Baseline Nutrition and WASH Survey of Refugee Settlements in Southern Sudan

December 2010



UNHCR
United Nations High Commissioner for Refugees
Haut Commissariat des Nations Unies pour les réfugiés

Collecting water in Lalu Settlement: *Photo by Fiona Cameron*

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Acronyms

ARI	Acute Respiratory Infection
CAR	Central African Republic
CBR	Crude Birth Rate
CMR	Crude Mortality Rate
DRC	Democratic Republic of Congo
ENA	Emergency Nutrition Assessment
FCS	Food Consumption Score
GAM	Global Acute Malnutrition
HH	Household
MAM	Moderate Acute Malnutrition
MUAC	Middle Upper Arm Circumference
SAM	Severe Acute Malnutrition
SMART	Standardized Monitoring & Assessment of Relief & Transitions
UNHCR	United Nations High Commissioner for Refugees
WASH	Water, Sanitation & Hygiene
WFP	World Food Programme

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Finally, on behalf of UNHCR, myself, and the entire research team, I would like to extend my sincere gratitude to the individuals who volunteered their time to participate in this assessment.

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Executive Summary

This study was conducted in five refugee settlements: Lologo, Lasu, Ezo, Makpandu, and Pochalla. The baseline assessment consisted of administering three questionnaires to obtain an estimate of the extent of malnutrition of children aged 6-59 months and and the knowledge and practices of water, sanitation and hygeine in the five settlements. The surveys were designed to assess levels of knowledge and practices regarding good nutrition, water, sanitation, and hygiene practices, as well as food consumption. Information was collected through interviews of heads of households and mothers or caretakers as well as through anthropometric measurements of children between 6 and 59 months and hemoglobin levels of non-pregnant mothers and children aged 6-59 months. Data was collected through a randomized sampling technique with quotas designed and advised by the SMART methodology and ENA software. Information was gathered through four components: interview with the household head, interview with the caretaker/mother, anthropometric measurements obtained by a trained data collector, and hemoglobin levels tested through blood sample from the child and mother. This assessment collected and analyzed information on household food consumption, water, sanitation, and hygiene knowledge and practices, nutritional status and death of children under age five, the illness prevalence of children under five, and the birth rate and crude mortality rate in the five settlements.

The following paragraphs summarize the key findings of the study.

In Lologo, there are 998 refugees of the Anyuak tribe originating from Ethiopia. Nutritional indicators for children under five were under the WHO emergency threshold with a global acute malnutrition prevalence of 10.1%. Similarly, measurements of the middle upper-arm circumference (MUAC) indicated that 97.1% were classified as "normal" and thus not at risk for malnutrition. However, anemia levels were high with 76.1%, despite 94.3% of the households interviews receiving an acceptable score on the WFP dietary diversity index. Water and sanitation indicators demonstrated a need for improved water sources and latrine facilities, with only 74.7% using an improved water source currently and 91.9% of households surveyed using the bush for defecation. However, it is understood that many of these issues will be addressed when the population is relocated to a new settlement in the coming months. Despite this improvement, there is a need for awareness raising on hygiene practices as well as provision of soap, as just over half 54.4% of households indicated that they had soap available.

Lasu hosts 7,038 refugees originating from the Democratic Republic of Congo. Nutritional indicators for children under five noted some need for intervention with a global acute malnutrition prevalence of 10.4%. Similarly, 91.3% of children under 5 had a MUAC circumference over 13.5cm classifying them as normal and not at risk for malnutrition. Under five anemia rates were low in comparison to other settlements at only 44.8%. This trend was also seen in an assessment of dietary diversity where no households were found to have poor dietary diversity and only 5.6% being classified as borderline. Lasu demonstrated remarkable indicators on water and sanitation, with 100% of households surveyed reporting boreholes as their primary water source and less than 1% reporting open defecation. Similarly, 90.3% of people have soap available in their homes. Given the achievements of the Lasu settlement it is suggested that the programs and practices

of the implementing partner in this location (ACROSS) be examined more closely for potential replication in the other settlements.

In the Ezo settlement there are 3,539 refugees originating from the Democratic Republic of Congo and the Central African Republic. Global malnutrition rates in this location are at the WHO emergency threshold of 15.1%. This is correlated with the highest anemia prevalence of all the settlements with 79.7% of children under five being classified as anemic. However, only 6.8% of children were found with with a MUAC between 12.5 and 13.4 cm and thus "at-risk" for malnutrition. Furthermore, 93.3% of households surveyed in Ezo were found to have an acceptable level of dietary diversity. In terms of water and sanitation indicators, Ezo faired well, with 82.4% of households using improved water sources, no reported households using the bush for defecation, and 76.7% of households having soap available.

In the Makpandu settlement, there are 4,305 refugees originating from the Democratic Republic of Congo and the Central African Republic. Similar to Ezo, GAM was above the WHO emergency threshold at 16.8%. However, 94.1% of children were found to have a normal middle upper-arm circumference. Only 69.1% of households were found to have an acceptable dietary diversity and anemia levels were high among children under five at 77.2%. Also similar to Ezo, WASH indicators were satisfactory, with 99.7% of households surveyed using an improved water source, less than 1% reporting open air defecation, and 83.8% reporting soap availability in the home.

Pochalla hosts 3,368 Anyuak refugees from Ethiopia. Nutritional indicators for children under five showed need for intervention, with a GAM prevalence of 6.6%, although still well under the WHO emergency threshold. Only 3.7% had a middle upper-arm circumference less than 12.4cm indicating acute malnutrition, and an additional 8.3% at-risk for malnutrition. Anemia levels among children under five were high at 73.7%. The vast majority of households (75.8%) in Pochalla scored a poor dietary diversity. Water, sanitation and hygiene indicators were also poor and warranting attention with only 37.1% of households reporting using improved water sources, and almost all 95.2% reporting defecating in the bush. Soap was only available in 9% of the households surveyed.
Based on these findings and the other indicators discussed in this report, the following recommendations are made:

- Overall, households within the refugee settlements have acceptable food consumption patterns, with the exception of Pochalla.
- UNHCR should prioritize improving the water sources and access to latrines in Pochalla.
- Soap should be provided to households in Pochalla.
- More attention should be paid to practices and policies in the Lasu settlement.
- High prevalence of GAM in Ezo and Makpandu should be addressed through targeted, nutritional programs.
- There is a need for raising awareness regarding proper hygiene practices in Ezo and Makpandu.
- Need for better waste disposal facilities in Ezo.

1. Introduction

Refugees and displaced populations are particularly vulnerable to the worst nutrition, water, sanitation and hygiene indicators due to their mobile nature. Furthermore, groups fleeing crises and emergency situations often suffer from nutritional and health problems associated with environments in their countries of origin. As of December 2010, Southern Sudan hosted a total of 27,185 refugees from the Central African Republic, Democratic Republic of Congo and Ethiopia in five settlements in Central Equatoria, Western Equatoria, and Jonglei States. These settlements are managed by UNHCR's three implementing partners – ACROSS, World Vision, and IMC.
This baseline assessment was conducted to assist in the development of better health services and overall living conditions for these populations.

1.1 Methodology

The baseline assessment consisted of three questionnaires to be administered in the following locations: Lologo, Lasu, Ezo, Makpandu, and Pochalla.
The purpose of the assessment was to collect information on the following:

1) Household food consumption, including food sources and dietary diversity
2) Water, sanitation and hygiene knowledge, attitudes, and practices
3) Nutritional status and diet of children under five, including prevalence of anemia
4) Illness prevalence of children under 5
5) Birth rate and crude mortality rate

1.2 Baseline survey design

A cross-sectional quantitative study was conducted to obtain a reasonable estimate of the magnitude of malnutrition and for assessing levels of knowledge and practice concerning good nutrition, water, sanitation, and hygiene practices, and food consumption, to serve as a baseline for future assessment and inform programming. Necessary information for the calculation of birth and death rates was also collected. Information was gathered through interviewing heads of households and mothers/caretakers, in addition to anthropometric measurements and hemoglobin levels.

1.3 Baseline survey population

The source populations for the study were children 6-59 months of age and their mothers/caregivers who resided in the camps. In addition, nutritional and water, sanitation, hygiene, birth, and death information were collected from household heads.

1.4 Sample size and sampling procedure

A randomized sampling technique with quotas was used so that results could be obtained with a 95% confidence interval based on the current total population for each of the locations. The following table shows the quotas established for each questionnaire and each location.

Table 1: Sampling frame by questionnaire and location

Location	Total Population Size	Mortality Questionnaire	Total # of HHs	Nutrition/ WASH Questionnaire	Total # of Children Under 5	Children Under 5 Questionnaire
Lologo	998	399	477	210	202	104
Lasu	7038	607	1880	288	1591	252
Ezo	3539	548	1636	342	564	147
Makpandu	4305	576	2269	314	742	101
Pochalla	3368	667	956	359	678	217

In order to randomize the sample, at each of the camps, a route was designed as advised by the SMART methodology whereby each data collection team visited the third home on the route to collect data.

1.5 Data Collection

Information was gathered for the baseline survey through three components: interview with the household head, interview with the caretaker/mother, anthropometric measurements taken by a trained data collector, hemoglobin levels tested through blood sample from the child and mother. The mother was excluded if she was pregnant at the time of the interview.

Table 2: Dates of Data Collection by Location

Location	Data collection duration	Dates
Lologo, Central Equatoria	4 days	19/11/10 – 22/11/10
Lasu, Central Equatoria	4 days	24/11/10 – 27/11/10
Makpando, Western Equatoria	4 days	1/12/10 – 4/12/10
Ezo, Western Equatoria	4 days	6/12/10 – 9/12/10
Pochalla, Jongelei	4 days	29/11/10 – 2/12/10

[1] All population size references are taken from the UNHCR Refugee Population in the Settlements, South Sudan by Sex and Age Group Weekly Refugees Statistics from UNHCR Juba 18/12/2010.

[2] The sample size for calculating the mortality rate is determined using the following equation , where the sample size n and margin of error E are given by

x = Z(c/100)2r(100-r)

n = N x/((N-1)E2 + x)

E = Sqrt[(N - n)x/n(N-1)]

where N is the population size, r is the fraction of responses that one is interested in, and Z(c/100) is the critical value for the confidence level c. Assuming a 5% margin of error, 99% confidence interval, and 50% response distribution.

[3] The sample size was calculated using the same formula as explained in the above footnote, assuming a 5% margin of error, 95% confidence interval, and 50% response distribution.

[4] The sample size was calculated using the planning feature of the ENA software.

1.5.1 Nutrition & Water, Sanitation & Hygiene Questionnaire

A structured questionnaire was used to assess the levels of knowledge and practice on issues surrounding basic water, sanitation & hygiene. These questions were developed in conjunction with the UNHCR Regional Nutrition Specialist and UNHCR – Juba Associate Public Health Coordinator. An additional component also included questions necessary for the calculation of the World Food Programme Food Consumption Score. The questionnaire was written in English and translated by the data collectors into French, Amharic, or Anyuak as necessary. Discussions on each question as well as how it should be translated took place during the data collector training.

The questionnaire was designed in a way to gather important information on the following subject areas:

- Household demographic information
- Water sources
- Defecation practices
- Rubbish disposal
- Hand washing and access to soap
- Food sources and consumption patterns
- Food aid

Eligible respondents for interview were the heads of household. Trained data collectors interviewed eligible respondents using the questionnaire.

1.5.2 Mortality Questionnaire

A structured questionnaire was used to record the number of individuals in each household, as well as births and deaths in a 90 day recall period. These questions were based on the standard SMART questionnaire.

The questionnaire was written in English and translated by the data collectors into French, Amharic, or Anyuak as necessary. Discussions on each question as well as how it should be translated took place during the data collector training.

Eligible respondents for interview were the heads of household. Trained data collectors interviewed eligible respondents using the questionnaire.

1.5.3 Children under 5 Questionnaire

A structured questionnaire was used to assess the feeding practices and health of children under 5 in addition to determining the nutritional status of the children through weight, height, and Middle Upper-Arm Circumference (MUAC) measurements. The questionnaire was based on the standard SMART methodology in addition to questions formulated in conjunction with the UNHCR Regional Nutrition Specialist and UNHCR – Juba Associate Public Health Coordinator.

1.5.3.1 Weight Measurement

The weight measurements of children were obtained using the SMART methodology. Each team was provided with one hanging scale for weighing children. The scales have a precision of 100 grams and were standardized across data collectors each day with a set of weights. Data collectors first explained to mothers the procedure of weighing their children. The scale was hung from a suitable point and the dial on the scale was at eye level. The naked child was placed into the weighing basket then the basket was then hooked onto the scale. The data collectors read aloud and recorded the weight to the nearest 100 grams.

1.5.3.2 Length/Height Measurement

Each team had a length/height board to measure the length or height of the child. Children under 2 years of age were measured lying down and older children were measured standing up. For this purpose UNICEF's recommended model measuring board that accommodates children up to 130 centimeters was used.

1.5.3.3 Child Nutrition & Health Questionnaire

The questionnaire was written in English and translated by the data collectors into French, Amharic, or Anyuak as necessary. Discussions on each question as well as how it should be translated took place during the data collector training.

The questionnaire was designed in a way to gather important information on the following subject areas:

- Breastfeeding practices
- Child feeding practices
- Illnesses
- Mosquito net usage

Eligible respondents for interview were mothers/caregivers of the children under five years of age. In cases where mother/caregiver were not available, any adult (15 years or above) household member who lives with the child was interviewed; priority was given to the person who is reported to be closest to the child care. Trained data collectors interviewed eligible respondents using the questionnaire.

1.5.4 Hemoglobin Measurement/Anemia Prevalence

Hemoglobin levels were measured for all children between 5 – 59 months, as well as non-pregnant mothers, using a DiaSpect hemoglobin measurement device and corresponding microcuvettes. Data collectors for this component were required to have a experience working in a clinic or pharmacy in order to ensure proper technique and protocol were observed when dealing with biohazardous materials.

Anemia prevalence was tested through the collection of capillary blood samples and corresponding microcuvettes, which were measured using a DiaSpect hemoglobin machine. The data collectors followed the precise procedures of properly and safely sticking a finger, filling the microcuvette, and reading hemoglobin levels. Data collectors explained the procedure to the subjects and prepared the work station. After ensuring the correct position of the subject they selected either the middle finger or ring finger the blood sample would be taken from. The finger was disinfected, the lancet was placed on the finger, and the finger was pricked. The lancet was disposed of immediately in the biohazard waste container and the first drop of blood was wiped away. The hemoglobin sample was taken from the second drop of blood, which filled the microcuvette. Three minutes after the microcuvette was placed in the holder the sample was placed in a DiaApect hemoglobin machine. After a few minutes and the subject had received a plaster, the hemoglobin value appeared on the display for the recording of data. Gloves and contaminated material were then disposed of in the biohazard waste container.

Data collectors for this particular component of the assessment were recruited from existing health clinic staff or other members of the community with similar experience. They received additional training on techniques needed to maximize the accuracy of capillary blood testing, the correct use of diaspect machines, and proper procedures for handling biohazardous waste.

1.6 Pre-Test and Piloting

The study procedures and tools were pre-tested in the settlement of Lologo. After the pre-test, comments were gathered from the field teams and necessary adjustments to the study procedures and questionnaire were made. The measurement standardization (weight, height and MUAC) was also completed twice, once in the training room and the other on the field during piloting. The trainers were used as gold standards in taking anthropometric measurements. Each data collector took the measurement for 10 times in the class and at least 15 times on the field after the gold standards did the same measurement. For standardization in the class, weighted objects were used and on the field children were measured. Level of agreement between the gold standards and enumerators was calculated and all of them performed to the necessary standard.

For the above measurements, Cronbach's Alpha was used in the analysis as a measure of internal consistency. Intraclass correlation was also calculated. Since the main objective of taking anthropometric measurement is to determine the nutritional status of children, classification of the nutritional status of children by the gold standard and the data collectors was analyzed. Cohen's Kappa measure of agreement was used for this analysis. A Kappa value above 60% was considered as a good level of agreement. Only enumerators who performed 60% and above were included in the actual survey.]

1.7 Data Quality, Transfer & Storage

Appropriate data quality assurance mechanisms were established to ensure data quality from collection to analysis and reporting. The SMART manual was reviewed by all supervisors. Supervision of data collection took place at two levels to assure the standard procedures are followed and quality data was gathered. At the first level a field supervisor was assigned in each team to check whether sampling was done according to the manual in each enumeration area and data are collected using the study tools. At the second level the principle investigator conducted a visit two of the survey sites, directly overseeing the data collection process for the first site (Lologo).

The collected data then transferred by the designated field supervisor as soon as data collection was completed to the principle investigator. Manual data entry using Excel and ENA was completed by two clerks over the course of 20 days. The data entry was made separately for each of the three questionnaires. Randomized spot checks of 10% of the data entered was performed by the principle investigator to ensure accuracy.

Data cleaning procedure was also developed and data was cleaned before it is transferred to STATA software for analysis. Finally, the cleaned data was transformed into STATA statistical program for further analysis. For anthropometry analysis data was transferred to ENA software and all anthropometric data was calculated using 2005 WHO standards.

1.8 Limitations

Several limitations were encountered during the implementation of the baseline nutrition and WASH survey of refugee settlements in Southern Sudan. The biggest obstacle to data collection was the lack of sufficient time to recruit/train data collectors and to effectively survey the subjects. As the table below indicates, the subject quotas (5,000 surveys at each of the 5 settlements) were met for some of the questionnaires and for some of the settlements surveyed. We were allotted approximately 21 days to complete the survey in five locations. The timing and duration of this survey limited our ability to effectively recruit data collectors and administer surveys. The ramifications of this are discussed in greater detail in Annex 1.

Location	Total Population Size	Mortality Questionnaire	Mortality Questionnaires	Total # of HHs	Nutrition/WASH Questionnaire	Nut/WASH Completed	Total # of Children Under 5	Children Under 5 Questionnaire	Children Under 5 Completed
Lologo	998	399	399	477	213	211	202	111	107
Lasu	7038	607	637	1880	319	288	1591	213	252
Ezo	3539	559	548	1636	311	342	564	171	147
Makpandu	4305	576	631	2269	329	314	742	185	101
Pochalla	3368	555	667	956	274	360	678	181	217

5 All population size references are taken from the UNHCR Refugee Population in the Settlements, South Sudan by Sex and Age Group Weekly Refugees Statistics from UNHCR Juba 18/12/2010.

6 The sample size for calculating the mortality rate is determined using the following equation , where the sample size n and margin of error E are given by

x = Z(c/100)2r(100-r)

n = N x/((N-1)E2 + x)

E = Sqrt[(N - n)x/n(N-1)]

7 where N is the population size, r is the fraction of responses that you are interested in, and Z(c/100) is the critical value for the confidence level c. Assuming a 5% margin of error, 99% confidence interval, and 50% response distribution.

The sample size was calculated using the same formula as explained in the above footnote, assuming a 5% margin of error, 95% confidence interval, and 50% response distribution.

2. Logogo

2.1 Socio-demographic characteristics of household heads and children interviewed

The baseline survey was conducted in Logogo, Central Equatoria State. The camp was established in December 2003 and at the time of the survey was hosting 477 families and 998 individuals from Ethiopia. Further demographics of the total population are available in the following table.

Table 3: Refugee Population in Logogo by Sex and Age Group, December 2010

# of HHs	Total	998	
Number of Refugees	Female headed	HH	100
		%	21.0
	0 – 4 years old	F	94
		M	108
		T	202
	5 – 11 years old	F	89
		M	82
		T	171
	12 – 17 years old	F	30
		M	24
		T	54
	18 - 59 years old	F	189
		M	378
		T	567
	60 years +	F	2
		M	2
		T	4
	NA	F	0
		M	0
		T	0
	Total	F	404
		M	594
		T	998

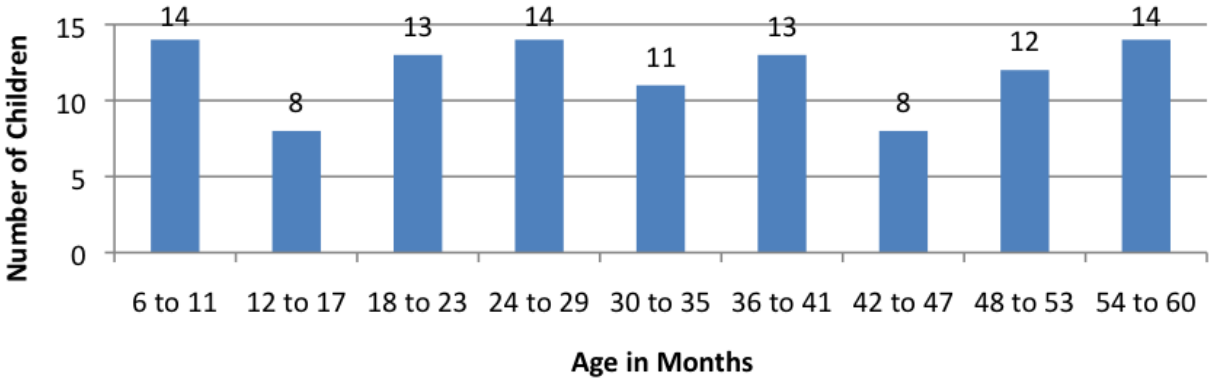
Nutritional and WASH information was gathered from 210 households, mortality and birth information was gathered from 399 households and health was gathered information on 107 children. As indicated in Table 4, the majority of households interviewed were headed by men (75.7%, n=159) and two (1.0%) household heads are aged 15 to19 years. The majority of household heads are between the ages of 25-29 (32.9%, n=69).

Table 4: Socio-demographic characteristics of Respondent HHs in the study in Logogo, December 2010

Characteristics	Frequency	Percent
Household Head Sex		
Male	159	75.7
Female	51	24.3
Total	210	100.0
Household Head Age		
15-19	2	1.0
20-24	41	19.5
25-29	69	32.9
30-34	55	26.2
35-39	14	6.7
40-44	19	9.1
45-49	8	3.8
50-54	2	1.0
55-59	0	0.0
60-64	0	0.0
>65	0	0.0
Total	210	100.0
Household Family Size		
1	102	48.6
2-4	67	32.1
5-6	31	14.8
7-8	7	3.4
More than 8	2	1.0
Total	209	100.0

From the children included in the study, 42 were male (45.7%) and 50 were female (54.4%). The largest sampled ages included 6-11 months (14%), 24-29 months (14%), and 54-60 months (14%). Figure 1 shows the distribution of the ages of those children included in the survey.

Figure 1 : Age distribution of children in the study in Lologo, December 2010



2.2 Sphere Indicator Comparison

This section will compare highlights of the results of the study in Lologo against the Sphere Minimum Standards. The Minimum Standards and corresponding indicators represent a general consensus among practitioners regarding the level and type of services to be delivered in each sector.[9] Two sectors will be addressed in this comparison: water supply & sanitation and nutrition.

[9] Sphere Project. 2004. Humanitarian Charter and Minimum Standards in Disaster Response.

[10] Formula: 12 minutes roundtrip walking 500 meters to the water source at 5 kph (average walking speed) + 15 minutes maximum queuing time + (3 minutes per Jerry Can x average of 3 Jerry Cans/HH) = 36 minutes

[11] It should be noted as a limitation that the survey took place while ACROSS was distributing mosquito nets to mothers with children under the age of 5.

Table 5: Water Supply & Sanitation Sphere Indicator Comparison with Lologo, December 2010

Sphere Indicator	Lologo Results
Average water use for drinking, cooking and personal hygiene in any household is at least 15 liters per person per day.	See Table 8.
Maximum distance to the water point is not more than 500 meters, queuing time at the water source is no more than 15 minutes and it takes no more than 3 minutes to fill a 20 liter container.	45.4% (n=102) of respondent households are able to collect water in a timely fashion.
Water collection and storage containers have narrow necks and/or covers.	76.3% of respondent households are using narrow neck Jerry Cans.
There is at least 250g of soap available for personal hygiene per person per month.	54.4% of respondent households have soap available in the home.
Household waste burnt or buried in a specified refuse pit.	27.9% of respondent households dispose of household waste either by burning or use of a designated compost pit.
Toilets are no more than 50 meters from dwellings	47.2% of respondent households indicated that their defecation facilities were less than 50 meters from their home.
Children's feces are disposed of hygienically	33.6% of respondent households dispose of children's feces in a hygienic fashion.
Children sleep under mosquito nets.	98.1% of children under 5 in respondent households sleep under a mosquito net.

Table 6: Nutrition Sphere Indicator Comparison with Lologo, December 2010

Sphere Indicator	Lologo Results
There is access to a range of foods – staple, pulses and fat sources that meet nutritional sources.	94.3% of respondent households had acceptable dietary diversity using the WFP Food Consumption Scale.
Infants under six months are exclusively breastfed.	90.3% of children under the age of 5 in respondent households were exclusively breastfed for the first six months.

Table 7: Water Consumption by HH Size as Compared to Sphere Indicator in Lologo, December 2010

# in HH	Jerry Cans Required	# Achieving Indicator	% Achieving Indicator	Avg. Jerry Can Consumption/ Day
1	1	102	100.0	1.9
2	2	14	82.4	2.6
3	3	11	64.7	3.2
4	3	26	78.8	3.4
5	4	10	62.5	3.7
6	5	4	26.7	3.3
7	6	1	100.0	5.0
8	6	2	33.33	4.2
9	7	0	0.0	5.0
10	8	0	0.0	4.0

2.3 Household food consumption

Only one household (0.5%) in the study area had access to land for cultivation. Almost all (99.5%; n=206) households indicated that they had received some type of food aid during the previous six months (May – November 2010).

Table 8: Consumption and food sources for HH surveyed in Lologo, December 2010

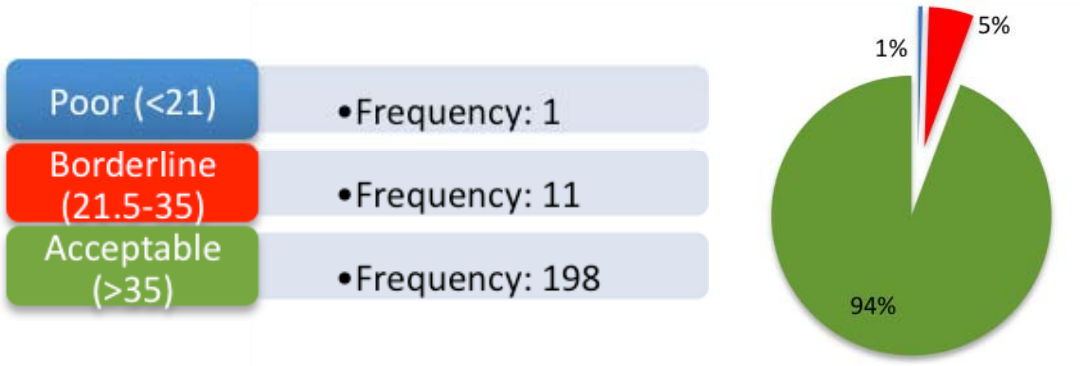
Food Item	Consumed in Past Week		Source: Personal Production		Source: Food Aid	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Maize	199	95.2	0	0.0	197	99.0
Rice	36	17.3	0	0.0	0	0.0
Sorghum	115	55.0	1	0.9	113	98.3
Millet	3	1.4	1	33.3	1	33.3
Wheat	10	4.8	0	0.0	3	33.3
Cassava	2	1.0	1	50.0	1	50.0
Potatoes	33	15.8	3	8.6	0	0.0
Yams	12	5.7	1	10.0	0	0.0
Bread	69	33.0	4	5.5	5	6.9
Beans	165	79.0	5	3.0	123	74.1
Groundnuts	36	17.2	2	6.5	7	22.6
Vegetables	68	32.5	2	2.8	15	20.8
Fruit	21	10.1	0	0.0	6	37.5
Fish	141	49.5	4	2.8	4	2.8
Meat	82	28.6	1	1.2	5	6.2
Eggs	20	6.9	4	19.1	4	19.1

[12] The Sphere indicator for availability of water for consumption, cleansing, cooking, and other uses is 15 liters per person per day. In the survey, respondents were asked how many 20-liter Jerry Cans were consumed by the household per day. For the purpose of measuring consumption against the Sphere indicator, the number of liters per person was calculated and then rounded up to the nearest increment of 20 liters, or number of Jerry Cans.

Only twelve individuals (5.8%) indicated that they consumed alcohol in the week prior. The majority indicated that they consumed alcohol only once (50.0%; n=6) in the seven day period.

Overall, based on the WFP dietary diversity assessment, the food consumption score of the majority of households (94.3%, n=198) in Lologo was characterized as "acceptable," with a score more than 35. Chart 1 details the food consumption scores of all households.

Chart 1: Food Consumption Scores of Households Surveyed in Lologo, December 2010



2.4 Water and sanitary conditions

The majority of respondents (74.2%; n=155) indicated that their main source of drinking water was a borehole. Furthermore, nearly half (45.4%, n=93) indicated that reaching the time required to collect water was between 30-59 minutes.

Table 9: Water and sanitary conditions of HH surveyed in Lologo, December 2010

Characteristics	Frequency	Percentage
Main water source		
Borehole	155	74.2
Protected water source	1	0.5
Unprotected pond river/stream/well	53	25.4
Total	209	100.0
Number of Jerry Cans used per day		
1	55	26.2
2	58	27.6
3	39	18.6
4	26	12.4
<5	32	15.2
Total	210	100.0
Type of Jerry Can used		
Narrow mouth	148	76.3
Wide mouth	46	23.7
Total	194	100.0
Time to collect water [13]		
Less than 15 minutes	33	16.1
15- 29 minutes	15	7.3
30- 59 minutes	93	45.4
60- 89 minutes	41	20
90 – 119 minutes	12	5.9
120 minutes or more	11	5.4

[13] This is the amount of time required to travel to the water collection point, queue, collect water and return.

Total	205	100.0
Frequency water container washed		
Every time used	171	81.4
Every week	34	16.2
Every month	5	2.4
Never	0	0.0
Total	210	100.0
Satisfied with camp water supply		
Yes	88	42.1
No	121	57.9
Total	209	100.0
Reason dissatisfied		
Water is bad	8	5.1
Not enough water	119	76.3
Queues too long	1	0.6
Interruptions	10	6.4
Distribution times	18	11.5
Total	156	100.0

As shown in Table 10, most households (91.9%; n=193) indicated they used the bush for defecation. Only 8.1% (n=17) indicated having access to a latrine. The majority of households (52.4%; n=108) indicated they were over 50 meters away from where they defecate. The most common method of disposal for children's feces was in a bush (66.5%, n=117). Most households (65.4%, n=136) noted that they disposed of household rubbish in the bush as well.

Table 10: Water and sanitary conditions of HH surveyed in Lologo, 2010 (continued)

Characteristics	Frequency	Percentage
Type of defecation facility		
Private latrine	5	2.4
Community latrine	11	5.2
Bush	193	91.9
Neighbor's latrine	1	0.5
Other	0	0.0
Total	210	100.0
Meters from defecation facility		
Less than 10 meters	36	17.6
10 to 50 meters	61	29.6
Over 50 meters	108	52.4
Total	205	100.0
Method of disposal of child feces		
Private latrine	8	4.6
Community latrine	3	1.7
Bush	117	66.5
Bury	48	27.3
Total	176	100.0

Method of disposal of HH waste		
Compost pit	1	0.5
Garden	1	0.5
Bush	136	65.4
Burn	57	27.4
Pickup organized by ACROSS	13	6.3
Total	208	100.0

As demonstrated in Table 11, the majority of individuals interviewed (68.3%, n=142) indicated that when washing their hands they used soap and water. Only 31.7% (n=66) indicated that they used water only. In addition, only 54.4% (n=112) of individuals indicated that soap was available in their homes.

Table 11: Soap use and availability in HH surveyed in Lologo, December 2010

Characteristic	Frequency	Percentage
Materials used to wash hands		
Water alone	66	31.7
Soap and water	142	68.3
Ash	0	0.0
Soil or sand	0	0.0
Total	208	100.0
Availability of soap in HH		
Yes	112	54.4
No	94	45.6
Don't Know	0	0.0
Total	206	100.0

Table 12 compares knowledge and practice with regards to soap use and shows that when soap is available. These numbers clearly indicate a need for both greater soap provisions in households as well as awareness raising of proper hygienic practices.

Table 12: Knowledge and practice of soap used in HH surveyed in Lologo, December 2010

Use	Knows to Use Soap		Practice Day Prior	
	Frequency	Percentage	Frequency	Percentage
Preparing food	--		80	64.5
Before eating	--		85	68.6
Before feeding children	107	51.4	46	37.1
After changing baby	89	42.6	46	37.1
After defecating	136	65.1	85	68.6

2.5 Feeding practices

The breast feeding practice in Lologo is estimated to be 96.3% (n=103), with 60.2% (n=62) initiating breastfeeding within the first hour of birth. In addition, 90.3% (n=93) reported exclusively breastfeeding for the first six months. The most commonly introduced foods in the first six months were cereals (94.2%, n=97) and milk (76.9%, n=80).

Table 13: Breast feeding history of children born in the five years preceding the survey in Lologo, December 2010

Breast feeding history	Frequency	Percentage
Children ever breastfed		
Yes	103	96.3
No	4	3.7
Total	107	100.0
Breastfeeding initiated		
Within 1 hour of birth	62	60.2
After 1 hour of birth	41	39.8
Total	103	100.0
Exclusive breastfeeding for 6 months		
Yes	93	90.3
No	10	9.7
Total	103	100.0
Foods given before 6 months		
Water	48	46.2
Milk	80	76.9
Juice	20	19.2
Cereal	97	94.2
Tea	3	2.9
Soup	0	0.0
Duration of breastfeeding		
6 months or less	13	12.2
7 to 12 months	12	11.2
13 to 18 months	11	10.3
19 to 24 months	45	42.1
25 to 36 months	21	19.6
37 to 47 months	1	0.9
48 months or more	4	3.7
Total	107	100.0

In the past week, the most commonly reported foods given to children under the age of five were fruits (44.2%, n=46), milk (36.5%, n=38), fish (34.6%, n=36), and meat (34.6%, n=36). Most children surveyed (80.0%, n=64) received three meals the day prior. Boys were significantly more likely to receive three meals a day than girls (16 percentage points); girls were 14 percentage points more likely than boys to only receive two meals the day prior.

Table 14: Current feeding practice of children born in the last five years preceding the survey in Lologo, December 2010

Feeding Practice	Frequency	Percentage
Frequency of feeding in previous day		
0 meals	0	0.0
1 meal	1	1.3
2 meals	13	16.3
3 meals	64	80.0
4 meals	2	2.5
5 meals	0	0.0
6 meals	0	0.0
Total	80	100.0
Foods administered in past week		
Cereal	17	16.4
Legumes	34	32.7
Fish	36	34.6
Milk	38	36.5
Meat	36	34.6
Tubers	32	30.8
Fruits	46	44.2

2.6 Diarrheal disease & other illnesses

The prevalence of diarrheal illness in the two weeks prior to the study among those interviewed was 50.0% (n=52). With regard to the occurrence of febrile illnesses among children in Lologo, 60.6% (n=63) reported having some form of fever in the two weeks before the study. Almost all (98.1%, n=103) of children under the age of five surveyed regularly sleep under a mosquito net.[14] Acute respiratory infections (ARI) were also frequently reported, with 50.0% (n=52) of children surveyed having suffered from an ARI in the two weeks prior to the survey. Table 15 provides more details on the illnesses reported by children in Lologo.

[14] This number is expected to be artificially high as the survey took place during mosquito net distribution, and thus may not reflect normal practice in the camp.

Table 15: Illnesses reported among children under 5 in the two weeks prior to the survey in Lologo, December 2010

Variable	Frequency	Percentage
Had fever in last 2 weeks		
Yes	63	60.6
No	41	39.4
Total	104	100.0
Had measles in last 2 weeks		
Yes	2	1.9
No	102	98.1
Total	104	100.0
Had diarrhea in last 2 weeks		
Yes	52	50.0
No	52	50.0
Total	104	100.0
Had ARI in last 2 weeks		
Yes	52	50.0
No	52	50.0
Total	104	100.0
Had skin disease in last 2 weeks		
Yes	11	10.6
No	93	89.4
Total	104	100.0
Had eye disease in last 2 weeks		
Yes	1	1.0
No	103	99.0
Total	104	100.0
No illness in last 2 weeks		
Yes	19	18.3
No	85	81.7
Total	104	100.0

2.7 Nutritional status of children

Height, weight, prevalence of oedema, mid upper-arm circumference (MUAC), and hemoglobin levels were recorded for children between 6 and 59 months to estimate nutritional status. The prevalence of global malnutrition (<-2 z-score and/or oedema) was 10.3% (n=6), with little variation between boys at 10.2% (n=5) and girls 10.3% (n=6). Prevalence of moderate malnutrition (<2 z-score and >= 3 z-score, no oedema) was 5.6% (n=6), without significant variation by gender. There were also cases of severe malnutrition (<-3 z-score and/or oedema), with a prevalence of 4.7% (n=5) and little variation by gender. Table 16 details these findings also with the confidence intervals.

Table 16: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex in Lologo, December 2010

	All n=107		Boys n= 49		Girls n= 58	
Prevalence of global malnutrition	Freq.	Percent.	Freq.	Percent.	Freq.	Percent.
	(<-2 z-score and/or oedema)		(1.7-18.7; 95% C.I.)		(2.5-18.2; 95% C.I.)	
Prevalence of moderate malnutrition (<2 z-score and >= 3 z-score, no oedema)	6	5.6	3	6.1	3	5.2
	(1.2-10.0; 95% C.I.)		(-0.6-12.8; 95% C.I.)		(-0.5-10.0; 95% C.I.)	
Prevalence of severe malnutrition	5	4.7	2	4.1	3	5.2
	(<-3 z-score and/or oedema)		(-1.5-9.6; 95% C.I.)		(-0.5-10.9; 95% C.I.)	

Children between the ages of 18-29 months showed a much higher propensity to present with acute malnutrition based on weight-for-height z-scores (wasting), as demonstrated in the following table.

Table 17: Prevalence of acute malnutrition by age based on weight-for-height z-scores and/or oedema in Lologo, December 2010

		Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age	Total	No.	%	No.	%	No.	%	No.	%
6-17	23	1	4.3	1	4.3	21	91.3	0	0.0
18-29	27	3	11.1	1	3.7	23	85.2	0	0.0
30-41	24	0	0.0	0	0.0	24	100.0	0	0.0
42-53	19	1	5.3	2	10.5	16	84.2	0	0.0
54-59	14	0	0.0	2	14.3	12	85.7	0	0.0
Total	107	5	4.7	6	5.6	96	89.7	0	0.0

Further analysis also showed that a small percentage of the population as qualified as marasmic (4.7%; n=5), but none were classified as kwashiorkor or marasmic kwashiorkor.

Many of the children surveyed were stunted, with 41.1% (n=44) with a less than -2 z-score. The following table details the findings of the height-for-age measurements.

Table 18: Prevalence of stunting based on height-for-age z-scores and by sex in Lologo, December 2010

	All n=107		Boys n= 49		Girls n= 58	
Prevalence of stunting (<-2 z-score)	Freq.	Boys	Freq.	Percent.	Freq.	Percent.
	44	41.1	20	40.8	24	41.4
	(25.6-43.6; 95% C.I.)		(15.9-41.2; 95% C.I.)		(27.1-52.2; 95% C.I.)	
Prevalence of moderate stunting (<2 z-score and >= 3 z-score)	25	23.4	11	22.4	14	24.1
	12.9-28.2; 95% C.I.)		(6.0-26.7; 95% C.I.)		(13.1-35.2; 95% C.I.)	
Prevalence of severe stunting (<-3 z-score)	19	17.8	9	18.4	10	17.2
	(7.4-20.6; 95% C.I.)		3.1-21.4; 95% C.I.)		(6.2-24.8; 95% C.I.)	

Less than one quarter of the population sampled were found to be underweight, with 83.2% of the population having a weight-for-age z-score within the acceptable range. The following table details the findings.

Table 19: Prevalence of underweight based on weight-for-age z-scores in Lologo, December 2010

	All n=107		Boys n= 49		Girls n= 58	
Prevalence of underweight (<-2 z-score)	Freq.	Boys	Freq.	Percent.	Freq.	Percent.
	18	16.8	8	16.3	10	17.2
	(15.3-31.4; 95% C.I.)		(12.4-36.5; 95% C.I.)		(11.7-33.1; 95% C.I.)	
Prevalence of moderate stunting (<2 z-score and >= 3 z-score)	10	9.3	5	10.2	5	8.6
	(9-22.8; 95% C.I.)		(7.5-29.2; 95% C.I.)		(4.9-22.7; 95% C.I.)	
Prevalence of severe stunting (<-3 z-score)	8	7.5	3	6.1	5	8.6
	(2.5-12.5; 95% C.I.)		(-0.6-12.8; 95% 0C.I.)		(1.4-15.8; 95% C.I.)	

There were no cases of oedema observed. Based on the MUAC measurement, only 2 (1.9%) of the children were found to be in a state of acute malnourishment (MUAC >12.5). The following table details the findings of the MUAC measurements.

Chart 2: MUAC classifications in Lologo, December 2010

Finally, 76.1% (n=70) of children surveyed were found to have low hemoglobin levels (less than 11.0 g/dl) indicating the presence of anemia. In addition to these children, 37.4% (n=40) of their mothers also presented with anemia (less than 12.0 g/dl). Furthermore, boys were more likely to present with anemia than girls, and anemia was most severe among the youngest children (6-23 months).

Table 20: Hemoglobin levels of children and mothers in Lologo, December 2010

Characteristics	Frequency	Percentage
Child Hemoglobin Level		
Less than 11.0 g/dl	70	76.1
11.0 g/dl +	22	23.9
Total	92	100.0
Mother Hemoglobin Level		
Less than 12.0 g/dl	40	37.4
12.0 g/dl +	67	62.6
Total	107	100.0

Table 21: Children under five presenting with anemia by sex in Lologo, December 2010

Anemia	Male Children		Female Children		Total	
	Freq.	Percent	Freq.	Percent	Freq.	Percent
Yes Hemoglobin less than 11.0 g/dl	35	83.3	35	70.0	70	76.1
No Hemoglobin 11.0 g/dl +	7	16.7	15	30.0	22	23.9
Total	42	100.0	50	100.0	92	100.0

Table 22: Breakdown of anemia by age and severity in Logolo, December 2010

Age	Severe (<7g/dL)		Moderate (7-9.9g/dL)		Mild (10-10.9/dL)		Total Anemia	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
6-23 mos.	3	9	21	62	8	24	32	94
24 – 35 mos.	1	4	12	50	4	17	17	71
36 - 59 mos.	1	2	22	49	8	18	31	69
Total	5	15	55	52	20	19	80	76

3. Lasu

3.1 Socio-demographic characteristics of household heads and children interviewed

The baseline survey was conducted in Lasu, Central Equatoria State. The camp was established in February 2009 and at the time of the survey was hosting 1,880 families and 7,038 individuals from the Democratic Republic of Congo. Further demographics of the total population are available in the following table.

Table 24: Refugee Population in Lasu by Sex and Age Group, December 2010

# of HHs	Total	1,880	
Number of Refugees	Female headed	HH	897
		%	47.7
	0 – 4 years old	F	804
		M	787
		T	1,591
	5 – 11 years old	F	871
		M	857
		T	1,728
	12 – 17 years old	F	481
		M	467
		T	948
	18 - 59 years old	F	1,459
		M	1,109
		T	2,568
	60 years +	F	126
		M	73
		T	199
	NA	F	2
		M	2
		T	4
	Total	F	3,743
		M	3,295
		T	7,038

Nutritional and WASH information was gathered from 288 households, mortality and birth information gathered from 637 households, and health information on 252 children. As indicated in Table 25, a slight majority of households interviewed were headed by women (50.2%, n=143) and 10 (3.5%) of household heads are aged 15 to19 years. The majority of household heads are between the ages of 30-34 (16.5%, n=47).

Table 25: Socio-demographic characteristics of Respondent HHs in the study in Lasu, December 2010

Characteristics	Frequency	Percent
Household Head Sex		
Male	142	49.8
Female	143	50.2
Total	285	100.0
Household Head Age		
15-19	10	3.5
20-24	45	15.7
25-29	40	13.9
30-34	47	16.5
35-39	35	12.3
40-44	27	9.5
45-49	30	10.5
50-54	20	7.0
55-59	14	4.9
60-64	13	4.6
>65	1	0.4
Total	285	100.0
Household Family Size		
1	32	11.1
2-4	120	41.7
5-6	68	23.6
7-8	51	17.7
More than 8	17	5.9
Total	288	100.0

Quick Facts

- Implementing Partner: ACROSS
- Total Number of Refugees: 7,038
- Country of Origin: DRC
- Crude Birth Rate: 14.49/1,000
- Crude Death Rate: 2.19/1,000
- Crude Death Rate <5: 6.09/1,000

Indicators for Children Under 5

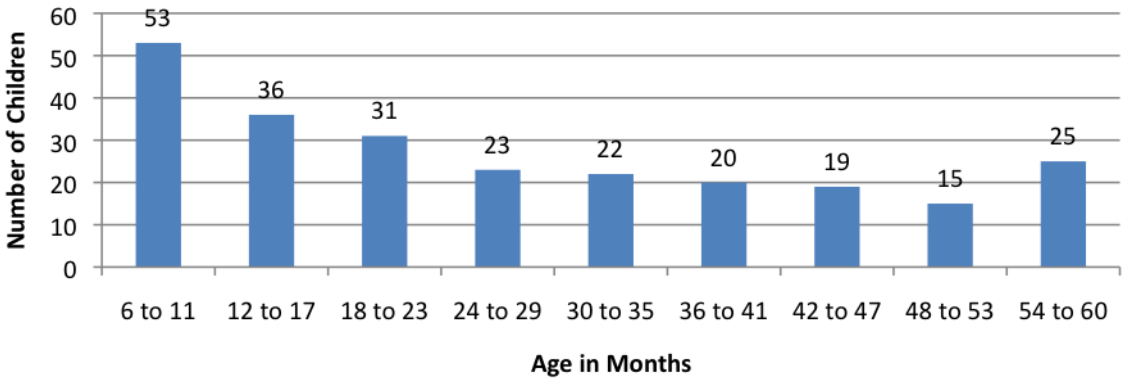
- GAM: 10.4%
- Wasting Prevalence: 3.4%
- Underweight Prevalence: 14.9%
- Stunting Prevalence: 35.1%
- Oedema Prevalence: 3.4%
- Anemia Prevalence: 44.8%
- MUAC ≥ 135mm: 87.6%

WASH Indicators

- Using Improved Water Source:100.0%
- Soap Available in Home: 90.3%
- Open Defecation: 0.7%

From the children included in the study, 127 were male (50.4%) and 125 were female (49.6%). The largest sampled ages included 6-11 months (21.7%) and 12-17 months (14.75%). Figure 2 shows the distribution of the ages of those children included in the survey.

Figure 2 : Age distribution of children in the study in Lasu, December 2010



3.2 Sphere Indicator Comparison

This section will compare highlights of the results of the study in Lasu against the Sphere Minimum Standards. The Minimum Standards and corresponding indicators represent a general consensus among practitioners regarding the level and type of services to be delivered in each sector. Two sectors will be addressed in this comparison: water supply & sanitation and nutrition.

Table 26: Water Supply & Sanitation Sphere Indicator Comparison with Lasu, December 2010

Sphere Indicator	Lasu Results
Average water use for drinking, cooking and personal hygiene in any household is at least 15 liters per person per day.	See Table 28
Maximum distance to the water point is not more than 500 meters, queuing time at the water source is no more than 15 minutes and it takes no more than 3 minutes to fill a 20 liter container.	65.3% (n=164) of respondent households are able to collect water in a timely fashion.
Water collection and storage containers have narrow necks and/or covers.	78.6% of respondent households are using narrow neck Jerry Cans.
There is at least 250g of soap available for personal hygiene per person per month.	90.3% of respondent households have soap available in the home.
Household waste burnt or buried in a specified refuse pit.	91.8% of respondent households dispose of household waste either by burning or use of a designated compost pit.
Toilets are no more than 50 meters from dwellings	96.2% of respondent households indicated that their defecation facilities were less than 50 meters from their home.
Children's feces are disposed of hygienically	98.9% of respondent households dispose of children's feces in a hygienic fashion.
Children sleep under mosquito nets.	100% of children under 5 in respondent households sleep under a mosquito net.
Household waste burnt or buried in a specified refuse pit.	89.9% of respondent households dispose of household waste either by burning or use of a designated compost pit.

Table 27: Nutrition sphere indicator comparison with Lasu, Dcember 2010

There is access to a range of foods – staple, pulses and fat sources that meet nutritional sources.	94.4% of respondent households had acceptable dietary diversity using the WFP Food Consumption Scale.
Infants under six months are exclusively breastfed.	19.9% of children under the age of 5 in respondent households were exclusively breastfed for the first six months.

[15] Sphere Project. 2004. Humanitarian Charter and Minimum Standards in Disaster Response.

[16] Formula: 12 minutes roundtrip walking 500 meters to the water source at 5 kph (average walking speed) + 15 minutes maximum queuing time + (3 minutes per Jerry Can x average of 4 Jerry Cans/HH) = 36 minutes

Table 28: Water Consumption by HH Size as Compared to Sphere Indicator in Lasu, December 2010

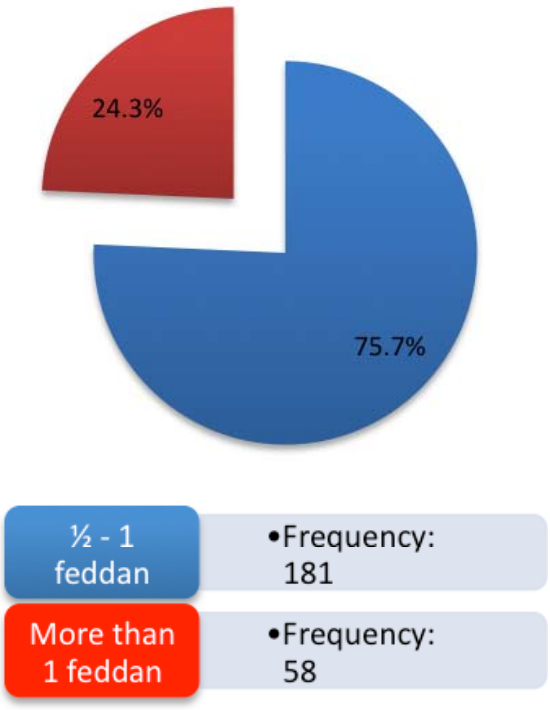
# in HH	Jerry Cans Required	# Achieving Indicator	% Achieving Indicator	Avg. Jerry Can Consumption/ Day
1	1	32	100.0	2.6
2	2	31	100.0	3.8
3	3	45	90.0	4.1
4	3	35	89.7	4.4
5	4	26	83.9	4.5
6	5	31	83.8	4.8
7	6	20	66.7	4.7
8	6	11	52.4	4.7
9	7	7	70.0	4.9
10	8	3	75.0	4.5
12	9	0	0.0	5.0
14	11	0	0.0	3.5

3.3 Household food consumption

Just over half of households (66.0%, n=184) in the study area had access to land for cultivation. The following chart shows the amount of land available for cultivation for those households which have land access in Lasu.

Cultivating land in Lasu setttlement : *Photo taken by Fiona Cameron*

Chart 3: Land available for cultivation in Lasu, December 2010



[17] The Sphere indicator for availability of water for consumption, cleansing, cooking, and other uses is 15 liters per person per day. In the survey, respondents were asked how many 20 liter Jerry Cans were consumed by the household per day. For the purpose of measuring consumption against the Sphere indicator, the number of liters per person was calculated and then rounded up to the nearest increment of 20 liters, or number of Jerry Cans.

In addition, all respondents (n=286) of households indicated that they had received some type of food aid during the previous six months (May – November 2010). Table 29 shows the types of food consumed and the percentage obtained from personal production or food aid.

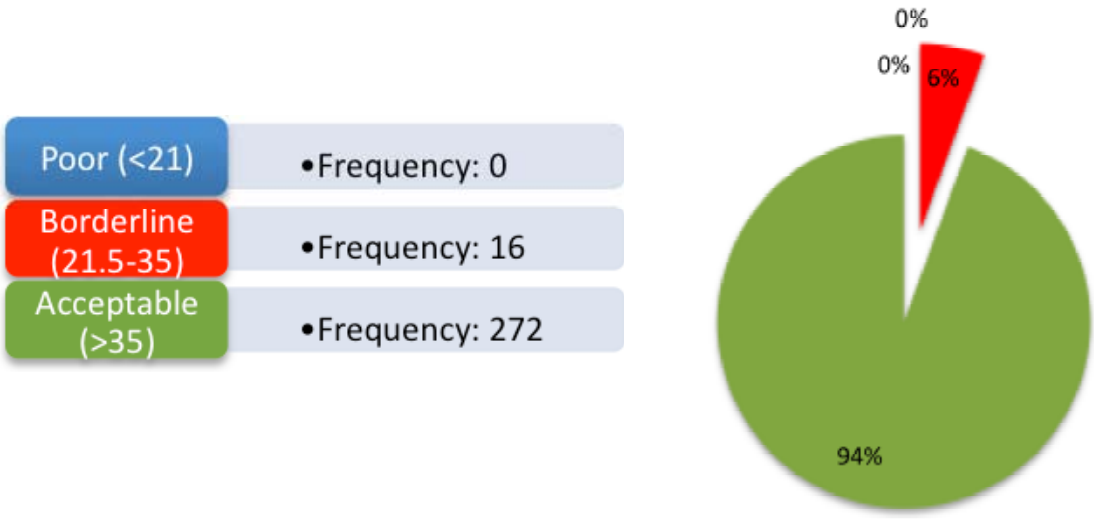
Table 29: Consumption and food sources for HH surveyed in Lasu, December 2010

Food Item	Consumed in Past Week		Source: Personal Production		Source: Food Aid	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Maize	247	85.8	1	0.4	247	98.8
Rice	191	66.3	48	25.1	5	2.6
Sorghum	268	93.1	1	0.4	267	99.6
Millet	27	9.4	8	29.6	1	3.7
Wheat	10	3.47	1	10.0	1	10.0
Cassava	118	41	13	10.9	2	1.7
Potatoes	217	75.7	131	60.4	2	0.9
Yams	21	9.6	5	23.8	1	4.8
Bread	81	71.9	2	2.4	8	9.8
Beans	274	95.1	1	0.4	258	93.8
Groundnuts	134	46.5	21	15.7	13	9.7
Vegetables	251	87.2	116	46.2	7	2.8
Fruit	26	9.0	5	20.8	0	0.0
Fish	141	49.5	4	2.8	4	2.8
Meat	82	28.6	1	1.2	5	6.2
Eggs	20	6.9	4	19.1	4	19.1

One third (32.5%; n=90) of respondents indicated that they consumed alcohol in the week prior. The majority of those respondents indicated that they consumed alcohol either only once (54.4%; n=49) or twice (31.1%; n=28) in the seven-day period.

Overall, based on the WFP dietary diversity assessment, the food consumption score of the majority of households (94.4%, n=272) in Lasu was characterized as "acceptable," with a score more than 35. Chart 4 details the food consumption scores of all households.

Chart 4: Food Consumption Scores of Households Surveyed in Lasu, December 2010



3.4 Water and sanitary conditions

All respondents (n=288) indicated that their source of drinking water was a borehole. Furthermore, the majority (65.3%, n=188) indicated that reaching their most frequented water source took between 30-59 minutes.

Table 30: Water and sanitary conditions of HH surveyed in Lasu, December 2010

Characteristics	Frequency	Percentage
Main Water Source		
Borehole	287	100.0
Protected water source	0	0.0
Unprotected pond river/stream/well	0	0.0
Total	287	100.0
Number of jerry cans used per day		
1	0	0.0
2	34	11.8
3	35	12.2
4	53	18.4
5	57	19.86
6	44	15.33
7	12	4.18
8	34	11.85
9	5	1.74
10	10	3.48
12	1	0.35
15	1	0.35
16	1	0.35
Total	287	100.0
Type of jerry can used		
Narrow mouth	180	78.6
Wide mouth	48	21.4
Total	228	100
Time to Collect Water		
Less than 15 minutes	13	4.6
15- 29 minutes	21	7.5
30- 59 minutes	188	66.9
60- 89 minutes	35	12.5
90 – 119 minutes	7	2.5
120 minutes or more	17	6.1
Total	281	100.0
Frequency Water Container Washed		
Every time used	262	91.3
Every week	12	4.2
Every month	10	3.5
Never	3	1.1
Total	287	100.0

[18] This is the amount of time required to travel to the water collection point, queue, collect water, and return.

As shown in Table 31, most households (67.7%; n=191) indicated they had access to private latrines, and an additional 23.4% (n=66) accessed communal latrines. Only 2 of the respondent households (0.7%) indicated using the bush as a venue for defecation. The majority of households (74.2%; n=198) indicated they were less than 10 meters away from the latrine they use. The most common method of disposal for children's feces was in a latrine (83.3%, n=235). Most households (82.6%, n=233) noted that they disposed of household rubbish in a compost pit.

Table 31: Water and sanitary conditions of HH surveyed in Lasu, 2010 (continued)

Characteristics	Frequency	Percentage
Satisfied with camp water supply		
Yes	245	91.8
No	22	8.2
Total	267	100.0
Reason dissatisfied		
Water is bad	12	21.8
Not enough water	36	65.5
Queues too long	5	9.1
Interruptions	1	1.8
Distribution times	1	1.8
Total	55	100.0
Type of defecation facility		
Private latrine	191	67.7
Community latrine	66	23.4
Bush	2	0.7
Neighbor's latrine	23	8.2
Other	0	0.0
Total	282	100.0
Meters from defecation facility		
Less than 10 meters	198	74.4
10 to 50 meters	58	21.8
Over 50 meters	10	3.8
Total	266	100.0
Method of disposal of child feces		
Private latrine	186	66.9
Community latrine	49	17.6
Bush	3	1.1
Bury	40	14.4
Total	278	100.0
Method of disposal of HH waste		
Compost pit	233	82.6
Garden	3	1.1
Bush	20	7.1
Burn	26	9.2
Total	282	100.0

As demonstrated in Table 32, the majority of individuals interviewed (79.0%, n=226) indicated that when washing their hands they used soap and water. Only 21.0% (n=60) indicated that they used water only. In addition, 90.3% of individuals indicated that soap was available in their homes.

Table 32: Soap use and availability in HH surveyed in Lasu, December 2010

Characteristic	Frequency	Percentage
Materials used to wash hands		
Water alone	60	21.0
Soap and water	226	79.0
Ash	0	0.0
Soil or sand	0	0.0
Total	286	100.0
Availability of Soap in HH		
Yes	205	90.3
No	22	9.7
Don't Know	0	0.0
Total	227	100.0

Table 33 compares knowledge and practice with regards to soap use and shows that when soap is available, the majority of respondents will use it at the most crucial times for sanitary and hygienic living practices.

Table 33: Knowledge and practice of soap used in HH surveyed in Lasu, December 2010

Use	Knows to Use Soap		Practice Day Prior	
	Frequency	Percentage	Frequency	Percentage
Preparing food	--		129	47.8
Before eating	--		130	48.0
Before feeding children	171	59.4	139	51.5
After changing baby	153	53.3	152	56.3
After defecating	191	66.3	157	58.0

3.5 Feeding practices

The breast feeding practice in Lasu is 98.0% (n=247), however only 34.0% (n=84) initiated breastfeeding within the first hour of birth and only 19.9% (n=50) were exclusively breastfed for the first six months. The most commonly introduced foods in the first six months were cereals (94.1%, n=237) and tea (72.2%, n=182).

Table 34: Breast feeding history of children born in the five years preceding the survey in Lasu, December 2010

Breast feeding history	Frequency	Percentage
Children ever breastfed		
Yes	247	98.0
No	5	2.0
Total	252	100.0
Breastfeeding initiated		
Within 1 hour of birth	84	34.0
After 1 hour of birth	163	66.0
Total	247	100.0
Exclusive breastfeeding for 6 months		
Yes	50	19.9
No	201	80.1
Total	251	100.0
Foods given before 6 months		
Water	173	68.9
Milk	20	7.9
Juice	35	13.9
Cereal	237	94.1
Tea	182	72.2
Soup	0	0.0
Duration of breastfeeding		
6 months or less	42	16.7
7 to 12 months	22	8.7
13 to 18 months	31	12.3
19 to 24 months	114	45.2
25 to 36 months	33	13.1
37 to 47 months	0	0.0
48 months or more	10	4.0
Total	252	100.0

In the past week, the most commonly reported foods given to children under the age of five were fruits (94.4%, n=238), cereal (91.7%, n=231) and legumes (88.5%, n=223). Most children surveyed (58.4%, n=136) received three meals the day prior.

Table 35: Current feeding practice of children born in the last five years preceding the survey in Lasu, December 2010

Feeding Practice	Frequency	Percentage
Frequency of feeding in previous day		
0 meals	0	0.0
1 meal	14	6.0
2 meals	78	33.5
3 meals	136	58.4
4 meals	4	1.7
5 meals	1	0.4
6 meals	0	0.0
Total	233	100.0
Foods administered in past week		

Cereal	231	91.7
Legumes	223	88.5
Fish	55	21.8
Milk	8	3.2
Meat	14	5.6
Tubers	8	3.2
Fruits	238	94.4

3.6 Diarrheal disease & other illnesses

The prevalence of diarrheal illness in the two weeks prior to the study among those interviewed was 27.0% (n=68). With regard to the occurrence of febrile illnesses among children in Lasu, 35.7% (n=90) reported having some form of fever in the two weeks before the study. 100% (n=247) of children under the age of five surveyed regularly sleep under a mosquito net. Acute respiratory infections (ARI) were also frequently reported, with 64.7% (n=163) of children surveyed having suffered from an ARI in the two weeks prior to the survey. Table 36 provides more details on the illnesses reported by children in Lasu.

Table 36: Illnesses reported among children under 5 in the two weeks prior to the survey in Lasu, December 2010

Variable	Frequency	Percentage
Had fever in last 2 weeks		
Yes	90	35.7
No	162	64.3
Total	252	100.0
Had measles in last 2 weeks		
Yes	4	1.6
No	248	98.4
Total	252	100.0
Had diarrhea in last 2 weeks		
Yes	68	27.0
No	184	73.0
Total	252	100.0
Had ARI in last 2 weeks		
Yes	163	64.7
No	89	35.3
Total	252	100.0
Had skin disease in last 2 weeks		
Yes	13	5.2
No	239	94.8
Total	252	100.0
Had eye disease in last 2 weeks		
Yes	7	2.8
No	245	97.2
Total	252	100.0
No illness in last 2 weeks		
Yes	37	14.7
No	215	85.3
Total	252	100.0

3.7 Nutritional status of children

Height, weight, prevalence of oedema, mid upper arm circumference (MUAC), and hemoglobin levels were recorded for children between 6 and 59 months to estimate the nutritional status in Lasu.

The prevalence of global malnutrition (<-2 z-score and/or oedema) was 9.5% (n=23), with little variation between boys at 8.9% (n=11) and girls 10.1% (n=12). Prevalence of moderate malnutrition (<2 z-score and >= 3 z-score, no oedema) was 4.1% (n=10), without significant variation by gender. Prevalence of severe malnutrition (<-3 z-score and/or oedema) was 5.3% (n=13).

Table 37: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex in Lasu, December 2010

	All n=249		Boys n= 126		Girls n= 123	
	Freq.	Percent.	Freq.	Percent.	Freq.	Percent.
Prevalence of global malnutrition (<-2 z-score and/or oedema)	26	10.4	13	10.3	13	10.6
	(7.3-15.2; 95% C.I.)		(5.6-16.6; 95% C.I.)		(5.8-17.0; 95% C.I.)	
Prevalence of moderate malnutrition (<2 z-score and >= 3 z-score, no oedema)	10	4.0	7	3.2	6	4.9
	(3.1-9.0; 95% C.I.)		(1.6-9.6; 95% C.I.)		(2.1-10.9; 95% C.I.)	
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	16	6.4	9	7.1	7	5.7
	(2.5-8.0; 95% C.I.)		(1.6-9.6; 95% C.I.)		(1.1-8.7; 95% C.I.)	

Children between the ages of 54-59 months showed a much higher propensity to present with acute malnutrition based on weight-for-height z-scores (wasting), as demonstrated in the following table.

Table 38: Prevalence of acute malnutrition by age based on weight-for-height z-scores and/or oedema in Lasu, December 2010

		Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age	Total	No.	%	No.	%	No.	%	No.	%
6-17	83	1	1.2	2	2.4	80	96.4	3	3.4
18-29	54	2	3.7	3	5.6	49	90.7	0	0.0
30-41	40	0	0.0	2	5.0	38	95.0	2	4.8
42-53	33	2	6.1	0	0.0	31	93.9	1	2.9
54-59	23	3	13.0	2	8.7	18	78.3	2	8.0
Total	233	8	3.4	9	3.9	216	92.7	8	3.4

Further analysis also showed that a small percentage of the population as qualified as marasmic, kwashiorkor, and marasmic kwashiorkor. The following table details those findings.

Table 39: Distribution of acute malnutrition and oedema based on weight-for-height z-scores in Lasu, December 2010

	<=3 z-score		>=-3 z-score	
	Marasmic kwashiorkor		Kwashiorkor	
	Freq.	Percent	Freq.	Percent
Oedema Present	2	0.8	6	2.4
	Marasmic		Normal	
	Freq.	Percent	Freq.	Percent
Oedema Absent	8	3.2	233	93.6

Approximately one quarter of the children surveyed were stunted, with 35.1% with a less than -2 z-score. There was no significant difference between the prevalence of stunting by gender. The following table details the findings of the height-for-age measurements.

Table 40: Prevalence of stunting based on height-for-age z-scores and by sex in Lasu, December 2010

	All n=242		Boys n= 125		Girls n= 117	
	Freq.	Percent.	Freq.	Percent.	Freq.	Percent.
Prevalence of stunting (<-2 z-score)	85	35.1	47	37.6	38	32.5
	(25.6-37.3; 95% C.I.)		(26.8-43.6; 95% C.I.)		(19.3-35.4; 95% C.I.)	
Prevalence of moderate stunting (<2 z-score and >= 3 z-score)	33	13.6	15	12	18	15.4
	(9.0-17.5; 95% C.I.)		(7.6-19.6; 95% C.I.)		(6.8-18.9; 95% C.I.)	
Prevalence of severe stunting (<-3 z-score)	52	21.5	32	25.6	20	17.1
	(13.3-23.0; 95% C.I.)		(14.4-28.8; 95% C.I.)		(8.1-20.9; 95% C.I.)	

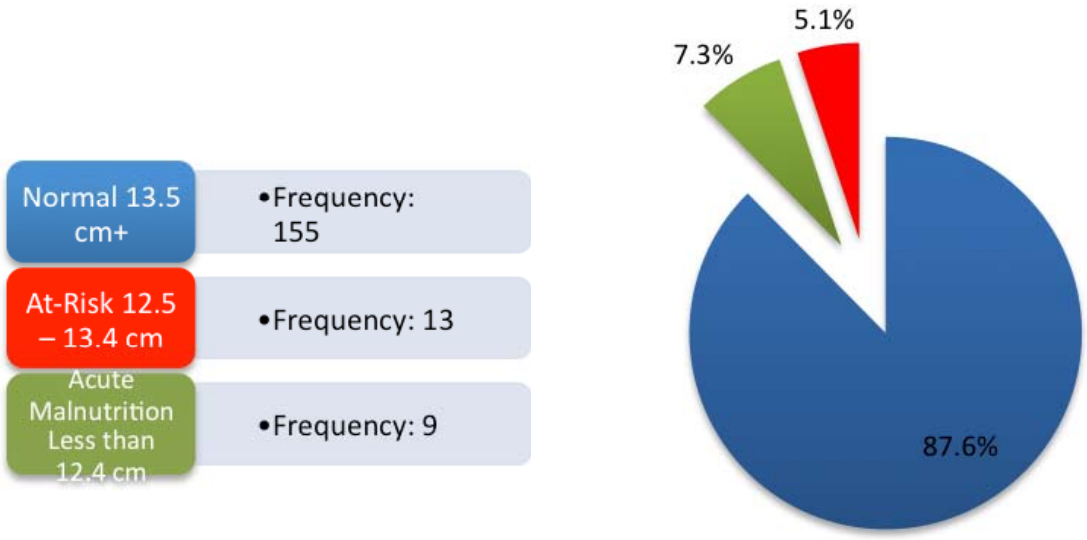
Only a small portion of the population sampled were found to be underweight, with 86.2% of the population having a weight-for-age z-score within the acceptable range. The following table details the findings.

Table 41: Prevalence of underweight based on weight-for-age z-scores in Lasu, December 2010

	All n=235		Boys n= 119		Girls n= 116	
	Freq.	Percent.	Freq.	Percent.	Freq.	Percent.
Prevalence of underweight (<-2 z-score	35	14.9	20	16.8	15	11.9
	(9.3-18.3; 95% C.I.)		(13.7-28.3; 95% C.I.)		(8.9-22.1; 95% C.I.)	
Prevalence of moderate underweight (<2 z-score and >= 3 z-score)	22	9.4	12	10.1	10	8.6
	(8.5-17.0; 95% C.I.)		(8.0-20.6; 95% C.I.)		(5.5-16.9; 95% C.I.)	
Prevalence of severe underweight (<-3 z-score)	13	5.5	8	6.7	5	4.3
	(2.6-8.5; 95% C.I.)		(2.2-11.2; 95% C.I.)		(0.6-8.0; 95% C.I.)	

There were 8 cases of oedema observed (3.3%). Based on the MUAC measurement, none of the children were found to be in a state of acute malnourishment (MUAC >12.5), although 6.8% (n=10) were found to be at-risk for malnourishment. The following table details the findings of the MUAC measurements.

Chart 5: MUAC classifications in Lasu, December 2010



Finally, 44.8% (n=113) of children surveyed were found to have low hemoglobin levels (less than 11.0 g/dl) indicating the presence of anemia. In addition to these children, 2.8% (n=7) of their mothers also presented with anemia (less than 12.0 g/dl). There was no significant difference between male and female children, and in Lasu the youngest children (6-23 months) were most likely to present with anemia.

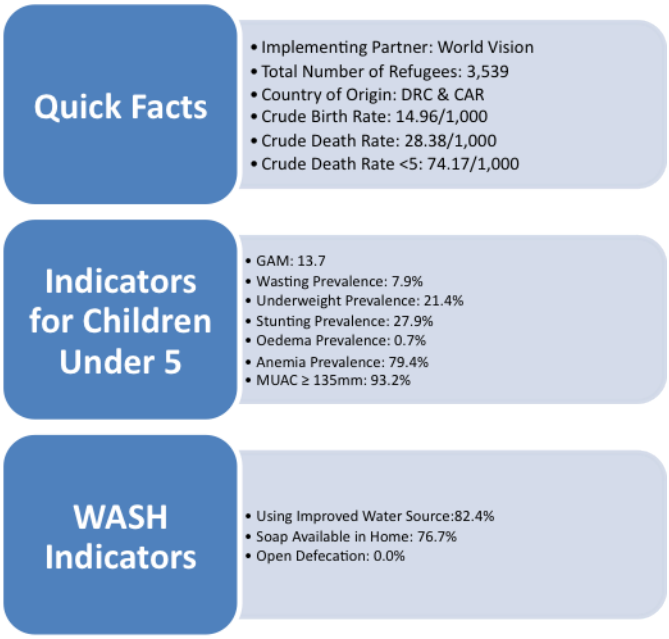
Table 42: Breakdown of anemia by age and severity in Lasu, December 2010

Age	Severe (<7g/dL)		Moderate (7-9.9g/dL)		Mild (10-10.9/dL)		Total Anemia	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
6-23 mos.	5	6	40	51	12	15	57	72
24 – 35 mos.	0	0	10	38	10	38	20	77
36 - 59 mos.	2	4	20	36	8	14	30	54
Total	7	4	70	43	30	19	107	66

Table 43: Hemoglobin levels of children and mothers in Lasu, December 2010

Characteristics	Frequency	Percentage
Child Hemoglobin Level		
Less than 11.0 g/dl	113	44.8
11.0 g/dl +	139	55.2
Total	252	100.0
Mother Hemoglobin Level		
Less than 12.0 g/dl	7	2.8
12.0 g/dl +	245	97.2
Total	252	100.0

4. EZO



4.1 Socio-demographic characteristics of household heads and children interviewed

The baseline survey was conducted in Ezo, Western Equatoria State. The camp was established in September 2008 and at the time of the survey was hosting 1,636 families and 3,539 individuals. Further demographics of the total population are available in the following table.

Table 44: Refugee Population in Ezo by Sex and Age Group, December 2010

# of HHs	Total		1,636
	Female headed		
		%	42.4%
Number of Refugees	0 – 4 years old	F	284
		M	280
		T	564
	5 – 11 years old	F	331
		M	346
		T	377
	12 – 17 years old	F	145
		M	169
		T	314
	18 - 59 years old	F	946
		M	885
		T	1,831
	60 years +	F	79
		M	73
		T	152
	NA	F	1
		M	0
		T	1
	Total	F	1,786
		M	1,753
		T	3,539

The majority of refugees hosted in Ezo camp are from the Democratic Republic of Congo (99.8%; n=3,531) with the remainder originating in Central African Republic (0.2%; n=8).

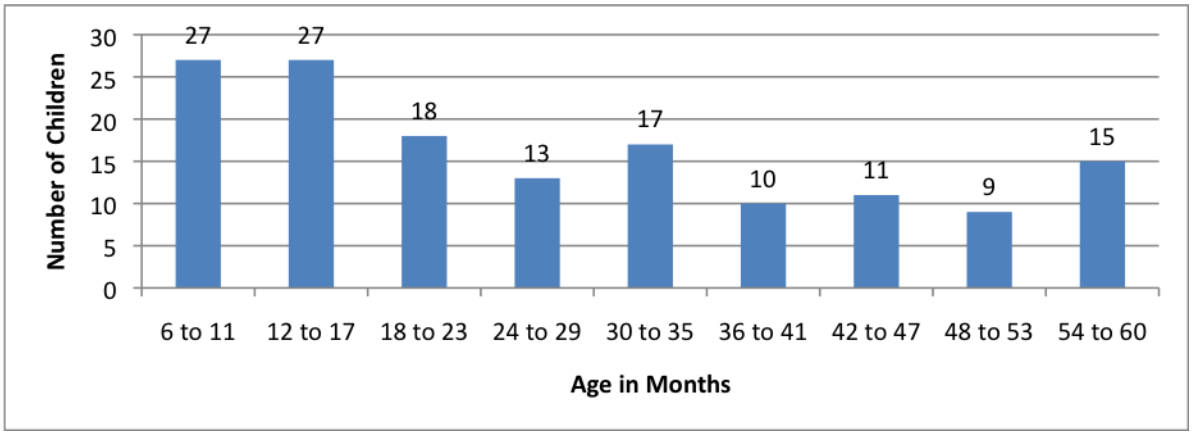
Nutritional and WASH information was gathered from 342 households, mortality and birth information gathered from 548 households, and health information on 147 children. As indicated in Table 45, the majority of households interviewed were headed by men (58.2%, n=199) and 7 (2.1%) household heads are aged 15 to 19 years. The majority of household heads are between the ages of 40 - 44 (13.2%, n=45).

Table 45: Socio-demographic characteristics of Respondent HHs in the study in Ezo, December 2010

Characteristics	Frequency	Percent
Household Head Sex		
Male	199	58.2
Female	143	41.8
Total	342	100.0
Household Head Age		
15-19	7	2.1
20-24	32	9.4
25-29	40	11.8
30-34	42	12.4
35-39	35	10.3
40-44	45	13.2
45-49	42	12.3
50-54	37	10.9
55-59	22	6.5
60-64	20	5.9
>65	11	3.2
Total	340	100.0
Household Family Size		
1	78	22.9
2-4	185	54.3
5-6	48	14.1
7-8	15	4.4
More than 8	12	3.5
Total	341	100.0

From the children included in the study, 42 were male (49.4%) and 43 were female (50.6%). The largest sampled ages included 6-11 months (18.4%) and 12-17 months (18.4%). Figure 3 shows the distribution of the ages of those children included in the survey.

Figure 3 : Age distribution of children in the study in Ezo, December 2010



4.2 Sphere Indicator Comparison

This section will compare highlights of the results of the study in Ezo against the Sphere Minimum Standards. The Minimum Standards and corresponding indicators represent a general consensus among practitioners regarding the level and type of services to be delivered in each sector.[1] Two sectors will be addressed in this comparison: water supply & sanitation and nutrition.

Table 46: Water Supply & Sanitation Sphere Indicator Comparison with Ezo, December 2010

Sphere Indicator	Ezo Results
Average water use for drinking, cooking and personal hygiene in any household is at least 15 liters per person per day.	See Table 50.
Maximum distance to the water point is not more than 500 meters, queuing time at the water source is no more than 15 minutes and it takes no more than 3 minutes to fill a 20 liter container.	85.2% (n=276) of respondent households are able to collect water in a timely fashion.[16]
Water collection and storage containers have narrow necks and/or covers.	46.1% of respondent households are using narrow neck Jerry Cans.
There is at least 250g of soap available for personal hygiene per person per month.	76.7% of respondent households have soap available in the home.
Household waste burnt or buried in a specified refuse pit.	64.3% of respondent households dispose of household waste either by burning or use of a designated compost pit.
Toilets are no more than 50 meters from dwellings	97.9% of respondent households indicated that their defecation facilities were less than 50 meters from their home.
Children's feces are disposed of hygienically	97.8% of respondent households dispose of children's feces in a hygienic fashion.
Children sleep under mosquito nets.	56.2% of children under 5 in respondent households sleep under a mosquito net.

1 Sphere Project. 2004. Humanitarian Charter and Minimum Standards in Disaster Response.

Table 47: Nutrition Sphere Indicator Comparison with Ezo, December 2010

There is access to a range of foods – staple, pulses and fat sources that meet nutritional sources.	93.3% of respondent households had acceptable dietary diversity using the WFP Food Consumption Scale.
Infants under six months are exclusively breastfed.	77.5% of children under the age of 5 in respondent households were exclusively breastfed for the first six months.

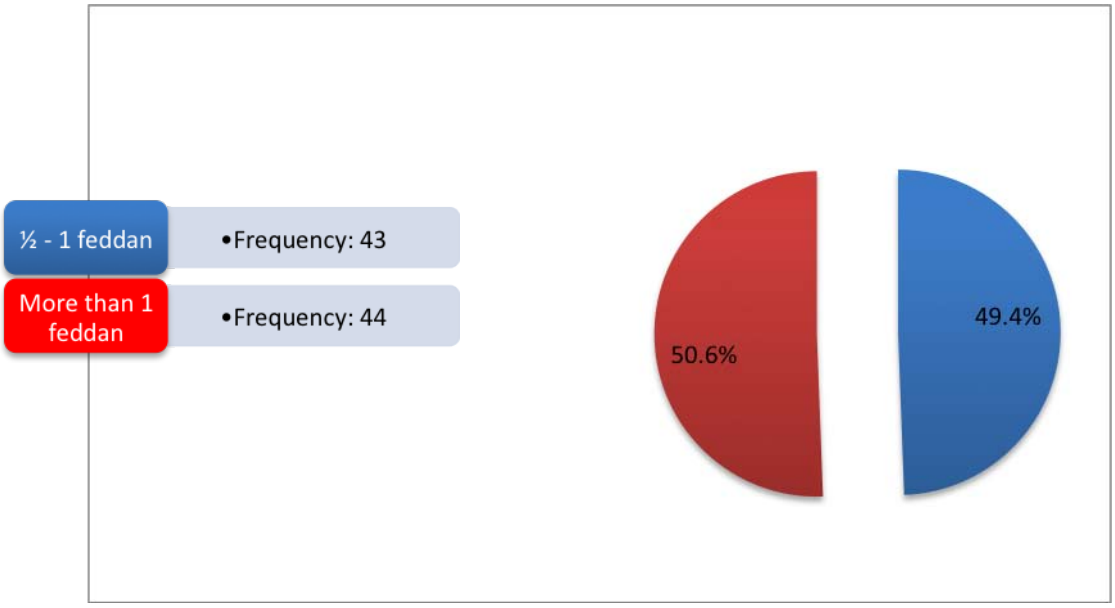
Table 48: Water Consumption by HH Size as Compared to Sphere Indicator in Ezo, December 2010

# in HH	Jerry Cans Required[17]	# Achieving Indicator	% Achieving Indicator	Avg. Jerry Can Consumption/ Day
1	1	78	100.0	1.9
2	2	55	69.6	2.7
3	3	37	56.9	3.0
4	3	27	65.9	3.1
5	4	9	30.0	2.8
6	5	7	38.9	3.1
7	6	0	0.0	4.3
8	6	0	0.0	2.9
9	7	0	0.0	3.5
10	8	0	0.0	5.0
11	9	0	0.0	2.0
12	9	0	0.0	5.0
13	10	0	0.0	5.0

4.3 Household food consumption

Just over one quarter of households (34.8%, n=87) in the study area had access to land for cultivation. The following chart shows the amount of land available for cultivation for those households which have land access in Ezo.

Chart 6: Land available for cultivation in Ezo, December 2010



Given this percentage, it is not surprising that many households did not report consuming goods from their own production. In addition, 98.2% (n=324) of households indicated that they had received some type of food aid during the previous six months (May – November 2010). Table 49 shows the types of food consumed and the percentage obtained from personal production or food aid.

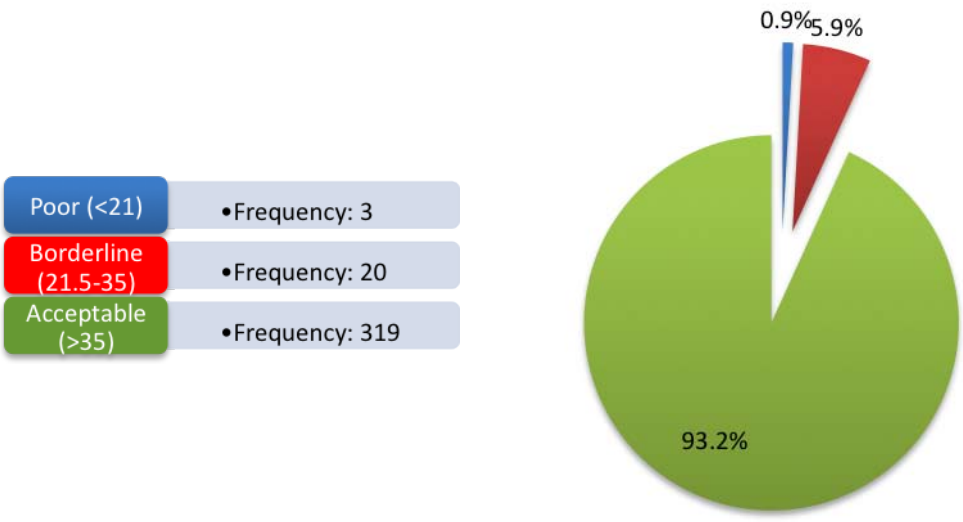
Table 49: Consumption and food sources for HH surveyed in Ezo, December 2010

Food Item	Consumed in Past Week		Source: Personal Production		Source: Food Aid	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Maize	155	47.8	45	29.0	23	14.8
Rice	201	62.0	8	4.0	0	0.0
Sorghum	322	99.4	0	0.0	318	98.8
Millet	27	8.3	17	63.0	2	7.4
Wheat	7	2.2	2	28.6	0	0.0
Cassava	272	84.0	58	21.3	2	0.7
Potatoes	288	88.9	175	60.8	0	0.0
Yams	44	13.6	6	13.6	0	0.0
Bread	124	38.3	1	0.8	3	2.4
Beans	242	74.7	7	2.9	172	71.1
Groundnuts	274	84.6	27	9.9	16	5.8
Vegetables	249	76.9	73	29.3	8	3.2
Fruit	34	25.9	7	20.6	1	2.9
Fish	81	25.0	8	9.9	0	0.0
Meat	84	25.9	8	9.5	2	2.4
Eggs	41	12.7	3	7.3	20	48.8

One third (27.2%; n=88) of respondents indicated that they consumed alcohol in the week prior. The majority indicated that they consumed alcohol either only once (46.6%; n=41) or twice (34.1%; n=30) in the seven day period.

Overall, based on the WFP dietary diversity assessment, the food consumption score of the majority of households (93.2%, n=319) in Ezo was characterized as "acceptable," with a score more than 35. Chart 7 details the food consumption scores of all households.

Chart 7: Food Consumption Scores of Households Surveyed in Ezo, December 2010



4.4 Water and sanitary conditions

The source of drinking water used by the vast majority of households (70.0%, n=231) was a borehole. Furthermore, the majority (51.2%, n=175) indicated that reaching their most frequented water source took between 30-59 minutes.

As shown in Table 51, most households (59.4%; n=202) indicated they had access to private latrines, and an addition 37.1% (n=126) accessed communal latrines. None of the respondent households indicated using the bush as a venue for defecation. The majority of households (65.3%; n=216) indicated they were less than 10 meters away from the latrine they use. The most common method of disposal for children's feces was in a latrine (95.6%, n=217). Most households (62.8%, n=211) noted that they disposed of household rubbish in a compost pit, but 31.3% (n=105) indicated they disposed of rubbish by depositing it in the bush.

Table 50: Water and sanitary conditions of HH surveyed in Ezo, December 2010

Characteristics	Frequency	Percentage
Main water source		
Borehole	231	70.0
Protected water source	41	12.4
Unprotected pond river/stream/well	58	17.6
Total	330	100.0
Number of Jerry Cans used per day		
1	106	31.0
2	70	20.5
3	58	17.0
4	24	7.0
5	84	24.6
Total	342	100.0
Type of Jerry Can used		
Narrow mouth	136	46.1
Wide mouth	159	53.9
Total	295	100.0
Time to collect water[18]		
Less than 15 minutes	73	21.4
15- 29 minutes	69	20.2
30- 59 minutes	175	51.2
60- 89 minutes	7	2.1
90 – 119 minutes	0	0.0
120 minutes or more	18	5.3
Total	342	100.0
Frequency water container washed		
Every time used	219	65.4
Every week	111	33.1
Every month	4	1.2
Never	1	0.3
Total	335	100.0

Table 51: Water and sanitary conditions of HH surveyed in Ezo, 2010 (continued)

Characteristics	Frequency	Percentage
Satisfied with camp water supply		
Yes	246	73.0
No	91	27.0
Total	337	100.0
Reason Dissatisfied		
Water is bad	53	58.9
Not enough water	30	33.3
Queues too long	3	3.3
Interruptions	1	1.1
Distribution times	3	3.3
Total	90	100.0
Type of defecation facility		
Private latrine	202	59.4
Community latrine	126	37.1
Bush	0	0.0
Neighbor's latrine	12	3.5
Other	0	0.0
Total	340	100.0
Meters from defecation facility		
Less than 10 meters	216	65.3
10 to 50 meters	108	32.6
Over 50 meters	7	2.1
Total	331	100.0
Method of disposal of child feces		
Private latrine	139	61.2
Community latrine	78	34.4
Bush	5	2.2
Bury	5	2.2
Total	227	100.0
Method of disposal of HH waste		
Compost pit	211	62.8
Garden	15	4.5
Bush	105	31.3
Burn	5	1.5
Total	336	100.0

As demonstrated in Table 52, the majority of individuals interviewed (83.9%, n=281) indicated that when washing their hands they used soap and water. Only 15.8% (n=53) indicated that they used water only. In addition, 76.7% of individuals indicated that soap was available in their homes.

Table 52: Soap use and availability in HH surveyed in Ezo, December 2010

Characteristic	Frequency	Percentage
Materials used to wash hands		
Water alone	53	15.8
Soap and water	281	83.9
Ash	1	0.3
Soil or sand	0	0.0
Total	335	100.0
Availability of Soap in HH		
Yes	256	76.7
No	78	23.4
Don't Know	0	0.0
Total	334	100.0

Table 53 compares knowledge and practice with regards to soap use and shows that when soap is available, the majority of respondents will use it at the most crucial times for sanitary and hygienic living practices.

Table 53: Knowledge and practice of soap used in HH surveyed in Ezo, December 2010

Use	Knows to Use Soap		Practice Day Prior	
	Frequency	Percentage	Frequency	Percentage
Preparing food	--		184	54.3
Before eating	--		172	50.7
Before feeding children	164	48.4	117	34.5
After changing baby	132	38.9	101	29.8
After defecating	309	91.2	183	54.0

4.5 Feeding practices

The breast feeding practice in Ezo is estimated to be 97.3% (n=143), however only 4.9% (n=7) initiated breastfeeding within the first hour of birth. However, 2.0% (n=3) were exclusively breastfed for the first six months. The most commonly introduced foods in the first six months were cereals (91.8%, n=135) and juice (40.1%, n=59).

Table 54: Breast feeding history of children born in the five years preceding the survey in Ezo, December 2010

Breast feeding history	Frequency	Percentage
Children ever breastfed		
Yes	143	97.3
No	4	0.7
Total	147	100.0
Breastfeeding initiated		
Within 1 hour of birth	7	4.9
After 1 hour of birth	136	95.1
Total	143	100.0
Exclusive breastfeeding for 6 months		
Yes	3	2.0
No	144	98.0
Total	147	100.0
Foods given before 6 months		
Water	141	95.9
Milk	9	6.1
Juice	59	40.1
Cereal	135	91.8
Tea	32	21.8
Soup	15	10.2
Duration of breastfeeding		
6 months or less	4	2.8
7 to 12 months	2	1.4
13 to 18 months	117	83.0
19 to 24 months	18	12.8
25 to 36 months	0	0.0
37 to 47 months	0	0.0
48 months or more	0	0.0
Total	141	100.0

In the past week, the most commonly reported foods given to children under the age of five were fruits (90.5%, n=133), meat (75.5%, n=111) and cereal (62.6%, n=92). Most children surveyed (44.4%, n=60) received three meals the day prior.

Table 55: Current feeding practice of children born in the last five years preceding the survey in Ezo, December 2010

Feeding Practice	Frequency	Percentage
Frequency of feeding in previous day		
0 meals	3	2.2
1 meal	15	11.1
2 meals	48	35.6
3 meals	60	44.4
4 meals	8	5.9
5 meals	1	0.7
6 meals	0	0.0
Total	135	100.0
Foods administered in past week		
Cereal	92	62.6
Legumes	4	2.7
Fish	75	51.0
Milk	5	3.4
Meat	111	75.5
Tubers	16	10.9
Fruits	133	90.5

4.6 Diarrheal disease & other illnesses

The prevalence of diarrheal illness in the two weeks prior to the study among those interviewed was 70.1% (n=103). With regard to the occurrence of febrile illnesses among children in Ezo, 80.3% (n=118) reported having some form of fever in the two weeks before the study. Only 56.2% (n=50) of children under the age of five surveyed regularly sleep under a mosquito net. Acute respiratory infections (ARI) were also frequently reported, with 50.7% (n=74) of children surveyed having suffered from an ARI in the two weeks prior to the survey. Table 56 provides more details on the illnesses reported by children in Ezo.

Table 56: Illnesses reported among children under 5 in the two weeks prior to the survey in Ezo, December 2010

Variable	Frequency	Percentage
Had fever in last 2 weeks		
Yes	118	80.3
No	29	19.7
Total	147	100.0
Had measles in last 2 weeks		
Yes	7	4.8
No	140	95.2
Total	147	100.0
Had diarrhea in last 2 weeks		
Yes	103	70.1
No	44	29.9
Total	147	100.0
Had ARI in last 2 weeks		
Yes	74	50.7
No	73	49.3
Total	147	100.0
Had skin disease in last 2 weeks		
Yes	20	13.6
No	127	86.4
Total	147	100.0
Had eye disease in last 2 weeks		
Yes	14	9.5
No	133	90.5
Total	147	100.0
No illness in last 2 weeks		
Yes	0	0.0
No	147	100.0
Total	147	100.0

4.7 Nutritional status of children

Height, weight, prevalence of oedema, mid upper arm circumference (MUAC), and hemoglobin levels were recorded for children between 6 and 59 months to estimate the nutritional status in Ezo.

The prevalence of global malnutrition (<-2 z-score and/or oedema) was 7.9% (n=10), with little variation between boys at 8.2% (n=5) and girls 7.7% (n=5). Prevalence of moderate malnutrition (<2 z-score and >= 3 z-score, no oedema) was 7.1% (n=9), without significant variation by gender. Prevalence of severe malnutrition (<-3 z-score

and/or oedema) was 0.8% (n=1), and was only found among girls at 1.5% (n=1). The following table details the findings.

Table 57: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex in Ezo, December 2010

	All n=146		Boys n= 70		Girls n= 76	
	Freq.	Percent.	Freq.	Percent.	Freq.	Percent.
Prevalence of global malnutrition (<-2 z-score and/or oedema)	20	15.1	11	15.7	11	14.5
	(8.1 – 19.3; 95% C.I.)		(7.2 – 24.2; 95% C.I.)		(4.6 – 19.1; 95% C.I.)	
Prevalence of moderate malnutrition (<2 z-score and >= 3 z-score, no oedema)	11	7.5	5	7.1	6	7.9
	(3.3 – 11.8; 95% C.I.)		(4.0 – 18.9; 95% C.I.)		(-0.4 – 8.3; 95% C.I.)	
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	11	7.5	6	8.6	5	6.6
	(2.3 – 10.1; 95% C.I.)		(-0.5 – 9.0; 95% C.I.)		(1.8 – 14.0; 95% C.I.)	

Children between the ages of 30-41 months showed a much higher propensity to present with acute malnutrition based on weight-for-height z-scores (wasting), as demonstrated in the following table. Further analysis also showed that a small percentage of the population as qualified as marasmic, with only 6.8% (n=10) of children meeting the definition of having a less than -3 z-score. Only one child (0.7%) presented with kwashiorkor, with a greater than-3 z-score and oedema present.

Table 58: Prevalence of acute malnutrition by age based on weight-for-height z-scores and/or oedema in Ezo, December 2010

		Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age	Total	No.	%	No.	%	No.	%	No.	%
6-17	55	3	5.5	4	7.2	48	87.3	0	0.0
18-29	33	2	6.1	3	9.1	28	84.8	0	0.0
30-41	24	4	16.7	2	8.3	18	75.0	0	0.0
42-53	18	0	0.0	0	0.0	18	100	1	6.0
54-59	14	1	7.1	2	14.3	11	78.6	0	0.0
Total	144	10	6.8	11	7.5	123	84.2	1	0.7

Approximately one quarter of the children surveyed were stunted, with 25.2% with a less than -2 z-score. There was no significant difference between the prevalence of stunting by gender. The following table details the findings of the height-for-age measurements.

Table 59: Prevalence of stunting based on height-for-age z-scores and by sex in Ezo, December 2010

	All n=147		Boys n= 71		Girls n= 76	
	Freq.	Percent.	Freq.	Percent.	Freq.	Percent.
Prevalence of stunting (<-2 z-score)	45	30.6	21	29.6	24	31.6
	(20.6 – 35.1; 95% C.I.)		(15.2 – 35.5; 95% C.I.)		(19.9 – 40.6; 95% C.I.)	
Prevalence of moderate stunting (<2 z-score and >= 3 z-score)	18	12.2	8	11.3	10	13.2
	(6.9 – 17.5; 95% C.I.)		(3.9 – 18.6; 95% C.I.)		(5.6 – 20.8; 95% C.I.)	
Prevalence of severe stunting (<-3 z-score)	27	18.4	13	18.3	14	18.4
	(9.8 – 21.5; 95% C.I.)		(6.0 – 22.2; 95% C.I.)		(8.6 – 25.6; 95% C.I.)	

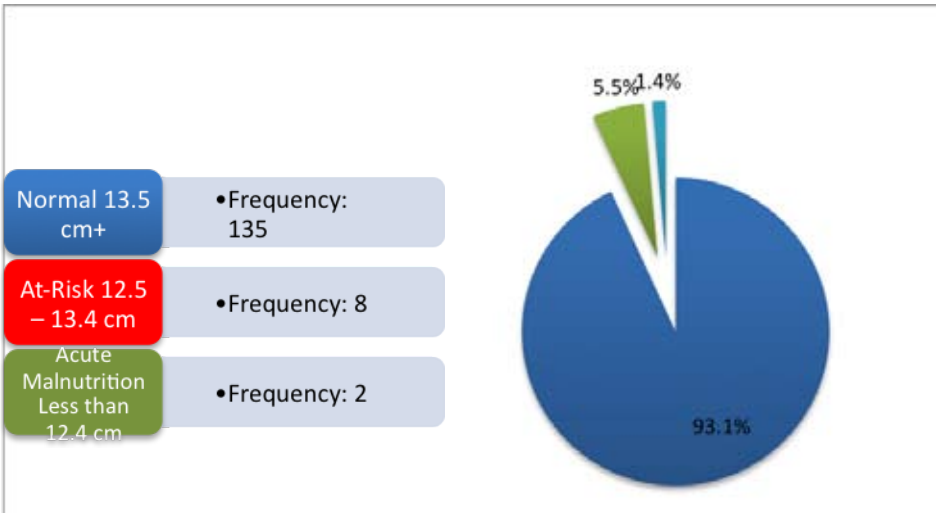
Only a small portion of the population sampled were found to be underweight, with 87.7% of the population having a weight-for-age z-score within the acceptable range. Boys were significantly more likely to be underweight than girls with 18.5% (n=12) and 6.2% (n=4), respectively. The following table details the findings.

Table 60: Prevalence of underweight based on weight-for-age z-scores in Ezo, December 2010

	All n=145		Boys n= 70		Girls n= 70	
	Freq.	Percent.	Freq.	Percent.	Freq.	Percent.
Prevalence of underweight (<-2 z-score)	24	16.6	14	20	10	13.3
	(14.7 – 28.1; 95% C.I.)		(15.5 – 36.0; 95% C.I.)		(8.8 – 25.9; 95% C.I.)	
Prevalence of moderate underweight (<2 z-score and >= 3 z-score)	14	9.7	11	15.7	3	4
	(8.8 – 20.2; 95% C.I.)		(13.0 – 32.7; 95% C.I.)		(1.0 - 12.3; 95% C.I.)	
Prevalence of severe underweight (<-3 z-score)	10	6.9	3	4.3	7	9.3
	(2.8 – 11.0; 95% C.I.)		(-1.0 – 6.8; 95% 0C.I.)		(3.7 – 17.7; 95% C.I.)	

There was only 1 case of oedema observed (0.7%). Based on the MUAC measurement, none of the children were found to be in a state of acute malnourishment (MUAC >12.5), although 6.8% (n=10) were found to be at-risk for malnourishment. The following chart details the findings of the MUAC measurements.

Chart 8: MUAC classifications in Ezo, December 2010



79.7% (n=110) of children surveyed were found to have low hemoglobin levels (less than 11.0 g/dl) indicating the presence of anemia. Girls were more likely (5 percentage points) to present with anemia than boys (Table 62). In addition to these children, 19.1% (n=28) of their mothers also presented with anemia (less than 12.0 g/dl). Male children were more likely to present with anemia than female children, and most cases occurred in those between the ages of 24 and 35 months.

Table 61: Hemoglobin levels of children and mothers in Ezo, December 2010

Characteristics	Frequency	Percentage
Child Hemoglobin Level		
Less than 11.0 g/dl	110	79.7
11.0 g/dl +	28	20.3
Total	138	100.0
Mother Hemoglobin Level		
Less than 12.0 g/dl	28	19.1
12.0 g/dl +	119	81.0
Total	147	100.0

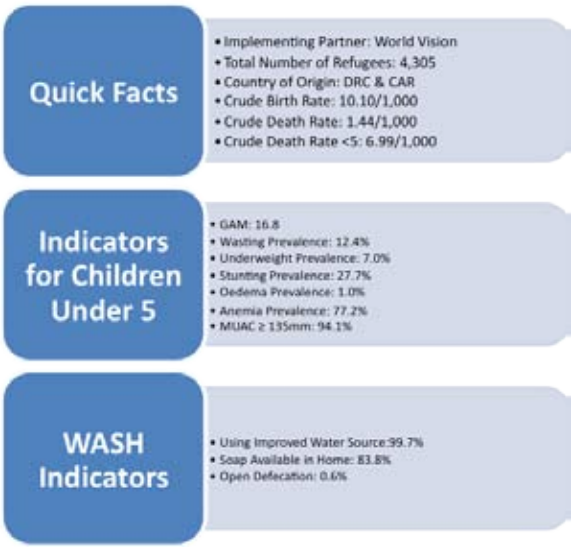
Table 62: Children under five presenting with anemia by sex in Ezo, December 2010

Anemia	Male Children		Female Children		Total	
	Freq.	Percent	Freq.	Percent	Freq.	Percent
Yes Hemoglobin less than 11.0 g/dl	52	81.3	58	78.4	110	79.7
No Hemoglobin 11.0 g/dl +	12	18.8	16	21.6	28	20.3
Total	64	100.0	74	100.0	138	100.0

Table 63: Presence of anemia by age and severity in Ezo, December 2010

Age	Severe (<7g/dL)		Moderate (7-9.9g/dL)		Mild (10-10.9/dL)		Total Anemia	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
6-23 mos.	3	4	33	46	24	34	60	85
24 – 35 mos.	0	0	13	45	13	45	26	90
36 - 59 mos.	1	2	15	33	15	33	31	69
Total	4	3	61	42	52	36	117	81

5. Makpandu



5.1 Socio-demographic characteristics of household heads and children interviewed

The baseline survey was conducted in Makpandu, Western Equatoria State. The camp was established in September 2008 and at the time of the survey was hosting 2,269 families and 4,305 individuals. Further demographics of the total population are available in the following table.

Table 64: Refugee Population in Makpandu by Sex and Age Group, December 2010

# of HHs	Total	2,269	
	Female headed	HH	720
		%	16.8%
Number of Refugees	0 – 4 years old	F	396
		M	346
		T	742
	5 – 11 years old	F	315
		M	309
		T	624
	12 – 17 years old	F	183
		M	180
		T	336
	18 - 59 years old	F	1006
		M	1434
		T	2440
	60 years +	F	55
		M	73
		T	128
	NA	F	4
		M	4
		T	8
	Total	F	1956
		M	2346
		T	4305

The majority of refugees hosted in Makpandu camp are from the Democratic Republic of Congo (97.2%; n=4,184) with the remainder originating in Central African Republic (2.8%; n=121).

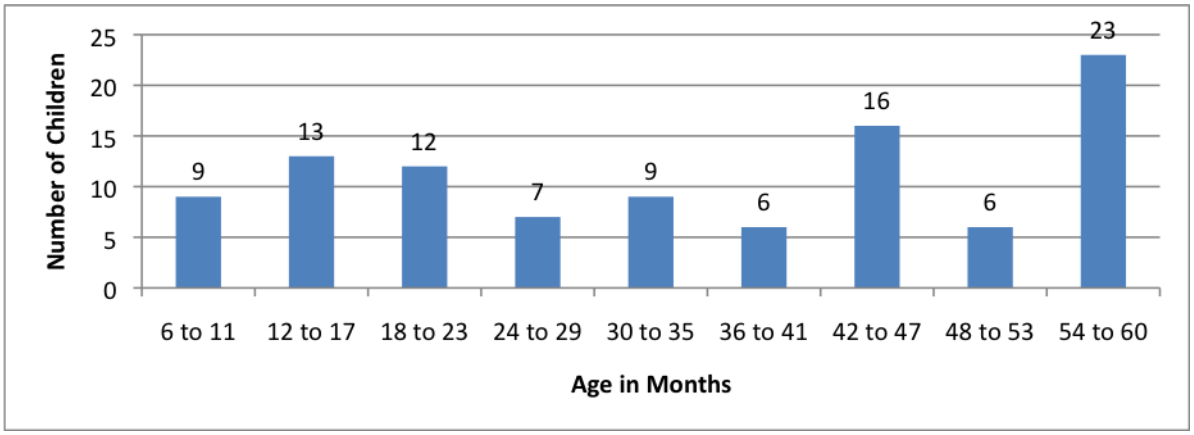
Nutritional and WASH information was gathered from 314 households, mortality and birth information gathered from 631 households, and health information on 101 children. As indicated in Table 65, the majority of households interviewed were headed by men (72.9%, n=229) and 26 (8.3%) of household heads are aged 15 to 19 years. The majority of household heads are between the ages of 25 - 29 (20.7%, n=65).

Table 65: Socio-demographic characteristics of Respondent HHs in the study in Makpandu, December 2010

Characteristics	Frequency	Percent
Household Head Sex		
Male	229	72.9
Female	85	27.1
Total	314	100.0
Household Head Age		
15-19	26	8.3
20-24	37	11.8
25-29	65	20.7
30-34	48	15.3
35-39	25	8.0
40-44	29	9.2
45-49	18	5.7
50-54	17	5.4
55-59	14	4.5
60-64	15	4.8
>65	20	6.4
Total	314	100.0
Household Family Size		
1	81	26.0
2-4	153	49.0
5-6	45	14.4
7-8	20	6.4
More than 8	13	4.2
Total	312	100.0

From the children included in the study, 42 were male (49.4%) and 43 were female (50.6%). The largest sampled ages included 54-60 months (22.8%), 42-47 months (15.8%) and 12-17 months (12.9%). Figure 4 shows the distribution of the ages of those children included in the survey.

Figure 4 : Age distribution of children in the study in Makpandu, December 2010



5.2 Sphere Indicator Comparison

This section will compare highlights of the results of the study in Makpandu against the Sphere Minimum Standards. The Minimum Standards and corresponding indicators represent a general consensus among practitioners regarding the level and type of services to be delivered in each sector.[2] Two sectors will be addressed in this comparison: water supply & sanitation and nutrition.

Table 66: Water Supply & Sanitation Sphere Indicator Comparison with Makpandu, December 2010

Sphere Indicator	Makpandu Results
Average water use for drinking, cooking and personal hygiene in any household is at least 15 liters per person per day.	See Table 71.
Maximum distance to the water point is not more than 500 meters, queuing time at the water source is no more than 15 minutes and it takes no more than 3 minutes to fill a 20 liter container.	61.5% (n=169) of respondent households are able to collect water in a timely fashion.[19]
Water collection and storage containers have narrow necks and/or covers.	83.8% of respondent households are using narrow neck Jerry Cans.
There is at least 250g of soap available for personal hygiene per person per month.	83.8% of respondent households have soap available in the home.
Household waste burnt or buried in a specified refuse pit.	48.9% of respondent households dispose of household waste either by burning or use of a designated compost pit.
Toilets are no more than 50 meters from dwellings	100% of respondent households indicated that their defecation facilities were less than 50 meters from their home.
Children's feces are disposed of hygienically	95.8% of respondent households dispose of children's feces in a hygienic fashion.
Children sleep under mosquito nets.	56.2% of children under 5 in respondent households sleep under a mosquito net.

2 Sphere Project. 2004. Humanitarian Charter and Minimum Standards in Disaster Response.

Table 67: Nutrition Sphere Indicator Comparison with Makpandu, December 2010

There is access to a range of foods – staple, pulses and fat sources that meet nutritional sources.	69.1% of respondent households had acceptable dietary diversity using the WFP Food Consumption Scale.
Infants under six months are exclusively breastfed.	28.4% of children under the age of five in respondent households were exclusively breastfed for the first six months.

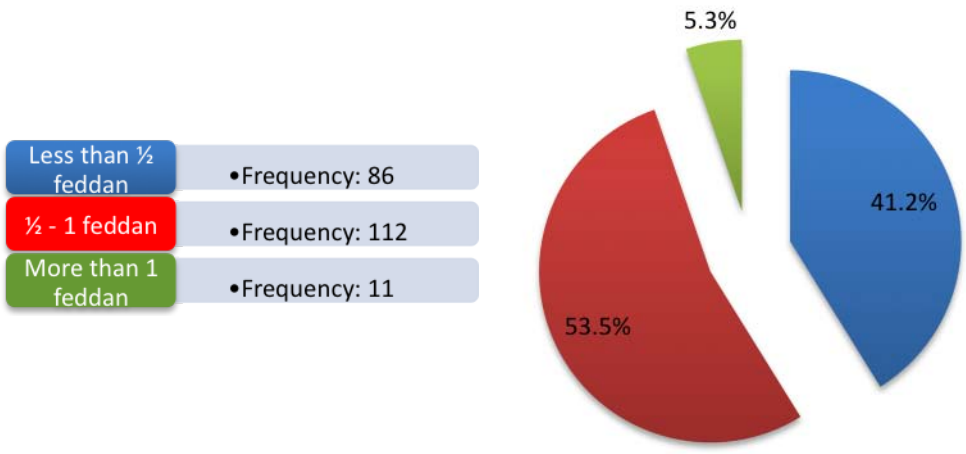
Table 68: Water Consumption by HH Size as Compared to Sphere Indicator in Makpandu, December 2010

# in HH	Jerry Cans Required[20]	# Achieving Indicator	% Achieving Indicator	Avg. Jerry Can Consumption/ Day
1	1	81	100.0	2.5
2	2	53	84.1	2.9
3	3	39	69.7	3.4
4	3	26	76.5	3.7
5	4	17	58.6	3.8
6	5	8	50.0	4.1
7	6	0	0.0	4.2
8	6	0	0.0	4.8
9	7	0	0.0	3.3
10	8	0	0.0	4.0
11	9	0	0.0	3.0
14	11	0	0.0	5.0
15	12	0	0.0	5.0

5.3 Household food consumption

The majority of households (72.3%, n=224) in the study area had access to land for cultivation. The following chart shows the amount of land available for cultivation for those households which have land access in Makpandu.

Chart 9: Land available for cultivation in Makpandu, December 2010



Given that such a large percentage of the population has access to land for cultivation, it is not surprising that several households reported consuming goods from their own production. In addition, 96.5% (n=246) of households indicated that they had received some type of food aid during the previous six months (May – November 2010). Table 69 shows the types of food consumed and the percentage obtained from personal production or food aid.

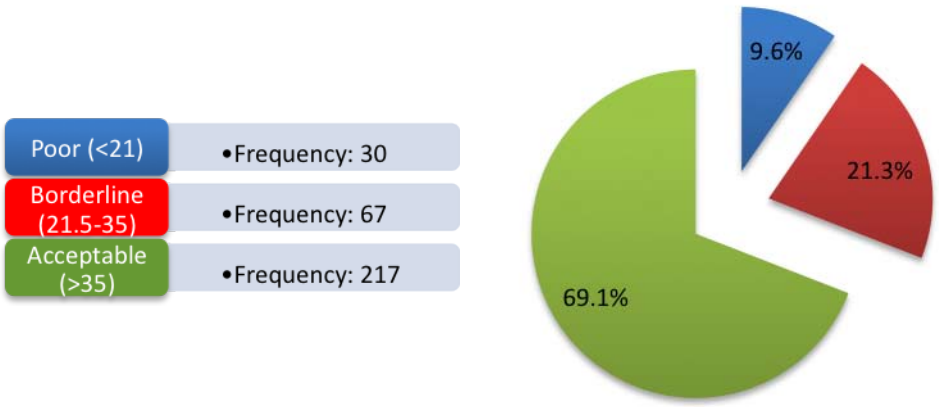
Table 69: Consumption and food sources for HH surveyed in Makpandu, December 2010

Food Item	Consumed in Past Week		Source: Personal Production		Source: Food Aid	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Maize	117	37.3	53	29.9	20	11.3
Rice	261	83.1	96	36.8	2	0.8
Sorghum	227	72.3	1	0.4	223	98.2
Millet	8	2.5	3	37.5	1	12.5
Wheat	15	4.8	2	13.3	2	13.3
Cassava	242	77.1	26	10.7	1	0.4
Potatoes	233	74.2	118	50.6	2	0.9
Yams	60	19.1	12	20.0	1	1.7
Bread	189	60.2	6	3.2	8	4.2
Beans	252	80.3	3	1.2	234	92.9
Groundnuts	192	61.1	25	13.0	8	4.2
Vegetables	235	74.8	122	51.9	0	0.0
Fruit	92	29.3	17	18.5	0	0.0
Fish	87	27.7	1	1.2	1	1.2
Meat	99	31.5	3	3.0	3	3.0
Eggs	44	14.0	1	2.3	16	36.4

One third (33.1%; n=104) of respondents indicated that they consumed alcohol in the week prior. The majority (56.7%; n=59) indicated that they consumed alcohol only once in the seven day period.

Overall, based on the WFP dietary diversity assessment, the food consumption score of the majority of households (69.1%, n=217) in Makpandu was characterized as "acceptable," with a score more than 35. Chart 10 details the food consumption scores of all households.

Chart 10: Food Consumption Scores of Households Surveyed in Makpandu, December 2010



5.4 Water and sanitary conditions

The source of drinking water used by the vast majority of households (99.4%, n=309) was a borehole. Furthermore, the majority (61.5%, n=193) indicated that reaching their most frequented water source took between 30-89 minutes.

As shown in Table 71, most households (72.0%; n=224) indicated they had access to private latrines, and an addition 22.5% (n=70) accessed communal latrines. Less than 0.6% (n=2) indicated using the bush as a venue for defecation. The majority of households (76.0%; n=218) indicated they were less than 10 meters away from the latrine they use. The most common method of disposal for children's feces was in a latrine (94.4%, n=202). Most households (48.9%, n=151) noted that they disposed of household rubbish in a compost pit, but 40.5% (n=125) indicated they disposed of rubbish by depositing it in the bush.

Table 70: Water and sanitary conditions of HH surveyed in Makpandu, December 2010

Characteristics	Frequency	Percentage
Main water source		
Borehole	309	99.4
Protected water source	1	0.3
Unprotected pond river/stream/well	1	0.3
Total	311	100.0
Number of Jerry Cans used per day		
1	46	14.7
2	66	21.0
3	48	15.3
4	68	21.7
5	86	27.4
Total	314	100.0
Type of Jerry Can used		
Narrow mouth	228	83.8
Wide mouth	44	16.2
Total	272	100.0
Time to collect water[21]		
Less than 15 minutes	41	13.1
15- 29 minutes	55	17.5
30- 59 minutes	96	30.6
60- 89 minutes	97	30.9
90 – 119 minutes	7	2.2
120 minutes or more	18	5.7
Total	314	100.0
Frequency water container washed		
Every time used	140	49.5
Every week	141	49.8
Every month	2	0.7
Never	0	0.0
Total	283	100.0

Table 71: Water and sanitary conditions of HH surveyed in Makpandu, 2010 (continued)

Characteristics	Frequency	Percentage
Satisfied with camp water supply		
Yes	218	72.2
No	84	27.8
Total	302	100.0
Reason dissatisfied		
Water is bad	63	47.0
Not enough water	62	46.3
Queues too long	5	3.7
Interruptions	0	0.0
Distribution times	4	3.0
Total	134	100.0
Type of defecation facility		
Private latrine	224	72.0
Community latrine	70	22.5
Bush	2	0.6
Neighbor's latrine	15	4.8
Other	0	0.0
Total	311	100.0
Meters from defecation facility		
Less than 10 meters	218	76.0
10 to 50 meters	69	24.0
Over 50 meters	0	0.0
Total	287	100.0
Method of disposal of child feces		
Private latrine	167	78.0
Community latrine	35	16.4
Bush	9	4.2
Bury	3	1.4
Total	214	100.0
Method of disposal of HH waste		
Compost pit	151	48.9
Garden	33	10.7
Bush	125	40.5
Burn	0	0.0
Total	309	100.0

As demonstrated in Table 72, the majority of individuals interviewed (86.4%, n=267) indicated that when washing their hands they used soap and water. Only 13.3% (n=41) indicated that they used water only. In addition, 83.8% of individuals indicated that soap was available in their homes.

Table 72: Soap use and availability in HH surveyed in Makpandu, December 2010

Characteristic	Frequency	Percentage
Materials used to wash hands		
Water alone	41	13.3
Soap and water	267	86.4
Ash	1	0.3
Soil or sand	0	0
Total	309	100.0
Availability of soap in HH		
Yes	258	83.8
No	49	15.9
Don't Know	1	0.3
Total	308	100.0

Table 73 compares knowledge and practice with regards to soap use and shows that when soap is available, the majority of respondents will use it at the most crucial times for sanitary and hygienic living practices.

Table 73: Knowledge and practice of soap used in HH surveyed in Makpandu, December 2010

Use	Knows to Use Soap		Practice Day Prior	
	Frequency	Percentage	Frequency	Percentage
Preparing food	7	2.3	151	48.1
Before eating	9	2.9	187	59.6
Before feeding children	119	37.9	67	21.3
After changing baby	118	37.6	65	20.7
After defecating	252	80.3	170	54.1

5.5 Feeding practices

The breast feeding practice in Makpandu is estimated to be 88.1% (n=89), with 84.3% (n=75) initiating breastfeeding within the first hour of birth. However, only 28.4% (n=29) were exclusively breastfed for the first six months. The most commonly introduced foods in the first six months were cereals (58.4%, n=59) and juice (26.7%, n=27).

Table 74: Breast feeding history of children born in the five years preceding the survey in Makpandu,

December 2010

Breast feeding history	Frequency	Percentage
Children ever breastfed		
Yes	89	88.1
No	12	11.9
Total	101	100.0
Breastfeeding initiated		
Within 1 hour of birth	75	84.3
After 1 hour of birth	14	15.7
Total	89	100.0
Exclusive breastfeeding for 6 months		
Yes	29	28.4
No	73	71.7
Total	102	100.0
Foods given before 6 months		
Water	37	36.6
Milk	8	7.9
Juice	27	26.7
Cereal	59	58.4
Tea	2	2.0
Soup	6	6.0
Duration of breastfeeding		
6 months or less	1	1.2
7 to 12 months	2	2.4
13 to 18 months	66	80.5
19 to 24 months	13	15.9
25 to 36 months	0	0.0
37 to 47 months	0	0.0
48 months or more	0	0.0
Total	82	100.0

In the past week, the most commonly reported foods given to children under the age of 5 were cereals fruits (86.1%, n=87), meat (65.4%, n=66) and legumes (51.5%, n=52). Most children surveyed (50.0%, n=46) received only two meals the day prior.

Table 75: Current feeding practice of children born in the last five years preceding the survey in Makpandu, December 2010

Feeding Practice	Frequency	Percentage
Frequency of feeding in previous day		
0 meals	2	2.2
1 meal	14	15.2
2 meals	46	50.0
3 meals	25	27.2
4 meals	3	3.3
5 meals	0	0.0
6 meals	2	2.2
Total	92	100.0
Foods administered in past week		
Cereal	25	24.8
Legumes	52	51.5
Fish	2	2.0
Milk	2	2.0
Meat	66	65.4
Tubers	0	0.0
Fruits	87	86.1

5.6 Diarrheal disease & other illnesses

The prevalence of diarrheal illness in the two weeks prior to the study among those interviewed was 27.7% (n=28). With regard to the occurrence of febrile illnesses among children in Makpandu, 46.5% (n=47) reported having some form of fever in the two weeks before the study. Only 56.2% (n=50) of children under the age of five surveyed regularly sleep under a mosquito net. Acute respiratory infections (ARI) were also frequently reported, with 39.6% (n=40) of children surveyed having suffered from an ARI in the two weeks prior to the survey. Table 76 provides more details on the illnesses reported by children in Makpandu.

Table 76: Illnesses reported among children under 5 in the two weeks prior to the survey in Makpandu, December 2010

Variable	Frequency	Percentage
Had fever in last 2 weeks		
Yes	47	46.5
No	54	53.5
Total	101	100.0
Had measles in last 2 weeks		
Yes	2	2.0
No	99	98.0
Total	101	100.0
Had diarrhea in last 2 weeks		
Yes	28	27.7
No	73	72.3
Total	101	100.0
Had ARI in last 2 weeks		
Yes	40	39.6
No	61	60.4
Total	101	100.0
Had skin disease in last 2 weeks		
Yes	11	10.9
No	90	89.1
Total	101	100.0
Had eye disease in last 2 weeks		
Yes	0	0.0
No	101	100.0
Total	101	100.0
No illness in last 2 weeks		
Yes	18	17.8
No	83	82.2
Total	101	100.0

5.7 Nutritional status of children

Height, weight, prevalence of oedema, mid upper arm circumference (MUAC), and hemoglobin levels were recorded for children between 6 and 59 months to estimate the nutritional status in Makpandu.

The prevalence of global malnutrition (<-2 z-score and/or oedema) was 12.4% (n=11), with little variation between boys at 11.1% (n=5) and girls 13.6% (n=6). Prevalence of moderate malnutrition (<2 z-score and >= 3 z-score, no oedema) was 11.2% (n=10), without significant variation by gender. Prevalence of severe malnutrition (<-3 z-score and/or oedema) was 1.1% (n=1), and it was only found among girls at 2.3% (n=1) The following table details the findings.

Table 77: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex in Makpandu, December 2010

	All n=101		Boys n= 48		Girls n= 53	
	Freq.	Percent.	Freq.	Percent.	Freq.	Percent.
Prevalence of global malnutrition (<-2 z-score and/or oedema)	17	16.8	6	12.5	11	20.8
	(9.5 – 24.1; 95% C.I.)		(3.1 – 21.9; 95% C.I.)		(9.8 – 31.7; 95% C.I.)	
Prevalence of moderate malnutrition (<2 z-score and >= 3 z-score, no oedema)	10	9.9	5	10.4	5	9.4
	(3.3 – 11.8; 95% C.I.)		(4.0 – 18.9; 95% C.I.)		(-0.4 – 8.3; 95% C.I.)	
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	7	7.9	1	2.1	6	11.3
	(2.0 – 11.9; 95% C.I.)		(-2.0 – 6.1; 95% C.I.)		(2.8 – 19.9; 95% C.I.)	

Children between the ages of 42-53 months showed a much higher propensity to present with acute malnutrition based on weight-for-height z-scores (wasting), as demonstrated in the following table. Further analysis also showed that a small percentage of the population as qualified as marasmic, with only 5.9% (n=6) of children meeting the definition of having a less than -3 z-score. Only one child (1%) presented with marasmic kwashiorkor, with a less than-3 z-score and oedema present.

Table 78: Prevalence of acute malnutrition by age based on weight-for-height z-scores and/or oedema in Makpandu, December 2010

		Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age	Total	No.	%	No.	%	No.	%	No.	%
6-17	44	1	2.3	1	2.3	42	95.5	0	0.0
18-29	31	0	0.0	4	12.9	27	87.7	1	3.1
30-41	22	0	0.0	3	13.6	19	86.4	0	0.0
42-53	23	3	13.0	5	21.8	14	65.2	0	0.0
54-59	25	2	8.0	1	4.0	22	88.0	0	0.0
Total	147	6	4.1	14	9.5	124	84.4	1	1.0

Approximately a quarter surveyed were stunted, with 23.9% (n=21) with a less than -2 z-score. There was no significant difference between the prevalence of stunting by gender. The following table details the findings of the height-for-age measurements.

Table 79: Prevalence of stunting based on height-for-age z-scores and by sex in Makpandu, December 2010

	All n=101		Boys n= 48		Girls n= 53	
	Freq.	Percent.	Freq.	Percent.	Freq.	Percent.
Prevalence of stunting (<-2 z-score)	28	27.7	13	27.1	15	28.3
	(19.0 – 36.5; 95% C.I.)		(14.5 – 39.7; 95% C.I.)		(16.2 – 40.4; 95% C.I.)	
Prevalence of moderate stunting (<2 z-score and >= 3 z-score)	14	13.9	7	14.6	7	13.2
	(7.1 – 20.6; 95% C.I.)		(4.6 – 24.6; 95% C.I.)		(4.1 – 22.3; 95% C.I.)	
Prevalence of severe stunting (<-3 z-score)	14	13.9	6	12.5	8	15.1
	(7.1 – 20.6; 95% C.I.)		(3.1 – 21.9; 95% C.I.)		(5.5 – 24.7; 95% C.I.)	

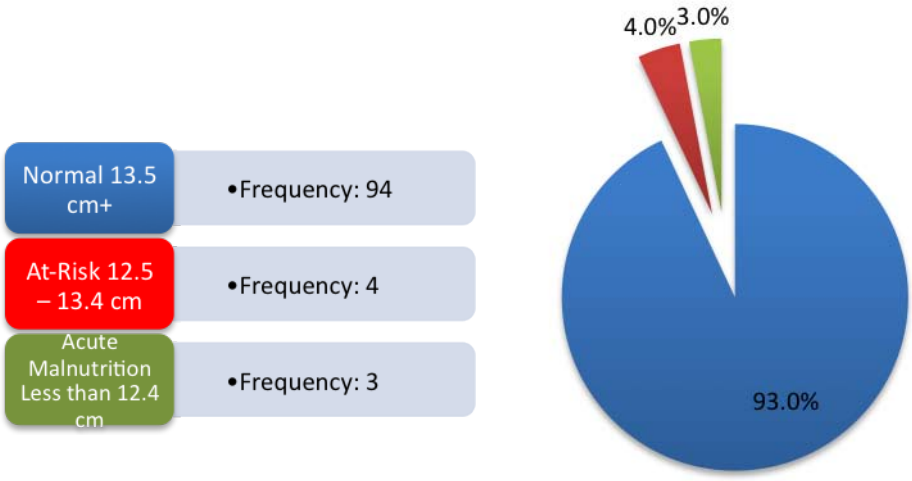
Only a small portion of the population sampled were found to be underweight, with 93.9% of the population having a weight-for-age z-score within the acceptable range. No significant differences were found based on gender. The following table details the findings.

Table 79 continued: Prevalence of underweight based on weight-for-age z-scores in Makepandu, December 2010

	All n=100		Boys n= 48		Girls n= 52	
	Freq.	Percent.	Freq.	Percent.	Freq.	Percent.
Prevalence of underweight (<-2 z-score)	7	7.0	4	8.3	3	5.8
	(2.0 -12.0; 95% C.I.)		(0.5 – 16.2; 95% C.I.)		(-0.6 – 12.1; 95% C.I.)	
Prevalence of moderate underweight (<2 z-score and >= 3 z-score)	5	5.0	2	4.2	3	5.8
	(0.7 – 9.3; 95% C.I.)		(-1.5 – 9.0; 95% C.I.)		(-0.6 – 12.1; 95% C.I.)	
Prevalence of severe underweight (<-3 z-score)	2	2.0	2	4.2	0	0.0
	(-0.7 - 4.7; 95% C.I.)		(-1.5 – 9.8; 95% 0C.I.)		(0.0 – 0.0; 95% C.I.)	

There was only 1 case of oedema observed (1.1%). Based on the MUAC measurement, none of the children were found to be in a state of acute malnourishment (MUAC >12.5), although 5.9% (n=6) were found to be at-risk for malnourishment. The following table details the findings of the MUAC measurements.

Chart 11: MUAC classifications in Makpandu, December 2010



Finally, 77.2% (n=78) of children surveyed were found to have low hemoglobin levels (less than 11.0 g/dl) indicating the presence of anemia. Girls were more likely (17 percentage points) to present with anemia than boys (Table 81). In addition to these children, 12.9% (n=13) of their mothers also presented with anemia (less than 12.0 g/dl).

Table 80: Hemoglobin levels of children and mothers in Makpandu, December 2010

Characteristics	Frequency	Percentage
Child Hemoglobin Level		
Less than 11.0 g/dl	78	77.2
11.0 g/dl +	23	22.8
Total	101	100.0
Mother Hemoglobin Level		
Less than 12.0 g/dl	13	12.9
12.0 g/dl +	88	87.1
Total	101	100.0

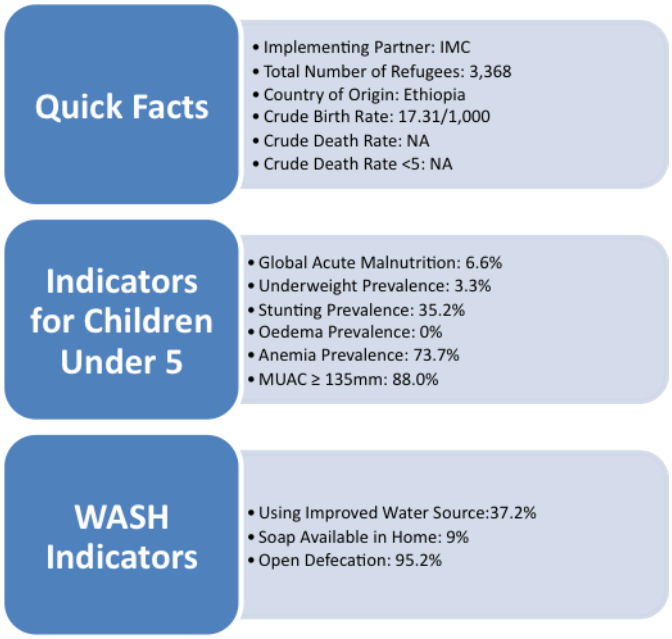
Table 81: Children under five presenting with anemia by sex in Makpandu, December 2010

Anemia	Male Children		Female Children		Total	
	Freq.	Percent	Freq.	Percent	Freq.	Percent
Yes Hemoglobin less than 11.0 g/dl	31	73.8	39	90.7	70	82.4
No Hemoglobin 11.0 g/dl +	11	26.2	4	9.3	15	17.7
Total	42	100.0	43	100.0	85	100.0

Table 82: Presence of anemia by age and severity in Makpandu, December 2010

Age	Severe (<7g/dL)		Moderate (7-9.9g/dL)		Mild (10-10.9/dL)		Total Anemia	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
6-23 mos.	7	20	13	37	10	29	30	86
24 – 35 mos.	1	5	8	42	5	26	14	74
36 - 59 mos.	3	6	20	43	11	23	34	72
Total	**11**	**11**	**41**	**41**	**26**	**26**	**78**	**77**

6. Pochalla



6.1 Socio-demographic characteristics of household heads and children interviewed

The baseline survey was conducted in Alari camp serving Ethiopian Anuak refugees near Pochalla, Jonglei State. The camp was established in October 2003 and at the time of the survey was hosting 956 families and 3,368 individuals. Further demographics of the total population are available in the following table.

Table 83: Refugee Population in Pochalla by Sex and Age Group, December 2010

# of HHs	Total	956	
	Female headed	HH	702
		%	73.4%
Number of Refugees	0 – 4 years old	F	333
		M	345
		T	678
	5 – 11 years old	F	528
		M	545
		T	1073
	12 – 17 years old	F	197
		M	197
		T	394
	18 - 59 years old	F	856
		M	290
		T	1146
	60 years +	F	37
		M	20
		T	57
	NA	F	13
		M	7
		T	20
	Total	F	1964
		M	1404
		T	3368

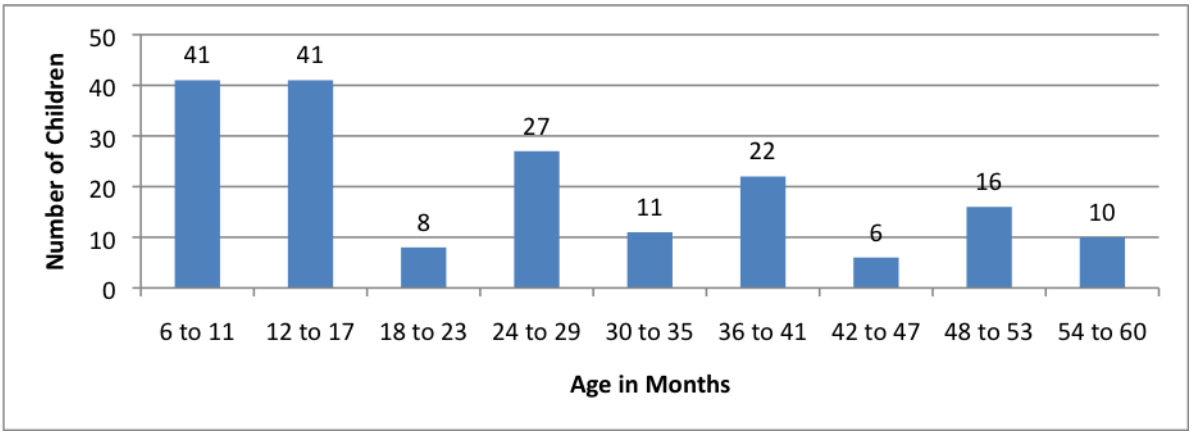
Nutritional and WASH information was gathered from 360 households, mortality and birth information gathered from 667 households, and health information on 217 children. As indicated in Table 84, the majority of households interviewed were headed by women (65.4%, n=208) and 27 (8.4%) household heads are aged 15 to 19 years. The majority of household heads are between the ages of 30-34 (20.5%, n=66).

Table 84: Socio-demographic characteristics of HH heads in the study in Pochalla, December 2010

Characteristics	Frequency	Percent
Household Head Sex	-	
Male	110	34.6
Female	208	65.4
Total	318	100.0
Household Head Age		
15-19	27	8.4
20-24	31	9.6
25-29	36	11.2
30-34	66	20.5
35-39	37	11.5
40-44	35	10.9
45-49	27	8.4
50-54	27	8.4
55-59	8	2.5
60-64	17	5.3
>65	11	3.4
Total	322	100.0
Household Family Size		
1	65	19.9
2-4	153	46.8
5-6	90	27.5
7-8	15	4.6
More than 8	4	1.2
Total	327	100.0

From the children included in the study, 121 were male (56.8%) and 92 were female (43.2%). The largest sampled ages included 6-11 months (22.5%), 12-17 months (22.5%), and 24-29 months (14.8%). Figure 5 shows the distribution of the ages of those children included in the survey.

Figure 5 : Age distribution of children in the study in Pochalla, December 2010



6.2 Sphere Indicator Comparison

This section will compare highlights of the results of the study in Pochalla against the Sphere Minimum Standards. The Minimum Standards and corresponding indicators represent a general consensus among practitioners regarding the level and type of services to be delivered in each sector.[3] Two sectors will be addressed in this comparison: water supply & sanitation and nutrition.

Table 85: Water Supply & Sanitation Sphere Indicator Comparison with Pochalla, December 2010

Sphere Indicator	Pochalla Results
Average water use for drinking, cooking and personal hygiene in any household is at least 15 litres per person per day.	See Table 92.
Maximum distance to the water point is not more than 500 meters, queuing time at the water source is no more than 15 minutes and it takes no more than 3 minutes to fill a 20 liter container.	40.7% (n=142) of respondent households are able to collect water in a timely fashion. [22]
Water collection and storage containers have narrow necks and/or covers.	44.5% of respondent households are using narrow neck Jerry Cans.
There is at least 250g of soap available for personal hygiene per person per month.	9% of respondent households have soap available in the home.
Household waste burnt or buried in a specified refuse pit.	71.5% of respondent households dispose of household waste either by burning or use of a designated compost pit.
Toilets are no more than 50 meters from dwellings	30.2% of respondent households indicated that their defecation facilities were less than 50 meters from their home.
Children's faeces are disposed of hygienically	67.7% of respondent households dispose of children's feces in a hygienic fashion.
Children sleep under mosquito nets.	20.8% of children under 5 in respondent households sleep under a mosquito net.

Table 86: Nutrition Sphere Indicator Comparison with Pochalla, December 2010

There is access to a range of foods – staple, pulses and fat sources that meet nutritional sources.	8.6% of respondent households had acceptable dietary diversity using the WFP Food Consumption Scale.
Infants under six months are exclusively breastfed.	5.6% of children under the age of 5 in respondent households were exclusively breastfed for the first six months.

3 Sphere Project. 2004. Humanitarian Charter and Minimum Standards in Disaster Response.

Table 87: Water Consumption by HH Size as Compared to Sphere Indicator in Pochalla, December 2010

Members of HH	Jerry Cans Required (Sphere Indicator)	# Achieving Sphere Indicator	% Achieving Sphere Indicator	Average Jerry Can/ Day Consumption for HH Size
1	1	69	100.0%	1.9
2	2	39	78.0%	2.3
3	3	23	34.3%	2.4
4	3	30	54.5%	2.7
5	4	15	27.8%	2.7
6	5	5	11.1%	3.0
7	6	0	0.0%	2.9
8	6	0	0.0%	3.3
9	7	0	0.0%	4

6.3 Household food consumption

Very few households (5.5%, n=19) in the study area had access to land for cultivation. Of those households who reported access, all indicated that they had 2 feddans for cultivation purposes. Despite this small number, several households reported consuming goods from their own production. Every household interviewed indicated that they had received some type of food aid during the previous six month (May – November 2010). Only 5.5% (n=18) and 2.8% (n=9) reported having consumed fish or meat, respectively, in the week prior to the survey. Of those who reported consuming fish, 31.3% (n=5) liquidated assets to purchase fish. Of those who reported consuming meat, 55.6% (n=5) liquidated assets to purchase the food item. Table 88 shows the types of food consumed and the percentage obtained from personal production or food aid.

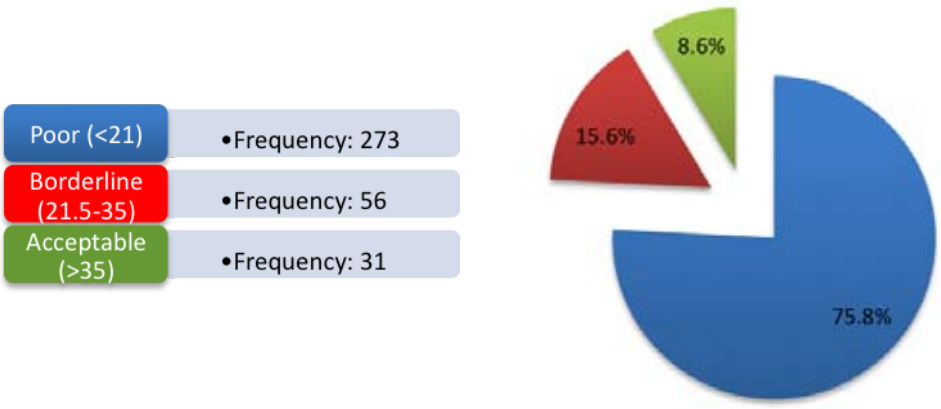
Table 88: Consumption and food sources for HH surveyed in Pochalla, December 2010

Food Item	Consumed in Past Week		Source: Personal Production		Source: Food Aid	
	Frequency	Percentage	Freq.	Percentage	Freq.	Percentage
Maize	234	71.6	62	27.4	68	30.1
Rice	4	1.1	2	28.6	3	42.9
Sorghum	214	59.6	1	0.5	192	98.5
Millet	6	1.8	0	0.0	4	100.0
Cassava	51	15.6	28	63.6	14	31.8
Potatoes	3	0.8	1	16.7	4	66.7
Yams	8	2.2	1	10.0	9	90.0
Bread	5	1.5	1	14.3	6	85.7
Beans	142	39.6	0	0.0	142	99.3
Groundnuts	9	2.8	6	66.7	1	11.1
Vegetables	93	28.4	60	58.3	36	35.0
Fruit	14	4.3	1	82.4	7	11.8
Fish	18	5.5	4	25.0	3	18.8
Meat	9	2.8	2	22.2	0	0.0
Eggs	6	1.7	1	16.7	4	66.7

Only 7 individuals (.02%) interviewed reported consuming alcohol in the past week. Of those who reported consuming alcohol, they indicated that they obtained it through exchange of labor for goods and consumed it daily.

Overall, based on the WFP dietary diversity assessment, the food consumption score of the majority of households (75.8%, n=273) in Pochalla was characterized as "poor," with a score less than 21. Chart 12 details the food consumption scores of all households.

Chart 12: Food Consumption Scores of Households Surveyed in Pochalla, 2010



6.4 Water and sanitary conditions

The source of drinking water used by the majority of households (62.9%, n=225) was an unprotected river, stream or well. Only 28.2% (n=101) reported collecting water from a borehole, and 8.9% reported using a protected water source. Furthermore, almost half (41.6%, n=136) indicated that reaching their most frequented water source took between 60-89 minutes.

As shown in Table 89, almost all of the households (95.2%, n=340) do not have any kind of toilet facility, and as a result household members go to bushes or open fields for defecation. A vast majority (69.8%, n=243) indicated that they traveled over 50 meters to reach the areas used for defecation purposes. The most common method of disposal for children's feces was burial (62.6%, n=211) followed by disposing of them in the bush (32.3%, n=109). Most households (63.1%, n=226) noted that they disposed of household rubbish through burning, while 28.2% (n=101) indicated that they disposed of it in the bush.

Table 89. Water and sanitary conditions of HH surveyed in Pochalla, 2010

Characteristics	Frequency	Percentage
Main water source		
Borehole	101	28.2
Protected water source	32	8.9
Unprotected pond river/stream/well	225	62.9
Total	**358**	**100.0**
Number of Jerry Cans used per day		
1	84	23.3
2	122	33.9
3	73	20.3
4	52	14.4
5	29	8.1
Total	**360**	**100.0**
Type of Jerry Can used		
Narrow mouth	154	44.5
Wide mouth	192	55.5
Total	**346**	**100.0**
Time to collect water[23]		
Less than 15 minutes	48	14.7
15- 29 minutes	49	15.0
30- 59 minutes	29	8.9
60- 89 minutes	136	41.6
90 – 119 minutes	25	7.7
120 minutes or more	40	12.2
Total	**327**	**100.0**
Frequency water container washed		
Every time used	257	72.0
Every week	96	26.9
Every month	4	1.1
Never	0	0.0
Total	**357**	**100.0**

Table 89 Continued

Characteristics	Frequency	Percentage
Satisfied with camp water supply		
Yes	35	10.0
No	314	90.0
Total	**349**	**100.0**
Reason Dissatisfied		
Water is bad	65	20.4
Not enough water	16	5.0
Queues too long	210	65.8
Interruptions	2	0.6
Distribution times	26	8.2
Total	**319**	**100.0**
Type of defecation facility		
Private latrine	12	3.4
Community latrine	4	1.1
Bush	340	95.2
Neighbor's latrine	0	0.0
Other	1	0.3
Total	**357**	**100.0**
Meters from defecation facility		
Less than 10 meters	14	4.0
10 to 50 meters	91	26.2
Over 50 meters	243	69.8
Total	**348**	**100.0**
Method of disposal of child feces		
Private latrine	15	4.5
Community latrine	2	0.6
Bush	109	32.3
Bury	211	62.6
Total	**337**	**100.0**
Method of disposal of HH waste		
Compost pit	30	8.4
Garden	1	0.3
Bush	101	28.2
Burn	226	63.1
Total	**358**	**100.0**

As demonstrated in Table 90, the majority of individuals interviewed (89.2%, n=315) indicated that when washing their hands they used water alone. Only 3.4% (n=12) indicated that they regularly washed with soap and water. However, only 9% of individuals indicated that soap was available in their homes. Further questions made it clear that lack of frequency of soap use reflected lack of availability of soap rather than lack of knowledge regarding washing practices.

Table 90. Soap use and availability in HH surveyed in Pochalla, 2010

Characteristic	Frequency	Percentage
Materials used to wash hands		
Water alone	315	89.2
Soap and water	12	3.4
Ash	24	6.8
Soil or sand	2	0.6
Total	**353**	**100.0**
Availability of Soap in HH		
Yes	31	9.0
No	314	90.8
Don't Know	1	0.3
Total	**346**	**100.0**

Table 91 compares knowledge and practice with regards to soap use and shows that when soap is available, the majority of respondents will use it at the most crucial times for sanitary and hygienic living practices.

Table 91: Knowledge and practice of soap used in HH surveyed in Pochalla, December 2010

Use	Knows to Use Soap		Practice Day Prior	
	Frequency	Percentage	Frequency	Percentage
Preparing food	282	79.0	74	20.7
Before eating	276	76.9	76	21.2
Before feeding children	224	62.4	85	23.7
After changing baby	165	46.0	75	21.0
After defecating	272	75.8	96	26.8

6.5 Feeding practices

The breast feeding practice in Pochalla is estimated to be 97.7% (n=212), with 81.6% (n=173) initiating breastfeeding within the first hour of birth. However, only 5.6% (n=12) were exclusively breastfed for the first six months. The most commonly introduced foods in the first six months were cereals (76.9%, n=166) and cow milk (10.7%, n=23).

Table 92. Breast feeding history of children born in the five years preceding the survey in Pochalla, 2010

Breast feeding history	Frequency	Percentage
Children ever breastfed		
Yes	212	97.7
No	5	2.3
Total	217	100.0
Breastfeeding initiated		
Within 1 hour of birth	173	81.6
After 1 hour of birth	39	18.4
Total	212	100.0
Exclusive breastfeeding for 6 months		
Yes	12	5.6
No	204	94.4
Total	216	100.0
Foods given before 6 months		
Water	1	0.5
Milk	23	10.7
Juice	1	0.5
Cereal	166	76.9
Tea	0	0.0
Soup	12	5.6
Duration of breastfeeding		
6 months or less	16	14.0
7 to 12 months	26	28.0
13 to 18 months	3	3.0
19 to 24 months	29	29.0
25 to 36 months	4	4.0
37 to 47 months	0	0
48 months or more	22	22
Total	100	100.0

In the past week, the most commonly reported foods given to children under the age of 5 were cereals (68.5%, n=148), fruits (13.9%, n=30), and cow milk (9.3%, n=20). Most children surveyed (59.1%, n=78) received only two meals the day prior. Boys were eight percentage points more likely to have received three meals the day prior (Table 99).

Table 93. Current feeding practice of children born in the last five years preceding the survey in Pochalla, 2010

Feeding Practice	Frequency	Percentage
Frequency of feeding in previous day		
0 meals	3	2.3
1 meal	12	9.1
2 meals	78	59.1
3 meals	39	29.6
Total	**132**	**100.0**
Foods administered in past week		
Cereal	148	68.5
Legumes	0	0.0
Fish	8	3.7
Milk	20	9.3
Meat	0	0.0
Tubers	2	0.9
Fruits	30	13.9

Table 94. Meals consumed day prior by Children under five by sex in Pochalla, 2010

# of Meals	Male Children		Female Children		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
0	3	4.0	0	0.0	3	2.3
1	7	9.3	5	9.1	12	9.2
2	40	53.3	36	65.5	76	58.5
3	25	33.3	14	25.5	39	30.0
Total	**75**	**100.0**	**55**	**100.0**	**130**	**100.0**

6.6 Diarrheal disease & other illnesses

The prevalence of diarrheal illness in the two weeks prior to the study among those interviewed was 15.8% (n=34). With regard to the occurrence of febrile illnesses among children in Pochalla, 44.7% (n=96) reported having some form of fever in the two weeks before the study. Only 20.8% (n=42) of children under the age of five surveyed regularly sleep under a mosquito net. Acute respiratory infections (ARI) were also frequently reported, with 25.6% (n=55) of children surveyed having suffered from an ARI in the two weeks prior to the survey. Table 100 provides more details on the illnesses reported by children in Pochalla.

Table 95: Illnesses reported among children under 5 in the two weeks prior to the survey in Pochalla, December 2010

Variable	Frequency	Percentage
Had fever in last 2 weeks		
Yes	96	44.7
No	119	55.4
Total	**215**	**100.0**
Had measles in last 2 weeks		
Yes	7	3.3
No	208	96.7
Total	**215**	**100.0**
Had diarrhea in last 2 weeks		
Yes	34	15.8
No	181	84.2
Total	**215**	**100.0**
Had ARI in last 2 weeks		
Yes	55	25.6
No	160	74.4
Total	**215**	**100.0**
Had skin disease in last 2 weeks		
Yes	13	6.1
No	202	94.0
Total	**215**	**100.0**
Had eye disease in last 2 weeks		
Yes	5	2.3
No	209	97.7
Total	**214**	**100.0**
No illness in last 2 weeks		
Yes	18	8.4
No	197	91.6
Total	**215**	**100.0**

6.7 Nutritional status of children

Height, weight, prevalence of oedema, mid upper arm circumference (MUAC), and hemoglobin levels were recorded for children between 6 and 59 months to estimate the nutritional status in Pochalla.

The prevalence of global malnutrition (<-2 z-score and/or oedema) was 4.4% (n=7), with little variation between boys at 4.85% (n=4) and girls 4.0% (n=3). Prevalence of moderate malnutrition (<2 z-score and >= 3 z-score, no oedema) was 2.5% (n=4), without significant variation by gender. Prevalence of severe malnutrition (<-3 z-score and/or oedema) was 1.9% (n=3), and was slightly more common among boys at 2.4% (n=2) than girls at 1.3% (n=1). The following table details the findings.

Table 96: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex in Pochalla, December 2010

	All n=181		Boys n= 95		Girls n= 86	
	Freq.	Percent.	Freq.	Percent.	Freq.	Percent.
Prevalence of global malnutrition (<-2 z-score and/or oedema)	12	6.6	8	8.4	4	4.7
	(3.0-10.3; 95% C.I.)		(2.8-14.0; 95% C.I.)		(0.2-9.1; 95% C.I.)	
Prevalence of moderate malnutrition (<2 z-score and >= 3 z-score, no oedema)	7	3.9	5	5.3	2	2.3
	(1.4-7.4; 95% C.I.)		(1.4-11.2; 95% C.I.)		(-0.9 – 5.5; 95% C.I.)	
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	5	2.8	3	3.2	2	2.3
	(0.1-4.4; 95% C.I.)		(-0.8 – 5.0; 95% C.I.)		(-0.9-5.5; 95% C.I.)	

There were no age groups which showed a higher propensity for wasting than others, as demonstrated in the following table. Further analysis also showed that a small percentage of the population as qualified as marasmic, with only 3.4% (n=6) of children meeting the definition of having a less than -3 z-score.

Table 97: Prevalence of acute malnutrition by age based on weight-for-height z-scores and/or oedema in Pochalla, December 2010

		Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age	Total	No.	%	No.	%	No.	%	No.	%
6-17	83	3	3.6	2	2.4	78	94	0	0.0
18-29	33	0	0.0	1	3.0	32	97	0	0.0
30-41	33	1	3.0	1	3.1	31	93.9	0	0.0
42-53	22	1	4.5	2	9.1	19	86.4	0	0.0
54-59	10	0	0.0	1	10.0	9	90.0	0	0.0
Total	181	5	2.8	7	3.9	169	93.4	0	0.0

A significant amount of the population surveyed is stunted, with 37.5% (n=66) with <-2 z-score. -Stunting was significant more prevalent among male children than female children; with boys almost twice as likely to exhibit signs of stunting as girls. The following table details the findings of the height-for-age measurements.

Table 98: Prevalence of stunting based on height-for-age z-scores and by sex in Pochalla, December 2010

	All n=182		Boys n= 95		Girls n= 87	
	Freq.	Percent.	Freq.	Percent.	Freq.	Percent.
Prevalence of stunting (<-2 z-score)	67	36.8	42	44.2	25	28.7
	(28.2-42.1; 95% C.I.)		(32.2-52.0; 95% C.I.)		(18.2-37.0; 95% C.I.)	
Prevalence of moderate stunting (<2 z-score and >= 3 z-score)	30	16.5	19	20	11	12.6
	(14.5-26.2; 95% C.I.)		(17.5-35.2; 95% C.I.)		(6.5-21.0; 95% C.I.)	
Prevalence of severe stunting (<-3 z-score)	37	20.3	23	24.2	14	16.1
	(9.7-20.0; 95% C.I.)		(8.5-23.1; 95% C.I.)		(6.5-21.0; 95% C.I.)	

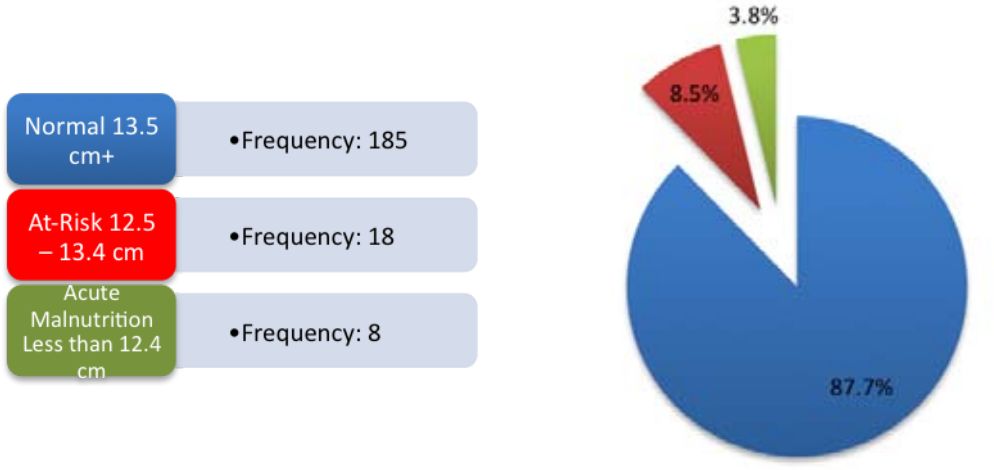
Only a small portion of the population sampled were found to be underweight, with 96.7% of the population having a weight-for-age z-score within the acceptable range. Boys were slightly more likely to present as underweight than girls, at 5.3% and1.2%, respectively. The following table details the findings.

Table 99: Prevalence of underweight based on weight-for-age z-scores in Pochalla, December 2010

	All n=181		Boys n= 95		Girls n= 86	
	Freq.	Percent.	Freq.	Percent.	Freq.	Percent.
Prevalence of underweight (<-2 z-score)	6	3.3	5	5.3	1	1.2
	(0.7 – 5.9; 95% C.I.)		(0.8 – 9.8; 95% C.I.)		(-1.1 – 3.4; 95% C.I.)	
Prevalence of moderate underweight (<2 z-score and >= 3 z-score)	4	2.2	4	4.2	0	0.0
	(0.1 – 4.4; 95% C.I.)		(0.2 – 8.2; 95% C.I.)		(0.0 – 0.0; 95% C.I.)	
Prevalence of severe underweight (<-3 z-score)	2	1.1	1	1.1	1	1.2
	(-0.4 - 2.6; 95% C.I.)		(-1.0 - 3.1; 95% C.I.)		(-1.1 – 3.4; 95% C.I.)	

There were no cases of oedema observed in the population. Based on the MUAC measurement, 3.7% (n=8) of children are also found to be in a state of acute malnourishment measuring less than 12.4 cm. The following chart details the findings of the MUAC measurements.

Chart 13: MUAC classifications in Pochalla, December 2010



Finally, 73.7% (n=160) of children surveyed were found to have low hemoglobin levels (less than 11.0 g/dl) indicating the presence of anemia. Girls were slightly more likely (4 percentage points) to present with anemia than boys (Table 100). In addition to these children, 21.7% (n=47) of their mothers also presented with anemia (less than 12.0 g/dl).

Table 100: Hemoglobin levels of children and mothers in Pochalla, December 2010

Characteristics	Frequency	Percentage
Child Hemoglobin Level		
Less than 11.0 g/dl	160	73.7
11.0 g/dl +	57	26.3
Total	**217**	**100.0**
Mother Hemoglobin Level		
Less than 12.0 g/dl	47	21.7
12.0 g/dl +	170	78.3
Total	**217**	**100.0**

Table 101: Children under five presenting with anemia by sex in Pochalla, December 2010

Anemia	Male Children		Female Children		Total	
	Freq.	Percent	Freq.	Percent	Freq.	Percent
Yes Hemoglobin less than 11.0 g/dl	88	72.7	71	77.2	159	74.7
No Hemoglobin 11.0 g/dl +	33	27.3	21	22.8	54	25.4
Total	**121**	**100.0**	**92**	**100.0**	**213**	**100.0**

Table 102: Presence of anemia by age and severity in Pochalla, December 2010

Age	Severe (<7g/dL)		Moderate (7-9.9g/dL)		Mild (10-10.9/dL)		Total Anemia	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
6-23 mos.	8	7	60	56	21	19	89	82
24 – 35 mos.	0	0	9	39	7	30	16	70
36 - 59 mos.	3	6	14	30	14	30	31	66
Total	**11**	**6**	**83**	**47**	**42**	**24**	**136**	**76**

7. Discussion

As the previous sections have indicated, the conditions in each of the five refugee settlements differ substantially. The following table compares some of the key indicators from each of the settlements.

Table 103: Comparison of select indicators in each of the five settlements, December 2010

Location	Poor FCS	GAM	Anemia Prevalence	Improved Water Source	Open Defecation	Availability of Soap
Lologo	0.5%	10.1%	76.1%	74.7%	91.9%	54.4%
Lasu	0.0%	10.4%	44.8%	100.0%	0.7%	90.3%
Ezo	0.9%	15.1%	79.7%	82.4%	0.0%	76.7%
Makpandu	9.6%	16.8%	77.2%	99.7%	0.6%	83.8%
Pochalla	75.8%	6.6%	73.7%	37.1%	95.2%	9.0%

As Table 103 indicates, the combination of food rations and cultivation for personal consumption has allowed most settlements to achieve acceptable levels of dietary diversity, with the exception of Pochalla. Only two camps (Ezo & Makpandu) have global acute malnutrition levels that reach or exceed the WHO emergency threshold, although the extent to which is this caused by conditions in the settlement or reflect nutrition behaviors in the country of origin are unclear. Anemia prevalence among children under five is high in all camps, and even though significantly lower in Lasu at 44.8%, this is still high. The water source issue in Pochalla needs to be addressed immediately, with only 37.1% of households using an improved water source. Similarly, there is a need for a priority intervention and latrine provision in Lologo and Pochalla in order to improve the sanitation in those settlements. Soap availability varies between settlements, but needs to be addressed urgently in Pochalla, which due to its remote location may have difficulty accessing markets.

Perhaps more concerning is the universally poor findings (with the exception of GAM) in the Pochalla settlement. On several key indicators Pochalla routinely fails to meet Sphere Indicator Standards and is in a significantly worse situation than other settlements. Conversely, Lasu routinely has the most positive findings, particular in the areas of water, sanitation & hygiene.

Based on these conclusions and several findings contained throughout this report, the following recommendations are made:

- High prevalence of GAM in Ezo and Makpandu should be addressed through targeted, nutritional programs. In both locations, the GAM prevalence meets or exceeds the WHO emergency threshold.

- UNHCR should prioritize improving WASH indicators and dietary diversity in the Pochalla settlement. Pochalla is in an extremely isolated area with limited access to markets. UNHCR bears a larger burden with regards to this settlement in order to ensure that the settlement meets hygienic and nutritional standards. More attention should be paid to this settlement.

- A breakout study for the identification of positive deviant strategies for child feeding practices in Pochalla should be conducted. Despite having the highest number of households with a poor food consumption score, Pochalla had the lowest prevalence of global acute malnutrition among children under the age of 5. This means that households in Pochalla have adapted child feeding practices that ensure healthy eating for their children despite the limited resources available to them. This should be studied in greater detail to promote replication in similar contexts.

- Knowledge on proper hygience practices needs to be approved in all the settlements. Based on indicators pertaining to proper soap usage, UNHCR should make an effort to raise awareness on these issues within the settlement either using existing medical staff or peer educators. This is particularly true in Lasu, where despite soap availability of 90%, only two third know to wash their hands after defecating.

- More attention should be paid to practices and policies in the Lasu settlement. Lasu routinely had the most positive results on several key indicators. The possibility of replicating successful promotion activities and policies should be explored.

- The policy of encampment, particularly with regards to Ethiopian Anyuak refugees in Pochalla and Lologo, should be reexamined. In both locations, refugees in the settlements are juxtaposed to community members of the South Sudanese Anyuak tribe, with whom they share similar traditions, practices, culture and a common language. Since the Anyuak Kingdom spreads between Sudan and Ethiopia, the border in these areas has become blurred. Many of those fleeing the 2003 violence which originally displaced these populations were South Sudanese, yet do not receive assistance from UNHCR since they are not legal refugees. The practice of encampment, rationing, and other targeted services to Ethiopian Anyuak refugees without activities to displaced South Sudanese Anyuak (particularly true in the case of Lologo) has begun to cause resentment within the community. A policy of local integration, as advised in the UNHCR Standing Committee document EC/55/SC/CRP.15 on Local Integration[4] should be explored or at minimum, a program of beneficiary-blind assistance in Lologo and Pochalla.

4 UN High Commissioner for Refugees, *Local Integration and Self-Reliance*, 2 June 2005, EC/55/SC/CRP.15, available at: http://www.unhcr.org/refworld/docid/478b3ce12.html [accessed 13 March 2011]

Annex 1: Comments on Methodological Limitations Encountered with Nutrition Indicators for Children Under 5

As was noted in the limitations section of the report, there were three locations where the quotas for the questionnaires administered to children under 5 were not met. Several outside factors unique to the context caused this result, which were outside the control of the research team. Specifically, as mentioned in the methodology section, due to time limitations each location was only accorded four full days to train data collectors and complete data collection. In many instances, finding data collectors with the required levels of numeracy to accurately collect the data was difficult. Among those who were capable, training required longer that could be expected to ensure data collectors would conduct the survey accurately. Whenever possible, UNHCR or implementing partner staff was used to collect data, which helped overcome this obstacle in some circumstances. However, in addition to a tight time frame, data collection did not proceed as quickly as desired as data collectors had limited capacity and high levels of monitoring and supervision were required in order to ensure the accuracy of the data. The following paragraphs address these weaknesses by location and suggest ways that the data can be utilized and future difficulties overcome.

In Lologo, only 96% (107 of 111) of the established quota was met. As a result, the precision of these findings is not as high as may have been desired. The data indicates that the prevalence of global acute malnutrition (GAM) is 10.3%. However, because of the data collection fell short of the quota of 111, collecting data from only 96% of the targeted number of children, the confidence interval is wide, ranging from 4.5% to 16.0%. This may cause slight difficulty at a later stage, as in order for a follow-up nutrition survey to show that the nutritional status of children (due to an intervention or other impact) has increased or decreased to a significant degree since December 2011, the confidence interval must not overlap the current one (4.5% - 16.0%). However, this range is only 4 percentage points wider than those locations who met their full quotas, thus making comparison quite possible. In terms of guiding programming priorities, we can say that GAM in Lologo has not yet exceeded the WHO emergency threshold of 15%.

In Lasu, the full quota of 213 questionnaire was met and exceeded by 23 questionnaires, the findings are sound within the ±5 percent degree of precision used in calculating the sample size. While a ±3 percent would have naturally increased the precision of the findings, this would have also increased the quota to 478 children, which would have been impossible to achieve given the time frame in which the survey was required to be conducted.

In Ezo, 86% of the quota was reached, or 147 of the 171 children required to be interviewed, thus increasing the band of the confidence interval as was experienced in Lologo. The GAM prevalence was found to be 15.1%, placing it at the WHO emergency threshold. The confidence interval tells us that we know that the precise mean lies somewhere between 8.1% and 19.3%. Again, difficulties may present themselves with follow-up nutrition surveys, as in order to show significant change in the GAM prevalence the confidence intervals cannot overlap with this range. However, this number can safely be used as an indicator for prioritizing nutritional programming for children under 5 in Ezo, as the GAM percentage has reached the WHO emergency threshold.

Makpandu was the most difficult location to reach the required quota, with only 54% (n=101) of the 185 children being measured. As a result, we see a range corresponding with the 95% confidence interval that is must larger than the other locations, with the GAM prevalence at 16.8% and the true mean lying somewhere between 9.5% and 24.1%. As previously mentioned, this will cause difficulty in showing significant change in subsequent surveys. However, in terms of programming, it can safely be said that there is a priority need

to address the GAM prevalence in Makpandu is above the WHO emergency threshold.

In Pochalla, the full quota of 181 questionnaire was met and exceeded by 36 questionnaires, the findings are sound within the ±5 percent degree of precision used in calculating the sample size. While a ±3 percent would have naturally increased the precision of the findings, this would have also increased the quota to 340 children, which would have been impossible to achieve given the time frame in which the survey was required to be conducted.

Despite these limitations, they are easily overcome. In Ezo and Makpandu, the GAM prevalence was found to be high, and thus it is recommended that nutritional programs targeting those under 5 are implemented. Since new equipment (scales, measuring boards, MUAC strips) were procured in the course of this survey, these locations can be equipped with the necessary tools to collect baseline data from those children selected to take place in a targeted intervention. By doing this, the baseline for the intervention will be exact.

Annex 2: Data Quality Criteria (WHO Standards)Lologo

	Mean ± SD	Range	95% CI
WAZ	-0.91 ± 1.31	-4.50 - 2.34	-1.15 - -0.66
HAZ	-1.52 ± 1.62	-4.62 - 2.43	-1.83 - -1.22
WHZ	-0.09 ± 1.58	-4.95 - 4.81	-0.39 - 0.21

Lasu

	Mean ± SD	Range	95% CI
WAZ (n=145)	-0.49 ± 1.64	-5.37 - 7.82	-0.70 - -0.28
HAZ	-1.08 ± 2.23	-8.52 - 8.03	-1.36 - -0.80
WHZ	0.26 ± 2.18	-5.12 - 16.81	-0.02 - 0.53

Ezo

	Mean ± SD	Range	95% CI
WAZ (n=145)	-0.34 ± 1.77	-4.36 – 4.79	-0.63 - -0.06
HAZ	-0.80 ± 2.48	-8.86 - 6.55	-1.20 - -0.39
WHZ	0.18 ± 1.92	-4.45 - 5.70	-0.13 - 0.49

Makpandu

	Mean ± SD	Range	95% CI
WAZ (n=145)	0.20 ± 1.33	-3.95 - 3.48	0.00 - 0.39
HAZ	-0.96 ± 2.28	-6.50 - 5.41	-1.29 - -0.63
WHZ	1.01 ± 2.30	-5.98 - 8.54	0.68 - 1.35

Pochalla

	Mean ± SD	Range	95% CI
WAZ (n=145)	-0.40 ± 1.37	-3.68 - 4.79	-0.63 - -0.18
HAZ	-0.77 ± 2.22	-8.86 - 6.55	-1.13 - -0.41
WHZ	0.02 ± 1.80	-3.92 - 5.70	-0.27– 0.31

Annex 3: Detailed Nutritional Analysis Information: Lologo

This Annex gives some more detailed information for this nutrition survey: first the evaluation of all children and then the evaluation of the difference by sex and age. Case variables are evaluated for their frequency and continuous variables for mean ± SD, range, 95% confidence interval. Values which are outside of the plausible range are included in this evaluation. Therefore there might be small differences to the results in the text box or the full report.

Evaluated for All

Sex (n=107)	**Male (n=49)**	**Female (n=58)**		
	Mean ± SD	**Range**	**95% CI**	**Median**
Months (n=107)	32.44 ± 16.02	(6.01 - 58.87)	(29.41 - 35.47)	31.34
Height (n=107)	85.78 ± 11.75	(60.00 - 114.00)	(83.55 - 88.00)	86.00
Weight (n=107)	11.84 ± 2.85	(6.50 - 18.00)	(11.30 - 12.38)	11.70

Oedema (n=107)	**y (n= 0) 0.0 %**	**n (n= 107) 100.0%**	
	Mean ± SD	**Range**	**95% CI**	**Median**
MUAC (n=107)	157.06 ± 15.03	(118.00 - 196.00)	(154.21 - 159.90)	154.00

	Mean ± SD	Range	95% CI	Median	Findings	
WAZ (n=107)	-0.91 ± 1.31	(-4.50 - 2.34)	(-1.15 - -0.66)	-0.84	16.8 % underweight (< -2z)	7.5 % severe underweight (< -3z)
HAZ (n=107)	-1.52 ± 1.62	(-4.62 - 2.43)	(-1.83 - -1.22)	-1.67	41.1 % stunted (< -2z)	17.8 % severe stunted(< -3z)
WHZ (n=107)	-0.09 ± 1.58	(-4.95 - 4.81)	(-0.39 - 0.21)	0.03	10.3 % wasted (< -2z)	4.7 % severe wasted(< -3z) 7.5 % obese (> 2z)

Evaluated for Sex

		Mean ± SD	Range	95% CI	Median
Months	m (n=49)	32.08 ± 15.67	(6.05 - 58.48)	(27.69 - 36.47)	30.39
	f (n=58)	32.74 ± 16.43	(6.01 - 58.87)	(28.51 - 36.97)	32.16
Height	m (n=49)	86.57 ± 11.05	(71.00 - 106.00)	(83.47 - 89.66)	83.00
	f (n=58)	85.11 ± 12.36	(60.00 - 114.00)	(81.93 - 88.29)	86.00
Weight	m (n=49)	11.74 ± 2.46	(7.50 - 17.00)	(11.06 - 12.43)	11.50
	f (n=58)	11.92 ± 3.16	(6.50 - 18.00)	(11.11 - 12.74)	11.50

Odema	**m (n=49)**	**y (n = 0) 0.0 %**	**n (n = 49) 100.0%**
	f (n=58)	y (n = 0) 0.0 %	n (n = 58) 100.0%

		Mean ± SD	Range	95% CI	Median
MUAC	m (n=49)	156.80 ± 14.14	(118.00 - 184.00)	(152.84 - 160.76)	median: 154.00
	f (n=58)	157.28 ± 15.86	(124.00 - 196.00)	(153.19 - 161.36)	median: 160.00

		Mean ± SD	Range	95% CI	Median	Findings	
WAZ (n=107)	m (n=49)	-1.09 ± 1.26	(-4.50 - 2.25)	(-1.44 - -0.74)	-1.06	16.3 % underweight (< -2z)	6.1 % severe underweight (< -3z)
	f (n=58)	-0.75 ± 1.34	(-3.89 - 2.34)	(-1.91 - -0.99)	-0.74	17.2 % underweight (< -2z)	8.6 % severe underweight (< -3z)
HAZ (n=107)	m (n=49)	-1.45 ± 1.65	(-4.62 - 2.43)	(-1.91 - -0.99)	-1.82	40.8 % stunted (< -2z)	18.4 % severe stunted (< -3z)
	f (n=58)	-1.59 ± 1.60	(-4.60 - 1.91)	(-2.00 - -1.18)	-1.62	41.4 % stunted (< -2z)	17.2 % severe stunted (< -3z)
WHZ (n=107)	m (n=49)	-0.46 ± 1.33	(-4.95 - 1.89)	(-0.83 - -0.08)	-0.29	10.2 % wasted (< -2z)	4.1 % severe wasted (< -3z) 0.0 % obese (> 2z)
	f (n=58)	0.22 ± 1.71	(-3.91 - 4.81)	(-0.22 - 0.66)	0.19	10.3 % wasted (< -2z)	5.2 % severe wasted (< -3z) 13.8 % obese (> 2z)

Evaluated for Months

Oedema	Group <6 (n=0)		
	Group 6 to 18 (n=23)	y (n = 0) 0.0 %	n (n = 23) 100%
	Group 18 to 30 (n=27)	y (n = 0) 0.0 %	n (n = 27) 100%
	Group 30 to 42 (n=24)	y (n = 0) 0.0 %	n (n = 24) 100%
	Group 42 to 54 (n=19)	y (n = 0) 0.0 %	n (n = 19) 100%
	Group >54 (n=14)	y (n = 0) 0.0 %	n (n = 14) 100%

MUAC		Mean ± SD	Range	95% CI	Median
	Group <6 (n=0)	0.00 ± 0.00	N/A	N/A	0.00
	Group 6 to 18 (n=23)	148.09 ± 10.28	(130.00 –170.00)	(143.89 - 152.29)	148.00
	Group 18 to 30 (n=27)	150.67 ± 15.40	(118.00 - 190.00)	(144.86 - 156.48)	154.00
	Group 30 to 42 (n=24)	165.25 ± 13.45	(148.00 - 196.00)	(159.87 - 170.63)	166.00
	Group 42 to 54 (n=19)	164.21 ± 14.01	(140.00 - 190.00)	(157.91 - 170.51)	160.00
	Group >54 (n=14)	160.36 ± 12.61	(142.00 - 182.00)	(153.75 - 166.96)	160.00

		Mean ± SD	Range	95% CI	Median	Findings	
WAZ (n=107)	Group <6 (n=0)	0.00 ± 0.00	(0.00 - 0.00)	N/A	0.00	0.0 % underweight (< -2z)	0.0 % severe underweight (< -3z)
	Group 6 to 18 (n=23)	0.16 ± 1.08	(-1.81 - 2.34)	(-0.28 - 0.60)	0.11	0.0 % underweight (< -2z)	0.0 % severe underweight (< -3z)
	Group 18 to 30 (n=27)	-1.57 ± 1.62	(-4.50 - 1.63)	(-2.18 - -0.96)	-1.67	29.6 % underweight (< -2z)	22.2 % severe underweight (< -3z)
	Group 30 to 42 (n=24)	-0.82 ± 0.80	(-2.05 - 0.85)	(-1.14 - -0.50)	-1.06	8.3 % underweight (< -2z)	0.0 % severe underweight (< -3z)
	Group 42 to 54 (n=19)	-1.17 ± 1.07	(-3.43 - 0.48)	(-1.65 - -0.69)	-1.12	21.1 % underweight (< -2z)	10.5 % severe underweight (< -3z)
	Group >54 (n=14)	-1.16 ± 0.98	(-2.90 - 0.05)	(-1.68 - -0.65)	-0.81	28.6 % underweight (< -2z)	0.0 % severe underweight (< -3z)

		Mean ± SD	Range	95% CI	Median	Findings	
HAZ (n=107)	Group < 6 (n=0)	0.00 ± 0.00	(0.00 - 0.00)	N/A	0.00	0.0 % stunted (< -2z)	0.0 % severe stunted (< -3z)
	Group 6 to 18 (n=23)	-0.24 ± 1.65	(-2.91 - 2.43)	(-0.92 - 0.43)	-0.45	21.7 % stunted (< -2z)	0.0 % severe stunted (< -3z)
	Group 18 to 30 (n=27)	-2.30 ± 1.37	(-4.62 - 0.64)	(-2.82 - -1.78)	-2.40	63.0 % stunted (< -2z)	37.0 % severe stunted (< -3z)
	Group 30 to 42 (n=24)	-1.92 ± 1.53	(-4.46 - 1.33)	(-2.53 - -1.30)	-2.08	50.0 % stunted (< -2z)	20.8 % severe stunted (< -3z)
	Group 42 to 54 (n=19)	-1.57 ± 1.39	(-4.60 - 0.14)	(-2.20 - -0.94)	-1.57	26.3 % stunted (< -2z)	15.8 % severe stunted (< -3z)
	Group >54 (n=14)	-1.40 ± 1.26	(-3.64 - 1.20)	(-2.06 - -0.74)	-1.34	35.7 % stunted (< -2z)	7.1 % severe stunted (< -3z)
WHZ (n=107)	Group < 6 (n=0)	0.00 ± 0.00	(0.00 - 0.00)	N/A	0.00	0.0 % wasted (< -2z)	0.0 % severe wasted (< -3z) 0.0 % obese (> 2z)
	Group 6 to 18 (n=23)	0.41 ± 1.69	(-3.91 - 4.81)	(-0.28 - 1.10)	0.37	8.7 % wasted (< -2z)	4.3 % severe wasted (< -3z) 8.7 % obese (> 2z)
	Group 18 to 30 (n=27)	-0.55 ± 1.77	(-4.95 - 3.05)	(-1.22 - 0.11)	-0.29	14.8 % wasted (< -2z)	11.1 % severe wasted (< -3z) 7.4 % obese (> 2z)
	Group 30 to 42 (n=24)	0.37 ± 1.12	(-1.81 - 2.70)	(-0.07 - 0.82)	0.24	0.0 % wasted (< -2z	0.0 % severe wasted (< -3z) 8.3 % obese (> 2z)
	Group 42 to 54 (n=19)	-0.32 ± 1.77	(-3.52 - 3.29)	(-1.12 - 0.47)	-0.35	15.8 % wasted (< -2z)	5.3 % severe wasted (< -3z) 10.5 % obese (> 2z)
	Group > 54 (n=14)	-0.49 ± 1.05	(-2.53 - 0.82)	(-1.04 - 0.06)	-0.54	14.3 % wasted (< -2z)	0.0 % severe wasted (< -3z) 0.0 % obese (> 2z)

Annex 4: Detailed Nutritional Analysis Information: Lasu

This Annex gives some more detailed information for this nutrition survey: first the evaluation of all children and then the evaluation of the difference by sex and age. Case variables are evaluated for their frequency and continuous variables for mean ± SD, range, 95% confidence interval. Values which are outside of the plausible range are included in this evaluation. Therefore there might be small differences to the results in the text box or the full report.

Evaluated for All

Sex (n=252)	Male (n=127)	Female (n=125)

	Mean ± SD	Range	95% CI	Median
Months (n=244)	27.97 ± 16.42	(5.95 - 59.73)	(25.91 - 30.03)	24.41
Height (n=250)	83.79 ± 11.67	(60.00 - 116.00)	(82.35 - 85.24)	83.00
Weight (n=249)	11.65 ± 3.24	(6.00 - 32.90)	(11.25 - 12.05)	11.10

Oedema (n=252)	y (n= 8) 3.2 %	n (n= 244) 96.8%

	Mean ± SD	Range	95% CI	Median
MUAC (n=193)	136.16 ± 44.16	(2.00 - 196.00)	(129.93 - 142.39)	148.00

	Mean ± SD	Range	95% CI	Median	Findings	
WAZ (n=235)	-0.49 ± 1.64	(-5.37 - 7.82)	(-0.70 - -0.28)	-0.56	14.9 % underweight (< -2z)	5.5 % severe underweight (< -3z)
HAZ (n=242)	-1.08 ± 2.23	(-8.52 - 8.03)	(-1.36 - -0.80)	-1.24	35.1 % stunted (< -2z)	21.5 % severe stunted (< -3z)
WHZ (n=241)	0.26 ± 2.18	(-5.12 - 16.81)	(-0.02 - 0.53)	0.07	7.5 % wasted (< -2z)	3.3 % severe wasted (< -3z) 9.1 % obese (> 2z)

Evaluated for Sex

		Mean ± SD	Range	95% CI	Median
Months	m (n=125)	29.01 ± 15.88	(6.31 - 59.73)	(26.22 - 31.79)	26.32
	f (n=119)	26.88 ± 16.96	(5.95 - 58.74)	(23.83 - 29.93)	23.00
Height	m (n=127)	84.58 ± 10.98	(62.00 - 116.00)	(82.67 - 86.49)	84.00
	f (n=123)	82.98 ± 12.34	(60.00 - 115.50)	(80.80 - 85.16)	81.00
Weight	m (n=126)	11.79 ± 2.74	(6.30 - 19.10)	(11.31 - 12.27)	11.50
	f (n=123)	11.51 ± 3.70	(6.00 - 32.90)	(10.86 - 12.16)	10.90

Oedema	m (n=127)	y (n = 5) 3.9 %	n (n = 122) 96.1%
	f (n=125)	y (n = 3) 2.4 %	n (n = 122) 97.6%

		Mean ± SD	Range	95% CI	Median
MUAC	m (n=96)	133.68 ± 46.96	(2.00 - 186.00)	(124.28 - 143.07)	148.00
	f (n=97)	138.61 ± 41.30	(2.00 - 196.00)	(130.39 - 146.83)	148.00

		Mean ± SD	Range	95% CI	Median	Findings	
WAZ (n=235)	m (n=119)	-0.71 ± 1.48	(-5.37 - 3.41)	(-0.98 - -0.44)	-0.67	16.8 % underweight (< -2z)	6.7 % severe underweight (< -3z)
	f (n=116)	-0.26 ± 1.76	(-3.65 - 7.82)	(-0.58 - 0.06)	-0.43	12.9 % underweight (< -2z)	4.3 % severe underweight (< -3z)
HAZ (n=242)	m (n=125)	-1.30 ± 2.34	(-8.52 - 8.03)	(-1.71 - -0.89)	-1.51	37.6 % stunted (< -2z)	25.6 % severe stunted (< -3z)
	f (n=117)	-0.85 ± 2.08	(-5.16 - 5.08)	(-1.23 - -0.48)	-1.14	32.5 % stunted (< -2z)	17.1 % severe stunted (< -3z)
WHZ (n=241)	m (n=121)	0.13 ± 1.61	(-5.12 - 4.70)	(-0.16 - 0.41)	0.07	6.6 % wasted (< -2z)	3.3 % severe wasted (< -3z) 10.7 % obese (> 2z)
	f (n=120)	0.39 ± 2.62	(-4.39 - 16.81)	(-0.08 - 0.86)	0.07	8.3 % wasted (< -2z	3.3 % severe wasted (< -3z) 7.5 % obese (> 2z)

Evaluated for Months

Oedema	Group <6 (n=1)	y (n = 0) 0.0 %	n (n = 1) 100.0 %
	Group 6 to 18 (n=88)	y (n = 3) 3.4 %	n (n = 85) 96.6%
	Group 18 to 30 (n=54)	y (n = 0) 0.0 %	n (n = 54) 100.0%
	Group 30 to 42 (n=42)	y (n = 2) 4.8 %	n (n = 40) 95.2%
	Group 42 to 54 (n=34)	y (n = 1) 2.9 %	n (n = 33) 97.1%
	Group >54 (n=25)	y (n = 2) 8.0 %	n (n = 23) 92.0%

		Mean ± SD	**Range**	**95% CI**	**Median**
MUAC	Group <6 (n=1)	138.00 ± 0.00	(138.00 - 138.00)	(138.00 - 138.00)	0.00
	Group 6 to 18 (n=64)	133.58 ± 40.54	(2.00 - 180.00)	(123.65 - 143.51)	142.00
	Group 18 to 30 (n=49)	127.27 ± 52.93	(2.00 - 178.00)	(112.44 - 142.09)	146.00
	Group 30 to 42 (n=35)	149.60 ± 28.62	(2.00 - 186.00)	(140.12 - 159.08)	154.00
	Group 42 to 54 (n=21)	142.76 ± 34.28	(2.00 - 178.00)	(128.10 - 157.42)	144.00
	Group >54 (n=17)	144.44 ± 45.04	(17.40 - 196.00)	(123.03 - 165.84)	150.00

		Mean ± SD	**Range**	**95% CI**	**Median**	**Findings**	
WAZ (n=235)	Group < 6 (n=1):	0.97 ± 0.00	(0.97 - 0.97)	(0.97 - 0.97)	0.00	0.0 % underweight (< -2z)	0.0 % severe underweight (< -3z)
	Group 6 to 18 (n=84):	0.16 ± 1.78	(-3.38 - 7.82)	(-0.22 - 0.55)	-0.04	7.1 % underweight (< -2z)	1.2 % severe underweight (< -3z)
	Group 18 to 30 (n=54):	-0.51 ± 1.41	(-3.49 - 2.60)	(-0.88 - -0.13)	-0.71	13.0 % underweight (< -2z)	3.7 % severe underweight (< -3z)
	Group 30 to 42 (n=40):	-0.96 ± 1.26	(-3.65 - 1.40)	(-1.35 - -0.57)	-0.86	20.0 % underweight (< -2z)	0.0 % severe underweight (< -3z)
	Group 42 to 54 (n=33):	-1.18 ± 1.47	(-5.37 - 0.80)	(-1.68 - -0.67)	-0.79	27.3 % underweight (< -2z)	9.1 % severe underweight (< -3z)
	Group >= 54 (n=23):	-1.10 ± 1.59	(-3.30 - 4.29)	(-1.75 - -0.45)	-1.28	21.7 % underweight (< -2z)	13.0 % severe underweight (< -3z)

		Mean ± SD	Range	95% CI	Median	Findings	
HAZ (n=242)	Group < 6 (n=1):	2.32 ± 0.00	(2.32 - 2.32)	(2.32 - 2.32)	0.00	0.0 % stunted (< -2z)	0.0 % severe stunted (< -3z)
	Group 6 to 18 (n=87):	-0.04 ± 2.24	(-4.98 - 8.03)	(-0.51 - 0.43)	-0.28	21.8 % stunted (< -2z)	5.7 % severe stunted (< -3z)
	Group 18 to 30 (n=54):	-1.16 ± 1.91	(-4.83 - 4.23)	(-1.67 - -0.65)	-1.34	31.5 % stunted (< -2z)	18.5 % severe stunted (< -3z)
	Group 30 to 42 (n=42):	-1.83 ± 1.96	(-4.69 - 2.86)	(-2.42 - -1.24)	-2.50	50.0 % stunted (< -2z)	35.7 % severe stunted (< -3z)
	Group 42 to 54 (n=34):	-2.39 ± 2.09	(-8.52 - 1.39)	(-3.10 - -1.69)	-2.11	52.9 % stunted (< -2z)	44.1 % severe stunted (< -3z)
	Group >= 54 (n=24):	-1.68 ± 1.72	(-5.16 - 1.90)	(-2.37 - -0.99)	-1.37	41.7 % stunted (< -2z)	29.2 % severe stunted (< -3z)
WHZ (n=241)	Group < 6 (n=1):	-0.20 ± 0.00	(-0.20 - -0.20)	(-0.20 - -0.20)	0.00	0.0 % wasted (< -2z)	0.0 % severe wasted (< -3z) 0.0 % obese (> 2z)
	Group 6 to 18 (n=83):	0.47 ± 2.38	(-3.00 - 14.69)	(-0.04 - 0.98)	0.12	3.6 % wasted (< -2z)	1.2 % severe wasted (< -3z) 12.0 % obese (> 2z)
	Group 18 to 30 (n=54):	0.11 ± 1.70	(-5.12 - 4.70)	(-0.35 - 0.56)	-0.01	9.3 % wasted (< -2z)	3.7 % severe wasted (< -3z) 9.3 % obese (> 2z)
	Group 30 to 42 (n=40):	0.09 ± 1.12	(-2.78 - 2.53)	(-0.26 - 0.43)	0.07	5.0 % wasted (< -2z)	0.0 % severe wasted (< -3z) 2.5 % obese (> 2z)
	Group 42 to 54 (n=33):	0.31 ± 1.72	(-4.39 - 4.57)	(-0.27 - 0.90)	0.17	6.1 % wasted (< -2z)	6.1 % severe wasted (< -3z) 12.1 % obese (> 2z)
	Group >= 54 (n=23):	0.13 ± 4.02	(-4.04 - 16.81)	(-1.52 - 1.77)	-0.47	21.7 % wasted (< -2z)	13.0 % severe wasted (< -3z) 8.7 % obese (> 2z)

Annex 5: Detailed Nutritional Analysis Information: Ezo

This Annex gives some more detailed information for this nutrition survey: first the evaluation of all children and then the evaluation of the difference by sex and age. Case variables are evaluated for their frequency and continuous variables for mean ± SD, range, 95% confidence interval.Values which are outside of the plausible range are included in this evaluation. Therefore there might be small differences to the results in the text box or the full report.

Evaluated for All

Sex (n=147)	**Male (n=71)**	**Female (n=76)**

	Mean ± SD	**Range**	**95% CI**	**Median**
Months (n=147)	27.89 ± 16.56	(6.21 - 59.24)	(25.22 - 30.57)	24.25
Height (n=147)	84.86 ± 13.69	(58.40 - 119.20)	(82.65 - 87.08)	82.40
Weight (n=146)	11.98 ± 3.42	(5.20 - 19.90)	(11.43 - 12.54)	11.70

Oedema (n=147)	**y (n= 1) 0.7 %**	**n (n= 146) 99.3%**

	Mean ± SD	**Range**	**95% CI**	**Median**
MUAC (n=145)	158.17 ± 14.05	(122.00 - 194.00)	(155.89 - 160.46)	158.00

	Mean ± SD	**Range**	**95% CI**	**Median**	**Findings**	
WAZ (n=145)	-0.34 ± 1.77	(-4.36 - 4.79)	(-0.63 - -0.06)	-0.45	16.6 % underweight (< -2z)	6.9 % severe underweight (< -3z)
HAZ (n=147)	-0.80 ± 2.48	(-8.86 - 6.55)	(-1.20 - -0.39)	0.88	30.6 % stunted (< -2z)	18.4 % severe stunted (< -3z)
WHZ (n=145)	0.18 ± 1.92	(-4.45 - 5.70)	(-0.13 - 0.49)	0.30	14.5 % wasted (< -2z)	6.9 % severe wasted (< -3z) 14.5 % obese (> 2z)

Evaluated for Sex

		Mean ± SD	Range	95% CI	Median
Months	m (n=71)	29.15 ± 16.96	(6.21 - 59.24)	(25.20 - 33.09)	24.31
	f (n=76)	26.72 ± 16.20	(6.44 - 59.24)	(23.08 - 30.36)	21.19
Height	m (n=71)	86.19 ± 14.39	(59.90 - 118.00)	(82.84 - 89.53)	82.40
	f (n=76)	83.62 ± 12.98	(58.40 - 119.20)	(80.70 - 86.54)	82.10
Weight	m (n=70)	12.45 ± 3.33	(5.70 - 19.90)	(11.67 - 13.23)	12.00
	f (n=76)	11.55 ± 3.48	(5.20 - 19.00)	(10.77 - 12.33)	11.00

Oedema	m (n=71)	y (n = 0) 0.0 %	n (n = 71) 100.0%	
	f (n=76)	y (n = 1) 1.3 %	n (n = 75) 98.7%	

		Mean ± SD	Range	95% CI	Median
MUAC	m (n=71)	160.93 ± 12.30	(122.00 - 194.00)	(158.07 - 163.79)	160.00
	f (n=74)	155.53 ± 15.15	(122.00 - 182.00)	(152.08 - 158.98)	158.00

		Mean ± SD	Range	95% CI	Median	Findings	
WAZ (n=145)	m (n=70)	-0.35 ± 1.66	(-4.26 - 4.79)	(-0.74 - 0.04)	-0.41	20.0 % underweight (< -2z)	4.3 % severe underweight (< -3z)
	f (n=75)	-0.34 ± 1.88	(-4.36 - 4.64)	(-0.76 - 0.09)	-0.47	13.3 % underweight (< -2z)	9.3 % severe underweight (< -3z)
HAZ (n=147)	m (n=71)	-0.97 ± 2.36	(-8.86 - 4.38)	(-1.52 - -0.42)	-0.87	29.6 % stunted (< -2z)	18.3 % severe stunted (< -3z)
	f (n=76)	-0.64 ± 2.60	(-5.65 - 6.55)	(-1.22 - -0.05)	-0.94	31.6 % stunted (< -2z)	18.4 % severe stunted (< -3z)
WHZ (n=145)	m (n=70)	0.25 ± 2.04	(-4.45 - 5.70)	(-0.23 - 0.73)	0.44	15.7 % wasted (< -2z)	8.6 % severe wasted (< -3z) 12.9 % obese (> 2z)
	f (n=75)	0.12 ± 1.82	(-3.95 - 4.29)	(-0.29 - 0.53)	0.17	13.3 % wasted (< -2z)	5.3 % severe wasted (< -3z) 16.0 % obese (> 2z)

Evaluated for Months

Oedema	Group <6 (n=0)	y (n = 0) 0.0 %	n (n = 0) 0.0 %
	Group 6 to 18 (n=56)	y (n = 0) 0.0 %	n (n = 56) 100.0%
	Group 18 to 30 (n=33)	y (n = 0) 0.0 %	n (n = 33) 100.0%
	Group 30 to 42 (n=24)	y (n = 0) 0.0 %	n (n = 24) 100.0%
	Group 42 to 54 (n=20)	y (n = 1) 5.0%	n (n = 19) 95.0%
	Group >54 (n=14)	y (n = 0) 0.0 %	n (n = 14) 100.0%

		Mean ± SD	Range	95% CI	Median
MUAC	Group <6 (n=0)	0.00 ± 0.00	(0.00 - 0.00)	(0.00 - 0.00)	0.00
	Group 6 to 18 (n=54)	152.83 ± 15.33	(122.00 - 182.00)	(148.75 - 156.92)	153.00
	Group 18 to 30 (n=33)	161.15 ± 13.93	(132.00 - 194.00)	(156.40 - 165.90)	159.00
	Group 30 to 42 (n=24)	160.88 ± 13.12	(132.00 - 180.00)	(155.63 - 166.12)	164.00
	Group 42 to 54 (n=20)	162.65 ± 12.14	(140.00 - 186.00)	(157.33 - 167.97)	164.00
	Group >54 (n=14)	160.71 ± 6.16	(152.00 - 170.00)	(157.49 - 163.94)	158.00

		Mean ± SD	Range	95% CI	Median	Findings	
WAZ (n=145)	Group < 6 (n=0):	0.00 ± 0.00	(0.00 - 0.00)	(0.00 - 0.00)	0.00	0.0 % underweight (< -2z)	0.0 % severe underweight (< -3z)
	Group 6 to 18 (n=55):	0.08 ± 2.11	(-4.36 - 4.79)	(-0.47 - 0.64)	-0.07	10.9 % underweight (< -2z)	5.5 % severe underweight (< -3z)
	Group 18 to 30 (n=33):	-0.26 ± 1.65	(-3.79 - 3.07)	(-0.82 - 0.30)	-0.41	21.2 % underweight (< -2z)	3.0 % severe underweight (< -3z)
	Group 30 to 42 (n=24):	-0.91 ± 1.63	(-3.87 - 1.84)	(-1.56 - -0.25)	-0.87	29.2 % underweight (< -2z)	16.7 % severe underweight (< -3z)
	Group 42 to 54 (n=19):	-0.80 ± 1.36	(-3.66 - 1.35)	(-1.41 - -0.19)	-0.70	21.1 % underweight (< -2z)	10.5 % severe underweight (< -3z)
	Group >= 54 (n=14):	-0.63 ± 0.76	(-1.93 - 0.65)	(-1.04 - -0.23)	-0.74	0.0 % underweight (< -2z)	0.0 % severe underweight (< -3z)

		Mean ± SD	Range	95% CI	Median	Findings	
HAZ (n=147)	Group < 6 (n=0):	0.00 ± 0.00	(0.00 - 0.00)	(0.00 - 0.00)	0.00	0.0 % stunted (< -2z)	0.0 % severe stunted (< -3z)
	Group 6 to 18 (n=56):	-0.27 ± 2.56	(-6.10 - 6.55)	(-0.94 - 0.40)	-0.48	26.8 % stunted (< -2z)	12.5 % severe stunted (< -3z)
	Group 18 to 30 (n=33):	-1.21 ± 2.68	(-8.86 - 4.38)	(-2.13 - -0.30)	-1.62	36.4 % stunted (< -2z)	18.2 % severe stunted (< -3z)
	Group 30 to 42 (n=24):	-0.65 ± 2.53	(-4.78 - 3.60)	(-1.67 - 0.36)	-0.68	29.2 % stunted (< -2z)	29.2 % severe stunted (< -3z)
	Group 42 to 54 (n=20):	-1.81 ± 1.89	(-4.70 - 1.79)	(-2.63 - -0.98)	-1.88	45.0 % stunted (< -2z)	30.0 % severe stunted (< -3z)
	Group > =54 (n=14):	-0.71 ± 1.99	(-5.05 - 2.16)	(-1.76 - 0.33)	-1.67	14.3 % stunted (< -2z)	7.1 % severe stunted (< -3z)
WHZ (n=145)	Group < 6 (n=0):	0.00 ± 0.00	(0.00 - 0.00)	(0.00 - 0.00)	0.00	0.0 % wasted (< -2z)	0.0 % severe wasted (< -3z) 0.0 % obese (> 2z)
	Group 6 to 18 (n=55):	0.40 ± 1.96	(-3.95 - 5.70)	(-0.12 - 0.92)	0.76	12.7 % wasted (< -2z) 16.4 % obese (> 2z)	5.5 % severe wasted (< -3z)
	Group 18 to 30 (n=33):	0.55 ± 2.03	(-3.64 - 5.32)	(-0.14 - 1.24)	0.24	15.2 % wasted (< -2z) 24.2 % obese (> 2z)	6.1 % severe wasted (< -3z)
	Group 30 to 42 (n=24):	-0.77 ± 1.86	(-4.45 - 2.64)	(-1.51 - -0.03)	-0.40	25.0 % wasted (< -2z) 4.2 % obese (> 2z)	16.7 % severe wasted (< -3z)
	Group 42 to 54 (n=19):	0.50 ± 1.34	(-1.87 - 3.85)	(-0.11 - 1.10)	0.62	0.0 % wasted (< -2z) 10.5 % obese (> 2z)	0.0 % severe wasted (< -3z)
	Group >= 54 (n=14):	-0.34 ± 1.91	(-3.89 - 3.22)	(-1.34 - 0.66)	-0.18	21.4 % wasted (< -2z) 7.1 % obese (> 2z)	7.1 % severe wasted (< -3z)

Annex 6: Detailed Nutritional Analysis Information: Makpandu

This Annex gives some more detailed information for this nutrition survey: first the evaluation of all children and then the evaluation of the difference by sex and age. Case variables are evaluated for their frequency and continuous variables for mean ± SD, range, 95% confidence interval. Values which are outside of the plausible range are included in this evaluation. Therefore there might be small differences to the results in the text box or the full report.

Evaluated for All

Sex (n=147)	Male (n=68)	Female (n=79)

	Mean ± SD	Range	95% CI	Median
Months (n=147)	31.21 ± 17.78	(6.21 - 59.86)	(28.34 - 34.09)	27.47
Height (n=147)	87.41 ± 14.64	(58.40 - 118.20)	(85.05 - 89.78)	86.00
Weight (n=146)	12.32 ± 3.30	(6.20 - 19.50)	(11.79 - 12.86)	12.00

Oedema (n=147)	y (n= 1) 0.7 %	n (n= 146) 99.3%

	Mean ± SD	Range	95% CI	Median
MUAC (n=146)	155.10 ± 13.43	(114.00 - 194.00)	(152.92 - 157.28)	156.00

	Mean ± SD	Range	95% CI	Median	Findings	
WAZ (n=145)	-0.40 ± 1.37	(-3.68 - 4.79)	(-0.63 - -0.18)	-0.52	9.0 % underweight (< -2z)	1.4 % severe underweight (< -3z)
HAZ (n=147)	-0.77 ± 2.22	(-8.86 - 6.55)	(-1.13 - -0.41)	-0.79	25.9 % stunted (< -2z)	13.6 % severe stunted (< -3z)
WHZ (n=145)	0.02 ± 1.80	(-3.92 - 5.70)	(-0.27 - 0.31)	0.02	13.8 % wasted (< -2z)	4.1 % severe wasted (< -3z) 12.4 % obese (> 2z)

Evaluated for Sex

		Mean ± SD	Range	95% CI	Median
Months	m (n=68)	32.22 ± 18.04	(6.21 - 59.37)	(27.93 - 36.51)	26.02
	f (n=79)	30.34 ± 17.63	(6.60 - 59.86)	(26.46 - 34.23)	27.47
Height	m (n=68)	88.49 ± 14.34	(59.90 - 118.20)	(85.09 - 91.90)	86.00
	f (n=79)	86.48 ± 14.92	(58.40 - 116.00)	(83.19 - 89.77)	84.00
Weight	m (n=67)	12.83 ± 3.21	(6.70 - 19.50)	(12.06 - 13.59)	12.20
	f (n=79)	11.90 ± 3.34	(6.20 - 19.00)	(11.16 - 12.64)	12.00

Oedema	m (n=68)	y (n = 0) 0.0 %	n (n = 68) 100.0%
	f (n=79)	y (n = 1) 1.3 %	n (n = 78) 98.7%

		Mean ± SD	Range	95% CI	Median
MUAC	m (n=68)	156.99 ± 12.41	(128.00 - 194.00)	(154.04 - 159.93)	156.00
	f (n=78)	153.46 ± 14.13	(114.00 - 188.00)	(150.32 - 156.60)	154.00

		Mean ± SD	Range	95% CI	Median	Findings	
WAZ (n=145)	m (n=67)	-0.41 ± 1.51	(-3.68 - 4.79)	(-0.77 - -0.04)	-0.52	11.9 % underweight (< -2z)	3.0 % severe underweight (< -3z)
	f (n=78)	-0.40 ± 1.25	(-2.62 - 4.55)	(-0.68 - -0.12)	-0.52	6.4 % underweight (< -2z)	0.0 % severe underweight (< -3z)
HAZ (n=147)	m (n=68)	-0.87 ± 2.23	(-8.86 - 4.38)	(-1.40 - -0.34)	-0.87	25.0 % stunted (< -2z)	13.2 % severe stunted (< -3z)
	f (n=79)	-0.69 ± 2.22	(-5.65 - 6.55)	(-1.18 - -0.20)	-0.50	26.6 % stunted (< -2z)	13.9 % severe stunted (< -3z)
WHZ (n=145)	m (n=67)	0.11 ± 1.86	(-3.90 - 5.70)	(-0.33 - 0.56)	0.08	11.9 % wasted (< -2z)	1.5 % severe wasted (< -3z) 13.4 % obese (> 2z)
	f (n=78)	-0.06 ± 1.75	(-3.92 - 3.88)	(-0.45 - 0.33)	0.00	15.4 % wasted (< -2z)	6.4 % severe wasted (< -3z) 11.5 % obese (> 2z)

Evaluated for Months

Oedema	Group <6 (n=0)	y (n = 0) 0.0 %	n (n = 0) 0.0 %
	Group 6 to 18 (n=45)	y (n = 0) 0.0 %	n (n = 31) 100.0%
	Group 18 to 30 (n=32)	y (n = 1) 3.1 %	n (n = 31) 96.9%
	Group 30 to 42 (n=22)	y (n = 0) 0.0 %	n (n = 22) 100.0%
	Group 42 to 54 (n=23)	y (n = 0) 0.0%	n (n = 23) 100.0%
	Group >54 (n=25)	y (n = 0) 0.0 %	n (n = 25) 100.0%

		Mean ± SD	Range	95% CI	Median
MUAC	Group < 6 (n=0):	0.00 ± 0.00	(0.00 - 0.00)	(0.00 - 0.00)	0.00
	Group 6 to 18 (n=44):	150.57 ± 14.06	(124.00 - 182.00)	(146.41 - 154.72)	150.00
	Group 18 to 30 (n=32):	155.00 ± 16.07	(114.00 - 194.00)	(149.43 - 160.57)	154.00
	Group 30 to 42 (n=22):	160.45 ± 10.69	(146.00 - 180.00)	(155.99 - 164.92)	160.00
	Group 42 to 54 (n=23):	155.13 ± 7.65	(138.00 - 168.00)	(152.01 - 158.26)	156.00
	Group >= 54 (n=25):	158.48 ± 13.12	(128.00 - 188.00)	(153.34 - 163.62)	156.00

		Mean ± SD	Range	95% CI	Median	Findings	
WAZ (n=145)	Group < 6 (n=0):	0.00 ± 0.00	(0.00 - 0.00)	(0.00 - 0.00)	0.00	0.0 % underweight (< -2z)	0.0 % severe underweight (< -3z)
	Group 6 to 18 (n=44):	0.09 ± 1.69	(-2.62 - 4.79)	(-0.41 - 0.59)	-0.22	6.8 % underweight (< -2z)	0.0 % severe underweight (< -3z)
	Group 18 to 30 (n=31):	-0.52 ± 1.25	(-2.48 - 3.07)	(-0.96 - -0.08)	-0.57	12.9 % underweight (< -2z)	0.0 % severe underweight (< -3z)
	Group 30 to 42 (n=22):	-0.03 ± 1.14	(-1.50 - 1.84)	(-0.50 - 0.45)	-0.42	0.0 % underweight (< -2z)	0.0 % severe underweight (< -3z)
	Group 42 to 54 (n=23):	-1.00 ± 0.89	(-2.73 - 0.38)	(-1.36 - -0.64)	-1.09	8.7 % underweight (< -2z)	0.0 % severe underweight (< -3z)
	Group >= 54 (n=25):	-0.91 ± 1.07	(-3.68 - 0.50)	(-1.32 - -0.49)	-0.83	16.0 % underweight (< -2z)	8.0 % severe underweight (< -3z)

		Mean ± SD	Range	95% CI	Median	Findings	
HAZ (n=147)	Group < 6 (n=0):	0.00 ± 0.00	(0.00 - 0.00)	(0.00 - 0.00)	0.00	0.0 % stunted (< -2z)	0.0 % severe stunted (< -3z)
	Group 6 to 18 (n=45):	-0.41 ± 2.36	(-6.10 - 6.55)	(-1.10 - 0.28)	-0.68	22.2 % stunted (< -2z)	8.9 % severe stunted (< -3z)
	Group 18 to 30 (n=32):	-1.34 ± 2.68	(-8.86 - 4.38)	(-2.27 - -0.41)	-1.58	37.5 % stunted (< -2z)	21.9 % severe stunted (< -3z)
	Group 30 to 42 (n=22):	-0.79 ± 2.01	(-3.68 - 2.94)	(-1.63 - 0.05)	-1.62	27.3 % stunted (< -2z)	18.2 % severe stunted (< -3z)
	Group 42 to 54 (n=23):	-0.56 ± 2.01	(-4.64 - 2.74)	(-1.38 - 0.27)	-0.18	21.7 % stunted (< -2z)	13.0 % severe stunted (< -3z)
	Group >= 54 (n=25):	-0.88 ± 1.56	(-4.19 - 2.01)	(-1.49 - -0.27)	-0.79	20.0 % stunted (< -2z)	8.0 % severe stunted (< -3z)
WHZ (n=145)	Group < 6 (n=0):	0.00 ± 0.00	(0.00 - 0.00)	(0.00 - 0.00)	0.00	0.0 % wasted (< -2z)	0.0 % severe wasted (< -3z) 0.0 % obese (> 2z)
	Group 6 to 18 (n=44):	0.51 ± 1.71	(-3.73 - 5.70)	(0.00 - 1.01)	0.12	4.5 % wasted (< -2z) 18.2 % obese (> 2z)	2.3 % severe wasted (< -3z)
	Group 18 to 30 (n=31):	0.20 ± 1.82	(-2.50 - 5.32)	(-0.44 - 0.84)	-0.07	12.9 % wasted (< -2z) 12.9 % obese (> 2z)	0.0 % severe wasted (< -3z)
	Group 30 to 42 (n=22):	0.60 ± 1.75	(-2.73 - 3.67)	(-0.13 - 1.33)	0.52	13.6 % wasted (< -2z) 18.2 % obese (> 2z)	0.0 % severe wasted (< -3z)
	Group 42 to 54 (n=23):	-1.00 ± 1.70	(-3.90 - 2.88)	(-1.70 - -0.31)	-0.73	34.8 % wasted (< -2z) 4.3 % obese (> 2z)	13.0 % severe wasted (< -3z)
	Group >= 54 (n=25):	-0.62 ± 1.56	(-3.92 - 2.52)	(-1.23 - -0.02)	-0.92	12.0 % wasted (< -2z) 4.0 % obese (> 2z)	8.0 % severe wasted (< -3z)

Annex 7: Detailed Nutritional Analysis Information: Pochalla

This Annex gives some more detailed information for this nutrition survey. First the evaluation of all children and then the evaluation of the different clusters, sex and age. Case variables are evaluated for their frequency and continuous variables for mean ± SD, range, 95% confidence interval. Values which are outside of the plausible range are included in this evaluation. Therefore there might be small differences to the results in the text box or the Word Report.

Evaluated for All

Sex (n=182)	**Male (n=95)**	**Female (n=87)**

	Mean ± SD	**Range**	**95% CI**	**Median**
Months (n=182)	24.38 ± 15.86	(6.01 - 59.99)	(22.07 - 26.68)	23.62
Height (n=182)	82.08 ± 15.02	(60.00 - 115.00)	(79.90 - 84.26)	80.00
Weight (n=181)	11.92 ± 3.03	(6.50 - 20.30)	(11.48 - 12.36)	11.70

Oedema (n=182)	**y (n= 0) 0.0 %**	**n (n= 182) 100.0%**

	Mean ± SD	**Range**	**95% CI**	**Median**
MUAC (n=179)	148.86 ± 15.93	(12.70 - 178.00)	(146.53 - 151.19)	152.00

	Mean ± SD	**Range**	**95% CI**	**Median**	**Findings**	
WAZ (n=181):	0.20 ± 1.33	(-3.95 - 3.48)	(0.00 - 0.39)	0.11	3.3 % underweight (< -2z)	1.1 % severe underweight (< -3z)
HAZ (n=182):	-0.96 ± 2.28	(-6.50 - 5.41)	(-1.29 - -0.63)	-1.42	36.8 % stunted (< -2z)	20.3 % severe stunted (< -3z)
WHZ (n=181):	1.01 ± 2.30	(-5.98 - 8.54)	(0.68 - 1.35)	0.66	6.6 % wasted (< -2z)	2.8 % severe wasted (< -3z) 31.5 % obese (> 2z)

Evaluated for Sex

		Mean ± SD	Range	95% CI	Median
Months	m (n=95)	25.35 ± 16.67	(6.01 - 59.99)	(21.99 - 28.70)	23.66
	f (n=87)	23.32 ± 14.94	(6.01 - 59.99)	(20.18 - 26.46)	20.01
Height	m (n=95)	83.09 ± 15.51	(60.00 - 113.00)	(79.97 - 86.21)	80.80
	f (n=87)	80.98 ± 14.47	(60.00 - 115.00)	(77.94 - 84.02)	80.00
Weight	m (n=95)	12.17 ± 3.08	(6.50 - 18.80)	(11.55 - 12.79)	12.00
	f (n=86)	11.63 ± 2.97	(6.50 - 20.30)	(11.01 - 12.26)	11.30

Oedema	**m (n=95)**	**y (n = 0) 0.0 %**	**n (n = 95) 100.0%**
	f (n=87)	y (n = 1) 1.3 %	n (n = 87) 100.0%

		Mean ± SD	Range	95% CI	Median
MUAC	m (n=94)	149.32 ± 11.66	(118.00 - 172.00)	(146.96 - 151.68)	152.00
	f (n=85)	148.35 ± 19.66	(12.70 - 178.00)	(144.17 - 152.53)	148.00

		Mean ± SD	Range	95% CI	Median	Findings	
WAZ (n=181)	m (n=95)	0.07 ± 1.40	(-3.95 - 3.48)	(-0.21 - 0.35)	-0.08	5.3 % underweight (< -2z)	1.1 % severe underweight (< -3z)
	f (n=86)	0.33 ± 1.24	(-3.33 - 3.04)	(0.07 - 0.60)	0.42	1.2 % underweight (< -2z)	1.2 % severe underweight (< -3z)
HAZ (n=182)	m (n=95)	-1.10 ± 2.35	(-6.50 - 4.79)	(-1.58 - -0.63)	-1.57	44.2 % stunted (< -2z)	24.2 % severe stunted (< -3z)
	f (n=87)	-0.80 ± 2.20	(-4.88 - 5.41)	(-1.26 - -0.34)	-1.30	28.7 % stunted (< -2z)	16.1 % severe stunted (< -3z)
WHZ (n=181)	m (n=95)	0.95 ± 2.46	(-5.80 - 8.54)	(0.46 - 1.45)	0.42	8.4 % wasted (< -2z)	3.2 % severe wasted (< -3z) 29.5 % obese (> 2z)
	f (n=86)	1.08 ± 2.12	(-5.98 - 6.41)	(0.63 - 1.53)	1.14	4.7 % wasted (< -2z)	2.3 % severe wasted (< -3z) 33.7 % obese (> 2z)

Evaluated for Months

Oedema	Group <6 (n=0)	y (n = 0) 0.0 %	n (n = 0) 0.0 %
	Group 6 to 18 (n=84)	y (n = 0) 0.0 %	n (n = 84) 100.0%
	Group 18 to 30 (n=33)	y (n = 0) 0.0 %	n (n = 33)100.0%
	Group 30 to 42 (n=33)	y (n = 0) 0.0 %	n (n = 33) 100.0%
	Group 42 to 54 (n=22)	y (n = 0) 0.0%	n (n = 22) 100.0%
	Group >54 (n=10)	y (n = 0) 0.0 %	n (n = 10) 100.0%

		Mean ± SD	Range	95% CI	Median
MUAC	Group < 6 (n=0):	0.00 ± 0.00	(0.00 - 0.00)	(0.00 - 0.00)	0.00
	Group 6 to 18 (n=82):	143.65 ± 18.83	(12.70 - 172.00)	(139.58 - 147.73)	146.00
	Group 18 to 30 (n=33):	150.79 ± 12.82	(120.00 - 176.00)	(146.41 - 155.16)	148.00
	Group 30 to 42 (n=33):	155.24 ± 10.33	(132.00 - 178.00)	(151.72 - 158.77)	154.00
	Group 42 to 54 (n=21):	152.62 ± 9.38	(140.00 - 166.00)	(148.61 - 156.63)	152.00
	Group >= 54 (n=10):	156.20 ± 12.02	(136.00 - 172.00)	(148.75 - 163.65)	154.00

Home in Lulogo settlement: *Photo by Natilie. I. Forcier*

		Mean ± SD	Range	95% CI	Median	Findings	
WAZ (n=181)	Group < 6 (n=0):	0.00 ± 0.00	(0.00 - 0.00)	(0.00 - 0.00)	0.00	0.0 % underweight (< -2z)	0.0 % severe underweight (< -3z)
	Group 6 to 18 (n=83):	0.63 ± 1.34	(-2.41 - 3.48)	(0.34 - 0.91)	0.56	2.4 % underweight (< -2z)	0.0 % severe underweight (< -3z)
	Group 18 to 30 (n=33):	0.28 ± 1.46	(-3.95 - 3.04)	(-0.22 - 0.78)	-0.05	3.0 % underweight (< -2z)	3.0 % severe underweight (< -3z)
	Group 30 to 42 (n=33):	-0.20 ± 0.80	(-2.61 - 0.98)	(-0.47 - 0.07)	-0.11	3.0 % underweight (< -2z)	0.0 % severe underweight (< -3z)
	Group 42 to 54 (n=22):	-0.63 ± 1.26	(-3.33 - 1.62)	(-1.15 - -0.10)	-0.52	9.1 % underweight (< -2z)	4.5 % severe underweight (< -3z)
	Group >= 54 (n=10):	-0.53 ± 0.59	(-1.56 - 0.53)	(-0.90 - -0.17)	-0.47	0.0 % underweight (< -2z)	0.0 % severe underweight (< -3z)
HAZ (n=182)	Group < 6 (n=0):	0.00 ± 0.00	(0.00 - 0.00)	(0.00 - 0.00)	0.00	0.0 % stunted (< -2z)	0.0 % severe stunted (< -3z)
	Group 6 to 18 (n=84):	-1.17 ± 2.46	(-6.50 - 5.41)	(-1.70 - -0.64)	-1.83	45.2 % stunted (< -2z)	23.8 % severe stunted (< -3z)
	Group 18 to 30 (n=33):	-1.41 ± 2.11	(-4.88 - 3.06)	(-2.13 - -0.69)	-1.99	42.4 % stunted (< -2z)	21.2 % severe stunted (< -3z)
	Group 30 to 42 (n=33):	-0.56 ± 2.09	(-4.44 - 2.66)	(-1.27 - 0.15)	-0.78	24.2 % stunted (< -2z)	18.2 % severe stunted (< -3z)
	Group 42 to 54 (n=22):	-0.37 ± 2.07	(-4.37 - 2.85)	(-1.23 - 0.50)	-0.40	27.3 % stunted (< -2z)	13.6 % severe stunted (< -3z)
	Group >= 54 (n=10):	-0.29 ± 1.03	(-3.03 - 0.65)	(-0.93 - 0.35)	-0.09	10.0 % stunted (< -2z)	10.0 % severe stunted (< -3z)

		Mean ± SD	Range	95% CI	Median		Findings
WHZ (n=181)	Group < 6 (n=0):	0.00 ± 0.00	(0.00 - 0.00)	(0.00 - 0.00)	0.00	0.0 % wasted (< -2z)	0.0 % severe wasted (< -3z) 0.0 % obese (> 2z)
	Group 6 to 18 (n=83):	1.84 ± 2.33	(-5.80 - 8.54)	(1.34 - 2.34)	1.83	6.0 % wasted (< -2z)	3.6 % severe wasted (< -3z) 45.8 % obese (> 2z)
	Group 18 to 30 (n=33):	1.34 ± 2.29	(-2.80 - 5.39)	(0.56 - 2.12)	0.62	3.0 % wasted (< -2z)	0.0 % severe wasted (< -3z) 33.3 % obese (> 2z)
	Group 30 to 42 (n=33):	0.15 ± 1.63	(-3.28 - 3.89)	(-0.40 - 0.71)	-0.39	6.1 % wasted (< -2z)	3.0 % severe wasted (< -3z) 21.2 % obese (> 2z)
	Group 42 to 54 (n=22):	-0.58 ± 1.68	(-5.98 - 1.92)	(-1.29 - 0.12)	-0.56	13.6 % wasted (< -2z)	4.5 % severe wasted (< -3z) 0.0 % obese (> 2z)
	Group >= 54 (n=10):	-0.63 ± 1.40	(-2.57 - 2.40)	(-1.50 - 0.23)	-0.77	10.0 % wasted (< -2z)	0.0 % severe wasted (< -3z) 10.0 % obese (> 2z)

Footnotes

1 All population size references are taken from the UNHCR Refugee Population in the Settlements, South Sudan by Sex and Age Group Weekly Refugees Statistics from UNHCR Juba 18/12/2010.

2 The sample size for calculating the mortality rate is determined using the following equation , where the sample size n and margin of error E are given by

$$x = Z(c/100)2r(100-r)$$

$$n = N\,x/((N-1)E2 + x)$$

$$E = Sqrt[(N - n)x/n(N-1)]$$

where N is the population size, r is the fraction of responses that one is interested in, and Z(c/100) is the critical value for the confidence level c. Assuming a 5% margin of error, 99% confidence interval, and 50% response distribution.

3 The sample size was calculated using the same formula as explained in the above footnote, assuming a 5% margin of error, 95% confidence interval, and 50% response distribution.

4 The sample size was calculated using the planning feature of the ENA software.

5 All population size references are taken from the UNHCR Refugee Population in the Settlements, South Sudan by Sex and Age Group Weekly Refugees Statistics from UNHCR Juba 18/12/2010.

6 The sample size for calculating the mortality rate is determined using the following equation , where the sample size n and margin of error E are given by

$$x = Z(c/100)2r(100-r)$$

$$n = N\,x/((N-1)E2 + x)$$

$$E = Sqrt[(N - n)x/n(N-1)]$$

where N is the population size, r is the fraction of responses that you are interested in, and Z(c/100) is the critical value for the confidence level c. Assuming a 5% margin of error, 99% confidence interval, and 50% response distribution.

7 The sample size was calculated using the same formula as explained in the above footnote, assuming a 5% margin of error, 95% confidence interval, and 50% response distribution.

8

9 Formula: 12 minutes roundtrip walking 500 meters to the water source at 5 kph (average walking speed) + 15 minutes maximum queuing time + (3 minutes per Jerry Can x average of 3 Jerry Cans/HH) = 36 minutes

10 It should be noted as a limitation that the survey took place while ACROSS was distributing mosquito nets to mothers with children under the age of 5.

11 The Sphere indicator for availability of water for consumption, cleansing, cooking, and other uses is 15 liters per person per day. In the survey, respondents were asked how many 20-liter Jerry Cans were consumed by the household per day. For the purpose of measuring consumption against the Sphere indicator, the number of liters per person was calculated and then rounded up to the nearest increment of 20 liters, or number of Jerry Cans.

12 This is the amount of time required to travel to the water collection point, queue, collect water and return.

13 Formula: 12 minutes roundtrip walking 500 meters to the water source at 5 kph (average walking

speed) + 15 minutes maximum queuing time + (3 minutes per Jerry Can x average of 4 Jerry Cans/HH) = 36 minutes

14 The Sphere indicator for availability of water for consumption, cleansing, cooking, and other uses is 15 liters per person per day. In the survey, respondents were asked how many 20 liter Jerry Cans were consumed by the household per day. For the purpose of measuring consumption against the Sphere indicator, the number of liters per person was calculated and then rounded up to the nearest increment of 20 liters, or number of Jerry Cans.

15 This is the amount of time required to travel to the water collection point, queue, collect water, and return.

16 Formula: 12 minutes roundtrip walking 500 meters to the water source at 5 kph (average walking speed) + 15 minutes maximum queuing time + (3 minutes per Jerry Can x average of 3 Jerry Cans/HH) = 36 minutes

17 The Sphere indicator for availability of water for consumption, cleansing, cooking, and other uses is 15 liters per person per day. In the survey, respondents were asked how many 20 liter Jerry Cans were consumed by the household per day. For the purpose of measuring consumption against the Sphere indicator, the number of liters per person was calculated and then rounded up to the nearest increment of 20 liters, or number of Jerry Cans.

18 This is the amount of time required to travel to the water collection point, queue, collect water, and return.

19 Formula: 12 minutes round-trip walking 500 meters to the water source at 5 kph (average walking speed) + 15 minutes maximum queuing time + (3 minutes per Jerry Can x average of 3 Jerry Cans/HH) = 36 minutes

20 The Sphere indicator for availability of water for consumption, cleansing, cooking, and other uses is 15 liters per person per day. In the survey, respondents were asked how many 20 liter Jerry Cans were consumed by the household per day. For the purpose of measuring consumption against the Sphere indicator, the number of liters per person was calculated and then rounded up to the nearest increment of 20 liters, or number of Jerry Cans.

21 This is the amount of time required to travel to the water collection point, queue, collect water, and return.

22 Formula: 12 minutes roundtrip walking 500 meters to the water source at 5 kph (average walking speed) + 15 minutes maximum queuing time + (3 minutes per Jerry Can x average of 3 Jerry Cans/HH) = 36 minutes

23 This is the amount of time required to travel to the water collection point, wait in line, collect water, and return home.

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