TURKANA SMART NUTRITION SURVEY

JUNE 2023 REPORT

Supporting partners

ACKNOWLEDGEMENT

Turkana 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 levels.

Therefore, the Directorate of Family Health would like to take this early opportunity to acknowledge effort and support of all those individuals and organizations that supported and participated in the survey. Specifically, I would like to thank UNICEF Kenya, Concern World Wide, World Vision Kenya, Save the Children International, WHH, World Relief, KRCS, USAID Nawiri, IRC, Malteser International, Panafricare and NDMA for their financial, in-kind and technical support.

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LIST OF ABBREVIATION

1	ANC	Ante Natal Care
2	ARI	Acute Respiratory Infections
3	ASAL	Arid and Semi-Arid Lands
4	BCG	Bacille Calmette Guerin
5	BFCI	Baby Friendly Community Initiative
6	CDH	County Director of Health
7	CECM	County Executive Committee Member
8	CHMT	County Health Management Team
9	CHS	Community Health Services
10	CHV	Community Health Volunteer
11	CHWs	Community Health Workers
12	CI	Confidence interval
13	CIDP	County Integrated Development Plan
14	cIMCI	community Integrated Management of Childhood Illnesses
15	CL	Cluster
16	CLTS	Community led Total Sanitation
17	cm	Centimetre
18	CMAM	Community Management of acute Malnutrition
19	CMR	Crude Mortality Rate
20	CNC	County Nutrition Coordinator
21	CO	Chief Officer
22	CSB	Corn Soy Blend
23	CSG	County Steering Group
24	CSI	Coping strategy index
25	CWW	Concern World Wide
26	DD	Dietary Diversity
27	DoL	Diocese of Lodwar
28	ENA	Emergency Nutrition Assessment
29	EPI	Expanded Program on Immunizations
30	EWS	Early Warning System
31	FANC	Focused ante natal care
32	FAO	United Nations Food and Agriculture Organization
33	FBO	Faith based Organization
34	FCS	Food Consumption Score
35	FEWSNET	Famine Early Warning Systems Network
36	FFA	Food For Asset
37	FSL	Food security and livelihood
38	GAM	Global Acute Malnutrition
39	GFD	General Food Distribution
40	GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
41	GoK	Government of Kenya

42	HAZ	Height for Age -Z score
43	HDD	Household Dietary Diversity
44	HH	Household
45	HiNi	High Impact Nutrition Interventions
46	HNDU	Human Nutrition and Dietetics Unit
47	HSNP	Hunger Safety Net Program
48	IDP	Internally Displace Persons
49	IFA	Iron and Folic Acid
50	IFAS	Iron and Folic Acid Supplements
51	IMAM	Integrated Management of Acute Malnutrition
52	IPC	Integrated Food Security Phase Classification
53	IRC	International Rescue Committee
54	KEMSA	Kenya Medical Supplies Agency
55	KEPI	Kenya Expanded Programme of Immunisation
56	KFSSG	Kenya Food Security Steering Group
57	KHIS	Kenya Health Information System
58	KIHBS	Kenya Integrated Household and Budget Survey
59	KNBS	Kenya National Bureau of statistics
60	KRCS	Kenya Red Cross Society
61	LMIS	Logistics Management Information System
62	LRA	Long Rains Assessment
63	MAM	Moderate Acute malnutrition
64	MCH	Mother Child Booklet
65	MDD	Minimum Dietary Diversity
66	MDD-W	Minimum Dietary Diversity for Women
67	MOH	Ministry of Health
68	MOW	Ministry of Water
69	MSP	Multi Stake Holder Forum
70	MUAC	Mid Upper Arm Circumference
71	NDMA	National Drought Management Authority
72	NGO	Non-governmental Organization
73	NICHE	Nutrition Improvement Through Cash and Health Education
74	NIWG	Nutrition Information Working Group
75	ODK	Open Data Kit
76	OJT	On The Job Training
77	OPV	Oral polio Vaccine
78	ORS	Oral Rehydration Solution
79	OTP	Outpatient Therapeutic Programme
80	PLW	Pregnant and Lactating Women
81	PPS	Probability proportional to size
82	RC	Reserve cluster
83	RUSF	Ready To use Supplementary food

84	RUTF	Ready To Use Therapeutic Food
85	SAM	Severe Acute Malnutrition
86	SANNUT	Sanitation and Nutrition Program
87	SCHMT	Sub-County Health Management Team
88	SCI	Save the Children International
89	SCNO	Sub County Nutrition Officer
90	SD	Standard Deviation
91	SFP	Supplementary Feeding Programme
92	SMART	Standardized Monitoring and Assessment of Relief and Transitions
93	SPSS	Statistical package for Social Sciences
94	TV	Television
95	U5	Under Five Years Old
96	UMR	Under-five Mortality Rate
97	UN	United Nations
98	UNICEF	United Nations Children's Fund
99	WASH	Water Sanitation and Hygiene
100	WAZ	Weight for Age -Z score
101	WFP	World Food Programme
102	WHH	Welt Hunger Hilfe
103	WHO	World Health Organization
104	WHO-GS	World Health Organisation Growth Standards
105	WHZ	Weight for Height -Z score
106	WR	World Relief
107	WRA	Women of Reproductive Age
108	WVK	World Vision Kenya

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EXCUTIVE SUMMARY

Introduction

The Turkana County Department of Health and Sanitation in collaboration with nutrition partners UNICEF Kenya, Concern World Wide, World Vision Kenya, Save the Children International (SCI), WHH, World Relief (WR), KRCS, USAID Nawiri, International Rescue Committee (IRC), Malteser International, Panafricare and NDMA successfully conducted four independent SMART surveys in June 2023 covering the entire county. The survey covered all the four livelihood zones in the county (pastoral, agro-pastoral, Fisher forks and formal employment/business/petty trade). The survey zones were namely Turkana Central (Central and Loima Sub Counties), Turkana North (North and Kibish Sub Counties), Turkana South (South and East Sub Counties) and Turkana West (West Sub County).

The main goal of the survey was to determine the prevalence of malnutrition among the children aged 6-59 months old and determine mortality rate in Turkana County. The survey had several specific objectives which included to assess the prevalence of malnutrition among children under five-year-old and to assess malnutrition levels among women of reproductive age by MUAC. In addition, the survey was to determine the immunization coverage for measles, Oral Polio Vaccines (OPV 1 and 3), and vitamin A supplementation in children aged 6-59 months and to estimate coverage of iron / folic acid supplementation during pregnancy among WRA. Other specific objectives were to determine de-worming coverage for children aged 12 to 59 months; to determine the prevalence of common illnesses among children under five and to collect information on possible underlying causes of malnutrition such as household food security, water, sanitation, and hygiene practices. Unlike in June 2022 this survey accessed IYCF indicators. Also assessed was crude mortality rate (CMR) and under five mortality rates (U5MR).

Methodology

The survey used the same methodology like in 2022; Standardized Monitoring Assessment for Relief and Transition Method (SMART). This is a cross-sectional design methodology. It is a descriptive study and aims to provide data on the entire population under study.

As detailed in the methodology, a two-stage sampling procedure was used in this survey. The first stage involved sampling of villages (clusters) from a sampling frame detailing the villages identified by information from KNBS estimated populations with contributions from community level leaders including chiefs/sub chiefs, ward administrators and with inputs from community health services program using ENA for SMART software (11th January 2020 version). In the second stage, households were selected randomly upon getting the updated list of households in the village/Cluster provided by the village elder/community health volunteer/promotor (CHV/P).

Based on previous SMART Survey experience and considering the maximum number of clusters allowed and considering the time spent on travelling to each household, introductions and breaks, 15-17 households were sampled per cluster per day for interview for the household questionnaire while 6 to 16 households per day were sampled for the mortality questionnaire. This depended on survey zones with Turkana West and Central having 15 households per day and the highest being Turkana South at 17 households per day. The data was uploaded in Kobo collect and ODK aggregate servers (hosted by Concern Worldwide) from the tablets and downloaded daily for plausibility checks and at the end of the survey for data analysis. 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. This formed the bases for supervisors' work for the day.

Anthropometric data processing was done using ENA software version 11thJanuary 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 2006 WHO malnutrition cut-offs. All the other quantitative data were analysed in the SPSS (Version 25) and Microsoft Excel 2016 computer packages.

The mortality section was also sampled through the ENA for SMART software with inputs from the previous survey (June 2022). Clusters were generated at the first stage sampling, while the second stage sampling was done at the village (the same clusters the household questionnaire was administered). Data was collected through kobo collect and analysis done using ENA for SMART and Excel software.

Table 1:Summary of the findings

S/No	Indicator	Acceptable values/range	Central	North	South	West	County
1	Overall plausibility score	<24	7 % excellent	3% excellent	6 % excellent	8 % excellent	
Anthropometric results (% (With 95% CI))							
	Indicator		**Central**	**North**	**South**	**West**	County
2	n	MUAC	573	713	746	528	2560
3	Global < 125mm		(33) 5.8 % (4.1 - 8.0 95% C.I.)	(52) 7.3 % (5.3 - 10.0 95% C.I.)	(67) 9.0 % (6.7 – 10.8 95% C.I.)	(68) 12.9 % (9.8 - 16.7 95% C.I.)	(220) 8.6 % (7.5 - 9.9 95% C.I.)
4	Severe under nutrition <115mm		(4) 0.7 % (0.3 - 1.8 95% C.I.)	(4) 0.6 % (0.2 - 1.5 95% C.I.)	(6) 0.8 % (0.4 - 1.7 95% C.I.)	(8) 1.5 % (0.8 - 3.0 95% C.I.)	(22) 0.9 % (0.6 - 1.3 95% C.I.)
5	n	Underweight	564	694	738	523	2446
6	Global underweight		(196) 34.8 % (28.8 - 41.2 95% C.I.)	(211) 29.7 % (24.6 - 35.4 95% C.I.)	(301) 40.8 % (36.4 - 45.3 95% C.I.)	(190) 36.3 % (30.5 - 42.6 95% C.I.)	(891) 36.4% (33.1 - 39.8 95% C.I.)
7	Severe underweight		(41) 7.3 % (4.9 - 10.7 95%C.I.)	(44) 6.2 % (4.2 - 9.2 95% C.I.)	(92) 12.3 % (9.4 - 16.0 95% C.I.)	(52) 9.9 % (7.3 - 13.5 95% C.I.)	(230) 9.4% (7.8 – 11.0 95% C.I.)
8	n	Stunting	n = 559	n= 694	n= 724	n = 506	n=2391

9	Global Stunting		(135) 24.2 % (19.8 - 29.1 95% C.I.)	(123) 17.7 % (14.1 - 22.1 95% C.I.)	(201) 27.8 % (23.2 – 33.0 95% C.I.)	(155) 30.6 % (25.8 - 35.9 95% C.I.)	(n=625) 26.10% (23.5 – 29.0 95% C.I.)
10	Severe Stunting		(37) 6.6 % (4.3 - 10.0 95% C.I.)	(25) 3.6 % (2.2 - 5.9 95% C.I.)	(64) 8.8 % (6.6 - 11.6 95% C.I.)	(54) 10.7 % (8.1 - 14.0 95% C.I.)	(n=189) 7.90% (6.4 - 9.7 95% C.I.)
11	n	Wasting	566	704	738	524	2442
12	Global Acute Malnutrition (GAM)		(144) 25.4 % (21.1 - 30.3 95% C.I.)	(167) 23.7 % (19.5 - 28.5 95% C.I.)	(241) 32.7 % (28.1 - 37.5 95% C.I.)	(113) 21.6 % (17.1 - 26.8 95% C.I.)	(591) 26.40% (23.5- 28.7 95% C.I)
13	Severe Acute Malnutrition (SAM)		(22) 3.9 % (2.4 - 6.2 95% C.I.)	(29) 4.1 % (2.8 - 6.0 95% C.I.)	(35) 4.7 % (3.2 - 6.8 95% C.I.)	(12) 2.3 % (1.3 - 4.0 95% C.I.)	(91) 3.70% (2.7 - 4.9 95% C.I.)
Child morbidity (last two weeks)							
	Indicator	Type of illness	Central	North	South	West	County
14	Ill	yes	25%	18%	21%	26%	23%
15	Type of illness	Fever with chills	73.9%%	62.3%	37.5%	46.7%	54.6%
16		ARI	70.4%	71.3%	73.3%	51.1%	65.2%
17		Watery diarrhea	40.1%	16.7%	12.7%	24.4%	25.8%
18		Bloody diarrhea	0.0%	0.0%	0.0%	0.0%	0.0%
19	Sought Assistance	Yes	99%	87%	88%	96%	94%
20	Zinc	yes	93%	95%	85%	91%	92%

	supplementation						
Vitamin A supplementation and deworming							
	Indicator	No. of times	Central	North	South	West	County
21	Vitamin A Supplementation (6- 11m)	Once	73.5%	94.2%	91.3%	94.4%	86.8%
22	Vitamin A Supplementation 12- 59m)	Twice	71.5%	90.5%	96%	98.9%	88.8%
23	Vitamin A supplementation 6- 59 months	Twice	71.7%	90.9%	97.3%	98.3%	90%
24	Deworming (12-59 m)	Once	74.4%	92.9%	96.8%	95.2%	90.4%
IMMUNISATION							
	Antigen	Means of Verification	Central	North	South	West	County
25	BCG	Presence of Scar	98.6%	97%	99%	100%	99%
26	OPV1	Card and Recall	98.4%	96.3%	98.8%	99.8%	98.7%
27	OPV3	Card and Recall	97.4%	96.5%	98.7%	99.7%	98.2%
28	Measles at 9 months	Card and Recall	95%	96%	98.7%	99%	98%
29	Measles at 18 months	Card and Recall	95%	96%	98%	100%	98%
MATERNAL NUTRITION							
	Indicator	Description	Central	North	South	West	County
30	MUAC< 21.0 cm	Women of reproductive age (non PLW)	13%	10%	11%	15%	12%
31	MUAC< 21.0 cm	Women of reproductive age - PLW	11%	10%	11%	8%	10%

32	Women supplemented with FeFo	Mothers of children less than 2 years	91%	92%	95%	89%	92%
33	Pregnant women consuming FeFo	above 180 days	2.3%	0.0%	6%	0.4%	2.7%
34	Pregnant women consuming FeFo	Below 90 days	49.8%	74.7%	17%	44.2%	40.3%
WATER HYGIENE AND SANITATION							
	Indicator	Description	Central	North	South	West	County
35	Households water consumption	at least 15 l per day	37.6%	57.5%	39.9%	63%	49%
36	Trekking distance	less than 500 m	21.2%	65.6%	44.7%	70.8%	50.7%
37	Household treating their drinking water		11%	21.9%	11.5%	25.9%	17.3%
38	Hand washing	4 critical times	55.5%	88.5%	52%	58.6%	57.4%
39	Relieving points	Open defecation	55.1%	85.8%	70.9%	68.4%	70.8%
Food security							
HOUSEHOLD AND WOMEN DIETARY DIVERSITY							
	Indicator	Description	Central	North	South	West	County
40	Hunger scale	Emergency & catastrophe	2%	15%	25%	13%	15%
41	Households consuming more than 5 food groups	Household dietary diversity	37.8%	1.9%	33.7%	17.7%	22.7%
42	Women consuming more than 5 food groups	(MDD-W)	30%	9%	13.0%	27%	22%
FOOD CONSUMPTION SCORE AND COPING STRATEGY INDEX							
	Indicator	Description	Central	North	South	West	County

43	Households FCS	Acceptable	38.0%	4.0%	50.5%	17.8%	28.8%
44	Reduced Coping Strategy index (rCSI)	Crisis +	31.8%	18.3%	42%	8.4%	26.3%
IYCF							
45	MDD		41.4%	10%	16.5%	30.3%	27.9%
46	MMF		40%	40%	43%	39%	41%
47	MAD		18%	5%	9%	14%	13%

Conclusion

The overall county nutrition situation significantly improved in June 2023 compared to June 2022 with noted improved across all the survey zones. The GAM was remained extremely critical in Turkana South Survey zone while it was critical at the county weighted average and the three other survey zone of Turkana West, North and Central. There was a significant reduction of GAM in Turkana North.

The persistent poor nutrition status is consistent with poor Food security indicator status; that is HDDS/ FCS. The key drivers to high undernutrition in the county slightly improved leading to improving trend of malnutrition. The malnutrition levels across the four survey zones are attributed to worsening food insecurity resulting from successive failed rains which led to drought and rapid increase in food prices, loss of livestock and poor coping mechanisms. Other drivers included chronic food insecurity, high prevalence of childhood illness, inadequate dietary diversity, poor access to safe water, poor hygiene practices, inadequate incomes and assets for the households.

The June 2023 mortality findings were within the acceptable levels for U5MR though CMR was above the threshold in all apart from South survey zone. CMR was at emergency for Turkana Central and North while it was at alert in Turkana West. The most prevalent causes of mortality were illnesses followed by trauma/ injury though there was no trauma in Turkana Central. Majority of deaths occurred at the current location of settlement.

Recommendations

Based on the survey findings the following actions were recommended:

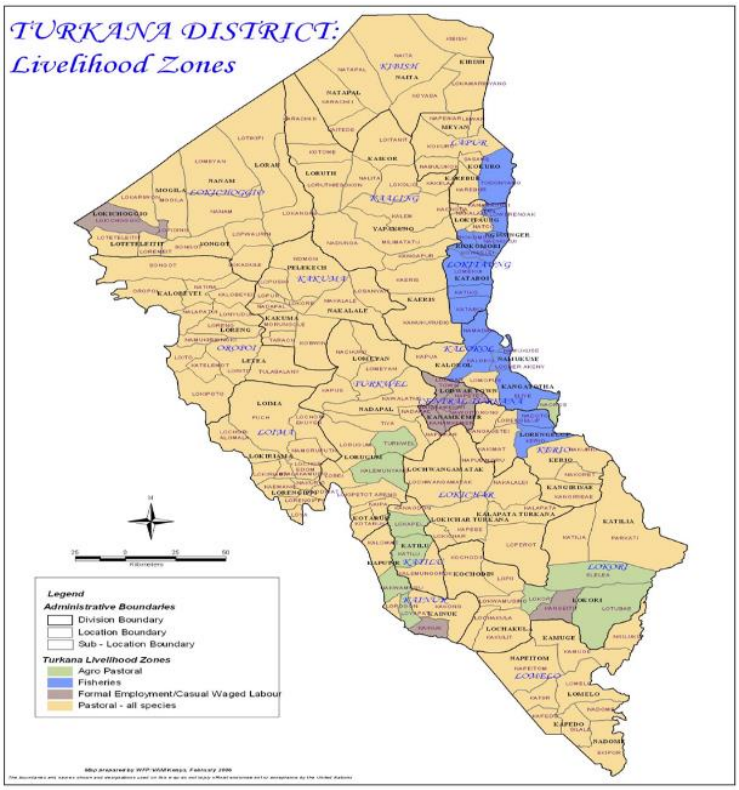
1. Continue with active case finding and referral in all malnutrition hot spots to ensure all malnourished women and children access treatment in all service delivery points
2. Scale up and strengthen WASH interventions
3. Remap and scale-up a sustainable strategy for integrated outreaches in hard-to-reach areas
4. Manage and strengthen supply chain for nutrition commodities
5. Strengthen quality of care for malnourished children through mentorship and training especially for severely malnourished children in inpatient care.
6. Scale up and strengthen SBCC through mother-to-mother support groups and at all service delivery points.
7. Continue with creation of linkages for acutely malnourished children and women to existing social safety net programs – Scale-up cash transfer and stabilize food markets in hard-to-reach areas.
8. Conduct peace building in most affected areas of Turkana south, Turkana North, T. west and Loima for improved humanitarian access.

9. Activate one health program for cross border programing.
10. Scale up school enrolment and retention.
11. Scaling up of school feeding programme for school going children
12. Initiate food for Assets (FFA) to compliment cash transfer
13. Rehabilitation of boreholes to minimize trekking distance
14. Implement low-cost /climate SMART/resilient technologies Water systems
15. Stimulate markets across the county
16. Plans to introduce adult education among the care- givers

1.0 CHAPTER 1

1.1 Background information

Turkana County is situated in the arid North-western region of the country. Internally it borders three countries, namely Ethiopia, Sudan and Uganda. it also borders Baringo, West Pokot and Samburu counties.



The County has an estimated total population *1,049,168 and 147,856 of <5s (according to 2022 Estimates*) and covers an area of 77,000km^2 (KNBS 2019). The county is divided into seven sub counties and seventeen administrative divisions.

According to NDMA, the County has four main livelihood zones. Nearly 60% of the population is considered pastoral, 20% agro pastoral, 12% fisher folks and 8% are in the urban/peri-urban formal and informal employments.

According to KNBS report 2016, Turkana County is the poorest county in Kenya at 79.4% compared to a national average of 31.6%.

Turkana County is a drought prone area that experiences frequent, successive and prolonged drought and cattle rustling which leads to heavy losses of lives and livestock.

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1.2 Survey Justification

According to the February 2022 Integrated Phase Classification (IPC) for acute malnutrition among children U5, Turkana is ranked at critical phase (IPC Phase 4- GAM 15-30% percent). In the June 2021 SMART survey, Acute malnutrition levels remains above emergency level in the 4 Turkana survey zones; T. Central 19.3%, T. North 25.4%, T. South 23.4% and T. West 16.5%. The county is classified as “Crisis” (IPC Phase 3, food security) as per the February 2021 SRA assessment report. The county’s EWS bulletin June 2022, shows the county was at ALRT drought phase and worsening in all livelihood apart from agro-pastoral which was stable. The last SMART survey was conducted in June 2021 which is considered outdated. This survey provides a progress update of health, nutrition and food security situation in the county to inform response actions, LRA report and programme adjustments. Last mortality survey was conducted in 2017, thus it was over three years the specified duration to carry out mortality survey. There had been other shocks including COVID 19 pandemic, prolonged, depressed long rains and insecurity along the borders.

1.3 Humanitarian and Development partners

Many agencies, UN and NGOs are working in collaboration with the County Department of Health (CDH), Decentralized Public Administration, and Disaster Response in child survival interventions. The main responsibility of County is coordination, resource mobilization and quality assurance of the integrated health, nutrition, food security and WASH response in the county.

1.4 Main Objective

The main goal of the survey was to determine the prevalence of malnutrition among the children aged 6-59 months old and women of reproductive age (WRA), and determine morbidity levels in Turkana County.

1.4.1 **Specific Objectives**

1. To assess the prevalence of malnutrition among 6-59 months old children.
2. To assess malnutrition levels among women of reproductive age by MUAC.
3. To determine the immunization coverage for measles, Oral Polio Vaccines (OPV 1 and 3), and vitamin A supplementation in children aged 6-59 months;
4. To estimate coverage of iron / folic acid supplementation during pregnancy in women of reproductive age
5. To determine de-worming coverage for children aged 12 to 59 months;
6. To determine the prevalence of common illnesses among children under five;
7. To collect information on possible underlying causes of malnutrition such as household food security, water, sanitation, and hygiene practices.
8. To assess the Minimum meal frequency, Minimum Acceptable Diet and Minimum Dietary Diversity for children aged 6-23 months
9. To estimate the crude mortality rate (CMR) and under five mortality rate (U5MR) Timing of Turkana SMART survey

The survey was conducted towards the end of the long rains, in the month of June 2023.
The results of the survey fed into the LRA 2023.

Table 1:Seasonal calendar

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Dry Season			**Long Rain**			**Dry Cool Season**			**Short Rains**		

1.5 Survey Area

There are a total of 7 sub counties in Turkana County. Due to the vastness and heterogeneity of the county, four independent surveys were conducted as summarized below;

Table 2: Turkana County survey zones

No	Survey Zone	Administrative Sub counties
1		

	Turkana Central	Turkana Central and Loima
2	Turkana North	Turkana North and Kibish
3	Turkana West	Turkana West
4	Turkana South	Turkana South and Turkana East

2.0 CHAPTER TWO

2.1 METHODOLOGY

The June 2023 survey used SMART Methodology in planning, training, data entry and analysis. There was other data sets collected concurrently included data on Water Sanitation and Hygiene (WASH) and Food security and livelihood (FSL) as well as Morbidity and Causes.The whole survey was done in consideration with all guidelines as stipulated by the MoH at county and national level. The survey methodology was presented to the County Steering Group (CSG) and National Nutrition Information Working Group (NIWG) for validation before commencement of data collection. Necessary COVID 19 infections preventive measures were put in place during recruitment, training data collection, analysis and dissemination of results.

2.1.1 **Sample size calculation**

The Sample size was calculated using as per ENA for SMART software Jan 11th 2020 version. The table below outlines factors considered when determining the sample size calculation.

Table 3: Sample size calculation- June 2023

Variable	**Turkana Central**	**Turkana South**	**Turkana North**	**Turkana West**	**Rationale**
Estimate (GAM)	**19.5 %**	**24.7%**	**17.4%**	**30.8%**	Use of Lower CI due to projected slight improvement of nutrition situation from January 2023
Desired Precision	5.0%	5.0%	5.0%	5.0%	SMART methodology guidance (Rule of thumb)
Design Effect	1.5	1.5	1.5	1.5	Rule of thumb (All the ENA generated DEFF from Jan 2023 were above 1.8)
Estimated Number of Children	**394**	**467**	**361**	**535**	As per EN output
Average HH Size	6	6	6	6	From the 2019 census report
Non-Response Rate (%)	2	2	2	2	Based on previous SMART Survey Experience
Proportion of Children Under 5	15.3%	15%	14.6%	15%	From previous surveys
Estimated Number of Households	**486**	**588**	**467**	**674**	As per ENA output
Number of Households per Day	**15**	**18**	**16**	**15**	Based on previous SMART Survey Experience and considering the maximum No of clusters allowed
Number of Cluster	**37**	**44**	**42**	**35**	Computed from the Number of HHs per Day
Number of Teams	**6**	**8**	**7**	**6**	

Table 4: Sample size calculation- Mortality- June2023

Parameter	TC	TS	TN	TW	Rationale
Estimated death rate per 10,000/ day	0.20	0.41	0.16	0.40	Lower C.I from 2022 mortality survey because of insignificant Change in key determinants of mortality across the all-sub-counties
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	1.0	1.26	1.55	1.47	From 2022Mortality survey
Recall period in days	93	93	93	93	Based on 14th March which was the day the county experienced heavy rains after a long drought leading to heavy loss of livestock due to hypothermia.
Average HH size	6	6	6	6	KNBS census 2019
Non-response %	2	2	2	2	Based on previous surveys
Total No. HH to be surveyed	**170**	**439**	**211**	**500**	Based on ENA output
No. of HH per day/cluster	6	11	6	16	Calculated as per no. of clusters
Population to be included	999	2581	1239	2939	Based on ENA output

2.1.2 **Sampling method**

This survey used a two-stage sampling process. In the first stage villages were sampled from a sampling frame (villages identified by information from KNBS estimated populations with contributions from the chiefs/sub chiefs and Turkana community health services). Names of villages with their respective population sizes were then entered into ENA for SMART software (Jan 11th 2020 version). In the second stage households were randomly selected upon getting the updated list of households in the village/Cluster. A total of 15 to 17 households were sampled considering the time spent during travelling, introductions and breaks to each household per cluster for HH questionnaire and 6-16 households for mortality questionnaire. The definition of a household was a shelter or more whose residents and ate from the same "cooking pot" the day preceding the survey.

2.1.3 **Selection of children for anthropometry**

The June 2023 survey considered and included all children between 6-59 months of age staying in the selected household in the sample. Respondent were the primary caregivers of the index child/children. If a child and/or the caregiver were temporarily absent, then the survey team re-visited the household to collect the data at an appropriate time.

2.1.4 **Selection of women for determination of nutritional status**

The mother of the index child within the reproductive age (15-49years) in the identified households and any other household member within the age bracket was enlisted in the study and had their MUAC measurements taken.

2.1.5 **Survey team composition**

The June 2023 Turkana county SMART Survey had 8 survey zone coordinators and 2 survey managers as has been the case in the previous surveys. Unlike in June 2022 which had 27 teams the June 2023 had 22 teams, with each survey zone having between 5-6 teams. The number of teams per zone was determined by the number of clusters. Each team had 3 members; two measures, one enumerator/team leader. The coordinators and team leaders were from MOH & partner staff. The enumerators were selected based on past performance, experience in SMART survey and their performance during the standardization exercise.

2.1.6 **Survey team training**

A four days comprehensive training of the survey teams was carried out at in Lodwar town (the central place among the survey zones) where 2 halls each 37 participants were used. The training included sampling methods; anthropometric measurements; interviewing techniques; and completion of questionnaires. It also included standardization tests and pilot test and included each enumerator completing two questionnaires and all pre-tested questionnaires entered on a computer to test the practicability of data entry. The pre-test exercise was discussed and necessary changes on the questionnaire done accordingly.

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

- Anthropometry (weight, height, edema, MUAC, age, sex) for children and MUAC for mothers.
- Prevalence of childhood illnesses in the last 2 weeks prior to the survey.
- Water, hygiene and sanitation, social protection and Food security.
- Mortality

The standard survey questionnaires developed by the NITWG and modified to the context during the June 2023 period was used.

2.1.7 **Data collection**

The collected data was uploaded daily by the teams to ODK aggregate server hosted by Concern Worldwide. The team left at the central data center downloaded the anthropometry data daily to excel then to during data collection days, for plausibility checks and gave feedback to the teams every morning. Analysis of anthropometric data was done using ENA for SMART (Jan 11th 2020 version). Other data sets were analyzed using SPSS 25.0 and Microsoft Excel. Weighting of the sub county results was later done to obtain the County average.

2.1.8 **COVID 19 protocols**

COVID-19 protocols were observed throughout the survey, though there was general relaxation of COVID 19 containment measures across the survey zones.

2.1.9 **Variables Measured**

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 (double weighing scale).

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

MUAC: With the hand relaxed and hanging by the body's side, the Mid Upper Arm Circumference (MUAC) was measured to the nearest centimetres, at the middle point between the elbow and the shoulder, on the less active hand. MUAC measurements were taken for children 6-59months of age and for women in the reproductive age bracket (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

Coping strategy index (CSI): 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 meal time (1.0)
4. Limiting adult intake (3.0)
5. Reducing the number of meals per day (1.0)

CSI 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).

2.2 Nutrition Indicators

2.2.1 **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

Adapted from SMART Manual, Version 1, April 2006

2.2.2 **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.

2.3 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 a number of 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 January 2020). 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 version 25 and Microsoft excel.

2.4 Survey Limitations

1. 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.
2. 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. There was

another type of vitamin A tablets which were supplied by the county to the health facilities and was only discovered when the teams were in the field. This omission could have led to poor recall of vitamin A supplementation.

2.5 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.

3.0 CHAPTER THREE: RESULTS AND DISCUSSIONS

3.1 House hold demographics and socio economic indicators

3.1.1 Household demographic characteristics

3.1.1.1 Number of households surveyed

The June 2023 SMART survey reached 1.3% more households than sampled. All sampled households accepted to be interviewed. All sampled clusters as per the methodology were reached.

Table 7: Number of households surveyed

Survey Zone	No. of HHs Sampled	No. of HHs Reached	%	Non response rate	No. of Children sampled	No. of Children Reached	%	No. of Clusters Sampled	No. of Clusters done	%
T Central	486	490	101	0.0%	394	573	146.6	33	33	100
T North	588	590	100	0.0%	467	714	135.6	37	37	100
T West	467	487	104	0.0%	361	528	129.4	32	32	100
T South	674	676	100	0.0%	535	746	138.3	40	40	100
County	2215	2243	101%	0.0%	1757	2561	145.8	142	142	100

3.1.1.2 Average household size, Age cohort and Sex distribution of the members in the sampled households

The proportion of children under-five years slightly increased in the June 2023 SMART survey 28.4%, a 2.3 difference from the June 2022 SMART survey. This increase was sustained from the June 2021 SMART survey. Turkana North had the highest proportion of children the same trend as in June 2022.

Table 8: Age cohort distribution

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
Age category	Count	%	Count	%	Count	%	Count	%	Count	%
Less than 5 years	624	27.6%	743	33.7%	803	23.7%	561	32.0%	2731	28.4%
5 to less than 18 years	669	29.6%	477	21.7%	1174	34.7%	394	22.5%	2714	28.3%
18 years and above (Adult)	970	42.9%	983	44.6%	1409	41.6%	800	45.6%	4162	43.3%
n	2263		2203		3386		1755		9607	

The average household size in the county in June 2023 SMART survey remained basically the same at approximately 5 persons i.e., 4.28 a merely 0.04 decrease from June 2022; a change from an increasing trend. Unlike in June 2022 when the same household size cut across all the four survey zones, in June 2023, Turkana South average household size rose to 6 (5.01), the same as 2019 census report. Both Turkana North and West went below the 5 persons per household. The mean number of children under five years per household was 1.14, an increase from1.03, in June 2022 with all survey zones showing an increase.

Table 9:Household size per survey zone

	Turkana Central	Turkana North	Turkana South	Turkana West	**Turkana County**
Household size	4.62	3.73	5.01	3.60	4.28
Mean U5	1.17	1.21	1.10	1.08	1.14

3.1.2 **Residency and marital Status**

Only 0.2% (4 persons) of the respondents were not residents with 4 of them being refugees and one an IDP, an improvement 99.3% residents in June 2023 SMART survey. An increase in the refugee population in the sample can be attributed to integration within the host community. IDP reduced due stabilization of security within the county.

Table 10: Residency

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
IDP	1	0.2%	0	0.0%	0	0.0%	0	0.0%	1	0.0%
Refugee	0	0.0%	1	0.2%	3	0.4%	0	0.0%	4	0.2%
Resident - Nomadic/Pastoralist	30	6.1%	79	13.4%	123	18.2%	26	5.3%	258	11.5%
Resident - Permanent residential	459	93.7%	510	86.4%	550	81.4%	461	94.7%	1980	88.3%
n	490		590		676		487		2243	

3.1.3 **Immigrant children in the households**

The survey also investigated the reasons for children migration. The proportion of children who had migrated slightly reduced with 0.1% drop which was 20 children difference maintaining the reducing trend from June 2021. A big improvement was witnessed in Turkana South with a reduction from 11.8% to 6.8%. This could have a bearing in the improved nutrition situation in the sub-county.

Table 11: Children migration

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
No	450	91.8%	575	97.5%	630	93.2%	454	93.2%	2109	94.0%
Yes	40	8.2%	15	2.5%	46	6.8%	33	6.8%	134	6.0%
n	490		590		676		487		2243	

3.1.4 **Reasons for Children migration**

Lack of food at home was the main reason children migrated followed by the mother/father left home, however death of caregiver came up prominently during this year's survey with Turkana Central survey zone on the lead. All survey zones showed elevated proportion of children migrating due to lack of food with Turkana North and West having more than half of children migrating due to lack of food. This showed still food insecurity was prevalent in the county. Only Turkana North didn't have children migrating because they were living in the streets. Important to note was lack of nearby school was not given a reason for migration unlike in previous surveys where it was the main reason.

Table 12: Reasons for Children migration

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
Child was living on the street	1	2.5%	0	0.0%	0	0.0%	1	3.0%	2	1.5%
His/her caregiver died	12	30.0%	3	20.0%	11	23.9%	6	18.2%	32	23.9%
His/her Father and Mother left home	11	27.5%	1	6.7%	13	28.3%	8	24.2%	33	24.6%
other	1	2.5%	3	20.0%	2	4.3%	1	3.0%	7	5.2%
The child did not have access to food	15	37.5%	8	53.3%	20	43.5%	17	51.5%	60	44.8%
n	40		15		46		33		134	

3.1.5 **Caretakers' marital status**

Caregivers' marital status is correlated with good child care practices. Thus, this survey assessed the proportion of caregivers who were married. Caregivers who were married improved from 80.2% to 84.2% in the June 2023 SMART survey changing the stagnation from the last two surveys. The rest of the indicators maintained the decreasing trend. Turkana West had the highest number of widowed respondents hence the lowest married respondents.

Table 13: Summary of caretakers' marital status

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
Divorced	1	0.2%	11	1.9%	6	0.9%	23	4.7%	41	1.8%
Married	425	86.7%	509	86.3%	582	86.1%	373	76.6%	1889	84.2%
separated	5	1.0%	17	2.9%	9	1.3%	14	2.9%	45	2.0%
Single	51	10.4%	22	3.7%	22	3.3%	22	4.5%	117	5.2%
Widowed	8	1.6%	31	5.3%	57	8.4%	55	11.3%	151	6.7%
n	490		590		676		487		2243	

3.1.6 **Occupation of the household main provider**

The June 2023 SMART survey found livestock herding, firewood/charcoal and petty trade were the main occupation for main provider of the interviewed households. This was the same top three in the last survey though the arrangement changed where petty trade was leading in June 2022. Livestock herding led in all survey zones except in Turkana West where firewood/charcoal was the main occupation. Petty trade continued to be a major occupation in survey zones with major town centers. Salaried / employed population remained low as was the case in the last SMART survey.

Table 14: Summary of household's main provider occupation

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
Crop farming/Own farm labour	26	5.3%	19	3.2%	73	10.8 %	16	3.3%	134	6.0%
Employed (salaried)	11	2.2%	3	0.5%	36	5.3%	4	0.8%	54	2.4%
Firewood/charcoal	112	22.9%	142	24.1 %	122	18.0 %	148	30.4 %	524	23.4%
Fishing	32	6.5%	40	6.8%	0	0.0%	1	0.2%	73	3.3%

Livestock herding	113	23.1%	276	46.8 %	245	36.2 %	133	27.3 %	767	34.2%
Merchant/trader	16	3.3%	6	1.0%	13	1.9%	5	1.0%	40	1.8%
Others (Specify)	5	1.0%	4	0.7%	18	2.7%	11	2.3%	38	1.7%
Petty trade	101	20.6%	82	13.9 %	95	14.1 %	94	19.3 %	372	16.6%
Waged labour (Casual)	74	15.1%	18	3.1%	74	10.9 %	75	15.4 %	241	10.7%
n	490		590		676		487		2243	

3.1.7 **Main current source of income of the Household head**

The dominant source of income for the household for all survey zones was petty trading indicating majority of household have no stable sources of income. Among the major petty trade are the firewood/ charcoal selling which is destructive form of livelihood. Sale of livestock came in third. Considering the ongoing drought, this current source of income might be depleted with time. Important to note was that no income was the second most common response indicating that most households were destitute. Unlike the last survey where destructive income sources like sale of alcohol and personal assets were prevalent, this survey recoded only sale of personal assets at 0.6%, a more than 50% reduction from 1.5%.

Table 15: Main current source of income of the Household head

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
Casual labor	80	16.3%	38	6.4%	70	10.4%	67	13.8%	255	11.4%
Emergency Cash Transfer	1	0.2%	0	0.0%	1	0.1%	0	0.0%	2	0.1%
No income	60	12.2%	130	22.0%	149	22.0%	93	19.1%	432	19.3%
Others (Specify)	23	4.7%	2	0.3%	10	1.5%	4	0.8%	39	1.7%
Permanent job	9	1.8%	2	0.3%	30	4.4%	4	0.8%	45	2.0%
Petty trading e.g. sale of firewood	192	39.2%	228	38.6%	210	31.1%	243	49.9%	873	38.9%
Regular cash transfer program (HSNP or Inua Jamii)	2	0.4%	0	0.0%	0	0.0%	1	0.2%	3	0.1%
Remittance	5	1.0%	1	0.2%	10	1.5%	4	0.8%	20	0.9%
Sale of crops	39	8.0%	6	1.0%	75	11.1%	18	3.7%	138	6.2%
Sale of livestock	50	10.2%	122	20.7%	91	13.5%	42	8.6%	305	13.6%
Sale of livestock products	26	5.3%	55	9.3%	27	4.0%	9	1.8%	117	5.2%
Sale of personal assets	3	0.6%	6	1.0%	3	0.4%	2	0.4%	14	0.6%
n	490		590		676		487		2243	

3.1.8 **Education**

3.1.8.1 Highest Education level for adults

There was improvement of literacy level of care givers interviewed in the June 2023 SMART survey compared to June 2022 from 17% to 31.8%. A total of 68.2% of the interviewed care givers had no formal education an improvement from 83.0% in June 2022. Turkana North was the most affected at 89.6%. Turkana west was the most literate.

Table 16: Education Levels

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
Tertiary	49	5.1%	11	1.1%	54	3.8%	18	2.3%	132	3.2%
Secondary	131	13.5%	32	3.3%	198	14.1%	84	10.5%	445	10.7%
Primary	125	12.9%	48	4.9%	178	12.6%	100	12.5%	451	10.8%
Pre primary	13	1.3%	8	0.8%	136	9.7%	129	16.1%	286	6.9%
other	2	0.2%	0	0.0%	2	0.1%	0	0.0%	4	0.1%
None	649	66.9%	881	89.6%	840	59.6%	468	58.5%	2838	68.2%
Madrasa / Duksi	1	0.1%	3	0.3%	1	0.1%	1	0.1%	6	0.1%
n	970		983		1409		800		4162	

3.1.8.2 School enrolment for age group 3 years to 18 years

There was a 3.7% increase in school enrollment of children in Turkana County in June 2023 compared to the same period the previous year. Though a high decline was noted in Turkana South from 91.0% to 77.9%. Turkana Central led with the proportion of children enrolled in school while Turkana North was the worst which could be attributed to access.

Table 17: School enrollment per survey zone

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	776	87.1%	468	61.3%	1162	77.9%	491	82.0%	2897	77.4%
No	115	12.9%	295	38.7%	329	22.1%	108	18.0%	847	22.6%
Total	891		763		1491		599		3744	

Enrollment in the ECD (36 to 59 months age category) declined slightly from 78.2% to 75.8%. Turkana West had the best enrollment unlike in June 2022 when Turkana South was the best. Turkana North survey zone had the worst enrollment within the 36 to 59 months category though almost the same as the rest. This could be attributed to the poor access. Improvement was witnessed in the formal education (6 to 18 years), from 72.4% to 78.0%, a 5.6% deference. This time, Turkana South survey zone showed the best performance with only 9.4% reporting not to be in school. The table below details the school enrolment results.

Table 18: School enrolment for age group 3 years to 18 years

		Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
		Count	%	Count	%	Count	%	Count	%	Count	%
Less than 5 years	Yes	170	76.6%	205	71.7%	240	75.7%	166	81.0%	781	75.8%
	No	52	23.4%	81	28.3%	77	24.3%	39	19.0%	249	24.2%
	n	222		286		317		205		1030	
5 to less than 18 years	Yes	606	90.6%	263	55.1%	922	78.5%	325	82.5%	2116	78.0%
	No	63	9.4%	214	44.9%	252	21.5%	69	17.5%	598	22.0%
	n	669		477		1174		394		2714	

3.1.9 **Reason for not attending school**

A total of 847 (22.6%) of children were reported not be enrolled in any form of education. The main reasons for not attending school were; family labour responsibility 37.3% from 35% in 2022, no school nearby 16.5% from 23.8% and too young to go to school 15.7%. The proportion of caregivers who did not see the importance of school were highest in Turkana West while it was lowest in Turkana North.

Table 18: Reasons for not attending school-June 2023

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
Chronic Sickness	0	0.0%	3	1.0%	0	0.0%	0	0.0%	3	0.4%
Family labour responsibilities	21	18.3%	159	53.9%	127	38.6%	9	8.3%	316	37.3%
Household doesn't see value of schooling	19	16.5%	12	4.1%	45	13.7%	26	24.1%	102	12.0%
Insecurity / violence	0	0.0%	3	1.0%	3	0.9%	0	0.0%	6	0.7%
lack of fees or money to meet other costs	32	27.8%	21	7.1%	26	7.9%	14	13.0%	93	11.0%
Married	1	0.9%	0	0.0%	1	0.3%	1	0.9%	3	0.4%
Migrated/ moved from school area	1	0.9%	9	3.1%	1	0.3%	1	0.9%	12	1.4%
No food in the schools	1	0.9%	2	.7%	0	0.0%	1	0.9%	4	0.5%
No school Near by	2	1.7%	79	26.8%	47	14.3%	12	11.1%	140	16.5%
Others (specify)	3	2.6%	0	0.0%	12	3.6%	5	4.6%	20	2.4%
Pregnant / Taking care of her own child	1	0.9%	0	0.0%	1	0.3%	1	0.9%	3	0.4%
Teacher absenteeism	0	0.0%	1	.3%	6	1.8%	0	0.0%	7	0.8%
Too young to be in school	34	29.6%	3	1.0%	58	17.6%	38	35.2%	133	15.7%
Weather (rain, floods, storms)	0	0.0%	3	1.0%	1	0.3%	0	0.0%	4	0.5%
Working outside home	0	0.0%	0	0.0%	1	0.3%	0	0.0%	1	0.1%
n	115		295		329		108		847	

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3.2 Anthropometry

Most of interviewed children had their age verified by mother and child booklet at 91%, an improvement from 81.5%, a trend maintained from previous two surveys. This was attributed to efforts made during the response to ensure all children had mother and child booklet for effective follow up. The improvement cut across all the survey zones. Still a considerable proportion of children had their ages verified by recall in Turkana North and West survey zones though an improvement. Birth registration has been on improvement trend for the last three surveys. There is still need to continue promoting birth registration in the entire Turkana County. The improvement in birth registration might have affected indices with age as a variable such as stunting and underweight. The table below show the age verification means per survey zone.

Table 19:Summary of Children age verification means- June 2023

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
Recall (use event calender)	29	4.6%	105	14.1%	27	3.4%	67	11.9%	228	8.3%
Health card/Mother child booklet	588	94.2%	631	84.9%	774	96.4%	492	87.7%	2485	91.0%
Birth certificate/notification	6	1.0%	4	0.5%	2	0.2%	2	0.4%	14	0.5%
Baptism card	1	0.2%	3	0.4%	0	0.0%	0	0.0%	4	0.1%
n	624		743		803		561		2731	

3.2.1 **Age and sex distribution of the sampled children**

More young children were sampled across all survey zones, a trend witnessed over years. Overall sex distribution across all survey zones was 1.1 (boy: girl) hence meeting the acceptable range of 0.6 -1.4, hence low bias due to equal representation of sexes across the zones. The previous two surveys got 1.0 to 1.1 and 0.9 to 1.0. The table below details the findings.

Table 20: Distribution of age and sex of sample

	Turkana Central		**Turkana North**		**Turkana south**		**Turkana West**	
	n=573		**n**=713		**n**=746		**n**=528	
AGE (mo)	Total %	Ratio Boy: girl	Total %	Ratio Boy: girl	Total %	Ratio Boy: girl	Total %	Ratio Boy: girl
6 to 17	25.5	0.9	23.1	1	22.7	1	25.8	0.9
18-29	25.8	1.3	26.2	1.2	26.1	0.9	25.4	1.1
30-41	22	1.4	23	0.9	21.8	1.1	23.5	1.3
42-53	19.9	1	18	1.4	21	1.2	18.6	1.2
54-59	6.8	1.3	9.7	1.2	8.3	1.2	6.8	1.4
Total	100	1.1	100	1.1	100	1.1	100	1.1

3.2.2 **Prevalence of Acute Malnutrition**

The February 2023 Integrated Phase Classification (IPC) for acute malnutrition among children U5 ranked Turkana at "**critical"** phase (IPC Phase 4- GAM 15-30 per cent); the same as in the last three years. The same report classified the county as **"Crisis"** (IPC Phase 3, food security), the same phase as in June 2022 though improving. The January 2023 SMART survey indicated an

improving trend across all survey zones though critical. These findings were supported by the June 2023 SMART survey results where the GAM levels despite the improvement were still critical to extremely critical according to WHO classification. Results for the four survey zones were as follow: Turkana Central 25.4 %, Turkana North 23.7%, Turkana South 32.7%, Turkana West 21.6 % and a county weighted GAM of 26.4%, all of which were above the 15% WHO emergency cut off. The most improved was Turkana North. The most affected was Turkana South which still remained extremely critical.

There was no oedema detected across the four survey zones. The Weight for Height standard deviation ranged between -1.20±0.99 to -1.49±1.00 for the four survey zones while design effect ranged between 1.54 to 1.91.

Table 21: Mean z-scores, Design Effects and excluded subjects (Turkana Central)

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	566	-1.39±0.94	1.54	0	7
Weight-for-Age	564	-1.65±0.96	2.35	0	9
Height-for-Age	559	-1.26±1.12	1.62	0	14

* contains for WHZ and WAZ the children with edema.

Table 22: Mean z-scores, Design Effects and excluded subjects (Turkana North)

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	704	-1.32±1.00	1.91	0	9
Weight-for-Age	710	-1.46±0.98	2.45	0	3
Height-for-Age	694	-0.98±1.08	1.87	0	19

* contains for WHZ and WAZ the children with edema.

Table 23: Mean z-scores, Design Effects and excluded subjects (Turkana South)

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	738	-1.49±1.00	1.79	1	7
Weight-for-Age	738	-1.77±1.01	1.49	0	8
Height-for-Age	724	-1.34±1.12	2.09	0	22

* contains for WHZ and WAZ the children with edema.

Table 24: Mean z-scores, Design Effects and excluded subjects (Turkana West)

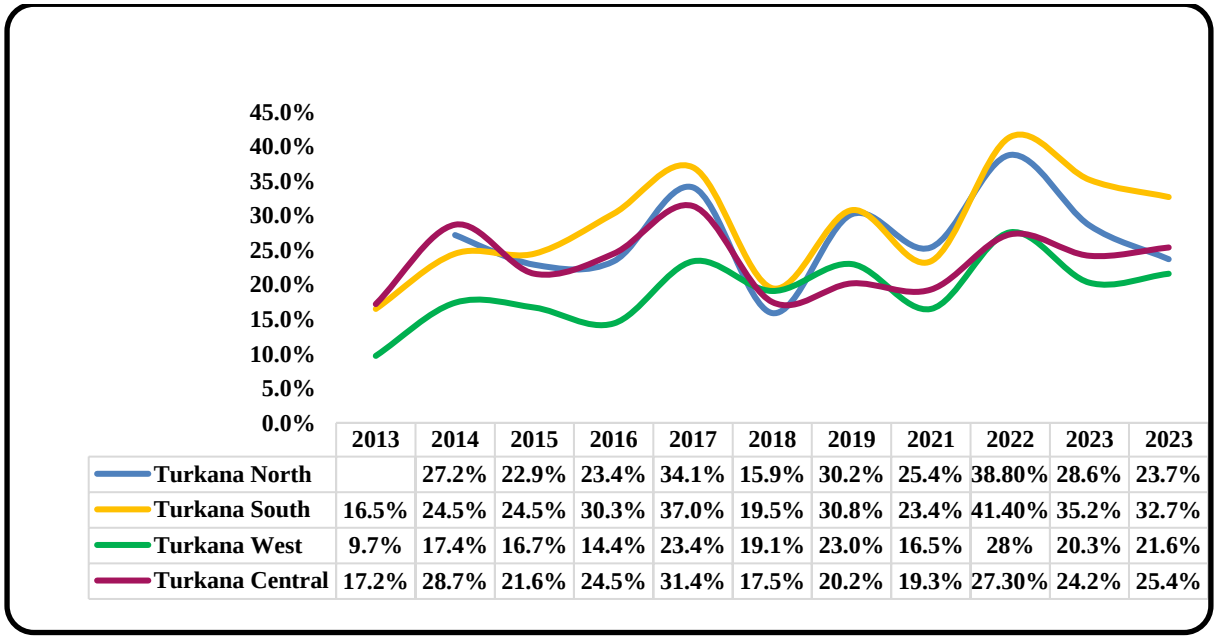
Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	524	-1.20±0.99	1.74	0	4
Weight-for-Age	523	-1.62±1.07	2.01	0	5
Height-for-Age	506	-1.47±1.15	1.47	0	22

* contains for WHZ and WAZ the children with edema.

Table 25: Prevalence of malnutrition weight-for-height z-scores (WHO Standards 2006)

Turkana	Central	North	South	West	County
Wasting (WHO 2006) 2023	n= 566	n= 704	n= 738	n= 524	n=2442
2022	n= 553	n= 727	n= 752	n= 525	n=2549
Global Acute Malnutrition (GAM) - June 2023	(144) 25.4 % (21.1 - 30.3 95% C.I.)	(167) 23.7 % (19.5 - 28.5 95% C.I.)	(241) 32.7 % (28.2 - 37.5 95% C.I.)	(113) 21.6 % (17.1 - 26.8 95% C.I.)	(591) 26.40% (23.5-28.7 95% C.I)
Global Acute Malnutrition (GAM) - June 2022	(151) 27.3 % (22.4 - 32.8 95% C.I.)	(282) 38.8 % (34.3 - 43.5 95% C.I.)	(311) 41.4 % (36.3 - 46.5 95% C.I.)	(145) 27.6 % (21.8 - 34.3 95% C.I.)	(891) 34.8 % (32.3 - 37.3 95% C.I.)
Severe Acute Malnutrition (SAM)- June 2023	(22) 3.9 % (2.4 - 6.2 95% C.I.)	(29) 4.1 % (2.8 - 6.0 95% C.I.)	(35) 4.7 % (3.2 - 6.9 95% C.I.)	(12) 2.3 % (1.3 - 4.0 95% C.I.)	(91) 3.70% (2.7 - 4.9 95% C.I.)
Severe Acute Malnutrition (SAM)- June2022	(33) 6.0 % (3.5 - 9.9 95% C.I.)	(88) 12.1 % (8.6 - 16.7 95% C.I.)	(84) 11.2 % (8.7 - 14.2 95% C.I.)	(28) 5.3 % (3.5 - 8.2 95% C.I.)	(233) 9.1 % (7.6 - 10.8 95% C.I.)

The levels of acute malnutrition have varied in severity across the four survey zones of Turkana County from 2013. The figure below illustrates the trends in acute malnutrition over time per survey zone, which further reveals persistently high GAM levels (exceeding WHO very high thresholds of 15%) over years. This again highlights no obvious recovery from the persistent various shocks from drought, floods, diseases outbreaks and conflict facing the population.



	2013	2014	2015	2016	2017	2018	2019	2021	2022	2023	2023
Turkana North		27.2%	22.9%	23.4%	34.1%	15.9%	30.2%	25.4%	38.80%	28.6%	23.7%
Turkana South	16.5%	24.5%	24.5%	30.3%	37.0%	19.5%	30.8%	23.4%	41.40%	35.2%	32.7%
Turkana West	9.7%	17.4%	16.7%	14.4%	23.4%	19.1%	23.0%	16.5%	28%	20.3%	21.6%
Turkana Central	17.2%	28.7%	21.6%	24.5%	31.4%	17.5%	20.2%	19.3%	27.30%	24.2%	25.4%

Figure 2: Trends of Global Acute Malnutrition in Turkana County (2013-2023)

3.2.3 **Prevalence of acute malnutrition based on weight-for-height z-scores (and/or edema) and by sex**

Generally, boys were more malnourished than girls as has been the case in the last surveys. However, girls were more severely malnourished in Turkana Central and North survey zones. There is need further research to establish why boys are more malnourished than girls. Table below shows the prevalence of global acute malnutrition by sex per survey zone.

Table 26: **Prevalence of acute malnutrition based on weight-for-height z-scores (and/or edema) and by sex(95% Confidence interval)**

	Sex	**Central n**=566	**North n**=704	**South n**= 738	**West n**=524	**County n= 2442**
		M =302**, F**=264	**M** =371**, F**=333	**M** =378**, F**=360	**M** =276**, F** =248	**M= 1281 F=11161**
Prevalence of global malnutrition (<-2z- score and/or edema)	Boys	(77) 25.5 % (20.4 - 31.4 95% C.I.)	(102) 27.5 % (22.6 - 33.0 95% C.I.)	(139) 36.8 % (30.5 - 43.5 95% C.I.)	(64) 23.2 % (17.8 - 29.7 95% C.I.)	(381) 28.50% (24.6 - 32.8 95% CI)
	Girls	(67) 25.4 % (19.6 - 32.2 95% C.I.)	(65) 19.5 % (15.1 - 24.8 95% C.I.)	(102) 28.3 % (23.3 - 34.0 95% C.I.)	(49) 19.8 % (14.7 - 26.1 95% C.I.)	(282) 24.20% (21.0 - 27.6, 95% CI)
Prevalence of moderate malnutrition. (<-2 z-score and >=-3 z-score, no oedema)	Boys	(66) 21.9 % (17.2 - 27.3 95% C.I.)	(90) 24.3 % (19.4 - 29.8 95% C.I.)	(117) 31.0 % (26.0 - 36.4 95% C.I.)	(57) 20.7 % (15.7 - 26.6 95% C.I.)	(330) 24.9% (21.7 - 28.3 95% C.I.)
	Girls	(56) 21.2 % (16.1 - 27.5 95% C.I.)	(48) 14.4 % (10.9 - 18.8 95% C.I.)	(89) 24.7 % (19.7 - 30.5 95% C.I.)	(44) 17.7 % (12.7 - 24.2 95% C.I.)	(237) 19.7% (16.9 - 22.7 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	Boys	(11) 3.6 % (1.9 - 6.9 95% C.I.)	(12) 3.2 % (1.8 - 5.7 95% C.I.)	(22) 5.8 % (3.8 - 8.8 95% C.I.)	(7) 2.5 % (1.2 - 5.5 95% C.I.)	(51) 3.90% (2.8 - 5.4 95% CI)
	Girls	(11) 4.2 % (2.2 - 7.9 95% C.I.)	(17) 5.1 % (3.2 - 8.1 95% C.I.)	(13) 3.6 % (2.0 - 6.5 95% C.I.)	(5) 2.0 % (0.7 - 5.4 95% C.I.)	(45) 3.40% (2.2 - 5.3, 95% CI)

3.2.4 **Prevalence of acute malnutrition (wasting) by age based on weight-for-height Z-scores and or edema (WHO Standards 2006)**

The prevalence of Oedema was 0.0% in all survey zones, a change from the same period last year when Turkana West survey zone has a case of oedema. The June 2022 SMART survey showed a spread of malnutrition across the ages, while the June 2023 SMART survey showed more malnutrition in the older child. The table below details the analysis across the four survey zones.

Table 27: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema

Zone	Age	Total	Severe wasting		Moderate		Normal		Oedema	
	month	no.	No.	%	No.	%	No.	%	No.	%
Central	**6-17**	142	6	4.2	33	23.2	103	72.5	0	0.0
	18-29	146	2	1.4	28	19.2	116	79.5	0	0.0
	30-41	125	4	3.2	25	20.0	96	76.8	0	0.0
	42-53	114	7	6.1	26	22.8	81	71.1	0	0.0
	54-59	39	3	7.7	10	25.6	26	66.7	0	0.0
	Total	566	22	3.9	122	21.6	422	74.6	0	0.0
	6-17	163	5	3.1	18	11.0	140	85.9	0	0.0

North	**18-29**	187	6	3.2	36	19.3	145	77.5	0	0.0
	30-41	158	8	5.1	29	18.4	121	76.6	0	0.0
	42-53	128	6	4.7	39	30.5	83	64.8	0	0.0
	54-59	68	4	5.9	16	23.5	48	70.6	0	0.0
	Total	704	29	4.1	138	19.6	537	76.3	0	0.0
South	**6-17**	167	11	6.6	35	21.0	121	72.5	0	0.0
	18-29	193	8	4.1	56	29.0	129	66.8	0	0.0
	30-41	160	10	6.3	35	21.9	115	71.9	0	0.0
	42-53	157	2	1.3	55	35.0	100	63.7	0	0.0
	54-59	61	4	6.6	25	41.0	32	52.5	0	0.0
	Total	738	35	4.7	206	27.9	497	67.3	0	0.0
West	**6-17**	134	3	2.2	32	23.9	99	73.9	0	0.0
	18-29	132	3	2.3	20	15.2	109	82.6	0	0.0
	30-41	124	1	0.8	22	17.7	101	81.5	0	0.0
	42-53	98	3	3.1	19	19.4	76	77.6	0	0.0
	54-59	36	2	5.6	8	22.2	26	72.2	0	0.0
	Total	524	12	2.3	101	19.3	411	78.4	0	0.0
County	**6-17**	590	23	3.8	118	19.5	463	76.7	0	0.0
	18-29	632	19	2.9	140	21.3	499	75.8	0	0.0
	30-41	548	23	4.1	111	19.6	433	76.4	0	0.0
	42-53	487	18	3.6	139	28.0	340	68.4	0	0.0
	54-59	186	13	6.4	59	28.9	132	64.7	0	0.0
	Total	2442	96	3.8	567	22.4	1867	73.8	0	0.0

There was no oedema case identified across the four survey zones, supporting the survey findings of improved nutrition situation. This has been the case in previous surveys except in the June 2022 where there was one case in Turkana West.

Table 28: **Distribution of Severe acute malnutrition and oedema based on weight-for-height z-score**

	Central		**North**		**South**		**West**	
	<-3 z-score	**>=-3 z-score**	**<-3 z-score**	**>=-3 z-score**	**<-3 z-score**	**>=-3 z-score**	**<-3 z-score**	**>=-3 z-score**
Oedema present	Marasmic kwashiorkor. 0 (0.0 %)	Kwashiorkor. 0 (0.0 %)	Marasmic kwashiorkor. 0 (0.0 %)	Kwashiorkor. 0 (0.0 %)	Marasmic kwashiorkor. 0 (0.0 %)	Kwashiorkor. 0 (0.0 %)	Marasmic kwashiorkor. 0 (0.0 %)	Kwashiorkor. 0 (0.0 %)
Oedema absent	Marasmic No. 24 (4.2 %)	Not severely malnourished. 549 (95.8 %)	Marasmic No. 34 (4.8 %)	Not severely malnourished. 679 (95.2 %)	Marasmic No. 38 (5.1 %)	Not severely malnourished. 707 (94.9 %)	Marasmic No. 15 (2.8 %)	Not severely malnourished. 513 (97.2 %)

3.2.5 **Prevalence of acute malnutrition based on MUAC**

Among the methods used to assess malnutrition in the June 2023 SMART survey was MUAC. GAM by MUAC is not a very sensitive indicator of acute malnutrition and tends to underestimate acute malnutrition for children below one year of age when compared to GAM by WFH z-score. However, it is used as a rapid screening tool for admission into nutrition intervention programmes especially in community screening like mass screening. Thus, MUAC generally tends to indicate lower GAM levels

compared to WFH z-scores as it is the case in this survey. The prevalence of malnutrition using MUAC was significantly lower compared to using Weight for Height Z-scores and this has been observed across the Turkana survey zones over years. This could be associated with the physiology of this population in Turkana which is similar to the Somali and South Sudanese, with a high cormic index[1].This means, overall, significantly lower cases of malnourished children were identified using MUAC when compared to weight for height.

There was a significant reduction of malnutrition as assessed by MUAC for both severe and global malnutrition from **12.7%** to **8.6%**. Turkana West led with the proportion malnourished by MUAC at 12.9 % unlike in June 2022 when it was Turkana South and North. Turkana North had the highest reduction which was consistent with the GAM by weight for Height z- score. The table below summarizes prevalence of malnutrition by MUAC.

Table 29: Prevalence of Malnutrition based on MUAC per survey

Prevalence of Acute malnutrition MUAC	**Central**	**North**	**South**	**West**	**County**
2023	n=573	n=713	n=746	n=528	n = 2560
2022	n=402	n=624	n=595	n=498	n =2602
Severe under nutrition ((< 115 mm) -June 2023)	(4) 0.7 % (0.3 - 1.8 95% C.I.)	(4) 0.6 % (0.2 - 1.5 95% C.I.)	(6) 0.8 % (0.4 - 1.7 95% C.I.)	(8) 1.5 % (0.8 - 3.0 95% C.I.)	(22) 0.9 % (0.6 - 1.3 95% C.I.)
Severe under nutrition ((< 115 mm) -June 2022)	(9) 1.6% (0.7 - 3.4 95% C.I.)	(22) 3% (1.6 - 5.5 95% C.I.)	(23) 3% (1.9 - 4.8 95% C.I.)	(13) 2.4% (1.4 - - 4.2 95% C.I.)	(68) 2.6 % (2.0 - 3.4 95% C.I.)
Moderate under nutrition (≥115–<125 mm)-June 2023)	(29) 5.1 % (3.6 - 7.0 95% C.I.)	(48) 6.7 % (4.8 - 9.4 95% C.I.)	(61) 8.2 % (6.1 - 10.8 95% C.I.)	(60) 11.4 % (8.3 - 15.4 95% C.I.)	(198) 7.7 % (6.7 - 9.0 95% C.I.)
Moderate under nutrition (≥115–<125 mm)-June 2022)	(21)3.7% (2.0 - 6.7 95% C.I.)	(114) 15.4% (11.7 - 20.0 95% C.I.)	(81)10.6% (8.3 - 13.5 95% C.I.)	(45) 8.5% (5.8 - 12.2 95% C.I.)	(262) 10.1 % (8.6 - 11.8 95% C.I.)
Global Acute Malnutrition (≤125 mm)-June 2023)	33) 5.8 % (4.1 - 8.0 95% C.I.)	(52) 7.3 % (5.3 - 10.0 95% C.I.)	(67) 9.0 % (6.7 - 11.9 95% C.I.)	(68) 12.9 % (9.8 - 16.7 95% C.I.)	(220) 8.6 % (7.5 - 9.9 95% C.I.)
Global Acute Malnutrition (≤125 mm)-June 2022)	(30)5.3% (3.1 - 8.9 95% C.I.)	(132) 18.2 % (13.6 - 24.0 95% C.I.)	(104)13.6% (10.9 - 16.8 95% C.I.)	(60) 11.2 % (8.2 - 15.1 95% C.I.)	(330) 12.7 % (11.0 - 14.6 95% C.I.)

Comparing the sexes, girls were more malnourished by MUAC unlike in weight for height z-score where boys were more malnourished. However, in Turkana North boys were more malnourished than girls.

Table 30: Prevalence of acute malnutrition based on MUAC cut off's (and/or oedema) and by sex

	Sex	**Central n**=573	**North n**=713	**South n**= 746	**West n**=528	**County n= 2560**
		M =305**, F**=268	**M** =375**, F**=338	**M** =383**, F**=363	**M** =277**, F** =251	**M= 1340 F=1220**
Prevalence of global	Boys	(9) 3.0 %		(29) 7.6 %	(25) 9.0 %	(91) 6.8 %

[1]The most common bivariate index of shape is the Cormic index, sitting height/ total height (SH/S). It is a measure of the relative length of the trunks or legs and varies between individuals and groups. If sitting height is held constant and leg length varied it produce a range of ratios from 0.48 to 0.55 within and between populations. This demonstrates that variations in SH/S found in or between different population groups may be associated with variations in BMI of some 5kg/m^2, with weight and composition being kept constant. The mean SH/S for European and Indo-Mediterranean populations is about 0.52. Africans have proportionally longer legs, in general, with ratios around 0.51 most notable Somali, Sudanese and Turkana populations with even higher ratios. Asian and Far Eastern populations have proportionally shorter legs and means of 0.53-0.54. However, there is considerable variation within populations and within these major groupings

malnutrition(<-2z-score and/or edema)		(1.6 - 5.2 95% C.I.)	(28) 7.5 % (4.9 - 11.2 95% C.I.)	(5.0 - 11.4 95% C.I.)	(5.8 - 13.8 95% C.I.)	(5.3 - 8.6 95% C.I.)
	Girls	(24) 9.0 % (5.9 - 13.5 95% C.I.)	(24) 7.1 % (4.8 - 10.3 95% C.I.)	(38) 10.5 % (7.5 - 14.4 95% C.I.)	(43) 17.1 % (12.4 - 23.2 95% C.I.)	(129) 10.6 % (8.9 - 12.5 95% C.I.)
Prevalence of moderate malnutrition. (<-2 z-score and >=-3 z-score, no oedema)	Boys	(8) 2.6 % (1.4 - 4.9 95% C.I.)	(25) 6.7 % (4.3 - 10.3 95% C.I.)	(28) 7.3 % (4.7 - 11.1 95% C.I.)	(23) 8.3 % (5.3 - 12.9 95% C.I.)	(84) 6.3 % (4.8 - 8.1 95% C.I.)
	Girls	(21) 7.8 % (5.1 - 11.8 95% C.I.)	(23) 6.8 % (4.6 - 9.9 95% C.I.)	(33) 9.1 % (6.5 - 12.6 95% C.I.)	(37) 14.7 % (10.2 - 20.7 95% C.I.)	(114) 9.3 % (7.9 - 11.1 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	Boys	(1) 0.3 % (0.0 - 2.5 95% C.I.)	(3) 0.8 % (0.3 - 2.5 95% C.I.)	(1) 0.3 % (0.0 - 1.9 95% C.I.)	(2) 0.7 % (0.2 - 2.7 95% C.I.)	(7) 0.5 % (0.3 - 1.1 95% C.I.)
	Girls	(3) 1.1 % (0.4 - 3.4 95% C.I.)	((1) 0.3 % (0.0 - 2.2 95% C.I.)	(5) 1.4 % (0.6 - 3.2 95% C.I.)	(6) 2.4 % (1.2 - 4.9 95% C.I.)	(15) 1.2 % (0.7 - 2.1 95% C.I.)

3.2.6 **Prevalence of underweight**

Weight -For-Age (WFA) index was also used to access nutrition status in the June 2023 SMART survey. It is 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 visualise the trend of their children's changes in weight against age. A low WFA is referred to as underweight. There was improvement in the proportion of children underweight June 2023 compared to June 2022 though not significant. The improvement cut across all the four survey zones except in Turkana Central and Central where there was deterioration. This was in agreement with other indices which showed improving nutrition status across the four survey zones. The table below details the analysis.

Table 31: Prevalence of underweight

Underweight (WHO 2006)	**Central**	**North**	**South**	**West**	**County**
2023	**n=564**	**n=710**	**n=738**	**n=523**	**n=2538**
2022	**n=553**	**n=729**	**n=755**	**n=529**	**n=2566**
Prevalence of global underweight-June (2023)	(196) 34.8 % (28.8 - 41.2 95% C.I.)	(211) 29.7 % (24.6 - 35.4 95% C.I.)	(301) 40.8 % (36.4 - 45.3 95% C.I.)	(190) 36.3 % (30.5 - 42.6 95% C.I.)	(897) 35.3 % (32.2 - 38.6 95% C.I.)
Prevalence of global underweight-June (2022)	(188) 34.00% (27.8 - 40.8 95% C.I.)	(282) 38.7 % (34.5 - 43.1 95% C.I.)	(343) 45.4 % (40.8 - 50.2 95% C.I.)	(168) 31.8 % (26.6 - 37.4 95% C.I.)	(984) 38.3 % (35.6 - 41.2 95% C.I.)
Prevalence of severe underweight (June (2023)	(41) 7.3 % (4.9 - 10.7 95% C.I.)	(44) 6.2 % (4.2 - 9.2 95% C.I.)	(92) 12.5 % (9.6 - 16.1 95% C.I.)	(52) 9.9 % (7.3 - 13.5 95% C.I.)	(228) 9.0 % (7.4 - 10.8 95% C.I.)
Prevalence of severe underweight-(June 2022)	(50) 9.00% (5.8 - 13.8 95% C.I.)	(87) 11.9 % (9.2 - 15.4 95% C.I.)	(108) 14.3 % (11.4 - 17.8 95% C.I.)	(53) 10.0 % (6.9 - 14.3 95% C.I.)	(300) 11.7 % (10.1 - 13.5 95% C.I.)

3.2.7 **Prevalence of stunting**

Stunting, a deficit in linear growth measured by a low height-for-age was another index used in the June 2023 SMART survey to assess nutrition status of children between 6 months to 59 months. Actually, it is as a result of the devastating result of poor nutrition in-utero and early childhood**.** Children suffering from stunting are known not to attain their full possible height and their brains may never develop to their full cognitive potential and the worst is it is not reversible after 2 years of life. Globally, 144.0 million children under 5 years old suffer from stunting. These children begin their lives at a marked disadvantage: they face learning difficulties in school, earn less as adults, and face barriers to participation in their communities[2]**.** Stunting in childhood leads to reduced adult size and reduced work capacity. This, in turn, has an impact on economic productivity at the national level.

From the June 2023 SMART survey results, there was a marked reduction in the proportion of children who were stunted compared to the previous survey though not significant. Stunting is an outcome indicator which need multi-sectoral form of interventions to reduce hence the insignificant reduction. All the sub counties are classified as high according to WHO standards.

Table 32: Prevalence of Stunting

Stunting (WHO 2006)	**Central**	**North**	**South**	**West**	**County**
2023	**n=559**	**n=694**	**n=724**	**n=506**	**n=2482**
2022	**n=551**	**n=686**	**n=750**	**n=512**	**n=2512**
Prevalence of global stunting (<-2 z-score) June 2023	(135) 24.2 % (19.8 - 29.1 95% C.I.)	(123) 17.7 % (14.1 - 22.1 95% C.I.)	(201) 27.8 % (23.2 - 32.9 95% C.I.)	(155) 30.6 % (25.8 - 35.9 95% C.I.)	(616) 24.8 % (22.3 - 27.5 95% C.I.)
Prevalence of global stunting (<-2 z-score) June 2022	(128) 23.20% (18.5 - 28.7 95% C.I.)	(128) 18.20% (15.2 - 21.7 95% C.I.)	(172) 22.90% (19.9 - 26.2 95% C.I.)	(116) 22.70% (17.7 - 28.5 95% C.I.)	(553) 21.90% (20.2 - 23.7 95% C.I.)
Prevalence of severe stunting (<-3 z-score)-June 2023	(37) 6.6 % (4.3 - 10.0 95% C.I.)	(25) 3.6 % (2.2 - 5.9 95% C.I.)	(64) 8.8 % (6.6 - 11.7 95% C.I.)	(54) 10.7 % (8.1 - 14.0 95% C.I.)	(182) 7.3 % (6.0 - 8.9 95% C.I.)
Prevalence of severe stunting (<-3 z-score)-June 2022	(22) 4.00% (2.4 - 6.5 95% C.I.)	(31) 4.40% (3.0 - 6.5 95% C.I.)	(46) 6.10% (4.7 - 7.9 95% C.I.)	(35) 6.80% (4.4 - 10.4 95% C.I.)	(138) 5.50% (4.5 - 6.7 95% C.I.)

3.2.8 **Indirect coverage of Integrated Management of acute Malnutrition programme**

The survey also assessed the proxy IMAM coverage. All the children 6-59 months who were malnourished (MUAC<125MM or WFH Z score<-2 SDS) were asked whether they were enrolled into any nutrition programme during the survey. Below is a figure summarising the finding from this analysis.

Table 33: Indirect coverage of IMAM Programme

Response	**Turkana Central**		**Turkana North**		**Turkana South**		**Turkana West**		**Turkana County**	
	Count	%	Count	%	Count	%	Count	%	Count	%
No	50	30.1%	134	68.4%	135	48.9%	81	64.8%	400	58.7%
Yes	116	69.9%	62	31.6%	141	51.1%	44	35.2%	282	41.3%

[2] UNICEF, WHO, World Bank Group. Levels and trends in child malnutrition: key findings of the 2020 edition of the joint child malnutrition estimates. United Nations Children's Fund, World Health Organization, World Bank Group, 2020

n	**166**		**196**		**276**		**125**		**682**	

The county indirect coverage reduced to below 50%, the recommended cut off for rural areas when compared June 2022 which was 58% to the current 41.3%. This was despite the high proxy coverage from the administrative data and optimal coverage from the March/April SQUEC. Coverage was minimal in Turkana North at 31.6% and highest in Turkana Central at 69.9% survey zone. Majority of the beneficiaries were in SFP at 74.7% with only 25.3% being in SAM.

Table 34: Indirect coverage of IMAM Programme- Type of program

Response	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
OTP (Receive RUTF)	14	28.00%	34	25.37%	25	18.52%	24	29.63%	97	24.33%
SFP (Receive RUSF/CSB)	36	72.00%	100	74.63%	110	81.48%	57	70.37%	303	75.67%
n	50		134		135		81		400	

3.3 Children's Morbidity and Health Seeking Behaviour

The UNICEF conceptual framework of malnutrition gives diseases as immediate causes of malnutrition. This is because diseases affect food intake which in turn worsens malnutrition in a vicious cycle kind of a relationship. Thus, the survey assessed morbidity and whether it had any effect on nutrition status of the vulnerable population in the survey areas.

3.3.1 **Child morbidity**

The survey used recall by mothers/caregivers of children 6 to 59 months to establish whether their children had been sick in the past 2 weeks prior to the survey. Those who answered yes were further probed on what illness 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 diarrhea were probed on the kind of treatment that was given to them.

It was established 23.4% of children had been ill two weeks preceding the surveys, a slight reduction from 25.8% reported in June 2022, a trend sustained from June 2018 survey. Turkana West was the most affected 26.3% reporting to have been sick, like it was the case in June 2021. Unlike in June 2022 when Turkana North was the most affected, during this survey it was the best 18.4%. The detailed analysis is as shown in the table below.

Table 35: Children ill

	Turkana Central		**Turkana North**		**Turkana South**		**Turkana West**		**Turkana County**	
	count	**%**	**count**	**%**	**count**	**%**	**count**	**%**	**count**	**%**
No	427	75.04%	584	81.56%	587	78.90%	390	73.72%	1988	76.64%
Yes	142	24.96%	132	18.44%	157	21.10%	139	26.28%	570	23.36%
n	**569**		**716**		**744**		**529**		**2558**	

The proportion of children affected by malaria generally increased compared to June 2022 while the rest reduced. As was the case in June 2022, the leading morbidity cause was ARI/Cough followed by malaria. There is a correlation of childhood morbidity and malnutrition, thus this is an indication child malnutrition will remain high has the case with morbidity. Important to note in the 0% of bloody

diarrhea unlike in June 2022 when there were 22 cases across the four survey zones. The table below summarizes prevalence of child morbidity in the county.

Table 36: Prevalence of child morbidity 2 weeks prior to the survey

Disease	Lable	Turkana Central	Turkana North	Turkana South	Turkana West	Turkana County
Malaria	Count	105	69	59	65	298
	%	73.94%	52.27%	37.58%	46.76%	54.01%
ARI /Cough	Count	100	94	112	71	377
	%	70.42%	71.21%	71.34%	51.08%	65.25%
Watery diarrhoea	Count	57	22	20	34	133
	%	40.14%	16.67%	12.74%	24.46%	25.86%
Bloody diarrhoea	Count	0	0	0	0	0
	%	0%	0%	0%	0%	0%
Other (specify)	Count	7	0	9	3	19
	%	4.93%	0.00%	5.73%	2.16%	3.94%
	n	142	132	157	139	570

3.3.1.1 Diseases incidences

Different measures can be used to describe diseases. These include diseases incidence and prevalence. Prevalence reflects the number of existing cases of a disease while incidence reflects the number of new cases of disease and can be reported as a risk or as an incidence rate (Marlies, 2010). The June 2023 SMART survey found an incidence rate of below 20% in all morbidity causes.

Table 37: Incidence of child morbidity 2 weeks prior to the survey

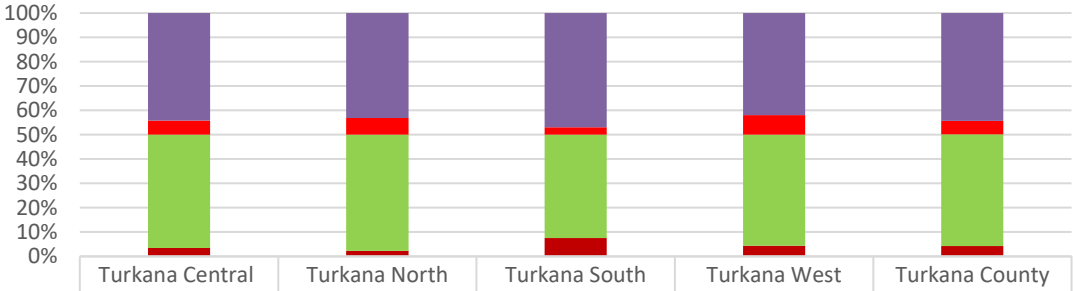
Disease	Label	Turkana Central	Turkana North	Turkana South	Turkana West	Turkana County
Malaria	Count	105	69	59	65	298
	%	18.5%	9.6%	7.9%	12.3%	11.6%
ARI /Cough	Count	100	94	112	71	377
	%	17.6%	13.1%	15.1%	13.4%	14.7%
Watery diarrhoea	Count	57	22	20	34	133
	%	10.0%	3.1%	2.7%	6.4%	5.2%
Bloody diarrhoea	Count	0	0	0	0	0
	%	0%	0%	0%	0%	0%
Other (specify)	Count	7	0	9	3	19
	%	1.2%	0.0%	1.2%	0.6%	0.7%
	n	**569**	**716**	**744**	**529**	**2558**

3.3.2 **Therapeutic Zinc Supplementation during watery diarrhoea episodes**

Zinc supplementation is used in Kenya as an accompanying drug to reduce the severity and duration of the disease. It has been proven to reduce the duration and severity of diarrhea as shown by the evidence from efficacy studies. In 2004, WHO and UNICEF gave a recommendation on 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 diarrhea[3]. Kenya adopted these recommendations through the policy guideline on control and management of diarrheal diseases in children below five years. This guideline states that all under-fives with diarrhea should be given zinc supplements as soon as possible.

During the June 2023 survey one the objectives was to establish the number of children who suffered from watery diarrhea and whether they were supplemented with zinc. The findings are illustrated in the figure below.



	Turkana Central	Turkana North	Turkana South	Turkana West	Turkana County
Jun-22 Yes	88.40%	86.30%	93.90%	83.90%	88.30%
Jun-22 No	11.60%	13.70%	6.10%	16.10%	11.20%
Jun-23 Yes	92.98%	95.45%	85.00%	91.18%	91.52%
Jun-23 No	7.02%	4.55%	15.00%	8.82%	8.48%

Figure 1:Therapeutic Zinc supplementation

Utilization of zinc across the four survey zones improved in June 2023 survey when compared to June 2022 with only Turkana South showing a decline. This survey zone led in June 2022, but in June 2023, Turkana North survey zone was the best. Generally, zinc utilization was good.

3.3.3 **Health Seeking Behavior**

The survey also sought to establish whether the caregivers/parents of the children who were reported to have been sick sought treatment. Health seeking behavior continued to improve with a positive change from 91.9% to 93.9% a trend maintained from June 2019. Detailed analysis is shown below.

Table 38: Those who sought health assistance

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
No	2	1.41%	17	12.88%	19	12.10%	5	3.60%	43	6.06%
Yes	140	98.59%	115	87.12%	138	87.90%	134	96.40%	527	93.94%
n	142		132		157		139		570	

Where caregivers/parents of the sick children seek treatment is important because it determines the treatment outcome. This survey sought to understand where caregivers of children who were sick in the past two weeks prior to the survey first sought assistance from. Public health facilities remained the most preferred places where caregivers sought treatment for their children, the same case as in June 2022 though, the proportion reduced, a trend maintained from June 2021. CHVs are a critical component of Turkana County health care and were the second most trusted source of treatment. Despite there being about 493 active integrated health and nutrition outreaches, only 6% of the respondents sought treatment at the clinics, though it ranged from 26% in Turkana North to 4.5% in

[3] Klemm RDW, Harvey PWJ, Wainwright E, Faillace S, Wasantwisut, E. Micronutrient Programs: What Works and What Needs More Work? A Report of the 2008 Innocenti Process. August 2009, Micronutrient Forum, Washington, DC.

Turkana West. The increase could be attributed to scale up of emergency response. This was an improvement from June 2022. The naming of mobile clinic from the commonly used outreach clinic could have also affected the response. The table below summarizes the health seeking behavior per survey zone in Turkana County.

Table 39: First Point of seeking health assistance

		Turkana Central	Turkana North	Turkana South	Turkana West	Turkana County
traditional healer	Count	0	0	0	1	1
	%	0.00%	0.00%	0.00%	0.75%	0.22%
Community health worker	Count	18	14	4	19	55
	%	12.86%	12.17%	2.90%	14.18%	10.55%
Private clinic/ pharmacy	Count	5	1	1	3	10
	%	3.57%	0.87%	0.72%	2.24%	2.21%
Shop/kiosk	Count	3	0	1	1	5
	%	2.14%	0.00%	0.72%	0.75%	1.19%
Public clinic	Count	108	87	129	109	433
	%	77.14%	75.65%	93.48%	81.34%	82.58%
Mobile clinic	Count	7	30	4	6	47
	%	5.00%	26.09%	2.90%	4.48%	6.00%
Relative or friend	Count	3	0	0	0	3
	%	2.14%	0.00%	0.00%	0.00%	0.78%
Local herbs	Count	3	1	0	0	4
	%	2.14%	0.87%	0.00%	0.00%	0.85%
NGO/FBO	Count	0	0	0	5	5
	%	0.00%	0.00%	0.00%	3.73%	1.09%
n		140	115	138	134	527

Still some proportion of population in Turkana Central and North used herbs to treat children. This was a change from June 2022 where Turkana South and North led in use of herbs.

3.4 Childhood Immunization, Vitamin A Supplementation and Deworming

3.4.1 **Childhood Immunization**

The Kenya immunization target for children under the age of one year was 95% by the end of third medium term plan (2018- 2022). The Kenyan definition of a fully immunized child is a child who has received all the prescribed antigens ***and at least one Vitamin A dose*** under the national immunization schedule before the first birthday. This survey assessed the coverage of 4 vaccines namely, BCG, OPV1, OPV3, and measles at 9 and 18 months in addition to vitamin A supplementation.

There was improvement in BCG[4] immunization as confirmed by scar from 94.9% to 98.9% changing the declining trend witnessed in June 2021 to 2022. This is an indication the effect of COVID 19 containment measure have worn out though the current emergency response had a big contribution to

[4]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.

the improvement. The immunization coverage for the four assessed antigens is summarized in the tables below per survey zone and the county.

Table 40: Child BCG immunization Coverage

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
No Scar	8	1.41%	18	2.51%	6	0.81%	1	0.19%	33	1.03%
Yes / Scar	561	98.59%	698	97.49%	738	99.19%	528	99.81%	2525	98.97%
n	569		716		744		529		2558	

By card only two survey zones had above 90% coverage in OPV1 which is a measure of access, however when both recall and card were combined, all survey zones met the 90% mark hence a very good coverage and an improvement from the June 2022 survey.

Table 41: Child OPV 1 coverage

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
Do not know	0	0.00%	10	1.40%	0	0.00%	1	0.19%	11	0.20%
No	9	1.59%	16	2.23%	9	1.21%		0.00%	34	1.14%
Yes, Card	510	90.27%	601	83.94%	695	93.41%	441	83.36%	2247	88.80%
Yes, Recall	46	8.14%	89	12.43%	40	5.38%	87	16.45%	262	9.85%
n	565		716		744		529		2554	

There was a general improvement in the proportion immunized on OPV 3 and confirmed by card an indication use of mother child booklets is improving in the county. Generally, there was improvement when recall was combined with card.

Table 42: OPV 3 Coverage

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
Do not know	0	0.00%	9	1.26%	0	0.00%	0	0.00%	9	0.14%
No	15	2.65%	16	2.23%	10	1.34%	2	0.38%	43	1.62%
Yes, Card	506	89.56%	601	83.94%	699	93.95%	442	83.55%	2248	88.79%
Yes, Recall	44	7.79%	90	12.57%	35	4.70%	85	16.07%	254	9.45%
n	565		716		744		529		2554	

However, efforts are still needed to distribute mother child booklets to improve documentation of services. Notable improvement was noted in Turkana West.

Table 43: Child measles Vaccination coverage at 9 months

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
Do not know	1	0.19%	7	1.03%	1	0.14%	0	0.00%	9	0.22%
No	23	4.31%	15	2.22%	6	0.85%	4	0.80%	48	2.09%

Yes, Card	466	87.27%	564	83.31%	670	94.37%	415	82.83%	2115	87.95%
Yes, Recall	44	8.24%	91	13.44%	33	4.65%	82	16.37%	250	9.74%
n	534		677		710		501		2422	

There was a slight positive deviation of measles coverage from June 2022 to June 2023. The improvement was noted also when health cards was used as well as when recall was combined with health cards. This improvement meant health services utilization was improving in the county. All survey zones achieved over 90%.

Table 44: Child measles Vaccination coverage at 18 Months

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
Do not know	1	0.24%	6	1.08%	0	0.00%	0	0.00%	7	0.20%
No	19	4.50%	21	3.78%	10	1.75%	2	0.51%	52	2.54%
Yes, Card	363	86.02%	453	81.62%	534	93.19%	319	80.96%	1669	86.55%
Yes, Recall	39	9.24%	75	13.51%	29	5.06%	73	18.53%	216	10.71%
n	422		555		573		394		1944	

Unlike in the past surveys when measles coverage at 18 months was very low, the June 2023 survey found minimal difference between measles coverage at 9 months and 18 months with both achieving over 90% coverage. This was a significant improvement from June 2022 survey.

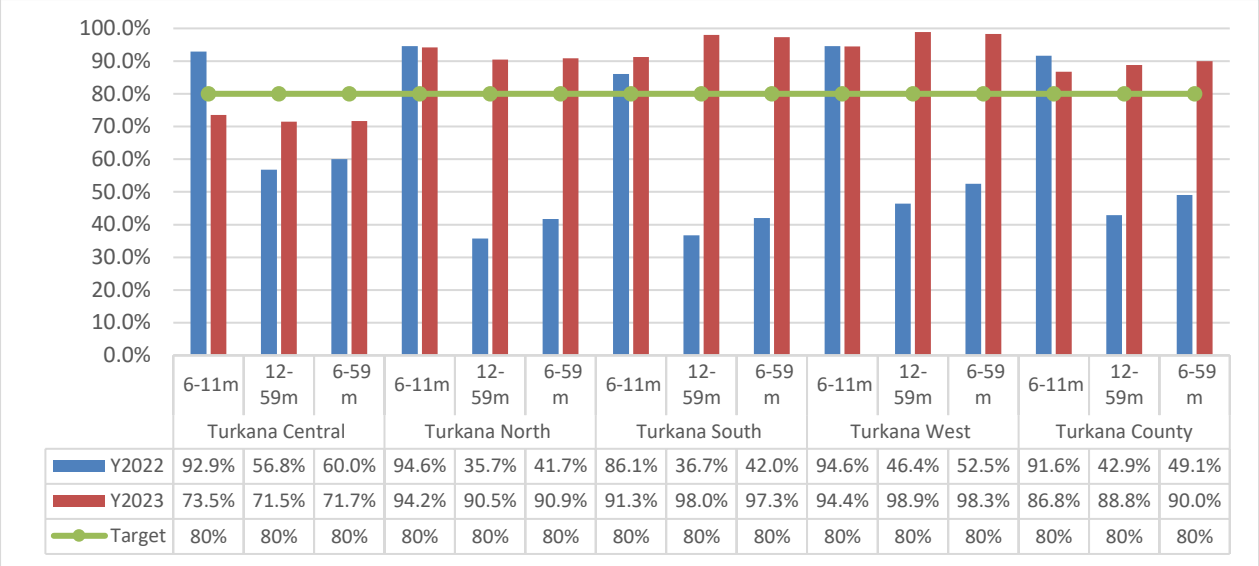
3.4.2 **Vitamin A supplementation**

Vitamin A supplementation[5] is proven as key evidence-based intervention which can be achieved at scale and with proven potential to reduce the number of preventable child deaths each year. Vitamin A supplementation is among the 11 high impact nutrition interventions which is recognized as one of the most cost-effective interventions for improving child survival. Improving vitamin A supplementation coverage of malnourished children enhances their resistance to disease and can reduce mortality from all causes by approximately 23 per cent[6]. Thus, vitamin A supplementation is important, not only for eliminating vitamin A deficiency as a public-health problem, but also as a central element for child survival.

The June 2023 SMART survey had an objective to assess vitamin A supplementation coverage among children 6 to 59 months. This was done by asking caregivers whether their children had been supplemented and if yes for how many times in the past one year. The team confirmed the responses through child health cards or recall in cases the cards were not available. Samples of the capsules commonly used in Turkana County were shown to the care givers.

[5] Jones, Gareth, et al., 'How Many Child Deaths can we Prevent this Year?', The Lancet, vol. 362, 5 July 2003, pp. 65-71.

[6] Vitamin A Supplementation: A Decade of Progress, UNICEF 2007



	6-11m	12-59m	6-59m	6-11m	12-59m	6-59m	6-11m	12-59m	6-59m	6-11m	12-59m	6-59m	6-11m	12-59m	6-59m
	Turkana Central			Turkana North			Turkana South			Turkana West			Turkana County		
Y2022	92.9%	56.8%	60.0%	94.6%	35.7%	41.7%	86.1%	36.7%	42.0%	94.6%	46.4%	52.5%	91.6%	42.9%	49.1%
Y2023	73.5%	71.5%	71.7%	94.2%	90.5%	90.9%	91.3%	98.0%	97.3%	94.4%	98.9%	98.3%	86.8%	88.8%	90.0%
Target	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%

Figure 2: Vitamin A supplementation coverage

The overall vitamin A coverage in June 2023 was 90% which was above the set target of 80% and was above 49.1% coverage in June 2022. There was a significant improvement in vitamin A coverage when June 2022 was compared to June 2023 SMART survey. Though the change was more in 12 to 59 age category and consequently 6-to 59 months. In some survey zones 6 to 11 months was more in June 2022 survey than in June 2023. This was evident in Turkana Central, North and West hence having only Turkana South was the only survey zone where 6 to 11 months coverage was more in June 2023 compared to June 2023. The figure above shows vitamin A supplementation coverage per survey zone in Turkana County.

3.7.3 De-worming

Research shows children in developing countries are exposed to poor sanitation due to poor availability of water and sanitation facilities. WHO recommends that children in developing countries especially those exposed to poor sanitation and poor availability of clean safe water be de-wormed once every 6 months. Kenya adopted this recommendation through the Kenya National School Based Deworming Program. This is a Kenya Vision 2030 flagship program, which has provided over 52 million treatments to school going children over nine years. Routine de-worming of the vulnerable population is important in controlling parasites such as helminthes, schistosomiasis (bilharzias) and prevention of anemia.

Turkana County implements this program through the routine child action days known as malezi bora. This survey assessed de-worming for all children aged 12-59 months old. Deworming coverage improved by 3.6% points when 2023 SMART survey results were compared with June 2022 results. All survey zones had above 90% coverage, the county set target except Turkana Central which had 74%. This was a deterioration from June 2022 coverage of 87%. All the other survey zones showed improvement.

Table 45: De-worming coverage among children 12-59 months old

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
No	128	25.60%	45	7.14%	21	3.17%	22	4.84%	216	11.27%
Yes	372	74.40%	585	92.86%	642	96.83%	433	95.16%	2032	88.73%
n	500		630		663		455		2248	

4.0 MATERNAL NUTRITION

Nutritional status of women prior to pregnancy influences their ability to conceive, determines the fetal growth and development and the size of the fetus and its overall health as well as the health of the mother. Optimal maternal nutrition is important for a successful pregnancy, child delivery and lactation. Malnutrition prior and around pregnancy makes the placenta fail to develop fully therefore it cannot optimally nourish the fetus. Under nourished and over nourished women experience more complications during pregnancy and delivery than normal women. Anemic women are more likely to deliver low birth weight infants while low folic acid levels are associated with an increased risk of low birth weight and birth defects. Adequate weight gain during pregnancy is a good indicator of good nutrition for the women and is essential for fetal growth. Desired weight gain is based on pre-pregnancy weight using BMI criteria and pre-conception nutritional status of the woman.

4.1 Women physiological status

The June 2023 SMART survey assessed physiological status of respondents. Women were asked their current physiological status. Majority of female caregivers were lactating (49.6%) a considerable decrease 57% (7.4%) from June 2022. Proportion of pregnant caregivers slightly increased to 11.4% from, a trend maintained from June 2021 survey. The proportion of caregivers who were both pregnant and lactating decreased remained low at 0.3% though an increase from 0.1% with all survey zone having the cases. Thus, there is need for FP services enhancement across the county. The table below details the physiological status of women of reproductive age across the four survey zones.

Table 46: Women Physiological status

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
Lactating	242	50.6%	288	54.1%	322	49.5%	208	46.7%	1060	49.6%
Not Pregnant & Not Lactating	188	39.3%	170	32.0%	253	38.9%	179	40.2%	790	38.7%
Pregnant	48	10.0%	72	13.5%	74	11.4%	54	12.1%	248	11.4%
Pregnant & Lactating		0.0%	2	0.4%	1	0.2%	4	0.9%	7	0.3%
n	478		532		650		445		2105	

4.2 Acute Malnutrition

4.2.1 Nutrition status of women of reproductive age

Women nutrition status was assessed by mid-Upper -Arm circumference (MUAC). This was administered to all women of reproductive age (15 to 49 years) in all sampled households, irrespective of their physiological status. About 10.7% of women were found to be malnourished (<21cm). This was an improvement from 14.8% detected in June 2022. This improvement cut across all survey zones except Turkana Central where it was the same and Turkana West where there was deterioration. Turkana Central survey zone remained the most affected which was consistent with the child malnutrition.

Table 47: Nutrition status of women reproductive age

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
MUAC ≥ 23 cm	282	59.0%	279	52.4%	352	54.2%	258	58.0%	1171	55.6%

MUAC ≥21 cm - < 23 cm	140	29.3%	200	37.6%	229	35.2%	140	31.5%	709	33.7%
MUAC < 21 cm	56	11.7%	53	10.0%	69	10.6%	47	10.6%	225	10.7%
n	478		532		650		445		2105	

4.2.2 **Nutrition status of pregnant and lactating women**

Further analysis was carried out to determine malnutrition in the pregnant and lactating women group who are the most vulnerable due to their increased nutrients requirement. More improvement was noted here with county average of 9.9% against 15.2% identified in June 2022. The improvement cut across all survey zones with Turkana West being the best and Turkana Central the worst.

Table 48: Nutrition status of Pregnant and lactating women

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
MUAC ≥ 23 cm	164	56.6%	196	54.1%	205	51.6%	154	57.9%	719	54.7%
MUAC ≥21 cm - < 23 cm	94	32.4%	130	35.9%	150	37.8%	92	34.6%	466	35.4%
MUAC < 21 cm	32	11.0%	36	9.9%	42	10.6%	20	7.5%	130	9.9%
n	290		362		397		266		1315	

Non-pregnant and non- breastfeeding women have lesser nutrients needs compared to those who are pregnant or lactating. It is therefore expected that this group could be better nourished. These were found to be more malnourished with a county average of 12.0% against 13.9% recorded in June 2022 SMART survey, a slight improvement. Deterioration was noted in Turkana West and Central survey zones. Turkana west was the worst affected while Turkana North was the best unlike in previous years where Turkana North and South were the worst. The results are detailed in the table below.

Table 49: Non-Pregnant/ lactating women

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
MUAC ≥ 23 cm	118	62.8%	83	48.8%	147	58.1%	104	58.1%	452	57.2%
MUAC ≥21 cm - < 23 cm	46	24.5%	70	41.2%	79	31.2%	48	26.8%	243	30.8%
MUAC < 21 cm	24	12.8%	17	10.0%	27	10.7%	27	15.1%	95	12.0%
n	188		170		253		179		790	

4.3 ANC attendance

Recent evidence by WHO indicates that a higher frequency of antenatal contacts by women and adolescent girls with a health provider is associated with a reduced likelihood of stillbirths. Increased visits enhance the opportunities to detect and manage potential complications. WHO recommended increase of minimum antenatal visits from four to eight. Eight or more ANC contacts with a health worker for ANC can reduce perinatal deaths by up to 8 per 1000 births when compared to 4 visits.

About 2,105 females responded to the survey among which 53.2% had children below 2 years.

Table 50: Full term pregnancy for mothers with children less than 2 years

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
No	245	51.3%	262	49.2%	334	51.4%	152	34.2%	993	46.8%
Yes	233	48.7%	270	50.8%	316	48.6%	293	65.8%	1112	53.2%
n	478		532		650		445		2105	

WHO recommend a specified package for the women attending ANC. Some of the recommendations are:

- An increase from four to eight minimum contacts to reduce perinatal mortality and improve women's experience of care.
- Counselling on healthy eating and keeping physically active during pregnancy.
- Daily oral IFAS with 30 mg to 60 mg of elemental iron and 400 µg (0.4 mg) folic acid for pregnant women to prevent maternal anemia, puerperal sepsis, low birth weight, and preterm birth.
- Tetanus toxoid vaccination for all pregnant women, depending on previous tetanus vaccination exposure, to prevent neonatal mortality from tetanus.
- One ultrasound scan before 24 weeks' gestation (early ultrasound) for pregnant women to estimate gestational age, improve detection of fetal anomalies and multiple pregnancies, reduce induction of labor for post-term pregnancy, and improve a woman's pregnancy experience.
- Health-care providers should ask all pregnant women about their use of alcohol and other substances (past and present) as early as possible in the pregnancy and at every antenatal visit.

Table 51: Attendance to antenatal clinic

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
No	4	1.7%	15	5.6%	5	1.6%	7	2.4%	31	2.2%
Yes	229	98.3%	255	94.4%	311	98.4%	286	97.6%	1081	97.8%
n	233		270		316		293		1112	

Among the women with children below two years, majority (97.8%) had attended ANC with all survey zones having almost the same proportion. This was a good indication the county health system was working on improving MCH indicators.

Table 52: First ANC attendance (month)

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
Don't know	0	0.0%	2	0.8%	6	1.9%	22	7.7%	30	3.1%
1 to Month 3	89	38.9%	112	43.9%	163	52.4%	102	35.7%	466	42.4%
4 to Month 6	105	45.9%	106	41.6%	77	24.8%	140	49.0%	428	40.1%
7 to Month 9	35	15.3%	35	13.7%	65	20.9%	22	7.7%	157	14.5%
n	229		255		311		286		1081	

The timing of the first time a pregnant women visit to ANC will determine how many times she will visit before delivery. The survey sought to know at what time women were making their first visit to

the ANC on their pregnancy. Slightly less than half were visiting between the 1st and the 3rd month; meaning these were likely to meet the minimum 8 visits. About 14.5% visited ANC in their last trimester and were unlikely to meet the minimum eight visits thus missing the essential health package. Turkana South and Central led in this poor indicator.

4.4 Iron and Folic Acid Supplementation (IFAS)

The current WHO recommendation of Iron and Folic Acid Supplementation (IFAS) are a daily dose for the entire period of pregnancy as part of the Ante Natal Care (ANC) to reduce the risk of low birth weight, maternal anaemia, iron deficiency and neural tube defects commonly referred to as NTDs. The guidelines state that all pregnant women should receive Iron and Folic Acid Supplementation (IFAS) regardless of anaemia status in countries where anaemia is >40%. Kenya lying in the bracket adopted the WHO guidelines. IFA formulations are: 60mg iron /400µg folic acid and should be given as a combined pill throughout pregnancy in accordance with WHO 2012 recommendations. Iron and Folic Acid Supplementation 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 in the Focused Antenatal Care (FANC).

The June 2023 SMART survey assessed IFAS coverage by asking mothers of children below 2 years if they had consumed iron folate in their most recent pregnancy and if affirmative, for how long. About 91.7% of women with children below 2 years across the county had been supplemented with Iron and Folic acid during their last pregnancy, almost the same proportion as in June 2022 of 91.9%. The deteriorating trend was recorded from June 2019. All survey zones had over 90% coverage except Turkana West where the population which didn't know was a bit higher. The survey zone had recorded an improvement from June 2022 SMART survey which had 82.4%. Deterioration was recorded in all survey zones despite heightened emergency response.

Table 53: Caretakers with children aged 24 months and below who were supplemented with Iron Folic acid in their last pregnancy

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
Don't know	0	0.0%	1	0.4%	14	4.4%	16	5.5%	31	3.1%
No	20	8.6%	20	7.4%	2	0.6%	17	5.8%	59	5.2%
Yes	213	91.4%	249	92.2%	300	94.9%	260	88.7%	1022	91.7%
n	233		270		316		293		1112	

There was an improvement in the number of days IFAS were consumed by pregnant women from 66.3 days to 102.9 days. Two of the survey zones had more than 100 days a departure from the past surveys where all had less than 100 days average. Duration of supplementation remained poor especially considering the current recommendation where women are expected to take the supplements for the entire pregnancy duration. Only 2.7% of women took the supplements for more than 180 days against 7.7% in June 2022. Turkana South was the best at 7% while none took the supplements for more than 180 days in Turkana North. The poor length of taking IFAS could be attributed to the later first ANC visit as reported by the health workers. There is need to create more demand for IFAS among pregnant women through behavior change communication approaches.

Table 54: Number of days caretakers with children aged 24 months and below consumed IFAS

in their last pregnancy

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
90 to <180 days	102	47.89%	63	25.30%	231	77.00%	144	55.38%	540	57.01%
Above 180 days	5	2.35%	0	0.00%	18	6.00%	1	0.38%	24	2.66%
Below 90 days	106	49.77%	186	74.70%	51	17.00%	115	44.23%	458	40.33%
Grand Total	213		249		300		260		1022	
	99.2		79.0		126.2		102.1		102.9	

4.5 Mosquito Nets Ownership and Utilization

4.5.1 **Mosquito nets ownership**

The county mosquito net ownership at the county considerably improved from 29.8% in June 2022 to 43.1%, changing the declining trend witnessed from June 2018. Though Turkana County is not a malaria zone, some survey zones are endemic malaria parasite area like Loima which is in Turkana Central survey zone. There are malaria interventions in Loima and Turkana West sub-counties which could be seen in the high proportion of households owning mosquito nets. Turkana North had the least mosquito nets ownerships which is consistent with previous survey findings.

Table 55: Mosquito nets ownership

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
No	227	46.3%	393	66.6%	414	61.2%	242	49.7%	1276	56.9%
Yes	263	53.7%	197	33.4%	262	38.8%	245	50.3%	967	43.1%
n	490		590		676		487		2243	

4.6 Family led MUAC

Mid Upper Arm Circumference (MUAC) is a methodology that measures the mid-point of the less dominant arm (mostly left arm) and is globally recognized as a best and cost-effective practice community measurement approach for identifying children at high risk of death as result of undernutrition. Usually, community health workers measure children for acute malnutrition in the communities where they work or as they visit the clinics. The technique of taking MUAC is relatively simple, and can easily be learned by mothers or other primary caregivers. Hence with some guidance they can measure their children thinness on a more regular basis, thus identifying decline in weight before malnutrition progress. Early identification of malnutrition means that treatment can be sought on time thus improving the health outcomes. The approach also empowers mothers to manage their children's health and CHWs have more time to carry out other tasks. Family led MUAC was rolled out in Turkana in 2019 and has since spread to cover over 50% of the functional community units. The June 2023 SMART survey sought to investigate the extent of implementation of the strategy in the county.

Among the interviewed caregivers, slightly more than half could identify the family led MUAC tape. This agrees with the family led MUAC coverage from the administrative data. Turkana South and Central led with caregivers who had seen the tape while Turkana West was the worst. The table below details the findings.

Table 56: Seen family led MUAC tape

	Turkana Central	Turkana North	Turkana South	Turkana West	Turkana County

	Count	%	Count	%	Count	%	Count	%	Count	%
No	180	36.7%	334	56.6%	236	34.9%	330	67.8%	1080	48.4%
Yes	310	63.3%	256	43.4%	440	65.1%	157	32.2%	1163	51.6%
n	490		590		676		487		2243	

The interviewers sought to establish if the caregivers who had seen the MUAC tapes had any sensitization on the strategy. About 60% had been sensitized on the strategy. Thus, there is a dire need to continuously sensitize the caregivers on the family led MUAC strategy for effective services delivery. Turkana North and South led with those who reported to have been sensitized while Turkana Central had the least proportion. This should guide the county in targeted sensitization.

Table 57: Sensitized on the strategy

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
No	202	65.2%	57	22.3%	93	21.1%	57	36.3%	409	40.1%
Yes	108	34.8%	199	77.7%	347	78.9%	100	63.7%	754	59.9%
n	310		256		440		157		1163	

For the caregivers to screen their children they need to have the tapes. Turkana county with support of partners, have been distributing family led MUAC tapes to all caregivers in CUs which have been sensitized. This survey identified a gap in family led MUAC tape ownership by caregivers because on 36.3% reported having the tapes. Despite Turkana Central having the highest number of caregivers who were aware of the strategy, the survey zone had the least proportion of caregivers posing the tapes.

Table 58: Poses family led MUAC tape

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
No	274	88.4%	63	24.6%	257	58.4%	76	48.4%	670	63.7%
Yes	36	11.6%	193	75.4%	183	41.6%	81	51.6%	493	36.3%
n	310		256		440		157		1163	

For those who had the tapes, about 90% had used the tape. But a worrying 9.8% of them had not used the tape despite having children. This call for need to continuously mentor the caregivers after issuing the tape to ensure they use the tapes and use them effectively. All the survey zones had almost the same level of usage of the tape.

Table 59: Used the tape

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
No	6	16.7%	19	9.8%	11	6.0%	10	12.3%	46	9.8%
Yes	30	83.3%	174	90.2%	172	94.0%	71	87.7%	447	90.2%
n	36		193		183		81		493	

Surprisingly, there were some caregivers who had the tapes and could not demonstrate its use. This was more common in Turkana South and West while all in Turkana Central survey zones demonstrated use.

Table 60: Can demonstrate its use

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
Can demonstrate	30	100.0%	172	98.9%	164	95.3%	68	95.8%	434	96.7%
Cannot demonstrate	0	0.0%	2	1.1%	8	4.7%	3	4.2%	13	3.3%
n	30		174		172		71		447	

The main purpose of family led MUAC is self-referral of children before malnutrition worsen. The survey sought to assess caregivers' ability to make self-referral of their children. A good proportion (70%) of caregivers had made referral using the strategy. With Turkana south and North doing the bigger part of the referral. About a third of caregiver in Turkana central did referrals using the strategy. There is need to keep on strengthening the strategy across the sub-counties. Only a small number had been referred from Turkana Central survey zone.

Table 61: Referred children using the strategy

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
No	20	66.7%	49	28.2%	29	16.9%	26	36.6%	124	30.0%
Yes	10	33.3%	125	71.8%	143	83.1%	45	63.4%	323	70.0%
n	30		174		172		71		447	

Majority of referrals were made to the nearest health facilities across all the four survey zones though the CHV was a major referral point in Turkana North survey zone. Only Turkana Central and North had referred children to outreaches.

Table 62: Place of referral

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
Nearest health center/dispensary	6	60.0%	53	42.4%	126	88.1%	33	73.3%	218	72.7%
Outreach site	2	20.0%	1	0.8%	0	0.0%	0	0.0%	3	1.2%
To CHV	2	20.0%	71	56.8%	17	11.9%	12	26.7%	102	26.1%
n	10		125		143		45		323	

5.0 WATER SANITATION& HYGIENE

Water access and good sanitation are considered a human right according to UN.[7] Thus all individuals are entitled to have access to a specified amount of safe drinking water and to basic sanitation facilities as water and sanitation are deeply interrelated. The human right to water requires everyone to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic use. While sanitation is essential for the conservation and sustainable use of water resources, access to water is required for sanitation and hygiene practices. The realization of other human rights, like the right to the highest attainable standard of health, the right to food and good nutrition, right to education and the right to adequate housing, depends very substantially upon the implementation of the right to water and sanitation which are basic.

From research, poor water and sanitation (WASH) indicators are linked to under nutrition and more so on stunting levels. Some killer diseases of young children like diarrhea, is closely linked to poor/inadequate WASH (Pruss-Ustun et al, 2014), which often causes under nutrition. Diarrhea in turn reduces a child's resistance to subsequent infections, thus creating a vicious circle leading to death. An estimated 25% of stunting is attributable to five or more episodes of diarrhea before 24 months of age (Checkley et al, 2008).

5.1 Main Source of Water

The June 2023 SMART survey had an objective to understand where the households were currently obtaining water for their domestic use. The proportion of households obtaining water from safe sources, that is borehole / protected spring /protected shallow wells, Earth pan/dam with infiltration well, piped water system, Water vendor as well as water tracking reduced from 60.6% in June 2022 to the current 59.6%, a trend maintained from June 2019. As was the case in June 2022 when Turkana West survey zone was the best in water access from save sources, the same was maintained in the June 2023 SMART survey. Turkana South also led with piped water systems while Turkana North led with borehole / protected spring /protected shallow wells. Water tracking featured minimally despite being a major intervention in the current drought response.

Table 63: **Main current sources of water**

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
borehole / protected spring /protected shallow wells	112	22.9%	226	38.3%	105	15.5%	100	20.5%	543	24.2%
Earth pan/dam	1	0.2%	14	2.4%	0	0.0%	10	2.1%	25	1.1%
Earth pan/dam with infiltration well	0	0.0%	9	1.5%	0	0.0%	0	0.0%	9	0.4%
other	0	0.0%	15	2.5%	0	0.0%	11	2.3%	26	1.2%
Piped water system	174	35.5%	92	15.6%	279	41.3%	224	46.0%	769	34.3%
River/spring	93	19.0%	31	5.3%	187	27.7%	58	11.9%	369	16.5%
Unprotected shallow well	109	22.2%	200	33.9%	104	15.4%	73	15.0%	486	21.7%
Water trucking / Boozer	1	0.2%	2	0.3%	0	0.0%	0	0.0%	3	0.1%
Water vendor	0	0.0%	1	0.2%	1	0.1%	11	2.3%	13	0.6%
n	490		590		676		487		2243	
Safe water sources		58.6%		55.9%		57.0%		68.8%		59.6%

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

Due to the high proportion of the population relying on unsafe water sources, there is eminent need to sensitize the community on water treatment while at the same time ensure access to water treatment chemicals. The table above summarizes main sources of water per survey zone.

To the responded who gave others as a source of water source, this was specified per response. Only two survey zones gave this as a response; Turkana North and west. A closer look on the response reveled majority obtained water for domestic use from the lake in Turkana North while in Turkana West majority got water from water kiosks.

Table 64: Main source of drinking water (Specify other)

	Turkana North		Turkana West		Turkana County	
	Count	%	Count	%	Count	%
Kiosk	0	0.0%	1	9.1%	1	3.8%
Kiosks	0	0.0%	1	9.1%	1	3.8%
Lake	13	86.7%	0	0.0%	13	50.0%
Lakes	1	6.7%	0	0.0%	1	3.8%
Pump	1	6.7%	0	0.0%	1	3.8%
Water canteen	0	0.0%	2	18.2%	2	7.7%
Water kiosk	0	0.0%	7	63.6%	7	26.9%
Total	15		11		26	

5.1.1 **Type of Piped water**

Further analysis of those who gave piped water as a response, reveled a decline for those using public taps, a trend witnessed from June 2021 from 53.5% to 49.3% in June 2022, a lower level of 44.9% was recorded in the June 2023 SMART survey. However, piped into dwelling increase from 18.2% to the current 27.2%, a trend witnessed from June 2021 SMART survey. Turkana Central host the largest urban centre in the county hence it was expected the survey zone would report the highest proportion having water piped in their dwelling place. Thus, the survey zone led with the proportion reporting having water in their dwellings at almost double the other survey zones. Turkana South led with those using public taps.

Table 65: Type of piped water

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
Piped into dwelling	75	43.1%	26	28.3%	58	20.8%	50	22.3%	209	27.2%
Piped to neighbor	37	21.3%	12	13.0%	27	9.7%	7	3.1%	83	10.8%
Piped to yard / plot	29	16.7%	10	10.9%	26	9.3%	67	29.9%	132	17.2%
Public tap / standpipe	33	19.0%	44	47.8%	168	60.2%	100	44.6%	345	44.9%
n	174		92		279		224		769	

5.1.2 **Type of Dug Well Used**

About 22% of the interviewed households were getting their domestic water from wells. Of these almost all (98.2%) were using unprotected water sources, an increase from 90.7% in June 2022. This was a deterioration from June 2021's 96.5%. This is a worrying trend.

Table 66: Type of dug well used

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
Protected well	0	0.0%	7	3.5%	0	0.0%	1	1.4%	8	1.6%
Unprotected well	109	100.0%	193	96.5%	104	100.0%	72	98.6%	478	98.4%
n	109		200		104		73		486	

5.2 Distance to Water Source and Queuing Time

A standard of 500 meters is given by the SPHERE standards for WASH as the maximum distance to the nearest water point each household should trek to access water. The same handbook gives the maximum queuing time at a water point to be not more than 15 minutes and should not take more than three minutes to fill a 20-litre jerry can**.**

5.2.1 **Distance to water sources**

The June 2023 sought to establish the distance household were walking to the nearest water points. The results show a reduction in the proportion of households accessing water from the acceptable recommended distance of less than 500m. The proportion reduced from 56.2% in June 2022 to the current 50.7%, a trend seen from 2021 where it was 64.6%. This was consistent with the other water access indicators. Continued drought could be one of the causes of this worsening trend. The proportion accessing water from more than 2km distance increased from 11.8% to the current 18.2% while those accessing from more than 500m to less than 2km (15 to 1 hour) remained almost the same. The table below shows distance to water sources per survey zone in Turkana County.

Table 67: Distance to water sources

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
Less than 500m (Less than 15 minutes)	104	21.2%	387	65.6%	302	44.7%	345	70.8%	1138	50.7%
More than 2 km (1 – 2 hrs)	207	42.2%	104	17.6%	93	13.8%	5	1.0%	409	18.2%
More than 500m to less than 2km (15 to 1 hour)	179	36.5%	99	16.8%	280	41.4%	137	28.1%	695	31.0%
other	0	0.0%	0	0.0%	1	0.1%	0	0.0%	1	0.0%
n	490		590		676		487		2243	

Fetching water is one of the major causes of child and more so girls as well women labour in ASAL counties and more so in Turkana County. The survey sought to find out who in the households mainly fetches water. Generally, women bore the burden of fetching water for domestic use at 83.5% followed by girls. The proportion was almost the same across the four survey zones though Turkana West had more women fetching water while Turkana North had the lowest with girls leading in Turkana North survey zone. Strategies should be put in place to reduce the burden to girls and women.

Table 68: Who goes to fetch water

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%

Boys	7	1.4%	4	0.7%	17	2.5%	5	1.0%	33	1.5%
Girls	64	13.1%	103	17.5%	79	11.7%	31	6.4%	277	12.3%
Men	2	0.4%	6	1.0%	30	4.4%	14	2.9%	52	2.3%
other	0	0.0%	0	0.0%	1	0.1%	7	1.4%	8	0.4%
Women	417	85.1%	477	80.8%	549	81.2%	430	88.3%	1873	83.5%
n	490		590		676		487		2243	

5.2.2 **Queuing time to water sources**

The proportion of households not queuing for water slightly declined in the June 2023 SMART survey when compared to the same period in 2022 from 67.7% to 65.6%. This shows a deterioration of water access indicators. Turkana West was the worst in terms of queuing with almost half of the households queuing for water while Turkana Central was the best.

Table 69: Proportion of Households Queuing for water

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
No	362	73.9%	421	71.4%	444	65.7%	244	50.1%	1471	65.6%
Yes	128	26.1%	169	28.6%	232	34.3%	243	49.9%	772	34.4%
n	490		590		676		487		2243	

Among those who queued, more than half queued for less than 30 minutes though a deterioration from June 2022 from 56.4% to 51.8%. There was a reduction in the most severe duration of waiting of more than one hour from 12.5% to 11.3%. generally, the highest improvement was seen in Turkana North. The table below details the analysis.

Table 70: Queuing time at water source

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
30-60 minutes	57	44.5%	36	21.3%	88	37.9%	104	42.8%	285	36.9%
Less than 30 minutes	12	9.4%	131	77.5%	124	53.4%	133	54.7%	400	51.8%
More than 1 hour	59	46.1%	2	1.2%	20	8.6%	6	2.5%	87	11.3%
n	128		169		232		243		772	

5.3 Methods of drinking water treatment and storage

5.3.1 **Household water treatment**

Since most households were accessing water from unsafe source, it is important that they embrace water treatment methods to prevent water borne diseases. There was a slight improvement of the households who were treating water from 13.0% in June 2022 to 17.3% in June 2023. Thus majority (82.7%) of households were not treating drinking water. The improvement trend was witnessed from June 2021. Most improvement was seen in Turkana West and North survey zones. Efforts are needed to improve water treatment across the county. The table below details the analysis.

Table 71: Drinking Water treatment

	Turkana Central	Turkana North	Turkana South	Turkana West	Turkana County

	Count	%	Count	%	Count	%	Count	%	Count	%
No	436	89.0%	461	78.1%	598	88.5%	361	74.1%	1856	82.7%
Yes	54	11.0%	129	21.9%	78	11.5%	126	25.9%	387	17.3%
n	490		590		676		487		2243	

Throughout the four survey zones, only a small proportion was treating water despite the low latrine coverage and high proportion accessing water from unsafe sources. The poor WASH indicators could be among the leading contributors to the high levels of undernutrition especially when the relationship between WASH and undernutrition is considered.

Traditional herb seems to be now entrenched as a water treatment method in the county with Turkana West reporting almost half (49.2%) of the households were treating water using traditional herbs. Use of chemicals remained the dominant water treatment method in the county 73.6% though it was at 91.3% in Turkana West.

Table 72: Methods used for treating drinking water

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
Boiling	36	66.7%	102	79.1%	31	39.7%	70	55.6%	239	61.8%
Chemicals (Chlorine, Pur, Water guard)	43	79.6%	81	62.8%	46	59.0%	115	91.3%	285	73.6%
traditional herbs	4	7.4%	38	29.5%	12	15.4%	62	49.2%	116	30.0%
Pot filters	6	11.1%	5	3.9%	2	2.6%	14	11.1%	27	7.0%
n	54		129		78		126		387	

The county is also adopting pot filters as a water treatment method because it cut across all survey zones unlike the previous surveys.

5.3.2 **Storage of Drinking water**

There was an improvement in the use of closed containers by the households to store drinking water from 64.3% to 76.8%. This could be attributed to distribution of free water storage containers during the current emergency response. This changed the deteriorating trend reported from the 2019 SMART survey. This is a positive result likely to reduce water contamination and subsequent consequences. There is need to sustain the intervention in light of the poor water access experienced by the households across the four survey zones. Despite of the good performance, Turkana West had more than half of the households using open containers.

Table 73: Storage of drinking water

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
Closed container / Jerrican /brika	467	95.3%	429	72.7%	593	87.7%	234	48.0%	1723	76.8%
Open container / Jerrican /brika	23	4.7%	161	27.3%	83	12.3%	253	52.0%	520	23.2%
n	490		590		676		487		2243	

5.4 Water Payment

The declining trend of households paying for water recorded from the 2019 to 2022 SMART surveys changed with the June 2023 SMART survey where there was an increase from 34.7% to 35.6%. Those paying increase in Turkana West and Central survey zones while there was decrease in Turkana North and South.

Table 74: **Payment for water**

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
No	283	57.8%	434	73.6%	447	66.1%	281	57.7%	1445	64.4%
Yes	207	42.2%	156	26.4%	229	33.9%	206	42.3%	798	35.6%
n	490		590		676		487		2243	

Most of the interviewed households were paying water on monthly bases, the same scenario has reported in June 2022, though a lower proportion in June 2023. There was an increase to those who paying per 20 liters jerrican from 36.8% to 46.2%. Turkana North continued as a leader of those paying on monthly bases while only 22.3% were paying per month in Tukana West, a considerable decrease from 58.7% reported in June 2022.

Table 75: Domestic water payment mode

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
Per 20-liter jerrican	73	35.3%	5	3.2%	131	57.2%	160	77.7%	369	46.2%
Per month	134	64.7%	151	96.8%	98	42.8%	46	22.3%	429	53.8%
n	207		156		229		206		798	

5.5 Household water consumption

The global standards as per the SPHERE handbook is given as 15 liters and above daily water consumption per person as the adequate quantity. There was a considerable reduction of the proportion of households consuming the recommended amount from 97% in June 2022 to the current 49%. Thus, majority of the households were not consuming adequate quantity of water, changing the improvement trend recorded in the previous three surveys. The deterioration cut across all the four-survey zone with Turkana South being the worst unlike in the June 2022 survey when it was the best. The table below details sub-county specific analysis.

Table 76: household water consumption per day per survey zone

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
Consuming < 15 Liters/Person/Day	306	62.4%	251	42.5%	406	60.1%	180	37.0%	1143	51.0%
Consuming > 15 Liters/Person/Day	184	37.6%	339	57.5%	270	39.9%	307	63.0%	1100	49.0%
n	490		590		676		487		2243	

5.6 Hand washing

Research document that the single most cost-effective public health intervention in preventing diarrhea diseases is hand washing with soap and running water[8]. The National Ministry of Health (MOH) gives four critical hand washing moments as; after visiting the toilet/latrine, before cooking, before eating and after taking children to the toilet/latrine. The handwashing awareness in the county continued to decline, two years after peak of COVID 19 pandemic with the current survey recording 69.2% from June 2022's 72.1%, a trend maintained from 2021. As it was in the previous surveys, Turkana North survey zone was the least aware of handwashing practices. Turkana Central was had the most aware population at 94.5%.

Table 77: Awareness of hand washing practices

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
Do not know	2	0.4%	84	14.2%	6	0.9%	26	5.3%	118	5.3%
No	25	5.1%	238	40.3%	218	32.2%	92	18.9%	573	25.5%
Yes	463	94.5%	268	45.4%	452	66.9%	369	75.8%	1552	69.2%
Total	490		590		676		487		2243	

The survey teams were able to observe 56% of the handwashing facilities with the most dominant being no handwashing place in dwelling /yard / plot while 0.3% didn't grand access to see the handwashing facility.

Table 78: Hand washing facility

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
Fixed facility observed (Sink / Tap) In dwelling	20	4.1%	29	4.9%	7	1.0%	59	12.1%	115	5.1%
Fixed facility observed (Sink / Tap) In yard /plot	66	13.5%	51	8.6%	14	2.1%	81	16.6%	212	9.5%
Mobile object observed (bucket / jug / kettle)	149	30.4%	106	18.0%	48	7.1%	112	23.0%	415	18.5%
No handwashing place in dwelling /yard / plot	65	13.3%	100	16.9%	209	30.9%	133	27.3%	507	22.6%
No permission to see	0	0.0%	6	1.0%	0	0.0%	0	0.0%	6	0.3%
Not observed	190	38.8%	298	50.5%	398	58.9%	102	20.9%	988	44.0%
Total	490		590		676		487		2243	

Most of the interviewed households were washing hands before eating (94.5%) an improvement from 91.5% in June 2022 SMART survey. Those washing hands after visiting toilet decreased from 88.4% in June 2022 to 86.8% in June 2023.

[8]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.

Most of the households do not consider washing hand after taking children to the toilet is critical with the practice being worse in Turkana North survey zone. Efforts need to be put in place to have care givers wash hands after taking their children to the toilet which had minimal improvement. There was an overall improvement in hand washing practices in June 2023 compared to June 2022.

Table 79: Hand washing at critical times

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
After toilet	424	91.6%	242	90.3%	329	72.8%	352	95.4%	1347	86.8%
Before cooking	351	75.8%	183	68.3%	289	63.9%	221	59.9%	1044	67.3%
Before eating	458	98.9%	229	85.4%	428	94.7%	351	95.1%	1466	94.5%
After taking children to the toilet	315	68.0%	101	37.7%	228	50.4%	188	50.9%	832	53.6%
Other	0	0.0%	1	0.4%	0	0.0%	0	0.0%	1	0.1%
n	463		268		452		369		1552	

5.6.1 **Hand washing at all four critical times**

To break key contamination routes in the human body, it is recommended that one washes hand with soap and on running water as per the MOH guideline during four prescribed critical moments. Contamination is 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.[9] Adults and children who practice proper hand washing enjoy direct health benefits and other benefits.

The June 2023 SMART survey recorded a slight improvement of hand washing at the four critical times (before eating, before cooking, after visiting the toilet, after changing the baby diaper) compared to the same period in 2022; that is from 41.2% to 43.2%. This changed the declining trend noted from 2021 to 2022. Turkana North survey zone continued having the poorest hand washing coverage at the four critical moments as has been in the previous surveys. Turkana Central was the only zone with handwashing coverage above 50% followed by Turkana South which has been leading in the previous surveys. This is a worry situation where almost half of the community is exposed to contamination considering the poor health environment where they live. The results show a dire need to improve the hygiene practices across the county for better nutrition outcomes for the vulnerable population.

Table 80: Hand washing at all the four critical times

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
All 4 Instances	279	60.3%	34	12.7%	217	48.0%	141	38.2%	671	43.2%
< 4 Instances	184	39.7%	234	87.3%	235	52.0%	228	61.8%	881	56.8%
n	463		268		452		369		1552	

[9] Franks AH, Harmsen HJM, Raangs GC, Jansen GJ, Schut F, Welling GW. Variations of bacterial populations in human feces measured by fluorescent in situ hybridization with group-specific 16S rRNA-targeted oligonucleotide probes. Appl Environ Microbiol. 1998; 64(9):3336-3345.

5.6.2 **Hand washing with soap**

Evidence show 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.[10] Less than half of the households were washing hands with soap and water, a reduction from 50.7% in June 2022. None of the survey zones attained more than 50% in hand washing with soap and water. Those who washed hands with only water continued to increase from 33.6% to 38.3%. Continued behaviour change messaging is needed to have the right practice. Those using herbs decreased with only one zone using them to wash hands. As it was a recommendation in the last survey, still there is need to test if the specific herbs have the necessary antimicrobial effects as soap.

Table 81: What is used for hand washing

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
Only water	219	47.3%	74	27.6%	222	49.1%	79	21.4%	594	38.3%
Soap and water	218	47.1%	132	49.3%	162	35.8%	150	40.7%	662	42.7%
Soap when I can afford it	26	5.6%	62	23.1%	68	15.0%	138	37.4%	294	18.9%
traditional herb	0	0.0%	0	0.0%	0	0.0%	2	0.5%	2	0.1%
Total	463		268		452		369		1552	

Caregivers' knowledge level slightly declined from 75.2% to 72.3% in June 2023 survey with only 48.6% of caregivers in Turkana North survey zone having hand washing knowledge. High improvement was seen in Turkana Central from 78.4% to 96%. Continued deterioration was documented from June 2019 SMART survey. The results are consistent with the other WASH indicators seen in this survey. Much effort is needed to improve hygiene and sanitation indicators in Turkana North. There was an indication the gains made with the COVID 19 containment measures on WASH are wearing out and there is need to strengthening through community health strategies.

Table 82: Hand washing in HH with Children 0-23 Months

	Turkana Central		Turkana North		Turkana South		Turkana West		County	
Practice	n	%	n	%	n	%	n	%	n	%
Awareness of handwashing	263	96.0%	139	48.6%	221	68.2 %	186	79.1%	809	72.3 %
Hand washing moments	n	%	n	%	n	%	n	%	n	%
After toilet	234	89.0%	126	90.6%	161	72.9 %	179	96.2%	700	86.5 %
Before cooking	188	71.5%	97	69.8%	143	64.7 %	121	65.1%	549	67.9 %
Before eating	260	98.9%	120	86.3%	211	95.5 %	179	96.2%	770	95.2 %
After taking child toilet	174	66.2%	51	36.7%	113	51.1 %	103	55.4%	441	54.5 %
Below 4 critical moments	117	44.5%	123	88.5%	115	52.0 %	109	58.6%	464	57.4 %
All 4 critical moments	146	55.5%	16	11.5%	106	48.0 %	77	41.4%	345	42.6 %

[10] 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.

5.7 Latrine Utilization

The overall sanitation status for Turkana County improved with proportion of households relieving themselves in the bush or open field having (open defecation) considerably decreasing from 79.7% to 70.9% in June 2023 SMART survey. Hence the county latrine coverage was 29.2%. Pit latrine coverage being the main form of toilet, increased considerably from 18.2% to 23.5%. Open defecation was highest in Turkana North and Turkana South survey zones though declining. There is an urgent need to strengthen CLTS efforts to improve the household's sanitation facility coverage. The table below shows latrine ownership and utilization per survey zone.

Table 83: Latrine ownership and utilization

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
Bucket	0	0.0%	5	0.8%	0	0.0%	0	0.0%	5	0.2%
Composting toilet	38	7.8%	21	3.6%	1	0.1%	5	1.0%	65	2.9%
Flush / pour flush	0	0.0%	1	0.2%	0	0.0%	1	0.2%	2	0.1%
Hanging toilet / hanging latrine	10	2.0%	15	2.5%	25	3.7%	3	0.6%	53	2.4%
No facility / bush / field	270	55.1%	506	85.8%	479	70.9%	333	68.4%	1588	70.8%
other	0	0.0%	1	0.2%	1	0.1%	2	0.4%	4	0.2%
Pit latrine	172	35.1%	41	6.9%	170	25.1%	143	29.4%	526	23.5%
n	490		590		676		487		2243	

Improvement of sanitation came with different forms of sanitation facilities. The survey sought to establish what form of pit latrine was being utilized by the community. This can guide the county in scaling up the response to improve sanitation in the community. Pit latrine with slab was the most common structure across the survey zones except in Turkana Central where Pit latrine without slab /open pit was common.

Table 84: Type of pit latrine

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
other	0	0.0%	0	0.0%	1	0.6%	0	0.0%	1	0.2%
Pit latrine with slab	68	39.5%	36	87.8%	89	52.4%	122	85.3%	315	59.9%
Pit latrine without slab /open pit	90	52.3%	5	12.2%	43	25.3%	16	11.2%	154	29.3%
Ventilated improved pit latrine	14	8.1%	0	0.0%	37	21.8%	5	3.5%	56	10.6%
n	172		41		170		143		526	

6.0 FOOD SECURITY

Food and nutrition security is defined by FAO as a situation where all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. The February 2023 SRA classified Turkana County at "Crisis" (IPC Phase 3, food security) with a projected emergency phase (IPC phase 4) in pastoral areas. The SRA report recommended the population in need of food assistance per ward ranging from 35% in Lokichoggio to 65% in Kerio delta and Kalapata. The February 2023 Integrated Phase Classification (IPC AMN) among children U5, documented Turkana nutrition situation had remained critical to extremely critical with Turkana South in extremely critical phase (IPC AMN Phase 5) with a worsening projection. At the same time 106,587 children 6-59 months and 30,120 pregnant and lactating women were acutely malnourished in Turkana County (KFSSG, 2023). Turkana County is one of the counties with high burden of malnutrition. Consequently, this makes Turkana County as the most food insure county in Kenya.

6.1 Cash transfer

Kenya has been implementing cash transfer programs across the country for some years. The country has an entrenched government supported cash transfer domiciled in the Ministry of Public Service, Gender, Senior Citizens Affairs and Special Programmes and Ministry of East African Community, Arid and Semi-Arid Lands (ASALs), and Regional Development. Kenyan government through Kenya Social Inclusion and Economic Program (KSIEP) in the state department of Social Security and protection has an established social protection program costing KSh.30 billion annual budget and covers 1,338,000 people. Turkana County has over 60,000 households on cash transfer targeting different groups. Cash transfers are defined as direct payments of money to people, either as an alternative or in addition to distributing items such as food, blankets and shelter kits. It is usually done through physically giving cash, mobile money, and vouchers for local suppliers or smart card transfers. Cash transfers can be either conditional or unconditional cash transfers. Kenya's cash transfer program offers a model for affordable and well-targeted social protection, facilitated by deep government commitment and sensible donor support. In Turkana, several modalities of cash transfer are implemented including the Nutrition Improvement through Cash and Health Education (NICHE), a health program incorporated in the routine government supported cash transfer through the ministry of labour and social protection and Ministry of Devolution and ASAL (NDMA) targeting pregnant women and children below 24 months. Currently NICHE is implemented in four priority sub-counties of Turkana South, Central, Loima and West. The county through support of several partners and different government departments has been using cash transfer to respond to the ongoing drought emergency.

Research shows providing cash to vulnerable population and especially to women can reduce physical abuse, rates of child marriage and improve women's health and economic status. This evidence led to the survey objective of seeking to establish what proportion of the households interviewed was enrolled in any cash transfer program.

Table 85: Household enrolled in cash transfer

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
No	356	72.7%	527	89.3%	556	82.2%	444	91.2%	1883	84.0%
Yes	134	27.3%	63	10.7%	120	17.8%	43	8.8%	360	16.0%
n	490		590		676		487		2243	

There was a notable increase in the proportion of household enrolled in cash transfer from 11.8% in June 2022 to the current 16.%. This changed declining trend witnessed in June 2019 to June 2022. This

is still too low from the administrative data which indicate more than 50% of households in the county are enrolled in a cash transfer program. This could be attributes to the perception that the survey teams could be enrolling for more support thus household felt they would be left out by responding on the affirmative.

Table 86: Household enrolled which cash transfer programme

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
Hunger Safety net Programme	110	82.1%	43	68.3%	72	60.0%	24	55.8%	249	69.2%
Older persons programme	1	1%	7	11%	12	10%	7	16%	27	8%
OVC programme	2	1%	5	8%	9	8%	5	12%	21	6%
People with severe disabilities	0	0%	2	3%	1	1%	0	0%	3	1%
WFP Linda Lishe Bora	18	13%	4	6%	21	18%	0	0%	43	12%
other	3	2.2%	1	1.6%	4	3.3%	1	2.3%	9	2.5%
n	134		63		120		43		360	

The main cash transfer was HSNP followed by Inua Jamii as was the case in the past surveys. This means government is the main implementer of cash transfer programs in Turkana County. There was a slight improvement in the proportion of households receiving HSNP cash transfer when 2022 results were compared to June 2023 results from 68.3% to 69.2%. Minimal proportion was seen for other cash transfers (from other partners.

6.2 Food access and consumption

6.2.1 **Dominant foods and food groups consumed by households and women**

The major food groups consumed across the four survey zones was Grains, white roots and tubers and plantains as has been the case in the last survey. The least foods consumed across the survey zones were eggs, nuts and seeds. There was a considerable increase in the population consuming different food groups. Consumption of fruits remained relatively low in Turkana North (usually the last in past surveys) which could be attributed to access. The detailed analysis across different survey zones is shown in the table below.

Table 87 : Food groups consumed by respondents in the last 24 hours

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
Grains, white roots and tubers and plantains	385	93.67%	423	86.86%	509	93.22%	357	95.71%	1674	93.27%
Pulses	307	74.70%	186	38.19%	356	65.20%	293	78.55%	1142	68.53%
Nuts and seeds	13	3.16%	39	8.01%	17	3.11%	42	11.26%	111	6.16%
Dairy	185	45.01%	48	9.86%	214	39.19%	129	34.58%	576	35.82%
Meat, poultry and fish	170	41.36%	84	17.25%	49	8.97%	115	30.83%	418	26.43%
Eggs	10	2.43%	22	4.52%	17	3.11%	45	12.06%	94	5.71%
Dark green leafy vegetables	248	60.34%	47	9.65%	263	48.17%	154	41.29%	712	44.89%
Other vitamin a rich fruits and vegetables	80	19.46%	31	6.37%	54	9.89%	116	31.10%	281	18.60%
n	411		487		546		373		1817	

6.2.2 **Household Dietary Diversity (HDD)**

Household Dietary Diversity (HDD) provides an evaluation of household economic access to food. As a results items requiring household resources to obtain like condiments, sugar and sugary foods, and beverages, form part of the score. Individual dietary diversity scores aim to reflect nutrient adequacy. Evidence from studies in different age groups show an increase in individual dietary diversity score is related to an increase in specific diet nutrient adequacy. There are validated dietary diversity scores for different age/sex groups as a proxy measure for macro and/or micronutrient adequacy of the diet.

The June 2023 SMART survey assessed household dietary diversity based on a 24-hour recall period. Data was collected on 16 food group as described in the FAO 201 guideline. At analysis level, the groups were compressed into 10 food groups.

The overall dietary diversity for the county remained generally the same as the same period in 2022 though the population taking less than 3 food groups which is referred to as poor HDD increased from 48.1% to 55.3%. On the centrally the population taking more than 5 food groups increased from 17.7% to 22.7% in conformity with improved nutrition situation. Turkana North remained the worst with only 1.9% of the household taking the recommended dietary diversity, an improvement from 2.1% from the same period in 2022. Turkana West continued the deterioration though the households taking more than 5 food groups improved from 4% to 17.7%. The figure below details the analysis.

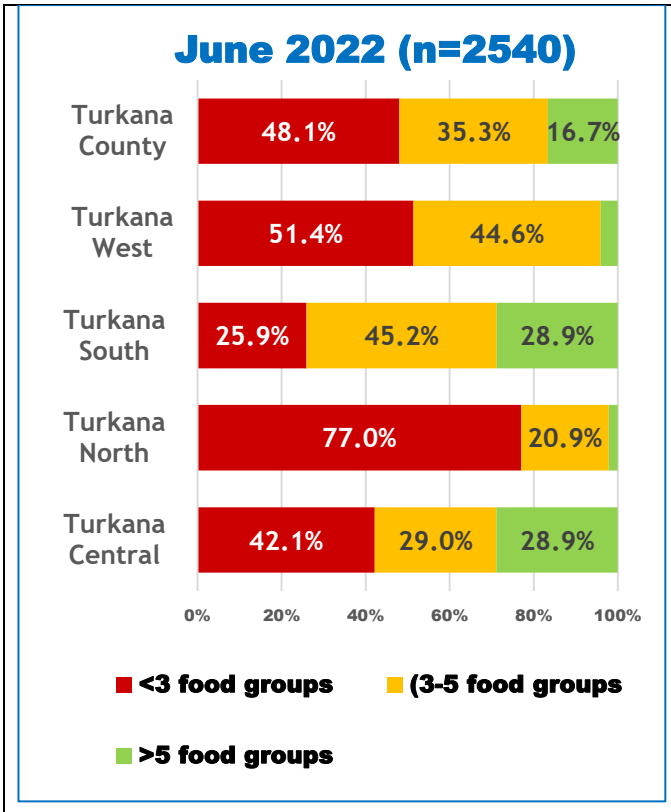


Figure 3: Household Dietary Diversity Score based on 24 hours recall for June 2021(n=2257)

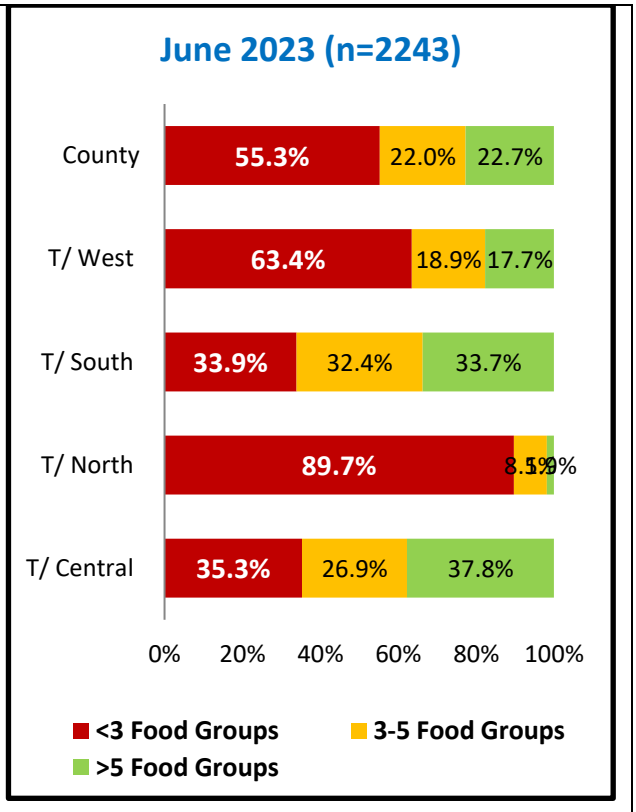


Figure 4 Household Dietary Diversity Score based on 24 hours recall for June 2022 (n=2540)

6.2.3 **Women Dietary Diversity score (MDD-W)**

Minimum Dietary Diversity for WRA (MDD-W) is another indicator for assessing food diversity. Mostly this indicator reflects key dimension of diet quality; that is micronutrient adequacy. It is a two-

level indicator showing whether or not women 15–49 years of age were consuming at least five out of ten defined food groups the previous day or night. Research has shown elevated nutrients requirement for pregnant and lactating women than for adult men (National Research Council, 2006). Apart from during pregnancy and lactation period, 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. In many resource-poor environments, diet quality for WRA is usually very poor, and there are gaps between intakes and requirements for a range of micronutrients (Arimond et al., 2010; Kavle, 2017). The proportion of women 15–49 years of age who reach the specified dietary diversity minimum in a population are usually used as a proxy indicator for higher micronutrient adequacy, one important dimension of diet quality.

The proportion of women 15 -49 years consuming 5 and more food groups improved across the four survey zones when compared to the same period in 2022; from 7% to 21.6% on average with all survey zones showing improvement except Turkana South where there was decline. However, despite the improvement, the indicator needs more effort if the nutrition status of women and children in the county has to improve. This shows women of reproductive age in Turkana are unlikely to meet micronutrients intake requirements.

Table 88: Minimum MDD-W June 2023

Survey zone	<5 food groups		5 and more food groups	
	June 2022	June 2023	June 2022	June 2023
Turkana Central	86%	69.8%	14%	30.2%
Turkana North	100%	91.0%	0%	9.0%
Turkana South	87%	87.4%	13%	12.6%
Turkana West	99%	73.5%	1%	26.5%
Turkana County	93%	78.4%	7%	21.6%

Similar to the previous survey, staples formed the greater proportion of food consumed at the households. This varies per survey zone with Turkana North and South being the worst. The results are consistent with the nutrition situation of the survey zones.

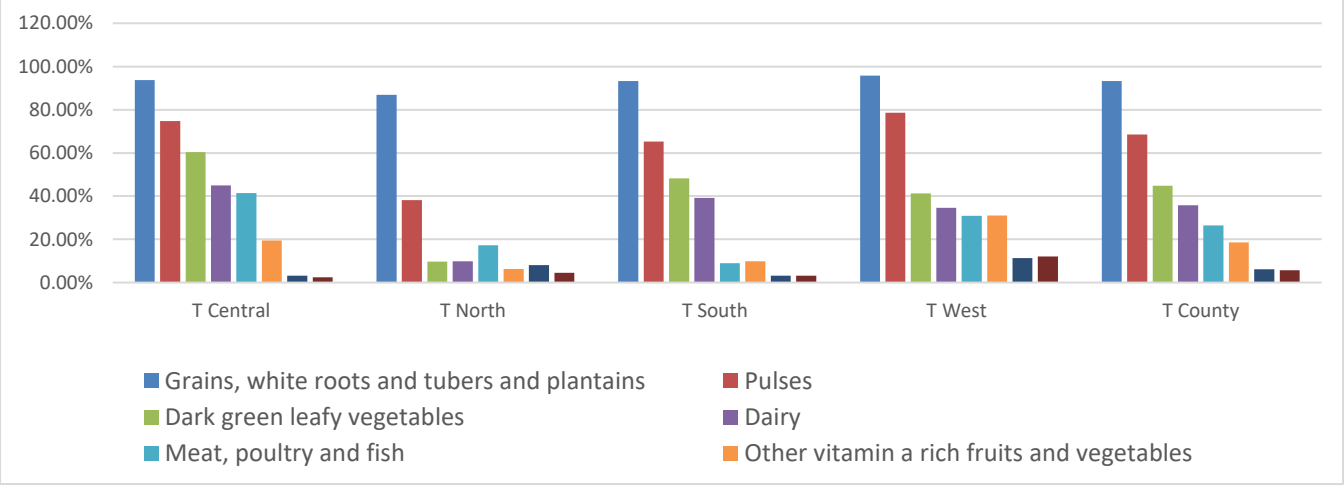


Figure 5: Food groups consumed (Women)

6.2.4 **Food Consumption Score Classification**

FCS is defined as a composite score based on dietary diversity, food frequency and relative nutrition importance of different food group (WFP, 2015). This is a proxy measure of household's food security and is designed to reflect the quality of people's diet and it is considered as an outcome measure of household food security. The June 2023 SMART survey assessed the households' Food Consumption Score (FCS). In this analysis households are classified in three categories according to food consumption score; namely, poor, borderline and acceptable. The figures below detail a comparison between the June 2022 with the June 2023 SMART survey results.

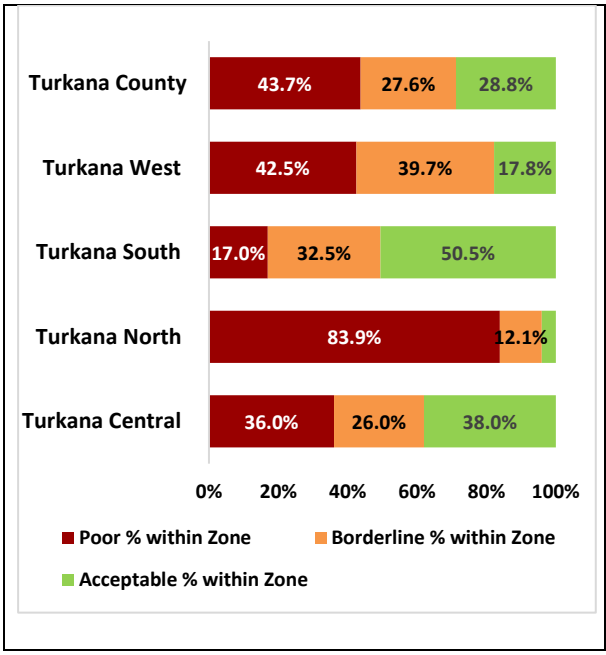


Figure 6:Jun 2022 Food Consumption Score (n=2540)

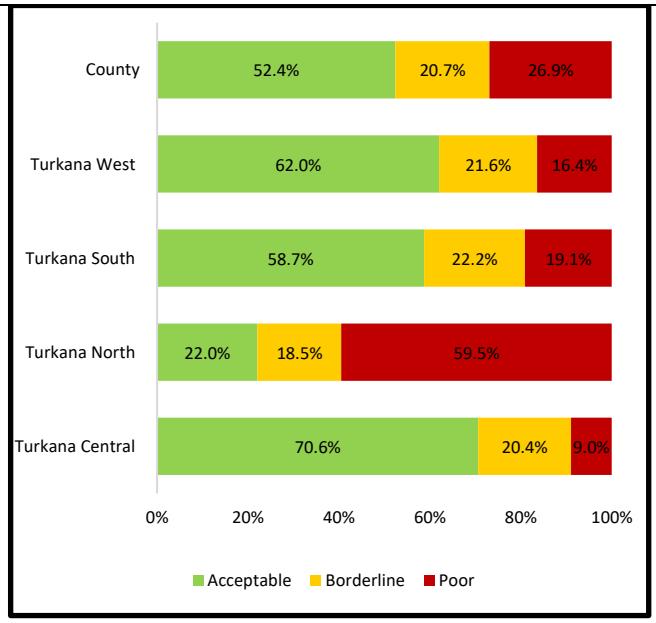


Figure 7:Jun 2023 Food Consumption Score (n=2243)

Food security indicators drastically improved across all survey zones with the highest improvement being in Turkana Central and West survey zones. The overall county food security improved with only 9.9% of households being in poor food consumption score compared to 36% in June 2022. This was supported by the nutrition status results where the levels of acute malnutrition significantly improved.

6.2.5 **Consumption of micronutrients (iron, protein and vitamin A rich foods in relation to Food consumption score**

Micronutrients are vitamins and minerals needed by the body in very small amounts but are vital for the body to thrive. Micronutrient deficiencies are also referred as hidden hunger and can cause visible and dangerous health conditions, as well as lead to clinically notable reductions in energy level, mental clarity and overall body incapacity. Research shows micronutrients deficiencies can lead to reduced educational outcomes, reduced work productivity and increased risk from other diseases and health conditions (WHO, 2021). The June 2023 SMART survey assessed the diet quality of the respondents based on vitamin A rich, iron rich and protein richness. Most households which were classified under poor category consumed none of vitamin A rich, protein and hem-iron rich foods at 79.8%, 94% and 68.7% which is a deterioration from June 2022 survey. There was an improvement in the borderline and acceptable categories. Hem rich iron food sources was the worst in terms of consumption. Turkana North was the worst in these indicators which was the same in the last two surveys. Dietary diversity interventions should be promoted across the county

Table 89: Consumption of protein, Vitamin A and Hem iron rich foods per food groups (n=2243)

		Turkana Central						Turkana North						Turkana South					
		Acceptable		Borderline		Poor		Acceptable		Borderline		Poor		Acceptable		Borderline		Poor	
		Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Vitamin A-rich foods"	0 days	23	6.6%	16	16.0%	14	31.8%	15	11.5%	55	50.5%	333	94.9%	11	2.8%	13	8.7%	87	67.4%
	1-6 days	105	30.3%	69	69.0%	28	63.6%	55	42.3%	45	41.3%	17	4.8%	46	11.6%	101	67.3%	34	26.4%
	7 days	218	63.0%	15	15.0%	2	4.5%	60	46.2%	9	8.3%	1	0.3%	340	85.6%	36	24.0%	8	6.2%
	n	346		100		44		130		109		351		397		150		129	
Protein-rich foods	0 days	0	0.0%	3	3.0%	26	59.1%	0	0.0%	1	.9%	289	82.3%	0	0.0%	7	4.7%	86	66.7%
	1-6 days	41	11.8%	92	92.0%	18	40.9%	7	5.4%	88	80.7%	62	17.7%	49	12.3%	133	88.7%	43	33.3%
	7 days	305	88.2%	5	5.0%	0	0.0%	123	94.6%	20	18.3%	0	0.0%	348	87.7%	10	6.7%	0	0.0%
	n	346		100		44		130		109		351		397		150		129	
Hem iron-rich foods	0 days	105	30.3%	74	74.0%	40	90.9%	19	14.6%	51	46.8%	333	94.9%	256	64.5%	130	86.7%	126	97.7%
	1-6 days	177	51.2%	26	26.0%	4	9.1%	62	47.7%	55	50.5%	18	5.1%	133	33.5%	20	13.3%	3	2.3%
	7 days	64	18.5%	0	0.0%	0	0.0%	49	37.7%	3	2.8%	0	0.0%	8	2.0%	0	0.0%	0	0.0%
	n	346		100		44		130		109		351		397		150		129	

		Turkana West						Turkana County					
		Acceptable		Borderline		Poor		Acceptable		Borderline		Poor	
		Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Vitamin A-rich foods"	0 days	2	0.7%	28	26.7%	48	60.0%	51	4.3%	112	24.1%	482	79.8%
	1-6 days	63	20.9%	65	61.9%	30	37.5%	269	22.9%	280	60.3%	109	18.0%
	7 days	237	78.5%	12	11.4%	2	2.5%	855	72.8%	72	15.5%	13	2.2%
	n	302		105		80		1175		464		604	
Protiein-rich foods	0 days	0	0.0%	1	1.0%	14	17.5%	0	0.0%	12	2.6%	415	68.7%
	1-6 days	16	5.3%	101	96.2%	66	82.5%	113	9.6%	414	89.2%	189	31.3%
	7 days	286	94.7%	3	2.9%	0	0.0%	1062	90.4%	38	8.2%	0	0.0%
	n	302		105		80		1175		464		604	
Hem iron-rich foods	0 days	45	14.9%	63	60.0%	69	86.3%	425	36.2%	318	68.5%	568	94.0%
	1-6 days	135	44.7%	42	40.0%	11	13.8%	507	43.1%	143	30.8%	36	6.0%
	7 days	122	40.4%	0	0.0%	0	0.0%	243	20.7%	3	0.6%	0	0.0%
	n	302		105		80		1175		464		604	

Staples as expected were the most consumed food sources followed by protein rich foods, the same as the June 2022 though in 2022 oils/fats were the 2nd most consumed food. Surprisingly fruits and vegetables were the third consumed food across the survey zones apart from Turkana North which could be attributed to physical access issues. Vitamin A rich foods and iron rich foods were the least consumed foods across the four survey zones. This explains the micronutrients deficiency levels specifically vitamin A and iron among the vulnerable population. The figure below details the analysis.

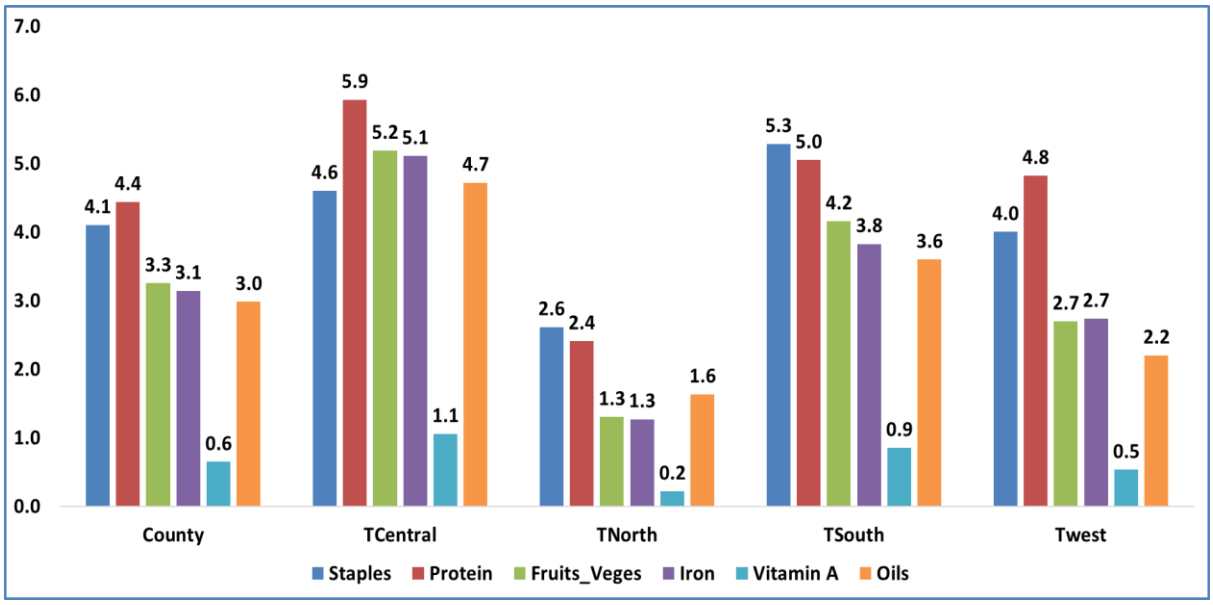


Figure 8: Number of days food was consumed showing micronutrient consumption

6.2.6 **Coping Strategy Index (rCSI)**

Another index used to assess food security was reduced Coping Strategy Index (CSI). This is a simple and easy-to-use indicator of household stress due to a lack of food or money to buy food. The rCSI is based on a series of responses to a single question: "What do you do when you don't have adequate food, and don't have the money to buy food?" rCSI combines, the frequency of each strategy (how many times was each strategy 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 (WFP 2012). rCSI is an experience-based indicator measuring the behaviour of households over the past seven days when they did not have enough food or money to purchase food.

The June 2023 SMART survey results show 98.1% of households reported an incident in the last 7 days where they had no adequate food or money to buy food an increase from 78% reported in June 2022. This increasing trend had been witnessed from the June 2021 SMART survey where about 66% had reported an incident where they had to cope with inadequate food or money to buy food. This indicted a worsening food security situation across the county. This was worse in Turkana South survey zone.

From the analysis almost a third of the households had crisis reduced coping strategy index.

Table 90: Reduced Coping strategy index

	Turkana Central	Turkana North	Turkana South	Turkana West	Turkana County

	Count	%	Count	%	Count	%	Count	%	Count	%
None	4	0.8%	1	0.2%	60	8.9%	0	0.0%	65	2.9%
Stressed	330	67.3%	481	81.5%	332	49.1%	446	91.6%	1589	70.8%
Crisis+	156	31.8%	108	18.3%	284	42.0%	41	8.4%	589	26.3%
n	490		590		676		487		2243	

Closely related to the reduced copy strategy index is hunger scale. The June 2023 SMART survey also measured the households hinger scale. Important to note is that 10.3% of the household were in catastrophe hunger scale with Turkana South survey zone having 20%. Majority of the households were in crisis hunger scale.

Table 91: Hunger scale

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
Minimal	77	15.7%	97	16.4%	169	25.0%	1	.2%	344	15.3%
Stressed	43	8.8%	19	3.2%	33	4.9%	0	0.0%	95	4.2%
Crisis	359	73.3%	385	65.3%	304	45.0%	423	86.9%	1471	65.6%
Emergency	6	1.2%	55	9.3%	30	4.4%	11	2.3%	102	4.5%
Catastrophe	5	1.0%	34	5.8%	140	20.7%	52	10.7%	231	10.3%
n	490		590		676		487		2243	

6.2.7 **Food fortification**

According to WHO, food fortification is defined as the practice of deliberately increasing the content of one or more micronutrients (vitamins and minerals) in a food to improve the nutritional quality of the food and provide a public health benefit with minimal risk to health. The main purpose of food fortification is to increase the nutritional content of foods, more so the staples. Evidence show food fortification can help to restore the micronutrient content lost during processing.

Kenya has made considerable achievements in achieving global commitments including the World Health Assembly 2025 targets. These include reduction in stunting, wasting and improving exclusive breastfeeding levels. These achievements vary across counties with some counties like Turkana having very poor indicators (Kenya Food fortification strategy 2018-2022, 2018). Kenya has an approved Food Fortification strategic plan 2018- 2022 to guide in program.

6.2.7.1 Food fortification awareness

The June 2023 SMART survey assessed the awareness level of the Turkana population on food fortification. About 19.7% of the household reported having heard about food fortification, an improvement from 6.1% in June 2022. The trend was maintained from June 2019. Turkana South and West led with the proportion who were aware of food fortification unlike in June 2022 when Turkana Central led; this time it was the last. Despite noted improvement, the county need to re-strategize on how to make the community aware of the strategy. The table below details the findings.

Table 92: Heard about food fortification

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%

Don't know	124	25.3%	109	18.5%	107	15.8%	48	9.9%	388	17.3%
No	331	67.6%	372	63.1%	379	56.1%	331	68.0%	1413	63.0%
Yes	35	7.1%	109	18.5%	190	28.1%	108	22.2%	442	19.7%
n	490		590		676		487		2243	

Detailed analysis shows the dominant source of food fortification information was trainings and radio messages, though it varied per survey zone with Turkana Central survey zone reporting TV as a dominant source of food fortification information. This differs from the June 2022 where all recorded radio as the main source of information.

Table 93: Source of food fortification information

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
Radio	33	94.3%	78	71.6%	58	30.5%	85	78.7%	254	57.5%
Road show	8	22.9%	48	44.0%	9	4.7%	3	2.8%	68	15.4%
In a training session attended	5	14.3%	57	52.3%	135	71.1%	61	56.5%	258	58.4%
On a TV show	14	40.0%	8	7.3%	11	5.8%	27	25.0%	60	13.6%
Others	0	0.0%	6	5.5%	20	10.5%	0	0.0%	26	5.9%
n	35		109		190		108		442	

The Kenyan food fortification strategic plan give a specific log to be put on the fortified food products. The survey wanted to establish whether the community can identify the log. Despite caregivers having heard about food fortification, some could hardly identify the food fortification logo though majority (85.7%) were able to identify the logo, an increase from 69.8% from June 2022. This meant 14.3% of the household could not use the food fortification logo to make decision about their food purchase.

Table 94: Know the food fortification logo

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	Count	%	Count	%	Count	%	Count	%	Count	%
No	15	42.9%	8	7.3%	4	2.1%	36	33.3%	63	14.3%
Yes	20	57.1%	101	92.7%	186	97.9%	72	66.7%	379	85.7%
n	35		109		190		108		442	

7.0 MIYCN

The first 1000 days of child's life; covering the period between a woman's pregnancy and the child 2nd birthday is a unique opportunity to shape up child's life for heathier life and future opportunities. This window of opportunity is adequate to create impact for child's ability to grow, learn and rise from poverty. This in turn affects the general society welfare (Maternal, infant and young child nutrition. national operational guidelines for health workers. 2013). Child's optimal growth and development starts from the womb because a malnourished baby in the mother's womb has hire risk of dying in infancy and are more likely to face lifelong cognitive and physical deficits and chronic health problems.

The last county MIYCN indicators were assessed in 2017 KABP survey, though the 2023 KDHS document some county specific indicators but more national level indicators. Hence the county needed some level of MIYCN assessment. At the national level, Kenya has made progress on exclusive breast feeding though there was stagnation from 61% in 2014 to 60 in 2023. This called for the county need to do this assessment.

Infants and young children should be fed a minimum acceptable diet. This means they should be fed meals with appropriate frequency and a variety of foods to meet their energy and nutrient needs. The last KABP recorded a MDD of 46.6% while this survey found a 27% as a county average with a survey zone highest of 41.4% in Turkana Central and a low of 10% in Turkana North.

Exclusive breast feeding stood at 83.7% in the county with some survey zones like Turkana West having 89.9%. The last KABP recorded 76% of the children were doing exclusive breast feeding. Children on complementary feeding consumed majorly starchy foods, legumes and other vegetables though fleshy foods were also consumed in a considerable amount. Eggs were sparingly consumed. From these finding almost half of the children were likely to consume and food diverse diet.

Table 95: Child MDD food groups

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
Breast milk	80.5%	39	82.6%	24	82.3%	42	89.9%	30	83.7%	136
n		49		29		51		31		162
Grains, white/pale starchy roots, tubers and plantains	64.5%	145	23.7%	58	51.5%	139	47.5%	96	52.1%	491
Beans, peas, lentils, nuts and seeds;	60.0%	135	19.5%	48	43.8%	118	58.6%	119	50.7%	477
dairy products (milk, infant formula, yogurt, cheese)	41.4%	93	24.1%	59	43.1%	116	44.4%	90	40.9%	385
Flesh foods (meat, fish, poultry, organ meats)	43.2%	97	20.3%	50	8.8%	24	37.9%	77	29.2%	275
Eggs;	3.2%	7	0.4%	1	2.3%	6	7.1%	14	3.6%	34
Vitamin A-rich fruits and vegetables	24.5%	55	8.7%	21	20.0%	54	28.3%	57	22.5%	212
Other fruits and vegetables	57.3%	129	9.5%	23	38.1%	103	42.9%	87	43.0%	405
n		225		244		270		203		942

Almost a third of the assessed children 6- 23 months children consumed 5 or more food groups, with some survey zones like Turkana north having about 10%.

Table 96: Food consumption score children

	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
<5FGs	129	58.64%	217	90.04%	217	83.46%	138	69.70%	701	72.12%
≥5FGs	91	41.36%	24	9.96%	43	16.54%	60	30.30%	218	27.88%
n	220		241		260		198		919	

Unlike in the 2017 KABP survey where continued breastfeeding was above 80%, this survey recorded half of the children continued to breastfed from 12-23 months. Considering the poor complementary feeding indicators, breast milk forms a critical component of their diet. The reduced continued breast-feeding mean children will not be able to meet their nutrition needs from their complementary food.

The table below details a worrying status of complementary feeding in Turkana among which was minimum acceptable diet 6–23 months (MAD) of 13% with some survey zones going as low as 5.4%. Others included unhealthy food consumption 6–23 months (UFC) of 31%, meaning children consume unhealthy foods in their early life which is likely to have an adverse effect in their adult life.

Table 97: MDD, MMF and MAD for 6-23 months (n=919)

IYCF indicators	Turkana Central		Turkana North		Turkana South		Turkana West		Turkana County	
	count	%	count	%	count	%	count	%	count	%
CONTINUED BREASTFEEDING 12–23 MONTHS (CBF) (n=605)	89	59.3%	15	9.6%	84	48.6%	67	53.2%	255	49.6%
INTRODUCTION OF SOLID, SEMI-SOLID OR SOFT FOODS 6–8 MONTHS (ISSSF) (n=144)	20	57.1%	6	15.0%	8	22.9%	8	23.5%	42	34.1%
MINIMUM DIETARY DIVERSITY 6–23 MONTHS (MDD) (n=919)	91	41.4%	24	10.0%	43	16.5%	60	30.3%	218	27.9%
MINIMUM MEAL FREQUENCY 6–23 MONTHS (MMF) (n=919)	88	40.0%	97	40.2%	113	43.5%	77	38.9%	375	40.8%
MINIMUM MILK FEEDING FREQUENCY FOR NON-BREASTFED CHILDREN 6–23 MONTHS (MMFF) (n=919)	10	23.3%	3	7.1%	10	21.7%	8	40.0%	31	23.7%
MINIMUM ACCEPTABLE DIET 6–23 MONTHS (MAD) (n=919)	40	18.2%	13	5.4%	24	9.2%	27	13.6%	104	13.0%
EGG AND/OR FLESH FOOD CONSUMPTION 6–23 MONTHS (EFF) (n=919)	98	44.5%	49	20.3%	25	9.6%	75	37.9%	247	29.9%
UNHEALTHY FOOD CONSUMPTION 6–23 MONTHS (UFC) (n=919)	67	30.5%	19	7.9%	92	35.4%	77	38.9%	255	31.8%
ZERO VEGETABLE OR FRUIT CONSUMPTION 6–23 MONTHS (ZVF) (n=919)	130	59.1%	32	13.3%	115	44.2%	89	44.9%	366	46.3%

8.0 MORTALITY

WHO defines mortality rate as a measure of the frequency of occurrence of death in a defined population during a specified interval. Mortality rate can be measured differently depending on the reference population segments. Mortality rate is expressed in units of deaths per 1,000 individuals per year; For this survey two types of mortality rates were measured: Crude Mortality rate (CMR) which records mortality from all causes and Under five Mortality Rate (U5MR).

Turkana County last conducted a mortality survey in June 2022 SMART survey after a long period from June 2017 survey. The June 2022 mortality findings were within the acceptable levels for both CMR and U5MR though U5MR for Turkana West survey zone were at alert. This was unlike the June 2017 survey when CMR for Turkana North was alert. The June 2023 recorded deteriorated mortality rate across survey zones with emergency CMR in Turkana Central and North survey zones while Turkana West was at alert. Despite the worsening crude mortality rates, under-fives mortality rate was normal in most of the survey zones though Turkana West also found alert U5MR.

Table 98: Crude Mortality rate

Zone	CMR (2022)	CMR (2023)	DE	U5MR (2022)	U5MR (2023)	DE
Central	0.44 (0.20-0.95)	3.19 (2.27-4.46)	1	0.00(0.00-0.00)	0.44 (0.06-3.25)	1
South	0.84 (0.41-1.71)	0.59 (0.32-1.10)	1.13	0.36 (0.05-2.63)	0.21 (0.03-1.51)	1
North	0.41 (0.16-1.07)	2.54 (1.49-4.32)	1.42	0.72 (0.16-3.18)	0.38 (0.05-2.90)	1.03
West	0.72 (0.40-1.31)	1.90 (1.16-3.08)	1.79	1.98 (0.96-4.07)	0.58 (0.19-1.76)	1
Alert	1/10,000/day			1/10,000/day		

Emergency	2/10,000/day	4/10,000/day

Cause specific analysis showed, majority of deaths were due to illness though injury and trauma formed a bigger proportion in Turkana South and North survey zones which form most of the insecure parts of the county. Majority of deaths occurred at the current locations of the households. However, for Turkana North survey zones a substantial proportion occurred during migration ranking migration as one of the most risk event in the zone. Households tend to shift after death of a family member as shown by the proportion which reported place of death as the last place of residence.

Table 99: Cause and location of death

	Category	Turkana South	Turkana North	Turkana Central	Turkana West
Cause of Death	Unknown	9.10%	11.10%	11.10%	6.7%
	Injury/trauma	36.40%	22.20%	0.00%	6.7%
	Illness	45.50%	55.60%	74.10%	73.3%
	Others	9.10%	11.10%	14.80%	13.3%
Location of death	In current location	81.80%	50.00%	74.10%	66.7%
	During migration	9.10%	33.30%	0.00%	6.7%
	In place of last residence	9.10%	16.70%	22.20%	26.7%
	others	0.00%	0.00%	3.70%	0%

Further analysis found not gender specific differences. Detailed autopsy is needed to establish the causality.

CONCLUSION

There was reduction of the proportion of children reported to have been sick two week preceding the survey; a trend maintained from the previous four surveys with this survey having 23.4% compared to 25.8% in June 2022, 29% in 2021 and 41% in 2019. The leading morbidity cause was ARI/Cough followed by malaria, the same as June 2022. There were no cases of bloody diarrhoea reported in June 2022 unlike in June 2022 when there were 22 cases across the four survey zones. The proportion of children affected by malaria generally increased compared to June 2022 while the rest reduced. Morbidity as an immediate cause of malnutrition was still high and can be linked to the high malnutrition level across the county. Health seeking behaviour continued to improve with a positive change from 91.9% to 93.9% a trend maintained from June 2019. Public health facilities remained the most preferred places across the four survey zones where caregivers sought treatment for their children, the same case as in June 2022 though, the proportion reduced, a trend maintained from June 2021. CHVs are a critical component of Turkana County health care and were the second most trusted source of treatment. Despite there being about 493 active integrated health and nutrition outreaches, only 6% of the respondents sought treatment at the clinics, though it ranged from 26% in Turkana North to 4.5% in Turkana West.

The negative effects of COVID 19 pandemic containment measure seems to have been contained with this year survey results showing an improving immunization coverage. There was improvement in BCG immunization as confirmed by scar from 94.9% to 98.9% changing the declining trend witnessed in June 2021 to 2022; this was the case with all assessed antigens. There was a significant improvement in vitamin A coverage when June 2022 was compared to June 2023 SMART survey with the overall vitamin A coverage in June 2023 was 90% which was above the set target of 80% and was above 49.1% coverage in June 2022. Vitamin A set target of 80% was met in all survey zones and by all the age categories, except in Turkana Central survey zone. Deworming coverage improved by 3.6% points when 2023 SMART survey results were compared with June 2022 results with all survey zones having above 90% coverage except Turkana Central which showed deterioration. MCH booklet coverage continued to improve, a trend maintained from the June 2019 SMART survey. Age verification by health card improved from 81.5% to 91% in June 2023. All survey zones had over 80% MCH booklet coverage. Utilization of zinc across the four survey zones improved in June 2023 survey when compared to June 2022 with only Turkana South showing a decline.

Majority of female caregivers were lactating (49.6%) a considerable decrease 57% (7.4%) from June 2022. About 10.7% of all women interviewed were found to be malnourished (<21cm), an improvement from 14.8% recorded in June 2022. There was improvement in the nutrition status of PLW with a county average of 9.9% against 15.2% identified in June 2022. The improvement cut across all survey zones with Turkana West being the best and Turkana Central the worst.

Among the women with children below two years, majority (97.8%) had attended ANC with all survey zones having almost the same proportion. A total of 91.7% of women with children below 2 years across the county had been supplemented with Iron and Folic acid during their last pregnancy, almost the same proportion as in June 2022 of 91.9%, a deteriorating trend maintained from June 2019. There was an improvement in the number of days IFAS were consumed by pregnant women from 66.3 days to 102.9 days. Two of the survey zones had more than 100 days a departure from the past surveys where all had less than 100 days. Duration of supplementation remained poor especially considering the current recommendation where women are expected to take the supplements for the entire pregnancy duration. Only 2.7% of women took the supplements for more than 180 days against 7.7% in June 2022.The reduction was attributed to late ANC visit by most women. Mosquito net ownership and utilization declined considerably across all survey zones.

Among the interviewed caregivers, slightly more than half could identify family led MUAC tape, 60% had been sensitized on the strategy. This survey identified a gap in family led MUAC tape ownership by caregivers because on 36.3% reported having the tapes, 90% of them had used the tape which call for continuous sensitization and mentorship for caregivers to use the tape. A good proportion (70%) of caregivers had made referral using the strategy majority of which were to the nearest health facilities.

The county indirect IMAM coverage reduced to below 50%, the recommended cut off for rural areas when compared June 2022 which was 58% to the current 41.3%. This was despite the high proxy coverage from the administrative data and optimal coverage from the March/April SQUEC. Coverage was minimal in Turkana North at 31.6% and highest in Turkana Central at 69.9% survey zone. Majority of the beneficiaries were in SFP at 74.7% with only 25.3% being in SAM.

The proportion of households obtaining water from safe sources, that is borehole / protected spring /protected shallow wells, Earth pan/dam with infiltration well, piped water system, Water vendor as well as water tracking reduced from 60.6% in June 2022 to the current 59.6%, a trend maintained from June 2019. There was a decline for those using public taps, a trend witnessed from June 2021 from 53.5% to 44.9% recorded in the June 2023 SMART survey. The results show a reduction in the proportion of households accessing water from the acceptable recommended distance of less than 500m. Generally, women bore the burden of fetching water for domestic use at 83.5% followed by girls an indication there is need to establish ways of reducing women workload. There was a deterioration of water access indicators shown by a decline proportion of households not queuing for water.

There was a slight improvement of the households who were treating water from 13.0% in June 2022 to 17.3% in June 2023; though majority (82.7%) of households were not treating drinking water despite the poor sources. Use of chemicals remained the dominant water treatment method in the county at 73.6% though it was at 91.3% in Turkana West. Traditional herb is gaining prominence as a water treatment method. There was an improvement in the use of closed containers by the households to store drinking water from 64.3% to 76.8%, meaning improvement in the prevention of water contamination. The declining trend of households paying for water recorded from the 2019 to 2022 SMART surveys changed with the June 2023 SMART survey where there was an increase from 34.7% to 35.6%. Majority of the households were not consuming adequate quantity of water, changing the improvement trend recorded in the previous three surveys.

The handwashing awareness in the county continued to decline, two years after the peak of COVID 19 pandemic with the current survey recording 69.2% from June 2022's 72.1%, a trend maintained from 2021. There was an overall improvement in hand washing practices in June 2023 compared to June 2022. There was a slight improvement of hand washing at the four critical times compared to the same period in 2022 changing the declining trend, though it remained below 50%. Less than half of the households were washing hands with soap and water, a reduction from 50.7% in June 2022. Caregivers' knowledge level slightly declined from 75.2% to 72.3% in June 2023 survey with only 48.6% of caregivers in Turkana North survey zone having hand washing knowledge. The overall sanitation status for Turkana County improved with proportion of households relieving themselves in the bush or open field (open defecation) having considerably decreasing from 79.7% to 70.9% in June 2023 SMART survey. The county latrine coverage improved to 29.2% from 20.3%.

There was a notable increase in the proportion of household enrolled in cash transfer when June 2022 and June 2023 SMART surveys were compared. This changed declining trend witnessed in June 2019 to June 2022. The improvement was attributed to the ongoing emergency response. There was a considerable increase in the population consuming different food groups attributed to improved access.

The major food groups consumed across the four survey zones were the staples (Grains, white roots and tubers and plantains) while the least consumed were the eggs, nuts and seeds. The overall dietary diversity for the county remained generally the same as the same period in 2022 though the population taking less than 3 food groups which is referred to as poor HDD increased from 48.1% to 55.3%. The population taking more than 5 food groups increased from 17.7% to 22.7% in conformity with improved nutrition situation.

The proportion of women 15 -49 years consuming 5 and more food groups improved across the four survey zones when compared to the same period in 2022; from 7% to 21.6% on average with all survey zones showing improvement except Turkana South where there was decline. This shoed, women of reproductive age in Turkana were unlikely to meet micronutrients intake requirements. The overall county food security improved with only 9.9% of households being in poor food consumption score compared to 36% in June 2022. This was supported by the nutrition status results where the levels of acute malnutrition significantly improved. The June 2023 SMART survey results show 98.1% of households reported an incident in the last 7 days where they had no adequate food or money to buy food an increase from 78% reported in June 2022. Important to note is that 10.3% of the household were in catastrophe hunger scale with Turkana South survey zone having 20%. Majority of the households were in crisis hunger scale while 10.3% of the household were in catastrophe hunger scale with Turkana South survey zone having 20%. Majority of the households were in crisis hunger scale.

Minimal proportion of the households (19.7%) reported having heard about food fortification, though an improvement from 6.1% in June 2022, a trend maintained from June 2019. Trainings and radio messages remained the dominant sources of food fortification awareness. Majority (85.7%) of those who had heard about food fortification were able to identify the logo, an increase from 69.8% from June 2022.

Exclusive breast feeding stood at 83.7% in the county with some survey zones like Turkana West having 89.9%. This was an improvement from 76% recorded in the last KABP survey. From these finding almost half of the children were likely to consume and food diverse diet. The survey recorded a worrying status of complementary feeding in Turkana among which was minimum acceptable diet 6–23 months (MAD) of 13% with some survey zones going as low as 5.4%. Others included unhealthy food consumption 6–23 months (UFC) of 31%.

The June 2023 recorded deteriorated mortality rate across survey zones with emergency CMR in Turkana Central and North survey zones while Turkana West was at alert. U5MR was normal in all survey zones. Majority of deaths were due to illness though injury and trauma formed a bigger proportion in Turkana South and North survey zones which form most of the insecure parts of the county. Majority of deaths occurred at the current locations of the households.

The overall county nutrition significantly improved in 2023 compared to June 2022, with improvement recorded in all survey zones. The GAM level significantly decreased to critical from extremely critical in North Survey zone while it remained extremely critical in Turkana South. It remained critical at the county weighted average and the two other survey zone of Turkana West and Central.

Despite the improvement the nutrition status remained above the WHO emergency cut off. The persistent poor nutrition status is consistent with poor food security indicator status; that is HDDS/ FCS. The key drivers to high undernutrition in the county are worsening leading to deteriorating trend of malnutrition. The malnutrition levels across the four survey zones are attributed to worsening food insecurity resulting from successive failed rains leading to drought and rapid increase in food prices,

loss of livestock, poor coping mechanisms. Other drivers include chronic food insecurity, high prevalence of childhood illness, inadequate dietary diversity, poor access to safe water, poor hygiene practices, inadequate incomes and assets for the households.

9.0 RECOMMENDATIONS

Table 100: Recommendation – June 2023

	Evidence	Action	By whom	By when
1	County remains a hotspot for acute malnutrition – TN/Kibish- Kibish, T. C/ Loima- Kangatosa, Lobei/Kotaruk , Kerio delta, Kanamkemer and Turkwel TE/TS- (All wards except unsurveyed Lomelo) Katilia, Lokori/Kachodin, Katilu, Kalapata, Lokichar, Kaputir T.W- Songot, Lopur	Continue with active case finding and referral in all hot spots to ensure all malnourished women and children access treatment in all service delivery points	MoH, NDMA and nutrition partners	Immediately
2	Sanitation remains suboptimal- at 23%	Scale up and strengthen WASH interventions	MoH/Partners	immediately
3	GAM rate- **26.4% remains critical** (**BUT** reduced Significantly from 34.8 %% in 2022	Remap and scale-up a sustainable strategy for integrated outreaches in hard-to-reach areas	MoH and nutrition partners UNICEF-KEMSA, KRCS, WFP	immediately
		Manage and strengthen supply chain for nutrition commodities		
4	Significant increase in crude and under-five mortality in the county due to a variety of reasons, such as illnesses and trauma/injury-	Strengthen Quality of care for malnourished children through mentorship and training especially for severely malnourished children in inpatient care.	MoH and partners	immediately
5	Poor food security (Hunger scale- **10%-Catastrophe; 5% Emergency** and **66%- Crisis**) and consumption practices at household level (**HDDS-22.7% MAD-13%**)	Scale up and strengthen SBCC through mother-to-mother support groups and all service delivery points.	MoH and nutrition partners	
		Continue with creation of linkages for acutely malnourished children and women to existing social safety net programs – Scale-up cash transfer and stabilize food markets in hard-to-reach areas	MoH, NDMA and nutrition partners	Immediately
6	For over 5 Years, Lomelo region has never been surveyed. Significant IDP population surveyed in T. East and South	Conduct peace building in most affected areas of Turkana south, Turkana North, T. west and Loima for improved humanitarian access.	TCG, National government and local leadership	Immediately

		Activate one health program for cross border programing	TCG, Partners	Immediately
7	22.6% of children not enrolled in school due to child labour and lack of access to school	Scale up school enrolment and retention	TCG/MoE/ Partners, Partners	Immediately
		Scaling up of school feeding programme for school going children		
8	Household main occupation- Sale of firewood/charcoal-23.4%; Pastoralism-**34.2%** (Reducing trend) Main source of income- Petty trading-38.9% and casual labour-11% **No income- 19%**	Initiate food for Assets (FFA) to compliment cash transfer	TCG/Partners	Immediately
9	Access to safe water (Bore holes and piped systems) at 58% little progress/improvement observed	Rehabilitation of boreholes to minimize trekking distance	TCG/MoW/ partners	immediately
		Implement low-cost /climate SMART/resilient technologies Water systems	TCG/Partners	immediately
	Household dietary diversity very poor at **22.7%**	Stimulate markets across the county	TCG, Partners	Immediately
	Low caregiver literacy levels- 68.2% of caregivers has no formal education	There should be plans to introduce adult education among the care- givers	TCG/MoE/ Partners	Low caregiver literacy levels- 68.2% of caregivers has no formal education

10.0 APPENDIX

10.1 Appendix 1: Mapped out hotspots- June 2022 & June 2023

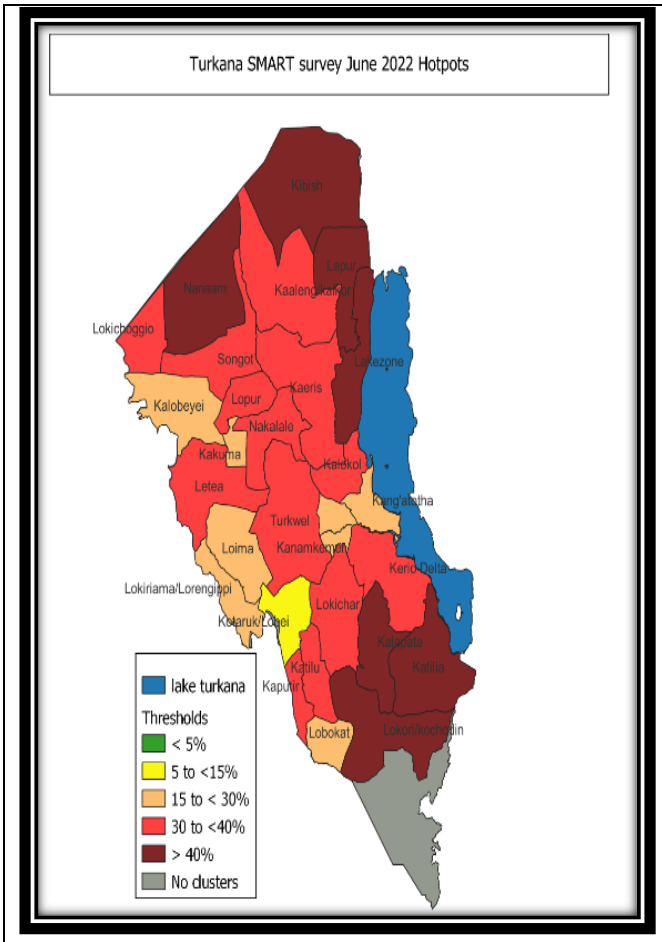


Figure 9: Turkana county June 2022 SMART survey hot spots

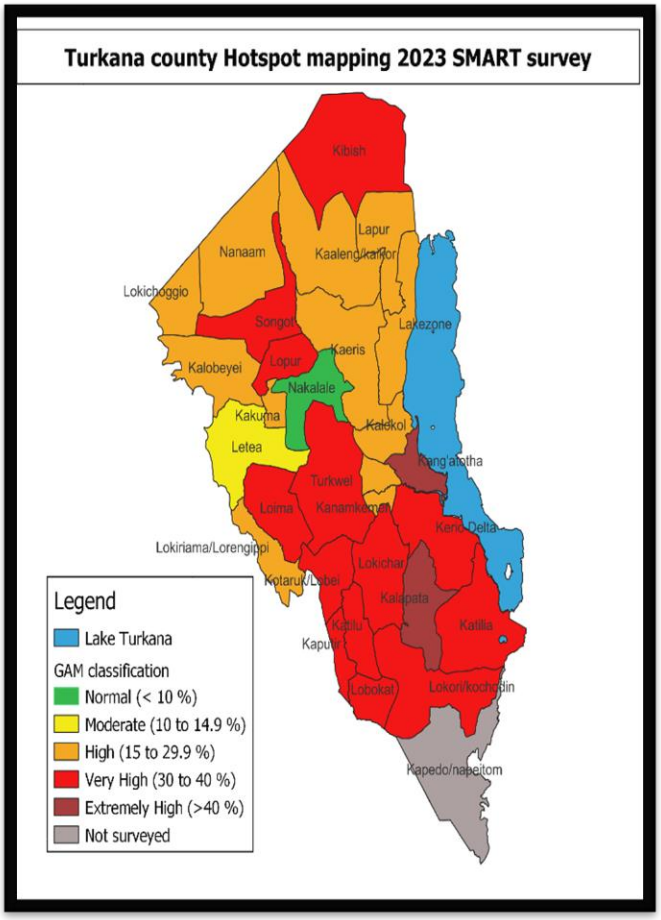


Figure 10: Turkana county June 2023 SMART survey hot spots

10.2 Appendix 2: Plausibility Summary report

Table 101:Turkana June 2023 SMART survey Plausibility summary report

	Indicator	Acceptable values/range	CENTRAL	NORTH	SOUTH	WEST
1	**Flagged data (% of out of range subjects)**	**<7.5**	**0 (1.8 %)**	**0 (2.0 %)**	**0 (1.4 %)**	**0 (1.3 %)**
2	**Overall sex ratio (significant CHI square)**	**>0.001**	**0** (p=0.584)	**0** (p=0.142)	**0** (p=0.425)	**0** (p=0.130)
3	**Age ratio (6-29vs 30-59) Significant CHI square**	**>0.001**	**4** (p=0.003)	**2** (p=0.089)	**10** (p=0.000)	**10** (p=0.000)
4	**Dig. prevalence score-weight**	**<20**	**0** (5)	**0** (5)	**0** (3)	**0** (4)

5	**Dig. prevalence score-height**	**<20**	**2** (11)	**0** (6)	**0** (4)	**0** (5)
6	**Dig. prevalence score-MUAC**	**<20**	**0** (5)	**0** (6)	**0** (4)	**0** (4)
7	**Standard Dev..height WHZ**	**>0.80**	**0** (1.00)	**0** (1.04)	**0** (1.05)	**0** (1.01)
8	**Skewness WHZ**	**<±0.6**	**0** (0.01)	**0** (-0.02)	**0** (0.03	**0** (-0.03)
9	**Kurtosis WHZ**	**<±0.6**	**1** (0.25)	**0** (-0.06)	**0** (-0.12	**0** (-0.06)
10	**Poisson WHZ -2**	**>0.001**	**3** (p=0.009)	**3** (p=0.005)	**5** (p=0.000)	**5** (p=0.000)
11	**OVERALL**	**<24**	**10** % Good	**5% excellent**	**15** % Acceptable	**15** % Acceptable

10.3 Appendix 3: Sampled clusters per survey zone

Table 102:Sampled clusters Turkana Central survey zone – June 2023

Survey Zone	Ward	Community Unit	Village	Population size	Cluster
Turkana Central	KANAMKEMER	KANAMKEMER	JULUK A	1116	1
Turkana Central	KANAMKEMER	KANAMKEMER	JULUK B AND C	1938	RC
Turkana Central	KANAMKEMER	CANAAN	KAMBI STAFF	396	2
Turkana Central	TOWNSHIP	TOWNSHIP	Soweto (D)	972	3
Turkana Central	TOWNSHIP	NAPETET	NASANYANAIT	1788	4
Turkana Central	TOWNSHIP	NAPETET	NAJAKASIKIRIA	648	5
Turkana Central	KANAMKEMER	NAWOITORONG	LOKITELA	1356	6
Turkana Central	TOWNSHIP	NAKWAMEKWI	Nakwasinyen	402	7
Turkana Central	TOWNSHIP	TOWNSHIP	Nataparkakono	1620	8
Turkana Central	KERIODELTA	NAKURIO	Natidao	1962	9
Turkana Central	KANGATOSA	KANGATOSA	Adunget	198	10
Turkana Central	TOWNSHIP	NAPETET	ADIPO	1464	11
Turkana Central	TOWNSHIP	NAKWAMEKWI	CHUKULTOM	882	RC
Turkana Central	KERIODELTA	LORENGELUP	NGIIPAE	204	12
Turkana Central	KALOKOL	LONGECH	DISII	378	13
Turkana Central	KERIODELTA	KERIO	ASINGILA	318	14
Turkana Central	KERIODELTA	KAKIMAT	Nabuskaal	192	15
Turkana Central	KERIODELTA	KAKIMAT	NAKWAA	1188	16
Turkana Central	KALOKOL	KALOKOL	LOPANGAE	672	17
Turkana Central	KALOKOL	KALOKOL	KAILELE B	480	18
Turkana Central	KERIODELTA	LORENGELUP	KAIKOL	444	19
Turkana Central	KALOKOL	KAPUA	KANUKUNMERI	1308	20
Turkana Central	KANGATOSA	NAOROS	LOTEDE	294	21
Turkana Central	TOWNSHIP	NGIITAKITO	NAPEYENGOL	738	22
Turkana Central	TOWNSHIP	KAKWANYANG	MONTI	1110	23
Turkana Central	Lobei Kotaruk	KALEMUNYANG	ASEKON B	186	24
Turkana Central	Lobei Kotaruk	KANGALITA	KAYEN	330	25
Turkana Central	Lobei Kotaruk	Lobei Kotaruk	NAKATIYAN	438	26
Turkana Central	Loima	lochor ekuyen	EDOME	522	RC
Turkana Central	Loima	NAMORUPUTH	NAMORUPUTH A	210	27

Turkana Central	Lorengippi Logiriama	Lorengippi Logiriama	ESEKON AMUTES	534	28
Turkana Central	Lorengippi Logiriama	URUM	NAKAKABAAN	156	29
Turkana Central	Turkwel	LOMIL	LOKOPU	480	30
Turkana Central	Turkwel	NACHURO	NAMANMAN	144	31
Turkana Central	Turkwel	NAPEIKAR	KAKIRING	414	32
Turkana Central	Turkwel	NASIGER	KALOPIRIA	480	33
Turkana Central	Turkwel	Turkwel	NAPETET ONE	552	RC

Table 103: Sampled clusters Turkana North survey zone – June 2023

Survey zone	Ward	Community Unit	Village Name	Cluster	Population
Turkana North	KIBISH	NAITESE	NATODOMERI	1	19
Turkana North	KIBISH	NATUMAKALEI	NAPAK EMEJEN	2	62
Turkana North	KIBISH	LOPERO-KOK	MUNOI	3	107
Turkana North	KAIKOR/KAALENG	NAYOOK	NAKILING'A 2	4	434
Turkana North	KAIKOR/KAALENG	NAYOOK	NAKWAMEKWI 1	5	484
Turkana North	KAIKOR/KAALENG	NGIKAREBOK	NAKINOMET A	6	309
Turkana North	LAPUR	EDOOT	NASOLAR	7	345
Turkana North	LAPUR	TOIUNAE KAREBUR	KATONGUN	8	181
Turkana North	LAPUR	LIWAN	MAISA 2	9	78
Turkana North	KAIKOR/KAALENG	ILEMKAJOKON	LOWASA/KENYA OIL	10	450
Turkana North	KAIKOR/KAALENG	KAPOKO	LOMAKAT	11	210
Turkana North	KAIKOR/KAALENG	KAPOKO	YEYA	12	966
Turkana North	KAIKOR/KAALENG	KAWOO	NATIIR	13	480
Turkana North	KAIKOR/KAALENG	LOCHILAMUYA	EKENGOT	14	287
Turkana North	LAPUR	SASAME	NANGORKITOE	15	306
Turkana North	LAPUR	SASAME	NAIROBI 'B'	16	312
Turkana North	KIBISH	KICHUBI	KOBORIN	17	229
Turkana North	KAIKOR/KAALENG	KAALING	MURUERIS	18	120
Turkana North	KAERIS	KAERIS	NAKALALIOIT	19	570
Turkana North	KAERIS	KAERIS	NGIPIDINGA	20	540
Turkana North	KAERIS	NADUNGA	Kangibenyoi	21	234
Turkana North	KAERIS	NADUNGA	kangiloi	22	216
Turkana North	KAERIS	KANAKURUDIO	NAPALAKIPOR	23	492
Turkana North	KAERIS	KANAKURUDIO	KANGAMOJOJ	24	732
Turkana North	KAERIS	KATABOI	KAMBI SAFI-B	RC	360
Turkana North	Lakezone	LOARENGAK	Pringan	25	342
Turkana North	Lakezone	LOARENGAK	Kiwanja Ndege A	26	360
Turkana North	Lakezone	LOARENGAK	lake side	27	714
Turkana North	Lakezone	NARIOKOTOME	ASEKON	28	156
Turkana North	Lakezone	NARENGEWOI	NASURA	RC	180
Turkana North	Lakezone	KOKISELEI	Kokiselei 1	29	222
Turkana North	Lakezone	RIOKOMOR	Small Erus	30	258
Turkana North	Lakezone	TODONYANG	Nayanaekabaran	31	432

Turkana North	Lakezone	EPUR	Moriedou	RC	498
Turkana North	Lakezone	KATIKO	Katiko	32	336
Turkana North	KAIKOR/KAALENG	LOKAPELPUS	Nasopo	33	408
Turkana North	KAIKOR/KAALENG	LOKAPELPUS	Nakatonguun	34	240
Turkana North	LAPUR	KACHODA	Manalongoria	35	336
Turkana North	LAPUR	LOKITAUNG	Naoyatira	36	468
Turkana North	LAPUR	LOKITAUNG	Ngatabab	RC	540
Turkana North	LAPUR	LOMII	EKINGOL	37	270

Table 104: Sampled clusters Turkana South survey zone – June 2023

Survey Zone	**SUB LOCATION**	**UNIT NAME**	Village	Population size	Cluster
Turkana South	PARAKATI	LOMUNYENAKWAAN	KETORO	426	1
Turkana South	KATILIA	KATILIA	PARAKATI	510	2
Turkana South	KATILIA	KATILIA	NAKWAMEKWI	576	3
Turkana South	KATILIA	KATILIA	NAKWASINYEN	348	4
Turkana South	ELELEA	ELELEA	NAYANAEKATWAAN	258	5
Turkana South	PARAKATI	LOPEDRU	KANGIMANIMANIA	258	6
Turkana South	LOTUBAE	LOTUBAE CHU	KILERETE	522	7
Turkana South	KOCHODIN	NAKUKULAS CHU	KALOUCHELEM	270	8
Turkana South	LOKORI	LOKORI PHC CHU	CALVARY	456	9
Turkana South	LOKORI	LOKORI AIC CHU	AP LINE A	270	10
Turkana South	KANGITIT	MORULEM B CHU	NAOYAKIPOR	300	11
Turkana South	KANGITIT	MORULEM A CHU	NAOYATIRA	264	12
Turkana South	LOTUBAE	LOKWII A CHU	AKWAKIRU	450	13
Turkana South	Katilu	Korinyang	ALIGOI B	300	14
Turkana South	KATILU	LOPUR	SIMAILELE	480	15
Turkana South	Kalemngorok	Kalemngorok	NABWEL ANAMADA A	192	16
Turkana South	KATILU	NAMAKAT	SIMAILELE A	504	17

Turkana South	KATILU	KATILU	LINE MOJA C	288	18
Turkana South	KATILU	KATILU	TOMOKIYA	276	19
Turkana South	KATILU	Kagitankori	KAIKAI	222	20
Turkana South	LOKAPEL	LOKAPEL	KIMIIRIK	372	21
Turkana South	KANAODON	KANAODON	AYANAE ELIM	564	22
Turkana South	KAINUK	NAKULULUMAET	MARKET B	204	23
Turkana South	KAINUK	NAKULULUMAET	NGIRIONOTUK B	234	24
Turkana South	Lorogon	Lorogon	LINE MOJA	192	25
Turkana South	NAKWAMORU	KAPUTIR	LOCHURCHUR	186	26
Turkana South	NAKWAMORU	NAKWAMORU	EKIPOR	114	27
Turkana South	KAPESE	LOKABURU	KIKISA	198	28
Turkana South	KAPESE	KAPESE	SABA	306	29
Turkana South	KAPESE	KAPESE	LOKWADWAT	204	30
Turkana South	Lochwaa	Locheremoit	NARENGEMUNYEN	432	31
Turkana South	Lochwaa	Locheremoit	EDOS B	492	32
Turkana South	Lokichar	Lokichar	MARKET E	150	33
Turkana South	Nakaalei	Nakaalei	KAATIR	300	34
Turkana South	napusmoru	napusmoru	KAENGOLERENGAN	360	35
Turkana South	kalapata	kangakipur	ABUKUT	300	36
Turkana South	Kalapata	KAPESE	KAPESE	312	37
Turkana South	LOKICHAR	KAMARESE	NAKWAMOR	132	38
Turkana South	LOCHWAA	LOCHWAA	KAIPOKOK	390	39
Turkana South	Katilu	NAKABOSAN	KARIOLE	240	40

Table 105: Sampled clusters Turkana West survey zone- June 2023

Survey zone	WARD	UNIT NAME	Geographical unit	Population size	Cluster
Turkana West	Kakuma	Morungole 1	Ekipetot	204	1
Turkana West	Kakuma	Morungole 1	Kabogorit	2310	2
Turkana West	Kakuma	Morungole 1	Market	930	3
Turkana West	Kakuma	Morungole 1	Nayanaeng'itira	1020	4
Turkana West	Kakuma	Morungole 2	America	2100	5
Turkana West	Kakuma	Morungole 2	Lokiding	234	6
Turkana West	Kakuma	Morungole 2	Nakwasinyen	1800	7
Turkana West	Kakuma	Nadapal	Kiwanja Ndege	2100	8
Turkana West	Kakuma	Nadapal	Lopacho	774	9
Turkana West	Kakuma	Nadapal	Nadapal Central	816	10
Turkana West	Kakuma	Nadapal	Natirae	1644	11
Turkana West	Kakuma	Nadapal	Towokayeni	1950	12
Turkana West	Kakuma	Tarach	ASIKIRIAIT	534	RC
Turkana West	Kakuma	Tarach	NACHOMIN	204	13
Turkana West	Kalobeiyei	Kalobeyei	ACHUKULE/ STADIUM/ NGIDIRITIPURU	192	14
Turkana West	Kalobeiyei	Lomunyana	LOMUNYANA	102	15
Turkana West	Kalobeiyei	Oropoi	Achuchukait	396	16
Turkana West	Kalobeiyei	Oropoi	Ngirapidi	306	RC
Turkana West	Letea	Letea	Ng'ikengoi	324	RC
Turkana West	Letea	loreng	Ngipotipoko	246	17
Turkana West	Lokichoggio	LOKARIWON	Locha-Ekaal	156	18
Turkana West	Lokichoggio	LOKICHOGGIO	LOTOROB	390	19
Turkana West	Lopur	lopur	KALEMCHUCH	348	20
Turkana West	Lopur	lopusiki	Kamnyaep	360	RC
Turkana West	Lopur	Namon	Lokiripeto(Namon)	306	21
Turkana West	Nakalale	lokore	Water Point	138	22
Turkana West	Nakalale	lolupe	Nakwasuro	204	23
Turkana West	Nakalale	losijait	Naurikori	336	24
Turkana West	Nakalale	NADUAT	Kobuin	540	25
Turkana West	Nakalale	NADUAT	Nakwakitela	420	26
Turkana West	Nanam	LOPIDING	LORUS	240	27
Turkana West	Nanam	mogila	NALAMACHA	222	28
Turkana West	Nanam	NANAM	NGIWOYASIKE	540	29
Turkana West	Songot	LOKANGAE	Natiir	402	30
Turkana West	Songot	lotiteleit	LOCHER- EREG	402	31
Turkana West	Songot	SONGOT	KAPETAJEM	240	32

10.4 Appendix 4: Movement plans per survey zone

Table 106: Movement plans Turkana Central – June 2023

DATE	TEAM	Location	Sub location	VILLAGE	Cluster

24/6/2023		TRAVELLING			
25/6/2023	1	KANAMKEMER	KANAMKEMER	JULUK A	**1**
	2	KANAMKEMER	KANAMKEMER	KAMBI STAFF	**2**
	3	TOWNSHIP	TOWNSHIP	Soweto (D)	**3**
	4	TOWNSHIP	TOWNSHIP	NASANYANAIT	**4**
	5	TOWNSHIP	TOWNSHIP	NAJAKASIKIRIA	**5**
26/6/2023	1	KANAMKEMER	KANAMKEMER	LOKITELA	**6**
	2	TOWNSHIP	TOWNSHIP	Nakwasinyen	**7**
	3	TOWNSHIP	TOWNSHIP	Nataparkakono	**8**
	4	KERIO DELTA	KERIO DELTA	Natidao	**9**
	5	KANGATOSA	KANGATOSA	Adunget	**10**
27/6/2023	1	KANAMKEMER	KANAMKEMER	NADIPO	**11**
	2	KERIODELTA	KERIODELTA	NGIPAE	**12**
	3	KALOKOL	KALOKOL	DISII	**13**
	4	KERIODELTA	KERIODELTA	ASINGILA	**14**
	5	KERIODELTA	KERIODELTA	Nabuskaal	**15**
28/6/2023	1	KALOKOL	KALOKOL	NAKWAA	**16**
	2	KALOKOL	KALOKOL	LOPANGAE	**17**
	3	KALOKOL	KALOKOL	KAILELE B	**18**
	4	KERIODELTA	KERIODELTA	Kaikol	**19**
	5	KALOKOL	KALOKOL	KANUKUNMERI	**20**
29/6/2023	1	KANGATOSA	KANGATOSA	LOTEDE	**21**
	2	TOWNSHIP	TOWNSHIP	NAPEYENGOL	**22**
	3	TOWNSHIP	TOWNSHIP	MONTI	**23**
	4	Lobei Kotaruk	Lobei Kotaruk	ASEKON B	**24**
	5	Lobei Kotaruk	Lobei Kotaruk	KAYEN	**25**
30/6/2023	1	Lobei Kotaruk	Lobei Kotaruk	NAKATIYAN	**26**
	2	Loima	Loima	NAMORUPUTHA	**27**
	3	Lorengippi Logiriama	Lorengippi Logiriama	ESEKON AMUTES	**28**
	4	Lorengippi Logiriama	Lorengippi Logiriama	NAKAKABAAN	**29**
	5	Turkwel	Turkwel	LOKOPU	**30**
1/7/2023	1	Turkwel	Turkwel	NAMANMANIA	**31**
	2	Turkwel	Turkwel	KAKIRING	**32**
	3	Turkwel	Turkwel	KALOPIRIA	**33**
		RC			
		KANAMKEMER	KANAMKEMER	JULUK B AND C	
		TOWNSHIP	TOWNSHIP	CHUKULTOM	
		Loima	Loima	EDOME	
		Turkwel	Turkwel	NAPETET ONE	

Table 107: Movement plans Turkana West- June 2023

DATE	TEAM NUMBER	WARD	LOCATION	SUB-LOCATION	VILLAGE	CLUSTER NUMBER
24/6/20223 TRAVELING DAY	ALL TEAMS		KAKUMA	KAKUMA	NONE	-
25th/6/2023	1	KAKUMA	KAKUMA	MORUNGOLE1	EKIPETOT	1
	2	KAKUMA	KAKUMA	MORUNGOLE 1	KABOKORIT	2
	3	KAKUMA	KAKUMA	MORUNGOLE 1	MARKET	3
	4	KAKUMA	KAKUMA	MORUNGOLE 1	NAYANAIANGITIRA	4
	5	KAKUMA	KAKUMA	MORUNGOLE 2	AMERICA	5
26/6/2023						
	1	KAKUMA	KAKUMA	MORUNGOLE 2	LOKIDING	6
	2	KAKUMA	KAKUMA	MORUNGOLE 2	NAKWASINYEN	7
	3	KAKUMA	KAKUMA	NADAPAL	KIWANJA NDEGE	8
	4	KAKUMA	KAKUMA	NADAPAL	LOPACHO	9
	5	KAKUMA	KAKUMA	NADAPAL	NADAPAL CENTRAL	10
27/6/2023	1	KAKUMA	KAKUMA	NADAPAL	NATIRAE	11
	2	KAKUMA	KAKUMA	NADAPAL	TOWOKAYENI	12
	3	LOKI	KAKUMA	TARACH	NACHOMIN	13
	4	LOKI	KALOBEYEI	LOMUNYANA	LOMUNYANA	15
	5	SONGOT	KALOBEYEI	KALOBEYEI	ACHUKULE	14
28/6/2023	1	KALOBEYEI	KALOBEYEI	OROPOI	ACHUCHUKAIT	16
	2	KALOBEYEI	KALOBEYEI	LORENG	NGIPOTIPOKO	17
	3	LOKI	LOKI	LOKARIWON	LOCHOR EKAAL	18
	4	LOKI	LOKI	LOPIDING	KOTOROB	19
	5	NANAM	NANAM	LOPIDING	LORUS	27
29/6/2023	1	NAKAL		MOGILA	NALAMACHA	28

	2		NANAM	NANAM	NGIWOYASIKE	29
	3		LOKICHOGI	LOKARIWON	LOCHOR-ERENG	31
	4		LOKICHOGIO	SONGOT	KAPETAJEM	32
	5	SONGOT	SONGOT	LOKANGAE	NATIIR	30
30/6/2023	1.	NAKALALE	NAKALALE	LOKORE	WATERPOINT	22
	2	NAKALALE	NADUAT	LOLUPE	NAKWASURO	23
	3		NAKALALE	LOSAJAIT	NAURUKORI	24
	4		NAKALALE	NADUAT	KOBUIN	25
	5	NAKALALE	NAKALALE	NADUAT	NAKWAKITELA	26
1/7/2023	1	LOPUSKI	LOPUR	LOPUR	KALEMCHUCH	20
	2		LOPUR	NAMON	LOKIRIPETO(NAMON)	21

Table 108: Movement plans Turkana North- June 2023

TEAM	TRAVELING	DAY 1	DAY2	DAY3
	24/6/2023	25/6/2023	26/6/2023	27/6/2023
TEAM 1	TRAVELING	KATIKO –KATIKO **CL 32**	SASAME-NANGORIKITOE **CL15**	NAITESE-NATODOMERI **CL1**
TEAM 2	TRAVELING	LOARENGAK-PRINGAN **CL 25**	KAREBUR-KATOGUN CL**8**	SASAME-NAIROBI B **CL16**
TEAM 3	TRAVELING	LOARENGAK-KIWANJA NDEGE CL 26	LOKITAUNG-NAOYATIRA CL36	LIWAN-MAIZA 2 CL9
TEAM 4	TRAVELING	LOARENGAK-LAKESIDE CL 27	NARIOKOTOME-SMALL ERUS CL30	NATODOMERI CL 1
TEAM 5	TRAVELING	NARIOKOTOME-ASEKON CL 28	KOKISULEI-KOKISILEI 1 CL29	KOYASA-KICHUBI CL17
TEAM 6	TRAVELING	TODONYANG-NYANAE KBARAN CL 31	KACHODA-MANAALONGORIA CL 35	NATUMAKINEI-NAPAK EMEJEN CL2
Day	DAY4	DAY5	DAY6	DAY 7
Date	28/6/2023	29/6/2023	30/6/2023	1/7/2023

TEAM 1	KAPOKO – LOMAKAT **CL11**	LOKAPELPUS – NAKATONGUNAN **CL34**	KANKURDIO-NAPALAKIPOR **CL 23**	KANKURDIO – KANGAMOJOJ **CL 24**
TEAM 2	NAYOOK-NAKILINGA **CL4**	KAPOKO – YEYA **CL12**	LOMII- IKINGOL **CL37**	
TEAM 3	NAYOOK-NAKWAMEKWI CL 5	KAWOO – NATIIR CL13	KAERIS-AKALELIOT CL 19	
TEAM 4	NGIKAREBOK-NAKINOMET A CL6	LOCHILAMUYA-EKENGOT CL 14	KAERIS – NGIPIDINGA CL 20	
TEAM 5	ILEMKAJOKON-LOWASA/KENYA IOL CL10	KAALENG – MORUERIS CL18	NADUNGA-KANGIBENYOI CL21	
TEAM 6	LOPEROKOK-MUNOI CL3	LOKAPELPUS-NASOPO CL 33	NADUNGA-KANGILOI CL22	

Table 109: Movement plan Turkana South -June 2023

TEAM		DAY 1	DAY 2	DAY 3
	24/06/2023	25/06/2023	26/06/2023	27/06/2023
TEAM 1	TRAVELLING DAY	KOTORO	CALVARY	NAOYATIRA
		Cluster no.1	Cluster no.9	Cluster no.12
TEAM 2	TRAVELLING DAY	PARAKATI	AP LINE	MARKET B
		Cluster no.2	Cluster no.10	Cluster no.23
TEAM 3	TRAVELLING DAY	NAKWAMEKWI	NAOYAKIPOR	NGIRIONOTUK -B
		Cluster no.3	Cluster no.11	Cluster no.24
TEAM 4	TRAVELLING DAY	NAKWASINYEN	KILERETE	SIMAILELE
		Cluster no.4	Cluster no.7	Cluster no.15
TEAM 5	TRAVELLING DAY	NAYANAEKATWAAN	KALOUCHELEM	SIMAILELE-A
		Cluster no.5	Cluster no.8	Cluster no.17
TEAM 6	TRAVELLING DAY	KANGIMANIMANIA	AKWAKIRU	NABWEL ANAMADA
		Cluster no.6	Cluster no.13	Cluster no.16
	DAY 4	DAY 5	DAY 6	DAY 7
	28/06/2023	29/06/2023	30/06/2023	1/7/2023
TEAM 1	LOCHURCHUR	MARKET -E	KAIKAI	EDOS –B
	Cluster no.26	Cluster no.33	Cluster no.20	Clusterno.32
TEAM 2	KAENGOLERENGAN	ALIGOI -B	KIMIIRIK	KAIPOKOK
	Cluster no.35	Cluster no.14	Cluster no.21	Cluster no.39
TEAM 3	KAATIR	LINE MOJA-C	AYANAE ELIM	NARENGEMUNYEN
	Cluster no.34	Cluster no.18	Cluster no.22	Cluster no.31
TEAM 4	ABUKUT	TOMOKIYA	SABA	KAPESE
	Cluster no. 36	Cluster no.19	Cluster no.29	Cluster no.37
TEAM 5	LINE MOJA	KARIOLE	LOKWADWAT	
	Cluster no.25	Cluster no.40	Cluster no.30	

TEAM 6	EKIPOR	KAKISA	NAKWAMOR	
	Cluster no.27	Cluster no.28	Cluster no.38	

10.5 Appendix 5: June 2023 SMART Survey Hot Spots

Table 110: Weight for Height Z scores ± SD-Malnutrition hot spots- June 2023

Survey Zone	Ward	Community Unit	Village Name	Clusters	n	% < -3SD	% < -2SD
Turkana Central	KALOKOL	KALOKOL	LOPANGAE	17	17	0.00%	5.90%
Turkana Central	KALOKOL	KALOKOL	KAILELE B	18	20	0.00%	10.00%
Turkana Central	KALOKOL	KAPUA	KANUKUNMERI	20	23	0.00%	17.40%
Turkana Central	KALOKOL	LONGECH	DISII	13	18	11.10%	22.20%
Turkana Central	KANAMKEMER	KANAMKEMER	JULUK A	1	22	0.00%	22.70%
Turkana Central	KANAMKEMER	CANAAN	KAMBI STAFF	2	13	7.70%	23.10%
Turkana Central	KANAMKEMER	NAWOITORONG	LOKITELA	6	15	0.00%	26.70%
Turkana Central	KANGATOSA	NAOROS	LOTEDE	21	19	5.30%	42.10%
Turkana Central	KANGATOSA	KANGATOSA	Adunget	10	24	4.20%	45.80%
Turkana Central	KERIODELTA	LORENGELUP	KAIKOL	19	16	0.00%	12.50%
Turkana Central	KERIODELTA	KERIO	ASINGILA	14	13	0.00%	23.10%
Turkana Central	KERIODELTA	KAKIMAT	NAKWAA	16	17	0.00%	29.40%
Turkana Central	KERIODELTA	LORENGELUP	NGIIPAE	12	13	7.70%	30.80%
Turkana Central	KERIODELTA	NAKURIO	Natidao	9	17	5.90%	35.30%
Turkana Central	KERIODELTA	KAKIMAT	Nabuskaal	15	22	4.50%	36.40%
Turkana Central	Lobei Kotaruk	KANGALITA	KAYEN	25	24	0.00%	12.50%
Turkana Central	Lobei Kotaruk	KALEMUNYANG	ASEKON B	24	20	0.00%	15.00%
Turkana Central	Lobei Kotaruk	Lobei Kotaruk	NAKATIYAN	26	19	10.50%	42.10%
Turkana Central	LOIMA	NAMORUPUTH	NAMORUPUTH A	27	9	11.10%	33.30%
Turkana Central	Lorengippi Logiriama	Lorengippi Logiriama	ESEKON AMUTES	28	16	0.00%	0.00%
Turkana Central	Lorengippi Logiriama	URUM	NAKAKABAAN	29	15	0.00%	33.30%
Turkana Central	TOWNSHIP	NAPETET	NASANYANAIT	4	11	0.00%	9.10%

Turkana Central	TOWNSHIP	NAPETET	ADIPO	11	11	0.00%	9.10%
Turkana Central	TOWNSHIP	NGIITAKITO	NAPEYENGOL	22	11	0.00%	9.10%
Turkana Central	TOWNSHIP	NAPETET	NAJAKASIKIRIA	5	18	0.00%	11.10%
Turkana Central	TOWNSHIP	KAKWANYANG	MONTI	23	18	11.10 %	27.80%
Turkana Central	TOWNSHIP	TOWNSHIP	Soweto (D)	3	16	0.00%	31.30%
Turkana Central	TOWNSHIP	NAKWAMEKWI	Nakwasinyen	7	21	14.30 %	33.30%
Turkana Central	TOWNSHIP	NAKWAMEKWI	Nataparkakono	8	18	5.60%	38.90%
Turkana Central	Turkwel	NACHURO	NAMANMAN	31	19	0.00%	21.10%
Turkana Central	Turkwel	NAPEIKAR	KAKIRING	32	10	0.00%	30.00%
Turkana Central	Turkwel	NASIGER	KALOPIRIA	33	17	11.80 %	35.30%
Turkana Central	Turkwel	LOMIL	LOKOPU	30	24	12.50 %	41.70%
Turkana North	KAERIS	KANAKURUDIO	NAPALAKIPOR	23	22	0.00%	18.20%
Turkana North	KAERIS	KANAKURUDIO	KANGAMOJOJ	24	22	9.10%	18.20%
Turkana North	KAERIS	KAERIS	NAKALALIOIT	19	20	5.00%	20.00%
Turkana North	KAERIS	NADUNGA	Kangibenyoi	21	14	0.00%	21.40%
Turkana North	KAERIS	KAERIS	NGIPIDINGA	20	18	5.60%	33.30%
Turkana North	KAERIS	NADUNGA	kangiloi	22	18	0.00%	50.00%
Turkana North	KAIKOR/KAALENG	KAPOKO	LOMAKAT	11	17	0.00%	0.00%
Turkana North	KAIKOR/KAALENG	NGIKAREBOK	NAKINOMET A	6	18	0.00%	5.60%
Turkana North	KAIKOR/KAALENG	KAPOKO	YEYA	12	18	0.00%	11.10%
Turkana North	KAIKOR/KAALENG	LOCHILAMUYA	EKENGOT	14	24	4.20%	12.50%
Turkana North	KAIKOR/KAALENG	KAWOO	NATIIR	13	15	0.00%	13.30%
Turkana North	KAIKOR/KAALENG	NAYOOK	NAKILING'A 2	4	24	0.00%	16.70%
Turkana North	KAIKOR/KAALENG	KAALING	MURUERIS	18	13	0.00%	23.10%
Turkana North	KAIKOR/KAALENG	NAYOOK	NAKWAMEKWI 1	5	19	5.30%	31.60%
Turkana North	KAIKOR/KAALENG	ILEMKAJOKON	LOWASA/KENYA OIL	10	19	5.30%	31.60%

Turkana North	KAIKOR/KAALENG	LOKAPELPUS	Nakatonguun	34	25	4.00%	32.00%
Turkana North	KAIKOR/KAALENG	LOKAPELPUS	Nasopo	33	18	0.00%	44.40%
Turkana North	KIBISH	NAITESE	NATODOMERI	1	19	0.00%	5.30%
Turkana North	KIBISH	LOPERO-KOK	MUNOI	3	20	0.00%	20.00%
Turkana North	KIBISH	NATUMAKALEI	NAPAK EMEJEN	2	16	6.30%	43.80%
Turkana North	KIBISH	KICHUBI	KOBORIN	17	19	21.10 %	52.60%
Turkana North	Lakezone	NARIOKOTOME	ASEKON	28	22	0.00%	9.10%
Turkana North	Lakezone	KOKISELEI	Kokiselei 1	29	19	0.00%	10.50%
Turkana North	Lakezone	RIOKOMOR	Small Erus	30	20	5.00%	15.00%
Turkana North	Lakezone	LOARENGAK	Kiwanja Ndege A	26	16	6.30%	25.00%
Turkana North	Lakezone	TODONYANG	Nayanaekabaran	31	19	5.30%	26.30%
Turkana North	Lakezone	LOARENGAK	lake side	27	15	6.70%	26.70%
Turkana North	Lakezone	KATIKO	Katiko	32	21	4.80%	28.60%
Turkana North	Lakezone	LOARENGAK	Pringan	25	18	5.60%	50.00%
Turkana North	LAPUR	TOIUNAE KAREBUR	KATONGUN	8	20	0.00%	10.00%
Turkana North	LAPUR	LIWAN	MAISA 2	9	21	4.80%	14.30%
Turkana North	LAPUR	SASAME	NANGORKITOE	15	18	0.00%	16.70%
Turkana North	LAPUR	SASAME	NAIROBI 'B'	16	23	4.30%	17.40%
Turkana North	LAPUR	EDOOT	NASOLAR	7	14	7.10%	21.40%
Turkana North	LAPUR	LOKITAUNG	Naoyatira	36	17	11.80 %	29.40%
Turkana North	LAPUR	LOMII	EKINGOL	37	23	13.00 %	30.40%
Turkana North	LAPUR	KACHODA	Manalongoria	35	21	9.50%	47.60%
Turkana South	KALAPATA	NAKAALEI	KAATIR	34	19	5.30%	63.20%
Turkana South	KALAPATA	KANGAKIPUR	ABUKUT	36	19	0.00%	31.60%
Turkana South	KAPUTIR	KAPUTIR	LINE MOJA	25	16	6.30%	31.30%
Turkana South	KAPUTIR	KAPUTIR	LOCHURCHUR	26	22	4.50%	36.40%
Turkana South	KAPUTIR	NAKWAMORU	EKIPOR	27	15	0.00%	6.70%

Turkana South	KATILIA	LOMUNYENAKWAAN	KOTORO	1	20	15.00%	55.00%
Turkana South	KATILIA	KATILIA	PARAKATI	2	12	8.30%	25.00%
Turkana South	KATILIA	KATILIA	NAKWAMEKWI	3	22	0.00%	27.30%
Turkana South	KATILIA	KATILIA	NAKWASINYEN	4	12	0.00%	8.30%
Turkana South	KATILIA	ELELEA	NAYANAEKATWAAN	5	22	0.00%	31.80%
Turkana South	KATILIA	LOPEDRU	KANGIMANIMANIA	6	18	5.60%	38.90%
Turkana South	KATILU	KORINYANG	ALIGOI B	14	19	10.50%	26.30%
Turkana South	KATILU	LOPUR	SIMAILELE B	15	18	0.00%	33.30%
Turkana South	KATILU	KALEMNGOROK	NABWEL ANAMADA A	16	15	0.00%	13.30%
Turkana South	KATILU	NAMAKAT	SIMAILELE A	17	24	0.00%	33.30%
Turkana South	KATILU	KATILU	LINE MOJA C	18	20	0.00%	15.00%
Turkana South	KATILU	KATILU	TOMOKIYA	19	12	0.00%	25.00%
Turkana South	KATILU	KAGITANKORI	KAIKAI	20	22	4.50%	40.90%
Turkana South	KATILU	LOKAPEL	KIMIIRIK	21	21	9.50%	47.60%
Turkana South	KATILU	KANAODON	AYANAE ELIM	22	22	0.00%	13.60%
Turkana South	KATILU	NAKABOSAN	KARIOLE	40	28	7.10%	46.40%
Turkana South	LOBOKAT	NAKULULUMAET	MARKET B	23	17	11.80%	17.60%
Turkana South	LOBOKAT	NAKULULUMAET	NGIRIONOTUK B	24	16	0.00%	37.50%
Turkana South	LOKICHAR	LOKABURU	KIKISA	28	17	5.90%	23.50%
Turkana South	LOKICHAR	KAPESE	SABA	29	14	0.00%	21.40%
Turkana South	LOKICHAR	KAPESE	LOKWADWAT	30	22	0.00%	31.80%
Turkana South	LOKICHAR	LOCHEREMOIT	NARENGEMUNYEN	31	19	0.00%	21.10%
Turkana South	LOKICHAR	LOCHEREMOIT	EDOS B	32	14	7.10%	42.90%
Turkana South	LOKICHAR	LOKICHAR	MARKET E	33	19	0.00%	36.80%
Turkana South	LOKICHAR	NAPUSMORU	KAENGOLERENGAN	35	24	4.20%	58.30%
Turkana South	LOKICHAR	KAPESE	KAPESE	37	24	12.50%	45.80%

Turkana South	LOKICHAR	KAMARESE	NAKWAMOR	38	11	0.00%	9.10%
Turkana South	LOKICHAR	LOCHWAA	KAIPOKOK	39	21	14.30 %	42.90%
Turkana South	LOKORI/KOCHODIN	LOTUBAE	KILERETE	7	18	16.70 %	33.30%
Turkana South	LOKORI/KOCHODIN	NAKUKULAS	KALOUCHELEM	8	14	0.00%	14.30%
Turkana South	LOKORI/KOCHODIN	LOKORI PHC	CALVARY	9	17	0.00%	17.60%
Turkana South	LOKORI/KOCHODIN	LOKORI AIC	AP LINE A	10	15	6.70%	53.30%
Turkana South	LOKORI/KOCHODIN	MORULEM B	NAOYAKIPOR	11	22	0.00%	9.10%
Turkana South	LOKORI/KOCHODIN	MORULEM A	NAOYATIRA	12	19	10.50 %	36.80%
Turkana South	LOKORI/KOCHODIN	LOKWII A	AKWAKIRU	13	20	15.00 %	50.00%
Turkana West	Kakuma	Morungole 1	Nayanaeng'itira	4	12	0.00%	0.00%
Turkana West	Kakuma	Nadapal	Lopacho	9	14	0.00%	0.00%
Turkana West	Kakuma	Morungole 1	Market	3	15	6.70%	6.70%
Turkana West	Kakuma	Morungole 2	Lokidingos	6	14	0.00%	7.10%
Turkana West	Kakuma	Nadapal	Natirae	11	16	0.00%	12.50%
Turkana West	Kakuma	Nadapal	Kiwanja Ndege	8	14	0.00%	14.30%
Turkana West	Kakuma	Nadapal	Towokayeni	12	19	0.00%	15.80%
Turkana West	Kakuma	Morungole 1	Ekipetot	1	15	0.00%	20.00%
Turkana West	Kakuma	Morungole 2	Nakwasinyen	7	21	0.00%	23.80%
Turkana West	Kakuma	Morungole 1	Kabokorit	2	20	10.00 %	25.00%
Turkana West	Kakuma	Morungole 2	America	5	22	4.50%	36.40%
Turkana West	Kakuma	Nadapal	Nadapal Central	10	22	4.50%	40.90%
Turkana West	Kakuma	Tarach	NACHOMIN	13	14	14.30 %	57.10%
Turkana West	Kalobeyei	Kalobeyei	ACHUKULE/STADIUM/NGIDIRITIPURU	14	21	0.00%	23.80%

Turkana West	Kalobeyei	Lomunyana	LOMUNYANA	15	16	0.00%	25.00%
Turkana West	Kalobeyei	Oropoi	Achuchukait	16	18	0.00%	27.80%
Turkana West	Letea	loreng	Ngipotipoko	17	15	0.00%	13.30%
Turkana West	Lokichoggio	LOKARIWON	Lochor Ekaal	18	12	0.00%	0.00%
Turkana West	Lokichoggio	LOKICHOGGIO	LOTOROBUO	19	15	0.00%	40.00%
Turkana West	Lopur	lopur	KALEMCHUCH	20	22	4.50%	18.20%
Turkana West	Lopur	Namon	Lokiripeto(Namon)	21	13	7.70%	38.50%
Turkana West	Nakalale	NADUAT	Kobuin	25	11	0.00%	0.00%
Turkana West	Nakalale	lolupe	Nakwasuro	23	17	5.90%	5.90%
Turkana West	Nakalale	losijait	Naurikori	24	11	0.00%	9.10%
Turkana West	Nakalale	NADUAT	Nakwakitela	26	20	0.00%	10.00%
Turkana West	Nakalale	lokore	Water Point	22	15	0.00%	40.00%
Turkana West	Nanam	LOPIDING	LORUS	27	18	0.00%	11.10%
Turkana West	Nanam	mogila	NALAMACHA	28	19	0.00%	15.80%
Turkana West	Nanam	NANAM	NGIWOYASIKE	29	17	0.00%	29.40%
Turkana West	Songot	LOKANGAE	Natiir	30	21	4.80%	28.60%
Turkana West	Songot	SONGOT	KAPETAJEM	32	12	8.30%	33.30%
Turkana West	Songot	lotiteleit	LOCHER- ERENG	31	13	0.00%	38.50%

10.6 Appendix 6: Word Questionnaire

Table 111: Revised June 2021 SMART survey questionnaire (May 2018 version)

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.
1.13 Household geographical coordinates	**Latitude**	_____	**Longitude**	_____				

		2. Household Demographics								
2.1	**2.2a**	**2.2b**	**2.3**	**2.4**	**2.5a go to 2.5b, c and d before proceeding to 2.6**	**2.6**	**2.7a**	**2.7b**	**2.8**	**2.10a**
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**	**Age (Record age in MONTHS for children <5yrs and YEARS for those ≥ 5 years's)**	**Childs age verified by** 1=Health card 2=Birth	**Sex** 1= Male 2= Female	**If between 3 and 18 years old, Is the child attending school?** 1 = Yes 2 = No	**Main reason for not attending school (Enter one code from list)** 1=Chronic Sickness 2=Weather (rain,	**2.7a, What is the child doing when not in school?** **1**=Working on family farm	**What is the highest level of education attained?(level completed) From 5 yrs and above**	**If the household owns mosquito net/s, who slept under the mosquito net last night? (***Probe-*

		colum n)	Ye ars	Mo nths	certific ate/ notifica tion 3=Bapt ism card 4=Reca ll 5. other _____ specify		(If yes go to 2.8; If no go t o 2.7)	floods, storms) 3=Family labour responsib ilities 4=Worki ng outside home 5=Teach er absenteei sm/lack of teachers 6= Fees or costs 7=House hold doesn't see value of schooling 8 =No food in the schools 9 = Migrated / moved from school area (includin g displace ments) 10=Insec urity/viol ence 11-No school Near by 12=Marri ed 13. Pregnant/ taking care of her own child 14. attending	2=Herdi ng Livestoc k 3=Work ing for payment away from home 4=Left home for elsewhe re 5=Child living on the street 6: Other specify _____	1 =Pre primary 2= Primary 3=Secon dary 4=Tertia ry 5= None 6=others (specify) Go to question to 2.9 ↓	*enter all responses mentione d (Use 1 if "Yes" 2 if "No and 3 if not applicabl e) go to question 2.11*

								Duksi/Madrasa 15. too young for school 13=others (specify) …… …… …..			
< 5 YRS	1										
	2										
	3										
	4										
>5 TO <18 YRS	5										
	6										
	7										
	8										
	9										
	10										
	11										
	12										
ADULT (18 years and above)	13										
	14)										
	15										
	16										
	2.5c. Total number of ALL people in the		2.5d Total number of children under 5 years (0-		2.5e Total number of children below 2 years (0-23 months)						

	Household including children ----------		59 months) _____	_____					

2.9	**How many mosquito nets does this household have? _____ (Indicate no.) go to question 2.10a before proceeding to question 2.10b**	
2.11	**Main Occupation of the Household Head – HH.** **(enter code from list)** 1=Livestock herding 2=Crop farming/Own farm labour 3=Employed (salaried) 4=Waged labour (Casual) 5=Petty trade 6=Merchant/trader 7=Firewood/charcoal 8=Fishing **9=** Income earned by children **10=Others (Specify)** |____|	**2.12.** What is the **main** current source of income **of the household?** 1. =No income 2. = Sale of livestock 3. = Sale of livestock products 4. = Sale of crops 5. = Petty trading e.g. sale of firewood 6. =Casual labor 7. =Permanent job 8. = Sale of personal assets 9. = Remittance 10. Other-Specify |____|
2.13	Marital status of the respondent 1. = Married 2. = Single 3. = Widowed 4. = separated 5. = Divorced. |____|	**2.14. What is the residency status of the household**? 1. IDP 2.Refugee 3. Resident |____|
2.15	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 _____

Fever with Malaria: High temperature with shivering	**Cough/ARI:** Any episode with severe, persistent cough or difficulty breathing	**Watery diarrhoea:** Any episode of three or more watery stools per day	**Bloody diarrhoea:** Any episode of three or more stools with blood per day

3.	4.	5.	6.	7.	8. **CHILD HEALTH AND NUTRITION (ONLY FOR CHILDREN 6-59 MONTHS OF AGE; IF N/A SKIP TO SECTION 3.6)** **Instructions:** *The caregiver of the child should be the main respondent for this section* ***3.1 CHILD ANTHROPOMETRY*** ***3.2 and 3.3 CHILD MORBIDITY*** *(**Please** fill in **ALL REQUIRED** details below. Maintain the same child number as part 2)*

A **Child No.**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	**N**	**3.2 a**	**3.2 b**	**3.3 a**	**3.3 b**	**3.3 c**
	what is the relationship of the respondent with the child/children 1=Mother	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	Was child weighed at birth? 1. Yes 2. No 3. Don't	How much did the child weigh? …… …… …… ……	Child's weight verified by: 1=Health card 2=Recall	Is the child in any nutrition program 1. Yes 2. No	If yes to question J. which nutrition program? 1.OTP	Has your child (NAME) been ill in the past two weeks? 1.Yes	If YES, which illness (multiple responses possible) 1 = Fever with chills like malaria 2 = ARI /Cough 3 = Watery diarrhoea	**When the child was sick did you seek assistance?** 1.Yes 2. No	**If the response is yes to question # 3.2 where did you seek assistance? (More than one response possible-**	If the child **had watery diarrhoea** in the last TWO (2) WEEKS, did the child get: 1. ORS 2. Zinc supplementation? *Show sample and probe further for*

	2=Father 3=Sibling 4=Grandmother 5=Other (specify)								know If no or don't know skip to M			If no skip to questions 3.2	2.SFP 3.BSFP Other Specify _____	2. No <u>If No, skip to 3.4</u>	4 = Bloody diarrhoea 5 = Other (specify) *See case definitions above*		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	*this component check the remaining drugs(confirm from mother child booklet)*
01															1, 2, 3			
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 in the past year**	If Vitamin A received how many times in the past one year did the child receive verified by **Card?**	**FOR CHILDREN 12-59 MONTHS** 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. **1 = scar** **2=No scar**	Has child received OPV1 vaccination **1=Yes, Card** **2=Yes, Recall** **3 = No** **4 = Do not know**	Has child received OPV3 vaccination? **1=Yes, Card** **2=Yes, Recall** **3 = No** **4 = Do not know**	Has child received measles vaccination at 9 months *(On the upper right shoulder)?* **1=Yes, Card** **2=Yes, Recall** **3 = No** **4 = Do not know**	Has child received the second measles vaccination (18 to 59 months) *(On the upper right shoulder)?* **1=Yes, Card** **2=Yes, Recall** **3 = No** **4 = Do not know**

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**			
	3.5.1.a Is MNP program available (program running in the past six month) in the survey area? Yes =1 No = 2 If 'No' skip section 3.5 and 3.6 and go to 3.7					
	3.5.1. b Is the child enrolled in the MNP program?(show the example of the MNP sachet) ***(record the code in the respective child's number)***	3.5.2 If the child, 6-23months, is not enrolled for MNP, give reason. (***Multiple answers possible. Record the code/codes in the respective child's number. DO NOT READ the answers)***	3.6.1 Has the child consumed MNPs in the last 7 days?(shows the MNP sachet) ***(record the code in the respective***	3.6.2 If yes, how frequent do you give MNP to your child? ***(record the code in the respective child's number)*** Every day …….....…….1	3.6.3 If no, since when did you stop feeding MNPs to your child? ***(record the code in the respective child's number)***	3.6.4 What are the reasons to stop feeding your child with MNPs? (***Multiple answers possible. Record the code/codes in the respective child's number. DO NOT READ the answers)***

	Yes =1 No=0 **If no go to 3.5.2,** **If yes go to section 3.6.1**	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 Ch ild receiving therapeutic or supplementary foods .....5 Other reason, specify ...…….....…….6 ***Skip to 3.7***	***child's number)*** YES = 1 N0= 0 ***If no skip to 3.6.3***	Every other day .....……..2 Every third day ……..…….3 2 days per week at any day ....4 Any day when I remember..…5	1 week to 2 weeks ago ....1 2 week to 1 month ago ....2 More than 1 month 3	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

Child 1						
Child 2						
Child 3						
Child 4						

MATERNAL NUTRITION FOR WOMEN OF REPRODUCTIVE AGE (15-49 YEARS)*(Please insert appropriate number in the box)*									
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? (***probe and approximate the number of days***)			
			Iron tablets syrup	Folic acid	Combined iron and folic acid supplements	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	**What is the MAIN source of drinking water for the household <u>NOW</u>?** **piped water** piped into dwelling ..... 11 piped to yard / plot ..... 12 piped to neighbour ..... 13 public tap / standpipe ..... 14 tube well / borehole ..... 21 **dug well** protected well ..... 31 unprotected well ..... 32 **spring** protected spring ..... 41 unprotected spring ..... 42 rainwater ..... 51 tanker-truck ..... 61 cart with small tank ..... 71 water kiosk ..... 72 surface water (river, dam, lake, pond, stream, canal, irrigation channel) ..... 81 **packaged water** bottled water ..... 91 sachet water ..... 92 1.	**4.2 a What is the trekking distance to the current main water source?** 1=less than 500m (Less than 15 minutes) 2=more than 500m to less than 2km (15 to 1 hour) 3=more than 2 km (1 – 2 hrs) 4=Other(specify) |____|	4.2b – Who MAINLY goes to fetch water at your current main water source? 1=Women, 2=Men, 3=Girls, 4=Boys
4.2.2 a	**How long do you queue for water?** 1. Less than 30 minutes 2. 30-60 minutes 3. More than 1 hour 4. Don't que for water 1.	**.3 Do you do anything to your water before drinking? (*MULTIPLE RESPONSES POSSIBLE) (Use 1 if YES and 2 if NO)*.** |____| 1. Nothing 2. Boiling…… …… |____| 3. Chemicals (*Chlorine,Pur,Waterguard*)…… |____| 4. Traditional herb……... |____|	

		5. Pot filters…… …….. |____| 5.
4.3a	|____|	**6.**

4.4	**Where do you store water for drinking?** 1. Open container / Jerrican 2. Closed container / Jerrican |____|	**4.5 How much water did your household use YESTERDAY (excluding for animals)?** *(Ask the question in the number of 20 liter Jerrican and convert to liters & write down the total quantity used in liters)*	|____|
4.6	**Do you pay for water?** 1. Yes 2. No **(If No skip to Question 4.7.1**) |____|	**4.6.1 If yes, how much per 20 liters jerrican _____ KSh/20ltrs**	**4.6.2 If paid per month how much** |____|

4.7.1a	We would like to learn about where members of this household wash their hands. Can you please show me where members of your household <u>most often</u> wash their hands? *Record result and observation.* **OBSERVED** FIXED FACILITY OBSERVED (SINK / TAP) IN DWELLING..... 1 IN YARD /PLOT..... 2 MOBILE OBJECT OBSERVED (BUCKET / JUG / KETTLE).....3 NOT OBSERVED NO HANDWASHING PLACE IN DWELLING / YARD / PLOT.....4 NO PERMISSION TO SEE..... 5	4.7.1b Is soap or detergent or ash/mud/sand present at the place for handwashing? YES, PRESENT ..... 1 NO, NOT PRESENT..... ……**2**

4.7.1	**Yesterday (within last 24 hours) at what instances did you wash your hands? (MULTIPLE RESPONSE-** (Use 1 if "Yes" and 2 if "No") 1. After toilet…… …… |____| 2. Before cooking…… ……... |____| 3. Before eating…… ……. |____| 4. After taking children to the toilet…….. |____| 5. Others…… ……	
4.7.2	**If the caregiver washes her hands, then probe further; what did you use to wash your hands?** 1. Only water 2. Soap and water 3. Soap when I can afford it 4. traditional herb 5. Any other specify |____|	**4.8 What kind of toilet facility do members of your household usually use?** **If 'Flush' or 'Pour flush', probe:** **Where does it flush to?** |____| **If not possible to determine, ask permission to observe the facility.** **flush / pour flush** **flush to piped sewer system 11** **flush to septic tank 12** **flush to pit latrine 13** **flush to open drain 14** **flush to DK where 18** **pit latrine** **ventilated improved pit latrine 21** **pit latrine with slab 22**

		pit latrine without slab / open pit 23 **composting toilet 31** **bucket 41** **hanging toilet / hanging latrine51** **no facility / bush / field95** 1. **OTHER (specify) 96**

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)**	**<u>WOMEN DIETARY DIVERSITY</u>** **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 a Pulses/legumes,*(e.g. beans, lentils, green grams, cowpeas)*?														
5.12b nuts and seeds														
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).
	In the past 7 DAYS, have there been times when you did not have enough food or money to buy food? If No; END THE INTERVIEW AND THANK THE RESPONDENT **If YES, how often has your household had to:** *(INDICATE THE SCORE IN THE SPACE PROVIDED)*	
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?	
	TOTAL HOUSEHOLD SCORE: **END THE INTERVIEW AND THANK THE RESPONDENT**	

	4.1 FOOD FORTIFICATION (FF)/- *Please ask the respondent and indicate the appropriate number in the space provided*
1.1	**Have you heard about food fortification?** 1. Yes 2. No 3. Don't know
1.1.1	**If yes, where did you hear or learn about it? (MULTIPLE RESPONSE ARE POSSIBLE-** (Use 1 if "Yes" and 2 if "No") 6. Radio…… ……|____| 7. Road show…… ……..|____| 8. In a training session attended……|____| 9. On a TV show……|____| 10. Others…… ……|____|

1.2	**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?** 1. Yes 2. No 3. Don't know	|____|
1.3	**What is the MAIN source of Maize flour for the household <u>NOW</u>?** 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)* |_____|	**1.1b Do you know if the maize flour you consume is fortified or not?** 1. Yes 2. No 3. Don't know
1.4	**What brands of the following foods does your household consume?** 1. Maize flour 2. Wheat flour 3. Margarine 4. Oils 5. Fats 6. Sugar	|_____| | |_____| | |_____| | |_____| | |_____| | |_____| |

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