SOUTH SUDAN

# NUTRITION AND MORTALITY RAPID SMART SURVEY FINAL REPORT

## LEER COUNTY OF UNITY STATE, SOUTH SUDAN

## Conducted By:


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## Funded by:

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## ACRONYMS AND ABREVIATIONS

| | |
|---|---|
| ACF | Action Against Hunger |
| CDC | Center for Disease Control |
| CMR | Crude Mortality Rate |
| CHD | County Health Department |
| C.I. | Confidence Interval |
| Cm | Centimeter |
| CMAM | Community Based Management of Acute Malnutrition |
| DEFF | Design Effect |
| ENA | Emergency Nutrition Assessment |
| FCS | Food Consumption Score |
| FHH | Female Headed Households |
| GAM | Global Acute Malnutrition |
| GFD | General Food Distribution |
| FAO | Food and Agriculture Organization |
| FSL | Food Security and Livelihood |
| HH | Household |
| INGO | International Non-Governmental Organization |
| IPC | Integrated Food Security Phase Classification |
| Km | Kilo Meter |
| LLITN | Long Lasting Insecticide Treated Nets |
| MAM | Moderate Acute Malnutrition |
| MSF | Medicine San Frontiers |
| MUAC | Mid Upper Arm Circumference |
| NGO | Non-Governmental Organization |
| NIWG | Nutrition Information Working Group |
| OFDA | Office of U.S Foreign Disaster Assistance |
| OTP | Out Patient Therapeutic Program |
| PPS | Probability proportional to size |
| SAM | Severe Acute Malnutrition |
| SD | Standard Deviation |
| SIAs | Supplementary Immunization Activities |
| SMART | Standardized Monitoring and Assessment of Relief and Transitions |
| TFP | Therapeutic Feeding Program |
| U5DR | Under five Death Rate |
| UNICEF | United Nations Children's Emergency Fund |
| WAZ | Weight for Age Z-Score |
| W/A | Weight for Age |
| WASH | Water Sanitation and Hygiene |
| W/H (WFH) | Weight for Height |
| WFP | World Food Program |
| WHO | World Health Organization |
| WHZ | Weight for Height Z- Score |

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## EXECUTIVE SUMMARY

Action Against Hunger- USA in collaboration with other partners (Nilehope and Concern) conducted nutrition and mortality rapid SMART survey from 24th – 27th April, 2017 in Leer County of Unity state, South Sudan.

***Objective*:** The overall objective of this survey was to determine the prevalence of acute malnutrition among children 6-59 months of age and asses the mortality situation of the community in Leer county of Unity state, South Sudan.

***Methodology*:** The assessment was a cross sectional study with two-stage cluster sampling using a Rapid SMART methodology, which proposes a method to rapidly collect reliable nutrition and mortality data and to ensure optimum quality in a time bound manner. A total of 30 clusters were selected. The sample size and selection of clusters were determined using ENA software (updated version, July 9th, 2015) based on Probability Proportional to Population Size (PPS). Simple random sampling method using households listing method was employed for second stage sampling, during household selection. A total of 420 households (14*30) were visited for the nutrition assessment, wherein mortality and food security and livelihood data were collected. Anthropometric and health data were gathered on 412 children aged 6-59 months old.

***Coverage of the survey*:** 4 Payams and 11 Bomas were assessed. A total of 30 villages were selected by PPS and 14 households were selected per village.

***Information collected:*** Anthropometric, mortality, morbidity, health seeking behavior of mothers or caretakers and food security and livelihood information.

***County level participation*:** 1 CHD staff and 3 Nilehope staffs from the Leer County participated in the actual data collection as part of the survey teams.

***Summary of Key results***: The prevalence of malnutrition rates among children in Leer county is high – estimated GAM prevalence of 20.1% (15.6-25.5 95% C.I.) and SAM of prevalence of 5.0% (3.2- 7.7 95% C.I.) based on weight-for-height/WFH z-score; this is alarming and classified as **'Critical'.** During the survey, no children have been identified with nutritional bilateral oedema. The crude mortality rate (CMR) and Under-five mortality rate (U5MR) were found at 0.68 (0.34-1.38 95% C.I.) and 0.00 (0.00-0.00 95% C.I.), respectively. The table below presents the summary of the indicators assessed by this survey:

| | **Children 6-59 months Anthropometric results (WHO 2006 Standards)** | | |
|---|---|---|---|
| **Index** | **Indicator** | **FEBRUARY, 2016** | **April, 2017** |
| WHZ- scores | Prevalence of global malnutrition (<-2 z-score and/or oedema**)** | 13.8 % (10.7 – 17.6 95% C.I.) | 20.1 % (15.6 - 25.5 95% C.I.) |
| | Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema) | 11.1 % (8.4 – 14.6 95% C.I.) | 15.1 % (11.4 - 19.8 95% C.I.) |
| | Prevalence of severe malnutrition (<-3 z-score and/ or no oedema) | 2.7 % (1.4 – 5.2 95% C.I.) | 5.0 % (3.2 - 7.7 95% C.I.) |
| HAZ- scores | Prevalence of stunting (<-2 z-score) | 15.9 % (12.7 – 19.8 95% C.I.) | 11.4 % (8.2 - 15.5 95% C.I.) |
| | Prevalence of Moderate stunting (<- z-scores and >=-3 z-score) | 12.8 % (10.1 – 16.2 95% C.I.) | 10.9 % (7.9 - 14.7 95% C.I.) |
| | Prevalence of Severe stunting (<-3 z-score) | 3.1 % (1.8 – 5.2 95% C.I.) | 0.5 % (0.1 - 2.0 95% C.I.) |

| Index | Indicator | February, 2016 | April, 2017 |
|---|---|---|---|
| WAZ- scores | Prevalence of underweight (<-2 z-score) | 17.2 % (13.7 – 21.3 95% C.I.) | 13.7 % (9.5 - 19.3 95% C.I.) |
| | Prevalence of Moderate underweight (<- z-scores and >=-3 z-score) | 13.8 % (10.9 – 17.5 95% C.I.) | 12.0 % (8.2 - 17.1 95% C.I.) |
| | Prevalence of severe underweight (<-3 z-score) | 3.3 % (2.1 – 5.3 95% C.I.) | 1.7 % (0.7 - 4.0 95% C.I.) |
| MUAC | Prevalence of global malnutrition (< 125 mm and/or oedema) | 8.4 % (6.3 – 11.1 95% C.I.) | 9.0 % (5.3 - 14.8 95% C.I.) |
| | Prevalence of global malnutrition (< 125 mm and >=115mm and/or oedema) | 6.7 % (4.6 – 9.6 95% C.I.) | 8.0 % (4.7 - 13.3 95% C.I.) |
| | Prevalence of global malnutrition (< 125 mm and/or oedema) | 1.7 % (0.9 – 3.3 95% C.I.) | 1.0 % (0.4 - 2.4 95% C.I.) |
| **Mortality (Retrospective over 90 days prior to interview)** | | | |
| **Mortality results** | Crude mortality rate(CMR) (total deaths/10,000 people / day) | 3.21 (2.47 – 4.14 95% CI) | 0.68 (0.34-1.38 95% C.I.) |
| | Under-five mortality rate(U5MR) (deaths in children under five/10,000 children under five / day) | 1.10 (0.43 – 2.81 95% CI) | 0.00 (0.00-0.00 95% C.I.) |

| **Health and Immunization Coverage Indicators** | | | |
|---|---|---|---|
| **Measles immunization, Vitamin A supplementation and** | | **February, 2016** | **April, 2017** |
| Measles coverage (9-59 months) | Card | 15.4% | 30.8% |
| | Mothers recall | 33.9% | 1.0% |
| Vitamin A overall coverage (6-59) in the last 6 months | Yes | 34.3% | 57.3% |
| | No | 65.7% | 42.7% |
| Deworming (12-59) in the last 6 months | Yes | 19.8% | 52.2% |
| | No | 80.2% | 47.8% |
| **Morbidity for the last 2 weeks** | | | |
| Child Illness in the last 2 weeks | Yes | 62.4% | 53.2% |
| | No | 37.6% | 46.8% |
| Proportion of children by type of sickness | Fever | 61.3% | 52.1% |
| | Cough | 30.7% | 21.5% |
| | Diarrhea | 33.7% | 41.1% |
| | Skin infection | 8.0% | 3.2% |
| | Eye infection | 5.5% | 1.8% |
| | Others | 12.9% | 10.5% |
| Treatment sought | None sought | 27.6% | 21.5% |
| | Hospital | 0.3% | 7.3% |
| | PHCC/PHCU | 69.6% | 45.2% |
| | Mobile/outreach clinic | 0.0% | 17.4% |
| | Village health care worker | 0.0% | 3.7% |
| | Private physician/clinic | 0.6% | 0.9% |
| | Shop | 0.0% | 0.5% |
| | Traditional practitioner | 1.9% | 0.0% |
| | Others | 0.0% | 3.7% |
| **Slept under mosquito net last night** | | | |
| Children who slept under mosquito net (LLITNs) | Yes | 76.2% | 73.5% |
| | No | 23.8% | 26.5% |

- For Recommendations please refer to Section 6 of the report.

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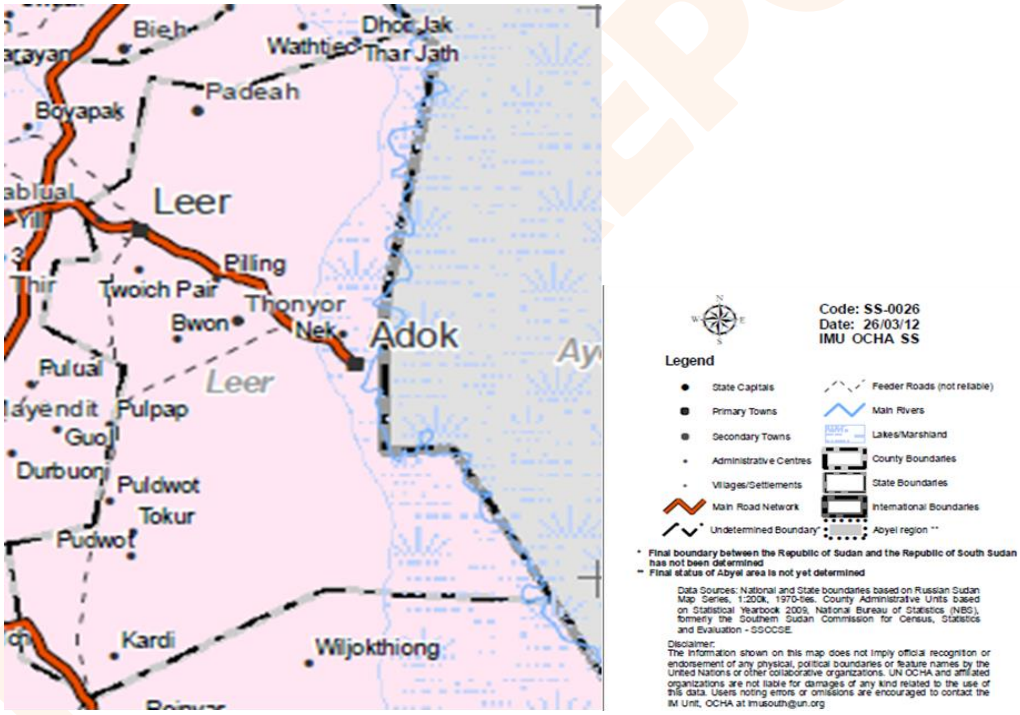
# 1. INTRODUCTION

## 1.1 Background Information

Unity State is the second largest state in the Upper Nile region bordering Southern Kordofan in the north. It also borders Warrap, Lakes, Jonglei, and Upper Nile States. Unity State[1] has a total population of 585,801 with an area of 38,837 km$^2$. The state is composed of nine counties, which are divided into Southern area and Northern area[2], namely Mayom, Rubkona, Panrieng, Leer, Guit, Koch, Abiemnom, Mayendit and Payinjiar.

Leer County is one of the Counties found in Unity state, South Sudan. Part of the Unity state, Leer is bordered on the south by Panyijiar, on the West by Mayendit, on the north by Koch and on east by Jonglie state. The County is in Dok Nuer territory and it is located in an important oil-producing area, 1.5 hour flight or a two-day drive from Juba, the capital of South Sudan. There are no commercial flights to Leer, only aircraft contracted by the humanitarian organizations. According to the South Sudan National Bureau of Statistics, the 2008 census estimated that the population of the county was 53, 022 and the 2017 population projection shows the total population of the county is estimated at 79,653, which is lower than the recent IPC estimate of 119,954[3].

**Figure 1.1 Map of Leer County[4]**




The county is found in Nile Basin Fishing and Agro Pastoral livelihood zone[5] (SSD 8), which is located along the Nile River extending into parts of the eastern and western flood plains. The zone is characterized by swampy vegetation of papyrus, reeds, Napier grass and bush scrub. Other water resources within the zone include lakes Namm and Nang.

[1] 5th Sudan Population and Housing Census, 2008
[2] http://www.ssddrc.org/states
[3] Leer population projection, as per the recent IPC report, January, 2017
[4] Adapted from UNOCHA (March, 2012)
[5] South Sudan Livelihood Zones and Description, August, 2013

This area has a unimodal rainfall pattern with average precipitation ranging from 800-1,100mm per annum. Temperatures range from a maximum of 30° to 36° Celsius in March-April and fall to 18 to 25° Celsius from June-December. Soils are mainly clay along the banks of the Nile with relatively fertile sandy loams in the outer boundaries of the River bank.

It is predominantly occupied by agro pastoralists. Crop production is rain fed and the main crops grown in the area include sorghum, maize, groundnut and cow peas. Sesame and vegetable crops such as okra, tomatoes and pumpkins are also grown on a smaller scale.

The main livestock kept are cattle, goats and sheep. Livestock are moved towards the River Nile from February to April and return to homesteads from May- June. Fishing using nets, lines, spears and hooks takes place throughout the year and is a source of both food and cash income for all wealth groups. Wild foods are abundant and include fish, laloub nuts, dolieb palm nuts, water lilly, and "*leau*" a very bitter nut growing in sandy places. However access to these natural products is normally constrained by excessive flood water.

The last nutrition and mortality SMART survey, in Leer was conducted by Action Against Hunger-USA in February, 2016. According to the survey result the prevalence of malnutrition (GAM) was found to be 13.8% (10.7 - 17.6 95% C.I.) which is below the 15% WHO critical level for emergency. The prevalence of SAM was 2.7 % (1.4 - 5.2 95% C.I.). The Crude Mortality Rate was found to be 3.21% (2.47 - 4.14 95% CI)/10000/day, which is above the 1/10000/day threshold for alert level according to WHO standards. The under-five death rate was 1.10 (0.43 - 2.81 95% CI)/10000/day, which is below the 2/10000/day threshold for alert level.

## 1.2 Survey Objectives

### 1.2.1 General objective

The overall objective of this survey is to determine the prevalence of acute malnutrition among children 6-59 months of age and asses the mortality situation of the community in Leer county of Unity state, South Sudan.

### 1.2.2 Specific objectives

- To estimate the prevalence of acute malnutrition in children aged 6 to 59 months;
- To estimate retrospective Crude Mortality Rate (CMR) and Under five Mortality Rates (U5MR) among population and under five children, respectively, in Leer county;
- To estimate the prevalence of morbidity (Diarrhoea, Fever, Cough and etc.) in children 6-59 months in the last two weeks prior to the survey dates;
- To estimate the vaccination coverage of Measles (9-59 months), Deworming (12-59 months) and Vitamin A supplementation for children 9-59 months;
- To assess the health seeking behavior of mothers/caretakers of children 6-59 months and use of LLITN;
- To assess the food security and livelihood situation, in the county and
- To make recommendations based on findings.

# 2. SURVEY METHODOLOGY

## 2.1 Geographic Target Area and Population Group

The survey was carried out in Leer County of Unity state, South Sudan. Areas which are not accessible (in terms of logistic and insecurity for actual data collection), were excluded from the

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sampling frame before cluster selection (See annex for Payams and Bomas included in this survey). The target populations for this survey were children aged 6-59 months for the anthropometric and health components and the general population for the retrospective mortality. The survey has collected information regarding:

1) **Nutrition status**: all children 6 – 59 months old in households selected for anthropometric survey were included. Anthropometric measurements were measured and oedema was checked from these children.

2) **Morbidity:** data on illness and health seeking behavior of mothers/caretakers of children 6-59 months was collected.

3) **Mortality rate**: all household members in all sampled households were included in the mortality component of the survey.

**Food security and Livelihood (FSL) factors**: FSL specific contextual data (using the new version questionnaire developed by WFP and FAO, in collaboration with NIWG) were collected from all households included in the anthropometric and mortality survey. The household heads were the respondents.

## 2.2 Study Timing

The study was conducted from 24th - 27th, April, 2017. This assessment was done before the rainy season starts, that generally start in May and ends in October. The lean season is generally from June to July[6], before green crops are ready for consumption. Thus, this survey is conducted when the household have depleted their stock and do not have enough for their household and high level of malnutrition persists in the county.

## 2.3 Study Design

This survey was a cross sectional study with two-stage cluster sampling using Rapid SMART methodology.

## 2.4 Sample Size

A sample size of 30 clusters by 14 households (420 households) was used, this is in line with the Rapid SMART methodology guideline[7]and the sample size is expected to be enough to ensure representativeness with acceptable precision.

A retrospective mortality survey was also undertaken in each household regardless of whether they had children or not, alongside the anthropometric survey.

## 2.5 Sampling Methodology

The assessment employed a Rapid SMART methodology, which proposes a method to rapidly collect reliable nutrition and mortality data and to ensure optimum quality in a time bound manner.

***First stage sampling (selection of clusters)***

In the first stage, clusters were randomly selected based on Probability Proportional to Size (PPS) using ENA for SMART software (update version, July 9th, 2015). Village level population figures were updated on the ground with the support of the local authorities before the actual data collection

[6] http://www.fews.net/east-africa/south-sudan

[7] The typical sample size of a Small Scale SMART survey is 25 clusters by 10 households, but when retrospective mortality is added to the survey, the sample size must be increased, and 30 clusters by 14 households is recommended.



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started. Name of the villages (clusters), that are accessible for this survey, with their respective population size were entered in the ENA for SMART software (update version, July 9th, 2015), and the software randomly assigned the clusters to the villages to be covered by the survey. A total of 30 clusters were selected.

***Second stage sampling (Selection of households)***
The second stage of sampling involves selection of households within the selected clusters using simple random sampling method. On arrival at the village:

- First each team introduced themselves, then explained the objectives and the methodologies of the survey through local community entrance procedure to the village leaders and sought their approval before data collection commences.
- The survey teams collected the actual number of households in the village and when the total number of households were less than or equal to 150, all the households in the village were listed and 14 households were randomly selected from the list. However, in Leer Payam, as one of the selected village was big (larger than 150 households), segmentation was done using natural boundaries or direction after which two clusters were selected and visited in the actual data collection of the survey.

The required numbers of households were selected using random number table that was briefly explained (how to use) and provided to the teams during the actual training. Since the sampling unit was households the numbers of children in each cluster was dependent of households visited. This means that all children of 6 to 59 months found in all visited households were included in anthropometric and mortality survey. Respondents were primarily mothers of children 6-59 months of age and in the absence of the mother; the caregiver of the child was interviewed to get all relevant information.

The team started the survey from any convenient household of the randomly selected households (14 households) to carry out anthropometric and mortality questionnaires. In cases where there is no eligible child, a household was considered as part of the sample, and only mortality data was collected[8]. When in sampled households eligible children (under five) or entire family found to be absent during the time of first visit, the teams left message in the neighbouring households and revisits were done. Survey team were also *strictly told not to substitute* any sampled household/s.

From the 30 selected clusters, 100% were surveyed. All randomly selected households were also included in the survey with in the selected clusters and a total of 412 children were measured.

## 2.6 Case Definition and Inclusion Criteria

***Case definition:***

1. ***Household:*** **-** a household was defined as a 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.

2. ***Nutritional status of children***
   - **Global Acute Malnutrition (GAM):** a weight for height z-score (WHZ) of less than -2.0 is taken as global acute malnutrition. Additionally children with MUAC less than 125mm and/or with nutritional edema are referred as GAM cases.

[8] It should be noted that like mortality FSL questionnaires was asked at every randomly selected household whether randomly selected household has a child 6-59 months age or not.

- **Moderate Acute Malnutrition (MAM)**: a WHZ between -2.0 and -3.0 is considered as MAM. Also, a MUAC reading between 115 mm and 125 mm in the absence of nutritional edema is taken as moderate acute malnutrition.
- **Severe Acute Malnutrition:** a weight for height z-score of less than -3.0 is taken as Severe Acute Malnutrition (SAM). Additionally, a child with MUAC less than 115 mm and/or has nutritional edema is referred as SAM case.

***3. Causes of illness and death (verbal autopsy)***

- **Fever:** Elevated body temperature and chills.
- **Cough:** Fever and difficulty in breathing.
- **Malaria**: Illness confirmed by blood test, or when an anti-malaria treatment was offered by a health professional.
- **Diarrhea**: Three or more loose stools/day.
- **Measles**: Persistent fever, esophageal ache, skin rash and red eyes.

In the selected households, all the eligible children (6-59 months) identified were included in the survey; anthropometric measurements as well as health data were collected. For each selected child, the following information's were collected:

- ***Age*** (in months): The exact age of the child was recorded in months, based on information gathered from the mother/caregiver and confirmed with health records. However a local calendar of events was used when records were not available as well as to convert the age from years to months. Only children between 6 and 59 months old of age were included. Height was not considered as a valid criterion in absence of age due to the high number of tall children in South Sudan.

- ***Sex*:** This was recorded as either male (m) or female (f).

- ***Weight*** (in Kg): Children were weighed to the nearest 0.1kg by using an electronic scale SECA® 874. The children who could easily stand were asked to stand on the weighing scale and their weight was recorded. In a situation when the children could not stand up, the double weighing method was applied.

- ***Height*** (in cm): The standard measuring board was used to measure bare headed and barefoot children. The precision of the measurement is 1 mm. Children of less than 2 years of age were measured lying down and those equal to or above 2 years of age measured standing up.

- ***Mid-Upper Arm Circumference*** (in cm): MUAC was used as an indicator of mortality risk for acute malnutrition and was measured to the nearest 1mm for all children with an indicated age of 6-59 months, using the UNICEF MUAC tapes.

- ***Bilateral pitting oedema***: Only children with bilateral pitting oedema (applying normal thumb pressure for at least 3 seconds to both feet) were to be recorded as having nutritional oedema. No cases of bilateral pitting oedema were identified.

- ***Measles vaccination***: Measles vaccination status of children 9-59 months was confirmed from their vaccination cards. In circumstances where this was not available, the caretaker was probed to determine whether the child had been immunized against measles or not.

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- ***Vitamin A supplementation***: Vitamin A supplementation status within the last 6 months for children 6-59 months was assessed by asking the question to the caretaker and by showing a sample of Vitamin A capsule.

- ***De-worming***: De-worming status within the last 6 months was assessed for children 12-59 months by asking the question to the caretaker and by showing a sample of de-worming medicine. However, it has been complicated to ensure that caretaker really understood for what exact medicine data has to be collected and recall bias should be considered for this question.

## 2.7 Questionnaires

The survey consisted of 3 separate structured questionnaires including: Anthropometry and health; Mortality (individual questionnaire) and Food security and livelihood (FSL). The Anthropometry and health questionnaire was administered at every randomly selected household with a child 6-59 months, while mortality and FSL questionnaires were asked at every randomly selected household whether randomly selected household with a child 6-59 months age or not.

## 2.8 Survey Teams and Training

Eight teams of three members (one team leader and two data collectors) were employed to collect the data. All the team leaders and data collectors were selected from Leer County in collaboration with the local authorities. These data collectors were selected based on their academic achievement, technical skill and health status, and previous work history/experience of conducting similar survey. The survey team also included nutrition program staff, drawn from Nilehope and Leer County CHD staff. Each team was assisted by a village guide (recruited at the village level) to lead and guide the survey team within the village in locating the selected households.

The survey teams were intensively trained for three consecutive days. The training was conducted in two areas; Leer town by Concern staff and Touchriak by Action Against Hunger-USA SET specialist. This training was focused on the survey objectives, methodology, anthropometric measurements, field procedures, interviewing techniques, administration of the survey tools. Standardization and field tests were also conducted as part of the training.

## 2.9 Survey Quality and Assurance

In order to ensure the survey data quality through: intensive training coupled with standardization test and practical field test; very close supportive supervision from the team leaders/supervisors/survey coordinator; every night a daily based consistency checking of each filed questionnaire and data sheet was done prior to the data entry. Based on the result of the checked questionnaires, survey coordinator provided feedback to data collectors/team leaders on daily bases before departing from the base for next day survey.

## 2.10 Data Entry and Analysis

The anthropometric, health and mortality data was entered in personal computers using ENA for SMART software (updated version, July 9$^{th}$ 2015) throughout data collection in the field, by the survey coordinator/Action Against Hunger- USA SET specialist. Anthropometric and mortality data were analysed using ENA for SMART software (updated version, 9$^{th}$ July 2015), with reference population of WHO, 2008. Other information, such as MUAC, immunization coverage and morbidity and household FSL data were analysed using EPI Info (3.5.3 version) and Microsoft Excel. A p-value of $< 0.05$ was considered to be statistically significant and 95% confidence intervals (C.I.) were used to judge the statistical precision of point estimates.

Regarding classification of nutritional status for children 6-59 months of age, WHO thresholds depicted in Table 2.1 below were followed.

**Table 2.1: Thresholds[9] for classifying nutritional status of children**

| Nutritional status | Acute Malnutrition | | | |
|---|---|---|---|---|
| | (Weight/Height) | MUAC | Chronic Malnutrition (Height/Age) | Under weight (Weight/Age) |
| Global | W/H < -2Z and Oedema | MUAC < 125 mm and/ or oedema | **H/A < -2 Z** | **W/A < -2 Z** |
| Moderate | -3 Z ≤ W/H < -2 | 115 mm ≤ MUAC < 125 mm | -3 Z ≤ H/A < -2 | -3 Z ≤ W/A < -2 |
| Sever | W/H < - 3Z and Oedema | MUAC < 115 mm and/ or oedema | H/A < - 3Z | W/A < - 3Z |

Source: WHO (2008)

## 2.11 Ethical Consideration

All relevant Leer country authorities were informed of the study objectives, methods and their roles, and then, their permission was being sought. Verbal agreement from each of the village leaders, mothers/caretakers of the children and household heads were used for voluntary participation in the survey. The identities of the participants were kept anonymous. Households were also told that, if they do not wish to participate in the survey, their self-determination/decisions will be respected. All children diagnosed as severely or moderately malnourished based on MUAC or with oedema were referred to a nearby health facility using the referral sheet provided to each survey team. The team leaders were assigned and in charge of filling the form and to give to the mother/caretaker, whose child was diagnosed as severely or moderately malnourished.

# 3. SURVEY RESULTS

## 3.1 Demographic Data

The survey covered a sample of 420 households and female-headed households (FHHs) accounted for 75% (n=315). As results from mortality survey, the average household size was found at 6.6 members, children less than 5 years of age were found to be 17.2% of total population and the birth rate was 0.36. Table 3.1 below reveals the demographic outcomes of the mortality survey result.

***Table 3.1: Demographic outcomes, Leer County, April 2017***

| | Population | Total number of HHs | Total number of HHs with U5 children | Average household size | Percentage of children U5 | Birth Rate | In-migration Rate (Joined) | Out-migration Rate (Left) |
|---|---|---|---|---|---|---|---|---|
| Surveyed | 2764.5 | 420 | 302 | 6.6 | 17.2 | 0.36 | 2.13 | 8.76 |

## 3.2 Anthropometric Results (Based on WHO Standards 2006)

### 3.2.1 Distribution of sample children by age and sex

***Table 3.2: Distribution of sample by age and sex, Leer County, April 2017***

| | Boys | | Girls | | Total | | Ratio |
|---|---|---|---|---|---|---|---|
| **Age (months)** | **no.** | **%** | **no.** | **%** | **no.** | **%** | **Boy: girl** |
| 6-17 | 32 | 41.6 | 45 | 58.4 | 77 | 18.7 | 0.7 |
| 18-29 | 64 | 54.2 | 54 | 45.8 | 118 | 28.6 | 1.2 |
| 30-41 | 48 | 52.7 | 43 | 47.3 | 91 | 22.1 | 1.1 |
| 42-53 | 45 | 52.3 | 41 | 47.7 | 86 | 20.9 | 1.1 |
| 54-59 | 20 | 50.0 | 20 | 50.0 | 40 | 9.7 | 1.0 |
| Total | 209 | 50.7 | 203 | 49.3 | 412 | 100.0 | 1.0 |

[9] with reference population of WHO, 2006

According to the survey result, of the total 412 children of 6-59 months old found in the sampled households, slightly above half (50.7%, n=209) were boys and the remaining 49.3% (n=203) were girls. The overall sex ratio was 1.0 which is in the acceptable range (0.9-1.1) indicating that the data collected was unbiased.

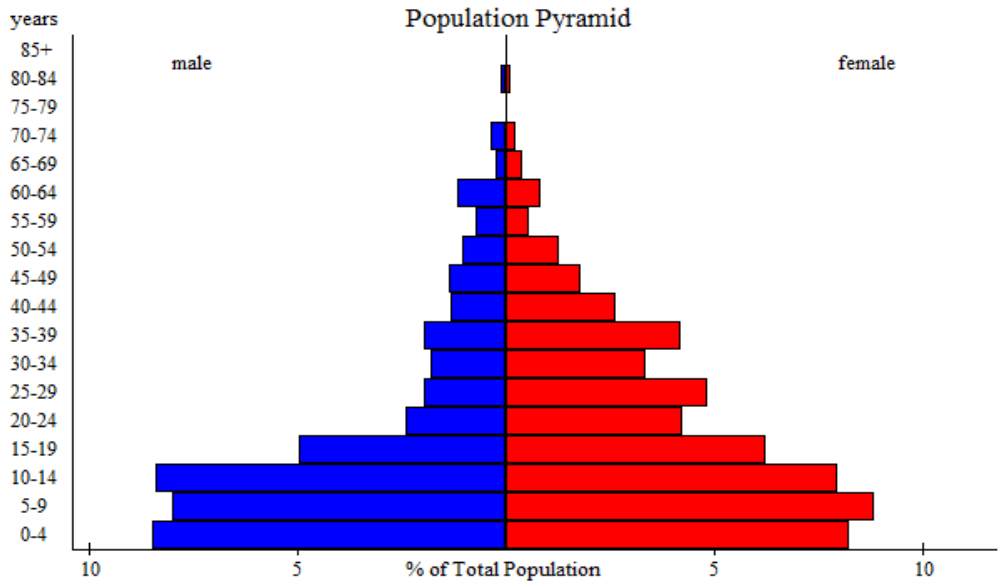



**Figure 3.1: Population pyramid, Leer County, April 2017**

The age distributions of children under 5 years old in Leer County indicated slight variation as compared to the normal age distribution of WHO[10] (2006) standard for under-five children of developing countries. The age groups 6-17 and 30-41 months were found to be slightly under represented and the other age groups were found to be over represented compared with the normal age distribution advised by WHO (2006). This variation is mainly explained by the fact that mothers/primary caretakers had difficulty in recalling exact age of their child and all local events.

### 3.2.2. Prevalence of Acute Malnutrition (Wasting) based on Weight-for-Height Z-Scores (or oedema) and by Sex

***Definition of Acute Malnutrition***

*Global Acute Malnutrition (**GAM**) and Severe Acute Malnutrition (**SAM**) are defined as weight-for-height less than -2 z-score and less than -3 z-score, respectively. Z-scores and percent of median were derived from comparison of children in the survey sample to the WHO 2006 reference population.*

The mean for WHZ was -0.99 (±1.13) indicating the presence of acute under-nutrition. GAM prevalence was 20.1% (15.6 – 25.5 95% CI) comprising a MAM prevalence 15.1% (11.4 - 19.8 95% C.I.) and a SAM prevalence of 5.0% (3.2 - 7.7 95% C.I.). Thus, the overall GAM prevalence is indicative of alarming and critical nutrition situation based on WHO standards[11].

[10] WHO reference population is composed of 23.9% age 6-17 months, 25.5% age 18- 29 months, 22.4% age 30-41 months, 19.2% age 42-53 months, and 9.0% age 54-59 months.

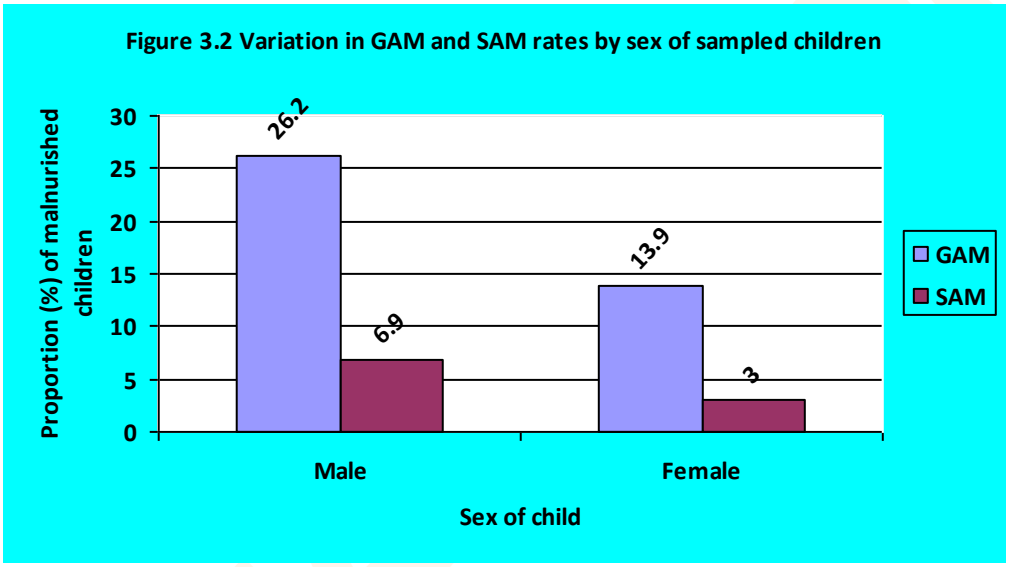
[11] WHO cut off points for wasting using Z scores (<-2 Z scores in populations: <5% acceptable; 5-9% poor; 10-14% serious; >15% critical).

Based on weight for height z-scores out of 403 measured, 61 (15.1%) children were considered moderately malnourished and 20 (5.0%) were severely malnourished. No children were found to be severely malnourished due to the presence of oedema based on weight for height z-scores.

***Table 3.3: Prevalence of acute malnutrition based on weight for height z-scores (and/or oedema) and by sex, Leer County, April, 2017***

| | **All** n = 403 | **Boys** n = 202 | **Girls** n = 201 |
|---|---|---|---|
| Prevalence of global malnutrition (<-2 z-score and/or oedema) | (81) 20.1 % (15.6 - 25.5 95% C.I.) | (53) 26.2 % (20.9 - 32.4 95% C.I.) | (28) 13.9 % (9.0 - 21.0 95% C.I.) |
| Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema) | (61) 15.1 % (11.4 - 19.8 95% C.I.) | (39) 19.3 % (14.7 - 24.9 95% C.I.) | (22) 10.9 % (7.1 - 16.5 95% C.I.) |
| Prevalence of severe malnutrition (<-3 z-score and/or oedema) | (20) 5.0 % (3.2 - 7.7 95% C.I.) | (14) 6.9 % (4.0 - 11.6 95% C.I.) | (6) 3.0 % (1.5 - 6.0 95% C.I.) |

The prevalence of oedema is 0.0 %




According to the survey result more male children than female children were found to be malnourished, although the number of children sampled in the survey indicates almost equal number of male and female children. The result, as depicted in Figure 3.2 above, also shows that both the GAM and SAM rates are higher for male children than female children.

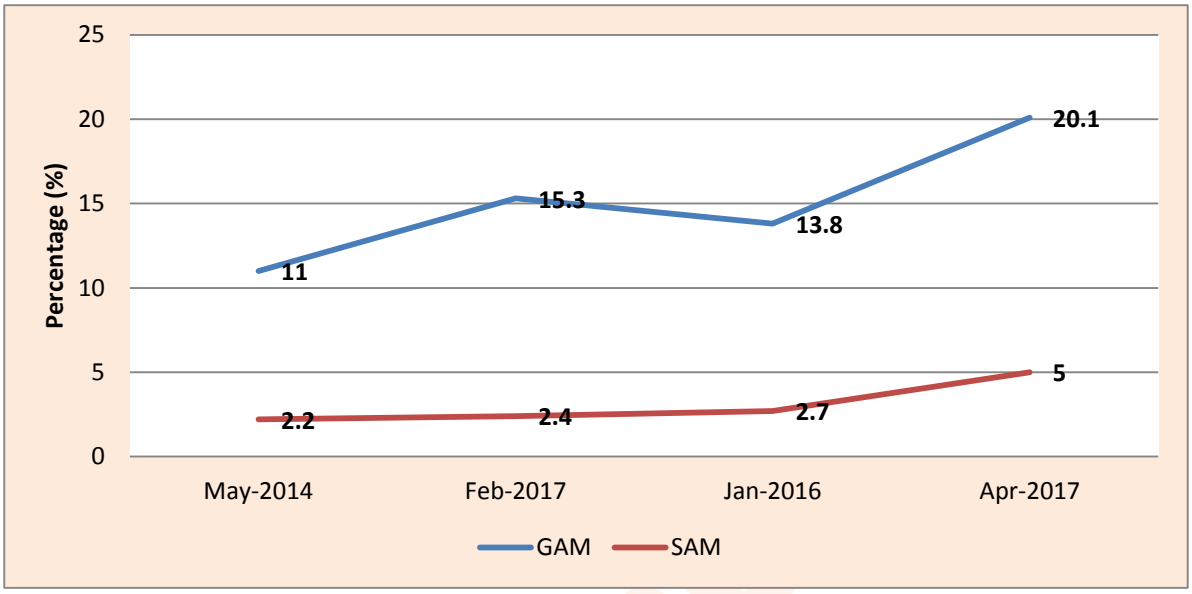
***Table 3.4: Distribution of acute malnutrition and oedema based on weight-for-height z-scores, Leer County, April, 2017***

| | **<-3 z-score** | **>=-3 z-score** |
|---|---|---|
| **Oedema present** | Marasmic kwashiorkor No. 0 (0.0 %) | Kwashiorkor No. 0 (0.0 %) |
| **Oedema absent** | Marasmic No. 20 (4.9 %) | Not severely malnourished No. 392 (95.1 %) |

The prevalence of GAM and SAM in the last SMART survey conducted in February, 2016 were 13.8% (10.7 – 17.6 95% CI) and 2.7% (1.4 – 5.2 95% CI), respectively. As can be seen in Figure

3.3 below, compared to the last survey the current survey result shows higher GAM and SAM prevalence.

**Figure 3.3: GAM and SAM rates trends in Leer between 2014 and 2017 (SMART surveys)**




According to the CDC-statistical-calculator[12], no significant difference noticed regarding SAM rates (p=0.102), but GAM rate in 2017 is found to be significantly different compared to last year survey, of February, 2016 (p=0.0371). This shows deterioration in nutrition situation within the county.

Using MUAC indicator GAM prevalence was 9.0% (5.3-14.8, 95% C.I.), which is 11.1 percentage points lower than prevalence calculated by WFH z-score. The prevalence for SAM with MUAC was 1.0% (0.4 – 2.4, 95% C.I.), 4 percentage points lower than the prevalence calculated by WFH z-score.

***Table 3.5: Prevalence of acute malnutrition based on MUAC cut off's (and/or oedema) and by sex, Leer County, April, 2017***

| | **All**<br>n = 412 | **Boys**<br>n = 209 | **Girls**<br>n = 203 |
|---|---|---|---|
| Prevalence of global malnutrition (< 125 mm and/or oedema) | (37) 9.0 %<br>(5.3 - 14.8 95% C.I.) | (20) 9.6 %<br>(5.7 - 15.6 95% C.I.) | (17) 8.4 %<br>(3.9 - 16.9 95% C.I.) |
| Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema) | (33) 8.0 %<br>(4.7 - 13.3 95% C.I.) | (19) 9.1 %<br>(5.2 - 15.3 95% C.I.) | (14) 6.9 %<br>(3.0 - 15.1 95% C.I.) |
| Prevalence of severe malnutrition (< 115 mm and/or oedema) | (4) 1.0 %<br>(0.4 - 2.4 95% C.I.) | (1) 0.5 %<br>(0.1 - 3.7 95% C.I.) | (3) 1.5 %<br>(0.5 - 4.3 95% C.I.) |

## 3.3 Stunting and underweight

Prevalence for global stunting was 11.4% (8.2 – 15.5 95% C.I.), of which 0.5% (0.1 – 2.0 95% C.I.) was severe stunting. As for stunting, a mean of -0.58 (±1.23) was found, indicating presence of stunting. However, as a SD of ± 1.23 was found, prevalence of global stunting is likely to be around 6.0%[13]. Underweight showed a mean of -0.93 (±0.98), that indicates presence of underweight.

[12] CDC-statistical-calcul;ator-Two surveys
[13] Prevalence calculated with a SD of 1.

Prevalence for underweight was 13.7% (9.5 – 19.3 95% C.I.), of which 1.7% (0.7 – 4.0 95% C.I.) was severe underweight.

***Table 3.6: Prevalence of stunting based on height-for-age z-scores by sex, Leer County, April, 2017***

| | **All** n = 405 | **Boys** n = 207 | **Girls** n = 198 |
|---|---|---|---|
| **Prevalence of stunting (<-2 z-score)** | (46) 11.4 % (8.2 - 15.5 95% C.I.) | (33) 15.9 % (12.4 - 20.2 95% C.I.) | (13) 6.6 % (3.2 - 13.0 95% C.I.) |
| **Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)** | (44) 10.9 % (7.9 - 14.7 95% C.I.) | (31) 15.0 % (11.6 - 19.2 95% C.I.) | (13) 6.6 % (3.2 - 13.0 95% C.I.) |
| **Prevalence of severe stunting (<-3 z-score)** | (2) 0.5 % (0.1 - 2.0 95% C.I.) | (2) 1.0 % (0.2 - 3.8 95% C.I.) | (0) 0.0 % (0.0 - 0.0 95% C.I.) |

***Table 3.7: Prevalence of underweight based on weight-for-age z-scores by sex, Leer County, April, 2017***

| | **All** n = 410 | **Boys** n = 208 | **Girls** n = 202 |
|---|---|---|---|
| Prevalence of underweight (<-2 z-score) | (56) 13.7 % (9.5 - 19.3 95% C.I.) | (38) 18.3 % (13.0 - 25.1 95% C.I.) | (18) 8.9 % (4.8 - 16.0 95% C.I.) |
| Prevalence of moderate underweight (<-2 z-score and >=-3 z-score) | (49) 12.0 % (8.2 - 17.1 95% C.I.) | (34) 16.3 % (11.4 - 22.8 95% C.I.) | (15) 7.4 % (4.1 - 13.2 95% C.I.) |
| Prevalence of severe underweight (<-3 z-score) | (7) 1.7 % (0.7 - 4.0 95% C.I.) | (4) 1.9 % (0.8 - 4.6 95% C.I.) | (3) 1.5 % (0.3 - 6.5 95% C.I.) |

## 3.4 Mortality

The mortality assessment was conducted in all the 14 randomly selected households with or without under-five children, using the mortality individual questionnaire. Mortality results were gathered over a recall period of 90 day (December 22nd, 2017 up to April 23rd, 2017/the day before the actual data collection[14]).

***Table 3.8: Summary of mortality results, Leer County, April, 2017***

| **Parameters for Mortality** | **Results (CI 95%)** |
|---|---|
| CMR (deaths per 10 000/day) | 0.68 (0.34-1.38) |
| U5MR (deaths in children <5/10 000/day) | 0.00 (0.00-0.00) |
| Persons recorded within recall period | 2764.5 |
| Total number of HHs with children <5 years old | 302 |
| Percentage of children under five | 17.2% |
| Mean household size | 6.6 |
| Total deaths during the recall period | 9 |
| Total births during the recall period | 17 |
| Recall Period (days) | 90 |
| **Causes of death** | |
| Injury/Traumatic | 23.5% |
| Illness | 35.3% |
| Violence/Conflict related | 35.3% |
| Others | 5.9% |
| **Location of death** | |
| In current location | 70.6% |
| During migration | 17.6% |
| In place of last residence | 11.8% |

[14] This day was chosen, only because, no clearly known local event/day by the community in recent days before the date of survey started.

From a total of 2764.5 population registered in the questionnaires, 17 were recorded dead during the recall period resulting in a CMR of 0.68 (0.34-1.38 95% C.I.), and is under the emergency thresholds[15]. All reported deaths in the recall period were adults. From all deaths registered in the survey, a majority (70.6%) were due to injury/traumatic and illness (each 35.3%). Seven in ten of deaths were also reported to have occurred in the household's current location (70.6%). Compared to last year rapid SMART survey result (February, 2016), both the CMR and U5MR are lower with high proportion; the U5MR is 0% for the current survey.

## 3.5 Additional Variables

### 3.5.1 Coverage of health indicators

The measles vaccination coverage both by card/recall in the county is far below the 95% SPHERE standards (measles vaccination coverage by card and recall was 31.8%, 17.6 percentage points less than the rate found in the February, 2016 rapid SMART survey result, which was 49.4%. This result is a proxy indictor of poor primary health care services coverage in the surveyed area. According to the survey result about half of surveyed children received Vitamin A supplementation and de-worming activity (57.3% and 52.2%, respectively) in the last 6 months prior to the survey date, which is also far below the 80% WHO target.

***Table 3.9: Vitamin A supplementation, Immunization and Mosquito net utilization, Leer County, April, 2017***

| Parameters | N | N | % | 95% C.I |
|---|---|---|---|---|
| **Vitamin A** (6-59 months) | 412 | 236 | 57.3 | 52.3 – 62.1 |
| **Measles** (9-59 months), card & recall | 396 | 126 | 31.8 | 27.3 – 36.7 |
| **By card** | 396 | 122 | 30.8 | 26.3 – 35.7 |
| **By recall** | 396 | 4 | 1.0 | 0.3 – 2.7 |
| **Dewormed** (12-59 months) | 389 | 203 | 52.2 | 47.1 – 57.2 |
| **LLITNs** (Mosquito Net utilization , children 6-59 months) | 412 | 303 | 73.5 | 69.0 – 77.7 |

### 3.5.2 Morbidity

Retrospective morbidity data (over the past 2 weeks) prior to the survey day was collected for all children under five (n=412). The survey found that among children aged 6-59 months, more than half (53.2%, n=219) reportedly suffered from some type of illness during the previous 2 week period. The two most commonly cited illnesses among children sick in the last two weeks prior to the survey day were found to be fever (52.1%, n=114) and diarrhea (41.1%, n=90).

***Table 3.10: Morbidity (two weeks prior to the survey date), Leer County, April, 2017***

| Parameters | N | N | % |
|---|---|---|---|
| **Illness*** | 412 | 219 | 53.2 |
| Fever | 285 | 114 | 52.1 |
| Diarrhea | 285 | 90 | 41.1 |
| Cough | 285 | 47 | 21.5 |
| Skin infection | 285 | 7 | 3.2 |
| Eye infection | 285 | 4 | 1.8 |
| Others | 285 | 23 | 10.5 |

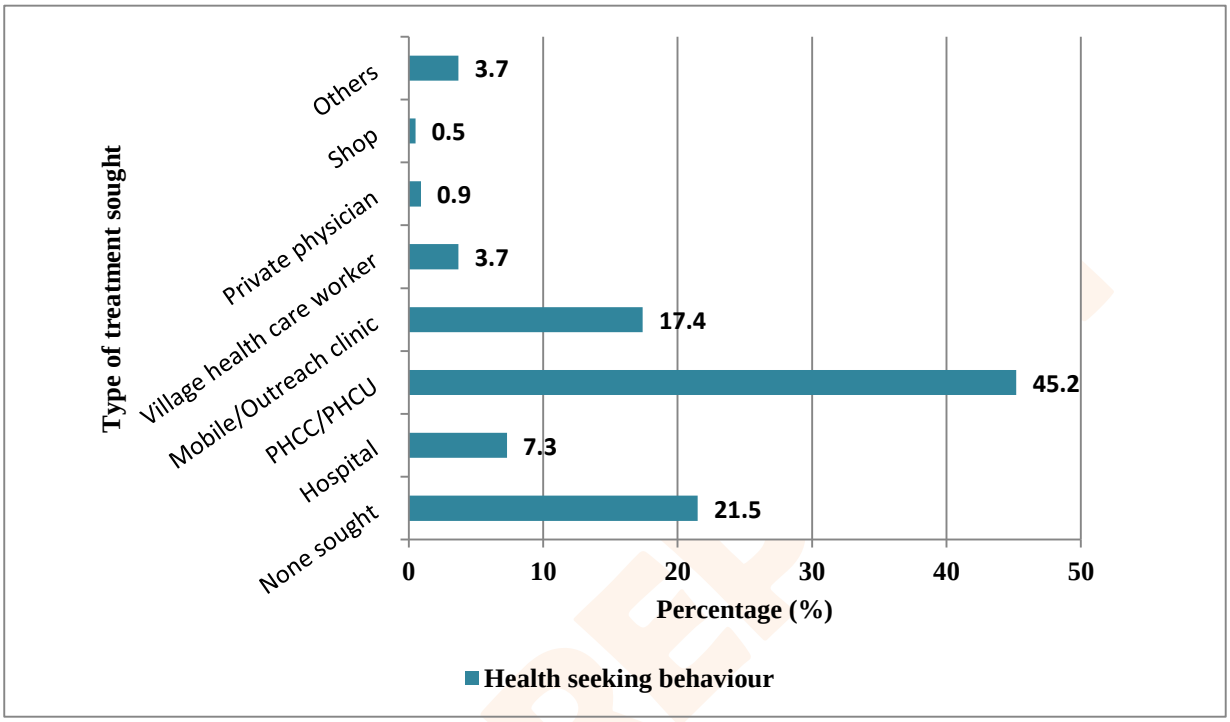
* More than one type of illnesses has been recorder for some children.

Of those 219 children reported sick during the past two weeks, the majority (78.5%, n=172) were taken for treatment PHCC/PHCU or other places. Only about two in ten (21.5%, n=47) children did not get medical treatment.

[15] IPC and WHO thresholds, Emergency thresholds: CMR ≥ 1 / 10000/day – U5MR ≥ 2 / 10000/ day

The survey result also reveals that out of the 219 ill children, 53% (n=116) of them were 6-29 months of age and 47% (n=103) were 30-59 months age. This implies that the younger children are more likely to be exposed for different illnesses than older children.

***Figure 3:4 Health seeking behaviour of mothers/caretakers, Leer County, April, 2017***




## 3.6 Food Security and Livelihood

Household food security situation and livelihood information was assessed by collecting data from all households included in anthropometric and mortality surveys, using the food security and livelihood questionnaire, revised by WFP/FAO and NIWG.

### 3.6.1 Households gender, living status, main source of income and livestock owner ship status

The survey covered a sample of 420 households in the survey area, and female-headed households (FHHs) accounted for 75% (n=315). The result from the FSL questionnaire analysis indicates, at the time of the survey, the majority (77.1%, n=324) of sampled households were resident of the survey area, followed by IDP (21.9%, n=92) and returnee (in the last 1 year) (1.0%, n=4).

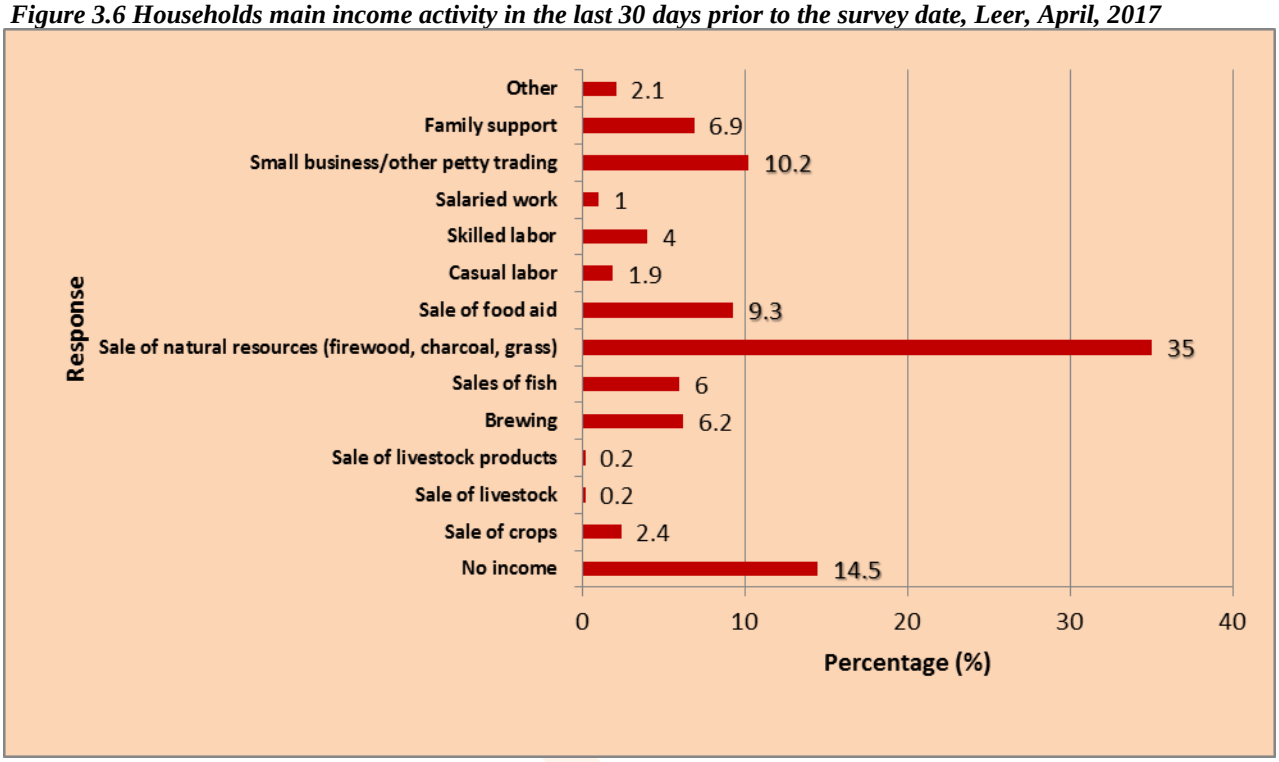
***Figure 3:5 Key food security and livelihood indicators,* Leer County, April, 2017**

| Indicator | Response | n | % | 95% C.I |
|---|---|---|---|---|
| Gender of household head (N=420) | Male | 105 | 25.0 | 21.0 - 29.5 |
| | Female | 315 | 75.0 | 70.5 - 79.0 |
| HHs living status (N=420) | Resident | 324 | 77.1 | 72.8 - 81.0 |
| | Returnee (in the last 1 year) | 4 | 1.0 | 0.3 - 2.6 |
| | IDP | 92 | 21.9 | 18.1 - 26.2 |
| HHs livestock ownership Status (N=420) | Yes | 41 | 9.8 | 7.2 - 13.1 |
| | No | 379 | 90.2 | 86.9 - 92.8 |
| HHs cultivation in most recent seasons (N=420) | Yes | 137 | 32.6 | 28.2 – 37.4 |
| | No | 283 | 67.4 | 62.2 –71.8 |

### 3.6.2 Main income activity

The main income activity of household, in the last 30 days prior to the survey date, as reported by sampled households was sale of natural resources/firewood, charcoal, grass 35% (n=147) followed by small business/other petty trading 10.2% (n=43) and sales of food aid 9.3% (n=39), respectively.

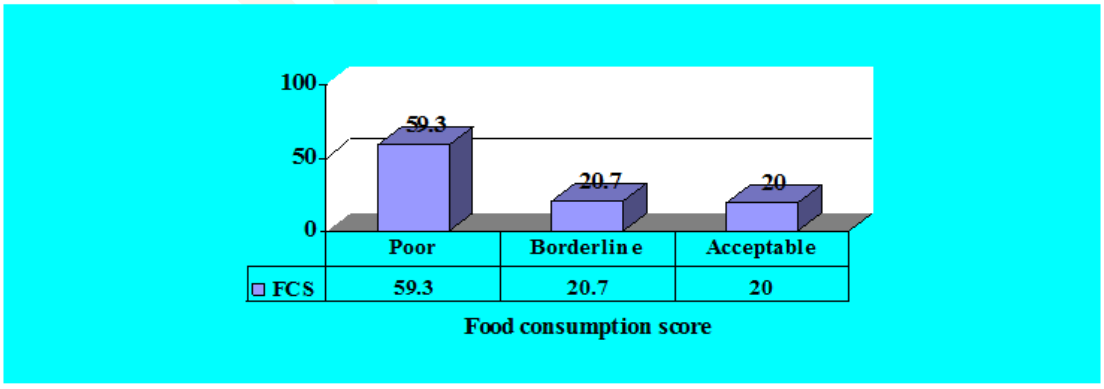
***Figure 3.6 Households main income activity in the last 30 days prior to the survey date, Leer, April, 2017***




### 3.6.3 Households food consumption score and Dietary diversity

During this survey the food consumption score is calculated based on the past 7 days food consumption recall for the household and classified into three categories: poor consumption; borderline; and acceptable consumption.

**Figure 3.7 Food consumption score, Leer Coun ty, April 2017**




As shown in Figure 3.7 above, only 20% of the households have acceptable food consumption, while eight in ten of households have either poor or borderline food consumption (59.3% and 20.7%, respectively).

The survey result shows that white tubers and roots (95.5%) are the most consumed food followed by cereals and cereal products (95.2%), fish and seafood (58.6%) in the past 24 hours. But the intakes of Egg and vitamin A rich vegetables and tubers, dark green leafy and other vegetables were found to be only 6% and 14%, respectively in the last 24 hours by the community in Leer County. The analysis of food security and livelihood questionnaire also reveals that, the average household dietary diversity score (HDDS) was 4.6 from a total score of 12 food groups for households, indicate low dietary diversity.

### 3.6.4 Households Hunger Scale

***Table 3.11:*** **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?** ***Leer County, April, 2017***

| Household Hunger Scale | Response | Frequency | % | C.I |
|---|---|---|---|---|
| **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?** | Yes | 293 | 69.8 | 65.1-74.1% |
| ***How often did this happen in the past [4 weeks/30 days]?*** | Rarely (1–2 times) | 151 | 51.5 | 45.7 - 57.4 |
| | Sometimes (3–10 times) | 120 | 41.0 | 35.3 - 46.8 |
| | Often (more than 10 times | 22 | 7.5 | 4.8 - 11.1 |
| **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?** | Yes | 330 | 78.6 | 74.3 - 82.3 |
| ***How often did this happen in the past [4 weeks/30 days]?*** | Rarely (1–2 times) | 192 | 58.2 | 52.7 - 63.6 |
| | Sometimes (3–10 times) | 121 | 36.7 | 31.5 - 42.1 |
| | Often (more than 10 times | 17 | 5.2 | 3.1 - 8.3 |
| **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?** | Yes | 318 | 75.9 | 71.5 - 79.9 |
| **How often did this happen in the past [4 weeks/30 days]?** | Rarely (1–2 times) | 207 | 65.1 | 59.6 - 70.3 |
| | Sometimes (3–10 times) | 94 | 29.6 | 24.7 - 35.0 |
| | Often (more than 10 times | 17 | 5.3 | 3.2 - 8.6 |

### 3.6.5 Ongoing intervention and assistance received

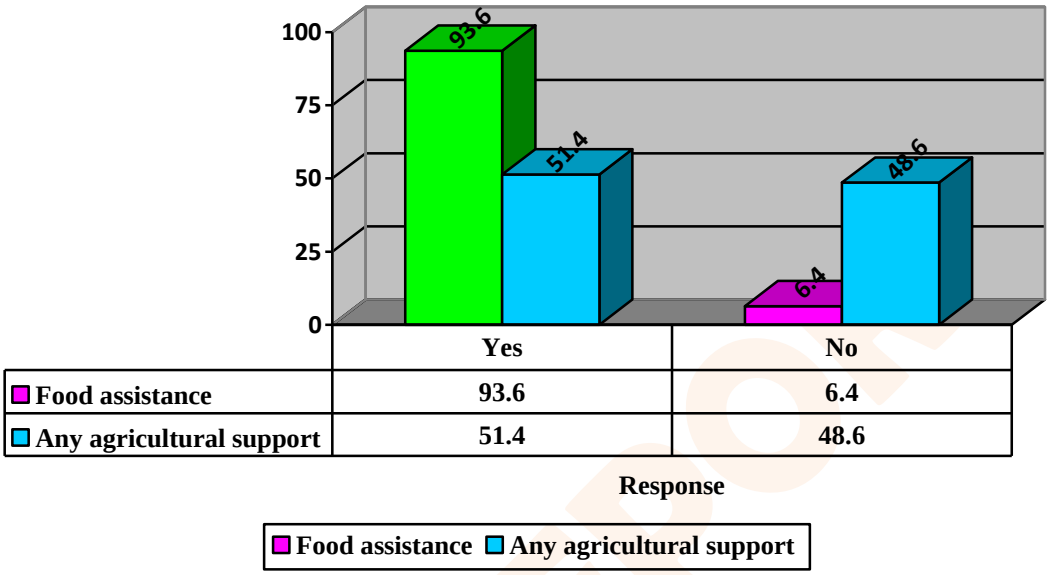
According to the Leer County CHD office different humanitarian organizations are implementing nutrition (Medair, Nilehope) and health programmes (MSF Holland, UNIDO and IMC) and WFP is dropping GFD in 8 sites.

***Table 3.12 Humanitarian Assistance in Leer County, April, 2017***

| *S/N* | *Name of organization* | *Type* | *Intervention Areas (Payam)* | *Current specific activity* |
|---|---|---|---|---|
| 1 | MSF Holland | INGO | Tochriar, Dindin and Mer | ○ Health (Mobile) |
| 2 | Mediar | INGO | Dindin, Padeah, Tharrub, Tandol and Mer | ○ Nutrition |
| 3 | Nilehope | National NGO | Thonyor, Kok, Tochteny, Rubichar, Rubchay and Yang, Touchriak Pilleny Guong Dhornyal Nyamirnyal Rubkong | ○ Nutrition |
| 4 | Universal Intervention and Development Organization (UNIDO) | NGO | Din dilieng, Padeah, Dirr, Rubchay, Adok and Thonyor | ○ Health |
| 5 | IMC | INGO | Tochriai, Thonyor, Dindin and Adok | ○ Health (Mobile) |
| 6 | WFP | UN | 8 sites including Padeah, Leer town, Thonyor, Dindin, etc | ○ GFD |

Analysis of the food security and livelihood questionnaire reveals more than half of the sampled households were beneficiaries of food aid and/or any agricultural support (seeds, agricultural and fishing kits/tools); 93.6% and 51.4%, respectively.

**Figure 3.8: Assistance received in the past 3 months, Leer County, April 2017**




# 4. DISCUSSTION

## 4.1 Anthropometry

The overall sex ratio reported in plausibility check shows that there is no significant difference (p=0.768), thus the boys and girls are equally represented.

The prevalence of malnutrition rates among children in the surveyed population is estimated at GAM of 20.1% (15.6-25.5 95% C.I.) (n=81) based on WFH Z-score. During the survey, no children have been identified with nutritional bilateral oedema. According to the IPC emergency classification thresholds (15%-30%) for assessing severity of acute under nutrition and the emergency classification under the WHO emergency classification thresholds (WHO, 2008[16]), this level of malnutrition is classified as ''***Critical***''. The survey result also show significant difference in GAM prevalence between sexes (p=0.003), that needs further investigation. The prevalence of SAM is found to be 5.0% (3.2- 7.7 95% C.I.) (n=20) based on WFH Z-score and is above the emergency levels of >4 %.

Prevalence of GAM is significantly different (p=0.0371[17]) compared to prevalence of the last nutrition and mortality rapid SMART survey conducted in Leer County, in February, 2016. However, the prevalence of SAM which was found at 2.7 % (1.4 – 5.2 95% C.I.) in February, 2016 has increased significantly from this time when it stood at 5.0% (3.2- 7.7 95% C.I.) in the current survey. The prevalence of underweight was 13.7 % (9.5 – 19.3 95% C.I.). Total stunting was 11.4 % (8.2 – 15.5 95% C.I.), however, as a SD of ± 1.23 was found, prevalence of global stunting is likely to be around 6.0%[18].

[16] WHO Cut Off Points using Z-Score (-2 Z scores in populations): <5% - Acceptable; 5-9% - Poor; 10-14% - Serious; >15% - Critical.
[17] Using CDC calculator
[1818] Prevalence calculated with a SD of 1.

This increase in severe acute malnutrition could be due to a combination of factors among which deterioration in food security situation. Malnutrition in the county has been high over years and this could be probably explained by the continued conflict which has had great impact on livelihoods of the community residing in the area.

### 4.2 Mortality

The Crude Mortality Rate (CMR) and U5 Mortality Rate (U5MR) were 0.68 (0.34 - 1.38 95% C.I) and 0.00 (0.00-0.00 95% C.I.) deaths/10,000/day, respectively. Both mortality rates are well below the threshold for alert level according to WHO standards[19], CMR >1/10,000/day and U5MR >2/10,000/day, respectively. Therefore, the health status of the community can be considered as normal.

Both reported CMR and U5MR are also lower than the rated reported in the last survey results conducted in February, 2016, i.e. Crude Mortality Rate of 3.21% (2.47 - 4.14 95% CI)/10000/day and under-five death rate of 1.10 (0.43 - 2.81 95% CI)/10000/day, respectively.

### 4.3 Vitamin A supplementation, Immunization Coverage and Deworming

Vitamin A supplementation in the last 6 months was estimated at 57.3 (52.3 – 62.1 95% C.I.) which is found to be far below the WHO 80% coverage target for settings, where vitamin A deficiency is likely to be high. Measles vaccination coverage among children 9-59 months of age verified by card was estimated at 30.8% (26.3 – 35.7 95% C.I.) which is very low[20] compared to Sphere guidelines for measles vaccination. But both the card and mothers recall estimated coverage at 31.8 (27.3 – 36.7 95% C.I.), still sub optimal and indicates poor health service and need of immediate intervention. De-worming coverage among children 12-59 months of age is found to be 52.2% (47.1 – 57.2 95% CI). This also again shows a weak access and use of health services in the County.

### 4.4 Morbidity

Retrospective morbidity (over the past 2 weeks) result showed that among children aged 6-59 months, more than half 53.2% (n=219) reportedly suffered from some type of illness during the previous 2 week weeks prior to the survey date, which shows existence of health problem in the area. Of all children that had been sick, the most common sickness reported was fever (52.1%, n=114), followed by diarrhea (41.1%, n=90) and cough (21.5%, n=47). Other types of sickness accounted for 15.5% (n=34). Among sick children, 21.5% (n=47) were not taken to any health facility for treatment/not receive ant treatment, showing poor use and/or accesses of service and low treatment seeking behaviour that needs to be strengthened.

About 73.5% of children aged 6-59 months reported that they have slept under LLITN in the last night prior to the survey date, thus in areas like Leer with all Bomas are of malaria which needs to be strengthened.

### 4.5 Food Security Indicators

Household food security situation and livelihood information was assessed by collecting data from all households included in anthropometric and mortality surveys, using questionnaire. The survey covered a sample of 420 household's heads in the survey area.

According to the survey result only 9.8% (n=41) of sampled household's heads in Leer own some kind of livestock (herds or farm animals). The main household income activity, in the last 30 days prior to the survey date, reported by sampled households was sales of natural resources/firewood,

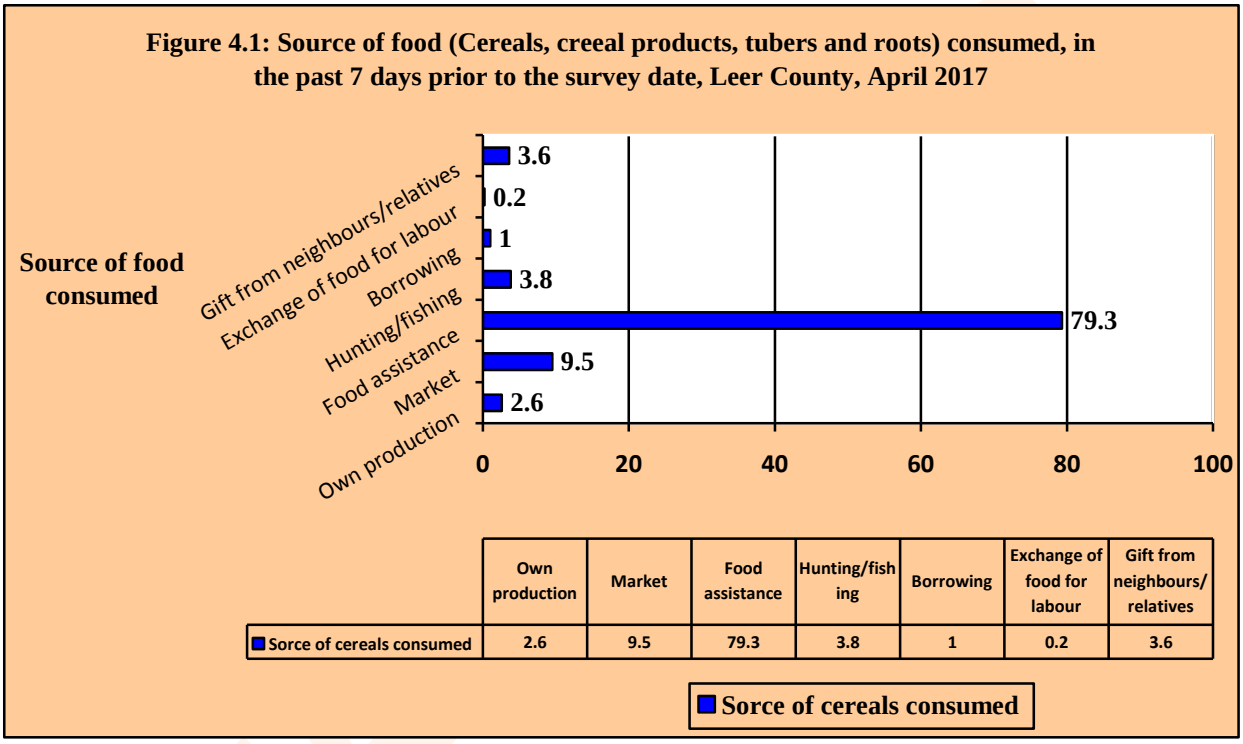
[19] The Sphere Project, 2004
[20] minimum 95% stated by Sphere guidelines for measles vaccination

charcoal, grass (35%, n=147). Small business/other petty trading and sales of food aid constitute 9.3% (n=39) and 10.2% (n=43), respectively.

***Food consumption score***

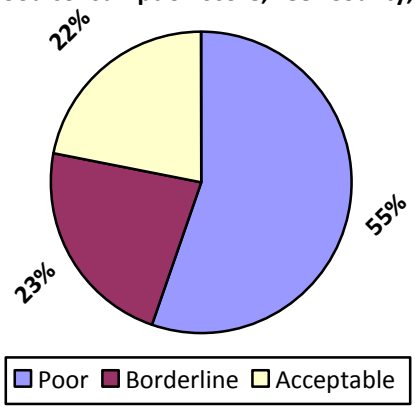
Interviewed households, using the food security and livelihood questionnaire, reported that cereals (98.3%, n=413) was the main source of food in the past 7 days prior to the survey date followed by meat , fish and egg (73.6%, n=309) and pulses (70.7%, n=297). According to the survey result, about eight out of ten households (79.3%, n=333)) reported that food assistance was the main source of food (cereals, cereal product, tubers and roots) consumed in the past 7 days prior to the survey date.

**Figure 4.1: Source of food (Cereals, creeal products, tubers and roots) consumed, in the past 7 days prior to the survey date, Leer County, April 2017**




According to the survey result 78% of the households have poor and borderline food consumption. Only about two in ten households have acceptable food consumption.

**Figure 4.2: Food consumption score, Leer County, April 2017**



***Households dietary diversity score***

Food diversity is one of the most reliable indicators of stress in communities. The analysis of the food security and livelihood questionnaire reveals, at the time of the survey, mostly consumed food by household members were white tubers and roots (95.5%) followed by cereals and cereal products (95.2%), fish and seafood (58.6%). But the intakes of egg and vitamin A rich vegetables and tubers, dark green leafy and other vegetables were found to be only 6% and 14%, respectively in the last 24 hours by the community residing in Leer County. Household's dietary diversity score (HDDS) as a proxy measure of the socio-economic level of the household was also calculated from a total score of 12 food groups. The average HDDS was 4.6, indicates low diet diversity.

***Households Hunger Scale and Coping Strategy***

Based on the survey result 69.8% (n=293) households reported, in the past 30 days prior to the survey day, there have been times when there ever no food to eat of any kind in their house because of lack of resources to get food. Sampled heads of households were also asked how often this did happen in the past [4 weeks/30 days]. Of those that said there ever no food to eat of any kind in their house because of lack of resources to get food; about half of the respondents (51.5%, n=151) reported rarely (1-2 times), 41% (n=120) reported sometimes (3-10 times) and the remaining 7.5% (n=22) reported it happened often (more than 10 times).

Analysis of the food security and livelihood questionnaire reveals, more than three fourth (78.6%, n=330) of the sampled households (or any of the households members), in the past 30 days prior to the survey day, has gone to sleep at night hungry as there was not enough food in the household. Of those that said the any member of the household gone to sleep at night hungry, because there was not enough food in the household; 58.2% (n=192) reported rarely (1-2 times), 36.7% (n=121) reported sometimes (3-10 times) and the remaining 5.2% (n=17) reported it happened often (more than 10 times).

About 76% of the respondents also reported that, in the past 30 days prior to the survey day, there was a time when their household member has gone a whole day and night without eating anything at all as there was not enough food in the household. Those who reported this happened rarely (1-2 times), sometimes (3-10 times) and often (more than 10 times) constitute 65.1%, 29.6% and 5.3%, respectively.

***Frequency of coping strategies***

In general, depending on exposure to different types of hazards, households exercise different coping mechanisms to cope with the various shocks. The survey also attempted to assess if there had been times when the households do not have enough food of money to buy food and what type of coping mechanisms households in Leer County adopted to adjust to food shortages or shortage of money to buy food in past 7 days prior to the survey date. According to the food security and livelihood questionnaire analysis, 88.3% (n=371) of sampled households reported that they have been time when their household do not have enough food or money to buy food, in past 7 days prior to the survey date.

The coping strategies that are often practiced are restrict consumption by adults, so that small children can eat followed by limit portion size at mealtimes and rely on less preferred and less expensive foods for household consumption from 5-7 days a week. These three practices are common in interviewed households as indicated in Figure 4.2 and Table 4.1 below, compared to other types of coping mechanisms reported by the households. However, increase in food availability is dependent on food availability and access. The adoption of these coping mechanisms

shows that the households cannot survive from their own farm production. As the survey result shows the majority of the respondents do not cultivated in most recent season (67.4%) and do not have livestock's (90.2%) the continuation of the on-going food aid/GFD is necessary, which obviously contributes to the communities of the area food security.

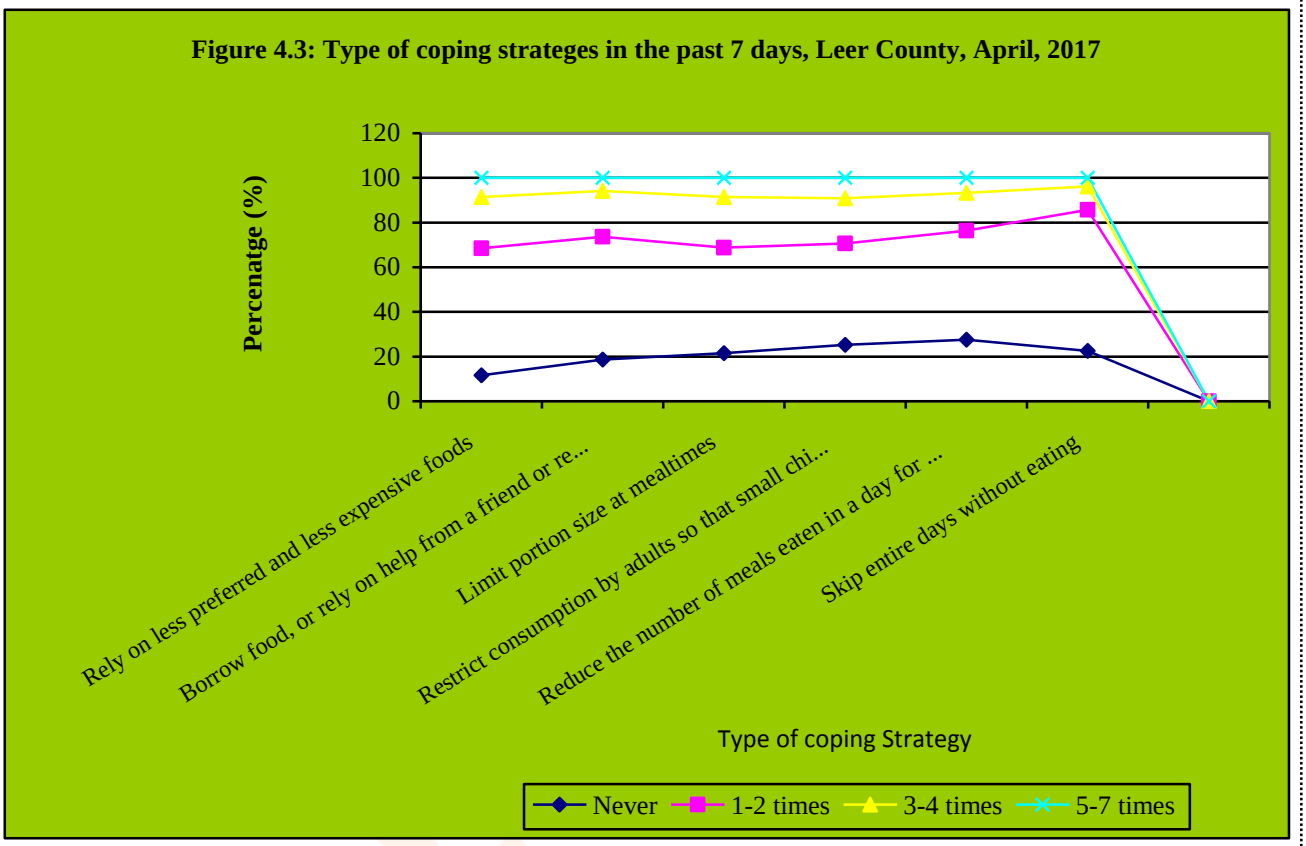



***Table 4.1: Frequency of coping strategies, Leer County, April, 2017***

| *Coping Strategy* | *Never* | *Rarely (1-2 days a week)* | *At times (3 – 4 days a week)* | *Often (5-7 days a week)* | *Total* |
|---|---|---|---|---|---|
| Rely on less preferred and less expensive foods | 11.6% (n=43) | 56.9% (n=211) | 22.9% (n=85) | 8.6% (n=32) | 371 |
| Borrow food, or rely on help from a friend or relative | 18.6% (n=69) | 55% (n=204) | 20.5% (n=76) | 5.9% (n=22) | 371 |
| Limit portion size at mealtimes | 21.6% (n=80) | 47.2% (n=175) | 22.6% (n=84) | 8.6% (n=32) | 371 |
| Restrict consumption by adults so that small children can eat | 25.3% (n=94) | 45.3% (n=168) | 20.2% (n=75) | 9.2% (n=34) | 371 |
| Reduce the number of meals eaten in a day for household members | 27.5% (n=102) | 48.8% (n=181) | 17% (n=63) | 6.7% (n=25) | 371 |
| Skip entire days without eating | 22.6% (n=84) | 63.1% (n=234) | 10.5% (n=39) | 3.8% (n=14) | 371 |

## 5. CONCLUSSION

The prevalence of malnutrition rates among children in the surveyed population is estimated at GAM of 20.1% (15.6-25.5 95% CI) (n=81) and SAM of 5.0% (3.2- 7.7 95% C.I.) (n=20) based on WFZ. While this is alarming and classified as '***Critical***', it also shows the nutrition situation in the area greatly deteriorated since the last nutrition and rapid mortality SMART survey conducted in February, 2016 (higher prevalence level both in GAM and SAM rates). Moreover, the levels of acute malnutrition remain far above WHO "critical" and IPC "emergency" and thresholds. Thus, it predicted that food insecurity will continue to be a concern in the area in the months ahead, and the on-going high levels of acute malnutrition call for immediate action (to improve the situation and avoid any further increases in prevalence) and close monitoring of the situation.

The CMR and U5MR remain below the IPC and WHO emergency thresholds. The large majority of deaths were reportedly due to illness and violence/conflict related causes. Retrospective morbidity (over the past 2 weeks) result showed that more than half of children aged 6-59 months, 53.2% (n=219) reportedly suffered from some type of illness during the previous 2 week weeks prior to the survey date, mainly from fever, diarrhea and cough. Of the total that had sick 21.5% (n=47) were not taken to any health facility for treatment, still showing low treatment seeking behaviour need to be strengthened. The proportion of children received Vitamin A supplementation, de-worming and measles vaccination is far below the WHO recommendations and SPHERE standards.

## 6. RECOMMENDATIONS

Intervention efforts that address both immediate needs for the acute and chronic malnutrition cases in the area should be mobilized. Specific recommendations include:

- WFP in collaboration with partners should continue to support the community through relief food distributions (GFD) to improve the household food security situation in all Bomas.
- The County health department office (CHD) in collaboration with partner need to implement the TFP in the remaining Bomas.
- Strengthening screening of all under-five in the county for appropriate responses.
- The CHD in collaboration with partners should further improve the routine vaccination coverage (measles) and supplementary immunisation activities (SIAs) that are needed for children who have no/missed vaccinations at appropriate ages.
- As all the communities are using unsafe swamp water as main source of drinking water, the County responsible office in collaboration with partners should work to improve safe water access. This is essential as the rates of current childhood illness (53.2%) caused by diarrhoeal disease (41.1%) can largely be attributed to poor access to safe drinking water supply.

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- As most of Leer areas are prone to malaria, strengthen LLITNs utilization, malaria control and prevention of the communities through providing support to the CHD and the health facilities in conjunction with its LLITNs distribution to prevent malaria.
- Close follow up of the overall food security situation of the County should be monitored through regular collection of early warning information and nutrition surveillance mechanism/ through nutrition surveys (both short and long rain periods).

## 7. REFERENCES


1. CDC-Statistical-Calculator- Two Surveys
2. Final report of SMART survey, Leer County, Unity state of South Sudan, February, 2016
3. Guidance Note: Nutrition Survey (SMART Methodology) for South Sudan, Nutrition Cluster, MoH RSS, UNICEF, October 2011
4. http://www.fews.net/east-africa/south-sudan
5. http://www.ssddrc.org/states
6. Leer population projection, as per the recent IPC report, January, 2017
7. Measuring Mortality, Nutritional Status, and Food Security in Crisis Situations: SMART METHODOLOGY, April 2006
8. National Bureau of Statistics, Population projections for South Sudan by County/ ssnbs.rog/ http://southsudanhumanitarianproject.com/counties/11792/
9. Nutrition Survey (SMART Methodology) Guideline for South Sudan (Nutrition Cluster, MoH/RSS, UNICEF; October 2011).
10. Rapid SMART surveys for Emergencies, version 1, September 2014
11. Sampling Methods and Sample Size Calculation for the SMART Methodology, June 2012.
12. South Sudan Livelihood Zones and Description, August, 2013
13. Sudan 5th Population and Housing Census, 2008
14. The Sphere Project, 2004
15. World Food Program, UNICEF: Technical Guidance for a Joint Food Security and Nutrition Assessments (JFSNA), March 2015


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# 8. ANNEXES

**Annex 1:** Plausibility check for: SSD_24042017_ACF_LEER.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** (2.2 %) |
| Overall Sex ratio | Incl | p | >0.1 | >0.05 | >0.001 | <=0.001 | |
| (Significant chi square) | | | 0 | 2 | 4 | 10 | **0** (p=0.768) |
| 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=0.573) |
| Dig pref score - weight | Incl | # | 0-7 | 8-12 | 13-20 | > 20 | |
| | | | 0 | 2 | 4 | 10 | **0** (7) |
| 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** (6) |
| 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 | **5** (1.13) |
| 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 | **1** (-0.39) |
| Poisson dist WHZ-2 | Excl | p | >0.05 | >0.01 | >0.001 | <=0.001 | |
| | | | 0 | 1 | 3 | 5 | **3** (p=0.001) |
| OVERALL SCORE WHZ = | | | 0-9 | 10-14 | 15-24 | >25 | **9** % |

The overall score of this survey is 9 %, this is **excellent**.

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**Annex 2**: Clusters selected based on Probability Proportion to Size of the village surveyed (using ENA for SMART, 9th July, 2015 version)

| *Payam* | *Boma* | *Geographical unit* | *Population size* | *Cluster* |
|---|---|---|---|---|
| Adok | Liap | Dhorloul | 972 | 1 |
| | | Kier | 3475 | 14 |
| | | Liap | 2215 | 5 |
| Thonyol | Rubkong | Naak | 1108 | 2 |
| | | Thor Chiengret | 3737 | 4 |
| | Ribq | Taryang | 692 | 3 |
| | | Chaaw | 1590 | 28 |
| | | Butwal | 2436 | 20 |
| | Luol | Majack | 2361 | 6 |
| | | Panthori1 | 3422 | 7 |
| | Tochrhriah (Tharyier) | Nyamieng | 1813 | 8 |
| | | Dhorbol | 2538 | 13 |
| | | Thoaltap | 1844 | 17 |
| | | Gondir | 3059 | 21 |
| | Dhorwic mouk (Wichguar) | Dhounicjuong | 3635 | 19 |
| | | Dhorbuoy | 1841 | 22 |
| Leer | Leer | TPA | 5837 | 29,30 |
| Yang | Nylem | Nyiem | 1753 | 9 |
| | | Dhorbiew | 1107 | 10 |
| | | Yang | 1457 | 11 |
| | Kamriak | Dhang Yow | 1009 | 12 |
| | | Looth | 2204 | 15 |
| | | Khamria | 2406 | 16 |
| | Rom | Tuluong | 2846 | 18 |
| | | Rhom | 3443 | 26 |
| | | Dhorliel | 1734 | 27 |
| | Dohornyal | Dhornyal | 2476 | 23 |
| | | Ngobuor | 1005 | 24 |
| | | Tuochriak | 2720 | 25 |

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## Annex 5: Survey questionnaires

# ANTHROPOMETRIC & HEALTH QUESTIONNAIRE

(To be conducted in EVERY HH with children 6-59 - from the random starting point onwards)

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

| 1.1 | 1.2 | 1.3 | 1.4 | 1.5 | 1.6 | 1.7 | 1.8 | 1.9 | 1.10 | 1.11 | 1.12 | 1.13 | 1.14 | 1.15 | 1.16 | 1.17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Child ID | HH ref. no. (To be copied from the CF/LF) | Sex<br>---<br>**m** = Male<br>**f** = Female | Age in months (use local calendar of event, heath card, birth certificates/ notifications) | Source of Age information<br>1. Birth certificate/ notification<br>2. Health card<br>3. Mothers recall/ calendar of events | Weight in Kg (e.g. 12.4) | Height in cm (e.g. 78.1) | Oedema<br>---<br>**n** = No<br>**y** = Yes | MUAC in cm (e.g. 11.3) | VIT A (**in last 6 months**)<br>---<br>**0** = No<br>**1** = Yes | Deworming **(in past 6 months)**<br>---<br>**0** = No<br>**1** = Yes<br>**3**= Do not know | Measles Vaccine<br>---<br>**0** = No<br>**1** = Yes with EPI card<br>**2** = Yes recall<br>**3**= Do not know<br>**88** = Child <9m | Illness **in past 2** weeks?<br>---<br>**0** = No<br>**1** = Yes<br>If no, go to 1.17 | Type of Illness<br>---<br>**1** = Fever*<br>**2** = Cough**<br>**3** = Diarrhoea***<br>**4** = Skin Infections<br>**5** = Eye infections<br>**66** = Other (**specify**)<br>_____ | Treatment sought<br>---<br>**0** = None sought<br>**1** = Hospital<br>**2** = PHCC/PHCU<br>**3** = Mobile /outreach clinic<br>**4** = Village health care worker<br>**5** = Private physician<br>**6** = Relative/ friend<br>**7** = Shop<br>**8** = Traditional practitioner<br>**9** = Pharmacy<br>**66** = Other (**specify**)_____ | Did the child sleep under a mosquito net (LLITN) last night?<br>---<br>0 = No<br>1 = Yes | If malnourished (MUAC < 11.5 and/or the child has edema), is child currently enrolled in treatment programme?<br>0 = No<br>1 = yes, (in TFP)<br>2 = yes, (in SFP)<br>99 = NA (the child is not malnourished) |
| 1 | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | |

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.

*Fever: Elevated body temp and chills

**Cough: Fever and difficulty in breathing
***Diarrhoea: Three or more loose stool/day

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## DEMOGRAPHY & MORTALITY QUESTIONNAIRE

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

| | | |
|---|---|---|
| **COUNTY:** | **PAYAM:** | **NAME OF INTERVIEWER:** |
| **BOMA:** | **VILLAGE:** | |
| **CLUSTER NO. [ ][ ]** | **TEAM NO. [ ][ ]** | **HOUSEHOLD[21] NO. [ ][ ]** |

| 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| **No.** | **Name** | **Sex** (M/F) | **Age** (in completed 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) Diarrhoea 2) Fever 3) Measles 4) Cough and difficulty breathing 5) Malnutrition 6) Violence/ conflict related 7) Injury 8) unknown 9) Others (Specify--------- | **Location of death** 1=current location 2=during migration 3=in place of last residence 4=other |
| a) List **ALL** the household members that are **currently living** in this household (that slept in this household last night). | | | | | | | | | |
| 1 | | | | | | | | | |
| 2 | | | | | | | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | | | | | | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| b) List all the household members that have **left this household** (out migrants) since **the start of the recall period, i.e.** *all the people that slept in this household on the* ***first night of the recall period*** *but did* ***NOT sleep*** *in the* ***household last night.*** | | | | | | | | | |
| 1 | | | | | Y | | | | |
| 2 | | | | | Y | | | | |
| 3 | | | | | Y | | | | |
| 4 | | | | | Y | | | | |
| 5 | | | | | Y | | | | |
| 6 | | | | | 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 | | |

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

[21] 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.

# FOOD SECURITY AND LIVELIHOOD QUESTIONNAIRE

(continue questioning HHs where Mortality 'Anthro' & Health Info' has been collected)

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

| 3.1 | 3.2 | 3.3 | 3.4 | 3.5 | 3.6 | 3.7 | 3.8 | 3.9 | 3.10 | 3.11 | 3.12 | 3.13 | 3.14 | 3.15 | 3.16 | 3.17 | 3.18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | **How many days in past 7 days did your household consumed the following items?** | | | | | | | | | | | | |
| **HH Ref. No:** | **HH size ------ (No. of people living in HH)** | **Resident status of HH:**<br>---------<br>1 = Resident<br>2 = Returnee (in the last 1 year)<br>3 = IDP<br>4 = Refugee<br>66 = Other (specify)<br>_____ | **Is the HH head male or female?**<br>---------<br>1 = Male<br>2 = Female | **What was your HHs main income activity in the last 30 days? (choose 1 option)**<br>----------<br>1 = Sale of crops<br>2 = Sale of livestock<br>3 = Sale of animal products<br>4 = Brewing<br>5 = Sale of fish<br>6 = Sale of natural resources (firewood; charcoal; grass)<br>7 = Sale of food aid<br>8 = Casual labour<br>9 = Skilled labour<br>10 = Salaried work<br>11 = Other petty trading<br>12 = Small business<br>13 = Family support<br>66 = Other (specify) | **Cereal and tubers:** Maize/ sorghum/ cassava/ potatoes/ sweet potatoes/ millet/ pasta/ bread/ rice/ other cereals and tubers | **Pulses:** beans/ lentils/ green grams/groundnuts/ cashew nuts/ sesame/ peas | **Vegetables/ green leaves** | **Fruits** | **Animal protein:** Beef, goat, pork, poultry, eggs, fish | **Milk and other dairy products** (yoghurt, curd) | **Sugar, honey, sweets** | **Oil, fats, butter** | **What was the main source of food in the past 7 days? (choose 1 option)**<br>----------<br>1 = Own production<br>2 = Work for food<br>3 = Gifts<br>4 = Market/ shop purchase<br>5=Borrowing/ debt<br>6 = Food aid<br>7 = Hunting<br>8 = Fishing<br>9 = Gathering<br>66 = Others<br>---------- | **Did you cultivate in the recent last season?**<br>---------<br>0 = No<br>1 = Yes | **Does the HH own any livestock, herds or farm animals?**<br>---------<br>0 = No<br>1 = Yes | **In the past 30 days, have there been times when you did not have enough food or money to buy food?**<br>----------<br>0 = No<br>1 = Yes | **If yes, which coping strategies were used? (list ALL options mentioned)**<br>----------<br>1 = Rely on less preferred/ cheaper food<br>2 = Borrowing/ kindship support<br>3 = Limit portion size at meals<br>4 = Restrict adults' consumption for children<br>5 = Reduce number of daily meals<br>6 = Sell more animals than usual<br>7 = Consume seed stocks<br>66=Other (specify)<br>---------- |
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FINAL REPORT