Post-Harvest Nutrition and Mortality SMART Survey

Preliminary report for Abyei Administrative Area, South Sudan

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Funded By

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List of Acronyms

CMR	Crude Mortality Rate
ENA	Emergency Nutrition Assessment
EPI	Expanded Program of Immunization
GAM	Global Acute Malnutrition
HH	Household
MUAC	Mid Upper Arm Circumference
NIWG	Nutrition Information Technical Working Group
rCSI	Reduced Coping strategy Index
HHHS	House Hold Hunger Scale
HDD	Household Dietary Diversity
PPS	Probability Proportionate to Size
SMART	Standard Monitoring and Assessment of Relief and Transition
IYCF	Infant and Young Children Feeding
U5MR	Under 5 Mortality Rate
WHO	World Health Organization
CHD	County Health Department
AAA	Abyei Administrative Area
BSFP	Blanket Supplementary Feeding Program
CBD	Community based distributors
RRC	Relief and Rehabilitation Commission

II. Executive summary

The Abyei Administrative Area (AAA) (formerly Abyei County) consists of five Payams Alal, Ameth Aguok, Majak and Rumameer. The main urban centre Abyei town is governed by the Abyei Mayor

The AAA is divided by two dominant culturally distinct groups: the agro-pastoralist Dinka-Ngok and the pastoral Misseriya. Conflict dynamics between the two groups are complex, with a number of different contributors. This includes issues rooted in livelihood patterns that require migrations through Dinka-Ngok territory by the Misseriya[1].

These tensions have been worsened by national politics that have made Abyei a contested area following the signing of the Comprehensive Peace Agreement in 2005 that would eventually lead to South Sudan's independence from Sudan in 2011.

Serious fighting in 2007 to 2008 in the area led to the displacement of up to 25,000[2] people from the central part of Abyei including Abyei town to areas south of river Kiir in Aguok and surrounding villages.

In 2016, there was multiple inter-communal security incidents between the communities and the Abyei population in need continued to move to Sudan due to economic hardships. Contributing factors included the closure of blanket food distribution for the Abyei community and IDPs in 2016, lack of adequate services including health and education and the impact of the July 2016 insurgency in Juba which aggravated already dire living conditions.

In the month of January 2017, cross-border movement trend tracking conducted by IOM indicated approximately 2,000 individuals or 1,200 households moving to Sudan to seek better health and education[3].

Save the Children (SCI) is operational in eight food distribution points in the county which function at providing essential nutrition services while six of the eight facilities have both health and nutrition services. Children under five with MAM and PLW are the primary target of the program. Adults with chronic illness and disability also are eligible for the Targeted Supplementary Feeding Programme (TSFP). Ready-to-Use Supplementary Food (RUSF) and blended CSB++ are distributed for children under five with MAM and PLW MAM respectively while MSF is running the stabilization centre in the Area

[1] IOM report 2007-2018
[2] IOM movement trend tracking, Abyei, January 2017
[3] IOM movement trend tracking, Abyei, January 2017

From date 3th to 11th February, 2018, 466 households in 43 randomly selected clusters/Villages in Abyei Administrative Area (AAA) were assessed. This report contains analysis of all indicators assessed in the survey (see Survey Objectives) nutrition anthropometric indicators were assessed among children aged 6-59 months, infant and young children feeding practices were collected from mothers with children Aged 0-23 months while demographic and food security and livelihood information were collected at Household Level.

The main goal of this survey was to determine the nutrition status of the population in Abyei Administrative Area (AAA)

This survey adopted a two stage cluster sampling using the SMART Methodology. The clusters were selected using probability proportional to population size (PPS) while the households were selected using the simple random sampling.

The survey was conducted in 43 clusters/villages; twelve households were sampled per cluster for this survey in all the five Payams. ENA for SMART software (July 9, 2015 version) was used to generate the sample size and the analyses of the anthropometry and mortality data

Table 1: Summary of key anthropometric and mortality findings:

Anthropometry

- 564 children were assessed, GAM prevalence was analysed based on 554 Children age 6-59 months, 10 children were excluded bases on SMART flags
- GAM prevalence was **17.7% (13.7-22.6 95% CI)** while SAM prevalence was **3.6% (2.2- 5.9 95% CI)** based on Weight-for-Height and/or presence of bilateral oedema.
- Prevalence of underweight was **29.6% (25.3-34.4 95% CI)** while Severe underweight was **7.5% (5.4-10.2 95% CI)**
- Prevalence of stunting was 23.4% at calculated SD of 1
- No case of oedema was identified

Mortality

- Crude death rate 0.75 (0.54↔1.05 95% C.I)
- Under 5 death rate was 1.18 (0.51↔2.70 95% C.I)

Causes of Death

According to the findings, illness contributed to 66.7% of the death cases while Traumatic and unknown death cases contributed to 16.7 % each

Summary findings have excluded extreme values (SMART Flags— +/- 3SD from the observed mean).

The prevalence of global acute malnutrition in Abyei Administrative Area based on the weight-for-height and/or oedema was 17.7[4] % (13.7 - 22.6 95% C.I.) which is classified as critical according to the WHO classification of global acute malnutrition. However there is a signification improvement (p=0.0018), compared to the last year's September 2017 GAM and SAM rate which was at 27.4 % (23.3↔31.9 95% C.I.) and **5.9 % (4.4↔7.9 95% C.I.)** respectively.

Comparing malnutrition by gender, the results showed that Boys are more malnourished than girls while by age, the 6-17months old are more severely wasted at 6.1% compared to the older age groups.

III. Possible reasons for the Improvement in the GAM and SAM rates

Apart from the improvement in the food security which is attributed to the fact that the survey was conducted in a post- harvest season,

- After the survey findings in September 2017, there was the formation of the save the children mobile team in the area which were able to do screening in the far to reach areas like Magar, Miyom ngok, Wunpeth, Athony and Mabok and made referrals of the malnourished children to the nearby facility and makes sure that these children's treatment is being monitored by the home health promoters in their respective facilities.
- There was formation and strengthening in the activities of home health promoters, they were involved in active case findings, follow up on defaulters and provide nutrition and health education to the households that they visit in the community. This is further supplemented by the activities of the MtMSGs which were able to provide and educate the mother with children under two year with better feeding practices and the nutrition information
- There is also an improvement in the care for the under- two children by their caregivers since it's a post-harvest period and most of the mothers have time for their children compared to during the busy cultivation season.

IV. Recommendations

GAM has improved compared to last year; but it's still classified as critical according to WHO classification of global acute malnutrition and there therefore, the following recommendations should be considered.

Nutrition

- SCI should therefore continue scaling up its nutrition and health programing in Abyei

[4] WHO Cut Off Points using Z-Score (-2 Z scores in populations: <5% - Acceptable; 5-9% - Poor;

area with much emphasis on decentralizing the program to the areas with no health and nutrition facilities as seen in the Map

- Save the children international should continue with and strengthen the activities of the mobile team to pocketed areas to detect cases early enough for treatment.
- Maintain and strengthen rehabilitation of acutely malnourished children through sustained active case finding, continued referrals and capacity building of the existing PHCU staff and the community health workers to manage acutely malnourished children. areas of Mading, kol luoth and Juol jok which have the highest number of malnutrition cases should be prioritized in MUAC screening
- The MAM rate is at **14.1% (10.9-18.1 95% CI)** which is classified as serious according to WHO thresholds, therefore; BSFP should be integrated into the ongoing program.

Maternal and Infant young child nutrition (MIYCN) and Health recommendations

Severe wasting for the children aged 6-17 months is at 6.1%, this is an indicator that the children under 2s are malnourished which is highly attributed to care and feeding practices, therefore the following should be considered

- SCI should scale up the MIYCN programing in the area through the MtMSGs and more emphasis on Behaviour change communications messages in the communities through the lead mothers.
- Mothers with children enrolled In the TSFP program should be targeted for nutrition education on recommended complementary feeding practices particularly minimum Acceptable diets, minimum meal frequency and minimum dietary diversity for their children during and after discharged from the program to Avoid cases of children relapsing due to inadequate/poor feeding practices at home.
- Disease surveillance in the Abyei County needs to be strengthened to detect the morbidity rates early enough and provide appropriate preventive measures.
- WFP should consider general food distribution to the most vulnerable population since the food security situation may worsen once the households exhaust their food stocks towards the start of the planting season and before the start of green harvest.

10-14% - Serious; >15% - Critical)

1.0 Introduction

The Abyei Administrative Area (AAA) is a territory of 10,546 km^2 bordering Sudan and South Sudan and disputed by the two countries. While the 2005 Comprehensive Peace Agreement mandated a referendum to determine Abyei's permanent status, the vote has yet to be held due to disputes over who qualifies to vote and composition of the Abyei Referendum Commission

The Abyei Administrative Area (AAA) (formerly Abyei County) consists of five Payams Alal, Ameth Aguok, Majak and Rumameer. The main urban centre Abyei town is governed by the Abyei Mayor

The AAA is divided by two dominant culturally distinct groups: the agro-pastoralist Dinka-Ngok and the pastoral Misseriya. Conflict dynamics between the two groups are complex, with a number of different contributors. This includes issues rooted in livelihood patterns that require migrations through Dinka-Ngok territory by the Misseriya[5].

Those tensions have been worsened by national politics that have made Abyei a contested area following the signing of the Comprehensive Peace Agreement in 2005 that would eventually lead to South Sudan's independence from Sudan in 2011.

Serious fighting in 2007 to 2008 in the area led to the displacement of up to 25,000[6] people from the central part of Abyei including Abyei town to areas south of river Kiir in Agok and surrounding villages.

In 2016, there is multiple inter-communal security incidents between the communities and the Abyei population in need continued to move to Sudan due to economic hardships. Contributing factors included the closure of blanket food distribution for the Abyei community and IDPs in 2016, lack of adequate services including health and education and the impact of the July 2016 insurgency in Juba which aggravated already dire living conditions. In the month of January 2017, cross-border movement trend tracking conducted by IOM indicated approximately 2,000 individuals or 1,200 households moving to Sudan to seek better health and education[7]

Save the Children (SCI) is operational in 8 food distribution points in the county which function at providing essential nutrition and health services. Children under five with MAM and PLW are the primary target of the program. Adults with chronic illness and disability also are eligible for the Targeted Supplementary Feeding Programme (TSFP). Ready-to-Use Supplementary Food (RUSF) and blended CSB++ are distributed for children under five with MAM and PLW MAM respectively while MSF is running the stabilization centre in the Area

[5] IOM report 2007-2018

[6] IOM movement trend tracking, Abyei, January 2017

1.1 Survey Justification

Save the Children conducted a nutrition survey in the former Abyei County in September 2017 which showed a critical nutrition situation with a GAM and SAM rates of **27.4 % (23.3↔31.9 95% C.I.)** and **5.9 % (4.4↔7.9 95% C.I.)** respectively.

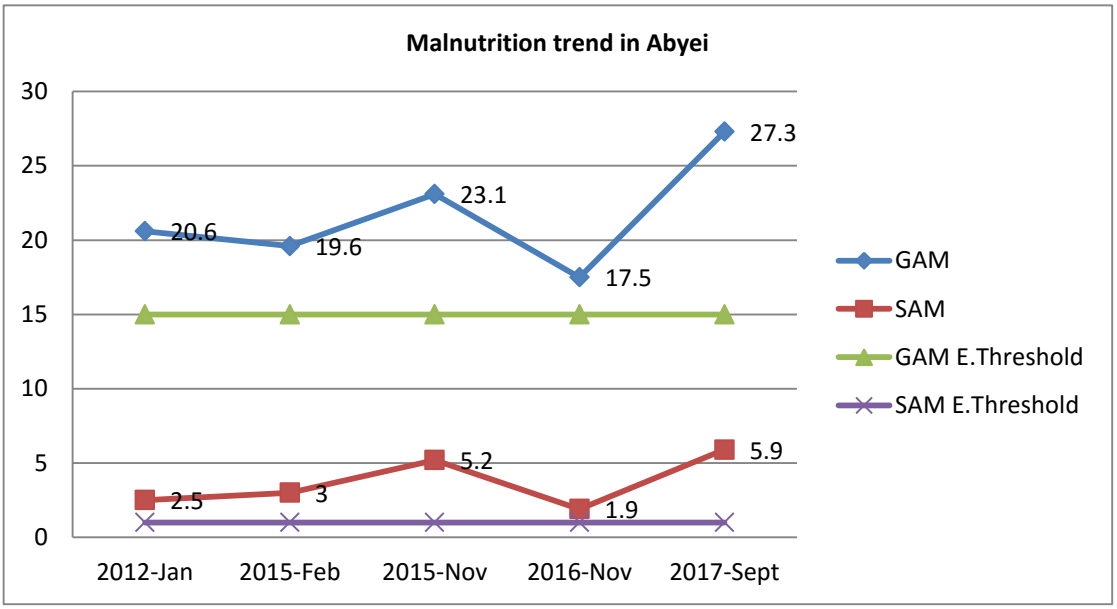

Figure 1: Malnutrition trend in Abyei Administrative Area

As part of monitoring the situation in the area with the currently ongoing interventions, the Results of this survey will provide up to date information on nutrition, mortality rates, child health status (morbidity, immunization and supplementation), food security and IYCF practices to be used to support evidence based decision making process and will further subsidize the National and County nutrition information system to inform future programming in the Area.

2.0 Survey Objectives

2.1 General Goal

The overall goal of the SMART survey was to determine the prevalence of acute malnutrition among children aged between 6-59 months in Abyei, and to estimate crude and under-five mortality rates in Abyei Administrative Area.

2.2 Specific Objectives

- To estimate the prevalence of acute malnutrition in children aged 6 to 59 months in Abyei Administrative Area

[7] IOM movement trend tracking, Abyei, January 2017

- To estimate retrospective Crude and under five Mortality Rates (CMR and U5MR) among the population and the under five children respectively in Abyei Administrative Area.
- To assess the morbidity of children 6-59 months and health seeking behavior of their caregivers in Abyei Administrative Area
- To assess Measles vaccination coverage for children aged 9-59 months, vitamin A supplementation in children aged 6-59 months, LLITN utilization and deworming coverage among children 12 to 59 months in Abyei Administrative Area
- To assess the infant and young child feeding practice as a proxy in Abyei Administrative Area.
- To assess the food security and livelihood situation in Abyei Administrative County
- To make recommendations based on the survey findings

2.3 Timing of the Survey

The Nutrition SMART Survey was conducted from 3th to 11th of Feb 2018 during the post-harvest season.

3.0 Survey methodology

The nutrition survey adopted a cross sectional household survey design using the two-stage cluster sampling based on the SMART methodology. The smallest geographical unit were considered as Clusters and where selected using probability proportional to population size (PPS) while a list of households was generated with the help of the community elders and households were selected using simple random sampling method.

3.1 Geographical target and population

The nutrition survey was carried out in all accessible Payams of the Abyei Administrative Area. No Payam was excluded from the assessment.

The study population for the anthropometric measurements were children aged 6 to 59 months while all households formed the population for retrospective mortality.

The study population for the infant and young child feeding practices were Care givers with children aged 0-23 months whereas all selected households' heads were interviewed to determine the food security situation in the area

3.2 Survey design

The survey was cross sectional study with two stage clusters sampling using SMART methodology. Clusters were selected using probability proportional to population size (PPS) and households were selected using simple random sampling.

3.3 Sample size for Anthropometry and mortality

Sample size for anthropometry and retrospective mortality was determined using Emergency Nutrition Assessment (ENA) for SMART software July 9th 2015 version.

Table 2: Anthropometry and Mortality Sample Size

Data Entered in the ENA	Anthropometry sample	Remark
Estimated prevalence	27.4 (23.3-31.9 95% CI)	The point prevalence for September 2017 Report of SCI SMART Survey in Abyei considered. Keeping in mind The trend of Malnutrition in Abyei, the point prevalence was therefore used.
Precision	4.5	SMART recommendation
Design effect	1.5	Default
Average household size	7.9	2017 September SMART survey, SCI
% under five	18.1	2017 September SMART survey, SCI
% non-response	3	Expected
Children to be included	616	
Households to be included	494	

Table 3: Mortality Sample Size

Data Entered in the ENA	Mortality Sample	Remark
Estimated prevalence	0.09	The point prevalence for crude mortality for September 2017 SMART Survey report in Abyei was used to determine the sample side.
Precision	0.12	SMART recommendation
Design effect	1.5	Default
Average household size	7.9	2017 September SMART survey report, SCI
% under five		2017 September SMART survey report, SCI
% non-response	3	Expected
Households to be included	507	
Recall Period	101	30-Oct-2017, Last day of Food distribution in Agok. (This was determined prior to data collection.
Population to be Included	3882	

Since anthropometry and mortality component give different sample sizes; the Mortality component with the highest household size (507 households) was used in order to obtain meaningful results and have enough children to study the infant and young child feeding indicators as a proxy of the wider practices

Table 4: Percent of households and children 6-59 months included in the survey

Number of HH planned	Number of HH surveyed	% surveyed /planned	Number of children 6-59 months planned	Number of children 6-59 months surveyed	% surveyed /planned
507	466	91.9	616	564	91.5

3.4 Number of Households per day:

The number of households to be completed per day was determined according to the time the team could spend on the field excluding transportation, other procedures and break times. The details below are taken into consideration when performing this calculation based on the given context:

1. Departure from office at 7:00 am and back at 5:00 pm.
2. Average travel time to reach each cluster and back: 2 hrs.
3. Duration for initial introduction and selection of households: 60 min.
4. Time spent to move from one household to the next: 10 min.
5. Average time in the household: 20 min.
6. Breaks: one lunch break of 1hr.

- ✓ 10 hours per day,
- ✓ wasted time= 2 hours traveling to and from the Cluster, 1 hour break and 60 minutes of introduction and selection gives a total wasted time of 240 minutes.
- ✓ Therefore, 600-240= 360minutes
- ✓ 360/30=12 (12 households per day)

The total number of households in the sample is then divided by the number of households to be completed in one day to determine the number of clusters to be included in the survey.

Total cluster =507/12= 42.25 (rounded off to 43 clusters)

3.5 Sampling procedure

3.5.1 First stage sampling- Selection of clusters

All villages in the County were considered as a cluster, the clusters will be selected based on probability proportionate to size (PPS). All villages of the County along with their respective populations were entered into ENA for SMART software July 9th 2015 version. The software automatically selected the number of clusters needed in the study.

3.5.2 Second stage sampling- Selection of households

Household definition: A household was defined as a group of people living under same roof and sharing food from the same cooking pot. In a home with multiple wives, those living and eating in different houses are considered as separate households. Wives living in different houses and eating from same pot were considered as one household.

Sample households were selected using simple random sampling as per the recommendation of SMART methodology[8]. This household selection method is preferred because it is objective, easy for monitoring and makes the process more transparent to the local community. Preliminary contacts with local village leader were made to prepare household lists in each village which is updated and used in sampling as sampling frame. Supervisors will use ENA generated random number table to select the households from the sampling frame (household list).

The survey team started data collection from any convenient household of the 12 randomly selected households to carry out anthropometry, mortality, FSL, and IYCF questionnaires. Household revisits were done to households in which eligible children (under five) or entire household members were found to be absent during the first attempt. No households were substituted.

3.6 Survey variables

3.6.1 Mortality

Retrospective mortality information was collected in all the selected households, including those without children aged 6-59 months.

Information was collected on the age and sex of the household members, the number of household members present within the recall period, the number of persons who arrived or left within the recall period, the number of births and deaths over the recall period and pregnancies during the recall period. The cause and location of death will also be captured. Individual mortality questionnaire will be used to collect data.

3.6.2 Anthropometrics

- Age: The main source for this information was the child's birth certificate. In the absence of this document, a local events calendar was used to estimate the age.
- Sex: Was recorded as either "f" for female or m for "male".

[8] www.SMARTmethodology.com

- Weight: Children's weight was taken without clothes using mother and child digital weighing scales (SECA scales).
- Height/length: Children were measured using the wooden UNICEF measuring boards (precision of 0.1cm). Children less than 24 months will be measured lying down, while those greater than or equal to 24 months will be measured standing up.
- Mid-upper arm circumference: MUAC measurement was taken at the mid-point of the left upper arm (precision of 0.1cm).
- Bilateral pitting oedema: This was assessed by the application of normal thumb pressure on both feet for 3 seconds. Occurrence of pitting oedema on both feet upon release of the fingers indicates nutritional oedema classified as severely malnourished.

3.6.3 Infant and Young Child Feeding

Infant and young child feeding practices were assessed based on the standard WHO recommendations (WHO, 2010) and the following indicators were collected

- Early initiation of breastfeeding (0-23 months)
- Exclusive breastfeeding under 6 months (0-5 months)
- Continued breastfeeding at 1 year of age (12-15 months)
- Introduction to solid/semi-solid/soft foods (6-8 months)
- Minimum dietary diversity (6-23 months)
- Minimum meal frequency (6-23 months)
- Minimum acceptable diet (6-23 months)
- Continued breastfeeding at 2 years of age 20-23 months

3.7 Case definitions and inclusion criteria

Age range of the children included in anthropometry survey: Weight loss among children aged 6–59 months is usually taken as a proxy indicator for the general health and well-being of the entire community. The nutrition survey included only children aged 6–59 months. Seasonal event calendar was developed to help determine age when it is difficult to find age documentation

Acute malnutrition/wasting: this is a measure of "thinness" due to rapid recent weight loss.

Global Acute Malnutrition (GAM): A population indicator that provides an aggregate of moderate and severe malnutrition, i.e. ≤-2 Z-scores and edema. GAM is divided into

moderate and severe acute malnutrition (GAM = MAM+SAM). Teams assessed GAM using weight for height and assessing edema.

Kwashiorkor - Bilateral pitting edema (nutritional edema) that is a clinical indicator for SAM. Edema is the excessive accumulation and abnormal infiltration of serous fluid in connective tissue or in a serious cavity. Classified into 3 grades; + *mild* (both feet, can include ankles), ++ *moderate* (Both feet, lower legs, hands or lower arms); +++ *severe* (generalized edema over whole body including arms and face). Each child in the selected household was assessed for edema by applying a thumb pressure and counting from 1001-1003.

Malnutrition - A state in which the physical function of an individual is impaired to the point where she/he can no longer maintain adequate bodily performance processes.

Marasmic-Kwashiorkor – A combination of both marasmus and kwashiorkor.

Marasmus - Severe weight loss and muscle mass leaving 'skin and bones'. Appearance can manifest as 'old man face' and 'baggy pants'.

Moderate Acute Malnutrition - Description of malnutrition level covering children 6-59 months with < -2 to ≥-3 z-scores and/or MUAC < 12.5 to 11.5 cm. Persons with MAM have higher morbidity and mortality risks.

MUAC – Low MUAC is an indicator for wasting. For a child 6-59 month, MUAC < 11.5 cm indicates severe wasting or SAM, MUAC 11.5 - < 12.5 cm indicates moderate wasting or MAM. MUAC is a better indicator of mortality risk associated with acute malnutrition than WFH. All children in the sample were measured their mid upper left arm. Also, mothers were measured.

Severe Acute Malnutrition (SAM): Description of malnutrition level covering children 6-59 months with < -3 z-scores, and/or MUAC < 11.5 cm, and/or bilateral pitting nutritional edema. Persons with SAM have higher morbidity and mortality risks. Survey teams have referred those children who were found to be SAM cases.

Standard Deviation (SD) or z-score: The deviation of the anthropometric value (weight, height, MUAC etc.) for an individual from the median value of the reference population.

Stunting or chronic under-nutrition: This is a form of under-nutrition that is defined by a height-for-age (HFA) z-score below two SDs of the median WHO standards. Stunting is a result of prolonged or repeated episodes of under-nutrition often starting before birth. This

type of under-nutrition is best addressed through preventative maternal health programmes aimed at pregnant women, infants, and children under age 2. Programme responses to stunting require longer-term planning and policy development.

Under-nutrition - Is a consequence of a deficiency in nutrient intake and/or absorption in the body. The different forms of under-nutrition that can appear isolated or in combination are acute malnutrition (bilateral pitting oedema and/or wasting), stunting, underweight (combined form of wasting and stunting), and micronutrient deficiencies.

Underweight - Underweight is a composite form of under-nutrition including elements of both stunting and wasting and is defined by a weight-for-age (WFA) z-score below -2 SDs of the median (WHO standards).

WHO Growth Standards (WHO GS 2006) - Developed using data collected in the WHO Multicentre Growth Reference Study in Brazil, Ghana, India, Norway, Oman, and the United States between 1997 and 2003 to generate new curves for assessing the growth and development of children from birth to five years of age under optimal environmental conditions.

Z-score - Indicates how far a measurement is from the median – also known as the standard deviation (SD) score. The reference lines on the growth charts (labelled 1, 2, 3, -1, -2, -3) are called **z-score lines**; they indicate how far the measurement is above or below the median (= z-score of 0).

Vitamin A supplementation: Vitamin A deficiency is associated with increased mortality, especially when children have low weight for height. WHO/UNICEF recommends that children living in the developing world in food insecure conditions should receive a vitamin A supplement twice a year Data of vitamin A supplementation was collected during the survey.

Morbidity: Questions about symptoms (usually diarrhea, fever and cough) were included. Case definitions were prepared for each illness.

For measles the definition was: 'any person in whom a clinician suspects measles infection or any person with fever, and maculopapular rash (i.e., non-vesicular), and cough, coryza (i.e., runny nose) or conjunctivitis (i.e., red eyes).

The definition of diarrhea for children over six months is three or more loose stools per day. Mothers were asked whether the child has suffered from these symptoms at any time during the past 14 days.

The results are presented based on WHO standards.

Acute Malnutrition/ Wasting Index: In this report, acute malnutrition (wasting) is estimated according to the Weight-for-Height (W/H) of each child and/or the presence of oedema. Weight-for-height expressed in z-score (WHZ) is calculated by comparing the anthropometric measurements of the sample to the WHO's 2006 standard population.

Acute malnutrition is defined as follows:

Table 5: Classification of malnutrition using WHZ score cut-off points

Classification	Criteria
Moderate acute malnutrition	-3 z-score ≤ W/H < –2 z-score (80% - 70% of the median) and/or Oedema
Severe acute malnutrition	W/H < –3 z-score (70% of the median) and/or Oedema

The weight for height index was used to quantify and qualify the prevalence of wasting in a population in emergency situations, where acute forms of malnutrition are the predominant pattern. However, the Mid-Upper Arm Circumference (MUAC) is a useful tool for rapid screening of children and detection of those who are at high risk of death.

The table below summarizes the classification of malnutrition using MUAC according to latest WHO recommendations and SPHERE standards[9] for children over 6 months of age.

Table 6: Classification of malnutrition using MUAC cut-off points

MUAC in mm	Classification
≥135mm	Well nourished
125 – 134 mm	At risk of malnutrition
115 – 124 mm	moderate acute malnutrition
< 115 mm	severe acute malnutrition

Chronic Malnutrition/Stunting Index: The height-for-age (H/A) index provides an indication of the nutritional history of a child rather than solely his/ her current nutritional status. This indicator is used to identify chronic malnutrition or stunting.

The same principle is used as for weight-for-height: the child's chronic nutritional status is interpreted by comparing its H/A ratio with WHO standards height-for-age curves. As for

the weight-for-height index, the height-for-age index as a z-score (HAZ) was calculated according to WHO standard data and the following H/A cut-off points were applied:

Table 7: Classification of Stunting using H/A Z-score cut-off points

Classification	Criteria
No stunting	H/A ≥ -2 z-score
Moderate stunting	-3 z-score ≤ H/A < -2 z-score
Severe stunting	H/A < -3 z-score

Underweight: The weight-for-age index (W/A) was used to indicate whether a child is underweight. As a composite index of malnutrition, it highlights the presence of wasting, stunting or both. Underweight children are at greater risk of mortality[10]. As for the above-mentioned indices, the weight-for-age index as a z-score (WAZ) was calculated according to WHO standard data and the following cut-off points:

Table 8: Classification of underweight using W/A Z-score cut-off points

Classification	Criteria
No underweight	W/A ≥ -2 z-score
Moderate underweight	-3 z-score ≤ W/A < -2 z-score
Severe underweight	W/A < -3 z-score

Immunization and supplementation: WHO recommends that 90% of children aged from 9 to 59 months should be vaccinated against measles, to ensure effective epidemic prevention. Improving case-based management and treatment with vitamin A forms part of the measles eradication strategy, and national guidelines follow the advice for countries with vitamin A deficiency problems for high-dose vitamin A supplementation every four to six months for all children aged 6-59 months.

3.8 Questionnaire, training, survey teams, supervision

Questionnaire

Four questionnaires were used in the survey, i.e. the anthropometry Questionnaire, mortality Questionnaire, Infant and Young Child Feeding (IYCF) questionnaire and the Food Security

[9] The SPHERE project, 2011
[10] WHO. 2010. Background paper 4 nutrition indicators.

and Livelihood Questionnaire. The content of these questionnaires were based on model questionnaires developed by the SMART initiative and contextualized by NIWG.

Prior to the data collection, the questionnaires were pre-tested in one of the none-selected villages before the actual survey

Training

The training was conducted by SCI Nutrition Survey officer. The training covered the general survey objectives, overview of survey design, household selection procedures, anthropometric measurements, signs and symptoms of malnutrition, data collection and interview skills, mortality, IYCF and FSL interview techniques.

The training was for duration of five days this included; standardization test were the enumerators measured ten children twice on the fourth day of the training. The fifth day of training was devoted for a field exercise (Pre-test) in one of the none-selected village before the actual survey.

Survey teams

Six teams of four members each; (one supervisor, one team leader and two enumerators) were used to collect the data. These teams included four RRC staffs, two from County health department and the save the children nutrition and survey officers that forms the supervision team, while the team leaders and data collectors comprises of well experienced people from previous surveys and with some nutrition and health background.

Field supervision

The team leaders were responsible for the overall quality of activities and teams performance. Additionally, four supervisors from RRC and County health department including SCI staff from the survey team supervised the team throughout the data collection.

Data entry and analysis

Mortality data entry and analysis was done in ENA for SMART (July 9th, 2015 version). The other components like Anthropometry, FSL and IYCF were collected using ODK collect App version 1.11.1 and downloaded from KoBo Toolbox in the XLS format and analysis was done using Epi Info (Version 3.5.4). Anthropometry data was analyzed using ENA for SMART (July 9th, 2015 version). The outliers in anthropometry data were excluded based on ±3 SD of WHZ from the observed WHZ mean.

4.0 Results

4.1 Anthropometric results (based on WHO standards 2006):

Global acute malnutrition is defined as <-2 z scores weight-for-height and/or oedema while severe acute malnutrition is defined as <-3z scores weight-for-height and/or oedema)

Exclusion of z-scores from Observed mean SMART flags: WHZ -3 to 3; HAZ -3 to 3; WAZ -3 to 3

As revealed in the table above, the overall sex ratio was found to be 1.2 which falls within the acceptable range between 0.8 and 1.2. This implies that the survey was unbiased for gender.

Table 9: Distribution of age and sex of sample

	Boys		Girls		Total		Ratio
AGE (mo)	**no.**	%	**no.**	%	**no.**	%	**Boy:girl**
6-17	68	58.6	48	41.4	116	20.6	1.4
18-29	73	55.3	59	44.7	132	23.4	1.2
30-41	71	56.3	55	43.7	126	22.3	1.3
42-53	57	48.7	60	51.3	117	20.7	0.9
54-59	40	54.8	33	45.2	73	12.9	1.2
Total	309	54.8	255	45.2	564	100.0	1.2

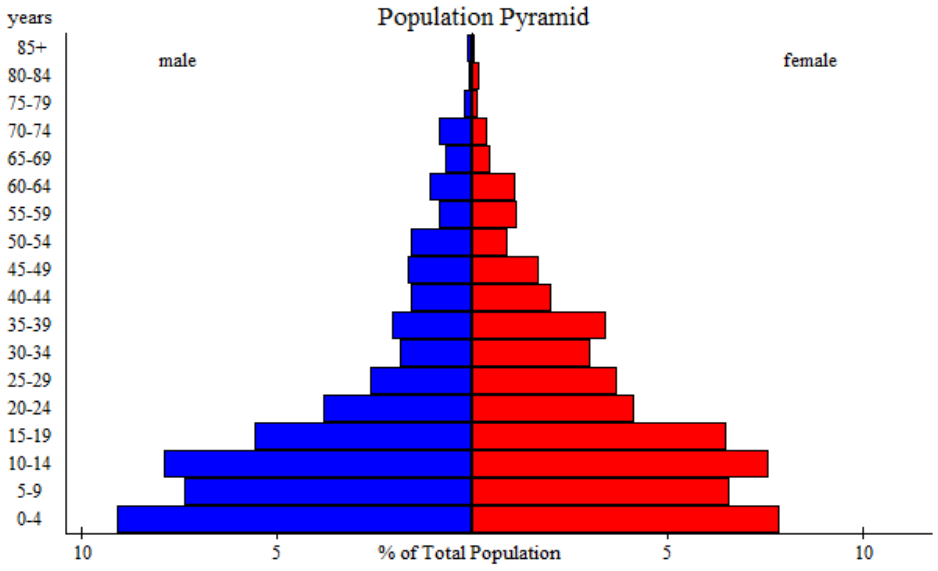

Figure 2: Population age and sex pyramid

Table 10: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All n = 554	**Boys** n = 301	**Girls** n = 253
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(98) 17.7 % (13.7 - 22.6 95% C.I.)	(57) 18.9 % (14.1 - 24.9 95% C.I.)	(41) 16.2 % (11.6 - 22.2 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(78) 14.1 % (10.9 - 18.1 95% C.I.)	(48) 15.9 % (11.7 - 21.4 95% C.I.)	(30) 11.9 % (8.3 - 16.6 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(20) 3.6 % (2.2 - 5.9 95% C.I.)	(9) 3.0 % (1.5 - 5.9 95% C.I.)	(11) 4.3 % (2.3 - 8.1 95% C.I.)

The prevalence of oedema is 0.0 %

The prevalence of global acute malnutrition in Abyei Administrative Area based on the weight-for-height and/or oedema was 17.7[11] % (13.7 - 22.6 95% C.I.) which is classified as critical according to the WHO classification of global acute malnutrition. However there is a significant improvement compared to the last year's September 2017 GAM and SAM rate which was at 27.4 % (23.3↔31.9 95% C.I.) and 5.9 %, respectively.

Comparing malnutrition by gender, the results showed that Boys are more malnourished than girls

Table 11: 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	115	7	6.1	13	11.3	95	82.6	0	0.0
18-29	128	3	2.3	14	10.9	111	86.7	0	0.0
30-41	123	1	0.8	16	13.0	106	86.2	0	0.0
42-53	116	7	6.0	20	17.2	89	76.7	0	0.0
54-59	72	2	2.8	15	20.8	55	76.4	0	0.0
Total	554	20	3.6	78	14.1	456	82.3	0	0.0

From the table above, the age group 6-17 months are mostly severly malnurished according to the findings at 6.1%, this group is the most valnurable to malnutrition if they are subjected to inadequate care and poor feeding practices in the community.

Equally according to the findings, the older age group of 54-59 months old are the most moderately malnurished at 20.8%.

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

Table 12: 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. 25 (4.4 %)	Not severely malnourished No. 539 (95.6 %)

Table 13: prevalence of acute malnutrition based on MUAC cut off's (and/or oedema) and by sex

	All n = 564	**Boys** n = 309	**Girls** n = 255
Prevalence of global malnutrition (< 125 mm and/or oedema)	(23) 4.1 % (2.5 - 6.6 95% C.I.)	(7) 2.3 % (1.0 - 5.0 95% C.I.)	(16) 6.3 % (3.7 - 10.5 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(20) 3.5 % (2.1 - 5.9 95% C.I.)	(6) 1.9 % (0.8 - 4.6 95% C.I.)	(14) 5.5 % (3.2 - 9.2 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(3) 0.5 % (0.2 - 1.7 95% C.I.)	(1) 0.3 % (0.0 - 2.5 95% C.I.)	(2) 0.8 % (0.2 - 3.1 95% C.I.)

The prevalence of global acute malnutrition based on MUAC (<125 mm) and/or oedema which was 4.1 % (2.5 - 6.6 95% C.I.) and of severe acute malnutrition (MUAC<115 mm and/or oedema) was 0.5 % (0.2 - 1.7 95% C.I.), this show a very significant improvement in the malnutrition level by MUAC compared to last year's GAM by MUAC of 10.5% (8.0-13.7) and SAM by MUAC of 2% (1.1-3.6)

Table 14: 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	116	3	2.6	7	6.0	106	91.4	0	0.0
18-29	132	0	0.0	8	6.1	124	93.9	0	0.0
30-41	126	0	0.0	5	4.0	121	96.0	0	0.0
42-53	117	0	0.0	0	0.0	117	100.0	0	0.0
54-59	73	0	0.0	0	0.0	73	100.0	0	0.0
Total	564	3	0.5	20	3.5	541	95.9	0	0.0

Looking a acute wasting based on MUAC by Age, the 6-17 months old chidren are still the most severly malnurished compared to the other age groups at 2.6%. in comparison to last year findings, there is an improvement in the 6-17 months from 3.4% to 2.6%. but there is still more needed in terms of scaling up of the MtMSGs activities in the area to help better educate the PLWs in iterms of better complementary feeding and care practises for the under 2s children.

Table 15: Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 560	**Boys** n = 306	**Girls** n = 254
Prevalence of underweight (<-2 z-score)	(166) 29.6 % (25.3 - 34.4 95% C.I.)	(93) 30.4 % (24.8 - 36.6 95% C.I.)	(73) 28.7 % (23.1 - 35.1 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(124) 22.1 % (18.5 - 26.3 95% C.I.)	(67) 21.9 % (17.6 - 26.9 95% C.I.)	(57) 22.4 % (17.7 - 28.1 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(42) 7.5 % (5.4 - 10.2 95% C.I.)	(26) 8.5 % (5.6 - 12.8 95% C.I.)	(16) 6.3 % (3.8 - 10.2 95% C.I.)

Table 16: 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	114	3	2.6	17	14.9	94	82.5	0	0.0
18-29	131	7	5.3	26	19.8	98	74.8	0	0.0
30-41	125	14	11.2	29	23.2	82	65.6	0	0.0
42-53	117	6	5.1	30	25.6	81	69.2	0	0.0
54-59	73	12	16.4	22	30.1	39	53.4	0	0.0
Total	560	42	7.5	124	22.1	394	70.4	0	0.0

The mean Z scores for wasting (WHZ), underweight (WAZ) and stunting (HAZ) were; 1.12±1.00, -1.49±1.02 and -1.27±1.25 respectively, all indicating a poorer nutrition situation compared to WHO reference population. The standard deviations for WHZ and WAZ were within the acceptable range of 0.8-1.2 while stunting was reported based on calculated SD of 1 since mean Z scores is out of the range of 0.8-1.2 as shown on table below.

Table 17: 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	554	-1.12±1.00	1.84	0	10
Weight-for-Age	560	-1.49±1.02	1.39	0	4
Height-for-Age	538	-1.27±1.25	1.61	0	26

* contains for WHZ and WAZ the children with oedema.

4.2 Mortality results (retrospective over 3 months/101 days prior to interview)

Mortality data was collected using the mortality individual questionnaire, summary of results are summarized in Table Below

Table 18: Mortality rates in Abyei administrative area

Parameters for Mortality	% Results (CI 95%)
CMR (deaths per 10 000/day	0.75 (0.54-1.05)
U5MR (deaths in children <5/10 000/day	1.18 (0.51-2.70)
Persons recorded within recall period	3945
Current residents <5 years old	668.5
Percentage of <5 years old	18.9
Average HH Size	8.3
Total deaths during the recall period	30
Total deaths during the recall period <5 years old	8
Recall Period (days)	101 days (30th October, food distribution in Agok)
Households included	466

Causes and Locations of death			
Causes of death		**Location of death**	
Unknown	16.7	In current location	80
Injury/Traumatic	16.7	During migration	6.7
Illness	66.7	In place of last residence	10
		Other	3.3

The crude death rate in the Abyei County was found to be 0.75[12] (0.54-1.05) which is considered low while the under-five mortality rate for the area was 1.18 (0.51-2.70) which has significantly deteriorated compared to September 2017 survey findings. The leading cause of mortality in Abyei was Illness which contributed to 66.7 % of the total deaths; other causes of deaths in the County included traumatic deaths at 16.7%, and unknown case of drowning 16.7%.

The security situation in the Abyei Area is generally calm despite a few criminal incidents along roads that lead in and out of Abyei; this is partly responsible for some of the traumatic deaths and coupled with intercommunal conflicts in and around the area.

Table 19: Prevalence of Malaria, severe malaria, Pneumonia and Diarrhoea cases for the Under 5s in the past four months in the Abyei

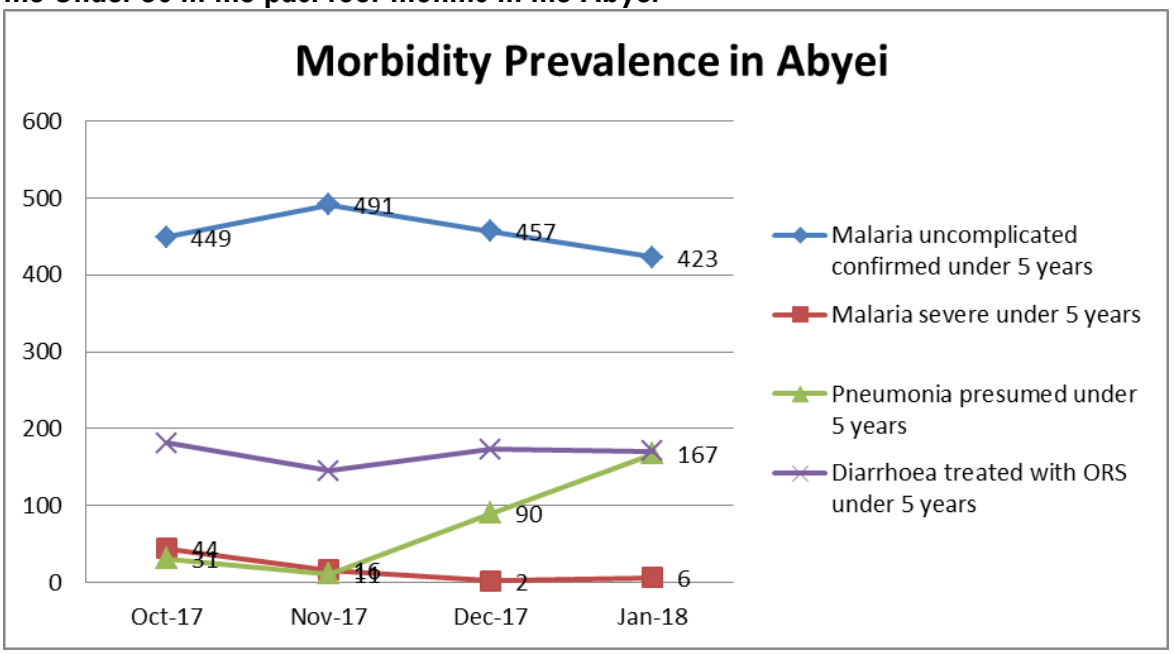

Figure 3: Prevalence of Malaria, severe malaria, Pneumonia and Diarrhoea cases for the Under 5s in the past four months in the Abyei[13]

A child's risk of dying is highest in the first 28 days of life (the neonatal period). Improving the quality of antenatal care, care at the time of childbirth, and postnatal care for mothers and their new-borns are all essential to prevent these deaths[14]. While From the end of the neonatal period and through the first 5 years of life, the main causes of death are pneumonia, diarrhoea and malaria. Malnutrition is the underlying contributing factor, making children more vulnerable to severe diseases[15].

[12] WHO Cut-offs: <2 – Low; 2 <4 – Medium; 4 and above - Emergency
[13] *Source of figure3: Monthly DHIS data*
[14] *www.who.int/mediacentre/factsheets/fs178/en/*
[15] www.who.int/mediacentre/factsheets/fs178/en/

From the findings, October and November witnessed an increase in the number of uncomplicated confirmed malaria cases in the area. While from November to January, the Pneumonia cases have been increasing in the area.

Being among the main child killers in sub-Saharan Africa, this trend reveals a serious health concern for the under 5s and could be mainly responsible for the high under five death rates in the area in the past three month prior to the survey.

5.0 Additional Variable

5.1 Children's morbidity

Table 20: Prevalence of reported illness in children in the two weeks prior to interview

Parameter	N	n	Percentage	95% CI
Illness	564	336	59.6	55.4-63.6

Illness is one of the immediate causes of malnutrition in children, according to the survey findings, two weeks prior to the survey period. 59.6 of the children aged 6-59 months reported to have fallen ill.

Table 21: Symptom breakdown in the ill children in the two weeks prior to interview

Type of illness	N	n	Percentage	95% CI
Fever	336	253	75.3	70.3-79.8
Cough	336	218	64.9	59.5-70.0
Diarrhoea	336	119	35.4	30.4-40.8
Other	336	65	19.3	15.3-24.1

Based on the symptom breakdown reported by the caregivers, fever was among the most prevalent symptom at 75.3 % while cough and diarrhoea was at 64.9% and 35.4% respectively.

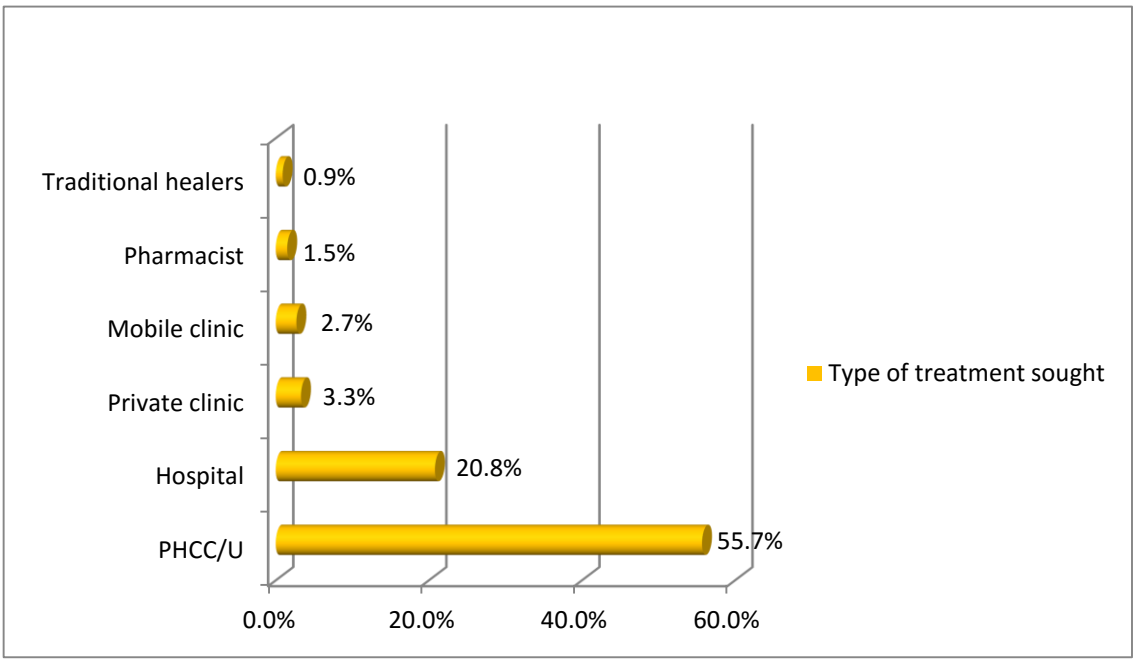

Figure 4: treatment sough

As reported by the care givers, out of the 59.6% who felt sick within the past 14 days prior to the survey, 55.7% of the population sought treatment at the PHCC/U which could be due to easy accessibility compared to the county hospital which represents only 20.8 % of the treatment sought.

Table 22: Vitamin A supplementation, measles vaccination deworming and mosquito net use

Indicator	N	n	%	(95% CI)
Mosquito Net use , 6-59 m	564	455	78.9	75.3-82.1
Vitamin A, 6-59 m	564	477	84.6	81.3-87.4
Measles with EPI card (9-59 m)	527	218	41.4	37.1-45.7
Measles recall (9-59 m)		220	41.7	37.5-46.1
Dewormed (12-59 m)	505	377	64.8	60.4-68.9

5.2 Infant and Young Child Feeding Practices

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

Table 23: IYCF indicators for 2018 February in comparison to September 2017

		February 2018			September 2017	
Indicator	**N**	**n**	**%**	**95% C.I**	**%**	**95% C.I**
Exclusive Breastfeeding 0↔5 months	73	54	74.0	62.4-83.5	76.1	64.5↔85.4
Early initiation of breastfeeding 0↔23 months within one hour of birth	239	183	76.6	70.7-81.8	88.7	84.4↔92.1
Complementary feeding 6↔8 months	36	10	27.8	14.2-45.2		
Continued breastfeeding at one year of age 12↔15 months	22	22	100		93.3	81.7↔98.6
Minimum dietary diversity 6↔23 months	166	44	26.5	20.0-33.9	27.0	21.1↔33.5
Minimal meal frequecy for aged 6↔23 months	166	23	13.9	9.0-20.1	12.8	8.6↔18.1
Minimal acceptable diet 6↔23 months	166	10	6.0	2.9-10.8	4.3	2.0↔7.9
Continued breastfeeding at 2 years for 20↔23 months	39	24	61.5	44.6-76.6	68.9	53.4↔81.4

5.3 Food security and Livelihood

5.3.1 House hold Dietary Diversity

Household dietary diversity is an indicator which looks at the number of unique foods consumed by household members over a given period. A 24 hour recall period was used to determine the acceptable dietary intake of the households members whether within or outside home, According to the findings, 49.2% of the households' are classified to have eaten at least from six food groups which is considered a high dietary diversity while 31.4% of the households reported to have eaten at most from three food groups which is considered a low dietary diversity intake.

Table 24: HDD indicators (N=455)

Household Dietary Diversity	**n**	**%**	**95% C.I**
Low Diversity Groups (<=3 food groups)	143	31.4	27.2- 35.9
Medium Diversity Groups (4-5 food groups)	88	19.3	15.9- 23.3
High Diversity Groups (>=6 food groups)	224	49.2	44.6- 53.9

5.3.2 Household Hunger Scale

This scale is a food deprivation scale used to determine how food insecure households are in the past 30 days; according to the findings 1.5% of the households reported a severe hunger situation in the past 4 weeks while most of the households 58.9% are in a moderate hunger threshold in the County

Table 25: HHHS Indicators (N=455)

Household Hunger Score	N	%	95%C.I
Little or no hunger (0 to 1)	180	39.6	35.1- 44.2
Moderate hunger (2 to 3)	268	58.9	54.2- 63.4
Severe hunger (4 to 6)	7	1.5	0.7- 3.3

5.3.3 Reduced Coping strategies

Table 26: rCSI indicators (N=455)

Reduced Copying Strategy index (rCSI)	N	%	95% C.I
Food secure/mildly food insecure (rCSI, 0 – 4)	65	14.3	11.3 - 17.9
Moderately food insecure (rCSI, 5 – 20)	208	47.7	41.1 - 50.4
Severely food insecure (rCSI, > 21)	182	40.0	35.5 - 44.7

5.4 Programme coverage

Save the Children (SCI) is operational in 8 food distribution points in the county which function at providing essential nutrition and health services. Children under five with MAM and PLW are the primary target of the program. Seven of the eight distribution facilities are located in the south sector of Abyei as seen in the map below

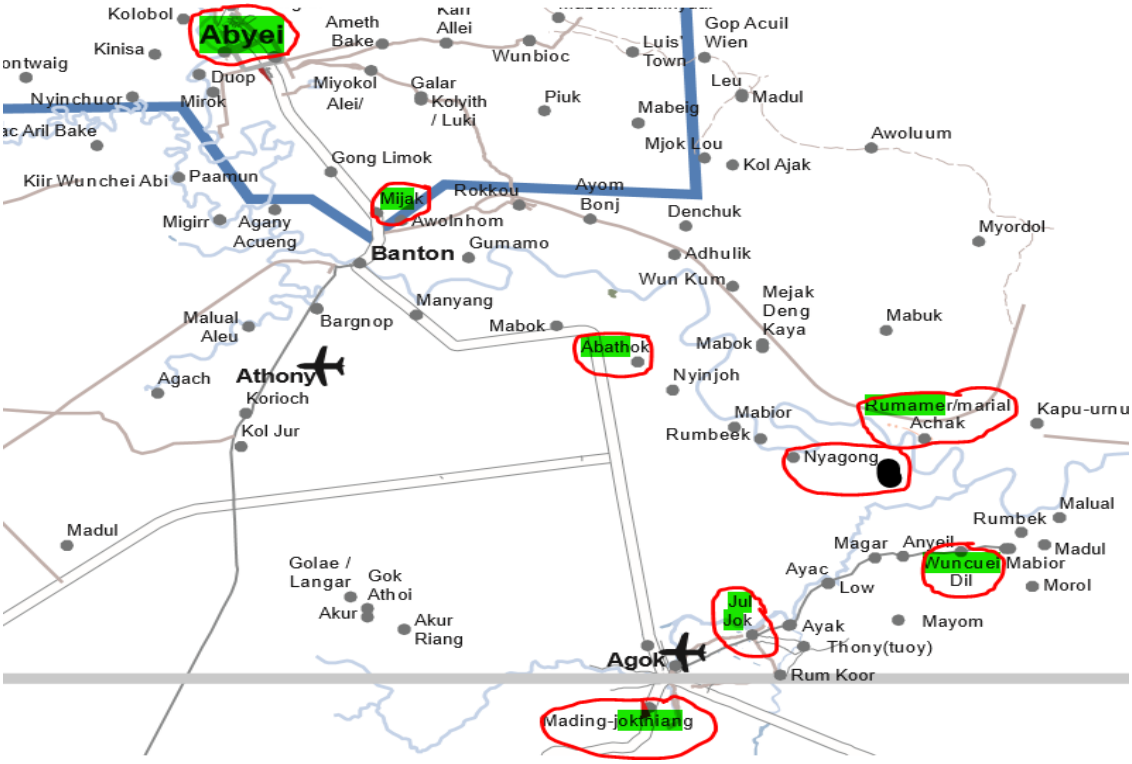

Figure 5: Map showing the location and distribution of the eight facilities supported by save the children
Source: Abyei Region IOM Reference Map 13 April 2016

The Abyei region is divided into three sectors, the Sector South, centre Sector and Sector North. Looking at the map, the seven of the eight facilities which save the children operates in are in the south sector with only one in the centre sector. And in the southern sector most of the facilities are more to the east of the south sector than the west, this is partly the reason why according to the survey findings, coverage seems to be a major concern which results in cases of malnutrition being in pocketed areas according to the poison distribution.

According to the January 2018 facility based nutrition report, the program has increased rate of admissions in certain areas of Ganga, Juljok and Mading were most of IDP communities have settled, this results however correlates with the of number of cases found in the survey; Areas of Mading, kol luoth and Juol jok have the highest number of malnutrition cases.

6.0 Discussion

6.1 Anthropometry

Survey 1						
Total Sample Size		Prevalence	Design Effect	Number of Clusters	Estimated Variance	
n1		p1	Deff1	C1	$s1^2$	se
702		27.40%	1.53	42	0.000434	0.020822
Survey 2						
Total Sample Size		Prevalence	Design Effect	Number of Clusters	Estimated Variance	
n2		p2	Deff2	C2	$s2^2$	se
564		17.70%	1.84	43	0.000475	0.0218
p1-p2	Pooled Variance	t	p	DF	2 sided	1 sided
9.70%	3.01%	3.22	0.0018	83	99.8%	99.9%

When comparing the GAM rates of September 2017 and February 2018, the results show that the situation has improved from **27.4 % (23.3-31.9 95% C.I)** in 2017 September to **17.7 % (13.7↔22.6 95% C.I.)** in February 2018. This is a very significant improvement in the nutrition situation in the county (p=0.0018), though the GAM prevalence remains to be at a critical level according the WHO thresholds.

6.2 Mortality

Generally, many of the diseases that kill children younger than 5-years-old are caused by lack/limited access to healthcare facilities, no enough food and low levels of education and information

The results show deterioration in both crude and under-five mortality rate. This could be mainly related to the high morbidity burden in the area. According to some households that reported cases of deaths of the under- one year old, they highly attributed it to fever and convulsing experienced by their children which resulted in dead cases. Most of the deaths occurred in the communities as a result of poor health seeking behaviour.

6.3 Infant and Young Child feeding

Adequate nutrition during infancy and early childhood is essential to ensure the growth, health, and development of children to their full potential. Poor nutrition increases the risk

of illness; the first two years of life provide a critical window of opportunity for ensuring children's appropriate growth and development through optimal feeding[16]

In regard to the infant and young child feeding practices findings, it shows that there was an improvement in practices on child's feeding by mothers. This is mainly witnessed by the improvement in minimum meal frequency, minimum acceptable diet and continued breastfeeding at one year; this could mainly be attributed to the scale up in the Mother to Mother support group's (MtMSGs) activities in the area. However, some practices still continue to be poor, this requires a much more strengthening in behaviour change communications to help educate the mothers on better feeding practices through the MtMSGs which will help reduce the malnutrition in the under-twos children which is directly related to feeding and care practices.

6.4 Food security

Food insecurity in South Sudan in general has been an increasing worry in recent years since the eruption of the conflict and coupled by the worsening economic crisis causing hyperinflation and thus making many urban and rural households vulnerable to food insecurity and malnutrition. For the rural households, insecurity has been the major disrupter of livelihoods in many parts of the country;

This assessment looked at the food security situation in terms of household hunger scale in Abyei and found out that food insecurity is a major concern. According to the findings 1.5% of the households reported a severe hunger situation in the past 4 weeks while most of the households 58.9% are in a moderate hunger threshold in the County. This food security situation has however improved compared to the September 2017 findings; this is majorly because it's a post-harvest season and majority of the households still have food stocks from the recent harvest. This has also been witnessed by the slight drop in malnutrition; this situation is however expected to deteriorate as households' exhausts their food stock which is also expected to cause deterioration in the malnutrition levels towards the lean period.

[16] World Bank, Repositioning nutrition as central to development: a strategy for large scale action. Washington DC: The World Bank; 2006

7.0 Recommendations

7.1 Nutrition

- SCI should therefore continue scaling up its nutrition and health programing in Abyei area with much emphasis on decentralizing the program to the areas with no health and nutrition facilities as seen in the Map
- Save the children international should continue with and strengthen the activities of the mobile team to pocketed areas to detect cases early enough for treatment.
- Maintain and strengthen rehabilitation of acutely malnourished children through sustained active case finding, continued referrals and capacity building of the existing PHCU staff and the community health workers to manage acutely malnourished children. areas of Mading, kol luoth and Juol jok which have the highest number of malnutrition cases should be prioritized in MUAC screening
- The MAM rate is at **14.1% (10.9-18.1 95% CI)** which is classified as serious according to WHO thresholds, therefore; BSFP should be integrated into the ongoing program.

Maternal and Infant young child nutrition (MIYCN) and Health recommendations

Severe wasting for the children aged 6-17 months is at 6.1%, this is an indicator that the children under 2s are malnourished which is highly attributed to care and feeding practices, therefore the following should be considered

- SCI should scale up the MIYCN programing in the area through the MtMSGs and more emphasis on Behaviour change communications messages in the communities through the lead mothers.
- Mothers with children enrolled In the TSFP program should be targeted for nutrition education on recommended complementary feeding practices particularly minimum Acceptable diets, minimum meal frequency and minimum dietary diversity for their children during and after discharged from the program to Avoid cases of children relapsing due to inadequate/poor feeding practices at home.
- Disease surveillance in the Abyei County needs to be strengthened to detect the morbidity rates early enough and provide appropriate preventive measures.
- WFP should consider general food distribution to the most vulnerable population since the food security situation may worsen once the households exhaust their food stocks towards the start of the planting season and before the start of green harvest.

8.0 Annexes

8.1 Plausibility check for: SSD_201802_AAA_SCI.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** (1.8 %)
Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**4** (p=0.023)
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=0.347)
Dig pref score - weight	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (4)
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** (4)
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** (1.00)
Skewness WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (-0.01)
Kurtosis WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (0.18)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<=0.001	
			0	1	3	5	**5** (p=0.000)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	**9** %
The overall score of this survey is 9 %, this is excellent.							

8.2 Local Events Calendar for AAA (Feb-2018 Pre-Harvest SMART survey

	2013	2014	2015	2016	2017	2018
January		**49** New year Movement of cattle to water areas	**37** New year Movement of cattle to water areas	**25** New year Movement of cattle to water areas	**13** New year Movement of cattle to water areas	**1** New year Movement of cattle to water areas Reception of new governor
February		**48**	**36**	**24**	**12**	**0**
March	**59** End of land preparation	**47** End of land preparation	**35** End of land preparation	**23** End of land preparation	**11** End of land preparation	End of land preparation
April	**58** Easter holidays Beginning of cultivation/plating Beginning of rain	**46** Easter holidays Beginning of cultivation/plating Beginning of rain	**34** Easter holidays Beginning of cultivation/planting Beginning of rain	**22** Easter holidays Beginning of cultivation/planting Beginning of rain	**10** Easter holidays Beginning of cultivation/planting Beginning of rain	Easter holidays Beginning of cultivation/planting Beginning of rain
May	**57** Labour day SPLM/A liberation day Planting continues	**45** Labour day SPLM/A liberation day Planting continues	**33** Labour day SPLM/A liberation day Planting continues	**21** Labour day SPLM/A liberation day Planting continues	**9** Labour day SPLM/A liberation day Planting continues	Labour day SPLM/A liberation day Planting continues
June	**56** End of planting Weeding begins	**44** End of planting Weeding begins	**32** End of planting Weeding begins	**20** End of planting Weeding begins	**8** End of planting Weeding begins	End of planting Weeding begins
July	**55** Independence day Martyrs day Peak of hunger season Scaring of birds begins	**43** Independence day Martyrs day Peak of hunger season Scaring of birds begins	**31** Independence day Martyrs day Peak of hunger season Scaring of birds begins	**19** Independence day Martyrs day Peak of hunger season Scaring of birds begins	**7** Independence day J1 Incidence Martyrs day Peak of hunger season Scaring of birds begins	Independence day Martyrs day Peak of hunger season Scaring of birds begins
August	**54** Harvesting begins Heroes day Veterans day	**42** Heroes day Veterans day	**30** Harvesting begins Heroes day Veterans day	**18** Harvesting begins Heroes day Veterans day	**6** Harvesting begins Heroes day Veterans day	Harvesting begins Heroes day Veterans day
September	**53** Harvesting continues	**41** Harvesting continues	**29** Harvesting continues	**17** Harvesting continues	**5** Harvesting continues	
October	**52**	**40**	**28**	**16**	**4**	
November	**51**	**39**	**27**	**15**	**3**	
December	**50** Christmas	**38** Christmas	**26** Christmas Beginning of Juba crisis	**14** Christmas	**2** Christmas	

8.3 Food Security and Livelihood Questionnaire

Date…Team No:……. Cluster No… HH No……. Village Name… Boma… Payam… County… State…

1. Household Hunger Scale

1.1	In the past 4 weeks (30 days), was there ever no food to eat of any kind in your house because of lack of resources to get food? **(if No, Skip to Q1.3.0)**		**1=** Yes	**0=** No
1.2	How often did this happen in the past 4 weeks/30 days?	1 = Rarely (1–2 times) 2 = Sometimes (3–10 times)	3 = Often (more than 10 times)	[___]
1.3	In the past 4 weeks (30 days), did you or any household member go to sleep ***at night hungry*** because there was not enough food? **(If No, Skip to Q1.5.0)**		1= Yes	0= No
1.4	How often did this happen in the past [4 weeks/30 days]?	1 = Rarely (1–2 times) 2 = Sometimes (3–10 times)	3 = Often (more than 10 times)	[___]
1.5	In the past 4 weeks (30 days), did you or any household member go a whole day and night without eating anything because there was not enough food? **(If No, Skip to Q2.0)**		1 = Yes	0 = No
1.6	How often did this happen in the past [4 weeks/30 days]?	1 = Rarely (1–2 times) 2 = Sometimes (3–10 times)	3 = Often (more than 10 times)	[___]

2 Coping Strategies

	In the past 7 DAYS, if there have been times when you did not have enough food or money to buy food, how often has your household had to?	Frequency score: Number of days out of the past seven (0 -7).
2.1	Rely on less preferred and less expensive foods?	
2.2	Borrow food, or rely on help from a friend or relative?	
2.3	Limit portion size at mealtimes?	
2.4	Restrict consumption by adults so that small children can eat?	
2.5	Reduce the number of meals eaten in a day for household members?	

3. Food consumption

3.1 Did you or anyone else in your household eat any food from these food groups ***in the past 24 hours, yesterday during the day and at night***	
	YES/NO
1.1 **Cereals and cereal products**: rice, ugali, bread, sorghum, maize, anjera, millet, water lilies, grain seeds, porridge, pasta orany other grains or foods made from these	
1.2 **White tubers and roots**: potatoes, yams, cassava, or other foods made from roots, wild roots	
2 **Pulses, legumes, nuts**: beans, cowpeas, groundnuts, lentils, *janjaro*, *foul masra*, soy, pigeon pea, greengrams/*logwidi* or any other seeds/nuts	
3 **Milk and milk products**: fresh/sour milk, yogurt, milk powder, other dairy products *(exclude margarine/butter or small amounts of milk for tea/coffee)*	
4.1 **Organ meat (iron rich)**: liver, kidney, heart or other organ meats or blood based foods	
4.2 **Flesh meats and offals**: beef, pork, sheep, goat, rabbit, game meat, chicken, duck, other birds, insects	
4.3 **Eggs**: from chicken, duck, guinea fowl or any other egg	
4.4 **Fish and seafood**: fresh or dried fish or shellfish, canned tuna, etc.	
6.1. Vitamin A rich vegetables and tubers: pumpkins, carrots, orange sweet potatoes, red sweet pepper	
6.2. Dark green leafy vegetables: wild green leaves, spinach, sukuma wiki/kale, cassava leaves, kudra, etc	
6.3. Other vegetables: tomato, onion, cabbages, lettuce, eggplant + other locally available vegetables, tree leaves	
6.1. Vitamin A rich fruits: mango,papaya, guava, orange + other locally available vitamin A rich fruits	
6.2 Other fruits: including any wild fruits (lalop, etc.)	
7. Oils and fats: vegetable oil, palm oil, shea butter(lulu), margarine, or any other fats/oil	
8. Sweets: sugar, honey, jam, sweetened soda/juice drinks, cakes, or other sugary foods	
9. Condiments, spices and beverages: tea, coffee, cocoa, salt, garlic, spices, baking powder, lanwin, tomato sauce, hot sauce, alcoholic beverages	

4. Livelihood Coping

4.1	During the past 30 days, did anyone in your household have to sell household assets or goods (jewelry/beads, furniture, items for cooking, etc.) due to a lack of food or money to buy food?	1 = Yes 2 = No, I did not need to do so 3 = No, because my household already sold these items in the last 12 months and has no more to sell 4 = Not applicable – My household never had these assets	[___]
4.2	During the past 30 days, did you send any household members to eat elsewhere due to a lack of food or money to buy food?	1 = Yes 2 = No, I did not need to do so 3 = No, because members of my household have already gone many times in the last 12 months and cannot continue to do so 4 = Not applicable	[___]
4.3	During the past 30 days, did your household sell more animals than usual due to a lack of food or money to buy food?	1 = Yes 2 = No I did not need to do so 3 = No, because my household already sold more animals than usual in the last 12 months and cannot continue 4 = Not applicable - My household does not keep animals	[___]
4.4	During the past 30 days, did your household consume seed stocks intended for planting, including any seeds from a distribution, due to a lack of food or money to buy food?	1 = Yes 2 = No, I did not need to do so 3 = No, because my household already consumed seed stocks in the last 12 months and cannot continue 4 = Not applicable – My household has no seed stocks	[___]
4.5	During the past 30 days, did anyone in your household have to borrow money and/or purchase food on credit due to a lack of food or money to buy food?	1 = Yes 2 = No, I did not need to do so 3 = No, because my household already borrowed money or bought food on credit in the last 12 months and cannot continue 4 = Not applicable	[___]
4.6	During the past 30 days, did anyone in your household have to sell productive assets or means of transport (panga, hoe, other tools, bicycle, wheel barrows, etc.) due to a lack of food or money to buy food?	1 = Yes 2 = No, I did not need to do so 3 = No, because my household already sold all productive assets in the last 12 months 4 = Not applicable – My household does not own productive assets	[___]
4.7	During the past 30 days, did your household have to reduce essential non-food expenses, such as on health or education, due to a lack of food or money to buy food?	1 = Yes 2 = No, I did not need to do so 3 = No, because my household already eliminated these expenses in the last 12 months 4 = Not applicable – My household was not spending money on health/education/etc	[___]
4.8	During the past 30 days, did anyone in your household have to engage risky or illegal activities, like theft, prostitution, or raiding, due to a lack of food or money to buy food?	1 = Yes 2 = No, I did not need to do so 3 = No, because members of my household have already engaged in these activities in the last 12 months and cannot continue 4 = Not applicable	[___]
4.9	During the past 30 days, did your household sell its last female animal due to a lack of food or money to buy food?	1 = Yes 2 = No I did not need to do so 3 = No, because my household already sold its last female animal in the last 12 months 4 = Not applicable- My household does not keep animals	[___]
4.10	During the past 30 days, did the entire household migrate due to a lack of food or money to buy food?	1 = Yes 2 = No, I did not need to do so 3 = No, because my household already migrated in the last 12 months and cannot do so again 4 = Not applicable	[___]

8.4 : Anthropometric & Health Questionnaire

(To be conducted in all selected HHs with children aged 6-59months)

Date……/……/……..… State:…….County……Payam……..…….Boma……..……..Village……..

Cluster No:…….. Team No……..

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Child ID.	HH. no.	Child's Name	Sex (f/m)	Birthday	Age in Months	Weight (kg)	Height (cm)	Oedema (Y=Yes) (N=No)	MUAC (cm)	VIT A in the last 6 months 0=No 1=Yes	Measles Vaccine 0=No 1=Yes with EPI card 2=Yes with recall 3=<9months	Illness in the past 14 days 0=No 1=Yes If No, Skip to 16	Type of Illness 1=Fever 2=Cough 3=Diarrhoea 99=other	Treatment Sought 0=none 1=hospital 2=PHCC/U 3=Mobile clinic 4=CBD 5=private clinic 6=Traditional healers 7=pharmacist 99=other	Did the child sleep under a mosquito net (LLITN) last night 0=No 1=yes	Dewormed in the last 6 months (12-59 months) 0=No 1=Yes 88=DK
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																

8.5 Infant and Young Child Feeding (0 TO 23 MONTHS)

Date (D/M/Y): ……./……./….. Cluster No:… Team No…. State:…….. County……..…….. Payam:……. Boma……..…….. Village:……...

INFANT AND YOUNG CHILD FEEDING (0 TO 23 MONTHS)

9. Yesterday, during the day or at night, did [NAME] receive any of the following liquids?			10. Describe what did (NAME) eat yesterday during the day or night, whether at home or outside the home since (NAME) woke up yesterday until NAME went to sleep?							11. How many times did [child's name] eat solid or semi-solid food other than liquids yesterday during the day or at night? (number of times)	12. Yesterday during the day/night, did [child's name] consume any food given by a health center for the treatment of malnutrition (Plumpy'Nut, Plumpy' sup, Plumpy'Nut dose, sprinkles/sachet etc) OR fortified food (porridge consisting of several meal mixed, CSB) OR any food with added a micronutrient powder (MNP)? 1= Yes 0 = No 8 = Don't know	13. Pregnant and Lactating Women (PLW) MUAC _____cm
clear Broth 1= Yes 0 = No 8 = Don't know	Thin Porridge 1= Yes 0 = No 8 = Don't know	Other water base liquids 1= Yes 0 = No 8 = Don't know	Cereals, flours, grains, roots and tubers 1= Yes 0 = No 8 = Don't know	legumes and nuts (Beans, Peas, Lentils, Nuts and Seeds) 1= Yes 0 = No 8 = Don't know	dairy products (milk, yogurt, cheese) 1= Yes 0 = No 8 = Don't know	flesh foods (meat, fish, poultry and liver/organ meats) 1= Yes 0 = No 8 = Don't know	eggs 1= Yes 0 = No 8 = Don't know	vitamin-A rich fruits and vegetables (carrot, red pepper, pumpkin, Ripe Mangoes, papaya 1= Yes 0 = No 8 = Don't know	other fruits and vegetables (Avocado, Banana, Apple, Grapes, Guava, Lemon, Pineapple, Cabbage, onions, tomatoes, etc 1= Yes 0 = No 8 = Don't know			

8.6 Demography and Mortality Questionnaire

DEMOGRAPHY & MORTALITY QUESTIONNAIRE

DATE OF INTERVIEW: [D][D]/[M][M]/ [Y][Y]

COUNTY:	**PAYAM:**	**NAME OF INTERVIEWER:**
BOMA:	**VILLAGE:**	
CLUSTER NO. [ ][ ]	**TEAM NO. [ ][ ]**	**HOUSEHOLD[17] NO. [ ][ ]**

01	02	03	04	05	06	07	08	09	10
No.	Name	Sex (M/F)	Age (years)	Joined on or after: ___ (Start date of the recall period - ex. Jan. 1, 1900) **WRITE 'Y' for YES. Leave BLANK if NO.**	Left on or after:	Born on or after:	Died on or after:	Cause of death 1= Injury 2=Illness 3=Unknown	Location of death 1=current location 2=during migration 3=in place of last residence 4=other
a) List all the people that slept in this household last night.									
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
b) List all the people that slept in this household on the **first night of the recall period (FILL IN DATE/EVENT)** but did **NOT sleep** in the **household last night**.									
1					Y				
2					Y				
3					Y				
4					Y				
c) List all the people that slept in this household on the **first night of the recall period but have since died** (probe clearly determine case)									
1							Y		
2							Y		
3							Y		
4							Y		

Was anyone in the household pregnant at the start of the recall period? No [ ] Yes [ ] If yes, how many? _____

[17] HH definition: Group of people living under same roof & sharing food from the same pot. In home with multiple wives, those living and eating in different houses are considered as separate HHs. Wives living in different houses and eating from same pot are considered as one HH.

8.7 Selected clusters

Geographical unit	Population size	Cluster
Gongbial	432	
Mulmul, Ameth Beek and Bukchop	576	1
Nyinkuac and Rum-Ajak	367	
Abyei Jokyom and Banychol Malual	720	2
Wunruok and Duop	648	RC
Tirawan & Ranypiny	403	3
Mijak	576	
Fod Agok & Ayom buony	396	RC
Nyobariik & Wejwej	216	
Jamena and Longbolok	295	
Nyin Jou	1447	4,5
Abothok	2426	6,RC,7
Wun Aran	274	
Wunokom	504	8
Titak	374	
Nyintar	482	9
Gung Mabil	209	
Wunchuei (Ganga)	590	10
Wonbiooch	187	
Makerbanyjok	598	11
Maker thou	540	
Nyial chuor	713	12
Agach	446	13
Wunpeth	734	
Majbong	878	14
Rumameer	504	15
Wunchuei	403	16
Awal & Koladet	439	
Achelkow	360	
Mathaing Dill	511	RC
Agok	2160	17,18,19
Mayom Ngok	886	20
Makuei Wut	324	
Juljuk (East and West)	1584	21,22
Maker Aniet	1152	23
Mijak Deng Kaya	252	RC
Mijakol	1130	24
Miyen Achok	180	
Miyen Jerdel	252	
Wawchin	540	25
Gakluom and Kolwei	295	
Gung kuel and Gigou	230	26
Agany dil and Mabok	432	
Thitheinyin & Ayach	310	
Mading Deng Mathiang	432	27
Mading Kanisa	871	28

Mading Yir Yir	526	29
Ajak thony	713	
Angot 1 & 2	281	30
Nyanguong	252	
Gailum	439	31
Dhanar	576	
Mabiordil	252	32
Rumbek & Malual Riba & Rubjaba	727	
Magar	360	33
Gumcholmonytoch	324	
Kol Louth	403	34
Maker Awat wat	511	
Nyiel & Mijok Alieu	857	35
Marol Ayuang	288	36
Rum Koor	886	37
Achech Nhial	540	
Mabil	266	38
Gil Dau	403	
Malual Aleu	626	39
Minyang Anyiel	324	
Athony	1080	40
Korioc	194	41
Kadhian	274	
Ditwengnhom	187	
Awolnhom	317	42
Rupnyin	302	
Aganyachueng	331	
Mading Achueng	403	43