Preliminary Report of Nutrition in Mayom County Unity State during November 26 to December 5, 2016.

Funded by CHF

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Executive Summary

Between November 26 to December 5 2016, a total of 396 households in Mayom County were assessed. This preliminary report contains analysis of nutrition anthropometric indicators assessed in the survey among children 6-59 months. The final report is expected to be completed by December 21, 2016.

Summary of key anthropometric and mortality findings:

Anthropometry

- 552 children were assessed
- GAM was 21.0% (17.8-24.6 95% CI) and SAM 2.7% (1.7- 4.4 95% CI) based on Weight-for-Height/MUAC and the presence of bilateral oedema.
- No case of oedema was identified
- Total stunting was 5.9% calculated with a SD of 1
- Total underweight was 12.7 % (9.7 – 16.5 95% C.I) and severe underweight was 1.6 % (0.8 – 3.2 95% C.I)

Mortality

- Crude death rate 1.41 (1.05 – 1.90 95% C.I)
- Under 5 death rate was 1.07 (0.49 – 2.31 95% C.I)

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

1. Introduction

1.1 Background

Mayom County is one of the four Counties of the newly created Northern Liech State; 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.

The County is made up of 10 Payams namely: Mankien, Riak, Ruathnyibol, Kueryiek, Kuerbone, Wangbour, Wangkei, Ngop, Pup and Bieh Kuach.

Acccording to the 2008 Sudan census, Mayom has an estimated population of 120,715 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 from River Chuolpi. Over time, merchants from Bentiu, Sudan and neighbouring states migrated to Mayom to establish a market economy.

Mayom is a disaster-prone County and is exposed to a multitude of natural disasters including, floods, droughts and armed conflict.

Results from a survey undertaken by CARE in Mayom during the pre-harvest period in May 2016 showed a high GAM rate of 28.5% (23.7-33.7 95% C.I). Food availability and access were expected to remain very limited in many parts of Unity where conflict continues to displace people and disrupt livelihoods. The double burden of internally displaced persons and the consequential disruption of livelihoods has been a major contributing factor to high malnutrition rates.

1.2 Survey Objectives

The overall objective is to estimate the level of acute malnutrition among children aged 6 to 59 months in Mayom County.

Specific Objectives:

1) To estimate the prevalence of acute malnutrition of children aged 6-59 months.
2) To estimate the retrospective crude (CDR) and under five (U5MR) mortality rates.
3) To determine the morbidity and health seeking behaviors in the County.
4) To estimate the coverage of measles vaccination and Vitamin A supplementation.
5) To determine IYCF practices at household level.
6) To assess the current household food security situation in the County.
7) To assess Water, Hygiene and Sanitation (WASH) practices in the County.
8) To make recommendations on appropriate interventions.

2. Methodology

2.1 Sample size for Anthropometry

The sample size for the nutrition survey was determined using ENA for SMART software (July 9th, 2015 version). The following assumptions based on the given context were made to obtain the number of children and households to be included in the survey.

Table 1: Number of children and households to be included in nutrition survey

Parameters for Anthropometry	Value	Rationale/ Source
Estimated Prevalence of GAM (%)	28.5	SMART Survey in Mayom by CARE, May 2016
± Desired precision	5	According to SMART Survey guidelines based on estimated prevalence
Design Effect	1.42	SMART Survey in Mayom by CARE, May 2016
Children to be included	484	
Average HH Size	8.7	SMART Survey in Mayom by CARE, May 2016
% Children under-5	20.5	SMART Survey in Mayom by CARE, May 2016
% Non-response Households	5	
Households to be included	317	

2.2 Sample Size Mortality

The sample size for the retrospective mortality survey was determined using ENA for SMART software (July 9th, 2015 version). The following assumptions based on the given context were made to obtain the population and number of households to be included.

Table 2: Number of children and households to be included in retrospective mortality survey

Parameters for Mortality	Value	Rationale/ Source
Estimated death rate per 10 000/day	0.44	SMART Survey in Mayom by CARE, May 2016
± Desired precision per 10 000/day	0.3	According to SMART Survey guidelines based on estimated prevalence
Design Effect	1.42	SMART Survey in Mayom by CARE, May 2016
Recall period in days	90	Registration for food distribution in Mankien Payam starting September 2, 2016
Population to be included	3226	
Average HH Size	8.7	SMART Survey in Mayom by CARE, May 2016
% Non-response Households	5	
Households to be included	390	

2.3 Survey Final Sample Size

In order to estimate acute malnutrition prevalence and mortality rates in the county, data was collected from 396 households as this was the bigger sample size.

Table 3: Percent of households and children 6-59 months included in the survey

Number of HH planned	Number of HH surveyed	% surveyed /planned	Number of children 6-59 months planned	Number of children 6-59 months surveyed	% surveyed /planned
390	396	101.5%	484	552	114%

2.4 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 reach each cluster (one-way): 2 hrs.
3. Duration for initial introduction and selection of households: 1 hour.
4. Time spent to move from one household to the next: 10 min.
5. Average time in the household: 30 min.
6. Breaks: 1 lunch break of 1hr.

The above gives an average 4.30 hours of working time in each cluster. If on average teams spend 10 min in each HH and 10 min traveling from one HH to another, each team can comfortably reach 12 HH per day. One day in each area (cluster) was assumed.

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

390 HH/ 12 HH per day = 33 (32.5) clusters

Based on this calculation 33 clusters were selected to be included in the survey.

All the selected households were surveyed and no replacements were done.

2.5 Cluster Sampling Strategy

2.5.1 First stage sampling- Selection of clusters

List of villages with their respective population was obtained from the RRC, CHD and community mobilizers. Villages in the county were considered as clusters and the clusters to be sampled were selected with probability proportionate to population size (PPS). All

villages of the County along with their respective populations were entered into ENA software; the software automatically selected clusters to be included in the study. Inaccessible villages where people had out-migrated due localized insecurity and flooding were excluded from the sampling frame.

All the clusters (from the updated sampling frame) with their respective population sizes were entered into ENA for SMART, and 33 clusters were selected.

2.5.2 Second stage sampling- Selection of households

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

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

2.6 Survey implementation

2.6.1 Survey teams training

The survey teams were trained on SMART methodology for four days from 26th to 29th November 2016.

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.

2.6.2 Data collection

Data collection was undertaken for six days starting on 30th November to 5th December 2016. 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, Hygiene and Sanitation questionnaire were also administered.

All questionnaires used were the standard SMART survey data collection tools recommended by the Nutrition Information Working Group (Annex 3).

2.6.3 Field Supervision

The team leaders were responsible for the overall quality of activities and team performance. In addition, four supervisors from RRC, CARE Nutrition staff and the survey manager closely supervised the teams throughout the survey.

Where possible, each data sheet was checked every night prior to data entry. The data was entered on daily basis and missing or flagged data identified. Based on the results the survey manager gave feedback to team members. For Missing and flagged data observed after daily entry and analysis, corrective action was taken including revisiting the household and directly assisting struggling teams.

2.7 Data Quality assurances

A number of measures were employed to ensure quality data including;

- A four-day comprehensive training together with standardization and pilot tests
- Field supervision of the survey teams during data collection
- Calibration and standardization of survey equipment
- Use of Cluster Control forms to track assessment outcome for every sampled household
- Daily plausibility checks and sharing of feedback with the teams every morning before departing to the field

2.8 Data analysis

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.

3. Results

3.1 Anthropometry

Anthropometric measurements were taken on a total of 552 children (273 boys and 279 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 the ratio of around 1.0 as expected (Table 4).

Table 4: Distribution of age and sex of sample

	Boys		Girls		Total		Ratio
AGE (mo)	**no.**	**%**	**no.**	**%**	**no.**	**%**	**Boy:girl**
6-17	74	50.0	74	50.0	148	26.8	1.0
18-29	61	46.6	70	53.4	131	23.7	0.9
30-41	59	48.0	64	52.0	123	22.3	0.9
42-53	63	51.6	59	48.4	122	22.1	1.1
54-59	16	57.1	12	42.9	28	5.1	1.3
Total	273	49.5	279	50.5	552	100.0	1.0

The prevalence of Global Acute Malnutrition (GAM) rate for the County was 21.0**%** (17.8 - 24.6 95% C.I.), and the severe acute malnutrition (SAM) rate was 2.7% (1.7 – 4.4 95% C.I.). In this assessment, no cases of oedema were observed. The findings indicate a critical nutrition situation according to WHO classification. Detailed results are presented in table 5.

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

	All n = 548	**Boys** n **=** 269	**Girls** n **=** 279
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(115) 21.0 % (17.8 - 24.6 95% C.I.)	(57) 21.2 % (15.9 - 27.6 95% C.I.)	(58) 20.8 % (16.1 - 26.3 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(100) 18.2 % (15.4 - 21.5 95% C.I.)	(48) 17.8 % (13.0 - 23.9 95% C.I.)	(52) 18.6 % (14.4 - 23.7 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(15) 2.7 % (1.7 - 4.4 95% C.I.)	(9) 3.3 % (1.6 - 6.8 95% C.I.)	(6) 2.2 % (0.9 - 5.0 95% C.I.)

Table 6: Distribution of acute malnutrition and oedema based on weight-for-height z-scores

	<-3 z-score	**>=-3 z-score**
Oedema present	Marasmic kwashiorkor No. 0	Kwashiorkor No. 0

	(0.0 %)	(0.0 %)
Oedema absent	Marasmic No. 15 (2.7 %)	Not severely malnourished No. 537 (97.3 %)

Table 7 below shows the prevalence of global acute malnutrition based on MUAC (<125 mm) and/or oedema which was 8.5 % (6.4 – 11.3 95% C.I.) and of severe acute malnutrition (MUAC<115 mm and/or oedema) was 0.5 % (0.1 - 2.4 95% C.I.).

Table 7: Prevalence of acute malnutrition based on MUAC cut off's (and/or oedema) and by sex

	All n = 552	**Boys** n = 273	**Girls** n = 279
Prevalence of global malnutrition (< 125 mm and/or oedema)	(47) 8.5 % (6.4 - 11.3 95% C.I.)	(23) 8.4 % (5.4 - 13.0 95% C.I.)	(24) 8.6 % (6.0 - 12.1 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(44) 8.0 % (6.0 - 10.6 95% C.I.)	(20) 7.3 % (4.5 - 11.7 95% C.I.)	(24) 8.6 % (6.0 - 12.1 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(3) 0.5 % (0.1 - 2.4 95% C.I.)	(3) 1.1 % (0.3 - 4.6 95% C.I.)	(0) 0.0 % (0.0 - 0.0 95% C.I.)

The prevalence of underweight among children was 12.7 % (9.7 - 16.5 95% C.I.) with 1.6 % (0.8 – 3.3 95% CI being severely underweight as presented in Table 8.

Table 8: Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 551	**Boys** n = 272	**Girls** n = 279
Prevalence of underweight (<-2 z-score)	(70) 12.7 % (9.7 - 16.5 95% C.I.)	(37) 13.6 % (9.4 - 19.3 95% C.I.)	(33) 11.8 % (8.0 - 17.1 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(61) 11.1 % (8.2 - 14.8 95% C.I.)	(32) 11.8 % (7.8 - 17.4 95% C.I.)	(29) 10.4 % (7.1 - 15.0 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(9) 1.6 % (0.8 - 3.3 95% C.I.)	(5) 1.8 % (0.8 - 4.3 95% C.I.)	(4) 1.4 % (0.4 - 4.8 95% C.I.)

The survey findings indicate the prevalence of stunting (HAZ<-2) was 5.9% calculated with an SD of 1.[1]

[1] 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

The mean Z scores for wasting (WHZ), underweight (WAZ) and stunting (HAZ) were; 0.95±1.06, -0.85±1.00 and -0.43±1.30 respectively, all indicating poorer nutrition situation compared to WHO reference population. The standard deviations for WHZ and WAZ were within the acceptable range of 0.8-1.2 but higher (1.30) for HAZ as shown on table 10.

Table 9: 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	548	-0.95±1.06	1.00	0	4
Weight-for-Age	551	-0.85±1.00	1.36	0	1
Height-for-Age	522	-0.43±1.30	1.58	0	30

* contains for WHZ and WAZ the children with edema.

3.2 Mortality

Mortality data was collected using the mortality individual questionnaire.

The crude mortality rate (CMR) was 1.41 (1.05-1.90 95% CI) and the under-five mortality rate (U5MR) was 1.07 (0.49-2.31 95%). CMR and U5MR rates are classified as emergency and alert respectively as per the WHO's thresholds of 1/10,000/day and 2/10,000/day

Most deaths were as a result of illness (76.6%) while injuries contributed 23.4% of deaths. About 68.8 % of deaths occurred in current location, 14.9% during migration, 8.5% in place of last residence and 8.5% in other locations.

Table 10: Mortality results, Mayom County, December, 2016

Parameters for Mortality		**Results (CI 95%)**	
CMR (deaths per 10 000/day		1.41 (1.05-1.90) (95% CI)	
U5MR (deaths in children <5/10 000/day		1.07 (0.49-2.31) (95% CI)	
Persons recorded within recall period		3698	
Current residents <5 years old		625	
Total deaths during the recall period		47	
Total deaths during the recall period <5 years old		6	
Recall Period (days)		90	
Population to be included		3226	
Average HH Size		9.3	
% Non-response Households		0	
Households to be included		390	
Cause of death	**%**	**Location of death**	**%**
1. Illness	76.6	1] In current location	68.1
2. Injury/traumatic	23.4	2] During migration	14.9
3. Unknown	0	3] In place of last residence	8.5
		4] Other	8.5

4. Additional Variables

4.1 Child morbidity

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 the children. Majority of the children (72.8%) were reported to have been sick two weeks prior to the survey. The common illnesses were fever at 39.4%, Cough (31.1%) and diarrhoea (20.6%).

An assessment of health seeking behaviour among caregivers showed that 48.3% did not seek treatment for their sick children. Among those who sought treatment 44.2% reported to have sought treatment from the PHCC/PHCU.

Morbidity results are summarized in table 12 below.

Table 11: Morbidity results, Mayom County, December, 2016

Indicator	N	n	Proportion (95% C.I)
Prevalence of reported illness	552	402	72.8 (68.8-76.6)
Fever		300	39.4 (35.6-42.7)
Cough		237	31.1 (27.9-34.3)
Diarrhea		157	20.6 (17.5-23.6)
Other		67	8.8 (6.8-10.9)

4.2 Measles immunization, vitamin A supplementation and deworming

Amongst children 9-59 months, measles vaccination coverage was low at 41.7%. Vitamin A coverage was also low with 55.1% of children 6-59 months old having received supplementation in the last 6 months.

Deworming in the past 6 months before the survey stood at 29.3%.

The coverage for both vitamin A and measles was far below the World Health Organization (WHO) recommended coverage of above 80% hence making the community prone to outbreaks of childhood preventable illnesses.

Table 12: Measles immunization, vitamin A and deworming results, Mayom County, December, 2016

Indicator	N	n	Proportion (95% C.I)
Children 9-59 months immunized against measles, based on card	504	197	39.1(34.7-43.5)
Children 9-59 months immunized against measles, based on recall	504	13	2.6 (1.2-4.2)
Vitamin A supplementation	481	265	55.1 (50.5-59.3)
Deworming	481	141	29.3 (25.4-33.3)

4.3 Infant and young child feeding practices

The survey collected data on Infant and Young Child Feeding practices. The number of children between 0-23 months considered for IYCF was 256 and therefore IYCF results should be interpreted with caution as the sample size was small to make statistically sound inference.

Initiation of children to breastfeeding within one hour after birth was reported by 84.4% of respondents. The proportion of children exclusively breastfed in the first six months of life was 78.9% and 43.2% of the children were reportedly introduced to solid, semi-solid or soft foods at the age of 6 months.

Table 13: Summary of Infant and young child feeding practices, Mayom County, December 2016

Indicator	N	n	Proportion (95% C.I)
Early initiation of breastfeeding (0-23 months)	256	216	84.4 (79.7-88.7)
Exclusive breastfeeding (0-5.9 months)	57	45	78.9 (68.4-87.7)
Introduction of solid, semi-solid or soft foods (6-8.9 months)	44	19	43.2 (29.5-59.1)
Continued breastfeeding at 12 months (12-15 months)	55	50	90.9 (81.8-98.2)
Continued breastfeeding at 24 months (20-23 months)	37	26	70.3 (54.1-83.8)
Minimum meal frequency for breastfed children (6-23.9 months)	199	97	48.7 (41.7-55.8)
Minimum meal frequency for both breastfed and non-breastfed children (6-23.9 months)	199	104	52.3 (45.2-59.3)

4.4 Water, Sanitation and Hygiene practices

Majority of the households 73.7% got their drinking water from rivers and streams which are considered unsafe water sources.

Most of the households (82.1%) do not treat their drinking water.

A large proportion of the surveyed households lack access to sanitation facilities and mostly use undesignated open area (82.3%) and designated open area (16.4%) for fecal disposal.

Only 5.3% of caregivers interviewed washed their hands with water and soap.

Table 14: Summary results for Water, Sanitation and Hygiene practices in Mayom County, December 2016

Indicator	N	n	Proportion (95% C.I)
Main source of drinking water (River or stream)	396	291	73.7 (69.7-77.4)

Treatment methods for drinking water (Not treating drinking water)	396	325	82.1(78.5-85.9)
Access to sanitation • Undesignated open area • Designated open area	 396 396	 326 326	 82.3 (78.5-86.1) 16.4 (12.9-20.2)
Hand washing with soap	396	21	5.3 (3.3-7.6)

4.5 Food Security and Livelihoods

The survey collected data on food security and livelihoods. The core food security indicators are summarized below.

4.5.1 Food Consumption score

The food consumption score (FCS) is a composite score based on dietary diversity, food frequency, and relative nutritional importance of different food groups. A significant number of surveyed households had poor (45.7%) and borderline (21.9%) FCS which indicates deteriorating household food consumption. The results are as shown in the table below.

Table 15: Food Consumption Score in Mayom, December 2016

Food consumption score	Frequency	Proportion (95% C.I)
Poor food consumption: 0 to 21	181	45.7 (40.7-51)
Borderline food consumption: 21.5 to 35	87	21.9 (17.9-26)
Acceptable food consumption: >35	128	32.2 (27.8-37.1)

4.5.2 Household dietary diversity

Dietary diversity is a qualitative measure of food consumption that reflects household access to a variety of foods.

Generally, household dietary diversity was acceptable. Only 14.4% of HHs consumed less than 3 food groups in the previous 24 hours as shown in table 15.2. The average HDD score for all HHs in the survey was 5.7 food groups out of 12 major food groups.

Table 16: Household Dietary Diversity in Mayom, December 2016

Household Dietary Diversity	Frequency	Proportion (95% C.I)
Low Diversity Groups (<=3 food groups)	57	14.4 (11.1-17.7)
Medium Diversity Groups (4-5 food groups)	130	32.8 (28.3-37.6)
High Diversity Groups (>6 food groups)	209	52.8 (47.7-57.8)

4.5.3 Reduced Coping Strategy Index

The Reduced Coping Strategies Index (rCSI) evaluates the frequency and severity of household coping strategies.[2] A high rCSI reflects greater vulnerability to food insecurity. Majority 87.9 % of the sampled population had average reduced coping strategy index which indicated that households were applying a number of coping strategies.

Table 17: Reduced Coping Strategy Index in Mayom, December 2016

Reduced Coping Strategy Index	Frequency	Proportion (95% C.I)
Good (rCSI, 0 – 4)	16	4 (2.3-6.1)
Average (rCSI, 5 – 20)	348	87.9 (84.6-90.9)
Poor (rCSI, > 21)	32	8.1 (5.3-10.9)

[2] Based on the country's context, the total rCSI score is the basis to determine and classify the level of coping into three categories: **No or low coping (rCSI= 0-3), medium (rCSI = 4-9, high coping (rCSI ≥10).** WFP Vulnerability Analysis & Mapping Guidance Note 2012

4. Conclusion and recommendations

The findings of the assessment depict a critical nutrition situation, above the WHO emergency threshold in Mayom County.

The survey recorded high crude mortality rate at 1.41 (1.05-1.90 95% CI). Disaggregation of data by sex shows that males were more affected than females with CMR of 2.21 (1.64-2.97 95% CI) and 0.69 (0.38-1.24) respectively. The high mortality among males may be related to ongoing conflict in some parts of Mayom County.

Overall, the key underlying factors of nutrition status are high morbidity, poor IYCF practices, poor food consumption, very high level of open defecation, poor handwashing practices and use of untreated water. Integrated approaches should be undertaken to reduce risk factors such as high morbidity, sub-optimal childcare and feeding practices, unsafe drinking water among others.

The following recommendations should be considered;

- Scale up both the out-patient therapeutic feeding and supplementary feeding programmes to improve coverage in order to treat acutely malnourished children. This can be achieved by increasing number of OTP and TSFP sites or by creating mobile treatment sites to reach far flung areas and other parts that are not covered by the current project specifically Kuerbuone and Wangbuor Payams.
- Infant and Young Child Feeding intervention should be integrated in other related programs being implemented especially health. There is also need for more awareness campaigns and community education programs on IYCF.
- Since CARE SS is implementing a health project in the County, it is important to strengthen primary health care by improving provision of essential drugs to treat common childhood illnesses.
- Increase the coverage of the health programme by decentralizing the services to other PHCC/PHCU. Mobile clinics can be considered for this.
- Scale up of integrated health services which include outreach services and mobile clinics emphasizing immunization campaigns, vitamin A supplementation and deworming for the under 5's.
- There is need to improve coverage of the food security programmes implemented by partner agencies including ICRC and VSF in order to reach a wider population. This may subsequently help to improve household food access.
- 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.

Annexes

Annex 1: Selected Clusters

Geographical unit	Population size	Cluster
Goachang	696	1
Poulnyang	1479	2
Wangar	452	3
Reithtual	539	
Guongkar	1044	4
Nyekuawne	783	5
But	435	RC
Manchuol	217	6
Yualbor	783	7
Pakur	243	8
Chotjak	652	9
Yoyoh	696	10
Bow	696	11
Koatma	1000	12
Ruathlual	435	13
Wanyuech	700	14
Boulbuol	687	15
Kainuan	435	RC
Tuob	774	16
Nyekong	87	
Chuotchar	165	17
Waan	626	18
Koab	661	19
Chalual	626	20
Kuoch	591	21
Juom	791	22
Nyadai	522	23
Barar	696	24
Tuoch thoak	435	25
Kuach nyoak	652	26
Nienkel	609	27
Jiathchuol	696	28
Kuergangak	783	RC
Kech	609	RC
Wuoye	800	29
Rupliethna	722	30
Kuerbol	826	31
Kuanyakey	600	32
Kuergar	609	33

Annex 2: 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** (0.7 %)
Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**0** (p=0.798)
Age ratio(6-29 vs 30-59)	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**4** (p=0.030)
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	**2** (10)
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** (1.06)
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	**1** (-0.35)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<=0.001	
			0	1	3	5	**0** (p=0.278)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	**9** %

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

Annex 3: Data collection tools

Final Data Collection Tools-Ma