

RAPID NUTRITION SURVEY

FINAL REPORT

Makpandu Refugee Settlement

Western Equatoria

South Sudan

Surveys conducted: 1-5 October 2018



TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS	3
ACKNOWLEDGMENTS.....	4
EXECUTIVE SUMMARY	5
INTRODUCTION.....	10
BACKGROUND	10
<i>Food Security</i>	10
<i>Health situation</i>	12
<i>Nutrition Situation</i>	13
<i>WASH Situation</i>	13
SURVEY OBJECTIVES.....	14
METHODOLOGY	14
<i>Sampling procedure</i>	14
<i>Survey population and sample size</i>	14
<i>Household questionnaire administration</i>	15
<i>Case definitions and calculations</i>	17
<i>Classification of public health problems and targets</i>	18
<i>Training, coordination and supervision</i>	19
<i>Data collection,entry and analysis</i>	19
RESULTS FROM MAKPANDU	21
LIMITATIONS.....	27
DISCUSSION	27
RECOMMENDATIONS.....	29
APPENDIX 1 - NAMES OF CONTRIBUTORS.....	31
APPENDIX 2 - SUMMARY OF OVERALL QUALITY OF ANTHROPOMETRIC DATA.....	32
APPENDIX 3 - SURVEY QUESTIONNAIRES	33
APPENDIX 4 - EVENTS CALENDER.....	35
APPENDIX 5 - MAKPANDU REFUGEE CAMP LOCATION IN SOUTH SUDAN.....	37

ACRONYMS AND ABBREVIATIONS

CMAM	Community Management of Acute Malnutrition
CSB	Corn-Soya Blend
ENA	Emergency Nutrition Assessment
EPI	Expanded Programme on Immunization
Epi Info	Name of CDC software for epidemiological investigations
GAM	Global Acute Malnutrition
GFR	General Food Ration
GFD	General Food Distribution
HAZ	Height-for-Age z-score
HH	Household
HIS	Health Information System
IYCF	Infant and Young Child Feeding
KCAL	Kilocalorie
MAM	Moderate Acute Malnutrition
MOH	Ministry of Health
MUAC	Middle Upper Arm circumference
NCHS	National Centre for Health Statistics
OTP	Out-patient Therapeutic Programme
ProGres	UNHCR registration database for refugees
SAM	Severe Acute Malnutrition
SC	Stabilization Centre
SD	Standard Deviation
SFP	Supplementary Feeding Programme
SMART	Standardised Monitoring & Assessment of Relief & Transitions
SSP	South Sudanese Pound
TFP	Therapeutic Feeding Programme
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Funds
WASH	Water Sanitation and Hygiene
WAZ	Weight-for-Age z-score
WFH	Weight-for-height
WHZ	Weight-for-Height z-score
WFP	World Food Programme
WHO	World Health Organization
WVI	World Vision International

ACKNOWLEDGMENTS

Gratefully acknowledge the important contributions made by so many that made this survey possible.

Firstly acknowledge UNHCR Juba and Yambio offices, UNHCR Public Health Unit for the operational support that made the planning, training and field work possible, UNHCR senior management for general guidance and oversight and the nutrition and food security unit of Regional Service Centre (RSC) for technical review of the SENS terms of reference and report.

Secondly sincere appreciation is extended to World Vision for planning the field level logistics and for providing staff during the entire duration of the exercise. Our gratitude also goes to WFP for supporting the training.

Finally, sincerely thank the refugee population who gave up their time to participate and allowed us to measure their children and, most importantly, to the children themselves. A complete list of key individuals involved can be found at **Appendix 1**.

EXECUTIVE SUMMARY

UNHCR and WVI carried out a rapid nutrition survey in Makpandu from 1 to 5 October 2018. The overall aim of the survey was to assess the nutrition situation among the refugee population and to monitor the progress of the current nutrition interventions.

The survey was based on the UNHCR Standardized Expanded Nutrition Survey (SENS) guidelines for refugee populations (version 2, 2013). Only the anthropometric and health module of SENS <http://sens.unhcr.org/> were carried out due to access limitations.

A cross-sectional survey was conducted using simple random sampling. Households were physically labelled with unique numbers per block. To reduce non-response rate and ensure results were representative of people actually living in the settlement at the time of the survey, empty households¹, as verified through neighbours were not be labelled and thus not be included in the sampling frame. A random household sample was drawn from the actual number of physically verified household before the survey. Children 6-59 months were included in the survey.

A total of six survey teams composed of three members each: one team leader/questionnaire enumerator and two anthropometric measurers carried out the data collection. A three day training was carried out from 25 to 27 September 2018 by UNHCR. Data collection lasted five days. The survey teams were supported by a World Vision International (WVI) supervisor on ground and coordinated remotely by the UNHCR Nutrition and Food Security Officer throughout the duration of data collection.

Data collection was carried out using paper questionnaires. The data was entered daily into ENA for SMART software (version July 9th, 2015) <https://smartmethodology.org/>. Data validation was carried out on a daily basis by the UNHCR survey coordinator which allowed for daily feedback to the WVI supervisor and onward to the team leaders. Data analysis was undertaken using ENA for SMART July 9th 2015 version for anthropometric indices and Epi info version 7.

Results from the survey showed a Global Acute Malnutrition (GAM) prevalence of 5.3%, with 0.9% severe acute malnutrition (SAM). This is classified as poor according to the WHO classification as it falls between 5-9%². Compared to 2017, the GAM prevalence showed increase trend from 3.3% to 5.3% and SAM prevalence from 0% to 0.9% in 2018 but not being statistically significant. This increase, however, is indicative of likely deterioration if the causes of undernutrition are not addressed.

The prevalence of global stunting of 21.1% in 2018 indicates a poor situation according to WHO classification as it is above the acceptable standard of <20%. This should, however, be interpreted with caution due to the age estimation limitation. 44% of the children 6-59 months did not have a reliable age documentation.

The coverage of Targeted Supplementary Feeding Program (TSFP) and Therapeutic Feeding Program (TFP) using both admission criterion did not meet the recommended standard of

¹ An empty household will be considered an abandoned and excluded from the nutrition survey if no one was present in that tent for the last one month.

² WHO 2000 categorization

Prevalence %	Critical	Serious	Poor	Acceptable
Low weight-for-height	≥15	10-14	5-9	<5

>90%. This indicates the need to strengthen active case finding, referral and enrollment into the nutrition programme in Makpandu.

The coverage of measles vaccination and vitamin A supplementation was below the target coverage of $\geq 95\%$ and $\geq 90\%$ respectively indicating the need to strengthen and maintain both the routine and campaign vaccination/supplementation interventions.

Almost a third of children 6-59 months reported to have had diarrhea in the last two weeks prior to the survey indicating a high morbidity rate requiring improved health services provision, and strengthening of community based preventive interventions on hygiene, sanitation and child care practices. Three quarters of these sought medical care at the Makpandu PHCC.

Maintenance of a comprehensive nutrition program, strengthening of preventative activities including the provision of adequate household food intake, appropriate caring practices with support and promotion of optimal Infant and Young Child Feeding (IYCF) practices, health and sanitation at household level are recommended to facilitate optimal nutrition. This to be accomplished through adequate food assistance, promotion and protection of infant and young child feeding practices, improved health services, adequate water and sanitation and the expansion of livelihood activities in addition to the treatment of malnourished persons.

The summary results are as below

Table 1: Summary of results

	95% C.I.	Classification of public health significance / target (where applicable)
CHILDREN (6-59 months)		
No. of children surveyed	226	
Acute Malnutrition (N=226)		
Global Acute Malnutrition (GAM) (n=12)	5.3 (1.5-16.9)	Critical if $\geq 15\%$
Moderate Acute Malnutrition (MAM) (n=10)	4.4 % (1.4 - 13.4)	
Severe Acute Malnutrition (SAM) (n=2)	0.9 % (0.1 - 10.2)	
Oedema(n=2)	0.9 % (0.1 - 10.2)	
Stunting (N=228)		
Total Stunting (n=48)	21.1 % (12.2 - 33.8)	Critical if $\geq 40\%$
Severe Stunting (n=10)	4.4 % (2.4 - 7.9)	
Mid Upper Arm Circumference (MUAC (N=228)		
Prevalence of MUAC <125mm or oedema (n=8)	3.5 % (1.1 - 10.8)	

	95% C.I.	Classification of public health significance / target (where applicable)
Prevalence of MUAC < 125 mm and \geq 115 mm, no oedema (n=3)	1.3 % (0.2 - 7.1)	
Prevalence of MUAC < 115mm and/or oedema (n=5)	2.2 % (0.5 - 8.7)	
Programme coverage (6-59 months)		
Therapeutic Feeding Program (TFP) (based on all admission criteria WHZ, oedema and MUAC) (n=1/3)	33.3 (0.8-90.6)	Target of \geq 90%
Targeted Supplementary Feeding Program(TSFP) (based on all admission criteria WHZ and MUAC) (n=2/10)	20% (2.3-55.6)	Target of \geq 90%
Therapeutic Feeding Program (based on oedema and MUAC)(n=1/5)	20% (0.5-71.6)	
Targeted supplementary feeding program based on MUAC only (n=2/3)	66.7% (9.4-99.2)	
Measles vaccination with card (9-59 months) (n=100/212)	47.2% (40.3-54.1)	
Measles vaccination with card or recall (9-59 months) (n=172/212)	81.1% (75.2-86.2)	Target of \geq 95%
Vitamin A supplementation coverage with card, within past 6 months (6-59 months) (n=43/228)	18.9% (14.0-24.6)	
Vitamin A supplementation coverage with card or recall, within past 6 months (6-59 months)(n=133/228)	58.3% (51.6-64.8)	Target of \geq 90%
Morbidity		
Diarrhoea in the past 2 weeks (n=75/228)	32.9% (26.8-39.4)	
Proportion of children with Diarrhoea who were taken to a health facility (n=56/73)	76.7% (65.4-85.8)	

Interpretation

- The overall nutrition situation in Makpandu settlement is classified as poor as the GAM prevalence of 5.3% falls between 5-9%³. The GAM prevalence showed increased trend from 3.3% in 2017 to 5.3% in 2018. The prevalence of severe acute malnutrition (SAM) increased to 0.9% from 0% in 2017. Although the increase in GAM prevalence from 3.3% to 5.3% in 2018 was not statistically significant ($p > 0.05$) the prevalence range moved from “acceptable” level to “poor” level indicating a likely deteriorating situation. This was also the case for the prevalence of SAM.
- The prevalence of global stunting was 21.1 % (12.2 - 33.8 C.I.). This indicates a poor

³ WHO 2000 categorization

level according to WHO classification and is above the acceptable standard of <20%. This should however be interpreted with caution due to the age estimation limitation. 66% of the children 6-59 months did not have a reliable age documentation.

- The enrolment coverage of Targeted Supplementary Feeding Program (TSFP) and Therapeutic Feeding Program (TFP) was low and did not meet the recommended standard of $\geq 90\%$. This indicates the need to strengthen active case finding, referral and enrollment in nutrition programme through screening at the community level in Makpandu.
- The coverage of measles vaccination and vitamin A supplementation was also slightly below the target coverage of $\geq 95\%$ and $\geq 90\%$ respectively indicating the need to strengthen and maintain both the routine and campaign vaccination/supplementation interventions.
- Almost a third of children 6-59 months reported to have had Diarrhoea in the last two weeks prior to the survey (32.9% vs. 24.5% in 2017 showed increased trend) indicating a high morbidity rate which is possibly one of the contributing factors for the increasing trends in GAM and SAM prevalence in 2018 requiring continued health services provision, and strengthening of community based preventive interventions on hygiene, sanitation and child care practices. Three quarter of these sort medical care at the Makpandu PHCC.

Recommendations and priorities

Nutrition related

- Maintain a comprehensive Community based Management of Acute Malnutrition (CMAM) program providing both therapeutic and supplementary feeding programs to facilitate the rehabilitation of identified acute malnourished children, pregnant and lactating women, people living with HIV/AIDS and TB patients on treatment. This to include active case finding and community mobilization. (UNHCR, UNICEF, WFP and WVI).
- Ensure all community screened and referred 6-59 months children identified with a MUAC less than 125mm get enrolled into the management of acute malnutrition programs through community outreach follow up at household level (WVI).
- Maintain blanket supplementary feeding programme for children 6-23 months, pregnant and lactating women using a fortified blended food or lipid based supplement to prevent malnutrition and to cover the nutrient gap these vulnerable groups have in light of a predominant grain based general food diet (UNHCR, WFP and WVI).
- Conduct a two-step MUAC and WHZ scores (for children with MUAC at risk) screening monthly at the BSFP site and the PHCC triage area in Makpandu to ensure both high MUAC and WHZ score coverage (WVI). This to be coupled with mapping of the settlement location malnourished cases are identified from, to allow complementary prevention interventions to be put in place.
- Continue strengthening the capacity of the nutrition program, in terms of provision of adequate staff and training to ensure quality provision of both curative and preventative components (UNHCR, WFP, UNICEF and WVI).

- Strengthen the prevention of malnutrition components including IYCF and community outreach education aspects to stop malnutrition from occurring in the first place. (UNHCR, UNICEF and WVI).
- Conduct quarterly mass MUAC screening to monitor the evolution of the nutrition situation in Makpandu settlement. (WVI).
- Ensure regular monitoring and supervision, quarterly joint monitoring and yearly program performance evaluations in Makpandu to assess performance progress and formulate recommendations for any identified gaps. (UNHCR, WFP, UNICEF and WVI).
- Undertake a follow up annual nutrition survey to analyze trends and facilitate program impact evaluation. (UNHCR, WVI, WFP and UNICEF).

Food security related

- Food assistance providing the minimum recommended dietary requirements (2100kcal/person/day) is critical to ensure basic nutrition provision. Until April 2018 the ration provided in Makpandu settlement provided 1582 kcal/p/d (75%) of the recommended calories which is insufficient. Following the introduction of the hybrid food and cash model systematic post distribution monitoring to be carried out to ensure the cash component is contributing to the intended food assistance requirements. In addition to this prepositioning of 2019 supplies to be carried out at the beginning of the year to avoid pipeline breaks (UNHCR, WVI and WFP).
- Continue the routine joint monthly food basket monitoring on site and ensure Makpandu inclusion in the country post distribution monitoring at the household level (UNHCR, WVI and WFP).
- Expand the coverage of sustainable food security and livelihood solutions in Makpandu settlement to complement the provided food assistance (UNHCR, WFP and WVI).

Health related

- Maintain and strengthen the provision of comprehensive primary health care programme for refugees and host populations in Yambio. (UNHCR and WVI).
- UNICEF, WVI and UNHCR to ensure that Expanded Programme on Immunization (EPI) and Vitamin A supplementation campaigns and routine programmes are strengthened to increase coverage to acceptable standards.
- Adequate clean water provision to be maintained in 2019. In addition to this hygiene promotion and latrine coverage strengthening to reduce the diarrhea caseload to be ensured. (UNHCR and WVI).

INTRODUCTION

This report presents the results of rapid nutrition survey conducted in Makpandu settlement. The survey was carried out from 1-5 October 2018.

This report is divided into the following sections:

- *Background:* This section sets out background information related to the health, nutrition and food security situation for Makpandu settlement;
- *Methodology;*
- *Results:* presents the findings;
- *Discussion; and*
- *Recommendations.*

Background

Makpandu refugee settlement has an estimated refugee population of 4205⁴ who are mainly from DRC and CAR, and a few from Sudan and Eritrea.

Key partners in terms of the provision of the health, nutrition and food security services include UNHCR, WFP, UNICEF and World Vision International (WVI). UNHCR is mainly involved in coordinating services offered to the refugees through the partners. WFP's main role is to ensure that the refugee's food security is adequately addressed through the provision of the general food assistance once per month. In addition to this WFP supports the supplementary feeding program targeting vulnerable groups. UNICEF in collaboration with UNHCR provides support to the management of severe acute malnutrition and IYCF programmes. WVI implements the health, nutrition and food security programme.

Food Security

Refugees in the Makpandu settlement are mainly dependent on the WFP provided food assistance and have limited access to additional sources of food/income. From January to April 2018 the provided ration consisted of 350g maize, 35g of beans, 21ml vegetable oil and 3.5g of salt per person per day. This cumulates to approximately 409 grams providing 1582 kilocalories per person per day. This provided 75% of the recommended food ration of 2100 kilocalories per person per day.

Since May 2018, refugees in Makpandu receive a combination of cash and food – known as the hybrid basket. Under this modality, refugees still receive the 70% equivalent of the general food ration but 25% of this allocation is transferred in cash for both cereal and pulses, based on the market prices at the time of the general distribution. In addition to this part of the cash includes 100% of the vegetable oil and salt provision. The cash component also includes milling assistance. This translates to a food assistance package consisting of 7kg cereal, 0.75kg pulses and South Sudanese Pound (SSP) 890 per person. Galaxy International is the financial service provider contracted to carry out the cash-component of the GFD, while the WVI remains responsible for the food distribution. The hybrid basket is designed to allow flexibility for unforeseen changes in the context, to allow refugees to have 100% food assistance if the markets in and around the settlement fail to provide sufficient access to the food required to form 70% of the GFD. Table 2 below notes the breakdown of each of the likely scenarios and

⁴ UNHCR ProGres August 2018 population

the corresponding assistance breakdown. Under the hybrid modality, salt, oil and milling are always provided in cash. Option 2 was not utilized in 2018.

Table 2: Hybrid basket tables, Makpandu, 2018

CASH	Commodity	Option 1	Option 2
		Favorable market conditions	Unfavorable market conditions
	Cereal cash	25%	-
	Pulse cash	25%	-
	Oil cash	100%	100%
	Salt cash	100%	100%
	Milling cash	100%	100%

IN-KIND	Commodity	Option 1	Option 2
		Cereal cash	75%
	Pulse cash	75%	100%
	Oil cash	0%	0%
	Salt cash	0%	0%

As with other services food assistance faced access challenges partly in May (53% of the households did not receive food) and all of June 2018 as a result of insecurity which also restricted the movement of the UNHCR partner-WVI to the refugee settlement. Makpandu refugees did not receive their food or cash entitlements in June 2018.

See breakdown below showing the monthly ration provision.

Table 3: General food ration provision by month – Makpandu refugee settlement, Yambio, 2018

Ration provided at the distribution in g/p/d	Standard	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Cereal	500g	350	350	350	350	233	0	233	233	233	233
Pulses	50g	35	35	35	35	25	0	25	25	25	25
Vegetable oil	30g	21	21	21	21	0	0	0	0	0	0
Salt	5g	0	0	0	0	0	0	0	0	0	0
CSB+	50g	0	0	0	0	0	0	0	0	0	0
Kcal	2100	1582	1582	1582	1582	935	0	935	935	935	935
	% of standard met	71	71	71	71	44	0	44	44	44	44
Cash in SSP						890		890	890	890	890

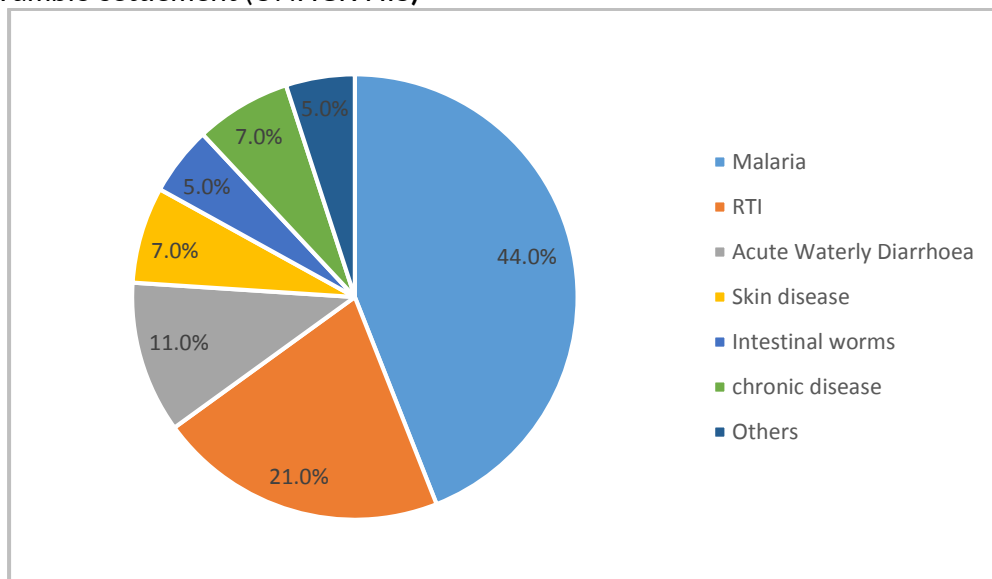
Health situation

Makpandu refugee settlement has one Primary Health Care Centre (PHCC).

The overall crude mortality rate for Makpandu settlement from the UNHCR Health Information System (HIS) from January to October 2018 was 0.1/10000/day while under-five mortality rate was 0.2/10000/day which was below the emergency threshold of <0.75 and <2 respectively. This indicates a stable population.

The main causes of illness in 2018 were malaria, respiratory tract infections, watery diarrhoea, skin disease, intestinal worms and chronic diseases. This was the same pattern in 2017.

Figure 1: Under-five proportional morbidity from January to October 2018; Makpandu, Yambio settlement (UNHCR HIS)



Nutrition Situation

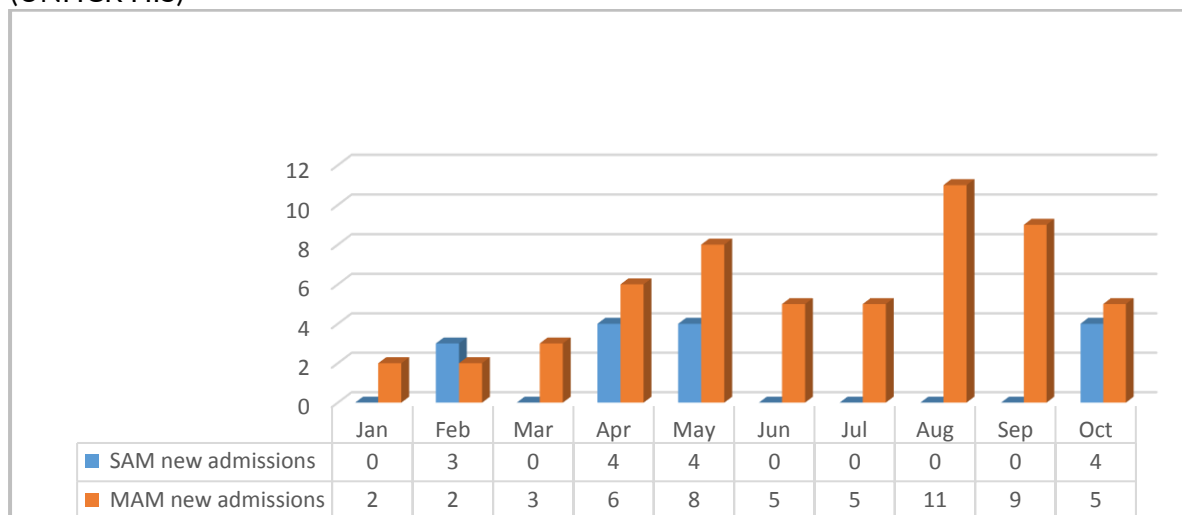
Health data from Makpandu refugee settlement traditionally reported low malnutrition cases. In 2016 however the MUAC screening data at the health facilities indicated a rising trend in the second half of the year. This prompted the need for further investigation. Results from a Mass MUAC screening carried out at the end of the year showed a proportion of 7.2% children 6-59 months were acute malnourished (had a MUAC <12.5cm) indicating a poor nutrition status. Following this a comprehensive nutrition program was set up to prevent malnutrition and rehabilitate all identified malnourished cases. A baseline standard nutrition survey was conducted in 2017 to assess nutrition situation. The GAM prevalence as per nutrition survey conducted in October 2017 was 3.3% (1.5-7.4 95% C.I.). The proportion of MUAC <12.5cm was 3.3% (1.9-5.7 95% C.I.). The latter indicated a decreasing malnutrition trend. A follow up nutrition survey was recommended to evaluate the impact of the on-going interventions to ensure provision of optimal health and nutritional care for the refugee population.

Nutrition services and activities in the settlement at the time of the survey included:

- Targeted Supplementary Feeding Programmes (TSFP) for moderately acute malnourished cases using CSB++.
- Outpatient Therapeutic feeding Program (OTP) for severely acute malnourished children without medical complications. Severe acute malnourished cases with medical complications were referred to the stabilization centre in Yambio hospital.
- Blanket Supplementary Feeding Program (BSFP) using CSB++ targeting children aged 6-23 months and pregnant and lactating women
- Basic infant and young child feeding support and promotion programme.
- Community outreach MUAC screening referral and follow up.

From January to October 2018 there were 71 (children aged 6-59) admissions of which 15 were admitted to the OTP and 56 to the TSFP. At the end of October 2018 there were 22 children aged 6-59 months enrolled in both the OTP and TSFP program. There was an additional 23 children enrolled admissions from the host community.

Figure 2: Admissions to the selective feeding program (OTP & TSFP) January- October 2018 (UNHCR HIS)



WASH situation

Access to water in Makpandu in 2018 was maintained through 13 water points (11 boreholes fitted with India Mark II pumps and 2 submersible pump fixed with an 8,000 and 10000 liters capacity elevated water tank. Routine water quality management (testing and chlorination of boreholes) and their maintenance was also carried out regularly. An average of 19.2 liters per person per day was available in 2018 which meets the minimum SPHERE standard but is lower than the UNHCR standard of ≥ 20 liters per person per day. The population in Makpandu will continue to require the water to be maintained within the minimum standards.

As of end of October 2018, Makpandu settlement had 431 functional sanitation facilities (416 household pit latrines serving 1,245 households. In addition to this there were 15 public/institutional Ventilated Improved Pit (VIP) latrines (5 at Makpandu primary school, 3 at Makpandu secondary school, 2 at the health facility, 1 at the proposed teacher's quarter, and 1 at the child friendly space, 1 at Makpandu market, 1 at the food distribution center and 1 at WVI team house). The overall average number of persons per hygiene promoter ratio was 507 in Makpandu. This number needs to be maintained to ensure there is no open defecation in

Makpandu settlement and to reduce the disease burden.

SURVEY OBJECTIVES

Specific primary objectives of the survey

- a. To determine the prevalence of acute malnutrition among children 6-59 months.
- b. To determine the prevalence of stunting among children 6-59 months.
- c. To determine the coverage of measles vaccination among children 9-59 months.
- d. To determine the coverage of vitamin A supplementation in the last six months among children 6-59 months.
- e. To determine the two-week period prevalence of diarrhoea among children 6-59 months.
- f. To establish recommendations on actions to be taken to address the situation.

Secondary objectives:

- a. To determine the enrolment coverage of of targeted supplementary and therapeutic feeding programmes for children 6-59 months.

METHODOLOGY

Sampling procedure

A cross-sectional survey was conducted using simple random sampling. Households were physically labelled with unique numbers per block. To reduce non-response rate and ensure results were representative of people actually living in the settlement at the time of the survey, empty households⁵, as verified through neighbours were not be labelled and thus not be included in the sampling frame. The sample size was estimated based on UNHCR registration ProGres data. A random household sample was drawn from the actual number of physically verified household before the survey.

Survey population and sample size

The sample size was calculated using the Emergency Nutrition Assessment (ENA) for Standardized Monitoring and Assessment of Relief and Transitions (SMART) software version July 9th, 2015 following UNHCR SENS methodology version 2 (2013). The GAM prevalence estimate was based on the likely scenario using the 2017 nutrition survey results. The total population and percentage of under-5 was derived from the UNHCR ProGres data. The average household size was derived from the household listing. A non-response rate of 10% was used in both camps as household listing was carried out right before the survey data collection.

⁵ An empty household will be considered an abandoned and excluded from the nutrition survey if no one was present in that tent for the last one month.

Table 4: Parameter used to calculate the sample size

Location	Makpandu
Total camp population (UNHCR ProGres August 2018)	4205
% population under 5	15.2
Estimated GAM prevalence (%)	7.4
± Desired Precision (%)	3
Non response rate (%)	10
Average household size	6.6
Number of Children (ENA)	194
Household target for Anthropometry and Health module (ENA for SMART) including non-response rate	239

As the population of children under five was less than 10,000 a correction factor was used while calculating the sample size in ENA for SMART.

House hold questionnaire administration

239 of the sampled households of the 539 listed with children 6-59 months were surveyed. Each team was allocated a number of households. Block locations and boundaries was discussed during the training to ensure all teams knew where to go.

If a child was absent the teams were instructed to revisit the household one more time. If they were unsuccessful after this, the child was recorded as absent and they were not replaced with another child.

If the household refused to participate then it was considered a refusal and the household was not replaced with another.

If a selected child was living with a disability or a physical deformity preventing certain anthropometric measurements the child was still included in the assessment of the other indicators

If it was determined that a selected household did not have any eligible children, the questionnaire was not administered and the team moved to the next household.

Questionnaires

Paper questionnaires were used for data collection. See **Appendix 3**

The questionnaires were prepared in English language. Following the survey training, revisions were adapted. The questionnaires were translated to the local dialect via the enumerators where necessary during data collection.

The anthropometric module questionnaire (adapted from UNHCR SENS Guidelines version 2, 2013) was administered targeting children 6-59 months. This included questions and measures for children aged 6-59 months. Information was collected on anthropometric status, oedema, enrolment in selective feeding programmes, immunization (measles), vitamin A supplementation in the last six months, if the child had diarrhoea two weeks prior to the survey and if they did whether they visited the health center. Either an EPI card or child health card were used to determine the age in case there was no birth certificate. If no reliable proof of age was available, age was estimated in months using a local event calendar and was recorded in months on the questionnaire. If the child's age could absolutely not be determined by using a local events calendar or by probing, the child's length/height was used for inclusion; the child had to measure between 65 cm and 110 cm.

Weight of children 6-59 months: measurements were taken to the closest 100 grams using an electronic scale (SECA scale). All children were weighed without clothes.

Height/Length of children 6-59 months: children's height or length was taken to the closest millimeter using a wooden height board (Shorr Productions). Height was used to decide on whether a child should be measured lying down (length) or standing up (height). Children less than 87cm were measured lying down, while those greater than or equal to 87cm were measured standing up.

Oedema in children 6-59 months: bilateral oedema was assessed by applying gentle thumb pressure on to the tops of both feet of the child for a period of three seconds and thereafter observing for the presence or absence of an indent.

MUAC of children 6-59 months: MUAC was measured at the mid-point of the left upper arm between the elbow and the shoulder and taken to the closest millimeter using a standard tape. MUAC was recorded in millimeters.

Child enrolment in selective feeding programme for children 6-59 months: selective feeding programme coverage was assessed for the outpatient therapeutic programme and for the supplementary feeding programme. This was verified by card or by showing images of the products given at the different programs

Measles vaccination in children 6-59 months: measles vaccination was assessed by checking for the measles vaccine on the EPI card if available or by asking the caregiver to recall if no EPI card was available. For ease of data collection, results were recorded on all children but were only analysed for children aged 9-59 months

Vitamin A supplementation in last 6 months in children 6-59 months: whether the child received a vitamin A capsule over the past six months was recorded from the EPI card or health card if available or by asking the caregiver to recall if no card is available. A vitamin A capsule image was shown to the caregiver when asked to recall.

Diarrhoea in last 2 weeks in children 6-59 months: Caregivers were asked if their child had suffered of any illness in the past two weeks.

Health seeking behavior: for children that were ill, whether the caregiver took the child to the health center for treatment.

Referrals: Children aged 6-59 months were referred to nutrition centre for treatment when MUAC was < 12.5 cm or oedema was present, and if the WHZ was <-2 z-scores.

Case definitions, inclusion criteria and calculations

Malnutrition in children 6-59 months: Acute malnutrition was defined using weight-for-height index values or the presence of oedema and classified as show in the table below. Main results are reported after analysis using the WHO 2006 Growth Standards.

Stunting, also known as chronic malnutrition was defined using height-for-age index values and was classified as severe or moderate based on the cut-offs shown below. Main results are reported according to the WHO Growth Standards 2006.

Table 5: Definitions of stunting using height-for-age in children 6–59 months

Categories of stunting	Z-scores (WHO Growth Standards 2006 and NCHS Growth Reference 1977)
Stunting	<-2 z-scores
Moderate stunting	<-2 z-score and >=-3 z-score
Severe stunting	<-3 z-scores

Underweight was defined using the weight-for-age index values and was classified as severe or moderate based on the following cut-offs. Main results are reported according to the WHO Growth Standards 2006.

Table 6: Definitions of underweight using weight-for-age in children 6–59 months

Categories of underweight	Z-scores (WHO Growth Standards 2006 and NCHS Growth Reference 1977)
Underweight	<-2 z-scores
Moderate underweight	<-2 z-scores and >=-3 z-scores
Severe underweight	<-3 z-scores

Mid Upper Arm Circumference (MUAC) values were used to define malnutrition according to the following cut-offs in children 6-59 months:

Table 7: MUAC malnutrition cut-offs in children 6-59 months

Categories of MUAC values
<125 mm
≥ 115 mm and <125 mm
< 115 mm

Child enrolment in selective feeding programme for children 6-59 months: Feeding programme coverage is estimated during the nutrition survey using the direct method as follows (reference: Emergency Nutrition Assessment: Guidelines for field workers. (Save the Children 2004):

Targeted supplementary feeding programme

Coverage of TSFP programme (%) =

$100 \times \frac{\text{No. of surveyed children with MAM according to SFP admission criteria who reported being registered in SFP}}{\text{No. of surveyed children with MAM according to SFP admission criteria}}$

Therapeutic feeding programme

Coverage of OTP programme (%) =

$100 \times \frac{\text{No. of surveyed children with SAM according to OTP admission criteria who reported being registered in OTP}}{\text{No. of surveyed children with SAM according to OTP admission criteria}}$

Classification of public health problems and targets

Anthropometric data: UNHCR states that the target for the prevalence of global acute malnutrition (GAM) for children 6-59 months of age by camp, country and region should be <10% and the target for the prevalence of severe acute malnutrition (SAM) should be <2%. For stable camps, the target is to have GAM<5%.

The table below shows the classification of public health significance of the anthropometric results for children under-5 years of age.

Table 8: Classification of public health significance for children under 5 years of age

Prevalence %	Critical	Serious	Poor	Acceptable
Low weight-for-height	≥15	10-14	5-9	<5
Low height-for-age	≥40	30-39	20-29	<20
Low weight-for-age	≥30	20-29	10-19	<10

Selective feeding programmes:

UNHCR Strategic Plan for Nutrition and Food Security 2008-2012 includes the following indicators. The table below shows the targeted performance indicators for malnutrition treatment programmes according to UNHCR Strategic Plan for Nutrition and Food Security 2008-2012 (same as Sphere Standards).

Table 9: Performance indicators for selective feeding programmes (UNHCR Strategic Plan for Nutrition and Food Security 2008-2012)*

	Recovery	Case fatality	Defaulter rate	Coverage		
				Rural areas	Urban areas	Refugee camps

						/settlements
SFP	>75%	<3%	<15%	>50%	>70%	>90%
TFP	>75%	<10%	<15%	>50%	>70%	>90%

* Also meet SPHERE standards for performance

Measles vaccination coverage: UNHCR recommends target coverage of $\geq 95\%$ (same as SPHERE standards).

Vitamin A supplementation coverage: UNHCR Strategic Plan for Nutrition and Food Security (2008-2012) states that the target for vitamin A supplementation coverage for children aged 6-59 months by settlement, country and region should be $\geq 90\%$.

Training, coordination and supervision

The surveys were coordinated by UNHCR Juba and Yambio offices in collaboration with the WVI team including Godfrey Otobi and Chan Gatluak.

The surveys were undertaken by six teams. Each team was composed of three members: one team leader/questionnaire enumerator and two anthropometric measurers. The team leaders/questionnaire enumerators were health/nutrition staff, while the anthropometric measurers were home health promoters.

A three day training was carried out from 25 to 27 September 2018. WFP also supported the training. The training focused on: the purpose and objectives of the survey, roles and responsibilities of each team member, familiarization with the questionnaires by reviewing the purpose of each question; interviewing skills and recording of data; interpretation of calendar of events and age determination; how to take anthropometric measurements, common errors and data recording. A standardisation exercise on anthropometric measurements was also carried out for practice. Post the training the data collection tools were reviewed based on the feedback from the team

Data collection, entry and analysis

Data collection lasted for 5 days from 1 to 5 October 2018. Each survey team explained the purpose of the survey and issues of confidentiality and obtained verbal consent before proceeding with the survey in the selected households. The informed consent form is shown in **Appendix 3**. The survey teams were supported by a WVI supervisor on ground and coordinated remotely by the UNHCR Nutrition and Food Security Officer throughout the duration of data collection. Data collection was carried out using paper questionnaires. The data was entered daily into ENA for SMART software (version July 9th, 2015). A plausibility check was generated thereafter for the provision of daily feedback to the supervisor and onward to the team leaders. Records with queries were marked and returned to the team for correction and/or confirmation the following day.

At the end of the data collection, a complete set of data was ready. All data files were cleaned before analysis. Entries were double checked, one by one, with the original questionnaire to ensure there were no data entry errors. Analysis was performed using ENA for SMART and Epi Info software. The SMART plausibility report was generated in order to check the quality of the anthropometric data and a summary of the key quality criteria is shown in **Appendix 2**.

The nutritional indices were cleaned using flexible cleaning criteria from the observed mean (also known as SMART flags in the ENA for SMART software), rather than the reference mean (also known as WHO flags in the ENA for SMART software). This flexible cleaning approach is recommended in the UNHCR SENS Guidelines (Version 2, 2013) in accordance with SMART recommendations. For the weight-for-height index, a cleaning window of ± 3 SD value contained in the SMART for ENA software was used.

RESULTS FROM MAKPANDU

CHILDREN 6-59 MONTHS INDICATORS, MAKPANDU SETTLEMENT, YAMBIO (October 2018)

Table 10 shows the total number of children who were sampled.

Table 10: Actual number of children captured during the survey Makpandu settlement versus target, (October 2018)

Target group	Target population	Subjects measured/interviewed during the survey	% of the target
Children 6-59 months	194	228	>100%

The targeted number of the children to be surveyed was within the recommended standard of >80%.

Anthropometric results (based on WHO Growth Standards 2006)

The coverage of age documentation was 44% (children having an exact birth date). As this does not include all children, stunting and the underweight data should be interpreted with caution. Of note is that this proportion decreased compared to that in 2017 when the coverage was 76%. The reason behind the decrease to be investigated.

Table 11: Distribution of age and sex of sample-Makpandu settlement, Yambio (October 2018)

AGE (mo)	Boys		Girls		Total		Ratio
	no.	%	no.	%	no.	%	Boy: girl
6-17	30	54.5	25	45.5	55	24.1	1.2
18-29	30	50.8	29	49.2	59	25.9	1.0
30-41	28	51.9	26	48.1	54	23.7	1.1
42-53	21	47.7	23	52.3	44	19.3	0.9
54-59	9	56.3	7	43.8	16	7.0	1.3
Total	118	51.8	110	48.2	228	100.0	1.1

The overall sex ratio was 1.1 (sex ratio should be between 0.8-1.2), which confirms that both sexes were equally distributed.

Table 12: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex- Makpandu settlement, Yambio (October 2018)

	All n = 226	Boys n = 117	Girls n = 109
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(12) 5.3 % (1.5 - 16.9 95% C.I.)	(5) 4.3 % (0.9 - 17.3 95% C.I.)	(7) 6.4 % (2.1 - 17.7 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(10) 4.4 % (1.4 - 13.4 95% C.I.)	(4) 3.4 % (0.8 - 13.1 95% C.I.)	(6) 5.5 % (1.9 - 14.8 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(2) 0.9 % (0.1 - 10.2 95% C.I.)	(1) 0.9 % (0.1 - 9.7 95% C.I.)	(1) 0.9 % (0.1 - 10.8 95% C.I.)

The prevalence of oedema is 0.9 %. Data excludes SMART flags

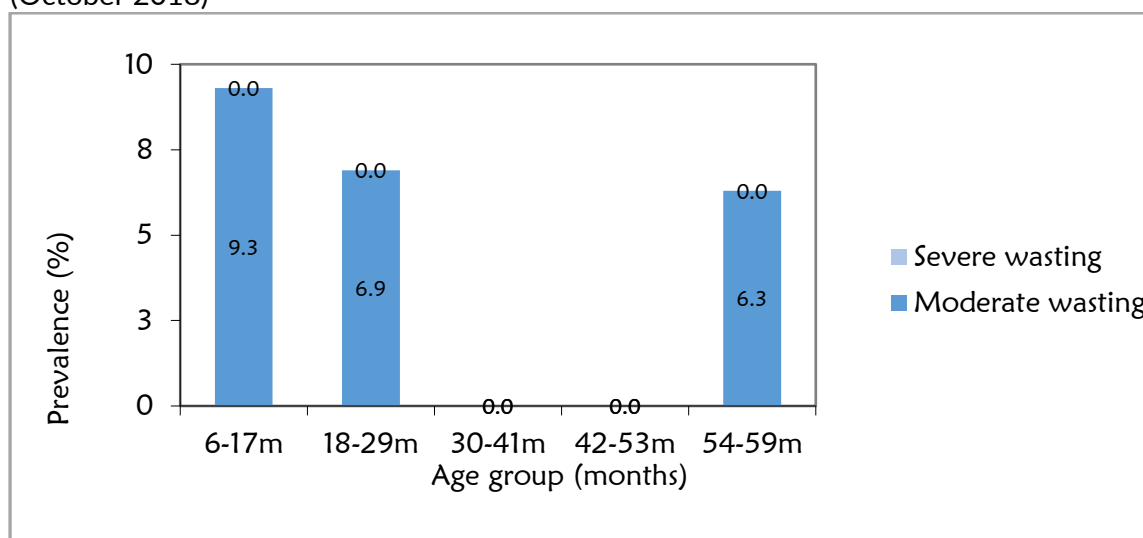
There was no significant difference between boys and girls in the prevalence of acute malnutrition ($p>0.05$).

Table 13: Prevalence of acute malnutrition by age, based on weight-for-height z-scores Makpandu settlement, Yambio (October 2018)

Age (mo.)	Total no.	Severe wasting (<-3 z-score)		Moderate wasting (≥ -3 and <-2 z-score)		Normal (≥ -2 z score)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	54	0	0.0	5	9.3	48	88.9	1	1.9
18-29	58	0	0.0	4	6.9	53	91.4	1	1.7
30-41	54	0	0.0	0	0.0	54	100.0	0	0.0
42-53	44	0	0.0	0	0.0	44	100.0	0	0.0
54-59	16	0	0.0	1	6.3	15	93.8	0	0.0
Total	226	0	0.0	10	4.4	214	94.7	2	0.9

Younger children aged 6-17 months were the most affected by acute malnutrition.

Figure 3: Prevalence of wasting by age in children 6-59 months- Makpandu settlement, Yambio (October 2018)



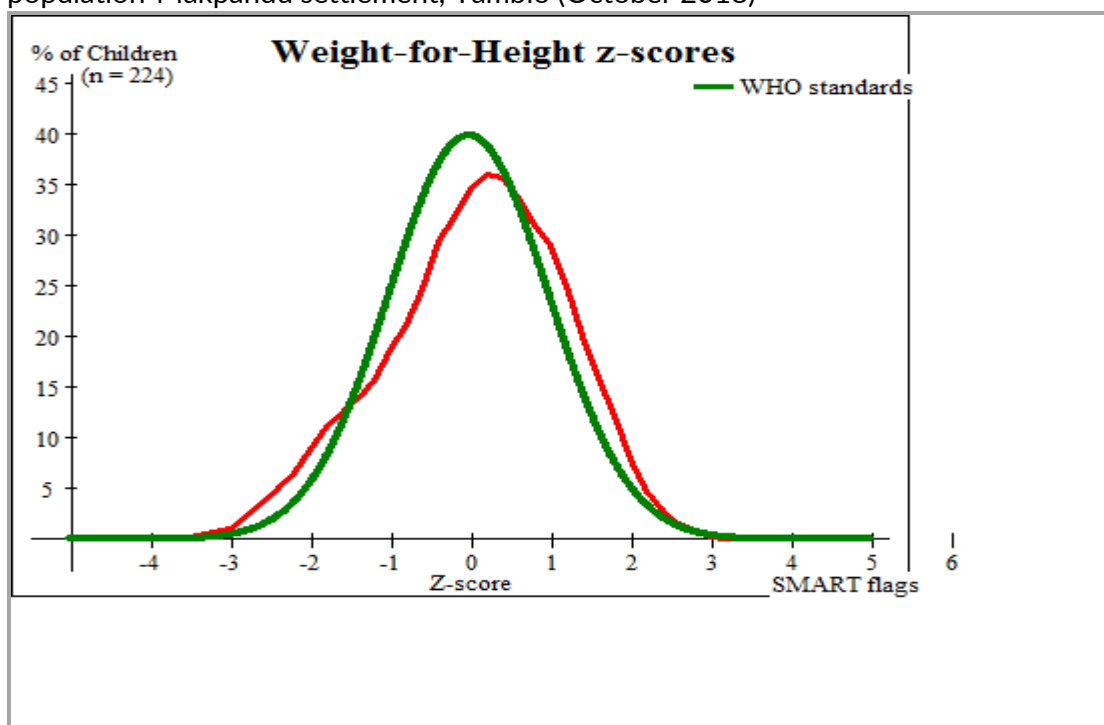
Children in the age groups 6-17, 18-29, and 54-59 months tend to be the most affected by wasting as compared to the other age groups.

Table 14: Distribution of severe acute malnutrition and oedema based on weight-for-height z-scores- Makpandu settlement, Yambio (October 2018)

	<-3 z-score*	≥ -3 z-score
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 2 (0.9 %)
Oedema absent	Marasmic No. 1 (0.4 %)	Not severely malnourished No. 225 (98.7 %)

*Includes Flags

Figure 4: Distribution of weight-for-height z-scores (based on WHO Growth Standards; the reference population is shown in green) of survey population compared to reference population-Makpandu settlement, Yambio (October 2018)



The figure shows that malnutrition is not generalized in the population as the weight-for-height z-score distribution is mostly not shifted to the left. However there are pockets of malnutrition that need to be addressed.

Table 15: Prevalence of stunting based on height-for-age z-scores and by sex- Makpandu settlement, Yambio (October 2018)

	All n = 228	Boys n = 118	Girls n = 110
Prevalence of stunting (< -2 z-score)	(48) 21.1 % (12.2 - 33.8 95% C.I.)	(32) 27.1 % (12.2 - 50.0 95% C.I.)	(16) 14.5 % (9.4 - 21.9 95% C.I.)
Prevalence of moderate stunting (< -2 z-score and ≥ -3 z-score)	(38) 16.7 % (9.3 - 28.0 95% C.I.)	(26) 22.0 % (10.1 - 41.6 95% C.I.)	(12) 10.9 % (6.0 - 18.9 95% C.I.)
Prevalence of severe stunting (< -3 z-score)	(10) 4.4 % (2.4 - 7.9 95% C.I.)	(6) 5.1 % (2.2 - 11.2 95% C.I.)	(4) 3.6 % (1.1 - 11.0 95% C.I.)

The prevalence of stunting indicates a decreasing trend compared to that in 2017 when total and severe stunting was 33.6% and 10% respectively. This should however be interpreted with caution due to the highlighted age limitation. Only 44% of the assessed children had a valid age documentation.

Table 16: Prevalence of stunting by age based on height-for-age z-scores- Makpandu settlement, Yambio (October 2018)

Age (mo.)	Total no.	Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
		No.	%	No.	%	No.	%
6-17	55	1	1.8	9	16.4	45	81.8
18-29	59	3	5.1	9	15.3	47	79.7
30-41	54	2	3.7	9	16.7	43	79.6
42-53	44	3	6.8	9	20.5	32	72.7
54-59	16	1	6.3	2	12.5	13	81.3
Total	228	10	4.4	38	16.7	180	78.9

Children in the age groups 42-53, 18-29, and 30-41 months tend to be the most affected by stunting as compared to the other age groups.

Figure 5: Prevalence of stunting by age in children 6-59 months- Makpandu settlement, Yambio (October 2018)

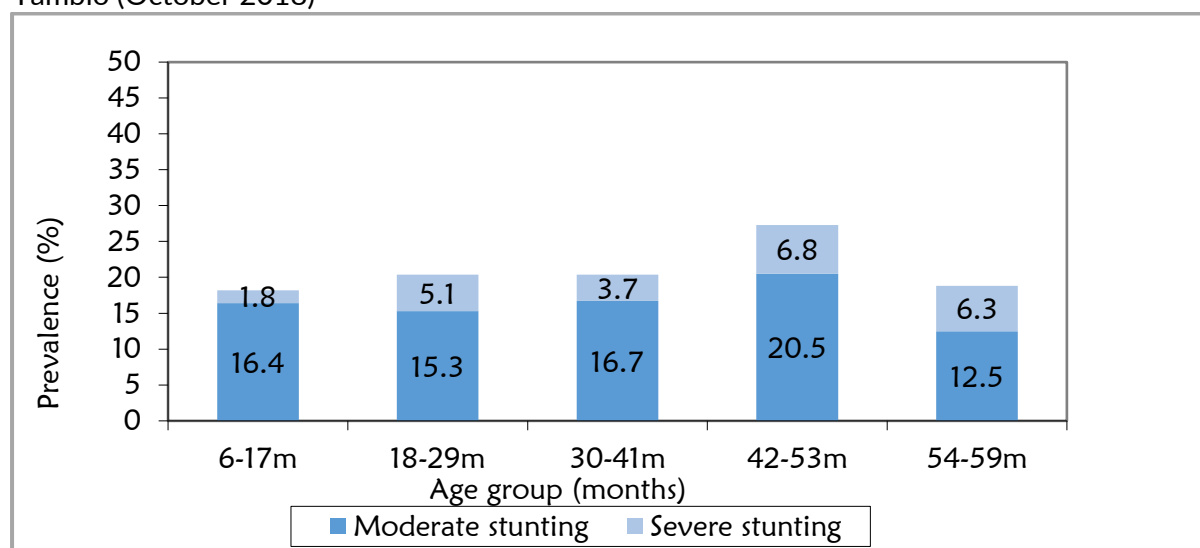


Table 17: Prevalence of underweight based on weight-for-age z-scores by sex- Makpandu settlement, Yambio (October 2018)

	All n = 226	Boys n = 117	Girls n = 109
Prevalence of underweight (<-2 z-score)	(13) 5.8 % (1.5 - 20.0 95% C.I.)	(11) 9.4 % (2.2 - 32.4 95% C.I.)	(2) 1.8 % (0.4 - 8.7 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(11) 4.9 % (1.6 - 14.1 95% C.I.)	(9) 7.7 % (2.3 - 22.6 95% C.I.)	(2) 1.8 % (0.4 - 8.7 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(2) 0.9 % (0.1 - 10.4 95% C.I.)	(2) 1.7 % (0.1 - 18.1 95% C.I.)	(0) 0.0 % (0.0 - 0.0 95% C.I.)

Although it was not a statistically significant change (p=0.05) the prevalence of underweight indicates a decreasing trend compared to that in 2017 when total and severe underweight was 10.8% and 2.1% respectively.

Table 18: Mean z-scores and excluded subjects - Makpandu settlement, Yambio (October 2018)

Indicator	n	Mean z-scores \pm SD	z-scores not available*	z-scores out of range
Weight-for-Height	224	0.06 \pm 1.08	2	2
Weight-for-Age	226	-0.59 \pm 0.90	2	0
Height-for-Age	228	-1.14 \pm 1.02	0	0

* contains WHZ and WAZ for the children with oedema.

MUAC was used in the community for screening, referral and admission to therapeutic and supplementary feeding programmes.

Table 19: Prevalence of acute malnutrition based on MUAC cut off's (and/or oedema) and by sex - Makpandu settlement, Yambio (October 2018)

	All n = 228	Boys n = 118	Girls n = 110
Prevalence of MUAC (< 125 mm and/or oedema)	(8) 3.5 % (1.1 - 10.8 95% C.I.)	(4) 3.4 % (1.1 - 9.7 95% C.I.)	(4) 3.6 % (0.9 - 13.8 95% C.I.)
Prevalence of MUAC (< 125 mm and \geq 115 mm, no oedema)	(3) 1.3 % (0.2 - 7.1 95% C.I.)	(2) 1.7 % (0.4 - 7.7 95% C.I.)	(1) 0.9 % (0.1 - 10.8 95% C.I.)
Prevalence of MUAC (< 115 mm and/or oedema)	(5) 2.2 % (0.5 - 8.7 95% C.I.)	(2) 1.7 % (0.4 - 6.6 95% C.I.)	(3) 2.7 % (0.6 - 11.3 95% C.I.)

The case load for the selective feeding programmes was estimated to aid in programme planning. The Makpandu settlement total population as of October 2018 was 4685. 770 of this was the under 5 population. 693 of these was children aged 6-59 months (assuming that 10% of under-5 are infants 0-5 months). The TFP and TSFP target for children aged 6-59 months at the end of October 2018 is reflected below:

Table 20: Estimated number of acute malnourished children aged 6-59 months eligible to be enrolled in a selective feeding programme at the time of the survey (based on all admission criteria)- Makpandu settlement, Yambio (October 2018)

	Total/number	%	Estimate based on 693 6-59 population
Eligible for therapeutic feeding programme**	5/226	2.2	15
Eligible for targeted supplementary feeding programme**	10/226	4.4	31

** smart flags are excluded

Using the HIS data for week 4 October 2018 there were 3 children enrolled in the therapeutic feeding program which was 0.4% of children 6-59 months while 17 were enrolled in the targeted supplementary feeding program which was 2.5% of children 6-59 months using the October population.

Feeding Programme enrolment coverage

The Therapeutic Feeding Program (TFP) and Supplementary Feeding Program (SFP) enrolment coverages using both the criterias “all admission and MUAC only criterion” did not meet the recommended standard of $\geq 90\%$. See tables below with details.

Selective feeding programme

Table 21: Nutrition treatment programme enrolment coverage based on all admission criteria (weight-for-height, MUAC, oedema) – Makpandu settlement, Yambio (October 2018)

	Number/total	%
Proportion of children aged 6-59 months with severe acute malnutrition currently enrolled in therapeutic feeding programme*	1/3	33.3%
Proportion of children aged 6-59 months with moderate acute malnutrition currently enrolled in supplementary feeding programme*	2/10	20.0%

*WHZ flags excluded from analysis

Table 22: Nutrition treatment programme enrolment coverage based on MUAC and oedema only- Makpandu settlement, Yambio (October 2018)

	Number/total	% (95% CI)
Proportion of children aged 6-59 months with severe acute malnutrition currently enrolled in therapeutic feeding programme	1/5	20%
Proportion of children aged 6-59 months with moderate acute malnutrition currently enrolled in supplementary feeding programme	2/3	66.7%

Vaccination and supplementation programmes

Measles vaccination coverage

Table 23: Measles vaccination coverage for children aged 9-59 months (n= 212) - Makpandu settlement, Yambio (October 2018)

	Measles (with card) n=100	Measles (with card <u>or</u> confirmation from mother) N=172
YES	47.2% (40.3-51.1)	81.1% (75.2-86.2)

The measles vaccination coverage was below the recommended standard target of $\geq 95\%$. This decreased compared to that in 2017 when the coverage was 92.1%.

Vitamin A supplementation coverage

Table 22: Vitamin A supplementation for children aged 6-59 months within past 6 months (n=228) - Makpandu settlement, Yambio (October 2018)

	Vitamin A capsule (with card) n=36	Vitamin A capsule (with card <u>or</u> confirmation from mother) n=133
YES	18.9% (14.0-24.5)	58.3% (51.6-64.8)

The vitamin A coverage was below the recommended standard target of $\geq 90\%$. This decreased compared to that in 2017 when the coverage was 89.3%

Morbidity

A third of the children 6-59 months reported to have had diarrhoea two weeks prior to the survey. 76.7% (65.4-85.8 95% C.I.) of these reported to have been taken to the health facility.

Table 23: Prevalence of sickness in children 6-59 months

	Number/total	%
Children had diarrhoea in the last two weeks (6-59 months)	75/228	32.9% (26.8-39.4 95% C.I.)

LIMITATIONS

- There was restricted/limited access to Makpandu refugee settlement for UN staff during the survey period due to insecurity. This limited the number of modules that could be carried out as recommended in the UNHCR SENS guideline. As a result and to ascertain the nutrition situation in Makpandu settlement we carried out using a rapid nutrition survey. Only remote supervision was possible for the survey team that remained in the settlement during the data collection.
- The age documentation coverage was 44%. Although an event calendar was used by the surveyors to ascertain age, stunting results need to be interpreted with caution because z-scores for height-for-age require accurate ages to within two weeks⁶

DISCUSSION

Nutritional status of young children and mortality

The overall nutrition situation in Makpandu settlement is classified as poor as the GAM prevalence 5.3% (1.5-16.9 95% C.I.) falls between 5-9%⁷. Of note is that the highest confidence interval is above the critical WHO emergency threshold of 15%. Looking at weight-for-height z-score distribution for Makpandu against the reference (refer to figure 4) the distribution is mostly not shifted to the left. This distribution curve pattern indicates that acute malnutrition is not generalized in the population but there are pockets of acute malnutrition that need to be addressed. Mapping of the settlement location acute malnourished cases are identified from is required to allow the investigation of the causes which should be remedied by complementary prevention interventions in addition to the treatment.

The GAM prevalence showed increased trend in 2018 compared to that in 2017 (from 3.3% increased to 5.3%). The increase from 3.3% to 5.3% in 2018 was not statistically significant ($p > 0.05$) indicating the acute malnutrition situation has been shifted from acceptable level to poor level (WHO classification). This was also the case for the prevalence of SAM. The increase from 0% in 2017 to 0.9% in 2018 was not statistically significant. In 2018 therapeutic

⁶ (CDC/WFP: A manual: Measuring and Interpreting Mortality and Malnutrition, 2005).

⁷ WHO 2000 categorization

supplies were adequate throughout the year. Targeted supplementary feeding was carried out using CSB++ as there was no Plumpy'Sup- the recommended supplementary feeding product. Although not substantiated by research, survey data comparison among the various camps indicate better management of moderate acute malnutrition outcomes for cases supplemented with Plumpy'Sup compared to the CSB++ ones for the south Sudan refugee response. Blanket supplementary feeding supplies were received in April 2018 thus a three month pipeline shortage was experienced. Access remained a challenge, due to insecurity, especially in the months of May and June when not even the nutrition partner, could not travel to the settlements. Efforts to further reduce the acute malnourished caseload need to continue in 2019.

Stunting refers to a deficit in height relative to age due to a long-term process of linear growth retardation. The prevalence of global stunting was 21.1 % (12.2 - 33.8). This indicates a serious level according to WHO classification and is above the acceptable standard of <20%. This should however be interpreted with caution due to the age estimation limitation. 66% of the children 6-59 months did not have a reliable age documentation. 'Stunting is a well-established risk marker of poor child development. Stunting before the age of 2 years predicts poorer cognitive and educational outcomes in later childhood and adolescence. Factors that contribute to stunted growth and development include poor maternal health and nutrition, inadequate infant and young child feeding practices, and infection.'⁸ Action across multiple areas is necessary to reduce the stunting levels. This to include promotion of infant and young child feeding practices, ensuring adequate water and sanitation, infection control and maternal health and nutrition support.

Morbidity and Health seeking behavior

The interactions of nutrition and infection are cyclic with each exacerbating the other. Almost a third (32.9%) of children 6-59 months reported to have had diarrhoea in the last two weeks prior to the survey indicating a high morbidity rate requiring continued health services provision, and strengthening of community based preventive interventions on hygiene, sanitation and child care practices. Three quarter of these sort medical care at the Makpandu PHCC indicating positive health facility utilization. Interventions to prevent diarrhoea, including safe drinking-water, use of improved sanitation and hand washing with soap need to be strengthened and maintained. To reduce the morbidity caseload further there is also need to strengthen the current health service provision. Top causes of morbidities (malaria, respiratory tract infections, skin infections and intestinal worms) should also be given special attention.

Programme coverage children 6 – 59 months

Selective feeding programme

The enrolment coverage of Targeted Supplementary Feeding Program (TSFP) and Therapeutic Feeding Program (TFP) was low and did not meet the recommended standard of $\geq 90\%$. Strengthening of active case screening at the community recommended. Analysis of MUAC versus WHZ z-scores noted that only 3/10 of the children that had < -2 Z-scores had a MUAC proportion of < 12.5 cm. The proportion of children that were eligible for admission based on both MUAC and WHZ scores was 6.6%. In this light, a mixed criteria for admission using MUAC or WHZ scores to capture the children missed by either MUAC or the WHZ scores admission criteria continues to be important. To improve coverage a two stage monthly screening to be carried out during BSFP for children 6-23 months and for all children 24-59 months presenting

⁸ WHA Global Nutrition Targets 2025: Stunting policy brief

at the health facility. All children 6-59 months found to be at risk (12.5 -14.4cm)⁹ to go through a second stage weight for height z-score measurement and any child found to meet the admission criteria using the WHZ scores to be enrolled into the appropriate program.

Measles vaccination and vitamin A supplementation

The coverage of measles vaccination and vitamin A supplementation was 81.1% and 58.3% respectively. This is below the target coverage of $\geq 95\%$ and $\geq 90\%$ respectively indicating the need to strengthen both the routine and campaign vaccination/supplementation interventions. As these results were based on both card and recall there is also need to continue improving the coverage of cards for reliability and monitoring.

Food security related

In 2018 a hybrid basket was initiated in Makpandu from May onwards. This was in line with the WFP/UNHCR joint action plan 2016-2018 that had highlighted the need to explore the feasibility of using cash for food assistance. This was in order to minimize the effect of pipeline breaks and also allow refugees to choose their food preferences based on availability thus allowing better dietary diversity. The roll out was successful and the program is ongoing. Analysis of the impact of the hybrid basket use is yet to be consolidated. Of note however is that refugees still receive the 70% equivalent of the general food ration from the hybrid basket thus the 30% food assistance gap remains. Advocacy to fill the food assistance gap to thus be continued.

RECOMMENDATIONS AND PRIORITIES

Nutrition related

- Maintain a comprehensive Community based Management of Acute Malnutrition (CMAM) program providing both therapeutic and supplementary feeding programs to facilitate the rehabilitation of identified acute malnourished children, pregnant and lactating women, people living with HIV/AIDS, and TB patients on treatment. This to include active case finding and community mobilization. (UNHCR, UNICEF, WFP and WVI)
- Ensure all community screened and referred 6-59 months children identified with a MUAC less than 125mm get enrolled into the management of acute malnutrition programs through community outreach follow up at household level (WVI).
- Maintain blanket supplementary feeding programme for children 6-23 months, pregnant and lactating women using a fortified blended food or lipid based supplement to prevent malnutrition and to cover the nutrient gap these vulnerable groups have in light of a predominant grain based general food diet (UNHCR, WFP and WVI).
- Conduct a two-step MUAC and WHZ scores (for children with MUAC at risk) screening monthly at the BSFP site and the PHCC triage area in Makpandu to ensure both high MUAC and WHZ score coverage (WVI). This to be coupled with mapping of the settlement location malnourished cases are identified from, to allow complementary prevention interventions to be put in place.
- Continue strengthening the capacity of the nutrition program, in terms of provision of adequate staff and training to ensure quality provision of both curative and preventative components (UNHCR, WFP, UNICEF and WVI).

⁹ Makpandu specific based on the 2017 survey analysis

- Strengthen the prevention of malnutrition components including IYCF and community outreach education aspects to stop malnutrition from occurring in the first place. (UNHCR, UNICEF and WVI).
- Conduct quarterly mass MUAC screening to monitor the evolution of the nutrition situation in Makpandu settlement. (WVI)
- Ensure regular monitoring and supervision, quarterly joint monitoring and yearly program performance evaluations in Makpandu to assess performance progress and formulate recommendations for any identified gaps. (UNHCR, WFP, UNICEF and WVI)
- Undertake a follow up annual nutrition survey to analyze trends and facilitate program impact evaluation. (UNHCR, WVI, WFP and UNICEF)

Food security related

- Food assistance providing the minimum dietary requirements (2100kcal/person/day) is critical to ensure basic nutrition provision. Until April 2018 the ration provided in Makpandu settlement provided 1582 kcal/p/d (75%) of the recommended calories which is insufficient. Following the introduction of the hybrid food and cash model systematic post distribution monitoring to be carried out to ensure the cash component is contributing to the intended food assistance requirements. In addition to this repositioning of 2019 supplies to be carried out at the beginning of the year to avoid pipeline breaks (UNHCR, WVI and WFP).
- Continue the routine joint monthly food basket monitoring on site and ensure Makpandu inclusion in the country post distribution monitoring at the household level (UNHCR, WVI and WFP).
- Expand the coverage of sustainable food security and livelihood solutions in Makpandu settlement to complement the provided food assistance (UNHCR, WFP and WVI).

Health related

- Maintain and strengthen the provision of comprehensive primary health care programme for refugees and host populations in Yambio. (UNHCR and WVI)
- UNICEF, WVI and UNHCR to ensure that Expanded Programme on Immunization (EPI) and Vitamin A supplementation campaigns and routine programmes are strengthened to increase coverage to acceptable standards.
- Adequate clean water provision to be maintained in 2019. In addition to this hygiene promotion and latrine coverage strengthening to reduce the Diarrhoea caseload to be ensured. (UNHCR and WVI)

APPENDICES

Appendix 1: Names of contributors

	Name	Role	Organization
1	Joyce Apollo Mundu	Team leader	WVI
2	Joseph Martin Saraba	Enumerator	WVI
3	Dijas Nasran Abdulhaman	Enumerator	WVI
4	Mborote Alson	Team leader	WVI
5	Joseph Miwai Alex	Enumerator	WVI
6	Marie Lapatric Jeuea	Enumerator	WVI
7	Mbiko Morris	Team leader	WVI
8	Naade Justine Zege	Enumerator	WVI
9	Nalayenga Alphonstine Zege	Enumerator	WVI
11	Celestino Juma	Team leader	WVI
12	Nahon Kahsay Hablegerash	Enumerator	WVI
13	Kaka Ibrahim	Enumerator	WVI
14	Tut Bol Buodit	Team leader	WVI
15	Nakosa Justine	Enumerator	WVI
16	Santina Martin	Enumerator	WVI
17	Suzy Emmanuel Dogberengere	Team leader	WVI
18	Dijas Nasran Abdulhaman	Enumerator	WVI
19	Scopa Mandila	Enumerator	WVI
20	Chan Gatluak	Supervisor	WVI
21	Samuel Paul	Survey operations support	UNHCR
22	Jackline Lollis	Survey operations support	UNHCR
23	Terry Theuri	Coordinator	UNHCR
24	Robert Akua	Training Facilitator	WFP

Data analysis and report compilation

Terry Theuri (Nutrition and Food Security Officer, UNHCR Juba, South Sudan)

Report review

Gebrewold Petros Yohannes (Senior Public Health Officer, UNHCR Juba, South Sudan),
NaserMohmand (Senior Regional Nutrition and Food security officer, Regional Service Centre, Nairobi)

Funding

UNHCR and WVI supported the survey. UNICEF and WFP provide the nutrition program supplies and also support with capacity building.

Appendix 2: Summary of overall quality of anthropometric data (weight-for-height data)

Overall data quality

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	Score
Flagged data (% of out of range subjects)	Incl	%	0-2.5	>2.5-5.0	>5.0-7.5	>7.5	0 (0.9 %)
Overall Sex ratio (Significant chi square)	Incl	p	>0.1	>0.05	>0.001	<=0.001	0 (p=0.596)
Age ratio(6-29 vs 30-59) (Significant chi square)	Incl	p	>0.1	>0.05	>0.001	<=0.001	0 (p=0.219)
Dig pref score - weight	Incl	#	0-7	8-12	13-20	> 20	0 (5)
Dig pref score - height	Incl	#	0-7	8-12	13-20	> 20	0 (10)
Dig pref score - MUAC	Incl	#	0-7	8-12	13-20	> 20	0 (7)
Standard Dev WHZ .	Excl	SD	<1.1	<1.15	<1.20	>=1.20	
.	Excl	SD	>0.9	>0.85	>0.80	<=0.80	0 (1.08)
Skewness WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	0 (1)
Kurtosis WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	0 (1)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<=0.001	0 (1)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	7 %

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

Appendix 3: Nutrition Survey Questionnaires October 2018

Greeting and Reading of Rights

THIS STATEMENT IS TO BE READ TO THE HEAD OF THE HOUSEHOLD OR, IF THEY ARE ABSENT, ANOTHER ADULT MEMBER OF THE HOUSE BEFORE THE INTERVIEW. DEFINE A HOUSEHOLD AS A GROUP OF PEOPLE WHO LIVE TOGETHER AND ROUTINELY EAT OUT OF SAME POT. DEFINE HEAD OF HOUSEHOLD AS MEMBER OF THE FAMILY WHO MANAGES THE FAMILY RESOURCES AND IS THE FINAL DECISION MAKER IN THE HOUSE.

Hello, my name is _____ and I work with [organization/institution]. We would like to invite your household to participate in a survey that is looking at the nutrition and health status of people living in this camp.

UNHCR and WVI are working in the nutrition and health sectors are sponsoring this nutrition survey

Taking part in this survey is totally your choice. You can decide to not participate or stop taking part at any time and for any reason. If you stop being in this survey it will not have any negative effects on how you or your household is treated or what aid you receive.

If you agree to participate, I will ask you some questions about your family. We will then measure the arm circumference, weight and height of children who are older than 6 months up to 5 years.

Before we start to ask you any questions or take any measurements, we will ask you to give your verbal consent. Be assured that any information that you will provide will be kept strictly confidential.

You can ask me any questions that you have about this survey before you decide whether to participate.

Thank you

Questionnaire for Children 6-59 months (every other HH)

THIS QUESTIONNAIRE IS TO BE ADMINISTERED TO ALL CARETAKERS OF A CHILD THAT LIVES WITH THEM AND IS BETWEEN 6-59 MONTHS OF AGE

Date (dd/mm/yyyy)						Camp			Team Number				Block	
_ _ _ _ / _ _ _ _ / _ _ _ _ _ _ _ _									_ _ _ _				_ _ _ _	
CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8	CH9***	CH10**	CH11	CH12	CH13	CH14	CH15
ID	HH	Consent given 1=yes 2=no 3=absent	Sex (m/f)	Birthdate* dd/mm/yy	Age** (months)	Weight (kg) ±100g	Height (cm) ±0.1cm	Oedema (y/n)	MUAC (cm)	If MUAC <12.5cm is child enrolled 1=TSFP 2=OTP 3=None of the above	Measles card 1=Yes 2=Yes recall 3=No or don't know	Vit. A in past 6 months (show capsule) 1=Yes card 2=Yes recall 3=No or don't know	Diarrhoea in past 2 weeks# 1=Yes 2=No 8=Don't Know	If yes, was the child taken to the health facility? 1=Yes 2=No 8=Don't Know
01				/ /										
02				/ /										
03				/ /										
04				/ /										
05				/ /										
06				/ /										
07				/ /										
08				/ /										
09				/ /										
10														

Record from EPI/health card/age documentation if available. Leave blank if no valid age documentation. **Estimate using event calendar and recall if age documentation not available. *C9 & C10: Refer to clinic for malnutrition if not already enrolled in TSFP / OTP/SC if oedema=y or MUAC < 12.5cm. #Diarrhoea: 3 or more loose stools within 24hrs*

Appendix 4: Events Calendar

Dark grey areas are for children not eligible for 6-59 months surveys.

Seasons	Religious Holidays	Other Events	Months / Years	Age in months	Height Range
Harvest of Sorghum/Maize			October 2018	0	
Harvest of groundnuts & Beans			September 2018	1	
Second planting season			August 2018	2	
Crop Weeding continues			July 2018	3	
Weeding of crops		World refugee day (20 June)	June 2018	4	
			May 2018	5	
Planting season/ Mango season			April 2018	6	
Land preparation			March 2018	7	
			February 2018	8	65-70 cm
Renovation/Building of houses		CPA & New year celebrations	January 2018	9	
	Christmas (25 Dec)		December 2017	10	71-76 cm
Post harvest			November 2017	11	
Harvest of Sorghum/maize			October 2017	12	
Harvest of groundnuts & beans			September 2017	13	
Second planting season			August 2017	14	
Crop Weeding continues			July 2017	15	
Weeding of crops		World refugee day (20 June)	June 2017	16	
			May 2017	17	
Planting season/ Mango season			April 2017	18	77-80 cm
Land preparation			March 2017	19	
			February 2017	20	
Renovation/Building of houses		CPA & New year celebrations	January 2017	21	
	Christmas (25 Dec)		December 2016	22	81-86 cm
Post harvest			November 2016	23	
Harvest of Sorghum/maize			October 2016	24	
Harvest of groundnuts & beans			September 2016	25	
Second planting season			August 2016	26	
Crop Weeding continues			July 2016	27	
Weeding of crops		World refugee day (20 June)	June 2016	28	
			May 2016	29	
Planting season/ Mango season			April 2016	30	
Land preparation			March 2016	31	87-90 cm
			February 2016	32	
Renovation/Building of houses		CPA & New year celebrations	January 2016	33	
	Christmas (25 Dec)		December 2015	34	
Post harvest			November 2015	35	
Harvest of Sorghum/maize			October 2015	36	
Harvest of groundnuts & beans			September 2015	37	
Second planting season			August 2015	38	
Crop Weeding continues			July 2015	39	
Weeding of crops		World refugee day (20 June)	June 2015	40	
			May 2015	41	91-99 cm
Planting season/ Mango season			April 2015	42	
Land preparation			March 2015	43	
			February 2015	44	
Renovation/Building of houses		CPA & New year celebrations	January 2015	45	
	Christmas (25 Dec)		December 2014	46	
Post harvest			November 2014	47	
Harvest of Sorghum/maize			October 2014	48	
Harvest of groundnuts & beans			September 2014	49	
Second planting season			August 2014	50	
Crop Weeding continues			July 2014	51	100-110 cm
Weeding of crops		World refugee day (20 June)	June 2014	52	
			May 2014	53	
Planting season/Mango season			April 2014	54	
Land preparation			March 2014	55	
			February 2014	56	
Renovation/Building of houses		CPA & New year celebrations	January 2014	57	
	Christmas (25 Dec)		December 2013	58	
Post harvest			November 2013	59	
Harvest of Sorghum/maize			October 2013	60	

How to Use a Local Events Calendar

Survey inclusion and exclusion criteria

Survey inclusion criteria: these are the cut-off birth dates for children to be eligible to participate in the 6-59 months sample.

- Included in the survey are all children born between November 2013 and April 2018.

Survey exclusion criteria: all children born as of these dates are excluded from the sample (i.e. they are over 59 months or under 6):

- Excluded from the survey are all children born before November 2013 and April 2018.

When to use the events calendar?

- The events calendar is a tool that helps determine the approximate age of children who have no reliable administrative documents (birth certificate, child's health notebook, etc.)
- It includes all different events that occurred during the 60 months that preceded the survey, and serves as a reference and check-list for surveyors and surveyed populations.

How to use the events calendar

- Use a line of questions phrased as follows: "**<name> was he/she born before or after <event>?**"
- Choose the events in the most appropriate column of the calendar to reduce the range at each question.
- The child's mother usually knows either the age of the child in years, or the birth date (but without any official corroboration. In both cases, it is necessary to refine the age estimation by using the events calendar.

1. When the mother knows the age in years, convert the age in months using the calendar and ask her questions relating to the events that occurred around the child's birth. Specify with the mother:

- On the calendar, whether a particular event occurred about the time the child was born (e.g. end of Ramadan); ask the mother whether the birth occurred before or after this event;
- Ask her the season in which the child was born: rain, warm or cold season, etc.;
- This information will allow you to estimate the child's age in a more reliable and accurate way.

2. When the mother knows the child's birth date, but has no official document to prove it:

- Locate the birth date on the calendar;
- Ask the mother questions on events that occurred around the child's birth (religious holiday, celebration, season, etc.) in order to estimate the age in actual months.

3. When the mother knows neither the age nor the birth date, the events listed in the calendar will help her remember the circumstances of her child's birth and to estimate the age in months:

- Ask the mother, or the person who cares for the child, if she remembers the period or an event that surrounded the birth of the child;
- According to her answer, ask further questions to locate the month and year of the birth.

4. When it is absolutely impossible to get any reliable indication from the mother, look for a child of similar stature in the neighbourhood:

- Determine the age of the other child;
- Estimate the age difference between both children using the calendar;
- Deduce the age of the surveyed child.

*To determine the age of a child, the surveyor must enter on the questionnaire either the date of birth or the age in months, **but not both.***

If the child has a health notebook or an official identity document that indicates his/her birth date; write down the birth date on the questionnaire.

Appendix 5: Makpandu refugee camp location in south Sudan

