FINAL REPORT



Fangak County, Jonglei State, South Sudan September 2023 – August 2024









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ABBREVIATIONS

ACF	Action Contre la Faim / Action Against Hunger
ANC	Antenatal Care
ARI	Acute Respiratory Infections
CI	Confidence Interval
СМАМ	Community Management of Acute Malnutrition
FEWSNET	Famine Early Warning System
FGD	Focus Group Discussion
FSL	Food Security and Livelihoods
FSNMS	Food Security and Nutrition Monitoring System
GAM	Global Acute Malnutrition
GBV	Gender-Based Violence
нн	Household
HAZ	Height for Age Z-Score
HHS	Household Hunger Scale
HDDS	Household Dietary Diversity Score
IYCF	Infant and Young Child Feeding
MAM	Moderate Acute Malnutrition
MDD	Minimum Dietary Diversity
MUAC	Mid-Upper Arm Circumference
NCA	Nutrition Causal Analysis
NGO	Non-Governmental Organization
PNC	Postnatal Care
PPS	Probability Proportional to Size
rCSI	Reduced Coping Strategy Index
RUTF	Ready-to-Use Therapeutic Food
SAM	Severe Acute Malnutrition
SMART	Standardized Monitoring and Assessment for Relief and Transitions
ТВА	Traditional Birth Attendant
UNICEF	United Nations' Children's Fund
USD	United States Dollar
WASH	Water, Sanitation and Hygiene
WFP	World Food Programme
WAZ	Weight for Age Z-Score
WHO	World Health Organization
WHZ	Weight for Height Z-Score

FIGURES

Figure	1: Community perceptions of causal patterns of undernutrition, Fangak County	19
Figure	2: Trends in prevalence of acute malnutrition in Fangak County (2015-2024)	20
Figure	3: Trends in prevalence of stunting in Fangak County (2022-2024)	25
Figure	• 4: Trends in prevalence of undeweight in Fangak County (2019-2024)	26
Figure	5: Causal diagram of acute malnutrition, Fangak County	89
Figure	e 6 : Causal diagram of stunting, Fangak County	90
Figure	7: Causal diagram of underweight, Fangak County	92
Figure	8: Summary of available data for three types of undernutrition, Fangak County	93

TABLES

Table 1: Sampling framework for qualitative data collection Link NCA, Fangak County	14
Table 2: Summary of community consultations during the Link NCA qualitative study, Fangak County	14
Table 3: Summary of data available for SMART 2024 Fangak	16
Table 4: List of local terms used to describe acute malnutrition, Fangak County	22
Table 5: Summary of community perceptions of the causes and treatment of the two forms of acute malnutri	tion,
Fangak County	25
Table 6: List of local terms used to describe stunting, Fangak County	26
Table 7: Summary of community perceptions of the causes and treatment of stunting, Fangak County	26
Table 8: Summary of community perceptions of the causes and treatment of childhood illnesses, Fangak Cou	nty
	30
Table 9: Seasonal calendar for childhood morbidity, Fangak County	31
Table 10: Results of the participatory exercise on meal composition, Fangak County	63
Table 11: Distribution of decision-making power within households, Fangak County	84
Table 12: Summary of risk factor categorisation, Fangak County	95
Table 13: Unadjusted associations between risk factors and the binary classification of wasting, stunting and	
underweight demonstrated by logistic regression (SOURCE: SMART Fangak 2024)	97
Table 14: Unadjusted associations between risk factors and the binary classification of wasting, stunting and	
underweight demonstrated by linear regression (SOURCE: SMART Fangak 2024)	100

TABLE OF CONTENTS

ACK	IOWLEDGEMENTS	3
TABL	E OF CONTENTS	6
EXEC	UTIVE SUMMARY	7
I.	INTRODUCTION 1	1
II.	OBJECTIVES OF THE STUDY 1	2
III.	METHODOLOGY 1	2
IV.	RESULTS 1	9
UND	ERNUTRITION	9
HEAL	TH AND NUTRITION	7
MEN	TAL HEALTH AND CARE PRACTICES	1
FOO	D, SCURITY AND LIVELIHOODS	1
WAT	ER, SANITATION AND HYGIENE	3
GENI	DER7	9
VI.	CONCLUSION AND RECOMMENDATIONS	9
ANN	EXES	7

EXECUTIVE SUMMARY

Fangak County is one of the eleven counties of the Jonglei state in South Sudan¹. In 2022 the county experienced compounded shocks, including continued endemic, conflict, displacement and high inflation; a third consecutive year of unprecedented floods submerged human settlements, farms and pasturelands, displacing people and hindering the delivery of humanitarian assistance.² At the end of 2022, 80% of the population was facing crisis or worse food insecurity with 5% of the population facing catastrophe levels (IPC 5).³ A situation that was projected to worsen in 2023 due to ethnic clashes along the River Nile.⁴ Food distributions constitute main source of food for 80% of the local population.⁵ The county is characterised by an overall lack of infrastructure meaning that women and girls are traveling long distances to source food or reach health facilities which exposes them to a higher risk of gender-based violence. The 2023 SMART survey revealed combined Global Acute Malnutrition (GAM) rates of 24.6%, of which 3.8 % classified as SAM highlighting a critical situation.⁶

Acton Against Hunger has been implementing multisectoral programmes focusing on health, nutrition, food security and livelihoods, WASH, and child protection across various states in South Sudan. In Fangak County, Action Against Hunger conducted a Link NCA study which has proven valuable to gather evidence on the multi-causality of under-nutrition in 28 countries across three continents.⁷The study represents an essential starting point for improving the relevance and effectiveness of nutrition security programming in Fangak building consensus amongst communities, local stakeholders and technical experts on mechanisms of undernutrition and the best solutions to address them.

Key results

The analyses conducted during this Link NCA study made it possible to categorise 20 risk factors likely to have an effect on the incidence of undernutrition (wasting) in the study area. Following a triangulation of data from various sources, five (5) risk factors were identified as having a major impact, eleven (11) risk factors were classified as having an important impact while **four** (4) risk factors were considered to have a **minor** impact. Among the major risk factors, were identified in the health and nutrition sector, namely limited access to health services and low nutritional status of women, two risk factors were identified in the food security and livelihoods sector namely low access to guality diet and low access to income sources while one risk factor was identified in the water, hygiene and sanitation sector, namely inadequate accessibility, availability and guality of water at household level. The categorisation of risk factors identifies the same three major factors raised by the communities, namely limited access to health services, limited income sources and inadequate accessibility and availability to quality water. Additionally, low nutritional status of women and low-quality diet were categorised as major factors due to the strong association of the respective indicators with wasting in the secondary data review and/or on the basis of primary data analyses (SMART 2024) as well as the variation according to historical and seasonal trends.

¹ FEWSNET, Livelihoods Zone Map and Descriptions for the Republic of South Sudan, 2018.

² IPC Acute Food Insecurity and Malnutrition Analysis, July 2022 - July 2023.

³ IPC, 'South Sudan: IPC Acute Food Insecurity & Malnutrition Snapshot (October 2022-July 2023)'.

⁴ IPC.

⁵ SMART 2023, 'Integrated Nutrition and Mortality SMART Survey Final Report. Fangak County, Jonglei State, South Sudan'. ⁶ SMART 2023.

⁷ <u>https://linknca.org/etude/former renk county upper nile state.htm</u>, not cleared for publication.

According to community consultations, undernutrition is caused by poor access to income due to the lack of income-generating activities in the study zone especially since 2020. The main outlined reasons were the unavailability of arable land and loss of livestock due to four years of recurrent floods which have drastically reduced the population income and food sources. As a result, access to quality food compounded by the restricted access to markets, is extremely limited with most of the population relying on food rations and water lilies to survive. This has a direct effect on complementary feeding practices as well as women's nutritional status and their ability to breastfeed their children.

At the same time, poor access to income increases women's workload, further exacerbated by low social support, consequently having a negative effect on maternal mental wellbeing. Mothers often feel exhausted and overwhelmed due to the household and food procurement responsibilities. This often translates in sub-optimal care practices namely limited breastfeeding and complementary feeing practices, reduced interactions with their children as well as sub-optimal child personal hygiene practices. Children are frequently left for long hours in the care of siblings, neighbours or other family members.

Moreover, low female decision making leads to early and repetitive pregnancies and translates into low birth weight. Women, often agree to have sexual intercourse within the first year from delivery to prevent their husbands from having concubines and loosing potential resources for the family. Simultaneously, the flooded environment makes it extremely difficult to access health facilities, if not close by the village, impacting the use of health services and often delaying treatment for children. Lastly, access to quality potable water compounded by open defecation practices as a result of lack of latrines leads to overall poor environmental hygiene which translates in poor hygiene practices for children that often play on muddy soil, walk around in dirty clothes or without shoes increasing their risk to water-borne diseases.

These perceptions were corroborated in a **study comparing malnourished children with their non-malnourished siblings**, during which mothers highlighted the cumulative effect of limited financial resources, heavy workload and receiving minimal support during pregnancy and after delivery. More than half women stated to have had a malnourished child while single or widowed. Additionally, every other woman reported worse mental health while pregnant with their malnourished child. In most cases, malnourished children were reported to be born smaller than their non-malnourished siblings, were typically the younger child, and had poorer health status while breastfeeding. The situation was further aggravated by the lower quantity and quality foods consumed during pregnancy and lactation which had negative repercussions on IYCF practices and an overall worse health status during lactation.

It is important to note that the current situation has been strongly influenced by the recurrent floods since 2020 which have destroyed livelihoods, assets and the community's ability to be auto sufficient. As a result, they remain in a constant cycle of extreme poverty and fight for survival which leaves them depleted, often resorting to multiple coping strategies while being heavily dependant on humanitarian aid. Men attempt to bring income and food through the few income generating activities available but this takes them away from home for many months. During this time, women take on the heavy burden of household and childcare responsibilities while trying to provide enough food for themselves and their children with the limited resources available.

Based on available data (SMART 2024), statistical associations through logistic and linear regressions allowed us to observe risk factors and protective factors for acute malnutrition (wasting).

Risk factors for *wasting* included living in a house further away from the main water point, being delivered at home by a friend and living in a household that had debts at the time of the survey. In contrast, protective factors included living in a household with higher numbers of cattle or in one that harvested crops the previous year, coming from a household with a higher diet diversity score, specifically consuming meat (including fish) or oil/fat in the 24h prior the survey decreased the likelihood of children being wasted. Lower risk of wasting was also found among children that consumed a higher number of food groups according to their minimum diversity score (MDD), children that consumed porridge or meat, those that received pentavalent and measles vaccinations before the first birthday or were taken to health centre for treatment of diarrhoea or fever. Additionally, children that were initiated to breastfeeding within one hour from birth or those that were observed having a clean face and body at the time of the survey were also less likely to be wasted. Vulnerability to wasting decreased for older children.

Most overlaps of risk and protective factors were observed between *wasting and underweight*. One **common risk factor** between wasting based on weight/height index and underweight based on weight/age index included a **child being delivered at home with the support of a friend**. In contrast, **common protective factors** for *wasting* based on one or multiple indexes (weight/height, MUAC or combined weight/height and MUAC) *and underweight* based on weight/age index included being an **older child**, a child who lived in a household with **higher diversity score** or in household that **consumed meat (including fish) or oil/fat in the 24h prior the survey**, a child that consuming a **higher number of food groups according to their minimum diversity score (MDD)**, a child that was **taken to the health centre for treatment of diarrhoea or fever** and a child that had a **clean face and hands** at the time of the survey. Additionally, common risk factors between *stunting* based on height/age *and underweight* based on weight/age included being a **male child** and **having a mother currently lactating** at the time of the survey. No common protective factors were found between *wasting* based on multiple indice and *stunting* based on height/age.

Recommendations

Based on these results, the following activities are recommended for incorporation into the Right2Grow project and/or complementary projects implemented in the study area:

- Disseminate the main findings of this Link NCA study to Action Against Hunger project partners, authorities and civil society in Fangak County to ensure that these are accounted for in their programmatic responses, specifically focusing on intervention targeting women of reproductive age and children under 5 years of age.
- Expand a variety of income sources to decrease households' dependence on humanitarian assistance, improving their economic stability and resilience. This could be done by assisting communities to mindfully manage natural resources, e.g. by strengthening fishing (and/or fish farming) and fish transformation activities, introducing crops which flourish in wetlands, for example rice, arrowroot, banana, sugarcane or bio-fortified crops, among others and/or introducing poultry, such as

chickens or ducks, which could also contribute to a higher food diversity in the household. Additionally, provide food preservation skills to increase food diversity during the lean season.

- Engage the community in SBCC interventions focused on women's health, including nutrition before, during, and after pregnancy, as well as breastfeeding, involving men as key decision-makers within the household.
- Introduce mobile clinics, such as boat clinics, to reduce barriers to healthcare services among the most isolated communities and those that are displaced due flooding. Additionally, strengthen referral systems from the community to health facilities to ensure timely access to care. Access to health services could also be improved via community health worker networks, bringing essential services closer to the communities to improve the quality and scope of health services provided at states service points (health centres) by ensuring that sufficient staff and medicine are available throughout the year, but especially during the peak periods of recurrent illnesses.
- Increase awareness of the benefits of boiling water collected from the swamps before drinking to prevent disease. This could be also done by reviving traditional knowledge of creating pots from mud to boil water in larger quantities to overcome the lack of cooking utensils.
- Support the development of new boreholes and the renovation of existing ones, ensuring a sustainable transfer of infrastructure to the community.
- Facilitate a creation or strengthening of community structures, particularly for women, aiming to create safe space for information sharing, learning and social support.
- Advocate for the introduction of solar energy projects, enabling communities to benefit from electricity for daily use, including solar powered boats, water pumps, telephone network, etc.
- Stimulate a community dialogue aiming to seek community-based or householdbased solutions for priority concerns, reducing the vulnerability of the populations dependent on humanitarian assistance.

Other recommendations:

 Promote peace and stability in Fangak County while strengthening basic services, such as health, markets, and education, to enhance community access and utilisation.

I. INTRODUCTION

CONTEXT

Fangak County is one of the eleven counties of the Jonglei state in South Sudan. Bordered on the west and north by the White Nile, Fangak County is part of the eastern plains, sorghum and cattle livelihood zone⁸. In 2022, Fangak, along other counties of Jonglei State, experienced compounded shocks, including continued endemic conflict that resulted in the loss of life and assets, displacement, disruption and destruction of livelihoods; a third consecutive year of unprecedented and atypical floods that submerged human settlements, farmlands and pasturelands, displacing people while also restricting mobility, disrupted markets and delivery of humanitarian assistance to the flood-affected populations; as well as the continuing economic decline and inflation linked to the depreciation of the South Sudanese Pound, which led to high food prices.⁹

In October and November 2022, the food security situation in Fangak County was of major concern as estimated 80% of its population was facing Crisis (IPC Phase 3) or worse acute food insecurity with 5% of the population facing Catastrophe (IPC Phase 5) acute food insecurity. In December 2022 to March 2023, Fangak County was projected to face Emergency (IPC Phase 4) acute food insecurity as clashes along the River Nile were expected to continue and further extend along the White Nile, with violence spilling over into Fangak and Canal/Pigi counties, resulting in further civilian displacement, destruction of properties, and access impediments to humanitarian actors.⁹ Conflict across South Sudan is certainly driven by historical discrimination and marginalisation biases between and among ethnic groups. However, ethnicity must not be understood as the only issue. Conflict is also driven by numerous factors related to governance and the state's capacity to mitigate violence and its drivers.¹⁰ South Sudan is ethnically and culturally diverse, with 64 major ethnic groups¹¹ but the two dominant ethnic groups are the Dinka and the Nuer, predominantly agropastoral, derive their livelihoods from farming and cattle rearing.

The majority of households are headed by women.¹²The lack of infrastructure means that women and girls are traveling longer distances to source food, including food distributions, which constitute main source of food for 80% of the local population. This puts them at a higher risk of gender-based violence outside their homes while domestic violence has also been on the rise.12 Healthcare is limited in Fangak, and therefore communities must travel as far as Malakal to seek specialised care in case of need.¹²

The most recent Integrated Nutrition and Mortality SMART Survey conducted in Fangak County by Action Against Hunger in March 2023 estimated the prevalence of combined Global Acute Malnutrition (GAM) by weight-for-height z-score and/or MUAC and/or oedema at 24.6 % (20.0 - 29.8 95% C.I.). The prevalence of severe acute malnutrition (SAM) by the same criteria was estimated 3.8 % (2.4 - 6.0 95% C.I.).

STUDY JUSTIFICATION

⁸ FEWSNET, Livelihoods Zone Map and Descriptions for the Republic of South Sudan, 2018.

⁹ IPC Acute Food Insecurity and Malnutrition Analysis, July 2022 - July 2023.

¹⁰ Gordon, 'In the Eye of the Storm: An Analysis of Internal Conflict in South Sudan's Jonglei State'.

¹¹ United Nations Environment Programme, 'Background Analysis for the GEF CCCD Project: Gender and Ethnicity in South Sudan'.

¹² REACH, Situation Overview: Jonglei State, 2019.

Right2Grow is a Strategic Partnership between Action Against Hunger, Centre for Economic Governance and Accountability in Africa (CEGAA), Max Foundation, Save the Children, The Hunger Project and World Vision with funding from the Dutch Government (Civil Society Strengthening – Power of Voices), In South Sudan, Right2Grow is a five-year consortium of eight developmental and humanitarian organisations comprising of four national NGOs (CIDO, UNIDOR, SPEDP and CRC) and four international NGOs (Save the Children, World Vision, Action Against Hunger and CEGAA). They all are implementing multisectoral programmes focusing on health, nutrition, food security and livelihoods, WASH, and child protection across all states in South Sudan, with the exception of CEGAA who focuses on budget advocacy.

In Fangak County, Action Against Hunger conducted a Link NCA study which has proven valuable to gather evidence on the multi-causality of under-nutrition in 28 countries across three continents, including one study conducted in Aweil East in 2011¹³ and a qualitative assessment of risk factors using the Link NCA methodology conducted in Renk in 2020¹⁴. The study represents an essential starting point for improving the relevance and effectiveness of nutrition security programming in a given context as it uses participatory approaches to build a consensus amongst communities, local stakeholders and technical experts on mechanisms of undernutrition and the best solutions to address them.

II. OBJECTIVES OF THE STUDY

GLOBAL OBJECTIVE

The main objective of this Link NCA study is to understand causal mechanisms of wasting in the Action Against Hunger's intervention area in Fangak County, South Sudan, to improve the relevance and efficiency of its nutrition security programming.

SPECIFIC OBJECTIVES

The study specifically aimed to:

- To identify and categorize risk factors responsible for wasting among the population in the study area;
- To understand how risk factors responsible for wasting among the population in the study area interact with each other in order to determine which causal pathways are likely to explain most cases of wasting in the study area;
- To understand how risk factors responsible for wasting among the population in the study area have evolved over time and/or evolve in different seasons;
- To identify vulnerable groups of wasting among the population;
- To develop recommendations to improve nutrition security programming.

III. METHODOLOGY

METHODOLOGY

A Link NCA Nutrition Causal Analysis is a mixed method for analysing the multi-causality of under-nutrition as a starting point for improving the relevance and effectiveness of multi-sectoral nutrition security programming in a given context. It is a structured, participatory and

¹³ https://fscluster.org/sites/default/files/documents/Nutrition%20Causal%20Analysis%20by%20ACF-USA%202011.pdf

¹⁴ <u>https://linknca.org/etude/former_renk_county_upper_nile_state.htm</u>, not cleared for publication.

holistic study that builds on UNICEF's conceptual framework with an objective to build an evidence-based consensus on plausible causes of undernutrition in a local context.

The Link NCA methodology offers a unique opportunity for a variety of key informants, from technical experts to community members, to express their opinions on the local determinants of undernutrition in the study area. The findings are constantly reviewed until validated by all stakeholders. Undernutrition is examined globally, avoiding a vertical, sectoral approach, linking different verified sources of information to build consensus around the plausible causes of undernutrition in a given context.

KEY STAGES

A. Preparatory phase (September-October 2023)

The main objective of a preparatory phase was to define key parameters of the study, including its objectives, geographical coverage and feasibility. Safeguarding a mixed method approach of the Link NCA methodology, the qualitative data collection was complemented by statistical analyses of the 2024 SMART Surveys. The Terms of Reference was validated on 31 August 2023 during the Nutrition Information Working Group (NIWG) virtual meeting in Juba, South Sudan. In the meantime, the study team proceeded with a systematic literature review, using the *Link NCA Pathways to Undernutrition* module and all grey literature available locally and the preparation of a complete set of data collection tools. The review covered past surveys and research applicable to the study area, including primary data from the SMART 2024 survey, peer-review research on nutrition status among women of reproductive age (WRA) and children under five (CU5) years of age, food security as well as Action Against Hunger South Sudan reports of recent assessments conducted in the study area.

The aim of the exercise was to identify a set of risk factors and their interactions, which might trigger undernutrition among the target population. The identified hypothesised risk factors were contextualised accordingly. Out of the 25 hypothesised risk factors (presented in greater detail in the findings section of this report), all were retained for field-testing.

KEY STEPS

A. Preparatory phase (September- October 2023)

The preparatory phase of the study defined the key parameters, geographical coverage and feasibility of the Link NCA study. This phase also included the preparatory stages required for any type of study, i.e. development of the concept note, identification and securing of resources and authorisation from the Ministry of Health in Juba.

The Link NCA Analyst then carried out a systematic review of the literature (using the Link NCA "Pathways of undernutrition" module and locally available grey literature) and secondary data. The secondary data review included more than 40 documents from multiple sectors (Health and Nutrition, Mental Health and Care Practices, Food Security and Livelihoods, Water, Sanitation and Hygiene, Gender). The secondary data review was enriched by available data from the SMART survey implemented in 2024.

The synthesis of the secondary data review was presented to stakeholders and technical experts at an initial technical workshop held on 17 October 2023 in Juba. Workshop

participants were asked to provide input by risk factor and then to categorise the risk factors according to their perceived effect of each factor on the prevalence of undernutrition in Fangak County. Secondary data analyses were not available at the time of the workshop as data were shared and collected in the following months.

B. Primary qualitative data collection (October - November 2023)

Qualitative data collection lasted five weeks, from 24 October to 26 November 2023. It consisted of an in-depth study of all the risk factors identified and validated in the previous stage through semi-structured interviews and focus group discussions, the two main methods of data collection.

Sampling framework

The aim of the sampling framework for the Link NCA qualitative study is not to be statistically representative of the target population, but rather to be qualitatively representative of the different segments of the population living in the study area. In order to ensure that the qualitative data collected represented the realities of the majority of households, purposive sampling was used to select bomas and villages. Particular attention was paid to the representativeness of geographical position and vulnerability of the selected villages.

The Link NCA methodology guidelines recommend the selection of four localities, generally considered sufficient to complete data saturation by theoretical sufficiency. The bomas and villages selected for this study, including the reason for their selection, can be found in Table 1 below.

Payam Boma		Sampled Village	Distance to big	Distance to health facility
			market	
Paguir	Kuerdar	Kanynhial	(2-3h)	(1h+)
Old Fangak	Chotboor	Chotboor Central	(1-2h)	(1h+)
New Fangak	Door	Door Central	(2-3h)	(1-2h)
Mareang	Nyadin	Meer	(3-4h+)	(1-2h)

Table 1: Sampling framework for qualitative data collection Link NCA, Fangak County

At village level, the following categories of participants were selected to take part in the semistructured interviews (SSI) or group discussions (FGD):

- a. Community leaders (neighbourhood chiefs, religious leaders and other key community figures);
- b. Traditional healers and birth attendants;
- c. Health centre staff (doctors, nurses, community health workers);
- d. Representatives of community-based organisations;
- e. Mothers and fathers of children under 5, including parents of malnourished children;
- f. Grandparents of children under 5.

Sample size

Payam	Boma	Village	Focus	Semi-	Comparative	Restitutions	Days	No. of	No.
			Group	structured	study			participants	participants
			discussions	interviews ¹⁵				(total)	(female)
Paguir	Kuerdar	Kanynhial	12	11	8	1	6	121	78
Old	Chotboor	Chotboor	12	13	6	1	6	98	69
Fangak		central							

¹⁵ Including a study comparing malnourished children with their non-malnourished brothers or sisters (n=23).

New	Door	Door	15	16	10	1	7	119	87
Fangak		central							
Mareang	Nyadin	Meer	12	17	10	1	6	116	86
TOTAL			47	39	34	4	25	454	320

Table 2: Summary of community consultations during the Link NCA qualitative study, Fangak County

The qualitative research team spent around 6 consecutive days in each sampled village. Semistructured interviews and focus group discussions were limited to a maximum of 1 hour or 1 hour 15 minutes. The group discussions took place between 9 a.m. and 3 p.m. in order to adapt to the community's availability and daily routine.

On the last day of data collection in each sampled community, the results were presented to community representatives with the aim of requesting their comments on the interpretation of the data collected and, more importantly, involving them in the development of community solutions to the problems identified and their prioritisation.

Data collection tools

The qualitative research team used semi-structured interviews and focus group discussions as the two main methods of data collection. However, in order to avoid information bias due to a long history of humanitarian interventions in the area potentially creating community dependency on external assistance, the qualitative study team used a variety of participatory tools aimed at revealing the true determinants of undernutrition in the study area. The selection of participatory tools included, but was not limited to:

- a. Historical calendar
- b. Seasonal calendar
- c. Ranking
- d. Story-telling
- e. 1000-day timeline
- f. Daily activities
- g. Meal composition
- h. Household expenses
- i. Therapeutic itinerary

The semi-structured interviews and focus group discussions were guided by interview guides covering the main themes related to the risk factors pre-identified in the secondary data review. The content of the interview guides accounted for the data available for Fangak County and, rather than repeating certain questions, aimed to deepen understanding of individual risk factors and their interactions in the target area.

For more information on the methods and tools used in the qualitative study, please refer to the Qualitative Guide in **Annex D**.

Team composition and training

Qualitative data collection was led by the Link NCA Analyst with the help of two research assistants, two community facilitators and a community mobiliser, often a community member, recruited locally in each village. The main role of the community mobiliser was to ensure a fair selection of participants for each focus group discussion and to take on any support functions as required.

Prior to the start of data collection, members of the qualitative study team attended a twoday training course, which took place in Fangak from 19 to 21 October 2023. The training included modules on the Link NCA methodology and data collection tools, as well as an explanation of the ethical considerations to be respected during the study. A series of simulations were integrated into a learning process to check team members' understanding of key concepts and practices and to ensure a high level of quality in data collection. The training was followed by a pilot test which took place on 22 October 2023 in the Paguir Payam, Kuerdar Boma.

C. Summary of results (January - February 2024)

Once the data was collected, it was duly analysed and triangulated in order to categorise the risk factors according to their relative impact on undernutrition in the study area. The categorisation of risk factors considered all sources of information collected during the study. The results were presented to key stakeholders and operational partners during the final technical workshop held in Juba on 29 August 2024. The Link NCA Analyst also facilitated a participatory process around evidence-based recommendations to establish a plan for using the Link NCA results to improve nutrition security programming.

D. Primary quantitative data collection (March 2024)

Following the qualitative data analysis, an extended SMART survey was conducted from 12th March till the 20th March 2024. The survey included standard SMART indicators related to children (6-59 months) and their mothers, including anthropometry, followed by a series of indicators on care practices and living conditions in the household plus additional ones which were deemed relevant to the context following the qualitative enquiry. On receipt of data, the databases were merged and cleaned and children under 5 were selected as the main unit of analysis. Outliers identified through ENA were excluded from analysis. The final sample number is detailed in the table 3 below:

	SMART 2024: Fangak county sample								
Index	No. children with nutritional deficiency	No. of children with no nutritional deficiencies	Tot al	Outliers (+/-3 SD)					
Weight for Height z- scores	83	412	495	18					
MUAC GAM	63	450	513	0					
Combined GAM	107	388	501	0					
Height for Age z- scores	75	408	483	30					
Weight for Age z- scores	103	405	508	5					

Table 3: Summary of data available for SMART 2024 Fangak

Wherever possible, data was coded as 0 and 1 to allow logistic regression. For example, the sex of the child was coded 1 for male and 0 for female. Children suffering from childhood illnesses, such as diarrhoea, cough, or fever were coded as 1 while children not suffering from these illnesses were coded as 0. Households owning assets were coded as 1 if they owned any assets or 0 if they owned none. Household residence was coded 1 for rural areas and 0 for urban areas. Households with toilets, soap or water treatment were coded as 1 while those without were coded as 0. Improved water sources and toilets were coded as 0, unimproved as 1. Variables relating to child breastfeeding and/or dietary diversity were coded as 1 if the child consumed the food in question or 0 if the child did not consume the food during the recall

period. For continuous variables, such as the age of the child and the mother, the child's weight or the household wealth index, a linear regression was performed.

The aim of this analysis was to establish statistical associations by means of logistic and linear regressions between the nutritional status of children under-five and various risk factors assessed through individual and household indicators. This type of analysis also makes it possible to differentiate between the risk factors associated with acute malnutrition, stunting and underweight, while identifying similarities between these different forms of undernutrition.

DATA PROCESSING AND ANALYSIS

Qualitative data were recorded manually in a notebook and transcribed electronically at the end of each data collection period in a sampled community. The data was compiled in NVivo 12 software and coded thematically for more efficient analysis, guaranteeing speakers' confidentiality. All views were then analysed using qualitative content analysis methods.

ETHICAL CONSIDERATIONS

The following provisions were complied with during this Link NCA study:

- a. The Ministry of Health from South Sudan was informed in advance on the 28 June 2023 of the objective and terms of the Link NCA study and invited to the initial technical workshop on the 17 October 2023.
- b. The representatives of the local authorities (RRC) in each of the sampled Payams were visited and informed of the objective and terms of the Link NCA study when the teams arrived in their locations. Their authorisation and collaboration were requested and granted on 22 10 2023 (Paguir Payam), 30 October 2023 (Old Fangak Payam), 9 November 2023 (New Fangak Payam) and 17 November 2023 (Mareang Payam);
- c. Village leaders were informed of the selection of their community for the qualitative study at the initial meeting, during which they were given a detailed schedule of research activities in their village to facilitate the process of selecting participants and ensuring their availability at set times. The detailed schedule were modified if required by village members. The qualitative team adapted its routine as far as possible, considering the time constraints of the study;
- d. Participants were selected fairly and informed consent was requested to ensure their voluntary participation in the study;
- e. Participants were able to take part in more than one group discussion if they wished, but given their heavy workload, the community mobiliser was advised to cascade the selection of participants over the whole village;
- f. Group discussions were limited to a maximum of 1 hour 15 minutes. The qualitative team closed all focus group discussions at the agreed time and organised further discussions with participants if necessary;
- g. Participants' anonymity was ensured at all stages of the study (data collection, data analysis and data storage). Their names were neither collected nor shared;
- h. The qualitative team organised a restitution discussion on the last day of data collection to enable the communities to review and validate their findings, rank the risk factors identified and prioritise the actions to be taken;

STUDY LIMITATIONS

- Lack of secondary data: Despite availability of several SMART surveys and the 2021 Food Security and Nutrition survey data, the inability to merge children's data with their respective mothers and household data hindered our ability to run additional regressions and explore associations across various data sources.
- Statistical associations: It is advisable to assess statistical associations with caution, as observed links do not necessarily prove causality, while unobserved links do not mean that causality does not exist. Correlations should therefore be considered in a broader context, triangulated with other data sources, and as such can be used to prioritise current and future interventions. For the purposes of this report, all statistical associations with a **p**-value <0.05 are qualified as 'significant' in relation to the outcome of interest, i.e. wasting, stunting, underweight.Error! Bookmark not defined. with the aim of informing future r esearch into the relationships between these risk factors and nutritional status.</p>
- Confounding variables: The statistical analyses carried out in this study are based on unadjusted regression models that do not consider the effects of confounding variables. The aim of these analyses is to determine the relationships between the nutritional status of children under 5 and a variety of individual and household indicators based on their independent significant associations in order to enrich triangulation with other data sources. However, these associations should be viewed with caution as they may change in multiple regression models.
- Team composition: the qualitative team was mostly male-dominated due to limited research and translation capacity in Fangak county. This imbalance affected the ability to engage in gender-sensitive conversations in the community which had an impact of the depth of the qualitative research findings of this study.

IV. RESULTS

UNDERNUTRITION

QUALITATIVE INQUIRY FINDINGS

Community perceptions of causal pathways of undernutrition

According to the community, undernutrition is caused by poor access to income due to the lack of income-generating activities in the study area, especially since 2020. The main outlined reasons were the unavailability of arable land and loss of livestock due to four years of recurrent floods which have drastically reduced the population income and food sources. As a result, access to quality food compounded by the restricted access to markets, is extremely limited with most of the population relying on food rations and water lilies to survive. This has a direct effect on women's nutritional status - and their ability to breastfeed their children as well as complementary feeding practices.



Figure 1: Community perceptions of causal patterns of undernutrition, Fangak County

At the same time, poor access to income increases women's workload, further exacerbated by low social support, consequently having a negative effect on maternal mental wellbeing. Mothers often feel exhausted and overwhelmed due to the household and food sourcing responsibilities. This often translates in sub-optimal care practices namely limited breastfeeding and complementary feeing practices, reduced interactions with their children as well as sub-optimal child personal hygiene practices. Children are frequently left for long hours in the care of siblings, neighbours or other family members.

Moreover, low female decision making leads to early and repetitive pregnancies and translates into low birth weight. Women, often agree to have sexual intercourse within the first year from delivery to prevent their husbands from having concubines and losing potential resources for the family. Simultaneously, the flooded environment makes it extremely difficult to access health facilities, if not close by the village, impacting the use of health services and often delaying treatment for children.

Lastly, access to quality potable water compounded by open defecation practices as a result of lack of latrines leads to overall poor environmental hygiene which translates in poor hygiene practices for children that often play on muddy soil, walk around in dirty clothes or without shoes which increases their risk to water-borne diseases.

ACUTE MALNUTRITION

SECONDARY DATA REVIEW¹⁶



Figure 2: Trends in prevalence of acute malnutrition in Fangak County (2015-2024)

¹⁶ The data included in this section is not exhaustive and represents only an overview of the data available at the time of the preparatory phase of the study. It is possible that new data sources have since been published. Moreover, it is important to note that the inclusion of these data in the Link NCA report does not mean approval or comparability, as some data are not automatically comparable. It is therefore advisable to assess these data with caution and refer to the sources cited for further information.

Risk factors¹⁷: Male sex^{18 19 20}, female sex²¹, age group (child's younger age^{22 23 24 25}) belonging to a household of moving IDP/returnees²⁶ and non-residents²⁷

Protection factors¹⁷: Higher HH educational status²⁸

- Except for 2015 where the GAM rate dropped to 13%, levels of malnutrition have been above the WHO emergency threshold since 2015.²⁹ The 2023 GAM prevalence in Fangak was 18.8% (15.0 23.3 95% C.I.) with highest prevalence among boys 19.9% (14.7 26.5 95% C.I.) compared to girls 17.6% (13.4 22.7 95% C.I.). The prevalence of GAM by MUAC was 11.8 % (8.8 15.6 95% C.I.) with boys more wasted [11.9 % (8.4 16.6 95% C.I.)] than girls [11.7 % (7.6 17.4 95% C.I.)].³⁰
- Main causes of the deterioration in the nutrition status in Fangak are attributed to the food insecurity caused by prolonged flooding and poor access to livelihood options.³¹
- Extensive flooding has significantly impacted the majority of nutrition OTP/TSFP sites, relocating them to higher grounds. The rate of actute malnutrition is anticipated to rise due to the destruction of crops caused by the floods.³²

PRIMARY DATA ANALYSIS FINDINGS (SMART 2024)

According to the Linear regression results, children that were older in age (p<0.001), had a higher weight (p<0.001) and height (p<0.001) and were less likely to be wasted on the basis of weight for height z-scores and MUAC.

QUALITATIVE INQUIRY FINDINGS

Community perceptions of acute malnutrition

In the Link NCA qualitative study, we focused on understanding how local communities view and deal with acute malnutrition. By exploring the terms they use, we gain valuable insights into their perceptions. This approach is crucial for grasping the socio-cultural context in which acute malnutrition occurs and where management and prevention programmes operate.

¹⁷ In the context of this Link NCA report, a risk factor means a factor that increases a child's risk of undernutrition, whereas a protective factor means a factor that reduces this risk. For example, according to the sources cited, children aged between 6 and ²³ months had a higher risk of acute malnutrition.

¹⁸ Kiarie et al., 'The Prevalence and Associated Factors of Undernutrition among Under-Five Children in South Sudan Using the Standardized Monitoring and Assessment of Relief and Transitions (SMART) Methodology'.

¹⁹ Hoffman et al., 'Childhood Stunting and Wasting Following Independence in South Sudan'.

²⁰ lyya et al., 'Prevalence and Factors Associated with Malnutrition in Children Aged 6-59 Months in Jubek State, South Sudan.'

²¹ Action Against Hunger, 'Nutrition Causal Analysis Aweil East County, Northern Bahr El Ghazal State, South Sudan'.

²² The study was conducted in Tierkidi refugee camp in Gambella region, western Ethiopia from February to March, 2015. The camp is home to nearly 50,000 refugees who fled from the ongoing war in South Sudan.

²³ Gezahegn, 'Factors Associated with Acute Malnutrition among South Sudanese Children in Tierkidi Refugee Camp: A Case-Control Study'.

²⁴ Hoffman et al., 'Childhood Stunting and Wasting Following Independence in South Sudan'.

²⁵ Action Against Hunger, 'Nutrition Causal Analysis Aweil East County, Northern Bahr El Ghazal State, South Sudan'.

²⁶ Action Against Hunger.

²⁷ Kiarie et al., 'The Prevalence and Associated Factors of Undernutrition among Under-Five Children in South Sudan Using the Standardized Monitoring and Assessment of Relief and Transitions (SMART) Methodology'.

²⁸ Action Against Hunger, 'Nutrition Causal Analysis Aweil East County, Northern Bahr El Ghazal State, South Sudan'.

²⁹ World Food Programme, Food Agriculture Organisation, and United Nations International Children's Emergency Fund, 'Food Security and Nutrition: South Sudan (Data from 2020)'.

³⁰ SMART 2023, 'Integrated Nutrition and Mortality SMART Survey Final Report. Fangak County, Jonglei State, South Sudan'. ³¹ SMART 2023.

³² 'Inter-Agency Spot-Check Assessment Report to Floods Affected Communities in Northern Part of Jonglei State Fangak County'.

The community referred to acute malnutrition using 24 terms of which 16 were used to identify wasting and 8 to describe kwashiorkor. Wasting was considered the most prevalent form of malnutrition seen in the community. Two main forms of wasting were mostly mentioned: one characterised by a child born with a large head (*Giath*) and a very thin body, and another form where a thin body was accompanied by a prolonged chest or humpback (*Giath-luoth*). Additional variations included a child's inability to sit independently, paralysis, abdominal bloating, and bending of the limbs. Loss of weight, lack of appetite and fever were common symptoms in acutely malnourished children while visible swelling was recognised as the main characteristic to distinguish between the two forms.

Acute malnutrit	ion - wasting
Buor	child with big belly and no fever
Buoth	child suffering from chronic hunger
Buryier	child with big belly because of eating dry food that has no vitamins ³³
Duany	child who is not able to walk
Giath	child born with big head
Giath-luoth	child born paralysed because of Giath and not able to move
Kon	child with legs or arms bended inwards
Kuem	very thin child with bloated stomach
Lengkok	child with chronic disease
Liaw	disease that stays for long time in child's body
Liir	less severe Nguatak that appears in the neck through swelling punctures
Ngong	disease that stays for long time in child's body
Nguatak	disease that affects the lungs/chest/ upper or lower back and makes the child malnourished ³⁴
Noy	child lost all the body fat
Thil/Weth	disease caused by syphilis
Thinerew	child with big belly and fever
Thiang	child wasted as a result of parent's sexual intercourse while child is breastfeeding
Rual	child wasted as a result of mother cheating on husband with a relative
Majiajia	shapless child ³⁵
Marongron	child with all bones out ³⁵
Majuangjuanga	child that has shrank and creased ³⁵
Magokgok	tall and skinny with bones out ³⁵
Acute malnutrit	ion - kwashiorkor
Puotpuot	serious swelling on the body (oedema)
Chueth	serious swelling on the body (oedema)
Reem	Stomach problem
Dakriem	lack of red blood cells
Liryieer	child with air accumulated between skin and flesh
Gardia	lack of red blood cells in the body
Joknyoch	flood disease ³⁶
Jokpina	water disease

Table 4: List of local terms used to describe acute malnutrition, Fangak County

Communities also highlighted a link between wasting, meningitis and tuberculosis perceiving wasting as a consequence of meningitis or having similar symptoms to tuberculosis.

According to the community exchanges, the most vulnerable children to wasting are young children (0-2 years), orphans, children living in households headed by women, having mother (widowed or divorced) or a mother that lacks support from family or husband, living in big

³³ Like Kop, Keeh waterlily

³⁴ When very severe it can break the child's bones and the mother will be hearing the child whizzing

 $^{^{\}rm 35}$ Term used with a negative connotation to refer to a child that its not yet wasted

³⁶ Disease that became more prevalence since the persistent floods started (around 2020)

(>20 individuals) or polygamous households and households with suboptimal hygiene practices. No perceived difference between sexes were highlighted in the discussions.

Kwashiorkor was easily recognised by the community through the swelling of the body, caused by water or air in between the flesh. Swelling was linked by some to a deficiency of white blood cells, while decreased red blood cells were believed to contribute to overall blood deficiency. Similarly, to wasting, initial treatments for children included the administration of traditional herbal infusions and cutting procedures.

Mothers of malnourished children were said to be negatively referred to as *Batch/ Nyop* ("someone that is not clean"), *Doar* ("foolish for not taking care of the child") *Duan* ("someone that doesn't act quickly") by other members of the village. They are believed to not take care of their children properly, therefore, contributing to the malnutrition status of their child. However, mothers of those children were also said to experience weight loss due to worry when caring for their sick child.

According to community members, since the arrival of the big floods four to five years ago (2019-2020), the number of wasting cases has increased. This rise was primarily attributed to the decreased quantity and quality of food, especially with a significant loss of cows and therefore milk, and the persistently wet and humid environment. The main perceived causes of wasting were the lack of food in terms of both quality and quantity, suboptimal care practices, inadequate drinking water and environmental conditions due to the floods and colder weather (particularly during the rainy season) or passed by one of the parents at conception or during pregnancy. Regarding the seasonality of malnutrition, there is not a unanimous agreement, but most community members reported an increase in cases during the rainy season (July to December), correlating with the rise in wet and cooler weather. However, some also mentioned an increase during the dry season (January to April) due to the hot weather and its negative consequences on child health and nutritional status. Hot temperatures were said to cause indigestion leading to more cases of diarrhoea and vomiting and prolonged, wasting.

According to the comparative study, most interviewed malnourished children in the sample (n=34) were female (n=20). The age varied from 24-59 months. When comparing malnourished children to their siblings, all (n=34) were younger and one in three (n=11) was born within less than 24 months.

A summary of community perceptions of the causes and treatment of two forms of acute malnutrition can be found in table 5 below.

ACUTE MALNUTRITION	ACUTE MALNUTRITION - WASTING					
Causes	•	lack of food/severe hunger and lack of child's quality diet				
	•	maternal malnutrition during pregnancy				
	•	sub-optimal IYCF practices: giving hot/cold breastmilk to the child following a long day				
		in cold water ³⁷ or under the sun;				
		introduction of solid foods before 6 months or giving the child "dry" food like Walwal with no milk or sauce.				
	•	parents having a sexual intercourse while child is breastfeeding (Thiang)				
	-	mother cheating on husband with a relative (<i>Rual</i>) ³⁸				
	•	mother contracting syphilis while pregnant and breastfeeding				

³⁷ While collecting water lilies

³⁸ Rual can be cured sacrificing a goat or a sheep to wash away the sins. These can only be killed the elderly in the community.

	child contracting pneumonia in the womb due to the mother spending long hours in
	water collecting water lilies.
	 child sleeping in a cold and humid/wet house surrounded by water
	Child walking on hot ground during dry season
	 passed to the child through the intected blood of one of the parents caused by an insect bits
	Insect Dire
	 child drinking dirty or stagnant water
	 inappropriate hygiene practices, both personal and environmental linked to food
	contamination by flies
	 unknown cause - child is born like this, especially in the case of a big head
Vulnerability	no difference between boys and girls
	 children under 2 years of age
	children from families where women lack support/ fathers do not respect their
	responsibility of providing food and money to the family
	 children of pregnant women when the father is not present
	 children of single mothers (widowed or divorced)
	 children from large households (20+) and polygamous families
	 children from families with inadequate hygiene practices
Prevention	 pregnant women should avoid working in cold water or sleeping outside during the cold
	seasons or floods.
	bathe the child daily (morning and evening)
	protect child from wind and cover the child with a blanket at night.
	give soft foods, cow s milk, waiwai, tilapia fish (Rueth)
	 ensure the child has clean and light clothes to avoid overheating during the day clippers to protect from the best coming from the ground in the bet months.
	 supports to protect from the heat coming from the ground in the hot months take shild to bespital when sick
	 Track child to hospital when sick protect the child by making them wear a necklace made of horn of antelone (Tungdigy)
Treatment	 care at the health centre (PlumpyNut) if a facility is easily accessible
Treatment	 Administration of traditional herbs³⁹ If the herbs don't work the child is taken to hospital
	 cutting of child's head, chest or back by the traditional healer for the disease to come
	out with the blood. Hot water is then applied to the wounds and this process is repeated
	till the child is cured. Traditional herbs are given to the child to drink after the cutting by
	the traditional healer. If the child doesn't recover the healer needs to be changed or the
	child is taken to hospital. At times, the child is also taken to hospital to make the wound
	dry.
	 If wasting is caused by meningitis, the child will not be allowed to bathe or touch their
	eyes and will be isolated with the mother or an elder woman for 7 days. During this
	time, they will be given very little water. The child will have fever for 4 days, and spots
	from day 2.
	Feed the child with a variety of foods
ACUTE MALNUTRITIO	N - KWASHIORKOR
Causes	 lack of food causing lack of blood in the body
	- child eating foods that are hard to digest like waterlily, <i>keeh</i> which cause diarrhoea
	contaminated breastmilk caused by a disease or infection transmitted from the mother
	and/or child eating catfish
	- hot or cold breastmilk or insufficient breastmilk
	- mother mainourished during pregnancy
	- parents having sexual intercourse while child is breastreeding (Thiang)
	 Lack of red cells and blood in the body.
	- transmitted by another sick child
	- indigestion due to dirty water
	- meningitis
	- cold weather and child sleeping in a cold house
	- child staying in wet environment with mosquitos
	- child walking on hot ground + drinking hot breastmilk during dry season
	- drinking river water that is dirty and full of insects
	- brought by flies that contaminated food eaten by the child
	- child not bathed regularly and wearing dirty clothes

³⁹ Reep, Wal, Nyabuokni, Nyanuan, Nomloch, Yiaw, Riem, Kuak, Boreel, Luor, Waar, Neem Koat, Tiltil, Walnyaboni, Kier-with, Ngor, Gar, Nhiany (grinded leaves + water for the child to drink). Waltop and Neem for bathing while Borreel is given to chew.

Treatment	•	administration of traditional herbs ⁴⁰ to reduce swelling by inducing urine cutting of the body with traditional knife (<i>ngom</i>) for the infected blood to flow out. Followed by patching of wounds with hot water or cow's urine hot water showers

Table 5: Summary of community perceptions of the causes and treatment of the two forms of acute malnutrition, Fangak County

STUNTING

SECONDARY DATA REVIEW¹⁶



Figure 3: Trends in prevalence of stunting in Fangak County (2022-2024)

Risk factors⁴¹: younger child's age, and agricultural livelihood⁴².

Boys appear to be more stunted (13.2%) compared to girls (12.9%). Stunting proportion
was highest among older children aged 18-29 months and 54-59 months of age.⁴³

PRIMARY DATA ANALYSIS FINDINGS (SMART 2024)

According to Logistic regression, male children had a higher risk of being stunted (p<0.001). Based on Linear regression results, children that were taller (p<0.001) or those with a higher weight (p<0.001) were less likely to be stunted on the basis of weight for height z-scores.

⁴⁰ Luor, Boreel, Rep, Yaw, + cold water and Kerwith + hot water

⁴¹ In the context of this Link NCA report, a risk factor means a factor that increases a child's risk of undernutrition, whereas a protective factor means a factor that reduces this risk. For example, according to the sources cited, children aged between 6 and 23 months had a higher risk of acute malnutrition.

⁴² Kiarie et al., 'The Prevalence and Associated Factors of Undernutrition among Under-Five Children in South Sudan Using the Standardized Monitoring and Assessment of Relief and Transitions (SMART) Methodology'.

⁴³ SMART 2023, 'Integrated Nutrition and Mortality SMART Survey Final Report. Fangak County, Jonglei State, South Sudan'.

QUALITATIVE INQUIRY FINDINGS

Community perceptions of stunting

The communities referred to stunting using four terms below.

Stunting	
Tuil	child growing slowly
Natich	child of very small size
Guok guok	short child
Joknyuach	disease that comes from the flood
Joknyuach	disease that comes from the flood

Table 6: List of local terms used to describe stunting, Fangak County

Some members also mentioned genetic condition linked to the parent's stature which justified the child's short height. Other causes included inappropriate care practices due to the mother being away for extended hours, consumption of dirty water, staying in a cold and wet environment, mother's sexual intercourse during breastfeeding or attributing it to God's will. While many causes overlapped with wasting, the communities reported very few cases of stunting in the villages. No stigmatisation words were reported for this form of malnutrition.

CHRONIC MALNUTRITION - STUNTING					
Causes	•	Sub-optimal diet/lack of food			
	•	Genetic			
	•	Infected breastmilk from mother			
	•	Sub-optimal care practices due to mother's heavy workload (many hours away from the			
		house). Child not bathed properly will develop lace that suck their blood making them			
		sick			
	•	drinking dirty water			
	•	cold weather/ sleeping in a cold and wet house			
	•	sexual intercourse during breastfeeding			
	•	God's will			

 Table 7: Summary of community perceptions of the causes and treatment of stunting, Fangak County

UNDERWEIGHT

SECONDARY DATA REVIEW¹⁶





Risk factors⁴⁴ : Larger household size and younger child's age were significantly associated with underweight.⁴⁵

 The prevalence of underweight is 18.1 % (14.0 - 23.1 95% C.I.) where boys accounted for 18.9 % (14.3 - 24.6 95% C.I.) compared to girls 17.3 % (12.4 - 23.6 95% C.I.) ⁴⁶

PRIMARY DATA ANALYSIS FINDINGS (SMART 2024)

According to Logistic regression, male children had a higher risk of being underweight (p=0.008). Based on Linear regression results, children that were older (p<0.01) or taller (p<0.001) or had a higher weight (p<0.001) were less likely to be underweight on the basis of weight for height z-scores

HEALTH AND NUTRITION

South Sudan's health system is currently unable to cope and provide essential life-saving health services relying heavily on international humanitarian assistance.⁴⁷ Several factors contribute to the poor health indicators: i) weak and underfunded healthcare system, with less than 2% of the annual budget allocated to health; ii) weak health policy implementation, iii) severe capacity gaps with respect to human resources for health [1 doctor per 65,574 persons and 1 midwife per 39,088 persons]⁴⁸ In Jonglei, health and nutrition are integrated well at heath facility level.⁴⁹ There are 17 health facilities in Fangak: one hospital (Phom hospital, nonfunctional), 6 Primary Health Care Centres (PHCCs) (all functional), and 10 Primary Health Care Units PHCU (4 functional and 6 non-functional).⁵⁰ Emergency obstetric services remain limited and service delivery is largely provided by international organizations. There are 7 Action Against Hunger managed nutrition sites that provide free services to women and children under five years of age. Additional treatment services include first-line malaria drugs and treatment for other minor diseases with paracetamol, Albendazole, Zinc, or Amoxicillin. Those admitted to the nutrition programme also receive nutrition and health education and nonfood items (NFIs), such as saucepans, jerrycans, buckets, soap, and menstrual hygiene kits. Men and adolescents are not directly targeted but can receive some of the first-line drugs.⁵¹

CHILDHOOD ILLNESSES

SECONDARY DATA REVIEW¹⁶

Indicator

Fangak county

⁴⁶ SMART 2023, 'Integrated Nutrition and Mortality SMART Survey Final Report. Fangak County, Jonglei State, South Sudan'.

National

Jonglei State

⁴⁴ In the context of this Link NCA report, a risk factor means a factor that increases a child's risk of undernutrition, whereas a protective factor means a factor that reduces this risk. For example, according to the sources cited, children aged between 6 and 23 months had a higher risk of acute malnutrition.

⁴⁵ Kiarie et al., 'The Prevalence and Associated Factors of Undernutrition among Under-Five Children in South Sudan Using the Standardized Monitoring and Assessment of Relief and Transitions (SMART) Methodology'.

⁴⁷ United Nations Office for the and Coordination of Humanitarian Affairs, 'Humanitarian Needs Overview South Sudan'.

⁴⁸ United Nations Population Fund, 'Maternal Health in South Sudan'.

⁴⁹ Ratib et al., 'Draft Report for the Baseline Study of the Right2Grow Project.'

⁵⁰ SMART 2022, 'Final Report of Nutrition and Mortality SMART Survey Fangak County of Jonglei State, South Sudan'.

⁵¹ Sherrie, 'A GENDER ANALYSIS AND SAFETY AUDIT ASSESSMENT IN OLD FANGAK, JONGLEI STATE OF SOUTH SUDAN'.

			50%
			(FSNMS 2023)
			14.4%
	21%	20%	(SMART 2023)
Cougn 6-59 months	(FSNMS 2021)	(FSNMS 2021)	67.7%
			(SMART 2022)
			15.8%
			(SMART 2019)
			32.1%
			(FSNMS 2023)
			12.1%
Child diarrhoon	19% (FSNMS 2021)	20%	(SMART 2023)
Child diarribea		(FSNMS 2021)	47.2%
			(SMART 2022)
			12.1%
			(SMART 2019)
			85.8%
			(FSNMS 2023)
			65.1%
Child favor	49%	48%	(SMART 2023)
Child fever	(FSNMS 2021)	(FSNMS 2021)	83.3%
			(SMART 2022)
			25.7%
			(SMART 2019)

Risk factors⁵² : diarrheal disease⁵³⁵⁴⁵⁵, high prevalence of diseases (up to 25%)⁵⁶

- The most prevalent illness among children under-five years of age in Fangak County is fever (65.1%) and mostly associated by mothers with malaria, followed by cough (14.4%). People know the link between mosquitoes and malaria, more precisely fever, and most of the households have mosquito nets. ⁵⁷. Diarrhoea and other child illnesses account for about 20.6% of morbidity cases.⁵⁸ The swampy area is particularly favourable to the proliferation of mosquitoes.
- Forced to flee their homes due to the floods, children and pregnant women are at times sleeping outside in the cold in host communities which makes them vulnerable to sickness like pneumonia or malaria.⁵⁹

PRIMARY DATA ANALYSIS FINDINGS (SMART 2024)

No significant associations found through logistic or linear regressions.

QUALITATIVE INQUIRY FINDINGS

Participants described a healthy child as playful, smiley, active, waking up early and having a good appetite. A sick child was described instead as not eating well or sucking the breast, crying, sleepy and feverish. The community clearly identified the causes of common childhood illnesses and resorted to herbal remedies, in most cases, as primary treatment. A clear link

⁵⁶ IPC, 'South Sudan: IPC Acute Food Insecurity & Malnutrition Snapshot (October 2022-July 2023)'.

⁵² In the context of this Link NCA report, a risk factor means a factor that increases a child's risk of undernutrition, whereas a protective factor means a factor that reduces this risk. For example, according to the sources cited, children aged between 6 and 23 months had a higher risk of acute malnutrition.

⁵³ The study was conducted in Tierkidi refugee camp in Gambella region, western Ethiopia from February to March, 2015. The camp is home to nearly 50,000 refugees who fled from the ongoing war in South Sudan.

⁵⁴ Gezahegn, 'Factors Associated with Acute Malnutrition among South Sudanese Children in Tierkidi Refugee Camp: A Case-Control Study'.

⁵⁵ lyya et al., 'Prevalence and Factors Associated with Malnutrition in Children Aged 6-59 Months in Jubek State, South Sudan.'

⁵⁷ 'Inter-Agency Spot-Check Assessment Report to Floods Affected Communities in Northern Part of Jonglei State Fangak County'.

⁵⁸ SMART 2023, 'Integrated Nutrition and Mortality SMART Survey Final Report. Fangak County, Jonglei State, South Sudan'.

⁵⁹ 'Inter-Agency Spot-Check Assessment Report to Floods Affected Communities in Northern Part of Jonglei State Fangak County'.

between child disease and water was highlighted in terms of dirty water consumed by children and flooded environment. Diseases like diarrhoea, vomit, chicken pox, skin disease or Kalaazar were linked to dirty water as open defecation is widely practiced in the waters surrounding the villages and boats release fuel in the water. Instead fever, cold and malaria were associated with the wet and cold environment, especially at night, during the rainy season or linked to mothers' cold breastmilk. Conversely to other childhood disease, fever was largely associated with malaria which prompts parents to take children directly to the hospital where they can receive treatment, rather than resorting to herbal remedies during the first days of offset of symptoms.

A summary of community perceptions of the causes and treatment of recurrent childhood illness can be found in table 8 below.

Disease	Cause	Treatment	Further information
ARI/Cough Duot/Kiel	 cold weather/wind cold breastmilk** 	 herbal remedies: buaw⁶⁰, moringa, kerwith⁶⁰ hospital treatment – amoxicillin* 	*treatment provided at the hospital, usually amoxicillin ** transmitted by the mother through breastmilk when she spends long time in cold water
Diarroea Jic	 contaminated/dirty water* hot breastmilk** gap in breastfeeding due to workload** measles eating wild fruits*** 	 herbal remedies: nyiany root⁶⁰, kuak⁶⁰, moringa, puok⁶⁰, boreel⁶⁰ and loor⁶⁰ + cold water hospital treatment especially when lacking herbs 	*communities drink water directly from the river/swamps where people defecate – no treatment of water **Transmitted by the mother through breastmilk when she spends long time under hot sun. *** a child that eats wild fruits, especially 1 st time
Vomit <i>Ngoh</i>	 comes with strong cough dirty water hot ground 	 herbal remedies: thow leaf⁶⁰ for chewing, nuawal⁶⁰ medication from the market in red box 	
Fever Lethpuany, bohorpuany	 malaria mosquito wet and cold environment eating hard to digest foods (eg. waterlily, keeh, guan) typhoid lack of food* 	 herbal remedies: neem, reep⁶⁰, luor⁶⁰ tomtom⁶⁰, yaw⁶⁰ hospital treatment especially when lacking herbs 	Usually in combination with cough and/or vomiting; *Lack of food causes a decrease child's blood and sickness
Malaria	- mosquito	 hospital treatment (mostly) herbal remedies: <i>neem</i> and <i>rua rua</i>⁶⁰ 	The area is always wet and humid due to floods
Measles Jiom	- airborne - god's will	 no treatment just isolation 	It comes with small red spots. child is isolated to avoid further spread. Considered a big killer, more prevalent recently
Chickenpox Borjom, jony, Gonye	 dirty water contaminated food 	- isolation + natural remedy	mud from ant house applied on skin
Skin disease Kuk	 dirty water poor personal hygiene practices 	- natural remedy	mud from ant house applied on skin
Meningitis <i>Rieny</i>	 airborne bathing in the water while sun is hot. 	- cutting + hot water	Associated with malnutrition (wasting)
Cholera and Thyphoid	- floods/waterborne	no information	
Hepatitis E TB (bone/blood) <i>Nguatak/</i> <i>Ngualuoth</i>	 floods/waterborne transmitted by mother cool environment hot environment 	no information cutting + hot water	may appear chest, back or blood causing paralysis. TB is often associated with malnutrition (wasting).
Hemorrhage Gith	- diarrhea for long duration	salt + hot water to clean the anus	
Kala-azar	- dirty water - hard to digest food	 herbal remedies: kerwith⁶⁰ and kerignan⁶⁰ hospital treatment 	The herbs will make the child vomit and diarrhea till the indigested food is out

Table 8: Summary of community perceptions of the causes and treatment of childhood illnesses, FangakCounty

⁶⁰ Local herb, english or latín translation uknown

Traditional medicines, consisting in a wide variety of herbs and roots mixtures, are used to treat common childhood illnesses. However, many areas in the county are now experiencing a complete absence of these herbs, leaving communities without alternatives other than going to health facilities for assistance. No witchcraft practices were mentioned as cause of childhood diseases. Animal sacrifice was only practiced in cases of women' infidelity (*Rual*), believed to be the cause of a child illness such as diarrhoea, vomiting and fever eventually leading to wasting. In such instances, a goat sacrifice in the presence of the elderly is necessary to absolve the sin and restore the child's health otherwise the sickness will spread to the other children.

A general increase in childhood illnesses was observed since 2020 with the onset of floods and was attributed to the lack of food persistently wet and humid environment, including inside the dwellings, especially at night when the temperatures drop. In fact, 10-15 years ago children were said to eat good food, drink cow's milk, live in a dry environment which overall made them less sick compared to now. Some members also acknowledged the positive impact of vaccination campaigns and increased medical assistance provided by NGOs during the last few years. In terms of seasonality, the community has observed a change in the occurrence of common childhood illnesses which can now happen anytime because of the flooded environment. However, fever and diarrhoea were associated more with hot temperatures and hot ground increasing during the first months of the year while respiratory infections, cold and malaria were said to increase during the rainy season.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Climate	Climate											
Season	Dry season Rainy season											
Health	Health											
Diarrhoea	+++	+++	+++	+++								
ARI/ Cough							++	+++	++	++	+++	+++
Fever		+++	+++	+++								
Malaria						+++	+++	+++	+++	+++	+++	

Table 9: Seasonal calendar for childhood morbidity, Fangak County

In the study comparing malnourished children with their non-malnourished siblings, 65% of malnourished children (n=22) had a poor health status while breastfeeding, with most (n=18, 81%) experiencing frequent fever, diarrhoea and respiratory infections. Most mothers (n=26, 76%) followed the recommended vaccination schedule for the malnourished child, and of these 10 reported doing it less precisely.

A. LIMITED ACCESS TO HEALTH SERVICES

Strength of the association with undernutrition in the <i>scientific literature</i> ⁶¹	++	
Strength of association with undernutrition based on SECONDARY DATA REVIEW relevant to the study		
area ⁶²		
Strength of association with undernutrition based on primary data analyses (SMART 2024)		
Categorisation by the technical experts at the initial technical workshop		
Categorisation by the communities during the qualitative study	+++	
Categorisation by the qualitative team	+++	

⁶¹ Based on the Link NCA "Mechanisms of undernutrition" module

⁶² If cross-sectional studies with statistical associations are available for the study area. Otherwise, hypothetical strength of association, if based on prevalence values.

Influence of historical and/or seasonal variations on undernutrition trends	+ + +
Overall interpretation	+++

SECONDARY DATA REVIEW¹⁶

- Geographical barriers: poor geographical accessibility⁶³ due to distance ^{64 65 66 6768}, floods^{69 70 71}, insecurity ^{72 73} and communal clashes⁷⁴, wild animals⁷⁵, violent youth.⁷⁶ Most vulnerable groups are: women and girls⁷⁷ particularly heavily pregnant women⁷⁸, IDPs⁷⁹, people with disabilities⁸⁰, and elderly⁸¹. Nationally, only 49% of the population can access health facilities within one hour and 66% has difficulty accessing health services. In Fangak majority of people are able to access health sites in between 30 minutes to 3 hours.⁸²
- Temporal barriers: long waiting time.⁸³
- Financial barriers: transportation and health care costs.⁸⁴
- Socio-cultural barriers: Beliefs that herbal medicine is an effective alternative compounded by cost and accessibility barriers. Men are expected to taketheir children or women to the health facility during a complication or emergency.⁸⁵
- Quality of service: lack of medicine, staff^{86 87}, equipment⁸⁸, overcrowding,⁸⁹ limited maternal health services⁹⁰ and lack of follow up care⁹¹.

PRIMARY DATA ANALYSIS FINDINGS (SMART 2024)

No significant associations found through logistic or linear regressions.

QUALITATIVE INQUIRY FINDINGS

Barriers to access to healthcare services

Geographical barriers

Distance is the biggest geographical barrier, which delays or hinders access to health services. Distance to the nearest health facility varies from 1h to 4h by canoe and seeking medical help

⁶⁴ United Nations Office for the and Coordination of Humanitarian Affairs.

76 Sherrie.

⁶³ United Nations Office for the and Coordination of Humanitarian Affairs, 'Humanitarian Needs Overview South Sudan'.

⁶⁵ Sherrie, 'A GENDER ANALYSIS AND SAFETY AUDIT ASSESSMENT IN OLD FANGAK, JONGLEI STATE OF SOUTH SUDAN'.

⁶⁶ Action Against Hunger, 'The Underlying Causes of Malnutrition in Old Fangak Payam'.

 ⁶⁷ Sherrie, 'A GENDER ANALYSIS AND SAFETY AUDIT ASSESSMENT IN OLD FANGAK, JONGLEI STATE OF SOUTH SUDAN'.
 ⁶⁸ Sherrie.

⁶⁹ United Nations Office for the and Coordination of Humanitarian Affairs, 'Humanitarian Needs Overview South Sudan'.

⁷⁰ Sherrie, 'A GENDER ANALYSIS AND SAFETY AUDIT ASSESSMENT IN OLD FANGAK, JONGLEI STATE OF SOUTH SUDAN'.

⁷¹ Action Against Hunger, 'The Underlying Causes of Malnutrition in Old Fangak Payam'.

⁷² United Nations Office for the and Coordination of Humanitarian Affairs, 'Humanitarian Needs Overview South Sudan'.

⁷³ Sherrie, 'A GENDER ANALYSIS AND SAFETY AUDIT ASSESSMENT IN OLD FANGAK, JONGLEI STATE OF SOUTH SUDAN'.

⁷⁴ Sherrie.

⁷⁵ Sherrie.

⁷⁷ United Nations Office for the and Coordination of Humanitarian Affairs, 'Humanitarian Needs Overview South Sudan'.

⁷⁸ Sherrie, 'A GENDER ANALYSIS AND SAFETY AUDIT ASSESSMENT IN OLD FANGAK, JONGLEI STATE OF SOUTH SUDAN'.
⁷⁹ 'Inter-Agency Spot-Check Assessment Report to Floods Affected Communities in Northern Part of Jonglei State Fangak County'.

 ⁸⁰ Sherrie, 'A GENDER ANALYSIS AND SAFETY AUDIT ASSESSMENT IN OLD FANGAK, JONGLEI STATE OF SOUTH SUDAN'.
 ⁸¹ Sherrie.

⁸² Sherrie.

⁸³ United Nations Office for the and Coordination of Humanitarian Affairs, 'Humanitarian Needs Overview South Sudan'.

⁸⁴ United Nations Office for the and Coordination of Humanitarian Affairs.

⁸⁵ Sherrie, 'A GENDER ANALYSIS AND SAFETY AUDIT ASSESSMENT IN OLD FANGAK, JONGLEI STATE OF SOUTH SUDAN'.

⁸⁶ United Nations Office for the and Coordination of Humanitarian Affairs, 'Humanitarian Needs Overview South Sudan'.

⁸⁷ REACH, 'Humanitarian Situation Overview, Jonglei State, South Sudan.'

⁸⁸ United Nations Office for the and Coordination of Humanitarian Affairs, 'Humanitarian Needs Overview South Sudan'.

⁸⁹ REACH, 'Humanitarian Situation Overview, Jonglei State, South Sudan.'

⁹⁰ United Nations Office for the and Coordination of Humanitarian Affairs, 'Humanitarian Needs Overview South Sudan'.

⁹¹ United Nations Office for the and Coordination of Humanitarian Affairs.

often takes the whole day. Travel time increases even more when going against the current. The journey by canoe is long and trying and comes with the risk of capsizing in deep waters and even drowning. Sometimes, the distance further increases when services are not available which leads to referrals to a local hospital. Renting a canoe is very challenging as canoes are considered big assets, crucial to generate income for the family. Owners are reluctant to rent them out for fear of theft or damage as *"If you lose your canoe, you don't know when you will get another one"*. In extreme cases, mothers walk through the swampy waters to reach the nearest health facility.

"Some women walk through waters, put their child on their head when the water becomes deep, because if they wait for an available canoe it might be too late for the child."

Access to health facilities is difficult across seasons, particularly during the rainy season when walking becomes impossible as the water becomes too deep to carry a child safely. There are not many coconut trees due to the floods and if available, they are very expensive. However, if they trust you, they will rent the canoe at your own responsibility. The presence of NGOs providing medical assistance at the local health facilities and hospitals has increased access and use of those services despite distance.

Time barriers

Limited time due to heavy women's workload was also considered a barrier as mothers are engaged in back-to-back activities such as house chores, cooking, wood, wild fruits or, water lily collection throughout the day. Part of these activities keep them away from home, increasing the risk of missing the first symptoms of child's illness. A visit to the health facility, starting early in the morning takes long hours mostly due to distance and translates into a full day of missed work, impacting the entire family. Despite these challenges, once the child's sickness is noticed, mothers reported prioritising their child's health over any other activity.

"If your child is sick, you leave whatever you are doing and you go to the hospital."

Financial barriers

Renting a canoe to reach the health centres is not only challenging but also expensive. Depending on the length of the trip the price ranges from a few thousand to 20-30 thousand SSP per person each way, if renting with a rower. Canoes are scarce, primarily used by men for fishing and not every family has one. Community members take occasional lifts from speed boats, if the village is on the main waterway, or from community members willing to help. As last resorts, they walk if the water is not too deep or simply wait for the child to get better. To the transportation costs, a trip to the hospital also includes cost of eventual medicines and accommodation, if the visit requires an overnight stay or gets delayed. Some members reported that back in the days people were hosted for free by local communities but since around 2013 hosts started charging for accommodation. Generally speaking, services are free at the point of access for children under-five years of age and women of reproductive age but medicines are often not available and need to be paid for separately. (Cf. **Quality of care barriers**).

Barriers to quality of care

Despite being free at the point of access, quality of care is compromised by the lack of medicines at the facilities, combined with long waiting time. Private clinics, usually situated in markets, serve as alternative source of medicines when not available at the hospital.

Community members spend long hours to reach the health facility often without food and are kept waiting even longer to be attended. In cases where medications are not in stock, patients receive a diagnosis but must seek paid treatment at private clinics or pharmacies. Inpatient care faces similar challenges, with a shortage of medicines and a limited number of beds. Health facilities, offering reduced services, refer patients to the nearest hospitals in Old Fangak, New Fangak, or even Malakal for specialised treatment, further contributing to treatment delays. In general, the community tends to prefer larger hospitals to mitigate the risk of shortages of medicines or treatment. However, the higher costs and increased distance often force them to initially seek care at local facilities. Despite these obstacles, communities acknowledge the positive impact of NGOs providing additional medical assistance considering the increased prevalence of childhood diseases (cf. **Childhood illnesses**), noting a reduction in the overall distance to healthcare compared to a decade or more ago.

B. LIMITED UTILISATION OF HEALTH SERVICES

Strength of the association with undernutrition in the <i>scientific literature</i> ⁶¹	++
Strength of association with undernutrition based on SECONDARY DATA REVIEW relevant to the study	++
area ⁶²	
Strength of association with undernutrition based on primary data analyses (SMART 2024)	++
Categorisation by the technical experts at the initial technical workshop	++
Categorisation by the communities during the qualitative study	+
Categorisation by the qualitative team	++
Influence of historical and/or seasonal variations on undernutrition trends	++
Overall interpretation	++

SECONDARY DATA REVIEW¹⁶

Indicator	National	Fangak county
		17.4%
		(FSNMS 2023)
		2.5%
Measles vaccine		(SMART 2023)
(vaccination card)		39%
		(SMART 2022)
		4%
		(SMART 2019)
		56.5%
		(FSNMS 2023)
		79.5%
Measles vaccine (by recall)		(SMART 2023)
weasies vacenie (by recail)		36.9%
		(SMART 2022)
		22.8%
		(SMART 2019)
		81.1%
		(FSNMS 2023)
Vitamin A supplementation	63%	66.3%
Vitamin A supplementation	(FSNMS 2021)	(SMART 2023)
		18.7%
		(SMART 2019)
		85.6%
		(FSNMS 2023)
Doworming	63%	60.8%
Dewolithing	(FSNMS 2021)	(SMART 2023)
		60.6%
		(SMART 2022)
Antonatal care visit (at least	62%	
	17%	
1)	(Every Preemie Scale 2017)	

	14.7%	
Skilled birth attended	(HNO 2023)	

Risk factors⁹² :: prompt health seeking for sick child (less than 24h) ⁹³⁹⁴

Protection factors¹⁷: having antenatal care⁹⁵

- Only 39% reported using antenatal care services during their pregnancy and just 14.7% had a skilled birth attendant.⁹⁶ Pregnant women are largely supported by TBAs as delivery facilities are scarce.⁹⁷ Traditionally, children are born at home, however, this pattern is shifting towards institutional delivery.⁹⁸Approximately 112 children under-five of per 1,000 live births die every year.⁹⁹
- In Fangak, majority of mothers or caregivers seek treatment for their children from PHCC (68%), community outreach (6.6%) or a hospital (5.6%). 18.3% reported not seeking treatment when a child was sick.¹⁰⁰
- Vitamin A and measles vaccination coverage are low which may be attributed to poor access to health services given the extremely difficult context.

PRIMARY DATA ANALYSIS FINDINGS (SMART 2024)

According to the Logistic regression results, children that received Measles and Penta vaccinations before their 1st birthday were less likely to be wasted on the basis of weight for height z-scores (p=0.002 and p=0.005) as well as and combined weight for height z-scores and MUAC (p=0.006 and p=0.012). Additionally, children taken to the health centre for treatment of diarrhoea were less likely to be wasted on the basis of weight for height z-scores (p=0.002), and combined weight for height z-scores and MUAC (p<0.001) while those taken to the health centre for treatment of fever had lower odds of wasting on the basis of combined weight for height z-scores and Combined weight for height z-scores and MUAC (p=0.005)

QUALITATIVE INQUIRY FINDINGS

Curative services

Treatment of recurrent childhood illnesses

Mothers frequently resort to traditional herbs as the initial treatment for common child illnesses (cf. **Childhood illnesses**). It is their responsibility to inform the father and take the necessary actions. For each illness, there are one or multiple herbs available, typically ground and mixed with cold water. This mixture is then administered to the child to drink, including those under 6 months. If one herbal remedy is ineffective, another is grounded and given to

⁹⁸ United Nations High Commissioner for Refugees, 'CULTURE, CONTEXT AND MENTAL HEALTH AND PSYCHOSOCIAL WELL-BEING OF REFUGEES AND INTERNALLY DISPLACED PERSONS FROM SOUTH SUDAN'.

⁹² In the context of this Link NCA report, a risk factor means a factor that increases a child's risk of undernutrition, whereas a protective factor means a factor that reduces this risk. For example, according to the sources cited, children aged between 6 and 23 months had a higher risk of acute malnutrition.

⁹³ The study was conducted in Tierkidi refugee camp in Gambella region, western Ethiopia from February to March, 2015. The camp is home to nearly 50,000 refugees who fled from the ongoing war in South Sudan.

⁹⁴ Gezahegn, 'Factors Associated with Acute Malnutrition among South Sudanese Children in Tierkidi Refugee Camp: A Case-Control Study'.

⁹⁵ Action Against Hunger, 'Nutrition Causal Analysis Aweil East County, Northern Bahr El Ghazal State, South Sudan'.

⁹⁶ SMART 2023, 'Integrated Nutrition and Mortality SMART Survey Final Report. Fangak County, Jonglei State, South Sudan'.

⁹⁷ 'Inter-Agency Spot-Check Assessment Report to Floods Affected Communities in Northern Part of Jonglei State Fangak County'.

⁹⁹ United Nations Office for the and Coordination of Humanitarian Affairs, 'Humanitarian Needs Overview South Sudan'.

¹⁰⁰ SMART 2023, 'Integrated Nutrition and Mortality SMART Survey Final Report. Fangak County, Jonglei State, South Sudan'.
the child. If the condition does not show improvement after some days, mothers then turn to health centres for further assistance.

This approach is also compounded by the geographical and financial barriers that severely limit access to health services (Cf. **A. Limited access to health services**). If the water is not too deep mothers walk to the local health facilities, otherwise they wait in hope for the child to improve or to find transport. Due to the consequent years of recurrent floods local herbs are rapidly disappearing. In the case of a child not recovering, parents would either change healer or take the child to the hospital. Generally speaking, fever is the only condition for which the community would go directly to the health centre given the strong association with malaria, however recommended herbal remedies like Niim baths are also available and utilised especially when conventional malaria treatment is not accessible or available.

Additionally, skin cutting using a razor is commonly performed to treat wasting and kwashiorkor but also TB and meningitis both associated with these forms of malnutrition. Treatment involves skin cutting and herbal remedies administered by a traditional healer until the child recovered. The cutting targets the child's head, chest, or back depending on where the disease is perceived to release the "bad blood "and alleviate the child suffering. Healing of the cuts is followed by the application of hot water to the wounds and if the child does not recover it is then taken to the health centre.

Childbirth

Women typically become aware of their pregnancy within the first two months when their menstruation stops. Those close to a hospital may verify their pregnancy early on. Common pregnancy-related symptoms in the first trimester include morning sickness, fatigue, irritability, and a desire to have the father around. During the second trimester, women often feel better as they get used to the pregnancy, while the third trimester poses more challenges due to increased weight and fatigue.

Due to the floods and distance to the hospitals many women mostly deliver at home, although institutional deliveries have increased compared to the past. Hospital deliveries are more common only when complications arise. Limited bed availability in certain locations means that women are not encouraged to come to the health facility unless they face complications. Instead, as part of antenatal care, women are provided with a dignity kit containing essential items such as razors, ointment, and a few diapers to facilitate home deliveries supervised by Traditional Birth Attendants. The TBA assesses the baby's position, supports the mother during childbirth, checks on the baby's health post-delivery, and helps women in delivering the placenta. The placenta is secured with multiple knots based on the baby's sex, and the umbilical cord is cut with a sharp sorghum stem (*Rang*) and tied with a grass leaf (*Tuat*) if the woman doesn't have a dignity kit.

"The TBA puts the child on a mat and ties the placenta three times for a boy and four times for a girl as she provides resources to the family through f the dowry. After the ritual" tying", the placenta is hung on a tree in a container for good luck and is never buried as burying the placenta is believed to increase the risk of burying the baby as well."

Once the placenta is delivered, the child is placed on the mother's breast and breastfed for the first time. This is because the focus switches on the mother's health, as the baby is already born.

Previously, mothers were afraid to deliver at the hospital due to fear that something could happen to the child. However, with more women sharing their positive experiences and mentioning the advantages of hospital delivery, perceptions among the community have started to change.

Now, many women expressed a preference for hospital deliveries due to the better care they receive, especially in cases of complications. Caesarean sections for example are only available at the Malakal hospital, meaning that women are transported by hospital speedboat in case of emergencies. Hospital delivery services are provided free of charge, and both the woman and the child receive vaccinations before and after delivery. Women are also offered pain relief medication and any other necessary medication, along with appropriate post-delivery hygiene, specifically removal of clotted blood from the abdomen.

"We would prefer to go to the hospital because of (potential) complications. If something happens they can support you at the hospital, while here in the village there is nowhere to run. If we have complications and the TBA is not able to manage you need to take a canoe and go to the hospital which can take hours."

If complications arise at the hospital, women are typically kept under observation for a few days. However, if there are no available beds, they may be sent home after delivery. When delivering at home, women often experience post-delivery pain during the 7 days afterward. This discomfort is associated with clotted blood getting stuck in the abdomen (*Nak*) since it is not cleaned during home deliveries. Home treatment includes only hot baths believed to help the removal of blood in the days following delivery.

In cases of the first baby, women are usually taken to their parents' house to deliver and stay there for several months, even one year. This allows them to receive the necessary support and learn how to care for the child from their mother. With the first baby, women said to receive more support and have the opportunity to rest for 2-3 months, mostly focusing on caring for the baby. However, with subsequent children, this duration decreases as the woman is no longer at her parents' house.

"The time you get to rest depends on how many people can support you with home tasks such as fetching water, cooking food or cleaning. If support is available we usually rest for 1 month but if support is limited, this period is reduced to 2 weeks because you need to go back to searching food for the other children."

With the following children, during the first month, women concentrate on caring for their new-born and protecting them from the wind, which is believed to bring sickness. Support during this period often comes from the husband, elder children, neighbours, or relatives from the husband's family (Cf. **T Low social support for women**)

In the study comparing malnourished children with their non-malnourished brothers or sisters, most malnourished children (n=26, 76%) were delivered at home and 68% of mothers were assisted by a skilled person (n=23). Nearly half mothers (n=16) experienced complications at birth with a more difficult birth experience. The post-delivery rest period varied from 5 days to over 5 months.

Preventive services

Antenatal and Postnatal care

Both antenatal and postnatal care are provided free of charge at most visited health centres, but attendance is inconsistent. Mothers expressed a desire to attend regularly but face access challenges (cf. **A Limited Access to Health Services**). Most reported completing some visits

during the initial months of pregnancy to monitor the progress and towards the end, especially if provided with dignity kits for home delivery. Pregnant women also receive vaccinations, soap and mosquito nets as part of the antenatal care visits.

If they experience pain, women seek medical check-ups, but if the pregnancy progresses without complications, they may not feel the need to attend till the last months. However, generally speaking, more women attend antenatal care compared to a decade ago. For postnatal care, attendance is even more sporadic, resulting in children not receiving all the recommended vaccinations or receiving only a few doses.

In the study comparing malnourished children with their non-malnourished brothers or sisters, 12 mothers (35%) didn't attend any antenatal care visits and 14 (41%) reported to receive less consultations with their malnourished child. The main reasons were a non-functional health centre (n=7), inaccessible health centre (n=5) and workload (n=4). 41% of mothers (n=14) didn't attend any postnatal consultation.

C. LOW BIRTH SPACING/EARLY/UNWANTED/REPETITIVE PREGNANCIES

Strength of the association with undernutrition in the scientific literature ⁶¹	+++	
Strength of association with undernutrition based on SECONDARY DATA REVIEW relevant to the study area ⁶²		
Strength of association with undernutrition based on primary data analyses (SMART 2024)	++	
Categorisation by the technical experts at the initial technical workshop		
Categorisation by the communities during the qualitative study		
Categorisation by the qualitative team	++	
Influence of historical and/or seasonal variations on undernutrition trends	++	
Overall interpretation	++	

SECONDARY DATA REVIEW¹⁶

Indicator	National	Fangak county	
		~13	
HH SIZE		(Finn Church Aid 2015)	
	52%		
Child marriage (< 1890)	(World vision 2021)		
	28%		
Forthy program size (< 1940)	(World vision 2021)		
Early pregnancies (< 1690)	30%		
	(OCHA 2021)		
Adelessent Fortility Date (15, 10)	59 births/1000 women (World Bank		
Addiescent Fertility Rate (15-199)	2020)		
	6%		
Use of Contraception	(OCHA 2021)		

Risk factors¹⁰¹ : short birth interval (< 24m)^{102 103}, households with two or more children¹⁰⁴

- In Fangak, an average household has approximately 13 members. Due to the substantial influx of internally displaced persons (IDPs), primarily driven by flooding, some households have even grown exponentially, reaching even 43 members in some cases.¹⁰⁵
- Dowry benefits lead families to push girls into forced marriages, often after their first menstruation.¹⁰⁶ Food insecurity being one of the primary factors.¹⁰⁷ The rate of unplanned pregnancies is high among the young girls mainly due to lack of education opportunities, limited access to family planning, peer pressure, the lack of sexual education. Sex education is only discussed close to marriage, before that, it is considered a taboo, and parents shy away from these discussions.¹⁰⁸
- Polygamy is part of the cultural customs in Fangak.¹⁰⁹ Having many children is associated with wealth and increased labour hence polygamy and wife inheritance are widely practiced. However, providing for big families is a challenge due to the limited available resources.¹¹⁰
- Natural ways of birth spacing are preferred and mostly practiced also because of some shared fears of the side effects of family planning.¹¹¹ The Nuer culture prohibits sexual relations during lactating period, leading to a spacing of around 3 years, this way preventing competition for breast milk.

PRIMARY DATA ANALYSIS FINDINGS (SMART 2024)

¹⁰⁹ Finn Church Aid, 'Needs Assessment Report'.

¹⁰¹ In the context of this Link NCA report, a risk factor means a factor that increases a child's risk of undernutrition, whereas a protective factor means a factor that reduces this risk. For example, according to the sources cited, children aged between 6 and 23 months had a higher risk of acute malnutrition.

¹⁰² The study was conducted in Tierkidi refugee camp in Gambella region, western Ethiopia from February to March, 2015. The camp is home to nearly 50,000 refugees who fled from the ongoing war in South Sudan.

¹⁰³ Gezahegn, 'Factors Associated with Acute Malnutrition among South Sudanese Children in Tierkidi Refugee Camp: A Case-Control Study'.

 ¹⁰⁴ Iyya et al., 'Prevalence and Factors Associated with Malnutrition in Children Aged 6-59 Months in Jubek State, South Sudan.'
 ¹⁰⁵ Finn Church Aid, 'Needs Assessment Report'.

¹⁰⁶ World Vision, 'Child Marriage and Hunger Crisis'.

¹⁰⁷ United Nations Office for the and Coordination of Humanitarian Affairs, 'Humanitarian Needs Overview South Sudan'.

¹⁰⁸ Sherrie, 'A GENDER ANALYSIS AND SAFETY AUDIT ASSESSMENT IN OLD FANGAK, JONGLEI STATE OF SOUTH SUDAN'.

¹¹⁰ Sherrie, 'A GENDER ANALYSIS AND SAFETY AUDIT ASSESSMENT IN OLD FANGAK, JONGLEI STATE OF SOUTH SUDAN'. ¹¹¹ Sherrie.

According to the Logistic regression results, children that were delivered at home with the help of a friend of family member were more likely to be wasted on the basis of combined weight for height z-scores and MUAC (p=0.029).

QUALITATIVE INQUIRY FINDINGS

Household size

The average household in the community counts 15 people, with household size of 10 or less considered small and larger households often reaching 30 members or more. A typical household includes a husband, multiple wives, children of all wives, and in-laws from the husband's side.

Having large households has always been valued, and traditionally, whenever a husband married a new wife, he would give her a separate house. Large households are considered beneficial as members can support each other, and a sign of respect within the community. However, due to low resources and a lack of cattle to pay dowry, husbands now tend to have fewer wives, typically 2 or 3.

"In our culture, having a large family is considered beneficial because of mutual support during hard times and it generates respect from other village members. If you have a small family, people might think you don't like people, that you are not a respected man or that you have limited resources. Even in challenging times, it is considered wise to allocate resources for food and invest in new marriages. Having many children is beneficial, as even if there are struggles in raising them, they will eventually support later in life."

Nowadays, due to the recurrent floods, it has become more common for household to live closer, even within the same compound. Additionally, Internally Displaced People (IDP) move during the year, particularly from August to November when the water levels reach the peak, forcing many to flee as the water cover their land in the lookout for drier villages. If they have family around they join them but, if not, they choose a nearby dry village joining the existing households. If the husband is the only male child in the family he is usually advised to marry more wives to expand the family. This is because of the uncertainty that his wife will give birth to male children that will support the husband and the village in case of fighting. Generally, women reported wanting to have as many children as possible during their reproductive age because they are unsure of how many will survive and be able to offer support to the parents and siblings.

Early pregnancies

Nowadays girls start engaging in sexual activity at earlier age, around 14-15, which coincides with the onset of menstruation. During this time, the breasts grow, and the female genital is thought to expand to accommodate men. The availability of cell phones and the sharing of sexual videos within the community have been linked to an increase in early sexual encounters among the youth compared to the previous generations. The younger generation was also said to consume more sugary foods, providing them with excess energy that needed to be released. Culturally, girls have multiple boyfriends in various villages before marrying one. This is to secure a marriage candidate but also works as a competition among girls, with the number of boyfriends being associated with beauty. There is no economic benefit to this practice and girls refuse gifts from their boyfriends for fear of the parents finding out about their relationships. Sex is practiced only with those they potentially intend to marry. In fact, sex before marriage has become more common than in the past, however it is not socially accepted as it comes with a risk of unwanted pregnancies.

"We don't do it openly because it is not accepted, it is easier now because of the small distance between houses. If a girl is found to sneak out to have sex with her boyfriend, she will be beaten by the father and elder brothers and they

can even kill your boyfriend. This is because you are playing with the dowry by risking to get pregnant sleeping around. Your mother will also be beaten and blamed for not raising you properly."

As a result of early sexual encounters and lack of contraception, more girls are becoming pregnant before marriage.

"In the past, marriage was practiced through the official route. Now more girls get pregnant accidentally or run away with their boyfriends. Previously getting pregnant before the marriage would bring shame to the family, while now is happening more often and not perceived as shameful like before. Running away is also more accepted and considered a shortcut to the official marriage ceremony. However, you would rather run away than get pregnant accidentally."

If a girl becomes pregnant, the boy must marry her and provide support. However, this unplanned marriage often impacts the dowry he can pay. If the boy is unable to marry the girl or pay the dowry, she will remain in her parents' house until another man agrees to marry her. Typically, girls marry around the age of 15 which is believed to be an appropriate time for marriage. Multiple girls said that getting married and starting a family is their main aspiration, as there are limited alternative opportunities in the villages.

According to the comparative study, nearly one in two (n=14) were young mothers that delivered her first child when less than 18 years and 56% (n=19) had a mother that had more than 2 births prior. More than half mothers (n=19) that had a malnourished child were either single or widowed while 38% (n=13) came from a polygamous house). Nearly half of the sampled mothers (n=16) had a change in their marital status between the birth of the malnourished child and their sibling, with six separating, nine starting a new marriage and one becoming a widow.

Marriage in instalments

Four types of marriages exist in the community:

- **Official marriage:** based on mutual agreement between boyfriend and girlfriend. The boyfriend will formally visit the girls house and ask the father's for consent while also agreeing the number of cows to pay as part of the marriage arrangements;
- **Unexpected marriage:** in the case of unexpected pregnancy, the boyfriend is expected to marry her and support the child;
- **Run-away marriage:** a shortcut to the traditional marriage, were the girl runs away to the boyfriend's house at night and they start living together without the formality of an official marriage;
- **Forced marriage:** the girl is forced by the father to marry with a man usually due to lack of resources of the family;

The dowry is a requirement for all four types of marriage. However due to the lack of resources, specifically cattle, which is used as trading currency, the community started implementing alternative solutions. This includes paying the value of the agreed cows in cash and paying in instalments, if the future husband cannot provide the full amount upfront.

According to a customary law a minimum of 25 cows is exchanged for a wife, but this number can vary according to the agreement with the father of the bride. In cases of instalment payments, an agreement is set with the father of the girl who closely monitors the payments until the dowry is paid. This process can last multiple years, and the man is generally not allowed to marry another wife until the debt is fully settled.

For the father to accept the future husband, certain criteria must be met. Reasons for rejection include: i) if the boy is considered incapable of taking care of the wife and children, ii) if there is a blood relation between the two families, iii) if the boy has a reputation of a troublemaker or someone who enjoys fighting, iv) if the families are involved in revenge conflicts, and v) if the background of the person is not known.

In the community, a "good marriage" is the one with a formal approach. The process begins with a man asking the woman to be married, then she is expected to inform her parents, and subsequently, the boyfriend visits the

girl's house to formally ask the father for consent. The agreed dowry is paid, and the woman is then allowed to go to her husband's house. However, for the initial period after moving to her husband's home, typically six months to one year, she is not allowed to cook for her husband or the family. The first time she cooks is as part of a public ceremony where the community is informed that she has now taken full household-caring responsibilities can now provide food and water to anyone in her husband's family.

On the other hand, forced marriages were said to not last long, as women often feel unhappy leading to eventual separation, if the reason is considered valid by the parents and elders.

Birth spacing

The first child should be conceived during the first year of marriage. Women engage in sexual activity till the 4th - 5th month of pregnancy or till they feel uncomfortable as the belly grows. It is a common belief that women should pause any sexual intercourse while breastfeeding, as it is thought to cause a sickness known as *Thiang*. *Thiang* causes severe diarrhoea and vomiting in the child which can lead to acute malnutrition or even death. Therefore, women usually wait between 7 months to one year or more before re-starting sexual relations with their husbands. During this period, some husbands may have concubines or engage with their other wives. Generally, women reported to feel unhappy about their husbands having concubines and said that some agree to have encounters even before the recommended waiting period, while breastfeeding.

"We feel upset about our husband sleeping with a concubine, we keep the resentment and fight later. Some will tell the husband to stop but he will ask them to have sex with him. Some women go and fight the concubine but if he finds out he can beat you. For this reason, men often have concubines far away in other villages. To avoid this, some women accept to have sex while breastfeeding and hope that the baby will not get sick."

The decision about when to have another child is ultimately in the hands of the husband. If women wish to wait longer before conceiving again, they can try to discuss with their husbands to explain their reasons. However, the husband has the final say and can, in some cases, insist on having sexual relations before what is considered a safe time, leading to back-to-back pregnancies. Young parents, particularly in the first years of marriage, were said to have a smaller gap between pregnancies.

The pain experienced during delivery discourages some women from having children close to each other, but it is often forgotten after delivery. Instead, lack of financial resources was mentioned as the main reasons for wanting to wait longer in between pregnancies.

Contraceptive methods

Modern contraceptives are mostly unavailable in Fangak and a lack of awareness about them was seen in certain communities. To avoid unwanted pregnancies, women rely on having sex during safe days. To determine these safe days, they count days from the first day of their menstrual cycle, although the specific numbers vary ranging between 15-18 days after. Some women also said to just hope not to fall pregnant. Discussing about reproductive health with their mothers is considered a taboo and girls often learn about counting safe days from their peers. Additionally, women near Old Fangak mentioned a local organisation, which provides free support for women on reproductive health. This knowledge is then shared among women in the other villages.

Mothers often fear advising their daughters about family planning, as they worry that it might lead to early sexual activity and unwanted pregnancies. While some women have heard about family planning methods and condoms, these options are rarely available in private pharmacies. Among those who are aware of family planning, there is a fear that using such methods might impact negatively on their ability to conceive, and there is also concern about the husband's disagreement.

The primary purpose of engaging in sexual relations is procreation, women want to have as many children as possible and they will stop only once they cannot have them anymore. Only God was said to know how many children each woman would have. Generally, women of around 45 years of age stop having sexual intercourse with their husbands as they cannot have more children.

D. LOW BIRTH WEIGHT

Strength of the association with undernutrition in the scientific literature ⁶¹	+++	
Strength of association with undernutrition based on SECONDARY DATA REVIEW relevant to the study area ⁶²		
Strength of association with undernutrition based on primary data analyses, (SMART 2024)	NA	
Categorisation by the technical experts at the initial technical workshop		
Categorisation by the communities during the qualitative study		
Categorisation by the qualitative team		
Influence of historical and/or seasonal variations on undernutrition trends		
Overall interpretation	+	

SECONDARY DATA REVIEW¹⁶

- In South Sudan, 59,000 babies are born too soon each year and 4,600 children under five years of age die due to direct pre-term complications. Pre-term birth rate (<37 weeks) accounts for 13%.¹¹² Overall, the country has limited data on low birth weight.
- A recent study found that shaming was directed at the family and the woman if low birth weight was due to inadequate spacing between pregnancies¹¹³
- Risk factors associated with mothers giving birth to low birth weight children included: being a mother aged 25-29, 30-34, and ≥35 years, low social support, >4 ANC visits, not taking folic acid supplementation and taking antibiotics.¹¹⁴ Lack of pregnancy complication and having a salaried employment were instead protective factors¹¹⁵

PRIMARY DATA ANALYSIS FINDINGS (SMART 2024)

No significant associations found through logistic or linear regressions.

QUALITATIVE INQUIRY FINDINGS

In Fangak, babies were perceived to be born small primarily because of lack of food. Women don't eat well nor enough while pregnant and work heavily for long hours which are considered the main causes of low birth weight.

"When a mother works a lot during pregnancy and suffers, the child suffers as well and will be born with low birth weight."

According to the community, women are not supposed to carry out heavy tasks such as collecting water lilies or wood in the river. However, due to current hardship, women find themselves unable to rest, which often leads to illness, miscarriages, and pre-term deliveries.

In the past, children were born with healthier bodies because the community could engage in farming, had cattle, and women did not have to do hard work. However, after years of recurrent floods, the suffering has intensified as the environment became harsher, leading to a higher number of small babies at birth (Cf. **E Sub-optimal nutritional status of mothers & J Low access to quality diet**)

According to the comparative study, 42% malnourished children were perceived to be born very small or small (n=14) and were overall smaller than their non-malnourished sibling. Only 3 children were delivered earlier than expected while most (n=27) were born around the due

in Unity State, Republic of South Sudan'.

¹¹² Every Preemie Scale, 'PROFILE OF PRETERM AND LOW BIRTH WEIGHT PREVENTION AND CARE SOUTH SUDAN'.

¹¹³ Kane et al., 'Social Norms and Family Planning Decisions in South Sudan'.

¹¹⁴ John Bosco, John Bosco, and Kareodu, 'Magnitude and Associated Risk Factors for Low Birth Weight in Bentiu State Hospital

¹¹⁵ John Bosco, John Bosco, and Kareodu.

date. Nearly half (n=14) were born with a worse health than their sibling, with all experiencing complications at birth. Six children experienced major complications.

E. SUB-OPTIMAL NUTRITIONAL STATUS OF MOTHERS

Strength of the association with undernutrition in the <i>scientific literature</i> ⁶¹	+++	
Strength of association with undernutrition based on SECONDARY DATA REVIEW relevant to the study		
area ⁶²		
Strength of association with undernutrition based on primary data analyses (SMART 2024)	++	
Categorisation by the technical experts at the initial technical workshop		
Categorisation by the communities during the qualitative study		
Categorisation by the qualitative team	++	
Influence of historical and/or seasonal variations on undernutrition trends	+++	
Overall interpretation	+++	

SECONDARY DATA REVIEW¹⁶

Indicator	Fangak county		
DIW in the negulation	40.0% [44.2% - 35.8%]		
	(FSNMS 2023)		
	52.4%		
	(SMART 2023)		
Brognant woman (%)	10.6%		
	(SMART 2022)		
	23.1%		
	(SMART 2019)		
	47.6%		
	(SMART 2023)		
Lactating women (%)	63.8%		
	(SMART 2022)		
	36.1%		
	(SMART 2019)		
	0%		
	(SMART 2023)		
Mother	0%		
SAM by MUAC	(SMART 2022)		
	2.1%		
	(SMART 2019)		
	12%		
	(SMART 2023)		
Mother	9.2%		
MAM by MUAC	(SMART 2022)		
	32.2%		
	(SMART 2019)		
MODW	4[2-5]		
	(FSNMS 2023)		

Risk factors¹¹⁶: having a mother eating fewer meals during pregnancy¹¹⁷

- Maternal mortality in the country is one of the highest in the world, with 789 per 100,000 live births.¹¹⁸
- In South Sudan less than 50% of women in most states met the required dietary diversity, 36% in Jonglei.¹¹⁹
- In South Sudan, 34% of women in reproductive age were suffering with anaemia.¹²⁰

¹¹⁶ In the context of this Link NCA report, a risk factor means a factor that increases a child's risk of undernutrition, whereas a protective factor means a factor that reduces this risk. For example, according to the sources cited, children aged between 6 and 23 months had a higher risk of acute malnutrition.

¹¹⁷ Action Against Hunger, 'Nutrition Causal Analysis Aweil East County, Northern Bahr El Ghazal State, South Sudan'.

¹¹⁸ United Nations Office for the and Coordination of Humanitarian Affairs, 'Humanitarian Needs Overview South Sudan'.

¹¹⁹ World Food Programme, Food Agriculture Organisation, and United Nations International Children's Emergency Fund, 'Food Security and Nutrition: South Sudan (Data from 2020)'.

¹²⁰ Action Against Hunger, 'Qualitative Assessment of Risk Factors of Undernutrition Based on the Link NCA Methodology January 2020 - June 2020. Renk County, Upper Nile State, South Sudan'.

Community members would like to prepare special meals for pregnant and I breastfeeding women, a diet with more protein (meat, lentils, milk, fish), vegetables, and fruit. However, because of limited financial resources and food access, pregnant and breastfeeding women eat the same meal as the rest of family e.g. kisra with water. Some households with more resources adapt their meals and make meat soup or porridge for pregnant and breastfeeding mothers. Pregnant women do not eat more because they do not have appetite, or do not feel well. There are no forbidden foods per se, but women experience certain taste and smell aversions (fish, for example). Some women are also worried to face complications during the delivery if their baby is too big, which impacts the quantity of consumed food during pregnancy.¹²¹

PRIMARY DATA ANALYSIS FINDINGS (SMART 2024)

According to the Linear regression results, children that had a mother with a higher MUAC were less likely to be wasted on the basis of weight for height z-scores (p=0.024) and MUAC (P=0.004).

QUALITATIVE INQUIRY FINDINGS

Mothers reported not eating enough food which was perceived to cause the reduction of the quantity of breastmilk they produced. They work long hours away from home during the day often eating very little. Single women, widowed or divorced, were said to be the most vulnerable as they have reduced support and have to work and care for their children alone.

"We don't have enough milk now because we don't eat good food and the only good food available is sorghum, maize and fish, if there is no food at home we depend on wild fruits from the bush and from the river."

The dry season, especially the months from March to July, are very difficult for women as there is less available food. Women, on average, consume only one meal per day in the evening during this period, relying extensively on wild foods like *wor*¹²², moringa, and other bush leaves as well as water lily, *keeh* and *guan*. In the past, the presence of cattle facilitated a healthier diet for women, being able to incorporate milk into their meals and give it to their children. However, since 2019-2020 the floods have caused nearly all cattle to perish and milk is now very difficult to find.

In terms of diet, specific foods are recommended or discouraged for pregnant and breastfeeding women. Pregnant women are advised to avoid certain foods like *kop* (especially from the 7th month onward), dried mud fish, and maize due to the fact that they are hard to digest and can potentially cause constipation. If a particular food gives women nausea, they should stop eating it because it is perceived as a sign that it may not being good for the baby, although this may vary from one pregnancy to another. Instead, *walwal* is highly recommended for pregnant women, especially when consumed with milk or fish soup made from Tilapia or Lek. Other recommended foods with fish include *kisra*¹²³ and *pocho*¹²⁴ as all are easily digestible. Pregnant women are also encouraged to drink powdered juice, hibiscus tea, or milk if available, for energy and weight gain. Coffee is not recommended during pregnancy as it may cause stomach pain and affect the child.

¹²¹ Action Against Hunger.

¹²² Local herb, english or latin translation uknown

¹²³ A sorghum-based crepe.

¹²⁴ thick maize or sorghum milled mass

After delivery, women are advised to consume fish, especially Tilapia or Lek, with *walwal*, *kisra*, or *pocho*¹²⁴, along with sugar, coffee, and juice. If milk is available, *walwal* and milk are considered the best post-delivery foods. Coffee is used as a painkiller for discomfort caused by clotted blood in the abdomen, while the other foods help women regain energy and aid milk production. However, *kop* is once again not recommended after delivery due to its difficulty in digestion as the stomach is sensitive during this period. Breastfeeding women are advised to avoid coconut juice, red palm oil, fruit, and catfish, as they may cause diarrhoea in the child. Overall, apart from these specific recommendations, there is minimal variation in the diet of women before, during and after pregnancy.

According to the comparative study, the majority of mothers (n=26, 76%) reported being in a worse health situation when pregnant with their malnourished child. Out of those 16 suffered with nausea, 19 lost appetite, 1 was anaemic and 11 felt dizzy and 19 were in physical pain such as abdominal pain, bleeding, fever, joint pain. Nearly one in three mothers had health issues during the lactating period of their malnourished child (n= 12) with most experiencing physical pain (n=10) while few others reported cases of anaemia and loss of appetite. 85% of the mothers reported having less quality and quantity of foods when pregnant with their malnourished child. The reasons were: flooding (23, 68%), loss of income sources (21, 62%), heavy workload (19, 56%), loss of cattle (15, 44%), displacement (12, 35%), insecurity (7, 21%) change in marital status (n=2, 5%), or a combination of those. 65% (n=22) mentioned experiencing a change in their eating habits.

V. MENTAL HEALTH AND CARE PRACTICES

F. CAREGIVER WELLBEING

Strength of the association with undernutrition in the <i>scientific literature</i> ⁶¹	+++	
Strength of association with undernutrition based on SECONDARY DATA REVIEW relevant to the study	+++	
area ⁶²		
Strength of association with undernutrition based on primary data analyses (SMART 2024)	NA	
Categorisation by the technical experts at the initial technical workshop	+	
Categorisation by the communities during the qualitative study		
Categorisation by the qualitative team	++	
Influence of historical and/or seasonal variations on undernutrition trends	++	
Overall interpretation	++	

SECONDARY DATA REVIEW¹⁶

Indicator	Fangak county		
Rehavioural stress cleaning issues	29%		
Benavioural stress: sleeping issues	(Finn Aid 2015)		
Rehavioural stress; increased aggression	4%		
Benavioural stress: increased aggression	(Finn Aid 2015)		
Rehavioural stress isolation	8%		
Benavioural stress: isolation	(Finn Aid 2015)		
Behavioural stress: difficulty in concentrating/feeling	12%		
tired	(Finn Aid 2015)		
Clung haboviour (children	2%		
Clung behaviour (children	(Finn Aid 2015)		
Rehavioural stross: feeling fear	18%		
Benavioural stress. reeling lear	(Finn Aid 2015)		

In South Sudan, access to Mental Health and Psychosocial Support (MHPSS) remains inadequate. Approximately 2.5 million cases are affected by mental health disorders.¹²⁵ Decades of conflict have deeply affected the psychosocial well-being of people, with a particular impact on women and children and those who were forced to flee. Feelings, such as being fearful and anxious and feeling uncertain and confused about the future are persistent in people. Negative emotions were linked to factors such as ongoing conflict or rumours about it, separation from the family, lack of freedom and food insecurity.

Internally displaced women reported that a range of factors such as not being sure that their children are well cared for, lack of social connection within family and community, lack of cultural ties, spirituality and traditions and not having a peaceful society impacted their wellbeing. For many refugees, "home" is a source of emotional support, identity, a physical connection to the past and a strong symbol of continuity. The mutual support becomes a burden when families are divided.¹²⁶

- People without access to basic needs experienced more symptoms of impairment, trauma, anxiety and depression. Elevated levels of distress were reported among refugee and IDP children.¹²⁷
- Restrictive marital practices and gender norms are major drivers of both intimate partner and non-partner violence. Men and women believe that a woman should tolerate violence in order to keep the family together and that there may be instances when a woman deserves to be beaten. During armed conflict, gender-based violence has been used as a weapon to attack the community. Many women reported having nightmares, loss of memory, lack of concentration, stress and thoughts of revenge or suicide. Many coped silently to protect themselves and their children from stigmatization or exclusion.¹²⁸
- Stress signs, in both adults and children in Fangak, included nightmares, increased aggression, withdrawal behaviours/isolation, difficulty in concentrating/feeling tired, clung behaviours and fear.¹²⁹ No counselling services are currently available¹³⁰ Beating children was also linked to overwhelming frustration of mothers who do not succeed in finding food for their children. If a child complains persistently due to hunger this makes mothers very stressed ¹³¹ Exhausted and emotionally strained by the many household responsibilities, women involve children in some domestic and childcare practices.

PRIMARY DATA ANALYSIS FINDINGS (SMART 2024)

No significant associations found through logistic or linear regressions.

QUALITATIVE INQUIRY FINDINGS

Both men and women feel generally stressed. A significant contributor to this stress is the lack of food, particularly outside of food distribution periods. Food finishes quickly, especially in

¹²⁵ United Nations Office for the and Coordination of Humanitarian Affairs, 'Humanitarian Needs Overview South Sudan'. ¹²⁶ United Nations High Commissioner for Refugees, 'CULTURE, CONTEXT AND MENTAL HEALTH AND PSYCHOSOCIAL WELL-BEING OF REFUGEES AND INTERNALLY DISPLACED PERSONS FROM SOUTH SUDAN'.

¹²⁷ United Nations High Commissioner for Refugees.

¹²⁸ United Nations High Commissioner for Refugees.

¹²⁹ Finn Church Aid, 'Needs Assessment Report'.

¹³¹ Action Against Hunger, 'Qualitative Assessment of Risk Factors of Undernutrition Based on the Link NCA Methodology January 2020 - June 2020. Renk County, Upper Nile State, South Sudan'.

bigger families and women start worrying because children do not have food, start crying often and get sick. The absence of husbands, who are away fishing or selling dry fish for extended periods, further increases stress, leaving women to cope alone.

"When men are away, they are usually gone for a long time, even one year, because 6-7 months are spent fishing and drying with 2-3 additional months selling it. When he comes back, he buys food which will be enough for some months and then goes back again. Repeated migration happens more if the man has more wives as the resources finish quickly. We feel bad because we like to have our husband around, he will provide food and children and you do not need anything else. We also feel protected and less lonely. When men are away, now there is no farm, cattle, garden and you do not have anything."

Single women are particularly vulnerable, bearing the hardship of the situation and the lack of support while all the responsibilities related to the house such as food provision, and childcare fall on their shoulders. Since 2013, many men have lost their lives due to the persistent conflict, leaving numerous women widowed. Women feel exhausted and in pain because of workload, some expressing that at times it feels like wanting to die. However, as there is no alternative, they usually power through the pain and keep working for their children.

"You do not even have the time to feel, you just do what you need to do because nobody will do it for you."

The stress increases when the husband does not fulfil his responsibilities as breadwinner of the family and does not provide food or money for the family. Women said "Your heart is heavy when you feel you are doing it all alone". Some reported wanting to divorce if the husband is not supporting the family while others said to lose their patience easily when the children disobey and beat them to realise the frustration towards their husband. Women also disclosed that men often use drinking as a coping mechanism when unable to support their families. This increased their concerns who not only have to care for the children and ensure their survival but also need to care for their husbands.

"We feel sad and stressed because when you have many children with a man who drinks you cannot leave and you will drown in responsibilities. If a child is hungry they will always come to you and you are not able to provide, you do not have clothes to wear you just feel like dying."

Women on the other hand stay away from drinking as they would not be able to care for their children or even risk being beaten by their husbands. The presence of concubines¹³² and new wives adds another layer of stress for women, leading to feelings of frustration, jealousy, and concern for the already limited resources. When a man takes on a new wife, women often experience a shift in the relationship dynamics. Love, attention, and support usually decrease. Even if resources are divided equally, the previous wives, having more children, find it inadequate. While women generally prefer an additional wife over a concubine to keep resources within the same family, this situation creates tension, and some women may fight the other women for the husband's attention, leading to domestic conflicts and violence. Other women suffer in silence hoping that the husband will eventually give them more attention.

In addition, there is a persistent fear of losing their homes due to the unpredictable rain that can flood the village at any time, requiring multiple efforts to pump out water during the rainy season. Both men and women control the dykes daily but it's the men's responsibility to reconstruct when they break. The stress was said to increase during the rainy season due to the increased risk of floods. Men reported feeling stressed when unable to provide for the family, when a child was sick or when conflict would start. While some admitted to playing

¹³² Women outside of the household with whom the husband has sexual reltionships.

dominos or having conversations with villagers, families, or wives as coping mechanisms, only a few acknowledged resorting to alcohol. Culturally in fact men said they can show emotions like frustration, worry, sadness or anger but cannot cry as this is seen by the community as a weakness because "crying will not improve the situation".

Gender-based violence in the form of sexual assault is also present in the community. Despite women feeling generally safer in the village compared to the past, they reported feeling afraid when walking alone outside of the village to look for firewood or fetch water. To reduce this risk, they often walk in groups for protection. Other women mentioned feeling more vulnerable when the husband is away but having neighbours close by helps them feel safer at home, especially at night. Women generally are not scared of reporting abuse to the relevant authorities in the village.

"We now go in groups because if there is a wild animal or a man we can protect each other. It's also risky when we go to fetch water or when our husband is away because someone might come in the house. Some houses don't have doors so it's easy to get in. If rape happens, we shout in the moment and go to report to the police after. We don't fear to report because the person that rapes us will have even more fear of being found. When found they will have to give a cow to your husband"

When comparing malnourished children with their non-malnourished siblings, one in two mothers (n=17) felt that their mental health was worse when pregnant with their malnourished child. Of those, 5 felt anxious, 13 felt sad, 2 felt abandoned, 11 felt difficulty in concentrating and 5 experienced sleeping disorders. 28% of mothers (n=8) reported being in a worse mental health situation with their malnourished child when breastfeeding mentioning sadness(n=5), anxiety (n=4), difficulty in concentrating (n=4) and nightmares (n=2).

G. SUB-OPTIMAL BRESTFEEDING PRACTICES

Strength of the association with undernutrition in the scientific literature ⁶¹	+++	
Strength of association with undernutrition based on SECONDARY DATA REVIEW relevant to the study	++	
area ⁶²		
Strength of association with undernutrition based on primary data analyses (SMART 2024)	++	
Categorisation by the technical experts at the initial technical workshop		
Categorisation by the communities during the qualitative study		
Categorisation by the qualitative team	+	
Influence of historical and/or seasonal variations on undernutrition trends	+	
Overall interpretation	++	

SECONDARY DATA REVIEW¹⁶

Indicator	National	Jonglei State	Fangak county
			67.3%
		64.8%	(SMART 2023)
	51.3%	(FSNMS 2023)	50%
EDF	(FSNMS 2021)	32%	(SMART 2022)
		(FSNMS 2021)	0%
			(SMART 2019)
Mixed feeding	45.1%	9.4%	32.7%
Mixed reeding	(FSNMS 2021)	(FSNMS 2023)	(SMART 2023)
			100%
		86.2%	(SMART 2023)
Early initiation of RE	77.2%	(FSNMS 2023)	95.3%
Early Initiation of Br	(FSNMS 2021)	85%	(SMART 2022)
		(FSNMS 2021)	92.9%
			(SMART 2019)
			93.4%
Continuous	91.3%	89%	(SMART 2022)
breastfeeding at 1y	(FSNMS 2021)	(FSNMS 2021)	100%
			(SMART 2019)
			95.4%
		88%	(SMART 2023)*
Continuous	78.9%	(FSNMS 2023)	100%
breastfeeding at 2 y	(FSNMS 2021)	82%	(SMART 2022)
		(FSNMS 2021)	92.9%
			(SMART 2019)

Risk factors¹³³: non-exclusive breast feeding¹³⁴¹³⁵, not receiving colostrum.¹³⁶

Protection factors¹⁷: receiving appropriate continued breast-feeding up two years.

- In 2020 national rates for exclusive breastfeeding reached 51%, a 17% decrease from the previous year (68.1%). Other than breastmilk, children below 6 months were introduced to water (17%), milk (9.5%), formula (7.6%) and porridge (15.2%). Jonglei state recorded one of the highest proportion of children who were introduced to porridge and milk (35% and 33.5%), before attaining the required age for introduction of complementary foods.
- Breastfeeding practices by the mothers is relatively good in Fangak. All infants from 0-23 months initiated breastfeeding immediately after birth. Mothers did not give colostrum to

¹³³ In the context of this Link NCA report, a risk factor means a factor that increases a child's risk of undernutrition, whereas a protective factor means a factor that reduces this risk. For example, according to the sources cited, children aged between 6 and 23 months had a higher risk of acute malnutrition.

¹³⁴ The study was conducted in Tierkidi refugee camp in Gambella region, western Ethiopia from February to March, 2015. The camp is home to nearly 50,000 refugees who fled from the ongoing war in South Sudan.

¹³⁵ Gezahegn, 'Factors Associated with Acute Malnutrition among South Sudanese Children in Tierkidi Refugee Camp: A Case-Control Study'.

¹³⁶ Action Against Hunger, 'Nutrition Causal Analysis Aweil East County, Northern Bahr El Ghazal State, South Sudan'.

their children as it is considered dirty, thicker and yellower than breast milk. The decision to stop breastfeeding is linked to the ability of the child to eat alone, and to the return of the husband in the bed of the mother. While exclusive breastfeeding is recommended up to 6 months, water and milk are introduced very early. Children usually receive their first water within the first month. Mothers introduce cow milk either because they need to leave the children for a while, or because they feel that children are not satisfied with breast milk only. While children are supposed to suck on demand the frequency depends on mothers' availability.¹³⁷ Mothers considered breast pain as a barrier to breastfeeding and a minority of mothers mentioned breastfeeding as releasing pressure in their breasts. Mothers also explained that they felt weaker while breastfeeding. A belief that prolonged breastfeeding to stop breastfeeding when the child turned one.¹³⁸

PRIMARY DATA ANALYSIS FINDINGS (SMART 2024)

According to the Logistic regression results, children that were put to breast within the first hour were less likely to be wasted on the basis of their combined weight for height z-scores and MUAC res (p=0.003). Additionally, children with a mother that perceived to have enough breastmilk had lower odds of being of being wasted on the basis of weight for height z-scores (p=0.001).

QUALITATIVE INQUIRY FINDINGS

Mothers initiate breastfeeding after they deliver the placenta, usually within the first hour although it might take longer in cases of complications. Young children are kept protected from the wind as if a child catches a cold the nose blocks and restricts their ability to breastfeed. While mothers are generally sensitised about the importance of exclusive breastfeeding, they reported having insufficient milk production due to their limited diet.

When prompted about what they do when they do not have enough milk and the child cries mothers admitted resorting to alternative options such as giving milk or the upper part of yogurt (*piwcaak*), fish broth from Tilapia or Lek (without flesh), or even powdered milk if available from the market. Only few mothers said to give water to children before 6 months. Around 10-15 years ago, giving water and milk before six months was a common practice among the community, however NGO led sensitisation sessions have helped decreasing this practice. However, during discussions on common childhood illnesses most mothers gave herbal remedies to children under six months (Cf. **Childhood illnesses**)

Not having enough milk and hearing their child crying because of hunger makes them worry as there are not many alternatives. A decade ago there was enough land to cultivate and cows providing milk daily, which supported breastmilk production. Now, most of the cows are dead making cow's milk a luxury item while powder milk is either not available or very expensive. Additionally, women believe that the quality of their diet affects the quality of the breastmilk with non-nutritious foods like waterlily believed to cause child's stomach pain and bloat. Breastfeeding is more difficult in the first half of the year when the weather is hotter and there

¹³⁷ Action Against Hunger, 'The Underlying Causes of Malnutrition in Old Fangak Payam'.

¹³⁸ Action Against Hunger, 'Qualitative Assessment of Risk Factors of Undernutrition Based on the Link NCA Methodology January 2020 - June 2020. Renk County, Upper Nile State, South Sudan'.

is less food. Instead from August till December more food is available and women are able to eat and produce breastmilk in larger quantities (Cf. E **Poor nutritional status of women**).

Heavy workload away from the house negatively impacts the ability to breastfeed on demand as mothers leave children for several hours in the care of other siblings or neighbours. Children are breastfed mainly in the morning and at night meaning that they may stay hungry during the day as milk extraction is not practiced when the mother is away for longer hours. When the child is very small, not yet crawling, mothers carry their children along with them. Mothers know that it is time to breastfeed when the breasts start leaking, the breast is getting hard, or the child starts crying.

"If you are not close to the baby this is when you run to feed them, because if the breast is like this it means that you left it for too long and the child is hungry."

Spending many hours in the river or under the sun is perceived to spoil breastmilk. The milk becomes hot or cold and makes them sick typically with diarrhoea. To prevent this, mother usually warm up the milk by taking a hot bath, sitting in front of the fire, or express the first milk if hot before breastfeeding.

Having sexual intercourse while breastfeeding is also perceived to negatively affect the child, so women avoid sex to protect their children from *Thiang* (cf. acute malnutrition)

Women breastfeed on demand when close to their children. Some mothers mentioned the practice of shaking the child to help settle the milk in the stomach. Boys were said to breastfeed more than girls, but feeding satisfaction was linked more with quantity of milk received rather than child sex. Breastfeeding is interrupted when a mother becomes pregnant with a new baby as it is believed that continued breastfeeding during pregnancy could potentially make the child sick.

According to the comparative study, all mothers initiated their malnourished and nonmalnourished children within the first hour of birth and 88% of mothers (n=30) were still breastfeeding their malnourished child. Only 5 mothers reported giving their children other liquids within the first six months while none gave any solid/semi-solid foods.

H. SUB-OPTIMAL COMPLEMENTARY FEEDING PRACTICES OF CHILDREN 6-23 MONTHS

Strength of the association with undernutrition in the <i>scientific literature</i> ⁶¹		
Strength of association with undernutrition based on SECONDARY DATA REVIEW relevant to the study	++	
area ⁶²		
Strength of association with undernutrition based on primary data analyses (SMART 2024)	++	
Categorisation by the technical experts at the initial technical workshop		
Categorisation by the communities during the qualitative study		
Categorisation by the qualitative team	++	
Influence of historical and/or seasonal variations on undernutrition trends		
Overall interpretation	++	

SECONDARY DATA REVIEW¹⁶

Indicator	National	Jonglei State	Fangak county
			33.3%
		32%	(SMART 2023)
Introduction to solid	96.3%	(FSNMS 2023)	20%
and semi-solid food	(FSNMS 2021)	95%	(SMART 2022)
		(FSNMS 2021)	59.3%
			(SMART 2019)

			10.8%
		27.2%	(SMART 2023)
Minimum meal	28.7%	(FSNMS 2023)	0.88%
frequency	(FSNMS 2021)	26%	(SMART 2022)
		(FSNMS 2021)	2.9%
			(SMART 2019)
			13.8%
		17.3%	(SMART 2023)
Minimum diet diversity	24.8%	(FSNMS 2023)	6.5%
(MDD)	(FSNMS 2021)	17%	(SMART 2022)
		(FSNMS 2021)	2.2%
			(SMART 2019)
Iron rich foods			5.5%
consumption			(SMART 2019)
		2.8%	
Minimum acceptable	5.9%	(FSNMS 2023)	
diet (MAD)	(FSNMS 2021)	4%	
		(FSNMS 2021)	

Opposed to liquids, solid foods are introduced very late, i.e. at around 12 months of age. The type of food given as complementary food is not fully appropriate (eg. water and milk not fully boiled, thick porridge made of *madida*¹³⁹, no fruit or vegetables). This porridge leads to children feeling full when they have not eaten the proper quantity. Children were said to eat only 2 meals per day like adults. Until the child is totally weaned, they have a separate bowl and eat under supervision of the mother. After this age children eat together from a common bowl which can sometime lead to food competition. Once a child is no longer breastfed, food intake remains problematic as it is affected by the food insecurity in the region¹⁴⁰.

PRIMARY DATA ANALYSIS FINDINGS (SMART 2024)

According to the Logistic regression results, children that ate porridge in the 24h previous the survey were less likely to be wasted on the basis of their MUAC (p=0.008) and combined weight for height z-scores and MUAC (p=0.0011). According to the Linear regression results, children that had a higher Minimum Dietary Diversity Score (MDDS) as part of infant and young child feeding practices were less likely to be wasted on the basis of their MUAC (p=0.006)

QUALITATIVE INQUIRY FINDINGS

Solids are typically introduced around 7 months¹⁴¹, starting with foods like the head of *walwal*, porridge, and cow milk if available. After a few months, fish sauce with fish chuncks is introduced as cow's milk or milk powder are not very available. *Kisra*, a sorghum-based crepe, is another food given to children as part of complementary feeding, softened with fish sauce, along with *walwal*. Harder-to-digest foods like *kop* are introduced between 12-24 months when the child has more teeth and can chew. Mothers observe their children's reactions to these foods, delaying the introduction of harder-to-digest ones if there are adverse reactions like diarrhoea or vomiting. Traditionally, children love drinking milk, which is considered a staple element in the local diet, and believed to prevent diseases, whereas fish may sometimes

¹³⁹ Made with fenugreek, flour, milk, sugar, salt

¹⁴⁰ Action Against Hunger, 'The Underlying Causes of Malnutrition in Old Fangak Payam'.

¹⁴¹ Discrepancy between primary and secondary data sources can be attributed to a 20y difference between studies data collections, justifying the change.

cause diarrhoea in children. However, due to the lack of cattle, young children are now forced to consume more fish, despite not liking its taste.

"10-15 years ago, we had cows and land; waterlily wasn't our main food, and children enjoyed drinking plenty of milk. Milk is in our heritage – all our ancestors consumed it. Even if we mixed waterlily with milk, our children would be happy to eat it, as they don't like fish. Now, there's no fresh milk, and powdered milk is hard to access because you have to travel to Old Fangak. While we prefer fresh milk, our children are also very happy to drink the powdered milk."

From August to December, children can enjoy a more diverse diet, due to the maize harvest and increased availability of vegetables. For children under five years of age and especially for children under two years, it is advised to avoid hard-to-digest foods like boiled maize. Fatty fish such as catfish (*pet*) or mudfish (*luth*) are not recommended due to their high fat content, which prevents the child to consume other foods and additionally cause diarrhoea and vomiting. Pumpkin was said to have similar effects. In the absence of cow's milk, recommended foods for children under-five include fish like Tilapia and Lek, as it is believed that these were the first two fish created by God. Moringa is considered good for cleaning the child's stomach and preventing diseases. Coconut juice and hibiscus juice are suggested for energy while kisra is also recommended because it is easily digested.

In the study comparing malnourished children to their non-malnourished siblings' mothers reported introducing complementary foods after the 6th month. Majority of mothers (n=28) said to feed all their children with the same type of foods and treating them equally.

I. LOW QUALITY OF INTERACTIONS BETWEEN CHILD AND CAREGIVER

Strength of the association with undernutrition in the <i>scientific literature</i> ⁶¹	+	
Strength of association with undernutrition based on SECONDARY DATA REVIEW relevant to the study	++	
area ⁶²		
Strength of association with undernutrition based on primary data analyses (SMART 2024)	NA	
Categorisation by the technical experts at the initial technical workshop		
Categorisation by the communities during the qualitative study		
Categorisation by the qualitative team	+	
Influence of historical and/or seasonal variations on undernutrition trends	+	
Overall interpretation	+	

SECONDARY DATA REVIEW¹⁶

- Due to the high women's workload, many children are left alone, especially during the rainy season. If neighbours, or neighbour's children, are available during the day, they help the family and look after their children. A baby aged from 6 months can be left to the care of their older siblings. Most mothers do not perceive risks to leave their baby with an older sibling. Generally, the oldest child takes care of the youngest. A child is old enough to take care of a sibling when they reach the age of 7 years, however it would be unlikely for a caring child to be a boy. In some villages, when mothers are away and there is no adult to take care of their children, the woman prepares a meal in the evening or early in the morning and leaves the food for the children. In some households, children do not have food during the day until their mother comes back in the evening. ¹⁴²
- Positive and attentive interactions between fathers and children are limited as many fathers died during the war or are working and living in another area. Older children have many

¹⁴² Action Against Hunger, 'Qualitative Assessment of Risk Factors of Undernutrition Based on the Link NCA Methodology January 2020 - June 2020. Renk County, Upper Nile State, South Sudan'.

responsibilities because they are left at home by themselves. They must take care of their younger siblings, go to the market, cook, bathe their siblings, etc. It may happen that a neighbour beats another's child, but this is not well accepted because it is believed that physical corrective measures should be conducted only in the privacy of one's home.¹⁴³

PRIMARY DATA ANALYSIS FINDINGS (SMART 2024)

No significant associations found through logistic or linear regressions.

QUALITATIVE INQUIRY FINDINGS

Children typically have closer contact with their mothers, who, despite working throughout the day, spend more time around the house than their fathers. It is usually while cooking that mothers find a bit of time to play and cuddle with their children as well as in the night.

"At night after work you talk, breastfeed, kiss, and tickle your children and when you see them smiling all your worry disappear for a bit."

Men often go fishing during the day or even for extended periods, limiting the interaction with their children.

"We (men) don't have time on a daily basis, but when home we prioritise spending time with our children; they need to get to know you. Long fishing trips mean that we are away for months, and even if you fish during the day and return in the evening, you may not see your children. In the past, our work was closer to home – in the farm or with cattle – allowing more interaction with our children during the day. Food was abundant, and there was no need to go far for fishing or spend long periods away. Migration was limited and men would go and for a shorter duration."

Fathers interact with their children mainly during the night, sharing stories and encouraging them to be a good person. However, this interaction is limited, as men and women usually sit separately at night, and mothers sit next to the children. Before the floods, parents used to have more time to spend together as a family as mothers did not have to go for water lily collection and men did not go fishing far away.

While away, mothers leave their young children in the care of other siblings, giving them instructions on how to feed and keep them clean. Children as young as 8 or 9 are considered capable of looking after their younger siblings, with some mothers leaving babies in the care of even younger children. Once a child starts walking or even just crawling, they may be left in the care of other children for a few hours. For more extended periods, mothers often seek assistance from elderly in the house or neighbours, highlighting the crucial role of the neighbours in providing support within the community. Mothers said they would like to have more time to spend together with their children but the current situation due to the heavy workload simply does not allow them.

"When you come back home from a full day collecting water lily, the young child wants to be with you but you need to cook, so you breastfeed them and leave them with a sibling to carry because you don't have time and need to cook for the family."

Moreover, when they need to take one child to the hospital the others will be left behind for long periods. The rainy season was very busy but despite the peak in farming activities everyone worked closer to home and food was enough for the survival of the family. Nowadays between January and April, men and women stay more around the house engaged in house repair work, which contributes to a slight increase in interaction time with their children.

¹⁴³ Action Against Hunger.

FOOD, SECURITY AND LIVELIHOODS

J. LOW ACCESS TO QUALITY DIET

Strength of the association with undernutrition in the <i>scientific literature</i> ⁶¹	++	
Strength of association with undernutrition based on SECONDARY DATA REVIEW relevant to the study		
Strength of approximation with underputrition based on primary data analyzed (SMART 2024)		
Strength of association with undernutition based on primary data analyses (SMART 2024)	+++	
Categorisation by the technical experts at the initial technical workshop		
Categorisation by the communities during the qualitative study		
Categorisation by the qualitative team	+++	
Influence of historical and/or seasonal variations on undernutrition trends		
Overall interpretation	+++	

SECONDARY DATA REVIEW¹⁶

Indicator	Fangak county
HDDS <4/<3*	50.4%
	(SMART 2023)
	76.3%
	(SMART 2019) *
	46.9%
	(SMART 2023)
	51%
IIII food consumption convet (noov)	(FSNMS 2023)
HH lood consumption score" (poor)	57.5%
	(SMART 2022)
	50.1%
	(SMART 2019)
	36% 0 days
Vitemin A Dich Foods consumption	63% 1-6 days
Vitamin A Rich Foods consumption	1% 7 days
	(FSNMS 2023)
	9% 0 days
Protoin Rich Foods consumption	85% 1-6 days
Protein Rich Poous consumption	6% 7 days
	(FSNMS 2023)
	29% 0 days
Hom Iron Dish Foods consumption	69% 1-6 days
Hem Iron Rich Foods consumption	2% 7 days
	(FSNMS 2023)
	Little/no 11%
Household Hunger Scale	Moderate 89%
	Severe 0%
	(FSNMS 2023)

- The main drivers of food insecurity include shocks such as floods and dry spells, inflation and rising food prices, continued disruption of livelihoods due to conflict and insecurity and household-level stressors, like death of the breadwinner, GBV, morbidity and mortality due to poor hygiene and the lack of access to essential basic services. Since 2013 the situation has progressively worsened, reaching its peak in 2022. Gender norms influence food access and displaced people are more likely to be severely food insecure.¹⁴⁴
- In 2022, 85% of respondents reported not having enough food or money.¹⁴⁵ At the national level, cereals and vegetables are the two most frequently consumed food groups. The least consumed food groups are fruits and meat/fish. Jonglei state ranks high in the

¹⁴⁴ United Nations Office for the and Coordination of Humanitarian Affairs, 'Humanitarian Needs Overview South Sudan'.

¹⁴⁵ SMART 2022, 'Final Report of Nutrition and Mortality SMART Survey Fangak County of Jonglei State, South Sudan'.

consumption of meat and fish. This is because of the presence of rivers, key sources of fish for most of the year¹⁴⁶, including the lean season.¹⁴⁷

- Vegetable consumption is generally based on household production. The 3 most cultivated crops are sorghum, maize and groundnuts.¹⁴⁸
- 80% of the population of Fangak depends predominantly on food aid. Low 'own-production' is linked to flooded farmlands that can no longer be used for cultivation.¹⁴⁹
- The relatively good HDDS and FCS is largely attributed to the provision of food aid.¹⁵⁰ 92% reported falling into moderate hunger over the previous 4 weeks.¹⁵¹ The majority of households consume either 1 or 2 meals per day (generally breakfast and dinner).¹⁵²
- Traditionally, male members are served first. Boys eat with their fathers, eating more food than girls who eat with their mothers.¹⁵³
- Food insecurity at household level shows high levels of vulnerability to female family members, especially women gone through a divorce.¹⁵⁴

PRIMARY DATA ANALYSIS FINDINGS (SMART 2024)

According to the Linear regression results, children that lived in a household with a higher diet diversity score (HDDS) were less likely to be wasted on the basis of weight for height z-scores (P=0.04). More specifically, children that lived in a house were meat, inclusive of fish and oil or fat were consumed as food groups were less likely to be wasted on the basis of weight for height z-scores (p<0.001 and p= 0.013) as well as on the basis of combined weight for height z-scores and MUAC (p=0.001 and p=0.015). Additionally, children that consumed meat in the 24h prior the survey were less likely to be wasted on the basis of combined weight for height z-scores and MUAC (p=0.040)

QUALITATIVE INQUIRY FINDINGS

The community's diet has drastically decreased in both in quality and quantity since the onset of the floods. Typically, meals are consumed twice a day, morning and evening, with a reduction to once a day during the first half of the year when food is scarce.

The typical diet includes *walwal*, a sorghum-based runny porridge, and fish or *kop*, boiled sorghum formed into small balls, with fish sauce for breakfast or dinner. The diet is then expanded with vegetables such as pumpkin, okra, onion, aubergine, sweet potato, and various green leaves like pumpkin leaves, moringa, watermelon, or wild leaves such as *womach*, *niadel*, *pam*, *sial*, *keino*, *kodra*, *and lalop*. In one village, beans were mentioned as available. Kisra, a thin sorghum crepe, and *pocho*, a thick maize or sorghum milled mass, are alternative options

¹⁴⁶ World Food Programme, Food Agriculture Organisation, and United Nations International Children's Emergency Fund, 'Food Security and Nutrition: South Sudan (Data from 2020)'.

¹⁴⁷ SMART 2023, 'Integrated Nutrition and Mortality SMART Survey Final Report. Fangak County, Jonglei State, South Sudan'.

¹⁴⁸ World Food Programme, Food Agriculture Organisation, and United Nations International Children's Emergency Fund, 'Food Security and Nutrition: South Sudan (Data from 2020)'.

¹⁴⁹ SMART 2023, 'Integrated Nutrition and Mortality SMART Survey Final Report. Fangak County, Jonglei State, South Sudan'. ¹⁵⁰ SMART 2023.

¹⁵¹ SMART 2022, 'Final Report of Nutrition and Mortality SMART Survey Fangak County of Jonglei State, South Sudan'.

¹⁵² SMART 2019, 'Final Report of Nutrition and Mortality SMART Survey in Fangak (the Former) County of Jonglei State (the Former), South Sudan 24th August – 4th September, 2019'.

¹⁵³ Ratib et al., 'Draft Report for the Baseline Study of the Right2Grow Project.'

¹⁵⁴ Ratib et al.

served with fish sauce, vegetables, or green leaves. Maize is consumed boiled or roasted when available.

A summary of the dishes consumed during the dry and rainy seasons is given in Table 10 below.

	Dry season	Rainy season	Desired meal
Breakfast	– Walwal + fish sauce	 Walwal + fish sauce + vegetables 	– Walwal + milk
Dinner	– Kop and fish sauce + wild leaves if available	 Kop/ Kisra or pocsho + fish sauce¹⁵⁵ + vegetables like okra, onion, aubergine, sweet potato or leaves (pumpkin, moringa, watermelon) 	 Kop/ Kisra or pocho + meat(cow/goat) + vegetables like aubergine, sweet potato, cabbage or green leaves Kop/ Kisra or pocho + Tilapia or lek fish or dry fish + vegetables like aubergine, sweet potato, cabbage or green leaves Kop/ Kisra or pocho + beans/lentils + vegetables like aubergine, sweet potato, cabbage or green leaves Walwal + milk
Snack	NA	 Boiled/roasted maize 	- Milk

Table 10: Results of the participatory exercise on meal composition, Fangak County

During the rainy season, particularly from August to December, the community enjoys a wider range of vegetables alongside the maize harvest in August. Fish availability also increases with rising water levels. Sorghum and fish remain daily staples, even though sorghum cultivation is hindered by a lack of arable land. Sorghum is mostly provided through WFP food rations every 3-4 months and it's not cultivated in villages. When sorghum finishes, people purchase it from the market when available. The price however increases when the food distribution is delayed. Therefore, due to financial constraints, many look for water lily (*yiel*), and integrate it partially or fully into their diet, also combining it with sorghum to make it last longer or fully replacing it.

"We eat water lily with fish because it makes us and our children feel full and keeps us alive. However, if we had enough food we wouldn't eat it."

During the dry season, especially from February to July food is scarce and forcing the community to consume *kop* and *walwal* made from sorghum and/or water lily, accompanied by fish soup on a daily basis. In the absence of sorghum, *walwal* becomes the primary option as it requires lower amounts of sorghum. If sorghum is unavailable, it is substituted with water lily or *keeh*. A part from okra, vegetables are extremely limited during this period, forcing women to forage wild leaves or roots like *guan* to integrate into the family meals. The typical fish sauce consists of fish (fresh or dry), water, and, if available, a small amount of salt and oil. The community relies on these dishes for survival during the first half of the year, waiting for more variety in the second part of the year. The community practices longer-term food storage after harvest, with the surplus of maize and vegetables typically lasting until the first months of the year. Before the floods, the community had cattle and milk was consumed daily. Nowadays, absence of daily milk intake is perceived to hinder children's growth. The remaining

¹⁵⁵ Fish can be euther freh or dry

few families with cows have just enough milk for their own needs and if a child is sick, some parents said to beg for milk from those families.

The essential role of waterlily and keeh in the battle for survival

Communities started consuming water lily seeds regularly since the beginning of the floods in 2019-2020, mainly for survival. The knowledge on how to process the seeds was passed down by their ancestors who experienced occasional floods in the past. It is the women's role to search for water lily in the river, spending long days looking for bulbs. The process takes 2-3 days from collection to processing during the dry season and 3-4 days during the rainy season, depending on the intensity of sunlight.

"You collect the water lily from the river, cut it in half and scoop out the black seeds from the inside. Then you leave them to dry otherwise they get bitter. Before preparation you need to wash, soak and grind them. Once grinded, the paste is used make small balls that resemble sorghum which are then cooked in walwal or boiled for kop"

Water lily is usually collected between July and November and stored for a maximum of 6 months. When the availability of bulbs decreases, women wait between 7-10 days between collections and switch to collecting *keeh*, which is the root tuber of water lily. *Keeh* is considered the last resource in times of severe food scarcity and its mostly eaten in the lean months. *Keeh* is processed similarly to waterlily to prepare walwal and kop, however, collecting *keeh* is more challenging, as it requires women to dive into water.

"To collect keeh you dive under water because the tuber is close to the root, put a saucepan floating in the water and gather all the roots there. For waterlily you take a sack tie to the weeds in water while you look for the bulbs."

The community perceives waterlily as unpalatable, bitter, and a cause of constipation, haemorrhoids, reduced urination and stomach aches particularly affecting children under five. However, its taste is considered better than *keeh*. It is only consumed for survival, with no perceived nutritional benefits beyond satiety. While children dislike it, they often lack alternatives and must consume it.

Conversiy to the community's perceptions, a recent review analysed a total of fifteen species of waterlilies and lotus. The findings showed that the rhizome and seed of water lilies are rich sources of essential nutrients such as protein, dietary fiber, carbohydrates, amino acids, fatty acids, vitamins, and minerals and can contribute to a balanced. Additionally, they were found to possess anti-inflammatory, antidiarrhoeal, hepatoprotective, anti-hyperglycemic, anti-hyperlipidemic, and anticancer properties as well.¹⁵⁶

Community members are well aware of what a nutritious meal should look like to make the body produce "good blood". However, they constantly struggle to find nutritious foods such as meat, vegetables, milk, pulses, potatoes and sorghum. Food availability increases around August each year when maize is harvested and more vegetables are available. The situation also improves during food distributions occurring around three times a year, although they are not regular, and leave the community to struggle in the months in between. Additionally, the amount of the food ration is not perceived as sufficient, consisting of 2kg of sorghum per person, lentils or beans and oil. Many people, especially those displaced by constant floods, are not registered to receive food aid making them even more vulnerable.

K. LOW ACCESS TO INCOME SOURCES

Strength of the association with undernutrition in the scientific literature ⁶¹	++
Strength of association with undernutrition based on SECONDARY DATA REVIEW relevant to the study	
Strength of association with undernutrition based on primary data analyses (SMART 2024)	
Categorisation by the technical experts at the initial technical workshop	
Categorisation by the communities during the qualitative study	
Categorisation by the qualitative team	+++
Influence of historical and/or seasonal variations on undernutrition trends	

¹⁵⁶ Abelti, Teka, and Bultosa, 'Review on Edible Water Lilies and Lotus'.

Overall interpretation

+++

SECONDARY DATA REVIEW¹⁶

Indicator	National	Jonglei State	Fangak county
Female HH head	62.5% (FSNMS 2021)	76.3% (FSNMS 2021)	47% (FSNMS 2023) 55% (SMART 2022) 34% (SMART 2019)
Household Access to Land for Cultivation			46% (FSNMS 2023)
Owned land (of those with access)			90% (FSNMS 2023)
Communal (of those with access)			10% (FSNMS 2023)
Household Owns Livestock or Farm Animals			10% (FSNMS 2023)

- In South Sudan the top five livelihoods sources are: agriculture, livestock production, unskilled casual labour, sale of alcoholic beverages and food assistance. Most households engage in a combination of activities but agriculture remains the main livelihood across all states.¹⁵⁷
- Fangak remains one of the areas of highest concern. The main income sources in county are: food assistance/sale of food assistance (48.9%), gathering of wild food and hunting (18.6%), fishing or fish sales (12%), cereals, vegetables, and other crops production (9.9%).¹⁵⁸
- Sorghum and maize are the major cultivated cereals. Maize harvest extends from late July to August and is mainly consumed green. By mid-October, households sort out maize seed for planting during the next agricultural season. Wild foods are estimated to meet 20% to 25% of their food needs.¹⁵⁹ The main challenges to agriculture are shortage of seeds, floods, tools, worm, locusts and weed infestations, cost of casual labour, insecurity, lack of purchasing power for crops and at times shortage of rain.¹⁶⁰ Over 90% of the households reported not having cultivated and planted crops the previous year.¹⁶¹
- Livestock ownership is of critical importance in Fangak, as it serves multiple purposes: source of milk and meat as well as source of household's financial capital. Cattle, goats, sheep and poultry are the main animals kept in the communities. ¹⁶² However, 83.2% of households do not have any access to livestock. ¹⁶³
- Fishing is normally done in Phom and Nile rivers which also provide reeds for construction and for sale.¹⁶⁴

¹⁵⁷ World Food Programme, Food Agriculture Organisation, and United Nations International Children's Emergency Fund, 'Food Security and Nutrition: South Sudan (Data from 2020)'.

¹⁵⁸ SMART 2019, 'Final Report of Nutrition and Mortality SMART Survey in Fangak (the Former) County of Jonglei State (the Former), South Sudan 24th August – 4th September, 2019'.

¹⁵⁹ Finn Church Aid, 'Needs Assessment Report'.

¹⁶⁰ World Food Programme, Food Agriculture Organisation, and United Nations International Children's Emergency Fund, 'Food Security and Nutrition: South Sudan (Data from 2020)'.

¹⁶¹ SMART 2023, 'Integrated Nutrition and Mortality SMART Survey Final Report. Fangak County, Jonglei State, South Sudan'.

¹⁶² Finn Church Aid, 'Needs Assessment Report'.

¹⁶³ SMART 2023, 'Integrated Nutrition and Mortality SMART Survey Final Report. Fangak County, Jonglei State, South Sudan'.

¹⁶⁴ Finn Church Aid, 'Needs Assessment Report'.

- Causal labour, petty trading, domestic remittances and employment from few humanitarian organizations are limited sources of income.¹⁶⁵ Offering transport across the river for residents via canoes adds to the main sources of income.¹⁶⁶
- In most communities' access to land is low.¹⁶⁷ Land is acquired through the boma chief/herdsman.¹⁶⁸Women usually own kitchen items while men own the rest of the household's property (women, children, land, animals, canoe, and the house).¹⁶⁹

PRIMARY DATA ANALYSIS FINDINGS (SMART 2024)

According to the Logistic regression results, children that lived in a house with debts were more likely to be wasted on the basis of weight for height z-scores (p=0.027). According to the Linear regression results, children that lived in a household with more cattle had a lower likelihood to be wasted on the basis of their MUAC (p=0.043). Additionally, children that lived in a household with higher number of members non-contributing to food provision (p=0.028) and an overall higher dependency ratio (p=0.045) had a higher likelihood of being wasted on the basis of weight for height z-scores.

QUALITATIVE INQUIRY FINDINGS

Definition of a vulnerable household

Despite poverty and hardship in the communities, the most vulnerable households are those headed by single mothers, divorcee or widow, as they lack support from men and have to bear all the responsibility of caring for their children and the house on their own. Other particularly vulnerable groups are women with disability, women with an elderly husband and women with a husband that consumes alcohol as they also lack support and in the case of those suffering with a physical disability are unable to carry all the tasks independently, e.g. pounding sorghum, carrying a child to the hospital or collecting waterlilies for many hours.

Men's sources of income

The sources of income in the community have been continuously exacerbated by the recent floods. Income is mostly spent on food, transport and health, specifically medicines. Most men engage in local fishing or migrate to catch larger quantities of fish, which are sold at bigger markets and brought home for family consumption. Additional income sources include selling charcoal, wood, or reeds.

However, fishing, the primary source of income, faces challenges such as the lack of durable nets, limited canoes, and health risks associated with spending extended periods in water. Nets often spoil due to overuse, mud fish biting through them, or entangle because of the constantly moving grass in the river. When large nets break, the community uses small nets to catch Tilapia in shallow waters nearby villages. NGOs occasionally distribute fishing nets, hooks, and canoes to support the community. When available, communities purchase rolls of net material from the major markets in Old Fangak or Malakal. The process of cutting and preparing new nets is considered time-consuming. Canoes are scarce, and their production is affected by the limited availability of coconut trees. Health issues related to fishing include

¹⁶⁵ 'Inter-Agency Spot-Check Assessment Report to Floods Affected Communities in Northern Part of Jonglei State Fangak County'.

¹⁶⁶ Finn Church Aid, 'Needs Assessment Report'.

¹⁶⁷ Finn Church Aid.

¹⁶⁸ Sherrie, 'A GENDER ANALYSIS AND SAFETY AUDIT ASSESSMENT IN OLD FANGAK, JONGLEI STATE OF SOUTH SUDAN'.

¹⁶⁹ Sherrie.

joint pain, foot wounds, and exposure to wild animals like hippos, crocodiles, and snakes. Interestingly, fishing was mentioned as a coping mechanism that emerged with the floods. Before, only a few people used to fish as most were engaged in farming and cattle rearing, but when the floods came, the NGOs started distributing nets, and the whole community started fishing as the main mean for survival.

"We believe that when God creates people the first thing that's is created is the stomach and God will give you ways to find food every day. When there is no food the stomach cries and God will provide you with an alternative - for us this was fishing."

To provide for their families, men seasonally migrate, either with one of their children or in groups for protection against wildlife, to fish larger quantities in deeper waters. The duration of time spent away varies, ranging from a few months several times during the year to 6-8 months or even longer, including the time for selling the produce at major markets. While away they catch and dry fish on floating bases made of reeds, plastic sheets, and grass in the river. Some men return to the village only for a few months, typically towards the end of the year, before going back to fishing around March-April. Fishing is the most remunerative income activity followed by selling reeds, charcoal, wood and papyrus. However, lack trees and dry space to make charcoal forces men to migrate also to engage in these other activities. Before the floods, migration was rare. The community would migrate with cattle for grazing at the beginning of the year, usually from January to April, returning to the village in May to engage in farming activities. This migration was usually carried out by the younger generation, while the elderly remained at home.

Farming is also limited because the majority of land is submerged, preventing the community from using it as a source of income. In the past, communities in Fangak cultivated crops like sorghum, maize, beans, sweet potatoes, and eggplants. Now maize has become the main crop as its more resistant to water and only few families have their own little gardens where they grow a few vegetables. Families without gardens collect wood and sell it at local markets to make income and buy some vegetables. Additionally, the few cows left are kept for milk rather than income, and chickens serve as occasional source of income.

Women's sources of income

Traditionally, men are expected to do work outside the house, but the ongoing challenges have shifted these gender roles. Nowadays women engage in some income-generating activities such as grinding sorghum and maize to sell at the market, collecting firewood, and selling chickens, vegetables, green leaves. They either sell these goods directly at the market or to passing boats or leave them with the vendor of a tea shop in the market and come back to collect their money. Others also go to bigger towns like Old Fangak or New Fangak and fetch water, clean clothes or cook for NGOs. Only few women sell tea and coffee at the market because this type of business is linked to the perception of a woman being promiscuous and requires the husband's consent. If he agrees, he will provide the startup money for the business.

"If a woman sits in the market she can easily become promiscuous because of the many men passing by her shop. Even if this is not the case, the perception will not change and people will be gossiping. Men will also perceive such a woman in this way and will be flirting with her."

Within the villages, women also make traditional alcohol from sorghum known as *kong*. They use it as a compensation for men who support them with various tasks such as repairing the

roof of the house, cutting wood, making charcoal, or preparing the garden for cultivation, especially when the husband is away for extended periods.

"Initially, sorghum is pounded into a fine powder, and soaked in a little amount of water for fermentation. The soaked mixture is then fried and dried. At the same time, another portion of sorghum is germinated, grinded and added to the previous part. This germinated part functions as a natural yeast, aiding fermentation. A third part of sorghum is then grinded, transformed into pocho consistence, and combined with the other two parts. The three parts are then soaked together and squeezed to extract the alcohol."

However, despite contributing to the household income, women do not have control over their earnings. The decision on how the money is spent is reserved for the husband (Cf. **S Low autonomy of women**).

When comparing malnourished children with their non-malnourished brothers or sisters, 65% of women (n=15) in the sample (N=23) mentioned a lack of financial resources during pregnancy. Three quarters of women (n=16) experienced shortages during the breastfeeding period and/or when supplementary food was introduced to the child. Differences between women in monogamous versus polygamous unions were not observed.

Seasonal trends in sources of income

Income sources are limited throughout the year, with the most challenging period being the dry season. A decrease in fish due to lower water levels and hotter temperatures reduces household income. During the initial 3-4 months of the year, communities prioritise household repairs, particularly replacing the roof with new grass and repairing any damages caused by water during the rainy season. Men start migrating for fishing usually after the house repairs, however income generated from this activity reaches the family only several months after. Delays in food aid rations increase the difficulties during this period, prompting the communities mostly implement coping mechanisms such as consumption of water lilies and wild foods (Cf. **M Low coping strategies**).

For those with access to land, the farming season begins in March with the preparation of the land. Planting typically takes place around May, and the harvest occurs from August for maize till November for specific vegetables such as pumpkin, eggplant, sweet potato, and onions. After harvest the community starts storing maize for the months to come. The end of the year represents the most prosperous moment for the community given by an increased variety food and income brought back home by migrating husbands.

10-15 years ago, communities had access to land and cattle which made them self-sufficient in terms of food availability and access. Movement was much easier as the environment was dry and markets where reachable on foot. Since 2020 the chiefs have been splitting the remaining land among the villagers to enable them to produce maize for their survival as cattle is nearly all dead.

L. LIMITED ACCESS TO MARKETS

Strength of the association with undernutrition in the <i>scientific literature</i> ⁶¹	
Strength of association with undernutrition based on SECONDARY DATA REVIEW relevant to the study	
area ⁶²	
Strength of association with undernutrition based on primary data analyses (SMART 2024)	
Categorisation by the technical experts at the initial technical workshop	
Categorisation by the communities during the qualitative study	
Categorisation by the qualitative team	

Influence of historical and/or seasonal variations on undernutrition trends	++
Overall interpretation	+ +

SECONDARY DATA REVIEW¹⁶

Indicator	Fangak county	
	13%	
Distance to market (1)	(FSNMS 2023)	
Distance to market < m	65.1%	
	(SMART 2022)	
	87%	
Distance to market > 1h	(FSNMS 2023)	
Distance to market > m	~35%	
	(SMART 2022)	
Access to market	72%	
ACCESS to market	(FSNMS 2023)	

- 47% households in Fangak reported having access to market with 65% spending less than one hour to travel to the nearest market.¹⁷⁰Common challenges to access included long distance, floods, robberies along the way and wild animals such as snakes and crocodiles. It takes the population in Toch two days to reach the marketplace in New Fangak by floating down the Nile on a pile of grass covered by a plastic sheet. In the rainy season, market access deteriorates heavily for many households. If they do not have canoes, they are cut off from markets for several months and rely on humanitarian aid.¹⁷¹ Other challenges include struggle to carry purchases, market damages¹⁷²and high prices.¹⁷³
- High prices are driven by heavy taxation along supply routes, access issues and high transport costs. Prices are even higher in satellite markets. The price of sorghum has increased by 71%, onions by 53%, beef by 40%, cooking oil and wheat flour by 33%. Sugar, commonly consumed in tea, has increased by 32% reducing the ability of households to afford these basic food commodities.¹⁷⁴ The rising food prices has eroded trade and reduced household purchasing power.
- Sorghum is scarce and hardly enough to meet local demand due to logistical and transport challenges¹⁷⁵
- Most commonly bought food items are sorghum, sugar and salt. Consumers normally
 access a marketplace once or twice a week, mostly women, who buy and sell items.
 Households visit the closest marketplace, mostly relying on rural satellite markets, and
 when encountering challenges in locating goods, they embark on long journeys to one of
 the larger markets.¹⁷⁶

PRIMARY DATA ANALYSIS FINDINGS (SMART 2024)

No significant associations found through logistic or linear regressions.

QUALITATIVE INQUIRY FINDINGS

Distance and limited financial resources were the main barriers of access to markets mentioned by the community. The time required to reach a bigger market in Old Fangak or New Fangak

¹⁷⁰ SMART 2022, 'Final Report of Nutrition and Mortality SMART Survey Fangak County of Jonglei State, South Sudan'.

¹⁷¹ REACH, 'Fangak Rapid Market Assessment'.

¹⁷² World Food Programme, Food Agriculture Organisation, and United Nations International Children's Emergency Fund, 'Food Security and Nutrition: South Sudan (Data from 2020)'.

¹⁷³ SMART 2022, 'Final Report of Nutrition and Mortality SMART Survey Fangak County of Jonglei State, South Sudan'.

¹⁷⁴ REACH, 'Socioeconomic, Climatic Hazards, and Community Infrastructure County Profile, Fangak',.

¹⁷⁵ Finn Church Aid, 'Needs Assessment Report'.

¹⁷⁶ REACH, 'Fangak Rapid Market Assessment'.

ranged from 3-9 hours each way. Smaller markets like those in Paguir, Diel, or Toch are located around 1-2 hours away, but also more expensive, and with restricted availability of items. The community uses these markets to buy goods in small quantities, while for larger purchases, they prefer going to big markets, even if it requires more money for transport and more time. However, lack of canoes and financial resources greatly affects their ability to go.

	Market	Products marketed
Monday-Sunday	Paguir	sugar, tea, ginger, coffee and fresh food (<i>kisra, kop</i> and <i>walwal</i>) – small quantity purchases
Monday-Sunday	Toch	sugar, tea, ginger, coffee and fresh food – small quantity purchases
Monday-Sunday	Diel	soap, sugar in bundle, coffee in bundle, salt, tea, torch, batteries, onions, cups – small quantity purchases
Monday-Sunday	Old Fangak	sorghum, clothes, coffee, sugar, oil, salt, silver items, jewellery, clothes, shoes, mosquito nets – all needed items are there
Monday-Sunday	New Fangak	sorghum, oil, sugar, salt, clothes, shoes - all needed items are there

The community access the market roughly once or twice a month, and sometimes a person is sent to collect items for a group, which then splits the transport costs. During the rainy season, from July to November, it is more challenging to access markets not only because the water level increases, affecting movement, but also because villages can flood anytime, requiring people to be around to repair dykes and protect their houses. Moreover, long canoe journeys increase the risk of capsizing and losing all the goods, and even risking to drown. Inflation has been rising since 2013 due to long years of conflict in the country.

"Since the 2013 crisis and the entrance of the dollar into our country the value of our money has decreased. Traders now have to convert their money into dollars to purchase goods which increases the price of the goods when they are sold to us."

Prices generally rise towards the end of the year starting from the 10th of October (Daniel Comboni day) and during Christmas as most people buy clothes and shoes for the festivities. Specifically, the price of sorghum drastically increases when food aid rations are delayed, rising from a standard price of 25,000 SSP per sac to a range between 35,000 to 60,000 SSP per sac.

M. LOW COPING STRATEGIES

Strength of the association with undernutrition in the <i>scientific literature</i> ⁶¹	++	
Strength of association with undernutrition based on SECONDARY DATA REVIEW relevant to the study	++	
area ⁶²		
Strength of association with undernutrition based on primary data analyses (SMART 2024)	NA	
Categorisation by the technical experts at the initial technical workshop		
Categorisation by the communities during the qualitative study		
Categorisation by the qualitative team	++	
Influence of historical and/or seasonal variations on undernutrition trends	++	
Overall interpretation	++	

SECONDARY DATA REVIEW¹⁶

Indicator	Fangak county
Coping Strategy Index (low 0-3)	2.5%
	(SMART 2023)
	7%
	(FSNMS 2023)
	79.1%
	(SMART 2022)
	68.1%
	(SMART 2019)
Coping Strategy Index (medium 4-9)	9.9%
	(SMART 2023)
	91%

	(FSNMS 2023)
	20.9%
	(SMART 2022)
	31.9%
	(SMART 2019)
Coping strategy Index (high) (>10)	87.7%
	(SMART 2023)
	3%
	(FSNMS 2023)
Food expenditure	84%
	(FSNMS 2023)
Food expenditure (> 75% of budget)	81%
	(FSNMS 2023)
Economic Capacity to Meet Essential Needs -	70%
Expenditure Based Approach (below)	(FSNMS 2023)

- Nationally, nearly half of households employed emergency coping strategies and of these 87.7% used food-based strategies.
- In Fangak 83.7% households engaged in crisis, stress or emergency coping strategies.¹⁷⁷ High food prices, droughts, floods and crops distraction and livestock disease were the main shocks experienced in county.¹⁷⁸ Coping strategies included borrowing money or food, purchasing on credit, liquidating assets, migrating, and consuming wild foods. People reduced portion sizes, number of daily meals, or restricted adult consumption. Wild foods remained widely used to fill consumption gaps. Displacement due to flooding forced many people from the surrounding villages to move to Old and New Fangak ¹⁷⁹. Currently, local communities are able to cope, thanks to humanitarian assistance, and by consuming water lilies and fish. Lack of a sustainable livelihoods leads to marrying off young girls as a source of wealth or cattle, acquiring additional help in the family.¹⁸⁰

PRIMARY DATA ANALYSIS FINDINGS (SMART 2024)

No significant associations found through logistic or linear regressions.

QUALITATIVE INQUIRY FINDINGS

Households deploy multiple coping strategies when food stocks and financial resources decrease. Reducing the quantity and quality of meals are usually the first strategies. When food is scarce, the community eats once a day in the evening.

"If there is no food you only have one meal, usually dinner. Its easier to skip breakfast because you go out, talk to people and forget about being hungry."

Water lily and *keeh* play a crucial role in the community's survival (**Cf. J. Low access to quality food**) alongside other wild foods like *Guan* which is collected in the forest and eaten *kop* or alone. Additionally, children are often prioritised, and adults wait for the next day if there is not enough food at home. In extreme cases, forced marriage is used as a coping mechanism due to the dowry given by the future husband, but this practice was not highlighted as one of the main implemented coping mechanisms (Cf. **C. Early pregnancies**)

Apart from occasional breaks, the ongoing conflict since 2013 and the more recent floods represented major shocks for the livelihoods of the communities in Fangak. However, conflict

¹⁷⁷ SMART 2022, 'Final Report of Nutrition and Mortality SMART Survey Fangak County of Jonglei State, South Sudan'.

¹⁷⁸ World Food Programme, Food Agriculture Organisation, and United Nations International Children's Emergency Fund, 'Food Security and Nutrition: South Sudan (Data from 2020)'.

¹⁷⁹ REACH, 'Fangak Shocks Verification Mission'.

¹⁸⁰ United Nations Office for the and Coordination of Humanitarian Affairs, 'Humanitarian Needs Overview South Sudan'.
was not present all over the county but was instead localised in the Payam of New Fangak from the side of Malakal. Door was the only village where members reported having to flee in 2022. Some families returned in April 2023 while others are still away for fear of coming back. The rest of the visited Payams, namely Paguir, Old Fangak, and Mareang, were not directly affected.

"The suffering from the conflict was not like the one from floods. During periods of conflict food was easy to find because we had cattle and land, we didn't have many diseases because the environment was dry and it was easier to move. When a dyke breaks you lose all the resources and sometimes even your house. During conflict you can hide your valuable items and run away while the youth will fight at the front to protect the village."

Moreover, COVID-19 was not perceived to affect the community in any way. Community members mentioned organisations conducting vaccination campaigns but never heard of anyone dying from the virus

Support mechanisms at community level

A strong sense of unity is present in the community which helps facing the hardship of the current situation. For example, to overcome the high transport costs, several people join forces appointing one individual to purchase essential items from the market and collectively shared expenses. Members also reported borrowing money from neighbours, relatives or vendors and repaying the debt with sorghum. Not repaying is against the Nuer values and one can be put in jail for it. In cases where a single woman is struggling, some men said to bring them fish to cook for the children. No village savings or financial support groups exists in the community due to the general limited financial resources.

When comparing malnourished children with their non-malnourished brothers or sisters, a third of the women (n=7) in the sample (N=23) reported shocks at household level during pregnancy. In most cases, these shocks were linked to their husbands as heads of household, with significant consequences for the support given to the women. The shocks cited included husbands leaving to migrate, loss of income-generating activity (unemployment), road accident, death as well as marital problems and/or divorce. A number of women reported shocks during the breastfeeding period (4) or when introducing complementary foods.

WATER, SANITATION AND HYGIENE

N. INADEQUATE ACCESSIBILITTY, AVAILABILITY AND QUALITY OF WATER AT HOUSEHOLD LEVEL

Strength of the association with undernutrition in the <i>scientific literature</i> ⁶¹	++
Strength of association with undernutrition based on SECONDARY DATA REVIEW relevant to the study area ⁶²	
Strength of association with undernutrition based on primary data analyses (SMART 2024)	++
Categorisation by the technical experts at the initial technical workshop	+++
Categorisation by the communities during the qualitative study	+++
Categorisation by the qualitative team	+++
Influence of historical and/or seasonal variations on undernutrition trends	+++
Overall interpretation	+++

SECONDARY DATA REVIEW¹⁶

Indicator	Fangak county
Access to improved water sources	3%
	(SMART 2023)*
Water from borehole	45.8%
	(FSNMS 2023)

	16.8%
	(SMART 2023)
	14.8%
	(SMART 2022)
	4.9%
	(SMART 2019)
	51.7%
	(FSNMS 2023)
Water from river/stream	80.2%
water nom nver/stream	(SMART 2023)
	85.2%
	(SMART 2022)
	2.5%
	(FSNMS 2023)
Surface water	90.5%
	(SMART 2019)
	99.3%
	(SMART 2023)
Time to collect water (less than 1h)	99 %
	(SMART 2022)
	78.5%
	(SMART 2019)
	87.2%
Making water safe for drinking (does nothing)	(SMART 2023)
	80.4%
	(SMART 2023)
Storage water: clean and covered container or jar	19.3%
Storage water. clean and covered container of jar	(SMART 2023)
Storage water: clean container or jar	57.8%
Storage water. Clean container of jar	(SMART 2023)

Risk factors¹⁸¹ : children from households with water sources other than piped¹⁸²

- Nationally 45% of the population needs to walk for more than 30 minutes to access a water source. The flooding limits access to safe drinking water¹⁸³.
- 80.2% households in Fangak drink water from the river.¹⁸⁴ There are 21 hand pumps in Old Fangak but 9 are submerged, 4 are non-functional and only 5 are functional.¹⁸⁵ People do not make distinction between water points for drinking water, bathing or cattle watering and water sources are often contaminated.^{186 187} It takes less than an hour for nearly all households (99.3%) to do round trip to collect water ¹⁸⁸ and 87% of households do not treat water before drinking.
- Collecting water is done by women and children. It is taboo for men and boys to carry water containers. Women are exposed to several risks during water collection linked to presence of wild animals like snakes, hippos and crocodiles as well as GBV cases close to

¹⁸¹ In the context of this Link NCA report, a risk factor means a factor that increases a child's risk of undernutrition, whereas a protective factor means a factor that reduces this risk. For example, according to the sources cited, children aged between 6 and 23 months had a higher risk of acute malnutrition.

 ¹⁸² Iyya et al., 'Prevalence and Factors Associated with Malnutrition in Children Aged 6-59 Months in Jubek State, South Sudan.'
 ¹⁸³ Ratib et al., 'Draft Report for the Baseline Study of the Right2Grow Project.'

¹⁸⁴ SMART 2023, 'Integrated Nutrition and Mortality SMART Survey Final Report. Fangak County, Jonglei State, South Sudan'.

¹⁸⁵ 'Inter-Agency Spot-Check Assessment Report to Floods Affected Communities in Northern Part of Jonglei State Fangak County'.

¹⁸⁶ Action Against Hunger, 'The Underlying Causes of Malnutrition in Old Fangak Payam'.

¹⁸⁷ Sherrie, 'A GENDER ANALYSIS AND SAFETY AUDIT ASSESSMENT IN OLD FANGAK, JONGLEI STATE OF SOUTH SUDAN'.

¹⁸⁸ SMART 2023, 'Integrated Nutrition and Mortality SMART Survey Final Report. Fangak County, Jonglei State, South Sudan'.

water points¹⁸⁹ and water being too deep for children and disabled persons¹⁹⁰ Families are using the same water containers for fetching water and bathing.¹⁹¹ Water is mostly stored in a clean container (57.8%) and covered in 40% of households. A large part of the population stores drinking cups and containers directly on the ground. Fetched water is therefore often contaminated, not properly treated and not safely stored.

PRIMARY DATA ANALYSIS FINDINGS (SMART 2024)

According to the Linear regression results, children that lived further from a waterpoint were more likely to be wasted (p=0.008).

QUALITATIVE INQUIRY FINDINGS

Despite Fangak being surrounded by water, access to safe and potable sources is generally difficult. Communities fetch and drink unprotected water from the nearby rivers and swamps. The same water is used for cooking, bathing and washing dishes or clothes. While some have access to sporadic boreholes, most are either not working or far away, requiring one hour or more each way, which hinders their access. The community attempted to construct basic wells because they aware that this would improve the quality of the consumed water but these usually collapse with the start of the rainy season.

"In the past you could dig a well and get cleaner water than the river but now there is no space and everything collapses with the rain. These are not modern wells but just holes that we were taught how to dig by our ancestors."

Water was reported as dirty and not good for consumption, nonetheless often not treated and drank immediately after being fetched despite a general awareness about the practice of boiling water thanks to the sensitisation session received from NGOs, the community faces several barriers to implement this practice. These include lack of large pans and the need to boil water multiple times a day, use extra leaves or charcoal for fire and lack of time.

"We don't have large sauce pans to boil, we only have small sauce pans and you need to boil 3-4 times for one bucket and it's time consuming because you also have to wait for the water to cool down."

An outbreak of hepatitis E in mid-2023, mentioned in one of the communities, increased the awareness of community members about the need to boil drinking water. Cholera and Typhoid cases were mentioned as known water-borne diseases in some villages. NGOs occasionally distribute chlorine tablets, give buckets to children and mothers enrolled in nutrition rehabilitation programmes and provide sensitisation sessions on water treatment. According to the Nuer culture, women and girls (5-12 years) are responsible for fetching water, they carry 20 litre buckets on their head multiple times a day depending on the household size. In some communities' young boys were also observed.

According to community observations, water cans were overall unclean, cleaned with stones rather than soap, and not all communities were seen washing them before a re-fill. Open defecation, solid waste and presence of domestic/wild animals were observed around the water fetching points. Instead flies and insects, children playing with water, animal excrement were observed in the household where the water was stored.

¹⁸⁹ 'Inter-Agency Spot-Check Assessment Report to Floods Affected Communities in Northern Part of Jonglei State Fangak County'.

¹⁹⁰ Sherrie, 'A GENDER ANALYSIS AND SAFETY AUDIT ASSESSMENT IN OLD FANGAK, JONGLEI STATE OF SOUTH SUDAN'.

¹⁹¹ 'Inter-Agency Spot-Check Assessment Report to Floods Affected Communities in Northern Part of Jonglei State Fangak County'.

The availability of water is generally stable thought the year, however communities reported that during the dry season the water becomes dirtier close to the villages as levels reduce requiring women fetch further from their village, increasing walking distance. The quality of water usually improves from July till the end of the year when the rain becomes more frequent.

O. INADEQUATE HOUSEHOLD SANITATION PRACTICES

Strength of the association with undernutrition in the scientific literature ⁶¹	++
Strength of association with undernutrition based on SECONDARY DATA REVIEW relevant to the study	+++
area ⁶²	
Strength of association with undernutrition based on primary data analyses (SMART 2024)	NA
Categorisation by the technical experts at the initial technical workshop	+++
Categorisation by the communities during the qualitative study	++
Categorisation by the qualitative team	+++
Influence of historical and/or seasonal variations on undernutrition trends	++
Overall interpretation	++

SECONDARY DATA REVIEW¹⁶

Indicator	Fangak county
Access to improved sanitation facilities	
Presence of a latrine	23% (SMART 2023)
Shared latrine	53.8% (SMART 2023)
Individual latrine	46.2% (SMART 2023)
Pit latrine no slab	69.9% (SMART 2023)
Pit latrine with slab	28% (SMART 2023)
Open defecation	97.5% (SMART 2022)

Access to improved facilities is below 10% in Jonglei state. Recurrent flooding regularly damages existing sanitation facilities.¹⁹². There is also a shortage of construction materials to build resilient sanitation facilities capable of withstanding the environmental challenges, such as sandy soils and recurring flooding.¹⁹³ Open defecation is widely practiced heightening the risk of water-borne diseases. ¹⁹⁴This is particularly concerning during floods when pit latrines seep into the waterways.¹⁹⁵ Schools do not have any form of latrines or hand washing facilities and teachers and pupils are forced to practice open defecation. Similarly, in market centres like in New and Old Fangak, open defecation causes a high risk of an outbreak of diseases.¹⁹⁶

PRIMARY DATA ANALYSIS FINDINGS (SMART 2024)

No significant associations found through logistic or linear regressions..

QUALITATIVE INQUIRY FINDINGS

Very few toilets are present in the villages of Fangak and those that exist are usually for private use. Community members mostly practice open defecation in the swamps or directly in the river. Some men reported intentionally not defecating where women collect water and going

¹⁹² United Nations Office for the and Coordination of Humanitarian Affairs, 'Humanitarian Needs Overview South Sudan'.

¹⁹³ Ratib et al., 'Draft Report for the Baseline Study of the Right2Grow Project.'

¹⁹⁴ REACH, 'Humanitarian Situation Overview, Jonglei State, South Sudan.'

¹⁹⁵ United Nations Office for the and Coordination of Humanitarian Affairs, 'Humanitarian Needs Overview South Sudan'.

¹⁹⁶ Finn Church Aid, 'Needs Assessment Report'.

further away even using canoes. However, generally speaking the community perceived that open defecation contaminates their water (cf. **N Inadequate access, availability and quality of water**). Organisations attempted to construct toilets but those easily collapse with the start of the rains. The community reported not having the materials like iron or plastic sheets or suitable dry land to construct new toilets. Children under five years of age are usually told by mothers to defecate close to the compound and faeces are then disposed in the river. This is because mothers are afraid of children going near latrines for fear of them collapsing. Women also defecate in the river and do not tend to use private toilets due to cultural norms. Per Nuer culture, women are not supposed to be seen by men entering a latrine.

P. INADEQUATE PERSONAL HYGIENE PRACTICES

Strength of the association with undernutrition in the scientific literature ⁶¹	++
Strength of association with undernutrition based on SECONDARY DATA REVIEW relevant to the study	++
area ⁶²	
Strength of association with undernutrition based on primary data analyses (SMART 2024)	++
Categorisation by the technical experts at the initial technical workshop	++
Categorisation by the communities during the qualitative study	+
Categorisation by the qualitative team	
Influence of historical and/or seasonal variations on undernutrition trends	++
Overall interpretation	++

SECONDARY DATA REVIEW¹⁶

Indicator	Fangak county
	67.1%
Indicator Image: Comparison of the second secon	(SMART 2023)
Hand washing facility No handwashing facility Hand washing (only water) Hand washing (water + soap) Hand washing (water + asb)	30.9%
No bandwashing facility	(SMART 2023)
	83.1%
Hand washing facility Hand washing (only water) Hand washing (water + soap) Hand washing (water + ash)	(SMART 2019)
Hand washing (only water)	92.6%
	(SMART 2023)
	51.3%
	(SMART 2022)
	6.4%
	(SMART 2023)
Hallu washing (water + soap)	27.6%
	(SMART 2022)
Hand washing (water + ash)	1%
	(SMART 2023)
	21.1%
	(SMART 2022)

- 19 % of household reported owning soap.¹⁹⁷ 56% reported washing hands after defecating, 41% after cleaning child's faeces, 47% before eating and 35% before breastfeeding.¹⁹⁸
- People wash their hands with soap for specific purposes, like after having handled something smelly such as fish. This does not include post defecation, before eating or cooking. Children do not wash their hands after having handled cow's dung. Most times, people just rinse their hands, with contaminated water, and wipe them on dirty clothes.¹⁹⁹
- Mothers usually do not wash their breast before breastfeeding, except if they have been perspiring or if they have been away for a while.²⁰⁰

¹⁹⁷ World Food Programme, Food Agriculture Organisation, and United Nations International Children's Emergency Fund, 'Food Security and Nutrition: South Sudan (Data from 2020)'.

¹⁹⁸ SMART 2022, 'Final Report of Nutrition and Mortality SMART Survey Fangak County of Jonglei State, South Sudan'.

¹⁹⁹ Action Against Hunger, 'The Underlying Causes of Malnutrition in Old Fangak Payam'.

²⁰⁰ Action Against Hunger.

 Most children run around naked. Menstrual hygiene management is a big challenge among women. They cannot afford the sanitary pads and are forced to use dirty rags or confine themselves at home for fear of bloodstaining. The worst challenge is managing menstruation while walking in water: "You have nothing to do but go and look for food so you put on a short pad and enter the water while the blood flows in water".²⁰¹

PRIMARY DATA ANALYSIS FINDINGS (SMART 2024)

According to the Logistic regression results, children that were observed to have a clean face and hands were less likely to be wasted on the basis of weight for height z-scores (p=0.001) and combined weight for height z-scores and MUAC (p=0.009).

QUALITATIVE INQUIRY FINDINGS

Key informants reported that hygiene practices are overall poor within the community. A scabies (*Gony*) outbreak was mentioned in one of the villages and attributed to the poor hygiene practices. Mothers reported that children's hygiene practices are often compromised due to their workload. They leave them in the care of neighbours or siblings that may not keep them as clean as they would do or come back home too late which impacts proper bathing practices before sleep. NGOs were said to conduct sensitisation sessions to improve both personal and environmental hygiene. Menstrual hygiene is particularly challenging as pads are mostly unavailable in Fangak. Women wear regular underwear and multiple petty coats while on their periods "You need to stay more indoors during these days and your daughter, cowives or neighbours will help you because you will do the same for them".

According to study observations, children are generally seen walking around with dirty clothes and bodies. The muddy environment, especially during the rainy season, contributes to the generic uncleanliness of children. They play on the floor outside of their houses, walk barefoot, half-dressed in dirty and overused clothes. Handwashing is usually practiced without soap. Hand-washing was observed after managing child faeces, before cooking and after eating. Handling fish was said to aid the handwashing practice. Handwashing after breastfeeding or after toilet use was not observed.

Q. INADEQUATE ENVIRONMENTAL AND FOOD PRACTICES

Strength of the association with undernutrition in the scientific literature ⁶¹	+++
Strength of association with undernutrition based on SECONDARY DATA REVIEW relevant to the study	++
area ⁶²	
Strength of association with undernutrition based on primary data analyses (SMART 2024)	++
Categorisation by the technical experts at the initial technical workshop	++
Categorisation by the communities during the qualitative study	+
Categorisation by the qualitative team	
Influence of historical and/or seasonal variations on undernutrition trends	++
Overall interpretation	++

PRIMARY DATA ANALYSIS FINDINGS (SMART 2024)

According to logistic regression children that were observed to live in a household with animal excreta around were more likely to be wasted on the basis of MUAC.

QUALITATIVE INQUIRY FINDINGS

²⁰¹ Sherrie, 'A GENDER ANALYSIS AND SAFETY AUDIT ASSESSMENT IN OLD FANGAK, JONGLEI STATE OF SOUTH SUDAN'.

According to study observations children play in areas where mud is present on the floor and but not many animals were seen around the playground areas. A few cats, dogs and chickens were present in some villages. One of the visited villages was particularly infested by flies sitting on coffee/tea cups, food and people. The community reported being aware of flies not having to sit on food. To prevent this knitted food covers and cup covers are used as preventative measures. Waste was observed to be thrown directly to river or to the bush, and sometimes left on the ground.

GENDER

South Sudan is a patriarchal society where women have limited access to education and low decision-making power. Most prevalent forms of GBV include forced early marriage (25.2%), domestic violence (21%), and rape/attempted rape (13.7%). Intimate Partner Violence (IPV) involving male partners as perpetrators is widely accepted. Fear of retaliation and stigma attached to having experienced GBV explains why many cases go unreported. Support systems for survivors of GBV are overall absent.²⁰²

Fangak is among the counties with the highest GBV rates. The main safety concerns for women and girls included rape, sexual exploitation and abuse, physical assault, and forced marriage.²⁰³ Sexual violence in form of intimate partner violence is prevalent among households. Common reasons were not/late cooking, denying sex, not taking care of children and household as expected, not helping in the garden or putting water in the bathroom for the husband, having a disorganised house. This violence also targets adolescent girls who are meant to step in their mother's shoes if she fails her responsibilities. Psychological or emotional abuse and economic violence, as many men lost their jobs were also reported. Women and girls are rape targets when they go to the bushes to collect firewood and grass. If reported, it may lead to village clashes in the form of revenge from the family of the victim²⁰⁴16% of women in rural and urban households feel unsafe while collecting water.²⁰⁵

The main reasons behind early marriages are poverty, lack of jobs, unplanned pregnancies, death of a parent (pressure to have a 'helper'), lack of education, wife inheritance practice, and demand by parents. Wife inheritance is a culturally accepted practice because a woman is not only married to her husband but also a family property. It is also treated as a way of family continuity in case of death or infertility of the husband.

R. CAREGIVER'S HEAVY WORKLOAD

Strength of the association with undernutrition in the scientific literature ⁶¹	
Strength of association with undernutrition based on SECONDARY DATA REVIEW relevant to the study	
area ⁶²	
Strength of association with undernutrition based on primary data analyses (SMART 2024)	NA
Categorisation by the technical experts at the initial technical workshop	++
Categorisation by the communities during the qualitative study	
Categorisation by the qualitative team	
Influence of historical and/or seasonal variations on trends in undernutrition	+
Overall interpretation	++

SECONDARY DATA REVIEW¹⁶

²⁰³ United Nations Office for the and Coordination of Humanitarian Affairs, 'Humanitarian Needs Overview South Sudan'.

²⁰² Ratib et al., 'Draft Report for the Baseline Study of the Right2Grow Project.'

²⁰⁴ Sherrie, 'A GENDER ANALYSIS AND SAFETY AUDIT ASSESSMENT IN OLD FANGAK, JONGLEI STATE OF SOUTH SUDAN'.

²⁰⁵ United Nations Office for the and Coordination of Humanitarian Affairs, 'Humanitarian Needs Overview South Sudan'.

- In Fangak women and girls carry the bulk of household duties and spend more time on unpaid work. They are often confined at home to fulfilling the roles as mothers, wives, and caretakers. Women are responsible for cooking food for the family, washing clothes, caring for young children, cultivating, weeding, and harvesting food and taking care of the sick and elderly. Girls are responsible for fetching water, sweeping the compound, looking after smaller siblings, and cleaning utensils. Men take care of the cattle, cut timber for sale, construct houses and sanitary facilities and make decisions on behalf of the family. Boys also look after cattle, play sports and go hunting.²⁰⁶
- The burden of work has an impact on women's ability to exclusively breastfeed their children. Men stated that they would not be able to ease this burden as they fear being mocked by peers if they are seen taking on women's roles like cooking and cleaning.²⁰⁷ Women have also been looking after animals, providing for the family and house construction. Society finds it normal for a woman to take on previously considered masculine roles, however it is culturally unacceptable for men or boys to carry water, firewood, and food on their heads.
- Some children are denied the opportunity to attend school if they need to support their parents at home.^{208 209} The daily workload is heavy and time consuming, especially during the rainy season, which affects the attention paid to children.²¹⁰

PRIMARY DATA ANALYSIS FINDINGS (SMART 2024)

No significant associations found through logistic or linear regressions.

QUALITATIVE INQUIRY FINDINGS

Distribution of household tasks and responsibilities

Women's workload

According to the community, a good wife takes care of the house and the children, cooks for the family, always welcomes visitors and stays loyal. She should not be jealous of the husband's co-wives or concubines and should avoid conflict within the family and wider community.

Women's day typically begins at around 5am and ends in the evening at around 7-8pm when they go to bed. Apart from house chores like cleaning, graining, pounding, cooking, fetching water and taking care of children women engage in a variety of external tasks such as collection of water lilies or wild fruits, palm leaves, firewood or cutting grass for the house roof. The heaviest tasks were said to be pounding and grinding of sorghum, waterlily or *keeh* collection, carrying heavy loads like large sacs of sorghum (50-60 kg) from food distributions or heavy 20 litre water jerrycans multiple times a day. Women described their workload as heavy, painful, "too much" and reported feeling continuously exhausted as they move from one task to another without breaks everyday.

"We work from sunrise to sunset and never stop, you only rest when you go to sleep. We don't even think about it, this is what we have to do!"

²⁰⁹ 'Inter-Agency Spot-Check Assessment Report to Floods Affected Communities in Northern Part of Jonglei State Fangak County'.

²⁰⁶ Ratib et al., 'Draft Report for the Baseline Study of the Right2Grow Project.'

²⁰⁷ Ratib et al.

²⁰⁸ Sherrie, 'A GENDER ANALYSIS AND SAFETY AUDIT ASSESSMENT IN OLD FANGAK, JONGLEI STATE OF SOUTH SUDAN'.

²¹⁰ Action Against Hunger, 'The Underlying Causes of Malnutrition in Old Fangak Payam'.

Others added: "Sometimes after all day at work you feel pain in your body, there is no energy for the following day and you feel like your body is giving up."

Generally speaking, women's workload was said to impact their ability to breastfeed (Cf. **G Sub-optimal breastfeeding practices**) and interact with their children because of the long hours spent away from the house (Cf. **I Poor quality interactions between child and caregiver**). It was also associated by some women with miscarriages due the heavy loads and long hours spent in cold water. In fact, women do not stop working even when pregnant. Culturally, they should not engage in any heavy task while pregnant and restrain to light house chores. However, due to the current situation, women often spend hours collecting water lilies or looking for firewood which negatively affects the unborn child.

"If women are working heavily while pregnant the child will be suffering inside the womb. The mother will probably not reach the due date and the child will be born sick as the sickness is transmitted through the blood by the mother. If a mother carries heavy loads like wood or water on her head she could also lose the baby."

Single women are particularly vulnerable because of the limited support they receive. Similarly, when the husband is away fishing for longer periods, women's workload increases even more as they take on additional responsibilities like fishing to sustain their children. In cases where there is an older son, he will take on this responsibility from the father. Girls start supporting their mothers since very little, around the age of 8 years or even younger. Their responsibilities usually start with sweeping, washing utensils, then progressing to wash clothes, fetching water and cooking. By the age of 13 girls can take on full household responsibilities.

"Mothers are happy to have daughters because they decrease their workload. At 5 years you are told how to sweep, at 7 years how to grind food and at 13 years you are responsible for all the housework. Your mother goes outside to work and you look after your siblings and the house. You then start feeling that you are at the same level because you are in their same shoes as your mother and you are caring for your siblings."

According to the comparative study, nearly half mothers (n=18) experienced their workload to be heavy or very heavy when pregnant with their malnourished child with 35% (n=12) working more and 6 about the same.

Historical and seasonal trends in women's workload

Due to the hardship brought by the floods, there is little difference in workload between the seasons. Women reported that workload is heavy all year round and even a bit more during the rainy season, from May-December, because of the rain and the house damage associated with it.

"There is no difference in our work during the year because of the flood, in the rainy season it is a bit harder because when you go out for waterlily it will rain on you and then you come home and your house is flooded and you have to start scooping out water immediately"

In the past communities had enough land and workload was focused around land preparation, cultivation and farming, looking after cattle as well as daily house and child-care tasks. Women did not have to collect waterlily, *keeh* or wild fruits and the environment was dry. Food was enough to sustain their families and their workload was mostly conducted close by the house.

Men's workload

A good husband supports his family and the community without sparking conflict. Men's work is carried out outside of the house and revolves mostly around fishing activities, cutting wood, repairing dykes and roofs. Similarly, to women, men start their days very early around 4-5am.

They usually check their fishing nets, remove caught fish and re-set the nets for the day, cut and dry fish when back to the village. Other activities include collection of wood, charcoal production, dyke repairs during the rainy season, and taking care of the few left cows by clearing the dung and taking them out from the *Luak*²¹¹ in the morning. They feel overworked and tired, constantly overwhelmed by the burden of responsibility of having to provide for their families in such hard circumstances.

"Now you always feel exhausted, when you go to Old Fangak market to sell wood or charcoal you worry about you family because they are waiting for you for food and if you stay overnight because you didn't sell everything, you will not sleep well. When you feel like this, there is nothing to do, you just trust God and hope the situation will improve"

Men's workload was said to increase during the rainy season due to the dyke construction and constant repair. Between March-August faming activities intensified for those that still own a piece of land. It was then said to diminish during the dry season when the focus switches on house repairs.

S. LOW FEMALE AUTONOMY/LOW DECISIONMAKING POWER

Strength of the association with undernutrition in the scientific literature ⁶¹	+
Strength of association with undernutrition based on SECONDARY DATA REVIEW relevant to the study	+++
area ⁶²	
Strength of association with undernutrition based on primary data analyses (SMART 2024)	NA
Categorisation by the technical experts at the initial technical workshop	++
Categorisation by the communities during the qualitative study	+
Categorisation by the qualitative team	
Influence of historical and/or seasonal variations on undernutrition trends	+
Overall interpretation	+

SECONDARY DATA REVIEW¹⁶

Social norms coupled with patriarchal privileges, contribute to the dominance of men in decision-making within domestic, economic, and public spheres, while also limiting women's autonomy in matters related to reproduction.²¹² Women have to seek permission while leaving home, even when seeking maternal and child health. Without permission from men, some women do not engage in community activities, and at times their participation may put them at risk of violence. Most women do not own or have access to resources to meet their unique needs. They depend on their husbands, who are also vulnerable. Even when they engage in small businesses or casual labour, they do not have any right on how to spend the money. Some reported that their husbands take away the money to drink alcohol, leaving them with unmet needs and psychological stress.²¹³Lack of voice is the most significant barrier women and girls face in accessing resources which is mainly due to discriminatory cultural beliefs and less linked to poverty.²¹⁴

PRIMARY DATA ANALYSIS FINDINGS (SMART 2024)

No significant associations found through logistic or linear regressions.

QUALITATIVE INQUIRY FINDINGS

Distribution of decision-making power within the household

²¹¹ Livestock hut

²¹² Kane et al., 'Social Norms and Family Planning Decisions in South Sudan'.

²¹³ Sherrie, 'A GENDER ANALYSIS AND SAFETY AUDIT ASSESSMENT IN OLD FANGAK, JONGLEI STATE OF SOUTH SUDAN'.

²¹⁴ Sherrie.

Men are the primary decision makers within households in Fangak County. Culturally even children belong to the father because "*it's the man's blood that goes inside the woman*". The mother is responsible for looking after and raising them since they are born but in the event of a divorce the father can claim back his children once they reach the age of 7-8 years old. However, this could come at the risk of those children not being accepted by the new wife if he re-marries. When boys reach around 10 years old they start supporting their father fishing or looking after cattle while girls support their mothers around the house. The father will be responsible for his daughters till they get married and part of his role is to accept the future husband and agree the dowery payment. Women need to report to their husband for nearly all decisions, with the exception of house chores and cooking meals.

"By asking permission, this is how we respect and honour our husband. If you spend the money without asking, it will bring conflict. If you take decision alone (e.g. take the child to school) it may seem like you are the man of the house and the man will think that the children might not even be his because you are asking permission to the real father."

Domain	Decision-	Further information
	making	
, , , , , 215	women	Women are responsible for all housework from cleaning, cooking, fetching
Housework ²¹³	women	water. The husband authorisation is not necessary.
Household diet	women	Women cook daily meals based on what food is available. The husband brings
		substitute Women reported considering the husbands food preferences when
		food availability allows.
Buying food at the market	men/wom	Some husbands bring food home from the market or give women an allowance
	en	to purchase the necessary supplies (the amount varies on availability and family
		size). Generally, very lew items are bought from the market such as sorghum, salt, sugar, tea or coffee.
Use of financial resources	men	Women do not have a say; the husband has full decision-making power on the
generated by the man		family resources, their mobilisation and allocation.
Use of financial resources	men	Women need to report to their husbands about their earnings. He will then
generated by the woman		decide how to spend it and how much to give to the woman. Women usually
		spend money on food items, clothes and cooking utensils.
Taking loans	men	The husband authorisation is necessary. Women are unable to take a loan
		without permission.
Property ownership	men	Men own the house and the large items inside (eg. bed) and the land. Women
		usually only own the utensils. Usually a husband gives a house to his wife once
		married where she lives with the children. In the case of multiple wives living in
		responsible and the other will have to report to her asking permission to use
		utensils or to milk cows.
Use of healthcare	men	Women need to inform their husband when they are planning to go to the
(women/children)		health centre for themselves or their children. If the husband is available he will
Use of contraceptives	men	Contraception is mostly unavailable in Fangak County, but the husband would need to agree for women to use it.
Birth spacing	men	Usually women wait till the child is able to walk. However, if the husband wants
		to have children earlier it will be his final decision. Women reported trying to
		is particularly hard but ultimately women are not supposed to refuse the
		husband's will.
Number of children	men	Women have as many children as possible during their reproductive age and it will be the husband decision on when to have intercourse with his wife.
Schooling for children	men	The husband authorisation is necessary as he will be the one providing money
Visite in the		to pay school fees.
visits in the neiahbourhood/outside the	men	The husband authorisation is necessary, women always need to inform their
village		husbands when they plan to leave the compound.

Table 11: Distribution of decision-making power within households, Fangak County

In Nuer culture, seeking permission is deeply engrained, serving as the mechanism through which power dynamics between men and women are established within households. When men pay the dowry, women become their property and responsibility and therefore they must ask permission for most activities. Most women find it normal and necessary while others reported wanting more freedom.

"How can you not like to report back to him, if he is responsible for you. It is not fun when he is away because you need to step-up as a household head. When he goes, he gives you money, food and rules to follow. This is not a problem because he took you from your father and he is now responsible for you."

²¹⁵ Including drawing water from outside the household.

After marriage women are instructed to respect, attend and follow the husband's orders. Mothers usually advice women how to be good wives and keep good relationships with the in-laws. Men are told to provide, respect and defend their wives. Particularly, during the rainy season, informing the husband is needed as a protection measure due to the unpredicted floods that require all family members to be vigilant of the dykes around the house. Other women also said that reporting to the husband avoids arguments as he may think that they went away in the look out for other men.

When men migrate, women do not need to ask for permission for daily movement which increases their independence, however husbands usually leave instructions for women on what to do during their absence. Women generally respect those instructions for fear of being reported by other community members and having to deal with the consequences. Some women said to enjoy their increased temporary independence despite the additional responsibilities linked to the husband being away (Cf. **K Low access to income sources**). They also perceived more peace among co-wives when the husband is not around due to the lack of competition among each other.

"When the husband is away you work on your own and you don't have to consult anyone. When he is back you just report what you spent but you can spend the money on what you want and friends can come over without him telling you that they are a bad influence. We feel comfortable, happy and free when our husband is away. Sometimes when you need to buy slippers he will refuse but if he is not around you will just buy them. You can go and work at the market to make more income and probably the co-wife will come with you. There is peace in the house when the husband is not around because he will not have favourites and create jealousy loving the new wife more."

If they earn money while the husband is away, they will use part for food and keep the rest to give to the husband once back to the village reporting their spending while he was away. Some women admitted that if the husband does not support them, especially if he spends money on alcohol and girlfriends, they would secretly take part of the earned money to buy food and just pretend that it came from the previous received allowance.

"Women will never lack ideas to bring food to the table for their children even when men don't provide."

T. LOW SOCIAL SUPPORT FOR WOMEN

Strength of the association with undernutrition in the <i>scientific literature</i> ⁶¹	++
Strength of association with undernutrition based on SECONDARY DATA REVIEW relevant to the study	+++
area ⁶²	
Strength of association with undernutrition based on primary data analyses (SMART 2024)	NA
Categorisation by the technical experts at the initial technical workshop	++
Categorisation by the communities during the qualitative study	
Categorisation by the qualitative team	
Influence of historical and/or seasonal variations on undernutrition trends	+
Overall interpretation	+

SECONDARY DATA REVIEW¹⁶

In South Sudan the community relies on strong kinship ties, meaning an efficient system of solidarity.²¹⁶ People who are excluded from this system are particularly vulnerable because they cannot rely on neither physical support – men to clear the farms or to fish, women to look after the children – nor food support – gifts of grains, fish, milk, lent milking cow. Particularly vulnerable sub-groups in the community are: i) widows that are transferred to the brother of her dead husband but he usually prioritises his own wives ii)

²¹⁶ Action Against Hunger, 'The Underlying Causes of Malnutrition in Old Fangak Payam'.

women whose husbands live far away, iii) women living alone with young children, iv) household with bad relationship with co-wives, v) newly arrived in the area, displaced persons or returnees²¹⁷.

- Education is not a priority among parents. Many girls delay in primary schools due to repeating and complete primary school at an approximate age of 18-20 years or even older²¹⁸
- After delivery, mothers usually receive support from a relative in terms of house work. Once this period is over, mothers resume their normal activities and their heavy workload.²¹⁹

PRIMARY DATA ANALYSIS FINDINGS (SMART 2024)

No significant associations found through logistic or linear regressions.

QUALITATIVE INQUIRY FINDINGS

Men support their families primarily by providing food and money. However, the time they spend with their wives to offer emotional support is often limited. While some husbands sit down with their wives to discuss concerns, others, particularly those looking for new girlfriends or consuming alcohol, were said not to fulfil their responsibilities.

"This is a problem for us because if he drinks he will spend money on drinking and not on the family. There are many men like this but you can't point your finger at them in the village. We feel bad because when they come home drunk and they might even fall down and you have to take care of them now. They may also sell food to buy alcohol or make debts and people will come to your house to take food to clear the debts."

Particularly vulnerable are widows who have lost their husbands due to conflict, illness or old age, as well as divorcees who lack support from their previous family and must provide alone for their own family. According to customary law, when a woman loses her husband to death, the closest brother or cousin becomes responsible for giving her children, who will bear her husband's name. However, this responsibility does not always come with additional support, as they usually have their own families to care for. Women with elderly husbands are also vulnerable, as their husbands may not be able to provide like before, and the roles reverse with the women becoming primary family providers.

When a husband marries a new wife, his support is said to decrease as his attention switches to the new wife. He would still support the previous wives as part of his duties, but due to the limited resources the support will decrease especially for the wives with more children. Other forms of support for women include assistance from sisters, husband's sisters or co-wives. When a wife is pregnant, particularly the first wife, the husband often brings a sister from his household to help with household tasks after the wife comes home. Typically, women give birth to their first child in their family home to receive additional support from their mothers, particularly during the initial months. The duration of rest after child birth varies, typically ranging from 1 to 3 months depending on the available support.

Mothers and grandmothers have an important role in guiding new mothers, particularly with their first child. While advice from the mother-in-law varies based on the relationship, the woman's mother is often the primary source of support. Typical advice includes to be vigilant at all times, protect the child from the wind to prevent illness, breastfeed on demand to aid

²¹⁷ Action Against Hunger.

²¹⁸ Finn Church Aid, 'Needs Assessment Report'.

²¹⁹ Action Against Hunger, 'Qualitative Assessment of Risk Factors of Undernutrition Based on the Link NCA Methodology January 2020 - June 2020. Renk County, Upper Nile State, South Sudan'.

proper suckling, change the baby's positions on the mat, ensure the baby is under a mosquito net, and maintains the baby and the mat clean. With subsequent children, mothers said to become more confident needing less advice and supporting younger mothers within the community themselves.

No support groups exist in the community, as women are too busy to gather in support groups or even enjoy tea together. Limited financial resources do not allow creation of village savings groups, because the available resources are mostly used for survival. Neighbours play a very important supporting role, often closer than family due to their proximity. In fact, the flooded environment has brought houses much closer compared to the past which helps community members to look out for each other. This is also why controlling fights and rumours and reporting them to the leaders to restore peace are practiced behaviours to maintain the unity among the community.

"Neighbours are the closest, even closer than family, because they will come to you the fastest. They are most probably experiencing the same issues. At times, this friendship is even stronger than the relationship with your family. If you are sick or need food they will check on you and if you need to leave your children they will look after them."

According to the comparative study, 65% mothers (n=22) reported having less social support when pregnant with their malnourished child and nearly all (95%) ranked their support low or very low during their pregnancy with the malnourished child. Nearly half (n-14) mothers said to have had less support while breastfeeding their malnourished child. Additionally, most mothers (n=25, 74%) had no formal education while the rest started primary school.

There are limited educational opportunities for girls in nearby schools which only offer few classes of primary education. Therefore, girls need to travel to bigger towns like Old Fangak or New Fangak to continue their education depending on their parent's ability to support them. Due to the constant floods, classes are interrupted for long periods and girls need to re-peat schooling years several times. Despite the challenges, girls expressed a desire to continue their education and move as far as Juba or even Uganda, if only there was the opportunity. However most said not to have these opportunities and instead follow their mothers' path into early marriage as soon as the reach puberty (cf. C. Early marriage) Parents were said to be more supportive of girls continuing their education compared to the past. This is because they saw the benefits of educated youth returning to support their families in the village. Some women also mentioned that, if allowed and supported by their husbands, they sometimes move to larger towns to continue their studies even after getting married and having children.

Marriage, conflict and divorce

The main reasons for conflict between men and women in the community include:

- Lack of support from men, mainly in terms of food and income for the family often also related to drinking;
- Jealousy because the husband is having concubines or new wives
- Women neglecting house chores or cooking late
- Lack of respect towards husbands
- Women going somewhere without informing their husbands or not reporting about earned/spent resources;
- Refusal of sexual intercourse with their husbands
- Wives not attending visitors immediately
- Mothers being blamed because their daughters fell pregnant before being married

According to community discussions, arguments between husband and wife often escalate into physical violence. While some women reported a decrease in beatings due to increased awareness and the courage to

report abusive behaviours to village police authorities, physical violence between couples remains rather frequent. Many women view it as a regular part of a married life and try to avoid triggers whenever possible. The close distance between houses has made incidents more visible to neighbours, who are now more likely to report this way reducing physical abuse. However, cases still occur, often at night when people are sleeping. At times, women seek temporary shelter with neighbours or family to escape these situations till an agreement is found. Conflict is often initiated by lack of resources, with women struggling to support their families and feeling threatened by men engaging in new relationships. When talking about men's concubines' women said: "*They will take away resources from your husband that were meant for his family, that's why we don't like them.*"

According to the elderly and religious leaders, relationships within the community have become calmer and more respectful because nowadays community members live according to the teachings of the Bible. However, despite this, more women are getting divorced. Divorce is in fact socially accepted and more frequent compared to the past. Women usually stay at their family house till the case is complete. The husband is then invited to the women's family to discuss the issue with her and her parents. The leaders and the elderly are then involved and the case is brought to court, if necessary. If the reason of divorce is socially accepted, such as the husband not providing for the family, the woman will be able to re-marry in future.

"If the reason is genuine, it is socially accepted, you talk to your parents and they will then talk to the leaders. As long as your father agrees, it is ok. Then your father will need to give back the dowry to your husband and everyone will go to court. The dowry is given back so you can remarry. It is easy to re-marry if your reason is genuine and if you can give children to the new man."

However, if women have already many children with their husband, that is 5-6, it is more difficult to divorce. Another man will not marry them and it will be very difficult to support children alone. These women either remain in unhappy relationships and do not engage in sexual relations with their husbands anymore or separate and return to their family house, hoping for more support.

VI. CONCLUSION AND RECOMMENDATIONS

Causal mechanisms of undernutrition

Statistical associations using logistic and linear regressions between the nutritional status of children under 5 and different risk factors show similarities as well as differences between the causal mechanisms of wasting, stunting and underweight. The causal diagrams presented below are based on the diagram constructed during the community consultations (see **Figure 1**), while the results of the statistical analyses have been added to visually summarise the evidence available for wasting, stunting, underweight as well as a joint pathway for undernutrion. It is important to note that the statistical associations are not systematically valid for all three forms of undernutrition and/or contradictions may arise.

Wasting

On the basis of the available evidence, three causal pathways built around nine key risk factors can explain most cases of wasting in the study area. Firstly, *limited access to income* contributes to *poor access to quality diet* leading on one side to *sub-optimal nutritional status of mothers* which hinders *optimal breastfeeding practices* and on the other side to sub-optimal complementary feeding practices. On the other hand, the flooded environment poses considerable mobility challenges to reach health centres negatively affecting the *use of health services* while, at the same time, *inadequate accessibility and availability of water* leads to *sub-optimal environmental hygiene* and consequently *personal hygiene practices* increasing children's vulnerability to infections and subsequently wasting.



Figure 5: Causal diagram of acute malnutrition, Fangak County²²⁰

²²⁰ The red cells represent risk factors significantly linked to acute malnutrition, while the green cells indicate protective factors significantly linked to acute malnutrition, according to calculations of p-value < 0.05. (Cf. Appendix A + B). Grey cells represent risk factors supported by the available evidence.

Risk factors: Living in a house further away from the main water point, being delivered at home by a friend and living in a household that had debts at the time of the survey increased the likelihood of children being wasted.

Protective factors: Living in a household with higher numbers of cattle or in one that harvested crops the previous year, coming from a household with a higher diet diversity score, specifically consuming meat (including fish) or oil/fat in the 24h prior the survey decreased the likelihood of children being wasted. Lower risk of wasting was also found among children that consumed a higher number of food groups according to their minimum diversity score (MDD), children that consumed porridge or meat, those that received pentavalent and measles vaccinations before the first birthday or were taken to health centre for treatment of diarrhoea or fever. Additionally, children that were initiated to breastfeeding within one hour from birth or those that were observed having a clean face and body at the time of the survey were also less likely to be wasted. Vulnerability to wasting decreased for older children.

Stunting

On the basis of the available evidence, two causal pathways built around three key risk factors can explain most cases of stunting in the study area. Firstly, persistent low income triggers *low access to quality diet* which translates in *sub-optimal maternal nutritional status*. This hinders optimal breastfeeding practices leading to a protracted children's inadequate nutritional intake and therefore stunting. At the same, the flooded environment negatively affects people's mobility translating into a *low use of health services* and therefore higher vulnerability to child disease if treatment is sought late leading to stunting.



Figure 6: Causal diagram of stunting, Fangak County²²⁰

Risk factors: Living in a household that received humanitarian assistance in the past three months and having a mother currently lactating increased the risk of a child being stunted. Additionally, vulnerability to stunting increased for male children.

Protective factors: A mother being supported by a traditional birth attendant during delivery and having a higher weight decreased the risk of stunting. Vulnerability to stunting decreased for children with a higher weight.

Underweight

On the basis of the available evidence, four causal pathways built around six key risk factors can explain most cases of underweight in the study area. Firstly, *low access to income* translates into *low quality diet* leading to *sub-optimal maternal nutritional status* and consequent sub-optimal breastfeeding practices for their children. At the same time low female decision-making power impacts their *low birth spacing* increasing early and unwanted pregnancies. As a consequence, women deliver children with low birth at the same time worsening their already *sub-optimal nutritional status of mothers* which affects their ability to breastfeed on demand as they perceive not having enough breastmilk. On the other hand, the flooded environment and lack of means to access transport translates into *low use of health services* increasing children vulnerability to disease. Similarly, inadequate access to clean water translates to sub-optimal environmental hygiene practices which translate into *inadequate personal hygiene* and consequently a higher risk of children contracting disease and depleting of their nutritional status.



Figure 7: Causal diagram of underweight, Fangak County²²⁰

Risk factors: Living in a household with a higher number of dependencies, having a home delivery with the support of a friend and children having a lactating mother increased the risk of a child underweight. Vulnerability to underweight increased for male children.

Protective factors: Living in a household with a higher diet diversity score, specifically in respect to meat (including fish) and oil/fat in the 24h prior the survey or living in a household with a higher food consumption score decreased the likelihood of being underweight. Similarly, children with a higher minimum diet diversity score, those taken for treatment to the hospital in case of diarrhoea, fever or cough and those found to have a clean face and hands at the time of the survey had a lower risk of being underweight. Lastly having a mother who desired to be pregnant with the last child also decreased the likelihood of being underweight. Vulnerability to underweight decreased for older and taller children.

Undernutrition



Figure 8: Summary of available data for three types of undernutrition, Fangak County

Most overlaps of risk and protective factors were observed between wasting and underweight. One common *risk factor* between wasting based on weight/height index and underweight based on weight/age index included a child **being delivered at home with the support of a friend.** In contrast, common *protective factors* for wasting based on one or multiple indexes (weight/height, MUAC or combined weight/height and MUAC) and underweight based on weight/age index included being an **older child**, a child who lived in a household with **higher diversity score** or in household that **consumed meat (including fish)** or **oil/fat** in the 24h prior the survey, a child that consuming a **higher number of food groups according to their minimum diversity score (MDD)**, a child that was **taken to the health centre for treatment of diarrhoea or fever** and a child that **had a clean face and hands** at the time of the survey.

Additionally, common risk factors between stunting based on height/age and underweight based on weight/age included being a **male child** and having a **mother currently lactating** at the time of the survey. No common protective factors were found between wasting based on multiple indice and stunting based on height/age.

Summary of risk factor categorisation

The analyses conducted during this Link NCA study made it possible to categorise 20 risk factors likely to have an effect on the incidence of undernutrition (wasting) in the study area. Following a triangulation of data from various sources, five (5) risk factors were identified as having a major impact, eleven (11) risk factors were classified as having a major impact and four (4) risk factors were considered to have a minor impact. Among the major risk factors, were identified in the health and nutrition sector, namely **limited access to health services** and **low nutritional status of women**, two risk factors were identified in the food security and livelihoods sector namely **low access to quality diet** and **low access to income sources**.

while one risk factor was identified in the water, hygiene and sanitation sector, namely inadequate accessibility, availability and quality of water at household level.

Risk fa	actors	Final interpretation
Α	Limited access to health services	+++
В	Limited utilisation of health services	++
С	Low birth spacing/ early, repetitive or unwanted pregnancies	++
D	Low birth weight	+
E	Low nutritional status of women	+++
F	Caregiver's well-being	++
G	Non-optimal breastfeeding practices	++
н	Non-optimal complementary feeding practices	++
I	Low quality of interactions between a child and a caregiver	+
J	Low access to a quality diet	+++
к	Low access to income sources	+++
L	Malfunctioning market or supply system	++
м	Low coping capacities	++
Ν	Inadequate accessibility, availability and quality of water at household level	+++
0	Non-optimal sanitation practices	++
Р	Non-optimal personal hygiene practices	++
Q	Non-optimal environmental and food hygiene practices	++
R	Heavy workload of women	++
S	Low female autonomy/ decision-making	+
Т	Low social support for women	+

Table 12: Summary of risk factor categorisation, Fangak County

The categorisation of risk factors identifies the same three major factors raised by the communities, namely limited access to health services, limited income sources and inadequate accessibility and availability to quality water. Additionally, low nutritional status of women and low-quality diet were added classified as major due to the strong association of the respective indicators with wasting in the secondary data review and/or on the basis of primary data analyses (SMART 2024) as well as the variation according to historical and seasonal trends. It is important to note that three out of five of these risk factors are directly linked to the reduced quality of diet and its effect on women and children' nutritional status, highlighting the importance of focussing programmatic responses on increasing access to additional local food sources to diversify the diets of both children and caregivers.

Recommendations

Based on these results, the following activities are recommended for incorporation into the Right2Grow project and/or complementary projects implemented in the study area:

- Disseminate the main findings of this Link NCA study to Action Against Hunger project partners, authorities and civil society in Fangak County to ensure that these are accounted for in their programmatic responses, specifically focusing on intervention targeting women of reproductive age and children under 5 years of age.
- Expand a variety of income sources to decrease households' dependence on humanitarian assistance, improving their economic stability and resilience. This could be done by assisting communities to mindfully manage natural resources, e.g. by strengthening fishing (and/or fish farming) and fish transformation activities, introducing crops which flourish in wetlands, for example rice, arrowroot, banana, sugarcane or bio-fortified crops, among others and/or introducing poultry, such as chickens or ducks, which could also contribute to a higher food diversity in the

household. Additionally, provide food preservation skills to increase food diversity during the lean season.

- Engage the community in SBCC interventions focused on women's health, including nutrition before, during, and after pregnancy, as well as breastfeeding, involving men as key decision-makers within the household.
- Introduce mobile clinics, such as boat clinics, to reduce barriers to healthcare services among the most isolated communities and those that are displaced due flooding. Additionally, strengthen referral systems from the community to health facilities to ensure timely access to care. Access to health services could also be improved via community health worker networks, bringing essential services closer to the communities to improve the quality and scope of health services provided at states service points (health centres) by ensuring that sufficient staff and medicine are available throughout the year, but especially during the peak periods of recurrent illnesses.
- Increase awareness of the benefits of boiling water collected from the swamps before drinking to prevent disease. This could be also done by reviving traditional knowledge of creating pots from mud to boil water in larger quantities to overcome the lack of cooking utensils.
- Support the development of new boreholes and the renovation of existing ones, ensuring a sustainable transfer of infrastructure to the community.
- Facilitate a creation or strengthening of community structures, particularly for women, aiming to create safe space for information sharing, learning and social support.
- Advocate for the introduction of solar energy projects, enabling communities to benefit from electricity for daily use, including solar powered boats, water pumps, telephone network, etc.
- Stimulate a community dialogue aiming to seek community-based or householdbased solutions for priority concerns, reducing the vulnerability of the populations dependent on humanitarian assistance.

Other recommendations:

 Promote peace and stability in Fangak County while strengthening basic services, such as health, markets, and education, to enhance community access and utilisation.

ANNEXES

ANNEX A: LOGISTIC REGRESSION TABLE

Table 13: Unadjusted associations between risk factors and the binary classification of wasting, stunting and underweight demonstrated by logistic regression (SOURCE: SMART Fangak 2024)

Risk factor	Wasting (W/H)		Wasting (N	/UAC)	Wasting (MUAC	Stuntin	g	Underweight					
Logistic Regression					Children 6-59 months		months	W/H) Children 6-59 m	Children 6-59	months	Children 6-59		
20910110 11091053017			children o 55 months		children o 55 m	ontris	cintar en o 55	monting	months				
Indicator N n Proportion in analyzed				Odds Ratio	P-	Odds Ratio	P-	Odds Ratio	P-	Odds Ratio	P-	Odds	P-
			sample		value		value		value		value	Ratio	value
			[95% CI]	[95% CI]		[95% CI]		[95% CI]		[95% CI]		[95% CI]	
	51	28		1.55		1.29				2.02		2.64	
child_sex	3	1	54.78 [50.47: 59.09]	[0.96:2.54]	0.076	[0.76:2.24]	0.346	1.41 [0.92:2.19]	0.120	[1.21:3.46]	0.008	[1.66:4.31]	0.000
	15	13		0.16		0.48				4.25		0.5	
when_first_put_at_brest (within 1h)	1	2	87.42 [82.13: 92.71]	[0.05:0.46]	0.001	[0.18:1.32]	0.143	0.17 [0.04:0.5]	0.003	[0.81:78.38]	0.169	[0.18:1.42]	0.184
		11		0.6		0.7				0.59		0.57	
perception_of_enough_milk_production		2	74.17 [67.19: 81.15]	[0.27:1.34]	0.207	[0.32:1.57]	0.373	0.54 [0.25:1.14]	0.105	[0.24:1.53]	0.264	[0.27:1.24]	0.151
		14	96 [92.86: 99.14]	0.88	0.887	0.76	0.759	1.35 [0.25:9.97]	0.734	1.13	0.915	0.98	0.981
child_had_other_liquids_yesterday		4		[0.17:6.54]		[0.14:5.65]				[0.17:22.08]		[0.18:7.24]	_
		11		1.13		1.03				0.74		0.75	
child_was_given_water yesterday	4	4	79.17 [72.54: 85.8]	[0.46:2.97]	0.794	[0.43:2.68]	0.954	0.92 [0.4:2.16]	0.850	[0.27:2.23]	0.566	[0.32:1.8]	0.514
	14			0.36		1.08				0.88			
child_was_given_formula yesterday	4	7	4.86 [1.35: 8.37]	[0.02:2.22]	0.355	[0.15:5.26]	0.928	1.14 [0.22:5.37]	0.868	[0.05:5.81]	0.912	0 []	0.986
	14			0.52		0.36				2.73		0.67	
child_was_given_porridge yesterday	4	92	63.89 [56.04: 71.74]	[0.25:1.12]	0.094	[0.17:0.76]	0.008	0.4 [0.19:0.81]	0.011	[1.02:8.67]	0.061	[0.32:1.39]	0.275
	15	12				1.03				2.33		1.78	
child_ate_solid_semisolid_food yesterday	1	9	85.43 [79.8: 91.06]	0.53 [0.2:1.4]	0.187	[0.39:3.06]	0.951	0.69 [0.27:1.79]	0.443	[0.62:15.23]	0.277	[0.65:5.72]	0.286
	15	14		2.26		0.76				0.42		0.97	
child_brestfed_yesterday	1	5	96.03 [92.92: 99.14]	[0.35:43.97]	0.464	[0.14:5.65]	0.759	1.35 [0.25:9.97]	0.734	[0.08:3.19]	0.339	[0.18:7.17]	0.971
	12			0.19		0.19				0.72		0.31	
child_ate_any_meat	9	13	10.08 [4.88: 15.28]	[0.01:1.01]	0.114	[0.01:1.04]	0.121	0.11 [0.01:0.61]	0.040	[0.11:2.93]	0.682	[0.05:1.25]	0.145
	12			1.18		1.73				1.45		2.11	
child_ate_any_fish	9	86	66.67 [58.54: 74.8]	[0.51:2.81]	0.702	[0.75:4.28]	0.215	1.5 [0.7:3.32]	0.307	[0.55:4.33]	0.470	[0.94:5.05]	0.079
	12			0.4		0.41						0.3	
child_ate_any_eggs	9	7	5.43 [1.52: 9.34]	[0.02:2.49]	0.410	[0.02:2.55]	0.423	0.25 [0.01:1.52]	0.204			[0.02:1.85]	0.275
	12			0.83		1.32				0.57		0.95	
child_ate_any_dairy	9	9	6.98 [2.58: 11.38]	[0.12:3.84]	0.829	[0.27:5.31]	0.707	0.78 [0.16:3.11]	0.732	[0.03:3.41]	0.602	[0.19:3.8]	0.944
	12			0.83		0.35				2.66		0.62	
child_ate_any_oils_fat_or_butter	9	8	6.2 [2.04: 10.36]	[0.12:3.84]	0.829	[0.02:2.08]	0.336	0.95 [0.19:4.05]	0.942	[0.51:11.72]	0.204	[0.09:2.82]	0.566
child_received_measles_vaccination_before_	47	38		0.41		0.69				0.84		0.6	
first_birthday	3	5	81.4 [77.89: 84.91]	[0.24:0.74]	0.002	[0.36:1.44]	0.302	0.47 [0.28:0.81]	0.006	[0.46:1.61]	0.574	[0.35:1.04]	0.060

child_received_penta_vaccination_before_fir	47	30		0.48		0.96				1.1		0.65	
st_birthday	2	6	64.83 [60.52: 69.14]	[0.29:0.81]	0.005	[0.53:1.8]	0.897	0.55 [0.35:0.88]	0.012	[0.66:1.89]	0.723	[0.41:1.03]	0.063
child_received_deworming_treatment_past_	47	34		0.85		0.66				1.04		1.1	
6m	3	0	71.88 [67.83: 75.93]	[0.49:1.49]	0.551	[0.36:1.25]	0.192	0.85 [0.52:1.43]	0.543	[0.6:1.85]	0.897	[0.67:1.85]	0.720
	51	35		0.84		0.71				1.52		1.13	
child_received_vitA_suppl_past_6m	2	1	68.55 [64.53: 72.57]	[0.51:1.4]	0.493	[0.42:1.25]	0.226	0.79 [0.51:1.26]	0.314	[0.88:2.75]	0.149	[0.71:1.83]	0.617
	51	20		1.51		1.44				1.18		1.37	
child_had_diarrhea_past2w	3	4	39.77 [35.53: 44.01]	[0.94:2.43]	0.088	[0.85:2.45]	0.176	1.32 [0.86:2.04]	0.204	[0.71:1.93]	0.521	[0.88:2.12]	0.160
	20	16		0.29		0.49				1.37		0.41	
child_taken_to_treatment_for_diarrhea	4	5	80.88 [75.48: 86.28]	[0.13:0.64]	0.002	[0.21:1.21]	0.106	0.25 [0.11:0.54]	0.000	[0.52:4.29]	0.548	[0.19:0.9]	0.024
	51	23		1.23		1.5						0.89	
child_had_fever_past2w	2	1	45.12 [40.81: 49.43]	[0.76:1.97]	0.394	[0.88:2.56]	0.133	1.19 [0.77:1.83]	0.426	1 [0.6:1.63]	0.985	[0.57:1.38]	0.607
	23	18		0.5		0.52				1.94		0.46	
child_taken_to_treatment_for_fever	1	6	80.52 [75.41: 85.63]	[0.23:1.11]	0.077	[0.23:1.22]	0.118	0.36 [0.18:0.75]	0.005	[0.71:6.82]	0.239	[0.22:1.01]	0.047
	51	10		0.78		0.57				1.09		1.14	
child_had_cough_past2w	3	0	19.49 [16.06: 22.92]	[0.4:1.42]	0.435	[0.24:1.17]	0.151	0.6 [0.32:1.07]	0.095	[0.57:1.98]	0.780	[0.66:1.91]	0.632
	10			0.33		0.49				1.1		0.24	
child_taken_to_treatment_for_cough	0	85	85 [78: 92]	[0.09:1.39]	0.107	[0.1:3.61]	0.417	0.37 [0.1:1.54]	0.142	[0.25:7.65]	0.908	[0.08:0.79]	0.017
	51	42		2.12		1.36				1.42		1.49	
obs child within visual range of caregiver	3	1	82.07 [78.75: 85.39]	[1.04:4.93]	0.056	[0.67:3.04]	0.422	1.37 [0.77:2.59]	0.304	[0.72:3.05]	0.338	[0.83:2.86]	0.203
	51	41		1.18		1.7				1.12		1.23	
obs caregiver talks to child	1	4	81.02 [77.62: 84.42]	[0.65:2.27]	0.610	[0.83:3.99]	0.179	1.19 [0.69:2.14]	0.548	[0.6:2.21]	0.739	[0.71:2.25]	0.475
	51	39	[]	0.94		171				1 15		125	
obs caregiver interacts with child	3	3	76 61 [72 95 [.] 80 27]	[0 55.1 67]	0.838	[0 88·3 68]	0 1 3 6	1 21 [0 73.2 08]	0 474	[0 65:2 15]	0.646	[0 74·2 16]	0416
	51	34		1 21	0.000	2 12	01100		0	1 75	0.0.10	1 55	00
obs caregiver smiles bugs caresses child	3	0	66 28 [62 19 [.] 70 37]	[0 73.2 04]	0 471	[1 15:4 18]	0.021	1 37 [0 86.2 21]	0 191	[1 01.3 15]	0.054	1.55	0.075
obs_caregiver_sinites_nags_caresses_enita	51	Ŭ	00.20 [02.15. 70.57]	[0.75.2.04]	0.471	1.02	0.021	1.57 [0.00.2.21]	0.151	3 36	0.034	24	0.075
obs caregiver spanks yells at child	2	8	1 56 [0 49: 2 63]			1.02	0.985	0 52 10 03-2 981	0545	0.68·13.001	0 102	2.4 [0.40.0 05]	0.236
	51	13	1.50 [0.49: 2.05]	0.30		0.59	0.905	0.52 [0.05.2.90]	0.545	0.87	0.102	0.46	0.230
obs child has clean face and hands	2	45	84 6 [81 48: 87 72]	10 22:0 681	0.001	0.33 [0 32·1 17]	0 1 1 2	0 40 10 20 0 841	0.000	0.07 [0.46:1.74]	0.679	10 27·0 701	0.005
	51	20	04.0 [01.40. 07.72]	1.02	0.001	0.91	0.112	0.49 [0.29.0.04]	0.009	0.40.1.74	0.079	0.84	0.005
abs shild has clean slather	21	59	76 17 172 49. 70 961	1.02	0.042	0.01	0.490		0.442	0.05	0 5 6 7	0.04	0.406
obs_child_has_clean_clothes	۲ ۲	25	70.17 [72.46. 79.80]	0.75	0.942	[0.43.1.3]	0.400	0.02 [0.31.1.30]	0.442	[0.49.1.32]	0.307	[0.32.1.4]	0.490
abs shild recently washed	21	35 0		0.75	0.250	0.72	0.226	0 71 [0 46:1 12]	0.146	0.97	0.005		0.020
obs_child_recently_washed	<u>۲</u>	0	09.92 [03.95. 75.89]	[0.40.1.25]	0.259	[0.42.1.20]	0.230	0.71[0.40.1.15]	0.140	[0.57.1.00]	0.905	[0.59.0.95]	0.029
she enimely annexed in also and	51		22 110 26: 26 64	1.4	0.210	0.85	0.024	1 21 [0 72.1 07]	0.420	0.87	0.040	1.15	0.500
obs_animais_present_in_play_area	5	8	23 [19.36: 26.64]	[0.81:2.34]	0.216	[0.43:1.59]	0.634	1.21 [0.73:1.97]	0.438	[0.47:1.55]	0.646	[0.69:1.88]	0.588
	51	49		2.67	0.247	1.99	0 5 1 0	2 62 60 71 66 001	0.210	0.73	0.000	1.02	0.070
HDDS_cereals_tubers	3	8	97.08 [95.62: 98.54]	[0.52:48.87]	0.347	[0.39:36.39]	0.510	3.62 [0.71:66.08]	0.218	[0.22:3.25]	0.629	[0.32:4.53]	0.979
	51	18		1.08		1.11			0.54	1.1		0.91	
HDDS_milk	0	3	35.88 [31.72: 40.04]	[0.65:1.75]	0.768	[0.64:1.91]	0.696	1.14 [0./3:1.//]	0.561	[0.65:1.81]	0.726	[0.57:1.43]	0.685
	51	46		0.27		0.68				0.74		0.37	
HDDS_meat	0	8	91.76 [89.37: 94.15]	[0.14:0.54]	0.000	[0.3:1.73]	0.378	0.32 [0.17:0.62]	0.001	[0.34:1.79]	0.475	[0.19:0.73]	0.004
	51	18		1.07		1.1				0.91		0.67	
HDDS_vitA_rich_veg	3	5	36.06 [31.9: 40.22]	[0.65:1.74]	0.772	[0.63:1.89]	0.720	0.97 [0.61:1.5]	0.882	[0.53:1.53]	0.728	[0.41:1.06]	0.095
	51	38		0.53		0.67				0.95		0.61	
HDDS_oil_or_fat	1	3	74.95 [71.19: 78.71]	[0.32:0.88]	0.013	[0.38:1.2]	0.164	0.56 [0.35:0.9]	0.015	[0.55:1.69]	0.848	[0.38:0.98]	0.038

	51	23		0.71		0.96				0.61		0.61	
HDDS_sweets	3	3	45.42 [41.11: 49.73]	[0.44:1.15]	0.168	[0.56:1.62]	0.868	0.87 [0.56:1.34]	0.525	[0.36:1.01]	0.058	[0.39:0.95]	0.030
	51	39				0.93				1.68		1.16	
main_source_of_food_in_HH	3	7	77.39 [73.77: 81.01]	1 [0.58:1.78]	0.988	[0.51:1.77]	0.808	1.1 [0.66:1.87]	0.726	[0.9:3.39]	0.121	[0.69:2.02]	0.576
humanitarian_assistance_received_in_last_3	51	40		1.02		1.1				2.61		1.45	
m	3	0	77.97 [74.38: 81.56]	[0.59:1.86]	0.936	[0.59:2.18]	0.776	1.05 [0.63:1.79]	0.853	[1.28:6.07]	0.014	[0.84:2.59]	0.194
	50	12		1.23		0.98				0.77		0.93	
when_last_received_humanitarian_assistance	9	3	24.17 [20.45: 27.89]	[0.71:2.07]	0.447	[0.51:1.78]	0.944	1.13 [0.69:1.83]	0.620	[0.41:1.38]	0.401	[0.55:1.52]	0.770
	51	27		1.26		1.06				0.76		0.99	
main_source_of_drinking_water	3	0	52.63 [48.31: 56.95]	[0.78:2.03]	0.347	[0.63:1.81]	0.821	1.18 [0.77:1.82]	0.449	[0.46:1.24]	0.265	[0.64:1.53]	0.976
	51	30				1.38						0.99	
whashing_hands_onlyWater	3	8	60.04 [55.8: 64.28]	1.1 [0.68:1.8]	0.706	[0.8:2.45]	0.253	1.22 [0.78:1.91]	0.389	1.5 [0.9:2.57]	0.128	[0.64:1.54]	0.956
	51	18		0.79		0.76				0.62		0.89	
whashing_hands_neither	3	2	35.48 [31.34: 39.62]	[0.46:1.3]	0.354	[0.42:1.33]	0.347	0.77 [0.48:1.21]	0.257	[0.35:1.06]	0.087	[0.56:1.4]	0.629
¥	51	30		1.28		0.95				0.83		1.02	
obs_children_playing_directly_on_floor	3	7	59.84 [55.6: 64.08]	[0.79:2.12]	0.322	[0.56:1.64]	0.847	1.27 [0.82:1.99]	0.295	[0.51:1.37]	0.462	[0.66:1.59]	0.935
	51	10		1.11		1.84				1.16		1.64	
obs_animal_excreta_around_HH	1	4	20.35 [16.86: 23.84]	[0.61:1.94]	0.720	[1.01:3.28]	0.041	1.53 [0.92:2.5]	0.096	[0.62:2.06]	0.627	[0.98:2.68]	0.054
	51	21		1.16		1.05				1.06		1.26	
HH_cultivated_plan_crops_last_year	3	5	41.91 [37.64: 46.18]	[0.72:1.85]	0.551	[0.61:1.78]	0.871	1.01 [0.66:1.56]	0.948	[0.64:1.73]	0.828	[0.81:1.94]	0.303
	21			0.78		1.62				1.99		1.12	
HH_cultivated_sorghum	4	34	15.89 [10.99: 20.79]	[0.25:2.03]	0.643	[0.56:4.18]	0.339	0.97 [0.37:2.31]	0.954	[0.77:4.78]	0.137	[0.44:2.58]	0.799
<u> </u>	21	19		5.67		1.67				0.84		2.19	
HH_cultivated_maize	4	0	88.79 [84.56: 93.02]	[1.14:103.13]	0.094	[0.45:10.8]	0.507	3.34 [0.93:21.35]	0.112	[0.29:3.07]	0.770	[0.71:9.56]	0.222
	21			0.38		1.37				1.06		0.84	
HH_cultivated_beans	4	25	11.68 [7.38: 15.98]	[0.06:1.38]	0.205	[0.38:4.01]	0.589	0.66 [0.19:1.86]	0.472	[0.29:3.04]	0.927	[0.27:2.23]	0.747
	21	11		0.59		1.19				1.11		0.91	
HH_cultivated_vegetables	4	9	55.61 [48.95: 62.27]	[0.29:1.2]	0.145	[0.53:2.76]	0.683	0.74 [0.38:1.43]	0.366	[0.53:2.4]	0.778	[0.48:1.76]	0.787
	21			1.01		1.58				0.51		0.75	
HH_cultivated_potatoes	4	11	5.14 [2.18: 8.1]	[0.15:4.14]	0.988	[0.23:6.59]	0.571	0.8 [0.12:3.24]	0.778	[0.03:2.8]	0.527	[0.11:3.05]	0.724
	21			0.35		1.57				0.76		0.85	
HH_harvested_crops_last_year_all	4	68	31.78 [25.54: 38.02]	[0.13:0.84]	0.028	[0.67:3.56]	0.287	0.7 [0.33:1.42]	0.339	[0.32:1.7]	0.523	[0.41:1.68]	0.642
	21			2.03		0.74				1.17		1.51	
HH_harvested_crops_last_year_none	4	58	27.1 [21.14: 33.06]	[0.96:4.23]	0.059	[0.26:1.84]	0.543	1.64 [0.8:3.28]	0.168	[0.5:2.58]	0.712	[0.74:3.01]	0.244
	51	28		1.75		0.95				0.9		1.42	
HH_has_debts	3	2	54.97 [50.66: 59.28]	[1.07:2.9]	0.027	[0.56:1.63]	0.864	1.29 [0.84:2]	0.249	[0.55:1.48]	0.683	[0.92:2.23]	0.120
	43			0.15		0.19				0.51		0.11	
mother_physiological_status_preg	1	32	7.42 [4.95: 9.89]	[0.01:0.74]	0.068	[0.01:0.93]	0.110	0.11 [0.01:0.52]	0.030	[0.12:1.51]	0.285	[0.01:0.55]	0.034
	43			0.98		0.69				2.03		1.83	
mother_physiological_status_lactating	1	69	16.01 [12.55: 19.47]	[0.46:1.92]	0.952	[0.27:1.5]	0.381	0.91 [0.47:1.69]	0.774	[1.06:3.75]	0.027	[1.01:3.22]	0.041
	42	20		0.9		0.62				0.56		0.66	
who_delivered_youngest_child_tba	8	6	48.13 [43.4: 52.86]	[0.53:1.52]	0.704	[0.35:1.08]	0.097	0.7 [0.44:1.12]	0.142	[0.32:0.96]	0.038	[0.41:1.06]	0.088
	42]		2.56		1.49				1.3		1.79	
who_delivered_youngest_child_friend	8	73	17.06 [13.5: 20.62]	[1.39:4.6]	0.002	[0.73:2.87]	0.246	1.87 [1.05:3.24]	0.029	[0.66:2.46]	0.426	[1:3.12]	0.044
wanted_to_get_pregnant_with_last_pregnan	42	41		0.68		0.77				0.41		0.32	
су	8	0	95.79 [93.89: 97.69]	[0.24:2.46]	0.510	[0.25:3.42]	0.694	0.98 [0.34:3.51]	0.967	[0.14:1.34]	0.109	[0.12:0.86]	0.019

ANNEX B: LINEAR REGRESSION TABLE

Table 14: Unadjusted associations between risk factors and the binary classification of wasting, stunting and underweight demonstrated by linear regression (SOURCE: SMART Fangak 2024)

Risk factor	G	AM [W/H	-1]	GA	M [MUA	\ C]	Stu	nting [H	/A]	Underweight [W/A]					
Linear Regression	Children 6-59 months			Childre	en 6-59 n	nonths	Children 6-59 months			Children 6-59 months					
Indicator	n	Mean [95% Cl]	Standard error	Coeff.	SE	P- value	Coeff.	SE	P- value	Coeff.	SE	P- value	Coeff.	SE	P- value
child age	513	31.87 [30.66:33.09]	0.62	0.017	0.003	0.000	0.437	0.036	0.000	-0.001	0.004	0.723	0.012	0.004	0.001
n weeks earlier	33	2.61 [2:3.21]	0.08	0.001	0.127	0.994	-0.224	1.574	0.888	0.125	0.134	0.357	0.199	0.124	0.119
child weight	513	11.8 [11.55:12.05]	0.13	0.191	0.014	0.000	3.016	0.146	0.000	0.129	0.019	0.000	0.241	0.013	0.000
child height	513	89.05 [88.09:90.01]	0.49	0.020	0.004	0.000	0.612	0.044	0.000	0.038	0.005	0.000	0.044	0.004	0.000
MDD iycf tot	129	2.52 [2.41:2.63]	0.03	0.176	0.140	0.211	4.242	1.505	0.006	0.170	0.170	0.319	0.291	0.147	0.050
mahfp	513	3.28 [3.12:3.45]	0.08	-0.031	0.025	0.211	0.090	0.304	0.766	-0.008	0.030	0.789	-0.038	0.026	0.143
HDDS score	513	4.13 [3.99:4.27]	0.07	0.057	0.028	0.044	0.405	0.344	0.239	0.029	0.034	0.386	0.090	0.030	0.002
FCS	513	19.25 [18.5:20]	0.38	0.007	0.005	0.186	0.086	0.066	0.193	0.004	0.007	0.491	0.012	0.006	0.041
n days relied on less preferred food	513	2.81 [2.66:2.97]	0.08	-0.028	0.026	0.284	0.392	0.310	0.208	-0.005	0.031	0.858	-0.022	0.027	0.411
n days had to borrow food	513	1.9 [1.78:2.03]	0.06	-0.057	0.033	0.087	0.007	0.400	0.986	0.036	0.039	0.360	-0.008	0.035	0.820
n days portions were limited	513	2.17 [2.02:2.31]	0.07	-0.021	0.029	0.475	0.542	0.350	0.123	0.037	0.035	0.285	0.016	0.030	0.608
n days reduced consumption to prioritise children	511	1.78 [1.65:1.92]	0.07	0.002	0.030	0.943	0.326	0.367	0.375	0.023	0.036	0.528	0.023	0.032	0.470
n days n of meals reduced	513	1.76 [1.64:1.88]	0.06	0.016	0.034	0.635	0.522	0.398	0.190	0.089	0.039	0.024	0.047	0.034	0.174
n meals eaten per day	512	1.93 [1.88:1.98]	0.03	0.038	0.078	0.629	-1.194	0.940	0.205	0.017	0.093	0.854	0.055	0.082	0.503
time to main waterpoint	513	17.86 [16.52:19.2]	0.68	-0.001	0.003	0.762	-0.098	0.037	0.008	0.002	0.004	0.663	0.000	0.003	0.993
n HH members contribution to food provision	513	1.71 [1.62:1.8]	0.05	0.026	0.046	0.576	0.113	0.552	0.838	-0.015	0.055	0.786	-0.028	0.048	0.554
n HH members not contribution to food provision	513	5.92 [5.67:6.16]	0.13	-0.036	0.016	0.028	0.012	0.201	0.954	-0.012	0.020	0.539	-0.036	0.017	0.037
HH dependancy ratio	513	4.45 [4.19:4.72]	0.14	-0.031	0.015	0.045	-0.025	0.187	0.893	0.001	0.018	0.945	-0.019	0.016	0.230
n cattle	496	0.52 [0.32:0.73]	0.1	0.023	0.021	0.256	0.508	0.251	0.043	0.015	0.024	0.540	0.030	0.022	0.167
n goats	496	0.58 [0.44:0.72]	0.07	0.053	0.030	0.077	0.416	0.364	0.253	-0.013	0.034	0.712	0.023	0.031	0.455
mother age	429	30.39 [29.64:31.14]	0.35	0.011	0.007	0.093	0.151	0.080	0.060	-0.002	0.008	0.819	0.014	0.007	0.042
MUAC mother	413	255.42 [253.05:257.79]	1.08	0.005	0.002	0.024	0.075	0.026	0.004	-0.002	0.003	0.440	0.004	0.002	0.120
n children given birth	427	3.57 [3.39:3.74]	0.08	0.025	0.029	0.382	0.822	0.341	0.016	0.010	0.034	0.770	0.042	0.029	0.151
age at first child	425	19.32 [19.04:19.61]	0.13	0.004	0.018	0.808		0.213	0.655	-0.049	0.021	0.020	0.001	0.018	0.975
n days of rest post delivery	401	36.66 [34.41:38.91]	1.01	-0.004	0.002	0.070	-0.042	0.029	0.142	0.001	0.003	0.712	-0.004	0.002	0.135

ANNEX C: LIFE IN THE PAST

Life in the past

Even 15-20 years ago, life in the community was very different than now. There were no clothes, no education, no church and no health services. Women were wearing *Yahat* to cover their intimate parts which was made of cow skin. People used to go everywhere on foot because the environment was dry and there were no other means of transportation. Houses were further away from each other because everyone was farming and had big gardens and cattle.

Cultural practices such as the removal of lower teeth and forehead marking were common rituals practiced for boys reaching the age of 15-16 years to initiate them into adulthood. During these ceremonies, boys were given 2 spears one for wild animals and one for catching fish and a long wood stick to be used for protection in their adult life. Now forehead marking is no longer obligatory due to safety because of the ongoing conflict, men with marks are considered "real" men and referred to as "*wut*".

"Marks were initially introduced by the white man during colonial times to identify the different tribes. Nuer had 6 straight lines on the forehead while Dinka had 4 lateral lines. The marking happens during a ceremony at the age of 15 years, which represents initiation of boys into adulthood. During the ceremony a group of boys is initiated at the same time. After marking they stay in a house to heal for 2 weeks and if one is not healing everyone will wait till all men are healed. When you come out there will be a big ceremony and a bull will be slaughtered because this will be the first day of being a man. You will be given multiple spears and your children will not be able to marry the children of anyone in your group because you will be considered brothers."

According to the community, there was more respect between young people, their parents and the older generation. Nowadays youth often does not respect their parents because they think that they are more intelligent because they went to school. This also applies to girls that are now allowed to go to school compared to the past.

ANNEX D: QUALITATIVE GUIDE

A. INFORMATION NOTE²²¹

Link NCA causal analysis of undernutrition in Fangak County, Jonglei State, is part of the Right to Grow project. The Link NCA study will seek to provide a better understanding of the multi-sectoral risk factors of wasting. As such, the study will make it possible to prioritise the project's interventions and ensure strong community involvement in all its phases.

Name of principal investigator: Patrizia Pajak

INVITATION: We would like you to take part in a study conducted by Action Against Hunger, a non-governmental organisation that fights the causes and effects of hunger in nearly 50 countries around the world, including South Sudan. The organisation has expertise in health and nutrition, mental health and care practices, gender, water, sanitation and hygiene, as well as food security and livelihoods.

STUDY OBJECTIVES: The aim of this study is to improve our understanding of the causes of wasting in Fangak County. We hope that this study will help us to identify the risk factors triggering wasting in your community so that together, and with the involvement of local authorities and other partners, we can reduce wasting in the future. The study will run from 23 October till 19 November in four sampled communities.

PROCEDURE: We would like to spend 6 consecutive days starting today in your community. We will share a detailed plan of our activities in order to facilitate the selection and mobilisation of participants for interviews and focus group discussions. The study will focus primarily on parents of children under 5 years of age, but other key informants may also be requested to participate. Anyone wishing to share their views outside of planned interviews and focus group

²²¹ To be used as an opening to each exchange with key informants, whether it is a semi-structured interview or a group discussion. The sentences in grey are only relevant for an initial meeting with community leaders.

discussions can contact the study team to do so. The study team would also like to carry out a number of observations and household visits in your community, if possible, so that we can better understand your day-to-day challenges. Focus group discussions will be organised around themes such as health, nutrition, care practices, water, hygiene and sanitation, food security and livelihoods, and gender. 8-12 people should participate in each focus group discussion, as indicated in the shared detailed planning. Please note that we will not be able to accommodate more people at any one time. Participants are asked to arrive on time in order not to delay subsequent focus group discussions. On behalf of your community, do you agree to participate in this study? Do you have any questions? If so, we will need you to appoint a community mobiliser. This person must be known and respected by all members of your community. This person's role will be to mobilise participants for semi-structured interviews and focus group discussions, as outlined in our detailed planning. Preferably, the selection of participants will be coordinated with you. Please note that it is preferable for the selected participants to attend only one group discussion. If they wish to contribute more than once, this is only permitted if it relates to different topics. However, we want to talk to as many members of your community as possible and for this reason it would be preferable if more people from your boma were mobilised to participate. Please note that the participation of a community mobiliser must be entirely voluntary.

Please note that there is no right or wrong answer to our questions, no right or wrong opinion and no right or wrong way of doing things. We are genuinely interested in delving into your daily life and learning more about your beliefs and practices. If you agree to participate, we will ask for about an hour of your time.

CONFIDENTIALITY: We will not ask you for your name and we will not share the content of our discussion with other people in your community. Your name will not appear in our study and no one will be able to identify what you have shared with us.

RISKS: Unfortunately, apart from our sincere gratitude, we cannot promise you anything in exchange for your participation in this study. Participation in this study does not guarantee your selection for future Action Against Hunger activities, nor should it adversely affect your participation in ongoing activities. However, during the focus group discussions, we will share water and snacks with you, which you may choose to take home if you wish.

INFORMED CONSENT: Participation in this study is your choice. You are free to stop the interview or leave the focus groupdiscussion at any time. Your participation is entirely voluntary. If you do not wish to answer a question, you can decline to do so and we will move on to another question. If you have any questions about us or the work we do, you can ask us at any time.

B. SEASONAL CALENDAR²²²

A seasonal calendar is a diagram of changes over the seasons - usually over a 12-month period. Seasonal calendars are useful for identifying seasonal patterns - for example, changes in the availability of resources, such as food or income, work patterns and migration flows; for exploring relationships between different patterns of change - for example, the relationship between income levels and movements of key populations for work; for identifying when people may be particularly vulnerable; for exploring seasonal patterns of well-being and

²²² Participatory Learning and Action (PLA), Tool no. 19 & 20 (https://www.aidsalliance.org/).

hardship and how different people are affected; or for identifying when people are particularly vulnerable to infection.

During the qualitative study, the qualitative data collection team will explore seasonal variations for each risk factor. The respective risk factors will be listed on a printed seasonal calendar format, describing twelve months of a universal year. During group discussions, participants will be asked to identify the month in which each risk factor is most significant and the precise causes of these changes.

C. HISTORICAL CALENDAR

A historical calendar is a diagram that shows changes over a certain period. For the purposes of this study, a period of 10 to 15 years will be considered. However, if participants mention key events prior to the 15-year period, these will also be noted. A historical timeline is useful for exploring changes over time in a particular situation and the reasons for this change. This can include changes in behaviour, knowledge and attitudes in a community. It is also useful for exploring the consequences of a particular event or for evaluating the effectiveness (impact) of a community project or initiative.

During the qualitative study, the research team will explore the historical variations for each risk factor. The respective risk factors will be listed on a hand-drawn model of a historical calendar (A2 format), depicting 15 universal years. During the focus group discussions, participants will be asked to define in which year each risk factor was most significant and to specify the causes of these changes. All the major events that have marked life in a community in a positive or negative way, whether political, socio-economic, environmental or other, will be considered as potential triggers. The aim will be to capture trends based on the community's knowledge and possibly identify correlations between various risk factors.

D. STORYTELLING²²³

Storytelling involves participants discussing "typical" stories of their community. This approach opens up discussions on sensitive issues in a non-threatening way and identifies real-life situations and problems that affect members of their community. It is useful to explore what people think about these situations and what action they would like to take.

During the qualitative study, the research team will introduce real-life stories during group discussions in order to test the participants' point of view on particularly sensitive subjects and/or to test their answers given as part of a classic question-and-answer exchange. The aim of this method will be to draw attention away from them (which may make them uncomfortable) and instead involve them as observers and advisers to others in situations reflecting their everyday reality.

E. DAILY ACTIVITIES

The daily activities chart maps out how people spend their time on a typical day. It is useful for exploring how men and women spend their day, assessing their workload and discussing their different roles and responsibilities or exploring the factors that influence these differences.

During the qualitative study, the research team will present printed images of daily activities in a given community and ask group discussion participants to arrange them chronologically,

²²³ Participatory Learning and Action (PLA), Tool no. 58 (https://www.aidsalliance.org/).

starting with the usual time they wake up and ending with the usual time they sleep. This will be done separately for men and women. Any other group, such as children or the elderly, or groups with different economic functions (farmers, herders or market vendors) can be introduced, if deemed relevant.

F. MEAL COMPOSITION

The meal composition table shows what people usually eat in the course of a day. It is useful for exploring the community's perception of good nutrition and how this is reflected in their eating habits now and in situations where money would not be a barrier to buying the desired food. For the purposes of this study, three scenarios will be considered: typical food consumption during a lean period, typical food consumption during a post-harvest period and typical food consumption when money is not an obstacle.

During the qualitative study, the study team will present a hand-drawn graph (A2 format), divided into three columns, representing each scenario. Participants in a group discussion will be asked to say how many meals they eat per day in each scenario and which meals they eat at those times of day.

G. HOUSEHOLD EXPENSES

Household expenditure is a participatory exercise, the main aim of which is to show how household income is allocated to cover expenses. This can reveal household spending priorities, identify harmful behaviours or decision-making mechanisms within the household.

During the qualitative study, the research team will present a set of printed images representing different types of ordinary expenditure incurred by a household in a given community. These images will be placed in front of the participants. Participants will also be given a set of pebbles representing the amount of money a household has available to cover these expenses. The role of the participants will be to divide the income between different groups of expenses, as they would do in real life.

H. THERAPEUTIC ITINERARY²²⁴

This tool allows you to draw the story of a person's journey towards recovery over a given period. The idea is to follow the evolution of the person's health since they fell ill, indicating the different treatment options explored in order to get better. The therapeutic itinerary is a participatory exercise, which opens up a discussion about traditional and non-traditional treatments in a non-threatening way. It also explores people's understanding of recurring illnesses, which essentially influences their choice of treatment. In addition, the tool explores the barriers to accessing biochemical treatment available in state-supported health facilities.

During the qualitative study, the research team will present a blank sheet of paper (A2 format) and ask participants to explain their typical health pathway in the event of recurring illnesses, which will be traced on this sheet of paper. The aim is to identify whether their knowledge of these illnesses triggers the same reaction and/or whether certain differences exist. Particular attention will be paid to understanding and treating undernutrition in children.

²²⁴ Participatory Learning and Action (PLA), Tool no. 17 (https://www.aidsalliance.org/).

I. INTERVIEW GUIDE: INTRODUCTION TO RISK FACTORS

- 1. How would you describe a healthy child (size/characteristics/behaviour)? What do you do to keep your child healthy? What type of care is most important? How much effort does it take to do this every day?
- 2. What challenges do parents in your community face in keeping their children healthy? (Cf. Hypotheses Flashcards) What impact do these challenges have on their health? Why? How do these challenges change over the seasons (Cf. Seasonal Calendar) How have they changed over the last 10-15 years (Cf. Historical Calendar)?
- 3. In what type of household/with what type of mother have you observed births of smaller children? (PROBE: age, ethnic group, religion, marital status (single, married, divorced, widowed), type of household (monogamous vs. polygamous), household size, birth spacing, level of education, workload, well-being, economic quintile, etc.) Why? How has the prevalence of low birthweight changed over the last 10-15 years (Cf. **Historical Calendar**)?
- 4. What type of woman seems to be more vulnerable to undernutrition? (PROBE: age, ethnic group, religion, marital status (single, married, divorced, widowed) In what type of household have you observed very thin or small children? (PROBE: age, ethnic group, religion, marital status (single, married, divorced, widowed).

J. INTERVIEW GUIDE: HEALTH

 What barriers to access (see Access Barriers Flashcards) pose the greatest difficulties for you in terms of access to healthcare facilities? Why or why not? How does your access to health facilities change over the seasons? (Cf. Seasonal Calendar) How has it changed over the last 10-15 years? (Cf. Historical Calendar)

<u>Geographical barriers</u>: poor geographical accessibility, inaccessibility of certain health facilities during the rainy season, lack of security.

Time barriers: waiting times, heavy workload

<u>Financial barriers</u>: opportunity cost, high cost of care, limited free access for certain services <u>Socio-cultural barriers</u>: reliance on traditional medicine, proliferation of street medicine, fear of judgement, lack of confidence in modern care and/or discouragement if results are not quick. <u>Barriers to quality of care</u>: insufficient offer of health services, inadequate infrastructure, equipment and human resources; poor reception, lack of confidentiality, shortcomings in the management of services, particularly in the supply of medicine.

- What type of household faces the greatest difficulties in accessing health services? (PROBE: Head of household M/F, marital status (single, married monogamous/polygamous, separated, divorced, widowed), ethnic group, religion, household size, source of income, level of education)
- 3. What types of services are available in the nearest health centre? Which ones do you use? (PROBE: antenatal/postnatal consultations, childbirth, family planning, treatment of childhood illnesses, vaccinations, deworming, vitamin supplements) Why? Which health services are not culturally acceptable? Which health services are not available at all, despite community need?
- 4. What do you think of children in the pictures (Cf. Childhood illnesses Flashcards) What illnesses are most common in your community? (PROBE: diarrhoea, fever, acute respiratory infections, malaria) How does the prevalence of these illnesses change over the seasons? (Cf. Seasonal Calendar) How has it changed over the last 10-15 years? (Cf. Historical Calendar)

- 5. What are the causes of these illnesses? How are these illnesses treated? (Cf. Therapeutic itinerary) (NB: To be plotted for each illness separately.) Which childhood illnesses cannot be treated in health facilities? Why? How have treatment options changed over the last 10-15 years? How do you decide which treatment to choose? Who advises you?
- 6. Apart from medication, how do you care for a sick child? (PROBE: breastfeeding/feeding/hygiene practices do they change compared to time when the child is healthy?)
- 7. What type of child seems to be more vulnerable to health problems? (PROBE: gender, age, child's rank, religion, household composition (size/birth spacing, head of household), mother's characteristics (age, education, workload, well-being), economic resources, breastfeeding/feeding/hygiene practices, etc.).
- 8. What do you think of the awareness-raising sessions organised by health workers or community mobilisation staff from different NGOs? What do you think of the different subjects they talk about? Did you find them useful/relevant/easily applicable? Why/why not? What behaviours did you particularly struggle with? Why? (Advantages/Disadvantages)

K. INTERVIEW GUIDE: MALNUTRITION

- What do you think of children in these photos? (Cf. Photos of acutely malnourished children (marasmus/kwashiorkor) + children suffering from chronic malnutrition) What illness are they suffering from? What words do you use to describe such children in your community? Are some words more sensitive than others? Why?
- 2. What do you think about this illness? How is it similar to or different from other childhood illnesses? Which type is more common in your community?
- 3. What causes this illness? Why would a child become like this? (Cf. Hypotheses Flashcards)
- 4. How do you treat this disease in your community? (Cf. **Therapeutic Itinerary**) (PROBE: What is the most common treatment?)
- 5. What type of child seems to be more vulnerable to this disease? (PROBE: gender, age, ethnic group, religion, household type (monogamous vs. polygamous), household size, birth spacing, level of education, economic quintile, head of household F/M), mother's characteristics (age, workload, well-being), breastfeeding/feeding/hygiene practices, etc.).
- 6. In which season/month do you see more children like this? (Cf. Seasonal Calendar) How long have children in your community suffered from this disease? (Cf. Historical Calendar) Have you seen an increase/decrease in cases in certain years? How would you explain these variations?
- 7. Do you think your child could become like that? Why/why not? What behaviours/practices can induce/prevent this condition? Do you think you could become like this? Why/why not?

L. INTERVIEW GUIDE: NUTRITION

 How would you describe a nutritious meal (with no limit on financial resources)? (PROBE: composition/quantity/type of cooking/ease of preparation/taste/nutritional value/energy value/ability to satisfy/priority right to eat/frequency of consumption) (Cf. Food Flashcards) Why do you think this meal is good for your health? How often do you eat this type of meal? What prevents you from eating it more often? (PROBE: availability/acceptability/ease of preparation) (Cf. Meal Composition)

- 2. How would you describe a favourite meal (very popular but not necessarily nutritious)? (Why do you like it? How often do you eat this type of meal? What prevents you from eating it more often? (PROBE: availability/accessibility/cultural habits)
- 3. How would you describe your usual (frequently eaten) meals? (Cf. **Food Flashcards**) What do you think of these types of meal? (PROBE: composition/quantity/type of cooking/ease of preparation/taste/nutritional value/energy value/satiating capacity/frequency of consumption) How often do you eat this type of meal? Who in the household decides what type of meal is cooked? How do you divide the available meal between all the members of your household? Does the family eat together or in a specific order?
- 4. What changes in your eating habits have you observed over the last 10-15 years? (Cf. **Historical Calendar**) What changes have you observed in your eating habits over the course of the year? (Cf. **Seasonal Calendar**) (Cf. **Meal composition** in lean season vs. post-harvest season)
- 5. How do eating habits of children and/or pregnant and breastfeeding women differ from those of other household members? What foods cannot be eaten by children and/or pregnant and breastfeeding women? Why? How does the diet of girls/boys differ?
- 6. Where do you usually get your food? (PROBE: farm production, purchase, food aid, barter/exchange, gathering/hunting) How does this vary throughout the year? (Cf. Seasonal Calendar) How has this changed over the last 10-15 years? (Cf. Historical calendar) What type of household faces the greatest difficulties in accessing food? (PROBE: Head of household M/F, marital status (single, married monogamous/polygamous, separated, divorced, widowed), ethnic group, religion, household size, source of income, level of education)

M. INTERVIEW GUIDE: CARE PRACTICES

- What is your daily routine like with a baby under 3 months/6 months/over 6 months? How does your daily routine change in relation to the child's age? (PROBE: breastfeeding/complementary feeding/interactions with the child/daycare/hygiene) How does your routine change over the course of the week? How does your routine change over the course of the year? (Cf. Seasonal Calendar) How has your routine changed between the first and successive children you have had? What changes in childcare practices have you observed between you and your parents/grandparents? (Cf. Historical Calendar)
- 2. What challenges do you face when looking after your children? (PROBE: lack of knowledge/resources/time/mental preoccupations, other)
- 3. Who helps you to look after your children? What do they help you with? How often? How are fathers involved in childcare activities? What do you think of their involvement?
- 4. Who advises you on how to look after your children? Are you obliged to follow this advice? What kind of childcare decisions can you make on your own?
- 5. How do care practices differ among households in this community? (PROBE: ethnic group, religion, household type (monogamous vs. polygamous), household size) What consequences have you observed for the growth and development of children living in these households?
- 6. What local beliefs influence childcare practices in your community? What beliefs prevent adoption of "new" practices promoted by health workers? (PROBE: Exclusive breastfeeding: colostrum considered dirty because thicker and yellower, child would become "stupid" if breastfed for too long).

What do you think of this story? What do you think of XX's situation? Do women in your community face the same difficulties? Why/why not? What would you do differently?

- 7. When do you introduce complementary foods to your baby? What do your baby's meals consist of? How often do you feed them? (Cf. **Meal Composition**) What would you like to do differently? Why? What prevents you from doing so? How do children's eating habits change over the year? (Cf. **Seasonal Calendar**) What type of households/mothers fail to follow the IYCF recommendations?
- 8. **Story-telling:** Jane was sensitised about what she should feed to her baby by an NGO working in Fangak. She understood the importance of providing her child with a diverse range of foods to enrich their diet and promote healthy growth. However, the food scarcity situation has been very severe in the past years and Jane found herself unable to access all the necessary foods for her baby. She feeds them with whatever food is available daily. What do you think of this story? What is the community approach to complementary feeding? What would you do if you were Jane?
- 9. How do you interact with your children on a regular basis (physical, vocal, visual, emotional interactions)? What level of contact is considered appropriate in this community? How much time are you able to devote to mental and social development activities (talking, playing, changing, etc.)? How do these practices change over the course of the year (Cf. Seasonal Calendar)? How have they evolved over the last 10-15 years (Cf. Historical Calendar)?
- 10. How do you usually show your love for your children? How do these demonstrations differ for girls and boys? How do you discipline your children?

N. INTERVIEW GUIDE: MARRIAGE, PREGNANCY & BIRTH SPACING

What do you think of this story? Does this happen in your community? How does the community view early marriage/pregnancy? What would you do if you were Halimatou? What would you do if you were her parents?

- At what age do young women and men in your community start to become sexually active? At what age do they get married? What changes have you seen in these practices over the last 10-15 years? (Cf. Historical Calendar) What inspired these changes? When are young men/women ready to marry/be parents (physically and emotionally?
- 2. How would you describe married life in your community? How would you describe an exemplary marriage? How do you deal with disagreements during marriage? What are the usual causes of these disagreements? When is the use of force justified? Why? In which type of household do you observe a higher prevalence of gender-based violence (e.g. denial of resources, opportunities or services, physical assault, psychological violence, sexual violence)? Why? How have relations between men and women changed over the last 10-15 years? (Cf. Historical Calendar)
- 3. How many children do members of your community usually have? Why? What is the usual birth spacing in your community? Why? What changes in a desired number of children and/or birth spacing have you observed over the last 10-15 years? Why? How do these practices differ among households in your community? (PROBE: ethnic group, religion, household type (monogamous vs. polygamous), education level, economic quintile)
- 4. What practices are used to space births (PROBE: traditional/modern contraceptive methods, physical distance from husband, abstinence)? How are these practices perceived/accepted by the community? What type of household is strictly against limiting
and/or spacing births (PROBE: age of the couple, ethnic group, religion, type of household (monogamous vs. polygamous), household size, level of education)?

5. **Story-telling:** Mary, a mother of three, faces a dilemma as her husband expressed a strong desire for more children but their financial situation is already difficult. She was sensitised about family planning by an NGO working in Fangak but is afraid of the side effects of modern contraception. She has heard that it could give hear heavy bleeding and headaches but she doesn't have many women to talk to about it as only very few are using it for the same reasons. She is currently using traditional methods but wants be sure not to fall pregnant too soon.

What do you think of this story? How does the community view the use of modern contraception? What would you do if you were Mary?

- 6. What barriers to the use of antenatal consultations pose the greatest difficulties for you? (PROBE: distance, access to transport, finances, time, cultural beliefs, quality and availability of service) Why? How does your use of antenatal consultations change over the seasons? (Cf. Seasonal Calendar) How has it changed over the last 10-15 years? (Cf. Historical Calendar)
- 7. What barriers to giving birth in a health facility pose the greatest difficulties for you?(PROBE: Distance, access to transport, quality and availability of service, cultural barriers). What are the reasons for this? How does the use of health facilities for childbirth change over the seasons? (Cf. Seasonal Calendar) How has it changed over the last 10-15 years? (Cf. Historical Calendar) What type of women find it more difficult or choose not to use health facilities for childbirth? (PROBE: Head of household M/F, marital status (single, married monogamous/polygamous, separated, divorced, widowed), ethnic group, religion, household size, source of income, level of education)
- 8. **Story-telling**: Margaret is currently pregnant. She has heard that delivery services are provided at the hospital in Old Fangak but the distance is a very big issue for her. The ongoing floods have made it very difficult to move around the county and she would need to take a boat the get there. She doesn't have access to a canoe or money to pay for transport. She has previously delivered at home with the help of a TBA, as most women do in the community, but her delivery was not easy and she experienced complications. She is very concerned and doesn't know what to do.

What do you think of this story? What is the community approach to delivery? What would you do if you were Margaret?

O. INTERVIEW GUIDE: WOMEN'S WORKLOAD AND MENTAL WELL-BEING

- 1. What characterises an ideal woman in this community? What tricks have women developed to get as close as possible to this ideal? What behaviour is difficult to accept (or is not accepted at all) in a woman? Why?
- 2. What does your daily routine look like? (Cf. Daily Activities) How does your routine change over the year? (Cf. Seasonal Calendar) What changes in a daily routine have you observed between you and your parents/grandparents? (Cf. Historical Calendar) How does your daily routine differ from that of men? What differences in daily routines have you observed between different households?
- 3. How do you perceive your workload? When is your workload heaviest/when do you feel busiest or most tired? (Cf. **Seasonal Calendar**) What do you do when you feel like this? What type of activities represent a particularly heavy workload? How does your workload

change during pregnancy/postpartum? What characterises households with a heavier or lighter workload? What do you do if you are unable to complete all your daily tasks?

- 4. How do you perceive your mental well-being? When do you feel more preoccupied/stressed? (Cf. Seasonal Calendar) What do you do when you feel like this? What are you not able to do when you feel like this? (PROBE: household chores, income-generating activities, breastfeeding, hygiene practices, sexual relations) What feelings do you have during these moments of worry/stress? (PROBE: lack of joy, anxiety, lack of energy, difficulty concentrating, lack of interest in the baby/household, guilt, feelings of abandonment, lack of appetite/too much appetit, sleep disorders, nightmares) What are common causes of your worries/stress (PROBE: marital problems, family problems, heavy workload, lack of financial resources, illness, death, departure of a family member (migration), lack of support)?
- 5. How acceptable is it for a woman to show her emotions/frustrations? What demonstrations of distress are generally tolerated vs. what demonstrations are not tolerated at all? What support mechanisms exist within the household/family/community to offer her the necessary support?
- 6. How would you describe the state of mind of women after giving birth? What feelings are often associated with this event? What other feelings did women in your community admit to having after giving birth? What type of women are likely to experience these feelings? Why?
- 7. How would you describe your relationships with other members of your household? Which relationships bring you most joy? Which relationships worry you the most? Why? How comfortable are you telling members of your household that you don't agree with them?
- 8. What community groups do you belong to? What are the advantages and/or disadvantages of participating in these groups? How often do you attend community gatherings?
- 1. **Story-telling**: Recently a rise in violence towards women and girls has been reported in Fangak. Critical moments are when women go to fetch water, wood or walk long distances to go to school and in search of food. One afternoon, a group of women in a local community of Fangak reunited in one of the houses to discuss a strategy that could protect them from these attacks. They agreed to go to fetch water in bigger groups at regular time slots during, one early morning and one in the afternoon. One afternoon, Sara was late to go and fetch water with the group, and she debated what to do: either go alone risking a potential attack or wait for the following day.

What do you think of this story? What would you suggest to Sara to do? What do women in your community do to protect them from violence?

P. INTERVIEW GUIDE: WOMEN'S AUTONOMY

- 1. How often do you leave your house/neighbourhood/village? Who decides whether you can leave? Where can you go without asking anyone?
- 2. What activities can women in this community do to generate income? Who controls the generated income? What other activities do you think women in this community should be allowed to do to generate income? What changes in autonomy/decision-making power have you observed between you and your parents/grandparents? (Cf. **Historical Calendar**)
- 3. What can you sell at the market without consulting another member of your household? What can you buy at the market without consulting another member of your household? What changes do you think would help you sell/buy at the market? Why?

- 4. For which activities can you make decisions without consulting anyone else? (PROBE: schooling, marriage, household expenses, composition of meals, daily activities, workload, rest after childbirth, medical treatment in the event of illness, family planning) For which activities do you need to consult another member of your household? For which activities can only one member of your household make decisions? What do you think of this division of decision-making? What would you like to change about this division of decision-making? In what areas would you like to make decisions made differently?
- 5. For decisions where you need to consult another member of your household, to what extent can you participate in the decision-making process? For decisions where a member of your household makes decisions, how involved can you be in the decision-making process? To what extent do you feel listened to when decisions are made? What can you do when you disagree with a decision? What happens when your opinion has not been taken into account, but it turns out that it would have been a good decision? How does this change decision-making in the household?
- 6. Does your decision-making power change when your husbands migrate? Who makes the decisions in their absence?
- 7. To what extent can you access information to make informed decisions? What barriers do you face in accessing information?
- 8. What rights do the women in this community have to own/inherit land? Who generally decides what to plant?
- 9. What rights do the women in this community have when it comes to borrowing money? Who decides how the borrowed money is spent? Who is responsible for repaying the money? What advantages/disadvantages does this arrangement bring you? How do you think this arrangement should change?
- 10. What type of women has less decision-making power than other women in this community? (PROBE: age, age difference between the couple, marital status, type of marriage (monogamous vs. polygamous), religion, level of education, economic quintile, etc.) Why? How does this affect their functioning and/or their health/health of their children?

Q. INTERVIEW GUIDE: MEN'S WORKLOAD AND MENTAL WELL-BEING

- 1. What characterises an ideal man in this community? What tricks have men developed to get as close as possible to this ideal? What behaviour is difficult to accept (or is not accepted at all) in a man? Why?
- 2. What is your daily routine like? (Cf. **Daily Activities**) How does your routine change over the year? (Cf. **Seasonal Calendar**) What changes in daily routine have you observed between you and your parents/grandparents? (Cf. **Historical Calendar**) How does your daily routine differ from that of women? What differences in daily routines have you observed between different households?
- 3. How do you perceive your workload? When is your workload heaviest/when do you feel busiest or most tired? (Cf. **Seasonal Calendar**) What do you do when you feel like this? What type of activities represent a particularly heavy workload? What characterises households with a heavier/lesser workload? What do you do if you can't get all your daily tasks done?
- 9. How do you perceive your mental well-being? When do you feel more worried/stressed? (Cf. **Seasonal Calendar**) What do you do when you feel like this? What are you not able to do when you feel like this? (PROBE: income-generating activities, hygiene practices,

sexual relations) What feelings do you have during these moments of worry/stress? (PROBE: lack of joy, anxiety, lack of energy, difficulty concentrating, lack of interest in work, guilt, feelings of abandonment, appetite problems, sleep disorder, nightmares) What are common causes of your worries/stress (PROBE: marital problems, family problems, heavy workload, lack of financial resources, illness, death, departure of a family member (migration), lack of support)?

- 4. How acceptable is it for a man to demonstrate his emotions/frustrations? What demonstrations of distress are generally tolerated vs. what demonstrations are not tolerated at all? What support mechanisms exist within the household/family/community to offer him the necessary support?
- 5. How would you describe your relationships with other members of your household? Which relationships bring you most joy? Which relationships worry you the most? Why? How comfortable are you telling members of your household that you don't agree with them?
- 6. What community groups do you belong to? What are the advantages and/or disadvantages of participating in these groups? How often do you attend community gatherings?

R. INTERVIEW GUIDE: LIFE PERSPECTIVES (PARENTS)

How has life in your community changed since your parents'/grandparents' generation? What did you used to live/hear that is no longer the reality today? What values have gradually disappeared and what new values are being revered? What effect has this change had on your community?

- 2. What events (PROBE: drought, flooding, insecurity, agro-pastoral conflict, population flow, demographic growth, exploitation of natural resources) have had the greatest impact on life in your community? (Cf. **Historical Calendar**) How have these events gradually changed life in your community?
- 3. What shocks have the greatest impact on household survival (PROBE: illness, death, departure of a household member, separation/divorce, reduction and/or loss of harvest, children's schooling (at the time of registration), etc.)?
- 4. How has access to sources of income /food /healthcare /water /sanitation /electricity /telephones /household appliances changed over the last 10-15 years? (Cf. **Historical Calendar**) What effect has this change had on life in the community?
- 5. What community self-help mechanisms were used in the past but have gradually disappeared? What effect did this disappearance have on households' ability to withstand the experienced shocks? What new mechanisms have been created to assist households in difficult times and/or contribute to community development? What type of household does not have an easy access to these mechanisms? Why?
- 6. How would you describe the way your parents interacted with you and the way you interact with your children? What has changed in the meantime?
- 7. What subjects did you usually discuss with your parents? What topics do you usually discuss with your children? How have the subjects and/or the time allocated to these discussions changed over the last 10-15 years? (Cf. **Historical Calendar**) Why? What subjects did you avoid with your parents and what subjects do you avoid with your children? Why? Who is supposed to familiarise children with sensitive subjects?
- 8. Who do you turn to for advice/help when you need it, and who has the most influence over your decisions? Who do your children turn to for advice/help? How do you feel about this choice?

- 9. What disagreements exist in your community between young people and their parents and/or grandparents? What values do you share with the younger generation? What do you reproach your children for the most?
- 10. In your opinion, what are the most recurrent problems between women and men? (PROBE: (sources of income and how they are used/ quality of meals /workload /intimate relationships /infidelity /number of children /power of decision) What do you never tolerate in your relationships? How have relationships between men and women changed over the last 10-15 years? (Cf. **Historical Calendar**)
- 11. When is the use of force justified? Why? What type of violence (e.g. denial of resources, opportunities or services, physical assault, psychological violence, sexual violence) is most recurrent/normalised/not tolerated at all?
- 12. **Story-telling**:One afternoon Rose found herself late coming back home after a long day working and looking for food. She bathed her children and started preparing dinner later than usual. As she was in the midst of cooking, her husband arrived, tired and hungry, expecting a prompt meal. He was unhappy seeing that dinner was not yet ready and that he had to wait a bit longer. He started raising his voice complaining about the food not being ready. Rose tried to explain why the food was delayed but he got even angrier and slapped her. He then told her that this should not be happen again as it is her duty to have the food ready when he returns home.

What do you think of this story? How typical this kind of situations would be in a Fangak household? How acceptable is physical violence within a couple? In what other instances would men use physical violence on women?

- 13. What opportunities for work and fulfilment do you have in your community? How do you feel about these opportunities? How do these opportunities influence the way you live in your household/community? What activities do you usually attend with other members of the community? What community groups do you belong to? What are the advantages and/or disadvantages of participating in these groups? Which institutions are of most value to you in your life (PROBE: family/diaspora/school/church/state/international aid). How has their role changed over time?
- 14. How does the feeling of safety/insecurity influence the way you live in the community?

S. INTERVIEW GUIDE: LIFE PROSPECTS (YOUNG PEOPLE)

- 1. How has life in your community changed since your parents'/grandparents' generation? What did you used to experience/hear that is no longer the reality today? What traditions did your parents insist on that you consider odl-fashioned today? How does your rejection of these traditions influence your relationship with your parents?
- 2. What disagreements exist in your community between young people and their parents and/or grandparents? What values do you share with them? What do you reproach your parents for most?
- 3. How would you describe the way your parents interact with you (emotional bond, shared activities, learning)? What subjects do you usually discuss with your parents? What subjects do you avoid? Why? From whom do you seek information on sensitive subjects?
- 4. Who do you turn to for advice/help when you need it? Who has the most influence in your decisions?

- 5. In your opinion, what are the most recurrent problems between women and men? (PROBE: (sources of income and how they are used /quality of meals /workload /intimate relationships /infidelity /number of children /power of decision) How do relationships between men and women differ from the relationships between your parents? (Cf. **Historical Calendar**)
- 6. When is the use of force justified? Why? What type of violence (e.g. denial of resources, opportunities or services, physical assault, psychological violence, sexual violence) is most recurrent/normalised/not tolerated at all?
- 7. What opportunities for work and fulfilment do you have in your community? How do you feel about these opportunities? How do these opportunities influence the way you live in your household/community? What activities do you usually attend with other members of the community? What community groups do you belong to? What are advantages and/or disadvantages of participating in these groups? Which institutions are of greatest value to you in your life (PROBE: family/diaspora/school/church/state/international aid). How has their role changed over time?
- 8. How does the feeling of safety/insecurity influence the way you live in the community?

T. INTERVIEW GUIDE: SOURCES OF INCOME & RESILIENCE STRATEGIES

- What are main sources of income in your community? Do they vary over the course of a year? (Cf. Seasonal Calendar) Have they changed over the last 10-15 years? (Cf. Historical Calendar) What has caused this change?
- 2. What activities can women in this community do to generate income? Who controls the generated income? What other activities do you think women in this community should be allowed to do to generate income?
- 3. What challenges do you face in relation to farming? (PROBE: access to water/land, agropastoral conflicts, soil degradation, unavailability of seeds/tools/know-how/labour, labour costs, plant diseases, access to market for sale, price fluctuations during sowing/harvesting period, fluctuations in market demand, quality requirements) Do these challenges vary over the year? (Cf. **Seasonal Calendar**) Have these challenges changed over the last 10-15 years? (Cf. **Historical Calendar**) What has caused the change?
- 4. What challenges do you face in relation to livestock rearing? (PROBE: access to water/pasture/vaccination, agro-pastoral conflicts, animal diseases, unavailability of know-how, access to markets for sale, price fluctuations, fluctuating market demand, quality requirements) Do these challenges vary over the year? (Cf. **Seasonal calendar**) Have they changed over the last 10-15 years? (Cf. **Historical Calendar**) What has caused the change?
- 5. What impact do these challenges have on your household income? What coping strategies are you using to compensate for any losses (Cf. **Coping strategies**)?
- 6. Which households in your community are more vulnerable to food insecurity? What criteria are used to categorise households as better off?
- 7. Do members of your community tend to migrate? If so, who migrates? Where? When? For how long? Why? (Cf. Seasonal Calendar) Have migration patterns in your community changed over the last 10-15 years? (Cf. Historical Calendar) What are the consequences of migration or changes in migration flows for members of a household who stay behind? (PROBE: income, workload, decision-making, nutrition, health, childcare practices)

U. INTERVIEW GUIDE: MARKET ACCESS AND USE OF RESOURCES

1. How would you describe your access to the market? What barriers to access do you face (PROBE: distance, lack of transport, transport costs, insecurity) How does your access to

market change over the seasons? (Cf. **Seasonal Calendar**) How has it changed over the last 10-15 years? (Cf. **Historical Calendar**)

- 2. What types of products are regularly available on the market? During what period of the year are products less available and/or unavailable? (Cf. **Seasonal Calendar**) Which products are not available at all, despite the community's need for them? What are you doing to alleviate this problem? Has the availability of products changed over the last 10-15 years? (Cf. **Historical Calendar**)
- 3. How do product prices fluctuate over the year? (Cf. **Seasonal Calendar**) How have they changed over the last 10-15 years? (Cf. **Historical Calendar**)
- 4. Which other services do you access at the market?
- 5. How do you use your household income? (Cf. **Household expenditure**) Which expenses are prioritised? Which expenses have gradually disappeared under the weight of your economic situation? What effect do you see this having on your children's health?
- 6. How/how much/why do members of your community tend to save resources?
- 7. How do members of your community access credit? From whom/on what terms? How much debt do members of your community tend to accumulate?
- 8. For what type of expenditure can women make decisions without consulting anyone? (PROBE: schooling, marriage, household expenses, composition of meals, daily activities, workload, rest after childbirth, medical treatment in the event of illness, family planning) For what types of expenditure do they need to consult their husbands/other family members? For what types of expenditure can only you make decisions? What do you think of this division of decision-making? What should change in this respect? Does the decision-making process change in husband's absence (e.g. migration)?
- 9. For decisions which require women to consult their husbands, to what extent do you allow them to participate in the decision-making process? For decisions that you mainly take alone, to what extent do you allow women to express their opinion? To what extent do you listen to women when making decisions? What happens when your wife's opinion has not been taken into account, but it turns out that it would have been a good decision? How does this change decision-making in the household?
- 10. What can women sell at the market without consulting you? What can they buy at the market without consulting you?
- 11. Do women receive a weekly/monthly allowance? If so, how much and what for?
- 12. What rights do women in this community have to own/inherit land? What rights do women in this community have to lend or borrow money? Who decides how borrowed money is spent? Who is responsible for repaying the money? What advantages/disadvantages does this arrangement bring you?

V. INTERVIEW GUIDE: WATER, SANITATION & HYGIENE

- How would you describe the importance of water in the life of your community? How does this perception influence water use? What use of water is prioritised in the event of an emergency? (PROBE: drinking, cooking, bathing, washing, animal consumption/agriculture)
- 2. How would you describe your access to water? What barriers to access do you face (PROBE: distance, availability, quality, price, workload, lack/expense of transport, waiting time) How does your access to water change over the seasons (Cf. **Seasonal Calendar**) How has it changed over the last 10-15 years (Cf. **Historical Calendar**)?

- 3. What type of household faces the greatest difficulties in accessing water? (PROBE: Head of household M/F, marital status (single, married monogamous/polygamous, separated, divorced, widowed), ethnic group, religion, household size, source of income, level of education)
- 4. Who is responsible for fetching water for the household? How much water is usually fetched/used in a day? How does this change throughout the year? (Cf. Seasonal Calendar) How has this changed over the last 10-15 years? (Cf. Historical Calendar) Why? What are the consequences of these changes?
- 5. How do members of your community treat/store water? What challenges do they face in this respect?
- 6. How would you describe cleanliness? How does the definition of cleanliness differ for girls/boys/women/men? How does this perception influence sanitation/hygiene in your community? How has your approach to sanitation changed over the last 10-15 years? (Cf. Historical Calendar) Why?
- 7. How would you describe your access to sanitation facilities? What barriers to access do you face (PROBE: availability, sustainability, acceptability, price, workload) Has this changed over the last 10-15 years? (Cf. **Historical Calendar**)
- 8. What type of household faces the greatest difficulties in accessing sanitation facilities and/or their sanitation/environmental hygiene practices differ substantially from other households in this community? (PROBE: Head of household M/F, marital status (single, married monogamous/polygamous, separated, divorced, widowed), ethnic group, religion, household size, source of income, level of education)
- 9. What local beliefs/positions influence optimal hygiene and sanitation practices in this community? What beliefs prevent the adoption of "new" practices promoted by health workers? What practices have you heard of but do not consider it risky not to apply them?

W. INTERVIEW GUIDE: PERCEPTIONS OF MALNUTRITION + RISK FACTORS (HEALTH STAFF)

- 1. What types of services do you offer? (PROBE: antenatal care, childbirth, postnatal care, vaccination) What fees do you charge for these services?
- 2. How does the community perceive the services offered in this health facility? Which services do they tend to use most often? Which services do they not use at all? Why or why not?
- 3. Which barriers to access (Cf. Access Barriers Flashcards) pose the greatest difficulties for the community in terms of access to health facilities? Why? How does their access to health facilities change over the seasons? (Cf. Seasonal calendar) How has it changed over the last 10-15 years? (Cf. Historical calendar)

<u>Geographical barriers</u>: poor geographical accessibility, inaccessibility of certain health facilities during the rainy season, lack of security.

Time barriers: waiting times, heavy workload

<u>Financial barriers</u>: opportunity cost, high cost of care, limited free access to certain services <u>Socio-cultural barriers</u>: reliance on traditional medicine, proliferation of street medicine, fear of judgement, lack of confidence in modern care and/or discouragement if results are not quick. <u>Barriers to quality of care</u>: insufficient offer of health services, inadequate infrastructure, equipment and human resources; poor reception, lack of confidentiality, shortcomings in the management of services, particularly in the supply of medicine.

4. What type of household faces the greatest difficulties in accessing health services? (PROBE: Head of household M/F, marital status (single, married monogamous/polygamous,

separated, divorced, widowed), ethnic group, religion, household size, source of income, level of education)

- 5. What are the most common childhood illnesses in this community? (PROBE: diarrhoea, fever, acute respiratory infections, malaria) What are main causes of these illnesses? In which months are they most common? (Cf. Seasonal Calendar) How has the prevalence of these illnesses changed over the last 10-15 years? (Cf. Historical Calendar) What is the preferred treatment option in this community for these childhood illnesses?
- 6. What is the perception of wasting in the community? What are its main causes in this community? (Cf. **Hypotheses Flashcards**) Does the community understand these causes differently? If so, how? Why?
- 8. What type of child seems to be more vulnerable to wasting? (PROBE: gender, age, ethnic group, religion, type of household (monogamous vs. polygamous), household size, birth spacing, level of education, economic quintile, head of household F/M), mother's characteristics (age, workload, well-being), breastfeeding/feeding/hygiene practices, etc.).
- 9. What type of woman seems to be more vulnerable to undernutrition (PROBE: age, ethnic group, religion, marital status (single, married, divorced, widowed), household type (monogamous vs. polygamous), household size, birth spacing, level of education, workload, well-being, economic quintile, etc.)?
- 11. What local beliefs influence childcare practices in this community? What beliefs prevent the adoption of "new" practices promoted by health workers? (PROBE: <u>exclusive</u> <u>breastfeeding</u>: colostrum considered dirty because thicker and yellower, child would become "stupid" if breastfed for too long).
- 12. What barriers to use of antenatal consultations pose the greatest difficulties for this community? PROBE: (distance, access to transport, cost, time, quality and availability of services any cultural beliefs) Why? How has their access to antenatal care changed over the seasons? (Cf. **Seasonal Calendar**) How has it changed over the last 10-15 years? (Cf. **Historical Calendar**)
- 10. What barriers to child birth in a health facility pose the greatest difficulties for this community? (PROBE: Distance, access to transport, financial costs, preference for giving birth at home with the assistance of a traditional birth attendant, any other cultural beliefs). Why? How does their access to health facilities for childbirth change over the seasons? (Cf. Seasonal Calendar) How has it changed over the last 10-15 years? (Cf. Historical Calendar) What type of women find it more difficult or choose not to access health facilities for childbirth? (PROBE: Head of household M/F, marital status (single, married monogamous/polygamous, separated, divorced, widowed), ethnic group, religion, household size, source of income, level of education).

X. INTERVIEW GUIDE: PERCEPTIONS OF MALNUTRITION + RISK FACTORS (COMMUNITY HEALTH WORKERS)

- 1. How does the community perceive the services offered in health facilities? Which services do they tend to use most often? Which services do they not use at all? Why?
- Which barriers to access (Cf. Access Barriers Flashcards) pose the greatest difficulties for the community in terms of access to health facilities? Why? How does their access to health facilities change over the seasons? (Cf. Seasonal Calendar) How has it changed over the last 10-15 years? (Cf. Historical Calendar)

<u>Geographical barriers</u>: poor geographical accessibility, inaccessibility of certain health facilities during the rainy season, lack of security.

Time barriers: waiting times, heavy workload

Financial barriers: opportunity cost, high cost of care, limited free access

<u>Socio-cultural barriers</u>: reliance on traditional medicine, proliferation of street medicine, fear of judgement, lack of confidence in modern care and/or discouragement if results are not quick. <u>Barriers to quality of care</u>: insufficient offer of health services, inadequate infrastructure, equipment and human resources; poor reception, lack of confidentiality, shortcomings in the management of services, particularly in the supply of medicine.

- 3. What type of household faces the greatest difficulties in accessing health services? (PROBE: Head of household M/F, marital status (single, married monogamous/polygamous, separated, divorced, widowed), ethnic group, religion, household size, source of income, level of education)
- 4. What are most common childhood illnesses in this community? (PROBE: diarrhoea, fever, acute respiratory infections, malaria) What are main causes of these illnesses? In which months are they most common? (Cf. **Seasonal Calendar**) How has the prevalence of these illnesses changed over the last 10-15 years? (Cf. **Historical Calendar**) What is the preferred treatment option for these childhood illnesses in this community?
- 5. What is the perception of wasting in the community? What are its main causes in this community? (Cf. **Hypotheses Flashcards**) Does the community understand these causes differently? If so, how? Why?
- 6. What type of child seems to be more vulnerable to wasting? (PROBE: gender, age, ethnic group, religion, type of household (monogamous vs. polygamous), household size, birth spacing, level of education, economic quintile, head of household F/M), mother's characteristics (age, workload, well-being), breastfeeding/feeding/hygiene practices, etc.).
- 7. What type of woman seems to be more vulnerable to undernutrition (PROBE: age, ethnic group, religion, marital status (single, married, divorced, widowed), household type (monogamous vs. polygamous), household size, birth spacing, level of education, workload, well-being, economic quintile, etc.)?
- 8. What local beliefs influence childcare practices in this community? What beliefs prevent adoption of "new" practices promoted by health workers? (PROBE: <u>exclusive breastfeeding</u>: colostrum considered dirty because thicker and yellower, child would become "stupid" if breastfed for too long)
- 9. What barriers to the of antenatal care pose the greatest difficulties for this community? PROBE: (distance, access to transport, cost, time, quality and availability of services any cultural beliefs) Why? How does their access to antenatal care change over the seasons? (Cf. Seasonal Calendar) How has it changed over the last 10-15 years? (Cf. Historical Calendar)
- 10. What barriers to childbirth in a health facility pose the greatest difficulties for this community? (PROBE: High financial costs, preference for giving birth with the assistance of a traditional birth attendant, any other cultural beliefs) Why? How does their access to child birth in health facilities change over the seasons? (Cf. **Seasonal Calendar**) How has it changed over the last 10-15 years? (Cf. **Historical Calendar**) What type of women find it more difficult or choose not to access health facilities for childbirth? (PROBE: Head of household M/F, marital status (single, married monogamous/polygamous, separated, divorced, widowed), ethnic group, religion, household size, source of income, level of education).

Y. INTERVIEW GUIDE: HEALTH + RISK FACTORS (TRADITIONAL HEALERS / TRADITIONAL BIRTH ATTENDANTS)

- 1. How does the community perceive the services offered in health facilities? Which services do they tend to seek here instead? Why? What type of household uses your care most often?
- 2. Which barriers to access (Cf. Access Barriers Flashcards) pose the greatest difficulties for the community in terms of access to health facilities? Why?

<u>Geographical barriers</u>: poor geographical accessibility, inaccessibility of certain health facilities during the rainy season, lack of security.

Time barriers: waiting times, heavy workload

Financial barriers: opportunity cost, high cost of care, limited free access to certain services

<u>Socio-cultural barriers</u>: reliance on traditional medicine, proliferation of street medicine, fear of judgement, lack of confidence in modern care and/or discouragement if results are not quick.

<u>Barriers to quality of care</u>: insufficient offer of health services, inadequate infrastructure, equipment and human resources; poor reception, lack of confidentiality, shortcomings in the management of services, particularly in the supply of medicine.

- How are you able to overcome these problems? How does their access to care change over the seasons? (Cf. Seasonal Calendar) How has it changed over the last 10-15 years? (Cf. Historical Calendar)
- 4. What barriers to use of antenatal care pose the greatest difficulties for this community? PROBE: (distance, access to transport, cost, time, quality and availability of services any cultural beliefs) Why?
- 5. What barriers to child birth in a health facility pose the greatest difficulties for this community? (PROBE: Distance, access to transport, financial costs, preference for giving birth at home with the assistance of a traditional birth attendant, any other cultural beliefs) Why? What type of woman has more difficulty accessing or chooses not to access health facilities for childbirth? (PROBE: Head of household M/F, marital status (single, married monogamous/polygamous, separated, divorced, widowed), ethnic group, religion, household size, source of income, level of education).
- 6. Looking at images, what are main challenges parents face in keeping their children healthy? (Cf. **Hypotheses flashcards**)
- 7. What do you think of children in these photos? (Cf. Photos of acutely malnourished children (marasmus/kwashiorkor) + children suffering from chronic malnutrition) What illnesses do they suffer from? What words do you use to describe such children in your community? Which words are more sensitive than others? What do you think about this illness? How is it similar to or different from other childhood illnesses? Which type is more common in your community?
- 8. What causes this disease? How do you treat this disease in your community? What is the most common treatment?

Z. INTERVIEW GUIDE: PERCEPTIONS OF MALNUTRITION + RISK FACTORS (COMMUNITY LEADERS)

1. What do you think of children in these photos? (Cf. Photos of acutely malnourished children (marasmus/kwashiorkor) + children suffering from chronic malnutrition) What illnesses do they suffer from? What words do you use to describe such children in your community? Which words are more sensitive than others? What do you think about this illness? How is it similar to or different from other childhood illnesses? Which type is more common in your community?

- 2. What causes this illness? Looking at images, what are other main challenges parents face in keeping their children healthy? (Cf. **Hypotheses Flashcards**) What local beliefs are linked to these challenges?
- 3. How do you treat this disease in your community? (Cf. **Therapeutic itinerary**) What is the most common treatment?
- 4. What type of child seems to be more vulnerable to this disease? (PROBE: gender, age, ethnic group, religion, type of household (monogamous vs. polygamous), household size, birth spacing, level of education, economic quintile, head of household F/M), mother's characteristics (age, workload, well-being), breastfeeding/feeding/hygiene practices, etc.).
- 5. What type of woman seems to be more vulnerable to undernutrition? (PROBE: age, ethnic group, religion, marital status (single, married, divorced, widowed), household type (monogamous vs. polygamous), household size, birth spacing, level of education, workload, well-being, economic quintile, etc.).
- 6. What local beliefs influence childcare practices in this community? What beliefs prevent adoption of "new" practices promoted by health workers? (PROBE: <u>exclusive breastfeeding</u>: colostrum considered dirty because thicker and yellower, child would become "stupid" if breastfed for too long)

AA. INTERVIEW GUIDE: CASE STUDY (ETHNICITY/RELIGION/SOCIAL STATUS)

- What are main values that govern the way your group functions? How do these values differ from values of other groups in your community? How do these differences influence communal life? How have these values changed over the last 10-15 years? (Cf. Historical Calendar) To what extent have these values changed under the weight of cohabitation with other groups in your community? How do you perceive this change?
- 2. What are roles of men/women/children/young people/older people in your group? Who is primarily responsible for a child's care/health? What changes in these roles have you observed over the last 10-15 years? (Cf. **Historical Calendar**) What effect have these changes had on life in your group?
- 3. How would you describe the relationships between women and men (life as a couple) in your group? How do these relationships differ from other groups in your community? To what extent are marriages between different groups accepted/tolerated? Which groups are never allowed to marry? What changes have you observed in this respect over the last 10-15 years? (Cf. **Historical Calendar**)
- 4. What beliefs do members of your group hold? How do these beliefs influence childcare practices (breastfeeding, infant and young child feeding, interactions with children)? What beliefs have gradually disappeared under the weight of modernisation/cohabitation with other groups? How does this influence children's health today?
- 5. What are daily routines of men/women/children in your group? How do they differ from the routines of other groups in your community? What advantages/disadvantages might these routines have on the health of women/children in your community? How have these routines changed over the last 10-15 years (Cf. **Historical Calendar**)?
- 6. Which of the practices recommended by healthcare staff do you find most difficult to adopt and/or implement? Why or why not? How relevant do you consider these practices to be for your life?
- 7. Looking at images, what are main challenges parents in your group face in keeping their children healthy? (Cf. **Hypotheses Flashcards**) Why?

8. How does your group's access to water/land/natural resources/sources of income/health services, etc. differ from other groups in your community? Why? How has your access changed over the last 10-15 years? (Cf. **Historical Calendar**)?

BB. INTERVIEW GUIDE: MALNUTRITION (COMPARATIVE STUDY)

Practices	Malnourished child	Other child
General information		
Gender		
Age		
Mother's age at the time of		
pregnancy		
Family situation at the time of		
pregnancy		

Practices	Malnourished child	Other child
Pregnancy		
General state of health		
Difficulties during pregnancy		
Mental well-being		
Workload		
Support available		
Prenatal consultations		
Eating habits: quantity		
Eating habits: quality		
Financial resources		
Special events		

Practices	Malnourished child	Other child
Childbirth & postnatal care		
Location		
Assistance		
Complications during childbirth		
Birth weight		
Child's general state of health		
Mother's general state of health		
Rest		
Postnatal consultations		
Vaccination		
Special events		

Practices	Malnourished child	Other child
Breastfeeding		
Initiating breastfeeding		
Duration of breastfeeding		
Frequency of breastfeeding		
Exclusive breastfeeding?		
Other liquids?		
Eating habits: quantity		
Eating habits: quality		
Workload		
Mental well-being		
Support available		

Interactions with infants	
Personal hygiene	
Environmental hygiene	
Infections	
Financial resources	
Special events	

Practices	Malnourished child	Other child
Supplementary foods		
Initiation (months)		
Complementary breastfeeding?		
Additional breastfeeding time		
No. of meals per day		
Type of meal		
Mother's workload		
Mental well-being		
Support available		
Interaction with the child		
Personal hygiene		
Environmental hygiene		
Infections		
Financial resources		
Special events		

CC. INTERVIEW GUIDE: BARRIER ANALYSIS (DOERS)

Prioritised behaviours

- a) Use of family planning
- b) Delivery at the health facility/Postnatal care
- c) Exclusive breastfeeding (0-6 months)
- d) Infant and young child feeding (6-23 months)
- e) Personal hygiene of the child
- 1. What illnesses can you/your child suffer from if you DO NOT PRACTICE THE BEHAVIOR?
- 2. What do you think of [ILLNESS mentioned by mother]? Is it dangerous?
- 3. Why do some people get (ILLNESS) and others not?
- 4. Is it sometimes God's will that people/children get (ILLNESS)?
- 5. Do people ever get (ILLNESS) from curses or other spiritual or supernatural causes?
- 6. When a person practices (THE BEHAVIOR), does this lead to the desired effect? (*Ex.* "When a person exclusively breastfeeds a child for the first six months of life, does this help prevent [the ILLNESS mentioned by the mother]?")
- 7. Who (individuals or groups) do you think, object or disapprove if you practice (THE BEHAVIOR)?
- 8. Who (individual or group) do you think approves if you practice (THE BEHAVIOR)?
- 9. Which of these individuals or groups in the two questions above are most important to you?
- 10. How easy is it for you to practice (THE BEHAVIOR)?
- 11. How easy is it to remember to practice (THE BEHAVIOR) every time you need to do it?
- 12. What do you think are the benefits or good things that happen if you practice (THE BEHAVIOR)? What things do you like about practicing (BEHAVIOR)?

13. What do you think are the downsides or bad things that happen if you practice (THE BEHAVIOR)? What are the things that you dislike about practicing (BEHAVIOR)?

DD. INTERVIEW GUIDE: BARRIER ANALYSIS (NON-DOERS)

Prioritised behaviours

- a) Use of family planning
- b) Delivery at the health facility/Postnatal care
- c) Exclusive breastfeeding (0-6 months)
- d) Infant and young child feeding (6-23 months)
- e) Personal hygiene of the child
- 1. What illnesses can you/your child suffer from if you PRACTICE THE BEHAVIOR?
- 2. What do you think of [ILLNESS mentioned by mother]? Is it dangerous?
- 3. Why do some people get (ILLNESS) and others not?
- 4. Is it sometimes God's will that people / children get (ILLNESS)?
- 5. Do people ever get (ILLNESS) from curses or other spiritual or supernatural causes?
- 6. When a person DOES NOT practice (THE BEHAVIOR), does this lead to the desired effect? (*Ex.* "When a person does not exclusively breastfeed a child for the first six months of life, does that help prevent [the ILLNESS mentioned by the mother]?")
- 7. Who (individuals or groups) do you think objects or disapproves of if you practice (THE BEHAVIOR)?
- 8. Who (individual or group) do you think approves if you don't practice (THE BEHAVIOR)?
- 9. Which of these individuals or groups in the two questions above are most important to you?
- 10. Would it be easy for you to practice (THE BEHAVIOR)?
- 11. What makes it difficult, if not impossible, to practice (THE BEHAVIOR)?
- 12. What could make (THE BEHAVIOR) easier to practice?
- 13. How easy would it be to remember to practice (THE BEHAVIOR) every time you had to?
- 14. What do you think are the benefits or good things that will happen if you practice (THE BEHAVIOR)? What are the things that will plead you practicing (THE BEHAVIOR)?
- 15. What do you think are the downsides or bad things that will happen if you practice (THE BEHAVIOR)? What are the things that you would not like about practicing (THE BEHAVIOR)?

EE. COMMUNITY/HOUSEHOLD OBSERVATION GUIDE

	Comments
Sanitation	
Presence of latrines	
Type of latrine	
Clean latrines	
Water/soap point available nearby?	
Managing children's faeces	

	Comments
Water	
Presence of water sources	
Type of water source	
Cleanliness of water source	
Cleanliness around water source	

Use of water source	
Distance to water source	
Waiting time	
Fetched by whom?	
Cleanliness of cans	
Washing cans before filling?	
Non-optimal practices observed / Sources of water	
contamination	
Water transport	
Water storage at home	
Water treatment	

	Comments
Hygiene	
Washing hands after toilet use /defecation	
Washing hands after handling child's faeces	
Washing hands before cooking food	
Wash hands before eating	
Washing breasts before breastfeeding	
Cleanliness of the child's body	
Cleanliness of the child's clothes	
Children's nappies observed?	
Children's play area	
Cleanliness of the courtyard	
Animals in the yard	
Animals in the house	
Animal excrements in the yard	
Animal excrements in the house	
Interactions between children and pets	
Cleanliness of the kitchen	
Waste management	

	Comments
Туре	
Women's workload	
Women's mental well-being	
Women's autonomy	
Social support	

	Comments
Other	
Childcare	
Interaction with the child	

FF. SUMMARY OF CONCLUSIONS, CATEGORISATION OF RISK FACTORS AND FINAL RECOMMENDATIONS

The purpose of this exercise is to involve community members in categorising risk factors according to their perceived impact on the prevalence of undernutrition in their community. In other words, community members will be encouraged to categorise identified risk factors from most to least problematic, according to their perceived link with undernutrition. In addition, they will be encouraged to identify risk factors that they think are likely to change first, if properly addressed.

Before the categorisation exercise, the research team will summarise their findings, which they will have been able to gather during the first five days in the community, using flashcards. Once all the identified risk factors have been presented, community members will be asked to validate the results and the team's interpretation of the community's main challenges in terms of undernutrition. If certain elements are deemed not to be representative of the community, the research team will modify the interpretation, if necessary.

Participants will then be asked to categorise identified risk factors, from most to least problematic, according to their perceived link with undernutrition. Using pebbles, they will be asked to give three pebbles to factors that have a major impact on undernutrition and two pebbles to factors that have an important impact on undernutrition. No pebbles will be used for factors that have a minor impact on undernutrition in their community. Photos of malnourished children, which were previously used during group discussions, will visually help them to focus more on this health problem than on the other main problems they face in their community.

All exchanges between participants in relation to this categorisation exercise and/or their rationale for categorisation will be duly noted. All participants will be encouraged to contribute and any disagreements will be duly addressed. The aim of this exercise will be to categorise the risk factors into three groups, on which all participants will agree.

Alternatively, if consensus on three risk categories proves difficult, the study team will give three pebbles to each participant and ask them to assign one pebble to each risk they consider to be the most important in relation to undernutrition in their community. Once all the pebbles have been counted, the risk factors will be divided into three categories. The study team will ask participants to validate them and reach a consensus on 4 or 5 factors that have a major impact on undernutrition in their community.

Once this stage will have been completed, participants will be asked to contribute their ideas on solutions to meet identified challenges. Their recommendations will be duly noted and integrated into global recommendations of the study.

ANNEXE E: RECOMMANDATIONS PROPOSED BY THE TECHNICAL EXPERTS DURING THE FINAL TECHNICAL WORKSHOP IN JUBA ON THE 29 AUGUST 2024

Recommendation	Points
Strengthen existing health facilities by increasing	12
availability of drugs, technical staff and building	
capacity of CHWs.	
Strengthening advocacy to allocate funding to	8
invest in HSS and government ownership of HSS	
Focus on mobile health services, BCC at facility	3
and community levels on utilisation of HS to	
improve cultural responsiveness and referral	
systems (from community to HF). Strengthen the	
community-based structure (TBA, CMVS,	
MTMSG)	

LIMTED ACCESS TO HEALTH SERVICES

LOW NUTRITIONAL STATUS OF WOMEN

Recommendation	Points
Implement programmes to empower women to earn/ improve their financial status through: 1.Training in small scale business (tailoring, hair braiding etc) 2.Balancing equal decision making/shared responsibilities utilisation of financial resources of the HH	7
Increase awareness on nutrient dense local food and utilisation of food gardens to increase their diet diversity and/or introduce biofortified crops. At the same time increase awareness on appropriate food practices eg. cooking and creating diverse meals	8
BCC/awareness 1.Women nutrition, before, during and after pregnancy and during breastfeeding to reduce food taboos. This awareness should include also adolescent (first 8000 days) 2.Expand nutrition awareness to men on what women need in terms of nutrition esp when pregnant and breastfeeding 3. immunization	7
Screening, mother MUAC, cash programmes for PLW, folic acid supplementation	8

LOW ACCESS TO QUALITY DIET

Recommendation	Points
Increase food diversity through:	14
1.introduction of flood resilient crops (rice,	
banana, sugar cane, maize in dry season)	
2.introduction of floating gardens for small scale	
vegetables	
3.skills to make new canoes to help fishing	
provide fishing tools	
4.increased availability of food can also be used	
for commerce that will increase diversity	
thorough availability of income	
Promote peace and stability to increase market	13
access	

Provide food preservation skills to use during the	9
dry season (lean period)	
Provide CBPAR in Fangak	4
•	
Nutrition education on importance of balanced	7
diet	
Bio-fortified crops	1
Nutrition education in school curriculum	0

LOW ACCESS TO INCOME SOURCES

Recommendation	Points
Fish preservation activities for local market and exportation	11
Flood resistant agriculture activities (rice, sugar cane, banana, vegetable kitchen gardens, maize) and introduction of ducks	10
Initiation of local income generation activities like making soap to increase income sources	5
Set up VSLA groups	1
Create farming cooperation for larger scale farming	3
Distribution of canoes for transport to access local markets	0

INADEQUATE ACCESS, AVAILABILITY AND QUALITY OF WATER AT HOUSEHOLD LEVEL

Recommendation	Points
Renovation and maintenance of existing	11
boreholes and construction of new flood	
resistant boreholes with possible implementation	
of solar powered pumps	
Increase awareness on use of clean water sources	12
(BCC)	
Water treatment of open source water through	3
provision of filters, distribution of Aqua tabs and	
pots. Teaching re rain water harvesting	
techniques as well as sensitization on mutual	
responsibility on water treatment between men	
and women.	

Capacity	building	to	create	а	water	user	7
committee in the communities							