Hilfe zur Selbsthilfe

Yirol West County Anthropometric and Mortality Survey

Report

25th June – 5th July 2015

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Abbreviations

BPHS: Basic Package of Health Services
CI: Confidence Interval
CHD: County Health Department
CHF: Common Humanitarian Fund
CMR: Crude Mortality Rate
DEFF: Design Effect
ENA: Emergency Nutrition Assessment
FEWSNET: Famine Early Warning System Network
FSL: Food Security and Livelihood
FSNMS: Food Security and Nutrition Monitoring System
GAM: Global Acute Malnutrition
HAZ: Weight-for-Age Z score
HH: Household
IDPs: Internally Displaced Persons
IYCF: Infant and Young Children Feeding
KIIs: Key Informant Interview
MAM: Moderate Acute Malnutrition
MoH: Ministry of Health
MUAC: Mid Upper Arm Circumference
PHCC: Primary Health Care Center
PHCU: Primary Health Care Units
PLW: Pregnant and Lactating Women
PPS: Probability Proportional to Population Size
RRC: Relief and Rehabilitation Commission
RSS: Republic of South Sudan
SAM: Severe Acute Malnutrition
SC: Stabilization Centers
SMART: Standardized Monitoring and Assessment in Relief and Transition
SSP: South Sudan Pound
WHO: World Health Organization
WAZ: Weight-for-Age Z score
WASH: Water, Sanitation and Hygiene
WFP: World Food Program
WHZ: Weight-for-Height Z score
U5MR: Under-Five Mortality Rate

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Special thanks go to the survey supervisors and enumerators for their determination even when faced with excessively poor roads conditions and sleeping out in the cold to cover the sampled households. Special appreciations are due to the village guides and drivers who gave all their support to ensure the exercise were a success. Also, special gratitude to all the respondents who willingly volunteered valuable information during the household visits

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Executive Summary

Yirol West County is situated on the Southern part of Lakes State and has seven Payams with an estimated population of 137,878[1]. Most parts of the county flood during the rainy season affecting the seasonal roads which become impassable. The major livelihood practices in the county include farming, livestock keeping and fishing. On farming, the major food items grown include maize, sorghum, groundnuts, millet, and cassava[2]. The county has been characterized by poor food security as observed by the IPC Classification analysis. For instance, the May IPC Classification[3] rated Yirol West County as being in the *crisis* Phase of the Food Classification. The County has 12 health facilities which are not evenly distributed and even 3 of them are not functioning due to insecurity hence making it difficult for both the host, IDP and returnee community to access health care and immunization. Though no SMART Survey that has been conducted in the county, results from the neighboring Yirol East County (April 2015) showed a global acute malnutrition rate of 13.9% which is rated as *serious* according to the World Health Organization Classification of Malnutrition. Help thus conducted this first pre-harvest survey in-order to establish the baseline nutrition situation.

The main objective of the survey was to measure the nutrition status of the children 6 to 59 months old, the crude and under-five death rates and the prevalence of acute malnutrition among the pregnant and lactating women (PLWs) using MUAC in Yirol West County. The proposed survey will be conducted using the SMART Methodology. This survey applied a two-stage cluster sampling using the SMART Methodology with the clusters being selected using probability proportional to population size (PPS) and households being selected using simple random sampling. The sample size was 455households from 36 clusters. The target number of households per cluster was 13.However, the survey managed to sample only 25 clusters out of which 308 households were sampled, the other 11 cluster were completely inaccessible due to an unexpected heavy downpour at the middle of the survey which caused flooding. The survey was implemented by six teams of four members each, with two members being measurers, the third member being the team leader and the fourth member was the cluster guide. The survey teams were trained for five days from 24th June to 28th June which included standardization and piloting exercises. Data collection took place for seven days, 29th June to 5th July. Anthropometric data was entered on daily basis, which helped monitor the quality of the survey. Anthropometric and Mortality data was entered and analyzed in ENA for SMART 2011 (21st April, 2015 Version) while the other set of data was entered and analyzed in SPSS Version 20.0. The overall quality of the data was rated as excellent with the overall plausibility value being 6%. The anthropometric indicators are presented using the WHO 2006 standards.

In total, 308 households were surveyed, where 428 children aged between 6 and 59 months were measured their anthropometric measurements. The results of the survey showed a Global Acute Malnutrition Rate of 11.8 % (7.9 - 17.2 95% C.I.) (n=50) with the prevalence of Severe Acute Malnutrition Rate being 0.9 % (0.2 - 4.5 95% C.I.) (n=4). No

[1] Population projection 2014
[2] Lakes State, Yirol West County, Village Assessment Survey, Atlas. IOM
[3] May IPC Classification for South Sudan

confirmed case of Oedema was detected during the survey. The prevalence of acute malnutrition based on MUAC was 4.7 % (2.2 - 9.6 95% C.I.) (n=20) while the prevalence of severe acute malnutrition based on MUAC was 0.2% (0.0 – 1.9 95% C.I.) (n=1). On Chronic malnutrition, the results showed a global stunting level of 5.1% (3.1 - 8.4 95% C.I.) (n=20). Further, the survey showed that the prevalence of underweight was 7.5 % (4.7 - 11.7 95% C.I.) (n=32). The prevalence of morbidity 2 weeks prior to the survey was 52.8% (n=226) with the prevalence of diarrhea being 13.7% (n=31). The survey also established that the measles coverage among the children aged 9 - 59 was 42.8% (n=168) while the prevalence of vitamin supplementation among the children aged 6 – 59 months was 37.4% (n=160). On water and sanitation; the proportion of households with access to safe drinking water was 9.7% (n=30), while the proportion of households that treat drinking water was 34.1% (n=105). The results further showed that the proportion of households with access to toilet facilities was 8.1% (n=25) and the proportion of respondents practicing proper hand washing at all critical times being 23.4% (n=72). On the infant and young children feeding practices; the exclusive breastfeeding was found to 32.6% (n=15), the proportion of children initiated to breast milk within the 1st hour after birth was 89.9% (n=160) while the proportion of children 6 – 23 months meeting the minimum meal frequency was 20.2% (n=36). The proportion of children 6 – 23 months meeting the minimum dietary diversity was 12.4% (n=22), and the continued breastfeeding at 1 year being 97.0% (n=32) while the continued breastfeeding at 2 years was 97.0% (n=22).

In conclusion, the overall nutrition situation in Yirol West County is classified as *serious* based on the WHO classification of malnutrition. The underweight and chronic malnutrition were also found to be low which is encouraging. Both the crude and under-five mortality rates were found to be within the expected range. The survey also established that the morbidity rate in the county was high with the health seeking behavior being poor. The survey further concludes that the breastfeeding practices among the caregivers in the county was encouraging, though on the other hand, the child feeding practices among the 6 to 23 months was considered to be very poor. In particular, the minimum meal dietary and the meal frequency were found to be low. However, the exclusive breastfeeding feeding practice was found to be poor and below the target. Both Vitamin A Supplementation and Measles Vaccination were found to be quite low. Finally, the WASH indicator in the county were found to be very poor especially; the hand washing at critical time which was poor, open defecation which was found to be extremely high and poor water treatment.

1.0 Introduction

1.1 Background

Yirol West is situated on the Southern part of Lakes State and borders with Central Equatoria and Awerial County to the North East, Western Equatorial to the North and Rumbek East to the North West (Warrap State). It is one of the eight counties of Lakes State and lies approximately 280 kilometers, by road, northwest of Juba. The county has seven payams with an estimated population of 137,878[4]. Most parts of the county flood during the rainy season affecting the seasonal roads which become impassable. The major livelihood practices in the county include farming, livestock keeping and fishing. On farming, the major food items grown include maize, sorghum, groundnuts, millet, and cassava[5]. During the lean season the county becomes food insecure and malnutrition increases especially in children under five boys and girls and the PLW. There are 12 health facilities which are not evenly distributed and even 3 of them are not functioning due to insecurity hence making it difficult for both the host, IDP and returnee community to access health care and immunization. Further, during the floods, food productivity is reduced due to crop destruction leaving the community vulnerable as a result of migration to higher land and sharing of the little food that is available. Some of the coping strategies employed includes eating once a day and wild fruit collection this in return greatly affects the nutrition situation of children U5 and the PLW. The county is also prone to inter-tribal conflicts and cattle rustling which cause population movement. According to the latest IPC[6] Yirol West is in crisis level which shows that the nutrition situation in the county is dire. High market prices affect the purchase will power of majority of the community as they can't afford to procure the food of their choice.

1.2 Rationale for Conducting a Nutrition Survey

In Dec 2014 World Food Program (WFP) warned that 2.5 million people in South Sudan would face acute hunger in 2015. WFP said pre-positioning of food then, before the rainy season was critical to averting a hunger catastrophe in South Sudan. The World Food Program says the acute hunger crisis facing millions of people in South Sudan is man-made. Since fighting between the government and opposition erupted one year ago, the United Nations estimates about 1.5 million people have become displaced within the country and another one-half million have sought refuge in neighboring countries. The ongoing fighting has interrupted the planting and harvesting of crops, causing large and widespread shortages of food.

Results from the April 2015 SMART Survey in the neighboring Yirol East County showed a *serious* nutrition situation with the GAM Rate being 13.9%. Further, A SMART survey conducted in November 2014 through Food Security and Nutrition Monitoring System (FSNMS) showed that the malnutrition level of children under 5 was serious with a GAM of 10.2% for Lakes State. As per the OCHA 1/11/2014 report, after fighting broke out in Jonglei State in December 2013, about 104,000 men, women, boys,

[4] National Bureau of Statistics, South Sudan
[5] Lakes State, Yirol West County, Village Assessment Survey, Atlas. IOM
[6] IPC Classification, May 2015

girls and the elderly were displaced and they sought refuge in Awerial County of Lakes state in Guot-thom 1,829 IDPs, Thian, 4255 Idps, Wunthou 2,865, Yalakot 971 IDPs in all these areas there are no partners providing nutrition assistance. The high influx of IDPs has exacerbated the already vulnerable food security situation in the county and as the lean season is approaching, the malnutrition situation will increase especially among the vulnerable groups of children and PLW. Lack of availability of food and relying on hand outs from relatives and well-wishers also affects their nutrition status and the situation is exacerbated by the heavy work load the women carry out which includes cutting of firewood, walking long distances to fetch water and pounding of sorghum/maize contribute largely to the malnutrition of the Pregnant & Lactating Women (PLW) and children both boys and girls below two years since the poor food intake does not provide enough nutrients for the body hence this will affect the milk production/breast feeding and development of the foetus, the lack of a balance diet will also affect children under the Infant and Young Child Feeding (IYCF) both boys and girls.

1.3 Survey Objectives

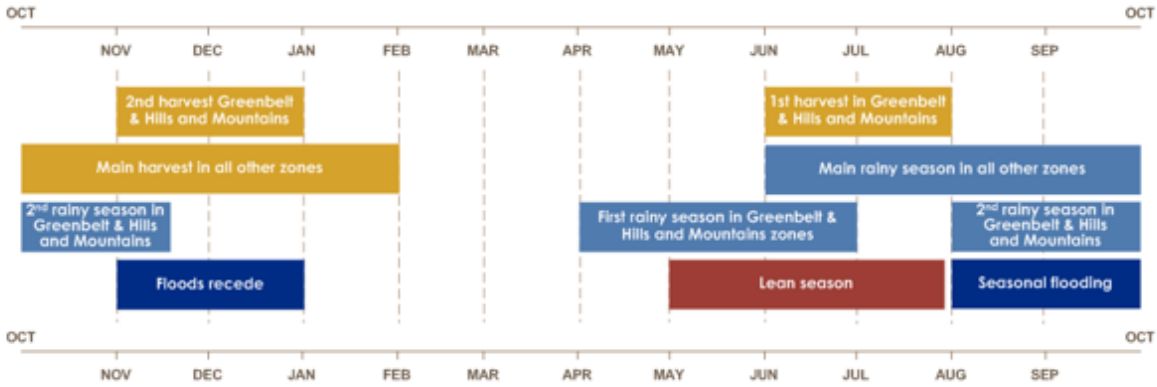
The main objective of the survey was to measure the nutrition status of the children 6 to 59 months old, the crude and under-five death rates and the prevalence of acute malnutrition among the pregnant and lactating women (PLWs) using MUAC in Yirol West County. The proposed survey was conducted using the SMART Methodology. The specific objectives of the survey include:

i. To estimate the prevalence of malnutrition among the population aged 6-59 months
ii. To estimate the crude and under-five mortality rates in Yirol West County
iii. To identify factors influencing the nutrition status of children aged 6-59 months in the County
iv. To estimate the prevalence of some common child illnesses (suspected measles, diarrhea, febrile and respiratory illnesses)
v. To estimate the coverage of measles vaccination and Vitamin A supplementation status among children aged 6-59 months
vi. To assess the infant and young child feeding (IYCF) and care practices among mothers with children aged 0-23 months.
vii. To assess the households' water, sanitation and hygiene practices (WASH) and Food Security and livelihood (FSL) situation.

1.4 Timing of the Survey and Seasonal Calendar

This survey was implemented from 15th June, 2015, while training of enumerators took place between 24thand 28th of June and the data collection was between 29th June and 5th of July.

The following is the seasonal calendar for Yirol West County



1.5Survey Area

This survey was conducted in Yirol West County, Lakes State

2.0 Methodology

2.1 Study Design

The survey applied a two stage cluster sampling using the SMART methodology with the clusters being selected using the probability proportional to population size (PPS). Stage one sampling involved the selection of the clusters included in the survey while the second stage sampling involved the selection of the households from the sampled clusters.

2.2 Study Population

The target population for this survey was children aged 6 to 59 months for the anthropometric component, 0 – 23 for the IYCF, the caregivers of the targeted children and the general population for the mortality survey.

2.3 Sample Size

The survey sample size was calculated using the SMART survey calculator. The parameters of interest were captured in the ENA for SMART software 21st April 2015 Version and the respective number of children and households required for the survey were computed. Table 1 shows the summary of the anthropometric and mortality sample size. Since there has been no SMART Survey conducted in Yirol West County, results from the neighboring Yirol East County (April 2015) were used since they share the same characteristics and also share a common boundary

Table 1: Sample Size (Anthropometric and Mortality)

Parameter	Anthropometric	Mortality
Estimated Prevalence (%)[7]	13.9	0.27
Desired Precision[8]	3.5%	0.30
Design Effect[9]	1.5	1.5
Average Household Size[10]	7.5	7.5
% children Under-Five	21	
% Non-Respondents	5%	5
Recall Period		90
Households to be Included	**455**	**293**
Children to be Included	613	
Population to be Included		2091

The calculation of the IYCF sample size used 50% as the estimated prevalence for initiation of breastfeeding, minimum diet diversity and meal frequency. Using IYCF calculator the sample size was found to be 245 for the IYCF indicators, with precision of 8 and design effect of 1.5.

Table 2: Summary of Sample size

Sample of IYCF	Sample of Anthropometry	# of HH to visit	# of HH for mortality	Sample size considered	# of HH/ cluster	# of clusters
245	613	455	293	613	13	35

Since the anthropometric sample size produced the highest Sample Size i.e. 455 households, then the sample size used in this survey was 455 households which was to be collected from 35 clusters with each cluster having 13 households. However, for logistical planning, the number of cluster was increased to 36 so that the data could be collected by six team for six days. This meant that, rather than working with 6 teams for 35 clusters, one cluster was added so that every team would work for six days hence making the logistics of the survey much simpler rather than the earlier 35 cluster where 5 teams would have worked for six days and one team work for five days.

2.4 Cluster and Household Selection

In this survey a cluster was deemed to be equivalent to a village and was assumed to be the smallest administrative unit and was further considered as the primary sampling unit. This implied that the sampling frame was the list of all the villages in the county. This list was obtained from local RRC and contained the name of the villages and their population sizes. The clusters to be included in the survey were selected using the probability

[7] Pre-Harvest Nutrition Survey, Yirol East County, Lakes States, April 2015 by CCM and MoH
[8] A precision of 3.5% is recommended for an estimated GAM Prevalence of 13.9% (SMART Global Project)
[9]Pre-Harvest Nutrition Survey, Yirol East County, Lakes States, April 2015 by CCM and MoH
[10]Mid between 6 (SSHHS) and 9 for Yirol East. It's assumed that the HH size will not reach 9

proportional to population size. This was done using the ENA for SMART 21st April, 2015 Version.

At stage 2, the survey adopted the simple random sampling to select the households which were included in the survey from the sampled clusters. This implied that prior to data collection the survey teams were listing the households in all the selected clusters with the help of the local guides/village elders. This enabled smooth management of the second stage sampling using the simple random sampling which works with the basic assumption that an updated list of households is available. Finally, within the selected households, all children 6-59 months were taken their anthropometric measurements. Additionally, in the sampled household without children under 5 years, the household questionnaire and the mortality questionnaires were administered.

2.5Data Collection Teams and Training

The survey was conducted by a set of 6 teams who collected the data for 7 days. Every team had 4 members namely: 1 Team Leader/Enumerator, 2 Measurers and 1 Community/Village Guide. The teams were given a5-days training prior to field work, including a standardization test to ensure standardization of measurement and recording practice. All data collectors were trained on taking anthropometric measurements, completion of questionnaires and sampling methodology. The data collection tools were pilot tested in clusters not selected to be part of the larger survey. Additionally, during the piloting the enumerators undertook the entire process of the survey which included: household selection, taking anthropometric measurements and also filling of the data collection forms.

2.6 Supervision and Data Quality

Supervision was ensured in order to have high quality results. The supervision was at two levels i.e. at the field level and at the data entry level. The overall coordinator for this survey was the Survey consultant and was assisted in supervision by the Hilfe zur Selbsthilfe.e.V Nutritionist and CHD Staff. The supervisors' main responsibilities included ensuring that the methodology was followed, measurements were taken appropriately and tackling any technical issue which arose during data collection. The Consultant also oversaw the data entry every evening after data collection and later would run the plausibility results which he shared with the survey teams every morning before proceeding to the field. Finally, the teams were required to calibrate the equipment every morning before proceeding with data entry

2.7 Data to be Collected and Data Collection Tool

The data collected in this survey included the anthropometric data, morbidity data, mortality data, demographic data, WASH and the food security data. To collect the anthropometric, morbidity, and the demographic data, this survey adopted the Survey Questionnaire which has been recommended by the Nutrition Information Working Group while for the mortality data the survey adopted the latest Mortality Survey Questionnaire (Individual)released by the Global SMART Project. Initially the data was to be collected using Open Data Kit (ODK) however, due to the county experiencing poor or no network in some parts, we reverted back to the manual way.

2.8 Data Analysis, Reporting and Dissemination

The anthropometric and mortality data entry and analysis was done using ENA for SMART 21st April, 2015 version while the other data collected was entered and analyzed using SPSS version 20. The anthropometric results are presented using the WHO (2006) reference levels.

2.9 Case Definition

Malnutrition by Z-Score: WHO (2006) Standard

- Severe acute malnutrition is defined by WFH < -3 SD and/or existing bilateral oedema on the lower limbs
- Moderate acute malnutrition is defined by WFH < -2 SD and >-3 SD and no oedema
- Global acute malnutrition is defined by WFH < -2 SD and/or existing bilateral oedema

Malnutrition by MUAC

- Severe malnutrition is defined by MUAC<115 mm and/or presence of bilateral oedema
- Moderate malnutrition is defined by MUAC < 125 mm and ≥115 mm and no oedema
- Global acute malnutrition is defined by MUAC <125 mm and/or existing bilateral oedema

2.10 Limitation of the Survey

This survey was due to be done in 36 clusters; however, at the 4th day of data collection, there was unexpected heavy downpour which led to flooding in the survey area. The survey teams spent 2 days and 2 nights in the field as their cars had been stuck in the mud, before they were removed by a hired tractor. At this time, the rain was continuing and the situation was getting worse. Help didn't have more resources to either explore other methods of finishing the remaining cluster like use of a chopper and hence the survey was called-off on the 7th day of data collection after several attempts to access more clusters was unsuccessful. Given the above scenario, the results of this survey should be interpreted with caution and particularly, when generalizing the results.

Table 3: Response Rate

Payam	Sampled Clusters	Reached Clusters	% Reach
Abang	6	6	100.0%
Aluakluak	5	5	100.0%
Anuol	5	0	0.0%
Geng-Geng	6	6	100.0%
Gheer	1	1	100.0%
Mapuordit	6	1	17.0%
Yirol Town	7	6	87.0%
Total	**36**	**25**	**69.4%**

3.0 Results

3.1 Demographics

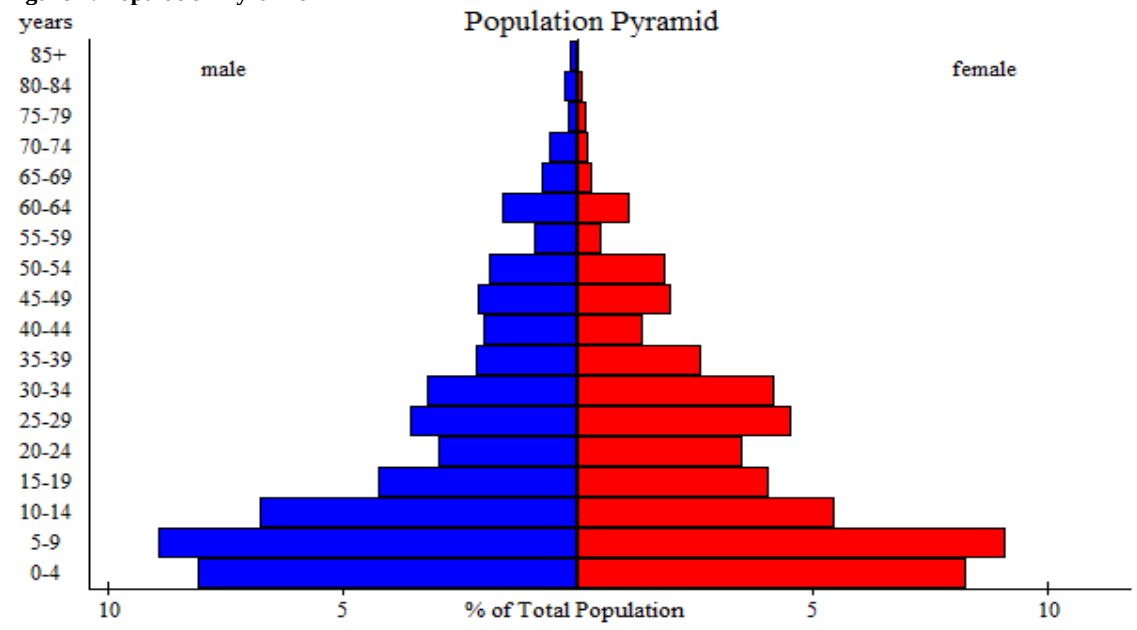
In total, 455 households were targeted for the survey; however, 308 households responded to the survey. The other planned households were not visited due to inaccessibility which was caused by the rapid flooding of the area during at the middle of the survey as explained in the previous section 2.10. From the sampled 308 households, the total population was 2,589 implying that the average household size for the survey area was 8.7. Further, out of the 308 households sampled, 99.0% (n=295) were residents while 0.7% (n=2) were returnees and the only 0.3% (n=1) was classified as IDP. The females headed households in Yirol West County was 13.3% (n=41).

Table 4: Demographic Characteristics

Characteristics	Value
Clusters/villages covered	25
Total HHs covered	308
Total population	2,589
Average HH Size	8.7
HH status (Resident)	99.0% (n=295)
HH status (IDP)	0.3% (n=1)
HH Status (Returnee)	0.7% (n=2)
Male headed HH	86.7% (n=267)
Female Headed	13.3% (n=41)
Households with Children Under 5	225

The figure below shows the population pyramid for the survey population.

Figure 1: Population Pyramid



3.2 Anthropometric Results (Based on WHO Standards 2006)

3.2.1 Sex and Age Distribution

The survey managed to sample 308 households from which 425 children were assessed and their anthropometric measurements taken. There were 218 boys and 207 girls in the sample. The table below presents the distribution of age and sex of the sample.

Table 5: Distribution of age and sex of sample

	Boys		Girls		Total		Ratio
AGE (mo)	**no.**	**%**	**no.**	**%**	**no.**	**%**	**Boy:Girl**
6-17	60	55.0	49	45.0	109	25.6	1.2
18-29	49	49.5	50	50.5	99	23.3	1.0
30-41	49	46.7	56	53.3	105	24.7	0.9
42-53	44	49.4	45	50.6	89	20.9	1.0
54-59	16	69.6	7	30.4	23	5.4	2.3
Total	218	51.3	207	48.7	425	100.0	1.1

The overall sex ratio was found to be 1.1 which falls within the acceptable range[11] between 0.8 and 1.2 and implies that the survey was unbiased for gender. Nevertheless, the age group 54-59 months had an overrepresentation of boys than girls as evidenced by the sex ratio of 2.3.

3.2.2 Prevalence of Acute Malnutrition (Wasting)

The Global Acute Malnutrition (GAM) is the index which is used to measure the level of wasting in any given population. In this survey, GAM was defined as the proportion of children with a z-score of less than -2 z-scores weight-for-height and/or presence of bilateral oedema. Severe Acute Malnutrition (SAM) was defined as the proportion of children with a z-score of less than -3 z-score and/or presence of oedema. Further, using the mid-upper arm circumference (MUAC), GAM was defined as the proportion of children with a MUAC of less than 125 mm and/or presence of oedema. Likewise, SAM was defined as the proportion of children with a MUAC of less than 115 mm and/or presence of oedema. The percentage of values flagged with SMART criteria was 0.7% (n=3) and they were excluded from the analysis. The table below presents the prevalence of malnutrition in Yirol West County.

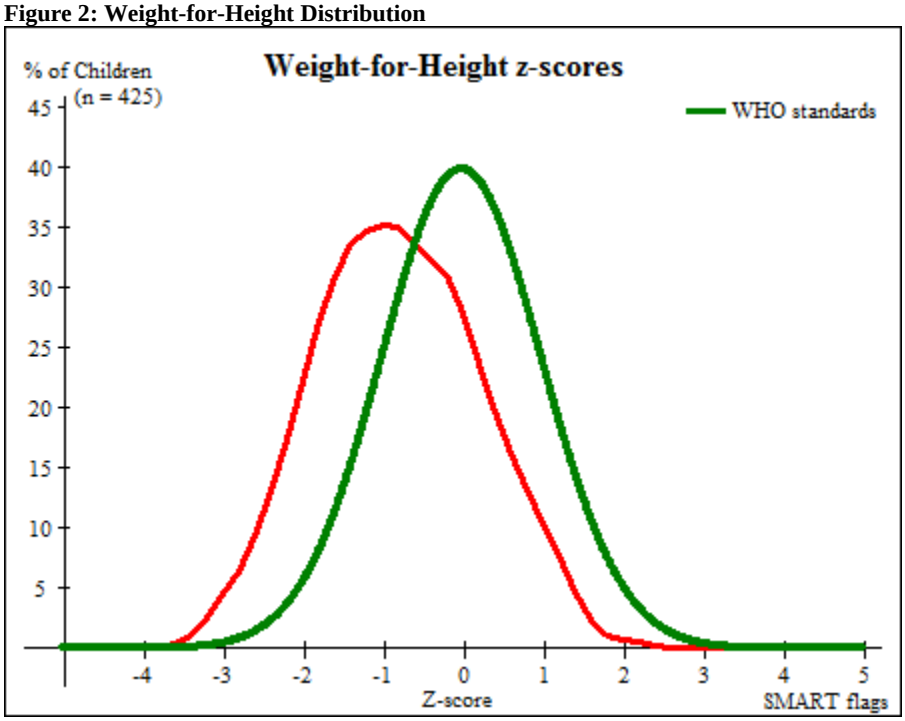
Table 6: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All n = 425	Boys n = 218	Girls n = 207
Prevalence of global acute malnutrition (<-2 z-score and/or oedema)	(50) 11.8 % (7.9 - 17.2 95% C.I.)	(22) 10.1 % (6.4 - 15.5 95% C.I.)	(28) 13.5 % (8.8 - 20.2 95% C.I.)
Prevalence of moderate acute malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(46) 10.8 % (7.2 - 15.9 95% C.I.)	(19) 8.7 % (5.4 - 13.7 95% C.I.)	(27) 13.0 % (8.4 - 19.6 95% C.I.)
Prevalence of severe acute malnutrition (<-3 z-score and/or oedema)	(4) 0.9 % (0.2 - 4.5 95% C.I.)	(3) 1.4 % (0.3 - 6.1 95% C.I.)	(1) 0.5 % (0.1 - 3.5 95% C.I.)

[11] SMART Survey Manual

The prevalence of Global Acute Malnutrition in Yirol West County based on the Weight-for-Height and/or oedema was 11.8% (n=50) which is classified as *serious*[12]according to the World Health Organization (WHO) classification of malnutrition (2006). Additionally, the prevalence of Severe Acute Malnutrition using the same criteria was 0.9% (n=4) which is considered *normal*according to the WHO Classification of Severe Acute Malnutrition. When comparing the results by gender, the analysis show that there was no significant difference in GAM or SAM by gender and hence gender was not a risk factor for acute malnutrition in Yirol West County (p=0.136 for GAM and p=0.170 for SAM). The prevalence of oedema was 0% (n=0)

Figure 2: Weight-for-Height Distribution



The above figure shows the comparison in nutrition status of the under-5 in Yirol West County and the reference population. The results show that there were more malnourished children in Yirol West County when compared with the reference population.

[12] WHO Cut Off Points using Z-Score ((-2 Z scores in populations: <5% - Acceptable; 5-9% - Poor; 10-14% - Serious; >15% - Critical)

Table 7: Prevalence of Acute Malnutrition based on MUAC (and/or oedema) and by Sex

Indicator	All n = 428	Boys n = 220	Girls n = 208
Prevalence of global malnutrition (< 125 mm and/or oedema)	(20) 4.7 % (2.2 - 9.6 95% C.I.)	(8) 3.6 % (1.5 - 8.5 95% C.I.)	(12) 5.8 % (2.7 - 12.0 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(19) 4.4 % (2.1 - 9.3 95% C.I.)	(8) 3.6 % (1.5 - 8.5 95% C.I.)	(11) 5.3 % (2.4 - 11.3 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(1) 0.2 % (0.0 - 1.9 95% C.I.)	(0) 0.0 % (0.0 - 0.0 95% C.I.)	(1) 0.5 % (0.1 - 3.7 95% C.I.)

Using the Mid Upper Arm Circumference (MUAC), the prevalence of Global Acute Malnutrition (GAM) was 4.7% (2.2 - 9.6 95% C.I.) (n=20) with the prevalence of Severe Acute Malnutrition (SAM) being 0.2% (0.0 - 1.9 95% C.I.) (n=1). When comparing the GAM Rate by gender, the results showed that there is no significant difference between the two gender (p=0.148).

3.2.3 Prevalence of Stunting and Underweight

Table 8: Prevalence of Stunting and Underweight

	Underweight n = 428	Stunting n = 393
Severe + Moderate (<-2 z-score)	(32) 7.5 % (4.7 - 11.7 95% C.I.)	(20) 5.1 % (3.1 - 8.4 95% C.I.)
Moderate (<-2 z-score and >=-3 z-score)	(29) 6.8 % (4.2 - 10.6 95% C.I.)	(20) 5.1 % (3.1 - 8.4 95% C.I.)
Severe (<-3 z-score)	(3) 0.7 % (0.2 - 2.2 95% C.I.)	(0) 0.0 % (0.0 - 0.0 95% C.I.)

The prevalence of global underweight for Yirol West County was found to be 7.5% (n=32) which was considered *low* according to the WHO classification of underweight[13] while the prevalence of severe underweight was 0.4% (n=2) which is also classified as *low* by the WHO Classification. On stunting, the survey found that the prevalence of global stunting was 5.1% (n=20) which is classified as *low* based on the WHO classification[14]. Finally, the prevalence of severe stunting was 0.0% (n=0).

3.3 Mortality

The crude death rate was found to be 0.29 (0.11 – 0.78) which is considered *low*. The design effect for the crude death rate was 1.69. The under-five death rate was found to be 0.26 (0.03 – 1.99) which is also considered to be *low*[15].

Table 9: Mortality Rate

Indicator	Crude Death Rate (95% CI)	Design Effect
Crude Death Rate	0.29 (0.11 – 0.78)	1.69
Under Five Death Rate	0.26 (0.03 – 1.99)	1.00

13 WHO Classification of Underweight: Low - <10%, Medium – 10 – 19.9%, High – 20 – 29.9%, Alarming/Critical - >30%
14 WHO Classification: Low - <20%, Medium - 20 – 29.9% , High – 30 – 39.9%, Alarming/Critical - >40.0%
15 WHO Cut-Offs: <2 – Low, 2 – <4 – Medium, 4 and above - Emergency

3.4 Children Morbidity

Table 10: Morbidity among the Under-5

Morbidity	n	N	Proportion
Morbidity	226	428	52.8%
Fever (Febrile)	157	226	69.5%
Cough	27		11.9%
Diarrhea	31		13.7%
Skin Infection	23		10.2%
Eye Infection	3		1.3%
Health Seeking Behavior			
Health Seeking Behavior	96	226	42.5%
Hospital	26	96	27.1%
PHCC/PHCU	56		58.3%
Mobile/Outreach	0		0.0%
Village Health Care Worker	2		2.1%
Shop	12		12.5%
Mosquito Net Usage			
Mosquito Net Usage	120	428	28.0%

The morbidity of children under 5 years was established using a 2 weeks recall period. Of the children sampled 52.8% (n=226) were reported to have been sick within the recall period. The most prevalence disease during the recall period among the under-five was fever (febrile) which was 69.5% (n=157), followed by diarrhea (13.7%, n=31) and then coughing (11.9%, n=27). Other diseases, included skin infections (10.2%, n=23) and eye infections (1.3%, n=3).

Among the children who were reported to be sick during the recall period, 42.5% (n=96) sought medical treatment. The most common source of treatment in the area was PHCC/PHCU (58.3%, n=56), followed by Hospital (27.1%, n=26). Based on the result of this survey, then the health seeking behavior was considered low as it was below 50%. On mosquito net usage, only 28.0% (n=120) of the children sampled had slept in a mosquito net the previous night.

3.5 Immunization and Vitamin A Supplementation Coverage

The World Health Organization notes that infants and children have increased vitamin A requirements to support rapid growth and to help combat infections[16]. On this note, Vitamin A supplementation is recommended in infants and children 6-59 months of age as a public health intervention to reduce child morbidity and mortality. WHO recommends that children aged between 6 and 11 months be supplemented once with the 100 000 IU while children aged between 12 and 59 months ought to be provided every 4-6 months with the 200 000 IU[17].

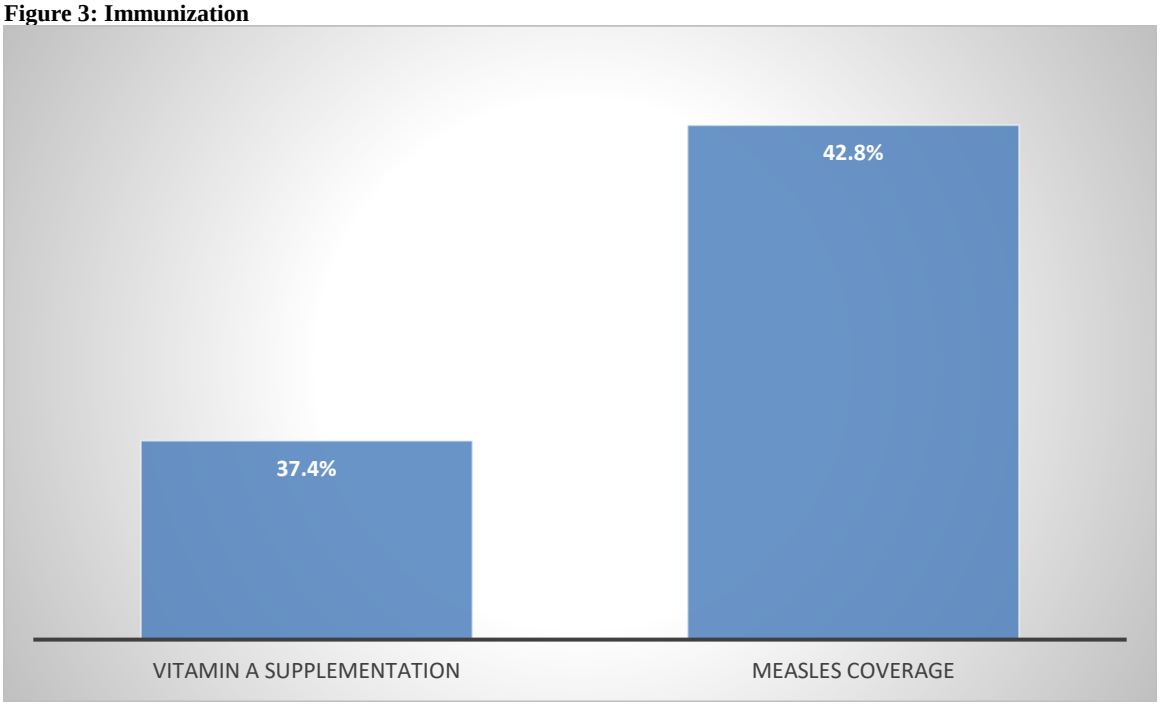
[16]WHO. Guideline: Vitamin A supplementation in infants and children 6–59 months of age. Geneva, World Health Organization, 2011.

[17]WHO. Guideline: Vitamin A supplementation in infants and children 6–59 months of age. Geneva, World Health Organization, 2011.

Measles is a highly contagious viral disease. It remains an important cause of death among young children globally, despite the availability of a safe and effective vaccine[18]. Measles is one of the most infectious diseases known to humankind and an important cause of death and disability among children worldwide. Those unvaccinated against the disease are at risk of severe health complications such as pneumonia, diarrhoea, and encephalitis (a dangerous infection of the brain causing inflammation) and blindness. The disease can be fatal. The WHO recommends that a child be vaccinated against measles at the age of 9 months.

The results of this survey showed that 37.4% (n=160) of the sampled children had been supplemented with Vitamin A within a period of 6 months prior to the survey. This is considered *low* since it was below the national target of 80%. Additionally, of the sampled children aged above 9 months, only 42.8% of them had been vaccinated against measles. This was again considered *low* as it was below the 90% target by WHO[19].

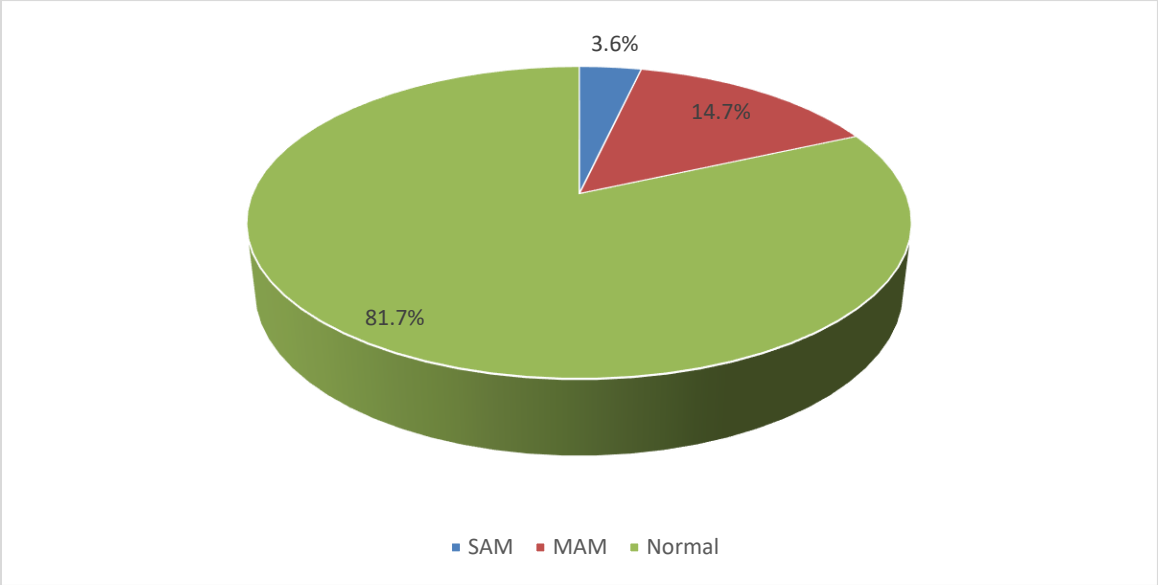
Figure 3: Immunization



[18] www.who.int/immunization/topics/measles/en/
[19] WHO Targets that by 2015, the Measles Vaccination Coverage Should be above 90% in All Region

3.6 Maternal Nutrition

Figure 4: Maternal Nutrition



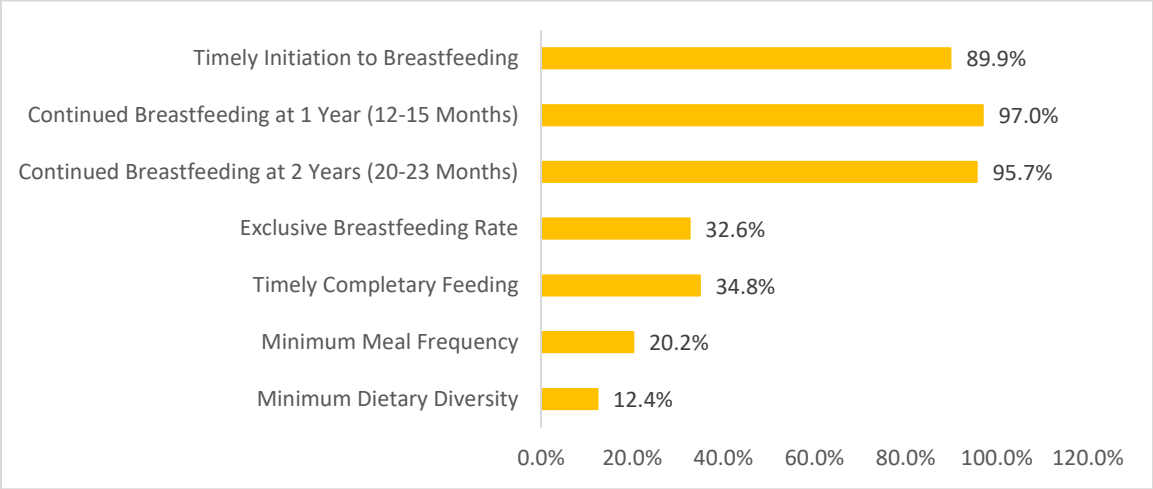
The maternal nutrition status was determined using the Mid-Upper Arm Circumference (MUAC). A woman with a MUAC of less than 21.0 cm is considered severely malnourished while a woman with a MUAC of between 21 and less than 23 is considered to be moderately malnourished, and the rest are considered normal. According to the results, 3.6% (n=9) of the women were severely malnourished, while 14.7% (n=37) were found to be moderately malnourished.

3.7 IYCF

The Infant and Young Children Feeding Practices were assessed in order to establish the care practices surrounding the child feeding practices. The child care practices have been found to have a direct relationship with malnutrition in any given community.

The exclusive breastfeeding rate in Yirol West County was found to be 32.6% (n=15) which is below the 50% target.However, on a positive note the continued breastfeeding at 1 year and 2 years were high at 97% (n=32) and 95.7% (n=22) respectively. Further, the results show that timely initiation to breastfeeding (within one hour after birth) was at 89.9% (n=160) which is considered high. It is therefore deduced that the breastfeeding practices among the caregivers in Yirol West County was satisfactory, except for the exclusive breastfeeding rate which requires attention from the program implementers.

Figure 5: IYCN Indicators



The timely complementary feeding was found to be low at 34.8% (n=46) with the majority of the children being introduced to other soft, semi-solid and solid foods before the age of 6 months. On the minimum meal frequency and the dietary diversity score, the results showed that the two indicators were low. The survey results showed that only 12.4% (n=22) of the children aged between 6 and 23 months met the minimum[20] dietary diversity with the common group of food being cereals. On the other side, only 20.2% (n=36) of the children were able to eat the minimum[21] number of meals per day. The above results are indicative of poor child feeding practices among the children aged between 6 and 23 months.

The poor infant and young child feeding practices were attributed to mainly household food insecurity, poor socio-economic status & poverty, poor crop harvests & seasonality, increased prices of food products, culture and traditions, lack of health education and counseling of the caregivers both at the community and health levels. This was further aggravated by the poor infrastructure which hinders the accessibility of these areas especially during flooding.

[20] Minimum Dietary Diversity as defined by WHO is the Proportion of children 6–23 months of age who receive foods from 4 or more food groups out of 7 food groups; However, for this survey; the minimum was defined as 3 since the IYCN tool can only compute 6 Food Groups

[21] Minimum Meal Frequency: Proportion of breastfed and non-breastfed children 6–23 months of age who receive solid, semi-solid, or soft foods (but also including milk feeds for non-breastfed children) the minimum number of times or more

3.8 WASH

Table 11: WASH Indicators

		n	N	Percent
Main Source of Drinking Water	Borehole	156	308	50.6
	Open Shallow Well	88		28.6
	Protect Shallow Well	11		3.6
	Protected Springs	1		0.3
	HH Connection/Stand Pipe	18		5.8
	Dam/Pond	34		11.0
Time Taken to Fetch Water	< 30 Minutes	131	308	42.5
	30 Min - < 1 Hr	63		20.5
	1 Hr - < 2 HRs	31		10.1
	2Hrs - < 4 Hrs	39		12.7
	Over 4 Hrs	44		14.3
Hand Washing At Critical Time		72	308	23.4

According to the survey, the main source of water in Yirol West County was borehole (50.6%, n=156), followed by open shallow well (28.6%, n=88) and dam/pond was 11.0% (n=34). On the water treatment, only 34.1% (n=105) of the households reported that they treat water before drinking. The low water treatment rate in the county would probably explain the high diarrhea rate (13.7%) as noted in the morbidity section of this report. Further, 42.5% (n=131) of the respondents spends less than 30 minutes in fetching water which is implies for most of the households the water points are not far. The results also showed that open defecation was high in the county as it stood at 85.1% (n=262) which is considered high. High open defecation when combined with the low rate of water treatment may explain the high diarrhea cases in the community among the children less than 5 years of age.

3.9 Food Security and Livelihood

The major source of households income 30 days before the survey was sale of crops (48.7%, n=150). This was followed by casual labor (18.5%, n=57) and then salaried work at 7.5% (n=23). It's also important to note that the main source of income for 6.2% (n=19) of the households sampled was brewing. Further, the results showed that the main source of food during the 7 days before the survey was own production (67.5%, n=208) followed by purchase from market at 27.3% (n=87). The results also showed that among the sampled households 78.6% (n=242) reported that they had cultivated in the last season. This clearly implies that at the time of the survey; own production of food was the dominant source of food in the area. However as noted during the Key Informant Interviews(KIIs) the food available in the area was to be short lived since it's wasn't plenty and hence the food security situation was anticipated to deteriorate in coming days and hence continuous monitoring of the food security in the area is required. Additionally, as noted by this survey the major source of income for the households remain to be sale of crops which could hasten the reduction of the food at the household level hence affecting the household food security negatively.

As earlier mentioned, food security in the area is anticipated to deteriorate in the coming days; the results showed that the high price of food was one of the three major shocks which the residents faced as mentioned by 49.7% (n=153) of the sampled households. The other two included lack of water and human sickness at 37.0% (n=114) and 34.7% (n=107) respectively.

Table 12: Food Security and Livelihood

Indicator	Category	Percent	n
Major Sources of Income	Sale of Crops	48.7	150
	Casual Labor	18.5	57
	Salaried Work	7.5	23
	Brewing	6.2	19
	Sale of Livestock	4.9	15
	Family Support	2.9	9
Main Sources of Food	Own Production	67.5	208
	Purchase from Market	27.3	84
	Gathering	1.9	6
Cultivated in Last Season	Yes	78.6	242
	No	21.4	66
Major Shocks	Lack of Water	37.0	114
	Expensive Food	49.7	153
	Human Sickness	34.7	107
	Insecurity	29.9	92

4.0 Discussion

4.1 Nutrition and Mortality Situation

In this survey, 428 children were assessed from 305 households. Of the assessed children 220 were boys while 208 were girls and the sex ratio was 1.1 which is within the acceptable range of 0.8 and 1.2 which indicates that the survey was unbiased for gender. The results of the survey indicated that the prevalence of global acute malnutrition among children aged 6-59 months is 11.8% (7.9 – 17.2 95% CI) which is classified as *serious* according to WHO classification of malnutrition. Additionally, the prevalence of severe acute malnutrition among the same age group was 0.9% (0.2 – 4.5 95% CI) which was classified as low. Based on the findings of this survey, then the nutrition situation in the county would be classified as *serious*which is also considered the baseline nutrition situation since there has been no previous nutrition assessments in the county. The Crude Mortality Rate in the County was found to be 0.29 (0.11-0.78) while the Under-Five Mortality Rate was 0.26 (0.03-1.99) both which are considered *low*[22].

[22] SPHERE Project Classification of Under-Five Mortality Rate: <2.0 – Low/Normal; Over 2.0 - Emergency

4.2 Probable Causes of Malnutrition

The UNICEF Conceptual Framework[23] for malnutrition notes that the immediate causes of malnutrition are diseases and inadequate dietary intake. During this survey a number of indicators were collected on various indicators related to both morbidity and food security. The results of this survey in addition to the conceptual information collected during the assessment could conclude that the major drivers of malnutrition in Yirol West County washigh morbidity rates, coupled with poor infant and young children feeding practices and poor food security.

On the morbidity rate, the results of the survey established that the morbidity rate among the children under-5 years two weeks prior to the survey was 52.8% which implies that about one out of every two children had been seek 2 weeks prior to the survey. The drivers of the high morbidity rate in the county as found by this survey were fever (suspected malaria) and diarrhea. The high prevalence of fever would probably be due to suspected malaria cases with the county being a major flooding area and thus a good bleeding ground for malaria and this is again complicated by the low (28%) number of children who sleep under mosquito nets. This high morbidity rate was also complicated with the low health seeking behavior of 42.5% which implies that out every 10 sick children only 4 of them sought medical treatment. The poor health seeking behavior could be attributed to the few health facilities available in the county which were found to be 11 and serving a population of approximately 137,878[24][25]. Further, of the 11 health facilities available 3 of them are in temporary structure or in open area hence classifying them as temporal. The high morbidity rate in the county coupled with the poor health seeking behavior could be a risk factor to the *serious* nutrition situation in the county.

Additionally, the *serious* nutrition situation in the county could be attributed to the poor food security observed in the survey area. This may also be supported by the finding of this survey where the prevalence of Moderate Acute Malnutrition (MAM) was found to be extremely high (10.8%) when compared with the prevalence of Severe Acute Malnutrition (0.9%). A high prevalence of moderate acute malnutrition is a pointer to poor food security while a high prevalence of severe acute malnutrition is a pointer of a high morbidity rate in any given area. The poor food security in the county was also noted by the Integrated Food Security Phase Classification (IPC) which classified Yirol West as in the *crisis phase* of food security[26] with slightly above 50% of the total population in Lakes State being in either *crisis* or *emergency phase* of food security. According to the IPC (May, 2015), the major driver to poor food insecurity in the county (May to July, 2015) included: poor road conditions, which limit the flow of food commodities into the state; insecurity from cattle theft and revenge killings; reduced levels of harvests; functionality of markets; and lower purchasing power by vulnerable households. The *poor* food security was also reflected by the poor feeding practices among the children aged between 6 and 23 months where the minimum meal frequency and minimum dietary diversity were found to be extremely low. Finally, the household

[23]http://www.unicef.org/nutrition/training/2.5/4.html
[24] IOM Village Assessment Survey, County Atlas 2013
[25] Population Estimate for 2014
[26]Integrated Food Security Phase Classification, Republic of South Sudan, December, 2015

food assessment conducted along this survey showed poor household food security with majority of the households resulting to sale of crops as their major source of income while still reporting expensive food at the market was the major shock that they faced.

5.1 Conclusion

In conclusion, the overall nutrition situation in Yirol West County is classified as *serious* based on the WHO classification of malnutrition. The underweight and chronic malnutrition were also found to be low which is encouraging. Both the crude and under-five mortality rates were found to be within the expected range. The survey also established that the morbidity rate in the county was high with the health seeking behavior being poor. The survey further concludes that the breastfeeding practices among the caregivers in the county was encouraging, though on the other hand, the child feeding practices among the 6 to 23 months was considered to be very poor. In particular, the minimum meal dietary and the meal frequency were found to be low. However, the exclusive breastfeeding feeding practice was found to be poor and below the target. Both Vitamin A Supplementation and Measles Vaccination were found to be quite low. Finally, the WASH indicator in the county were found to be very poor especially; the hand washing at critical time which was poor, open defecation which was found to be extremely high and poor water treatment.

5.2 Recommendation

5.2.1 Short Term Recommendation

1. Since the survey didn't manage to reach the sample as earlier planned; itis then be recommended that another Nutrition Assessment be planned in the county before the end of the year. This would help in getting the actual baseline nutrition situation which is representative of the entire county
2. Help should assist to capacity build the MoH and also work together with MoH/CHD to establish both tSFP and OTP interventions programs in the already established facilities and integrate outreach services in locations with no health facilities
3. Given that the nutrition situation in the county is already classified as serious, there is need for continuous screening for both children 6 to 59 months and pregnant and lactating women using MUAC. The nutrition team in the county should start with the remapping out of the villages in the county. Each village should be attached to a specific PHCC. Thereafter, a mass screening program should be developed by the team, and implement this recommendation on quarterly basis
4. Due to the chances that the food security situation may deteriorate and the already poor food security in the county, this survey recommends that the households' of children who are already in the OTP and TSFP programs should be linked directly to other food programs going on in the county such as General Food Distribution. This could be done at the entry level (when the child is being admitted) or at the exit level (when the child is exiting the program)

5. Help together with the MoH/CHD should introduce and imitate community mobilization activities through sensitization of the community accompanied by strong active case-finding at the community level
6. Promote infant and young Child Feeding practices through Mother to mother support groups, school clubs, women groups and community members. This can be done through training these target groups and strengthening health and nutrition education in the communities on IYCF
7. Help should strengthen the on-going WASH program in the county in-order to reinforce water, hygiene and sanitation practices to minimize the prevalence of diarrheal diseases including health education to educate the community on domestic treatment of drinking water
8. Due to the low measles vaccination and Vitamin A Supplementation Coverage, it is important for the MoH/CHD to develop a strategy of expanding the EPI Program so that it can maximize the chances of reaching the majority of children who are not vaccinated. This could be through integrated outreach services. It is also important for the MoH/CHD to conduct a systematic review in order to understand the factors behind the low measles coverage
9. The MoH/CHD with technical assistance from Help should strengthen the documentation of vaccinations. A significant proportion of the children did not have health cards and vaccination status was based on recall. Documentation of vaccination on cards is important to prevent unnecessary re-vaccination and monitoring of coverage. All vaccinations given during campaigns should be documented. Lost cards should be replaced as soon as possible

5.2.2 Long Term Recommendation

1. There is need for Help to conduct an in-depth study in the county such as a Nutrition Causal Analysis or a Knowledge, Attitude and Practices study which will help in understanding the, major causes of malnutrition in the county
2. A coordinated multi-sectorial approach should be discussed among local authorities and partners to tackle the underlying causes of malnutrition, such as food insecurity, poor transport and communication channels, frequent flooding among others. This can be enhanced through regular coordination meetings and feedback to enhance harmonization of drought-mitigation efforts;
3. There is need to map out all the health service delivery points in the county. This should be followed by developing a strategy to ensure that the services delivery points are increased in order to reach more population.
4. This survey notes and recommends that there is need to initiate process of the construction of toilets in the area as residents are also educated on the importance of toilets. This should be done through the Community Led Total Sanitation (CLTS). Other components which may be included in this process are hand washing and water treatments methods and procedure. This need to be a multi-sectorial approach led by the government and the other actors on the ground

Annexes

Annex I: Plausibility Results

Plausibility check for: SS_July_2015_Help_Yirol_West.as

Standard/Reference used for z-score calculation: WHO standards 2006
(If it is not mentioned, flagged data is included in the evaluation. Some parts of this plausibility report are more for advanced users and can be skipped for a standard evaluation)

Overall data quality

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	**Score**
Flagged data	Incl	%	0-2.5	>2.5-5.0	>5.0-7.5	>7.5	
(% of out of range subjects)			0	5	10	20	**0** (0.7 %)
Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**0** (p=0.562)
Age ratio(6-29 vs 30-59)	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**0** (p=0.195)
Dig pref score - weight	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (6)
Dig pref score - height	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (7)
Dig pref score - MUAC	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (5)
Standard Dev WHZ	Excl	SD	<1.1	<1.15	<1.20	>=1.20	
.			and	and	and	or	
.	Excl	SD	>0.9	>0.85	>0.80	<=0.80	
			0	5	10	20	**0** (1.01)
Skewness WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (0.10)
Kurtosis WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**3** (-0.45)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<=0.001	
			0	1	3	5	**3** (p=0.002)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	**6** %

The overall score of this survey is 6 %, this is excellent.

There were no duplicate entries detected.

Annex II: Data Collection Tools

The following is the anthropometric tool used for data collection.

SMART Tools.xls

The following is the Mortality Survey Tool used during this survey

Mortality Questionnaire.pdf

Annex III: Assignment of Clusters

	Village	Cluster	
Abang	ajol Puot	1	Visited
	Mayenakulik	2	Visited
	Bunthokrou	3	Visited
	Aninthok	4	Visited
	Botoi Iran	5	Visited
	Lual Aleth	6	Visited
Aluakluak	Acambek	7	Visited
	Ramjur	8	Visited
	Panjiei	9	Visited
	Puotapuoth	10	Visited
	Ameth	11	Visited
Anuol	Athuer	12	Not Visited
	Jakman	RC	
	Wunabei	13	Not Visited
	Mununguر	14	Not Visited
	Nyakal	RC	
	Ijur Mom	15	Not Visited
Geng-Geng	Jarweng	16	Visited
	Jurnyiel	17	Visited
	Areer	18	Visited
	Matbur	19	Visited
	Yekwotuel	20	Visited
	Kormuokngu	21	Visited
Gheer	Rakic	22	Visited
	Luongameth	RC	

Mapuordit	Lual	23	Not Visited
	aguran	24	Not Visited
	Hor Mayen	25	Not Visited
	Puolthiel	26	Visited
	Panamat	27	Not Visited
	Alel	28	Not Visited
	Hor Majongdit	29	Not Visited
Yirol Town	Ngop 1	30	Visited
	Majak	31	Visited
	Wunalei	32	Visited
	Matioroi	RC	
	Halakathin	33	Visited
	Waththueny	34	Not Visited
	Atorok	35	Visited
	Wunabei	36	Visited

Annex IV: Population Estimates

Population Yirol west.xlsx

Annex V: Calendar of Local Events

The following is the calendar of local event

Population Yirol west.xlsx

Annex VI: Result Tables for NCHS growth reference 1977

Table 3.2: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All n = 426	**Boys** n = 218	**Girls** n = 208
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(48) 11.3 % (7.7 - 16.1 95% C.I.)	(24) 11.0 % (6.9 - 17.2 95% C.I.)	(24) 11.5 % (7.5 - 17.3 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no	(47) 11.0 % (7.6 - 15.7 95% C.I.)	(24) 11.0 % (6.9 - 17.2 95% C.I.)	(23) 11.1 % (7.2 - 16.7 95% C.I.)

oedema)			
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(1) 0.2 % (0.0 - 1.8 95% C.I.)	(0) 0.0 % (0.0 - 0.0 95% C.I.)	(1) 0.5 % (0.1 - 3.4 95% C.I.)

The prevalence of oedema is 0.0 %

Table 3.3: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema

		Severe wasting (<-3 z-score)		**Moderate wasting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	109	0	0.0	21	19.3	88	80.7	0	0.0
18-29	100	1	1.0	9	9.0	90	90.0	0	0.0
30-41	105	0	0.0	9	8.6	96	91.4	0	0.0
42-53	89	0	0.0	5	5.6	84	94.4	0	0.0
54-59	23	0	0.0	3	13.0	20	87.0	0	0.0
Total	426	1	0.2	47	11.0	378	88.7	0	0.0

Table 3.4: Distribution of acute malnutrition and oedema based on weight-for-height z-scores

	<-3 z-score	**>=-3 z-score**
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 1 (0.2 %)	Not severely malnourished No. 427 (99.8 %)

Table 3.5: Prevalence of acute malnutrition based on MUAC cut off's (and/or oedema) and by sex

	All n = 428	**Boys** n **=** 220	**Girls** n **=** 208
Prevalence of global malnutrition (< 125 mm and/or oedema)	(20) 4.7 % (2.2 - 9.6 95% C.I.)	(8) 3.6 % (1.5 - 8.5 95% C.I.)	(12) 5.8 % (2.7 - 12.0 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(19) 4.4 % (2.1 - 9.3 95% C.I.)	(8) 3.6 % (1.5 - 8.5 95% C.I.)	(11) 5.3 % (2.4 - 11.3 95% C.I.)
Prevalence of severe malnutrition	(1) 0.2 % (0.0 - 1.9	(0) 0.0 % (0.0 - 0.0	(1) 0.5 % (0.1 - 3.7

(< 115 mm and/or oedema)	95% C.I.)	95% C.I.)	95% C.I.)

Table 3.6: Prevalence of acute malnutrition by age, based on MUAC cut off's and/or oedema

		Severe wasting (< 115 mm)		**Moderate wasting (>= 115 mm and < 125 mm)**		**Normal (> = 125 mm)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	110	1	0.9	11	10.0	98	89.1	0	0.0
18-29	100	0	0.0	5	5.0	95	95.0	0	0.0
30-41	105	0	0.0	0	0.0	105	100.0	0	0.0
42-53	90	0	0.0	3	3.3	87	96.7	0	0.0
54-59	23	0	0.0	0	0.0	23	100.0	0	0.0
Total	428	1	0.2	19	4.4	408	95.3	0	0.0

Table 3.5: Prevalence of acute malnutrition based on the percentage of the median and/or oedema

	n = 426
Prevalence of global acute malnutrition (<80% and/or oedema)	(24) 5.6 % (3.3 - 9.3 95% C.I.)
Prevalence of moderate acute malnutrition (<80% and >= 70%, no oedema)	(24) 5.6 % (3.3 - 9.3 95% C.I.)
Prevalence of severe acute malnutrition (<70% and/or oedema)	(0) 0.0 % (0.0 - 0.0 95% C.I.)

Table 3.6: Prevalence of malnutrition by age, based on weight-for-height percentage of the median and oedema

		Severe wasting (<70% median)		**Moderate wasting (>=70% and <80% median)**		**Normal (> =80% median)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	109	0	0.0	14	12.8	95	87.2	0	0.0
18-29	100	0	0.0	5	5.0	95	95.0	0	0.0
30-41	105	0	0.0	2	1.9	103	98.1	0	0.0
42-53	89	0	0.0	2	2.2	87	97.8	0	0.0
54-59	23	0	0.0	1	4.3	22	95.7	0	0.0

Total	426	0	0.0	24	5.6	402	94.4	0	0.0

Table 3.7: Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 424	**Boys** n = 220	**Girls** n = 204
Prevalence of underweight (<-2 z-score)	(52) 12.3 % (8.6 - 17.3 95% C.I.)	(23) 10.5 % (6.0 - 17.7 95% C.I.)	(29) 14.2 % (8.3 - 23.3 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(48) 11.3 % (7.9 - 16.0 95% C.I.)	(21) 9.5 % (5.6 - 15.9 95% C.I.)	(27) 13.2 % (7.6 - 21.9 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(4) 0.9 % (0.4 - 2.5 95% C.I.)	(2) 0.9 % (0.2 - 3.7 95% C.I.)	(2) 1.0 % (0.2 - 4.0 95% C.I.)

Table 3.8: Prevalence of underweight by age, based on weight-for-age z-scores

		Severe underweight (<-3 z-score)		**Moderate underweight (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	109	3	2.8	14	12.8	92	84.4	0	0.0
18-29	97	1	1.0	17	17.5	79	81.4	0	0.0
30-41	105	0	0.0	9	8.6	96	91.4	0	0.0
42-53	90	0	0.0	6	6.7	84	93.3	0	0.0
54-59	23	0	0.0	2	8.7	21	91.3	0	0.0
Total	424	4	0.9	48	11.3	372	87.7	0	0.0

Table 3.9: Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 399	**Boys** n = 211	**Girls** n = 188
Prevalence of stunting (<-2 z-score)	(16) 4.0 % (1.9 - 8.3 95% C.I.)	(6) 2.8 % (1.3 - 6.1 95% C.I.)	(10) 5.3 % (2.0 - 13.1 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(16) 4.0 % (1.9 - 8.3 95% C.I.)	(6) 2.8 % (1.3 - 6.1 95% C.I.)	(10) 5.3 % (2.0 - 13.1 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(0) 0.0 % (0.0 - 0.0 95% C.I.)	(0) 0.0 % (0.0 - 0.0 95% C.I.)	(0) 0.0 % (0.0 - 0.0 95% C.I.)

Table 3.10: Prevalence of stunting by age based on height-for-age z-scores

		Severe stunting (<-3 z-score)		**Moderate stunting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	106	0	0.0	3	2.8	103	97.2
18-29	88	0	0.0	3	3.4	85	96.6
30-41	95	0	0.0	5	5.3	90	94.7
42-53	87	0	0.0	3	3.4	84	96.6
54-59	23	0	0.0	2	8.7	21	91.3
Total	399	0	0.0	16	4.0	383	96.0

Table 3.11: Prevalence of overweight based on weight for height cut off's and by sex (no oedema)

	All n = 426	**Boys** n = 218	**Girls** n = 208
Prevalence of overweight (WHZ > 2)	(0) 0.0 % (0.0 - 0.0 95% C.I.)	(0) 0.0 % (0.0 - 0.0 95% C.I.)	(0) 0.0 % (0.0 - 0.0 95% C.I.)
Prevalence of severe overweight (WHZ > 3)	(0) 0.0 % (0.0 - 0.0 95% C.I.)	(0) 0.0 % (0.0 - 0.0 95% C.I.)	(0) 0.0 % (0.0 - 0.0 95% C.I.)

Table 3.12: Prevalence of overweight by age, based on weight for height (no oedema)

		Overweight (WHZ > 2)		Severe Overweight (WHZ > 3)	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**
6-17	109	0	0.0	0	0.0
18-29	100	0	0.0	0	0.0
30-41	105	0	0.0	0	0.0
42-53	89	0	0.0	0	0.0
54-59	23	0	0.0	0	0.0
Total	426	0	0.0	0	0.0

Table 3.13: Mean z-scores, Design Effects and excluded subjects

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	426	-0.97±0.87	1.73	0	2
Weight-for-Age	424	-0.76±1.03	1.73	0	4
Height-for-Age	399	0.12±1.22	2.16	0	29

* contains for WHZ and WAZ the children with edema.

Annex VII: Standardization Exercise Results

New Format

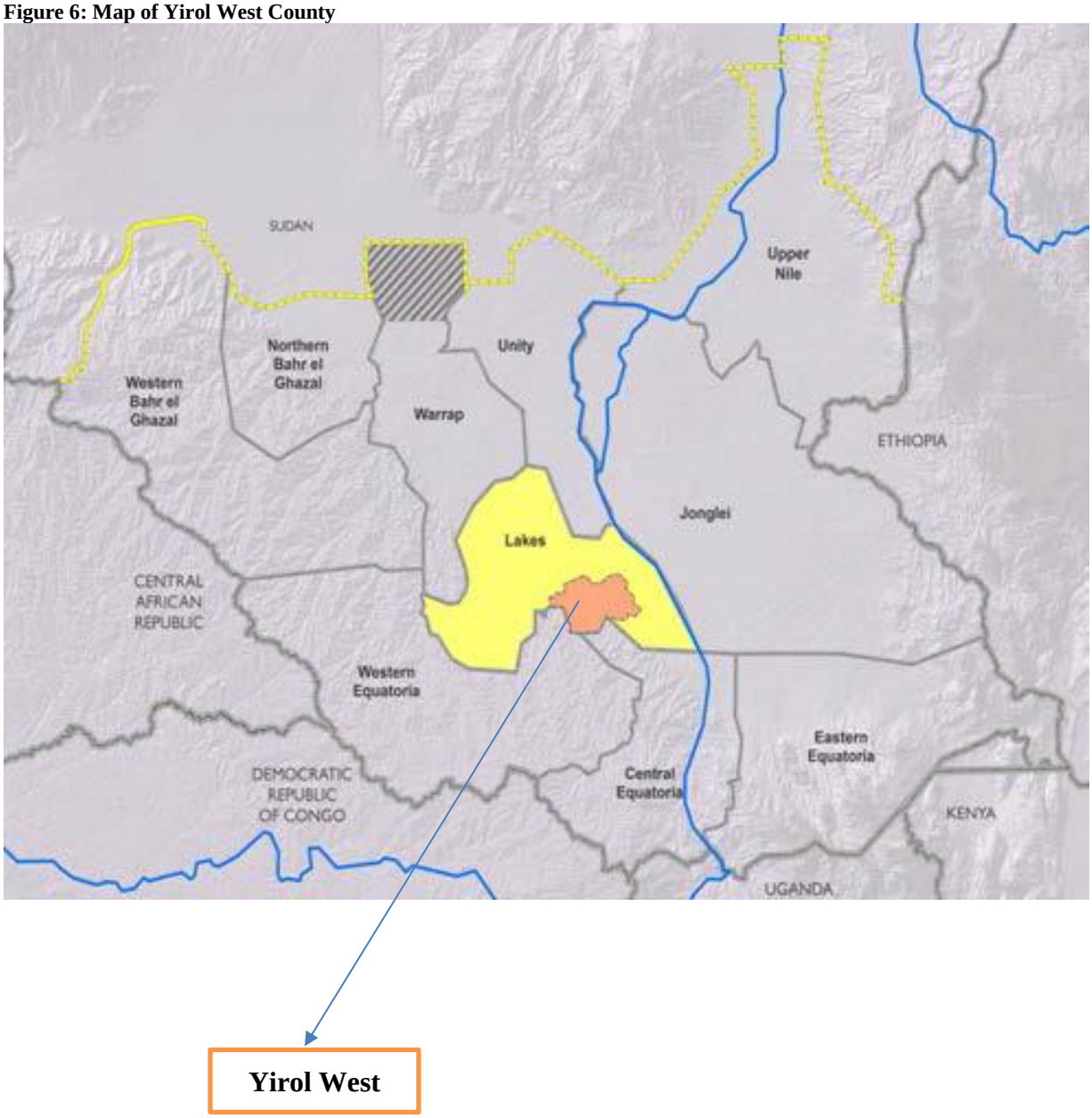
Standardization.xls

Old Format

Standardization Old Format.doc

Annex VIII: Map of Yirol West County

Figure 6: Map of Yirol West County



Annex IX: Summary of Indicators Resuls

Indicator	July 2015
Demographic	
Total No. of HHs Assessed for Anthropometry	308
Total number of Children assessed	428
Male	220
Female	208
Average Number of Persons per Household	8.7
Nutrition Status of Children 6 – 59 Months	
Global Acute Malnutrition (WHO 2006)	(50) 11.8 %(7.9 - 17.2 95% C.I.)
Male	(22) 10.1 %(6.4 - 15.5 95% C.I.)
Female	(28) 13.5 %(8.8 - 20.2 95% C.I.)
Severe Acute Malnutrition (WHO 2006)	(4) 0.9 %(0.2 - 4.5 95% C.I.)
Male	(3) 1.4 %(0.3 - 6.1 95% C.I.)
Female	(1) 0.5 %(0.1 - 3.5 95% C.I.)
Oedema	0%
Malnutrition by MUAC (<12.5 cm or oedema)	(20) 4.7 %(2.2 - 9.6 95% C.I.)
Male	(8) 3.6 %(1.5 - 8.5 95% C.I.)
Female	(12) 5.8 %(2.7 - 12.0 95% C.I.)
Malnutrition by MUAC (<11.5 cm or oedema)	(1) 0.2 %(0.0 - 1.9 95% C.I.)
Male	(0) 0.0 %(0.0 - 0.0 95% C.I.)
Female	(1) 0.5 %(0.1 - 3.7 95% C.I.)
Proportion of children Stunted (HAZ<-2)	(20) 5.1 %(3.1 - 8.4 95% C.I.)
Male	(11) 5.3% (2.8- 9.7 95% CI)
Female	(9) 4.9% (1.9-12.0 95% CI)
Proportion of children Underweight (WAZ<-2)	(32) 7.5 %(4.7 - 11.7 95% C.I.)
Male	(16) 7.3% (3.9-13.1 95% CI)
Female	(16) 7.7% (4.2-13.7 95% CI)
Children Morbidity	
Proportion of Children Sick 2 Weeks Preceding the Survey	52.8% (n=226)
Proportion of Children with Fever	69.5% (n=157)
Proportion of Children with Cough	11.9% (n=27)
Proportion of Children with Diarrhoea	13.7% (n=31)
Health Seeking Behaviour among the children sick 2 weeks prior	42.5% (n=96)
Vaccination Coverage	
Measles Coverage among Children 9 – 59 Months	42.8% (n=168)
Proportion of children aged 6-59 months supplemented with Vitamin A	37.4% (n=160)
Water and Sanitation	
Proportion of Households with Access to Safe Drinking Water	9.7% (n=30)
Proportion of households that treat drink water	34.1% (n=105)
Proportion of Households with Access to Toilet Facility	8.1% (n=25)
Proportion of Respondents Practising Proper Hand Washing at all Critical Times	23.4% (n=72)
Infant and Young Children Feeding Practices	
Proportion of Children Exclusively Breastfed	32.6% (n=15)
Early initiation to breast milk	89.9% (n=160)
Proportion of Children 6-23 months meeting the Minimum meal frequency	20.2% (n=36)
Proportion of children 6-23 months meeting the minimum dietary diversity	12.4% (n=22)
Continued Breastfeeding at 2 years	95.7% (n=22)
Continued Breastfeeding at 1 Year	97.0% (n=32)
Mortality Rates	
Crude Death Rate	0.29 (0.11 – 0.78)
Under-Five Mortality Rate	0.26 (0.03 – 1.99)