TURKANA SMART NUTRITION SURVEYS REPORT

FINAL REPORT

JUNE 2015

ACKNOWLEDGEMENT

Turkana County June 2015 SMART survey was successfully conducted with support of various partners. The directorate of family health would like 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, International rescue committee, World Vision, Save the Children, Aphia Plus Imarisha, Feed the Children, Gain for their financial and technical support.

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LIST OF ABBREVIATION

1	ARI	Acute Respiratory Infections
2	ASAL	Arid and Semi-Arid Lands
3	CHWs	Community Health Workers
4	CI	Confidence interval
5	CMAM	Community Management of acute Malnutrition
6	CMR	Crude Mortality Rate
7	CSB	Corn Soy Blend
8	DD	Dietary Diversity
9	DHMT	District Health Management Team
10	DMB	Drought Management Bulletin
11	DNO	District Nutrition Officer
12	DoL	Diocese of Lodwar
13	ENA	Emergency Nutrition Assessment
14	EPI	Expanded Program on Immunizations
15	EWS	Early Warning System
16	FEWSNET	Famine Early Warning Systems Network
17	FCS	Food Consumption Score
18	FFA	Food For Asset
19	GFD	General Food Distribution
20	GoK	Government of Kenya
21	HH	Household
22	HiNi	High Impact Nutrition Interventions
23	HNDU	Human Nutrition and Dietetics Unit
24	IMAM	Integrated Management of Acute Malnutrition
25	IPC	Integrated Food Security Phase Classification
26	IRC	International Rescue Committee
27	KEPI	Kenya Expanded Programme of Immunisation
28	KFSSG	Kenya Food Security Steering Group
29	NDMA	National Drought Management Authority
30	NSO	Nutrition Support Officer (UNICEF)
31	OJT	On The Job Training
32	OPV	Oral polio Vaccine
33	ORS	Oral Rehydration Solution
34	OTP	Outpatient Therapeutic Programme
35	PLW	Pregnant and Lactating Women
36	PPS	Probability proportional to size
38	SFP	Supplementary Feeding Programme
39	SMART	Standardized Monitoring and Assessment of Relief and Transitions
40	U5	Under Five Years Old
41	UMR	Under-five Mortality Rate
42	UNICEF	United Nations Children's Fund
43	WFP	World Food Programme
44	WHO-GS	World Health Organisation Growth Standards
45	WFH	Weight for Height

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EXECUTIVE SUMMARY

Turkana County department of health in collaboration with nutrition partners (UNICEF, Save the Children international, World Vision, Aphia Plus, and Gain) successfully conducted Four SMART surveys in June 2015. Four (4) independent surveys will be conducted concurrently to cover the whole County. This ensured all the livelihood zones in the county (pastoral, agro-pastoral and formal employment/business/petty trade) were covered. The survey zones are 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, pregnant and lactating mothers and contributory factors for malnutrition. The specific objective of the survey were;

1. To determine the prevalence of acute malnutrition among under five year old children, pregnant and lactating women
2. To determine the immunization coverage for measles, Oral Polio Vaccines (OPV 1 and 3), and vitamin A supplementation in children aged 6-59 months;
3. To estimate coverage of iron / folic acid supplementation during pregnancy in women of reproductive age
4. To determine de-worming coverage for children aged 12 to 59 months;
5. To determine the prevalence of common illnesses;
6. To collect information on possible underlying causes of malnutrition such as household food security, water, sanitation, and hygiene practices.

Standardized Monitoring Assessment for Relief and Transition Method (SMART) was used to conduct the surveys. The methodology is a cross sectional design. A three stage sampling process was used in this survey. The first stage involved sampling of sub locations (clusters) from a sampling frame using ENA for SMART software (February 2015 version).The second stage sampling involved segmentation of the sampled sub locations to identify the villages to be sampled. In the third stage, households were selected randomly upon getting the updated list of households in the village. Household was used as the basic sampling unit. Standard SMART questionnaire in ODK collect was used in tablets to collect data. The data was uploaded in ODK aggregate servers (courtesy of World Vision) from the tablets and downloaded daily for plausibility checks and at the end of the survey for data analysis. Table 2 show the summary of the survey findings.

Table 1:Survey findings summary

Indicator	Turkana Central	Turkana North	Turkana South	Turkana West	Turkana County
Wasting (WHO 2006)-2015	N=744	N=781	N=824	N=628	N=2974
Global Acute Malnutrition (GAM)-June 2015	(162) **20.9 %** (17.9 – 24.4)	(179) **22.9 %** (19.6 – 26.6)	(202) **24.5 %** (21.1 – 28.2)	(105) **16.7** % (13.8 – 20.1)	**21.2 %** (19.7 – 22.9)
Global Acute Malnutrition (GAM)-June 2014	**28.7%** (24.5-33.2)	(**27.2%** (22.7-31.2)	**24.5%** (20.8-28.6)	**17.4%** (14.3-21.0)	
Severe Acute Malnutrition (SAM)-June 2015	(37) **4.8** % (3.4 – 6.6)	(30) **3.8 %** (2.4 – 6.1)	(50) **6.1 %** (4.3 – 8.5)	(30) **4.8 %** (3.3 – 6.9)	**5.0%** (4.2 – 6.0)
Severe Acute Malnutrition (SAM) -2014	**6.8%** (4.7-9.7 C.I)	**5.2%** (3.3-8.1 C.I)	(**4.8%** (3.6-6.5 C.I)	**4.6%** (3.1-6.6 C.I)	
Mean z-scores ± SD-2015	-1.24±1.01	-1.30±1.05	-1.27±10.98	-1.04±1.05	-1.22±1.03
Mean z-scores ± SD:2014	-1.38±1.03	-1.42±0.99	-1.31±1.00	-1.09±1.02	
Design Effect[1] -2015	1.36	1.38	1.18	1.08	1.12

[1] Design effect for Z-score<-2

Design Effect -2014	1.50	1.74	1.55	1.29	
Underweight (WHO 2006)	**N=773**	**N=783**	**N= 824**	**N=629**	**N-2977**
Prevalence of global underweight-June 2015	(236) **30.5 %** (26.8 – 34.6)	(230) **29.4 %** (24.4 – 34.9)	(316) **38.3 %** (33.9 – 43.0)	(151) **24.0 %** (20.4 – 28.0)	**31%** (28.8 – 33.3)
Prevalence of global underweight-2014	**33.4%** (28.8-38.4)	**35.5%** (30.4-40.9)	**37.5%** (33.7-41.4)	**22.7%** (18.1-28.1)	
Prevalence of severe underweight-June 2015	(68) **8.8%** (7.1 – 10.9.)	(65) **8.3 %** (6.0 – 11.4)	(99) **12.0 %** (9.0 – 15.9)	(46) **7.3 %** (5.5 – 9.6)	**9.4%** (8.1-10.8)
Prevalence of severe underweight-2014	**9.4%** (7.1-12.3)	**10.7%** (8.0-14.0)	**11.2%** (9.0-14.0)	**4.9%** (3.2-7.3)	
Stunting (WHO 2006)-2015	**N = 749**	**N =743**	**N =802**	**N =617**	**N-2889**
Prevalence of global stunting –June 2015	(184) **24.6 %** (20.9 – 28.6)	(156) **21.0 %** (16.9 – 25.7)	(262) **32.7 %** (28.6 – 37.0)	(134) **21.7 %** (18.4 – 25.5)	**25.6%** (24.0-27.3)
Prevalence of global stunting-2014	20.5% (16.6-25.0)	26.5% (22.0-31.6)	30.1% (26.4-34.2)	18.5% (14.6-23.2)	
Prevalence of severe stunting-June 2015	(46) **6.1%** (4.6 – 8.2)	(40) **5.4%** (3.8 – 7.7)	(78) **9.7%** (7.7 – 12.2)	(33) **5.3%** (3.7 – 7.6)	**6.8%** (6.1-7.6)
Prevalence of severe stunting	4.8% (3.1-7.3 C.I)	5.6% (3.9-8.1 C.I)	9.3% (7.0-12.3 C.I)	3.5% (2.3-5.4 C.I)	
Prevalence of acute malnutrition by MUAC	**N=787**	**N=791**	**N=832**	**N=642**	
Severe under nutrition (< 115 mm)-July 2015	(13) **1.7 %** (0.7 – 3.7)	(13) **1.6 %** (0.9 – 2.9)	(14) **1.7 %** (1.0 – 2.8 9)	(13) **2.0 %** (0.8 – 4.9)	
Severe under nutrition (< 115 mm)-2014	1.9% (1.1-3.3)	0.9% (0.4-1.9)	0.9% (0.4-2.0)	2.1% (1.0-4.1)	
Moderate undernutrition (≥115–<125 mm)-July 2015	(61) **7.8 %** (5.9 – 10.1)	(78) **9.9 %** (7.4 – 13.0)	(75) **9.0 %** (6.7 – 12.0)	(58) **9.0 %** (6.0 – 13.5)	
Moderate undernutrition (≥115–<125 mm)-2014	7.7% (5.7-10.3)	12.3% (9.7-15.6)	4.2% (2.9-6.1)	5.7% (4.1-7.9)	
Global Acute Malnutrition (≤125 mm) –June 2015	(74) **9.4 %** (7.3 – 12.1)	(91) **11.5 %** (8.9 – 14.7)	(89) **10.7 %** (8.0 – 14.1)	(71) **11.1 %** (7.4 – 16.2)	
Global Acute Malnutrition (≤125 mm)	9.6% (7.3-12.5)	13.3% (10.5-16.6)	5.1% (3.5-7.4)	7.8% (6.0-10.2)	
Maternal Malnutrition-June 2014	**N=389**	**N=396**	**N=453**	**N=450**	**N=1688**
PLW with MUAC<21 cm-2015	(33)**8.5%**	(41)**10.4%**	(34)**7.5%**	(35)**7.8%**	(143)**8.5%**
PLW with MUAC<21 cm	12.1%	14.2%	4.9%	7.4%	
Immunization-June 2015					
BCG vaccination	(760)97.6%	(732)99.1%	(821)99.4%	(582)98.8%	(2895)98.7%
OPV1(Card and recall)	(774) 98.3%	(746) 94.3%	(823) 98.9%	(584) 90.9%	(2920)95.7%
OPV3 (Card and recall)	(704) 89.5%	(657) 83.1%	(762) 91.6%	(478) 74.5%	(2651)86.9%
Measles at 9 months	(599) 81.8%	(603) 82.8%	(698)91.5%	(482) 82.3%	(2382)84.8%
Measles Vaccination at 18 months	(24) 4.4%	(74) 13.8%	(59) 10.2%	(28) 6.4%	(185) 8.8%

Indicator	Turkana Central	Turkana North	Turkana South	Turkana West	Turkana County
Vitamin A supplementation and de-worming-June 2015					
Children 12-59 months supplemented with vitamin A at least once	N=664	N=661	N=691	N=541	N=2557
	(461)69.4%	(449)67.9%	(528)76.4%	(407)75.2%	(1845)72.2%
Children 12-59 months supplemented with Vitamin A at least twice	(160)24.1%	(240)36.3%	(227)32.9%	(107)19.8%	(734)28.7%
Children 12-59 months de-wormed at least once	(158)23.8%	(207)31.3%	(213)31.0%	(245)45.4%	(823)32.3%
Children 12-59 months de-wormed at least twice	(38)5.7%	(48)7.3%	(75)10.9%	(59)10.9%	(220)8.6%
Children 6-11 months supplemented with Vitamin A at least once	N=123	N=130	N=141	N=101	N=495
	(58)47.2%	(76)58.5%	(76)53.9%	(58)57.4%	(268)54.1%
Child Morbidity-June 2015					
Ill in the last 2 weeks(children 6-59 months)	N=787	N=791	N=832	N=642	N=3052
	(446)56.7%	(316)39.9%	(266) 32.0%	(384)59.8%	(1412)46.3%
Fever with chill like malaria	(156)20%	(156)12%	(97)12%	(127)16%	(473)60.1%
ARI/Cough	(139)18%	(139)20%	(103)13%	(175)22%	(577)73.3%
Watery diarrhoea	(64)8%	(64)4%	(34)4%	(49)6%	(180)22.9%
Bloody diarrhoea	(2)0%	(1)0%	(4)1%	(0)0%	(7)0.9%
Therapeutic Zinc Supplementation	N=85	N=75	n	N=52	N=110
	(63)74.1%	(61)81.3%	36	(36)69.2%	(94)85.5%
Maternal Nutrition-June 2015					
Iron folate supplementation for pregnant women	N=503	N=368	N=592	N=517	N=1980
	(389)77.3%	(309)84.0%	(483)81.6%	(362)70.0%	(1543)77.9%
IFA supplementation for at least 90 days	(62)15.9%	(50)16.2%	(48)9.9%	(44)12.2%	(204)13.2%
IFA supplementation for 270 days	(0)0.0%	(0)0.0%	(0)0.0%	(1)0.3%	(1)0.1%
PLW with MUAC<21 cm	N=389	N=396	N=453	N=450	N=1688
	(33)8.5%	(41)10.4%	(34)7.5%	(35)7.8%	(143)8.5%
WASH practises-June 2015					
Latrine/toilet utilization	N=647	N=626	N=659	N=629	N=629
Open defecation)	(511)79.0%	(527)84.2%	(463)70.3%	553	(553)87.9%
Use latrine	(136)21.0%	(99)15.8%	(196)29.7%	76	(76)12.1%
Food Security-June 2015					
Household food consumption score	625	N=605	N=651	N=575	N=2456
Poor	(80)12.8%	(120)19.8%	(56)8.6%	(100)17.4%	(356)14.5%
Borderline	(145)23.2%	(176)29.1%	(214)32.9%	(194)33.7%	(729)29.7%
Acceptable	(400)64.0%	(309)51.1%	(381)58.5%	(281)48.9%	(1371)55.8%
Mean household Coping Strategy Index	18.28	17.31	26.01	22.60	21.06

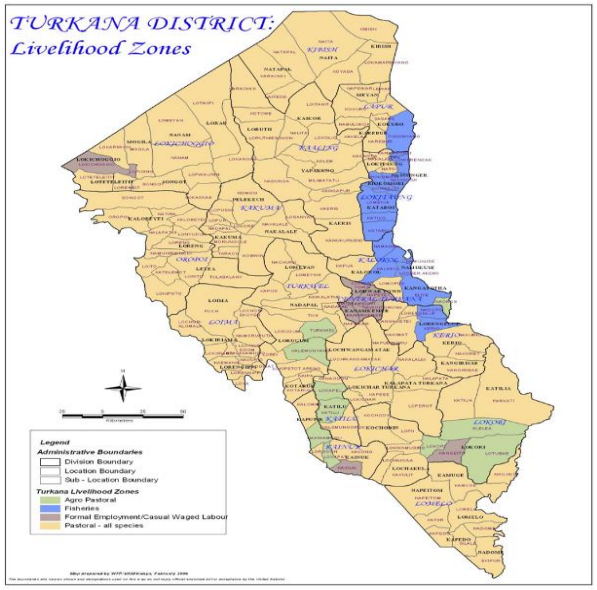
RECOMMENDATIONS

	Action	By whom	By when
1	Update and activate nutrition contingency and response plans	MoH,NDMA and nutrition	Immediately
2	Develop simplified nutrition survey packs/briefs easily synthesized for nutrition advocacy	MoH and nutrition partners	immediately
3	Scale up continuous active case finding for malnutrition for the expected caseload(U5) of 46,008 (severe10,259 and moderate 35,749) and 3,550 pregnant and lactating women in the year 2015 and referral for timely management	MoH(nutrition and community health strategy) and nutrition partners	Continuous
4	Develop and implement nutrition service delivery score card at health facilities	MoH and nutrition partners	Immediately
5	Conduct comprehensive on the job training and mentorship targeting facility health workers, community health extension workers(CHEWs) and Community health workers(CHWs)	MoH and nutrition partners	Immediately
6	Sensitize and link mother to mother support groups(MtMSGs) and households with malnourished children/pregnant and lactating women with other nutrition sensitive sectors to strengthen nutrition resilience	MoH,NDMA and nutrition partners	Continuous
7	Conduct community dialogue sessions and sensitization meetings with community leaders/key influencers on appropriate childcare practises including handwashing and latrine utilization	MoH and nutrition partners	Continuous
8	Advocate and create public awareness on micronutrient supplementation(micronutrient powders,IFA,Vitamin A),de-worming and dietary diversification	MoH and nutrition partners	Continuous
9	Continue capacity building of health care workers especially newly recruited staffs through OJT and joint support supervision on a quarterly basis	MoH and nutrition partners	Continuous
10	Scale up community led total sanitation approach to increase awareness on sanitation including latrine utilization	MoH(public health) and nutrition partners	Continuous
11	Institutionalize Vitamin A supplementation and de-woming at the Early Child Education Development(ECDE)centers and scale up during annual child health campaigns	MoH(nutrition& public health), MoE(ECDEs) and nutrition partners	Quarterly
12	Procurement and timely distribution of essential nutrition commodities to health facilities	MoH/UNICEF/WFP	Quarterly
13	Train county, sub county health managers, health workers on behavior social change communication(BSCC)/communication for development(C4D)	MoH and nutrition partners	December 2015
14	Develop, disseminate and implement multi-sectoral nutrition social behavior change communication(SBCC) strategy to address	MoH and nutrition partners	February 2016
15	Train health workers on scalability models (surge) and pilot its implementation	MoH and nutrition partners	March 2016
16	Train community health volunteers(CHVs) and community health extension workers(CHEWs) on nutrition module for community health strategy for improved active case finding, referral and nutrition education	MoH(nutrition, community strategy) and nutrition partners	March 2016
17	Scale up of Baby Friendly Community Initiatives(BFCI) in 20 MNCH centers of excellence	MoH(nutrition and community health strategy) and nutrition partners	June 2016

CHAPTER 1

1.0 BACKGROUND INFORMATION

Turkana County is situated in the arid North-western region of the country. It shares international borders with Ethiopia, Sudan and Uganda and locally with Baringo, West Pokot and Samburu counties. The County has an estimated total population of 855,399[2] and cover an area of 77,000km^2 .The County is divided into seven sub counties namely; Turkana Central, Loima, South, East, North, Kibish and West



According to National Drought Management Authority (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. The county has poverty index of 94% which contributes 3.13% on national poverty index. Turkana is constrained by the harsh environment, remoteness coupled with the poor infrastructure and low access to essential services in addition to other underlying causes of poverty that are experienced elsewhere in Kenya. It is classified among the Arid and semi-arid lands (ASAL).

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

1.1 Food security situation

According to the February 2015 Short rains assessment (SRA) report, the county's food security situation was classified as 'stressed' (IPC Phase 2) across all the livelihood zones in Turkana County. The overall food security situation slightly improved compared to the long rains assessment of 2014, when majority of fisheries and agro pastoral livelihoods zones in Turkana County were in the Stressed (IPC Phase 2) while parts of the Pastoral livelihood zones in the North, Central and Southern parts of the County were in Crisis (IPC Phase 3). A total of 54,730 beneficiaries are benefitting from GFD, 58,000 from FFA, 23,754 from GOK and 39,918 from Hunger Safety Net Program (HSNP)

The long rains have been average to above-average in cumulative amount since March in the high- and medium-potential agricultural areas which will likely result in an average to above-average in October to December harvest. Near average March to May long rains in most pastoral areas have helped improve food security. Despite improvements, most pastoral areas are expected to remain stressed (IPC Phase 2) through September 2015[3]

1.2 Humanitarian and Development partners

1. Many agencies, UN and NGOs are working in collaboration with the ministry of health in child survival interventions. The main responsibility of MoH is quality assurance of the nutrition and health-related activities through the coordination of all activities in Turkana County. The NGOs implementing health and nutrition programs include: Save the children International (SCI), World Vision Kenya (WVK)

[2] Kenya National Bureau of Statistics (KNBS) 2009 Census Report
[3] FEWSNET bulletin for the month of May 2015

and International Rescue Committee (IRC),APHIA PLUS IMARISHA and Elizabeth Glaser pediatric Aids Foundation(EGPAF)

2. UNICEF supports Nutrition, Health, WASH, Communication for Development and Child Protection programs
3. World Food Programme (WFP) provides Food for Assets (FFA), General Food Distribution (GFD) in SFP food commodities and MNPs.
4. Child fund, OXFAM and Turkana Relief program implement FFA and GFD
5. Kenya Red Cross support emergency response including Nutrition, WASH and livelihood project
6. Other agencies implementing resilience and livelihood projects are FAO,ADESO, DoL, APHIA PLUS Imarisha and IOM

1.3 Main Objective

The overall goal of the survey was to determine the prevalence of malnutrition among the children aged 6- 59 months old, pregnant and lactating mothers

1.4 Specific Objectives

1. To determine the prevalence of acute malnutrition among under five year old children, pregnant and lactating women
2. To determine the immunization coverage for measles, Oral Polio Vaccines (OPV 1 and 3), and vitamin A supplementation in children aged 6-59 months;
3. To estimate coverage of iron / folic acid supplementation during pregnancy in women of reproductive age
4. To determine de-worming coverage for children aged 12 to 59 months;
5. To determine the prevalence of common illnesses;
6. To collect information on possible underlying causes of malnutrition such as household food security, water, sanitation, and hygiene practices.

1.5 Timing of Turkana SMART surveys

The surveys were conducted in June 2014 towards the end of the long rains shortly before the Long Rains assessment (LRA). The results of the survey will feed into the LRA.

Table 2: Turkana Seasonal Calendar

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

1.6 Survey Area

Four independent surveys were conducted to cover all the livelihood zones (pastoral, agro-pastoral and formal employment/business/petty trade) and administrative boundaries of Turkana County. The survey zones are summarised in table 4 below;

Table 3:Turkana County survey zones

No	Survey Zone	Administrative sub counties
1	Turkana Central	Central and Loima
2	Turkana North	North and Kibish

3	Turkana West	West
4	Turkana South	South and East

CHAPTER TWO

2.0 METHODOLOGY

Standardized Monitoring Assessment for Relief and Transition Method (SMART) was used to conduct the survey in planning, training, data entry and analysis. Other data sets collected concurrently include data on WASH (Water Sanitation and Hygiene) and FSL (Food security and livelihood).The entire exercise was done in consideration with all guidelines as stipulated by the Ministry of Health at county and national level.

2.1 Sample size calculation

The Sample size was determined using ENA for SMART software (Feb 2015). The table below outlines factors considered when determining the sample size calculation

Table 4:Sample size calculation

	Central	North	South	West	Rationale
Estimated prevalence of GAM	[4]28.7%	[5]27.2%	[6]24.5%	[7]17.4%	NDMA march bulletin indicate an alert situation in all zones with a worsening trend in across the county
±Desired precision	5.0%	5%	5%	4%	Limits of CI doesn't influence decision making/control quality hence reduce bias and previous survey values
Design effect	[8]1.5	[9]1.5	[10]1.6	[11]1.24	Rule of thumb/slight variations among clusters and previous survey results
Average household size	6	6	6	6	KNBS Census report 2010 and previous survey results
Percent of under five children	15.2%	15.2%	15.2%	15.2%	KNBS Census report 2010
Percent of non-respondent	2%	2%	2%	2%	This is the anticipated non response based on the previous surveys experience
Households to be included	638	618	615	579	
Children to be included	513	497	495	466	
Number of clusters	42	44	41	41	

2.2 Sampling method

A three stage sampling process was used in this survey. The first stage involved sampling of sub locations (clusters) from a sampling frame using ENA for SMART software (February 2015 version).The second stage sampling involved segmentation of the sampled sub locations using the estimated populations provide by the chief/sub chief to identify the villages to be sampled. In the third stage, households were selected randomly upon getting the updated list of

[4] SMART survey 2014 - 28.7% (24.5-33.2CI)
[5] SMART survey 2014 27.2% (22.7-31.2CI)
[6] SMART survey 2014 24.5% (20.8-28.6 CI
[7] SMART survey 2014 17.4% (14.3-21.0 CI)
[8] Previous surveys values
[9] Rule of thumb/Slight cluster variations and previous survey values
[10] Due to the slight differences in the means of livelihood
[11] Based on the heterogeneity of the villages(clusters) and previous survey values

households in the village provided by the village elder. Taking into account the time spent on travelling to each household, introductions and breaks, 16 households were sampled per cluster.TableXX shows a summary of the actual number sampled clusters, households and children per survey zone

Table 5:Sampled number of Clusters, Households and Children

Survey Zone	Number of Clusters	No of Households	No. of children sampled
Turkana Central	42	638	787
Turkana North	44	618	786
Turkana South	41	615	835
Turkana West	41	579	642

2.2.1 Selection of the households

The definition of a household was a shelter or more whose residents ate from the same "cooking pot". Households to be surveyed were selected randomly using the updated list of households in the selected village/segment.

2.2.2 Selection of children for anthropometry

All children between 6-59 months of age staying in the selected household were included in the sample. The respondent was the primary care giver 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.

2.2.3 Selection of women for determination of nutritional status

All women in the reproductive age (15-49 years) in the identified households were enlisted in the study and their MUAC measurements taken.

2.3 Survey team

The survey was coordinated by county nutrition coordinator and supervised by four Sub County Nutrition Officers. The team was supported by officers from implementing partners and the Human Nutrition and Dietetics Unit-National MoH).The survey was undertaken by 5 teams in each survey zone. Each team comprised of 3 enumerators and 1 team leader.

2.4 Survey team training

2.4.1 Supervisors training

The survey supervisors/team leaders (from HMT and nutrition partners) were trained on supervisor's module for SMART for 6 days. The training was supported by trainers from HNDU office at national level, 2 UNICEF Nutrition Support Officers (NSOs) and representatives from nutrition implementing partners.

2.4.2 Enumerators training

A four-day training workshop was conducted before the commencement of the survey. The training focused on the objectives of the survey, survey questionnaire, interviewing techniques, anthropometric measurements, cluster and household selection. Role-plays on how to administer the questionnaire and record responses were conducted. Demonstrations on how to take anthropometric measurements were also conducted. This was followed by practice to standardize anthropometric measurements.

A half day of the training was allocated to pre-testing of the tablet questionnaire (in areas that had not been selected for inclusion in the survey) and reviewing of the data collection tools based on the feedback from the field. The anthropometric measurements from pre-testing were entered into the ENA for SMART software and a plausibility report developed for each team and this information was used to correct the teams' mistakes.

2.5 Data collection

Data collection took place concurrently in all the four survey zones. The data collection took 8 -9 days.survey coordinators supervised the teams throughout the data collection period. Teams administered the standardized questionnaire to the mother or caregiver. Each survey team explained the purpose of the survey and issues of confidentiality and obtained verbal consent before proceeding with the interview. The team used tablets questionnaire to record the responses. The data was uploaded to world vision servers at the end of each day. Anthropometry data was downloaded daily from world vision servers, reviewed/analyzed for plausibility and feedback provided to the teams.

2.6 Variables Measured

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

Weight: Children were measured using a digital weighing scale

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

MUAC: Mid Upper Arm Circumference (MUAC) was measured on the left arm, at the middle point between the elbow and the shoulder, while the arm was relaxed and hanging by the body's side. MUAC was measured to the nearest Cm. MUAC measurements were taken for children 6-59 months of age and for women in the reproductive age (18-45 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 6-59 months, 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 are 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 campaign cards and recall from caregivers.

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

De-worming status: Information was solicited from the caregivers as to whether children 12-59 months of age had received de-worming tablets or not in the previous one year. This information was verified by card where available.

Food security status of the households: Food consumption score, 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 obtained.

Education: Data on the enrolment in school for children aged 5-18 months and reasons for not attending school was collected

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

Household food consumption score. 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 were used to analyse the data.

Table 6: WFP corporate FCS thresholds

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

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

1. eating less-preferred foods (1.0),
2. borrowing food/money from friends and relatives (2.0),
3. limiting portions at mealtime (1.0),
4. limiting adult intake (3.0), and
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).

Nutrition Indicators

Nutritional Indicators for children 6-59 months of age

The following nutrition indicators were used to determine the nutritional status of the under – fives

Table 7: 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

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 the women for pregnant and lactating women: Cut off <21 cm was used for under nutrition

2.7 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 (February 2015) by the coordination team. The nutritional indices were cleaned using SMART flags in the ENA for SMART software .To obtain county data, weighting of the sub county results was done. Table 9 summarises other criterion that was used for exclusion.

Table 8:Definition of boundaries for exclusion

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

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

2.8 Survey Limitations

1. There were inherent difficulties in determining the exact age of some children (even with use of the local calendar of events), as some health cards had erroneous information. This may have led to inaccuracies when analysing chronic malnutrition. Although verification of age was done by use of health cards, in some cases no exact date of birth was recorded on the card other than the date a child first seen at the health facility or just the month of birth. 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 de-worming in the health cards. Some of the mothers indicated that their children had received Vitamin A and de-worming while it was not recorded in the health cards.

2.9 Ethical considerations

Sufficient information was provided to the local authorities about the survey. Include 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 of all eligible children in the survey. The decision of caregiver to participate or withdrawal was respected. Privacy and confidentiality of survey respondent and data was protected.

CHAPTER THREE

3.0 RESULTS AND DISCUSSIONS

3.1 Demographic results

The county mean household size is 5.98 and the mean number of children 6-59 months old per household is 1.16.The the sex ratio of male to female is 1.03 which is considered normal. Table 10 below shows a summary of household demography per survey zone

Table 9: household demography per survey

	Central	North	South	West	County
Household Characteristics	N=646	N=624	N=659	N=626	N=2555
Mean household size	5.89	5.80	6.13	6.08	5.98
Total population	3808	3617	4040	3808	15273
Total children under 5	787	791	832	642	3,052
Total males children under 5	366	413	441	325	1545
Total female children U5	421	378	391	317	1507
Children U5 sex ratio	0.87	1.09	1.13	1.03	1.03
Total Under five population	762	722	842	635	2961
Mean Children 6-59 month old	1.18	1.17	1.28	1.01	1.16

3.1.1 Residency and marital Status

97.4% of the respondents were residents of Turkana County.Turkana south had the highest number of IDPs at 7.6%. 87.7% of the respondents were married and the Turkana West had the highest number of single caretakers at 7.2% of the respondent.Turkana Central had the highest percentage of widowed caretakers at 10.2%. Table 11 below shows a summary of caretakers' marital status per survey

Table 10: Summary of caretakers' marital status

Turkana	Central	North	South	West	County
	N=647	N=626	N=660	N=629	N=2562
Married	(546)84.4%	(556)88.8%	(609)92.3%	(535)85.1%	(2246)87.7%
Single	(15) 2.3%	(8)1.3%	(9)1.4%	(45)7.2%	(77)3.0%
Widowed	(66) 10.2%	(47)7.5%	(35)5.3%	(44)7.0%	(192)7.5%
separated	(5)0.8%	(4)0.6%	(6) 0.9%	(5)0.8%	(20)0.8%
Divorced	(15)2.3%	(11)1.8%	(1) 0.2%	(0)0.0%	(27)1.1%

3.1.2 Occupation of the household main provider

The main occupation for the main household provider were livestock herding (27.2%), petty trade (22.3%) and firewood selling/charcoal burning (18.2%).Table 12 shows the household's main provider occupation per survey

Table 11: Summary of household's main provider occupation

	Central	North	South	West	County
Occupation	**N=647**	**N=626**	**N=660**	**N=629**	**N=2562**
Livestock herding	(96)14.8%	(245)39.1%	(147)22.3%	(208)33.1%	(696)27.2%
Own farm labour	(13)2.05	(0)0.0%	(82)12.4%	(22)3.5%	(117)4.6%
Employed (salaried	(36)5.6%	(15)5.65	(40)6.1%	(39)6.2%	(130)5.1%
Waged Labour (casual)	(110)17.0%	(61)9.7%	(128)19.4%	(79)12.6%	(378)14.8%
Petty trade	(159)24.6%	(122)19.5%	(110)19.5%	(180)28.6%	(571)22.3%
Merchant/trader	(26)4.0%	(12)1.9%	(16)2.4%	(15)2.4%	(69)2.7%
Firewood/charcoal	(153)23.6%	(133)21.2%	(107)16.2%	(74)11.8%	(467)18.2%
Fishing	(16)2.5%	(22)3.5%	(0)0.0%	(0).0%	(38)1.5%
No occupation	(38)5.9%	(16)2.6)	(30)4.5%	(12)1.9%	(96)3.7%

3.2 Anthropometry

76.7% of the children age was verified from health card, birth certificate/notification or baptism card.Age determination for 23% of the children was based on recall, hence prone to bias. This might have affected indices with age as a variable such as stunting and underweight. Table 13 below show the age verification means per survey

Table 12:Summary of Children age verification means

	Central	North	South	West	County
Means of verification	N=787	N=791	N=832	N=642	N=3052
Health Card/Birth cert/ Notification /Baptism card	(596) 75.7%	(637) 80.5%	(656) 78.8%	(453) 70.6%	(2342)76.7%
Recall	(182) 23.1%	(154) 19.5%	(176) 21.2%	(189) 29.4%	(701)23.0%
No verification	(9)1.1%	(0) 0.0%	(0)0.0%	(0)0.0%	(9)0.3%

3.2.1 Age and sex distribution of the sampled children

Generally there were younger children selected in the sample. For example in Central there were 32.2% children instead of 20-25% in the age group 6-17 months. As shown in table 14 below, the overall sex ratio (boys: girls) was within the acceptable range of 0.8-1.2.This means that both sexes were equally distributed, and the sample was unbiased. However, younger children were selected in all the surveys

Table 13:: Distribution of age and sex of sample

	Turkana Central N=787		Turkana North N=791		Turkana south N=832		Turkana West N=642		County N=3052	
AGE (mo)	Total %	Ratio Boy: girl	Total %	Ratio Boy: girl	Total %	Ratio Boy: girl	Total %	Ratio Boy: girl	Total %	Ratio Boy: girl
6-17	30.1	0.8	32.2	0.9	30.4	1.3	31.5	1.0	31.0	1.0
18-29	26.6	0.9	31.6	1.2	25.5	1.1	31.6	1.0	28.6	1.0
30-41	25.2	0.9	20.1	1.1	20.9	1.1	19.3	1.0	21.5	1.0
42-53	14.7	1.0	11.8	1.4	17.9	1.0	13.1	1.0	14.5	1.1
54-59	3.4	0.5	4.3	0.9	5.3	1.0	4.5	1.2	4.4	0.9
Total	100.0	0.9	100.0	1.1	100.0	1.1	100.0	1.0	100.0	1.0

3.3 Prevalence of Acute Malnutrition

Rates of acute malnutrition in Turkana Central/loima, North and South/East indicate a ***Very Critical*** nutrition situation, while the nutrition situation in Turkana West is classified as ***Critical***. As shown in Table xxx s, there was no significant change of the nutrition situation in Turkana County from the same time last year. The weighted Global Acute Malnutrition (GAM) for Turkana County is 21.2%. These results estimate that about ***1 in 4 children is acutely malnourished***.

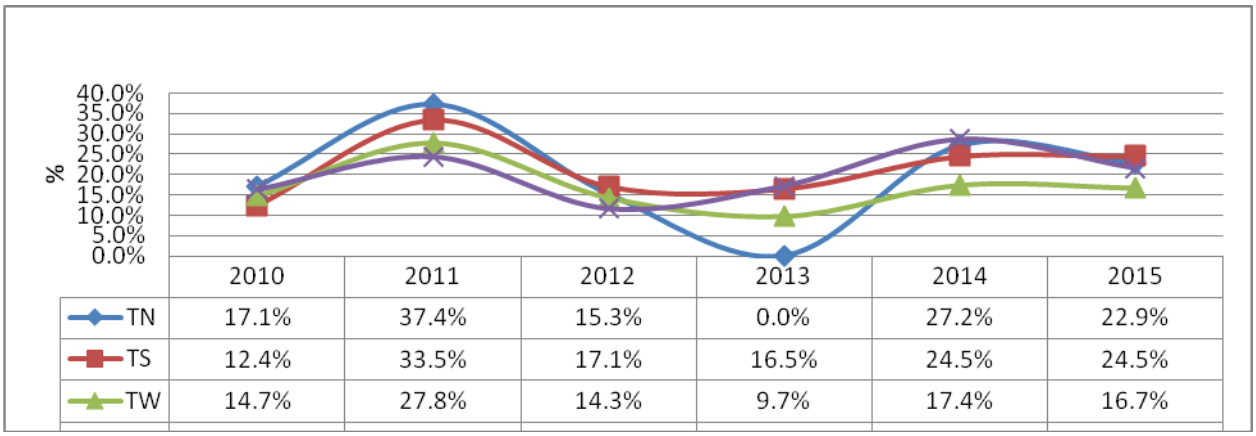
There were 0.1% cases of edema in Turkana Central, 0.1% in Turkana South, and none Turkana North and west respectively. The Weight for Height standard deviation of 0.98-1.06 across as all the survey zones was within the acceptable range of 0.8-1.2.The design effect was acceptable (1.3-1.6) in Turkana North and South. However in Turkana Central and Turkana west design effect of 1.18 and 1.08 respectively indicated heterogeneity in the sample selected.

Table 14: Prevalence of malnutrition weight-for-height z-scores (WHO Standards 2006)

Turkana	Central	North	South	West	County
Wasting (WHO 2006)	N=774	N=781	N=824	N=628	N=3005
Global Acute Malnutrition (GAM)-June 2015)	(162) 20.9 % (17.9 - 24.4)	(179) 22.9 % (19.6 - 26.6)	(202) 24.5 % (21.1 - 28.2)	(105) 16.7 % (13.8 - 20.1)	(21.2 % (19.7 – 22.9)
Global Acute Malnutrition (GAM)(2014)	28.70% (24.5-33.2)	(172) 27.2% (22.7-31.2)	(188) 24.5% (20.8-28.6)	(122) 17.4% (14.3-21.0)	
Severe Acute Malnutrition (SAM) –June 2015	(37) 4.8 % (3.4 - 6.6)	(30) 3.8 % (2.4 - 6.1 9	(50) 6.1 % (4.3 - 8.5)	(30) 4.8 % (3.3 - 6.9)	(5.0% (4.2 – 6.0)
Severe Acute Malnutrition (SAM) 2014	6.80% (4.7-9.7 C.I)	(33) 5.2% (3.3-8.1 C.I)	(37) 4.8% (3.6-6.5 C.I)	(32) 4.6% (3.1-6.6 C.I)	

Figure 1 below shows the trends of malnutrition in Turkana County from 2010-2015

Figure 1: Trends of Global Acute Malnutrition in Turkana County (2010-2015)



	2010	2011	2012	2013	2014	2015
TN	17.1%	37.4%	15.3%	0.0%	27.2%	22.9%
TS	12.4%	33.5%	17.1%	16.5%	24.5%	24.5%
TW	14.7%	27.8%	14.3%	9.7%	17.4%	16.7%

NB: The results for 2009 which used a different methodology (LQAS) and 2013 Turkana North results that were not validated have not been captured.

***SMART survey results for June 2013 in Turkana North were not validated due to data quality issues.

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

The proportion of boys malnourished was higher than girls in all the surveys apart from Turkana central where more girls were malnourished than boys. Table 16 below shows the prevalence of global acute malnutrition by sex per survey

Table 15;: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or edema) and by sex

	Central N=774	**North N=781**	**South N= 824**	**West N=628**	**County N=3005**
Sex	Prevalence of global malnutrition (<-2 z- score and/or edema)				
Boys	(75) 20.8% (16.5 - 25.9.)	(107) 26.2% (21.6 - 31.3)	(118) 27.2% (22.4 - 32.6)	(56) 17.6% (13.7 - 22.4)	(356)23.4% (21.1 - 25.8)
Girls	(87) 21.0% (16.8 - 25.9)	(72) 19.4% (15.1 - 24.5)	(84) 21.5% (17.4 - 26.3)	(49) 15.8 % (11.8 - 20.8)	(292) 19.7 % (17.9 - 21.6)

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

As shown in table 17 below, there was significant difference of the risk of malnutrition by age groups 6-29 months and 30-59 months in all the surveys

	Turkana Central		Turkana North		Turkana South		Turkana west		County	
Z-score	<-3	>=-3	<-3	>=-3	<-3	>=-3	<-3	>=-3	<-3	>=-3
Oedema present	Maras kwash	Kwash	Maras kwash	Kwash	Maras kwash	Kwash	Maras kwash	Kwash	Maras kwash	Kwash
	. 0 (0.0 %)	1 (0.1 %)	0 (0.0 %)	0 (0.0 %)	0 (0.0 %)	1 (0.1 %)	0 (0.0 %)	0 (0.0 %)	0 (0.0 %)	2 (0.1 %)
Oedema absent	Maras	Not SAM	Maras	Not SAM	Maras	Not SAM	Maras	Not SAM	Maras	Not SAM
	41 (5.2 %)	741 (94.6 %)	32 (4.1 %)	756 (95.9 %)	56 (6.7 %)	775 (93.1 %)	41 (6.4 %)	600 (93.6 %)	170 (5.6 %)	2872 (94.3 %)

Table 16:Distribution of acute malnutrition and edema based on weight for height Z scores

There were cases no of Marasmic- kwashiorkor and kwashiorkor in across all the survey zones, but there were 1 and 1 cases of Kwashiorkor in Turkana Central and South.

3.3.3 Prevalence of acute malnutrition based on MUAC

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

Generally, MUAC usually tends to indicate lower GAM levels compared to WFH z-scores. The prevalence of malnutrition using MUAC is significantly lower compared to using Weight for Height Z-scores. This could be associated with the physiology of this population in Turkana, similar to the Somali and South Sudanese, with a high cormic index[12].This means, overall significantly lower cases of malnourished children are identified using MUAC when compared to weight for height. The table 18 below summarizes prevalence of malnutrition by MUAC

Table 17 :Prevalence of Malnutrition based on MUAC per survey

Turkana	Central	North	South	West	County
Prevalence of Acute malnutrition MUAC	N=787	N=791	N=832	N=642	3052
Severe under nutrition (< 115 mm) -June 2015)	(13) 1.7 % (0.7 - 3.7)	(13) 1.6 % (0.9 - 2.9)	(14) 1.7 % (1.0 - 2.8)	(13) 2.0 % (0.8 - 4.9)	(53) 1.7 % (1.3 - 2.4)
Severe under nutrition (< 115 mm)-June 2014)	1.9% (1.1-3.3 C.I)	0.9% (0.4-1.9 C.I)	0.9% (0.4-2.0 C.I)	2.1% (1.0-4.1 C.I)	
Moderate undernutrition (≥115–<125 mm)-June 2015)	(61) 7.8% (5.9 - 10.1)	(78) 9.9 % (7.4 - 13.0)	(75) 9.0% (6.7 - 12.0.)	(58) 9.0 % (6.0 - 13.5)	(272) 8.9 % (7.7 - 10.3)
Moderate undernutrition (≥115–<125 mm)-June 2014)	7.7% (5.7-10.3 C.I)	12.3% (9.7-15.6 C.I)	4.2% (2.9-6.1 C.I)	5.7% (4.1-7.9 C.I)	
Global Acute Malnutrition (≤125 mm)-June 2015)	(74) 9.4 % (7.3 -12.1)	(91) 11.5 % (8.9 -14.7)	(89) 10.7 % (8.0 -14.1)	(71) 11.1 % (7.4 -16.2)	(325) 10.6 % (9.3 - 12.2)
Global Acute Malnutrition (≤125 mm)-June 2014)	**9.6%** (7.3-12.5 C.I)	**13.3%** (10.5-16.6 C.I)	**5.1%** (3.5-7.4 C.I)	**7.8%** (6.0-10.2 C.1)	

3.4 Prevalence of underweight

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

[12] 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

underweight is shown in XX. There is a slight decrease in the prevalence of underweight in June 2015 compared to June 2014 in all the surveys

Table 18: Prevalence of underweight

Turkana	Central	North	South	West	County
Underweight (WHO 2006)	N=773	N=783	N= 824	N=629	N=3008
Prevalence of global underweight -June 2015)	(236) 30.5 % (26.8 - 34.6.)	(230) 29.4 % (24.4 - 34.9)	(316) 38.3 % (33.9 - 43.0)	(151) 24.0 % (20.4 - 28.0)	(934) 31.1 % (28.7 - 33.5.)
Prevalence of global underweight -June 2014)	33.4% (28.8-38.4)	35.5% (30.4-40.9)	37.5% (33.7-41.4)	22.7% (18.1-28.1)	
Prevalence of severe underweight (June 2015)	(68) 8.8 % (7.1 - 10.9)	(65) 8.3 % (6.0 - 11.4)	(99) 12.0 % (9.0 - 15.9)	(46) 7.3 % (5.5 - 9.6)	(279) 9.3 % (8.0 - 10.8)
Prevalence of severe underweight (June 2014)	9.4% (7.1-12.3)	(67) 10.7% (8.0-14.0)	11.2% (9.0-14.0)	(34) 4.9% (3.2-7.3)	

3.5 Prevalence of stunting

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

There is a slight decrease in the prevalence of stunting in June 2015 compared to June 2014 in Turkana North survey zone while an increase was noted in Turkana Central, Turkana south and Turkana west survey zones as shown in table 20 below. This is indicative of minimal/no positive change in addressing stunting context factors (community and societal) and causes.

Table 19:Prevalence of Stunting

Turkana	**Central**	**North**	**South**	**West**	**County**
Stunting (WHO 2006)	**N = 749**	**N =743**	**N =802**	**N =617**	**N=2913**
Prevalence of global stunting (<-2 z-score) June 2015	(184) 24.6 % (20.9 - 28.6)	(156) 21.0 % (16.9 - 25.7)	(262) 32.7 % (28.6 - 37.0)	(134) 21.7 % (18.4 - 25.5)	(736) 25.3 % (23.6 - 27.1)
Prevalence of global stunting (<-2 z-score) June 2014	20.5% (16.6-25.0)	26.5% (22.0-31.6)	30.1% (26.4-34.2)	18.5% (14.6-23.2)	
Prevalence of severe stunting (<-3 z-score)-June 2015	(46) 6.1 % (4.6 - 8.2)	(40) 5.4 % (3.8 - 7.7)	(78) 9.7 % (7.7 - 12.2)	(33) 5.3 % (3.7 - 7.6)	(197) 6.8 % (6.0 - 7.6)
Prevalence of severe stunting (<-3 z-score)-June 2014	4.8% (3.1-7.3)	5.6% (3.9-8.1)	9.3% (7.0-12.3)	3.5% (2.3-5.4)	

4.0 CHILDREN'S MORBIDITY AND HEALTH SEEKING BEHAVIOR

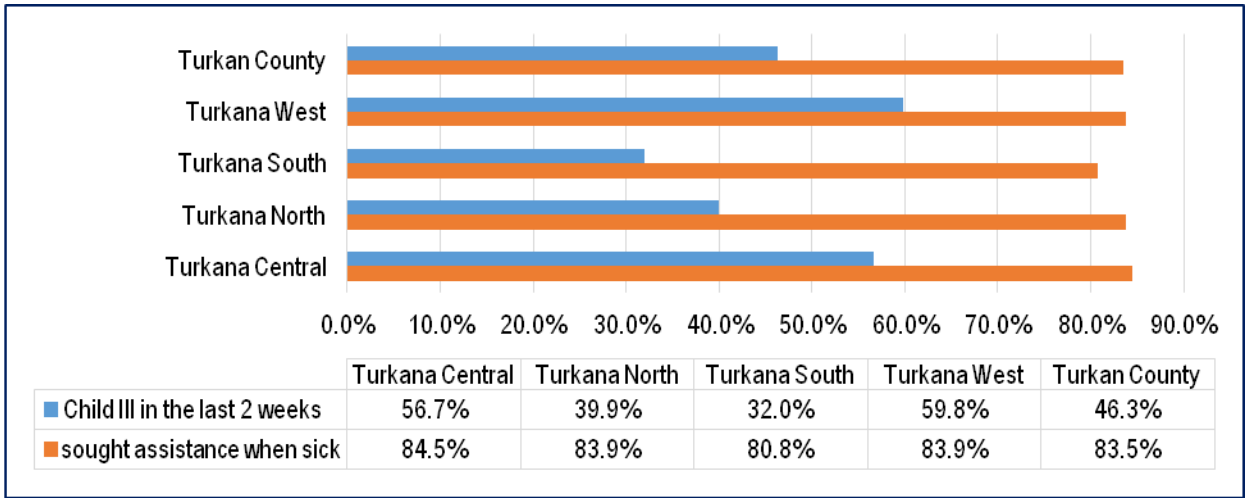
According to UNICEF conceptual framework on causes of malnutrition, disease is an immediate cause of malnutrition. It also affect food intake which is also categorized as an immediate cause. It is important therefore to assess morbidity and whether it had some effect on malnutrition.

4.1 Child Morbidity

To assess child morbidity mothers/caregivers of children aged 6 to 59 months were asked to recall whether their children had been sick in the past 2 weeks. Those who gave an affirmative answer to this question were further probed on 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.

From the assessment, 46.3% of the assessed children were reportedly sick in the past two weeks prior to the survey and 83.5% sought assistance. Figure 2 below summarizes the proportion of children sick and those who sought assistance per survey zone.

Figure 2:Children ill and sought assistance when sick



	Turkana Central	Turkana North	Turkana South	Turkana West	Turkan County
Child Ill in the last 2 weeks	56.7%	39.9%	32.0%	59.8%	46.3%
sought assistance when sick	84.5%	83.9%	80.8%	83.9%	83.5%

Among those who were sick, majority (73.1%) were affected by acute respiratory infection (ARI)/Cough. Fever chills like malaria affected 60.1%, while 22.9% suffered from watery diarrhea. Table 21 below summarizes prevalence of child morbidity.

Table 20:Prevalence of child morbidity 2 weeks prior to the survey

Type of illness	Turkana Central	Turkana North	Turkana South	Turkana West	Turkana County
N	787	791	832	642	3052
Fever with chill like malaria	(156)20%	(156)12%	(97)12%	(127)16%	(473)60.1%
ARI/Cough	(139)18%	(139)20%	(103)13%	(175)22%	(577)73.3%
Watery diarrhea	(64)8%	(64)4%	(34)4%	(49)6%	(180)22.9%
Bloody Diarrhea	(2)0%	(1)0%	(4)1%	(0)0%	(7)0.9%
Others	(109)14%	(96)12%	(60)8%	(141)14%	(379)48.2%

4.2 Therapeutic Zinc Supplementation during Watery Diarrhea Episodes

Based on compelling evidence from efficacy studies that zinc supplementation reduces the duration and severity of diarrhea, in 2004 WHO and UNICEF recommended incorporating zinc supplementation (20 mg/day for 10-14 days

for children 6 months and older, 10 mg/day for children under 6 months of age) as an adjunct treatment to low osmolality oral rehydration salts (ORS), and continuing child feeding for managing acute diarrhea[13]. Kenya has adopted these recommendations. According to Kenyan policy guideline on control and management of diarrheal diseases in children below five years in Kenya, all under-fives with diarrhea should be given zinc supplements as soon as possible. The recommended supplementation dosage is 20 milligrams per day for children older than 6 months or 10 mg per day in those below the age six months, for 10–14 days during episodes of diarrhea.

The survey sought to establish the number of children who suffered from watery diarrhea and supplemented with zinc. 78.9% of those who suffered from watery diarrhea were supplemented with zinc. (Turkana central-74.1%, North-81.3%, South-69.2% and West-85.5%)

4.3 Health Seeking Behavior

Mothers and caregivers whose children were sick in the past 2 weeks were further asked where they sought assistance. Majority (92.1%) sought assistance from appropriate service delivery points namely, public hospital (74.9%), private clinic/pharmacy (4.7%), mobile clinics (2.4%) and NGO/FBO clinics (10.1%). From such places they are likely to get assistance from trained health personnel with proper diagnosis and treatment being done. Apparently a number of them (7.9 %%) sought assistance either from a shop/kiosk, relatives and friends, traditional healers or local herbs. In such places, they were likely to be misdiagnosed and receive inappropriate treatment as the service providers lacked expertise and knowledge of offering treatment services. Another 16.5% never sought any assistance. Figure 5 below summarizes the health seeking behavior per survey zone in Turkana County.

Table 21:Places of seeking health assistance

	Turkana Central	Turkana North	Turkana South	Turkana West	Turkana County
N	377	265	215	322	1179
Traditional healer	(1)0.3%	(3)1.1%	(2)0.9%	(13)4.0%	(19)1.6%
Community Health Worker	(2)0.5%	(6)2.3%	(1)0.5%	(27)8.4%	(36)3.1%
Private clinic/pharmacy	(5)1.3%	(7)2.6%	(4)1.9%	(40)12.4%	(56)4.7%
shop/kiosk	(7)1.9%	(1)0.4%	(5)2.3%	(11)3.4%	(24)2.0%
Public clinic	(350) 92.8%	(211)79.6%	(198)92.1%	(124)38.5%	(883)74.9%
mobile clinic	(7) 1.9%	(16)6.0%	(3)1.4%	(2)0.6%	(28)2.4%
Relative or friend	(1) 0.3%	(1)0.4%	(0)0.0%	(3)0.9%	(5)0.4%
Local herbs	(1) 0.8%	(0)0.0%	(0)0.0%	(6)1.9%	(9)0.8%
NGO/FBO	(1)0.3%	(20)7.5%	(2)0.9%	(96)29.8%	(119)10.1%

5.0 CHILDHOOD IMMUNISATION, VITAMIN A SUPPLEMENTATION AND DEWORMING

5.1 Childhood Immunization

Kenya aims to achieve 90% under one immunization coverage by the end of second medium term plan (2013-2017). The Kenya guideline on immunization define a fully immunized child is one 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

[13] 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.

months. From the assessment, 98.7% of children were confirmed to have been immunized by BCG[14]. Those who

		Turkana Central	Turkana North	Turkana South	Turkana West	Turkana County
BCG vaccination	N	779	739	826	589	2933
	Scar	(760)97.6%	(732)99.1%	(821)99.4%	(582)98.8%	(2895)98.7%
OPV1	N	787	791	832	642	3052
	Card and recall	(774) 98.3%	(746) 94.3%	(823) 98.9%	(584) 90.9%	(2920)95.7%
OPV3	N	787	791	832	642	3052
	Card and recall	(704) 89.5%	(657) 83.1%	(762) 91.6%	(478) 74.5%	(2651) 86.9%
Measles at 9 months	N	732	728	763	586	2809
	Card and recall	(599) 81.8%	(603) 82.8%	(698)91.5%	(482) 82.3%	(2382)84.8%
Measles Vaccination at 18 months	N	550	536	579	440	2105
	Card and recall	(24) 4.4%	(74) 13.8%	(59) 10.2%	(28) 6.4%	(185) 8.8%

were immunized(based on card and recall) by OPV1[15] and OPV3 were 95.8% and 86.9% respectively while 84.8% had been immunized for measles at 9 months. However only 8.8% has been immunized with the second dose of measles antigen at 18 months.

Table 24: below summarizes the coverage of the assessed 4 vaccines per survey zone in Turkana County

Table 22: Childhood immunization Coverage

5.2 Vitamin A supplementation

Improving the vitamin A status of deficient children through supplementation enhances their resistance to disease and can reduce mortality from all causes by approximately 23 per cent[16]. Therefore, vitamin A supplementation is critical, not only for eliminating vitamin A deficiency as a public-health problem, but also as a central element for child survival.

Poor data management on vitamin A logistics, inadequate social mobilization to improve vitamin uptake and placement of vitamin A at lower level of priority among other interventions has been cited as major challenges in achieving the supplementation targets (MOH Vitamin A supplementation Operational Guidelines for Health Workers 2012).

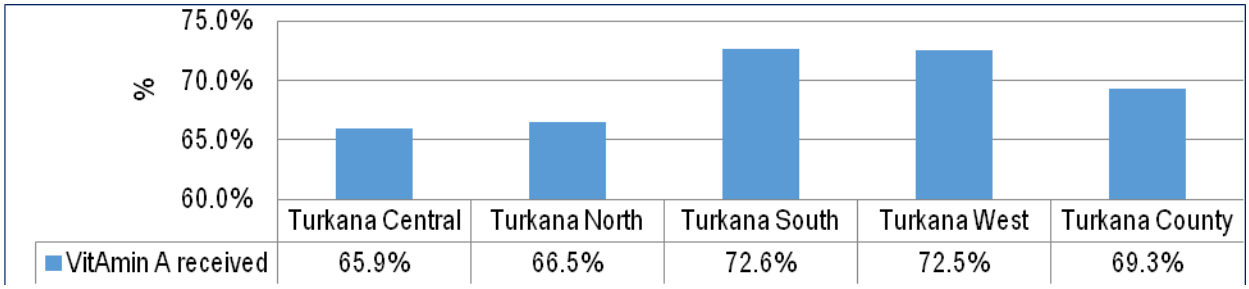
To assess vitamin A supplementation, parents and caregivers were probed on whether supplementation was done, for how many times and the place of supplementation (whether it was done in a health facility, outreach site or during mass campaigns) in the past one year. Reference was made to the child health card and in case the card was not available recall method was applied. Overall, 69.5% of children 6-59 months old were reported to have received Vitamin A in past one year. Figure 3 shows the proportion of children 6-59 months who received Vitamin A in the past one year per survey zone

[14] 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.

[15] In Kenya infants receive 4 doses of trivalent OPV before one year of age 1st dose is given immediately at birth or within two weeks of birth. This is known as the ***"birth dose"*** or ***"Zero dose"*** The other 3 doses should be given at 6 (OPV1) 10(OPV2) and 14 weeks (OPV3 of age

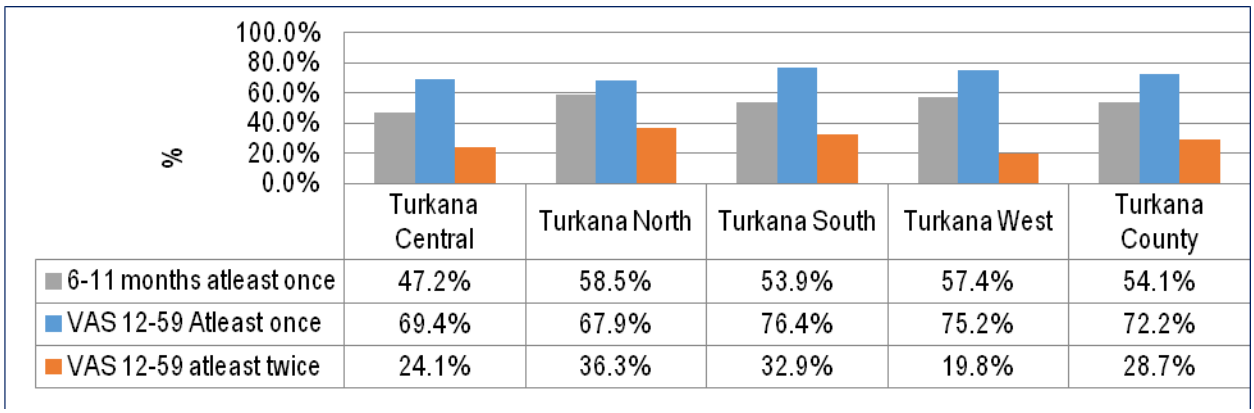
[16] Vitamin A Supplementation: A Decade of Progress, UNICEF 2007

Figure 3: Percentage of Children 6-59 months who received Vitamin A in the last one year



According to the survey, 54.1% of the children aged 6- 11 months were supplemented with vitamin A at least once, and only 28.7% children aged 12 to 59 months who had been at least supplemented twice. The performance of vitamin A supplementation especially among children 12-59 months is poor compared to the ministry of health target of 80%.Figure 4 below shows vitamin A supplementation coverage per survey zone in Turkana County

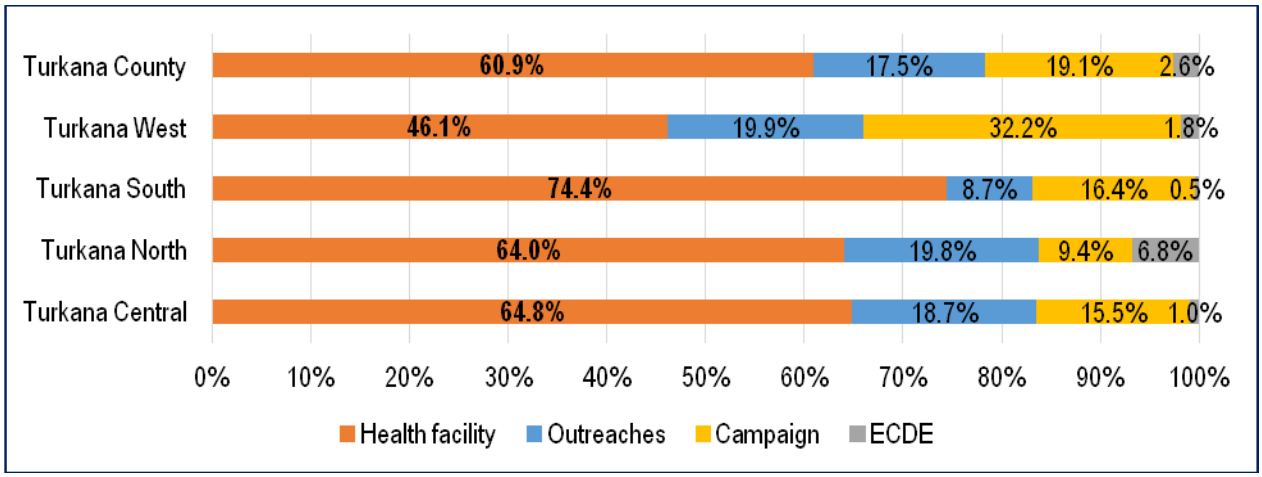
Figure 4: Vitamin A supplementation coverage



	Turkana Central	Turkana North	Turkana South	Turkana West	Turkana County
6-11 months atleast once	47.2%	58.5%	53.9%	57.4%	54.1%
VAS 12-59 Atleast once	69.4%	67.9%	76.4%	75.2%	72.2%
VAS 12-59 atleast twice	24.1%	36.3%	32.9%	19.8%	28.7%

Majority (60.9%) of vitamin A supplementation was done at the health facilities, 19.1% from campaigns, 17.5% from outreaches and only 2.6% from ECDE centers.Figure 5 Below shows place of vitamin A per survey zone in Turkana County

Figure 5: places of vitamin A supplementation

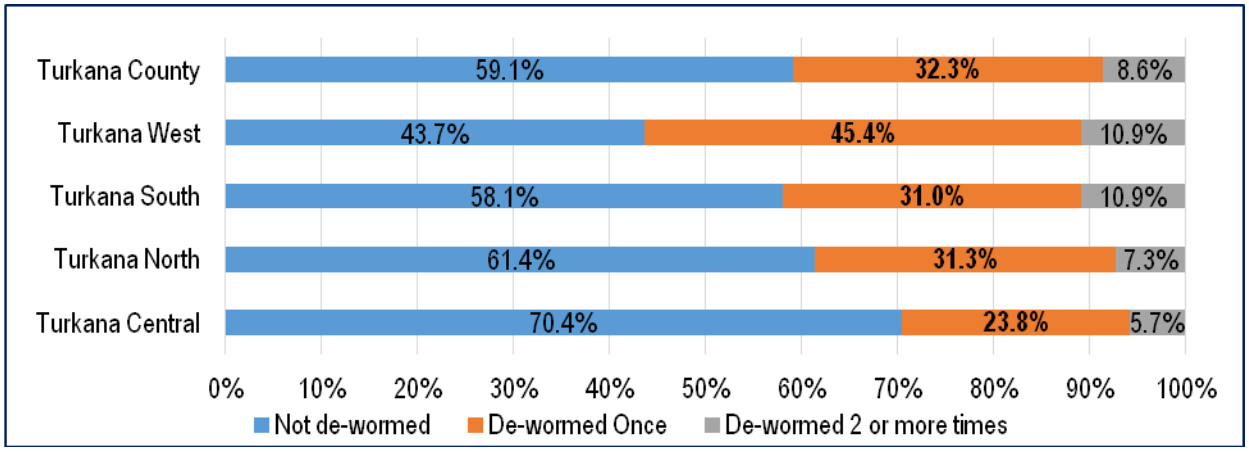


5.3 De-worming

De-worming is important in controlling parasites such as helminthes, schistosomiasis (bilharzias) and prevention of anemia. WHO recommends that children in developing countries exposed to poor sanitation and poor availability of clean safe water to be de-wormed once every 6 months.

De-worming was assessed for children aged 12-59 months old. Based on the findings, only 8.6% of this category of children were de-wormed at least twice as per the WHO recommendation.32.3% of the children were de-wormed at least once. Figure 6 shows coverage of de-worming per survey zone in Turkana County

Figure 6:De-worming coverage among children 12-59 months old



5.4 Micronutrient powder supplementation

Home fortification with micronutrient powder (MNP) has been shown to be a low-cost, feasible, and effective approach to address micronutrient deficiencies .A large-scale program distributing micronutrient powder was rolled out in Turkana County by the World Food Program in January 2015 with the Ministry of Health, Save the Children and World Vision supporting through implementation.

5.4.1 MNP program enrollment rate

The program targets children aged 6-23 months. 34.3% were enrolled in the while 65.7% were not. Table 24 below shows the MNP program enrollment rates per survey zone

Table 23: MNP program enrollment rate

	Turkana Central	Turkana North	Turkana South	Turkana West	Turkana County
N	332	359	357	307	1355
MNP enrollment	(95)28.6%	(132)36.8%	(149)41.7%	(89) 29.0%	(465)34.3%

The survey further assessed reasons why 65.7% of the eligible children were not enrolled and 82.8% reported that they were not aware of the MNP program .Table 25 gives the reasons why eligible children were not in the program.

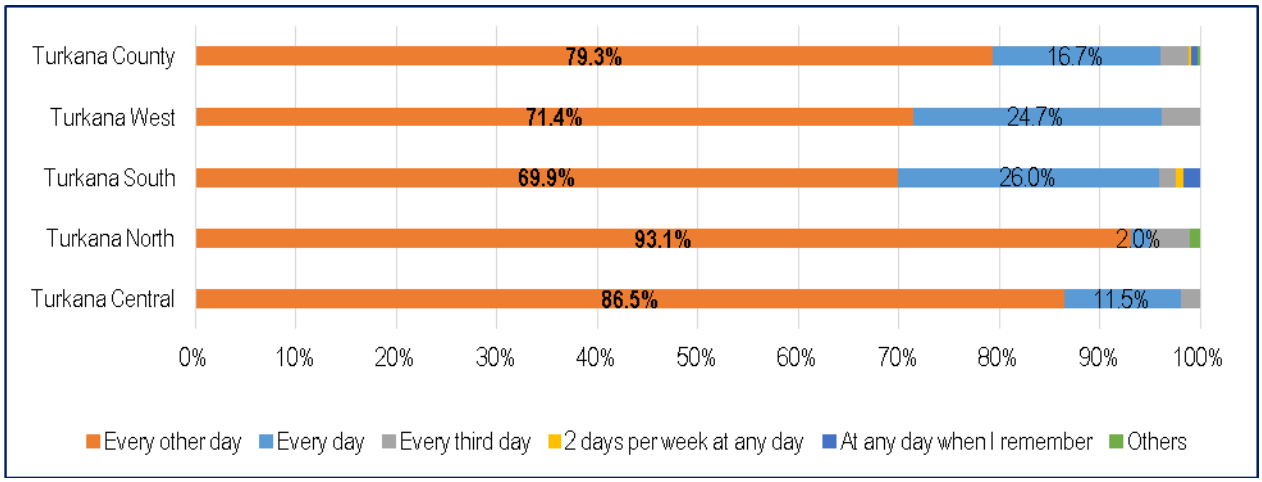
Table 24: Reasons for not being in the MNP program

Reasons for not being in the MNP program	Turkana Central	Turkana North	Turkana South	Turkana West	Turkana County
N	237	227	208	218	890
Do not know about MNPs	(204)86.1%	(182)80.2%	(152)73.1%	(199)91.3%	(737)82.8%
Discouraged from what I heard from others	(4)1.7%	(6)2.6%	(7)3.4%	(4)1.8%	(21)2.4%
the child has not fallen ill, so have not gone to the health facility	(5) 2.1%	(7)3.1%	(9)4.3%	(3)1.4%	(24)2.7%
Health facility or outreach is far	(1)0.4%	(0)0.0%	(3)1.4%	(3)1.4%	(7)0.8%
Child receiving therapeutic or supplementary foods	(12)5.1%	(17)7.5%	(28)13.5%	(5)2.3%	(62)7.0%
Other reasons	(11)4.6%	(15)6.6%	(9)4.3%	(4)1.8%	(39)4.4%

5.4.2 Consumption and adherence to MNP

The survey assessed the consumption and adherence of micronutrient powders. This was done by asking the caregiver of the eligible children if the child had been given MNP in the last 7 days and at what frequency.75.9% of the children enrolled consumed MNPs in the last 7 days and 79.3% of them adhered to the recommended alternate days. Table 26 below summarizes the MNP consumption frequency (adherence) in the last 7 days per survey zone.

Table 25: MNP consumption frequency in the last 7 days



6.0 MATERNAL NUTRITION

Pregnancy imposes a big nutrient-need load on mothers, which in the absence of adequate extra nutrients leads to utilization of body nutrient reserves leading to malnutrition.Gestational malnutrition leads to low birth weights and may ultimately culminate in poor child growth and development, thus there is an urgent need to address high rates of malnutrition among pregnant women. Poor adult nutritional status is a key indicator to household food insecurity. High figures of malnourished PLWs carry a risk of growth retardation of the fetus and consequently low birth weight.

If the situation deteriorates, both U5 children and caretakers from the same household are vulnerable to malnutrition, a common scenario during nutrition emergency levels.

6.1 Acute Malnutrition

Maternal nutrition was assessed by measuring MUAC of all women of reproductive age (15 to 49) in all sampled household. Analysis was further done for pregnant and lactating women. Based on the survey findings, 9.6% of all women of women of reproductive age were malnourished (MUAC≤ 21.0 cm) and 8.5% of pregnant and lactating women were malnourished using the same criteria. Figure 6 and 7 below show the prevalence of acute malnutrition among pregnant and lactating women and women of reproductive age (WRA) respectively.

Figure 7: Prevalence of Acute malnutrition among pregnant and lactating women

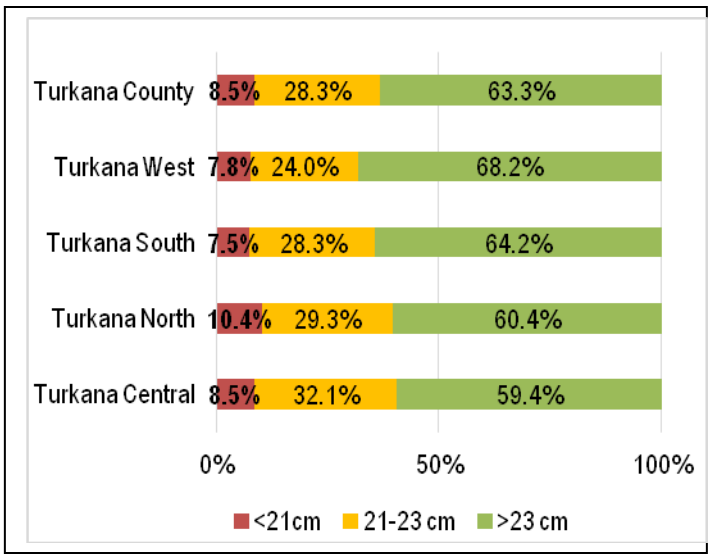
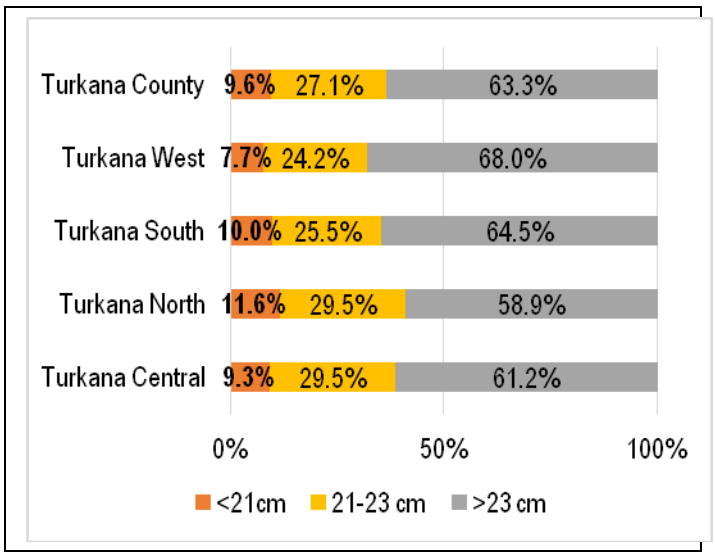


Figure 8: Prevalence of Acute Malnutrition among Women of Reproductive Age



6.2 Iron folic supplementation

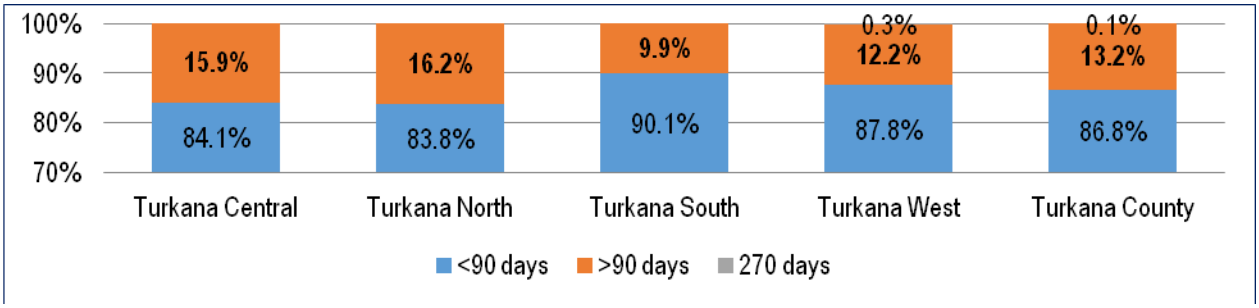
During pregnancy, women have increased need for additional iron to ensure they have sufficient iron stores to prevent iron deficiency. Iron supplementation is recommended in resource limited settings as strategy to prevent and correct iron deficiency and anemia among pregnant women

WHO recommends daily consumption of 60mg elemental iron and 0.4mg folic acid throughout the pregnancy[17].These recommendations have since been adopted by Kenya government in its 2013 policy guidelines on supplementation of iron folic acid supplementation (IFAS) during pregnancy. During the survey, iron folic supplementation was assessed by asking mothers of children below 2 years if they consumed iron folate in their most recent pregnancy.

The assessment finding showed that majority (77.9%) of women with children below 2 years had been supplemented with iron folate supplements during their most recent pregnancy.13.2% of the interviewed mothers had taken iron folate supplement in 90 days and over, with only 0.1% of the interviewed mothers had taken the supplements in the recommended 270 days, while the rest (86.8%) took the supplement in less than 90 days as indicated in figure 9 below

Figure 9: Iron-folic Acid supplements consumption in days

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



6.3 MOSQUITO NETS OWNERSHIP AND UTILISATION

Overall, 31.0% of Turkana County residents own at least one mosquito net. 53.8% of children under five, 30.1% of pregnant and lactating women and 16.2% of other families slept under mosquito net were utilizing mosquito nets

6.4 WATER SANITATION AND HYGIENE

International human rights consider access to water and sanitation as a human right.[18] This means that all individuals are entitled to have access to an essential amount of safe drinking water and to basic sanitation facilities. The human right to water entitles everyone to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic use. Water and sanitation are deeply interrelated. Sanitation is essential for the conservation and sustainable use of water resources, while access to water is required for sanitation and hygiene practices. Furthermore, the realization of other human rights, such as the right to the highest attainable standard of health, the right to food, right to education and the right to adequate housing, depends very substantially upon the implementation of the right to water and sanitation.

6.4.1 Main Source of Water

61.7% of Turkana County residents obtain their drinking water from safe sources namely; piped water, borehole, protected spring or protected shallow wells. The rest (38.3%) obtained their water for drinking from sources whose safety can be compromised hence need proper treatment before drinking. Such sources included; Unprotected dug well/ laga (20.0%), river/spring (11.0%) and unprotected shallow well (6.2%). Table 27 below, summarizes main sources of water per survey zone

Table 26: Main sources of water

	Turkana Central	Turkana North	Turkana South	Turkana West	Turkana County
	647	626	660	629	2562
Piped System/borehole/ protected spring/protected shallow well	(388)60.0%	(453)72.4%	(405)61.4%	(335)53.3%	(1581)61.7%
Unprotected shallow well	(58)9.0%	(71)11.3%	(26)3.9%	(3)0.5%	(158)6.2%
River/Spring	(81)12.5%	(20)3.2%	(110)16.7%	(71)11.3%	(282)11.0%
Unprotected dug well/ laga	(114)17.6%	(66)10.5%	(118)17.9%	(214)34.0%	(512)20.0%
Earth pan/dam	(2)0.3%	(14)2.2%	(0)0.0%	(6)1.0%	(22)0.9%
Earth pan/dam with infiltration well	(0)0.0%	(1)0.2%	(0)0.0%	(0)0.0%	(1)0.0%
Water trucking /Water vendor	(0)0.0%	(0)0.0%	(1)0.2%	(0)0.0%	(1)0.0%
Others	(4)0.6%	(1)0.2%	(0)0.0%	(0)0.0%	(5)0.2%

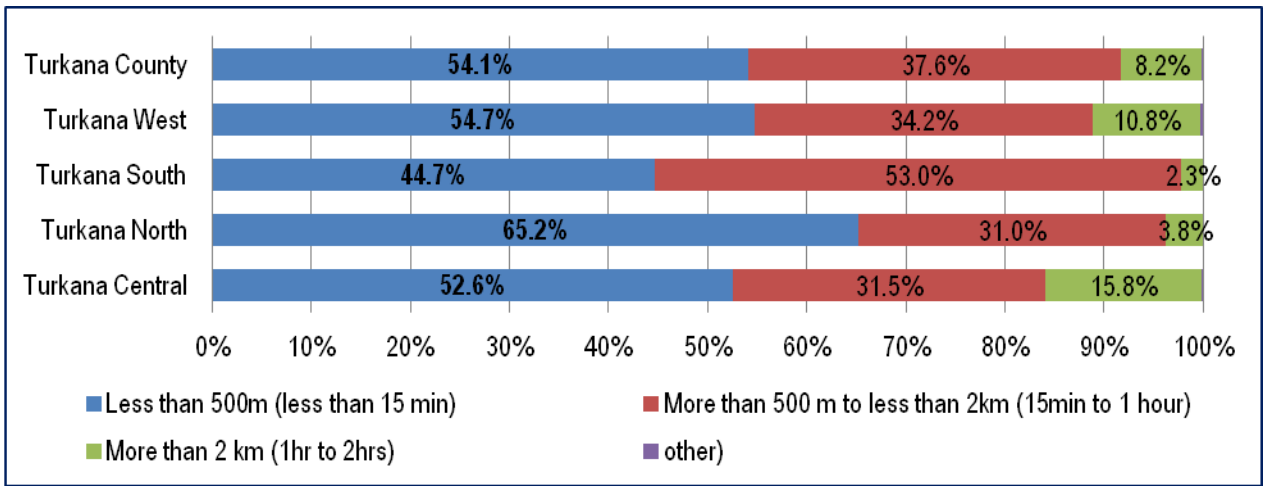
[18] The UN committee on economic, Cultural and Social rights states in its General Comment of November 2002

6.4.2 Distance to water source and queuing time

According to SPHERE handbook for minimum standards for WASH, the maximum distance from any household to the nearest water point should be 500 meters. It also gives the maximum queuing time at a water source which should be no more than 15 minutes and it should not take more than three minutes to fill a 20-litre container.

Analysis of distances to water sources indicated 54.1% of the households obtained their water from sources not more than 500m or less than 15 minutes walking distance. 37.6% took between 15 min to 1 hour or a distance of approximately 500m to 2km. The rest (8.3%) walked as far as more than 2Km (1- 2hrs) to their water sources. Figure 10 below shows distance to water sources per survey zone in Turkana County

Figure 10: Distance to water sources



29.6% of the respondents queued for water and 49.7% of them queued for less than 30 minutes, 40.4% queued for 30-60 minutes. Only 9.9% queued for more than one hour. Table 28 shows the percentage that queue and queuing time per survey zone

Table 27: Queuing time at water source

	Turkana Central	Turkana North	Turkana South	Turkana West	Turkana County
	647	626	660	629	2562
Queue for water	(133)20.6%	(153)24.4%	(266)40.3%	(206)32.8%	(758)29.6%
Queuing Time/N	133	153	266	206	758
Less than 30 min	(74)55.6%	(89)58.2%	(100)37.6%	(114)55.3%	(377)49.7%
30 to 60 min	(53)39.8%	(30)19.6%	(161)60.5%	(62)30.1%	(306)40.4%
More than 1 hour	(6)4.5%	(34)22.2%	(5)1.9%	(30)14.6%	(75)9.9%

6.4.3 Methods of drinking water treatment and storage

Majority (90.8%) of Turkana County residents do not treat their drinking water despite the fact that 38.3% of the respondents obtain their water from unsafe sources. 66.3% of those who treat drinking water use boiling method. Only 16.3% of the respondents use chemicals (Chlorine, Pur and water guard).Other methods used for water treatment included; use of pot filters (7.5%) and use of herbs (9.1%).Table 29 below shows the methods used for treating drinking water per survey zone.

Table 28: Methods used for treating drinking water

	Turkana Central	Turkana North	Turkana South	Turkana West	Turkana County
Treat drinking water	N=647	N=626	N=660	N=629	N=2562
	(58)8.9%	(86)13.7%	(46)6.9%	(62)9.9%	(252)9.8%
Water treatment methods	N=58	N=86	N=46	N=62	N=252
Boilling of water	(44)75.9%	(54)62.8%	(23)50.0%	(46)74.2%	(167)66.3%
Chemicals (Chlorine, Pur, water guard)	(14)24.1%	(9)10.5%	(5)10.9%	(13)21.0%	(41)16.3%
Traditional herbs	(0)0.0%	(5)5.8%	(18)39.1%	(0)0.0%	(23)9.1%
Pot filters	(0)0.0%	(18)20.9%	(0)0.0%	(1)1.6%	(19)7.5%
Other methods	(0)0.0%	(0)0.0%	(0)0.0%	(2)3.2%	(2)0.8%

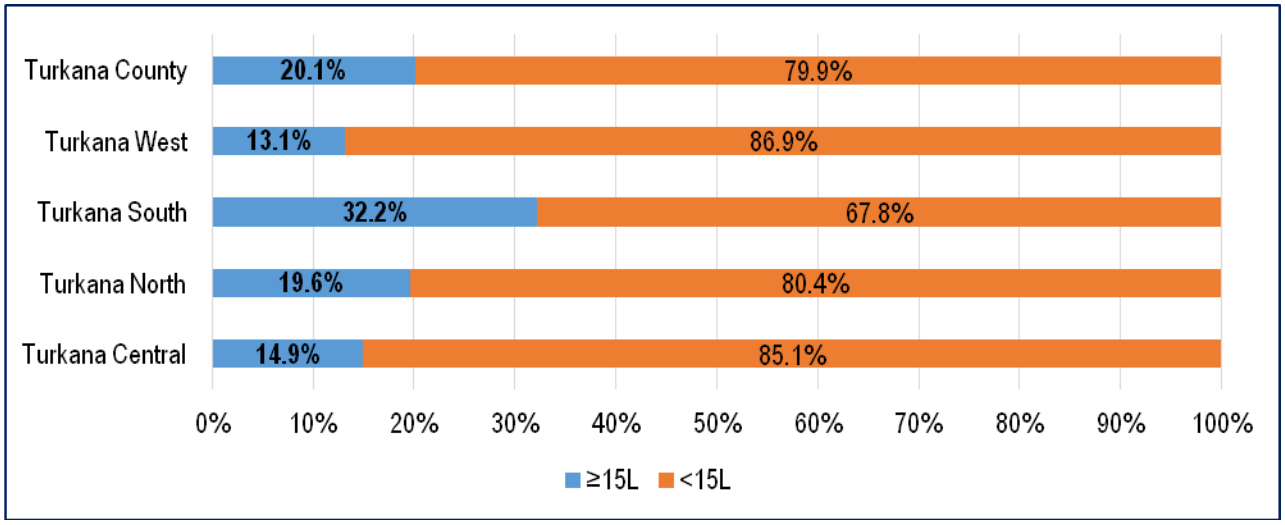
81.3% of the respondents store their drinking water properly in closed containers/jerry cans where it is less likely to have physical water contamination while 18.7% indicated that they stored their water in open containers/jerry cans exposing it to physical contamination.

6.4.4 Water utilization

According to SPHERE handbook for minimum standards for WASH, The average water use for drinking, cooking and personal hygiene in any household should be at least 15 liters per person per day

Only 20.1 % of the households used at least 15 liters of water per person per day which is the minimum average household water use for drinking cooking and personal hygiene (SPHERE Hand book 2004).Figure 11 below shows the water utilization in Liters per person per day in all the survey zone in Turkana County.

Figure 11: Water utilization (Liters/person/day



24.6% of the households pay for water. Among those who pay for water, 76.2% pay monthly and 23.8% pay per 20 liter jerrican. 64.4% of those who pay water per 20 liter jerrican pay Ksh 5 or less, 22.7% pay Ksh 10 and the rest (12.9%) pay more than Ksh 10.Table 30 shows the percentage of households paying for water and cost of water per 20 litter jerican per survey zone.

Table 29: Cost of water per 20 Liter jerrican

	Turkana Central	Turkana South	Turkana West	Turkana County
Pay for water	N=647	N=626	N=660	N=629
	(236)36.5%	(305)48.7%	(283)42.9%	(155)24.6%

Cost of water /20L	N=67	N=68	N=98	N=233
1-5	(20)29.9%	(55)80.9%	(75)76.5%	(150)64.4%
6-10	(39)58.2%	(4)5.9%	(10)10.2%	(53)22.7%
11-20	(8)11.9%	(8)11.8%	(6)6.1%	(22)9.4%
21-30	(0)0.0%	(0)0.0%	(7)7.1%	(7)3.0%
>30	(0)0.0%	(1)1.5%	(0)0.0%	(1)0.4%

Among those who pay water monthly, 64.1% pay ksh 100 or less and 35.9% pay more than Ksh 100.Table 31 below summarizes cost of water per month per survey zone

Table 30: Cost of water per month

	Turkana Central	Turkana North	Turkana South	Turkana West	Turkana County
N	169	304	214	57	744
<100Ksh	(102)60.4%	(186)61.2%	(153)71.5%	(36)63.2%	(477)64.1%
100 -200Ksh	(25)14.8%	(68)22.4%	(26)12.1%	(3)5.3%	(122)16.4%
201 - 399Ksh	(10)5.9%	(47)15.5%	(16)7.5%	(17)29.8%	(90)12.1%
400 Ksh and above	(32)18.9%	(3)1.0%	(19)8.9%	(1)1.8%	(55)7.4%

6.5 Hand washing

Hand washing with soap is the single most cost-effective intervention in preventing diarrhea diseases[19]. The four critical hand washing moments include; after visiting the toilet/latrine, before cooking, before eating and after taking children to the toilet/latrine.

Assessment of hand washing in the 4 critical times in Turkana County indicated that 86.8% of the respondents were practicing hand washing. Majority (82.2%) of them wash their hands before eating. 44.5% of the respondents wash hands after visiting toilet/latrine,42.5% wash hands before cooking and 24.7% wash hands after taking children to the toilet/latrine .Table 32 below shows hand washing at critical times per survey zone in Turkana County

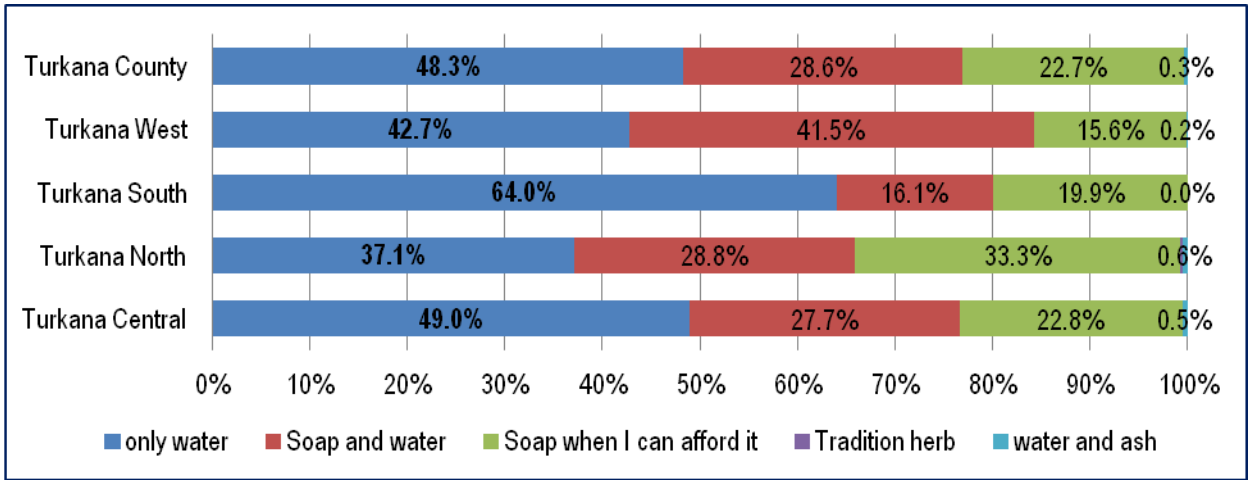
Table 31: Handwashing at critical times

	Turkana Central	Turkana North	Turkana South	Turkana West	Turkana County
	N=647	N=626	N=660	N=629	N=2562
Practice handwashing	(574)88.7%	(525)83.9%	(554)83.9%	(571)90.8%	(2224)86.8%
After visiting toilet/latrine	(249)38.5%	(317)50.6%	(258)39.1%	(315)50.1%	(1139)44.5%
Before cooking	(266)41.1%	(319)51.0%	(261)39.5%	(244)38.8%	(1090)42.5%
Before eating	(539)83.3%	(497)79.4%	(532)80.6%	(539)85.7%	(2107)82.2%
after taking children to the toilet/latrine	(120)18.5%	(233)37.2%	(119)18.0%	(160)25.4%	(632)24.7%

Majority (48.3%) of the respondents use water only for handwashing, 28.6% use water and soap and 22.7% use soap when they can afford it.Figure 12 below shows what is used for handwashing.

[19] 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.

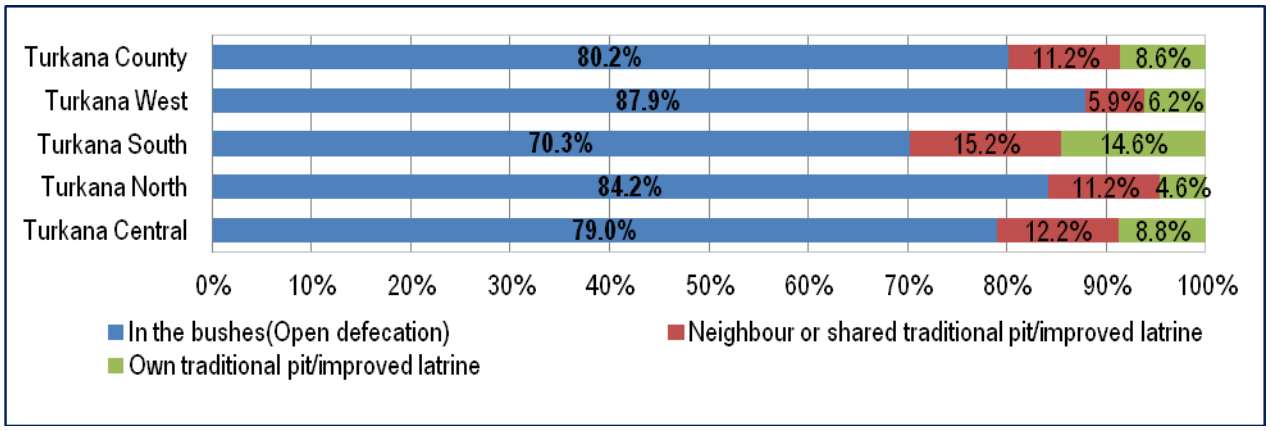
Figure 12: What is used for handwashing



6.6 Latrine ownership and utilization

80.2% of the respondents relieve themselves in the bushes (open defecation) while 19.8% use latrine (own latrine, neighbor or shared traditional pit/improved latrine). Only 8.6% of the respondents own traditional pit/improved latrine. Figure 13 below show latrine ownership and utilization per survey zone

Figure 13: Latrine ownership and utilization



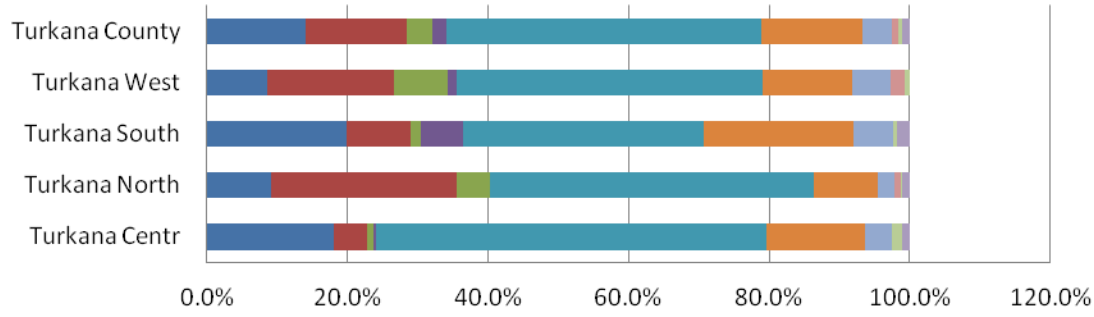
6.7 Food Security

6.7.1 Household's source of income

86% of the households had access to some form of income, with the main source income across the survey zone being petty trading (44.7%), casual labour (14.4%) and sale of livestock (14.4%). A higher proportion of households

in Turkana west have access to some form of income (91.7%) while the lowest is Turkana South (80.2%). There is no significant variation in the source of income across the survey zones. .Figure 14 shows the household's source of income.

Figure 14: Household's source of income

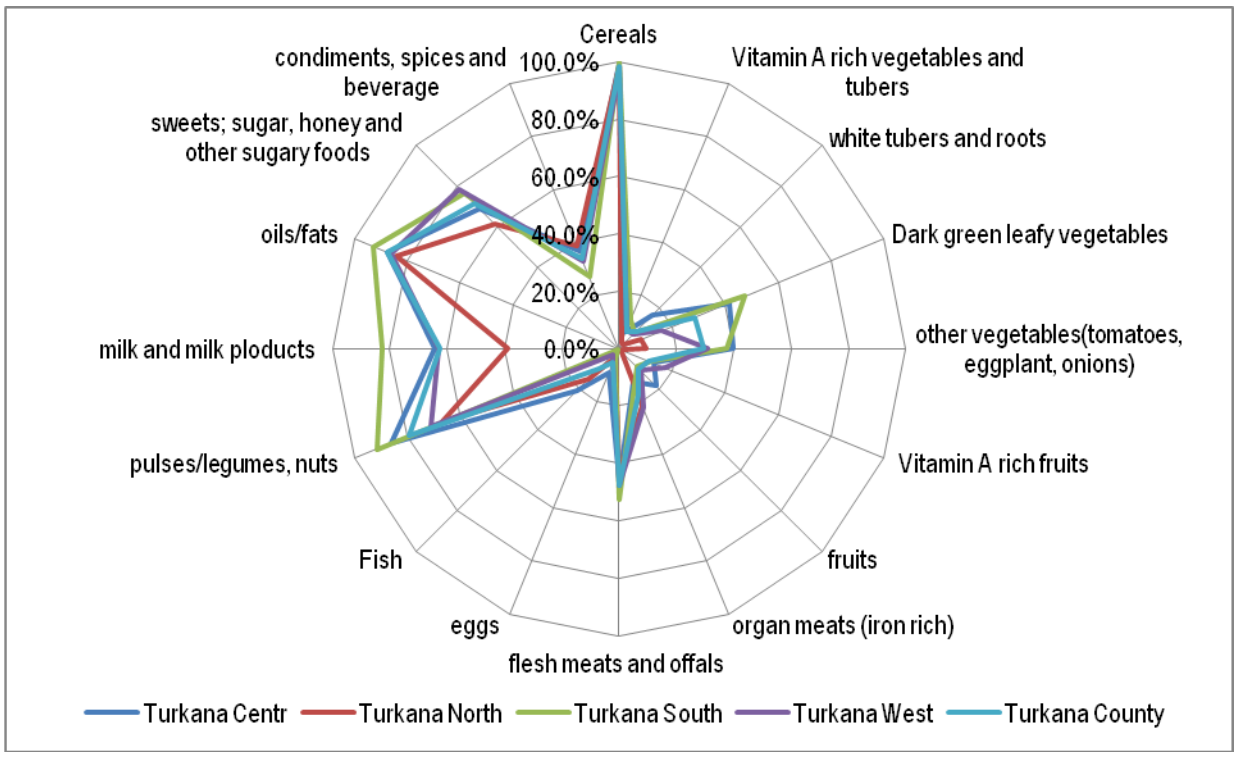


	Turkana Centr	Turkana North	Turkana South	Turkana West	Turkana County
No income	18.1%	9.1%	19.8%	8.6%	14.0%
Sale of Livestock	4.6%	26.4%	9.1%	18.0%	14.4%
Sale of livestock product	.9%	4.8%	1.5%	7.8%	3.7%
Sale of Crops	.5%	0.0%	6.1%	1.3%	2.0%
Petty Trading	55.5%	46.0%	34.2%	43.4%	44.7%
waged labour	14.1%	9.3%	21.2%	12.7%	14.4%
Permanent Job	3.7%	2.2%	5.6%	5.6%	4.3%
Sale of personal assets	.2%	1.0%	0.0%	2.1%	.8%
Remittances	1.4%	.2%	.6%	.6%	.7%
Other	1.1%	1.1%	1.8%	0.0%	1.0%

6.7.2 Household food consumption frequency

Cereals and cereal products are the main staple food consumed by 98.4% of all the households in the county. The second and third most consumed food group is fats and oils 87.6% and pulses/legumes/nuts at 79% respectively. Other foods consumed by most of the households are milk and milk products and sweets such as sugar, glucose, sweet juice and sweets. The least consumed foods included eggs at 5.4%, fish/sea food at 9.8% and fruits at 9.8%.as shown in figure 15 below.

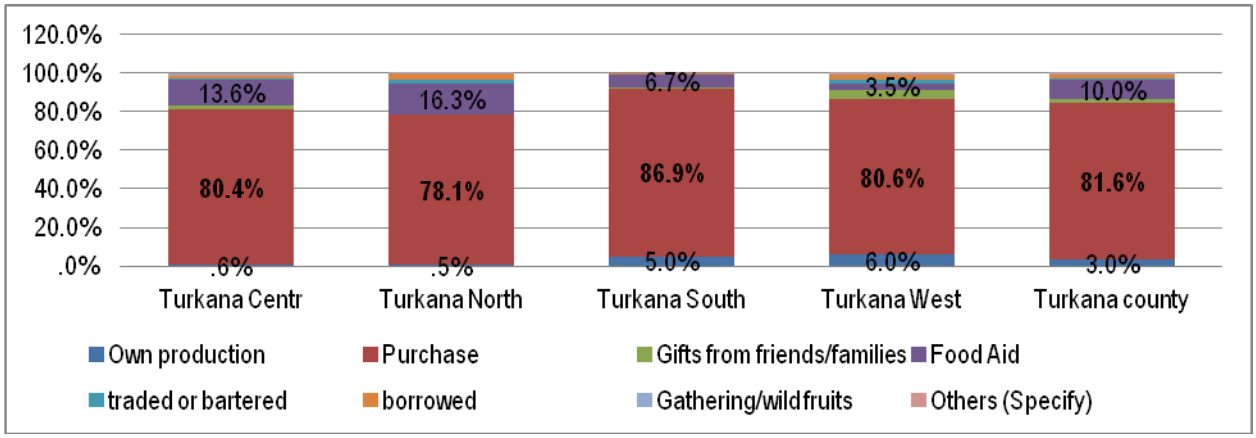
Figure 15: Food consumption frequency by households based on a 7 day recall



6.7.3 Source of dominant foods

The main source of dominant food in at least 78.1% of the households in all the survey zones was purchase, followed by food aid and own production. Food aid was also noted as a dominant source in 10% of households. 3.5% households in Turkana West depended on food aid compared to 16.3% in Turkana North. Own production averaged 3% across the survey zones with the highest observed in Turkana west at 6.0% as shown in figure 16 below.

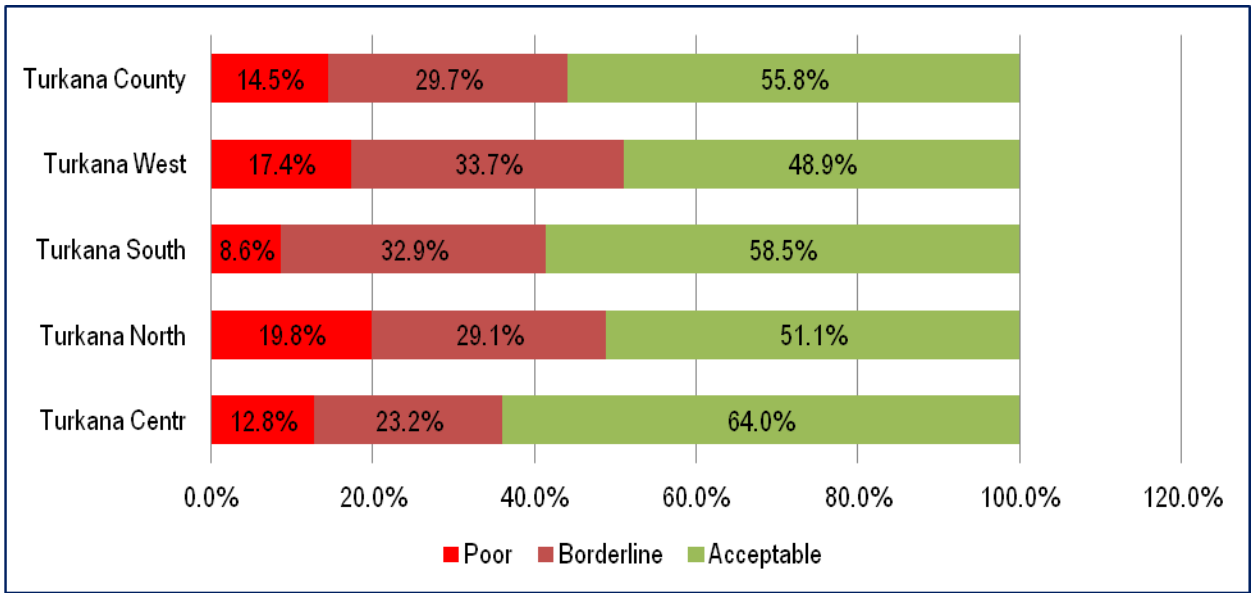
Figure 16:Source of dominant foods



6.7.4 Household food consumption score

55.8% of the households in the county reported acceptable food consumption score (> 35%) with central recording the highest at 64% and Turkana west recording the lowest at 48.9%. On average 14.5% recorded poor food consumption score across the county with the highest of 19.8% observed in Turkana North as shown in figure 17

Figure 17: Household food consumption score



6.7.5 Household Coping strategy index (Reduced CSI)

As shown in table 33 below, Turkana south had the highest CSI at 26.01 while Turkana North recorded the lowest CSI of 17.31. This indicated Turkana South households were more food insecure while Turkana North households were less food insecure. This correlates with the trend for percentage of households with poor household food consumption score as shown in figure 17 above.

When the 2015 Survey results are compared to the 2014 results improvements are noted in Turkana central and Turkana North whereas Turkana south and Turkana west there is an increase in the number of households who are food insecure.

Table 32: Mean Household Coping Strategy Index(CSI)

	Turkana Central	Turkana North	Turkana South	Turkana West	Turkana County
2015	18.28	17.31	26.01	22.60	21.06
2014	22.72	19.52	17.61	13.77	

Over 90% of HHs in all the survey zones reported facing food shortage and thus adopting coping strategies.The main adopted coping strategies in all the survey zones were; 1) consumption of less preferred and less expensive foods 2) Reduction of the number of meals taken in a day.

7.0 RECOMMENDATION

	Action	By whom	By when
1	Update and activate nutrition contingency and response plans	MoH,NDMA and nutrition	Immediately
2	Develop simplified nutrition survey packs/briefs easily synthesized for nutrition advocacy	MoH and nutrition partners	immediately
3	Scale up continuous active case finding for malnutrition for the expected caseload(U5) of 46,008 (severe10,259 and moderate 35,749) and 3,550 pregnant and lactating women in the year 2015 and referral for timely management	MoH(nutrition and community health strategy) and nutrition partners	Continuous
4	Develop and implement nutrition service delivery score card at health facilities	MoH and nutrition partners	Immediately
5	Conduct comprehensive on the job training and mentorship targeting facility health workers, community health extension workers(CHEWs) and Community health workers(CHWs)	MoH and nutrition partners	Immediately
6	Sensitize and link mother to mother support groups(MtMSGs) and households with malnourished children/pregnant and lactating women with other nutrition sensitive sectors to strengthen nutrition resilience	MoH,NDMA and nutrition partners	Continuous
7	Conduct community dialogue sessions and sensitization meetings with community leaders/key influencers on appropriate childcare practises including handwashing and latrine utilization	MoH and nutrition partners	Continuous
8	Advocate and create public awareness on micronutrient supplementation(micronutrient powders,IFA,Vitamin A),de-worming and dietary diversification	MoH and nutrition partners	Continuous
9	Continue capacity building of health care workers especially newly recruited staffs through OJT and joint support supervision on a quarterly basis	MoH and nutrition partners	Continuous
10	Scale up community led total sanitation approach to increase awareness on sanitation including latrine utilization	MoH(public health) and nutrition partners	Continuous
11	Institutionalize Vitamin A supplementation and de-woming at the Early Child Education Development(ECDE)centers and scale up during annual child health campaigns	MoH(nutrition& public health), MoE(ECDEs) and nutrition partners	Quarterly
12	Procurement and timely distribution of essential nutrition commodities to health facilities	MoH/UNICEF/WFP	Quarterly
13	Conduct quarterly nutrition data audit and advocate use of mother child health cards(MoH 216) for documentation of health services offered to the child	MoH and nutrition partners	Quarterly
15	Train county, sub county health managers, health workers on	MoH and nutrition	December

	behaviour social change communication(BSCC)/communication for development(C4D)	partners	2015
16	Develop, disseminate and implement multi-sectoral nutrition social behaviour change communication(SBCC) strategy to address	MoH and nutrition partners	February 2016
17	Train health workers on scalability models (surge) and pilot its implementation	MoH and nutrition partners	March 2016
18	Train community health volunteers(CHVs) and community health extension workers(CHEWs) on nutrition module for community health strategy for improved active case finding, referral and nutrition education	MoH(nutrition, community strategy) and nutrition partners	March 2016
19	Scale up of Baby Friendly Community Initiatives(BFCI) in 20 MNCH centres of excellence	MoH(nutrition and community health strategy) and nutrition partners	June 2016

APPENDIX 1 Turkana Malnutrition conceptual framework –June 2015

The following table summarises the main indicators used for malnutrition and causes of malnutrition in this study. The indicators and the interpretations are explained in relevant sections of the results and discussion

Malnutrition		Indicators used	Interpretation	Turkana Central	Turkana South	Turkana North	Turkana West
		Children WHZ <-2SD (GAM)	Critical/Very Critical	20.9 %	24.5%	22.9%	16.7%
		Children <12.5cm MUAC (GAM)		9.4%	10.7%	11.5%	11.1%
		Children WHZ <-3SD (SAM)	Moderate-Emergency	4.8%	6.1 %	3.8%	4.8%
		Children <11.5 cm MUAC (SAM)		1.7 %	1.7%	1.6%	2.0%
		Global Underweight	High	30.5%	38.3%	29.4%	24.0 %
		Severe Underweight		8.8%	12.0%	8.3%	7.3%
		Global Stunting	High	24.6%	32.7%	21.0%	21.7%
		Severe Stunting		6.1%	9.7%	5.4%	5.3%
		Pregnant/lactating mothers : MUAC <21.0 cm		8.5%	7.5%	10.4%	7.8%
Immediate causes							
		Vaccination Coverage	>80% OPV1;OPV3 & Measles				
		Vitamin A Supplementation					
		Children 6-11 months(at least once)	<80%	47.2%	53.9%	58.5%	57.4%
		Children 12-59 months(at least twice)	<80%	24.1%	32.9%	36.3%	19.8%
		Deworming for 12-59 months	<80%	23.8%	31.0%	31.3%	45.4%
		Zinc Supplementation	>50%	74.1%	69.2%	81.3%	85.5%
		Iron Supplementation for women at least 90 days during last pregnancy	<80%	15.9%	9.9%	16.2%	12.2%
		Morbidity-High prevalence of Malaria, ARIs and Diarrhoea	High	48.0%	30.0%	36.0%	44.0%

Underlying causes							
	Current Household Food Security	Inadequate food access	Lack of food/money to buy food last 7 days	71.9%	74.8%	89.6%	90.1%
		Mean HH Food Consumption Scores	>35	64.0%	58.8%	51.1%	48.9%
		% HH with poor food consumption scores(<21)	>10%	12.8%	8.6%	19.8%	17.4%
		% HH with no source of Income	>10%	14.3%	20.2%	13.6%	1.7%
		Main source of dominant foods consumed-Purchase	>80%	80.4%	86.9%	78.1%	80.6%
		Coping strategy Index	High	18.28	26.01	17.31	22.60
	Health/Water/ Sanitation	Access to safe water sources		60.0%	61.4%	72.4%	53.3%
		% HH treating drinking water		8.9%	6.9%	13.7%	9.9%
		% HH using>15 litres /person per day		14.9%	32.2%	19.6%	13.1%
		Caretakers hand-washing appropriately		27.7%	16.1%	28.8%	41.5%
		Access to toilet/latrine(own or neighbour)	Poor	21.0%	29.8%	15.8%	12.1%
		Open defecation	High	79.0%	70.3%	84.2%	87.9%
		Household Mosquito nets ownership		34.6%	22.9%	33.1%	33.9%
		Health services/personnel/drugs	Inadequate				
	Social Care Practices						
Basic causes							
	Economic social systems	Restricted mobility impacting on seasonal access to water and pasture and access to labour and trade					
		Lack (quantity and quality)of basic infrastructure and services: poor market linkages, increased cost of trade and limited access to functional public health, education and water systems					
	Potential Resources: Technology	Inadequate marketing support for livestock, fisheries and agro-produce. Inadequate business training and micro-finance					
	Organizational Resources	Delayed regional support for appropriate policy and practice Funds are usually not available before a crisis, when mitigation interventions					

		Are required.				
		Lack of Livelihoods-based early warning to improve the sensitivity of monitoring systems to hunger and impoverishment (shocks/coping strategies).				
	Potential Resources: People	Increasing constraints to traditional coping, leading to new vulnerable groups emerging and slow implementation of pastoral policy				
		Rural to urban population shifts, concentration and growth: increase of ex-pastoralists engaging in unsustainable livelihoods (charcoal/firewood selling and brewing). Environmental degradation ensues, threatening the viability of natural resource-based livelihoods. Brewing reduces manpower productivity				
		Shifting wealth status impacting on kin support and traditional social support (insurance)				
	Cultural social systems (inadequate/inappropriate knowledge and discriminatory attitudes limit HH access to actual resources)	Restrictive elements of development: illiteracy; negative cultural barriers; low status of women in controlling HH resources: speed of change: low capacity of community to adapt, utilization of new species to enhance dietary diversity				
	Potential Resources: Environment	Declining access to rangelands and Rangeland degradation				
		Human, livestock and crop health risks				
		More extreme climatic variations -Increased frequency of drought reducing resilience of community to shocks: pastoral livelihoods are becoming less sustainable.				
	Political	Insecurity				

8.0 APPENDICES

Appendix 1:Summary of plausibility report

	Indicator	Acceptable values/range	Central	South	North	West
1	Flagged data (% of out of range subjects)	<7.5	0(1.2% Excel)	0 (1.0% Excel)	0 (0.9% Excel)	0 (2% Excel)
2	Overall sex ratio (significant CHI square)	>0.001	2 (0.050 Good)	2 (0.083 Good)	0 (0.213 Excel)	0 (0.752 Excel)
3	Age ratio (6-29vs 30-59) Significant CHI square	>0.001	10 (0.000 Prob)	10 (0.000 Prob)	10 (0.000 Prob)	10 (0.000 Prob)
4	Dig. prevalence score-weight	<20	0 (3 Excel)	0 (4 Excel)	0 (3 Excel)	0 (4 Excel)
5	Dig. prevalence score-height	<20	0 (7 Excel)	0 (7 Excel)	0 (5 Excel)	2 (9 Good)
6	Dig. prevalence score-MUAC	<20	0 (3 Excel)	0 (6 Excel)	0 (7 Excel)	0 (5 Excel)
7	Standard Dev..height WHZ	>0.80	0 (0.98 Excel)	0 (1.06 Excel)	0 (1.01 Excel)	0 (1.05 Excel)
8	Skewness WHZ	<±0.6	1 (-0.29 Good)	0 (-0.05 Excel)	1 (0.04 Excel)	1 (-0.21 Good)
9	Kurtosis WHZ	<±0.6	1 (0.28 Good)	0 (0.06 Excel)	1 (-0.24 Good)	1 (0.20 Good)
10	**Overall Score**		**14%(Good)**	**12%(Good)**	**11%(Good)**	**14%(Good)**

Appendix 2:Turkana Central Survey Zone Sampled clusters

Geographical unit	Population size	Cluster	Geographical Unit	Population Size	Cluster
Lochor Ekuyen	3354		Kanamkemer Sub Location	14403	26,27,28
Namoruputh	4478	1	Nawoitorong Sub Location	8381	29,RC
Lorengippi	2459	2	Kerio	4254	30
Kaemanik	1207		Nakurio	7754	31
Lodwat	1384		Nadoto	8425	32,33
Lokiriama	3615	3	Nakoret	4198	34
Lochor Alomala	5839	4	Lorengelup	2173	
Atala Kamusio	3981	5	Kangagetei	1886	35
Lorugum	4737	6	Kakimat	1879	
Turkwel	8139	7,8	Kalokol	11480	36,37
Kalemunyang	8666	9,10	Kapua	3972	38
Lobei	5129	11	Namadak	4025	39
Nadapal	3286		Namukuse	6282	40
Tiya	2923	12	Lochor Aikeny	4580	RC
Napeikar	4526	13	Eliye	4792	RC
Kawalathe	1473		Naoros	4562	41
Lomeyan	10093	14,15	Lomopus	2479	42
Nachuro	5164	RC			
Kaapus	7058	16,17			

Naipa	3606	RC			
Lokipetot Arengan	4350	18			
Lodwar Township	14066	19,20,21			
Nakwamekwi	10285	22,23			
Napetet	11155	24,25			

Appendix 3:Turkana South Survey zone sampled clusters

Geographical unit	Population size	Cluster	Geographical Unit	Population Size	Cluster
Lokori	8261	1	Kalapata	8941	20,21
Kangitit	6400	2,3	Loperot	7384	22,23
Lotubae	18021	4,5,6,7	Nakalale	7184	24
Kochodin	2039	8	Lochwangikamatak	14561	25,26,27,28
Lopii	2810		Napusimoru	6220	29
Katilia	7747	9,10	Kainuk	7151	30,31
Elelea	3907	11	Kakongu	1883	
Lochakula	1566	12	Nakwamoru	9080	32,RC
Kakulit	2029		Katilu	17686	33,34,RC,35,36
Lokwamosing	2919	13	Kalomwae	3634	
Napeitom	6305	RC	Katir	1756	37
Lokichar	10820	14,15,16	Lokapel	7475	38,RC
Kapese	12632	17,18,19	Kalemngorok	8531	39,40
Kalapata	8941	20,21	Kanaodon	8232	RC,41

Appendix 4:Turkana North Survey zone sampled clusters

Geographical unit	Population size	Cluster	Geographical Unit	Population size	Cluster
Nakalale	3527	RC	Nabulukok	1171	28
Kachoda	2387	1	Napeikar	2788	RC
Natoo	1325	2	Kokuro	3843	29,30
Kataboi	4203	3,4	Sasame	2111	
Katiko	2031	5	Lokamarinyang	3414	31,32
Lomekwi	2527	6	Koyasa	298	
Riokomor	5710	7,8	Natapar	4445	33,RC
Kokiselei	3232	9,10	Karach I	4481	34,35
Lowarengak	5481	11,12	Loitanit	4237	36,37
Nachukui	6088	RC,13,14	Nalita	3675	38,39
Milima Tatu	4622	15,16	Lokolio	6859	40,41,42
Kaalem	6139	17,18,19	Loruth Esekon	2675	43
Kakelae	2508	RC	Karach II	1465	44
Kanakurudio	4491	20,21			
Kaeris	5544	22,23			
Nadunga	4274	24,25			

Kanagakipur	2407	26			
Karebur	1982	27			

Appendix 5:Turkana West Survey zone sampled clusters

Geographical unit	Population size	Cluster	Geographical Unit	Population Size	Cluster
Loritit	8527	1,2	Lopusiki	4870	26
Tulabalany	4202		Namon	2583	27
Katelemot	4007	3	Nakalale	3886	28
Lokipoto	15437	4,5,6	Losajait	2152	
Loito	5388	7,8	Kobwin	3487	RC
Nalapatui	4016		Lokichoggio	10980	RC,29
Natira	2004	9	Lokariwon	10980	30,31
Oropoi	4827	10	Songot	3620	32
Lonyoduk	2521		Lokudule	2619	33
Kalobeyei	3010	11	Lokangae	9446	34,35
Songot	1894		Lotikipi	7406	36
Loreng	3210	12	Lopiding	5208	37
Namor-Kirionok	2491		Nanam	5603	38
Lopur	38211	13,14,15,16,17,RC,18,19	Lomeyan	9447	39,40
Tarach	5936	RC	Loremiet	2700	41
Ndapal	15870	20,21,22,RC			
Namorungole	11733	23,24			
Lokore	5963	25			