Research Terms of Reference

[Multi-Sectoral Needs Assessment, Renk County, Upper Nile State, South Sudan]
[Research Cycle ID: SSD 1908]
[South Sudan]

[Release date: 17-07-2019]
[Version number 1]

REACH Informing more effective humanitarian action

1. Executive Summary

Country of intervention	South Sudan					
Type of Emergency	□	Natural disaster	X	Conflict		
Type of Crisis	□	Sudden onset	□	Slow onset	X	Protracted
Mandating Body/ Agency	*UNICEF, Medair, REACH*					
Project Code	*32DLF*					
Overall Research Timeframe *(from research design to final outputs / M&E)*	14/05/2019 to 14/06/2019					
Research Timeframe *Add planned deadlines (for first cycle if more than 1)*	1. Start collect data: 20/05/2019		5. Preliminary presentation: 09/07/2019			
	2. Data collected for household survey: 06/06/2019		6. Outputs sent for validation: 12/07/2019			
	3. Data analysed: 21/06/2019		7. Outputs published: 21/07/2019			
	4. Data sent for validation: 01/07/2019		8. Final presentation: _ _/_ _/_ _ _ _			
Number of assessments	X	Single assessment (one cycle)				
	□	Multi assessment (more than one cycle) *[Describe here the frequency of the cycle]*				
Humanitarian milestones *Specify **what** will the assessment inform and **when** e.g. The shelter cluster will use this data to draft its Revised Flash Appeal;*	**Milestone**		**Deadline**			
	□	Donor plan/strategy	_ _/_ _/_ _ _ _			
	□	Inter-cluster plan/strategy	_ _/_ _/_ _ _ _			
	□	Cluster plan/strategy	_ _/_ _/_ _ _ _			
	□	NGO platform plan/strategy	_ _/_ _/_ _ _ _			
	X	Other (Specify): IPC Analysis	08/2019			
Audience Type & Dissemination *Specify **who** will the assessment inform and **how** you will disseminate to inform the audience*	**Audience type**		**Dissemination**			
	X Strategic X Programmatic □ Operational □ [Other, Specify]		□ General Product Mailing (e.g. mail to NGO consortium; HCT participants; Donors) □ Cluster Mailing (Education, Shelter and WASH) and presentation of findings at next cluster meeting X Presentation of findings (e.g. at HCT meeting; Cluster meeting)			

			X Website Dissemination (Relief Web & REACH Resource Centre) □ [Other, Specify]	
Detailed dissemination plan required	□	Yes	X	No
General Objective	To better understand the multi-sectoral needs, humanitarian conditions and causes of malnutrition in Renk County to inform IPC Classification, Needs Analysis Working Group and Medair programs			
Specific Objective(s)	• To assess the prevalence of global acute malnutrition (GAM) by weight-for-height[1] for 6-59 month old children in Renk County following Standardized Methodology for Assessment in Relief and Transition (SMART) guidelines. • To estimate the Under-five crude mortality rate and Crude mortality rate of former Renk County population over a determined recall period. • To estimate the coverage of measles vaccination (9-59 months), Vitamin A supplementation (6-59 months) and deworming (12-59 months). • To assess the 2-weeks recall morbidity among children 6-59 months to determine the health seeking behavior of the caregivers. • Assess infant and young child feeding practices of caregivers of children 0-23 months old. • Assess the multi-sectoral humanitarian conditions, including food security, WASH, livelihoods, and health. • Compare the crude death rates attained from retrospective household survey method, compared to the informant method.			
Research Questions	RQ1: What is the prevalence of Global Acute Malnutrition (GAM) among children 6 to 59 months in host community and population living in camp-like settings[2] in former Renk County? A. What is the GAM by weight-for-height? B. What is the proxy GAM by mid-upper arm circumference (MUAC)? RQ2: What is the crude death rate (CDR) and under-five death rate (U5DR) for host community and population living in camp-like settings in Former Renk County? A. What are the CDR and U5DR calculated from the retrospective household survey method in host community and population living in camp-like settings in Former Renk County? B. What are the CDR and U5DR calculated from the informant method in host community populations in Former Renk County? RQ3: What are the vulnerabilities for host community and population living in camp-like settings in former Renk County? RQ4: What are the food security and livelihoods needs and conditions for host community and population living in camp-like settings in Former Renk County? A. What are food consumption levels at the household level? B. What are the main sources of income / livelihoods? C. What food and livelihood coping strategies are being used? D. What shocks have households experienced in the past 6 months?			

[1] WHO developed standard, globally applicable growth reference charts in 2006 which are used to classify the nutritional status of a child. Acute malnutrition is typically classified using growth references which compare whether a child has enough .
[2] The "camp" setting in Renk refers to a group of communities that used to be informal camps for people who had returned from Sudan. These communities have been there now for 5+ years, and by most definitions are actually host community.

RQ5: What are the water, sanitation and hygiene needs and conditions for host community and population living in camp-like settings in Renk County?

A. What are the main sources of drinking water? To what extent are households relying on unimproved water sources?
B. What are defecation practices in the community?
C. What percentage of households have access to latrines?

RQ6: What are the health needs and conditions for under-5 children in host community and population living in camp-like settings in Renk County?

A. To what extent have children under-5 accessed vaccination and supplementation services?
B. What illnesses have children under-5 had in the past 2 weeks?
C. How have caregivers sought treatment for illnesses in the past 2 weeks?
D. To what extent are children under 5 sleeping under long-lasting insecticide treated mosquito nets (LLITN)?

RQ7: What are the infant and young child feeding practices for under-2 children for host community and population living in camp-like settings in Renk County?

A. What are the breastfeeding practices for caregivers of children 0-23 months?
B. What are the complementary feeding practices for caregivers of children 6-23 months?

RQ8: What are the characteristics and experiences of households with malnourished children compared to non-malnourished children?

A. How have daily lives of households with malnourished and non-malnourished chidlren changed compared to previous seasons and years?
B. What differences are there between households with malnourished children and those with non-malnourished children in social, health, and WASH environments?
C. What differences are there in perceptions of causes of malnutrition between households with malnourished children and those with non-malnourished children?

Geographic Coverage	Renk County, Upper Nile State, South Sudan					
Secondary data sources	IPC Phase Classifications – January 2018, September 2018, January 2019 Renk SMART Survey 2014 – 2018 A New Method to Estimate Mortality in Crisis-Affected Populations: Validation and Feasibility Study. Version 2. Francesco Checchi, Bayard Robers, Oliver Morgan. Food and Nutrition Technical Assistance (FANTA) USAID. March 2009. SMART Methodology Manual v2.0					
Population(s) *Select all that apply*	X	IDPs in camp		□	IDPs in informal sites	
	□	IDPs in host communities		□	IDPs [Other, Specify]	
	□	Refugees in camp		□	Refugees in informal sites	
	□	Refugees in host communities		□	Refugees [Other, Specify]	
	X	Host communities		□	[Other, Specify]	
Stratification *Select type(s) and enter number of strata*	□	Geographical #:_ _ _ Population size per strata is known? □ Yes □ No	X	Group #: 2 Population size per strata is known? X Yes □ No	□	*[Other Specify]* #: _ _ Population size per strata is known? □ Yes □ No
Data collection tool(s)	X	Structured (Quantitative)		X	Semi-structured (Qualitative)	
	Sampling method			**Data collection method**		

Structured data collection tool # 1 *Select sampling and data collection method and specify target # interviews*	X Probability / Cluster sampling	X Household interview – Host Community (Target #):403 HH (and 391 children 6-59 months) X Household interview - Population living in camp-like settings (Target #):305 HH (and 270 children 6-59 months)
Semi-structured data collection tool (s) # 1 *Select sampling and data collection method and specify target # interviews* ****If more than 2 structured tools please duplicate this row and complete for each tool.*	□ Purposive X Snowballing □ [Other, Specify]	X Key informant interview – Village leaders (Target #: 1 per study site, approximately 50) X Key informant interview – Religious leaders (Target #: 1 per study site, approximately 50) Key informant interview – Elderly men / women (Target #: Minimum 2 men, 2 women per study site, 100)
Target level of precision if probability sampling	95% level of confidence	5.0+/- % margin of error

Data management platform(s)	□	IMPACT			□	UNHCR
	X	Medair internal server				
Expected ouput type(s)	□	Situation overview #: _ _	X	Report #: 1	X	Profile #: 1
	X	Presentation (Preliminary findings) #: 1	□	Presentation (Final) #: _ _	□	Factsheet #: _ _
	□	Interactive dashboard #:_	□	Webmap #: _ _	□	Map #: _ _
	□	[Other, Specify] #: _ _				
Access	X	Public (available on REACH resource center and other humanitarian platforms)				
	X	Restricted (bilateral dissemination only upon agreed dissemination list, no publication on REACH or other platforms) - Pending result validation by Nutrition Information Working Group (NIWG) and Medair				
Visibility *Specify which **logos** should be on outputs*	*Medair, USAID-OFDA, SDC*					

2. Rationale

2.1. Rationale

Renk County, located in northern South Sudan bordering Sudan's White Nile, Blue Nile, and Sennar States, has been the main port of entry for the large number of returnees travelling from Sudan to South Sudan following the 2013 independence. As a result, the county experienced a massive influx of returnees which, due to the lack of onward transportation, often stayed in the county for months to years. The transient camp-like settings now also host IDPs from South Sudan, largely as a result of the internal conflict. From April 2014 to April 2015 the conflict continued with regular clashes causing displacement. As such, the population numbers in Renk County remain volatile and Medair estimates this to be approximately 62, 663[3].

[3] Source: Medair estimated population data from mass MUAC screening in children under 5 years completed in August 2018.

The Standardized Monitoring and Assessment of Relief and Transition (SMART) survey conducted in May 2018 by Medair determined a GAM prevalence rate of **22.8%** (18.1-28.4), and a severe acute malnutrition prevalence of **6.0%** (3.6-9.7) in the camp population. The host population recorded a GAM prevalence rate of **26.9%** (22.7-31.6), and a SAM rate of **6.4%** (4.8-8.6). This indicated that both settlements recorded above emergency thresh hold of acute malnutrition according to the World Health Organisation classification.

As a follow up of the surveys conducted in May 2018, there is a need to determine the nutrition situation of the population during the lean season[4] in addition to obtaining robust data regarding food security and health related aggravating factors to evaluate and guide continued response in the county. This is in line with the recommendations and methodology developed by the national nutrition cluster in South Sudan.

3. Methodology

2.1. Methodology overview

There are three general sections to the assessment

- Standardized Monitoring and Assessment of Relief and Transition (SMART) methodology
- Rapid Mortality Assessment (Informant Method)
- Focus group discussions to understand causes of malnutrition

SMART survey – SMART methodology employs a standardized set of protocols for the collection and analysis of anthropometric data, in order to estimate the prevalence of GAM in a population. SMART utilizes quantitative, household survey method to select a representative sample of households, and exhaustively samples all children 6-59 months within the household. The six core anthropometric variables are measured in order to determine children's nutritional status. Additional multi-sectoral variables are added onto the survey at the household level to try and understand the key drivers of malnutrition in the population. Resources for the SMART methodology can be found here.

Rapid Mortality Assessment (Informant Method) - The informant method is an alternate methodology for assessing the death rates in the population, that has been previously validated in several contexts (Malawi, Thailand, Afghanistan[5]). The strength of this method is that it is less resource intensive than a traditional household retrospective survey, and could be used with sub-county level rapid assessments to estimate crude death rates. This is in contrast to the traditional retrospective survey method, which requires a large sample size and is often more time/resource intensive. While this method has been validated in other settings, it has yet to be fully tested in emergency contexts. The aim of testing this method in conjunction with a SMART survey would be to (1) provide a direct comparison between SMART and informant method results, and (2) allow for the derivation of a minimal number of clusters/sites needed with the informant method to have comparable results to retrospective household survey.

The method involves listing of deaths from several key informant sources within each of the study sites, and estimating the population through shelter counts, or similar method in each study site. Key informant sources will be identified through formative key informant interviews to inform potential sources of information for listing deaths (such as village chiefs, community leaders, village elders, etc.), and appropriate ways of discussing death in the context of local practices and beliefs. The observed rate of deaths per household is modelled against a poisson distribution to attain a mean and standard error, which is then used with a statistical method known as bootstrapping to derive an estimated CDR and 95% confidence intervals. More details on the method can be found here.

[4] Typically May through August for Renk County

[5] A New Method to Estimate Mortality in Crisis-Affected Populations: Validation and Feasibility Study. Version 2. Francesco Checchi, Bayard Robers, Oliver Morgan. Food and Nutrition Technical Assistance (FANTA) USAID. March 2009.

2.2. Population of interest

The assessment is being conducted in Renk County in collaboration with Medair, the nutrition and health partner in the county. Medair conducts SMART surveys each year in the rainy season (May/June) as a means of situation and program monitoring. Due to the different characteristics of the host community and population living in camp-like settings, the survey will be split into two separate strata in order to attain representative results of each group, that is host community and population living in camp-like settings. For the host community, clusters will be defined as villages/settlements or sub-sections of larger urban settlements, while in the camps, different camp blocks will be used as clusters.

2.3. Secondary data review

Context Resources - Past IPC classifications and SMART surveys are available to better understand the context of Renk County and Population living in camp-like settings prior to the survey. While there have been food security needs in Renk, since January 2018 the county has not been classified higher than Phase 3 *Crisis*. Despite this, there are seasonally high GAM prevalence of greater than 20%. Last May 2018, high GAM prevalence was accompanied by mortality rates above emergency thresholds (1 for CDR, 2 for U5DR). Renk town is relatively dependent on food imports from Sudan which the population accesses through the market, leaving populations vulnerable to market shocks when border closures occur. FEWSNET livelihood zone profiles are also a useful resource to help inform about the resources and causal factors of malnutrition in the county.

Table: IPC Classifications January 2018 – January 2019

Time	IPC Acute Food Insecurity	IPC Acute Malnutrition
January 2018	Phase 3 (20% - 27,000 people)	---
September 2018	Phase 3 (40% - 50,000 people)	Phase 4 (15-30% GAM)
January 2019	Phase 2 (15% - 20,000 people)	Phase 3 (10-15% GAM)

Table: Past SMART surveys in Renk County

Season	GAM (Host)	GAM (Camp)	CDR (Host)	CDR (Camp)
Rainy 2014	16.7 (14.1-19.6 95% CI)	9.1 (6.4-12.8 95% CI)	0.71 (0.43-1.19 95% CI)	0.98 (0.68-1.41 95% CI)
Rainy 2015	17.6 (14.9-20.6 95% CI)	21.8 (18.2-26.0 95% CI)	0.93 (0.68-1.29 95% CI)	1.86 (1.37-2.52 95% CI)
Rainy 2016	34.8 (30.3-39.5 95% CI)	27.6 (23.3-32.3 95% CI)	0.74 (0.49-1.19 95% CI)	1.39 (0.93-2.07 95% CI)
Rainy 2017	32.3 (26.6-38.7 95% CI)	27.1 (21.8-33.1 95% CI)	0.82 (0.56-1.2 95% CI)	0.72 (0.4-1.31 95% CI)
Rainy 2018	26.9 (22.7-31.6 95% CI)	22.8 (18.1-28.4 95% CI)	1.65 (1.15-2.36 95% CI)	1.69 (1.21-2.35 95% CI)

Renk Port and Road Monitoring January 2019 – REACH has been implementing Port and Road monitoring in key locations throughout South Sudan since 2016. In December 2018, there has been a steady increase in the net population flow into South Sudan with greater than 37 individuals per day estimated to be permanently entering South Sudan, a trend that partly continued through January 2019. Of arrivals noted in Renk Town, the majority were children (63%) and women (32%), mostly originating from Khartoum, as well as Al Alagaya Refugee Camp and Al Waral Refugee Camps in White Nile State of Sudan. UNHCR reports that more than one-third of refugees in Sudan are in Khartoum (34.0%) and nearly as many in White Nile State (30.4%)[6].

SMART Manual v2.0 – SMART is a standardized methodology for assessing nutrition and mortality in emergencies. This assessment will adhere to SMART guidelines, as well as in-country standards and guidance set by the Nutrition Information Working Group (NIWG). Resources for SMART can be found here.

[6] https://data2.unhcr.org/en/situations/southsudan/location/1904

Informant Method Validation Study[7] - Guidance for the informant method has previously been written for the analysis, which will be incorporated and guide the calculation of the CDR in this method. REACH has previously piloted this method in a rapid assessment format. Lessons learned from this previous implementation will inform the data collection and analysis steps for data collection in Renk.

2.4. Primary Data Collection

Method 1 – SMART Survey

Methodology – The SMART survey will utilize a quantitative household tool, using tablets for data collection. The questionnaire will be a multi-sectoral covering food security, livelihoods, WASH, Health, Infant and Young Child Feeding (IYCF), and vulnerabilities. Some questions in the survey will be asked about specific individuals in the household (mothers and children).

Sampling – A two-stage, cluster sampling design will be used for the SMART survey, with villages/settlements being the primary sampling unit (PSU) and households being sampled randomly within each PSU, either with simple random sampling or systematic random sampling depending on what is feasible at the cluster. A sampling frame of PSUs with population estimates will be attained from the National Bureau of Statistics (NBS) and updated in collaboration with local authorities. Clusters will be sampled with Probability Proportional to Size (PPS) sampling. In PPS, each cluster is assigned a population estimate. This estimate is used to weight the probability of that cluster being selected. This results in a 'self-weighted' sample within the strata, so that all households within the population have an equal chance of selection.

Household sample size calculations were done using ENA for both anthropometry and mortality with the parameters summarized in the below tables. The highest resulting sample, whether from anthropometry or mortality, was taken as the final sample. In this case 487 households for the camp population and 494 for the host community population. The final necessary sample for mortality may change on the field once a recall event is chosen, which would change the final recall period chosen.

Table: Sample size calculation for Anthropometry

Parameters for Anthropometry	Value (Camp)	Value (Host)	Assumptions based on context
Estimated prevalence of GAM	22.8%	26.9%	This is the prevalence of the previous SMART survey conducted by Medair in May 2018. This survey found a GAM rate of 22.8% (18.1-28.4; 95%CI) in the camp and 26.9% (22.7-31.6; 95%CI) in the host population. The point prevalence was used for the sample size calculation.
Desired precision	5.0%	5.0%	SMART Methodology recommendation for GAM prevalence between 20-30%
Design Effect	1	1.19	As per SMART survey conducted by Medair in May 2018
Average household size	5.9	7	As per SMART survey conducted by Medair in 2018
% of children under five years of age	20.9	21	As per SMART survey conducted by Medair in 2018
% non-response households	3	3	Anticipated non-response rate
Children to be included	**270**	**391**	
Sample size of households to be included	**251**	**305**	

[7] Francesco Checchi, Bayard Roberts, Oliver Morgan. A New Method to Estimate Mortality in Crisis-Affected Populations: Validation and Feasibility Study. March 2009

Table: Sample size calculation for Mortality

Parameters for Mortality	Value (Camp)	Value (Host)	Assumptions based on context
Estimate prevalence (CDR)	1.20	1.15	SMART survey of May 2018 conducted by Medair; 1.68 (1.20-2.34) in the camp and 1.65 (1.15-2.36) in the host population; lower prevalence used since the deaths in 2018 were in pockets due to injury and illness in old people
Desired precision	0.5	0.5	Recommended precision level for a Mortality rate of 1
Design effect	1	1.62	SMART survey conducted by Medair in May 2018
Recall period	107 days	114 days	Recall event = Death of Moh'd Saleh (the son of Joseph Ngor the former governor of Renk County), Feb.8th
Average household size	5.9	7	
% of non-response households	3	3	Anticipated non-response rate
Population to be included	**1723**	**2734**	
Sample size of households to be included	**301**	**403**	

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

Table: Parameters for calculating surveys per cluster

Activity	Camp	Host
Departure from office	8:30 am - 5.30 pm	8:30 am - 5.30 pm
Average travel time to reach each cluster (one-way)	30 mins	1 hour
Duration for initial introduction and selection of households	30	30
Time spent to move from one household to the next	5	5
Average time in the household	25	25
Breaks	30 mins	30 mins

The above calculation gave an average 7 hrs hours of working time in each cluster. There are villages in the County which take long to reach. The survey coordinator will write a movement plan and this will determine the farthest villages in order to plan departure days when the enumerators need to start off earlier. On average teams are expected to spend **30 minutes in each HH** and **5 min traveling from one HH to another**. This will enable them to reach **12 HH per day in the camp** and **10 HH per day in the host population**. The calculation of clusters per settlement is as shown below:

For the camp, the mortality sample is higher than the anthropometry sample thus used as the sample size for the survey so the sample size of 301 households will be used. No clusters are calculated due to the simple random sampling design. For the host population, the mortality sample is higher than the anthropometry sample thus used as the sample size for the survey. Hence, total number of households in the sample was divided by the number of households to be completed in one day to determine the number of clusters to be included in the survey i.e **(494/10) = 49.4**. Therefore, based on the aforementioned calculation **50** clusters are planned to be included in the survey.

Data Collected – Standard questionnaires developed by the South Sudan Nutrition Cluster will be used for the survey. Upon reaching the selected households, the team will enquire whether there are children less than five years of age. In each

household all children aged 6-59 months will be included for anthropometric measurement whereas in households that have no children under five, only the mortality questionnaires will be administered. All children aged between 6-59 months of the same household will be included in the survey for anthropometric measurements and all members of the household who were in the house as well as died or left the house during the recall period will be listed in the designated sections of the individual mortality questionnaire. No substitution of houses will be done. The survey coordinator would conduct daily reviews of the completed questionnaires and feedback will be shared with the teams every morning before commencement of data collection.

The key six anthropometric variables will be collected for all eligible children (6-59 months) the following information**:**

- ✓ **Age:** The primary source for this information will be the child's immunization card, birth certificate or birth notification. In the absence of these documents, a local calendar of events will be used to estimate the age.
- ✓ **Child's Sex:** This will be recorded as either 'f' for female or 'm' for male.
- ✓ **Weight:** A digital weighing scale will be used to measure the children's weight. The teams on a daily basis will calibrate the electronic scale using a standard weight to ensure accuracy. Children are to be weighed with minimal clothing and weight recorded to the nearest 0.1 kg. Minimal clothing means underwear such as underpants only.
- ✓ **Height:** A height board will be used to measure height for children above 2 years of age while length will be taken for children less than 2 years of age. While ensuring minimal or no movement of the child and maintaining height readings at eye level the height or length will be recorded to the nearest 0.1 cm.
- ✓ **MUAC:** The Mid-upper arm circumference will be measured using the internationally standardized approach. It will be measured to the nearest 0.1 cm. In the event of a disability on the left arm or a left-handed child, the right arm will be used. The cutoffs for children 6-59 months are <11.5cm for severe acute malnutrition, and from 11.5-<12.5cm for moderate acute malnutrition. For PLWs, severe acute malnutrition is determined by <18cm and moderate acute malnutrition from 18-<23cm, as per MIYCN guidelines.
- ✓ **Bilateral Oedema:** This will be assessed by the application of moderate thumb pressure for at least 3 seconds on both feet. If a depression formed upon pressure application, then presence of bilateral oedema will be confirmed.

The core infant and young child feeding indicators will be collected for all children 0-23 months:

- ✓ **Early initiation of breastfeeding:** All caregivers of children 0-23 months will be asked if they were put to the breast within the first 24 hours.
- ✓ **Exclusive breastfeeding:** All caregivers of children 0-5 months will be asked a standard series of questions for the previous day's recall to determine if (1) the child received breastmilk, either from the breast or expressed, and (2) if the child received any other food or liquid. If the child had consumed any food or liquid other than breastmilk, the child is not exclusively breastfeeding. The exception is if the child received ORS, drops or syrups (vitamins, minerals or medicines).
- ✓ **Continued breastfeeding at 1 and 2 years:** All caregivers of children 0-23 months will be asked if they were breastfed the previous day. The results of this indicator will be disaggregated by age of the child to determine continued breastfeeding. Continued breastfeeding at age 1 is determined by the proportion of children 12-15 months who received breastmilk the previous day. Continued breastfeeding at age 2 is determined by the proportion of children 20-23 months,
- ✓ **Introduction of solid, semi-solid or soft foods:** All caregivers of children 0-23 months will be asked if about solid foods and liquids the child may have consumed in the previous day. The indicator for appropriate introduction of solid, semi-solid or soft foods is determined by the proportion of children 6-8 months who received these foods the previous day.
- ✓ **Minimum dietary diversity –** The indicator is calculated only for children 6-23 months, though all caregivers of children 0-23 months will be asked about foods, liquids and breastmilk consumed by the child the previous day. If the child has consumed a minimum of 4 out of 7 food groups the previous day, they meet the criteria. Breastmilk is not included in this indicator as it is meant to reflect the complementary diet only.
- ✓ **Minimum meal frequency –** The indicator is calculated only for children 6-23 months, though all children 0-23 months will be asked how many times they ate solid, semi-solid or soft foods in the previous day. The appropriate number of meals depends on whether the child is breastfeeding or non-breastfeeding, and the age of the child. For breastfed children, they are recommended to eat 2 times for 6-8 month olds, 3 times for 9 month olds. For non-breastfed children

6-23 months, 4 times is recommended per day. "Meals" refers to both meals and snacks the child had based on caregiver reports.

- ✓ **Minimum acceptable diet (MAD):** This indicator is calculated by the proportion of children 6-23 months who meet the criteria for both minimum meal frequency and minimum dietary diversity.

Data Quality Control – Quality of household and child measurements will be ensured through the following:

a. Training – All enumerators will be given a 4-day training on taking anthropometric measurements, use of ODK applications, field procedures and field testing.

b. Standardization Test – All enumerators will be subject to a standardization test prior to data collection. A standardization test entails each screener taking two of each measurement (weight, length, MUAC) on 10 children each (so 20 measurements total). The results are analysed in ENA software to assess the **accuracy** and **precision** of the measurements using the following indicators[8]:
   I. Technical Error of Measurement (TEM) - a measure of the average measurement error in mm. (measurement of precision)
   II. Team TEM – The technical error of measurement in mm, for the team of measurers as a whole.
   III. R coefficient - ranges from 0-100, it is the proportion of measurement variation attributable to real differences in the child, as opposed to measurement technique. An R coefficient of 97.6 means that 97.6% of the variation is from real differences, while 2.4% of the variation is from measurement error. (measurement of precision)
   IV. Bias - the average difference between the enumerator value and the assumed "true" value provided by the enumerator. (a measurement of accuracy/validity)

   For each of the above indicators, each participant is graded as either good, acceptable, poor, or reject. The cutoffs in Table 1 below are used for this classification.

c. *Daily Data Checks / Digit Preference Checks – As possible, ODK data will be uploaded at the end of each day. Anthropometric measurements will be analysed with ENA to check for digit preference, age and sex ratios, and feedback will be given to teams the following morning. Household data will also be analysed for patterns or issues, and feedback also given to the teams.*
d. *Field Observations – Field Supervisors and Assessment Officer will make efforts to observe measurers work to ensure quality measurements are being taken.*

Ethical Considerations – all children found to be severely acutely malnourished will be referred to the nearest Outpatient Therapeutic Feeding Program site (OTP site) for admission and treatment. A referral slip will be provided with the referral information recorded. Referral criteria will be:

- Weight for height z-score <-3
- MUAC <11.5 cm
- Presence of bilateral pitting oedema

Method 2 – Rapid Mortality Assessment

Preparatory Qualitative Data – Prior to the start of data collection, teams will conduct formative key informant interviews to answer the following preparatory questions, which will enable to contextualize research findings but also allow for potential adjustments to research methodology given sensitivities surrounding data collection on mortality:

[8] SMART Methodology Manual 2.0. 2017.

- Which key informants or data sources at the community level can report on deaths?
- What are memorable recall events that can be used to clearly define recall periods of approximately 90 days ago?
- What taboos or beliefs exist around deaths and talking about deaths at the community level?
- What are traditional burial practices in the community?
- What sites in the target payam are accessible and have people currently?
- What uniquely identifiable information can be used to distinguish deaths from one another?
- What data for population figures exist for the area of interest?

Death Listing – From the preparatory field work, ideally 2-4 types of key informants or data sources will be identified to inform on deaths occurring at the community level. A separate list of deaths will be created for each key informant type identified. For each death, additional information will be gathered including the name, age, sex, nicknames, place of origin, place of death, cause of death, or other uniquely identifiable information determined from preparatory field work.

Sampling *– An initial key informant from each type will be initially identified through preparatory field work, or when the team arrives at the field. Snowball sampling will be used to identify additional key informants for reporting deaths. New informants will be identified and interviewed until exhaustion, or until time in the field runs out for that site.*

Tools *– A paper questionnaire will be provided for the initial preparatory field work, and paper death listing forms will be used during data collection.*

Quality Control

- ***Training*** *– enumerators specific for death listing will be subject to a two-day training along with the rest of the team. This will cover data collection forms, and expected conduct when asking about deaths.*
- ***Debriefing –*** *Daily debriefs will be conducted with the death listing enumerators to identify issues and check the quality of data collection.*

Ethical Considerations – *The following will be considered for data collection and reporting:*

- ***Anonymized -*** *Data will be anonymized in the final data-set. The mortality dataset will not be shared publicly.*
- ***Community Informed Consent –*** *Permission will be sought from the community leaders to collect mortality data in the settlement.*
- ***Individual Informed Consent –*** *Participants will be informed on what information will be collected and how it will be used prior to seeking their consent. The participant can choose not to participate in the interview, choose to stop the interview at any point and there will be no consequences in terms of aid reception for the participant if they choose not to participate.*
- ***Sensitivities surrounding mortality data collection –*** *given previous research in South Sudan has demonstrated that mortality can be a sensitive topic when interviewing HH members, guidance will be sought from community leaders prior to the start of data collection on how this is best approached and explained in the local language to ensure research is sensitive to the issues surrounding this topic.*

2.5. Data Processing & Analysis

Method 1 – SMART Survey

Household data from the tablets will be uploaded at the end of each day to the Medair Kobo server. Data will be downloaded and plausibility checks run for anthropometry and mortality data using ENA for SMART (9th July, 2015 version) software. Feedback will be given to the field teams each morning based on the results. Household data will also be assessed for patterns or errors for feedback. Anthropometric and mortality data will be analysed using ENA and standard SMART procedures, while the analysis of household variables will be done in IBM SPSS version 20 or *R version 3.5.2*. A preliminary

report and anonymized data sets will be submitted to the NIWG within 2 weeks after completion of data collection for validation.

Cross-sectoral analysis will be conducted with the multi-sectoral household data to help assemble a likely profile of characteristics for households with a malnourished child, vs. households without a malnourished child. This will be done with the following steps:

(1) Merging the household data onto the child data, such that each row is a child with household data included.
(2) Stratify the dataset by malnourished vs. non-malnourished children. Malnutrition will be defined with both GAM by WHZ and MUAC. Children with SMART flags will be excluded from analysis.
(3) Using the "UpsetR" R package, the most common intersections of multi-sectoral variables will be identified in both analysis strata (malnourished vs. non-malnourished). Results are interpreted for example "55% of households with a malnourished child take >30 minutes to collect water, have female heads of household and don't meet minimum meal frequency."
(4) For the most common intersections/combinations observed, the resulting proportions will be compared between strata using two-proportion z-test with different sample sizes. The combinations proving as statistically significant will be used to create an initial profile of malnourished households and will inform the focus group discussions. Limitations should be noted such as the quantitative profile is limited to the data collected in the survey, so indicators that may be related to malnutrition which are not included would be missed. Additionally, this identification will work best in areas with a high proportion of malnourished children. A low GAM rate would not yield as many malnourished children to calculate intersections/combinations.

Method 2 – Rapid Mortality Assessment

Data Entry and Storage *– Data entry will be done with EpiData v3.1. Double data entry will be used to check and limit errors. Duplicates within an individual list will be identified and removed. Hard copies of the death listings will be kept for one month after data collection for reference during data cleaning/analysis, then destroyed. Only an anonymized dataset with capture histories will be stored for long-term use.*

Data Cleaning and Processing Steps - The aim of the data processing steps will be to "match" death records and summarize the "capture history" of each record in a format applicable for analysis with the DGA package in R. Steps are as follows:

1) For each death list, remove any special characters and spaces from all string variables, and convert all characters to lowercase. Deaths that occurred outside the data collection sites or outside the recall period of interest will be excluded at the end of the deduplication and matching processes.
2) Use the compare.dedup function in "RecordLinkage" package to check for duplicates within each list. Weights are calculated to evaluate the strength of a match, however no set threshold will be used to determine whether a match is true or not. Remove confirmed duplicates and record in cleaning log.
3) Use compare.linkage function in "RecordLinkage" package to generate record pairs between lists. This comparison will be performed iteratively between each list collected. Matched pairs and possible pairs will be visually checked for confirmation.
4) A column will be created on each list to represent the other lists, and will be used to record captures on other lists (e.g List1_Match, List2_Match, etc.) and if there is a match that record will be given a value of 1, for no-match a value of 0. These columns will be considered as the "capture histories" for each death record.
5) Death records from all lists will be appended into one master list, dropping now duplicate records. A unique ID will be generated for each record.
    a. Choose List #1 as the master list. Remove records from all other lists that have a match with List 1.
    b. Look at List #2. Remove matches all other lists that have a match with List 2. Append List 2 onto the master list, List 1.

c. Repeat step b for any remaining lists.

6) All columns will be dropped keeping the "list match" columns and dropping everything else. These "list match" columns are defined as the "capture histories" for these deaths.

Data Analysis *– CDR results will be calculated for each specific information source, as well as by two methods to aggregate the lists: (1) the Informant Method, and (2) Capture-Recapture analysis.*

For the ***Informant Method****, the total number of uniquely identified deaths are identified by all key informants or sources is merged together and treated as the total number of deaths, used for the CDR calculation in combination with the estimate of the mid-period population. Bootstrapping techniques will be used to calculate the CDR and corresponding confidence intervals, with the total unique captured deaths by all informant sources used as the numerator and bootstrap sampling of the population parameters below for the denominator.*

$$CDR = \frac{captured\ deaths}{(Mean\ household\ size * num.households) - 0.5num.inmigrants - 0.5num.births + 0.5num.outmigrants + 0.5num.deaths}$$

For ***capture-recapture analysis****, the "true" total number of deaths is estimated based upon the overlap of reporting same deaths between different key informants or mortality sources. There are two main approaches to this analysis, the "model-selection" approach, where a single model is fit to estimate the uncaptured deaths, or* ***Bayesian Model Averaging***[9, 10]***,*** *where the highest probability estimate of the number of uncaptured deaths is attained by averaging the probability across several models. There are noted limitations in choosing and selecting any single model for the total estimation of deaths, as there is still a given amount of certainty in the results, hence Bayesian Model Averaging can help improve the reliability of the estimation. Several packages exist to help facilitate these calculations, however we will be using R version 3.5.2 with the "DGA" package. The CDR will be similarly calculated as with the key informant method, however an additional parameter of "uncaptured deaths" will added to the numerator and be bootstrapped from the weighted sum likelihood profiles given by the DGA package.*

For either of the above methods for determining the total deaths, the ***population denominator*** *is needed to calculate the CDR and U5DR. Several options are available for estimating this, though which option is best will be determined during field work when on the ground information can be used for triangulation:*

1) *Listing of heads of household provided by community chief. The household size, sex and age composition, will be determined by the SMART survey and can be applied to the total households. (To be collected)*
2) *Population figures provided in SMART sampling frame (TBD)*

Contingency Table – A contingency table of CDRs calculated by the informant method will be assembled demonstrating what the CDR results would have been on average given a certain number of clusters were sampled with PPS. This table in comparison with the retrospective household survey results will help inform the optimal methodology/number of clusters needed to achieve comparable CDRs.

3. Roles and responsibilities

Table 2: Description of roles and responsibilities

Task Description	*Responsible*	*Accountable*	*Consulted*	*Informed*

[9] Jennifer A. Hoeting, David Madigan, Adrian E. Raftery and Chris T. Volinsky. Bayeesian Model Averaging: A Tutorial. 1999 Statistical Science. Vol. 14. No. 4

[10] International Working Group for Disease Monitoring and Forecasting. Capture-Recapture and Multiple-Systems Estimation I: History and Theoretical Development. 1995. American Journal of Epidemiology.

Research design	*Nutrition Assessment Officer*	*Nutrition Assessment Officer*	*Research Design Unit, Medair, NIWG*	*Assessment Manager*
Supervising data collection	*Nutrition Assessment Officer, MEDAIR*	*Nutrition Assessment Officer*	*Research Design Unit,*	*Assessment Manager*
Data processing (checking, cleaning)	*Nutrition Assessment Officer*	*Nutrition Assessment Officer*	*Data Unit*	*Assessment Manager*
Data analysis	*Nutrition Assessment Officer*	*Nutrition Assessment Officer*	*Data Unit, MEDAIR*	*Assessment Manager*
Output production	*Nutrition Assessment Officer*	*Nutrition Assessment Officer*	Reporting Unit, *MEDAIR*	*Assessment Manager*
Dissemination	*Nutrition Assessment Officer*	*Nutrition Assessment Officer*	Reporting Unit, *MEDAIR*	*Assessment Manager*
Monitoring & Evaluation	Communications Manager	Communications Manager	*Research Design Unit*	Country Coordinator
Lessons learned	*Nutrition Assessment Officer*	*Nutrition Assessment Officer*	*Research Design Unit*	*Assessment Manager*

Responsible: *the person(s) who executes the task*

Accountable: *the person who validates the completion of the task and is accountable of the final output or milestone*

Consulted: *the person(s) who must be consulted when the task is implemented*

Informed: *the person(s) who need to be informed when the task is completed*

NB: Only one person can be Accountable; the only scenario when the same person is listed twice for a task is when the same person is both Responsible and Accountable.

Data Analysis Plan

TOOL 1: SMART HOUSEHOLD SURVEY TOOL

Research questions	IN #	Data collection method	Indicator / Variable	Questionnaire Question	Questionnaire Responses	Data collection level
RQ1: What is the prevalence of Global Acute Malnutrition (GAM) among children 6 to 59 months in host community and population living in camp-like settings in Former Renk County?		HH survey	Date of birth	What is the date of birth of [child name]? (ask for birth record)	Date	Individual child (0-59 months)
		HH survey	Age in months	How old is [child name] in months? (use local events calendar)	Integer	Individual child (0-59 months)
		HH survey	Sex of child	What is the sex of [child name]	1 = Male 2= Female	Individual child (0-59 months)
		HH survey	Weight (kg)	What is the weight of [child name]?	Integer	Individual child (6-59 months)

		HH survey	Height (cm)	What is the height of [child name]?	Integer	Individual child (6-59 months)
		HH survey	MUAC (mm)	What is the MUAC of [child name]?	Decimal	Individual child (6-59 months)
		HH survey	Oedema	Does [child name] have oedema?	1 = Yes 0 = No 98 = DK 99 = NR	Individual child (6-59 months)
RQ2: What is the crude death rate (CDR) and under-five death rate (U5DR) for host community and population living in camp-like settings in Former Renk County?		HH survey	Name household member	What is the HH member's name?	Text	Individual
		HH survey	Sex household member	What is the sex of [name]?	1 = Male 2= Female	Individual
		HH survey	Age (years)	What is the age in years of [name]?	Integer	Individual
		HH survey	Joined HH during recall period	Has [name] joined the household since [recall event]?	1 = Yes 0 = No 98 = DK 99 = NR	Individual
		HH survey	Left household during recall period	Has [name] left the household since [recall event]?	1 = Yes 0 = No 98 = DK 99 = NR	Individual
		HH survey	Born during recall period	Has [name] born in the household since [recall event]?	1 = Yes 0 = No 98 = DK 99 = NR	Individual
		HH survey	Died during recall period	Has [name] died the household since [recall event]?	1 = Yes 0 = No 98 = DK 99 = NR	Individual
		HH survey	Cause of death	What was the cause of death?	1 = Illness 2 = Injury/Trauma 97 = Other 98 = DK 99 = NR	Individual
		HH survey	Location of death	Where did the person die?	1 = Current location 2 = During migration 3 = Place of last residence 97 = Other 98 = DK 99 = NR	Individual
RQ3: What is the proxy coverage of Medair nutrition programs in host community and population living in camp-like settings in Former Renk Coutny?		HH survey	Coverage of feeding programs	Is this child currently in any feeding program?	0 = No 1 = OTP 2 = TSFP 3 = SC	Household
		HH survey	Coverage for Care groups	Are you part of a Care Group OR does a Care Group Volunteer regularly visit you at your home or talk to you in a group with other mothers in your neighbourhood about health, hygiene and nutrition related topics?	1 = Yes 0 = No 98 = DK 99 = NR	Household
RQ4: What are the vulnerabilities for host community and population living in		HH survey	Sex head of household	What is the sex of the head of household?	1 = Male 2= Female	Household
		HH survey	Elderly head of household	What is the age of the head of household?	Integer	Household

camp-like settings in Former Renk County?		HH survey	Pregnant or lactating woman	Is there a pregnant or breastfeeding woman in the household?	1 = Yes 0 = No 98 = DK 99 = NR	Household
		HH survey	Separated or unaccompanied children	Are there any children living in your household who are not staying with their parents?	1 = Yes 0 = No 98 = DK 99 = NR	Household
		HH survey	Chronically ill or disabled HH member	Is there any household member that has been ill for more than 3 months, or is mentally/physically disabled?	1 = Yes 0 = No 98 = DK 99 = NR	Household
RQ5: What are the food security and livelihoods needs and conditions for host community and population living in camp-like settings in Former Renk County?		HH survey	Food Consumption Score	How many days over the last 7 days, did members of your household eat the following food items, prepared and/or consumed at home? - Cereals, grains, roots and tubers, including wild roots: - Legumes / nuts: - Milk and other dairy products: - Meat, fish and eggs: - Vegetables and Leaves, including all wild vegetables and leaves: - Fruits including wild fruits: - Oil / fat / butter: - Sugar, or sweet: - Condiments / Spices:	Integer (0 to 7) For each food group	Household
		HH survey	Household Dietary Diversity Score (HDDS)	Did your household eat any of the listed food items yesterday during the day and night? - Cereals and grains: - Roots and tubers, including wild roots: - FLESH meat: - Organ meat: - Fish/shellfish: - Eggs - Orange vegetables - Green leafy vegetables: - Orange fruits	1 = Yes 0 = No 98 = DK 99 = NR For each food group	Household
		HH survey	Household Hunger Scale	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?	1 = Yes 0 = No 98 = DK 99 = NR	Household

		HH survey	Household Hunger Scale	How often did this happen in the past [4 weeks/30 days]?	1 = Rarely (1-2 times) 2 = Sometimes (3-10 times) 3 = Often (more than 10 times)	Household
		HH survey	Household Hunger Scale	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?	1 = Yes 0 = No 98 = DK 99 = NR	Household
		HH survey	Household Hunger Scale	How often did this happen in the past [4 weeks/30 days]?	1 = Rarely (1-2 times) 2 = Sometimes (3-10 times) 3 = Often (more than 10 times)	Household
		HH survey	Household Hunger Scale	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?	1 = Yes 0 = No 98 = DK 99 = NR	Household
		HH survey	Household Hunger Scale	How often did this happen in the past [4 weeks/30 days]?	1 = Rarely (1-2 times) 2 = Sometimes (3-10 times) 3 = Often (more than 10 times)	Household
		HH survey	Reduced Coping Strategies Index (rCSI)	In the past 7 days, if there have been times when you did not have enough food or money to buy food, how often has your households had to : - Rely on less preferred and less expensive food - Limit portion size at meals - Restrict consumption by adults in order for small children to eat - Borrow food or rely on help from friends or relatives - Restrict the consumption of elderly household members - Restrict the consumption of adult women in the household	Integer (0 to 7) For each behaviour group	Household
		HH survey	Main source of food last 7 days	What was the household's main source of Cereals, Grains, Roots and tubers in the past 7 days?	1 = Own production (crops, animals) 2 = Market (purchase on cash or credit) 3 = Food assistance 4 = Hunting / Fishing 5 = Borrowing food from neighbours or family 6 = Exchange food for labour	Household

					7 = Gifts from neighbours / relatives 8 – Wild food collection (i.e. fruit and leaves) 97 = Other 98 = DK 99 = NR	
		HH survey	Main source of income/livelihoods	What was the household's main source of income in the past 3 months?	0 = No income 1 = Agriculture and sale of crops 2 = Livestock and sale of livestock or livestock products and poultry 3 = Sale of alcoholic beverages 4 = Casual labour 5 = Skilled labour 6 = Trader / shop owner 7 = Salaried work (public/private) 8 = Sale of natural resources (firewood, charcoal, grass, etc.) 9 = Borrowing 10 = Fishing or sale of fish 11 = Kinship support from family/friends (remittances) 12 = Begging 13 = Food assistance/sale of food assistance 14 = Gathering of wild foods and hunting 97 = Other 98 = DK 99 = NR	Household
		HH survey	Livelihood coping strategies	During the past 30 days, did you or anyone in your household do any of the following due to a lack of food or money to buy food? (answer for each below) (0) None (1) Sell household assets or goods (2) Send any household members to eat elsewhere (3) Sell more animals than usual (4) Consume seed stocks intended for planting, including any seeds from a distribution (5) Borrow money and/or purchase food on credit (6) Sell productive assets or means of transport (panga, hoe, tools, bicycle, etc.) (7) Reduce essential non-food expenses,	1 = Yes 2 = No, because I didn't have a shortage of food 3 = No, because I've already exhausted that strategy 4 = No, it is not applicable to me	Household

				such as health or education (8) Engage in risky or illegal activities like theft, prostitution, raiding (9) Sell the last female animal (10) Entire household migrates		
		HH survey	Shocks experienced in last 6 months	Has your household experienced any difficulties or shocks[11] in the past 6 months? (don't read answers out loud)	0 = None 1 = Loss or reduced employment for HH member(s) 2 = Reduced income of a household member(s) 3 = Serious illness or accident of HH member(s) 4 = Death of working HH member/head of household/Spouse 5 = Unusually high food prices 6 = Unusually high prices of fuel/transport and other non-food prices 7 = Drought/irregular rains, prolonged dry spell 8 = Unusually high level of crop pests and disease 9 = Insecurity/violence/theft 10 = Epidemics (human disease outbreak) 97 = Other 98 = DK 99 = NR	Household
		HH survey	Household had access to land for agriculture last season	Did you have access to land for agriculture?	0 = No, Not applicable to me 1 = Yes, this year and last year 2 = Yes, this year but not last year 3 = Not this year, but yes last year 4 = Not this year and not last year 98 = DK 99 = NR	Household
		HH survey	Household planted/harvested last season	Did you plant last season (2018)?	0 = No, did not plant or harvest 1 = Yes, planted and harvested 2 = Yes, planted but partially harvested 3 = Yes, planted but no harvest 98 = DK 99 = NR	Household
		HH survey	Household has access to land for agriculture this season	Do you have access to land this season (2019)?	1 = Yes 0 = No 98 = DK 99 = NR	Household
		HH survey	Household plans for planting this season	Have you or will you plant this season (2019)?	0 = No, did not plant or harvest	Household

[11] An abnormal event which negatively affects a household's ability to access resources, resources, or food

					1 = Yes, planted and harvested 2 = Yes, planted but partially harvested 3 = Yes, planted but no harvest 98 = DK 99 = NR	
RQ6: What are the water, sanitation and hygiene needs and conditions for host community and population living in camp-like settings in Former Renk County?		HH survey	Main drinking water source	What is your household's main source of drinking water?	1= Borehole 2= Tap stand 3= River/stream 4= Unprotected well 5= Swamp 6= Puddle/stagnant water 7= Hand dug well 97 = Other 98= I don't know 99= I don't want to answer	Household
		HH survey	Household collects water < 30min	How long does it take for you to collect water (walking from your household to your main water drinking collection point, waiting there, filling the container and returning home)?	1 = Water available 2 = inside the compound 3 = Under 30 minutes 4 = 30 minutes to less than 1 hour 5 = 1 hour to less than 6 = half a day 7 = Half a day 8 = More than half a day 97 = Other 98= I don't know 99= I don't want to answer	Household
		HH survey	% HH with 15 l/p/d household water	Can you show me all the water containers you have in this household? (enter the number of each type of container used to collect water) - 20L bucket - 14L bucket - 20L rigid jerry can - 10L jerry can - 5L collapsible jerry can - 5L oil jerry can - 2L jug - Other	Integer	Household
		HH survey		How many times did you fill each container yesterday from the water point (including for drinking, cooking, bathing and laundry.	Integer	Household
		Observation	% HH safely storing drinking water	Are the containers used for storing drinking and cooking water covered and clean?	1=Yes, all containers cleaned and covered 0 = None (or only some) of the containers are clean and covered	Household

		HH survey	Household latrine access	Is there a family, shared or communal latrine in your settlement?	0 = No 1= Family latrine 2= Communal/ institutional latrine (in marketplace, school, etc.) 3= Shared latrine (between neighbouring HHs) 97 = Other 98= DK 99= NR	Household
		HH survey	Household latrine utilization	In the last two weeks, where did you usually go to the toilet (Defecate)?	1= In the bush 2= In the river 3= Dig a shallow hole and fill in (also known as the cat method) 4= I always use a latrine 97 = Other 98= DK 99= NR	Individual (mother)
		HH survey	% mothers who report washing their hands 3 of 5 critical times in the last 48 hours	Do you use a cleansing agent to wash your hands?	1 = Yes 0 = No	Individual (mother)
		HH survey		What cleansing agent do you use to wash your hands?	1 = water only 2 = soap (appears in one minute) 3 = soap (doesn't appear in one minute) 4 = ash 97 = other	
		HH survey		When did you wash your hands with a cleansing agent in the last 48 hours? (select all that apply)	1 = after defecation 2 = after attending a child that defecated 3 = before cooking 4 = before eating 5 = before feeding a child 6 = other (specify)	Individual (mother)
RQ7: What are the health needs and conditions for under-5 children in host community and population living in camp-like settings in Former Renk County?		HH survey	Vitamin A supplementation in last 6 months (6-59 months)	Has [name] received a capsule of vitamin A during the last 6 months?	1 = Yes 0 = No 98 = DK 99 = NR	Individual (6-59 months)
		HH survey	Measles vaccination (9-59 months)	Was [child name] vaccinated against measles?	1=Yes (seen vaccination book) 2=Yes, according to the memory of the mother and verbal narrative 3=No	Individual (9-59 months)
		HH survey	Deworming treatment (12-59 months)	Has [name] received any de-worming treatment during the last 6 months?	1 = Yes 0 = No 98 = DK 99 = NR	Individual (12-59 months)
		HH survey	Illness in past 2 weeks	Has [NAME] had any illness in the last 2 weeks?	0=No 1=Diarrhea 2=Fever 3=Cough (fast/difficult breathing) 98 = DK 99 = NR	Individual (0-59 months)
		HH survey	Treatment sought for illness in past 2 weeks	What treatment was sought for [child name]?	0 = None 1 = Hospital 2 = PHCC/U 3 = Mobile outreach clinic 4 = Community based distributor (CBD)	Individual (0-59 months)

					5 = Pharmacy / store 6 =Private clinc 97 = Other 98 = DK 99 = NR	
		HH survey	Child slept under LLITN last night	Did [child name] sleep under a mosquito net (LLITN) last night?	1 = Yes 0 = No 98 = DK 99 = NR	Individual (0-59 months)
		HH survey	PLW status	What is the status of the woman?	0 = None 1 = Pregnant 2 = Breastfeeding 3 = Pregnant and Breastfeeding	Individual (PLW)
		HH survey	Maternal MUAC	What is the MUAC of the mother? (mm)		Individual (PLW)
RQ8: What are the infant and young child feeding practices for under-2 children for host community and population living in camp-like settings in Former Renk County?		HH survey	All IYCF Indicators (these are composite indicators, hence why cover all these questions) Child ever breastfed Early initiation of breastfeeding Exclusive breastfeeding Continued breastfeeding at 1 year Continued breastfeeding at age 2 years Introduction of solid, semi-solid and iron-fortified foods Minimum dietary diversity (MDD) Minimum meal frequency (MMF) Minimum acceptable diet (MAD)	Has [NAME] ever been breastfed?	1 = Yes 0 = No 98 = DK 99 = NR	Individual (0-23 months)
		HH survey		How long after birth did you first put [NAME] to the breast?	1 = Less than one hour 2 = Between 1 and 23 hours 3 =More than 24 hours 98 = DK 99 = NR	Individual (0-23 months)
		HH survey		Was (NAME) breastfed yesterday during the day or at night?	1 = Yes 0 = No 98 = DK 99 = NR	Individual (0-23 months)
		HH survey		Yesterday, during the day or at night, did [NAME] receive any of the following liquids? - Plain water - Juice or juice drinks - clear Broth - Thin Porridge - Other water base liquids	1 = Yes 0 = No 98 = DK 99 = NR For each liquid	Individual (0-23 months)
		HH survey		Yesterday, during the day or at night, did [NAME] receive any of the following liquids? - Infant formula - Milk such as tinned, powdered, or fresh animal milk - Sour milk or Yoghurt	Integer (how many times) For each liquid	Individual (0-23 months)
		HH survey		Describe what did (NAME) eat yesterday during the day or night, whether at home or outside the home since (NAME) woke up yesterday until NAME went to sleep? - Cereals, flours, grains, roots and tubers	1 = Yes 0 = No 98 = DK 99 = NR For each food group	Individual (0-23 months)

				- legumes and nuts - (Beans, Peas, Lentils, Nuts and Seeds) - dairy products (milk, yogurt, cheese) - flesh foods (meat, fish, poultry and liver/organ meats) - eggs - vitamin-A rich fruits and vegetables - (carrot, red pepper, pumpkin, Ripe Mangoes, papaya - other fruits and vegetables - (Avocado, Banana, Appile, Grapes, Guava, Lemon, Pinappeale, Cabbage, onions, tomatoes, etc		
		HH survey		How many times did [child's name] eat solid or semi-solid food other than liquids yesterday during the day or at night?	Integer	Individual (0-23 months)
		HH survey		Yesterday during the day/night, did [child's name] consume any food given by a health centre for the treatment of malnutrition (Plumpy'Nut, Plumpy' sup, Plumpy'Nut dose, sprinkles/sachet etc) OR fortified food (porridge consisting of several meal mixed, CSB) OR any food with added a micronutrient powder(MNP)?	1 = Yes 0 = No 98 = DK 99 = NR	Individual (0-23 months)

TOOL 2: FORMATIVE FIELD RESEARCH FOR RAPID MORTALITY ASSESSMENT

Research questions	SUBQ#	Sub-question	Questionnaire QUESTION	Probes	Data collection method	Key disaggregations (Group types)
RQ3: What is the severity and causes of mortality experienced in Renk payam?	2.3	What are the practices, beliefs and taboos around death and talking about death in the assessment area?	What happens in a person's household when someone dies?	**Probing:** Is it the same for men and women? **Probing:** Adults and children? **Probing:** What happens with the body / burial practices?	Key informant interview	N/A

			What taboos or beliefs exist around talking about death?	**Probing:** What language/words are used for death or burial in the community? **Probing:** Would households be willing to share information about deaths in their own or other households? Does the community talk about death publically? Why? **Probing:** What challenges would exist in trying to collect information on recent deaths from community members? **Probing:** What would be a respectful way to ask about, or discuss about deaths?	Key informant interview or FGD	N/A
	2.4	What or who are the best data sources on deaths in the assessment area?	Who is involved in the process or ceremonies when someone dies?	**Probing:** Why are these people involved? **Probing:** Who else would be informed about who has died in the community? **Probing:** Are there any written record when someone dies? **Probing:** What about health facilities?	Key informant interview or FGD	N/A
			If someone from this Payam had left for 6 months, then returned and wanted to learn what had happened in the Payam, such as births, deaths or other events while he was gone…where would he/she obtain this information?	**Probing:** What are specifically the best ways to learn about deaths? **Probing:** Community leaders? Religious leaders? Health workers? Traditional birth attendants? Traditional medicine practitioners? **Probing:** Why are these the best sources about deaths? For adults? For children?	Key informant interview or FGD	N/A

	2.5	What events have occurred within the last 90 days that most people will be familiar with in the assessment area (recall events)?	What major events have occurred in the last three months, that the majority of people in Kurwai payam would remember well?	**Probing:** Community events? National holidays? Religious festivals? Distributions? **Probing:** In the last two months? One month?	Key informant interview or FGD	N/A

TOOL 3: DEATH LISTING FORM

Research questions	IN #	Data collection method	Indicator / Variable	Questionnaire Question	Questionnaire Responses	Data collection level
RQ2: What is the crude death rate (CDR) and under-five death rate (U5DR) for host community and population living in camp-like settings in Former Renk County?		Key informant or data source (TBD)	Mortality source	What is the source of the reported death?	1 = Wunda / Village Chief / Deputy 2 = Religious Leader (Mosque/Church) 3 = Village Admin 4 = Teacher 5 = Elderly Man 6 = Elderly Woman	Individual
	2.13	Key informant or data source (TBD)	First Name	What was the name of the deceased?	Text	Individual
	2.14	Key informant or data source (TBD)	Father's Name	What was father's name?	Text	Individual
	2.15	Key informant or data source (TBD)	Grandfather's Name	What was the grandfather's name?	Text	Individual
	2.16	Key informant or data source (TBD)	Sex	What was the sex of the deceased?	1. Male 2. Female 3. DK 4. NR	Individual
	2.17	Key informant or data source (TBD)	Age of death known	Do you know the age of the person when they died?	1. Yes 2. No	Individual
	2.18	Key informant or data source (TBD)	Age at Death	How old was the deceased when he or she died?	Integer	Individual
	2.19	Key informant or data source (TBD)	Died between recall periods	Did THIS PERSON die since the recall event?	1. Yes 2. No	Individual
	2.20	Key informant or data source (TBD)	Date of death known	Do you know the date the person died?	1. Yes 2. No	Individual
	2.21	Key informant or data source (TBD)	Date of death	What was the date of death?	Date	Individual
	2.22	Key informant or data source (TBD)	Place of death	Where did the person die?	1. Current location 2. During migration 3. In place of last residence 4. Other	Individual

	2.23	Key informant or data source (TBD)	Cause of death	What was the cause of death?	1. Illness 2. Trauma/Injury 3. Other	Individual
	2.24	Key informant or data source (TBD)	Christian or Other Name	Does the deceased have a Christian or any other name?	TBD	Individual

**Additional acceptable matching characteristics between deaths will be identified at the field level.*

5. Data Management Plan

- *Please complete the Data Management Plan below*

Administrative Data				
Research Cycle name	*Renk Multi-sectoral Needs Assessment*			
Project Code	*32DLF*			
Donor	*OFDA*			
Project partners	*Medair, UNICEF*			
Research Contacts	*Saeed Rahman, Nutrition Assessment Officer (saeed.rahman@reach-initiative.org*			
Data Management Plan Version	*Date: 16/04/2019*		*Version: 01*	
Related Policies	IMPACT Data Management SOPs for Personally Identifiable Information			
Documentation and Metadata				
What documentation and metadata will accompany the data? *Select all that apply*	X	Data analysis plan	X	Data Cleaning Log, including: □ Deletion Log □ Value Change Log
	□	Code book	□	Data Dictionary
	□	Metadata based on HDX Standards	□	[Other, Specify]
Ethics and Legal Compliance				
Which ethical and legal measures will be taken?	X	Consent of participants to participate	X	Consent of participants to share personal information with other agencies
	□	No collection of personally identifiable data will take place	X	Gender, child protection and other protection issues are taken into account
	X	All participants reached age of maturity		[Other, Specify]
Who will own the copyright and Intellectual Property Rights for the data that is collected?	*Medair*			
Storage and Backup				
Where will data be stored and backed up during the research?	□	IMPACT/REACH Kobo Server	□	Other Kobo Server: *[specify]*
	□	IMPACT Global Physical / Cloud Server	□	Country/Internal Server
	□	On devices held by REACH staff	X	Physical location *[REACH Juba Office, locked in secure location]*

	X	[Paper forms with identifiable information will be destroyed after 1 month, after no longer needed for data analysis.]		
Which data access and security measures have been taken?	□	Password protection on devices/servers	X	Data access is limited to *[Limited to REACH staff]*
	□	Form and data encryption on data collection server	X	Partners signed an MoU if accessing raw data
	□	[Other, Specify]		

Kobo Access Rights

Kobo Access	Person	Account Name
View Form	**Medair M&E Manager**	REACH will not access, Medair will share files
View and Edit Form	**Medair M&E Manager**	REACH will not access, Medair will share files
View Form and Submit Data	**Medair M&E Manager**	REACH will not access, Medair will share files
Download Data	**Medair M&E Manager**	REACH will not access, Medair will share files

Raw Data Access Rights

Raw Data Access	Reason	Person
Accountable	Accountable	*Medair M&E Team*
Access	*Analysis Purposes*	*Saeed Rahman*

Preservation

Where will data be stored for long-term preservation?	□	IMPACT / REACH Global Cloud / Physical Server	□	OCHA HDX
	X	REACH Country Server	□	[Other, Specify]

Data Sharing

Will the data be shared publically?	□	Yes	X	No, only with mandating agency / body
Will all data be shared?	□	Yes	X	No, only anonymized/ cleaned/ consolidated data will be shared
	□	No, [Other, Specify]		
Where will you share the data?	□	REACH Resource Centre	□	OCHA HDX
	□	HumanitarianResponse		

Data protection risk assessment

Have you completed the Indicators Risk Assessment table below?	X	Yes	□	No, no information that potentially allows identification of individuals is to be collected.
	[Please complete the first 4 columns in the Indicators Risk Assessment table below]			

Risk indicator	Type of identification risk	Disclosure implications	Benefits	**Class**	**Required mitigation**
Surname	Identification of KI reporting on deaths, including violence or	Backlash from specific individuals or groups that may not want deaths reported	Deduplication of deaths, and matching of death records in	B1	Deleted immediately after data processing completed. Raw

	conflict related deaths		the capture-recapture analysis		mortality KI dataset secured internally and only accessible to person listed as accountable for raw data above.
First name	Identification of KI reporting on deaths, including violence or conflict related deaths	Backlash from specific individuals or groups that may not want deaths reported	Deduplication of deaths, and matching of death records in the capture-recapture analysis	B1	Same as above
Any other identifying variable in the death listing (location of death, cause of death, age and sex of deceased, date of death, other identifying variables to be identified.)	Identification of KI reporting on deaths, including violence or conflict related deaths	Backlash from specific individuals or groups that may not want deaths reported	Deduplication of deaths, and matching of death records in the capture-recapture analysis	B1	Same as above
GPS coordinates	Identification of KI reporting on deaths, including violence or conflict related deaths	Backlash from specific individuals or groups that may not want deaths reported	Quality checks on data collection	B1	Deleted immediately after data cleaning completed.

Responsibilities	
Data collection	*Saeed Rahman, Nutrition Assessment Officer, saeed.rahman@reach-initiative.org*
Data cleaning	*Saeed Rahman, Nutrition Assessment Officer, saeed.rahman@reach-initiative.org*
Data analysis	*Saeed Rahman, Nutrition Assessment Officer, saeed.rahman@reach-initiative.org*
Data sharing/uploading	*Saeed Rahman, Nutrition Assessment Officer, saeed.rahman@reach-initiative.org*

6. Monitoring & Evaluation Plan

- *Please complete the M&E Plan column in the table and use the corresponding Tools in the Monitoring & Evaluation matrix to implement the plan during the research cycle.*

IMPACT Objective	External M&E Indicator	Internal M&E Indicator	Focal point	Tool	Will indicator be tracked?
Humanitarian stakeholders are accessing IMPACT products	Number of humanitarian organisations accessing IMPACT services/products Number of individuals accessing IMPACT services/products	# of downloads of x product from Resource Center	Country request to HQ	User_log	X Yes
		# of downloads of x product from Relief Web	Country request to HQ		X Yes
		# of downloads of x product from Country level platforms	Country team		X Yes
		# of page clicks on x product from REACH global newsletter	Country request to HQ		X Yes
		# of page clicks on x product from country newsletter, sendingBlue, bit.ly	Country team		X Yes
		# of visits to x webmap/x dashboard	Country request to HQ		X Yes
IMPACT activities contribute to better program implementation and coordination of the humanitarian response	Number of humanitarian organisations utilizing IMPACT services/products	# references in HPC documents (HNO, SRP, Flash appeals, Cluster/sector strategies)	Country team	Reference_log	HNO 2020 South Sudan HRP 2020 Cluster strategies IPC Workshop UN Agencies, INGOs and NNGOs strategic planning documents.
		# references in single agency documents			
Humanitarian stakeholders are	Humanitarian actors use IMPACT evidence/products as a	Perceived relevance of IMPACT country-programs	Country team	Usage_Feedback *and*	Survey Monkey to be conducted following dissemination with cluster coordinators, key UN

using IMPACT products	basis for decision making, aid planning and delivery Number of humanitarian documents (HNO, HRP, cluster/agency strategic plans, etc.) directly informed by IMPACT products			Usage_Survey template	Agencies and INGOs, Humanitarian coordination bodies.
		Perceived usefulness and influence of IMPACT outputs			
		Recommendations to strengthen IMPACT programs			
		Perceived capacity of IMPACT staff			
		Perceived quality of outputs/programs			
		Recommendations to strengthen IMPACT programs			
Humanitarian stakeholders are engaged in IMPACT programs throughout the research cycle	Number and/or percentage of humanitarian organizations directly contributing to IMPACT programs *(providing resources, participating to presentations, etc.)*	# of organisations providing resources (i.e.staff, vehicles, meeting space, budget, etc.) for activity implementation	Country team	Engagement_log	X Yes
		# of organisations/clusters inputting in research design and joint analysis			X Yes
		# of organisations/clusters attending briefings on findings;			X Yes

ANNEX 1: ABBREVIATIONS (IF RELEVANT)

BCC	Behaviour Change Communication
BMI	Body Mass Index
BMS	Breastmilk substitute
BSFP	Blanket Supplementary Feeding Program
CMR	Crude Mortality Rate
CMAM	Community Management of Acute Malnutrition
ENA	Emergency Nutrition Assessment
FANTA	Food and Nutrition Technical Assistance
GAM	Global Acute Malnutrition
GNC	Global Nutrition Cluster
ICCM	Integrated Community Case Management
IMAM	Integrated Management of Acute Malnutrition
MAM	Moderate Acute Malnutrition
MUAC	Mid-Upper Arm Circumference
OTP	Outpatient Therapeutic Program (for acute malnutrition)
PHCC	Primary Health Care Center
PHCU	Primary Health Care Unit
RUTF	Ready to Use Therapeutic Food (Plump nut)
RUSF	Ready to Use Supplementary Food (Plump sup)
SAM	Severe Acute Malnutrition
SC	Stabilization Center (inpatient treatment for acute malnutrition)
SMART	Standardized Methodology for Assessment in Relief and Transition
TSFP	Targeted supplementary feeding program
U5MR	Under five mortality rate
OEDEMA	Bilateral pitting oedema, or swelling of both feet, otherwise identified as a sign of oedema caused by malnutrition