOI is 11.4 members, which varies significantly by gendered household type. On average, there is an average of 11.9 people in adult male and female households, 6.3 in female only households, and 2.8 in male only households. The average number of household members who are adult and female is about 3. The average number of children under two and four years of age is 0.7 and 1.6, respectively, and the average number of children between 5 and 17 years of age is nearly 4. The number of children in each category is slightly lower in female only households and much lower in male only households.

For Senegal, considering that a large rural population attends religious school, the overall education has broadly been divided into two categories: regular education and religious school. Among the regular education categories, a fifth of the households do not have any education, 31 percent have primary or less than primary level of education, 28 percent have a medium level education[20], and 19 percent have a secondary or higher level of education. Forty-four percent of the households reported to attending religious (Koranic) school. There were no significant differences in educational level by gendered household type.

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]	11.4	11.9	6.3	2.8	2.0
Mean number of adult female household members[1,2]	2.7	2.8	2.1	--	--
Mean number of children (<2 years)[a1]	0.7	0.8	0.4	0.1	--
Mean number of children (0-4 years)[1]	1.6	1.7	0.9	0.1	--

[20] This category is referred to as "some secondary education" in the baseline report.

Characteristic	Total (All households)	By gendered household type[a]			
		Male and female adult	Female adult(s) only	Male adult(s) only	Child only
Mean number of children (5-17 years)[a1]	3.8	3.9	2.6	0.4	--
Mean percentage of adults who are female[1,2]	--	--	--	--	--
Highest education level attained (percentage of households)					
No education	21.3	20.6	25.0	40.7	--
Primary or less	31.4	31.7	29.4	22.5	--
Medium	28.2	28.2	31.0	20.8	--
Secondary or more	19.2	19.5	14.5	15.9	--
Religious school	44.0	43.0	0.6	0.3	--
n[3]					

[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, Senegal 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.

According to Table 3.2, the largest percentage of primary adult decisionmakers, 25.9 percent, are between the ages of 40 and 49, followed by 22.2 percent between the ages of 30 and 39 and 21.8 percent between the ages of 50 and 59. When the data are disaggregated by gender, it becomes evident that male decisionmakers are older, on average, than female decisionmakers. Approximately 25 percent of primary male decisionmakers are between the ages of 50 and 59 and 25 percent are age 60 or above, compared to only approximately 19 and 9 percent of primary female decisionmakers, respectively. Regarding literacy, only 13.3 percent of primary female decisionmakers responded that they can read and write, compared to 40 percent of primary male decisionmakers.

Furthermore, a majority of primary decisionmakers indicated that they are not educated (62.9 percent), including over 74 percent of primary female decisionmakers. The next largest group of respondents indicated that they have attended religious school, totaling 19 percent. Only 2.5

percent of primary decisionmakers have at least a secondary education, including less than one percent of primary female decisionmakers.

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

Characteristic	Total (All primary adult decisionmakers)		By primary adult decisionmaker sex			
			Male		Female	
	Percent	n	Percent	n	Percent	n
Age						
18-24	4.7	319	1.7	55	7.6	264
25-29	8.5	582	3.9	128	13.0	454
30-39	22.2	1516	18.8	625	25.5	891
40-49	25.9	1773	26.4	877	25.7	896
50-59	21.8	1490	24.8	823	19.1	667
60+	16.6	1134	24.5	815	9.1	319
Literacy						
Percent literate[1]	26.4	1737	40.0	1288	13.3	449
Educational attainment						
No education	62.9	4292	51.1	1691	74.1	2601
Primary or less	12.1	826	14.1	466	10.3	360
Middle	3.5	237	4.6	153	2.4	84
Secondary or more	2.5	168	4.2	140	0.8	28
Religious school	19.0	1296	26.0	861	12.4	435

Source: ZOI interim survey, Senegal 2015.

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

3.2 Living Conditions

Table 3.3 shows information on the 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 percentages of households that have access to an improved water source, improved sanitation, electricity, and solid cooking fuel. It also shows the average number of people per sleeping room, as well as roof, exterior wall, and floor materials. Values are shown for all households.

Table 3.3 reveals that 55.5 percent of households have access to an improved water source and that approximately 30 percent have improved sanitation. Almost all surveyed households are using solid fuel for cooking and only a fifth of the households have access to electricity. Fifty-three percent of the households have finished roof and 45 percent have a natural roof. Half of the households surveyed have natural walls, 36 percent have finished exterior walls, and 14 percent have rudimentary walls. A little over half of the households (58 percent) have floors constructed of natural materials and 41 percent of households have finished floors.

Table 3.3. Household dwelling characteristics

Characteristic	Total (All households)	
	Estimate	n
Percent with improved water source[1]	55.5	2,035
Percent with improved sanitation[2]	30.3	1,079
Mean persons per sleeping room[3]	2.7	3,800
Percent using solid fuel for cooking[4]	97.5	3,671
Percent with access to electricity	20.4	770
Household roof materials (%)[5]		
Natural	45.0	1,690
Rudimentary	1.9	68
Finished	53.2	2,044
Household exterior wall materials (%)[6]		
Natural	49.7	1,888
Rudimentary	13.8	679
Finished	36.5	1,236
Household floor materials (%)[7]		
Natural	58.1	2,242
Rudimentary	1.1	41
Finished	40.8	1,520

Source: ZOI interim survey, Senegal 2015.

[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, thatch/palm leaf,* and *sod.* Rudimentary roof includes *rustic mat, palm/bamboo, wood planks,* and *cardboard.* Finished roofs include *metal, wood, calamine/cement fiber, ceramic tiles, cement,* and *roofing shingles.* The *other* category is removed from percentages.

[6] Natural walls include *no walls, cane/palm/trunks,* and *dirt.* Rudimentary walls include *bamboo with mud, stone with mud, uncovered adobe, plywood, cardboard, reused wood,* and *metal sheeting.* Finished walls include *cement, stone with lime/cement, bricks, cement blocks, covered adobe,* and *wood planks/shingles.* The *other* category is removed from percentages.

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

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 household members under age 25 who are currently attending school. It also presents the percent of household members over age 9 who have completed a primary level of education, by age and gender, 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 Senegal, primary education is designated for children age 7 to 12, and divides six years of study into three cycles of two years that culminate in the completion of the Certificate of Elementary Completion and an entrance test into the next level of education. The curriculum places an emphasis on French grammar and reading, math and science, and geography.

Table 3.4 presents that among household members under age 25, the age category with the highest percentage of members attending school is 10-14 years (71.3 percent), followed by 5-9 years (55.5 percent), and 15-19 years (44.5 percent). This percentage drops significantly after age 19, as only 20.5 percent of members in the 20-24 age group are currently attending school. The association between age groups and school attendance is significant. Similar patterns are observed when the results are disaggregated by gender.

Among those reported to have some education, 77.5 percent have at least a primary level of education in the 10-14 years age group. Attainment of a primary level of education decreases with age. When disaggregated by gender, female attainment of primary level education is much lower than for males among older age groups (over 19 years of age). In the 20-24 year age group, half of the female respondents have attained at least a primary level of education compared to 65 percent of males in the same age group.

Literacy rates were estimated among those who never attended school. They were found to be less than one percent in each category when disaggregated by age group.

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[a b]							
5-9	55.5	n/a[1]	0.17	1.0	n/a[1]	n/a[1]	8,141
10-14	71.3	77.5	0.22	1.0	1.0	--	6,263
15-19	44.5	71.0	0.19	0.7	0.9	--	4,749
20-24	20.5	56.9	0.18	0.5	0.8	--	3,079
25-29	n/a[2]	43.4	0.19	n/a[2]	0.6	--	2,781
30-34	n/a[2]	43.4	0.2	n/a[2]	0.6	--	2,236

Characteristic	Percent			Female to male ratio			
	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]	n
35-54	n/a[2]	36.5	0.8	n/a[2]	0.5	--	6,173
55+	n/a[2]	25.4	0.33	n/a[2]	0.4	--	3,290
Sex							
Female							
Age group[@]							
5-9	56.5	n/a[1]	--	n/a[3]	n/a[3]	n/a[3]	4,126
10-14	73.1	79.1	--	n/a[3]	n/a[3]	n/a[3]	3,171
15-19	37.4	66.9	--	n/a[3]	n/a[3]	n/a[3]	2,394
20-24	14.3	49.5	--	n/a[3]	n/a[3]	n/a[3]	1,693
25-29	n/a[2]	34.5	--	n/a[3]	n/a[3]	n/a[3]	1,653
30-34	n/a[2]	34.2	--	n/a[3]	n/a[3]	n/a[3]	1,258
35-54	n/a[2]	24.6	--	n/a[3]	n/a[3]	n/a[3]	3,451
55+	n/a[2]	13.6	--	n/a[3]	n/a[3]	n/a[3]	1,714
Male							
Age group[@]							
5-9	54.6	n/a[1]	--	n/a[3]	n/a[3]	n/a[3]	4,015
10-14	70.0	75.8	--	n/a[3]	n/a[3]	n/a[3]	3,092
15-19	51.6	75.2	--	n/a[3]	n/a[3]	n/a[3]	2,355
20-24	28.1	65.9	--	n/a[3]	n/a[3]	n/a[3]	1,386
25-29	n/a[2]	56.3	--	n/a[3]	n/a[3]	n/a[3]	1,128
30-34	n/a[2]	54.7	--	n/a[3]	n/a[3]	n/a[3]	978
35-54	n/a[2]	51.4	--	n/a[3]	n/a[3]	n/a[3]	2,722
55+	n/a[2]	38.2	--	n/a[3]	n/a[3]	n/a[3]	1,576

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] Note whether the survey in the country was administered during 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.

[@] Literacy as defined by both reading and writing and totals at 2.23 percent among those who have not received any education. Thus, this variable was too low to be further disaggregated into gender and age group.

Source: ZOI interim survey, Senegal 2015.

4. Household Economic Status

This section includes a background discussion of monetary poverty in Senegal, including the logic of the Living Standard Measurement Survey (LSMS)[21] 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.[22]

Monetary poverty in Senegal has declined during the past decade, but poverty prevalence remains high. According to ANSD estimates produced from the ESPS-II,[23] the prevalence of poverty among households for all rural areas in 2011 was 57 percent. The national statistical agency followed a cost-of-basic-needs approach to estimate poverty lines separately for Dakar, other urban areas, and rural areas. This approach entailed the estimation of the cost associated with a basket of staple food items necessary to provide an adult with 2400 kilocalories per day. This food poverty threshold was used to create a total poverty threshold by calculating the average non-food expenditures of households whose food expenditures were 5 percent above or below the food poverty threshold. For further description of national poverty estimates consult the ESPS-II documentation.[24]

As with other indicators, the Feed the Future poverty estimates are derived from interim data collected by the Senegal PBS. Specially, the Household Roster and Household Expenditure modules are used to calculate prevalence of poverty and per capita expenditures in the ZOI. Refer to Annex A2.2 for further description of these calculations.

[21] 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.
[22] Deaton, A. 2008. The Analysis of Household Surveys: A microeconomic approach to development policy. Baltimore: The Johns Hopkins University Press.
[23] ANSD. (2013).
[24] ANSD. (2013).

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.

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. The table shows that the mean daily per capita expenditures for surveyed households is 2.56 USD, with the 10th percentile spending 0.87 USD and the 90th percentile spending 4.77 USD. This amount is much higher in households with male adults only, at 5.60 USD, and the 90th percentile spending at 10.89 USD. Per capita expenditures decrease significantly as households increase in size, with small households spending 4.09 USD per day, medium households spending 2.64 USD per day, and large households with 11 or more members spending 2.01 USD per day.

Mean daily per capita expenditures do not vary significantly by household educational attainment level. For instance, mean expenditures for households achieving a middle level of education are 2.40 USD, while they are 2.53 USD among households achieving a primary or lower level of education. They are highest among households that have received an education of secondary level or more, at 2.91 USD.

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

Characteristic	Estimate (weighted)						
		Percentile					
	Mean[a]	10th	25th	50th	75th	90th	n[2]
Total (All households)	**2.56**	**.87**	**1.32**	**1.99**	**3.07**	**4.77**	**3,775**
Gendered household type							
Male and female adults	2.45	0.87	1.29	1.96	2.94	4.57	3,538
Female adult(s) only	3.19	0.92	1.51	2.71	3.97	5.86	171
Male adult(s) only	5.60	1.75	2.55	4.47	7.42	10.89	65
Child(ren) only (no adults)	--	--	--	--	--	--	--
Household size							
Small (1-5 members)	4.09	1.14	1.97	3.01	4.86	8.24	502
Medium (6-10 members)	2.64	.95	1.40	2.12	3.21	4.79	1,480
Large (11+ members)	2.01	.80	1.16	1.68	2.46	3.58	1,793

Characteristic	Estimate (weighted)						
	Mean[a]	Percentile					n[2]
		10th	25th	50th	75th	90th	
Household educational attainment							
No education	2.46	0.92	1.41	2.00	2.80	4.47	721
Primary or less	2.53	0.83	1.29	1.95	2.96	4.61	1,211
Middle	2.40	0.86	1.25	1.87	2.92	4.69	1,105
Secondary or more	2.91	0.91	1.39	2.19	3.57	5.32	714
Religious school	2.56	0.99	1.39	2.02	2.99	4.65	1,440

[1] Per capita expenditures measured in [local currency] local currency units (LCU) were 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 = 298.25, 2015 CPI LCU = 104.73, 2005 CPI LCU = 100, 2010 USD CPI =111.65, and 2005 USD CPI = 100. The conversion factor was 0.0036.

[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.

[a] Source: ZOI interim survey, Senegal, 2015

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.[25] 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[26] 2005 USD 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.[27] The $1.25 threshold is in effect the extreme poverty threshold and represents the poverty line typical of the world's poorest countries.[28] Poverty estimates may also be presented for an individual country's own poverty and extreme poverty thresholds.

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

[25] 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.

[26] 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.

[27] 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.

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

non-poor counted as having a gap of zero. The measure is expressed as a proportion of the 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[29]. 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

Thirty-nine percent of individuals in the ZOI live below the $1.25 poverty threshold. Forty-five percent of large households with 11 or more members live below the poverty threshold, compared to only 16 percent of small households with one to five members. Prevalence of poverty remains relatively consistent by household educational attainment level.

Depth of Poverty

The depth of poverty in the ZOI is 13.9 percent, which indicates that the average gap between consumption levels of the population and the poverty line is $0.17 (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 2.76 million[30], a poverty threshold of $1.25 per day, and a poverty gap of 13.9 percent, $479,550 (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 67 percent of the poverty line, or 33 percent below the poverty line. The average value of consumption of a *poor* person is $0.84 (2005 PPP) per day, with an average consumption shortfall of $0.41. Average consumption shortfall of the poor is higher among female adult only households ($0.45) than male and female adult households ($0.41).

[29] Appendix Table 1.2 presents poverty estimates at the new $1.90 per day (2011 PPP) threshold.
[30] 2013 census data.

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

Characteristic	Prevalence of Poverty[2]		Depth of Poverty[3]		Average consumption shortfall of the poor[4]		
	Percent population	n[5]	Percent of poverty line	n[5]	In USD 2005 PPP	Percent of poverty line	n[5]
Total (All households)	**39.2**	**3,775**	**13.9**	**3,775**	**0.41**	**67.0**	**1,395**
Gendered household type							
Male and female adults	39.3	3,538	14.1	3538	0.41	67.0	1339
Female adult(s) only	32.0	171	10.7	171	0.45	63.7	47
Male adult(s) only	10.0	65	3.3	65	^	^	^
Household size							
Small (1-5 members)	16.3	502	6.9	502	0.41	67.4	102
Medium (6-10 members)	23.0	1,480	10.3	1480	0.40	67.8	460
Large (11+ members)	45.2	1,793	15.8	1793	0.42	67.0	833
Household educational attainment							
No education	38.2	721	12.7	721	0.39	68.5	248
Primary or less	38.6	1,211	14.5	1211	0.43	65.7	449
Middle	40.6	1,105	14.9	1105	0.41	67.1	453
Secondary or more	39.5	714	12.7	714	0.41	67.5	241
Religious school	39.2	1,440	10.6	1440	0.35	71.8	462

^ Results not statistically reliable, n<30.

[1] The Feed the Future poverty indicators are based on the poverty threshold of $1.25 2005 PPP per person per day. To calculate prevalence of poverty, depth of poverty, and average consumption shortfall of the poor, the following conversion was used to adjust for PPP 2005 and 2015 inflation: $1.25 (poverty threshold) multiplied by 289.68 (Senegal PPP 2005) multiplied by 104.6/88.4 (the ratio of 2015 CPI, 2010=100 over 2005 CPI, 2010=100).

[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] 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.

Source: Feed the Future PBS Interim ZOI Survey, Senegal, 2015.

4.2.2 The National Poverty Threshold

Table 4.3 presents poverty estimates at the national poverty threshold for Senegal. Similar to the $1.25 per day poverty 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.

The national poverty threshold for Senegal is $2.22 (2005 PPP per person per day), and is based on national poverty lines for rural areas published by the government of Senegal in 2014. The

threshold was calculated for a typical household with 2 parents and 6 children, using data from the 2011 ESPS2. At this threshold, according to Table 4.3, Senegal has a prevalence of poverty of 77.4 percent, with a depth of poverty of 35.4 percent below the poverty line, and an average consumption shortfall among the poor of $1.01 USD (2005 PPP).

Poverty Prevalence

Seventy-seven percent of individuals in the ZOI live below the $2.22 poverty threshold, which is significantly higher than the number of individuals living below the $1.25 poverty threshold (39.2 percent). Eighty-three percent of large households with 11 or more members live below the national poverty threshold, compared to only 48 percent of small households with one to five members. Similarly to the $1.25 poverty threshold, prevalence of poverty remains relatively consistent by household educational attainment level. Significantly more female adult only households fall below the poverty line than male adult only households, at 62 percent and 38 percent of households, respectively.

Depth of Poverty

The depth of poverty in the ZOI is 13.9 percent, which indicates that the average gap between consumption levels of the population and the poverty line is $0.17 (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 2.76 million[31], a poverty threshold of $2.22 per day, and a poverty gap of 35.4 percent, $2,169,029 (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 55 percent of the national poverty line, or 45 percent below the poverty line, which is significantly lower than the amount of the population living below the $1.25 poverty line. The average value of consumption of a *poor* person is $1.21 (2005 PPP) per day, with an average consumption shortfall of $1.01. Similarly, to the $1.25 poverty threshold, the average value of consumption of a poor person is significantly lower among large households ($1.18) than small households ($1.36), and little variation is seen by educational attainment.

[31] 2013 census data.

Table 4.3. Poverty at the national threshold of $2.22 (2005 PPP)[1]

Characteristic	Prevalence of Poverty[2]		Depth of Poverty[3]		Average consumption shortfall of the poor[4]		
	Percent population	n[5]	Percent of poverty line	n[5]	In USD 2005 PPP	Percent of poverty line	n[5]
Total (All households)	**77.4**	**3,775**	**35.4**	**3,775**	**1.01**	**54.7**	**2714**
Gendered household type							
Male and female adults	78.1	3,538	35.7	3,538	1.01	54.6	2597
Female adult(s) only	62.1	171	28.5	171	0.99	55.2	96
Male adult(s) only[6]	37.8	65	13.1	65	--	--	21^
Household size							
Small (1-5 members)	48.0	502	19.0	502	0.86	61.1	230
Medium (6-10 members)	69.3	1,480	29.5	1,480	0.92	58.3	1015
Large (11+ members)	83.0	1,793	38.9	1,793	1.04	53.2	1469
Household educational attainment							
No education	81.0	721	35.0	721	0.97	56.4	531
Primary or less	78.1	1,211	35.6	1,211	1.02	54.2	872
Middle	78.4	1,105	37.3	1,105	1.04	53.3	825
Secondary or more	72.7	714	32.9	714	0.98	55.9	477
Religious school	78.5	1,440	32.7	1,440	0.93	58.1	1,440

[1] The national poverty threshold of $2.22 2005 PPP per person per day are based on national poverty lines for rural areas as published by the government of Senegal in 2014. The threshold was calculated for a typical household with two parents and 6-children using data from the 2011 Enquête de Suivi de la Pauvreté au Sénégal (ESPS2). To calculate prevalence of poverty, depth of poverty, and average consumption shortfall of the poor, the following conversion was used to adjust for PPP 2005 and 2015 inflation: $2.22 (poverty threshold) multiplied by 289.68 (Senegal PPP 2005) multiplied by 104.6/88.4 (the ratio of 2015 CPI, 2010=100 over 2005 CPI, 2010=100).

[2] The prevalence of poverty is the percentage of individuals living below the national poverty line. Poverty prevalence is sometimes referred to as the poverty incidence or poverty headcount ratio.

[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] 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] Note that the sample size for child only households was too small to include (n<30).

Source: Feed the Future PBS Interim ZOI Survey, Senegal, 2015.

4.2.3 The National Extreme Poverty Threshold

Table 4.4 presents poverty estimates at the $1.38 extreme poverty threshold for Senegal. Similar to prior expenditures and poverty tables, this table presents poverty estimates for all households in the ZOI, as well as disaggregated by household characteristics, including gendered household type, household size, and household educational attainment.

Poverty Prevalence

Forty-nine percent of individuals in the ZOI live below the $1.38 extreme poverty threshold, which is higher than the percentage living below the standard extreme poverty threshold of $1.25 and lower than the percentage living below the national poverty threshold. Fifty-five percent of large households with 11 or more members live below the poverty threshold, compared to only 20 percent of small households with one to five members. Prevalence of poverty is highest among households with a middle level of educational attainment (55.1 percent) and lowest among households with a secondary or higher level of education (44.0 percent).

Depth of Poverty

The depth of poverty in the ZOI is 16.9 percent, which indicates that the average gap between consumption levels of the population and the extreme poverty line is $0.23 (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 2.76 million[32], an extreme poverty threshold of $1.38 per day, and a poverty gap of 16.9 percent, $643,687 (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 66 percent of the poverty line, or 34 percent below the poverty line – just slightly higher than the percentage living below the $1.25 poverty line. The average value of consumption of a *poor* person is $0.91 (2005 PPP) per day, with an average consumption shortfall of $0.47. Average consumption shortfall of the poor is higher among female adult only households ($0.49) than male and female adult households ($0.47). The highest consumption shortfall is seen among households with a primary or lower level of education ($0.48) among educational attainment disaggregates.

Table 4.4. Poverty at the national extreme threshold of $1.38 (2005 PPP)[1]

Characteristic	Prevalence of Poverty[2]		Depth of Poverty[3]		Average consumption shortfall of the poor[4]		
	Percent population	n[5]	Percent of poverty line	n[5]	In USD 2005 PPP	Percent of poverty line	n[5]
Total (All households)	**48.8**	**3,775**	**16.9**	**3,775**	**0.47**	**65.9**	**1644**
Gendered household type							
Male and female adults	49.5	3,538	17.1	3,538	0.47	65.9	1579

[32] 2013 census data.

Characteristic	Prevalence of Poverty[2]		Depth of Poverty[3]		Average consumption shortfall of the poor[4]		
	Percent population	n[5]	Percent of poverty line	n[5]	In USD 2005 PPP	Percent of poverty line	n[5]
Female adult(s) only	32.6	171	12.7	171	0.49	64.6	55
Male adult(s) only	10.0	65	4.2	65	^	^	10^
Household size							
Small (1-5 members)	20.0	502	8.3	502	0.49	64.3	112
Medium (6-10 members)	38.9	1,480	12.7	1,480	0.45	67.6	565
Large (11+ members)	55.1	1,793	19.1	1,793	0.48	65.5	967
Household educational attainment							
No education	48.0	721	15.8	721	0.45	67.1	294
Primary or less	50.0	1,211	17.5	1,211	0.48	65.0	538
Middle	51.8	1,105	18.1	1,105	0.47	66.1	529
Secondary or more	44.0	714	15.4	714	0.47	65.8	278
Religious school	47.8	1,440	13.6	1,440	0.40	70.8	567

[1] The national poverty threshold of $1.38 2005 PPP per person per day are based on extreme (or food) poverty lines for rural areas as published by the government of Senegal in 2014. The threshold was calculated for a typical household with two parents and 6-children using data from the 2011 Enquête de Suivi de la Pauvreté au Sénégal (ESPS2). To calculate prevalence of poverty, depth of poverty, and average consumption shortfall of the poor, the following conversion was used to adjust for PPP 2005 and 2015 inflation: $1.38 (poverty threshold) multiplied by 289.68 (Senegal PPP 2005) multiplied by 104.6/88.4 (the ratio of 2015 CPI, 2010=100 over 2005 CPI, 2010=100).

[2] The poverty prevalence is the percentage of individuals living below the national extreme poverty line. Poverty prevalence is sometimes referred to as the poverty incidence or poverty headcount ratio.

[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] 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.

Source: Feed the Future PBS Interim ZOI Survey, Senegal, 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.[33] For more information, the WEAI questionnaires and manual can be found online.[34]

5.1 Overview

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

The index is composed of two sub-indices: the Five Domains of Empowerment sub-index (5DE), which measures the empowerment of women in the five empowerment domains, and the Gender Parity Index (GPI), which measures the relative empowerment of men and women within the household. The WEAI questionnaire is 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.[35] The WEAI score is computed as a weighted sum of the ZOI-level 5DE and the GPI.

The data collected during the 2015 interim survey allow calculation of the 10 individual empowerment indicators for primary adult female and male decisionmakers (referred to hereafter as *surveyed women* and *surveyed men*), enabling Feed the Future to assess change to the individual indicators or constraints that are affecting women's empowerment in countries' ZOIs. This section presents findings on these 10 empowerment indicators.

[33] Alkire, S. Malapit, H., et al. (2013).
[34] IFPRI. (2013). http://feedthefuture.gov/lp/womens-empowerment-agriculture-index
[35] 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.

Table 5.1 presents the overall WEAI, and its sub-indexes, the 5DE and GPI, for the Senegal full ZOI and the truncated dataset of 63 CRs. To facilitate the interpretation of the disempowered headcount, the average inadequacy score, the positive counterpart of these numbers, the empowered headcount, the average adequacy score, and are presented for women and men. The percentage of women with no gender parity, the percentage of women with gender parity, and the average empowerment gap are reported for women.

Overall WEAI

In general, Senegal's ZOI shows a low level of women's empowerment in agriculture. The overall WEAI for the full ZOI is 0.692. It is a weighted average of the 5DE sub-index value of 0.679 and the GPI sub-index value of 0. 807. The WEAI for the truncated dataset shows similar results with the overall WEAI value of 0.697, the 5DE sub-index value of 0.684, and the GPI sub-index value of 0.814. From the value of 0.686 from the baseline, there is no noticeable improvement in the overall WEAI indicator for Senegal within the 63 CRs. When compared to other countries, Senegal's overall WEAI value is similar to Liberia's overall WEAI (0.69) in 2012 and slightly lower than Ghana's overall WEAI (0.716) in 2012.

Five Empowerment Domains (5DE)

There is a large gap between men and women's empowerment in the five domains of agriculture. The 5DE is 0.679 for women and 0.890 for men. The 5DE for Senegal also shows that only 26.19 percent of women are empowered compared to 68.77 percent of men who are empowered. In other words, 73.81 percent of women are disempowered in the ZOI, which is more than 40 percentage points higher than that of men. Out of the 73.81 percent of women who are not yet empowered, women, on average, have inadequate achievements in 43.47 percent of domains.

Gender Parity Index (GPI)

Women within the ZOI experience low gender parity. The GPI for Senegal ZOI is 0.807 and 0.814 for the truncated dataset of 63 CRs. The GPI also shows that only 32.89 percent of women within the ZOI have gender parity with the primary male in their households. Of the 67.11 percent of women who are without gender parity, the empowerment gap between them and the males in their households is large at 28.7 percent. While still low, the GPI shows a slight improvement from the baseline survey (0.769).

Table 5.1. ***Women's Empowerment in Agriculture Index***

Indexes	Women	Men
WEAI	**0.692**	**--**
Five Domains of Empowerment Index (5DE)	**0.679**	**0.890**
Disempowered Headcount	73.81%	31.23%
Empowered Headcount	26.19%	68.77%

Indexes	Women	Men
Average Inadequacy Score	43.47%	35.27%
Average Adequacy Score	56.53%	64.73%
Disempowerment Index	0.320	0.110
No. of observations used	1458	1330
Total observations	3736	3736
% of data used	39.03%	35.60%
Gender Parity Index (GPI)	**0.807**	--
Percentage without gender parity	67.11%	--
Percentage with gender parity	32.89%	--
Average Empowerment Gap	0.287	--
No. of observations used	1694	--
Total observations	3736	--
% of data used	45.34%	--

Table 5.2 presents the five empowerment domains, their definitions under the WEAI, the corresponding 10 indicators, and the percentage of women who achieve adequacy in the 10 indicators assessed in the ZOI interim survey. The percentages presented in Table 5.2 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).[36] The criteria for determining adequacy in each domain are provided in Appendix A2.3.

According to Table 5.2, surveyed women have the highest level of achievement in the income domain, as 71.4 percent reported that they have sole or joint control over income and expenditures. This is followed by the leisure indicator under the time domain, under which 69.5 percent of surveyed women reported that they are satisfied with their available time for leisure activities. On the other hand, surveyed women have the lowest level of achievement in the resources domain, with only 40.0 percent reporting that they have ownership, access to, and decision-making power over the purchase, sale, or transfer of productive resources such as land, livestock, agricultural equipment, consumer durables, and credit. Similarly, only 44 percent reported that they sufficiently allocate time to productive and domestic tasks.

Table 5.2. Achievement of adequacy on Women's Empowerment in Agriculture Index indicators

Domain	Definition of domain	Indicators	Percent with adequate achievement	n
Production	Sole or joint decisionmaking over food and cash crop farming,	Input in productive decisions	45.1	1428

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

Domain	Definition of domain	Indicators	Percent with adequate achievement	n
	livestock, and fisheries, and autonomy in agricultural production	Autonomy in production	65.1	1893
Resources	Ownership, access to, and decisionmaking power over productive resources such as land, livestock, agricultural equipment, consumer durables, and credit	Ownership of assets	55.6	1803
		Purchase, sale or transfer of assets	40.0	1297
		Access to and decisions on credit	51.0	1074
Income	Sole or joint control over income and expenditures	Control over use of income	71.4	2236
Leadership	Membership in economic or social groups and comfort in speaking in public	Group member	68.7	2227
		Speaking in public	59.7	1935
Time	Allocation of time to productive and domestic tasks and satisfaction with the available time for leisure activities	Workload	44.0	1423
		Leisure	69.5	2253

Source: ZOI interim survey. Senegal 2015.

5.2 Agricultural Production

Table 5.3 presents economic activities (including agricultural activities) among surveyed women. This table presents the percentage of surveyed women who are involved in agricultural activities (food crop farming, cash crop farming, livestock raising, or fishing), non-farm economic activities, and wage or salaried employment. This table also presents the percentage of women who have input into the decisions made regarding a specific activity, among women who participate in the activity. Women who do not participate in the activity were excluded from these estimates.

According to Table 5.3, 70.5 percent of surveyed women participate in food crop farming and 44.0 percent participate in livestock raising. However, only 2.3 percent participate in fishing or fishpond culture, and only 30.4 percent participate in non-farm economic activities. Overall, surveyed women's input into decisions about productive activities is relatively consistent across activities, averaging at 63.4 percent. Surveyed women have the greatest input into decisions about non-farm economic activities, at 79.1 percent, and the least input into decisions about fishing or fishpond culture, at 56.2 percent. Overall, input is consistent between decision-making on production and use of income among surveyed women.

Table 5.3. 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)	**84.5**	**3242**	**73.3**	**2753**
Type of activity				
Food crop farming	70.5	2286	60.3	1401
Cash crop farming	35.8	1161	61.0	692
Livestock raising	44.0	1426	56.8	793
Fishing or fishpond culture	2.3	75	56.2	42
Non-farm economic activities	30.4	986	79.1	744
Wage or salaried employment	0.8	242	66.1	160

[1] *Having input* means that a woman reported having input into most or all decisions regarding the activity. These percentages are calculated *among women who participate in the activity* only. Women who do not participate in the activity are excluded.
[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, Senegal 2015.

Table 5.4 shows the percentage of surveyed women who have input into the decisions made regarding the use of income derived from an activity. According to Table 5.4, surveyed women have the greatest input in decision-making on use of income from non-farm economic activities, at 79.2 percent, followed by wage or salaried employment, at 69.5 percent. Surveyed women have the least input in decision-making on use of income from livestock raising, at 55.9 percent.

Table 5.4. 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)	**72.9**	**2,005**
Type of activity		
Food crop farming	59.4	1374
Cash crop farming	60.0	680
Livestock raising	55.9	779
Fishing or fishpond culture	60.6	45
Non-farm economic activities	79.2	745
Wage or salaried employment	69.5	168

^ Results not statistically reliable, n<30.
[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. Senegal 2015.

In addition to the decisionmaking of women on broad agricultural and economic activities, the WEAI module collects information on the extent to which women can contribute to specific

agricultural and economic activities. **Table 5.5** presents the percent distribution of surveyed women's perceived ability to contribute to decisions regarding various activities.

According to Table 5.5, surveyed women feel that they can make their own decisions on minor household expenditures to a particularly high extent, at 44.3 percent, followed by on their own wage or salary employment, at 39.5 percent. On the other hand, surveyed women appear less able to make decisions with regard to getting inputs for agricultural production, with 32.0 percent reporting that they cannot make decisions at all and just over one quarter of respondents indicating that they can make decisions on this indicator to a small extent.

Tables 5.3, 5.4, and 5.5 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.

Table 5.5. Decisionmaking on production among surveyed women

	Extent to which respondents feel they can make their own decisions (percent)[1,2]				
Activity	Not at all	Small extent	Medium extent	High extent	n
Getting inputs for agricultural production	32.0	25.4	13.5	29.0	3242
The types of crops to grow	30.2	26.2	13.8	29.8	3242
Whether to take crops to the market	30.3	24.2	15.2	30.3	3242
Livestock raising	28.5	24.3	16.0	31.2	3242
Her own wage or salary employment	33.6	22.6	13.3	39.5	3242
Major household expenditures	29.5	25.5	16.0	29.0	3242
Minor household expenditures	14.4	21.7	19.6	44.3	3242

^ Results not statistically reliable, n<30.

[1] Estimates exclude households who have no primary adult female decisionmaker or whose data are missing or incomplete. Women who do not participate in an activity, or who report that no decision was made, are excluded from these percentages.

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

Source: ZOI interim survey. Senegal 2015.

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 5.6** presents households' ownership of productive resources, as reported by surveyed women. Table 5.6 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.

According to Table 5.6, 82.9 percent of households own agricultural land and 81.9 percent of households own a cell phone. In addition, over half of households own large livestock, small livestock, chickens, ducks, turkeys, and pigeons, non-mechanized farm equipment, or small consumer durables. Only 2.3 percent of households own fish pond or fishing equipment, 4.4 percent own non-agricultural land, and just over 6 percent own nonfarm business equipment. Women commonly report making decisions on the purchase and sale of chickens, ducks, turkeys, and pigeons, at about 52 percent of surveyed women for both. Only approximately 9 percent of surveyed women indicated that they can decide to purchase or sell mechanized farm equipment and only 15 percent indicated that they can decide to purchase or sell large livestock.

Table 5.6. 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	82.9	2688	21.6	582	22.7	616
Large livestock	57.9	1877	15.3	284	15.0	279
Small livestock	64.9	2104	41.2	857	41.5	869
Chickens, ducks, turkeys, and pigeons	63.5	2059	52.0	1075	51.9	1081
Fish pond or fishing equipment	2.3	75	21.5^	20^	23.0^	21^
Non-mechanized farm equipment	65.3	2117	19.3	405	20.3	427
Mechanized farm equipment	13.7	444	8.7	41	9.5	45
Nonfarm business equipment	6.2	201	n/a		n/a	
House or other structures	28.9	937	n/a		n/a	
Large consumer durables	15.3	496	n/a		n/a	
Small consumer durables	63.9	2072	n/a		n/a	
Cell phone	81.9	2655	n/a		n/a	

Type of resource	Someone in the household owns item		Woman can decide to purchase items		Woman can decide to sell/give/rent owned items	
	Percent	n[1]	Percent	n[1]	Percent	n[1]
Non-agricultural land	4.4	142.6	n/a		n/a	
Means of transportation	29.2	947	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. Senegal 2015.

Table 5.7 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.

Table 5.7 indicates that 45.0 percent of surveyed women report receiving loans, with the greatest percentage coming from friends or relatives (23.6 percent) and the lowest percentage coming from non-governmental organizations (3.3 percent). Most of these loans are cash (36.4 percent), compared to only 8.6 percent in-kind. While 73.7 percent of surveyed women report contributing to a credit decision, this percentage is highest when the loan source is friends or relatives (35.7 percent) and is lowest when the loan source is a non-governmental organization (4.8 percent). Decision-making is similar with regard to borrowing or using a loan, with relatively consistent percentages between the two. Women have the greatest ability to make decisions around loans from friends or relatives and group-based micro-finance.

Table 5.7. Credit access among surveyed women

Estimate	Any source (percent)	Credit source (percent)[1]				
		Non-governmental organization	Informal lender	Formal lender	Friends or relatives	Group-based micro-finance
Total receiving a loan (All surveyed women)	**45.0**	**3.3**	**8.9**	**8.0**	**23.6**	**15.8**
Type of loan						
In-kind and cash loan (3)	3.0	0.1	0.8	0.2	1.9	0.1
In-kind loan (2)	8.6	0.6	3.7	0.7	3.8	0.9
Cash loan (1)	36.4	2.6	4.3	7.1	17.9	14.8

Estimate	Any source (percent)	Credit source (percent)[1]				
		Non-governmental organization	Informal lender	Formal lender	Friends or relatives	Group-based micro-finance
n[2]	1450	106	287	258	760	509
Total contributing to a credit decision (All surveyed women)	**73.7**	**4.8**	**11.8**	**10.8**	**35.7**	**29.9**
Type of decisions						
On whether to borrow	72.8	4.7	11.2	10.8	35.0	29.7
On how to use loan	72.7	4.3	11.3	10.2	35.2	29.2
n[2]	**1086**	**71**	**174**	**159**	**526**	**441**

^ Results not statistically reliable, n<30.
[1] Percentages sum to more than 100 or more than total receiving a loan 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, Senegal 2015.

5.4 Leadership in the Community

The *Leadership* domain measures an individual's influence and involvement with community organizations and issues impacting her community. The first indicator of the domain is an individual's ease 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, 59.7 percent of surveyed women in the ZOI achieves adequacy in voicing her opinions on community matters (Table 5.8).

Table 5.8. Comfort with speaking in public among surveyed women

Topics for public discussion	Percent	n[1]
	Comfortable speaking in public about selected topics	
Total (All surveyed women)	**59.7**	**1935**
Topics		
To help decide on infrastructure to be built in the community	58.3	1890
To ensure proper payment of wages for public works or other similar programs	55.6	1803
To protest the misbehavior of authorities or elected officials	54.3	1760

^ Results not statistically reliable, n<30.

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

Source: ZOI interim survey, Senegal 2015.

The second indicator of the *Leadership* domain is an individual's participation in a community organization. **Table 5.9** shows the percentage of surveyed women who are active members of various organizations in their communities.

Table 5.9 shows that 68.7 percent of surveyed women are involved in any community group. Of this group, they are mostly involved in religious groups (40.8 percent), credit or microfinance groups (37.5 percent), other groups (26.9 percent), and agricultural producer's groups (14.8 percent). Only 2 percent reported being an active group member in a mutual help or insurance group.

Table 5.9. Group membership among surveyed women

Group type	Percent[1] Is an active group member	n[2]
Total (All surveyed women)	**68.7**	**2227**
Group type		
Agricultural producers' group	14.8	480
Water users' group	4.9	159
Forest users' group	2.6	84
Credit or microfinance group	37.5	1216
Mutual help or insurance group	2.0	65
Trade and business association	3.0	97
Civic or charitable group	10.4	337
Local government	2.9	94
Religious group	40.8	1323
Other	26.9	866

^ Results not statistically reliable, n<30.

[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. Senegal 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 5.10** 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 women who performed an

activity. Both primary and secondary activities are presented in Table 5.10. In the ZOI, approximately 70 percent of women reported being satisfied with their leisure time.

Table 5.10. Time allocation among surveyed women

Activity	Primary activity		Secondary activity[1] (G601_Sec_F)	
	Percent of women	Mean hours devoted	Percent of women	Mean hours devoted
Sleeping and resting 1	99.9	9.3	9.3	2.7
Eating and drinking 2	93.8	1.7	34.2	3.0
Personal care 3	75.0	0.9	25.1	1.8
School and homework 4	0.5	1.5	0.4	1.5
Work as employed 5	1.9	5.1	0.8	2.7
Own business work 6	10.2	4.9	2.3	3.7
Farming/livestock/fishing 7	35.4	5.4	2.2	3.0
Shopping/getting services 8	7.6	1.9	6.5	2.4
Weaving, sewing, textile care 9	1.7	2.4	1.7	2.4
Cooking 10	66.0	3.5	20.3	2.7
Domestic work (fetching food and water) 11	63.7	2.9	20.0	2.7
Care for children/adults/elderly 12	28.5	1.6	34.5	2.6
Travel and commuting 13	11.3	3.2	5.3	3.7
Watching TV/listening to radio/reading 14	11.7	2.0	14.0	2.0
Exercising 15	31.1	2.0	0.4	1.8
Social activities and hobbies 16	31.1	2.7	9.9	2.6
Religious activities 17	65.3	1.7	40.7	2.4
Other 96	30.9	3.9	24.2	3.4
N	**3239**		**2256**	

^ Results not statistically reliable, n<30.

[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. Senegal 2015.

According to Table 5.10, on average, women spend most of their time sleeping and resting (9.3 hours), followed by participating in farming, livestock, or fishing (5.4 hours) and work as employed (5.1 hours). Surveyed women reported spending the least amount of time on school and homework (1.5 hours) and caring for children, adults, and the elderly (1.6 hours). Activities that the highest percentage of women participate in include sleeping and resting (99.9 percent), eating and drinking (93.8 percent), personal care (75 percent), cooking (66 percent), and religious activities (65.3 percent). Meanwhile, less than 1 percent of surveyed women reported participating in school and homework.

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 Senegal 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.).[37,38]

The hunger season in Senegal occurs during the rainy season, which typically begins in June or July and ends in October. Data for the HHS were collected in December 2015 and January 2016.

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.

Out of total 3,801 households, a large majority (80 percent) reported to have no or little hunger, 18.4 percent has a moderate level hunger, and 2.5 percent of the households reported experiencing severe hunger at the time of the survey. Hunger status does not significantly vary by gendered household type, but does vary significantly by household size. Eighty-two percent of the larger households (households with more than 11 members) did not experience any hunger compared to 76 percent of medium size households and 78 percent of the small size households. Furthermore, a high percentage of households (86 percent) where at least one member has a secondary or higher level of education reported experiencing no or little hunger, as compared to other categories; 79 percent among households with no education, 75 percent among households with primary or less education, and 79 percent among households with a medium level education. Moderate level hunger was highest among households with primary or less

[37] Deitschler, Ballard, Swindale, & Coates (2011).
[38] 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.

education at 22.5 percent and lowest among households with secondary or more education at 12.6 percent. Severe hunger is highest among households with no education (3.8 percent).

Table 6.1. Household hunger

Characteristic	Percent			n[1]
	Little to no hunger[a]	Moderate hunger	Severe hunger	
Total (All households)	**79.1**	**18.4**	**2.5**	**3,801**
Gendered household type				
Male and female adults	79.2	18.4	2.4	3,565
Female adult(s) only	75.8	22.3	1.9	171
Male adult(s) only	82.9	12.6	4.5	66
Child(ren) only (no adults)^	--	--	--	--
Household size[a]				
Small (1-5 members)	78.1	19.0	2.9	505
Medium (6-10 members)	76.2	21.1	2.7	1,486
Large (11+ members)	82.0	15.9	2.1	1,812
Household educational attainment[a]				
No education	79.3	16.9	3.8	729
Primary or less	75.1	22.5	2.4	1,220
Medium	78.7	19.2	2.2	114
Secondary or more	85.9	12.6	1.6	716
Religious school	82.3	15.2	2.5	1,450

[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.

[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.

^ Results not statistically reliable.

Source: ZOI interim survey, Senegal 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. Note that for Senegal, the WDDS has been measured using 8 food groups rather than 9, as the organ meat group was inadvertently included with all flesh food during survey programming. Since this is an indicator reported as a mean value, this oversight will not have a significant effect on the estimates.

Table 6.2 shows the mean and median WDDS for all women of reproductive age in the ZOI, and by individual-level and household-level characteristics. Mean WDDS is the Feed the Future high-level indicator. Individual-level characteristics include women's age groups and educational attainment. Household-level characteristics include categories of gendered household type, household size, and household hunger.

WDDS is measured among 8,056 women between 15-49 years of age. The estimated mean of WDDS is 4.70 and the median of WDDS is 5.0. The mean and median WDDS do not vary significantly by age categories, remaining at an average of 4.70.

The mean WDDS is highly associated with women's educational attainment. The lowest mean value of WDDS (4.53) is observed in the category of women with no education, and the highest mean WDDS (4.99) is observed among women with secondary or higher education. The median value across the education categories is 5.0.

The mean WDDS is also highly associated with gendered household type. The mean WDDS is 4.71 (median: 5) among women residing in households comprising both male and female adults, while it is lower at 4.52 (median: 4) among women in adult female only households.

There is also a significant association between the WDDS and household size. The mean WDDS is lowest in small households at 4.23, followed by 4.52 in medium size households, and 4.81 in large households. The median value of WDDS is 4.0 in small households, and 5.0 in medium and large households.

WDDS is also associated with household hunger status at a significant level. The mean WDDS is 4.77 in those households that did not experience hunger compared to 4.40 in households reporting household hunger.

Table 6.2. Women's dietary diversity score

Characteristic	Mean [a]	Median	n[1]
Total (All women 15-49)	**4.70**	**5**	**8,056**
Age			
15-19	4.71	5	1,953
20-24	4.69	5	1,383
25-29	4.68	5	1,391
30-34	4.70	5	1,055
35-39	4.76	5	808
40-44	4.63	5	849
45-49	4.75	5	617
Educational attainment [a]			
No education	4.53	5	4,619
Primary	4.88	5	1,088
Medium	4.87	5	871
Secondary or more	4.99	5	267
Religious	4.97	5	1,201
Gendered household type[a]			
Male and female adults	4.71	5	7,776
Female adult(s) only	4.52	4	270
Male adult(s) only	--	--	--
Child(ren) only (no adults)	--	--	--
Household size[a]			
Small (1-5 members)	4.23	4	356
Medium (6-10 members)	4.52	5	2,052
Large (11+ members)	4.81	5	5,648
Household hunger[a]			
Little to no hunger	4.77	5	6,477
Moderate or severe hunger	4.40	4	1,579

[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 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, Senegal 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.[39] 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.[40]

During the translation of the questionnaire and as discussed in the Limitations section, the group "nuts and seeds" did not get separated from "legumes". As a result, there are 9 groups in the denominator of this indicator as opposed to 10 as in the definition. Thus, the indicator is slightly overestimating the achievement of minimum dietary diversity. In measuring the baseline MDD-W on the truncated data set of 63 CRs, the survey team similarly used 9 food groups in the denominator to facilitate comparison.

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 groups and educational attainment. Household-level characteristics include categories of gendered household type, household size, and household hunger.

MDD-W is 58.0 percent among 8,056 women between 15-49 years of age. The indicator does not vary significantly by age categories.

MDD-W is 53.7 percent among women with no education and over 62 percent in other categories of educational attainment. The indicator does not vary significantly by gendered household type. The indicator is 58 percent in adult male and female households and 50 percent in adult female only households. MDD-W is significantly associated with household size. The indicator is 46 percent in small sized households, 54 percent in medium sized households, and 60 percent in large households. Sixty percent of women achieved minimum dietary diversity in

[39] 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.

[40] 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/FEED THE FUTURE_guidanceseries_vol11_interimassessment_oct2014.pdf.

households that experienced little to no hunger compared to the 48 percent of women in households that experienced moderate to severe level hunger.

Table 6.3. Women's minimum dietary diversity

Characteristic	Percent [a]	n[1]
Total (All Women 15-49)	**58.0**	**8,056**
Age		
15-19	58.80	1,953
20-24	57.80	1,383
25-29	58.17	1,391
30-34	57.53	1,055
35-39	58.27	808
40-44	54.82	849
45-49	60.47	617
Educational attainment[a]		
No education	53.7	4,619
Primary or less	62.3	961
Medium	64.8	871
Secondary or more	64.5	394
Religious school	63.8	1,201
Gendered household type		
Male and female adults	58.3	7,776
Female adult(s) only	50.1	270
Male adult(s) only	--	--
Child(ren) only (no adults)	--	--
Household size[a]		
Small (1-5 members)	46.2	356
Medium (6-10 members)	53.8	2,052
Large (11+ members)	60.5	5,648
Household hunger[a]		
Little to no hunger	60.2	6,477
Moderate or severe hunger	48.5	1,579

[1] 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, Senegal 2015.

Table 6.4 shows the percentages of women aged 15-49 years who consume each of the 9 food groups by dietary diversity achievement status. Almost all women consume grains, roots, and tuber (99.12 percent). Consumption of legumes and nuts is over 60 percent. Consumption of meat, flesh food, and organ meat is over 80 percent. A little over half of surveyed women

consume dairy products. Consumption of egg is low, at around 6 percent, as is the consumption of other fruits (2.75 percent). Nearly two third of women consume vitamin A-rich vegetables and fruits.

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]	
	Achieving	Not achieving
Women consuming a specific food group		
Grains, roots and tubers	99.12[a]	0.88
Legumes and beans	61.44[a]	38.46
Nuts and seeds	n/a	n/a
Dairy products	52.56[a]	47.44
Meat and organ meats	84.34[a]	15.66
Eggs	5.97[a]	94.03
Vitamin A-rich dark green leafy vegetables	58.41[a]	41.59
Other Vitamin A-rich vegetables and fruits	77.05[a]	22.95
Other fruits	2.75[a]	96.38
Other vegetables	12.82[a]	86.06
N	**4552**	**3504**

^ Results not statistically reliable, n<30.

[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, Senegal 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 babies 0-5 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 0-5 months of age who were exclusively breastfed during the day preceding the survey.

Table 6.5 shows the prevalence of exclusive breastfeeding among children 0-5 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, primary or less, medium level of education, secondary education or more, or attended religious school. 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).

Prevalence of exclusive breastfeeding among children 0-5 months among a sample of 625 is 38 percent. There is minimal difference in the prevalence of breastfeeding by gender. Prevalence of this indicator is 37.6 percent among children with caregivers with no education, 39.1 percent among children with caregivers with a primary or lower level of education, and is lowest among children with caregivers that attended religious school (25.3 percent).

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

Characteristic	Percent [a]	n [1]
Total (All children under 6 months)	**38.0**	**625**
Child sex		
Male	37.0	290
Female	38.0	335
Caregiver's educational attainment[2a]		
No education	37.6	361
Primary or less	39.1	95
Medium	67.5	44
Secondary or more	33.8^	12
Religious school	25.3	113

^ 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, Senegal 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 child, caregiver, and household. Children's characteristics include 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.

Seven percent of children aged 6-23 months receive a MAD. The indicator is slightly higher among male children than female children (9 percent versus 6 percent). MAD decreases as the age of the child increases from 6 to 17 months. MAD achievement is highest among children whose caregivers attended religious school (11.6 percent) and is lowest among children whose caregivers received a secondary or greater level of education (4.1 percent). No statistical significance was seen by gendered household type, household size, or household hunger status.

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)	**7.03**	**2,047**
Child sex[a]		
Male	9.1	1,020
Female	6.0	1,027
Child age[a]		
6-11 months	13.2	645
12-17 months	3.9	781
18-23 months	4.3	621
Caregiver's educational attainment[2]		
No education	5.9	1,255
Primary or less	7.1	305
Medium	8.3	121
Secondary or more	4.1	34
Religious school	11.6	329
Gendered household type		
Male and female adults	7.1	1,994
Female adult(s) only	6.1	49
Male adult(s) only	--	--
Child(ren) only (no adults)	--	--
Household size		
Small (1-5 members)	9.6	58
Medium (6-10 members)	6.2	482
Large (11+ members)	7.2	1,507
Household hunger		
Little to no hunger	7.1	1,642
Moderate or severe hunger	6.9	405

^ 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 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, Senegal 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.

According to Table 6.7, 30.2 percent of breastfed children have achieved minimum meal frequency and 6.1 percent have achieved dietary diversity. Among non-breastfed children, 75.5 percent have achieved meal frequency, 24.6 percent have achieved milk feeding frequency, and 12.7 percent have received minimum dietary diversity. These indicators could not be accurately measured among non-breastfed children in the 6-11 and 12-17 age groups due to small sample sizes. Among children between the ages of 19-23 months, 65 percent achieved minimum meal frequency, 22 percent achieved minimum milk frequency, and 12 percent achieved dietary diversity.

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

MAD components and food groups	Percent			
	All children [a]	By child age (in months)		
		6 to 11	12 to 17	18 to 23
Breastfed children				
Achieving minimum meal frequency	30.2	72.0	8.4	--
Achieving minimum dietary diversity	6.1	13.2	2.9	--
Consuming:				
Grains, roots, and tubers	81.0	65.0	88.3	94.2
Legumes and nuts	35.1	21.8	40.9	46.4
Dairy products	39.2	34.4	41.1	43.7
Flesh foods	46.4	33.1	52.9	56.5
Eggs	4.8	3.3	5.5	5.9
Vitamin A-rich fruits and vegetables	58.4	42.9	66.5	69.6
Other fruits and vegetables	5.8	3.3	7.6	6.8
n	**1,752**	**629**	**726**	**397**
Non-breastfed children				
Achieving minimum meal frequency	75.5	100.0^	100.0^	63.6
Achieving minimum milk feeding frequency	24.6	22.6^	37.3	21.6

MAD components and food groups	Percent			
	All children [a]	By child age (in months)		
		6 to 11	12 to 17	18 to 23
Achieving minimum dietary diversity	12.7	9.6^	16.7	11.9
Consuming:				
Grains, roots, and tubers	95.8	63.3^	93.2	98.6
Legumes and nuts	54.2	35.2^	53.1	55.6
Dairy products	59.6	43.8^	64.9	59.3
Flesh foods	69.2	34.7^	59.6	73.7
Eggs	4.2	--	3.6	4.6
Vitamin A-rich fruits and vegetables	77.6	49.3^	79.3	78.9
Other fruits and vegetables	9.4	9.6^	8.7	9.6
n	**295**	**16**	**55**	**224**

^ Results not statistically reliable, n<30.

[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.

Source: ZOI interim survey, Senegal 2015.

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.

Height and weight were measured for a total of 7,407 women between the ages of 15-49 years. The mean BMI is 21.7. One fifth of the women (21 percent) are underweight, 60 percent are normal weight, 13.2 percent are overweight, and 8 percent are obese. BMI and weight status vary significantly by age. Mean BMI is lowest in the 15-19 age category (19.9) and highest in the 45-49 age group (23.7). There is clear inverse linear relationship between underweight status and age, and this relationship is statistically significant. Younger women are more likely to be underweight, and prevalence of underweight decreases with age. Thirty-three percent of women in the 15-19 age group are underweight compared to only 13 percent in the 45-49 age group. Older women are more likely to be overweight and obese. Twenty-five percent of the women in the 45-49 age group are overweight and 13 percent are obese compared to 4 and 5 percent of women 15-19 years of age who are obese and overweight, respectively.

The mean BMI is more or less similar across the educational level categories. However, the categories of body weight indicate some level of difference by educational level. Women with no education or primary level schooling are more likely to be obese. Fourteen percent of women with no education and 15 percent women with primary education are overweight compared to 10.7 percent women who have secondary or higher education.

The mean BMI is 21.6 among women living in households comprised of both male and female adults. BMI is 23 among women living in female only households.

The prevalence of underweight women is slightly lower in small households (17.4 percent) compared to medium (20.5 percent) and large households (21.4 percent).

There is a significant difference in women's underweight status by household experience of hunger. Twenty percent of the women in households without hunger are underweight, compared to 23.2 percent in households with moderate to severe hunger.

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

Characteristic	Mean BMI[a]	Body Mass Index (BMI) category (percent)[b]				n[1]
		Under-weight[c]	Normal weight	Over-weight	Obese	
Total (All women age 15-49)	**21.7**	**21.0**	**57.9**	**13.2**	**7.9**	**7,407**
Age[ab]						
15-19	19.9	33.2	57.7	4.2	4.9	1,828
20-24	20.8	23.0	64.7	6.9	5.4	1,227
25-29	21.8	18.7	59.9	15.4	6.0	1,230
30-34	22.4	14.7	61.3	15.0	9.1	950
35-39	22.8	15.0	53.0	21.2	10.9	737
40-44	23.5	12.6	52.0	21.5	13.9	823
45-49	23.7	13.0	48.3	25.7	13.1	612
Educational attainment[ab]						
No education	21.9	20.0	56.9	14.4	8.8	4,237
Primary or less	22.2	19.3	57.2	15.2	8.4	999
Medium level	20.8	25.7	60.5	7.4	6.5	832
Secondary or more	21.2	21.1	61.7	10.7	6.5	254
Religious school	21.3	22.6	59.5	12.4	5.5	1,077
Gendered household type						
Male and female adults	21.6	21.3	57.8	13.1	7.8	7,142
Female adult(s) only	23.0	12.9	58.9	16.9	11.3	257
Male adult(s) only	--	--	--	--	--	--
Child(ren) only (no adults)	--	--	--	--	--	--
Household size[ab]						
Small (1-5 members)	22.6	17.4	55.3	17.9	9.4	333
Medium (6-10 members)	21.6	20.5	60.3	12.4	6.8	1,863
Large (11+ members)	21.6	21.4	57.1	13.2	8.3	5,211
Household hunger*						
Little to no hunger	21.8	20.5	57.6	13.8	8.2	5,973
Moderate or severe hunger	21.2	23.2	59.3	10.7	6.7	1,434

[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-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, Senegal 2015.

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

This section reports on three anthropometric measurements of undernutrition among children under 5 years 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).[41] The 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.

Stunting was measured among 6,886 children 0-59 months old. A quarter of the children below the age of five are stunted (<-2SD) which includes both moderate and severe cases. About 10 percent of the children are severely stunted (<-3SD).

Prevalence of both stunting and severe stunting is significantly higher among male children than female children. Twenty-seven percent of male children are stunted compared to 23 percent of female children.

Stunting varies significantly with the child's age. This indicator is lowest among the youngest age group (0-11 months) at 8.3 percent. Prevalence of stunting increases threefold to 26.5 percent in the next age bracket (12-23 months), and is measured at 33.0 percent among children in the 24-35 month age group. The indicator remains high at 29.4 percent among children aged 36-47 months and 25.1 percent among children aged 48-59 months, respectively. The prevalence of

[41] WHO. (2006).

severe stunting increases with age. Three percent of the children in the 0-11 month age group are severely stunted compared to 9 percent in the 12-23 month age group. Severe stunting is highest among children aged 36-47 months.

Twenty-six percent of children in households comprising both male and female adults are stunted compared to 22.4 percent in female only households. Similarly, nearly 10 percent of children in adult male and female households are severely stunted compared to 7 percent in adult female households.

Prevalence of stunting in slightly higher though not significantly in smaller households at 28.6 percent compared to 23.7 percent in medium size households and 25.3 percent in large households. Severe stunting is more or less similar at around nine percent across the three categories of household size.

Prevalence of stunting is 25.6 percent in households that experienced little to no hunger and 22.4 percent in moderate to severe hunger households. The prevalence of stunting by hunger categories is not statistically significant.

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)	**25.0**	**9.7**	**-1.0**	**6,886**
Child sex[a b]				
Male	27.0	10.9	-1.1	3,455
Female	22.8	8.3	-0.9	3,431
Child age[a b]				
0-11 months	8.3	2.9	-0.1	1,207
12-23 months	26.5	9.2	-1.1	1,362
24-35 months	33.0	11.9	-1.3	1,372
36-47 months	29.4	13.0	-1.2	1,543
48-59 months	25.1	9.7	-1.1	1,402
Caregiver's educational attainment[2*]a b				
No education	26.6	10.3	-1.1	4436
Less than primary	19.3	7.0	-0.9	912
Primary	19.2	5.3	-0.8	340
Secondary or more	11.3	3.0	-0.7	95
Religious school	26.4	11.0	-1.0	1,096
Gendered household type[b]				
Male and female adults	25.6	9.6	-1.0	6,688
Female adult(s) only	22.4	6.7	-0.9	190
Male adult(s) only	--	--	-0.8	8

Characteristic	% Stunted (<-2 SD)[a]	% Severely stunted (<-3 SD)	Mean Z-score [b]	n[1]
Child(ren) only (no adults)	--	--	--	--
Household size[b]				
Small (1-5 members)	28.6	8.9	-1.1	228
Medium (6-10 members)	23.7	9.4	-1.0	1,761
Large (11+ members)	25.3	9.7	-1.0	4,897
Household hunger[b]				
Little to no hunger	25.6	9.9	-1.0	5,524
Moderate or severe hunger	22.4	7.9	-0.9	1,362

[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.

[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, Senegal 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 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.

The prevalence of wasting, severe wasting, overweight, and obesity is measured among 6,886 children between the ages of 0-59 months, of which 3,455 are male and 3,431 are female. The prevalence of wasting is 8 percent, severe wasting is 1.5 percent, overweight is 1.5 percent, and obesity is less than one percent in the overall 0-59 months population.

Wasting, overweight, and mean Z-score are significantly associated with the gender of the child. Prevalence of wasting is 9 percent among male children compared to 6.5 percent among female

children. About 1.5 percent of children of both sexes are severely wasted. Two percent of male children are overweight compared to 1.2 percent of female children.

Wasting, overweight, and mean Z-score are significantly associated with the child's age. Wasting is highest in the 48-59 month age group. The indicator is also high in the younger age groups, at around 9 percent in the 0-11 and 12-23 month age brackets. The prevalence drops to 4.7 percent and 6.3 percent in the 24-35 and 36-47 age-groups, respectively. Prevalence of overweight (4.3 percent) and obesity (1.2 percent) is highest among children aged 0-11 months.

These indicators are not significantly associated with caregivers' educational status. Prevalence of wasting is around 7.5 percent across most of the categories of caregivers' educational attainment. About 4.7 percent of children are wasted in households where the primary caregiver attained a secondary or higher level of education. Prevalence of overweight children is lower than 2 percent across the categories except in the secondary or higher education level category, for which it is 2.8 percent.

There is no significant difference in the prevalence of wasting, severe wasting, overweight, or obesity by household type. Prevalence of wasting is 7.7 percent in households with adult males and females and 9 percent in adult female only households. Prevalence of overweight children is below 1.5 percent.

There is no significant difference in the prevalence of wasting, severe wasting, overweight, or obesity by household size. Prevalence of wasting is 6.5 percent in smaller households, 7.3 in medium size households, and 7.9 large households.

The prevalence of stunting is around 7.6 percent in both households that experienced no hunger as well as those that experienced moderate to severe hunger. Prevalence of overweight children is lower than two percent.

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)	**7.7**	**1.6**	**1.5**	**0.5**	**-0.5**	**6,886**
Child sex[a b c]						
Male	8.9	1.6	1.9	0.7	-1	3,455
Female	6.5	1.5	1.2	0.3	-0.5	3,431
Child age[a b c]						
0-11 months	8.9	2.7	4.3	1.2	-0.3	1,207
12-23 months	9.4	2.5	1.1	0.3	-0.5	1,362
24-35 months	4.7	0.6	0.9	0.0	-0.4	1,372
36-47 months	6.3	0.6	1.0	0.5	-0.5	1,543

Characteristic	% Wasted (<-2 SD) [a]	% Severely wasted (<-3 SD)	% Overweight (> +2SD) [b]	% Obese (> +3SD)	Mean Z-score [c]	n[1]
48-59 months	9.5	1.6	0.7	0.4	-0.7	1,402
Caregiver's educational attainment[2]						
No education	7.5	1.5	1.4	0.5	-0.5	4,436
Primary	7.8	1.8	1.8	0.3	-0.5	916
Medium	7.5	1.7	2.0	0.9	-0.4	340
Secondary or more	4.7	1.3	2.8	1.7	-0.4	91
Religious	8.7	1.6	1.3	0.3	-0.5	1,096
Gendered household type						
Male and female adults	7.7	1.5	1.5	0.5	-0.5	6,688
Female adult(s) only	9.2	1.9	0.8	--	-0.6	190
Male adult(s) only	--	--	--	--	--	8
Child(ren) only (no adults)	--	--	--	--	--	--
Household size[c]						
Small (1-5 members)	6.5	2.0	0.4	0.0	-0.4	228
Medium (6-10 members)	7.3	1.1	1.4	0.3	-0.5	1,761
Large (11+ members)	7.9	1.7	1.7	0.6	-0.5	4,897
Household hunger						
Little to no hunger	7.7	1.5	1.6	0.5	-0.5	5,524
Moderate or severe hunger	7.6	1.6	1.1	0.3	-0.5	1,362

[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.

[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, Senegal 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.

Underweight is measured among 6,886 children between the ages of 0-59 months, of which 3,455 are males and 3,431 are females. Sixteen percent of the children are underweight (<-2SD) which includes both moderate and severe underweight, and 3.6 percent are severely underweight (<-3SD).

Prevalence of underweight is significantly higher among male children at 17.8 percent than among female children a 14.6 percent.

Underweight is significantly associated with age. Nine percent of the children in the 0-11 month age group are underweight, which nearly doubles to around 17 percent in the 12-23, 24-35, and 36-47 month age groups. Prevalence of underweight is highest at 19.5 percent among children in the 48-59 month age group.

Prevalence of underweight significantly varies by caregivers' educational status. Underweight is highest among children whose caregivers do not have any education at 17 percent and lowest at 9.4 percent among children with caregivers having a secondary or higher level of education.

Prevalence of underweight among children 0-59 months is around 16 percent regardless of gendered household type.

Prevalence of underweight among children is 13.3 percent, 15.9 percent, and 16.5 percent in small, medium and large households, respectively. Variations in underweight prevalence are not statistically significant. Prevalence of severe underweight among children is around 3 percent across the different household categories.

About 16 percent and 3.5 percent of children aged 0-59 months are underweight and severely underweight regardless of their households' hunger status.

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)	**16.2**	**3.6**	**-0.9**	**6,886**
Child sex[a b]				
Male	17.8	4.1	-0.9	3,455
Female	14.6	3.2	-0.9	3,431
Child age[a b]				
0-11 months	9.1	3.1	-0.4	1,207
12-23 months	16.3	3.8	-0.9	1,362

Characteristic	% Underweight (<-2 SD)[a]	% Severely underweight (<-3 SD)	Mean Z-score [b]	n[1]
24-35 months	17.5	3.5	-1.0	1,372
36-47 months	17.6	3.2	-1.0	1,543
48-59 months	19.5	4.7	-1.1	1,402
Caregiver's educational attainment[2 a b]				
No education	17.1	3.8	-0.9	4,436
Primary or less	13.0	3.6	-0.8	912
Medium	12.9	1.9	-0.7	340
Secondary or more	9.4	0.4	-0.7	95
Religious school	17.1	3.8	-0.9	1,095
Gendered household type				
Male and female adults	16.2	3.7	-0.9	6,688
Female adult(s) only	16.6	2.0	-0.9	190
Male adult(s) only	--	--	--	8
Child(ren) only (no adults)	--	--	--	--
Household size				
Small (1-5 members)	13.3	2.8	-0.9	228
Medium (6-10 members)	15.9	3.3	-0.9	1,761
Large (11+ members)	16.5	3.8	-0.9	4,897
Household hunger				
Little to no hunger	16.5	3.8	-0.9	5,524
Moderate or severe hunger	15.1	3.2	-0.9	1,362

[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.

[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, Senegal 2015.

8. Summary and Conclusions

The interim PBS in Senegal was conducted among 3,801 households in 10 regions, covering all 150 CRs in the current ZOI. The data was collected between December 2015 and January 2016, at the same time of year as baseline data collection. Due to a change of the ZOI definition between baseline and interim surveying and loss of data at the baseline, only 63 CRs from the baseline overlap with interim ZOI. Thus, in this report, comparability between the baseline and interim assessments has not been drawn.

Demographics. An overwhelming majority of selected households contain both male and female adults. In general, households in rural Senegal are very large, with an average household size of 11.4 members. Educational level of the population remains low with nearly one-fifth of adults having no education and 30 percent obtaining a primary or less than primary level of education. Religious education is common in Senegal: 44 percent of adults received Koranic schooling. Attainment of a primary level of education reduces among females as age increases. This association between age group and school attendance is statistically significant, with 44.5 percent of children aged 15-19 years attending school, compared with 20.5 percent of children aged 20-24 years. Similar patterns are observed when the results are disaggregated by gender.

Living conditions. Access to basic amenities such as improved water and improved sanitation is less than optimum, with half of the population having access to improved water and one third having access to sanitation. At the $1.25 poverty threshold, prevalence of poverty is 39 percent, with depth of poverty measured at 14 percent of the poverty line. Prevalence of poverty is significantly lower among male only households (10 percent) and small households (16 percent) than among adult male and female households (39 percent) and large households (45 percent), and the average value of consumption of a poor person is $0.84. At the national poverty threshold of $2.22, 77 percent of the ZOI falls below the poverty line, with a depth of poverty of 35.4 percent of the poverty line. The depth of poverty is significantly lower at the national extreme poverty threshold of $1.38, at 17 percent of the poverty line.

Women's empowerment. In general, Senegal's ZOI shows a low level of women's empowerment in agriculture. The overall WEAI for the full ZOI is 0.692. It is a weighted average of the 5DE sub-index value of 0.679 and the GPI sub-index value of 0.807. As measured by WEAI indicators, surveyed women obtain a high level of achievement in the income domain, with just over 70 percent reporting that they have sole or joint control over income and expenditures. Approximately 70 percent of surveyed women similarly reported that they are satisfied with their available time for leisure activities. However, only 40 percent of women have ownership, access to, and decision-making power over the purchase, sale, or transfer of productive resources such as land, livestock, agricultural equipment, consumer durables, and credit.

Hunger and dietary intake. Furthermore, one fifth of surveyed households in the ZOI suffer from moderate or severe hunger, with the prevalence of severe hunger measuring at less than 3

percent. The data show that households with more members, with a secondary or higher education level, and which are not experiencing hunger are more food secure, at a statistically significant level. The mean dietary diversity score for women is 4.7. Fifty-eight percent of surveyed women in the ZOI consumed five out of nine food groups in the last 24 hours. The percentage of women achieving minimum dietary diversity is significantly associated with household size, measuring at 46 percent in small households and 60 percent in large households. Less than half (40 percent) of children 0-5 months of age are exclusively breastfed, with no difference by gender. Moreover, less than 10 percent of children aged 6-23 months receive a MAD.

Nutritional status of women and children. One in five women is underweight, and this prevalence is highest among women age 15-19 years at 33 percent. Prevalence of overweight and obesity is higher among older women to a statistically significant degree, with nearly one in four women aged 45-49 years measuring at overweight and 13 percent measuring at obese. Among 7,407 women between the ages of 15-49 years, the mean BMI is 21.7. There is a significant difference in women's underweight status by household experience of hunger, with 23.2 percent of women in households with moderate to severe hunger measuring as underweight.

Stunting is an indicator of chronic undernutrition and is measured among children 0-59 months of age. The prevalence of stunting among children aged 0-59 months in the ZOI is 25 percent. The prevalence of stunting is higher among male children (27 percent) than female children (23 percent), at a statistically significant level. Stunting also varies significantly with the child's age, increasing threefold between the 0-11 month age bracket and the 12-23 month age bracket.

The wasting indicator measures the percentage of children 0-59 months who are acutely malnourished. The prevalence of wasting among children aged 0-59 months in the ZOI is 8 percent. A higher percentage of male children (9 percent) are wasted than female children (6.5 percent), at a statistically significant level. About 1.5 percent of children of both genders are severely wasted, and wasting is significantly associated with the child's age, with the greatest prevalence in the 48-59 month age bracket.

Underweight is a weight-for-age measurement and is a reflection of acute and/or chronic undernutrition. The prevalence of underweight children aged 0-59 months in the ZOI is 16 percent. As observed in the case of stunting and wasting, the prevalence of underweight children is similarly higher among male children (17.8 percent) than female children (14.6 percent). Prevalence of underweight also varies significantly by caregivers' educational status: it is highest among children whose caregivers do not have any education (17 percent) and lowest among children whose caregivers have a secondary or higher level of education (9.4 percent). Underweight is significantly associated with age, nearly doubling between the 0-11 months age group and the 12-23 months age group.

References

Alkire, S., Malapit, H., Meinzen-Dick, R., Peterman, A., Quisumbing, A., Seymour, G., & Vaz, A. (2013). *Instructional Guide on the Women's Empowerment in Agriculture Index*. International Food Policy Research Institute (IFPRI). (2013). Retrieved from http://www.ifpri.org/publication/womens-empowerment-agriculture-index.

Alkire, S., Meinzen-Dick, R., Peterman, A., Quisumbing, A., Seymour, G., & Vaz, A. (2013). The Women's Empowerment in Agriculture Index. *World Development*, 52(C), 71-91.

Ballard, T.; Coates, J.; Swindale, A.; and Deitchler, M. (2011). *Household Hunger Scale: Indicator Definition and Measurement Guide*. Washington, DC: Food and Nutrition Technical Assistance II Project, FHI 360.

Black, R.E., et al. (2008) Maternal and Child Undernutrition: Global and Regional Exposures and Health Consequences. *The Lancet*. 371(9608):243-260.

Darnton-Hill, I., et al. (2005) Micronutrient deficiencies and gender: social and economic costs. *American Journal of Clinical Nutrition*, May 2005, 81(Supplement): 1198S-1205S.

Deaton, A. (2008). *The Analysis of Household Surveys: A microeconomic approach to development policy*. Baltimore: The Johns Hopkins University Press.

Deaton, A. and S. Zaidi. (2002). "Guidelines for constructing consumption aggregates for welfare analysis, Working Paper No. 135. Washington, DC: The World Bank.

Deitchler, M., Ballard, T., Swindale, A., and Coates, J. (2011). *FANTA Technical Note No. 12: Introducing a Simple Measure of Household Hunger for Cross-Cultural Use.* Washington, DC: USAID.

Foster, J., Suman S., Lokshin, M. and Sajaia, Z. (2013). *A Unified Approach to Measuring Poverty and Inequality: Theory and Practice*. Washington, DC: The World Bank.115-118.

Grosh, M.E. and Munoz, J. (1996). A manual for planning and implementing the living standards measurement study survey. *Living Standards Measurement Study Group Working Paper No. 126*. Washington, DC: The World Bank.

Grosh, M. and Glewwe, P. (1995). A Guide to Living Standards Measurement Study Surveys and Their Data Sets. *Living Standards Measurement Study Group Working Paper No. 120*. Washington, DC: The World Bank.

Haughton, J. and Khandker, S. (2009). *Handbook on poverty and inequality*. Washington, DC: The World Bank.

Kaplinsky, R. And Morris, M. *A Handbook for Value Chain Analysis*. Ottawa, Canada: International Development Research Center.

United Nations Development Group (UNDP). (2003). *Indicators for monitoring the Millennium Development Goals: definitions, rationale, concepts and sources*. New York: United Nations.

University of Oxford. (2013). *Alkire Foster Method: OPHI's method for multidimensional measurement*. Oxford Poverty & Human Development Initiative (OPHI). Retrieved from http://www.ophi.org.uk/research/multidimensional-poverty/alkire-foster-method.

USAID. (2013). *Feed the Future Indicator Handbook: Definition Sheets* (updated October 18, 2014).

USAID. (2014). *Volume 11: Guidance on the First Interim Assessment of the Feed the Future Zone of Influence Population-Level Indicators (October 2014)*.

Victora, C.G., et al. (2008). Maternal and Child Undernutrition: Consequences for Adult Health and Human Capital. *The Lancet*. 371(9608):340-357.

Webber, C.M. and Labaste, P. (2010). *Building Competitiveness in Africa's Agriculture : A Guide to Value Chain Concepts and Applications*. Washington, DC: The World Bank. https://openknowledge.worldbank.org/handle/10986/2401

WHO and UNICEF. (2006). *WHO Child Growth Standards and the Identification of Severe Acute Malnutrition in Infants and Children*. World Health Organization and United Nations Children's Fund.

WHO/UNICEF/USAID/AED/FANTA 2/UC DAVIS/IFPRI/UNICEF. (2010). *Indicators for Assessing Infant and Young Child Practices* (Part 2 Measurements).

Zhang, L.C. (1999). A note on post-stratification when analyzing binary survey data subject to nonresponse. *Journal of Official Statistics*, 15(2): 329-334.

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	2.6	0.10	2.4-2.7	3.2	0.7%	3,775
Male and female adults	2.5	0.10	2.3-2.6	3.1	0.8%	3,538
Female adult(s) only	3.2	0.26	2.7-3.6	0.9	1.5%	171
Male adult(s) only	5.6	0.66	4.3-6.9	0.3	--	65
Prevalence of Poverty: Percent of people living on less than $1.25 per day (2005 PPP)						
All households	41.3	1.68	38.0-44.7	4.5	0.7%	3,775
Male and female adults	41.8	1.68	38.5-45.3	4.4	0.8%	3,538
Female adult(s) only	27.2	4.29	18.8-37.5	1.1	1.5%	171
Male adult(s) only	7.1	2.40	2.4-11.9	0.4	--	65
Depth of Poverty: Mean percent shortfall relative to the $1.25 per day (2005 PPP) poverty line						
All households	13.9	--	-- --	6.1	0.7%	3,775
Male and female adults	14.1	--	-- --	6.1	0.8%	3,538
Female adult(s) only	10.7	--	-- --	0.9	1.5%	171
Male adult(s) only	3.3	--	-- --	0.4	--	65
Percent of women achieving adequacy on Women's Empowerment in Agriculture Index Indicators [2]						
WEAI	0.692	0.00	0.684-0.700	--	54.7%	1,694
5DE Index	0.679	0.00	0.670-0.689	--	61.0%	1,458
GPI	0.807	0.01	0.794-0.821	--	54.7%	1,694
Input in productive decisions	45.1	1.53	42.1-48.2	3.1	62.7%	1395
Autonomy in production	65.1	2.24	60.7-69.2	6.0	50.1%	1864
Ownership of assets	55.6	1.48	52.7-58.5	2.8	51.7%	1805
Purchase, sale or transfer of assets	40.0	1.48	37.1-43.0	3.0	64.3%	1335
Access to and decisions on credit	51.0	1.84	47.4-54.5	2.7	71.0%	1085
Control over use of income	71.4	1.43	68.6-74.1	3.0	40.4%	2229
Group member	68.7	2.04	64.7-72.7	--	39.2%	2273
Speaking in public	59.7	1.84	56.1-63.2	4.4	46.8%	1989
Workload	44.0	1.38	41.3-46.7	2.5	61.5%	1439
Leisure	69.5	1.38	66.8-72.1	2.9	39.9%	2247

Feed the Future indicator	Estimate					
	Indicator[a]	SD	95% CI	DEFF	Non-response rate[1]	n
Prevalence of households with moderate or severe hunger						
All households	20.9	1.28	18.4-23.7	3.7	0.1%	3,801
Male and female adults	20.8	1.22	18.4-23.5	2.1	0.0%	3,564
Female adult(s) only	24.2	4.18	16.0-34.8	2.5	0.0%	171
Male adult(s) only	17.1	4.90	7.5-34.3	--	--	66
Women's Dietary Diversity: Mean number of food groups consumed by women of reproductive age						
All women age 15-49	4.7	0.05	4.6-4.8	10.7[42]	16.8%	8,056
Prevalence of exclusive breastfeeding among children under 6 months of age						
All children	37.4	0.71	36.0-46.2	1.8	4.1%	625
Male children	37.0	3.52	30.1-45.7	1.9	0.0%	290
Female children	38.0	3.57	31.0-45.5	1.8	5.3%	335
Prevalence of children 6-23 months receiving a minimum acceptable diet[a]						
All children	7.0	0.61	5.8-8.5	1.4	0.0%	2,047
Male children	9.1[a]	0.97	7.2-11.4	1.4	0.0%	1,020
Female children	5.0[a]	0.66	3.7-6.7	1.2	0.0%	1,027
Prevalence of underweight women						
All non-pregnant women age 15-49	21.7	0.77	20.2-23.4	--	26.3%	7,133
Prevalence of stunted children under 5 years of age[b]						
All children	25.0	0.82	23.4-26.7	--	11.5%	6,886
Male children	27.1[b]	0.97	25.2-29.2	--	7.5%	3,455
Female children	22.9[b]	0.97	21.0-24.8	--	15.3%	3,431
Prevalence of wasted children under 5 years of age[c]						
All children	7.7	0.41	6.9-8.6	--	11.5%	6,886
Male children	8.9[c]	0.56	7.8-10.1	--	7.5%	3,455
Female children	6.5[c]	0.51	5.5-7.6	--	15.3%	3,431
Prevalence of underweight children under 5 years of age[d]						
All children	16.2	0.66	14.9-17.6	--	11.5%	6,886
Male children	17.8[d]	0.71	16.4-19.6	--	7.5%	3,455
Female children	14.6[d]	0.61	13.4-16.1	--	15.3%	3,431

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.

[a-d] 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, Senegal, 2015.

[42] Note that this DEFF is similarly high at the baseline.

A1.2. Poverty at the $1.90 (2011 PPP) per person per day threshold

Characteristic	Prevalence of Poverty[1,4]		Depth of Poverty[2,4]		Average consumption shortfall of the poor[3,4]		
	Percent popula-tion[a]	n[5]	Percent of poverty line[b]	n[5]	In USD 2011 PPP[c]	Percent of poverty line[c]	n[5]
Total (All households)	**60.87**	**3,775**	**23.09**	**3,775**	**5.84**	**23.74**	**3,775**
Gendered household type							
Male and female adults	61.4	3,538	23.35	3,538	6.1	23.9	3,538
Female adult(s) only	51.6	171	17.44	171	2.5	18.9	171
Male adult(s) only	14.6	65	4.62	65	0.4	7.5	65
Child(ren) only (no adults)	--	--	--	--	--	--	--
Household size							
Small (1-5 members)	29.0	502	10.3	502	1.0	11.8	502
Medium (6-10 members)	50.4	1,480	18.0	1,480	3.1	18.4	1,480
Large (11+ members)	67.6	1,793	26.2	1,793	9.5	26.6	1,793
Household educational attainment							
No education	60.8	721	22.2	721	4.8	22.8	721
Less than primary	61.7	1,211	24.0	1,211	5.6	24.2	1,211
Middle	63.5	1,105	24.2	1,105	6.8	25.3	1,105
Secondary or more	56.5	714	21.2	714	6.1	21.7	714
Religious school	61.0	1,440	21.3	1,440	5.6	20.5	1,440

[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.

[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, Senegal, 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, 192 enumeration areas (EAs) defined as DRs were selected from the total number of CRs within the ZOI (150) in 10 regions by probability proportional to size (PPS) sampling. In the second stage, 20 households were selected for interview at random from a comprehensive list of households provided by Agence Nationale de la Statistique et de la Démographie (ANSD). Due to the tight timeline of the activity and availability of 2013 CR level census data, a supplementary listing procedure was not performed at the time of the interim assessment.

Formula 1: Proportions

The basic formula to calculate the sample size required to capture the change in the prevalence indicators (stunting, underweight, and poverty) is:

$$n = D * \left[\frac{\left(Z_\alpha + Z_\beta\right)^2 * [p_1(1-p_1) + p_2(1-p_2)]}{(p_2 - p_1)^2} \right]$$

Where:

n = required minimum sample size

D = design effect (assumed D=2 due to absence of actual baseline data)

p_1 = the estimated baseline value of the indicator (expressed as a proportion)

p_2 = the planned target value of the indicator at endline (expressed as a proportion)

Z_α = the z-score corresponding to the desired level of statistical significance (α=0.05)

Z_β = the z-score corresponding to the desired level of statistical power (β=0.80).

Formula 2: Means

The basic formula to calculate the sample size required to capture the change in mean in the daily per capita expenditures indicator is:

$$n = D * \left[\frac{\left(Z_\alpha + Z_\beta\right)^2 * (sd_1^2 + sd_2^2)}{(X_2 - X_1)^2} \right]$$

Where:

n = required minimum sample size

D = design effect (assumed D=2 due to absence of actual baseline data)

X_1 = the estimated baseline value of the indicator

X_2 = the planned target value of the indicator at endline

$sd_1 \; and \; sd_2$ = expected standard deviations for the respective survey rounds

Z_α = the z-score corresponding to the desired level of statistical significance (α=0.05)

Z_β = the z-score corresponding to the desired level of statistical power (β=0.80).

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 population number) used for selection of EAs. In this case, this is the DR population size; (2) measure of size of strata from which EAs are drawn. In this case, this is the CR population estimate, provided by ANSD; (3) measure of size of EAs as provided by ANSD (3) response rates among households, as weights were calculated for households 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 (DR) in stratum *h* (CR).
$P_{2hi} =$ second-stage sampling probability within the *i*-th cluster (DR) (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 (DRs) selected in stratum *h* (CR).
$N_{hi}=$ total population in the frame for the *i*-th sample cluster (DR) in stratum *h* (CR).
$N_h =$ total population in the frame in stratum *h* (CR).
$n_{hi} =$ number of sample households selected for the *i*-th sample cluster (DR) in stratum *h* (CR). To adjust for non-response, this is the true number of households that completed a survey in each DR.
$L_{hi} =$ number of households listed in the household listing for the *i*-th sample cluster in stratum *h*. This value is based on household counts obtained by ANSD.

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. Note that the teams targeted 20 households in each EA, but the number of completed surveys may be lower due to non-response. Response rates were calculated at the cluster level as ratios of the number of interviewed units over the number of eligible units, where units are household. In this way, the weights adjust for non-response at the EA level, resulting in more reliable estimates.

A2.2 Poverty Prevalence and Expenditure Methods

Data Source

National poverty and extreme poverty threshold data for Senegal are based on national poverty lines for rural areas published by the government of Senegal in 2014. The threshold was calculated for a typical household with 2 parents and 6 children, using data from 2011 ESPS2. Data on 2005 PPP private consumption for Senegal, along with the Local Currency Equivalent to $1.25 at 2005 PPP are based on World Bank data, as provided in the Feed the Future Indicator Handbook Definition Sheets (October 2014). Inflation rates were calculated using 2015 and 2005 Consumer Price Index data (2010=100) for Senegal, from the World Bank.[43]

[43] http://data.worldbank.org/indicator/FP.CPI.TOTL/countries/SN?display=default

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.

Data Preparation

For nonfood expenditures, data excluded from the analysis include missing values and cases where respondents did not know the cost. "Other" entries were excluded when they could not be fit into relevant groupings. For food expenditures, food quantities that were out of range for weekly consumption were coded as missing. Cases with missing per capita expenditure values were also excluded.

Imputations were not used in the data analysis. Missing data were dropped from the sample and the sample size was adjusted accordingly. Data were inspected for outliers, and outliers were excluded from the analysis to avoid shifting estimates. Data were also inspected for correct units.

A local Agriculture Expert was consulted throughout data cleaning to identify quantity conversations and prices. The unit "chariot a boeufs", for instance, was converted to liters, as the two were used interchangeably in the data. Because the survey took place during a short time period, prices were not adjusted to account for changes in market prices over time or between seasons.

Currency Conversions using CPI and PPP

The 2005 PPP used to adjust for inflation was 289.68. The CPI values used to adjust for inflation were 104.6 (2015) and 88.4 (2005), as provided by the World Bank (2010=100). World Bank CPI values are now normalized such that 2010=100, so to achieve consistency with the baseline, all CPI values were normalized such that 2005=100. Therefore, the $1.25 poverty threshold equates to 441.13 CFA, the $2.22 poverty threshold equates to 783.44 CFA, and the $1.38 poverty threshold equates to 487.00 CFA.

Poverty Thresholds

Three poverty thresholds are used throughout this report. $1.25 represents the standardized poverty threshold 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. The $1.25 threshold is in effect the extreme poverty

threshold and represents the poverty line typical of the world's poorest countries.[44] $2.22 represents the national poverty threshold of Senegal, according to the 2011 ESPS2. $1.38 represents the national extreme poverty threshold, according to the 2011 ESPS2. These thresholds were inflated to current prices using 2005 PPP World Bank data for Senegal and CPI measures for 2015 and 2005, adjusted to 2005=100.

Weights

All poverty calculations use the same sample weights as detailed in Appendix A2.1.

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, when or who would take crops to market, livestock raising	Must have at least some input into or can make own personal decisions in at least two decision-making areas	Inadequate if individual participates BUT does not have at least some input in decisions; or she does not make the decisions nor feels she could.

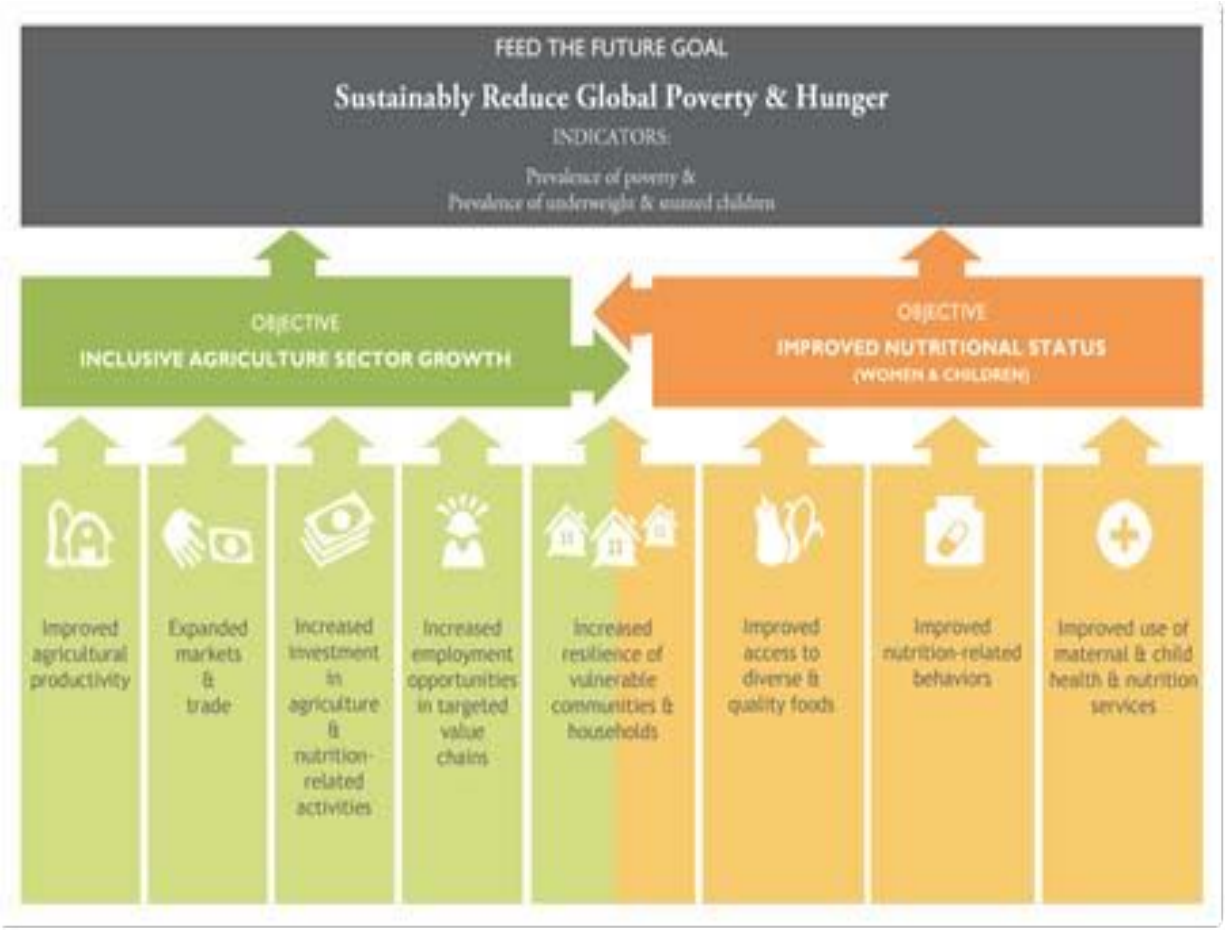
[44] World Bank. 2011. Poverty & Equality Data FAQs. http://go.worldbank.org/PYLADRLUN0. Accessed 15 April 2015.

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

Dimension	Indicator name	Survey questions	Aggregation of adequacy criteria	Inadequacy criteria
	Access to and decisions on credit	G3.08-G3.09 A-E Who made the decision to borrow/what to do with money/item borrowed from [SOURCE]? Non-governmental organization (NGO); Informal lender; Formal lender (bank); Friends or relatives; ROSCA (savings/credit group)	Must have made the decision to borrow or what to do with credit from at least one source	Inadequate if household has no credit OR used a source of credit BUT she did not participate in ANY decisions about it
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)

Appendix 3. Feed the Future Results Framework



Appendix 4. List of 2015 ZOI Communes and Population

REGION	DEPARTMENT	ARRONDISEMENT	COMMUNE	POP 2013
FATICK	Foundiougne	Djilor	DIOSSONG	23,361
FATICK	Foundiougne	Djilor	DJILOR	19,732
FATICK	Foundiougne	Niodior	BASSOUL	8,947
FATICK	Foundiougne	Niodior	DIONEWAR	11,274
FATICK	Foundiougne	Niodior	DJIRNDA	8,649
FATICK	Foundiougne	Toubacouta	KEUR SALOUM DIANE	26,715
FATICK	Foundiougne	Toubacouta	KEUR SAMBA GUEYE	23,523
FATICK	Foundiougne	Toubacouta	NIORO ALASSANE TALL	32,435
FATICK	Foundiougne	Toubacouta	TOUBACOUTA	34,957
KAFFRINE	Birkelane	Keur Mboucki	KEUR MBOUCKI	10,139
KAFFRINE	Birkelane	Keur Mboucki	TOUBA MBELLA	9,922
KAFFRINE	Birkelane	Mabo	MABO	25,208
KAFFRINE	Birkelane	Mabo	NDIOGNICK	29,776
KAFFRINE	Kaffrine	Katakel	DIAMAGADIO	19,336
KAFFRINE	Kaffrine	Katakel	KATHIOTTE	32,963
KAFFRINE	Koungueul	Ida Mouride	FASS THIEKENE	15,867
KAFFRINE	Koungueul	Ida Mouride	IDA MOURIDE	19,079
KAFFRINE	Koungueul	Ida Mouride	SALY ESCALE	22,799
KAFFRINE	Koungueul	Lour Escale	LOUR ESCALE	22,530
KAFFRINE	Koungueul	Lour Escale	RIBOT ESCALE	14,011
KAFFRINE	Koungueul	Missirah Wadene	GAINTHE PATHE	15,490
KAFFRINE	Koungueul	Missirah Wadene	MAKA YOPP	13,823
KAFFRINE	Koungueul	Missirah Wadene	MISSIRAH WADENE	18,896
KAFFRINE	Maleme hodar	Gniby	KAHI	21,491
KAFFRINE	Maleme hodar	Sagna	SAGNA	37,712
KAOLACK	Kaolack	Koumbal	KEUR BAKA	19,571
KAOLACK	Kaolack	Koumbal	LATMINGUE	28,814
KAOLACK	Kaolack	Koumbal	THIARE	23,626
KAOLACK	Kaolack	Ndiedieng	KEUR SOCE	26,967
KAOLACK	Kaolack	Ndiedieng	NDIAFFATE	34,705
KAOLACK	Kaolack	Ndiedieng	NDIEDIENG	29,070
KAOLACK	Nioro du rip	Medina Sabakh	KAYEMOR	22,524
KAOLACK	Nioro du rip	Medina Sabakh	MEDINA SABAKH	43,362
KAOLACK	Nioro du rip	Medina Sabakh	NGAYENE	23,842
KAOLACK	Nioro du rip	Paos Koto	GAINTHE KAYE	27,586
KAOLACK	Nioro du rip	Paos Koto	PAOS KOTO	16,214
KAOLACK	Nioro du rip	Paos Koto	PROKHANE	33,056

REGION	DEPARTMENT	ARRONDISEMENT	COMMUNE	POP 2013
KAOLACK	Nioro du rip	Paos Koto	TAIBA NIASSENE	27,539
KAOLACK	Nioro du rip	Wack Ngouna	KEUR MABA DIAKHOU	27,372
KAOLACK	Nioro du rip	Wack Ngouna	KEUR MADONGO	9,354
KAOLACK	Nioro du rip	Wack Ngouna	NDRAME ESCALE	20,537
KAOLACK	Nioro du rip	Wack Ngouna	WACK NGOUNA	36,911
KEDOUGOU	Kedougou	Bandafassi	BANDAFASSI	11,042
KEDOUGOU	Kedougou	Bandafassi	DINDIFELLO	5,277
KEDOUGOU	Kedougou	Fongolimbi	DIMBOLI	5,971
KEDOUGOU	Kedougou	Fongolimbi	FONGOLIMBI	4,764
KEDOUGOU	Salemata	Dakateli	DAKATELI	3,676
KEDOUGOU	Salemata	Dakateli	KEVOYE	4,334
KEDOUGOU	Salemata	Dar Salam	DARSALAM	3,883
KEDOUGOU	Salemata	Dar Salam	ETHIOLO	3,331
KEDOUGOU	Saraya	Bembou	BEMBOU	13,646
KEDOUGOU	Saraya	Bembou	MEDINA BAFFE	6,782
KEDOUGOU	Saraya	Sabodala	KHOSSANTO	2,546
KEDOUGOU	Saraya	Sabodala	MISSIRAH SIRIMANA	12,756
KEDOUGOU	Saraya	Sabodala	SABODALA	12,268
KOLDA	Kolda	Dioulacolon	DIOULACOLON	20,751
KOLDA	Kolda	Dioulacolon	GUIRO YERO BOCAR	15,555
KOLDA	Kolda	Dioulacolon	MEDINA EL HADJ	11,785
KOLDA	Kolda	Dioulacolon	TANKANTO ESCALE	15,256
KOLDA	Kolda	Mampatim	BAGADADJI	15,365
KOLDA	Kolda	Mampatim	COUMBACARA	10,132
KOLDA	Kolda	Mampatim	DIALAMBERE	13,302
KOLDA	Kolda	Mampatim	MADINA CHERIFF	12,923
KOLDA	Kolda	Mampatim	MAMPATIM	15,400
KOLDA	Kolda	Sare Bidji	SARE BIDJI	16,753
KOLDA	Kolda	Sare Bidji	THIETTY	4,372
KOLDA	Medina yoro foula	Fafacourou	BADION	8,523
KOLDA	Medina yoro foula	Fafacourou	FAFACOUROU	14,976
KOLDA	Medina yoro foula	Ndorna	BIGNARABE	5,184
KOLDA	Medina yoro foula	Ndorna	BOUROUCO	8,578
KOLDA	Medina yoro foula	Ndorna	KOULINTO	13,626
KOLDA	Medina yoro foula	Ndorna	NDORNA	18,081
KOLDA	Medina yoro foula	Niaming	DINGUIRAYE	8,382
KOLDA	Medina yoro foula	Niaming	KEREWANE	19,175
KOLDA	Medina yoro foula	Niaming	NIAMING	17,488
KOLDA	Velingara	Bonconto	BONCONTO	10,233
KOLDA	Velingara	Bonconto	LINKERING	17,059

REGION	DEPARTMENT	ARRONDISEMENT	COMMUNE	POP 2013
KOLDA	Velingara	Bonconto	MEDINA GOUNASS	48,219
KOLDA	Velingara	Bonconto	SINTHIANG KOUNDARA	26,554
KOLDA	Velingara	Pakour	OUASSADOU	16,529
KOLDA	Velingara	Pakour	PAKOUR	12,504
KOLDA	Velingara	Pakour	PAROUMBA	14,838
KOLDA	Velingara	Sare Coly Salle	KANDIA	21,075
KOLDA	Velingara	Sare Coly Salle	KANDIAYE	12,693
KOLDA	Velingara	Sare Coly Salle	NEMATABA	10,554
KOLDA	Velingara	Sare Coly Salle	SARE COLY SALE	19,000
MATAM	Kanel	Orkadiere	AOURE	35,137
MATAM	Kanel	Orkadiere	BOKILADJI	30,447
MATAM	Kanel	Orkadiere	ORKADIERE	40,533
MATAM	Kanel	Wouro Sidy	NDENDORY	32,182
MATAM	Kanel	Wouro Sidy	WOURO SIDY	37,307
MATAM	Matam	Agnam Civol	DABIA	23,121
MATAM	Matam	Agnam Civol	DES AGNAM	26,321
MATAM	Matam	Agnam Civol	OREFONDE	19,175
MATAM	Matam	Ogo	BOKIDIAWE	52,282
MATAM	Matam	Ogo	NABADJI CIVOL	52,372
MATAM	Matam	Ogo	OGO	45,592
SAINT LOUIS	Dagana	Mbane	BOKHOL	16,806
SAINT LOUIS	Dagana	Ndiaye	DIAMA	34,828
SAINT LOUIS	Dagana	Ndiaye	RONKH	21,593
SAINT LOUIS	Podor	Cas Cas	DOUMGA LAO	28,995
SAINT LOUIS	Podor	Gamadji Sare	GUEDE VILLAGE	44,091
SAINT LOUIS	Podor	Thile Boubacar	FANAYE	33,258
SAINT LOUIS	Podor	Thile Boubacar	NDIAYENE PENDAO	30,692
SEDHIOU	Bounkiling	Bona	DIACOUNDA	7,405
SEDHIOU	Bounkiling	Bona	INOR	8,633
SEDHIOU	Bounkiling	Diaroume	DIAROUME	17,926
SEDHIOU	Goudomp	Djibanar	DJIBANAR	10,548
SEDHIOU	Goudomp	Djibanar	MANGOUROUNGOU SANTO	12,485
SEDHIOU	Goudomp	Djibanar	SIMBANDI BALANTE	21,512
SEDHIOU	Goudomp	Djibanar	YARANG BANLANTE	12,305
SEDHIOU	Goudomp	Karantaba	KARANTABA	14,251
SEDHIOU	Goudomp	Karantaba	KOLIBANTANG	9,572
SEDHIOU	Goudomp	Simbandi Brassou	BAGHERE	10,797
SEDHIOU	Goudomp	Simbandi Brassou	NIAGHA	12,324
SEDHIOU	Goudomp	Simbandi Brassou	SIMBANDI BRASSOU	15,106
SEDHIOU	Sedhiou	Diende	DIANNAH BA	7,206

REGION	DEPARTMENT	ARRONDISEMENT	COMMUNE	POP 2013
SEDHIOU	Sedhiou	Diende	DIENDE	12,479
SEDHIOU	Sedhiou	Diende	SAKAR	9,028
SEDHIOU	Sedhiou	Diende	SAMA KANTA PEULH	3,851
SEDHIOU	Sedhiou	Djibabouya	BEMET BIDJINI	10,847
SEDHIOU	Sedhiou	Djibabouya	DJIBABOUYA	5,742
SEDHIOU	Sedhiou	Djibabouya	SAN SAMBA	13,787
SEDHIOU	Sedhiou	Djiredji	BAMBALI	17,330
SEDHIOU	Sedhiou	Djiredji	DJIREDJI	18,012
TAMBACOUNDA	Bakel	Bele	BELE	16,986
TAMBACOUNDA	Bakel	Bele	SINTHIOU FISSA	8,326
TAMBACOUNDA	Bakel	Kenieba	SADATOU	9,842
TAMBACOUNDA	Bakel	Moudery	BALLOU	21,345
TAMBACOUNDA	Bakel	Moudery	GABOU	19,002
TAMBACOUNDA	Bakel	Moudery	MOUDERY	23,589
TAMBACOUNDA	Koumpentoum	Bamba Thialene	BAMBA THIALENE	15,782
TAMBACOUNDA	Koumpentoum	Bamba Thialene	KAHENE	15,288
TAMBACOUNDA	Koumpentoum	Bamba Thialene	MERETO	13,296
TAMBACOUNDA	Koumpentoum	Bamba Thialene	NDAME	9,736
TAMBACOUNDA	Koumpentoum	Kouthiaba Ouolof	KOUTHIA GUAYDI	10,661
TAMBACOUNDA	Koumpentoum	Kouthiaba Ouolof	KOUTHIABA OUOLOF	19,455
TAMBACOUNDA	Koumpentoum	Kouthiaba Ouolof	PASS KOTO	12,413
TAMBACOUNDA	Koumpentoum	Kouthiaba Ouolof	PAYAR	19,700
ZIGUINCHOR	Bignona	Kataba I	DJINAKI	19,520
ZIGUINCHOR	Bignona	Kataba I	KATABA I	23,481
ZIGUINCHOR	Bignona	Sindian	SUELLE	9,146
ZIGUINCHOR	Bignona	Tenghori	COUBALANG	12,119
ZIGUINCHOR	Bignona	Tenghori	TENGHORY	30,743
ZIGUINCHOR	Oussouye	Loudia Ouolof	MLOMP	11,236
ZIGUINCHOR	Ziguinchor	Niaguis	ADEANE	17,580
ZIGUINCHOR	Ziguinchor	Niaguis	BOUTOUPA CAMARACOUNDA	5,149
ZIGUINCHOR	Ziguinchor	Niaguis	NIAGUIS	10,501
ZIGUINCHOR	Ziguinchor	Niassia	ENAMPOR	4,659
ZIGUINCHOR	Ziguinchor	Niassia	NIASSIA	5,081

Appendix 5. List of 2012 Truncated Baseline ZOI Communes

#	Region	Communes in Truncated Dataset (63)
1	FATICK	NIORO ALASSANE TALL
2	FATICK	TOUBACOUTA
3	KAFFRINE	TOUBA MBELLA
4	KAFFRINE	MABO
5	KAFFRINE	NDIOGNICK
6	KAFFRINE	KATHIOTTE
7	KAFFRINE	IDA MOURIDE
8	KAFFRINE	LOUR ESCALE
9	KAFFRINE	MISSIRAH WADENE
10	KAOLACK	THIARE
11	KAOLACK	NDIAFFATE
12	KAOLACK	MEDINA SABAKH
13	KAOLACK	NGAYENE
14	KAOLACK	GAINTHE KAYE
15	KAOLACK	PAOS KOTO
16	KAOLACK	PROKHANE
17	KAOLACK	TAIBA NIASSENE
18	KAOLACK	KEUR MABA DIAKHOU
19	KAOLACK	WACK NGOUNA
20	KEDOUGOU	BANDAFASSI
21	KEDOUGOU	BEMBOU
22	KOLDA	GUIRO YERO BOCAR
23	KOLDA	MEDINA EL HADJ
24	KOLDA	TANKANTO ESCALE
25	KOLDA	BAGADADJI
26	KOLDA	COUMBACARA
27	KOLDA	DIALAMBERE
28	KOLDA	SARE BIDJI
29	KOLDA	BADION
30	KOLDA	BIGNARABE
31	KOLDA	BOUROUCO

#	Region	Communes in Truncated Dataset (63)
32	KOLDA	NDORNA
33	KOLDA	DINGUIRAYE
34	KOLDA	KEREWANE
35	KOLDA	BONCONTO
36	KOLDA	MEDINA GOUNASS
37	KOLDA	SINTHIANG KOUNDARA
38	KOLDA	PAROUMBA
39	KOLDA	SARE COLY SALE
40	MATAM	DABIA
41	MATAM	OREFONDE
42	MATAM	BOKIDIAWE
43	MATAM	NABADJI CIVOL
44	MATAM	OGO
45	SAINT-LOUIS	BOKHOL
46	SAINT-LOUIS	DIAMA
47	SAINT-LOUIS	RONKH
48	SAINT-LOUIS	DOUMGA LAO
49	SAINT-LOUIS	GUEDE VILLAGE
50	SAINT-LOUIS	FANAYE
51	SAINT-LOUIS	NDIAYENE PENDAO
52	SEDHIOU	DIACOUNDA
53	SEDHIOU	INOR
54	SEDHIOU	SIMBANDI BALANTE
55	SEDHIOU	YARANG BANLANTE
56	SEDHIOU	BAGHERE
57	SEDHIOU	SAN SAMBA
58	SEDHIOU	BAMBALI
59	SEDHIOU	DJIREDJI
60	TAMBACOUNDA	KAHENE
61	ZIGUINCHOR	ADEANE
62	ZIGUINCHOR	NIAGUIS
63	ZIGUINCHOR	NIASSIA

Appendix 6. Population of Individuals by Category in the Current ZOI and the Sub-ZOI, Senegal 2013

Category of individuals	Estimated population[a]	
	Sub-ZOI (63 CRs)	Current ZOI (150 CRs)
Total population	**1,390,618**	**2,755,340**
Total population, by sub-population	1,187,864	2,358,571
Women of reproductive age (15-49 years)	299,539	599,838
Children 0-59 months	244,053	482,460
Children 0-5 months	22,667	45,463
Children 6-23 months	68,418	136,389
Children 6-59 months	221,386	436,997
Youth 15-29 years	331,801	657,424
Total population, by area type	**1,390,618**	**2,755,340**
Urban	--	--
Rural	1,390,618	2,755,340
Total population, by gendered household type	**1,390,618**	**2,755,340**
Male and female adult(s)	1,357,799	2,676,262
Female adult(s) only	26,283	67,506
Male adult(s) only	6,397	11,297
Child(ren) only (no adults)	139	275
Women of reproductive age, by pregnancy status	**299,539**	**599,838**
Pregnant	20,788	41,689
Non-pregnant	278,751	558,149
Children 0-59 months, by child sex	**244,053**	**482,460**
Male	125,718	241,602
Female	118,335	240,858
Children 0-5 months, by child sex	**22,667**	**45,463**
Male	10,416	22,767
Female	12,251	22,696
Children 6-23 months, by child sex	**68,418**	**136,389**
Male	35,449	68,040
Female	32,969	68,349
Children 6-59 months, by child sex	**221,386**	**436,997**
Male	115,302	218,835
Female	106,084	218,162
Youth 15-29 years, by sex	**331,801**	**657,424**
Male	155,335	301,725
Female	176,466	355,699

Source: National Statistics Office data [ANSD], 2013.

a The total population for the entire ZOI and the sub-ZOI are from the 2013 ANSD census. The category of individuals for the entire ZOI are extrapolated based on the 2015 interim survey's entire ZOI subpopulation proportions. The category of individuals for the sub-ZOI are extrapolated based 2015 interim survey's truncated 63 CR sample subpopulation proportions.