INTEGRATED SMART SURVEY REPORT

SAMBURU COUNTY

(JUNE 2023)

ACKNOWLEDGEMENT

Samburu County June 2023 SMART survey was successfully concluded with support from various partners under the stewardship of the County Department of Health (CDH). The results of the survey provide vital information about the health, nutrition, and food security status of the population in the County. The generated evidence will be integral in informing and evaluating programming in nutrition specific and sensitive sectors at the county and national level.

The County is indebted by immense contribution by partners who tirelessly made this year's survey a success. The following partners are highly appreciated for their contribution.

- UNICEF
- USAID Nawiri
- WFP
- USAID
- Action Against Hunger
- World Concern
- World Vision Kenya
- Feed the Children.

Special thanks go to the Samburu County Health Department and the National Nutrition Information Working Group for their technical guidance during the survey. At the community level, special gratitude is owed to all the households who made the exercise a reality. The Community Health Assistants and the Community Health Volunteers through the Community Strategy focal persons are also acknowledged for their role in mobilizing the community and acting as guides to the enumerators during the exercise. The survey teams composed of the enumerators and team leaders are highly appreciated for the hard work of collecting the high-quality data to the best of their abilities. Lastly, we appreciate the active role played by the County Health Management Team and Sub County Nutrition Officers from all the three Sub-Counties within Samburu County.

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LIST OF ABBREVIATIONS

ANC	Ante Natal Care
ARI	Acute Respiratory Infections
ASAL	Arid and Semi-Arid Lands
BCG	Bacille Calmette Guerin
BFCI	Baby Friendly Community Initiative
CDH	County Director of Health
CECM	County Executive Committee Member
CHMT	County Health Management Team
CHS	Community Health Services
CHV	Community Health Volunteer
CHWs	Community Health Workers
CI	Confidence interval
CIDP	County Integrated Development Plan
cIMCI	community Integrated Management of Childhood Illnesses
CL	Cluster
CLTS	Community led Total Sanitation
cm	Centimeter
CMAM	Community Management of acute Malnutrition
CMR	Crude Mortality Rate
CNC	County Nutrition Coordinator
CO	Chief Officer
CSB	Corn Soy Blend
CSG	County Steering Group
CSI	Coping strategy index
CWW	Concern Worldwide
DD	Dietary Diversity
ENA	Emergency Nutrition Assessment
EPI	Expanded Program on Immunizations
EWS	Early Warning System
FANC	Focused ante natal care
FAO	United Nations Food and Agriculture Organization
FBO	Faith based Organization
FCS	Food Consumption Score
FEED	Feed the Children
FEWSNET	Famine Early Warning Systems Network
FFA	Food for Asset
FSL	Food security and livelihood
GAM	Global Acute Malnutrition
GFD	General Food Distribution
GoK	Government of Kenya

HAZ	Height for Age -Z score
HDD	Household Dietary Diversity
HH	Household
HiNi	High Impact Nutrition Interventions
HSNP	Hunger Safety Net Program
IDP	Internally Displace Persons
IFA	Iron and Folic Acid
IFAS	Iron and Folic Acid Supplements
IMAM	Integrated Management of Acute Malnutrition
IPC	Integrated Food Security Phase Classification
KEMSA	Kenya Medical Supplies Agency
KEPI	Kenya Expanded Programme of Immunization
KFSSG	Kenya Food Security Steering Group
KHIS	Kenya Health Information System
KIHBS	Kenya Integrated Household and Budget Survey
KNBS	Kenya National Bureau of statistics
KRCS	Kenya Red Cross Society
LMIS	Logistics Management Information System
LRA	Long Rains Assessment
MAM	Moderate Acute malnutrition
MCH	Mother Child Booklet
MDD	Minimum Dietary Diversity
MDD-W	Minimum Dietary Diversity for Women
MOH	Ministry of Health
MOW	Ministry of Water
MSP	Multi Stake Holder Forum
MUAC	Mid Upper Arm Circumference
NDMA	National Drought Management Authority
NGO	Non-governmental Organization
NIWG	Nutrition Information Working Group
ODK	Open Data Kit
OJT	On the Job Training
OPV	Oral polio Vaccine
ORS	Oral Rehydration Solution
OTP	Outpatient Therapeutic Programme
PLW	Pregnant and Lactating Women
PPS	Probability proportional to size
RC	Reserve cluster
RUSF	Ready To use Supplementary food
RUTF	Ready to Use Therapeutic Food

SAM	Severe Acute Malnutrition
SANNUT	Sanitation and Nutrition Program
SCHMT	Sub-County Health Management Team
SCNO	Sub County Nutrition Officer
SD	Standard Deviation
SFP	Supplementary Feeding Programme
SMART	Standardized Monitoring and Assessment of Relief and Transitions
SPSS	Statistical package for Social Sciences
U5	Under Five Years Old
UMR	Under-five Mortality Rate
UN	United Nations
UNICEF	United Nations Children's Fund
WASH	Water Sanitation and Hygiene
WAZ	Weight for Age -Z score
WFP	World Food Programme
WHO	World Health Organization
WHO-GS	World Health Organisation Growth Standards
WHZ	Weight for Height -Z score
WRA	Women of Reproductive Age
WVK	World Vision Kenya

EXECUTIVE SUMMARY

Introduction

Samburu County Department of Health in collaboration with nutrition partners successfully conducted SMART survey which covered all the three sub counties in Samburu County.

Main Objectives of the survey

- To estimate the prevalence of malnutrition among the children aged 6-59 months old and women of reproductive age (15-49 years) in Samburu County
- To estimate crude mortality and under 5 mortality rates in the county

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- To determine the prevalence of acute malnutrition among children aged 6-59 months.
- To determine the nutrition status of women of reproductive age (15 to 49 years) based on MUAC.
- To determine the coverage of IFAS among women with children below 24 months.
- To determine minimum dietary diversity for women of reproductive age
- To assess the dietary diversity of children aged 6-23 months.
- To determine de-worming coverage for children aged 12 to 59 months.
- To determine the immunization coverage for measles, Oral Polio Vaccines (OPV 1 and 3), and vitamin A supplementation in children aged 6-59 months.
- To determine the prevalence of diseases of interest e.g., diarrhoea, measles, ARI contributing to malnutrition
- To estimate the use of zinc in diarrheal treatment in children
- To collect information on possible underlying causes of malnutrition such as household food security, water, sanitation, and hygiene practices
- To determine the coverage of social protection programs in the county
- To assess the Crude mortality rate (CRM) and under five mortality rates (U5MR) in Samburu County.

Methodology

Standardized Monitoring Assessment for Relief and Transition Method (SMART) was used to conduct the survey. The survey was cross sectional and descriptive by design. The survey applied a two-stage cluster sampling. First Stage; all villages were included in the initial sample selection with each village considered a cluster. Clusters with insecurity were excluded in the final list of clusters. The clusters were sampled with probability proportional to size (PPS). All villages along with their respective populations were entered into the ENA software (Jan 11th, 2020) and clusters selected accordingly. 40 clusters were selected for the study and additional 4 reserve clusters selected. At second stage, the teams used the Simple Random Sampling method at cluster level to select the household for administering the interview questionnaire. Within selected households all children 6-59 months fitting the inclusion criteria were measured.

Quantitative data collection method was used to collect the survey data through ODK collect. The survey was done in three Sub Counties: Samburu Central, Samburu East and North Sub counties as from 19th – 24th June 2023. The data collection teams were provided with daily

feedback on the quality of data collected the previous day before they started data collection for the new day.

Anthropometric data processing was done using ENA software (Jan 11th, 2020). The ENA software generated weight-for-height, height-for-age, and weight-for-age Z scores to classify them into various nutritional status categories using the new WHO malnutrition cut-offs. All the other quantitative data were analysed in the SPSS (Version 20) and Microsoft Excel computer packages.

Table 1: Summary of key findings

Anthropometric Results (WHO Standards				
Indicator	**2022**		**2023**	
	N	% (with 95% CI)	N	% (with 95% CI)
Prevalence of Global Acute Malnutrition (<-2 z-score and/or oedema)	417	21.8% (17.4 - 27.1 95% C.I.)	537	20.3% (16.7- 24.4 95% C.I.)
Prevalence of Severe Acute Malnutrition (<-3 z-score and/or oedema)	417	3.4% (1.9 - 5.9 95% C.I.)	537	1.9% (0.9 – 3.6 95% C.I.)
Prevalence of global malnutrition by MUAC (< 125 mm and/or oedema)	417	5.0% (3.4 - 7.4 95% C.I.)	542	6.1% (4.3 – 8.6 95% C.I.)
Prevalence of severe malnutrition by MUAC (< 115 mm and/or oedema)	417	1.0% (0.4 - 2.5 95% C.I.)	542	0.6% (0.2 – 1.7 95% C.I.)
Prevalence of underweight (<-2 z-score)	417	35.7% (28.7 - 43.5 95% C.I.)	538	39.2% (34.6 – 44.0 95% C.I.)
Prevalence of severe Underweight (<-3 z-score)	417	9.10% (6.2 - 13.2 95% C.I.)	538	8.9% (6.7 – 11.8 95% C.I.)
Prevalence of Stunting (<-2 z-score)	417	31.7% (25.3 - 38.8 95% C.I.)	529	32.7% (32.0 - 42.8 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	417	7.70% (4.9 - 11.8 95% C.I.)	529	11.0% (8.4 - 14.1 95% C.I.)
Child morbidity (last two weeks)				
Indicator	**2022**		**2023**	
All	44%		50%	
Fever with chills	34%		27%	
ARI	75%		68%	
Watery diarrhea	33%		23%	
Health Seeking Behaviour	83%		82%	
Vitamin A Supplementation and Deworming				
Indicator	**2022**		**2023**	
Vitamin A Supplementation (6- 11m) Once	89%		55%	
Vitamin A Supplementation (12- 59m) Once	99%		79%	
Vitamin A supplementation (12 to 59 m) Twice	50%		34%	
Vitamin A supplementation (6- 59m) Once	97%		77%	
Deworming (12- 59 m) Once	67%		72%	
Deworming (12- 59 m) Twice	25%		28%	

IMMUNIZATION		
Antigen	**2022**	**2023**
BCG (By presence of a scar)	94%	97%
OPV 1 (Card and Recall)	96%	97%
OPV 3 (Card and Recall)	92%	95%
Measles 9 at months (Card and Recall)	86%	81%
Measles 18 at months (Card and Recall)	69%	64%
MATERNAL NUTRITION		
Indicator	**2022**	**2023**
MUAC< 21.0 cm (Women of reproductive age)	13%	10%
MUAC< 21.0 cm (Pregnant & lactating)	12%	12%
Women supplemented with FeFo (Mothers of children less than 2 years)	90%	92%
Pregnant women consuming FeFo (90 days and above)	60%	76%
WATER HYGIENE AND SANITATION		
Indicator	**2022**	**2023**
Households obtaining water from sources less than 500 m	50%	45.%
Household treating their drinking water	14%	11%
Handwashing in the 4 critical times	18%	9%
HOUSEHOLD AND WOMEN DIETARY DIVERSITY		
Indicator	**2022**	**2023**
Households consuming more than 5 food groups	42%	19%
Women Consuming more than 5 food groups	79%	10%
FOOD CONSUMPTION SCORE AND COPING STRATEGY INDEX		
Indicator	**2022**	**2023**
Households with acceptable FCS	69%	61%
Coping Strategy Index	14.1	12.8

Overall, the acute nutrition status was at the critical phase (IPC phase 4) with GAM of 20.3% (16.7 - 24.4 95% C.I.). The prevalence of stunting increased 1 % to 37.2 % (32.0 - 42.8 95% C.I.) in 2023 compared to stunting prevalence in 2022 which was 31.7% (25.3 - 38.8 95% C.I.). Prevalence of underweight prevalence increased to 39.2% in 2023 from 35.7% in 2022.

Morbidity could be attributed to the high wasting in the County since it remained quite high at 50%.. Common illness affecting children in the County was ARI/Cough (68%). 27% of children suffered Fever with chills and watery diarrhea 23%. High number of diarrhea cases in the county can be attributed to poor performance in WASH indicators. Majority of the sick (82%) sought assistance.

Further, according to the survey, the stunting rates in the county is classified as very high according to the World Health Organization classification of stunting. The survey also noted that the coverage of maternal, neonatal, child health and nutrition indicators were average and required more context specific interventions to address the multi-faceted causes of malnutrition e.g., implementation of baby friendly community initiatives (BFCI), training of health workers and extension workers. In addition, the household food security situation in the county was poor due to current drought in other parts of the county. This calls for an integrated approach in the implementation of nutrition, health and food security interventions to ensure optimal impact on the current situation. In addition, the nutrition interventions need to be scaled up through utilizing the existing community mobilization channels (e.g., community

units) and innovate better ways to create more awareness of the nutritious products in the County. To improve the poor WASH indicators and reduce the prevalence diarrheal cases, scale-up of continuous health education on water treatment, handwashing as well as distribution of water purification products is required.

There is need for public-private partnerships with all the stakeholder's supporting health and nutrition interventions in Samburu County. Such partnerships will go a long way in improving the overall health, nutrition, and food security situation in Samburu County.

1.0 INTRODUCTION

1.1. Background

Samburu County lies in the northern part of Kenya and covers an area of 21,022.1 sq. km[1] (Samburu County CIDP 2018- 2022). It is situated in the northern part of Great Rift Valley. To the northwest the County borders Turkana County. The County also borders the following Counties: Baringo to the Southwest, Marsabit to the Northeast, Isiolo to the East and Laikipia County to the South. The County lies between latitudes 0˚30' and 2˚35' N and between the longitudes 36˚15' and 38˚10' E. The County estimated population is 347,336 with an under-five population of 56,726 (MoH 2022 projections based on KNBS, Census 2019).

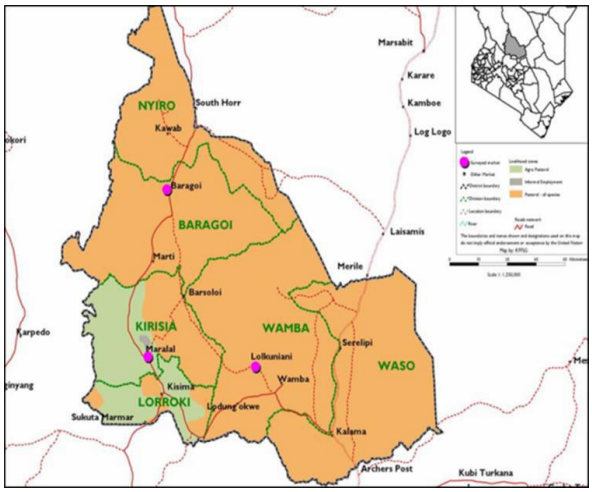

Figure 1: Samburu County map

Administratively, Samburu County is further divided in to 3 sub counties namely, Samburu North, Samburu East and Samburu Central. There are three main livelihoods including Pastoral all species (57%) mainly in Samburu East and North, Agro Pastoral (37%) mainly in Samburu central and Formal Employment/ Casual Waged Labour (6%). Approximately 85% of the County is lowland range land, the rest is highland where rain fed agriculture is practiced.

1.2.Survey Justification

The county food security phase classification remained at Crisis (IPC Phase 3) as per the LRA of July 2022 and SRA 2022 conducted in February 2023. The integrated phase classification for acute malnutrition (IPC AMN) conducted in February 2023 indicated the nutrition situation was at critical phase (IPC AMN Phase 4). This was projected to remain the same for the next 3 months (March – May 2023).

The last SMART survey conducted in Samburu County in July 2022 estimated the global acute malnutrition at very high (21.8%) while SAM was 3.4%. This was an increase from the previous survey, August 2021 with a GAM of 16.8% and SAM of 3.2%. The County has been at alarm between January and March 2023 however the situation has improved to recovery in April 2023 (Monthly Early Warning Phase Bulletins, NDMA)

The Short Rains Assessments conducted in February 2023 estimated 20,595 Children are malnourished: SAM- 4,024, MAM- 16,571. The report estimated 7,224 PLWs being malnourished. The SMART survey will give a clear picture of the current nutrition situation across the County and the findings will inform future programming.

[1] Samburu County CIDP 2018-2022

1.3.Survey Objective

The overall objective of the survey is to determine the prevalence of malnutrition among the children aged 6-59 months old and women of reproductive age (15-49 years-WRA), and determine mortality rate in Samburu County

Specific objectives of the baseline survey:

- To determine the prevalence of acute malnutrition among children aged 6-59 months.
- To determine the nutrition status of women of reproductive age (15 to 49 years) based on MUAC.
- To determine the coverage of IFAS among women with children below 24 months.
- To determine minimum dietary diversity for women of reproductive age
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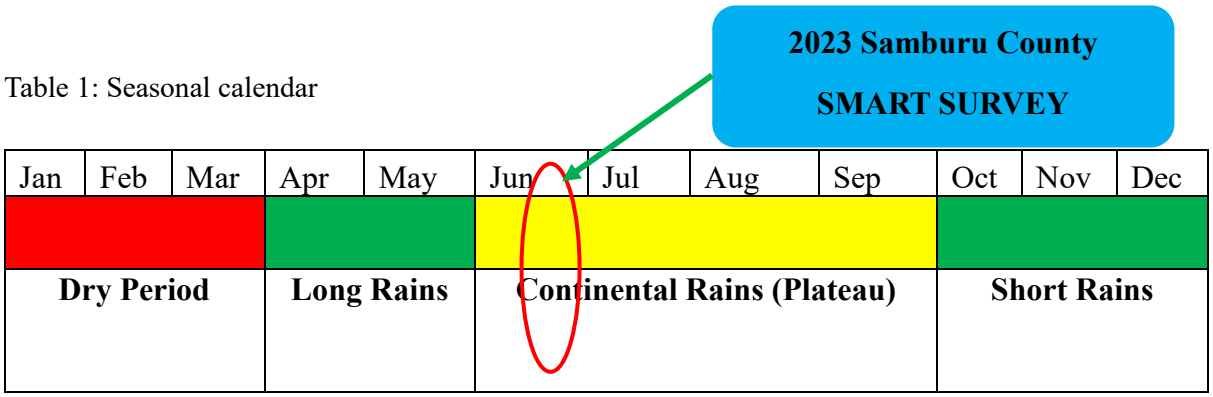
1.4.Survey Timing

Samburu County SMART survey was conducted after long rains and provided a snap short of nutrition status of children 6 to 59 months as an indirect effect of long rain performance.

Samburu County Seasonal Calendar

The survey was conducted after the end of long rains in the months of April and May 2023 and at the onset continental rains in June - August 2023.

Table 1: Seasonal calendar



2.0. METHODOLOGY

2.1. Survey Design

The survey was cross sectional and descriptive by design. Standardized Monitoring and Assessment on Relief and Transition methodology was adopted in the study. The study applied quantitative approach.

2.2. Sampling Plan

2.2.1. Sampling Population

The study population included the entire population in Samburu County. All villages (clusters/sampling units) in Samburu County which are accessible, secure, or not deserted were included in the primary sampling frame. The target population for this survey was children 6-59 months of age and women of reproductive age 15-49 years.

2.2.2. Sampling methods and Sample size calculation

Anthropometric Sample size Calculation

Two stage sampling was used in the survey. The first stage involved random selection of clusters from the sampling frame based on probability proportion to population size (PPS)1. Emergency Nutrition Assessment (ENA) for Standardized Monitoring for Assessment for Relief and Transition (SMART) software (Jan 11th, 2020) was used in calculation of sample size. Table 1 below illustrates the values used in ENA for sample size calculation and the rationale of using each value.

Parameters	Estimates	Rationale
Estimate GAM	21.8%	Point estimate from 2022 SMART Survey GAM 21.8% (17.4 – 27.1, 95% C.I.). The point estimate selection was based on factors including food security phase classification that remained constant between LRA of 2022 and SRA of 2022. Both food security phase classification and IPC AMN remained at crisis (IPC phase 3) and critical for IPC AMN phase 4 respectively. As per the April 2023 NDMA EWS, the County is at food security recovery phase however SRA 2023 report indicated the nutrition situation will remain same for the projection period (March – May 2023).
Precision	5	Rule of Thumb recommend a of precision of 5 for GAM of >20%
Design Effect	1.4	Based on the previous 2022 survey to cater for heterogeneity.
Estimated Number of Children	399	As calculated using the ENA for SMART software
Average HH size	5.0	Based on County SMART Survey 2022
Non-response rate	3%	Based on County SMART Survey 2022
Proportion of Children under 5	16.5%	From KHIS
Estimated Number of Households	554	As calculated using the ENA for SMART software
Number of Households per day	14	Based on 2022 SMART Survey experience
Number of Clusters	40	Computed from the no. of HHs per day
Number of Teams	7	
Number of Days	6	Based on the Number of Teams to be Recruited

Table 2:Sample size calculation-

Table 3:Sample Size Calculations-Mortality

Parameters	Estimates	Rationale
Estimated Death Rate /10,000/day	0.35	Used of Lower CI due to projected slight improvement of nutrition situation from June 2022
± Desired precision / 10,000 / day	0.3	Precision based on SMART guidance
Design Effect	1.27	SMART Methodology recommendation
Recall period	92	Start of recall period was be 22nd March 2022 which was the day the county experienced heavy rains after a long drought to the midpoint of the data collection period on 21st June 2023.
Population to be included	2,245	Based on ENA calculator
Average household size	5	Based on County SMART Survey 2022
% of non-Response household	3	SMART Recommended
Household to be include	463	Based on ENA calculator

2.2.3. Sample Size Description

Household was used as the sampling unit in the second stage sampling or basic Sampling Unit. Both Sample sizes for anthropometry (554 HH) and mortality (463 HH) were calculated separately. Given that the difference between the two sample sizes is minimal, the anthropometry sample size was used as the overall sample size for both surveys to fulfil both objectives. 40 clusters were selected where both Anthropometric and Mortality questionnaires were administered.

Based on logistical factors (time taken to arrive from the clusters, introductions, sampling, inter household movement, lunch, and time back to the base), it was possible to visit 14 households per cluster per day.

2.3. Data Collection

The survey was done in all the three Sub Counties: Samburu Central, Samburu East and North Sub counties as from 19th – 24th June 2023. Every team was composed of 3 members who included one measurer, one enumerator and a team Leader. One community guide appointed by the village leader guided the survey team in households' identification. All survey teams were trained for 4 days in Maralal prior to field work. The teams were trained on, the survey objectives, methodology, malnutrition diagnosis, anthropometric measurements, sampling methods, data collection tools, ODK data collection process as well as interviewing skills. A role play was included in the training to give the teams practical skills on data collection. On the 3rd day standardization test was done. The purpose of standardization test was to test the team's accuracy and precision in taking anthropometric measurements.

The data collection tool was tested in a cluster not selected to be part of the survey. Additionally, during the field test the enumerators were required to undertake the entire process of the survey which included household selection, taking anthropometric measurements, and also filling of the data collection forms.

The overall coordinator of the survey was Samburu County Nutrition Coordinator supported. The Ministry of Health, UNICEF and partners' technical team supervised the data collection process on daily basis. The supervisor's main responsibilities were to ensure that the methodology was followed, measurements were taken appropriately and tackling any technical issue which came up during data collection. On daily basis plausibility checks were done and gaps noted were communicated to all the teams before going to the field every morning.

2.4. Data Collection Tools and Variables

For the data collection purpose, electronic questionnaire was used. Each questionnaire consisted of identification information, household information, demographic information, anthropometric information, morbidity, immunization, maternal, WASH and food security data. Household, demographic, and food security information were collected in all the sampled households. The rest of the data was collected from only households with children aged 6 to 59 months.

Age: The exact age of the child was recorded in months. Calendar of events, health or baptismal cards and birth certificates were used to determine age.

Weight: Children were measured using a digital weighing scale

Height: Recumbent length was taken for children less than 87cm or less than 2 years of age while height measured for those greater or equal to 87cm or more than 2 years of age.

MUAC: Mid Upper Arm Circumference (MUAC) was measured on the left arm, at the middle point between the elbow and the shoulder, while the arm was relaxed and hanging by the body's side. MUAC was measured to the nearest cm. MUAC measurements were taken for children 6-59months of age and for women in the reproductive age (15-49 years of age).

Bilateral oedema: Assessed by the application of normal thumb pressure for at least 3 seconds to both feet at the same time. The presence of a pit or depression on both feet was recorded as oedema present and no pit or depression as oedema absent.

Morbidity: Information on two-week morbidity prevalence was collected by asking the mothers or caregivers if the index child had been ill in the two weeks preceding the survey and including the day of the survey. Illness was determined based on respondent's recall and was not verified by a clinician.

Immunization status: For all children 6-59months, information on BCG, OPV1, OPV3 and measles vaccinations status was collected using health cards and recall from caregivers. When estimating measles coverage, only children 9 months of age or older were taken into consideration as they were the ones who were eligible for the vaccination.

Vitamin A supplementation status: For all children 6-59 months of age, information on Vitamin A supplementation in the 6 months prior to the survey date was collected using child health and immunization cards or campaign cards and recall from caregivers.

Iron-Folic Acid supplementation: For all female caregivers, information was collected on IFA supplementation and number of days (period) they took IFA supplements in the pregnancy of the last birth that was within 24 months.

De-worming status: Information was solicited from the caregivers as to whether children12-59 months of age had received de-worming tablets or not in the previous one year. This information was verified by child health and Immunization card where available.

Food security status of the households: Food consumption score, Minimum Dietary Diversity score. Women source of predominant foods and coping strategies data was collected.

Household water consumption and utilization: The indicators used were main source of drinking and household water, time taken to water source and back, cost of water per 20-litre jerry-can and treatment given to drinking water.

Sanitation: Data on household access and ownership to a toilet/latrine, occasions when the respondents wash their hands were also obtained.

Mosquito nets ownership and utilization: Data on the household ownership of mosquito nets and their utilisation was collected.

Minimum Dietary Diversity Score Women (MDD-W): A 24-hour food consumption recall was administered to all women of reproductive Age (15-49 years). All foods consumed in the last 24 hours were enumerated for analysis. All food items were combined to form 10 defined food groups and all women consuming more or at least five of the ten food groups were considered to meet the MDD-W.

Household Food Consumption Score (FCS): Data on the frequency of consumption of different food groups consumed by a household during 7 days before the survey was collected. The Table below shows WFP corporate thresholds for FCS used to analyse the data.

Table 4: WFP/FAO corporate FCS thresholds

Food Consumption Score	Profile
<21	Poor
21.5-35	Borderline
>35	Acceptable

Reducing Coping strategy index (rCSI): Data on the frequency of the five reduced CSI individual coping behaviours was collected. The five standard coping strategies and their severity weightings used in the calculation of Coping Strategy Index are:

1. Eating less-preferred foods (1.0)
2. Borrowing food/money from friends and relatives (2.0)
3. Limiting portions at mealtime (1.0)
4. Limiting adult intake (3.0)
5. Reducing the number of meals per day (1.0)

rCSI index per household was calculated by summing the product of each coping strategy weight and the frequency of its use in a week (no of days).

Nutritional Indicators
Nutritional Indicators for children 6-59 months of age

The following nutrition indicators were used to determine the nutritional status of children under-five years.

Table 5: Definitions of acute malnutrition using WFH and/or edema in children aged 6–59 months.

Acute malnutrition	WFH Z-Score	Oedema
Severe	<-3 Z Score	Yes/No
	>-3 Z Score	Yes
Moderate	<-2 Z Scores to ≥ -3 Z scores	No
Global	<-2 Z scores	Yes/No

MUAC
Guidelines for the results expressed as follows:

1. Severe malnutrition is defined by measurements <115mm.
2. Moderate malnutrition is defined by measurements >=115mm to <125mm
3. At risk is defined by measurements >=125mm to <135mm
4. Normal >=135mm

MUAC cut off points for women, pregnant and lactating women: Cut off <21 cm was used for under nutrition.

2.5. Data analysis

During supervision in the field, and at the end of each day, supervisors manually checked the tablet questionnaires for completeness, consistency, and accuracy. This check was also used to provide feedback to the teams to improve data collection as the survey progressed. At the end of each day, and once supervisors had completed their checks, the tablets were each synchronized to the server and the data collected was uploaded, therefore there was no need for any further data entry. The SMART plausibility report was generated daily in order to identify any problems with anthropometric data collection such as flags and digit preference for age, height and weight, to improve the quality of the anthropometric data collected as the survey was on-going. Feedback was given to the teams every morning before the teams left for the field.

All data files were cleaned before analysis, although use of tablet reduced the amount of cleaning needed, as several restrictions were programmed in order to reduce data entry errors. Anthropometric data for children 6-59 months was cleaned and analysed using ENA for SMART software (11th Jan 2020 Version). The nutritional indices were cleaned using SMART flags in the ENA for SMART software. Weighting of the survey zone results was done in order to obtain county data. The table below summarises other criterion that was used for exclusion.

Table 6: Definition of boundaries for exclusion

1. If sex was missing the observation was excluded from analysis.
2. If Weight was missing, no WHZ and WAZ were calculated, and the programme derived only HAZ.
3. If Height was missing, no WHZ and HAZ were calculated, and the programme derived only WAZ.
5. For any child records had missing age (age in months) only WHZ was calculated.
6. If a child had oedema only his/her HAZ was calculated.

Additional data for children aged 6-59 months, women aged 15-49 years, WASH, and food security indicators were cleaned and analysed using SPSS and Microsoft excel.

2.6. Survey Limitations

i. There were inherent difficulties in determining the exact age of some children (even with use of the local calendar of events), this may have led to inaccuracies when analysing chronic malnutrition. Although verification of age was done by use of health cards or birth notification, in some instances, documentation of the child's birth date in the birth notifications differed from the mother child booklets hence making it difficult to get the right date of birth for the child. Recall bias may link to wrong age which then leads to wrong weight for age and height for age indices.
ii. There was poor recording of Vitamin A and deworming in the mother child booklets and hence most children are supplemented with vitamin A basing on recall by the mother.
iii. Migration of people from some clusters

2.7. Ethical considerations

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 withdraw was respected. Privacy and confidentiality of survey respondent and data was protected.

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3.0. RESULTS AND DISCUSSIONS

3.1. Household demographics and socio-economic indicators

3.1.1 Summary of Children and Households Surveyed

The targeted households for this survey were 554 households which also included a 3% non-response rate. A total of 558 household were reached. Out of the sampled households, 599 children aged between 6 and 59 months were reached.

Table 7: Summary of children and household reached compared to the target.

Planned			**Achieved**		
No. of HHs	No. of Children (Sample Size)	No. of Clusters	No. of HHs	No. of Children (Sample Size)	No. of Clusters
554	399	40	558 **(101%)**	599 **(150%)**	40 **(100%)**

3.1.2. Marital and Residency Status

Majority of the respondents (79%) were married, 12% were widowed while 6% were single and 3% were separated.

3.1.3. Respondents' level of education

As shown in the figure below, it is worth noting that 62.7% of the caregivers had no formal education, 18.3% of caregivers in the county were primary school education holders while 11.7% were secondary school holders. 2.1% of the caregivers had pre-primary education while 4.6% had tertiary attained tertiary education level.

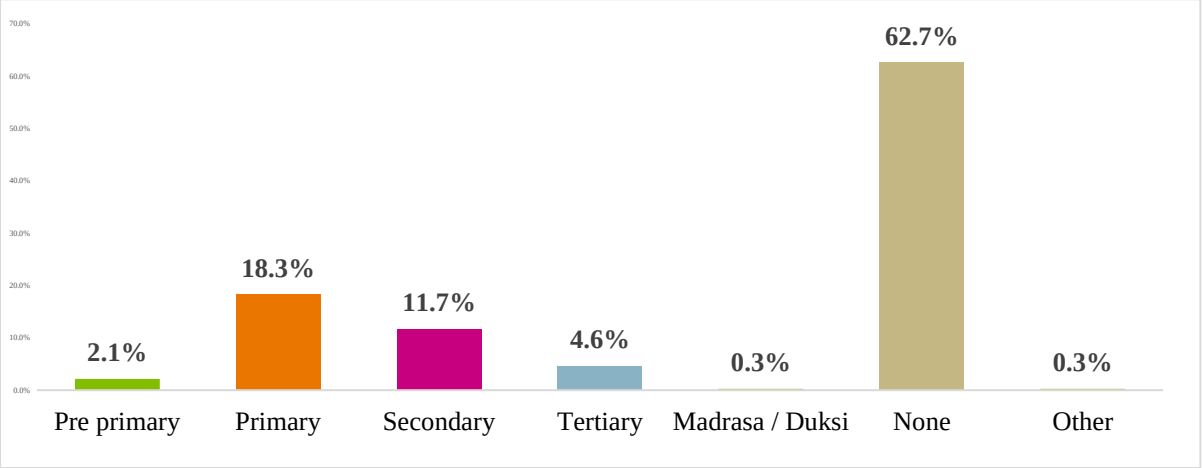


Figure 2:Respondents' level of education

Among ages 3 years to 18 years 73% were enrolled in schools and 27% were not enrolled and sighted that family labour responsibilities was the major reason for not being in school at 73.5% followed by Too young to be in school at 11.8%.

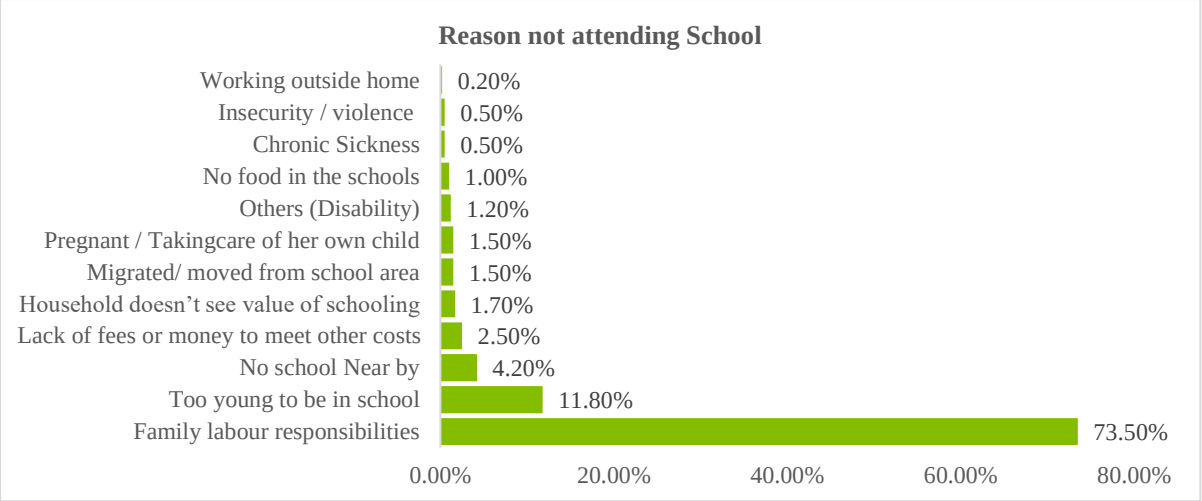


Figure 3: Reason not attending School.

3.1.4. Main Household Occupation and Income Sources

The main occupation of most household heads was livestock herding (46.8%) and waged or casual labour (18.5%). The figure below summarizes the occupation of household heads of households which participated in the survey.

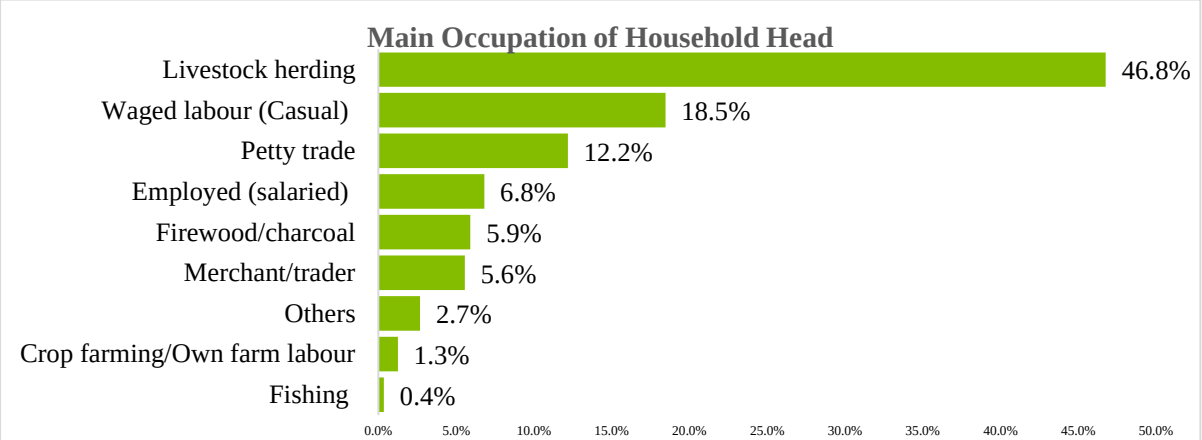


Figure 4: Main Occupation HH

In terms of income, majority of the household received income from sale of livestock (41.9%) with 17.6% receiving income from waged/casual labour. The figure below is a summary of other sources of income by household heads.

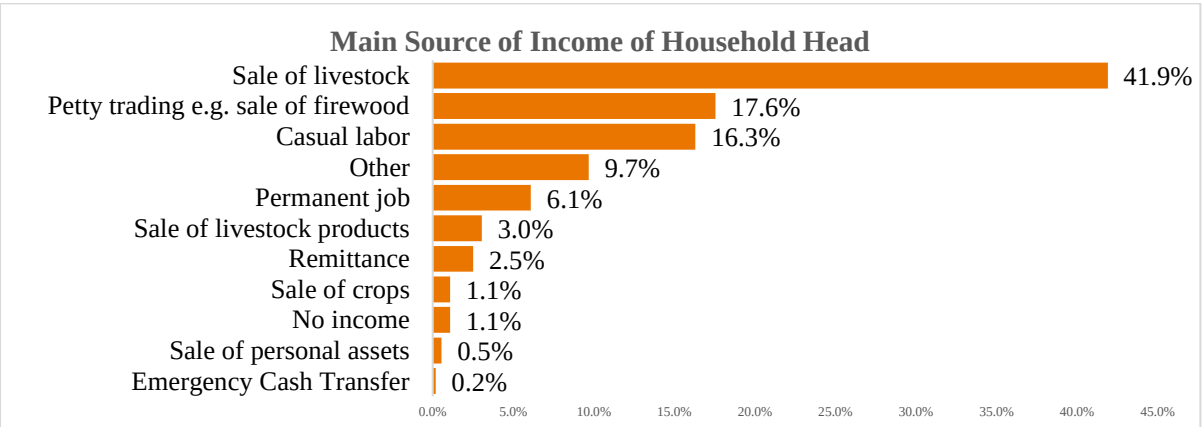


Figure 5: HH Income Sources

3.1.5. Mosquito net Usage

Mosquito nets are known to be highly effective in reducing malaria morbidity and mortality. However, usage varies among households, and such variations in actual usage may seriously limit the potential impact of nets. 82.3% of the household had no mosquito net prior to the survey date.

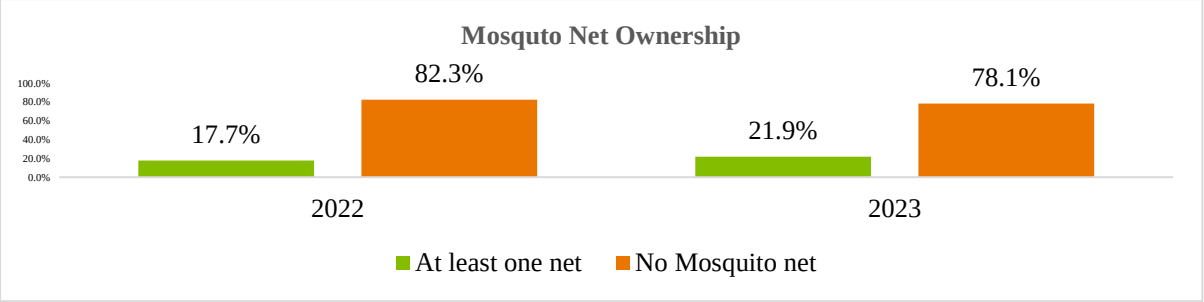


Figure 6: Mosquito net Usage

3.2 Children Nutrition Status

3.2.1. Prevalence of acute malnutrition

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.

Table 8: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex.

Indicator	All n = 537	Boys n = 271	Girls n = 266
Prevalence of global malnutrition (<-2 z-score and/or oedema)	**(109) 20.3 %** (16.7 - 24.4 95% C.I.)	**(60) 22.1 %** (17.7 - 27.3 95% C.I.)	**(49) 18.4 %** (13.7 - 24.3 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	**(99) 18.4 %** (14.9 - 22.6 95% C.I.)	**(55) 20.3 %** (15.9 - 25.6 95% C.I.)	**(44) 16.5 %** (12.0 - 22.3 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	**(10) 1.9 %** (0.9 - 3.6 95% C.I.)	**(5) 1.8 %** (0.8 - 4.3 95% C.I.)	**(5) 1.9 %** (0.7 - 5.2 95% C.I.)

The overall GAM Rate in the county was 20.3 % (16.7 - 24.4 95% C.I.) which is indicative of A very high malnutrition status in the area based on the WHO classification of GAM. The prevalence of SAM among the children aged 6 to 59 months in county was found to be 1.9% based on the WFH and/or oedema. The boys (22.1%) were more malnourished compared to the girls (18.4%).

When compared the SMART survey conducted in 2022, the results shows that the GAM Rate from 2023 survey is lower. The GAM Rate in 2022 SMART survey was 21.8%. There is need for concerted efforts by all stakeholders to address the major drivers of malnutrition in the county.

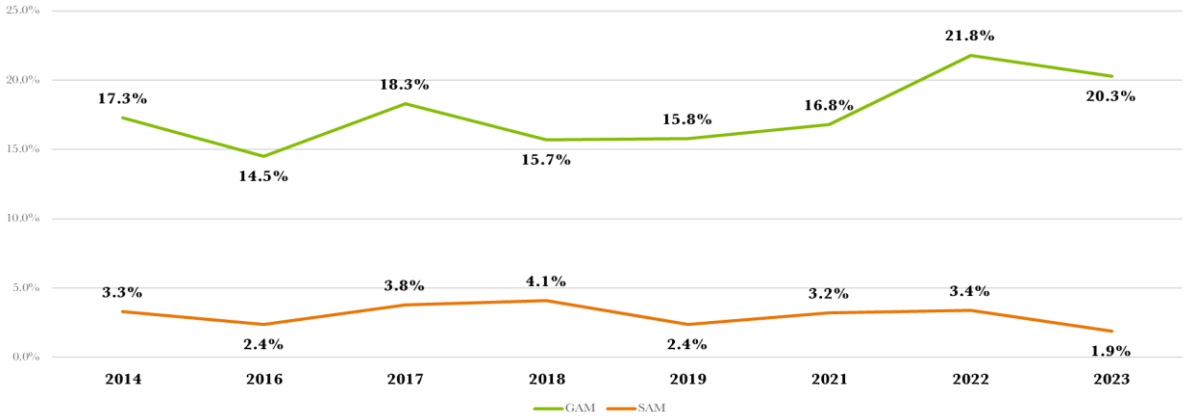


Figure 7: Trends of Acute Malnutrition (Wasting)

3.2.2. Prevalence of Acute Malnutrition by MUAC

The nutrition situation was also assessed using the MUAC and in comparison, with the GAM rates by the WFH scores. Using MUAC and/or Oedema, the prevalence of GAM in the county was 6.1 % (4.3 - 8.6 95% C.I.) while the prevalence of SAM was 0.6 % (0.2 - 1.7 95% C.I.). In comparison with the previous SMART survey results in 2022, the GAM by MUAC was 5.0% (3.4 - 7.4 95% C.I.) in 2022.

Table 9: Prevalence of Malnutrition based on MUAC.

Indicator	**All** **n = 542**	**Boys** **n = 272**	**Girls** **n = 270**
Prevalence of global malnutrition (< 125 mm and/or oedema)	**(33) 6.1 %** (4.3 - 8.6 95% C.I.)	**(12) 4.4 %** (2.4 - 8.0 95% C.I.)	**(21) 7.8 %** (5.2 - 11.6 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	**(30) 5.5 %** (3.8 - 7.9 95% C.I.)	**(10) 3.7 %** (1.9 - 6.9 95% C.I.)	**(20) 7.4 %** (4.8 - 11.2 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	**(3) 0.6 %** (0.2 - 1.7 95% C.I.)	**(2) 0.7 %** (0.2 - 3.0 95% C.I.)	**(1) 0.4 %** (0.0 - 2.8 95% C.I.)

3.2.3. Prevalence of underweight

The measure of underweight gives a mixed reflection of both the current and past nutrition experience by a population and is very useful in growth monitoring. Percentage of children underweight describes how many children under five years have a weight for-age below minus two standard deviations of the NCHS/ WHO reference median and Children who are WFA Z score fell below -3 standard deviation of the WHO reference population were classified as severe underweight.

Table 10: Prevalence of Underweight based on Weight for Height z- scores and by sex

Indicator	**All** **n = 538**	**Boys** **n = 270**	**Girls** **n = 268**
Prevalence of underweight (<-2 z-score)	**(211) 39.2 %** (34.6 - 44.0 95% C.I.)	**(109) 40.4 %** (34.8 - 46.2 95% C.I.)	**(102) 38.1 %** (31.9 - 44.6 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	**(163) 30.3 %** (26.4 - 34.5 95% C.I.)	**(86) 31.9 %** (27.0 - 37.2 95% C.I.)	**(77) 28.7 %** (23.2 - 35.0 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	**(48) 8.9 %** (6.7 - 11.8 95% C.I.)	**(23) 8.5 %** (5.9 - 12.1 95% C.I.)	**(25) 9.3 %** (6.2 - 13.8 95% C.I.)

The results in the above table show that the prevalence of underweight using the weight-for-age z-score in Samburu was found to be 39.2 % (34.6 - 44.0 95% C.I.). When compared with the SMART survey conducted in 2022, the results shows that the underweight from this survey is higher. 2022 SMART result was 35.7 % (28.7 - 43.5 95% C.I.).

3.2.4. Prevalence of Stunting based on Height for Age

The prevalence of stunting is the conventional anthropometric measure that reflects long-term chronic undernutrition, failure of linear growth and multifactorial social deprivation, a long-term response to the prolonged deprivation of food and/or presence of disease and other factors which interrupt normal growth. Unlike wasting, stunting is not affected by seasonality but rather related to the long-term effect of socio-economic development and long-standing food insecurity situation.

The results of the survey show that the prevalence of stunting in the county was 31.7 % (25.3 - 38.8 95% C.I.) which is categorized as very high based on the WHO classification. Further, the prevalence of severe stunting was found to be 7.7 % (4.9 - 11.8 95% C.I.). The stunting levels in the area represent poor nutrition in the first 1,000 days of a child's life. In these crucial days, the building blocks are established for the development of the brain and for future growth. Any alteration in this stage has long-term implications, and the damage caused by undernutrition in the early years of life is largely irreversible and associated with impaired cognitive ability and reduced school and work performance.

Table 11: Prevalence of Stunting based on height for age z-scores and by sex.

Indicator	**All** **n = 529**	**Boys** **n = 264**	**Girls** **n = 265**
Prevalence of stunting (<-2 z-score)	**(197) 37.2 %** (32.0 - 42.8 95% C.I.)	**(105) 39.8 %** (33.2 - 46.7 95% C.I.)	**(92) 34.7 %** (28.5 - 41.4 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	**(139) 26.3 %** (22.1 - 30.9 95% C.I.)	**(73) 27.7 %** (22.4 - 33.6 95% C.I.)	**(66) 24.9 %** (19.7 - 30.9 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	**(58) 11.0 %** (8.4 - 14.1 95% C.I.)	**(32) 12.1 %** (8.6 - 16.8 95% C.I.)	**(26) 9.8 %** (6.6 - 14.3 95% C.I.)

The results shows that the stunting from this survey was higher than the 2022 survey which recorded a stunting of 31.7 % (25.3 - 38.8 95% C.I.).

3.3. Children's Morbidity and Health Seeking Behaviour

Based on the UNICEF conceptual framework of the causes of malnutrition, disease is categorized as one immediate cause alongside inadequate diet. Undernutrition and childhood morbidity have a synergistic relationship. The interrelationship of the two is in such a way that illness can suppress appetite precipitating undernutrition of a child while, on the other hand, nutritional deficiencies increase the susceptibility of the child to infectious diseases.

The survey found out that, almost half (49.6%) of children aged 6-59 months in Samburu County were reported to have been ill two weeks prior to survey. The most prevalent illness during this period was acute respiratory illnesses/ cough at 67.7%, fever with chills (26.8%) and watery diarrhea (23%) as shown below:

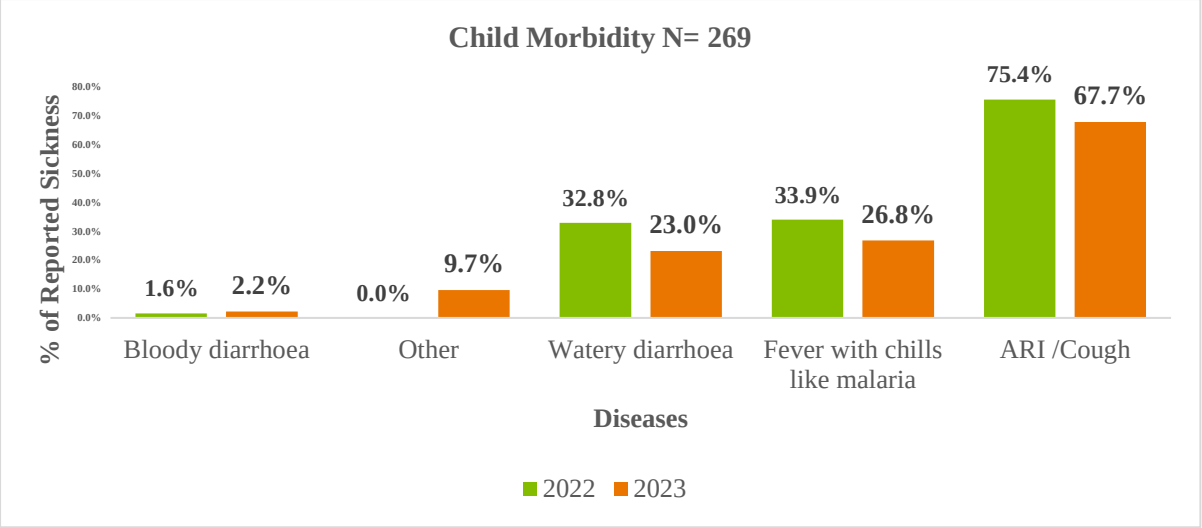


Figure 8: Prevalence of Child morbidity

Health seeking behaviour

Prompt and appropriate health seeking is critical in the management of childhood illnesses. A variety of factors have been identified as the leading causes of poor utilization of primary health care services. These include poor socio-economic status, lack of accessibility, cultural beliefs and perceptions, low literacy level of the mothers and large family size[2].

82% of caregivers whose children were sick two weeks prior to the survey sought assistance from appropriate sources namely public health facilities, private clinics/Pharmacies, mobile clinics as shown below.

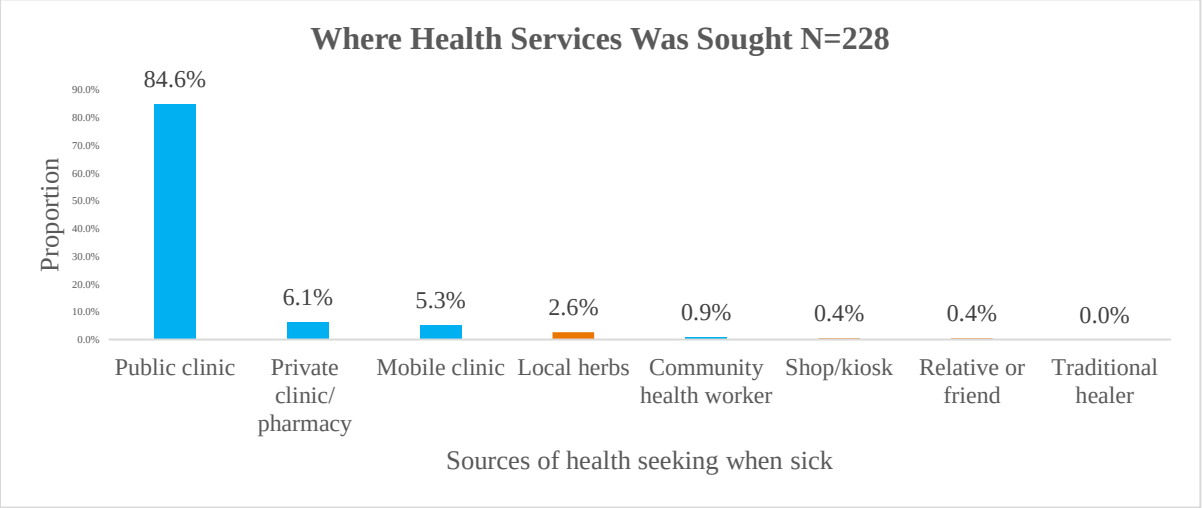


Figure 9: Health Seeking Places

3.4. Child Immunization, Vitamin A Supplementation and Deworming

3.4.1. Immunization

According to World Health Organization guidelines, children are considered to have received all basic vaccinations when they have received a vaccination against tuberculosis (also known

[2] Health seeking behaviour and health service utilization in Pakistan: challenging the policy makers. Shaikh BT, Hatcher J J Public Health (Oxf). 2005 Mar; 27(1):49-54.

as BCG), three doses each of the DPT-Hep B-Hib (also called pentavalent) and polio vaccines, and a vaccination against measles. The BCG vaccine is usually given at birth or at first clinical contact, while the DPT-Hep B-Hib and polio vaccines are given at approximately age 6, 10, and 14 weeks. Measles vaccinations should be given at or soon after age 9 months.

Information on vaccination coverage was obtained in two ways: from written vaccination records, including the mother and child health booklet and other health cards, and from mothers' verbal reports. All mothers were asked to show the interviewer health cards used for the child's immunization.

From the survey results, 97.4% of children were reported to have received BCG and confirmed by Scar. In terms of Measles vaccination at 9 months, 81.1% of the children had received the vaccination where 62.7% confirmed by card while 18.4% confirmed by recall. At 18 months, 63.5% had received measles vaccination where 45.5% were confirmed by card while 18% was by mother's recall. In terms of OPV 1, 96% had received the immunization where 71.7% was confirmed by card while 24% was by recall. For OPV 3, 97.4% had received the immunization where 77.6% was confirmed by card while 19.8% was confirmed by recall. This is as shown in the graph below:

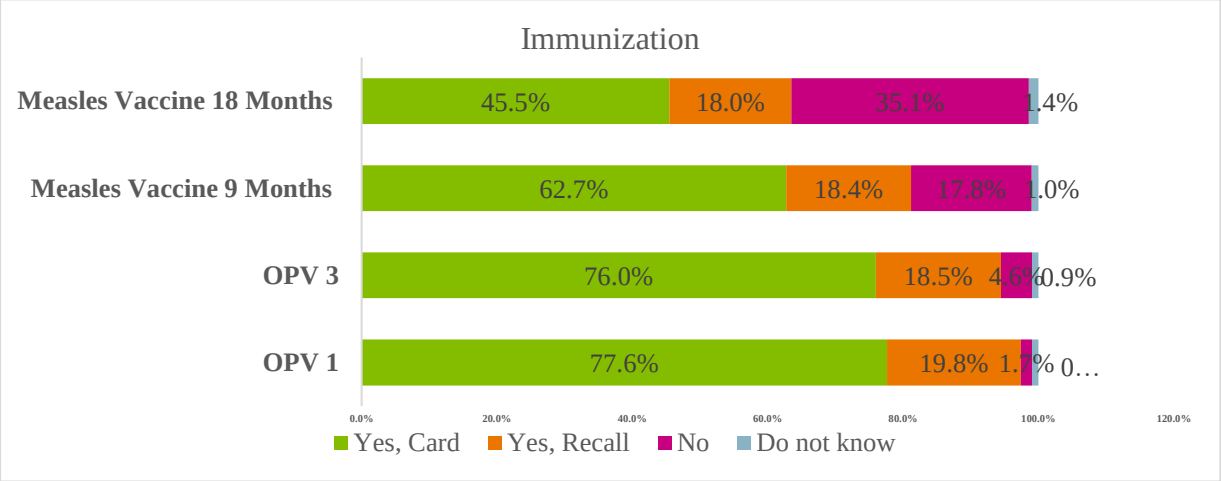


Figure 10: Immunization Coverage

3.4.2. Vitamin A supplementation

The Lancet (Child survival series) lists vitamin A supplementation among the key interventions achievable at a large scale that have proven potential to reduce the number of preventable child deaths each year[3]. Moreover, vitamin A supplementation is recognized as one of the most cost-effective interventions for improving child survival. Improving Vitamin A status of deficient children through supplementation enhances their resistance to disease and can reduce mortality from all causes by approximately 23%[4]. Therefore, vitamin A supplementation is critical, not only for eliminating vitamin A deficiency as a public-health problem, but also as a central element for child survival.

To assess vitamin A supplementation, parents and caregivers were probed on whether children had been supplemented and for how many times in the past one year. Reference was made to

[3] Jones, Gareth, et al., 'How Many Child Deaths can we Prevent this Year?', The Lancet, vol. 362, 5 July 2003, pp. 65-71.
[4] Vitamin A Supplementation: A Decade of Progress, UNICEF 2007

the child health card and in case the card was not available recall method was applied with sample of capsules commonly used in the county being shown to the caregiver.

According to the survey, 55% of the children aged 6- 11 months were supplemented with vitamin A at least once and deterioration from 2022 where it was 88.9%, and only 34% children aged 12 to 59 months who had at least been supplemented twice as recommended by MOH policy which is also an improvement. The performance of vitamin A supplementation especially among children 12-59 months was poor compared to the ministry of health target of 80%. The figure below shows vitamin A supplementation Samburu County.

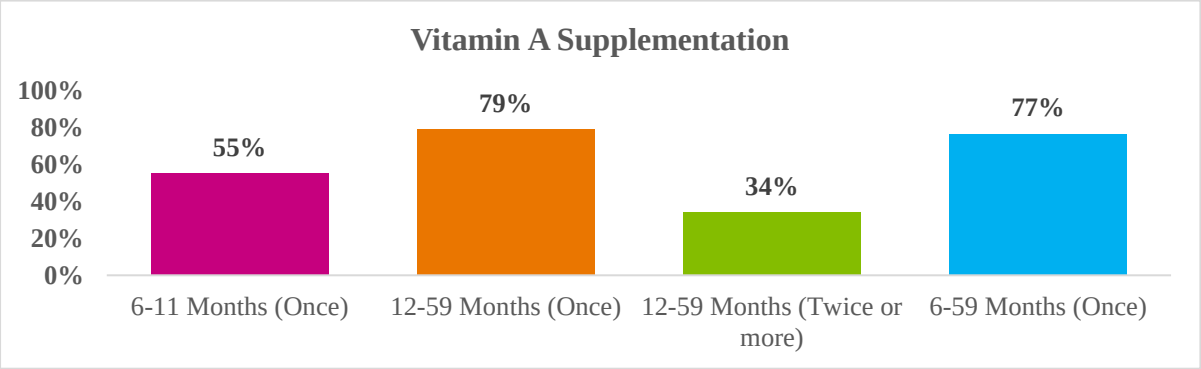


Figure 11: Vitamin A supplementation among the under- fives

3.4.3. De-worming

De-worming is important in controlling parasites such as helminths, schistosomiasis (bilharzias) and prevention of anaemia. W.H.O. recommends that children in developing countries exposed to poor sanitation and poor availability of clean safe water to be de-wormed once every six months.

De-worming was assessed for all children aged 12-59 months old. The results showed an overall coverage of 72% for children aged 12-59 months (once). Further de-worming was assessed for those who reported they had been dewormed on whether they had been dewormed once or twice in a year. Based on the findings, 28% of this category of children was de-wormed at least twice as per the WHO. This coverage is low compared to the Country's target of 80%. This could be attributed to low community awareness on the importance of deworming or low access to the service, thus the need for further research to confirm this. The figure below shows coverage of de-worming in Samburu County.

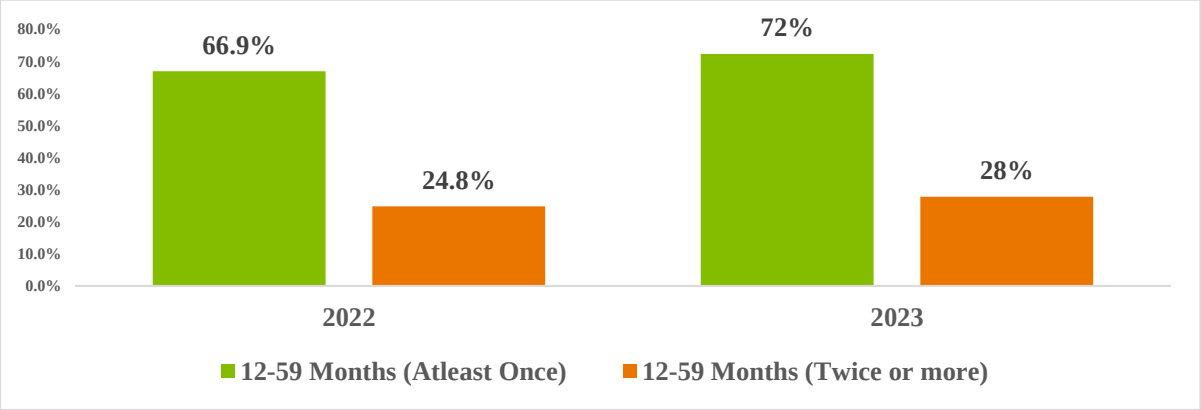
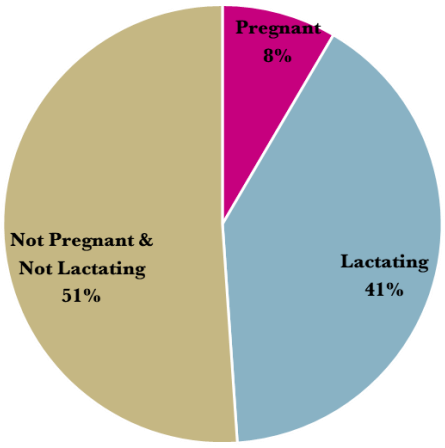


Figure 12: Deworming among the under- fives

3.5 Maternal Nutrition

Good maternal nutrition is important for a successful pregnancy, child delivery and lactation. Pre- pregnancy nutrition influences a woman's ability to conceive, determines the foetal growth and development and the size of the foetus and its overall health as well as the health of the mother. Malnutrition prior and around pregnancy makes the placenta fail to develop fully therefore it cannot optimally nourish the foetus. Anaemic women are more likely to deliver low birth weight infants and low folic acid levels are associated with an increased risk of low birth weight and birth defects.

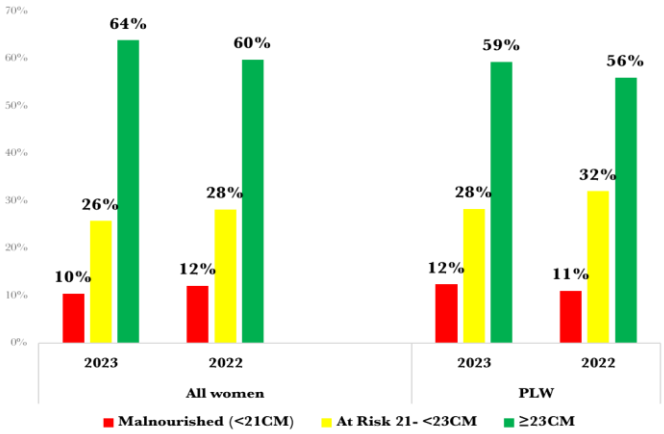
3.5.1 Women physiological status



Women in the survey were asked their current physiological status whereby the following was found out; pregnant (8%), lactating (41.0%) respectively and neither pregnant nor lactating 51%. The figure below details the physiological status of women of reproductive age in Samburu County.

Figure 13: Women physiological status

3.5.2. Nutrition status of women of reproductive age by MUAC



Maternal nutrition was assessed by measuring MUAC of all women of reproductive age (15 to 49 years) in all sampled households. In the county 12% of the women of reproductive age were found to be malnourished (MUAC<21CM).

Figure 14: Nutrition Status of women by MUAC

3.5.3. Iron and Folic Acid Supplementation (IFAS)

According to WHO, daily IFAS consumption is recommended as part of the Ante Natal Care (ANC) to reduce the risk of low birth weight, maternal anaemia, iron deficiency and neural tube defects (NTDs). WHO Guidelines recommends that all Pregnant Women should receive Iron and Folic Acid Supplementation (IFAS) regardless of anaemia status in countries where anaemia is >40%, and Kenya is one of them. IFAS formulations are: 60mg iron /400µg folic

acid and should be given as a combined pill throughout pregnancy[5]. Iron and Folic Acid Supplementation (IFAS) has been shown to reduce Low Birth Weight, which is the primary cause of neonatal deaths. Folic Acid supplementation with 400µg reduces incidence of NTDS if taken before conception and within 28 days of pregnancy. Similarly, IFAS sustains strength during pregnancy and ensures enough blood stores in the body during and after delivery. IFAS is a component within Focused Antenatal Care (FANC).

During the survey, iron folic supplementation was assessed by asking mothers of children below 24 months if they consumed iron folate in their most recent pregnancy.

The assessment findings showed that 92% of women with children below 2 years across the county had been supplemented with iron folate supplements during their last pregnancy.

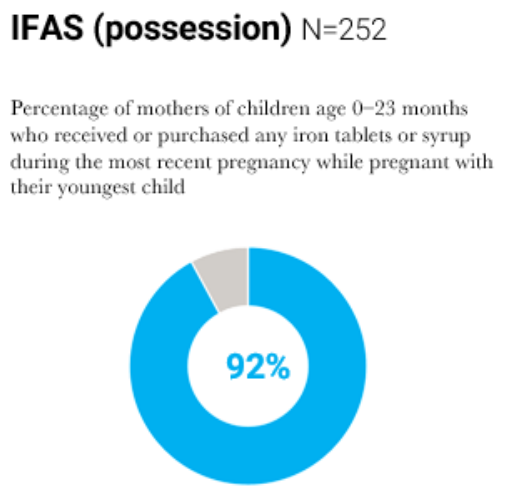


Figure 15: IFAS Possession

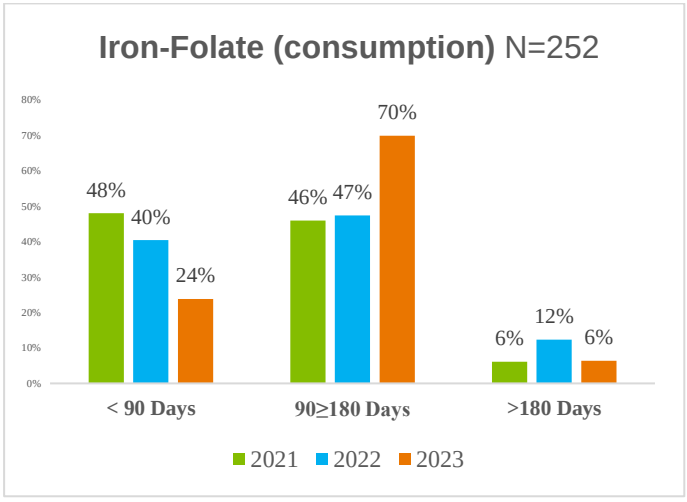


Figure 16: IFAS Consumption

Out of those that reported to have consumed IFAS tablets in their last pregnancy, 24% reported to have taken for <90 days while 70% reported to have token within >90 to 180 days; 6% of the women took IFAS for more than 180 days. This indicated poor utilization of IFAS considering the recommended 270 days of consumption. There is need to create more demand for IFAS among pregnant women through behaviour change communication approaches.

3.6. Water Sanitation& Hygiene

Globally, water access and good sanitation is considered a human right[6]. 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 related. Sanitation is essential for the conservation and sustainable use of water resources, while access to water is required for sanitation and hygiene practices.

Research has shown that poor WASH indicators are linked to under nutrition and more so on Stunting levels. Diarrhea, one of the leading killers of young children is closely linked to poor/inadequate WASH which often causes under nutrition, which in turn reduces a child's

[5] WHO. Guideline: Daily iron and folic acid supplementation in pregnant women. Geneva, World Health Organization, 2012

[6] The UN committee on economic, Cultural and Social rights states in its General Comment of November 2002

resistance to subsequent infections, thus creating a vicious circle[7]. An estimated 25% of stunting is attributable to five or more episodes of diarrhea before 24 months of age[8].

3.6.1. Main Source of Water

The respondents were asked about their main source of drinking water. 45% of the household accessed drinking water from an improved waters source (boreholes, piped water systems, protected dug wells/springs, rainwater collection). These sources are considered relatively safe sources since they are protected. Other unprotected sources included Unprotected dug well-25.8%, unprotected springs 3%, other- 0.2% and surface water (25.6%).

Due to the high proportion of the population relying on unsafe water sources, there is need to sensitize the community on water treatment while at the same time ensure access to water treatment chemicals. The figure below shows main sources of drinking water.

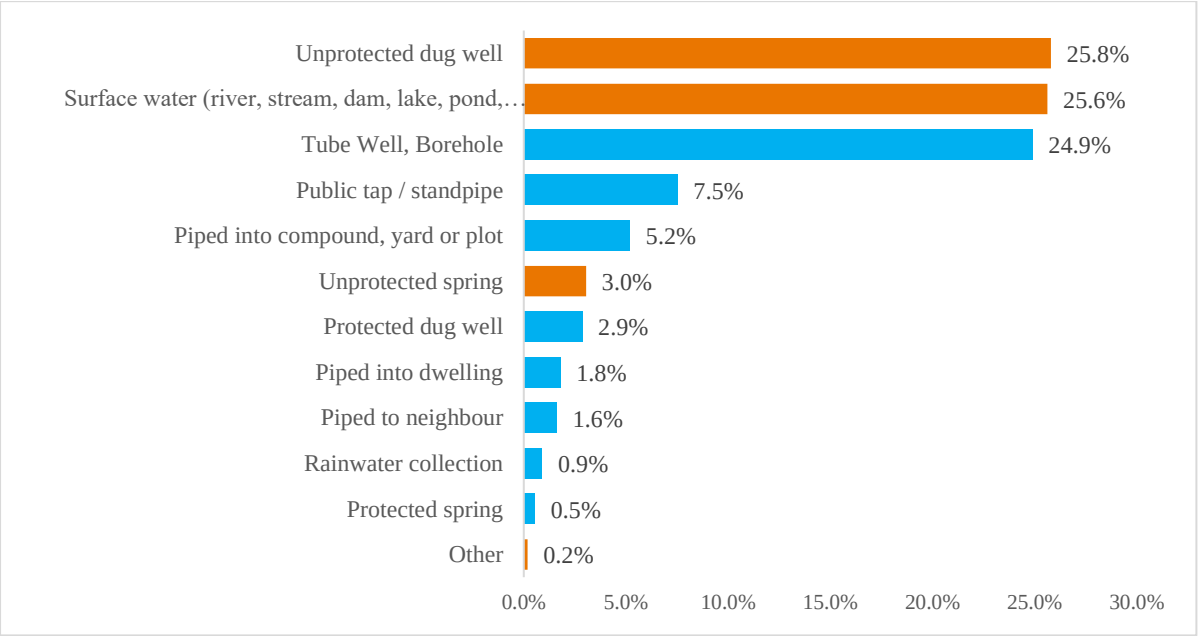


Figure 17: Main Sources of drinking water

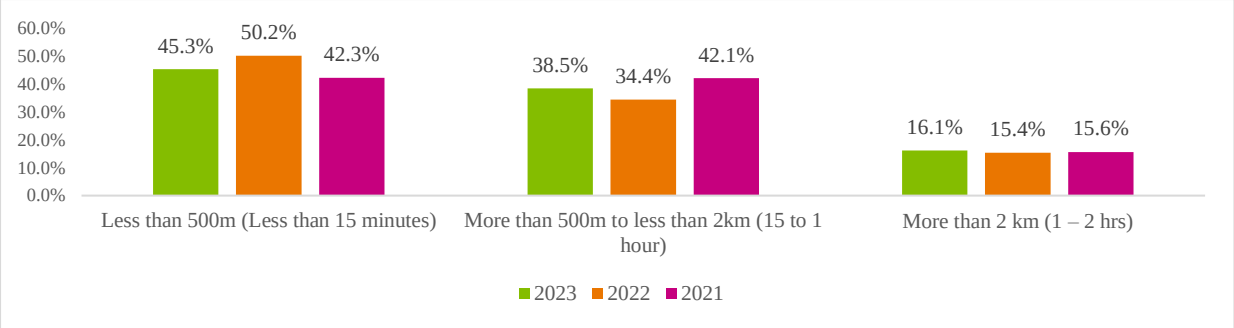
3.6.2. Distance to Water Source

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 not be more than 15 minutes and it should not take more than three minutes to fill a 20-litre container.

Analysis of distances to water sources indicated a deterioration from 50.2% to 45.3% of the households obtained their water from sources less than500m (less than 15 minutes walking distance), 38.5% took between 15 min to 1 hour (approximately 500m to 2km) while the rest (16.1%) walked as far as more than 2Km (1- 2hrs) to their water sources. The figure below shows distance to water sources in Samburu County.

[7] Pruss-Ustun et al, 2014. Burden of disease from inadequate water, sanitation, and hygiene in low- and middle-income settings: a retrospective analysis of data from 145 countries.

[8] Checkley et al, 2008. International Journal of Epidemiology, Volume 37, Issue 4, August 2008, Pages 816–830. Multi-country analysis of the effects of diarrhoea on childhood stunting



3.6.3. Queuing time to water sources

Majority (83%) of the households surveyed did not queuing for water.

Out of those that queued for water in the county, half (50.5%) of the respondents queued for less than 30 minutes while the rest (49.5%) of them were queuing for 30 and 60 minutes ormore as indicated in the figure below.

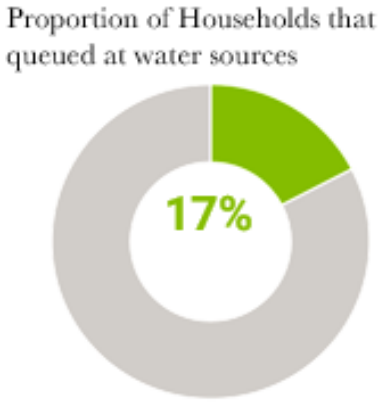


Figure 18: Proportion of Households Queuing for water.

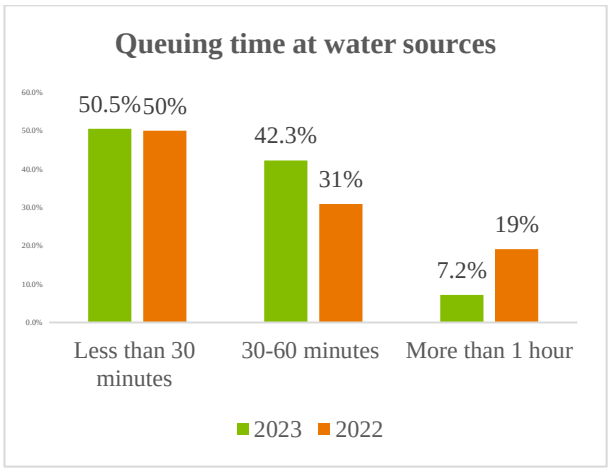


Figure 19: Queuing time at water source

3.6.4. Water Treatment

Despite some households obtaining water from unsafe sources, only 11% of the households in the county were treating their water before drinking as indicated in the figure below.

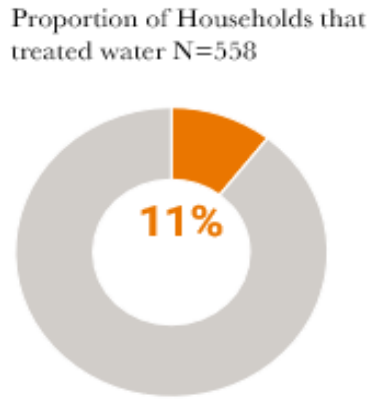


Figure 20: Treating drinking Water.

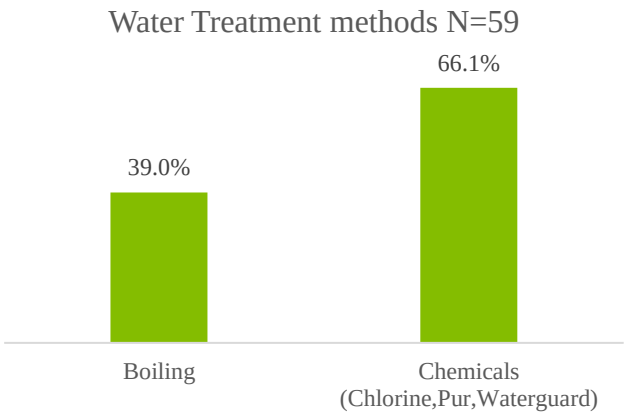
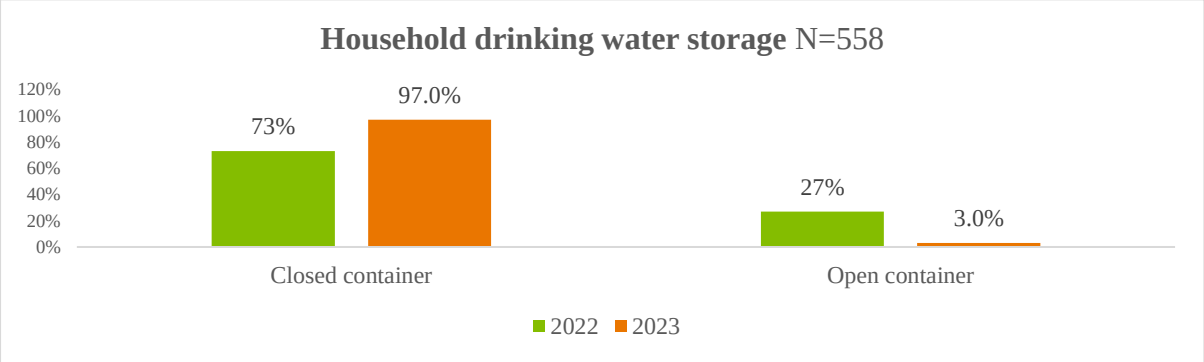


Figure 21: Methods used for treating drinking water.

This extremely low proportion of households that was treating drinking water, coupled with the low latrine coverage and high rates of open defecation could be one of the main contributors of malnutrition in the County as explained before (relationship between undernutrition and poor WASH).

3.6.5. Storage of Drinking water and payment

Out of the sampled households across the county, 97% were storing their drinking water in a closed container to preventing it from contamination. One out of every four household of the sampled households (25%) paid for water. 29.5% of the households paid for water per 20 L jerrican while 70.5% paid per month.



3.6.6. Hand washing

Hand washing with soap is the single most cost-effective intervention in preventing diarrhea diseases[9]. The four critical hand washing moments include; after visiting the toilet/latrine, before cooking, before eating and after taking children to the toilet/latrine.

As illustrated in the figure below 80% of the caretakers were aware of the hand washing practices, a decrease from 86.5% in 2022. The findings showed a decrease in proportion of respondents washing hands in all 4 critical times. The proportion is low an indication that still a large proportion of the community is exposed to contamination by diarrheal causing germs.

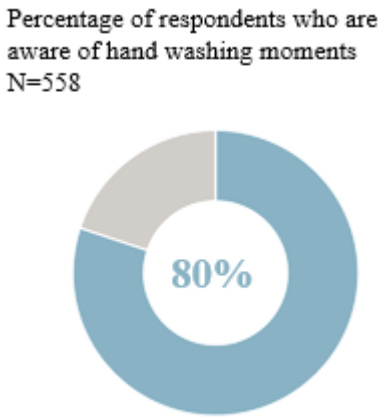


Figure 22: Awareness of hand washing practices

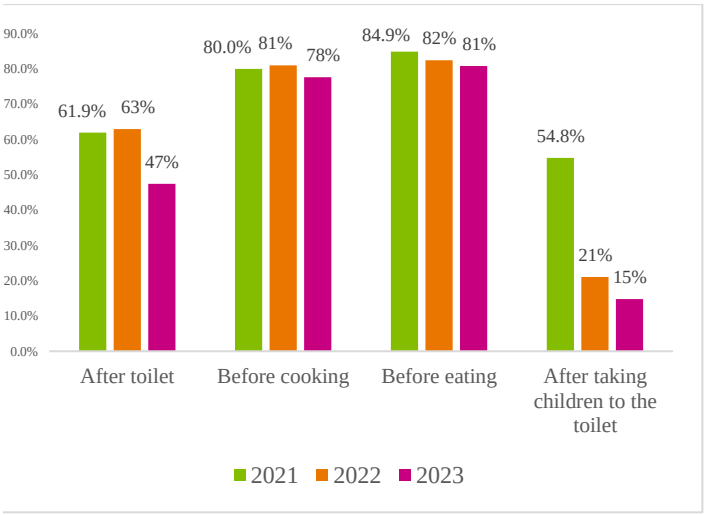


Figure 23: Hand washing at critical times

[9] Borghi, J., Guinness, L., Ouedraogo, and J., Curtis, V. (2002): Is hygiene promotion cost-effective? A case study in Burkina Faso. Tropical Medicine and International Health, 7(11), 960-969.

Assessment of hand washing in the 4 critical times indicated that most of the households were practicing hand washing before eating 81%, at least 78% before cooking. 47% washed their hands after visiting the toilet, and 15% of the households after taking the baby toilet.

3.6.7. Hand washing with soap

The survey indicated that most (76.5%) of the households were using soap and water for hand washing, followed by 14.1% using only water. Hand washing without soap does not offer effective protection against germs.

Figure 24: What is used for hand washing.

3.6.7. Sanitation facility access

If organic solid waste is not disposed of well, major risks are incurred due to fly breeding and surface water pollution which is a major cause of diarrheal diseases. Solid waste often blocks drainage channels and leads to environmental health problems associated with stagnant and polluted surface water. The highest proportion of households 61.8% practice open defecation

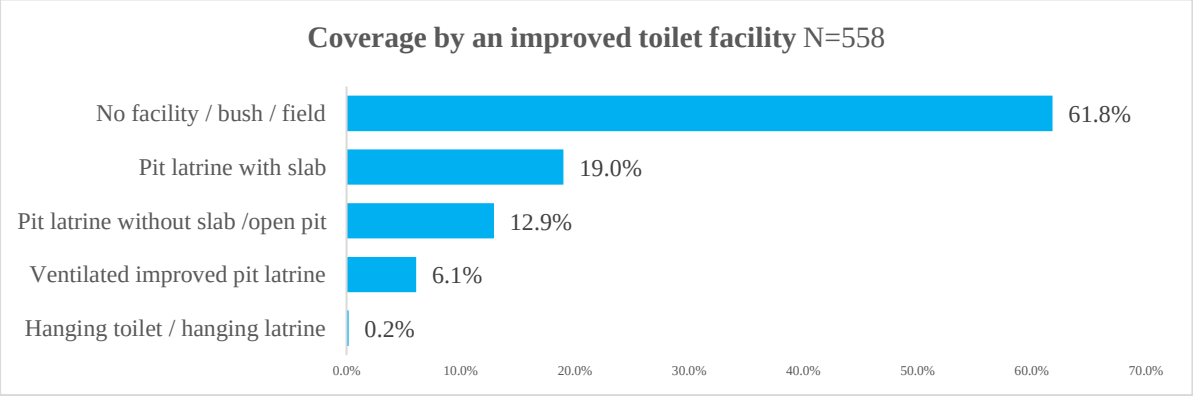


Figure 25: Latrine ownership

3.7. Food Security

The World Health Organization (WHO) considers food and nutrition security a basic human right.[10] In the Declaration of the World Summit on Food Security in 2009, **food security** was defined as:

> "Exist(ing) when all people, at all times, have physical, social, and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life".[11]

The international development community usually looks at food security through four "dimensions" - **food availability**, **food access**, **food utilization,** and **food stability**.

Food availability is defined as the availability of sufficient quantities of food of appropriate quality on a consistent basis.

Food access is defined as sufficient resources by individuals for acquiring appropriate foods for a nutritious diet.

Food Utilization refers to the consumption and biological use of food through adequate diet, clean water, sanitation, and health care to reach a state of nutritional wellbeing where all physiological needs are met.

Food Stability means that a population, household, or individual always has access to adequate food – they should not risk losing access to food because of sudden shocks (e.g., an economic or climatic crisis) or cyclical events (e.g., seasonal food insecurity).[12]

3.7.1. Household Dietary Diversity (HDD)

The household dietary diversity score (HDDS) is meant to reflect, in a snapshot form, the economic ability of a household to access a variety of foods. Studies have shown that an increase in dietary diversity is associated with socio-economic status and household food security (household energy availability)[13]. The HDDS is meant to provide an indication of household economic access to food, thus items that require household resources to obtain, such as condiments, sugar and sugary foods, and beverages, are included in the score.

Household dietary diversity assessment was based on a 24-hour recall period. At the data collection, 16 food groups were used. The groups were combined at the analysis stage to come up with 12 food groups. As shown in figure 26 below, there was a decline on household consuming more than five food groups from 42% in 2022 to 19% in 2023. Overall, most households in the county consumed less than five food groups justifying the high child under nutrition in the county. The figure below details the analysis.

[10] World Health Organization (WHO). (June 2015). Household Food and Nutrition Security. Retrieved from: http://www.who.int/nutrition/topics/foodsecurity/en/

[11] Food and Agriculture Organization of the United Nations (FAO). (June 2006). Food Security. Retrieved from: http://www.fao.org/forestry/13128-0e6f36f27e0091055bec28ebe830f46b3.pdf

[12] Ibid.

[13] FAO. 2010. Guidelines for Measuring Household and Individual Dietary Diversity

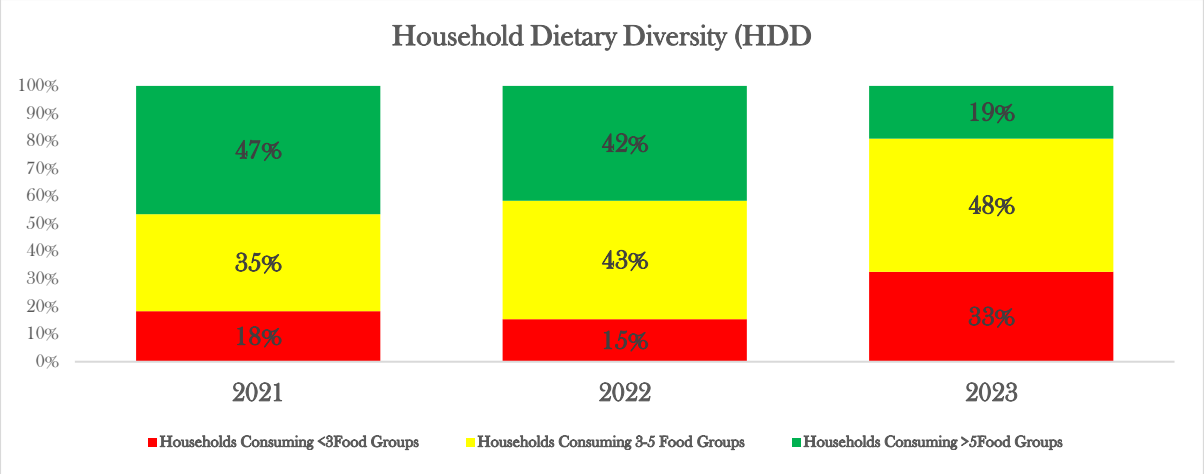


Figure 26: Household Dietary Diversity Score based on 24 hours recall.

3.7.2. Minimum Dietary Diversity for Women

Minimum Dietary Diversity for women (MDD-W) indicator is a food group diversity indicator that has been shown to reflect one key dimension of diet quality: micronutrient adequacy. MDD-W is a dichotomous indicator of whether women 15–49 years of age have consumed at least five out of ten defined food groups the previous day or night. Requirements for most nutrients are higher for pregnant and lactating women than for adult[14]. 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[15]. 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[16].

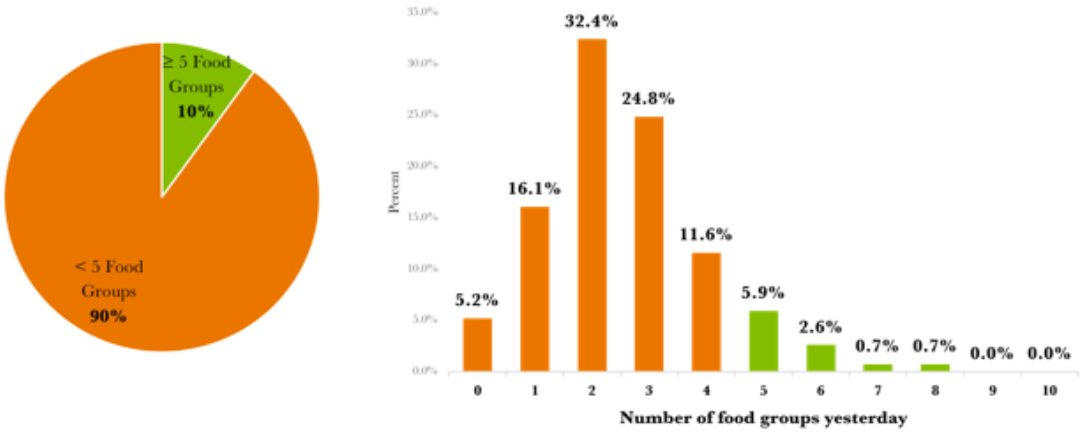


Figure 27: Minimum Dietary Diversity for Women (MDD-W)

[14] FAO and FHI 360. 2016. Minimum Dietary Diversity for Women: A Guide for Measurement. Rome: FAO.
[15] Torheim, L.E. & Arimond, M. 2013. Diet quality, micronutrient intakes and economic vulnerability of women. In V.R. Preedy, L.A. Hunter & V.B. Patel, eds. Diet Quality: An Evidence-Based Approach, Vol. I, pp. 105–115. New York, Springer.
[16] Arimond, M., Wiesmann, D., Becquey, E., Carriquiry, A., Daniels, M.C., Deitchler, M., Fanou-Fogny, N., Joseph, M.L., Kennedy, G., Martin-Prével, Y. & Torheim, L.E. 2010. Simple food group diversity indicators predict micronutrient adequacy of women's diets in 5 diverse, resource-poor settings. J Nutr. 140(11): 2059S–69S.

The figure above illustrated the proportion of women who consumed more than 5 food groups out of 10. From the analysis 10% of women met the minimum dietary diversity.

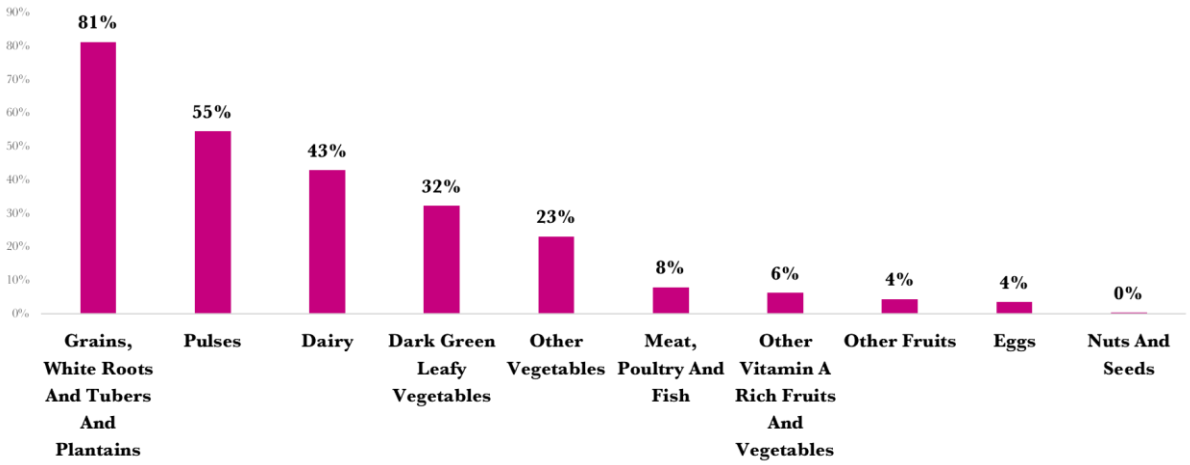


Figure 28: Food groups consumed (Women)

As indicated in figure above, the most of the WRA consumed grains, white roots, tubers and plantain (81%) which are major source of energy, pulses (55%) and dairies (43%) the latter two are protein sources.

3.7.3. Food Consumption Score Classification

The Food Consumption Score is a composite score based on dietary diversity, food frequency and relative nutrition importance of different food group. FCS is a proxy for household food security and is designed to reflect the quality of people's diet. The FCS is considered as an outcome measure of household food security. Food consumption score classifies households in to 3 categories namely, poor, borderline, and acceptable. In computing FCS, 16 food groups were collapsed to 8 groups namely, cereals, pulses, vegetables, fruits, meats (meats, fish, and eggs), dairies, sugars and oils. The frequency of consumption (maximum 7 days) was multiplied by an assigned weight factor i.e., cereals (2), pulses (3), vegetables (1), fruits (1), meats (4), dairies (4), oils (0.5) and sugar (0.5). Food consumption score (FCS) was obtained by summing up the product of each food item after which classification was done as illustrated in figure below. Households with a score of 0 to 21 are classified as poor while those with a score of 21.5 to 35 are classified as borderline. Those with a score of 35.5 and above are classified as acceptable. As the figure below illustrates, a large proportion of the households (61.3%) met the acceptable food consumption while 15.4% had poor food consumption score and 23.3% were classified to be in borderline. There was a decline in proportion of households in acceptable compared with 69.2% in 2022.

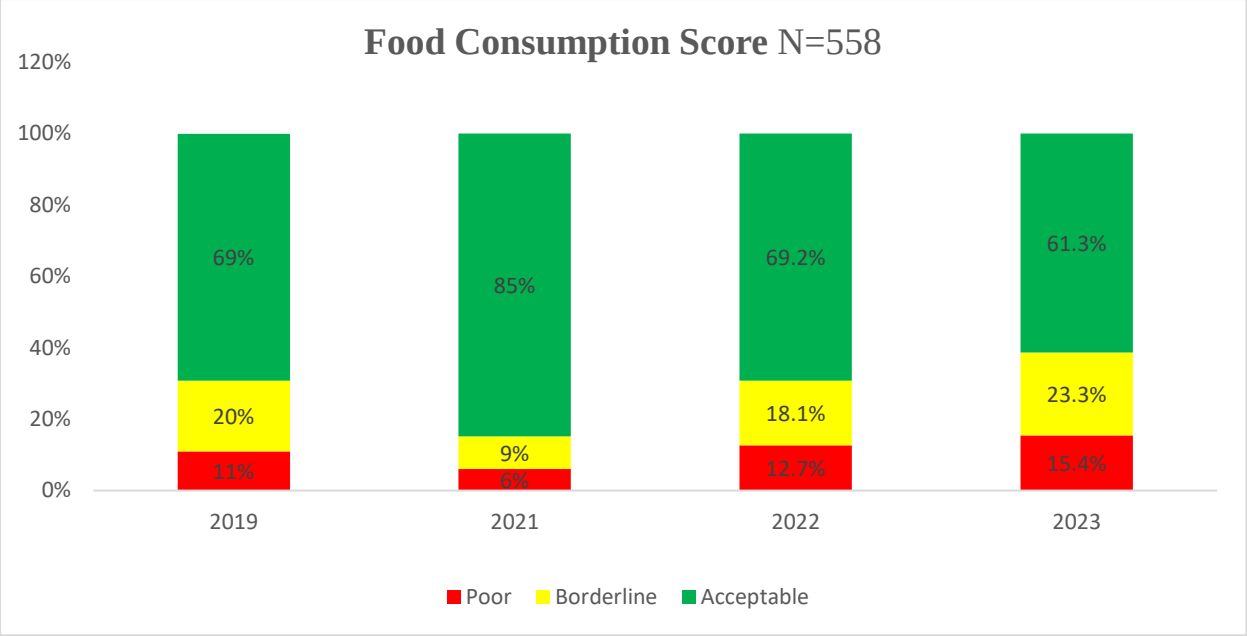
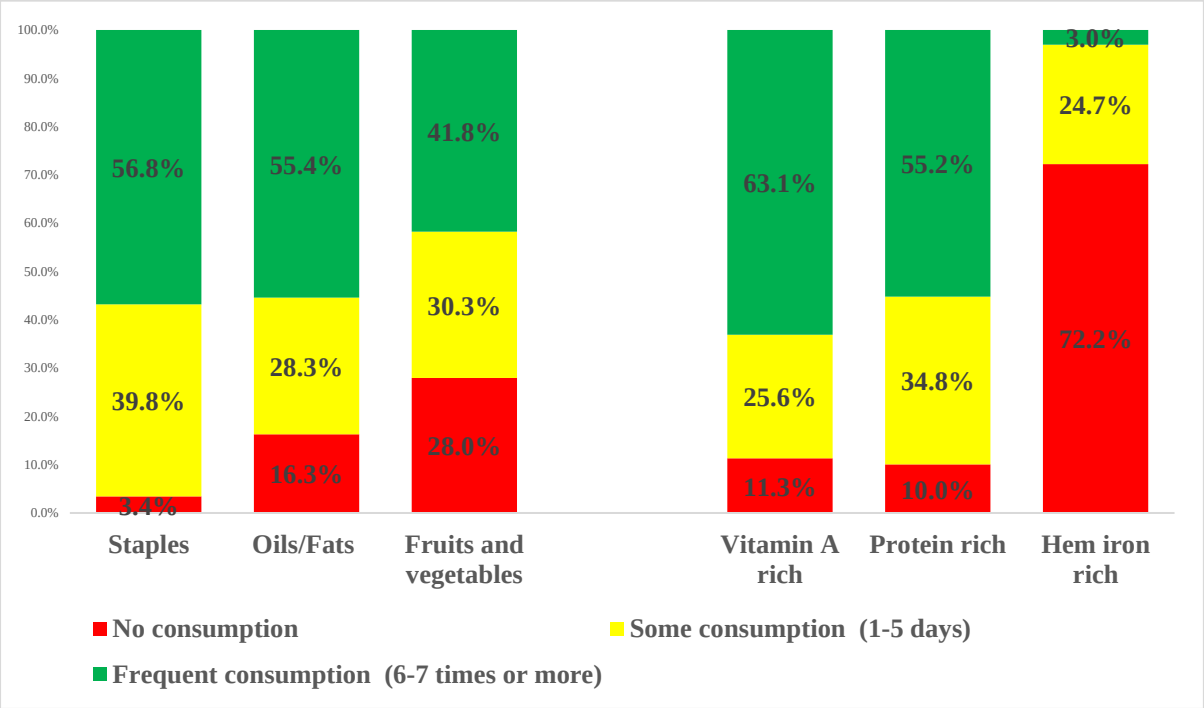


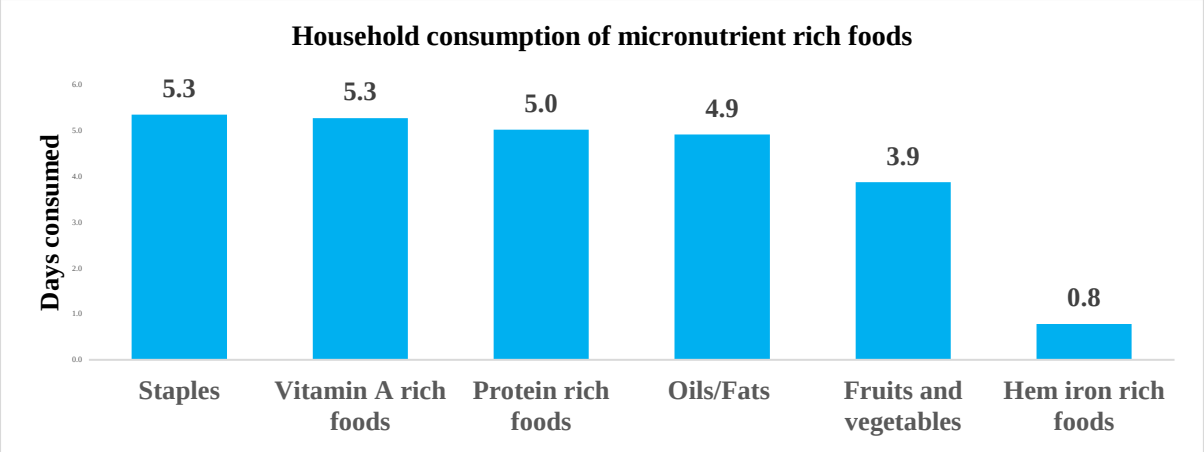
Figure 29: Food Consumption Score Classification

3.7.4. Household Consumption of Nutrient rich Foods

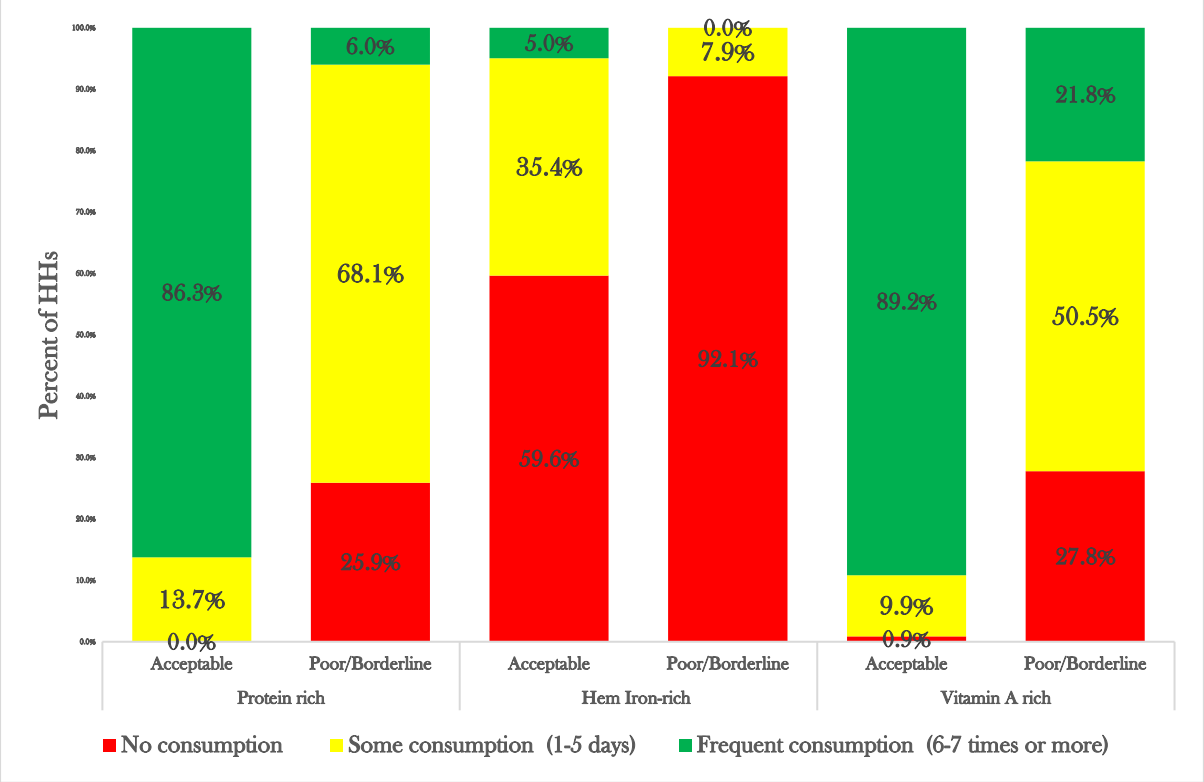
Most of the households had a very limited frequency of consumption of iron rich food and are thus likely to not be consuming enough to meet their nutrient needs.



The disaggregated consumption frequency of nutrient rich food groups shows that, a higher proportion of households are not eating enough iron rich foods and are thus at higher risk of iron deficiency anaemia.



The most frequently consumed source of micronutrients is Staples 5.3 days while Iron rich foods are the least consumed (0.8 days) as indicated in the figure above.



Most of the households with poor/borderline FC have a very limited frequency of consumption of protein rich foods and vitamin A rich foods and are thus likely to not be consuming enough to meet their nutrient needs, while consumption of iron rich food is low both for poor/borderline and acceptable food consumption groups.

3.7.4. Coping Strategy Index (CSI)

The Coping Strategies Index is a simple and easy-to-use indicator of household stress due to a lack of food or money to buy food. The CSI is based on a series of responses (strategies) to a single question: "What do you do when you do not have adequate food, and do not have the money to buy food?" The CSI combines, the frequency of each strategy (how many times was each strategy was adopted) and the severity (how serious is each strategy). This indicator assesses whether there has been a 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. The weighted frequency scores are summed up into one final score[17].

Table 13 Reduced Coping Strategies Index

In the past 7 days, if there have been times when you did not have enough food or money to buy food, how often (days) has your household had to:	Raw Score	Universal Severity Weight	Weighted Score 2022	Weighted Score 2023
Rely on less preferred and less expensive foods?	2.4	1	1.8	**2.4**
Borrow food, or rely on help from a friend or relative?	1.3	2	3.5	**2.7**
Limit portion size at mealtimes?	1.8	1	2.0	**1.8**
Restrict consumption by adults in order for small children to eat?	1.3	3	4.8	**3.9**
Reduce number of meals eaten in a day?	1.9	1	2.0	**1.9**
TOTAL HOUSEHOLD SCORE—Reduced CSI			**14.1**	**12.8**

The Reduced Coping Strategy Index (rCSI) Trend for Samburu County is as shown the figure below:

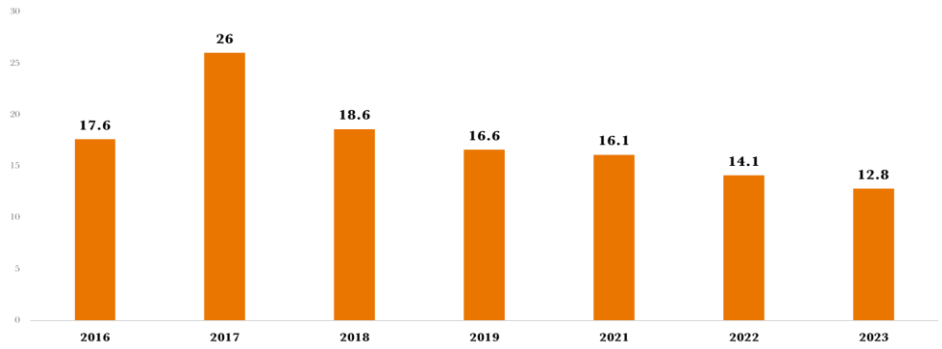
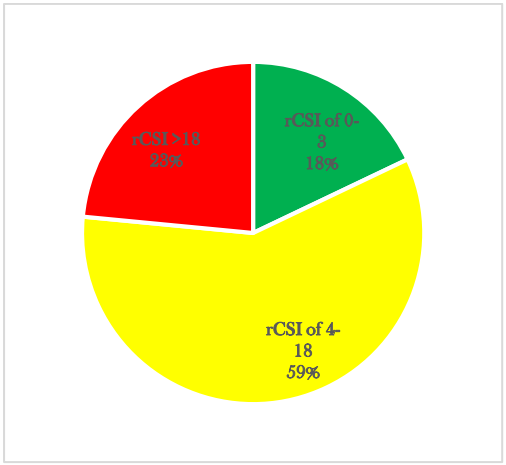


Figure 30: Coping strategy Index Trend

Slightly mor than half of the households were categorised as moderate- rCSI of 4-18.



[17] WFP 2008. Coping Strategies Index: Field Methods Manual

3.8 Complementary feeding indicators performance

Optimal nutrition during the first 2 years of a child's life lowers morbidity and mortality, reduces the risk of chronic diseases, and promotes healthy growth and development.

Table 14: Results for IYCF indicators for children 0-23 months of age

Minimum Dietary Diversity)	Minimum Meal Frequency (MMF) including non-breastfed children	Minimum Acceptable Diet (MAD)	Zero Vegetable or Fruit consumption (ZVF)	Egg and/or flesh Food consumption (EFF)	Continued Breastfeeding 12–23 months (CBF)	Sweet Beverage consumption (SwB)	Unhealthy Food Consumption (UFC)	Breast milk	Grains, roots, tubers, and plantains	Pulses (beans, peas, lentils), nuts and seeds	Dairy products (milk, infant formula, yogurt, cheese)	Flesh foods (meat, fish, poultry, organ meats);	Eggs	Vitamin-A rich fruits and vegetables	Other fruits and vegetables
20.70%	50.80%	16.10%	56.00%	18.10%	64.70%	16.60%	14.00%	74.60%	72.00%	36.80%	66.80%	12.40%	8.80%	14.50%	39.40%

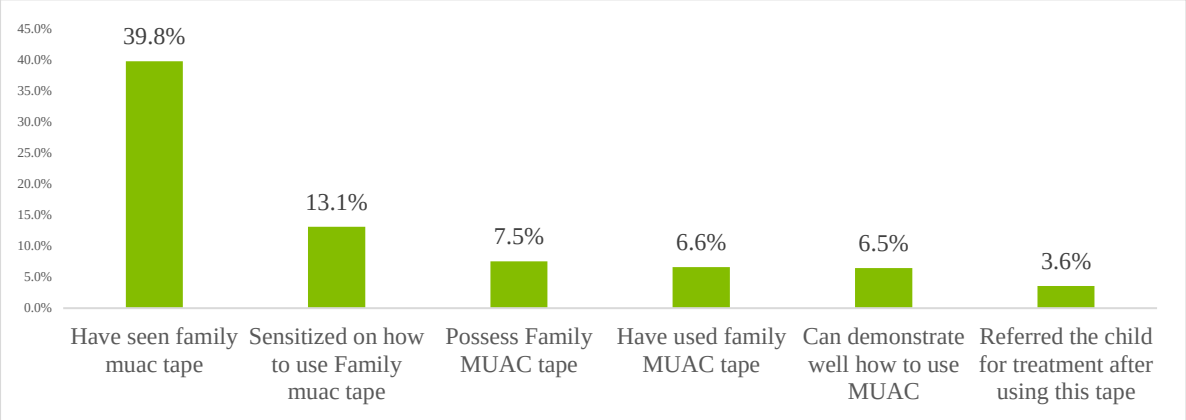
Table 15: Details about the cut off points and classification for IYCF indicators.

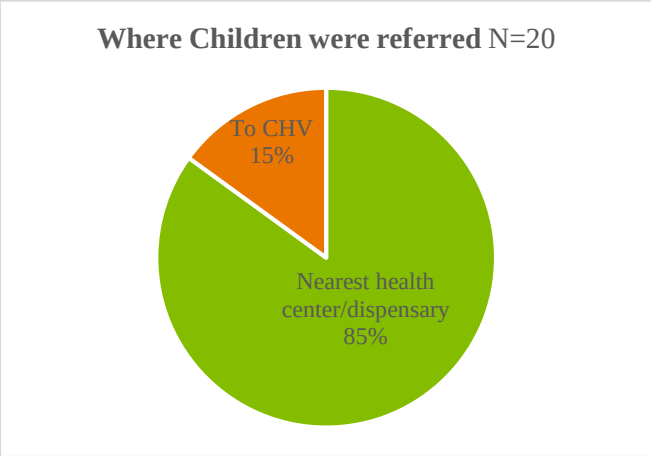
Rating Legend			
Rating	**Threshold**	**Indicator**	**Interpretation**
Poor Performance	0-25%	MDD, MMF, MAD, ZVF, EFF, CBF	Performance is significantly below recommended practices, indicating an urgent need for intervention.
	76-100%	SwB, UFC	
Fair Performance	26-50%	MDD, MMF, MAD, ZVF, EFF, CBF	Some recommended practices are being followed, but there is substantial room for improvement.
	51-75%	SwB, UFC	
Good Performance	51-75%	MDD, MMF, MAD, ZVF, EFF, CBF	Majority of the recommended practices are in place, but there are still opportunities for improvement.
	26-50%	SwB, UFC	
Excellent Performance	76-100%	MDD, MMF, MAD, ZVF, EFF, CBF	Nearly all or all recommended practices are being followed, indicating an ideal situation.
	0-25%	SwB, UFC	

3.9 Family MUAC

The Family MUAC approach trains mothers, caregivers and other family members on how to use color-coded MUAC tapes to check the nutritional status of their children. MUAC offers many advantages including its simplicity to understand and use; MUAC better identifies children at highest risk of death from common childhood illness and regular screening in the community has been shown to improve early diagnosis while decreasing risk of medical complication or death. Family MUAC offer the advantage of frequent screening improving chances of early detection for wasting.

The figure below shows caregivers‘ response on family MUAC implentation.





3.10. Food Fortification

Food fortification is addition of vitamins and minerals in commonly consumed staple foods to make the food a superior source of these micronutrients. Compared to other interventions, food fortification is assumed to be more cost-effective. It is also considered a more sustainable. intervention because it can reach wider populations without changes in existing consumption. patterns. If fortified foods are regularly consumed in sufficient quantities, it has the advantage of maintaining steady body stores of the micronutrients[18]. Only 2% (n=558) of the respondents reported to be aware of food fortification in the County. The main source of information about fortification n was reported to be training session (60%) and radio (40%)

[18] http://www.nutritionhealth.or.ke/programmes/micronutrient-deficiency-control/food-fortification/ Overview of food fortification program

4.0. CONCLUSION

The SMART survey conducted in June 2023 found that the estimated prevalence of global acute malnutrition (GAM) was 20.3 % (16.7 - 24.4 95% C.I.). This is classified very High (≥15%) based on the revised prevalence thresholds. The county was classified as Phase 4 (Critical) according to Integrated Phase Classification (IPC). Stunting was of major concern with 37 in every 100 children under five years (37.2%) suffering from it.

The causes of malnutrition were many and include, but were not limited to, suboptimal child feeding practices, inadequate diet, frequent incidences of diseases among young children, Poor access to safe water, Poor hygiene practices and the low socioeconomic status and poor nutritional conditions of some mothers.

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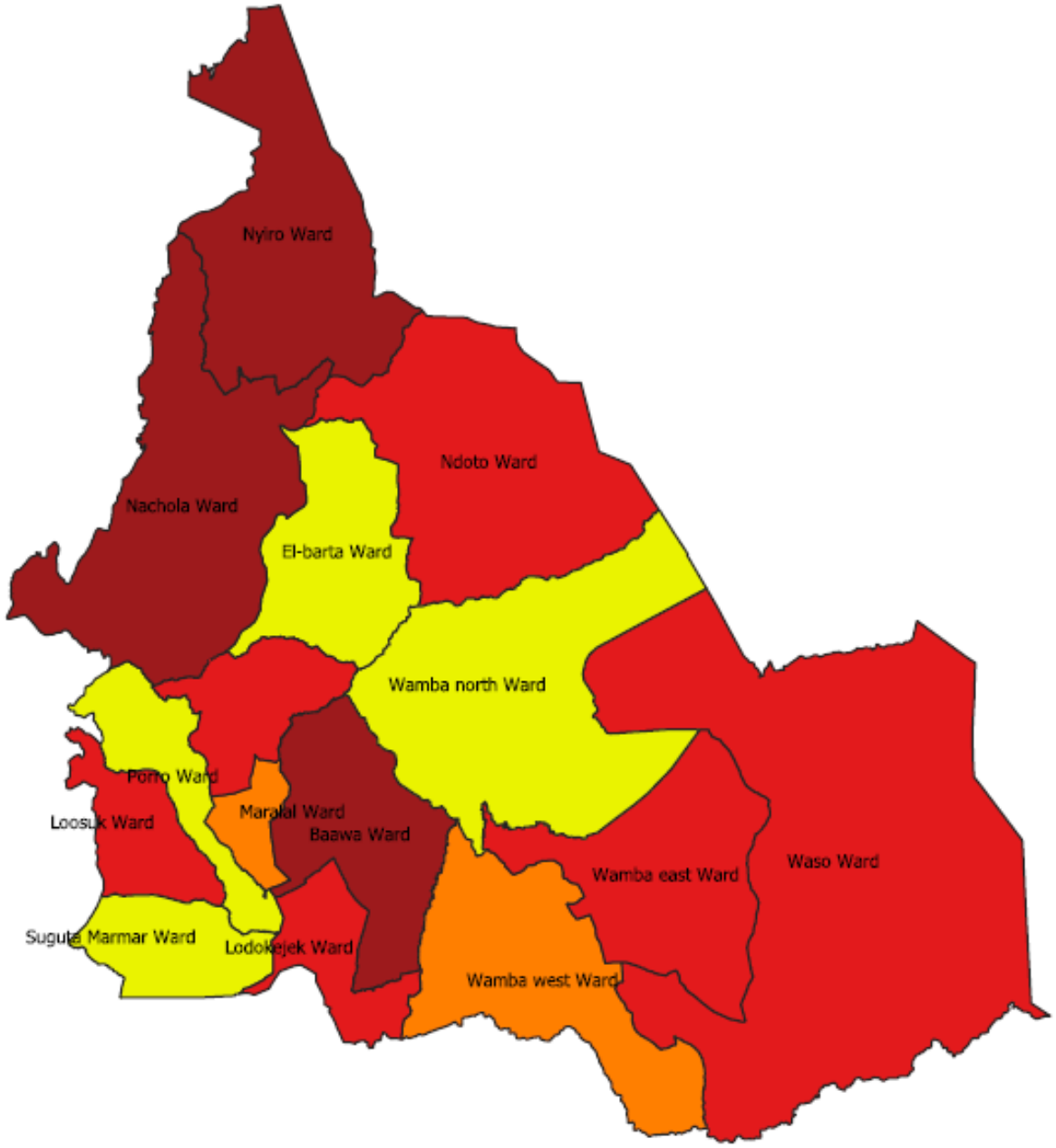
5.0. RECOMMENDATIONS

Indicator	Recommendation	By Who	By When
High Acute Malnutrition GAM – 20.3% SAM - 1.9%	Remap out hotspots for Mass screening and outreaches	MOH and partners	August 2023
	Initiate Mass screening in mapped out hotspots	MOH and partners	August 2023
	Conduct integrated outreaches in mapped out hotspots for acute malnutrition, mass screening and hard to reach areas.	MOH and partners	August 2023
	Train HCWs on Integrated management of Acute malnutrition.	MOH and partners	December 2023
	Preposition Nutrition supplies in sub county hubs	MOH and partners	September 2023
	Scale up Family MUAC	MOH and partners	December 2023
High Chronic malnutrition Stunting – 37.2%	Scale up BFCI in CUs	MOH and partners	June 2024
	Train HCWs on MIYCN/MIYCNe	MOH and partners	December 2023
	Intensify Food and cooking demonstrations in community units	MOH, MoAL&F and partners	June 2024
	Initiate and scale up weekly iron folate acid supplementation for adolescent girls in schools	MOH, MoE and partners	June 2023
Morbidity	Train HCWs on and initiate ICCM	MOH and Partners	June 2024
	Preposition health supplies in sub county hubs	MoH and Partners	June 2024
WASH Water treatment -11% Hand washing -18.3% Open defecation-61.8%	Sensitize communities on Water treatment methods and distribution of water treatment chemicals	MOH and Partners	June 2024
	Procure and distribute water treatment chemicals	MoH, MOW, Partners	June 2024
	Scale up community led total sanitation in all villages to certification	MOH and partners	June 2024
Food Security	Conduct food demonstrations at the community level in collaboration with department of Agriculture	MOH, MOA and partners	June 2024

APPENDIX

Appendix 1: Mapped out hotspots- June 2023



Appendix ii. Summary of plausibility report

Overall data quality

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	Score
Flagged data	Incl	%	0-2.5	>2.5-5.0	>5.0-7.5	>7.5	
(% of out of range subjects)			0	5	10	20	**0** (0.7 %)
Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**0** (p=0.966)
Age ratio(6-29 vs 30-59)	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**0** (p=0.134)
Dig pref score - weight	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (5)
Dig pref score - height	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (6)
Dig pref score - MUAC	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (4)
Standard Dev WHZ	Excl	SD	<1.1	<1.15	<1.20	>=1.20	
.			and	and	and	or	
.	Excl	SD	>0.9	>0.85	>0.80	<=0.80	
			0	5	10	20	**0** (0.96)
Skewness WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**1** (0.29)
Kurtosis WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**1** (-0.35)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<=0.001	
			0	1	3	5	**0** (p=0.320)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	**2** %

The overall score of this survey is 2 %, this is excellent.

Appendix iii

Samburu SMART Survey June 2023

Subcounty	Ward	Cluster	Cluster
Samburu Central	Angata Nanyoike	Nkorika	1
Samburu Central	Loosuk	Loosuk Town C	2
Samburu Central	Lodokejek	Mugur B	3
Samburu Central	Maralal	Lmutaro 5	4
Samburu Central	Maralal	Lgoss	5
Samburu Central	Maralal	Stadium 2 (Akiba tree nursery)	6
Samburu Central	Maralal	Sirai/Shabaa	7
Samburu Central	Maralal	Loilkurikuri	8
Samburu Central	Maralal	Lmutaro Behind Primary School	9
Samburu Central	Maralal	Yamo	10
Samburu Central	Baawa	Moru/Kirapash	11
Samburu Central	Poro	Serelokari/Losio	12
Samburu Central	Poro	Namibia	13
Samburu Central	Baawa	Lorrok Lolmongo	14
Samburu Central	Suguta Marmar	Angata Rongai A	15
Samburu Central	Suguta Marmar	Nkutoto/elpere	16
Samburu Central	Lodokejek	Lkichaki	17
Samburu Central	Suguta Marmar	Ntandurai	18
Samburu Central	Lodokejek	Suradoru B	19
Samburu Central	Lodokejek	Siiti	20
Samburu East	Wamba West	Lekupe	21
Samburu East	Waso	Township A	22
Samburu East	Wamba North	Leiroiya	23
Samburu East	Waso	Nakwamor	24
Samburu East	Wamba East	Matakwani	25
Samburu East	Wamba West	Nalepoboo	26
Samburu East	Waso	Leitemu	27
Samburu East	Wamba East	Lpashie	28
Samburu East	Wamba West	Saasab	29
Samburu East	Wamba East	Ilakweny	30
Samburu East	Waso	Ndonyo Wasin Town	31
Samburu North	Nachola	Natiti	32
Samburu North	El-Barta	Leonti	33
Samburu North	Nyiro	Parkati	34
Samburu North	Nyiro	Anderi	35
Samburu North	Nyiro	Loruko	36

Subcounty	Ward	Cluster	Cluster
Samburu North	Ndoto	Seren	37
Samburu North	Ndoto	Lolpopongi/lesirkan	38
Samburu North	Nachola	Nachola	39
Samburu North	Ndoto	Ntepes	40
Samburu Central	Maralal	Ledero	RC
Samburu Central	Baawa	Nyobit	RC
Samburu Central	Suguta Marmar	Longuin/intin/Lesukua	RC
Samburu East	Waso	Mabati	RC
Samburu North	Nachola	Parkichon	RC