NUTRITION AND MORTALITY SMART SURVEY

FINAL REPORT

MAYOM COUNTY, NORTHERN LIECH STATE,

SOUTH SUDAN

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Affirmation

Except as acknowledged by the references in this report to other authors and publications, the Mayom County Integrated Nutrition and Mortality SMART survey report described herein consists of the survey team's own work. Primary quantitative and qualitative data collected throughout the survey process remains the property of the communities and families described in this document. Information and data must be used only with their consent.

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Acronyms

CARE SS	CARE South Sudan
SMART	Standardized Monitoring and Assessment of Relief and Transitions
CMR	Crude Mortality Rate
U5MR	Under 5 Mortality Rate
ENA	Emergency Nutrition Assessments
PPS	Probability Proportional to Size
SD	Standard Deviation (measure of spread around the mean)
GAM	Global Acute Malnutrition
SAM	Severe Acute Malnutrition
MAM	Moderate Acute Malnutrition
WHZ	Weight for Height Z scores
WAZ	Weight for Age Z scores
HAZ	Height for Age Z scores
U5	Under 5 years
PLW	Pregnant and Lactating Women
IDPs	Internally Displaced Persons
IYCF	Infant and Young Child Feeding
EBF	Exclusive Breastfeeding
MUAC	Mid Upper Arm Circumference
OTP	Out-Patient Therapeutic Programme
TSFP	Targeted Supplementary Feeding Program
VAS	Vitamin A supplementation
FSL	Food Security and Livelihoods
WASH	Water Sanitation and Hygiene
RRC	Relief and Rehabilitation Commission of South Sudan
NIWG	Nutrition Information Working Group
IPC	Integrated Food Security Phase Classification
UNICEF	United Nation Children's Fund
WFP	World Food Program
WHO	World Health Organisation

Executive summary

CARE South Sudan in coordination with the South Sudan Nutrition Cluster conducted a SMART nutrition and mortality survey covering all the ten Payams of Mayom County, Northern Liech State. The main objective of the survey was to assess the current prevalence of acute malnutrition and retrospective mortality rate in the County.

The Standardized Methodology for Assessment in Relief and Transitions (SMART) which applies a two-stage cluster sampling was used. A total of 668 children aged 6-59 months from 495 households in 36 clusters were sampled for anthropometric measurements. The mortality assessment was conducted concurrently in 495 households.

Additional information was collected in the 495 households visited to provide more insight into possible risk factors associated with the high acute malnutrition prevalence (Morbidity, IYCF, WASH and Food Security).

The prevalence of Global Acute Malnutrition (GAM) (WHZ<-2 and/or oedema) for the County was 21.1% (17.7 - 24.8 95% C.I.) and the severe acute malnutrition (SAM) prevalence (WHZ<-3 and/or oedema) was 4.1% (2.9 - 5.7 95% C.I.). The GAM and SAM prevalence indicated a critical nutrition situation according to WHO classification. There were no edema cases identified during the assessment.

The crude mortality rate (CMR) and under five mortality rate (U5MR) were 0.68 (0.47 – 0.99 95% C.I) and 0.75 (0.31 – 1.78 95% C.I) respectively. Both CMR and U5MR rates were below the WHO emergency thresholds of 1/10,000/day and 2/10,000/day respectively. Most deaths among adults were due to illness (89.7%).

The percentage of children who had reportedly suffered from one or more illness in the two weeks prior to the survey was 65.9%. The most common cause of illness was fever (47.6%) followed by cough (31.6%) and diarrhea (19.9%).

Measles immunization coverage was only 39.3% and this was far below the World Health Organization (WHO) recommended standard of >80%. Similarly, vitamin A supplementation

coverage (42.1%) was low among the sampled children 6-59 months who reportedly received vitamin A supplementation in last six months.

Deworming was very low with only 10.7% of children above one year being dewormed in the past 6 months before the survey.

Information on infant and young child feeding (IYCF) practices was collected. The proportion of children exclusively breast fed to the age of 6 months was (30.4%) which was much lower than the WHO recommended standard of >80%. Another 68.3% of children (0-23.9 months) were initiated to breastfeeding within one hour after delivery. Introduction of solid, semi-solid or soft foods among children aged 6 to 8.9 months was low (56.5%). Findings indicated suboptimal IYCF practices.

Majority of the surveyed households (68.7%) were experiencing moderate hunger at the time of the survey. The main source of food was purchase (36.2%). This was followed by own production (34.1%) and food aid (11.5%). More than half of the households (56.6%) reported that they cultivated during the previous season while 85.9% owned livestock herds or farm animals. Despite majority of households reporting that they were able to cultivate in the recent last season, the overall food security situation remains a great concern.

Sources of drinking water for majority of the sampled households were river or stream (67.1%) and borehole/hand pump (26.3%). This shows that majority of the population were utilizing unsafe water sources. Moreover, most of the households (90.3%) do not treat their drinking water.

Hand washing at the recommended five critical times was very low (0.6%). Majority practiced hand washing at only one occasion (58.2%). Only 4% of respondents indicated that they wash their hands with soap and water. This shows poor hand washing practices with regards to use of water and soap.

A large proportion of the surveyed households lack access to sanitation facilities and most use undesignated open area (89.7%) and designated open area (8.3%) for excreta disposal.

The results of key indicators are summarized in table 1 below.

Table 1: **Summary of survey results**

Anthropometry - Children 6-59 months based on WHO 2006 standards				
Index	Indicator	N	n	Percent (95% C.I)
WHZ- scores	Prevalence of global acute malnutrition (<-2 z-score and/or oedema)	660	139	21.1% (17.7 - 24.8)
	Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	660	112	17 % (13.8 - 20.6)
	Prevalence of severe malnutrition (<-3 z-score and/or oedema)	660	27	4.1% (2.9- 5.7)
WAZ- scores	Prevalence of underweight (<-2 z-score)	666	94	14.1 % (11.2 – 17.7)
	Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	666	85	12.8 % (10.3 - 15.7)
	Prevalence of severe underweight (<-3 z-score)	666	9	1.4 % (0.6 – 2.9)
HAZ-scores	Prevalence of stunting (<-2 z-score) calculated with an SD of 1			3.9 %
MUAC	Prevalence of global acute malnutrition (< 125 mm and/or oedema)	668	54	8.1 % (6.2 – 10.5)
	Prevalence of moderate acute malnutrition (< 125 mm and >= 110 mm, no oedema)	668	51	7.6 % (5.8 – 10.0)
	Prevalence of severe acute malnutrition (< 115 mm and/or oedema)	668	3	0.4 % (0.1 - 1.4)
Retrospective Mortality - 91 days recall period				
Mortality	CMR Deaths/10,000 people/day	4666.5	47	0.68 (0.47-0.99)
	U5 MR Deaths/10,000 children U5/day	737.5	6	0.75 (0.31-1.78)
Other Child Variables				
Measles vaccination Vitamin A supplementation Deworming	Measles based on card	621	229	36.9 (33.2-40.6)
	Measles based on recall	621	15	2.4 (1.3-3.7)
	Vitamin A in the last 6 months	561	236	42.1 (38.0-46.2)
	Deworming in the last 6 months	561	60	10.7 (8.4-13.2)
Morbidity				
Types of illness	Prevalence of reported illness	668	440	65.9% (62.3-69.5)
	Fever		392	47.6% (44.2-50.8)
	Cough/difficulty of breathing		260	31.6% (28.4-34.6)
	Diarrhea		164	19.9% (16.8-22.6)

Health seeking behavior				
Treatment sought	None sought	668	311	46.6 (43.0-50.3)
	Hospital		45	6.7 (4.1-8.5)
	PHCC/PHCU		274	40.9 (36.8-44.5)
	Mobile clinic/outreach		16	2.4 (1.3-3.4)
	Private clinic		16	2.4 (1.3-3.7)
	Traditional practitioner		6	0.9 (0.3-1.6)
	Bought drugs from pharmacy		1	0.1 (0.0-0.4)
Food security and livelihoods				
Household hunger scale	Little to no hunger: 0 to 1 Moderate hunger: 2 to 3 Severe hunger: 4 to 6	495	52 340 103	10.5 (7.9-13.3) 68.7 (64.4-72.5) 20.8 (17.2-24.4)
Food consumption score	Poor food consumption Borderline food consumption Acceptable food consumption	495	41 64 390	8.3 (5.9-10.5) 12.9 (10.1-16.0) 78.8 (75.0-82.2)
Infant and young child feeding practices				
	Children initiated to breast milk within 1 hour after birth (0-23.9 months)	268	183	68.3 (62.3-73.9)
	Exclusive breastfeeding (0-5.9 months)	56	17	30.4 (19.6-42.9)
	Introduction of solid, semi-solid or soft foods (6-8.9 months)	46	26	56.5 (41.3-69.6)
	Continued breastfeeding at 12 months (12-15 months)	50	49	98 (94.0-100.0)
	Minimum dietary diversity (6-23.9 months)	212	71	33.5 (27.4-39.6)
	Minimum meal frequency for breastfed children (6-8.9 months)	46	35	76.1 (63.0-87.0)
	Minimum meal frequency for breastfed children (9-23.9 months)	166	116	69.9 (67.2-77.1)
	Minimum meal frequency for non-breastfed children (6-23.9 months)	212	5	2.4 (0.5-4.7)
Water, Hygiene and Sanitation practices				
Main source of drinking water	River/stream	495	332	67.1 (63.0-71.1)
Treatment methods for drinking water	Nothing	495	447	90.3 (87.7-92.7)
Hand washing	Hand washing with soap	495	20	4 (2.4-5.9)
Access to sanitation	• Undesignated open area • Designated open area	495	444 41	89.7 (87.1-92.3) 8.3 (5.9-10.7)

Specific recommendations are outlined below;

1. Survey results show that prevalence of acute malnutrition is well above the emergency threshold levels as defined by WHO. Given this fact, it is recommended that the current nutrition intervention (CMAM) should be continued. At the time of survey, CARE was providing CMAM services in seven out of ten Payams of Mayom. CARE should therefore focus on increasing the coverage to reach all the ten Payams in order to improve treatment of malnourished children.
2. Findings on morbidity showed that most of the children had suffered from ARI and diarrhoea in the past two weeks prior to the survey. It is recommended that CMAM be integrated with community case management of childhood illnesses in order to prevent spread of common illnesses especially ARI and diarrhoea.
3. The coverage for measles, vitamin A and deworming was low. Considering the relationship between low immunization and malnutrition, it is recommended that EPI coverage should be increased by working with partners to provide immunization services. The nutrition programme can serve as an entry point for increasing EPI coverage.
4. Survey results showed that majority of respondents (68.7%) experienced moderate hunger at the time of the survey. There is need to improve coverage for food security programmes implemented by partner agencies and also ensuring there is integration with the nutrition programme.
5. Intensive awareness raising sessions at health facilities as well as in the communities should focus on early initiation of breastfeeding, exclusive breastfeeding, timely introduction of solid, semi-solid and soft foods and providing information to mothers/caregivers on the recommended frequency and diversity of food fed to infants and young children.
6. Majority of the households (98%) do not have access to latrines for disposal of human waste. Construction of latrines and promotion of hygiene and sanitation through social

and behavior change communication strategies such as IEC materials and community change agents should be considered.

7. Only 4% of surveyed households indicated that they use water and soap for hand washing. Given the linkages between inadequate hand washing and disease transmission, options to increase the availability of soap and dissemination of hygiene messages should be explored.

1 Introduction

1.0 Background

Mayom County is one of the four Counties of Northern Liech State in the republic of South Sudan. It borders Abiemhnom County to the North, Rubkona County to the East, Koch County to the South, Tonj North and Gogrial East Counties to the South West, and Twic County to the North West.[1]

According to the South Sudan National Bureau of Statistics, Mayom has a projected population of 176,830 and an area of 4,970 Sq Km. The County is mainly inhabited by the Bul Nuer population who are agro-pastoralists, living on subsistence farming, livestock keeping and fishing.

The County is made up of ten Payams namely; Mankien, Riak, Ruathnyibol, Kueryiek, Kuerbone, Wangbour, Wangkei, Ngop, Pup and Bieh Kuach.[2]

The region is dominated by flat grasslands, with some shrubs, thorns, and patches of forest. The sandy and loamy soils are relatively fertile and in some areas the land is rocky. Mayom County receives relatively low rainfall compared to other regions of Unity which limits crop cultivation to certain drought resistant varieties mainly sorghum. The rivers Kiir and Loll run through the County, converging near Mayom Town, and the River Jur is also located at its South East. Potential flooding areas include the banks of River Jur and around Mankien Payam.[3]

This County faces multiple challenges caused by natural disasters such as floods, population movements and protracted conflict. Following the outbreak of violence in Juba in July 2016, renewed conflict also developed in many parts of the former Unity State.

Population needs and access to services in Mayom County appear to have improved in 2017 possibly due to the relative stability in many parts of the County. Nevertheless, overall access to services in Mayom County is still low and the situation remains volatile. Furthermore, it is

[1] CARE SS Nutrition and Mortality SMART Survey Mayom County, Unity State, December 2016
[2] CARE SS Nutrition and Mortality SMART Survey Mayom County, Unity State, May 2016
[3] South Sudan Humanitarian Project 2016

expected that the onset of the lean season (May to July) will exacerbate current food insecurity and malnutrition rates. As a result, there is increased vulnerability to malnutrition for majority of the population especially children under five years of age, pregnant and lactating women.

According to the Integrated Food Security Phase Classification analysis update in January 2017, Mayom County was projected to be at IPC phase 4 (critical level) for the period between May to July 2017. Acute malnutrition situation was expected to deteriorate further during the lean season.[4]

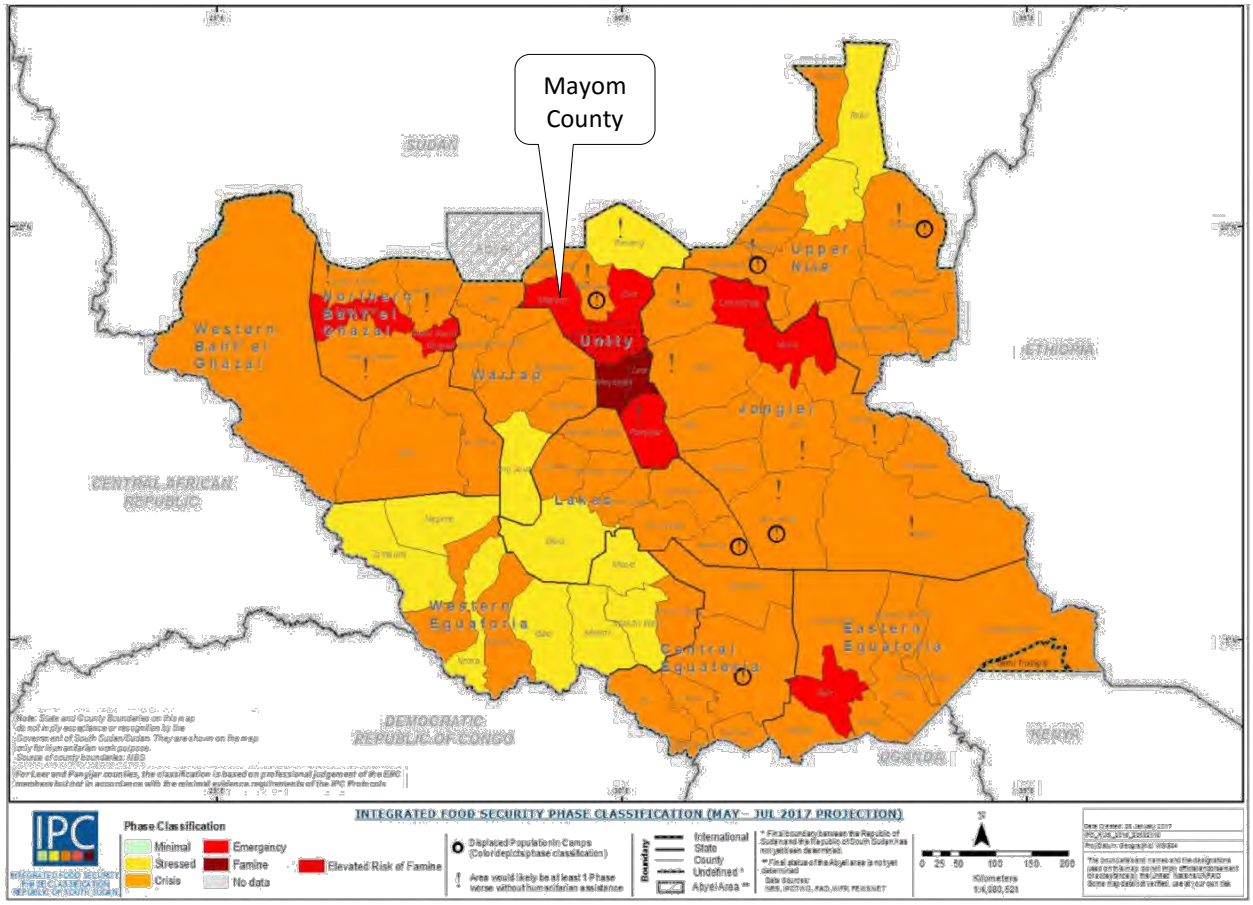

Figure 1: Map of South Sudan showing the location of Mayom County[5].

[4] Integrated Food Security Phase Classification January 2017, Communication summary

[5] Map of South Sudan, adopted from IPC South Sudan, Communication Summary January 2017

Results from a SMART Nutrition survey undertaken by CARE in Mayom during the previous pre-harvest period in May 2016 showed high rates of both the Global Acute Malnutrition at 28.5% (23.7-33.7 95% C.I) and Severe Acute Malnutrition at 6.7% (4.2-10.6 95% C.I). These results depicted a critical nutrition situation.

1.1 CARE Programme activities

CARE South Sudan is currently implementing the Community Management of Acute Malnutrition (CMAM) programme in Mayom County. This emergency nutrition project aims to provide 60 percent of malnourished children and women nutritional therapies and contribute to 10 percent reduction in Global Acute Malnutrition rate through health facility based Outpatient Therapeutic Programmes (OTPs) and Supplementary Feeding Programmes (SFPs).

CARE SS has been providing nutrition services in health facility based nutrition centres within seven Payams namely; Mankien, Ruathnyimbol, Kueryiek, Bieh Kuach, Ngop, Wangkei and Riak. In order to increase coverage, CARE is also providing nutrition outreach services in the seven Payams covered. Nutrition services provided include; CMAM at inpatient and outpatient, IYCF, micronutrient supplementation and deworming. The nutrition programmes are supported by UNICEF (OTP and SC) and WFP (TSFP).

One of the project key activities is to conduct annual nutrition surveys in project service delivery locations in order to monitor or determine the general nutritional status among the under-five children, pregnant and lactating mothers.

The current survey was carried out to assess and monitor the nutritional status in Mayom County and the findings will be used to understand the overall nutrition, food security and health status across the County. Further, the survey findings will provide recommendations for planning and decision making at County and National levels.

1.2 Other agencies currently working in Mayom

There are several humanitarian actors currently working in Mayom County including; World Relief, ICRC, MSF, Samaritan's Purse, INTERSOS, RCDI and CHIDDO. These organizations support and implement various programmes as outlined in the table 2 below.

Table 2: Other Agencies present in Mayom County

Organization	Sector
World Relief	Health
ICRC	Food distribution, seeds distribution, livestock vaccination
MSF	Health
Samaritan's Purse	WASH
INTERSOS	Education
RCDI	Agriculture, livestock vaccination
CHIDDO	Education, child protection

1.3 Survey Justification

The survey was necessary to determine the level of acute malnutrition among vulnerable groups in Mayom County. This assessment was also conducted as part of surveillance and monitoring of the nutrition situation in the County for the pre-harvest period.

Findings of the nutrition survey will also be used to understand the overall nutrition, food security and health status across the County.

1.4 Main objective of the survey

The main objective of the survey was to determine the nutrition status among children aged 6-59 months, crude and under 5 retrospective death rates and to analyse possible factors contributing to malnutrition.

1.4.1 Specific Objectives

1. To estimate the prevalence of acute malnutrition (Global and Severe) among children aged 6-59 months.
2. To estimate the retrospective crude and under five mortality rates.

3. To estimate the prevalence of morbidity among children 6-59 months and health seeking behaviours.
4. To estimate the coverage of measles vaccination, deworming and Vitamin A supplementation.
5. To assess Infant and Young Child Feeding (IYCF) practices among children aged 0 - 23 months.
6. To assess the current household food security situation in the County.
7. To assess Water, Sanitation and Hygiene practices in the County.
8. To make recommendations on appropriate interventions.

1.5 Timing of the survey

The Nutrition SMART Survey was conducted from 6th to 16th May 2017 during the lean season as shown in the seasonal calendar below.

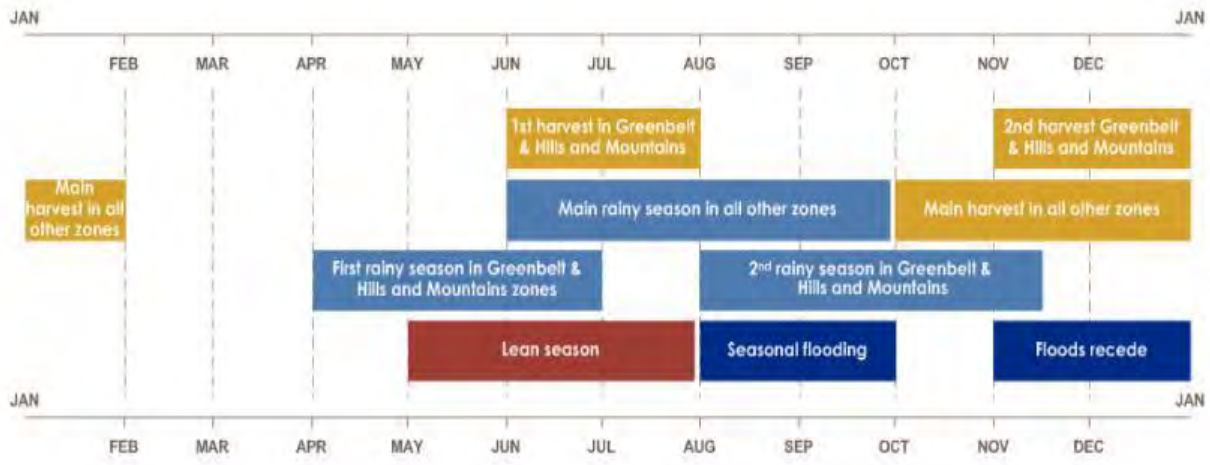

Figure 2: South Sudan Seasonal Calendar (source FEWSNET)

2 Methodology

2.1 Study design

The nutrition survey adopted a cross sectional household survey design using the two-stage cluster sampling based on the SMART methodology. Clusters were selected using probability proportional to population size (PPS). Stage one sampling involved the sampling of the clusters to be 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 the anthropometric survey was children aged 6-59 months while all households were targeted for retrospective mortality assessment. Mothers or caregivers of children aged 0-23 months were targeted for IYCF survey. Further, mothers and caregivers were interviewed to obtain information on food security and livelihoods (FSL) as well as Water, Sanitation and Hygiene (WASH) practices.

2.3 Sample size determination

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

For anthropometry, a total of 511 children in 417 households was calculated and for mortality a total of 3298 persons in 496 households was calculated using the parameters summarized in the table below.

Table 3: Survey Sample size determination

Parameters/values	Anthropometric survey	Mortality survey	**Rationale/ Source**
Estimated prevalence (%)	28.5	0.44	Mayom County SMART Survey by CARE, May 2016. GAM 28.5% (23.7-33.7 95% C.I) & CMR 0.44 (0.21-0.93)
Desired precision	5	0.3	According to SMART Survey

			guidelines based on estimated prevalence
Design effect	1.5	1.5	Recommended design effect for cluster sampling
Average household size	7	7	Mayom County SMART Survey by CARE, May 2016
Percent of U5 children	20.5	20.5	Mayom County SMART Survey by CARE, May 2016
Percent of none responsive households	5	5	According to SMART Survey guidelines (usually a range of 3-5%)
Recall period in days	N/A	91 days	County wide registration for food distribution by ICRC starting February 11, 2017
Children to be included	511	N/A	
Households to be included	417	496	
Population to be included	N/A	3298	

Sample size calculation for anthropometry and mortality yielded two different household samples and therefore the survey used the larger of the two samples (496) for both mortality and anthropometric surveys as recommended by the SMART Survey guidelines[6]. This sample size was deemed sufficient for the food security and WASH sample size requirements.

The sample size calculated for anthropometry was also used to assess infant and young child feeding practices. Information on infant and young child feeding practices (IYCF) was collected in all the 417 households with children 0-23 months in order to provide a snapshot of IYCF practices in the area. The results of the IYCF survey should therefore be interpreted and utilized cautiously due to small sample sizes.

[6] SMART Methodology. *SMART Manual Version 1 published in 2006.*

2.4 Sampling methodology

The survey applied a two-stage cluster sampling based on the SMART methodology with clusters being selected using probability proportional to population size (PPS).

2.4.1 First stage sampling

The first stage involved the assignment of the smallest sampling unit called clusters which in this case were villages. A sampling frame for clusters was prepared with assistance from the Relief and Rehabilitation Commission, County Health Department and local community mobilizers who were familiar with the area. All accessible villages along with their respective populations were entered into the ENA for SMART software.

Random selection of clusters from the total number of villages in the County was done using the planning screen of ENA for SMART software based on probability proportional to population size (PPS). Clusters were defined as villages within Bomas in all the Payams of the County.

A total of 36 clusters were selected from the sampling frame generated from the list of all villages in the County.

2.4.2 Second stage sampling

Simple random sampling was used to select 14 households per cluster to be surveyed. The household heads in the villages were listed with the support of the village Chiefs. Once a complete list of household heads was obtained, enumerators used ENA generated random numbers tables to select the households from the sampling frame (household list).

2.4.3 Number of households per cluster

The number of households to be completed per day was determined according to the time the team could spend in 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 8:00 am and back at 6:00 pm.
2. Average travel time (to and from field): 3 hrs.
3. Duration for initial introduction and selection of households: 1 hour.
4. Breaks: one lunch break of 1 hour and two 10 minute breaks for refreshments.

The above gives an average of 4 hours and 40 minutes working time in each cluster. If on average teams spend 15 minutes in each household and 5 minutes traveling from one household to another, each team could comfortably reach 14 households per day. One day in each cluster was assumed.

2.5 Survey implementation

2.5.1 Survey teams training and supervision

The survey teams were trained on SMART methodology for four days from 6th to 9th May 2017.

The training focused on survey objectives, sampling methodology, anthropometric measurements, field procedures, administration of the survey tools and interviewing techniques.

On the third day of training, the standardization test was conducted to evaluate accuracy and precision of the survey enumerator's measurements. Each enumerator took measurements of 10 children (aged 6-59 months) twice.

Data collection tools were pre-tested as part of the training of enumerators in a village close to the training venue which was not selected for actual data collection.

Data collection was undertaken for seven days starting on 10th to 16th May 2017. Six teams were used in the first two days of data collection but on the third day, eight team members dropped out of the survey citing poor payment. As a result, the third day of data collection was interrupted. After consultations with the CARE Nutrition Manager, RRC Coordinator and the Consultant, a decision was taken to replace the eight team members who left with Community Nutrition Workers previously trained in SMART methodology and had also participated in previous nutrition surveys.

At field level, close supportive supervision by the consultant, CARE Nutrition Manager and one representative from RRC ensured quality of data collected from the field was good. The survey consultant and team leaders went through all the questionnaires on a daily basis to ensure completeness and adherence to data collection procedures.

Anthropometric and mortality data was entered in the ENA software on a daily basis and plausibility checks performed to ensure good quality data. Feedback was provided to the teams every morning before they departed to the field.

2.5.2 Data collection tools

A set of five tools were used to collect quantitative data using paper forms. Paper forms were ideal because they are comparatively inexpensive and easy to administer especially when gathering data from large numbers of people spread over a wide geographic area.

Structured questionnaires were used to collect quantitative data. Data collection tools included; Mortality questionnaire (targeting all households), anthropometric and health questionnaire (targeting children 6-59 months), Infant and Young Child Feeding questionnaire (targeting children 0-23 months).

In addition, Food Security and Livelihoods questionnaire and Water, Sanitation and Hygiene questionnaire were also administered.

All questionnaires used were the standard SMART survey data collection tools recommended by the Nutrition Information Working Group (Appendix 4).

2.6 Data collected

In all selected households, all children 6-59 months were included in the anthropometric survey and those 0 – 23 months were included in the IYCF component. The age of the children was determined using a local calendar of events. If there were no children 6-59 months in the household, the household was still interviewed for mortality, WASH and Food Security and Livelihoods (FSL). Data on IYCF, morbidity, mortality, WASH and food security were collected by recall.

The following case definitions were used in the assessment:

2.6.1 Mortality

Retrospective mortality data was collected in all the visited households, including those with no children aged 6-59 months. A recall period of 91 days was used.

Individual Mortality questionnaire was used to collect the following data;

- Total number of people in the household
- Number of children under five years
- Number of people who left the household within the recall period (total and children under five years)
- Number of people who joined the household within the recall period (total and children under five years)
- Number of births in the household within the recall period
- Number of deaths in the household within the recall period (total and children under five years)
- Cause of deaths

2.6.2 Individual information per survey child - Anthropometry

Age: The primary source for this information was the child's immunization card, birth certificate or birth notification. In the absence of these documents, a local calendar of events was used to estimate the age (Appendix 5).

Gender/Sex: This was recorded as either 'f' for female or 'm' for male.

Weight: A digital weighing scale (SECA) was used to measure children's weight. Children were weighed with minimal or no clothing and weight recorded to the nearest 0.1kg.

The teams on daily basis calibrated the electronic scales using a standard weight to ensure accuracy.

Height/Length: This was measured using a standard UNICEF height/length board – taking a standing height for children 24-59 months (or >87 cm) and recumbent length for children 6-23

months (or <87 cm). Both height and length were measured to the nearest 0.1 cm. Measurement was done by a measurer and recorded with assistance from the child's mother/caretaker.

MUAC: Mid Upper Arm Circumference was measured on the left arm at the middle point between the tip of the elbow and the tip of shoulder bone while the arm was at right-angle. MUAC was measured to the nearest mm. In the event of a disability on the left arm or a left-handed child, the right arm was used.

Bilateral Oedema: This was assessed by the application of moderate thumb pressure for at least 3 seconds on both feet. If a depression formed upon pressure application, then presence of bilateral oedema was confirmed.

2.6.3 Individual information per survey child – Child health and feeding

Measles immunization, Vitamin A supplementation and Deworming:

- Measles: Assessed by checking for measles vaccination on EPI cards or by recall and was only done for eligible children (≥ 9 months)
- Vitamin A: Mothers/caregivers were asked whether the child received Vitamin A in the past six months. Vitamin A capsule was shown to caregivers to aid in recall, EPI cards were also used.
- Deworming: Mothers/caregivers were asked whether the child had been dewormed in the past six months. Deworming tablets were shown to caregivers to aid in recall.

Morbidity: Two-week retrospective morbidity data was collected from mothers/caregivers of all children (6-59 months) included in the anthropometric survey. The mother/caregiver was asked if the child had been ill in the past two weeks and if so, they were then asked the type of illness and treatment sought.

Infant and Young Child Feeding: Infant and young child feeding practices were assessed based on the standard WHO recommendations (WHO, 2010) as follows:

- **Early initiation of breastfeeding**: Proportion of children born in the last 23 months who were put to the breast within one hour of birth.

$$\frac{\text{Children 0-23 months who were put to the breast within one hour of birth}}{\text{Children 0-23 months}}$$

- **Exclusive breastfeeding under 6 months**: Proportion of infants 0–5 months of age who are fed exclusively with breast milk a day before the survey date.

$$\frac{\text{Infants 0–5 months of age who received only breast milk during the previous day}}{\text{Infants 0–5 months of age}}$$

- **Introduction of solid, semi-solid or soft foods**: Proportion of infants 6–8 months of age who received solid, semi-solid or soft foods.

$$\frac{\text{Infants 6-8 months of age who received solid, semi-solid or soft foods during the previous day}}{\text{Children 12–15 months of age}}$$

- **Continued breastfeeding at 1 year**: Proportion of children 12–15 months of age who are fed breast milk and other foods.

$$\frac{\text{Children 12–15 months of age who received breast milk during the previous day}}{\text{Children 12–15 months of age}}$$

- **Minimum dietary diversity**: Proportion of children 6–23 months of age who received foods from ≥ 4 food groups during the previous day.

$$\frac{\text{Children 6–23 months of age who received foods from ≥ 4 food groups during the previous day}}{\text{Children 6–23 months of age}}$$

- **Minimum meal frequency 6-8 months**: Proportion of breastfed children 6-8 months of age, who received solid, semi-solid, or soft foods 3 times or more

$$\frac{\text{Breastfed children 6-8 months of age who received solid, semi-solid, or soft foods 2 times or more during the previous day}}{\text{Breastfed children 6-8 months of age}}$$

- **Minimum meal frequency 9-23 months**: Proportion of breastfed children 9-23 months of age, who received solid, semi-solid, or soft foods 3 times or more.

  $$\frac{\text{Breastfed children 9-23 months of age who received solid, semi-solid, or soft foods 3 times or more during the previous day}}{\text{Breastfed children 9-23 months of age}}$$

- **Minimum meal frequency for non-breastfed children 6-23 months**: Proportion of non-breastfed children 6-23 months of age, who received solid, semi-solid, or soft foods 4 times or more

  $$\frac{\text{Non-breastfed children 6-23 months of age who received solid, semi-solid, or soft foods 4 times or more during the previous day}}{\text{Non-breastfed children 6-23 months of age}}$$

2.6.4 Household information

Food security and livelihoods:

- **Household income sources for the past 30 days:** Information was sought on the main source of income for the household.
- **Main sources of food for households:** Information was collected on the main sources of food for the households.
- **Household livestock ownership:** Information on whether households owned livestock was sought.
- **Households who cultivated in the recent season:** Information was collected on whether households cultivated any crop in the previous season.
- **Household hunger scale:** Information related to hunger, lack of food and resources to buy food was sought to assess incidence of hunger in the past 30 days (4 weeks) prior to the survey.

- **Food consumption score:** Information was collected on the frequency of consumption of the 16 main food groups weighted by their nutritional value.

Water, Sanitation and Hygiene:

- **Source of drinking water**: The survey sought information on households' source of drinking water.
- **Time taken to Water Source**: information was collected on time taken by households to collect water (including traveling to, waiting and return journey).
- **Treatment of drinking water**: The survey sought information on what the households did to the drinking water before consumption.
- **Hand washing during the critical moments**: The survey collected information on what occasions the caregivers washed their hands.
- **Use of soap in hand washing**: Information was collected on whether the care givers use soap and water while washing their hands.
- **Access to sanitation facilities**: Information was sought on where the household members relieved themselves.

2.7 Data entry, analysis and report writing

Data analysis for anthropometry and mortality was done using ENA for SMART software, July 9th 2015 version. Anthropometric indices were computed in ENA and results reported with exclusion of SMART flags.

Data on morbidity, vitamin A supplementation and measles coverage, IYCF, WASH, and FSL, were analyzed using SPSS and Excel.

2.8 Classifying malnutrition

2.8.1 Weight-for-height (WFH) and MUAC – Wasting among children

The prevalence of wasting is presented as global acute malnutrition (GAM) and severe acute malnutrition (SAM) using weight-for-height (WFH) z scores and MUAC indices described below:

- Children whose WFH z-scores fell below -2 standard deviations from the median of the WHO growth standards or had bilateral oedema were classified as wasted (to reflect GAM)
- Children whose WFH z-scores fell below -3 standard deviations from the median of the WHO growth standards or had bilateral oedema were classified as severely wasted (to reflect SAM)
- A cut-off point of <125mm MUAC was used to denote GAM among the under-fives

2.8.2 Weight-for-age (WFA) – Underweight

The prevalence of underweight is presented as weight for age (WFA) z scores defined below:

- Children whose WFA z-scores fell below -2 standard deviations from the median of the WHO growth standards were classified as underweight.
- Children whose WFA z-scores fell below -3 standard deviations from the median of the WHO growth standards were classified as severely underweight.

2.8.3 Height-for-age (HFA) – Stunting

The prevalence of stunting is presented as height-for-age (HFA) z scores defined below:

- Children whose HFA z-scores fell below -2 standard deviations from the median of the WHO growth standards were classified as stunted.
- Children whose HFA z-scores fell below -3 standard deviations from the median of the WHO growth standards were classified as severely stunted.

3 Survey results

3.1 Age and sex pyramid

The population pyramid below has a wide base which indicates a youthful population and is a result of high birth rates. In addition, the young population means there is a high dependency ratio considering the high number of less productive household members.

On the other hand, the top of the pyramid is narrow and this shows fewer people in the older age groups because life expectancy is lower. A higher proportion of the population is female than male.

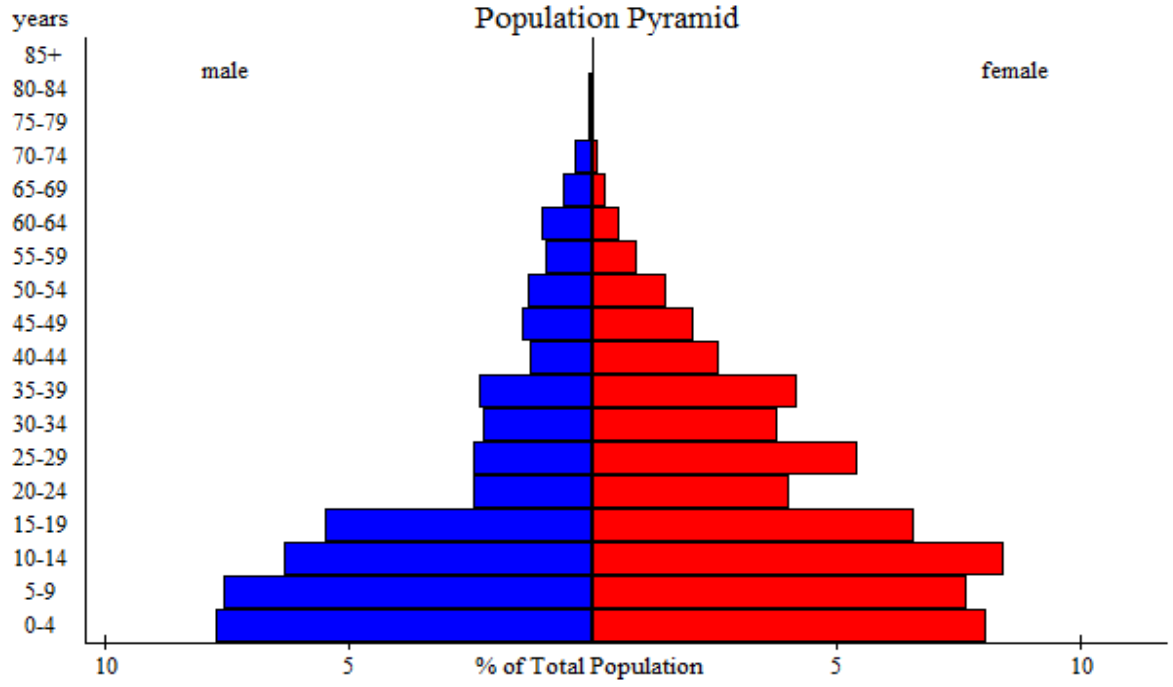

Figure 3: Population Pyramid for Mayom County

3.2 Anthropometric results (based on WHO standards 2006)

3.2.1 Distribution by age and sex

Anthropometric measurements were taken on a total of 668 children (325 boys and 343 girls) aged 6-59 months to assess acute malnutrition.

The distribution of the assessed children by age and sex shows that boys and girls were equally represented with a ratio of 0.9 which suggests there was no selection bias.

The age ratio of 6-29 months to 30-59 months was 0.98 (The value should be around 0.85) was found to be statistically insignificant p-value = 0.073. This indicates a balanced representation of younger (6-29 months) and older (30-59 months) children.

Distribution of age and sex is shown on Table 4 below.

Table 4: Distribution of age and sex of sample

	Boys		Girls		Total		Ratio
AGE (mo)	**no.**	**%**	**no.**	**%**	**no.**	**%**	**Boy:girl**
6-17	94	52.5	85	47.5	179	26.8	1.1
18-29	68	45.0	83	55.0	151	22.6	0.8
30-41	83	47.7	91	52.3	174	26.0	0.9
42-53	66	55.5	53	44.5	119	17.8	1.2
54-59	14	31.1	31	68.9	45	6.7	0.5
Total	325	48.7	343	51.3	668	100.0	0.9

3.2.2 Prevalence of acute malnutrition based on Weight for Height and by sex

The prevalence of Global Acute Malnutrition (GAM) defined as Weight-for-height <-2 z scores and/or oedema rate for Mayom County was 21.1**%** (17.7 - 24.8 95% C.I.), and the severe acute malnutrition (SAM) defined as Weight-for-Height z<-3 and/or oedema rate was 4.1% (2.9 - 5.7 95% C.I.). The findings indicate a critical nutrition situation according to WHO classification.

Table 5: Prevalence of acute malnutrition based on weight-for-height z-scores and/or oedema by sex

	All n = 660	Boys n = 320	Girls n = 340

Prevalence of global malnutrition **(<-2 z-score and/or oedema)**	(139) 21.1 % (17.7 - 24.8 95% C.I.)	(84) 26.3 % (21.6 - 31.4 95% C.I.)	(55) 16.2 % (12.4 - 20.9 95% C.I.)
Prevalence of moderate malnutrition **(<-2 z-score and >=-3 z-score, no oedema)**	(112) 17.0 % (13.8 - 20.6 95% C.I.)	(67) 20.9 % (16.9 - 25.6 95% C.I.)	(45) 13.2 % (9.8 - 17.6 95% C.I.)
Prevalence of severe malnutrition **(<-3 z-score and/or oedema)**	(27) 4.1 % (2.9 - 5.7 95% C.I.)	(17) 5.3 % (3.5 - 8.0 95% C.I.)	(10) 2.9 % (1.6 - 5.4 95% C.I.)

No oedema case was observed during the assessment.

Graphical presentation of the above results showed that the curve had deviated to the left with a mean of -1.15 and SD of ±1.02. The standard deviation of ±1.02 is within the acceptable range of 0.8 to 1.2. The design effect (DEFF) determined was 1.21 which shows no intra-cluster variations.

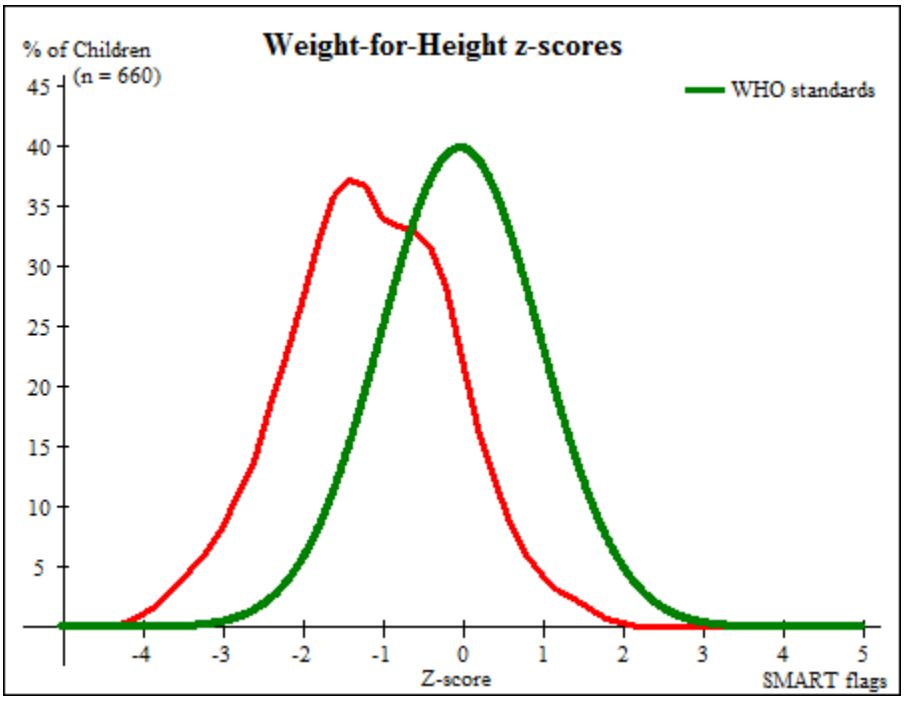

Figure 4: Frequency Distribution of WFH z-scores for children 6-59 months

3.2.3 Prevalence of acute malnutrition by age based on Weight for Height

The prevalence of acute malnutrition (WHZ<-2 and/or oedema) by age is presented in table 6 and shows a higher proportion of severe acutely malnourished (SAM) among the 6-17 months old and moderate acutely malnourished (MAM) among 54-59 months old children. This suggests varied exposure to malnutrition risk factors for various age categories. Generally, younger children 6-17 months were more affected by both severe and moderate acute malnutrition. This may be attributed to inadequate feeding practices among the younger children.

Table 6: 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	177	12	6.8	38	21.5	127	71.8	0	0.0
18-29	147	4	2.7	19	12.9	124	84.4	0	0.0
30-41	172	4	2.3	28	16.3	140	81.4	0	0.0
42-53	119	6	5.0	17	14.3	96	80.7	0	0.0
54-59	45	1	2.2	10	22.2	34	75.6	0	0.0
Total	660	27	4.1	112	17.0	521	78.9	0	0.0

3.2.4 Distribution of acute malnutrition and oedema based on WFH z-cores

Table 7 below shows the distribution of acute malnutrition based on WHZ and oedema. No kwashiorkor case was reported.

Table 7: Distribution of acute malnutrition and oedema based on WFH 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. 29 (4.3 %)	Not severely malnourished No. 639 (95.7 %)

3.2.5 Prevalence of acute malnutrition based on MUAC cut off's and/or oedema by sex

Prevalence of global acute malnutrition based on MUAC (<125mm) and/or oedema was 8.1% (6.2 - 10.5 95% C.I.) and of severe acute malnutrition MUAC (<115mm) and/or oedema was 0.4% (0.1 - 1.4 95% C.I.).

Table 8: Prevalence of acute malnutrition based on MUAC cut off's and/or oedema by sex

	All n = 668	Boys n = 325	Girls n = 343
Prevalence of global malnutrition **(< 125 mm and/or oedema)**	(54) 8.1 % (6.2 - 10.5 95% C.I.)	(26) 8.0 % (5.4 - 11.8 95% C.I.)	(28) 8.2 % (5.4 - 12.2 95% C.I.)
Prevalence of moderate malnutrition **(< 125 mm and >= 115 mm, no oedema)**	(51) 7.6 % (5.8 - 10.0 95% C.I.)	(26) 8.0 % (5.4 - 11.8 95% C.I.)	(25) 7.3 % (4.8 - 11.0 95% C.I.)
Prevalence of severe malnutrition **(< 115 mm and/or oedema)**	(3) 0.4 % (0.1 - 1.4 95% C.I.)	(0) 0.0 % (0.0 - 0.0 95% C.I.)	(3) 0.9 % (0.3 - 2.7 95% C.I.)

3.2.6 Prevalence of acute malnutrition based on MUAC cut off's and/or oedema by age

A higher proportion of the younger children aged 6-29 months had both severe and moderate acute malnutrition based on MUAC cut offs (<125mm) than their older counterparts (30-59).

Table 9: Prevalence of acute malnutrition based on MUAC cut off's and/or oedema by age

		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	179	3	1.7	32	17.9	144	80.4	0	0.0
18-29	151	0	0.0	13	8.6	138	91.4	0	0.0
30-41	174	0	0.0	4	2.3	170	97.7	0	0.0
42-53	119	0	0.0	2	1.7	117	98.3	0	0.0
54-59	45	0	0.0	0	0.0	45	100.0	0	0.0
Total	668	3	0.4	51	7.6	614	91.9	0	0.0

3.2.7 Prevalence of underweight based on weight for age z scores by sex

Prevalence of underweight was 14.1 % (11.2 - 17.7 95% C.I.) with severe underweight being 1.4% (0.6 – 2.9 95% C.I.). Higher prevalence of underweight was observed among boys 16.0 % (12- 21.2 95% C.I.) than girls 12.3% (8.9 - 16.6 95% C.I.).

Table 10: Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 666	Boys n = 324	Girls n = 342
Prevalence of underweight	(94) 14.1 %	(52) 16.0 %	(42) 12.3 %

(<-2 z-score)	(11.2 - 17.7 95% C.I.)	(12.0 - 21.2 95% C.I.)	(8.9 - 16.6 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(85) 12.8 % (10.3 - 15.7 95% C.I.)	(45) 13.9 % (10.4 - 18.3 95% C.I.)	(40) 11.7 % (8.6 - 15.7 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(9) 1.4 % (0.6 - 2.9 95% C.I.)	(7) 2.2 % (1.0 - 4.8 95% C.I.)	(2) 0.6 % (0.1 - 2.4 95% C.I.)

3.2.8 Prevalence of underweight based on weight for age z scores by age

A higher proportion of children in the age group (6-17 months) were both severely and moderately underweight.

Table 11: Prevalence of underweight based on weight-for-age z-scores by age

		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	177	6	3.4	29	16.4	142	80.2	0	0.0
18-29	151	1	0.7	19	12.6	131	86.8	0	0.0
30-41	174	1	0.6	19	10.9	154	88.5	0	0.0
42-53	119	0	0.0	16	13.4	103	86.6	0	0.0
54-59	45	1	2.2	2	4.4	42	93.3	0	0.0
Total	666	9	1.4	85	12.8	572	85.9	0	0.0

3.2.9 Prevalence of stunting based on height for age z scores

Overall prevalence of stunting (HAZ<-2) was 3.9% calculated with an SD of 1.[7]

3.2.10 Mean z-scores, Design effects and Excluded subjects

The design effect for Weight-for-Height (z-score < -2) was at 1.21 as compared to 1.5 used for planning, which showed that acute malnutrition prevalence is homogeneous in Mayom County. Number of children excluded from final analysis for Weight-for-Height (8) and Weight-for-Age (2) with SMART flags was low.

Table 12: 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	660	-1.15±1.02	1.21	0	8
Weight-for-Age	666	-0.93±0.99	1.40	0	2
Height-for-Age	652	-0.25±1.22	1.16	0	16

* contains for WHZ and WAZ the children with edema.

[7] If the SD of a given anthropometric index is greater than 1.2, it is recommended that the calculated prevalence (with an SD of one) is reported in the final survey report. The SMART Plausibility Check for Anthropometry 2015

3.3 Mortality results (retrospective over 91 days prior to interview)

The crude mortality rate (CMR) was 0.68 (0.47-0.99 95% C.I) and the under-five mortality rate (U5MR) was 0.75 (0.31-1.78 95% C.I). Both the CMR and U5MR rates were below the WHO emergency thresholds of 1/10,000 persons/day for CMR and 2/10,000 U5 children/day for U5MR).

Mortality results are presented in tables 13 and 14 below.

Table 13: Demographic profile of the Respondents for Mortality Data

Household information for mortality data			
Total population		Children 0-59 months	
Total number HH residents	4666.5	Number 0-4 years	737.5
Total number of people that joined HHs in recall period	328	Number of children 0-4 years that joined HH during recall period	3
Total number people that left HHs in recall period	1214	Number of children 0-4 years that left HH during recall period	17
Total number of births during recall period	32		
Total number deaths during recall period	29	Number of deaths among children 0-4 years during recall period	5
Crude mortality rate (deaths/10,*000*/day)	0.68 (0.47-0.99 95% C.I)	Under-5 mortality rate (deaths/10,000/day)	0.75 (0.31-1.78 95%)
Design effect	1.00	Design effect	1.00

Most deaths occurred among males 0.86 (0.56-1.32) than females 0.54 (0.29-1.01). Common cause of deaths was illness (89.7%) followed by injury/traumatic causes (10.3%) as reported based on recall by respondents. Many of the deaths occurred in the current location of the assessment 79.3% and 20.7% occurred during migration.

Table 14: Causes and Location of Death

Cause of death	**%**	**Location of death**	**%**
1. Illness	89.7	1] In current location	79.3
2. Injury/traumatic	10.3	2] During migration	20.7
3. Unknown	0	3] In place of last residence	0
		4] Other	0

4 Other results

4.1 Measles immunization, vitamin A supplementation and deworming

Among children 9-59 months, measles vaccination coverage was low at 39.3%. Vitamin A coverage was also low with 42.1% of children 12-59 months old having received supplementation in the past 6 months. Deworming in the past 6 months before the survey stood at 10.7%.

The coverage for measles, vitamin A and deworming was far below the World Health Organization (WHO) recommended coverage of above 80% hence making the community prone to outbreaks of childhood preventable illnesses. Results of the measles immunization, Vitamin A supplementation and deworming are shown on table 15 below.

Table 15: Measles immunization, vitamin A and deworming Coverage

Indicator	N	n	Percent 95% C.I.
Children (9-59 months) immunized against measles, based on card	621	229	36.9 (33.2-40.6)
Children (9-59 months) immunized against measles, based on recall	621	15	2.4 (1.3-3.7)
Children (12-59 months) who received Vitamin A in the past 6 months	561	236	42.1 (38-46.2)
Children (12-59 months) dewormed in the last 6 months	561	60	10.7 (8.4-13.2)

4.2 Morbidity status

Assessment of childhood illnesses was based on a two-week recall period prior to the survey date to establish the prevalence of common illnesses among children. The survey found that 65.9% (62.3-69.5 95% C.I) of children below five years reportedly suffered from some type of

illness 2 weeks prior to the survey. Fever, cough and diarrhea were the most reported illnesses at 47.6%, 31.6% and 19.9% respectively.

Table 16: Morbidity among children two weeks prior to the survey

Indicator	N	n	Percent 95% C.I.
Prevalence of reported illness	668	440	65.9 (62.3-69.5)
Fever		392	47.6 (44.2-50.8)
Cough		260	31.6 (28.4-34.6)
Diarrhea		164	19.9 (16.8-22.6)
Other		8	1 (0.4-1.7)

4.2.1 Health seeking behaviour

An assessment of health seeking behavior by caregivers of the sick children showed that 53.4% (357 cases) sought treatment. Most of the caregivers (40.9%) reported to have sought treatment for their children from the PHCC/PHCU as shown in figure 5 below.

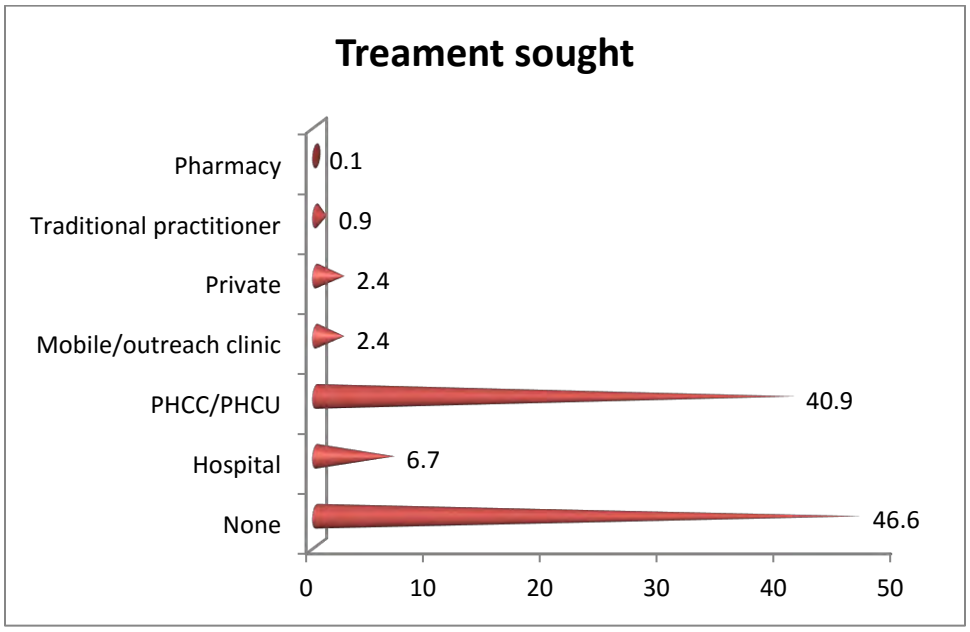

Figure 5: Health Seeking Practices

The proportion of children reported to be sleeping under insecticide treated mosquito nets the previous night of the interview was 85.9% (83.2-88.6 95% CI).

4.3 Maternal Nutrition

In this survey, the nutritional status of women was assessed using MUAC as an indicator of maternal nutritional status.

Women with MUAC <21cm were classified as severely malnourished, while women whose MUAC was between 21 and 23 cm were classified as moderately malnourished. Women whose MUAC was above 23 cm were classified as free of malnutrition.

It was discovered that only a small proportion (4.5%) of pregnant and lactating women screened were severely malnourished as they had a MUAC of <21 cm. Another 18.3% pregnant or lactating women were moderately malnourished with a MUAC of between >21cm and < 23 cm. However, majority (76.9%) of the PLW were found to be free of malnutrition.

Table 17: Maternal Nutrition

Indicator	N	n	Percent 95% C.I.
PLW MUAC <21cm	268	12	4.5 (2.2-7.5)
PLW MUAC >21-<23cm	268	49	18.3 (13.8-23.5)
PLW MUAC >23cm	268	207	76.9 (71.6-81.3)

4.4 Infant and Young Child Feeding

The survey collected data on Infant and Young Child Feeding practices. The number of children between 0-23 months considered for IYCF was 268 and therefore IYCF results should be interpreted with caution as the sample size was small to make statistically sound inference.

The proportion of infants reportedly put to the breast within the first hour of birth was 68.3%**.**

Information on exclusive breastfeeding collected from caregivers of 56 children aged 0-5.9 months showed only 30.4% of the children were being breast fed exclusively and this was much

lower than the WHO recommendation of ≥80%. Introduction of solid, semi-solid or soft foods at the age of six months was found to be low at 56.5%.

Table 18: Summary of Key IYCF Indicators for Mayom County

Indicator	N	n	Proportion 95% C.I.
Early initiation of breastfeeding (0-23.9 months)	268	183	68.3 (62.3-73.9)
Exclusive breastfeeding (0-5.9 months)	56	17	30.4 (19.6-42.9)
Introduction of solid, semi-solid or soft foods (6-8.9 months)	46	26	56.5 (41.3-69.6)
Continued breastfeeding at 12 months (12-15 months)	50	49	98 (94-100)
Minimum dietary diversity (6-23.9 months)	212	71	33.5 (27.4-39.6)
Minimum meal frequency for breastfed children (6-8.9 months)	46	35	76.1 (63-87)
Minimum meal frequency for both breastfed (9-23.9 months)	166	116	69.9 (62.7-77.1)
Minimum meal frequency for non-breastfed (6-23.9 months)	212	5	2.4 (0.5-4.7)

4.5 Food Security and Livelihoods

In this survey, household level interviews included questions to derive a number of international standard composite food security indicators to evaluate the food security status of households. The key food security indicators that were assessed included the Household Hunger Scale (HHS) and the Food Consumption Score (FCS).

4.5.1 Income sources for households in Mayom County in the past 30 days

Survey findings indicated that most of the households relied on sale of natural resources (31.9%) and sale of livestock (19.8%) as the main sources of income in the past 30 days. This was followed by sale of fish (14.5%) and sale of livestock products (12.1%).

Important sources of income are shown in figure 7.

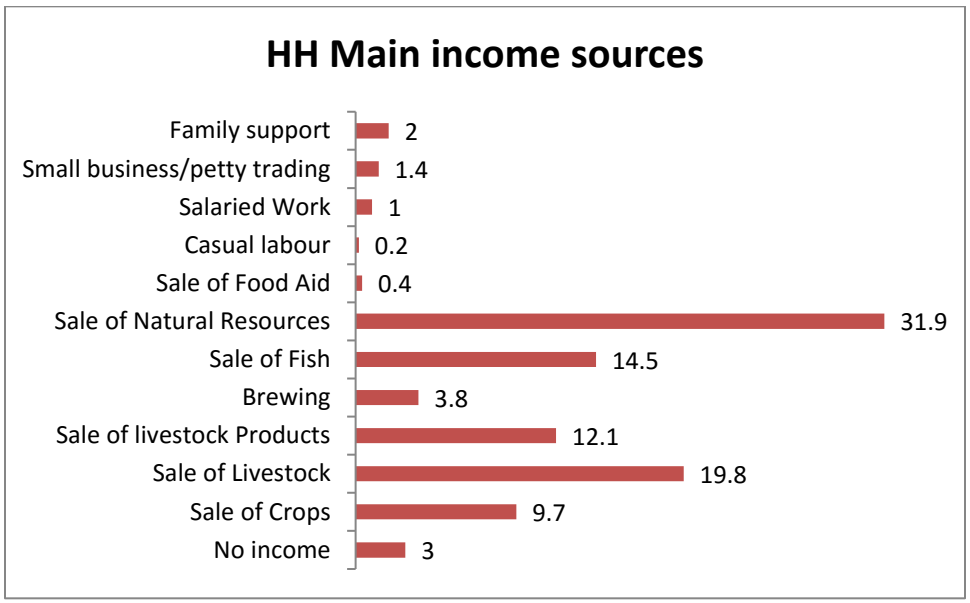

Figure 6: Main sources of Income for Households in Mayom County

4.5.2 Cultivation and livestock ownership

More than half of the households (56.6%) reported that they cultivated during the recent season while 85.9% reported that they owned livestock herds or farm animals.

4.5.3 Main sources of food for households in Mayom County

The main source of food was purchase (36.2%), this was followed by own production (34.1%) and food aid (11.5%).

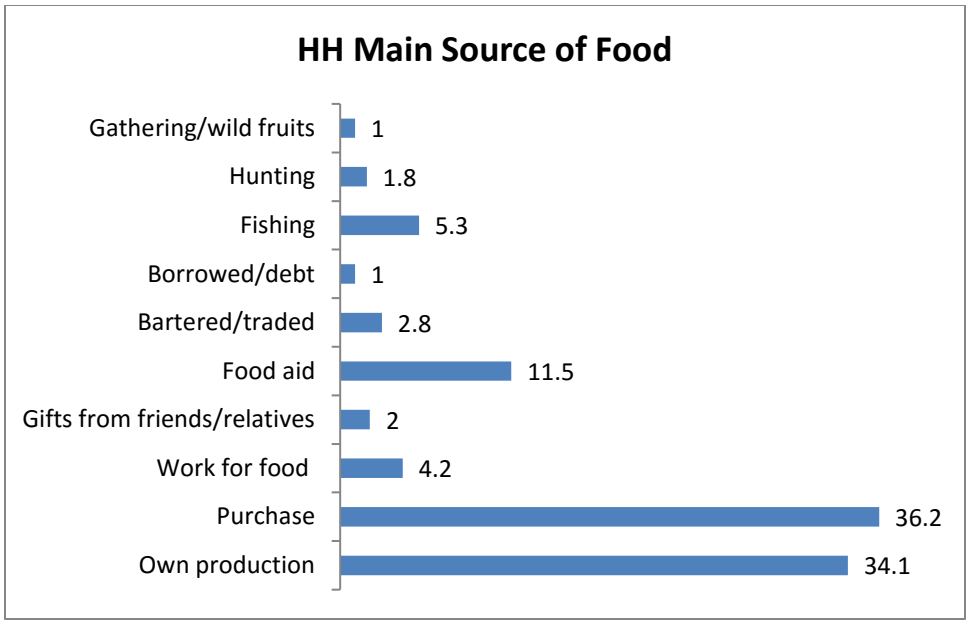

Figure 7: Main source of food for Households in Mayom County

4.5.4 Household hunger scale

The Household Hunger Scale (HHS) is a simple indicator used to measure household hunger in food insecure areas. HHS was calculated using a series of questions based on the FANTA III formula. Using this composite indicator, a respondent can score between zero and six depending on their answers. Individuals scoring from zero to one experience the least hunger and respondents scoring six experience the most hunger. Survey results showed that majority of respondents (68.7%) experienced moderate hunger at the time of the survey as shown on table 19 below:

Table 19: Household Hunger Scale in Mayom, May 2017

Household hunger scale	N	n	Percent 95% C.I.
Little to no hunger: 0 to 1	495	52	10.5 (7.9-13.3)
Moderate hunger: 2 to 3	495	340	68.7 (64.4-72.5)
Severe hunger: 4 to 6	495	103	20.8 (17.2-24.4)

4.5.5 Household food consumption

The food consumption score (FCS) is a composite score based on dietary diversity, food frequency, and relative nutritional importance of different food groups.

7.9% of households surveyed had poor food consumption, 13.5% of households had borderline food consumption but majority of surveyed households (78.6%) had acceptable food consumption. The results are as shown in table 20 below.

Table 20: Food Consumption Score for Households in Mayom County

Household food consumption score	N	n	Percent 95% C.I.
Poor food consumption: 0 to 21	495	39	7.9 (5.7-10.5)
Borderline food consumption: 21.5 to 35	495	67	13.5 (10.7-16.6)
Acceptable food consumption: >35	495	389	78.6 (74.7-81.8)

Despite the fact that many households reported experiencing moderate hunger, a higher proportion of households had acceptable food consumption score. Close examination of consumption patterns shows that in many cases, households were prioritizing intake of high energy and high protein foods which may explain the acceptable food consumption score.

Nearly all households reported consuming cereals and tubers in the week prior to the household interview. In addition, large proportions of households reported consuming meat, fish and milk which are part of the main diet in the area.

Percentage of households consuming each food group is shown in figure 9 below.

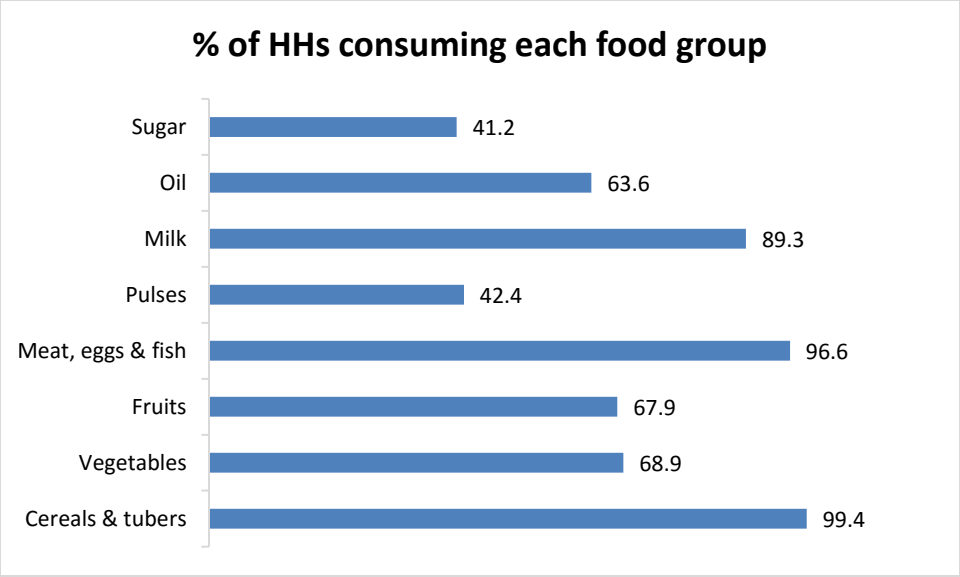

Figure 9: Households consuming each food group in Mayom County

4.6 Water, Sanitation and hygiene (WASH)

4.6.1 Main sources of drinking water and treatment methods

Sources of drinking water for majority of the sampled households were river/stream (67.1%) and boreholes (26.3%). This shows that majority of the population were utilizing unsafe water sources.

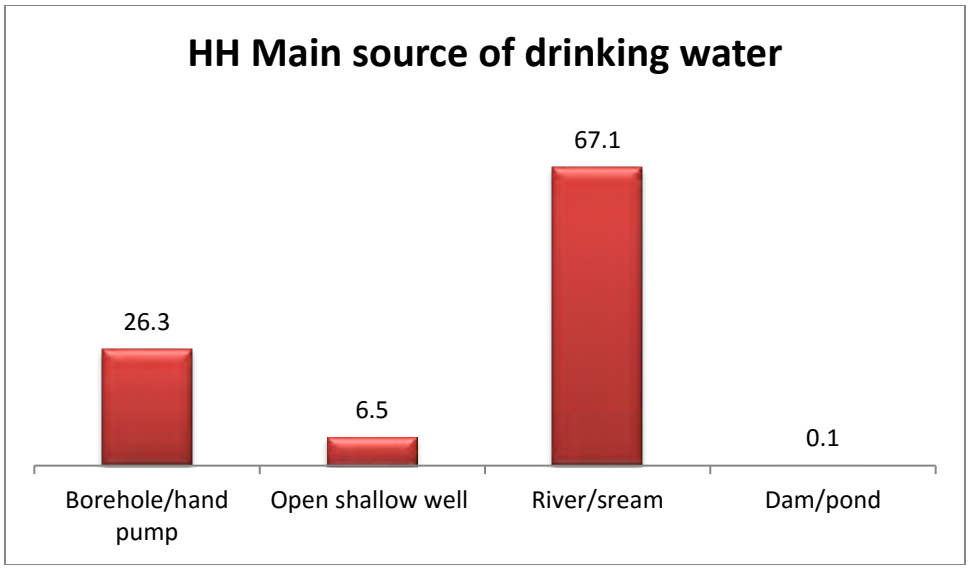

Figure 8: Main sources of drinking water for Households in Mayom County

The survey measured time taken to collect water which incorporates travel and waiting time. Majority of the population (39.8%) was taking between 30 minutes to 1 hour to travel, queue and fetch water. The time taken to fetch water is as shown in the figure 11.

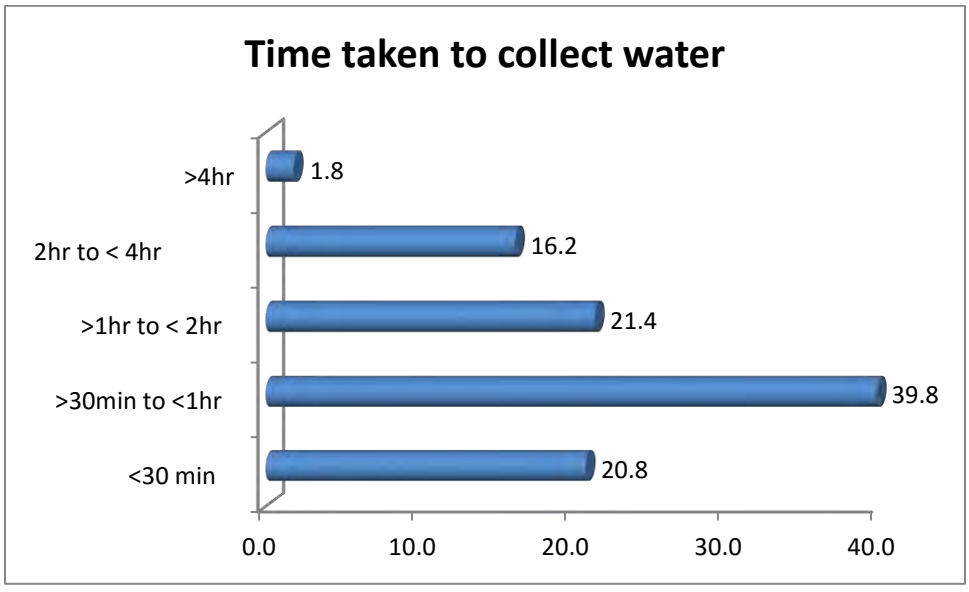

Figure 9: Time taken to collect water for Households in Mayom County

Most of the households (90.3%) do not treat their drinking water. The few who practice water treatment said they boil water (2.8%) and only 1% of respondents use water treatment chemicals.

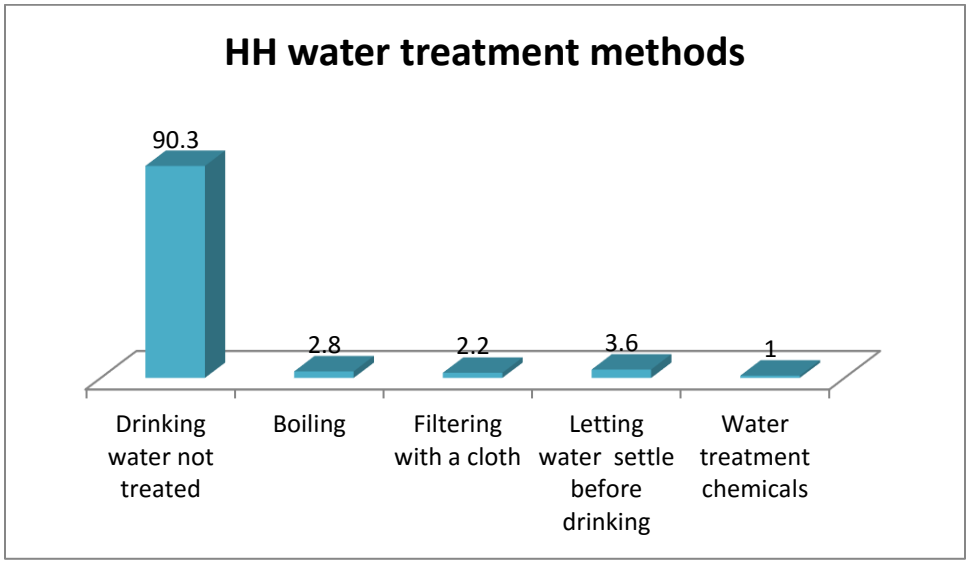

Figure 10: Water treatment methods used by Households in Mayom County

4.6.2 Hand washing practice

It is recommended that hand washing with soap should be at five critical times including; after using a latrine, before eating or preparing food, before eating, before feeding the baby, and after cleaning the baby[8]. Although most households reported that they wash hands (96.6%). majority wash hands before cooking (32.5%). Only 17.7% said they wash hands after defecation which increases risk of transmission of infections related to poor hygiene.

[8] The SPHERE Project Handbook (2011), Humanitarian Charter and Minimum Standards in Disaster Response

Figure 11: Hand washing practice by Households in Mayom County

Nearly all caregivers interviewed (99.4%) did not wash their hands at the recommended five critical times. Majority of caregivers interviewed (58.2%) washed their hands only on one occasion, 18.4% washed hands at two critical times, 14.5% washed hands at three critical times and only 3.2% said they washed hands at four critical times.

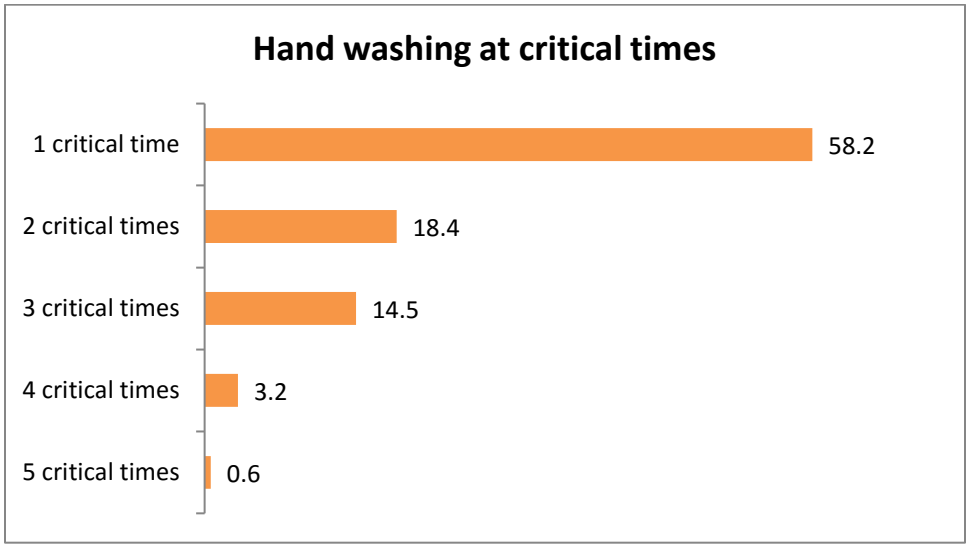

Figure 12: Hand washing at five critical times by Households in Mayom County

Majority of the households 84% use water only for handwashing with only 4% washing their hands with soap and water. This shows poor hand washing practices with regards to use of water and soap.

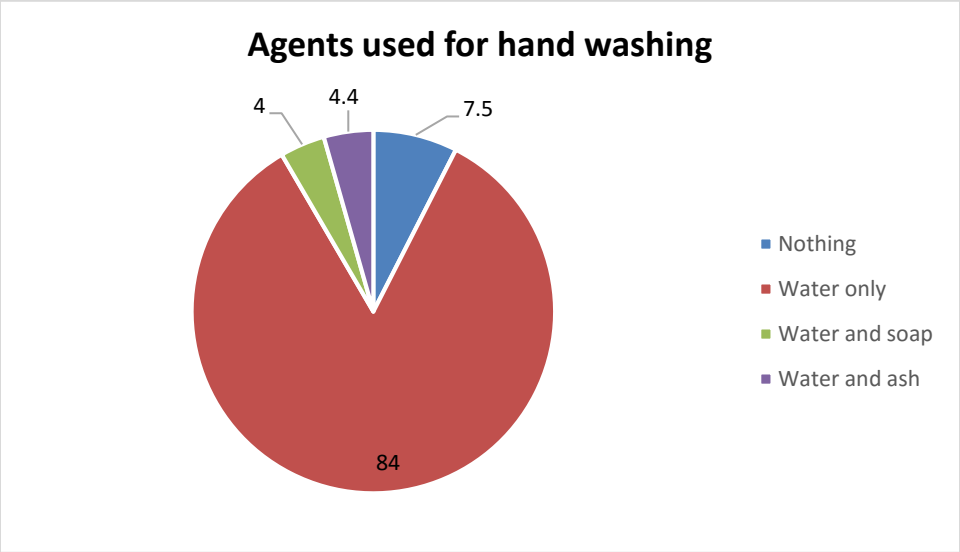

Figure 13: Agents used for hand washing by Households in Mayom County

4.6.3 Human excreta disposal methods

A large proportion of the surveyed households lack access to sanitation facilities and most use undesignated open area (89.7%) and designated open area (8.3%) for excreta disposal.

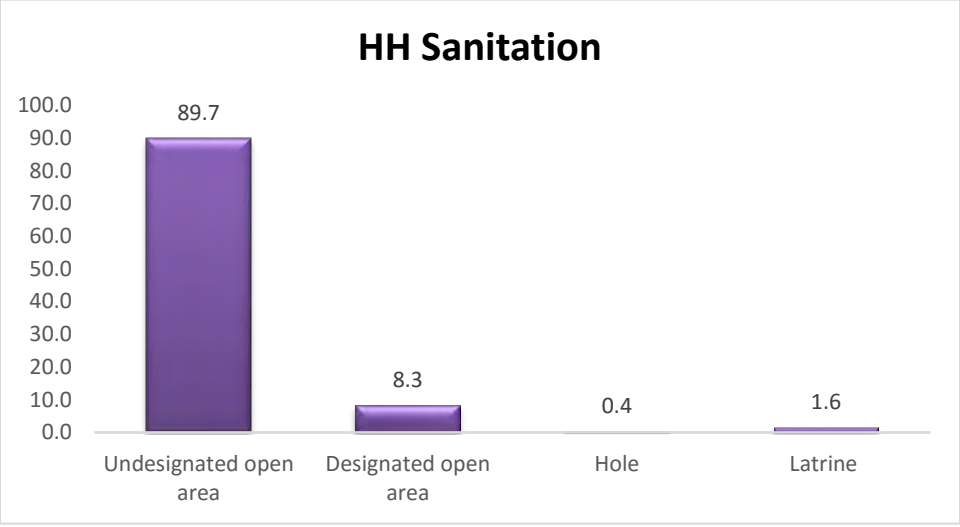

Figure 14: Human excreta disposal methods used by Households in Mayom County

5 Discussion

5.1 Nutrition status

According to the survey findings, the Global Acute Malnutrition (GAM) rate of 21.1% (17.7 - 24.8 95% C.I.) and a Severe Acute Malnutrition (SAM) rate of 4.1% (2.9 - 5.7 95% C.I.) indicate a critical nutrition situation as per the WHO malnutrition thresholds.

The findings show improvement of the nutrition situation when compared to the results from the survey that was conducted in May 2016. Comparative analysis using the CDC two surveys calculator shows significant change in the GAM rate for May 2017 when compared to May 2016 SMART survey (p value =0.0318).

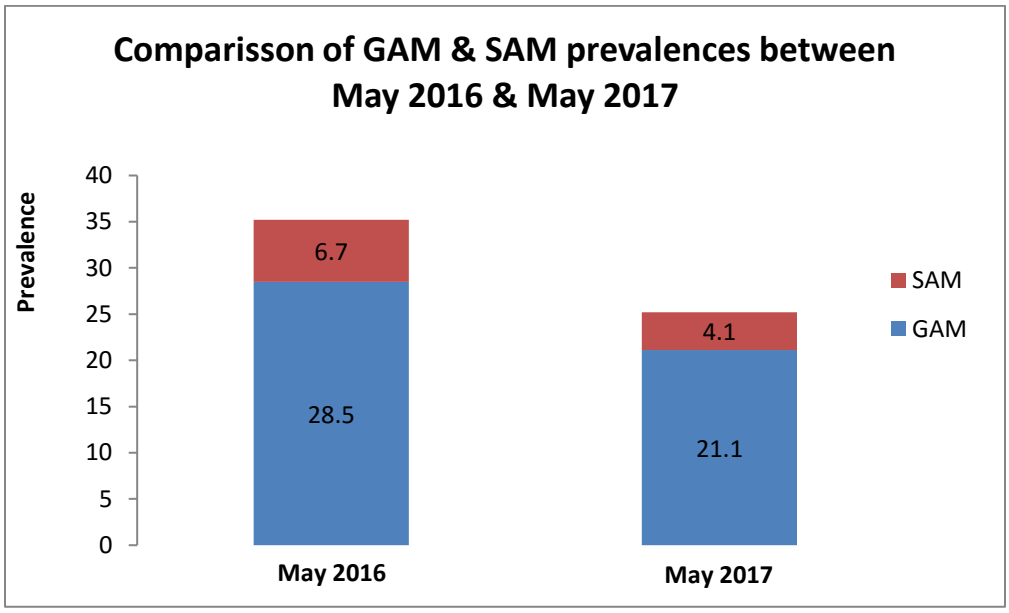

Figure 15: Comparison of GAM and SAM prevalence during the current and previous pre-harvest seasons in Mayom County

Results presented above indicate the current nutritional status in Mayom is critical in the presence of aggravating factors including; high morbidity rate, low immunization and micronutrient supplementation rates, poor IYCF, food insecurity, poor Water, Sanitation and Hygiene practices.

5.2 Mortality

The crude mortality rate (CMR) was 0.68 (0.47-0.99 95% CI) and the under-five mortality rate (U5MR) was 0.75 (0.31-1.78 95%). Both CMR and U5MR rates were below the WHO emergency thresholds of 1/10,000/day and 2/10,000/day respectively.

Compared with mortality rates of the May 2016 SMART survey in Mayom where the CMR was 0.44 (0.21-0.93 95% C.I) and the U5MR was 0.60 (0.12-3.00 95% C.I) the current mortality rates indicate a slight increase of both the CMR and U5MR rates according to WHO classification. Most deaths were as a result of illness (89.7%).

5.3 Health

The percentage of children who had reportedly suffered from one or more illnesses in the two weeks prior to the survey was 65.9%.

The most common cause of illness was fever (47.6%) followed by cough (31.6%) and diarrhea (19.9%). The health seeking behavior of the community was poor with 46.6% of the mothers reportedly not seeking treatment for their sick children.

The coverage for measles immunization (39.3%), vitamin A supplementation (42.1%) and deworming (10.7%) were far below the World Health Organization (WHO) recommended standard of >80%.

5.4 IYCF practices

Information on infant and young child feeding (IYCF) practices was collected although SMART surveys are not necessarily designed to collect IYCF data. Therefore, the data should be interpreted with caution as sample sizes are small.

Exclusive breastfeeding to the age of 6 months (30.4%) was far below the World Health Organization (WHO) recommended standard of >80%. The proportion of infants reportedly put to the breast within the first hour of birth was also low at 68.3%. Introduction of solid, semi-solid or soft foods at the age of 6 months was found to be low at 56.5%.

5.5 Possible factors triggering malnutrition

In Mayom County, the possible factors triggering the high level of malnutrition include; high morbidity, low immunization coverage and micronutrient supplementation, food insecurity, sub-optimal infant and young child feeding and poor Water, Sanitation and Hygiene.

The morbidity rate in the survey area was high with 65.9% of the sampled children being sick two weeks prior to the survey.

Survey results showed that majority of respondents (68.7%) experienced moderate hunger.

The proportion of households not treating their drinking water was very high (90.3%).

Majority of the households (98%) indicated that they lack access to sanitation facilities.

6 Conclusion

The current nutrition situation in Mayom County is above the WHO emergency thresholds and calls for continuation and expansion of programmes meant to treat and prevent acute malnutrition.

Overall, the key underlying factors affecting nutrition status are high morbidity, low immunization coverage and low micronutrient supplementation, poor IYCF practices especially inadequate breastfeeding and complementary feeding, food insecurity, very high level of open defecation, poor hand washing practices and use of untreated drinking water.

Currently, CARE SS is implementing CMAM and also partnering with WFP in carrying out the general food distribution. These interventions may potentially help to improve the nutrition situation in the short term and medium term. However, in the long term, integrated approaches should be undertaken to reduce risk factors such as high morbidity, poor child care and feeding practices, unsafe drinking water, and limited sanitation and hygiene services. Measures to increase access to health services and improved coverage of health programmes would play a critical role in both preventing and treating diseases.

7 Recommendations

1. Survey results show that prevalence of acute malnutrition is well above the emergency threshold levels as defined by WHO. Given this fact, it is recommended that the current nutrition intervention (CMAM) should be continued. At the time of survey, CARE was providing CMAM services in seven out of ten Payams of Mayom. CARE should therefore focus on increasing the coverage to reach all the ten Payams in order to improve treatment of malnourished children.
2. Findings on morbidity showed that most of the children had suffered from ARI and diarrhoea in the past two weeks prior to the survey. It is recommended that CMAM be integrated with community case management of childhood illnesses in order to prevent spread of common illnesses especially ARI and diarrhoea.
3. The coverage for measles, vitamin A and deworming was low. Considering the relationship between low immunization and malnutrition, it is recommended that EPI coverage should be increased by working with partners to provide immunization services. The nutrition programme can serve as an entry point for increasing EPI coverage.
4. Survey results showed that majority of respondents (68.7%) experienced moderate hunger at the time of the survey. There is need to improve coverage for food security programmes implemented by partner agencies and also ensuring there is integration with the nutrition programme.
5. Intensive awareness raising sessions at health facilities as well as in the communities should focus on early initiation of breastfeeding, exclusive breastfeeding, timely introduction of solid, semi-solid and soft foods and providing information to mothers/caregivers on the recommended frequency and diversity of food fed to infants and young children.
6. Majority of the households (98%) do not have access to latrines for disposal of human waste. Construction of latrines and promotion of hygiene and sanitation through social

and behavior change communication strategies such as IEC materials and community change agents should be considered.

7. Only 4% of surveyed households indicated that they use water and soap for hand washing. Given the linkages between inadequate hand washing and disease transmission, options to increase the availability of soap and dissemination of hygiene messages should be explored.

8 Appendices

Appendix 1: Plausibility report

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** (1.2 %)
Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**0** (p=0.486)
Age ratio(6-29 vs 30-59)	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**2** (p=0.073)
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	**2** (8)
Dig pref score - MUAC	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**2** (8)
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** (1.02)
Skewness WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (-0.02)
Kurtosis WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (-0.16)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<=0.001	
			0	1	3	5	**1** (p=0.030)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	**7** %

The overall score of this survey is 7 %, this is excellent.

Appendix 2: List of selected clusters

Geographical unit	Population size	Clusters
Kuernyaduop	1580	1
Thuarchiangbol	1044	2
Poulnyang	1485	3
Wichthiep	1618	4
Panhial	1230	5
Ruathbel	1210	6
Nyekuawne	783	7
Watwane	731	8
Kuerdik	280	9
Muolmuol	522	10
Doth	722	11
Pam	156	12
Wicruop	783	13
Buorjek	783	14
Mantoang	687	15
Majak	792	16
Kuanydiet	522	17
Ruathlual	435	18
Kerial	609	19
Mathiech	305	20
Chuom	150	21
Paluang	783	22
Kei	713	23
Chieychan	817	24
Nyadieng	696	25
Nyadai	522	26
Wichpol kol	739	27
Pakuor	704	28
Pakelob	696	29
Kuerming	522	30
Nienkel	609	31
Pattoy	609	32

Tuoch	748	33
Pajang	261	RC
Maper	304	34
Wuoye	800	RC
Nguonyier	783	RC
Maguol	791	35
Wanjuut	522	RC
Penpur	739	36

Appendix 3: Standardization test results

Standardization test results				Precision				Accuracy		OUTCOME		
Weight	subjects	mean	SD	max	Technical error	TEM/mean	Coef of reliability	Bias from superv	Bias from median	result		
	#	kg	kg	kg	TEM (kg)	TEM (%)	R (%)	Bias (kg)	Bias (kg)			
Supervisor	10	9.6	2	0.1	0.03	0.3	100	-	0.92	TEM good	R value good	
Enumerator 1	10	9.6	2	0.1	0.06	0.6	99.9	0.02	0.94	TEM acceptable	R value good	Bias good
Enumerator 2	10	9.6	1.9	0.3	0.12	1.3	99.6	-0.05	0.88	TEM poor	R value good	Bias good
Enumerator 3	10	9.7	2	0.2	0.12	1.2	99.7	0.03	0.95	TEM poor	R value good	Bias good
Enumerator 4	10	9.6	2	0.2	0.08	0.8	99.8	0.02	0.94	TEM acceptable	R value good	Bias good
Enumerator 5	10	9.6	2.1	0.3	0.12	1.3	99.7	-0.03	0.89	TEM poor	R value good	Bias good
Enumerator 6	10	9.6	2	0.2	0.1	1.1	99.7	0	0.92	TEM poor	R value good	Bias good
Enumerator 7	10	9.6	2	0.2	0.1	1	99.8	0.02	0.94	TEM poor	R value good	Bias good
Enumerator 8	10	9.6	2	0.2	0.09	1	99.8	-0.01	0.91	TEM acceptable	R value good	Bias good
Enumerator 9	10	9.6	2	0.3	0.1	1.1	99.7	0.01	0.93	TEM poor	R value good	Bias good
enum inter 1st	9x10	9.6	2	-	0.11	1.1	99.7	-	-	TEM acceptable	R value good	
enum inter 2nd	9x10	9.6	2	-	0.08	0.8	99.8	-	-	TEM good	R value good	
inter enum + sup	10x10	9.6	2	-	0.1	1	99.8	-	-	TEM good	R value good	

	TOTAL intra+inter	9x10	-	-	-	0.14	1.5	99.5	0	0.92	TEM acceptable	R value good	Bias good	
	TOTAL+ sup	10x10	-	-	-	0.14	1.4	99.5	-	-	TEM acceptable	R value good		

Height		subjects	mean	SD	max	Technical error	TEM/mean	Coef of reliability	Bias from superv	Bias from median	result		
		#	cm	cm	cm	TEM (cm)	TEM (%)	R (%)	Bias (cm)	Bias (cm)			
	Supervisor	10	83.3	8.7	0.3	0.13	0.2	100	-	3.32	TEM good	R value good	
	Enumerator 1	10	83.4	8.6	1	0.36	0.4	99.8	0.04	3.36	TEM good	R value good	Bias good
	Enumerator 2	10	83.3	8.5	1	0.47	0.6	99.7	0.02	3.35	TEM acceptable	R value good	Bias good
	Enumerator 3	10	83.4	8.6	1.1	0.38	0.5	99.8	0.07	3.39	TEM good	R value good	Bias good
	Enumerator 4	10	83.4	8.5	1.6	0.69	0.8	99.3	0.1	3.42	TEM poor	R value good	Bias good
	Enumerator 5	10	83.2	8.5	1.2	0.56	0.7	99.6	-0.1	3.23	TEM acceptable	R value good	Bias good
	Enumerator 6	10	83.3	8.5	1	0.55	0.7	99.6	-0.01	3.31	TEM acceptable	R value good	Bias good
	Enumerator 7	10	83.6	8.2	1	0.51	0.6	99.6	0.27	3.59	TEM acceptable	R value good	Bias good
	Enumerator 8	10	83.2	8.5	1	0.45	0.5	99.7	-0.11	3.21	TEM acceptable	R value good	Bias good
	Enumerator 9	10	83.4	8.4	1.7	0.67	0.8	99.4	0.04	3.36	TEM poor	R value good	Bias good
	enum inter 1st	9x10	83.3	8.3	-	0.55	0.7	99.6	-	-	TEM acceptable	R value good	
	enum inter	9x1	83.	8.	-	0.47	0.6	99.7	-	-	TEM good	R value good	

	2nd	0	4	3										
	inter enum + sup	10x 10	83.4	8.3	-	0.5	0.6	99.6	-	-	TEM good	R value good		
	TOTAL intra+inter	9x10	-	-	-	0.73	0.9	99.2	0.03	3.35	TEM acceptable	R value good	Bias good	
	TOTAL+ sup	10x 10	-	-	-	0.71	0.8	99.3	-	-	TEM acceptable	R value good		

MUAC		subjects	mean	SD mm	max	Technical error TEM	TEM/mean TEM	Coef of reliability	Bias from superv	Bias from median	result		
		#	mm	mm	mm	(mm)	(%)	R (%)	Bias (mm)	Bias (mm)			
	Supervisor	10	13.4	1	0.2	0.1	0.8	98.9	-	0.28	TEM good	R value acceptable	Bias good
	Enumerator 1	10	13.3	1	0.1	0.05	0.4	99.7	-0.08	0.2	TEM good	R value good	Bias good
	Enumerator 2	10	13.2	0.9	0.4	0.15	1.2	97.4	-0.14	0.14	TEM good	R value acceptable	Bias good
	Enumerator 3	10	13.2	0.9	0.9	0.36	2.7	84.8	-0.2	0.08	TEM good	R value reject	Bias good
	Enumerator 4	10	13.1	0.9	0.6	0.31	2.4	88	-0.26	0.02	TEM good	R value reject	Bias good
	Enumerator 5	10	13.5	1	0.7	0.26	1.9	93.7	0.1	0.39	TEM good	R value poor	Bias good
	Enumerator 6	10	13.1	0.8	0.3	0.12	0.9	97.8	-0.26	0.02	TEM good	R value acceptable	Bias good
	Enumerator 7	10	13.4	1	0.9	0.35	2.6	88.5	0.06	0.34	TEM good	R value reject	Bias good
	Enumerator 8	10	13.4	1	1.3	0.36	2.7	87.7	0.02	0.3	TEM good	R value reject	Bias good
	Enumerator 9	10	12.9	0.9	1	0.35	2.7	83.7	-0.51	-0.22	TEM good	R value reject	Bias good

enum inter 1st	9x10	13.3	1	-	0.37	2.8	86.3	-	-	TEM good	R value reject			
enum inter 2nd	9x10	13.2	0.9	-	0.33	2.5	87.1	-	-	TEM good	R value reject			
inter enum + sup	10x10	13.3	1	-	0.34	2.5	87.5	-	-	TEM good	R value reject			
TOTAL intra+inter	9x10	-	-	-	0.45	3.4	77.8	-0.14	0.16	TEM good	R value reject	Bias good		
TOTAL+ sup	10x10	-	-	-	0.43	3.3	79.5	-	-	TEM good	R value reject			

Appendix 4: Data collection tools

DEMOGRAPHY & MORTALITY QUESTIONNAIRE

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

COUNTY:	**PAYAM:**	**NAME OF INTERVIEWER:**
BOMA:	**VILLAGE:**	
CLUSTER NO. [ ][ ]	**TEAM NO. [ ][ ]**	**HOUSEHOLD[9] NO. [ ][ ]**

01	02	03	04	05	06	07	08	09	10
No.	Name	Sex (M/F)	Age (years)	Joined on or after:	Left on or after:	Born on or after:	Died on or after:	Cause of death 1= illness 2=injury 66=unknown	Location of death 1=current location 2=during migration 3=in place of last residence 4=other
				_____ (Start date of the recall period - ex. Jan. 1, 1900) WRITE 'Y' for YES. Leave BLANK if NO.					
a) List all the people that slept in this household last night.									
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									

[9] HH definition: Group of people living under same roof & sharing food from the same pot for a period of at least 6 months. 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.

12									
13									
14									
15									
16									
17									
18									
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				
5					Y				
6					Y				
7					Y				
c) List all the people that slept in this household on the **first night of the recall period but have since died**									
1							Y		
2							Y		
3							Y		
4							Y		
5							Y		

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

ANTHROPOMETRIC & HEALTH QUESTIONNAIRE

Date (DD/MM/YY): …./……/……. Cluster No:…… Team No…… State:…….. County…….. Payam:……..
Boma…….. Village:……..……

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Child No.	HH NO	Child Name	Sex **m** = Male **f** = Female	Date of Birth (DD/MM YY)	Age in months	Weight in Kg (eg 12.4)	Height in cm (eg 78.1)	Oedema **n** = No **y** =Yes	MUAC in cm (eg 11.3)	Vit. A in last 6 months ---------- **0** = No **1** =Yes	Measles Vaccine ---- **0** = No **1** =Yes with EPI card **2** =Yes recall **3** = Child <9m	Illness in past 14 days? **0** = No **1** =Yes If no, go to 16	Type of Illness **1** = Fever **2** = Cough **3** = Diarrhoea 99 = Other (specify)	Treatment Sought: **0** = None **1** =Hospital **2** =PHCC/U **3** = Mobile /outreach clinic **4**=CBD **5**=Private clinic **6**=Traditional practitioner **7**=Pharmacy/chemist **99**=Other (Specify)	Did the child sleep under a mosquito net(LLITN) last night? --------- 0= No 1= Yes	Dewormed in 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																

FOOD SECURITY AND LIVELIHOODS QUESTIONNAIRE

3.IDENTIFICATION 3.1 Data Collector_____ 3.2 Survey date (dd/mm/yy)----------							
3.3 State	3.4 County	3.5 Payam	3.6 Boma	3.7 Village	3.8 Cluster	3.9 Team No.	3.10 HH No

3.11	Please give me the number of the persons who live in your household. _____ (Indicate no.)	
3.12	What is the residency status of the household? 1.Resident 3.IDP 2.Returnee (in the last 1 year) 4.Refugee 66.Other specify |_____|	3.18. 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? 0 = No (Skip to Q.3.19) 1 = Yes |_____|
3.13	Is the household head male or female 1 = Male 2 = Female |___|	3.18a.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 |_____|
3.14	What was your households main income activity in the last 30days?(choose 1 option) 0= No income 1= Sale of crops 2= Sale of livestock 3= Sale of livestock products 4= Brewing 5= Sale of fish	3.19. 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?

	6= Sale of natural resources(firewood; charcoal; grass) 7= Sale of food aid 8= Casual labor 9= Skilled labor 10= Salaried work 11= Small business/other petty trading 12= Family support 66= Other-Specify |_____|	0 = No (Skip to Q3.20) 1 = Yes |_____|
3.15	Did you cultivate in the recent season 0. = No 1.= Yes |_____|	3.19a) How often did this happen in the past [4 weeks/30 days]? 0 = Rarely (1–2 times) 1 = Sometimes (3–10 times) 2 = Often (more than10 times) |_____|
3.16	Does the HH own any livestock, herds or farm animals? 0 = No 1 = Yes |_____|	3.20. In the past [4 weeks/30 days], did you or any household member go a whole day and night without eating anything at all because there was not enough food? 0 = No (Move to next section 4.0) 1 = Yes |_____|
3.17	From the first fighting of December 2013, how has your livestock ownership changed? 1 = Large decrease 2 = Small decrease 3 = Stayed the same 4 = Small increase 5 = Large increase |_____|	3.20a) 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

4.0: Food and Dietary frequency Household Diversity

	Did members of your household consume any food from these food groups in the last *7 days?(food must have been cooked/served at the household)*	If *yes*, mark days the food was consumed in the last 7 days?								What was the main source of the dominant food item consumed in the HHD? 1.Own production

	1=Yes *2=No*	yes=1; no=2								2.Purchase 3.Work for food 4.Gifts from friends/families 5.Food aid 6. Bartered/traded (exchange of food commodities) 7.Borrowed/debt 8.Fishing 9.Hunting 10.Gathering/wild fruit 66.Other (specify)
Type of food		D1	*D2*	D 3	D 4	D5	D 6	D7	TOTAL	
4.1. Cereals and cereal products *(e.g. sorghum, maize, spaghetti, pasta, posho, bread*)?										
4.2 Vitamin A rich vegetables and tubers: Pumpkins, carrots, orange sweet potatoes										
4.3 White tubers and roots: White potatoes, white yams, cassava, or foods made from roots										

4.4 Dark green leafy vegetables: Dark green leafy vegetables, including wild ones + locally available vitamin A rich leaves such as cassava leaves etc.										
4.5 Other vegetables *(e,g, tomatoes, egg plant, onions)?*										
4.6 Vitamin A rich fruits: + other locally available vitamin A rich fruits										
4.7 Other fruits										
4.8 Organ meat (iron rich): Liver, kidney, heart or other organ meats or blood based foods										
4.9 Flesh meats and offals: Meat, poultry, offal *(e.g. goat/camel meat, beef; chicken/poultry)?*										
4.10Eggs?										
4.11Fish: Fresh or dries fish or shellfish										
4.12Pulses/legumes, nuts *(e.g. beans, lentils, green grams, cowpeas)*?										
*4.13*Milk and milk products *(e.g. goat/camel/ fermented milk, milk powder)?*										
4.14Oils/fats *(e.g. cooking fat or oil, butter, ghee, margarine)?*										
4.15Sweets: Sugar, honey, sweetened soda or sugary foods such as chocolates, sweets or candies										
4.16Condiments, spices and beverages:										

INFANT AND YOUNG CHILD FEEDING QUESTIONNAIRE

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

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

Identification					INFANT AND YOUNG CHILD FEEDING (0 TO 23 MONTHS)								INFANT AND YOUNG CHILD FEEDING (0 TO 23 MONTHS)												
11	11.1	11.2	11.3	11.4	11.5	11.6	11.7	**11.8 Yesterday, during the day or at night, did [NAME] receive any of the following liquids?**					**11.8 Yesterday, during the day or at night, did [NAME] receive any of the following liquids?**			**11.9 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?**							11.10 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)	11.11 Yesterday during the day/night, did [child's name] consume any food given by a health centre 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	11.12
Child No.	HH No.	Child Name	Sex M= Male F= Female	Age in months (0-23 months)	Has [NAME] ever been breast fed? (EverBF) 1= Yes 0 = No 8 = Don't know	How long after birth did you first put [NAME] to the breast? 1 = Less than one hour 2 = Between 1 and 23 hours 3 =More than 24 hours 8 = Don't know	Is (Name) still breastfeeding now? 1= Yes 0 = No 8 = Don't know	Plain water **1= Yes 0 = No 8 = Don't know**	Infant formula ____ times	Milk such as tinned, powdered, or fresh animal milk ____ times	Sour milk or Yoghurt ____ times	Juice or juice drinks 1= Yes 0 = No 8 = Don't know	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, Appile, Grapes, Guava, Lemon, Pinappeale, Cabbage, onions, tomatoes, etc 1= Yes 0 = No 8 = Don't know			Pregnant and Lactating Women (PLW) MUAC ____cm

WATER AND SANITATION QUESTIONNAIRE

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

	31	32	33	34	35	36	37
HH NO	What is the household's main **source** of drinking water ? ---------- **1**=Borehole/hand pump **2**=Protected Shallow well **3**= Open shallow well **4**= Protected spring **5**= River /Stream **6**= HH connection / Stand pipe /Tanker **7**= Dam / Pond **99**= Other (specify_____)	How **long** does it take the HH to collect water (including travel to and from and waiting)? ---------- **1** = ≤30 min **2** = >30min to ≤1hr **3** = >1hr to ≤ 2hr **4** = >2hr to ≤ 4hr **5** = >4hr	How many **jerricans** of water did the HH use yesterday in total (excluding water for washing clothes and for animal)? (Define how many **litres** in a jerrycan if the population all use the same)	What do you usually do to water to make it safer **before** household members drink it? -------- **0** =Nothing **1** =Boiling **2** =Filtering with a cloth **3** =Letting it settle **4** =Water treatment chemicals **99** =Others(Specify)	**When** do you usually **wash** your hands (more than one if appropriate - do not prompt) --------- **0** = Never **1** = After defecating **2** = Before cooking **3** = Before eating **4** = Before feeding the baby **5**=Affter cleaning the baby **99**=other (specify)	**What** do you use to **wash** hands? ..... **0** = Nothing **1** = Water only **2** = Water + Soap **3** = Water + Ash 99 = other (specify)	**Where** does the household usually defecate or relieve themselves (include more than one if necessary)? --------- **1** = Undesignated open area **2** = Designated open area **3** = Hole **4** = Latrine **99** = Other (specify)

Appendix 5 Local calendar of events

Month	Season	2012	2013	2014	2015	2016	2017
January	Taking of cattle to cattle camps/ Dry period		CPA signing day **52**	CPA signing day/ Start of humanitarian response in UNIMISS Bentiu Base **40**	CPA signing day Demining at Mayom DDG **28**	CPA signing day **16**	CPA signing day **4**
February	Dry period		**51**	St. Bakhita day in Mayom **39**	Death of spiritual leader Garkulong **27**	Registration for food aid by WFP **15**	Registration for food distribution by ICRC in Mayom **3**
March	Clearing bushes		**50**	**38**	**26**	Measles campaign in Mayom by SCI **14**	Mobile phone network reopened in Mayom **2**
April	Clearing bushes		**49**	Conflict at Mankien Rebels captured Bentiu **37**	**25**	**13**	Food distribution by ICRC in Mayom **1**
May	Start of rains/Animals returning from cattle camps		SPLA DAY May 16th **48**	SPLA DAY May 16th **36**	SPLA DAY May 16th **24**	SPLA DAY May 16th **12**	SPLA DAY May 16th **0**
June	Planting of crops; maize, sorghum	**59**	**47**	**35**	**23**	Tetanus campaign by WHO in Mayom **11**	
July	weeding of farms	Independence Day /Martyr day **58**	Independence Day /martyr day Traditional celebrations in Mayom **46**	Independence Day celebration /martyr day Conflict in Wankien Epi campaign **34**	Independence Day celebration /martyr day **22**	Independence Day celebration /martyr day Fighting in Juba between Government & rebels **10**	
August	weeding of farms	Commander Paulino's death **57**	**45**	**33**	President Salva Kiir signs peace agreement **21**	Unity State divided into 3 Counties **9**	
September	Maize harvesting	**56**	**44**	**32**	**20**	**8**	
October	Sorghum harvesting	**55**	Abyei referendum **43**	**31**	**19**	**7**	
November	Sorghum harvesting	Public transport vehicle hits mine **54**	**42**	**30**	**18**	Military recruitment in Mayom **6**	
December	Christmas Day celebrations	**53**	Fighting erupted in Juba **41**	Floods in Mayom **29**	Division of the country into 28 States **17**	**5**	