

**INTEGRATED SMART SURVEY MARSABIT COUNTY KENYA**

**JULY 2022**

## **Partners Supporting the Activity**

- MOH
- UNICEF
- USAID Nawiri
- Concern Worldwide
- NDMA
- KRCS
- WFP
- WVI
- BOMA
- MSF
- SND
- KWS
- Welthunger

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### Acronym and Abbreviation

ANC:	Antenatal Care
ARI:	Acute respiratory Infections
BCG:	Bacillus Calmette–Guérin
BSFP:	Blanket Supplementary feeding program
CI:	Confidence Interval
CHAs:	Community Health Assistants
CHMT:	County Health Management Team
CHS:	Community Health Strategy
CHV:	Community Health Volunteer
CLTs:	Community Led Total Sanitation
CSG:	County Steering Group
CSI:	Coping Strategy Index
CWW:	Concern Worldwide
DEFF:	Design Effect
ENA:	Emergency Nutrition Assessment
FAO:	Food and Agricultural Organization
FCS:	Food consumption Score
FHK:	Food for the Hungry Kenya
FNS:	Food and Nutrition Security
GAM:	Global Acute Malnutrition
HDDS:	Household Dietary Diversity Score
HiNi:	High Impact Nutrition Intervention
IDPs:	Internally Displaced Persons
IFAS:	Iron Folic Acid Supplementation
IPC:	Integrated Food Security Phase Classification
IPs:	Implementing Partners
KNBS:	Kenya National Bureau Statistics

KNHP:	Kenya Nutrition and Health Program
MAM:	Moderate Acute Malnutrition
MoA:	Ministry of Agriculture
MoH:	Ministry of Health
MoLF:	Ministry of Livestock and fisheries
MUAC:	Mid Upper Arm Circumference
NDMA:	National Draught Management Authority
NGO:	Non-Governmental Organization
NIWG:	Nutrition Information Working Group
NNAP:	National Nutrition Action Plan
OPV:	Oral Poliovirus Vaccines
ORS:	Oral Rehydration Salts
OTP:	Outpatient Therapeutic Programme
PLW:	Pregnant and lactating Women
PPS:	Probability Proportional to Population Size
SAM:	Severe Acute Malnutrition
SD:	Standard Deviation
SFP:	Supplementary Food Programme
SMART:	Standardized Monitoring and Assessment in Relief and Transition
SPSS:	Statistical Packages for social Sciences
TB:	Tuber Culosis
UN:	United Nations
UNICEF:	United Nation Children Fund
USAID:	United States Agency for International Development
WASH:	Water sanitation and Hygiene
WDDS:	Women Dietary Diversity Score
WHO:	World Health Organization
WAZ:	Weight-for-Age Z score
WFA:	Weight-for-Age
WFP:	World Food Program
WHZ:	Weight-for-Height Z score
WRA:	Women of Reproductive age
WVK:	World Vision Kenya
VAS:	Vitamin A supplementation
VIP:	Ventilated Improved Pit

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- The survey team leaders and enumerators for their tireless efforts in ensuring quality and reliable data.
- The entire Marsabit county residents for collaborating and making the survey a success.

## EXECUTIVE SUMMARY

The survey was conducted in four Sub-Counties: Moyale, Saku, Laisamis and North Horr. Each Sub county had its own independent sample. Sampling was done using the SMART methodology and applied two stage cluster sampling methodology with the clusters being selected using the probability proportional to population size (PPS). Stage one sampling involved the sampling of the clusters while the second stage sampling involved the selection of the households from the sampled clusters.

The number of clusters sampled was, 33 in Moyale, 47 in Saku, 31 in Laisamis and 48 in North Horr. The data collected during the survey included: anthropometry, mortality, morbidity, vaccination and de-worming status, Vitamin A supplementation, hygiene and sanitation practices, other indicators assessed were household food security and livelihood. The standard data collection tool recommended by the National Nutrition Information Working Group was used. All the sampled clusters were visited. In total 2,416 households were sampled from 159 clusters and 1,915 children aged 6 to 59 months were assessed for anthropometry. Anthropometric data was analysed using the ENA software version (Jan 11th 2020) while other indicators were analysed using SPSS Version 20.0.

The survey findings indicated a GAM prevalence rate of 19.6% (16.7 - 22.9 95% C.I.) in Marsabit County with Laisamis Sub county reporting the highest 30.3% (24.6-36.6) followed by North Horr 29.7% (25.4-34.5), then Saku 10.6% ( 7.8-14.4) and lastly Moyale 9.4 % (6.4 - 13.5). This is generally classified as Critical by the WHO classification of malnutrition. The findings also showed the prevalence of underweight and stunting at 30.5% (26.9 - 34.3 95% C.I.) and 23.8% (21.2 - 26.6 95% C.I) respectively.

The survey findings indicated that 30.1% of children aged 0-59 months was reported to have been ill two weeks prior to survey. The most prevalent illness during this period was acute respiratory illnesses/ cough and Fever at 64.9% and 44.7% respectively.

The survey findings indicate that the overall proportion of children (12-59 Months) supplemented with Vitamin A for at least once times in the period of one year preceding the survey was 81.7% where the County has reached the National target. Additionally, the results of the survey showed that 24.5% of the households reported treating water before drinking and practicing hand washing at 4 critical times. For the household dietary diversity, analysis showed that only 66.2% and 68.1% in North Horr and Laisamis Sub Counties respectively of the households consumed more than five food groups. Lastly, the mean Reduced Coping Strategy Index for all HH surveyed was 15.5, meaning all HHs combined had an average rCSI (Moderately food insecure) according to WFP thresholds. The mean rCSI in the 4 sub-counties was between 5 and 20.

### **Methodology**

The target geographical area was Marsabit County's 4 sub-counties of Moyale, Marsabit Central, North Horr and Laisamis. The survey adopted a 2 stage sampling technique. The list of the villages was first obtained for each Sub-county. The simple random sampling was employed to select villages where the survey can be conducted in all the 4 Sub-counties. That formed the 1<sup>st</sup> stage sampling. Finally, with the sampled villages, a list of all households was drawn upon which 15-17 households was sampled using simple random sampling according to different sample sizes of different Sub Counties.

### **Objectives of the Survey**

#### **Main Objective**

- To determine the nutrition status of children aged 6- 59 months old and Women of reproductive age 15-49 Years and crude mortality rate (CMR) and under five mortality rate in Marsabit County.

#### **Specific Objectives**

- To estimate the current prevalence of acute malnutrition in children aged 6 – 59 months
- To estimate the crude mortality rate (CMR) and under five mortality rate (U5MR)
- To compare the overall nutritional changes with the previous GAM and SAM
- To determine the morbidity rates amongst children aged 6-59 months over a two week recall period.
- To relate nutrition status and the immunization coverage of Measles, BCG and Oral polio vaccines (OPV1 and 3) for children aged 6-59 months.

- To determine the coverage for deworming (12-59 months), zinc supplementation for diarrhea, and vitamin A supplementation among children 6-59 months.
- To estimate the nutritional status of women of reproductive age 15-49 years using MUAC measurements
- To collect information on household food security, water, sanitation, and hygiene practices

The following table presents the summary of the indicators

**Table 1: Summary Findings**

Indicators	North Horr July 2022	Moyale July 2022	Saku July 2022	Laisamis July 2022	COUNTY JULY 2022
Clusters	48	33	47	31	159
HHs Targeted	768	465	705	495	2431
HHs Reached	767	460	694	495	2416
Average Household Size	4.7	5.7	5.6	4.6	5.1
Prevalence of global malnutrition	29.7% (25.4-34.5)	9.4 %(6.4 - 13.5)	10.6% ( 7.8-14.4)	30.3% (24.6-36.6)	19.6% (16.7 - 22.9)
Prevalence of severe malnutrition	4.4% ( 2.8- 6.7)	2.2 %(1.2 - 3.9)	1.2% ( 0.5-2.7)	5.5% ( 3.2-9.0)	3.5% (2.6 - 4.7)
Prevalence of global malnutrition by MUAC	4.0 %(2.4 - 6.6)	5.0 %(3.2 - 7.8 )	4.3 %(2.7 - 6.9)	7.3 %(4.6 - 11.2)	5.0%(3.9 - 6.3)
Global underweight	39.7 %(35.0 - 44.6)	16.40%(12.1 - 21.8)	19.60%(15.0 - 25.2)	47.10% (40.6 - 53.7)	30.5% (26.9 - 34.3)
Severe Underweight	11.6 %(9.1 - 14.5)	1.90%(0.9 - 3.9)	4.70%(3.1 - 7.1)	11.50% (7.5 - 17.3)	7.1% (5.5 - 9.1)
Global Stunting	26.80% (22.7 - 31.4)	19.10%(15.1 - 23.9)	19.00%(15.2 - 23.6)	31.20% (25.7 - 37.3)	23.8% (21.2 - 26.6)
Severe Stunting	6.20% (4.6 - 8.4)	3.90%(2.0 - 7.2)	4.30%(2.8 - 6.6)	9.50% (6.5 - 13.8)	5.8% (4.5 - 7.4)
Measles Coverage at 9 Months by Card	71.03%	73.35%	84.42%	81.53%	76.93%
Measles Coverage at 9 Months by Recall	16.70%	20.78%	11.41%	11.08%	15.84%
Measles Coverage at 18 Months by Card	66.08%	66.36%	78.18%	73.40%	70.12%
Measles Coverage at 18 Months by Recall	15.71%	20.87%	11.82%	11.86%	15.92%
BCG by scar	96.80%	97.40%	99.30%	97.50%	97.60%
OPV 1 by Card	76.39%	76.54%	88.07%	84.12%	80.43%
OPV 1 by Recall	18.03%	19.43%	11.24%	11.41%	15.60%
OPV 3 by Card	73.42%	76.30%	87.40%	81.64%	78.96%
OPV 3 by Recall	17.66%	18.96%	11.93%	11.91%	15.60%
Vitamin A Supplementation (12-59 Months) - Once	82.23%	87.60%	90.45%	69.89%	81.74%
Vitamin A Supplementation (6-11 Months) - Once	69.01%	80.77%	82.43%	56.86%	71.58%
Deworming 12-59 Months	81.97%	82.21%	72.12%	79.83%	80.01%
<b>Morbidity</b>					
Sickness two weeks prior to survey	16.17%	35.22%	17.21%	38.46%	30.12%
Fever	68.97%	51.68%	23.76%	34.84%	44.67%
Acute Respiratory Infection	68.97%	52.35%	56.44%	80.00%	64.87%
Watery diarrhea	14.94%	9.40%	6.93%	16.77%	12.56%
Bloody diarrhea	1.15%	0.00%	0.99%	1.94%	0.93%
<b>Maternal Health and Nutrition</b>					
MUAC <21cm for WRA	1.76%	0.66%	0.54%	2.19%	1.36%

MUAC (21 < 23 cm) For WRA	50.09%	21.71%	24.01%	57.81%	39.63%
MUAC <21cm for PLW	14.58%	5.18%	7.48%	16.74%	28.06%
Iron Folate Supplementation	80.34%	94.24%	96.23%	89.50%	90.11%
<b>Household Food Consumption (Food consumption Score)</b>					
Poor FCS	20.73%	3.49%	2.17%	20.40%	13.10%
Border FCS	35.20%	11.55%	22.61%	34.75%	26.45%
Good FCS	44.07%	84.97%	75.22%	44.85%	60.45%
<b>Water and Sanitation (WASH)</b>					
Piped into dwelling	1.96%	0.00%	0.14%	0.61%	0.79%
Piped to yard / plot	1.17%	0.22%	4.35%	4.24%	2.53%
Piped to neighbour	4.17%	0.00%	1.88%	3.43%	2.57%
Public tap / standpipe	5.08%	0.87%	6.52%	13.33%	6.39%
borehole / protected spring /protected shallow wells	46.81%	21.57%	18.70%	53.74%	35.38%
Protected well	0.00%	0.22%	0.00%	0.20%	0.08%
Unprotected well	23.73%	5.01%	3.19%	14.95%	12.48%
Protected spring	0.00%	0.00%	0.14%	0.00%	0.04%
Unprotected spring	3.00%	0.00%	0.00%	2.22%	1.41%
Earth pan/dam	6.00%	44.66%	14.78%	2.02%	15.06%
Earth pan/dam with infiltration well	0.26%	3.92%	0.58%	0.20%	1.04%
Water trucking / Boozer	6.13%	7.63%	2.46%	0.00%	4.11%
Water vendor	1.30%	10.24%	45.22%	0.00%	15.30%
Harvested water (Jabiya)	0.13%	3.70%	1.59%	2.22%	1.66%
Cart with small tank	0.00%	0.22%	0.14%	0.00%	0.08%
<b>Sanitation Facility</b>					
Flush to piped sewer system	0.00%	0.22%	0.14%	0.00%	0.08%
Flush to septic tank	0.00%	0.00%	0.29%	0.00%	0.08%
Ventilated improved pit latrine	4.43%	1.31%	13.19%	2.83%	6.01%
Pit latrine with slab	13.17%	29.19%	28.55%	6.67%	19.29%
Pit latrine without slab /open pit	1.17%	51.85%	33.19%	0.81%	19.91%
Composting toilet	2.22%	0.22%	2.61%	0.40%	1.58%
Hanging toilet / hanging latrine	0.00%	2.40%	0.14%	1.21%	0.75%
No facility / bush / field	56.84%	14.81%	21.74%	88.08%	45.21%
Hand washing at 4 critical times	24.40%	43.30%	22.60%	8.80%	24.60%
Water treatment	29.70%	24.00%	29.40%	10.10%	24.50%
<b>Minimum Dietary Diversity of the Household</b>					
<3 food groups	65.94%	47.59%	50.15%	38.10%	49.35%
3 to 5 Food groups	19.53%	23.68%	11.91%	51.15%	29.07%
>5 food groups	14.52%	28.74%	37.94%	10.74%	21.58%
<b>Women Dietary Diversity</b>					
<5 food groups	99.50%	89.50%	84.60%	89.80%	91.10%
5 or more food groups	0.50%	10.50%	15.40%	10.20%	8.90%
<b>Household Hunger Scale</b>					
Little	35.46%	64.05%	60.43%	27.47%	44.59%
Moderate	55.54%	35.08%	35.07%	61.82%	48.84%

Severe	9.00%	0.87%	4.49%	10.71%	6.57%
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## CHAPTER ONE: INTRODUCTION

### 1.1 Back ground Information

Marsabit County is located in the upper eastern region of Kenya. It borders Ethiopia to the North, Marsabit to the north east, Isiolo to the south East, Samburu to the southeast and Turkana to the west. It covers an area of 70,961.2km<sup>2</sup>. The County has four (4) sub counties namely North Horr, Moyale, Saku and Laisamis.

The county has an estimated **459, 785** population of from an estimated **77,495** households (2019 KNBS). Additionally, it is the least populated county in the country in terms people per km<sup>2</sup> with a density of 4 people per km<sup>2</sup>. The county is composed of different ethnic groups including the Gabbra, Rendile, Borana, Turkana, Samburu, Burji, El Molo, Dassanach and Waata. Marsabit town is also inhabited by people from communities generally origination from the rest of Kenya such as Meru, Kikuyu, Luo and Luhya. <sup>1</sup>

The county is divided into four ecologically zones namely:

- Agro-ecological zone III: This zone has rainfall and is suitable for horticultural and food crop production such as maize, beans, fruits and vegetables. It comprises only 1% of total land area in the county.
- Agro-ecological zone IV that covers 2 % of the total land area and is suitable for settled livestock rearing and some mixed farming with dry land crops.
- Agro-ecological zone V that covers 28 % of the total land area and includes landmasses falling between 700-1000m above sea level. The vegetation here includes acacia tortillis woodland on stony soils and acacia bush land on deeper soils. Suitable for small animals such as goats.
- Agro-ecological zone VI that covers 69 % of the total land area and lies 700m above sea level. High rates of evaporation and salt deposits making grass growth stunted. It is only suitable for camels.

The County remains amongst the counties with the highest poverty index in the in Kenya and ranked position 44 out of 47 counties with a poverty rate of 83.2%. The percentage of population below the poverty line is 80 and 69 percent in the Pastoral and Agro-pastoral livelihood zones respectively. (SRA 2021 Report). There are three main livelihood zones which include: Pastoral livelihood zone constituting 81 percent of the county population, Agro-pastoral livelihood zone at 16 percent of the county population and others having a combined population of three percent. (SRA 2021 Report). The main source of cash income in the Pastoral and Agro Pastoral Livelihood Zones is sale of livestock and livestock products contributing 82 and 60 percent of cash income in the Pastoral and Agro-Pastoral Livelihood Zones respectively. Food crop production contributes 20 percent of cash income in the Agro-Pastoral Livelihood Zone while in the Pastoral Livelihood Zone, formal waged labour and petty trade contribute 11 percent of cash income. (SRA 2021 Report).

Marsabit is among the most conflict-prone in Kenya. As stated, the county is mainly semi-arid, and the residents are mainly pastoralist nomads who often clash over access to scarce pasture and water and cross border tensions. Women bear sole responsibility for collecting water and firewood in Marsabit, and for feeding children. Pastoralist families in this region rely so heavily on markets for buying core foods such as rice, sugar, potatoes and cooking fat.

The county experiences poor health and Nutrition outcomes especially due to Community Referral system is poor since community units are there but semi Functional and community Health services are poor hence most health facilities are not able to reach their catchment population. Thirdly, Vastness of the county and rough terrain i.e. in North Horr and Laisamis hence SCHMT operations have been narrowed to a limited scope of health facilities and with limited visits to far health facilities which are occasionally support by partners.

The county has suffered repeated episodes of severe drought and floods, with serious effects on household food security, disease burden and malnutrition. The main drivers of wasting in Marsabit County are poor dietary intake with reduced livestock milk production and consumption which forms the main diet for children in arid areas. The other drivers include high burden of disease, sub-optimal childcare practices, poor sanitation and health environment, and internal conflicts.

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<sup>1</sup> Focused Ethnographic Studies, Pelto & Thutha, GAIN Health, May 2016.

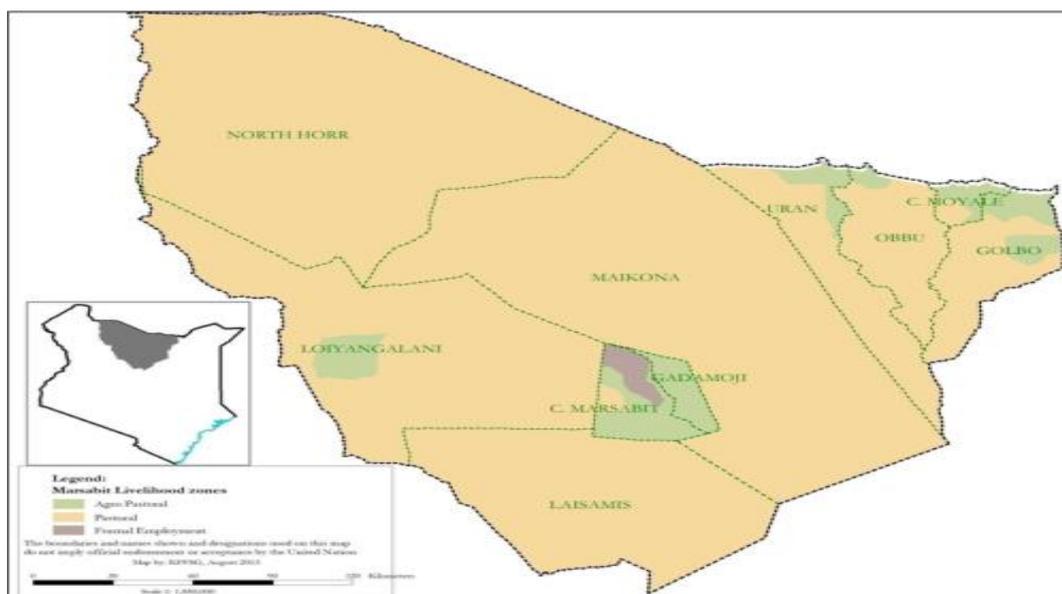


Figure 1: Map of County

### 1.2 Rationale of the Survey

The survey was proposed since according to the February 2022 Integrated Phase Classification (IPC) for acute malnutrition among children U5, Laisamis and North Horr is ranked at critical phase (IPC Phase 4- GAM 15-30% percent) while Saku and Moyale was ranked at Alert Phase (IPC Phase 2- GAM 5-9.9% percent). Also, the last SMART survey conducted in July 2021 showed overall *critical* nutrition situation in Marsabit County but ranged from alert levels Saku (9.5%) and Moyale (9.0%), critical levels in North Horr (22.6%) and Laisamis (20.8%).

The county was classified as “Crisis” (IPC Phase 3, food security) as per the February 2022 SRA assessment report. According to NDMA bulletin, in April 2022, the situation deteriorated and the County was classified as “Emergency” with 70% of the population being classified on IPC Phase 3 and higher. The county’s EWS classification April 2022, indicated that the County is at “Alarm” phase and stable.

House hold milk consumption is at 0.25 litre which was low and malnutrition by MUAC is 15.9 which is higher than Normal range attributable to an all-time low household milk consumption, increased immediate household food consumption gaps and application of crisis livelihood coping and reduced food consumption coping strategies. Additionally Mass screening conducted in Jan 2022 has indicated a Critical situation with a GAM of 23.5% with Laisamis being extremely critical at 33.3%, followed by Saku sub county at 25.3%, Moyale Sub county at 24.3% and North Horr Sub county at 22.0%. In IMAM Database, a sharp increase in OTP and SFP admissions was reported from Jan and March 2022 which is attributed to the worsening food security situation. On the IMAM performance indicators, high Non recovery rate was reported followed by defaulter rate in the month of April 2022. Mortality data will help in Understanding the mortality situation which was after, in January 9 deaths were reported in Illeret. Lastly, the County has experience other shock which include drought and insecurity especially in Saku Sub County among the COVID 19 pandemic.

The survey was conducted through the partnership of Marsabit County Government ministry of Health with Concern Worldwide, World Vision, WFP, UNICEF, USAID NAWIRI, MSF, BOMA, SND, KWS, NDMA, Welthunger and other implementing partners. This survey was conducted between 28<sup>th</sup> June and 9<sup>th</sup> July, 2022 and helped in evaluating the extent of malnutrition among the children aged 6-59 months and the possible factors contributing to malnutrition and recommends appropriate interventions.

### 1.3 Timing of the Survey

Marsabit has two rainfall seasons; long rains (April-June) and short rains; (October-December) season. The seasonal calendar also characterizes dry season into short (January-March) and long; July-September dry season.

The county inhabitants depend on long rains season rather than the short rains season. The integrated nutrition SMART survey was conducted in line to seasonal assessment and survey findings were used to classify and inform on outcome indicators (nutrition status) during long rains assessment in July 2022.

**Table 2: Seasonal Calendar for Marsabit County**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<ul style="list-style-type: none"> <li>➤ Short rains harvests</li> <li>Short dry spell</li> <li>➤ Reduced milk yields</li> <li>Increased HH Food Stocks</li> <li>➤ Land preparation</li> </ul>			<ul style="list-style-type: none"> <li>➤ Long Rain</li> <li>➤ Planting/Weeding</li> <li>➤ High Calving Rate</li> <li>➤ Milk Yields Increase</li> </ul>			<ul style="list-style-type: none"> <li>➤ Long rains harvests</li> <li>➤ A long dry spell</li> <li>➤ Land preparation</li> <li>➤ Increased HH Food Stocks</li> <li>➤ Kidding (Sept)</li> </ul>			<ul style="list-style-type: none"> <li>➤ Short Rains</li> <li>➤ Planting/weeding</li> </ul>		

### 1.4 Objective of the Survey

#### The overall objective

To determine the nutrition status of children aged 6- 59 months old and Women of reproductive age 15-49 Years and crude mortality rate (CMR) and under five mortality rate in Marsabit County.

#### Specific objectives

- To estimate the current prevalence of acute malnutrition in children aged 6 – 59 months
- To estimate the crude mortality rate (CMR) and under five mortality rate (U5MR)
- To compare the overall nutritional changes with the previous GAM and SAM
- To determine the morbidity rates amongst children aged 6-59 months over a two week recall period.
- To relate nutrition status and the immunization coverage of Measles, BCG and Oral polio vaccines (OPV1 and 3) for children aged 6-59 months.
- To determine the coverage for deworming (12-59 months), zinc supplementation for diarrhea, and vitamin A supplementation among children 6-59 months.
- To estimate the nutritional status of women of reproductive age 15-49 years using MUAC measurements
- To collect information on household food security, water, sanitation, and hygiene practices

## CHAPTER TWO: SURVEY METHODOLOGY

### 2.0 Survey Area

The target geographical area Marsabit County and it covered all four Sub Counties: Moyale, Laisamis, Saku and North Horr. Each Sub county had its own independent sample.

### 2.1 Survey Design

The survey applied a two stage stratified cluster sampling using the SMART methodology with the clusters being selected using the probability proportional to population size (PPS). Stage one sampling involved the sampling of the clusters to be included in the survey while the second stage sampling involved the selection of the households from the sampled clusters.

### 2.2 Study Population

The target population for the survey was children aged 6 – 59 months for the anthropometric component and women of reproductive age between 15 – 49 years for the maternal nutrition component.

### 2.3 Sample Size

#### 2.3.1 Anthropometric Survey Sample Size

The anthropometric survey sample size was calculated using the SMART survey calculator. The parameters of interest were captured in the ENA Jan 11<sup>th</sup> 2020 software and the respective number of children and households required for the survey computed. The sampling frame for this survey was the updated list of villages (with current projected population) from the survey area.

**Table 3: Moyale and Saku Sample Size Calculation**

Variable	Moyale	Saku	Rationale
Estimated Prevalence (%)	9.0	9.5	Point prevalence was used because according to the mass screening conducted in Jan 2022, Saku was still at 13.5% while for Moyale the situation is stable, with a moderate Vegetation Index and stable prices on Commodities. On IMAM Surge only one facility at Alert compared to other Sub Counties.
Precision (%)	3.5	3.5	Precision guided by Global SMART for the given prevalence
Design Effect	1.37	1.5	As per July 2019 SMART Survey. For Saku DEFF was 2.35 so it was adjusted downward to 1.5
<b>Estimated No of children</b>	<b>383</b>	<b>440</b>	
Average Household size	6.1	4.9	As per 2019 KNBS
Proportion of children < 5 yrs (%)	17.8	14.9	As per 2019 KNBS
Non Response rate (%)	3%	5%	As per July 2019 SMART survey
<b>Estimated No. of Households</b>	<b>404</b>	<b>705</b>	
No of Households per day	15	15	Based on 2019 SMART Survey Experience
No of clusters	27	47	Computed from the Number of HHs per Day

No of Teams	5	7	
No of days	6	7	Based on the Number of Teams to be Recruited

**Table 4: North Horr and Laisamis Sample Size Calculation**

Variable	N.Horr	Laisamis	Rationale
Estimated Prevalence (%)	27.6	24.6	Upper confidence interval was used since there Increasing admission trends into SAM program. Jan – march 2021(876), 2022(1482), Mass screening conducted in Jan 2022 GAM county, 26.5%. Laisamis 33.3% and N/Horr 22.0% Increase in the numbers of under-fives who are malnourished by MUAC <125mm at 15.9 percent above the long term average of 11.1.
Precision (%)	5.0	5.0	Precision guided by Global SMART for the given prevalence
Design Effect	1.6	1.16	Guided by July 2021 SMART Survey.
<b>Estimated No of children</b>	<b>535</b>	<b>360</b>	
Average Household size	6.7	5.6	As per 2019 KNBS
Proportion of children < 5 yrs (%)	11.9	16.5	As per 2019 KNBS
Non Response rate (%)	2.0	2.0	As per July 2021 SMART survey. Covid 19 related non response has also been factored.
<b>Estimated No. of Households</b>	<b>761</b>	<b>442</b>	
No of Households per day	16	15	Based on 2021 SMART Survey Experience
No of clusters	48	30	Computed from the Number of HHs per Day
No of Teams	7	5	
No of days	7	6	Based on the Number of Teams to be Recruited

### 2.3.2. Mortality Sample Size Calculation

The Mortality survey sample size was calculated using the SMART survey calculator. The parameters of interest were captured in the ENA Jan 11<sup>th</sup> 2020 software and the households required for the survey computed.

**Table 5: Mortality Sample Size calculation**

Parameter	Saku	Moyale	Laisamis	North Horr	Rationale
Estimated death rate per 10,000/day	0.36	0.36	0.36	0.36	SMART recommended prevalence for Sub sahara Africa where there is no data for mortality
Desired precision	0.3	0.3	0.3	0.3	SMART –with death rate less than 1.0 deaths/ 10,000/day a precision of 0.3 is appropriate

Design effects	1.5	1.5	1.5	1.5	Use the Rule of thumb since there is no data for mortality
Recall period in days	93	93	93	93	Based on 1 <sup>st</sup> April 2022- Day 1 of Ramadhan with training beginning on 28 <sup>th</sup> June 2022
Average HH size	4.9	6.1	5.6	6.7	KNBS census 2019
Non-response %	5	3	2	2	Based experience on the ground on Data collection
Total No. HH to be surveyed	580	456	492	411	Based on ENA calculator
No. of HH per day	15	15	15	17	
Population to be included	2698	2698	2698	2669	Based on ENA calculator
Number of clusters	39	31	33	24	

### 2.3.3. Final Sample Size

The sample size between Anthropometric and Mortality, the highest sample size was selected. For North Horr Sub County, both Anthropometrics/Household and Mortality data was collected in the first 10 Household sampled while for the other 6 household only Anthropometrics/Household data was collected.

**Table 6: Final Sample Size**

Parameter	North Horr	Laisamis	Moyale	Saku
Total No. HH to be surveyed based on GAM	761	442	404	705
Total No. HH to be surveyed based on Mortality	411	492	456	580
<b>Final Total No of HH to be surveyed</b>	<b>761</b>	<b>492</b>	<b>456</b>	<b>705</b>
No. of HH per day	16	15	15	15
Population to be included	2669	2,698	2698	2698
Number of clusters based on GAM	48	30	29	47
Number of clusters based on Mortality	24	33	31	39
<b>Final Number of clusters</b>	<b>48</b>	<b>33</b>	<b>31</b>	<b>47</b>
<b>Number of Teams</b>	<b>7</b>	<b>5</b>	<b>5</b>	<b>7</b>
<b>Number of days</b>	<b>7</b>	<b>7</b>	<b>7</b>	<b>7</b>

### 2.4 Cluster and Household Selection

All the villages that were accessible were included in the sampling Frame and sampled with probability proportional to size. At the second stage, each team listed all the households in a village/cluster and used the simple random sampling method to select the households to visit. Within the selected households all children 6-59 months were measured.

Prior to the survey, a household was defined as a group of people who lived together and shared a common cooking pot. In polygamous families with several structures within the same compound but with different wives

having their own cooking pots, the structures were considered as separate households and assessed separately.

In cases where there was no eligible child, a household was still considered part of the sample since it was integrated survey other household related information was collected. If a respondent or child was absent during the time of household visit, the teams left a message and re-visited later to collect data for the missing person, with no substitution of households allowed.

## 2.5 Data Collected

Quantitative data collection method was used to collect the survey data; the following data was collected:

1. Anthropometry (weight, height, edema, MUAC, age, sex) for children aged 6-59 months and MUAC for women of reproductive age.
2. Mortality Data.
3. Vaccination information ( OPV1 and 3, measles, BCG, and Vitamin A supplementation)
4. Incidences of childhood illnesses in the last 2 weeks prior to the survey
5. Food security information (Household Dietary Diversity Score, Women dietary Diversity Score, Food consumption Score , Food consumption Score-Nutrition and Coping strategy Index)
6. Water and sanitation Hygiene (Latrine access and coverage, water treatment and hand washing)

The survey adopted the data collection tools recommended in the nutrition survey guidelines with a few modifications to cater for all the objectives of the survey.

## 2.6 Survey Organisation

- **Coordination/Collaboration:** Before the survey was conducted, meetings were held with the respective authorities and key stakeholders briefed them about the purpose, objectives and methods for the survey. The survey details were discussed with the County Health office, key partners on the ground (NGO and UN). The authorities were requested to officially inform the communities (villages) that were involved in the assessment.
- **Recruiting the Survey Team:** Recruitment was done in collaboration with the Ministry of Health office at the County level in order to give ownership and participation in the assessment. Twenty five teams of four were selected to include two measurers, one enumerator and a team leader.
- **Training of the Survey Team:** The teams were given 4-days training prior to fieldwork, including a standardization test to ensure standardization of measurement and recording practice. All data collectors were trained on taking anthropometric measurements, completion of questionnaires and sampling methodology. The data collection forms and questionnaires were pilot tested in clusters not selected to be part of the larger survey, to ensure that the interviewers and respondents understand the questions and that interviewers follow correct protocols.
- **For the quality of training:** The teams were split into two namely: Moyale and North Horr teams were trained together and Saku and Laisamis team were trained together.
- **Team work in the field:** Twenty four teams each with four members who have experience in data collection were organized/ selected from the survey area with each team consisting of 1 team leader, interviewer and 2 measurers. In addition, supervisors from Concern Worldwide, World Vision, and NDMA, MoA, MoH, MoLF and other partners closely supervised the team throughout the survey. In moving from one randomly selected household to another, a village leader, or a community volunteer, depending on the village, guided the teams and who was available.

## 2.7 Questionnaire

The survey adopted the data collection tools recommended in the Nutrition Information Working Group.

## 2.8 Data Analysis and Report Writing

- **Data Analysis:** the data downloading and analysis was done using ENA for SMART, Excel and SPSS Statistical software version 22. The NITWG Representative and Concern Worldwide Manager Survey and

Surveillance, was responsible for the Data downloading, analysis and report writing. Results are presented using the new WHO reference levels.

- **Preliminary Results and Final Report:** NITWG Representative, Manager Surveys and Surveillance of Concern Worldwide and County Nutrition Coordinator presented the findings to CHMT, CSG stakeholders and the Nutrition Information Working Group (NIWG) within two weeks of completion of the survey fieldwork at County and National level.

### Indicators, Guidelines and Formulas used in determining Acute Malnutrition Weight for height (WFH) index

This was estimated from a combination of the weight for height (WFH) index values (and/or edema) and by sex based on WHO standards 2006. This index was expressed in WFH indices in Z-scores, according to WHO 2006 reference standards.

Z-Score:

- Severe acute malnutrition is defined by WFH < -3 SD and/or existing bilateral edema,
- Moderate acute malnutrition is defined by WFH < -2 SD and >-3 SD and no edema
- Global acute malnutrition is defined by WFH < -2 SD and/or existing bilateral edema.

Mid upper arm circumference (MUAC) MUAC analysis was also undertaken to determine the nutrition status of sampled children and women of reproductive age (15-49 years). The following MUAC criteria were applied.

Table 7: MUAC Guidelines

MUAC guidelines:	Interpretation
<b>Children 6-59 Months</b>	
MUAC<115mm and /or Bilateral Edema	Severe Acute Malnutrition
MUAC >=115mm and <125mm (no bilateral edema)	Moderate acute Malnutrition
MUAC>=125mm and <135mm(No bilateral Edema)	Risk of Malnutrition
MUAC>135mm (No bilateral Edema)	Adequate Nutritional Status
<b>Women of reproductive age (15-49 Years)</b>	
MUAC >21-23cm	At risk of malnutrition
MUAC <21cm	Maternal Acute Malnutrition

### 2.9 Referrals

During the survey, all severe and moderately malnourished children as per MUAC and Weight-for-Height cut offs referred to the nearby health service delivery points offering IMAM services. Pregnant and lactating women with MUAC.

### 2.10 Ethical consideration

Sufficient information was provided to the local authorities about the survey including the purpose and objectives of the survey, the nature of the data collection procedures, the target group, and survey procedures. Verbal consent was obtained from all adult participants and parents/caregivers of all eligible children in the survey. The decision of caregiver to participate or withdrawal was respected. Privacy and confidentiality of survey respondent and data was protected.

### 2.11 Survey Limitation.

In Saku Sub County, some sampled households were absent for most of the day due to the busy nature of the urban residents. Also in Saku Sub County, the urban set up especially gated community, the respondent denied the survey team access to some sampled Households.

## CHAPTER THREE: SURVEY FINDINGS

### 3.1 GENERAL CHARACTERISTICS OF STUDY POPULATION AND HOUSEHOLDS

#### 3.1.1 Demographics

All the survey clusters were visited according to the methodology.

In North Horr, the total number of households surveyed was 767 while in total; there were 538 children whose anthropometric measurements were taken who were aged between 6 and 59 months. The average number of persons per household in North Horr was 4.7.

In Laisamis, the total number of households surveyed was 495 while in total; there were 403 children whose anthropometric measurements were taken who were aged between 6 and 59 months. The average number of persons per household was 4.6.

In Moyale, the total number of households surveyed was 460 while in total; there were 423 children whose anthropometric measurements were taken who were aged between 6 and 59 months. The average number of persons per household was 5.7.

In Saku, the total number of households surveyed was 694 while in total; there were 587 children whose anthropometric measurements were taken who were aged between 6 and 59 months. The average number of persons per household was 5.6.

Overly, in Marsabit County, 2416 Household were surveyed and 1915 anthropometric measurement were taken. The average number of persons per household was 5.1.

**Table 8: Response Rate**

Survey Zone	No. of HH	No. of HH questionnaires filled	No. of Children	No. of Children	Number of Clusters	Number of Clusters Achieved	Average Household Size	Design Effect
Laisamis	495	<b>495</b>	360	<b>403</b>	33	<b>33</b>	<b>4.6</b>	<b>1.56</b>
North Horr	768	<b>767</b>	535	<b>538</b>	48	<b>48</b>	<b>4.7</b>	<b>1.29</b>
Saku	705	<b>694</b>	440	<b>587</b>	31	<b>31</b>	<b>5.6</b>	<b>1.45</b>
Moyale	465	<b>460</b>	383	<b>423</b>	47	<b>47</b>	<b>5.7</b>	<b>1.55</b>
Marsabit	2433	<b>2416</b>	1718	<b>1915</b>	159	<b>159</b>	<b>5.1</b>	

#### 3.1.2 Residency and Caregiver's Marital Status

In Marsabit County, 90.27% of the surveyed population are Resident - Permanent residential while 9.52% are Resident - Nomadic/Pastoralist. Majority of the respondents in the County were married and also it's worth noting

the widow are also high at 13.0%. The highest number of widows are in North Horr and Laisamis Sub County as shown in the figure below.

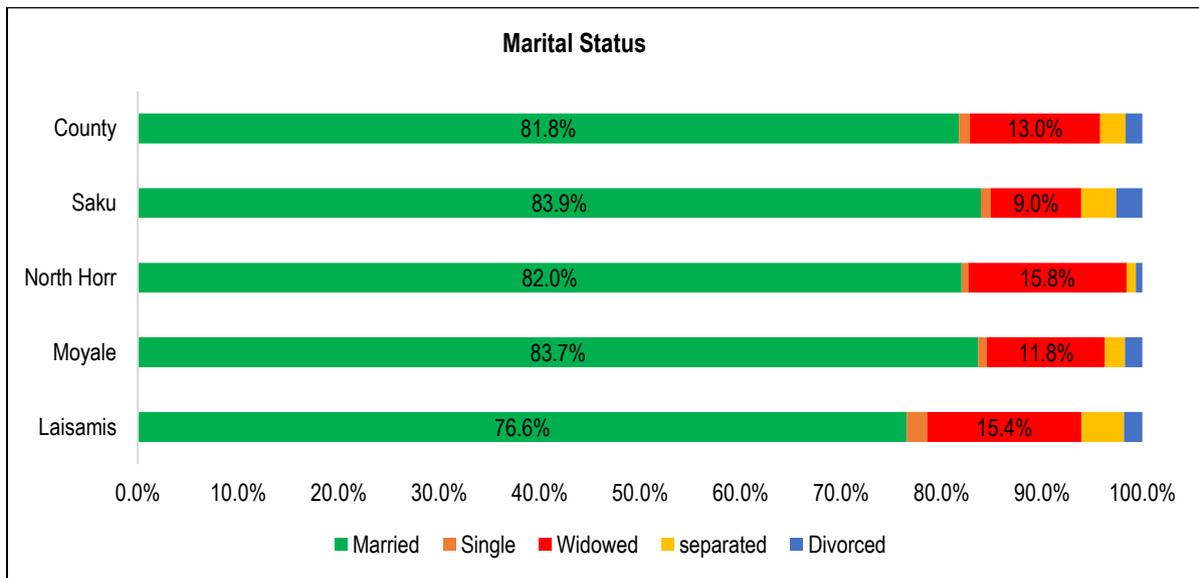


Figure 2: Marital Status

### 3.2 Socio-economic characteristics of households

#### 3.2.1 School Enrolment for 3-18 years

Over 70.0% of the respondents (3-18 year olds) in Marsabit County were enrolled in school. Further analysis showed the highest enrolment to be in Saku (88.5%) and Moyale (83.8%) while lower in North Horr (46.9%) and Laisamis (62.5%) respectively. In Marsabit County, according to the County Steering Group, most children enrol to school after the attaining the age of 7 years hence low enrolment rate. This is as shown below.

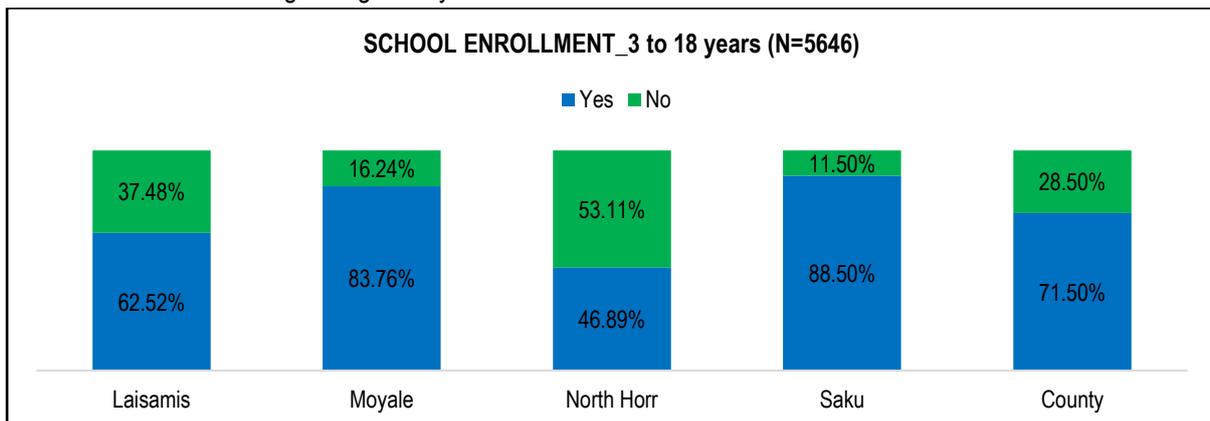


Figure 3: School Enrolment for children aged 3-18 Years

When the data was further analysed, it was found that for the respondents that were not enrolled in schools, majority (41.5%) were reported because of family responsibilities and (38.3%) since they are too young. In Laisamis 61.7% of them were not in school due to family responsibilities compared to Saku and Moyale sub Counties. This is as summarized in the table below:

Table 9: Reasons for being not in School

	Laisamis	Moyale	North Horr	Saku	County
Chronic Sickness	1.2%	1.0%	0.3%	2.0%	0.8%

Weather (rain, floods, storms)	0.0%	0.0%	0.0%	0.0%	0.0%
Family labour responsibilities	61.7%	10.0%	47.9%	4.0%	41.5%
Working outside home	0.0%	1.0%	0.0%	0.0%	0.1%
Teacher absenteeism	0.0%	0.0%	0.4%	0.5%	0.2%
lack of fees or money to meet other costs	1.2%	3.5%	3.1%	15.2%	4.1%
Household doesn't see value of schooling	3.0%	1.0%	2.0%	1.5%	2.1%
No food in the schools	0.0%	0.0%	0.4%	0.0%	0.2%
Migrated/ moved from school area	0.0%	0.0%	0.0%	0.5%	0.1%
Insecurity / violence	0.0%	0.0%	0.0%	1.0%	0.1%
No school Near by	2.6%	0.0%	11.9%	1.5%	6.7%
Married	0.5%	1.5%	1.6%	0.5%	1.2%
Pregnant / Taking care of her own child	0.0%	0.0%	0.0%	1.0%	0.1%
Others (specify)	2.3%	9.5%	4.5%	3.5%	4.4%
Too young to be in school	27.6%	72.6%	27.9%	68.7%	38.3%

### 3.2.2 Occupation of the household head

Marsabit county has four major livelihoods zones including: pastoralists, agro-pastoralists, fisheries and urban segregated in different proportions as Pastoralists 81%, Agro-pastoralists 16 % and others (formal employment, casual wage labour, petty trade & fisheries) 3%<sup>2</sup>. Overall, results show that almost half (54.7%) of households rely on pastoral economy as main occupation followed by casual labour at 19.2%.

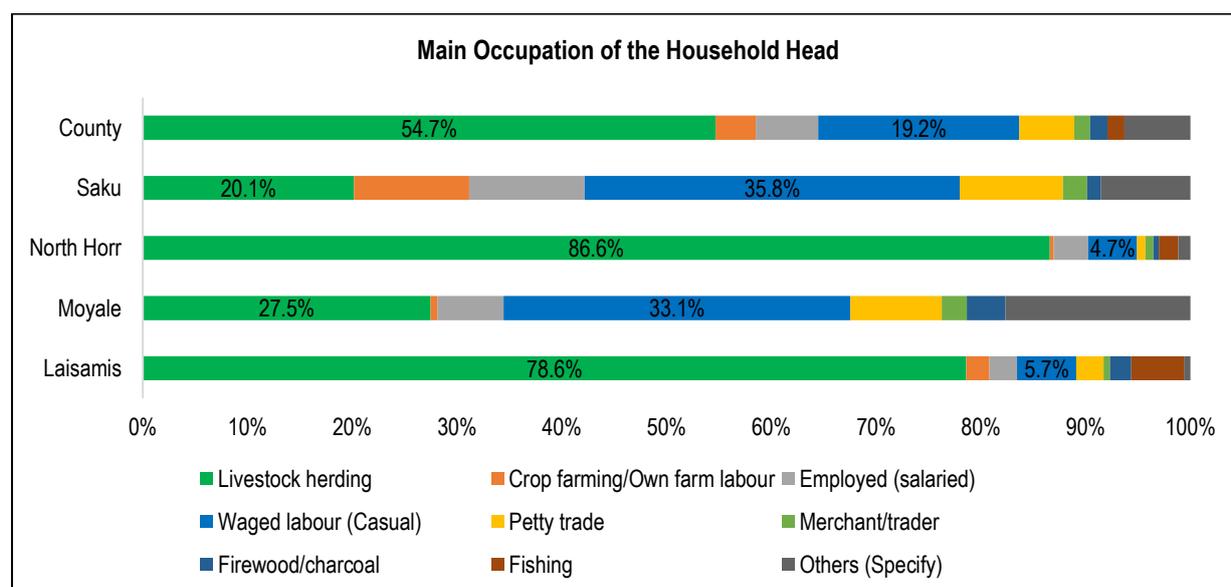


Figure 4: Main Occupation of the Household Head

### 3.2.3. Main source of Income of the Household Head

The current main source of income Marsabit County for the period of 30 days prior to the survey was sale of livestock reported by 46.6% of the households followed by casual labour at 20.3%, petty trading at 6.8% respectively. This is as summarized in the figure below:

<sup>2</sup> Marsabit County CIDP

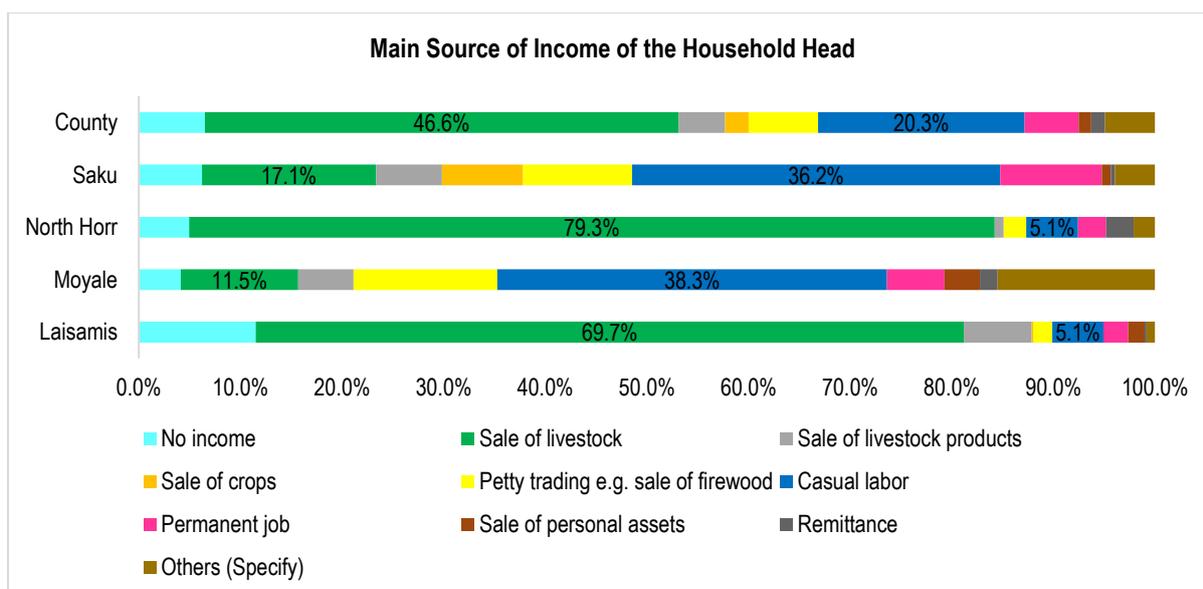


Figure 5: Main Source of income of the Household Head

### 3.3 Nutrition status of children

#### 3.3.1 Prevalence of acute malnutrition (weight-for-height z-score)

In this survey, the global acute malnutrition (GAM) is defined as the proportion of children with a z-score of less than -2 z-scores weight-for-height and/or presence of oedema. Additionally, severe acute malnutrition (SAM) is defined as the proportion of children with less than -3 z-scores weight-for-height and/or presence of oedema. Further, based on MUAC, GAM was defined as the proportion of children with a MUAC of less 125 mm and/or presence of oedema. SAM based on MUAC was defined as the proportion of children with a MUAC of less than 115 mm and/or presence of oedema.

Malnutrition by Z-Score: WHO (2006) Standard

- Severe acute malnutrition is defined by WFH < -3 SD and/or existing bilateral edema on the lower limbs
- Moderate acute malnutrition is defined by WFH < -2 SD and >-3 SD and no edema
- Global acute malnutrition is defined by WFH < -2 SD and/or existing bilateral edema

Malnutrition by MUAC

- Severe malnutrition is defined by MUAC < 115 mm and/or presence of bilateral edema
- Moderate malnutrition is defined by MUAC < 125 mm and ≥ 115 mm and no edema
- Global acute malnutrition is defined by MUAC < 125 mm and/or existing bilateral edema

The survey findings indicated a GAM prevalence rate of 19.6 % ( 16.7-22.9 95% C.I.), while the prevalence for severe malnutrition was 3.5 % ( 2.6-4.7 95% C.I.). This is generally classified as critical by the WHO classification of malnutrition. Further analysis showed that Laisamis sub-county had the highest GAM rate of 30.3 % (24.6 – 36.6) and this is above the emergency GAM threshold (15.0%) indicating extreme critical situation. This was followed by North Horr sub-county at 29.7 % (25.4 – 34.5) this indicating a critical situation. Saku and Moyale Sub Counties recorded poor nutrition status with GAM rates of 10.6% (7.8-14.4) and 9.4 % (6.4-13.5). There were no cases of edema that were reported.

Table 10: Prevalence of Malnutrition by WHZ/Oedema

	North Horr	North Horr	North Horr	Laisamis July 2019	Laisamis July 2021	Laisamis July 2022	Moyale July 2019	Moyale July 2022	Saku	Saku July 2022	County July 2019	County July 2022

	July 2019	July 2021	July 2022						July 2019			
Global Acute Malnutrition (GAM)	25.1 % (20.0 - 31.0)	22.6 % (18.2 - 27.6)	29.7 % (25.4 - 34.5)	30.7 % (26.0 - 35.9)	20.8% (17.3- 24.6)	30.3% (24.6- 36.6)	9.0 % (6.1 - 13.0)	9.4 % (6.4 - 13.5)	9.5 % (4.8 - 18.0)	10.6 % (7.8- 14.4)	18%(15.6 - 20.7)	19.6% (16.7 - 22.9)
Severe Acute Malnutrition (SAM)	3.1 % (1.7 - 5.5)	5.3% (3.4- 7.9)	4.4% (2.8- 6.7)	6.4 % (4.2 - 9.8)	4.3% (2.7- 6.6)	5.5% (3.2- 9.0)	1.2 % (0.5 - 3.3)	2.2 % (1.2 - 3.9)	1.0 % (0.2 - 3.8)	1.2% (0.5- 2.7)	2.9%(2.1 - 4.0)	3.5% (2.6 - 4.7)
% of Oedema	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2 %	0.0%	0.0%	0.0%	0.1%

The graph below shows the GAM trend of different Sub Counties in Marsabit County where in all the sub Counties show a deteriorating situation which could be attributed to the poor performance of the long rains. Livestock body condition was poor-fair which has affected milk production was below average across the livelihood zones. Livestock unusually migrated to the dry season grazing areas. In addition, livestock mortalities were reported amongst the cattle and sheep species and Low kidding, lambing and calving which contribute to low milk production less food at the household level.

According to Early warning bulletin, 95percent of open water sources are depleted which have contributed to increase in household watering distances by hence child care in compromised resulting to high malnutrition levels. Terms of trade are very low at the County level resulting limited purchasing power at the household level.

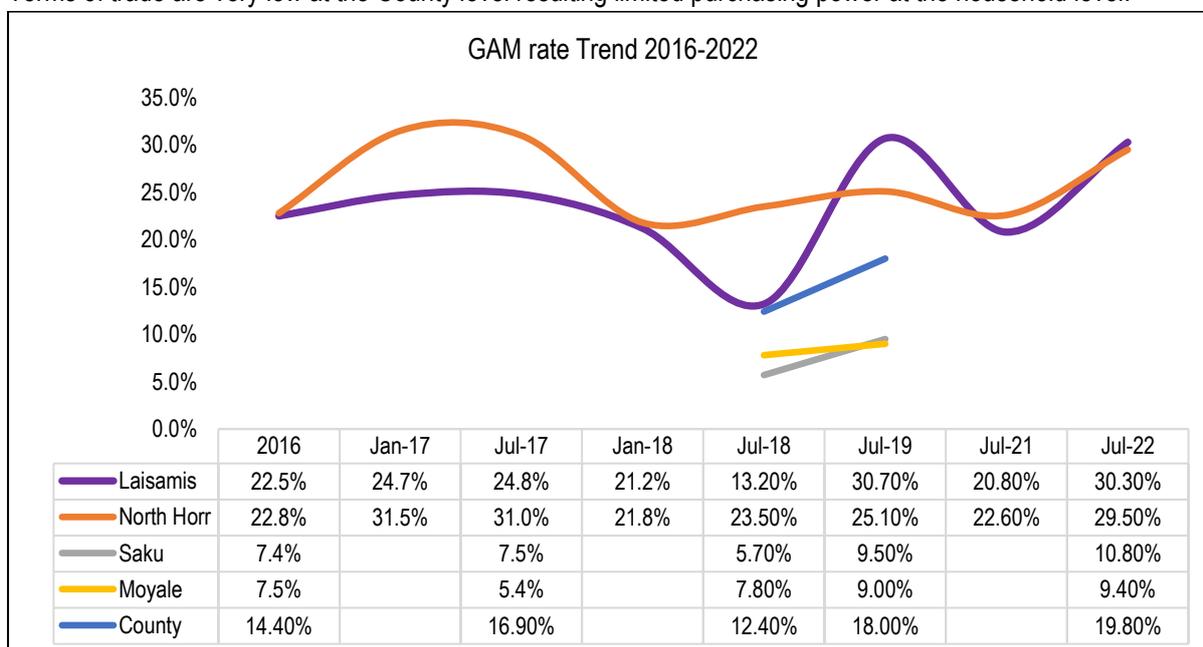


Figure 6: Marsabit County GAM Trends

### 3.3.3. Prevalence of acute malnutrition based on MUAC

Compared to weight for height Z-scores, the mid-upper arm circumference (MUAC) is not a very sensitive indicator of acute malnutrition and tends to underestimate acute malnutrition for children below one year of age. It is, however, used as a rapid screening tool for admission into nutrition intervention programmes. Generally, MUAC

usually tends to indicate lower GAM levels compared to WFH z-scores. The prevalence of malnutrition using MUAC is significantly lower compared to using Weight for Height Z-scores.

This means, overall significantly lower cases of malnourished children are identified using MUAC when compared to weight for height. Laisamis had the highest GAM rate (7.3%) followed by Moyale (5.0%) while there was no change in SAM rates with all the three survey zones recording below 1% except Laisamis sub County. The table below summarizes prevalence of malnutrition by MUAC.

**Table 11: Prevalence of Malnutrition by MUAC**

	North Horr July 2019	North Horr July 2021	North Horr July 2022	Laisamis July 2019	Laisamis July 2021	Laisamis July 2022	Moyale July 2019	Moyale July 2022	Saku July 2019	Saku July 2022	County July 2019	County July 2022
<b>Global malnutrition &lt; 125mm</b>	4.5 % (2.7 - 7.4)	5.2 % (3.2 - 8.1)	4.0 % (2.4 - 6.6)	6.4 % (4.3 - 9.3)	7.1% (5.2- 9.6)	7.3 % (4.6 - 11.2)	3.7 % (2.2 - 6.2)	5.0 % (3.2 - 7.8 95% C.I.)	0.9 % (0.2 - 3.8)	4.3 % (2.7 - 6.9)	4.4% (3.4- 5.8)	<b>5.0% (3.9 - 6.3 95% C.I.)</b>
<b>Severe malnutrition &lt;115mm</b>	0.5 % (0.1 - 2.0)	0.8 % (0.3- 2.0)	0.4 % (0.1 - 1.5)	1.2 % (0.6 - 2.5)	1.0% (0.5- 2.2)	1.0 % (0.4 - 2.5)	0.7 % (0.2 - 2.3)	1.2 % (0.5 - 2.8)	0.5 % (0.1 - 3.5)	0.7 % (0.3 - 1.8)	0.8% (0.4- 1.5)	<b>0.8 % (0.4 - 1.4)</b>

### 3.3.4. Prevalence of Underweight

The weight-for-age (WFA) index provides a composite measure of wasting and stunting and is commonly used to monitor the growth of individual children in Mother-child booklet since it enables mothers to easily visualize the trend of their children’s increase in weight against age. A low WFA is referred to as underweight.

Laisamis had the highest prevalence of underweight (47.1%) which shows there was significant difference compared 2021 and 2022. Closely followed by North Horr (39.7%) which shows there was significant difference compared 2021 and 2022. Saku (19.6%) and Moyale (16.4%) did show any significance difference comparing 2019 and 2022.

**Table 12: Prevalence of Underweight**

	North Horr July 2019	North Horr July 2021	North Horr July 2022	Laisamis July 2019	Laisamis July 2021	Laisamis July 2022	Moyale July 2019	Moyale July 2022	Saku July 2019	Saku July 2022	County July 2019	County July 2022
<b>Global underweight (&lt;-2 z-score)</b>	27.2 % (21.9 - 33.3)	28.1 % (23.4 - 33.3)	39.7 % (35.0 - 44.6)	39.6 % (35.8 - 43.5)	32.7% (28.1- 37.7)	47.1 % (40.6 - 53.7)	13.7 % (9.7 - 18.9)	16.4 % (12.1 - 21.8)	14.2 % (7.9 - 24.4)	19.6 % (15.0 - 25.2)	23.1%(20.4 - 26.1)	30.5% (26.9 - 34.3)

<b>Severe underweight (&lt;-3 z-score)</b>	5.1 % (3.3 - 7.8)	6.6% (4.6-9.3)	11.6 % (9.1 - 14.5)	10.2 % (7.9 - 13.0)	9.4% (7.2-12.3)	11.5 % (7.5 - 17.3)	2.2 % (0.9 - 5.2)	1.9 % (0.9 - 3.9)	3.3 % (1.0 - 10.5)	4.7 % (3.1 - 7.1)	4.9%(3.8 - 6.3)	7.1% (5.5 - 9.1)
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### 3.3.5 Prevalence of stunting

Height for age (stunting) is an indicator of chronic (long-term) malnutrition arising from deprivation related to persistent/chronic poor food security situation, micronutrient deficiencies, recurrent illnesses and other factors which interrupt normal growth. Unlike wasting, it is not affected by seasonality but is rather related to the long-term effects of socio-economic development and long-standing food insecurity situation. A low height-for-age reflects deficits in linear growth and is referred to as stunting.

Global stunting was highest in Laisamis (31.2%) followed by North Horr (26.8%). There was no notable change comparing 2019, 2021 and 2022.

Table 13: Prevalence of stunting

	North Horr July 2019	North Horr July 2021	North Horr July 2022	Laisamis July 2019	Laisamis July 2021	Laisamis July 2022	Moyale July 2019	Moyale July 2022	Saku July 2019	Saku July 2022	County July 2019	County July 2022
<b>Global Stunting (&lt;-2 z-score)</b>	16.7 % (13.7 - 20.2)	22.6 % (18.6 - 27.1)	26.8 % (22.7 - 31.4)	28.3 % (24.2 - 32.8)	29.1% (24.6-34.0)	31.2 % (25.7 - 37.3)	19.6 % (15.7 - 24.3)	19.1 % (15.1 - 23.9)	19.2 % (13.9 - 25.9)	19.0 % (15.2 - 23.6)	21.1% (18.9 - 23.4)	23.8% (21.2 - 26.6)
<b>Severe Stunting (&lt;-3 z-score)</b>	2.3 % (1.1 - 4.9)	5.3% (3.5-8.1)	6.2 % (4.6 - 8.4)	8.7 % (6.0 - 12.4)	7.2% (5.3-9.9)	9.5 % (6.5 - 13.8)	3.8 % (2.2 - 6.6)	3.9 % (2.0 - 7.2)	3.8 % (1.9 - 7.6)	4.3 % (2.8 - 6.6)	4.7%(3.5 - 6.3)	5.8%(4.5 - 7.4)

### 3.4 Children's Morbidity and Health Seeking Behavior

In describing the determinants of malnutrition, the UNICEF conceptual framework identifies inadequate dietary intake and disease as immediate causes of malnutrition. Disease if not disrupted may cause a vicious cycle since it not only affects food intake but may also compromise nutrient absorption, jeopardize immunity and hence further worsen disease and malnutrition. It was therefore important to assess morbidity and whether it had some effect on malnutrition.

#### 3.4.1 Child morbidity

More than half of under-5 child deaths are due to diseases that are preventable and treatable through simple, affordable interventions. Strengthening health systems to provide such interventions to all children will save many young lives. To assess child morbidity, mothers/caregivers of children aged 6 to 59 months were asked to recall whether their children had been sick in the past 2 weeks. Those who gave an affirmative answer to this question were further probed on the type of illness that affected their children and whether and where they sought any assistance when their child/children were ill. Those who indicated that their child/children suffered from watery

diarrhoea were further probed on the kind of treatment that was given to them.

The survey results showed that only 30.1% of the children 6-59 months surveyed were reported to have been ill within the past two weeks. Of the ill children, Acute Respiratory Infections remained the most common ailment, accounting for 64.9% of all cases while fever-like malaria was the second most common illness at 44.7%. Watery diarrhoea followed closely at 12.6% and also there were few incidences of bloody diarrhoea at 0.9%. Laisamis had the highest number of ARI cases while North Horr was most affected by fever-like malaria at 80.0% and 69.0% respectively. Water Diarrhoea was exhibited in all sub Counties with Laisamis Sub County reporting the highest at 16.8%.

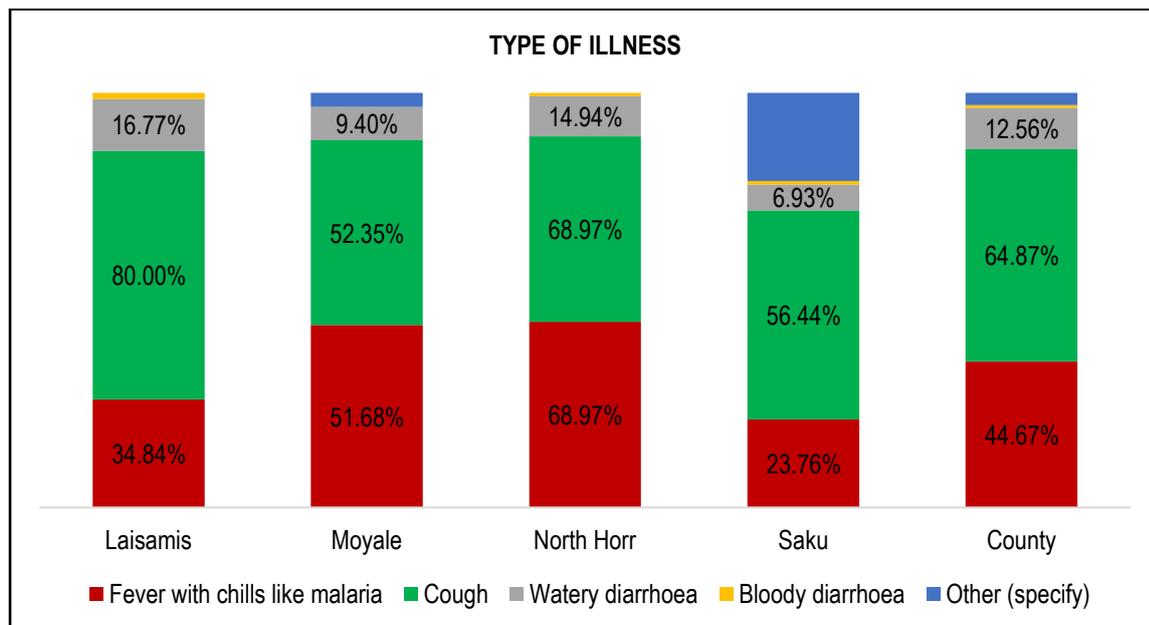


Figure 7: Type of Illness

### 3.4.1.1 Therapeutic Zinc Supplementation during Watery Diarrhea Episodes

Based on compelling evidence from efficacy studies, that zinc supplementation reduces the duration and severity of diarrhoea. In 2004 WHO and UNICEF recommended incorporating zinc supplementation (20 mg/day for 10-14 days for children 6 months and older, 10 mg/day for children under 6 months of age) as an adjunct treatment to low osmolality oral rehydration salts (ORS), and continuing child feeding for managing acute diarrhoea. Kenya has adopted these recommendations and enshrined this in the Kenyan policy guideline on control and management of diarrheal diseases in children below five years where all under-fives with diarrhoea should be given zinc supplements as soon as possible.

The survey sought to establish the number of children who suffered from watery diarrhoea and supplemented with zinc and ORS. The results showed that in all the sub Counties, both Zinc and ORS was widely used except in Saku where most used Zinc only.

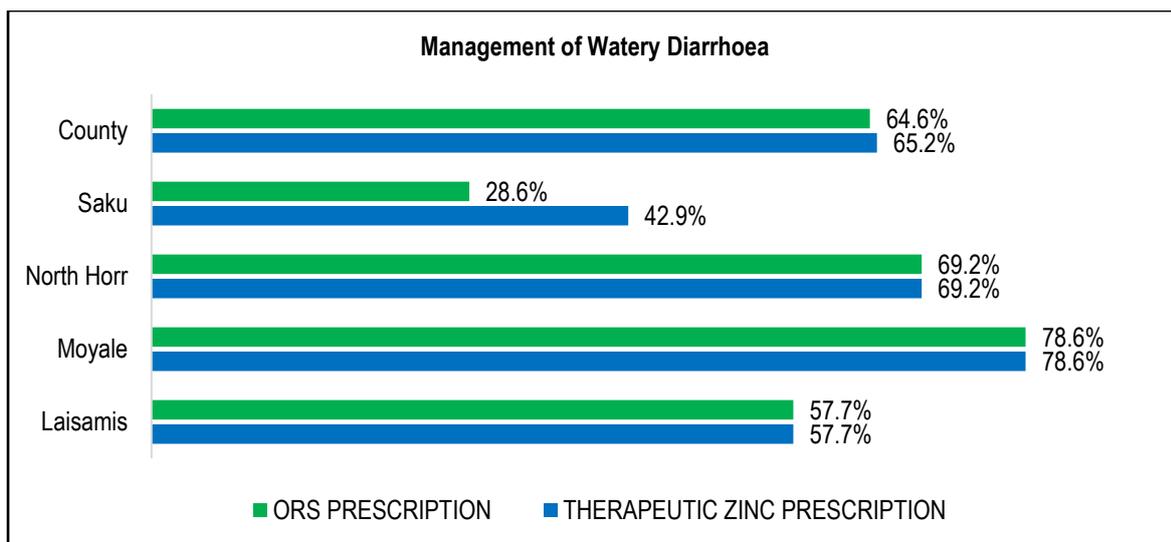
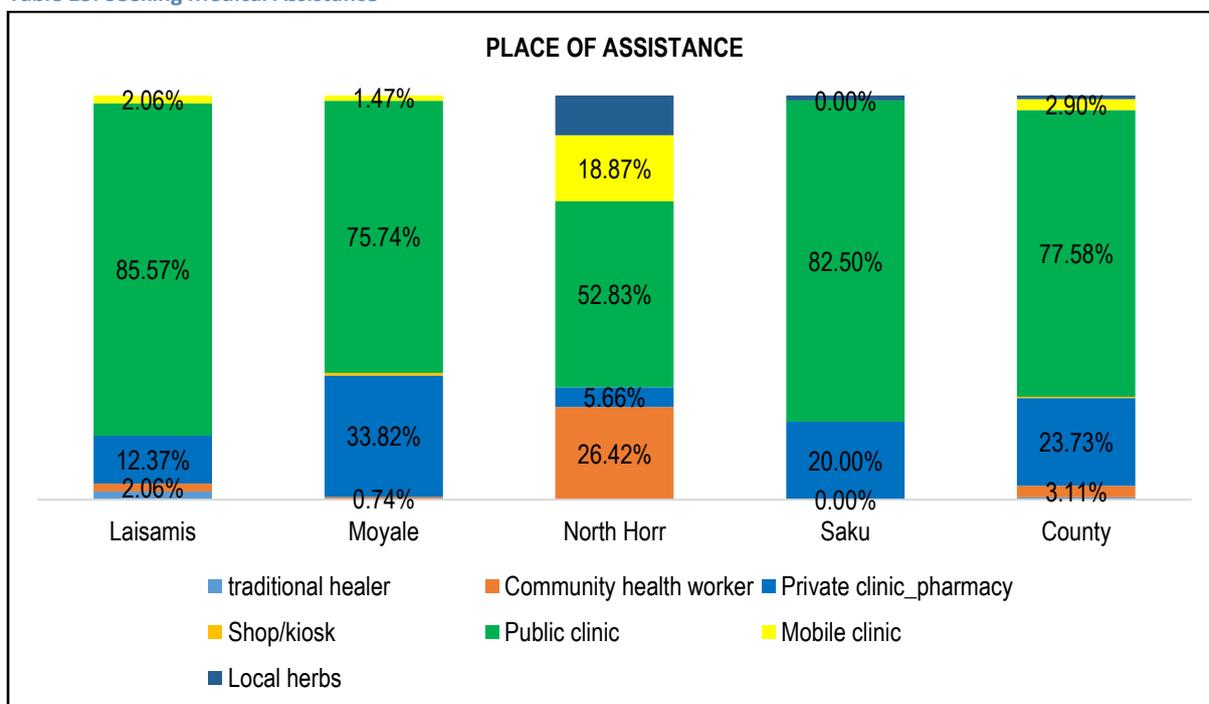


Table 14: Zinc Supplementation

### 3.4.2. Health Seeking Behavior

The proportion of caretakers who reported that their children had been ill during the past two weeks were asked if they sought any health assistance. Results showed that in Marsabit County, 76.35% of the children who were ill sought medical assistance with 77.58% of them seeking from Public clinic. Mothers and caregivers whose children were sick in the past 2 weeks and had sought assistance were further asked where they had first sought the assistance. Majority (77.6%) of the caretakers reported to have sought care from public clinics. It is worth noting 23.7% of them sought private clinic /pharmacy and 3.1% from Community Health Worker. Seeking medical assistance from the CHV is on rise in North Horr Sub County this could be attributed to long distances to access a health facility.

Table 15: Seeking Medical Assistance



### 3.5 Childhood Immunization, Vitamin A Supplementation and Deworming

#### 3.5.1. Childhood Immunization

Kenya aims to achieve 90% under one immunization coverage by the end of second medium term plan (2013-2017). The Kenya guideline on immunization defines a fully immunized child as one who has received all the prescribed antigens and at least one Vitamin A dose under the national immunization schedule before the first birthday. Immunization is a simple and effective way of protecting children from serious diseases. It not only helps protect individuals, it also protects the broader community by minimizing the spread of disease. Vaccines work by triggering the immune system to fight against certain diseases. If a vaccinated person comes in contact with these diseases, their immune system is able to respond more effectively, preventing the disease from developing or greatly reducing its severity. High immunization rates in the community have led to many of diseases becoming rare. However, they still exist and the risks of side effects or complications from these diseases are far greater than the very small risks of side effects from vaccination.

This survey assessed the coverage of 4 vaccines namely, BCG, OPV1, OPV3, and measles at 9 and 18 months. The BCG vaccine has variable efficacy or protection against tuberculosis (TB) ranging from 60-80% for a period ranging from 10-15 years. It is known to be effective in reducing the likelihood and severity of military TB and TB meningitis especially in infants and young children. This is especially important in Kenya where TB is highly prevalent, and the chances of an infant or young child being exposed to an infectious case are high. From the assessment, 97.5% (n=393), 97.4% (n=412), 96.8% (n=521), 99.3% (n=583), 97.6% (n=1765) of the children in Laisamis, Moyale, North Horr, Saku and County respectively were reported to have received BCG and confirmed by Scar. Those who were immunized (based on card and recall) by OPV1 were 96.0% respectively while for OPV3 were 94.5%.

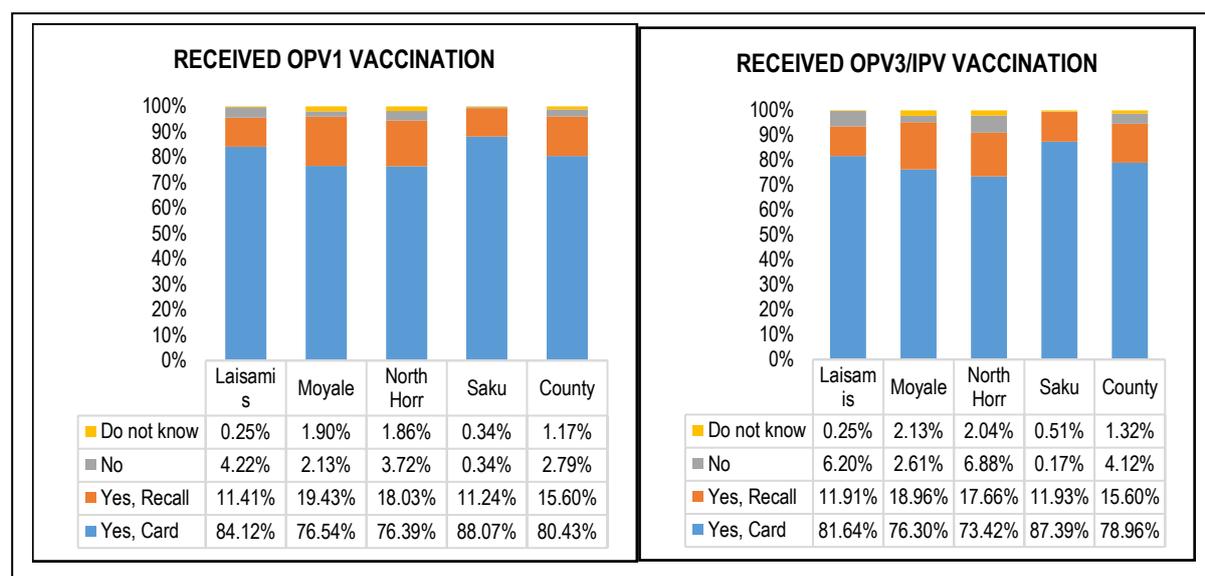


Figure 8: OPV1 and OPV3 Coverage

However, when we assessed immunization for measles at 9 months and at 18 months, 86.0% of children had been immunized (by card and recall) with the second dose of measles antigen at 18 months while at 9 months was 91.8%. Both antigens were above the 80% the National target.

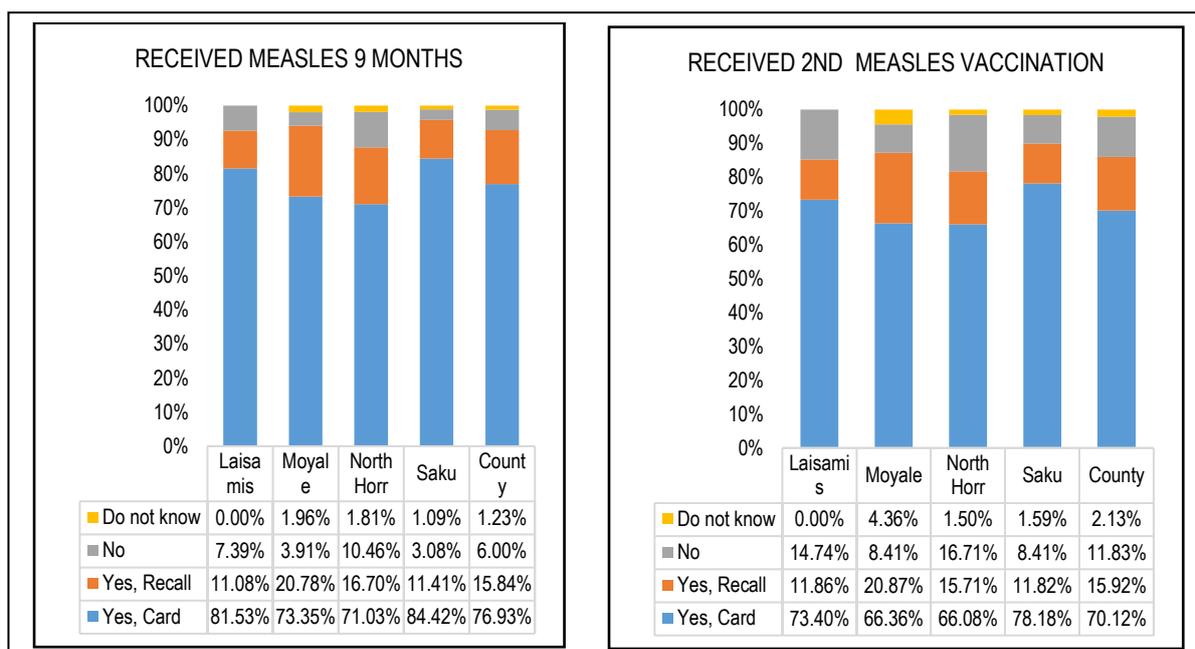


Figure 9: Measles Vaccination

### 3.5.2 Vitamin A supplementation

Over 140 million children are at greater risk of illness, hearing loss, blindness and even death if urgent action is not taken to provide them with life-saving vitamin A supplements. Two doses of vitamin A every year can save thousands of children’s lives. According to the new UNICEF report; “Coverage at a crossroads: New directions for vitamin A supplementation programmes”<sup>3</sup>, global coverage of vitamin A supplementation (VAS) has dropped to a six-year low, leaving more than one third of children unprotected from the devastating impacts of vitamin A deficiency. Currently, the future of VAS hangs in the balance and more work is needed to make programmes sustainable. As the world mobilizes towards the 2030 Agenda for Sustainable Development – and particularly the target of ending preventable deaths in children under age 5 – there has never been a more urgent time to reprioritize this safe, cost-effective and evidence-based intervention.

According to Kenya’s national nutrition action plan 2012-2017, the third priority objective is to reduce the prevalence of micro nutrient deficiencies especially through awareness, food fortification and supplementation. In these interventions, Vitamin A deficiency has been identified as a key micronutrient of concern (NNAP, 2012-2017). Furthermore, The Lancet medical journal lists vitamin A large-scale supplementation has proven potential to reduce the number of preventable child deaths each year (Jones et al, 2003). Improving the vitamin A status of deficient children enhances their resistance to disease and can reduce mortality from all causes by approximately 23 per cent (UNICEF, 2007). During much of early childhood – from 6 months to 5 years of age – two high-dose supplements of vitamin A per year, spaced four to six months apart, can strengthen the immune systems and improve chances of survival (WHO, 2018). Vitamin A supplementation among children below the age of 5 years offers protection against common childhood infections and substantially reduces mortality hence improving the child’s survival.

To assess vitamin A supplementation, parents and caregivers were probed on whether children had been supplemented, for how many times in the past one year. Reference was made to the child health card and in case the card was not available recall, method was applied. According to the survey, 71.6% of the children aged 6- 11 months were supplemented with vitamin A at least once, and 81.7% children aged 12 to 59 months who had been at least supplemented once. In comparison to the ministry of health, target of 80%, Performance in Vitamin A supplementation among children 12 – 59 months was above the target but for children 6 – 11 months still remains

<sup>3</sup> UNICEF. Coverage at a Crossroads: New directions for vitamin A supplementation programs, New York, 2018.

low. Laisamis Sub County, reported low intake if Vitamin A supplementation both for 6-11 months and 12-59 Months.

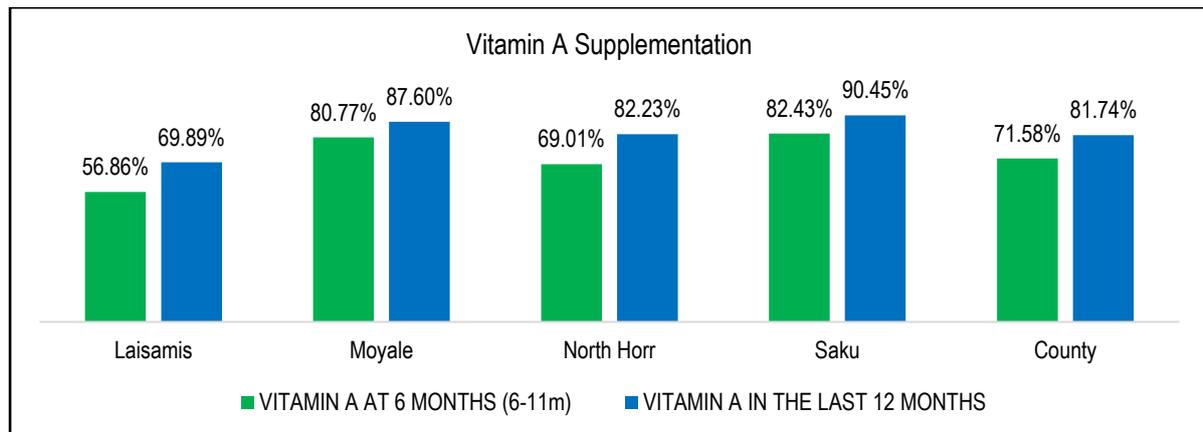


Figure 10: Vitamin A Supplementation

### 3.5.3. De-worming

De-worming is an essential intervention in controlling parasites including helminths, schistosomiasis (bilharzias) and prevention of anaemia. WHO recommends that children in developing countries exposed to poor sanitation and poor availability of clean safe water to be de-wormed once every 6 months. In this survey, de-worming was assessed for children aged 12-59 months old. Based on the findings, 79.83%, 82.21%, 81.97%, 72.12% & 80.01% for Laisamis, Moyale, North Horr, Saku and the County respectively

### 3.6 Maternal Nutrition

Evidence shows that the current total deaths in children younger than five years can be reduced by 15% if populations can access ten evidence-based interventions when implemented at scale with a coverage of 90% (Bhutta, et.al. 2013). One of these strategies, has a positive effect on child survival during 'the window of opportunity' which is also referred to as the 1st 1000 days (from conception to two years of age). One of them is optimal maternal nutrition during pregnancy, an enhanced nutrition package for the infant and young child focusing on promotion of exclusive breastfeeding. Pregnancy and lactation imposes a big nutrient-need load on mothers, which in the absence of adequate extra nutrients leads to utilization of body nutrient reserves leading to malnutrition. Gestational malnutrition leads to low birth weights and may ultimately culminate in poor child growth and development, thus there is an urgent need to address high rates of malnutrition among pregnant women. Household food insecurity is a key indicator/determinant for poor adult nutritional status. A high number of malnourished PLWs increase the risk of growth retardation of the fetus and consequently an increase in low birth weight and malnutrition burden spreads to both U5 children and caretakers from the same household faced with food insecurity and related vulnerabilities, a common scenario during nutrition emergency episodes.

#### 3.6.1 Women physiological status

The figure below indicates that majority of the surveyed women of Reproductive age (15-49 years) were lactating 50.9% followed by neither pregnant nor lactating at 39.6%.

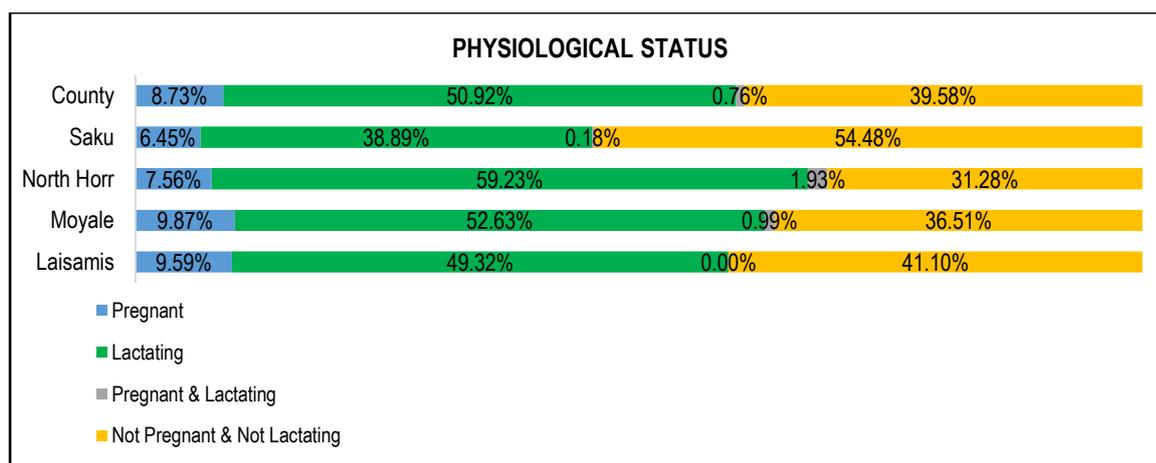


Figure 11: WRA physiological Status

### 3.6.2 Iron and Folic Acid Supplementation (IFAS)

During pregnancy, women have increased need for additional iron to ensure they have sufficient iron stores to prevent iron deficiency. Iron supplementation is recommended in resource limited settings as strategy to prevent and correct iron deficiency and anaemia among pregnant women WHO recommends daily consumption of 60mg elemental iron and 0.4mg folic acid throughout the pregnancy<sup>4</sup>. These recommendations have since been adopted by Kenya government in its 2013 policy guidelines on supplementation of iron folic acid supplementation (IFAS) during pregnancy.

During the survey, iron folic supplementation was assessed by asking mothers of children below 2 years if they consumed iron folate in their most recent pregnancy. Results showed 89.50%, 94.24%, 80.34%, 96.23% and 90.11% of Caretakers who had had a full term pregnancy in the last two years or had a child less than two years were supplemented with Iron/Iron Syrup /Iron-folate Tablets in their last pregnancy in Laisamis, Moyale, North Horr, Saku and the County respectively.

The mean number of days IFAS was consumed by the women varied by sub-county i.e. the Average Number of Days IFAS was consumed was 122.4, 96.7, 67.8, 69.3, and 86.4 for Laisamis, Moyale, North Horr, Saku and the County respectively. 42.6% of the mothers consumed less than 90 days in Marsabit County and only 13.1% who consumed above 180 Days. While access to IFAS is high, the main challenge is now on utilization, an indication of poor health seeking behaviour where mother seek ANC services late in their last trimester of pregnancy and limited counselling and peer support to encourage continued intake of IFAS.

Table 16: IFAS Supplementation

	Laisamis		Moyale		North Horr		Saku		County	
	N	%	N	%	N	%	N	%	N	%
Less than 90 days	40	22.35%	82	45.56%	139	59.66%	134	58.26%	330	42.64%
90 to >= 180 days	105	58.66%	71	39.44%	90	38.63%	73	31.74%	342	44.25%
More than 180 days	34	18.99%	27	15.00%	4	1.72%	23	10.00%	101	13.12%
Grand Total	179	100.00%	180	100.00%	233	100.00%	230	100.00%	773	100.00%

<sup>4</sup> WHO. Guideline: Daily iron and folic acid supplementation in pregnant women. Geneva, World Health Organization, 2012.

### 3.6.3 Maternal Nutrition

Maternal malnutrition is usually associated with high risk of low birth weights and it is recommended that before, during and after birth, the maternal nutrition status should be adequate. Maternal nutrition was assessed by measuring MUAC of all women of reproductive age (15 to 49) in all sampled households. Analysis was further focused on pregnant and lactating women.

The maternal malnutrition was defined as women whose MUAC measurements were < 21.0cm while women whose MUAC measurements were between 21.0 <23.0cm were classified as at risk of malnutrition.

The proportion of malnourished pregnant and lactating women in Marsabit County was 11.34% while for all the women of the reproductive age was 1.36%. According to the results, pregnant and lactating women in Laisamis are more affected followed by North Horr with malnutrition.

**Table 17: Maternal Nutrition**

	Laisamis		Moyale		North Horr		Saku		County	
<b>Women of Productive age</b>										
	n	%	n	%	n	%	n	%	n	%
MUAC ≥23cm	146	40.0%	236	77.6%	274	48.2%	421	75.5%	928	59.0%
MUAC >=21-<23cm	133	57.8%	49	21.7%	208	50.1%	92	24.0%	426	39.6%
MUAC <21cm	86	2.2%	19	0.7%	87	1.8%	45	0.5%	219	1.4%
<b>Grand Total</b>	<b>365</b>	<b>100.0%</b>	<b>304</b>	<b>100.0%</b>	<b>569</b>	<b>100.0%</b>	<b>558</b>	<b>100.0%</b>	<b>1573</b>	<b>100.0%</b>
<b>Pregnant and Lactating women</b>										
MUAC ≥23cm	93	43.3%	153	79.3%	195	49.9%	195	76.8%	576	60.6%
MUAC >=21-<23cm	86	40.0%	30	15.5%	139	35.6%	40	15.8%	267	28.1%
MUAC <21cm	36	16.7%	10	5.2%	57	14.6%	19	7.5%	108	11.3%
<b>Grand Total</b>	<b>215</b>	<b>100.0%</b>	<b>193</b>	<b>100.0%</b>	<b>391</b>	<b>100.0%</b>	<b>254</b>	<b>100.0%</b>	<b>951</b>	<b>100.0%</b>

## 3.7 WATER SANITATION & HYGIENE

International human rights consider access to water and sanitation as a human right.<sup>5</sup> This means that all individuals are entitled to have access to an essential amount of safe drinking water and to basic sanitation facilities. The human right to water entitles everyone to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic use. Water and sanitation are deeply interrelated. Sanitation is essential for the conservation and sustainable use of water resources, while access to water is required for sanitation and hygiene practices.

Furthermore, the realization of other human rights, such as the right to the highest attainable standard of health, the right to food, right to education and the right to adequate housing, depends very substantially upon the implementation of the right to water and sanitation. Research has shown that poor WASH indicators are linked to under nutrition and more so on High Stunting levels. Diarrhoea, the leading killer of young children is closely linked to poor/inadequate WASH (Pruss-Ustun et al, 2014), which often causes under nutrition, which in turn reduces a child's resistance to subsequent infections, thus creating a vicious circle. An estimated 25% of stunting is attributable to five or more episodes of diarrhoea before 24 months of age (Checkley et al, 2008).

### 3.7.1 Main Source of Water

Accessibility to improved water sources is of fundamental significance to lowering the faecal risk and frequency of associated diseases. Its association with other socioeconomic characteristics, including education and income, makes it a good universal indicator of human development. Drinking water coverage is presented as a two-step ladder that includes the proportion of the population using:

<sup>5</sup> The UN committee on economic, Cultural and Social rights states in its General Comment of November 2002

- Unimproved drinking water sources which include: Unprotected dug well, unprotected spring, cart with small tank/drum, tanker truck, and surface water (river, dam, lake, pond, stream, canal, irrigation channels), bottled water
- Improved drinking water sources also piped water which include: Public taps or standpipes, tube wells or boreholes, protected dug wells, protected springs and rainwater collection, Piped household water connection located inside the user's dwelling, plot or yard.

There are three main water sources in Marsabit County: borehole / protected spring /protected shallow wells, Earth pan/dam, and Water vendors. The main sources of water in North Horr was borehole / protected spring /protected shallow wells (46.8%) and unprotected well (23.7%). In Moyale, the main sources was tube earth pan (44.7%) and borehole / protected spring /protected shallow wells (21.6%). For Laisamis, the sources of water were borehole / protected spring /protected shallow wells (53.7%) and Public water stand (13.3%). In Saku the main sources of water was water kiosk and borehole / protected spring /protected shallow wells at 45.6% and 18.7% respectively.

**Table 18: Main Drinking Water Sources**

	Laisamis	Moyale	North Horr	Saku	County
Piped into dwelling	0.6%	0.0%	2.0%	0.1%	0.8%
Piped to yard / plot	4.2%	0.2%	1.2%	4.3%	2.5%
Piped to neighbour	3.4%	0.0%	4.2%	1.9%	2.6%
Public tap / standpipe	13.3%	0.9%	5.1%	6.5%	6.4%
borehole / protected spring /protected shallow wells	53.7%	21.6%	46.8%	18.7%	35.4%
Protected well	0.2%	0.2%	0.0%	0.0%	0.1%
Unprotected well	14.9%	5.0%	23.7%	3.2%	12.5%
Protected spring	0.0%	0.0%	0.0%	0.1%	0.0%
Unprotected spring	2.2%	0.0%	3.0%	0.0%	1.4%
Earth pan/dam	2.0%	44.7%	6.0%	14.8%	15.1%
Earth pan/dam with infiltration well	0.2%	3.9%	0.3%	0.6%	1.0%
Water trucking / Boozer	0.0%	7.6%	6.1%	2.5%	4.1%
Water vendor	0.0%	10.2%	1.3%	45.2%	15.3%
Harvested water (Jabiya)	2.2%	3.7%	0.1%	1.6%	1.7%
Cart with small tank	0.0%	0.2%	0.0%	0.1%	0.1%

### 3.7.2 Distance to Water Source and Queuing Time

According to SPHERE handbook for minimum standards for WASH, the maximum distance from any household to the nearest water point should be 500 meters. It also gives the maximum queuing time at a water source, which should be not more than 15 minutes, and it should not take more than three minutes to fill a 20-litre container.

#### 3.7.2.1 Distance to water sources

On the distances to water sources, almost half (43.8%) of the households interviewed obtained their water from sources less than 500m (less than 15 minutes walking distance), 32.6% took between 15 min to 1 hour (approximately 500m to 2km) while the rest (21.1%) walked as far as more than 2Km (1- 2hrs) to their water sources.

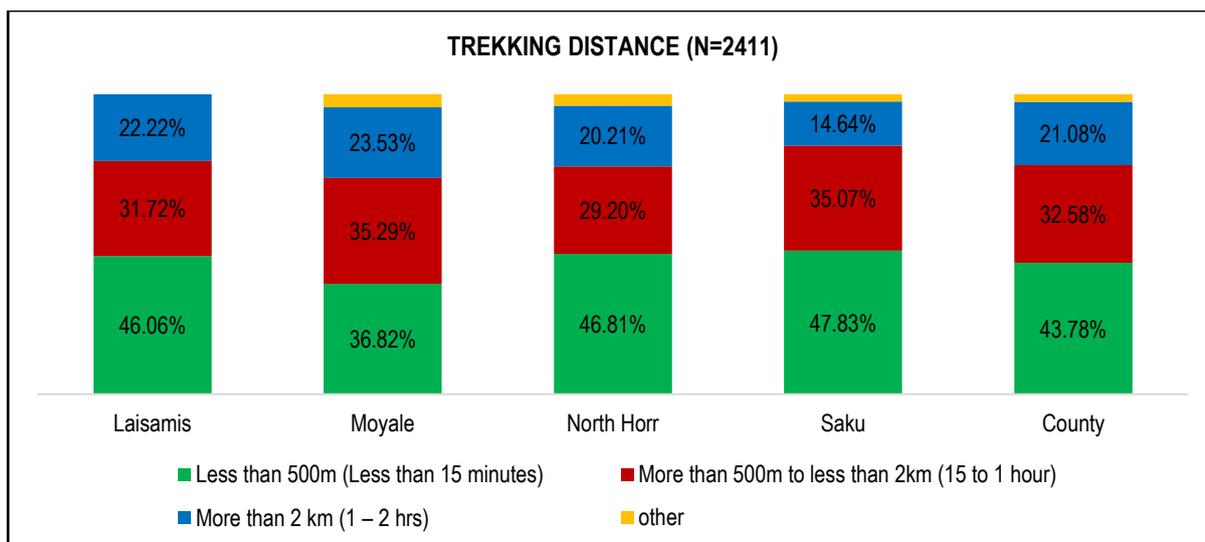


Figure 12: Trekking Distance to the Water Sources

### 3.7.2.2 Queuing time to water sources

On the proportion of household queuing for water, Half of the population in Marsabit queue for water (41.6%) of which indicates problem with access to water for households. Saku recorded the highest proportion of households (83.6%) queuing for water.

Out of those that were queuing for water in the county, (46.7%) of the respondents were waiting for less than 30 minutes while 35.0% of the households were queuing for 30 and 60 minutes and 18.4% are queuing for more than 1 hour as indicated in the figure above.

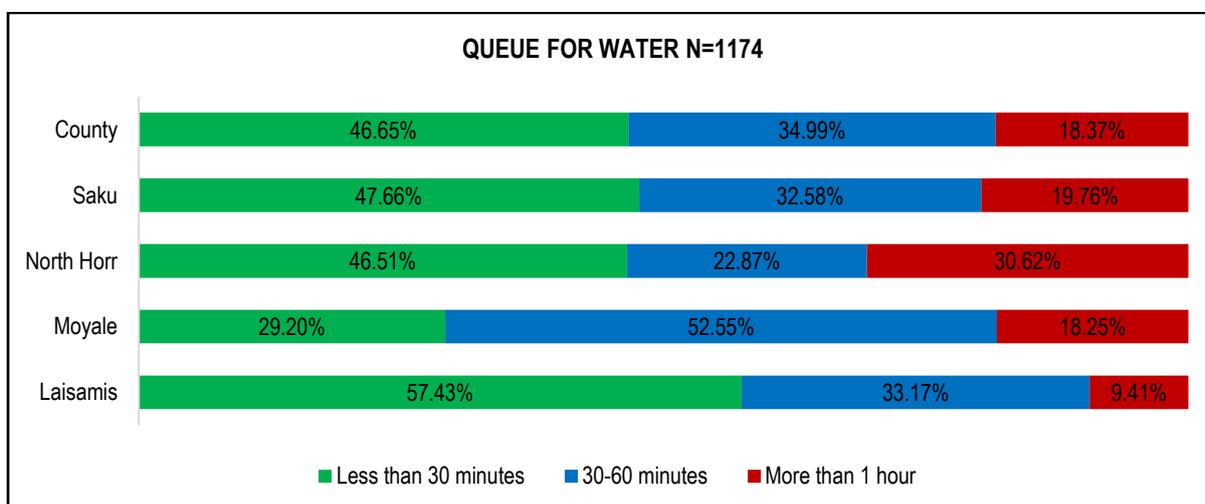


Figure 13: Queuing at the water sources

### 3.7.3 Methods of treatment and storage of drinking water

#### 3.7.3.1 Household water treatment

It is no doubt that water quantity and quality is of vital importance for the ecosystem.<sup>6</sup> The lack of water is further aggravated by insufficient treatment of water, particularly with rapid population growth. Despite most of the households obtaining water from unsafe sources, only 24.5% (n=593) of households sampled were treating their

<sup>6</sup> UNEP, Green Hills, Blue Cities: An Ecosystems Approach to Water Resources Management for African Cities. A Rapid Response Assessment, UNEP, Nairobi 2011.

water before drinking. North Horr Sub County was highest at 29.7 % followed by Saku 29.4%, then Moyale at 24.0% and lastly Laisamis at 10.1%.

Even though just 2 in 10 households treated water for drinking, use of chemicals such as PUR or aqua tabs were the dominant method used since the county government and WASH partners have invested heavily in supply of water purifying chemicals especially during and after emergency.

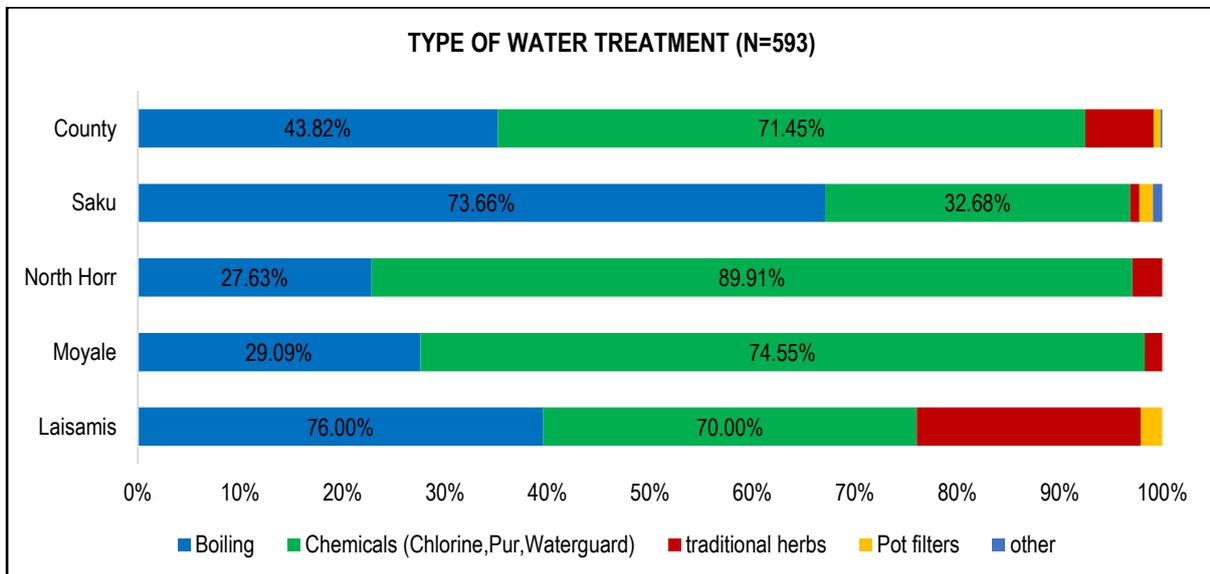


Figure 14: Water Treatment Methods

### 3.7.3.2 Storage of Drinking water

Storing water is a good survival skill to learn as it is our planet's most precious resource and should never be wasted. In addition, it is important to have for drinking, making food and personal hygiene. Out of the sampled households across the county over 87.3% were storing their drinking water in a closed container preventing it from contamination.

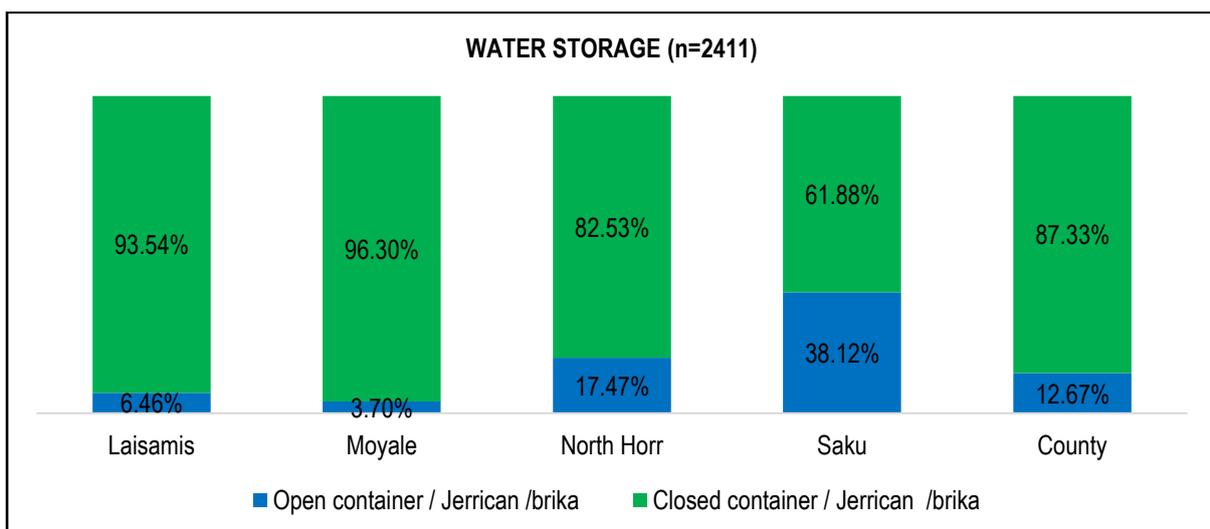


Figure 15: Water storage

### 3.7.3.3 Payment of Water and Consumption

With regard to water payment, 35.76%, 72.11%, 38.07% & 86.23% of Households in Laisamis, Moyale, North Horr, and Saku respectively and 53.73% for the county reported paying for water.

According to the sphere standards a household members is required to consume at least 15 litres per day.<sup>7</sup> In terms of consumption, only 28.89%, 43.67%, 16.47% and 22.32% of HHs in North Horr, Moyale, Saku, and Laisamis respectively accessed the Minimum of 15 litres of water per person per day. At County level only 29.21% of HHs met this minimum water access threshold.

### 3.8 Hygiene and sanitation

#### 3.8.1 Hand washing

Handwashing with soap is one of the most effective and inexpensive interventions for preventing diarrheal diseases and pneumonia, which together account for 3.5 million child deaths annually worldwide.<sup>8</sup> Handwashing is important for good health. Effective washing can be practiced with alternatives to soap and using a variety of different hygienic facilities. Overall, interventions to promote handwashing might save a million lives a year. Each person should be able to wash hands with water and soap after toilet use, before food preparation, before eating, and after cleaning babies.

With regard to hand washing, around 66.3% of the respondent in Marsabit County were aware of handwashing practices. When hand washing with soap is carried out properly at the four critical times, it breaks key contamination routes. This includes contact with an object or food that eventually goes into one's mouth. Contamination refers to the transmission of disease-causing germs from one human to another or via contact with human or animal faeces. (A single gram of human faeces can contain up to one trillion germs, (Franks et.al. 1998) Adults and children who practice proper hand washing will enjoy direct health benefits and other benefits. Handwashing at 4 critical times, the practice was poor with only 24.6% reporting to have washed their hands at the critical times. <sup>9</sup> With the lowest being recorded in Laisamis at 8.9% and the highest in Moyale at 44.3%.

Table 19: Handwashing

Description	Indicator	North Horr		Moyale		Laisamis		Saku		County	
		N	%	N	%	N	%	N	%	N	%
Used to wash hands	Soap and water	356	76.7%	219	66.4%	209	63.7%	280	62.1%	1064	67.6%
4 critical times	4 Critical times	113	24.4%	143	43.3%	29	8.8%	102	22.6%	387	24.6%

Hand washing with soap is one of the most effective and inexpensive interventions for preventing diarrheal diseases and pneumonia, which together account for 3.5 million child deaths annually worldwide (Cairncross & Valdmanis, 2006). The survey indicated that 67.6% of the households were using soap and water for hand washing. Hand washing without soap does not offer effective protection against germs.

<sup>7</sup> SPHERE hand book

<sup>8</sup> Cairncross, S. and Valdmanis V. (2006) Chapter 41: Water Supply, Sanitation, and Hygiene Promotion. In D.T. Jamison, J.G. Breman, A.R. Measham, et al. (Editors), Disease Control Priorities in Developing Countries, 2nd edition (771-792). Washington (DC): World Bank.

<sup>9</sup> People wash their hands with soap at four critical times: after defecation, after changing diapers, before preparing food, and before eating

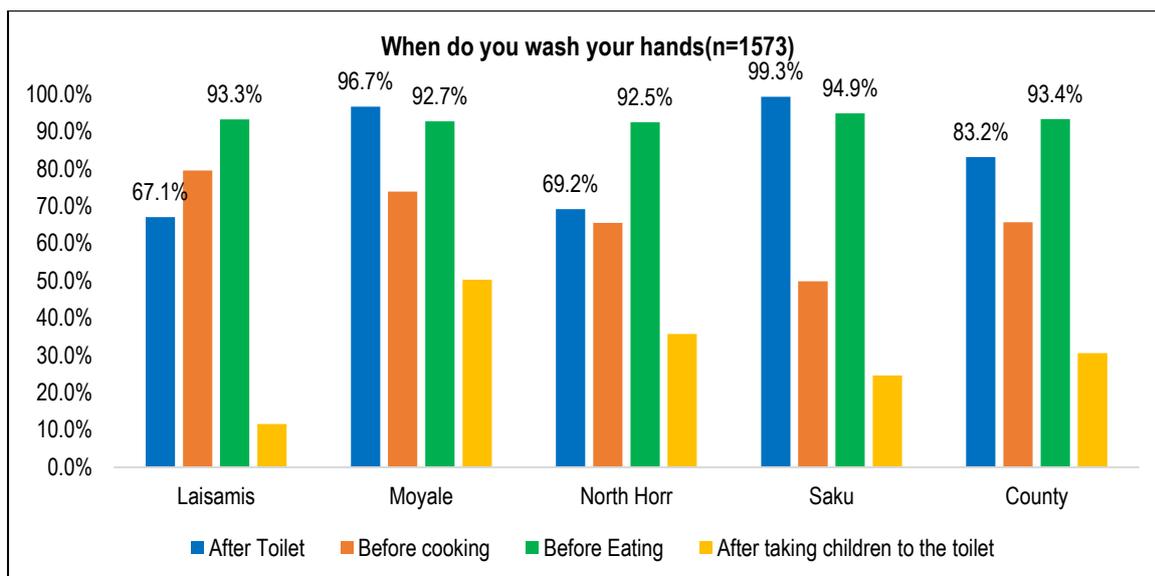


Figure 16: When do you wash your hands

### 3.8.2 Sanitation Facilities

People with at least basic sanitation services are considered to have safely managed sanitation services if the excreta from their homes is transported through sewers and treated off-site. Poor management of excreta is linked to transmission of diseases such as cholera, diarrhoea, dysentery, hepatitis A, typhoid and polio, and also contributes to malnutrition. Inadequate sanitation is estimated to cause 280 000 diarrhoeal deaths annually and is a major factor in several neglected tropical diseases, including intestinal worms, schistosomiasis, and trachoma. Proper sanitation facilities (for example, toilets and latrines) promote health because they allow people to dispose of their waste appropriately. Sanitation Facilities are classified as:

- Improved sanitation, which include:
  - ✓ Flush toilet
  - ✓ Connection to a piped sewer system
  - ✓ Connection to a septic system
  - ✓ Flush / pour-flush to a pit latrine
  - ✓ Pit latrine with slab
  - ✓ Ventilated improved pit latrine (abbreviated as VIP latrine)
  - ✓ Composting toilet
- Unimproved Sanitation which include:
  - ✓ Public or shared latrine (meaning a toilet that is used by more than one household)
  - ✓ Flush/pour flush to elsewhere (not into a pit, septic tank, or sewer)
  - ✓ Pit latrine without slab
  - ✓ Bucket latrines
  - ✓ Hanging toilet / latrine
  - ✓ No facilities / bush / field (open defecation)

In terms of accessing toilet facilities and ways of relieving, 45.2% population in Marsabit County has no sanitation facility with the highest reported in Laisamis at 88.1%, followed by North Horr at 56.8%. These high rates may be due to the mobile nature and as well as limited behavior change towards acquiring and use of sanitation facilities by the communities in these sub-counties. In Moyale and Saku, Most of the residents used pit latrines with slabs at 51.9% and 33.2% respectively.

**Table 20: Sanitation Facilities**

	Laisamis	Moyale	North Horr	Saku	County
Flush to piped sewer system	0.0%	0.2%	0.0%	0.1%	0.1%
Flush to septic tank	0.0%	0.0%	0.0%	0.3%	0.1%
Ventilated improved pit latrine	2.8%	1.3%	4.4%	13.2%	6.0%
Pit latrine with slab	6.7%	29.2%	13.2%	28.6%	19.3%
Pit latrine without slab /open pit	0.8%	51.9%	1.2%	33.2%	19.9%
Composting toilet	0.4%	0.2%	2.2%	2.6%	1.6%
Hanging toilet / hanging latrine	1.2%	2.4%	0.0%	0.1%	0.7%
No facility / bush / field	88.1%	14.8%	56.8%	21.7%	45.2%

### 3.9 FOOD SECURITY

#### 3.9.1 Dominant foods and food groups consumed by households and women

In assessing the nutritional quality and quantity of the food consumed by the survey population, 24 hour household dietary diversity questionnaire was administered that would also help to determine the households' economic capacity to consume various foods in the sub-counties.

In the entire county the five main foods consumed 24 hours prior to the survey were cereal and cereal products (66.7%), Milk and Milk Products (63.4%), sweets (72.5%), Oils/fats (59.9%) and condiments (62.1%). The least consumed are Meat (10.7%) followed by fruits (6.4%) and then Fish (27.9%).

**Table 21: Dominant foods and food groups consumed by households**

	North Horr	Laisamis	Moyale	Saku	County
Cereals	64.9%	42.1%	69.8%	83.0%	66.7%
White tubers and roots	26.4%	35.6%	44.2%	41.0%	40.4%
Vegetables	6.1%	13.9%	61.7%	73.2%	37.5%
Fruits	1.2%	2.8%	9.2%	12.9%	6.4%
Meat	7.0%	9.5%	9.4%	16.4%	10.7%
Eggs	21.4%	32.1%	28.4%	47.4%	37.1%
Fish and other sea foods	20.0%	32.3%	50.0%	28.6%	27.9%
Pulses/legumes, nuts	59.1%	37.3%	52.6%	57.4%	53.4%
Milk and milk products	62.3%	57.0%	47.4%	77.2%	63.4%
Oils/fats	16.7%	29.8%	97.7%	78.8%	59.9%
Sweets:	69.7%	58.7%	84.0%	79.1%	72.5%
Condiments, spices and beverages	74.3%	52.1%	22.6%	63.2%	62.1%

Women of reproductive age (WRA)<sup>10</sup> are often nutritionally vulnerable because of the physiological demands of pregnancy and lactation. Requirements for most nutrients are higher for pregnant and lactating women than for adult men<sup>11</sup>. Outside of pregnancy and lactation, other than for iron, requirements for WRA may be similar to or lower than those of adult men, but because women may be smaller and eat less (fewer calories), they require a more nutrient-dense diet<sup>12</sup> Insufficient nutrient intakes before and during pregnancy and lactation can affect both

<sup>10</sup> For the purposes of this document and indicator, WRA are defined as those 15–49 years of age.

<sup>11</sup> National Research Council, 2006; World Health Organization [WHO]/Food and Agriculture Organization of the United Nations [FAO], 2004

<sup>12</sup> “Nutrient density” refers to the ratio of nutrients (such as vitamins and minerals) to the energy content of foods.

women and their infants. Yet in many resource poor environments, diet quality for WRA is very poor, and there are gaps between intakes and requirements for a range of micronutrients<sup>13</sup>.

In assessing the nutritional quality and quantity of the food consumed by the surveyed women of reproductive age, a 24-hour recall period household dietary diversity questionnaire was administered and consumption of 10 food groups in the four Sub Counties is depicted in the table below. In the County, WRA mainly consume three major food groups: All starchy staple foods (91.6%), Beans and pulses (75.8%) and dairy products majorly milk (50.5%). The least consumed by WRA are Nuts and seeds (2.6%), other fruits (6.5%) and Other Vitamin A rich vegetables and fruits (10.6%).

	Laisamis	Moyale	North Horr	Saku	County
Grains, white roots and tubers and plantains	92.60%	90.46%	88.75%	95.70%	91.56%
Pulses	75.89%	77.30%	78.91%	67.92%	75.76%
Nuts and seeds	4.66%	2.30%	0.53%	1.79%	2.56%
Dairy	64.11%	30.26%	46.22%	69.53%	50.49%
Meat, poultry and fish	21.37%	20.39%	10.37%	25.63%	19.28%
Eggs	8.49%	8.55%	1.76%	12.01%	7.56%
Dark green leafy vegetables	13.70%	40.46%	1.58%	38.17%	23.10%
Other vitamin a rich fruits and vegetables	5.75%	22.37%	1.58%	9.68%	10.58%
Other vegetables	13.15%	33.55%	7.38%	43.91%	22.98%
Other fruits	7.67%	8.22%	0.88%	8.78%	6.50%

**Table 22: Dominant foods and Food groups consumed by Women**

### 3.9.2 Household Dietary Diversity (HDD)

Household dietary diversity Score (HDDS) is a qualitative measure of food consumption that reflects household access to a variety of foods. It is not meant to be used in accessing dietary diversity at individual level (FAO, 2010). Minimum Household Dietary Diversity is indicator of whether or not a household has consumed at least three out of twelve defined food groups within the last 7 days. At least more than 21.6% of the household surveyed had consumed more than 5 food groups in Marsabit County with Saku reporting the highest at 37.9%, followed by Moyale at 28.7%. 29.1% of them consumed 3 to 5 food groups.

<sup>13</sup> Arimond et al., 2010; Lee et al. 2013

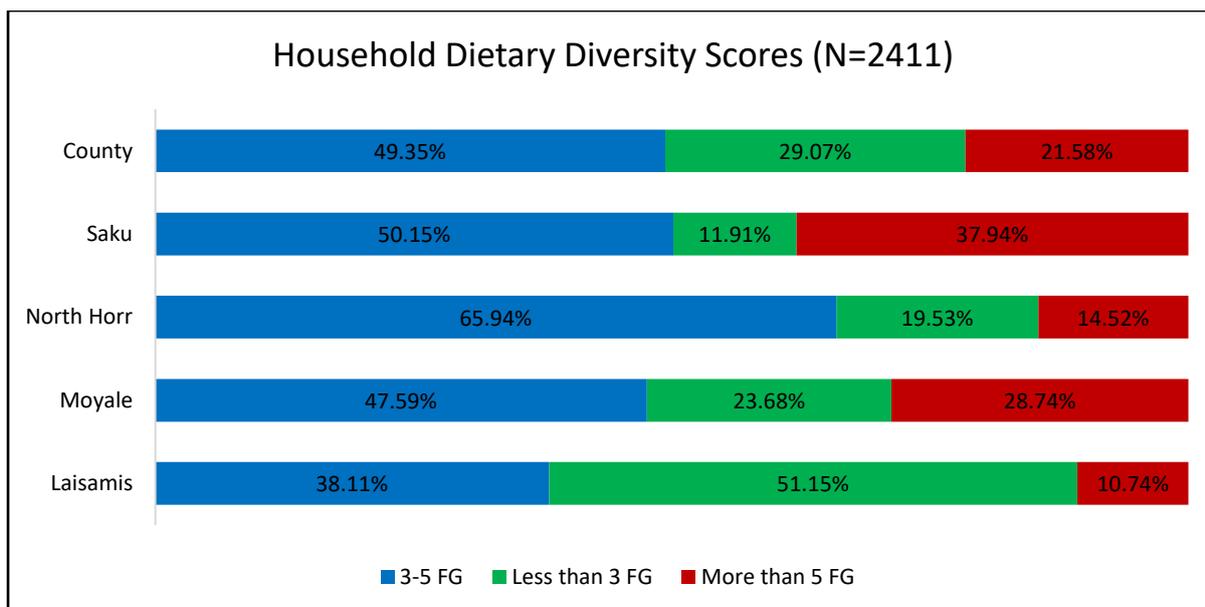


Figure 17: Household Dietary Diversity

The poor quality of the habitual diet and the lack of dietary diversity in much of the developing world contribute to deficiencies of micronutrients. Micronutrient malnutrition is a global problem much bigger than hunger and imposes enormous costs on societies in terms of ill health, lives lost, reduced economic productivity and poor quality of life. Addressing the global challenge of micronutrient malnutrition requires the need for many strategies – both short- and intermediate-term and long-term sustainable approaches. In addition to the conventional approaches of micronutrient supplementation and fortification, promoting sustainable food based approaches to enable adequate intakes of micronutrients by much of the population includes dietary diversification strategies and agriculture-based approaches. Dietary diversification is possible by the promotion of homestead food production, which includes home gardening, small livestock rearing and fishing as well as the processing and preservation of food. Agriculture and agricultural biotechnology offer the opportunity of increasing crop yields and have the potential to improve the micronutrient content of staple foods and cereal crops, thus contributing to better nutrition of populations and thereby helping to achieve nutrition security. By ensuring food and nutrition security and by reducing the widespread problem of micronutrient malnutrition we may hope to achieve the targets set for the Millennium Development Goals.

An analysis of micronutrient intake showed a serious deficit in meeting the recommended daily allowances as shown in figure below. The intake of fruits and vegetables, Vitamin A and Iron was very poor.

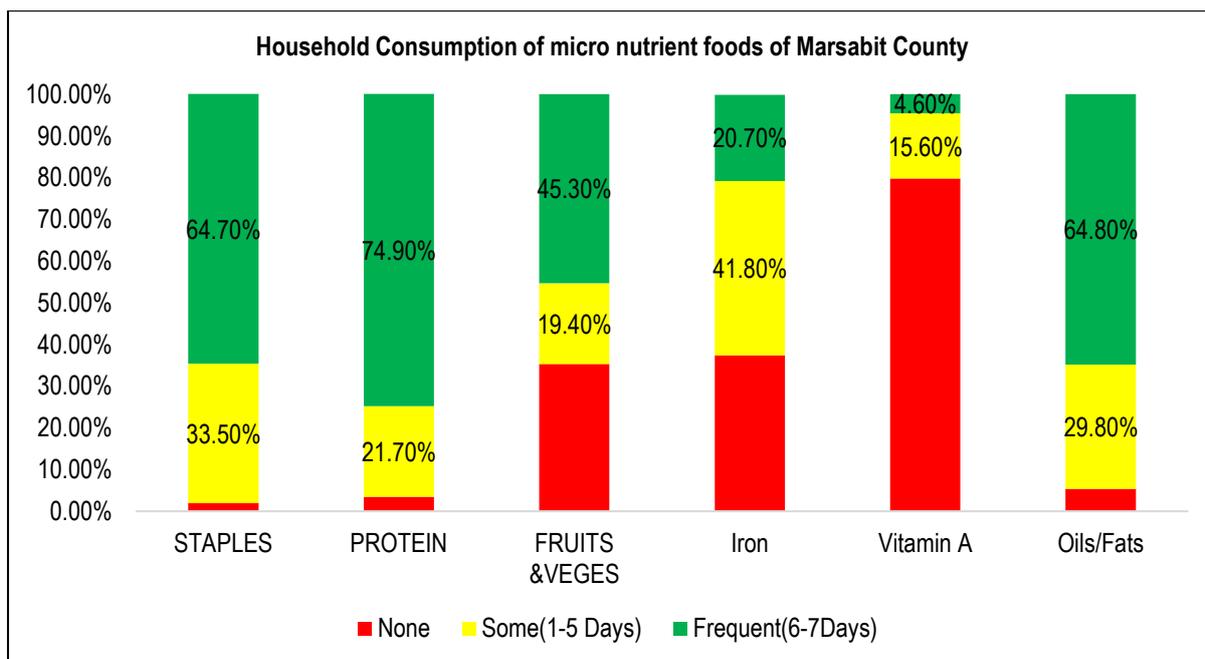


Figure 18: Household Consumption of micro nutrient foods of Marsabit County

### 3.9.3 Women Dietary diversity score

As for women's diversity in dietary intake, results showed that about three quarters of women consumed from just five food groups countywide with North Horr as the most affected. This is a major risk factor and contributor to poor maternal nutrition status and pregnancy outcomes. Women of reproductive age (WRA) are often nutritionally vulnerable because of the physiological demands of pregnancy and lactation. Requirements for most nutrients are higher for pregnant and lactating women than for adult men (National Research Council, 2006), World Health Organization [WHO]/ Food and Agriculture Organization of the United Nations (FAO, 2016). Outside of pregnancy and lactation, other than for iron, requirements for WRA may be similar to or lower than those of adult men, but because women may be smaller and eat less (fewer calories), they require a more nutrient-dense diet (Torheim and Arimond, 2013). Insufficient nutrient intakes before and during pregnancy and lactation can affect both women and their infants. Yet in many resource-poor environments, diet quality for WRA is very poor, and there are gaps between intakes and requirements for a range of micronutrients (Arimond et al., 2010; Kavle, 2017).

MDD-W14 is a dichotomous indicator of whether or not women 15-49 years of age have consumed at least five out of ten defined food groups the previous day or night. The proportion of women 15-49 years of age who reach this minimum in a population can be used as a proxy indicator for higher micronutrient adequacy, one important dimension of diet quality. The indicator constitutes an important step towards filling the need for indicators for use in national and subnational assessments. It is a population-level indicator based on a recall period of a single day and night, so although data are collected from individual women, the indicator cannot be used to describe diet quality for an individual woman. This is because of normal day-to-day variability in individual intakes. At the County only 8.9% of the WRA are taking 5 or more food groups with North Horr reported the lowest at 0.5% followed by Laisamis at 10.1% and Moyale at 10.5%. Saku Sub County reported the highest at 15.4%.

<sup>14</sup> Additional background on the indicator is available at: <http://www.fantaproject.org/monitoring-and-evaluation/minimum-dietary-diversity-women-indicator-mddw>.

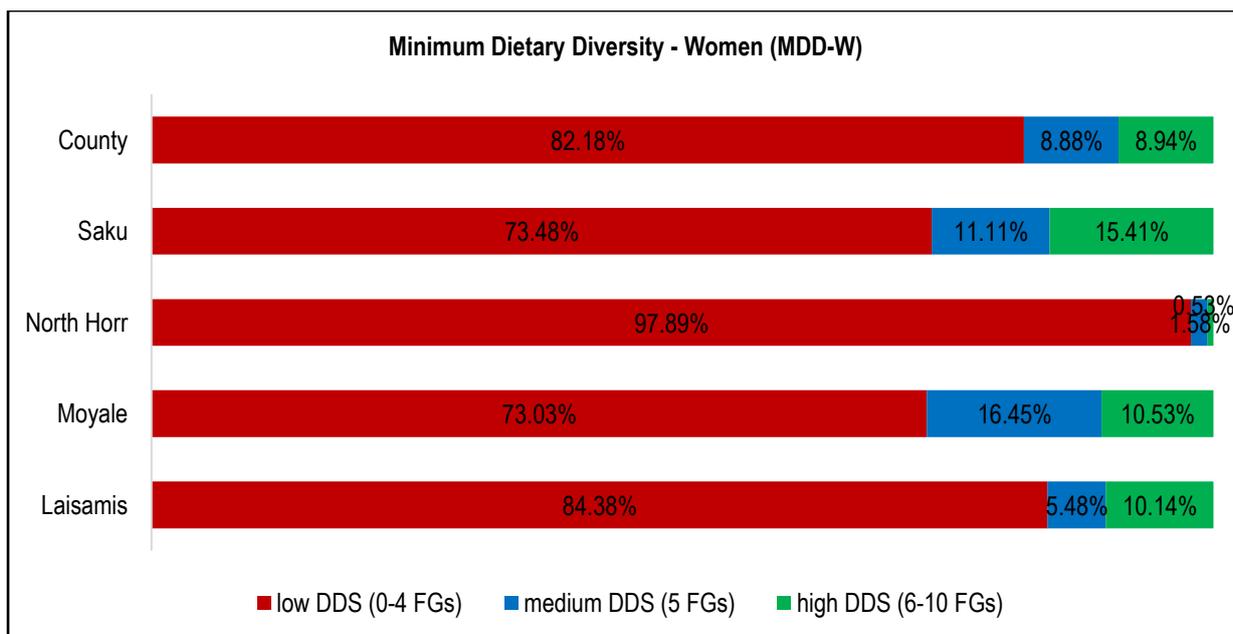


Figure 19: Women Minimum Dietary Diversity

### 3.9.4 Food Consumption Score Classification

The food consumption score is an acceptable proxy indicator to measure caloric intake and diet quality at household level, giving an indication of food security status of the household. It's a composite score based on dietary diversity, food frequency and relative nutritional importance of different food groups. Food consumption score classifies households into 3 categories namely, poor, borderline and acceptable (FAO 2010).

In Marsabit County, 60.5% of the household surveyed had acceptable food consumption Score, 26.5% had Borderline and 13.1% had poor consumption score. This is as shown in the figure below:

According to the NDMA bulletin for the Month of August 2022, 21.4percent of households are having poor food consumption whereas those with borderline and acceptable food consumption were 21percent and 57.6percent respectively across the livelihood zones. Across the livelihood zones, 17.8-25percent of households reported an FCS indicative of Emergency (IPC Phase 4), while 15.5-26.5percent of the households reported food consumption score indicative of Crisis (IPC Phase 3). Crisis-emergency food security outcomes are likely to persist due to depletion of livelihood assets following successive below average seasons.

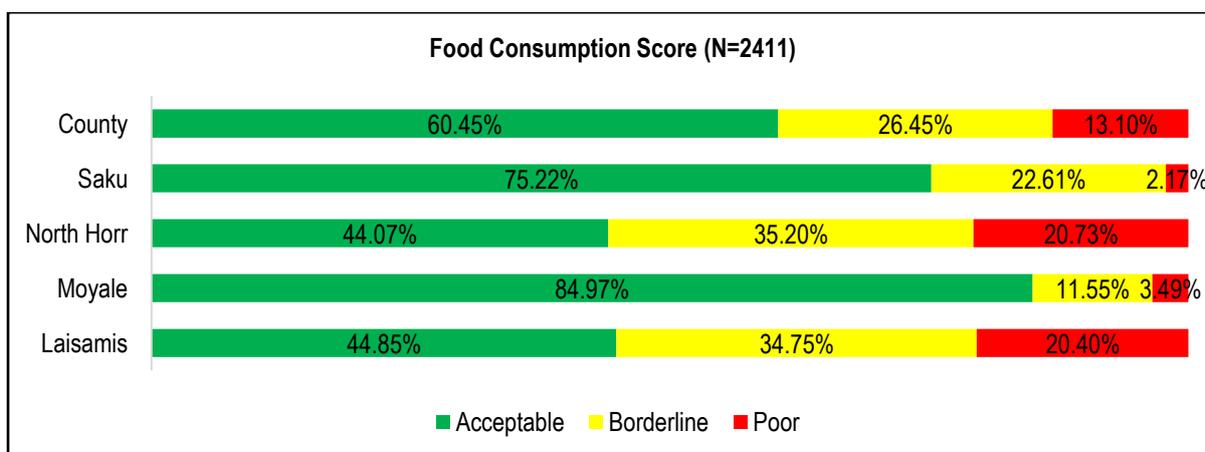


Figure 20: Household food Consumption Score

### 3.9.5 Food Consumption Score –Nutrition

WFP’s key corporate indicator for measuring food insecurity is the Food Consumption Score (FCS) used to define categories of household (HH) food insecurity. The information gathered to develop the FCS additionally provides a wealth of unexploited data that can be used to inform on nutrient rich groups consumed by the HH and which are essential for nutritional health and well-being: protein, iron and vitamin A. All macronutrients (carbohydrates, proteins and lipids) and micronutrients (vitamins and minerals) are important to ensure a healthy life, and all nutrients should be represented in a sufficient quantity for a balanced diet.

Macronutrients are good sources of energy. A lack in energy quickly leads to acute undernutrition. An insufficient intake of protein (essential for growth) is a risk for wasting and stunting. It also has an impact on micronutrient intake as protein foods are rich sources of vitamins and minerals.

Deficiencies in micronutrients, such as vitamin A and iron, over a long period, lead to chronic undernutrition. Iron deficiency leads to anaemia and Vitamin A deficiency leads to blindness and interferes with the normal functioning of the immune system, growth and development as well as reproduction.

This tool chooses to focus on three key nutrients; Protein, Vitamin A and Iron (hem iron) primarily for their nutritional importance but also those foods rich in these nutrients can be easily grouped from food consumption data.

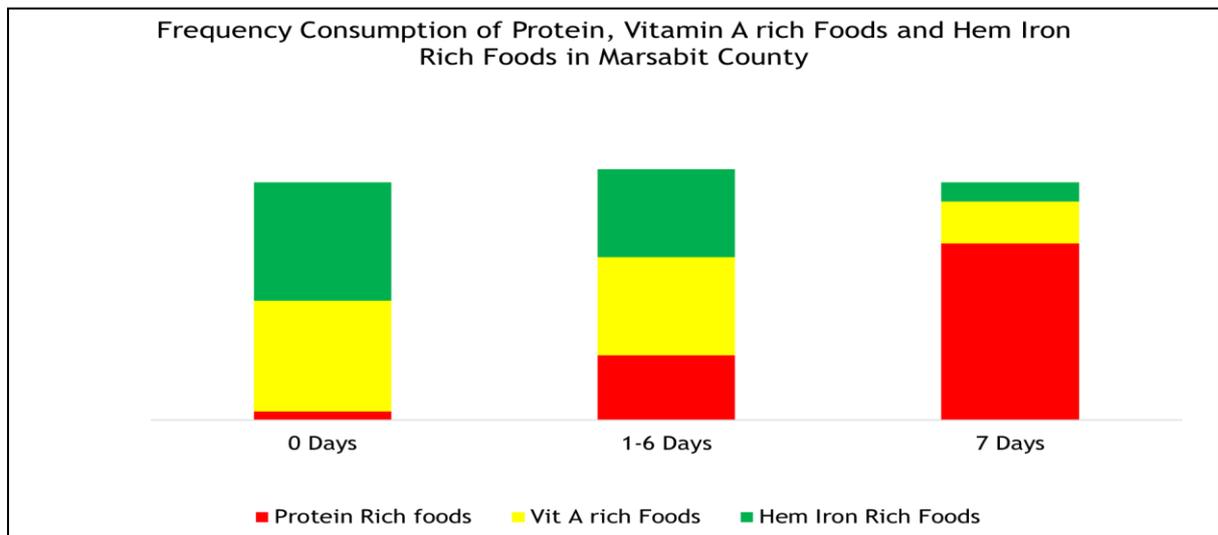


Figure 21: Frequency Consumption of protein, Vitamin A rich foods and Hem Iron Rich Foods

In terms of average number of days micronutrient are consumed in a household, the major micronutrient consumed in Marsabit County were Protein, Staples and Oil/fats which were consumed over 5 days in a week. The least consumed was Vitamin A, which was consumed for 1 day in a week. These results explain the deficiency in dietary micronutrient intake among households.

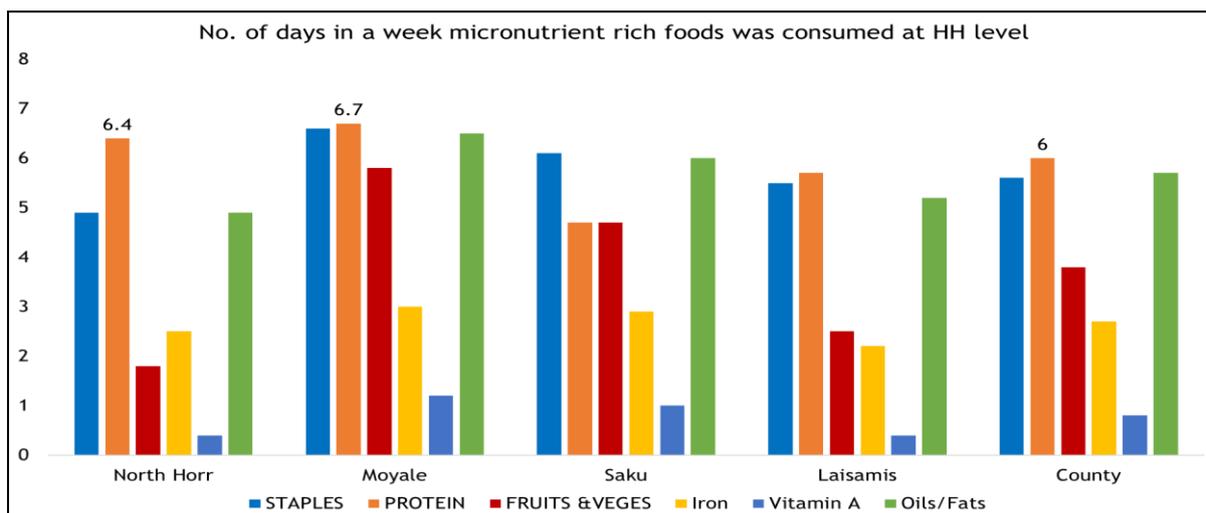


Figure 22: Number of days in a week micronutrient rich foods was consumed

### 3.10 Coping strategy Index

The Coping Strategy Index (CSI), a tool developed by the World Food Programme, is commonly used as a proxy indicator for access to food<sup>15</sup> and change in the consumption patterns of a given household. For each coping strategy, the frequency score (0 to 7) is multiplied by the universal severity weight. A weighted score allows one to measure the frequency and severity of coping strategies. Data is collected on the number of days in the last seven days a household used a specific coping strategy due to a shortage of food and/or income. The average CSI for Marsabit was 15.7 and indication the sampled households were food insecure and still engaging in different survival tactics.

	North Horr	Laisamis	Moyale	Saku	Marsabit County
N	767	495	459	690	2411
Mean	17.70	16.95	15.33	12.77	15.68
Std. Deviation	9.8	9.4	13.1	11.8	11.2

Figure 23: Coping Strategy Index

### 3.12 Household Hunger Score

The Household Hunger score is an individual indicator, it is a household food deprivation scale based on the ideas that the experience of household food deprivation causes predictable reactions that can be captured by a survey and summarized in a scale. Laisamis Sub County reported the highest number of Household at Severe at 10.7% followed closely by North Horr at 9.0%. Laisamis Sub County, also reported the least number of households in little at 27.5% followed by North Horr at 35.5%.

<sup>15</sup> 'Access to food' is just one of the three pillars of food security. Other pillars include, 'food availability' and 'food utilization'.

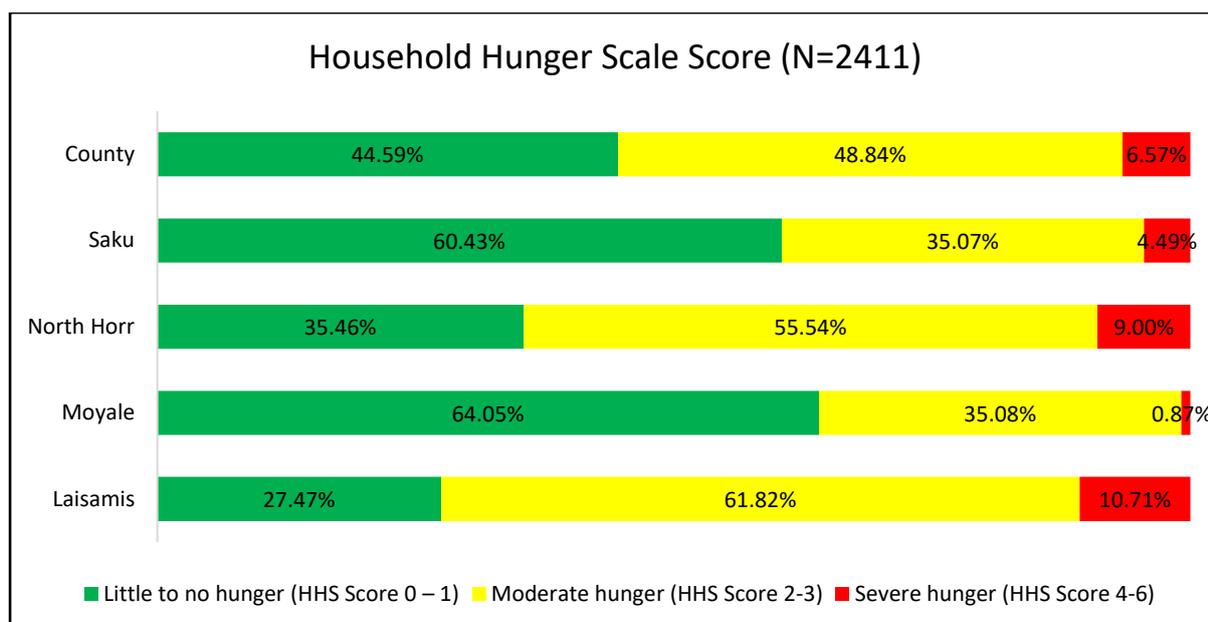


Figure 24: Household Hunger Score

### 3.13: Mortality Findings

Table 23: Mortality Findings

	North Horr	Laisamis	Moyale	Saku	County
	Results (CI 95%)				
CMR (deaths per 10 000/day)	0.18 (0.07-0.44)	0.30 (0.12-0.74)	0.04 (0.01-0.32)	0.53 (0.22-1.26)	0.28 (0.16-0.49)
U5MR (deaths in children <5/10 000/day)	0.00 (0.00-0.00)	0.26 (0.03-2.00)	0.00 (0.00-0.00)	1.36 (0.51-3.58)	0.46 (0.19-1.10)
Total number of HHs	765	495	460	694	2408
Total number of HHs with children under five	474	307	308	494	1583
Average household size	4.7	4.6	5.7	5.6	5.1
Mid Interval Population Size	3683	2170.5	2582.5	3855.5	12292
Number of Clusters	48	33	31	47	159
Percentage of children under five	16.4	20.5	18.3	16.9	17.7
Birth Rate	0.91	0.94	0.83	0.84	0.87
In-migration Rate (Joined)	0.58	12.48	0.83	0.36	2.67
Out-migration Rate (Left)	6.22	2.18	0.92	1.42	2.89
Total deaths during the recall period	6	5	1	19	32
Total deaths during the recall period <5 years old	0	1	0	8	9
Recall Period (days)	93	93	93	93	93
Cause of death	%	%	%	%	%
1] Unknown	16.7	16.7	0	10.5	12.5
2] Injury/Traumatic	16.7	16.7	100	10.5	15.6

3] Illness	66.7	66.7	0	78.9	71.9
Location of death	%	%	%	%	%
1] In current location	83.3	83.3	100	89.5	87.5
2] During migration	0	0	0	0	0
3] In place of last residence	16.7	16.7	0	10.5	12.5
4] Other	0	0	0	0	0

## CHAPTER FOUR: CONCLUSION AND RECOMMENDATIONS

### 4.1 Conclusion

According to the current Integrated Phase Classification (IPC) for acute malnutrition among children U5, Marsabit is ranked at critical phase (IPC Phase 4- GAM 15-29.9% percent). Nutrition status of Children has deteriorated significantly with significant change in North Horr and Laisamis Sub Counties in Underweight comparing 2021 and 2022. Malnutrition among women has remained high at 11.34%.

The survey results showed that only 30.1% of the children 6-59 months surveyed were reported to have been ill within the past two weeks. Of the ill children, Acute Respiratory Infections remained the most common ailment, accounting for 64.9% of all cases while fever-like malaria was the second most common illness at 44.7%. Watery diarrhoea followed closely at 12.6% and also there were few incidences of bloody diarrhoea at 0.9%. Laisamis had the highest number of ARI cases while North Horr was most affected by fever-like malaria at 80.0% and 69.0% respectively. Water Diarrhoea was exhibited in all sub Counties with Laisamis Sub County reporting the highest at 16.8%. Although many women, reported receiving IFAs, still intake is very low, with most women consuming less than 90 days.

The main source of water for drinking for the population at the County is Borehole/protected spring/protected well which is an improved water source. The household treating water is very low at 24.5%. Handwashing at the County level is still low with Hand washing at 4 critical times reporting at 24.5%. On part of sanitation, latrine coverage as very low 45% with almost 90% of the residents in Laisamis having no facility.

In the household, the major food groups that they are relying on are cereal and cereal products, Pulses and Legumes, Oils/fats. Sweets and Condiments which nutrition value is so low hence high malnutrition rates. Women of reproductive age dietary diversity is very low at the County where most women rely only on all starchy staple food, Beans and peas and milk hence being nutritionally vulnerable because of the physiological demands of pregnancy and lactation. In Marsabit County, 60.5% of the household surveyed had acceptable food consumption Score, 26.5% had Borderline and 13.1% had poor consumption score. In terms of coping strategy, at the County it's at 15 which is on the high side, meaning the food security situation is very dire.

### 4.2 Recommendations

Table 24: Recommendations

SECTOR	SURVEY FINDINGS	SHORT TERM RECOMMENDATIONS	MEDIUM TO LONG TERM	RESPONSIBLE
HEALTH AND NUTRITION	<ul style="list-style-type: none"> <li>Overall Critical Nutrition Status in Marsabit County (GAM rate WHZ of 19.6% (16.7 - 22.9) and SAM rate WHZ of 1.5%) with North Horr &amp;</li> </ul>	<ul style="list-style-type: none"> <li>Continued provision of Community based management of malnutrition interventions (Community</li> </ul>	<ul style="list-style-type: none"> <li>Sustain Strong coordination of health &amp; nutrition activities</li> <li>Advocacy for prioritization of Nutrition</li> </ul>	MoH, NDMA, MoA

	<p>Laisamis sub-county being the worst affected sub- counties.</p> <ul style="list-style-type: none"> <li>Poor maternal nutrition status of WRA with nearly 40% being acutely malnourished based on MUAC cut-offs (&lt;23cm).</li> </ul>	<p>mobilization, TSFP, OTP and SC).</p> <ul style="list-style-type: none"> <li>Intensified case detection and referral of acutely malnourished cases to CMAM programme via regular CMAM surge activities such as mass MUAC screening in the hot spots</li> <li>Integrated outreaches to reach population not covered by health facilities</li> <li>Strong program monitoring, coordination and surveillance among the stakeholders</li> <li>Support to CHVs to do household visits, screening and referral</li> <li>Updating contingency and response plans</li> </ul>	<p>issues (not a partner led activity)</p> <ul style="list-style-type: none"> <li>Sensitizing the political class and other county departments e.g. water and livestock on health and nutrition issues.</li> <li>Multi-sectoral interventions to address food insecurity at household level</li> <li>Strengthening of community health strategy to ensure timely screening and referral of malnourished cases</li> <li>SBCC messages on maternal nutrition during community level activities</li> <li>Mentorship and OJT to health workers.</li> </ul>	
	<ul style="list-style-type: none"> <li>Low IFAS utilization: IFAS intake for &gt;90 days was reported at 57.37%.</li> </ul>	<ul style="list-style-type: none"> <li>Sustained health education at the health facilities and outreach sites on consumption of iron folate during pregnancy</li> </ul>	<ul style="list-style-type: none"> <li>Foster male involvement as means of reaching women on IFAS consumption.</li> <li>Develop social behavior messages targeting the community on IFAS</li> <li>Reach women in women groups with key IFAS messaging</li> <li>Roll out BFCI in more community units</li> </ul>	MoH, Partners
	<ul style="list-style-type: none"> <li>Sub-optimal Vitamin A Supplementation (71.58% for children 6-11 months and 81.74% for children 6-59 months)</li> <li>Sub-optimal deworming coverage (80.01%)</li> </ul>	<ul style="list-style-type: none"> <li>Emphasis on proper documentation and routine supplementation at the facility level</li> <li>Support CUs to conduct deworming and refer children for vitamin A Supplementation (VAS)</li> <li>Health education to the community and</li> </ul>	<ul style="list-style-type: none"> <li>Health education on importance of VAS</li> <li>Continued VAS interventions in schools and ECDE and schools.</li> <li>Sustaining the CU activities that involves referrals for VAS routinely to avoid double supplementation during campaigns</li> </ul>	MoH and partners

		<p>routine VAS and de-worming</p> <ul style="list-style-type: none"> <li>Continued advocacy on documentation of the VAS in the MCH Booklet for monitoring</li> </ul>		
<p>WATER, HYGIENE AND SANITATION</p>	<ul style="list-style-type: none"> <li>Poor water access: More than 50% of HHs were &gt;500m nearest water point and Queued for &gt;30 minutes at water points. Again only 29.21% of HHs had the Minimum of 15 liters of water per person per day and 53.7% of HHs were paying for the water.</li> <li>Household treatment of water for drinking was at 24.5% when half of HHs were collecting drinking water from unsafe sources.</li> <li>Open defecation remained high in Marsabit County with 55.41%</li> <li>Using unsafe excreta disposal methods (No facility / bush / field)</li> <li>Poor Hand washing practices: Only 24.6% of HHs reported handwashing during four critical times and soap usage for hand washing was at 67.32%.</li> <li>56% of HHs did not have a handwashing station.</li> </ul>	<ul style="list-style-type: none"> <li>Continuous engagement with the community on CLTS; Focus on CLTS in all the 40 CUs</li> <li>Continuous health education on critical times for hand washing</li> <li>Re-trigger regressed villages and advocate for construction of more permanent structures.</li> <li>Targeted health education at the community level</li> <li>Promoting hand washing stations</li> <li>Provision of water treatment chemicals</li> </ul>	<ul style="list-style-type: none"> <li>Advocating for positive behavior change on use of latrines.</li> <li>Advocate for communities to move sanitation facilities away from the riverine hence reducing the risk of being washed away when the river floods.</li> </ul>	<p>MoH, MoW</p>

<p>FOOD SECURITY AND LIVELIHOOD</p>	<ul style="list-style-type: none"> <li>Poor HH dietary diversity with high consumption of low nutrient dense foods (29% of HH consuming less than 3 food groups).</li> <li>Poor Minimum Dietary Diversity for WRA (MDD-W) where only 17.82% of WRA (15-49 years) consumed at least five out of ten defined food groups the previous day or night before the survey.</li> <li>Low consumption of Vitamin A rich foods (80% consuming none)</li> <li>Overall County level Food security indicators depicted stressed level (as seen in FCS &amp; rCSI) to crisis level (as seen in HDDS &amp; HHS) food insecurity.</li> </ul>	<ul style="list-style-type: none"> <li>Promotion of kitchen garden(bucket irrigation with shade nets), hanging gardens re-using water and kitchen waste</li> <li>Unconditional/Conditional cash transfers to the vulnerable</li> <li>Mainstreaming gender in the activities; Issues around ownership and control of household resources</li> <li>Health education to community members on dietary diversity and preparation of quality diets</li> </ul>	<ul style="list-style-type: none"> <li>Promote kitchen garden at household level to provide nutrient (including bucket drip irrigation)</li> <li>Support Improved food security and reduce poverty • Mainstreaming gender in the activities to empower the most vulnerable.</li> <li>Training on dietary diversification through mother support groups</li> <li>Strengthen linkage of Nutrition sensitive interventions</li> </ul>	<p>MoH, MoA, Ministry of Gender</p>
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## ANNEX

### ANNEX 1: Summary of plausibility report

Indicator	Acceptable values/range	North Horr	Laisamis	Moyale	Saku
Flagged data (% of out of range subjects)	<7.5	0 (1.7 %)	0 (0.0 %)	0 (1.0 %)	0 (2.2 %)
Overall sex ratio (significant CHI square)	>0.001	0 (p=0.965)	4 (p=0.046)	0 (p=0.262)	0 (p=0.146)
Age ratio (6-29vs 30-59) Significant CHI square	>0.001	0 (p=0.485)	0 (p=0.824)	0 (p=0.459)	0 (p=0.279)
Dig. prevalence score-weight	<20	0 (5)	0 (6)	0 (3)	0 (4)
Dig. prevalence score-height	<20	0 (5)	0 (5)	0 (7)	0 (6)

Dig. prevalence score-MUAC	<20	0 (5)	0 (5)	0 (3)	2 (9)
Standard Dev. Height WHZ	>0.80	0 (0.93)	0 (0.96)	0 (1.04)	0 (1.07)
Skewness WHZ	<±0.6	1 (0.23)	0 (0.15)	0 (0.03)	0 (-0.13)
Kurtosis WHZ	<±0.6	1 (0.21)	3 (-0.43)	0 (-0.01)	0 (-0.16)
Poisson WHZ -2	>0.001	0 (p=0.338)	1 (p=0.049)	1 (p=0.018)	1 (p=0.011)
<b>OVERALL</b>	<b>&lt;24</b>	<b>2% (Excellent)</b>	<b>8% (Excellent)</b>	<b>1% (Excellent)</b>	<b>3% (Excellent)</b>

## ANNEX 2: Questionnaire

1.IDENTIFICATION		1.1 Data Collector _____		1.2 Team Leader _____		1.3 Survey date (dd/mm/yy)-----			
1.4 County	1.5 Sub County	1.6 Ward	1.7 Location	1.8 Sub-Location	1.9 Village	1.10 Cluster No	1.11 HH No	1.12 Team No.	
<b>1.13 Household geographical coordinates</b>	<b>Latitude</b>		<b>Longitude</b>						

2. Household Demographics										
2.1	2.2a	2.2b	2.3	2.4	2.5	2.6	2.7a	2.7b	2.8	2.10
Age Group	Please give me the names of the persons who usually live in your household.	Please indicate the household head (write HH on the member's column)	Age (Record age in MONTHS for children <5yrs and YEARS for those ≥ 5 years's) Year s Month s	Childs age verified by 1=Health card 2=Birth certificate / notification 3=Baptism card 4=Recall 5. other _____ specify	Sex 1= Male 2= Female	If between 3 and 18 years old, Is the child attending school?  1 = Yes 2 = No (If yes go to 2.8; If no go to 2.7)	Main reason for not attending school (Enter one code from list) 1=Chronic Sickness 2=Weather (rain, floods, storms) 3=Family labour responsibilities 4=Working outside home 5=Teacher absenteeism/lack of teachers 6= Fees or costs 7=Household doesn't see value of schooling	2.7a, What is the child doing when not in school? 1=Working on family farm 2=Herding Livestock 3=Working for payment away from home 4=Left home for elsewhere 5=Child living on the street 6: Other specify _____	What is the highest level of education attained?(level completed) From 5 yrs and above 1 =Pre primary 2= Primary 3=Secondary 4=Tertiary 5= None 6=others(specify) Go to question 2.9 ↓	If the household owns mosquito net/s, who slept under the mosquito net last night? (Probe- enter all responses mentioned (Use 1 if "Yes" 2 if "No and 3 if not applicable) go to question 2.11



<b>2.15</b>	Are there children who have come to live with you recently? 1. YES 2. NO	2.15b If yes, why did the child/children come to live with you? 1= Did not have access to food 2=Father and Mother left home 3=Child was living on the street, 4=Care giver died 5= Other specify _____
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<b>Fever with Malaria:</b> High temperature with shivering	<b>Cough/ARI:</b> Any episode with severe, persistent cough or difficulty breathing	<b>Watery diarrhoea:</b> Any episode of three or more watery stools per day	<b>Bloody diarrhoea:</b> Any episode of three or more stools with blood per day
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3.		4.		5. CHILD HEALTH AND NUTRITION (ONLY FOR CHILDREN 6-59 MONTHS OF AGE; IF N/A SKIP TO SECTION 3.6)											
<b>Instructions:</b> <i>The caregiver of the child should be the main respondent for this section</i> <b>3.1 CHILD ANTHROPOMETRY      3.2 and 3.3 CHILD MORBIDITY</b> <i>(Please fill in ALL REQUIRED details below. Maintain the same child number as part 2)</i>															
A	B	C	D	E	F	G	H	I	J	K	3.2 a	3.2 b	3.3 a	3.3 b	3.3 c
Child No.															
	<b>what is the relationship of the respondent with the child/children</b> 1=Mother 2=Father 3=Sibling 4=Grandmother 5=Other (specify)	SEX Female .....F  Male .....M	Exact Birth Date	Age in months	Weight (KG) XX.X	Height (CM) XX.X	Oedema Y= Yes N= No	MUAC (cm) XX.X	Is the child in any nutrition program 1. Yes 2. No  If no skip to questions 3.2	If yes to question J. which nutrition program? 1.OTP 2.SFP 3.BSFP Other Specify _____	Has your child (NAME) been ill in the past two weeks?  1.Yes 2. No  <u>If No, skip to 3.4</u>	If YES, which illness (multiple responses possible) 1 = Fever with chills like malaria 2 = ARI /Cough 3 = Watery diarrhoea 4 = Bloody diarrhoea 5 = Other (specify) See case definitions above	<b>When the child was sick did you seek assistance?</b> 1.Yes 2. No	<b>If the response is yes to question # 3.2 where did you seek assistance? (More than one response possible-</b> 1. Traditional healer 2. Community health worker 3. Private clinic/pharmacy 4. Shop/kiosk 5. Public clinic 6. Mobile clinic 7. Relative or friend 8. Local herbs 9. NGO/FBO	If the child <b>had watery diarrhoea</b> in the last TWO (2) WEEKS, did the child get: <b>1. ORS</b> 2. Zinc supplementation?  <i>Show sample and probe further for this component check the remaining drugs(confirm from mother child booklet)</i>

01															
02															
03															
04															

**3.4 Maintain the same child number as part 2 and 3.1 above**

	A1	A2	B	C	D	E	F	G	H	I
Child No.	How many times has child received Vitamin A in the past year? (show sample)	Has the child received vitamin A supplement in the past 6 months?	How many times did the child receive vitamin A capsules from the facility or out reach	If Vitamin A received how many times in the past one year did the child receive verified by Card?	<b>FOR CHILDREN 12-59 MONTHS</b>  How many times has child received drugs for worms in the past year? (show Sample)	Has the child received BCG vaccination? Check for BCG scar.  <b>1 = scar</b> <b>2=No scar</b>	Has child received OPV1 vaccination  <b>1=Yes, Card</b> <b>2=Yes, Recall</b> <b>3 = No</b> <b>4 = Do not know</b>	Has child received OPV3 vaccination?  <b>1=Yes, Card</b> <b>2=Yes, Recall</b> <b>3 = No</b> <b>4 = Do not know</b>	Has child received measles vaccination at 9 months (On the upper right shoulder)?  <b>1=Yes, Card</b> <b>2=Yes, Recall</b> <b>3 = No</b> <b>4 = Do not know</b>	Has child received the second measles vaccination (18 to 59 months) (On the upper right shoulder)?  <b>1=Yes, Card</b> <b>2=Yes, Recall</b> <b>3 = No</b> <b>4 = Do not know</b>
01										
02										
03										
04										

**3.5 MNP Programme Coverage.** *Maintain the same child number as part 2 and 3.1 above. Ask all the relevant questions (3.5.1 to 3.6.4) before moving on to fill responses for the next child. THIS SECTION SHOULD ONLY BE ADMINISTERED IF MNP PROGRAM IS BEING IMPLEMENTED OR HAS BEEN IMPLEMENTED*

	3.5 Enrolment in an MNP program		3.6 Consumption of MNPs			
	<p><b>3.5.1.</b> Is the child enrolled in the MNP program?(show the example of the MNP sachet) <i>(record the code in the respective child's number)</i></p> <p>Yes =1 No=0</p> <p><b>If no go to 3.5.2, If yes go to section 3.6.1</b></p>	<p><b>3.5.2</b> If the child, 6-23months, is not enrolled for MNP, give reason. <i>(Multiple answers possible. Record the code/codes in the respective child's number. DO NOT READ the answers)</i></p> <p>Do not know about MNPs .....1 Discouraged from what I heard from others .....2 The child has not fallen ill, so have not gone to the health facility ....3 Health facility or outreach is far .....4 Child receiving therapeutic or supplementary foods .....5 Other reason, specify .....6</p> <p><b>Skip to 3.7</b></p>	<p><b>3.6.1</b> Has the child consumed MNPs in the last 7 days?(shows the MNP sachet) <i>(record the code in the respective child's number)</i></p> <p>YES = 1 NO= 0</p> <p><b>If no skip to 3.6.3</b></p>	<p><b>3.6.2</b> If yes, how frequent do you give MNP to your child? <i>(record the code in the respective child's number)</i></p> <p>Every day .....1 Every other day .....2 Every third day .....3 2 days per week at any day ....4 Any day when I remember.....5</p>	<p><b>3.6.3</b> If no, since when did you stop feeding MNPs to your child? <i>(record the code in the respective child's number)</i></p> <p>1 week to 2 weeks ago ....1 2 week to 1 month ago ....2 More than 1 month .....3</p>	<p><b>3.6.4</b> What are the reasons to stop feeding your child with MNPs? <i>(Multiple answers possible. Record the code/codes in the respective child's number. DO NOT READ the answers)</i></p> <p>Finished all of the sachets .....1 Child did not like it .....2 Husband did not agree to give to the child .....3 Sachet got damaged .....4 Child had diarrhea after being given vitamin and mineral powder .....5 Child fell sick.....6 Forgot .....7 Child enrolled in IMAM program ...8 Other (Specify).....9</p>
Child 1						
Child 2						

Child 3						

MATERNAL NUTRITION FOR WOMEN OF REPRODUCTIVE AGE (15-49 YEARS) <i>(Please insert appropriate number in the box)</i>						
3.7	3.8	3.9	3.10			3.11
Woman ID. (all women in the HH aged 15-49 years from the household demographics – section 2 )	What is the mother's / caretaker's physiological status  1. Pregnant 2. Lactating 3. not pregnant and not lactating 4. Pregnant and lactating	Mother/ caretaker's MUAC reading: ____.____cm	During the pregnancy of the (name of the youngest biological child below 24 months) did you take the following supplements? indicate  1. Yes 2. No 3. Don't know 4. N/A			If Yes, for how many days did you take?  <i>(probe and approximate the number of days)</i>
			Iron tablets syrup	Folic acid	Combined iron and folic acid supplements	

4.0 WATER, SANITATION AND HYGIENE (WASH)- Please ask the respondent and indicate the appropriate number in the space provided			
4.1	<p><b>What is the MAIN source of drinking water for the household <u>NOW</u>?</b></p> <p><b>piped water</b></p> <p>piped into dwelling ..... 11</p> <p>piped to yard / plot..... 12</p> <p>piped to neighbour..... 13</p> <p>public tap / standpipe ..... 14</p> <p>tube well / borehole ..... 21</p> <p><b>dug well</b></p> <p>protected well ..... 31</p> <p>unprotected well ..... 32</p> <p><b>spring</b></p> <p>protected spring..... 41</p> <p>unprotected spring..... 42</p> <p>rainwater ..... 51</p> <p>tanker-truck..... 61</p> <p>cart with small tank ..... 71</p> <p>water kiosk..... 72</p> <p>surface water (river, dam, lake, pond, stream, canal, irrigation channel)..... 81</p> <p><b>packaged water</b></p> <p>bottled water ..... 91</p> <p>sachet water ..... 92</p> <p>1.</p>	<p><b>4.2 a What is the trekking distance to the current main water source?</b></p> <p>1=less than 500m (Less than 15 minutes)</p> <p>2=more than 500m to less than 2km (15 to 1 hour)</p> <p>3=more than 2 km (1 – 2 hrs)</p> <p>4=Other(specify) _____</p>	<p><b>4.2b – Who MAINLY goes to fetch water at your current main water source?</b></p> <p>1=Women, 2=Men, 3=Girls, 4=Boys</p>
4.2.2a	<p><b>How long do you queue for water?</b></p> <p>1. Less than 30 minutes</p> <p>2. 30-60 minutes</p> <p>3. More than 1 hour</p> <p>4. Don't que for water</p> <p>1.</p>	<p><b>.3 Do you do anything to your water before drinking? (MULTIPLE RESPONSES POSSIBLE) (Use 1 if YES and 2 if NO).</b> _____</p> <p>1. Nothing</p> <p>2. Boiling..... _____</p> <p>3. Chemicals (Chlorine,Pur,Waterguard)..... _____</p> <p>4. Traditional herb..... _____</p> <p>5. Pot filters..... _____</p> <p>5.</p>	
4.3a	<p>_____</p>	<p>6.</p>	
4.4	<p><b>Where do you store water for drinking?</b></p> <p>1. Open container / Jerrican</p>	<p><b>4.5 How much water did your household use YESTERDAY (excluding for animals)?</b></p>	

	2. Closed container / Jerrican <input type="checkbox"/>	<i>(Ask the question in the number of 20 liter Jerrican and convert to liters &amp; write down the total quantity used in liters)</i> <input type="checkbox"/>	
4.6	<b>Do you pay for water?</b> 1. Yes 2. No (If No skip to Question 4.7.1) <input type="checkbox"/>	<b>4.6.1 If yes, how much per 20 liters jerrican _____ KSh/20ltrs</b>	<b>4.6.2 If paid per month how much <input type="checkbox"/></b>
4.7.1a	<p>We would like to learn about where members of this household wash their hands.          Can you please show me where members of your household most often wash their hands?  <i>Record result and observation.</i></p> <p><b>OBSERVED</b></p> <p>FIXED FACILITY OBSERVED (SINK / TAP)</p> <p>IN DWELLING ..... 1</p> <p>IN YARD / PLOT ..... 2</p> <p>MOBILE OBJECT OBSERVED (BUCKET / JUG / KETTLE)..... 3</p> <p>NOT OBSERVED</p> <p>NO HANDWASHING PLACE IN DWELLING / YARD / PLOT ..... 4</p> <p>NO PERMISSION TO SEE ..... 5</p>	<p>4.7.1b Is soap or detergent or ash/mud/sand present at the place for handwashing?</p> <p>YES, PRESENT ..... 1</p> <p>NO, NOT PRESENT ..... 2</p>	
4.7.1	<p><b>Yesterday (within last 24 hours) at what instances did you wash your hands? (MULTIPLE RESPONSE- (Use 1 if "Yes" and 2 if "No")</b></p> <p>1. After toilet..... <input type="checkbox"/></p> <p>2. Before cooking..... <input type="checkbox"/></p> <p>3. Before eating..... <input type="checkbox"/></p> <p>4. After taking children to the toilet..... <input type="checkbox"/></p> <p>5. Others..... <input type="checkbox"/></p>		
4.7.2	<p><b>If the caregiver washes her hands, then probe further; what did you use to wash your hands?</b></p> <p>1. Only water</p> <p>2. Soap and water</p> <p>3. Soap when I can afford it</p> <p>4. traditional herb</p> <p>5. Any other specify <input type="checkbox"/></p>	<p><b>4.8 What kind of toilet facility do members of your household usually use?</b></p> <p><b>If 'Flush' or 'Pour flush', probe:</b></p> <p><b>Where does it flush to?</b> <input type="checkbox"/></p> <p><b>If not possible to determine, ask permission to observe the facility.</b></p> <p><b>flush / pour flush</b></p> <p>flush to piped sewer system 11</p> <p>flush to septic tank 12</p> <p>flush to pit latrine 13</p> <p>flush to open drain 14</p> <p>flush to DK where 18</p> <p><b>pit latrine</b></p> <p>ventilated improved pit latrine 21</p> <p>pit latrine with slab 22</p>	

		<p style="text-align: center;">pit latrine without slab / open pit 23</p> <p>composting toilet 31</p> <p>bucket 41</p> <p>hanging toilet / hanging latrine 51</p> <p>no facility / bush / field 95</p> <p>1. OTHER (specify) 96</p>
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### 5.0: Food frequency and Household Dietary Diversity

*Type of food*	Did members of your household consume any food from these food groups in the last 7 days?(food must have been cooked/served at the household)  0-No 1-Yes	If yes, mark days the food was consumed in the last 7 days?  0-No 1-Yes								What was the main source of the dominant food item consumed in the HHD? 1.Own production 2.Purchase 3.Gifts from friends/families 4.Food aid 5.Traded or Bartered 6.Borrowed 7.Gathering/wild fruits 8.Other (specify)	<b>WOMEN DIETARY DIVERSITY</b> ONLY FOR WOMEN AGE 15 TO 49 YEARS. REFER TO THE HOUSEHOLD DEMOGRAPHICS SECTION Q2.3 AND Q2.5  Please describe the foods that you ate or drank yesterday during day and night at home or outside the home (start with the first food or drink of the morning) 0-No 1-Yes						
		D1	D2	D 3	D 4	D5	D 6	D7	TOTAL		Woman ID.....	Woman ID.....	Woman ID .....	Woman ID.....			
5.1. Cereals and cereal products (e.g. sorghum, maize, spaghetti, pasta, anjera, bread)?																	
5.2. Vitamin A rich vegetables and tubers: Pumpkins, carrots, orange sweet potatoes																	
5.3. White tubers and roots: White potatoes, white yams, cassava, or foods made from roots																	

5.4 Dark green leafy vegetables: Dark green leafy vegetables, including wild ones + locally available vitamin A rich leaves such as cassava leaves etc.														
5.5 Other vegetables (e.g., tomatoes, egg plant, onions)?														
5.6. Vitamin A rich fruits: + other locally available vitamin A rich fruits														
5.7 Other fruits														
5.8 Organ meat (iron rich): Liver, kidney, heart or other organ meats or blood based foods														
5.9. Flesh meats and offals: Meat, poultry, offal (e.g. goat/camel meat, beef; chicken/poultry)?														
5.10 Eggs?														
5.11 Fish: Fresh or dries fish or shellfish														
5.12 Pulses/legumes, nuts (e.g. beans, lentils, green grams, cowpeas)?														
5.13 Milk and milk products (e.g. goat/camel/ fermented milk, milk powder)?														
5.14 Oils/fats (e.g. cooking fat or oil, butter, ghee, margarine)?														
5.15 Sweets: Sugar, honey, sweetened soda or sugary														

foods such as chocolates, sweets or candies														
5.16 Condiments, spices and beverages:														

6. COPING STRATEGIES INDEX		Frequency score: Number of days out of the past seven (0 -7).
<b>In the past 7 DAYS, have there been times when you did not have enough food or money to buy food?</b> If No; END THE INTERVIEW AND THANK THE RESPONDENT <b>If YES, how often has your household had to: (INDICATE THE SCORE IN THE SPACE PROVIDED)</b>		
1	Rely on less preferred and less expensive foods?	
2	Borrow food, or rely on help from a friend or relative?	
3	Limit portion size at mealtimes?	
4	Restrict consumption by adults in order for small children to eat?	
5	Reduce number of meals eaten in a day?	
<b>TOTAL HOUSEHOLD SCORE:</b> <b>END THE INTERVIEW AND THANK THE RESPONDENT</b>		

4.1 FOOD FORTIFICATION (FF)- Please ask the respondent and indicate the appropriate number in the space provided		
1.1	<b>Have you heard about food fortification?</b> 1. Yes 2. No 3. Don't know	
1.1.1	<b>If yes, where did you hear or learn about it? (MULTIPLE RESPONSE ARE POSSIBLE- (Use 1 if "Yes" and 2 if "No")</b> 6. Radio.....  __  7. Road show.....  __  8. In a training session attended.....  __  9. On a TV show.....  __  10. Others.....  __	
1.2	<b>Respondent's knowledge on the food fortification logo (Show the food fortification logo to the respondent and record the response). Do you know about this sign?</b> 1. Yes 2. No 3. Don't know	__
1.3	<b>What is the MAIN source of Maize flour for the household NOW?</b> 2. Bought from the shops, supermarket e.t.c 3. Maize is taken for milling at a nearby Posho Mill 4. Bought from a nearby Posho Mill 5. Other (Please specify)  _____	<b>1.1b Do you know if the maize flour you consume is fortified or not?</b> 1. Yes 2. No 3. Don't know
1.4	<b>What brands of the following foods does your household consume?</b> 1. Maize flour 2. Wheat flour 3. Margarine	_____   _____   _____

	4. Oils 5. Fats 6. Sugar	<table border="1"><tr><td data-bbox="935 192 1334 226"></td></tr><tr><td data-bbox="935 226 1334 259"></td></tr><tr><td data-bbox="935 259 1334 293"></td></tr></table>			

