TURKANA SMART NUTRITION SURVEYS

REPORT

June 2017

ACKNOWLEDGEMENT

Turkana County June 2017 SMART survey was successfully expedited with support of various partners under the stewardship of the County Department of Health (CDH). The survey provides vital information about the health, nutrition and food security status of the population in the County. The generated evidence will be integral in informing and evaluating programming in nutrition specific and sensitive sectors at the county and national levels.

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 EU under the Maternal Child Nutrition programme, UNICEF Kenya, GIZ, Save the Children, International Rescue Committee, World Vision, Feed the Children, KRCS and NDMA 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	SCNO	Sub County 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	KEPI	Kenya Expanded Programme of Immunisation
27	KFSSG	Kenya Food Security Steering Group
28	NDMA	National Drought Management Authority
29	OJT	On The Job Training
30	OPV	Oral polio Vaccine
31	ORS	Oral Rehydration Solution
32	OTP	Outpatient Therapeutic Programme
33	PLW	Pregnant and Lactating Women
34	PPS	Probability proportional to size
35	SFP	Supplementary Feeding Programme
36	SMART	Standardized Monitoring and Assessment of Relief and Transitions
37	U5	Under Five Years Old
38	UMR	Under-five Mortality Rate
39	UNICEF	United Nations Children's Fund
40	WFP	World Food Programme
41	WHO-GS	World Health Organisation Growth Standards
42	WFH	Weight for Height

TABLE OF CONTENTS

Acknowledgement ..... **ii**
List of abbreviation ..... **iii**
Table of contents ..... **iv**
List of tables ..... **vi**
List of figures ..... **vii**
CHAPTER 1 ..... **7**
1.0 Background information **7**
1.1 Food security situation 7
1.2 Humanitarian and Development partners 8
1.3 Main Objective 8
1.4 Specific Objectives 8
1.5 Timing of Turkana SMART surveys 8
1.6 Survey Area 8
CHAPTER TWO ..... **9~~8~~**
2.0 METHODOLOGY **9**
2.1 Sample size calculation 9
2.2 Sampling method 10
2.2.1 Selection of the households 11
2.2.2 Selection of children for anthropometry 11
2.2.3 Selection ofwomen for determination of nutritional status 11
2.3 Survey team 11
2.4 Survey team training 11
2.4.1 Supervisors training 11
2.4.2 Enumerators training 11
2.5 Data collection 11
2.6 Variables Measured 12
2.7 Data analysis 14
2.8 Survey Limitations 15
2.9 Ethical considerations 15
CHAPTER THREE: RESULTS AND DISCUSSIONS **16**
3.0 House hold demographics and socio economic indicators **16**
3.1 Household demographic characteristics 16
3.1.1 Number of households surveyed 16
3.1.2 Average household size, Age cohort and Sex distribution of the members in the sampled households 16
3.1.3 Residency and marital Status 17
3.1.1 Occupation of the household main provider 19

3.1.2 Education 19
4.0 CHILD hEALTH & nUTRITION 20
4.1 Anthropometry 20
4.1.1 Age and sex distribution of the sampled children 20
4.2 Prevalence of Acute Malnutrition 21
4.2.1 Prevalence of acute malnutrition based on weight-for-height z-scores (and/or edema) and by sex 22
4.2.2 Prevalence of acute malnutrition (wasting) by age based on weight-for-height Z-scores and or edema (WHO Standards 2006) 23
4.2.3 Prevalence of acute malnutrition based on MUAC 24
4.3 Prevalence of underweight 25
4.4 Prevalence of stunting 25
4.5 Indirect Coverage of Integrated Management of acute Malnutrition programme 26
4.6 Children's Morbidity and Health Seeking Behavior 26
4.6.1 Child morbidity 26
4.6.2 Therapeutic Zinc Supplementation during Watery Diarrhea Episodes 27
4.6.3 Health Seeking Behavior 28
4.7 Childhood Immunization, Vitamin A Supplementation and Deworming 29
4.7.1 Childhood Immunization 29
4.7.2 Vitamin A supplementation 30
3.7.3 De-worming 31
5.0 MATERNAL NUTRITION 32
5.1 Women physiological status 32
5.2 Acute Malnutrition 32
5.3 Iron and Folic Acid Supplementation (IFAS) 33
5.4 Mosquito Nets Ownership and Utilization 34
6.0 WATER SANITATION& HYGIENE 34
6.1 Main Source of Water 35
6.1.1 Type of Piped water 36
6.1.2 Type of Dug Well Used 36
6.2 Distance to Water Source and Queuing Time 37
6.2.1 Distance to water sources 37
6.2.2 Queuing time to water sources 37
6.3 Methods of drinking water treatment and storage 38
6.3.1 Household water treatment 38
6.3.2 Storage of Drinking water 38

6.4 Water Payment 39
6.5 Hand washing 40
6.6 Latrine Utilization 41
7.0 Food Security 42
7.1 Household income sources 42
7.2 Source of Dominant Foods 42
7.3 Foods Groups Consumed by Households 44
7.4 Household Food Consumption Score (FCS) 45
7.5 Household Consumption of Protein, Vitamin A and Heme Iron Rich Food Groups by Poor/Borderline and Acceptable Food Consumption Score Groups in Turkana County 45
7.6 Minimum Dietary Diversity -Women Score (MDD-W) 46
7.7 Household Coping Strategy Index (Reduced CSI) 47
7.8 Mean Coping Strategy Index (CSI) 48
8.0 Mortality 48
9.0 CONCLUSION 49
10.0 RECOMMENDATIONS 50
11.0 APPENDICES 52
12.0 REFERENCES: 83

LIST OF TABLES

TABLE 1: SURVEY FINDINGS SUMMARY 2
TABLE 2: RECOMMENDATIONS 4
TABLE 3: TURKANA SEASONAL CALENDAR 8
TABLE 4:TURKANA COUNTY SURVEY ZONES 8
TABLE 5:SAMPLE SIZE CALCULATION 9
TABLE 6: MORTALITY SAMPLE SIZE CALCULATION 9
TABLE 7: SUMMARY OF CLUSTERS AND HOUSEHOLDS INCLUDED IN THE SURVEY 10
TABLE 8: WFP CORPORATE FCS THRESHOLDS 13
TABLE 9: DEFINITIONS OF ACUTE MALNUTRITION USING WFH AND/OR EDEMA IN CHILDREN AGED 6–59 MONTHS 13
TABLE 10: PROPORTION OF DEATHS AMONG TOTAL POPULATION (CRM) AND CHILDREN UNDER 5 YEARS (U5MR) 14
TABLE 11:DEFINITION OF BOUNDARIES FOR EXCLUSION 14
TABLE 12: NUMBER OF HOUSEHOLDS SURVEYED 16
TABLE 13: AGE COHORT DISTRIBUTION 16
TABLE 14: SEX DISTRIBUTION FOR THE VARIOUS AGE COHORTS 16
TABLE 15: RESIDENCY 17
TABLE 16: CHILDREN MIGRATION 18
TABLE 17: REASONS FOR CHILDREN MIGRATION 18
TABLE 18: SUMMARY OF CARETAKERS' MARITAL STATUS 18
TABLE 2019: EDUCATION LEVELS 19
TABLE 20:PREVALENCEOF MALNUTRITION BASED ON MUAC PER SURVEY 24
TABLE 21: PREVALENCE OF UNDERWEIGHT 25
TABLE 22:PREVALENCE OF STUNTING 25
TABLE 23: CHILDREN ILL 26

TABLE 24:PREVALENCE OF CHILD MORBIDITY 2 WEEKS PRIOR TO THE SURVEY 27
TABLE 25: THOSE WHO SOUGHT HEALTH ASSISTANCE 28
TABLE 26: FIRST POINT OF SEEKING HEALTH ASSISTANCE 28
TABLE 27: CHILD BCG IMMUNIZATION COVERAGE 29
TABLE 28: CHILD OPV 1 COVERAGE 29
TABLE 29: OPV 3 COVERAGE 30
TABLE 30: CHILD MEASLES VACCINATION COVERAGE AT 9 MONTHS 30
TABLE 31: CHILD MEASLES VACCINATION COVERAGE AT 18 MONTHS 30
TABLE 32:DE-WORMING COVERAGE AMONG CHILDREN 12-59 MONTHS OLD 32
TABLE 33: WOMEN PHYSIOLOGICAL STATUS 32
TABLE 34: NUTRITION STATUS OF WOMEN OF REPRODUCTIVE AGE 33
TABLE 35: NUTRITION STATUS OF PREGNANT AND LACTATING WOMEN 33
TABLE 36: CARETAKERS WITH CHILDREN AGED 24 MONTHS AND BELOW WHO WERE SUPPLEMENTED WITH IRON FOLIC ACID IN THEIR LAST PREGNANCY 33
TABLE 37:NUMBER OF DAYS CARETAKERS WITH CHILDREN AGED 24 MONTHS AND BELOW CONSUMED IFAS IN THEIR LAST PREGNANCY 34
TABLE 38:MOSQUITO NETS OWNERSHIP 34
TABLE 39: MAIN CURRENT SOURCES OF WATER 35
TABLE 40: TYPE OF PIPED WATER 36
TABLE 41: TYPE OF DUG WELL USED 36
TABLE 42: DISTANCE TO WATER SOURCES 37
TABLE 43: PROPORTION OF HOUSEHOLDS QUEUING FOR WATER 37
TABLE 44: QUEUING TIME AT WATER SOURCE 37
TABLE 45: DRINKING WATER TREATMENT 38
TABLE 46: METHODS USED FOR TREATING DRINKING WATER 38
TABLE 47: STORAGE OF DRINKING WATER 38
TABLE 48: PAYMENT FOR WATER 39
TABLE 49: DOMESTIC WATER PAYMENT MODE 39
TABLE 50: COST OF WATER PER 20 LITER JERRICAN 39
TABLE 51: COST OF WATER PER MONTH 39
TABLE 52: AWARENESS OF HAND WASHING PRACTICES 40
TABLE 53: HANDWASHING AT CRITICAL TIMES 40
TABLE 54: HANDWASHING AT ALL THE FOUR CRITICAL TIMES 41
TABLE 55: WHAT IS USED FOR HANDWASHING 41
TABLE 56: LATRINE OWNERSHIP AND UTILIZATION 42
TABLE 57: HOUSEHOLD'S SOURCE OF INCOME 42
TABLE 58: SOURCE OF DOMINANT FOODS 43
TABLE 59: CRUDE MORTALITY RATE 48
TABLE 61: RECOMMENDATIONS 50

LIST OF FIGURES

FIGURE 1: MAP OF TURKANA COUNTY 7
FIGURE 2: TRENDS OF GLOBAL ACUTE MALNUTRITION IN TURKANA COUNTY (2010-2017) 22
FIGURE 3: INDIRECT COVERAGE OF IMAM PROGRAMME 26
FIGURE 4: THERAPEUTIC ZINC SUPPLEMENTATION 28
FIGURE 5: VITAMIN A SUPPLEMENTATION COVERAGE 31
FIGURE 6: PATHWAY TO REDUCTION OF STUNTING 35

Field Code Changed

FIGURE 7: FOOD GROUPS CONSUMED BY HOUSEHOLDS FROM 24 HOUR RECALL 44
FIGURE 8: HOUSEHOLD FOOD CONSUMPTION SCORE 45
FIGURE 9: HOUSEHOLD CONSUMPTION OF PROTEIN, VITAMIN A AND HEME IRON RICH FOOD GROUPS BY POOR/BORDERLINE AND ACCEPTABLE FOOD CONSUMPTION SCORE GROUPS 46
FIGURE 10: MINIMUM DIETARY DIVERSITY -WOMEN SCORE 47
FIGURE 11: PROPORTION OF HOUSEHOLDS EMPLOYING VARIOUS COPING STRATEGIES 47
FIGURE 12: MEAN COPING STRATEGY INDEX 48

LIST OF APPENDICES

APPENDIX 1:IPC FOR ACUTE MALNUTRITION MAPS 52
APPENDIX 2:SUMMARY OF PLAUSIBILITY REPORT 52
APPENDIX 3: MEAN Z-SCORES, DESIGN EFFECTS AND EXCLUDED SUBJECTS 53
APPENDIX 4: SAMPLED CLUSTERS 53
APPENDIX 5: CALENDER OF EVENTS JUNE 2017 57
APPENDIX 6: MAP OF HOT SPOTS 6059
APPENDIX 7: IDENTIFIED HOT SPOT CLUSTERS 60
APPENDIX 8: NUTRITION SMART SURVEY QUESTIONNAIRE 61
APPENDIX 9: MORTALITY QUESTIONNAIRES 8079

EXECUTIVE SUMMARY

Turkana County department of health in collaboration with nutrition partners (UNICEF GIZ, SCI, APHIA Timiza, IRC, KRCS, Feed the Children, WVK,) successfully conducted four independent SMART surveys concurrently in June 2017 covering the entire county. All the livelihood zones in the county (pastoral, agro-pastoral and formal employment/business/petty trade) were covered. The survey zones included Turkana Central (Central and Loima sub counties), Turkana North (North and Kibish sub counties), Turkana South (South and East sub counties) and Turkana West (West Sub County).

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

The specific objectives of the survey were:

1. To determine the prevalence of acute malnutrition among under five year old children, women of reproductive age.
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 childhood illnesses;
6. To collect information on possible underlying causes of malnutrition such as household food security, water, sanitation, and hygiene practices.
7. To assess availability of fortified food products among households
8. To estimate the crude and under five mortality rate

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 (July 9 , 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 Open Data Kit (ODK) collect installed in android tablets was used to collect data. The data was uploaded in ODK aggregate servers (courtesy of Save the Children) from the tablets and downloaded daily for plausibility checks and at the end of the survey for data analysis. The data collection teams were provided with daily feedback on the quality of data collected the previous day .Table 1 below shows 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)-2017	N=640	N=625	N-560	512	N=2312
Wasting (WHO 2006)-2016	n=720	n=661	n=831	n=567	n=2779
Global Acute Malnutrition (GAM)-June 2017	**31.4 % (27.5 - 35.6**	**34.1 % (30.1 - 38.3)**	**37.0 % (32.3 - 41.9)**	**23.4 % (18.7 - 28.9**	**31.0% (28.7-33.3)**
Global Acute Malnutrition (GAM)-June 2016	**24.5% (20.2-29.4)**	**23.4% (19.4-28.1)**	**30.3% (26.7-34.1)**	**14.4% (11.1-18.5)**	**23.3% (21.1 – 25.5)**
Severe Acute Malnutrition (SAM)-June 2017	**8.0 % (5.8 - 10.8)**	**8.6 % (6.4 - 11.5.**	**12.0 % (9.6 - 14.9)**	**6.4 % (4.4 - 9.4**	**8.7% (7.5-10.0)**
Severe Acute Malnutrition (SAM)-June 2016	**5.6% (4.2-7.5)**	**4.1% (2.5-6.7)**	**8.9% (7.1-11.0)**	**1.8 % (1.0-3.3)**	**2.3% (1.8-3.0)**
Mean z-scores ± SD-2017	-1.51±1.02	-1.59±1.02	-1.64±1.10	-1.33±1.06	-1.50±1.06
Mean z-scores ± SD-2016	-1.36±0.92	-1.40±0.83	-1.54±0.88	-1.03±0.93	-1.27±1.03
Design Effect -2017	1.19	1.15	1.36	1.81	
Design Effect -2016	2.0	1.47	1.23	1.49	1.9
Underweight (WHO 2006)	**n=643**	**n=620**	**n= 566**	**n=520**	**n=2328**
Prevalence of global underweight-June 2017	**39.8 %** (34.8 - 45.0 95% C.I.)	**40.8 % (35.7 - 46.1 95% C.I.)**	**43.6 % (38.6 - 48.9 95% C.I.)**	**32.5 % (27.3 - 38.2 95% C.I.)**	**38.9% (35.9-45.9C.I.)**
Prevalence of global underweight-June 2016	**33.9% (29.6 – 38.4)**	**30.8% (25.6-36.5)**	**44.6% (40.4 – 48.8)**	**27.7% (23.1 – 33.2)**	**34.7% (32.1-37.4)**
Prevalence of severe underweight-June 2017	**12.6 % (9.8 - 16.0 95% C.I.)**	**12.3 % (9.2 - 16.1 95% C.I.)**	**17.0 % (14.1 - 20.3 95% C.I.)**	**11.9 % (8.5 - 16.5 95% C.I.)**	**13.5% (11.9-15.4C.I.)**
Prevalence of severe underweight-June 2016	**10.0% (7.3 – 13.5)**	**9.0% (6.7-12.1)**	**17.8% (14.6-21.4)**	**6.0% (3.8– 9.5)**	**10.9% (9.5-12.4)**
Stunting (WHO 2006)-2015	**n = 633**	**n =600**	**n =562**	**n =516**	**n=2295**
Prevalence of global stunting – June 2017	**26.9 % (22.7 - 31.4)**	**27.8 % (22.9 - 33.2.)**	**29.0 % (24.6 - 33.9)**	**25.6 % (20.1 - 32.0)**	**27.1% (24.4-30.0)**
Prevalence of global stunting – June 2016	**27.2% (22.4-32.5)**	**25.1% (20.9 – 29.9)**	**33.6% (29.3-38.1)**	**25.9% (21.3-31.0)**	**28.2% (25.7-30.9)**
Prevalence of severe stunting-June 2017	**6.2 % (4.4 - 8.6)**	**8.5 % (6.0)**	**6.9 % (5.0 - 9.6)**	**6.0 % (3.6 - 9.9)**	**6.6% (5.3-8.2)**
Prevalence of severe stunting-June 2016	**8.1% (5.4-12.1)**	**10.5% (7.8-13.9)**	**10.5% (7.8-13.9)**	**6.5% (4.5 – 9.1)**	**8.0% (6.7-9.4)**
Prevalence of acute	**n=657**	**n=625**	**n=570**	**n=523**	

malnutrition by MUAC					
Severe under nutrition (< 115 mm)-June 2017	1.7 % (0.9 - 3.2 95% C.I.)	2.5 % (1.5 - 4.2 95% C.I.)	1.9 % (1.2 - 3.2 95% C.I.)	3.4 % (2.0 - 5.8 95% C.I.)	
Severe under nutrition (< 115 mm)-July 2016	**2.4% (1.3-4.2)**	**1.5% (0.8-2.8)**	**2.3% (1.2-4.4)**	**1.2% (0.5-3.3)**	
Moderate undernutrition (≥115–<125 mm)-June 2017	10.7 % (7.9 - 14.2 95% C.I.)	12.6 % (10.0 - 15.8 95% C.I.)	11.2 % (8.6 - 14.5 95% C.I.)	8.8 % (6.2 - 12.4 95% C.I.)	
Moderate undernutrition (≥115–<125 mm)-July 2016	**6.3% (4.5-8.6)**	**9.1% (6.5-12.6)**	**8.2% (6.3-12.6)**	**7.2% (4.9-10.5)**	
Global Acute Malnutrition (≤125 mm)–June 2017	12.3 % (9.4 - 16.1 95% C.I.)	15.1 % (12.0 - 18.9 95% C.I.)	13.2 % (10.4 - 16.5 95% C.I.)	12.2 % (9.0 - 16.5 95% C.I.)	
Global Acute Malnutrition (≤125 mm) –June 2016	**8.6% (6.4-11.5)**	**10.6% (7.6-14.6)**	**10.5% (8.1-13.4)**	**8.5% (5.8-12.2)**	
Maternal Malnutrition-June 2016	**n=455**	**n=455**	**n=550**	**n=412**	**n=1872**
PLW with MUAC<21 cm- June 2017	12.5%	14.7%	11.2%	8.9%	12%
PLW with MUAC<21 cm- June 2016	**9.2%**	**8.0%**	**6.5%**	**6.9%**	**7.5%**
Immunization-June 2017					
BCG vaccination	97.4 %	95.8 %	96.3 %	88.8 %	94.8 %
OPV1(Card and recall)	96.8%	84.2%	97.2%	87.3%	
OPV3 (Card and recall)	89.8%	88.4%	91.3%	78.6%	
Measles at 9 months	85.7%	86.2%	87.2%	74.2%	
Measles Vaccination at 18 months	47.7%	44.4%	35.1%	45.3%	
Indicator	**Turkana Central**	**Turkana North**	**Turkana South**	**Turkana West**	**Turkana County**
Vitamin A supplementation and de-worming-June 2017					
Children 6-59 months supplemented with vitamin A	n=467 44.8%	n=487 56.8%	n=671 64.8%	n=395 41.3%	n=2019 52%
Children 12-59 months supplemented with vitamin A at least once	n=412 46.1%	n=428 58.5%	n=580 65.2%	n=355 62.0%	n=1775 52.6%
Children 12-59 months supplemented with Vitamin A at least twice	41.5%	68.5%	43.6%	34.6%	48.4%
Children 12-59 months de-wormed at least once	30%	31.5%	35.3%	29.9%	31.7%
Children 12-59 months de-wormed at least twice	11.8%	19.6%	14.8%	7.4%	13.6%
Children 6-11 months	n=55	n=59	n=91	n=39	n=244

supplemented with Vitamin A at least once	36.8%	68.5%	43.6%	34.6%	48.4%
Child Morbidity-June 2017					
Ill in the last 2 weeks(children 6-59 months)	n=728	n=667	n=842	n=572	n=2809
	40.6 %	22.9%	44.5%	45.0 %	
Fever with chill like malaria	33.7%	54.1%	44.5%	44.9%	
ARI/Cough	64.8%	61.6%	67.3%	50.4%	
Watery diarrhoea	20.7%	30.1%	21.3%	24.6%	
Bloody diarrhoea	0.7%	2.7%	1.2%	1.3%	
Therapeutic Zinc Supplementation	n= 23	n=33	n= 44	n= 25	n= 125
	69.1%	59.1%	51.9%	37.9%	54%
Maternal Nutrition-June 2017					
Iron folate supplementation for pregnant women	n=323	n=203	n=393	n=227	n=1146
IFA supplementation for up to 90 days	80.1%	67.7%	59.1%	55.6%	66.6%
IFA supplementation for between 90 and 180days	19.9%	32.3%	40.9%	42.9%	33.1%
IFA supplementation >180 days	(0)0.0%	(0)0.0%	(0)0.0%	1.5%	0.3%
PLW with MUAC<21 cm	n=455	n=455	n=550	n=412	n=1872
	12.5%	14.7%	11.2%	8.9%	12.0%
% of WRA with MUAC <21cm	9.9%	9.0%	7.1%	5.8%	8.0%
WASH practises-June 2017					
Latrine/toilet utilization by HH	n=670	n=690	n=762	n=573	n=2695
Open defecation)	82.9%	92.6%	81.0%	87.5%	86.1%
Use latrine	14.7%	7.1%	18.3%	9.8%	12.5%
Food Security-June 2017					
Household food consumption score	625	n=605	n=651	n=575	n=2456
Poor	19.6%	35.1%	8.6%	31.4%	
Borderline	16.7%	34.4%	14.6%	26.7%	
Acceptable	63.6%	30.6%	76.8%	42.0%	
Mean household Coping Strategy Index	21.05	19.14	25.95	19.39	21.21

Table 2: Recommendations

	Action	Activity	By whom	By when
1	Update and activate nutrition contingency and response plans across all the four survey zones.	• Hold joint meeting to revise the contingency plans. • Ongoing quarterly review of the contingency plans.	MoH,NDMA and nutrition partners	Immediately
2	Scale up continuous active case finding for malnutrition for the expected caseload(U5) of 53,373 (severe 15,023 and moderate 39,350) and 5648 pregnant and lactating women in the June 2017 and referral for timely management	• Sensitize the CHVs on rapid nutrition screening and referrals. • Conduct routine screening through the existing community health units. • Conduct rapid nutrition mass screening using MUAC and WFH in the hot spot areas. • Conduct quarterly mass screening.	MoH(nutrition and community health strategy) and nutrition partners	Continuous

		• Integrate nutrition screening in the BSFP distributions.		
3	Increase access to life saving health and nutrition services through integrated outreaches for populations with limited access to these services.	• Carry out mapping of communities with limited access to health and nutrition for outreach support. • Conduct biweekly integrated health and nutrition outreaches in the in the mapped communities with limited access to health care. • Monthly monitoring of the outreaches.	MoH and nutrition partners	immediately
4	Develop simplified nutrition survey packs/briefs easily synthesized for nutrition advocacy and mobilization.	• Hold meetings with decision makers to disseminate the findings of the SMART survey and generate sector response plans.	MoH and nutrition partners	immediately
5	Develop and implement nutrition service delivery score card at health facilities	• On a quarterly basis populate the scorecard with nutrition data. • Quarterly meetings to deliberate on the output of nutrition score cards.	MoH and nutrition partners	Quarterly.
6	Conduct comprehensive on the job training and mentorship targeting facility health workers, community health extension workers(CHEWs) and Community health workers(CHWs)	• Sensitize all the HMTs, Health facility in charges and CHEWs on findings of SMART survey and rapid nutrition screening. • Train all the newly recruited nutritionists on IMAM including the SURGE model.	MoH and nutrition partners	Immediately
7	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	• Hold meetings with MtMSGs to sensitize them on the current nutrition situation and generate community led actions. • Link MtMSGs to existing livelihoods interventions.	MoH,NDMA and nutrition partners	Continuous
8	Cconduct community dialogue sessions and sensitization meetings with caregivers, community leaders/key influencers on appropriate childcare practises including micronutrient supplementation, deworming, handwashing, drinking water treatment and latrine utilization.	•Develop a brief pack for community dialogue meetings. •Integrate MIYCN messaging into BSFP distributions and outreach clinics. •Hold meetings with community leaders, communities, MtMSGs and caretakers to sensitize them on recommended child care and health & nutrition practices.	MoH and nutrition partners	Continuous
9	Advocate and create public awareness on micronutrient supplementation (micronutrient powders,IFA,Vitamin A),de-worming and dietary diversification.	• Conduct community dialogues with focus on micronutrients supplementation and deworming. • Integrate micronutrient supplementation and deworming into the integrated outreaches and nutrition calendar events. • Conduct micronutrient supplementation and deworming at the ECDs.	MoH and nutrition partners	Continuous
10	Continue capacity building of health care workers especially newly recruited staffs through OJT and joint support supervision on a quarterly basis	• Mobilize resources for training of health workers. • Conduct IMAM training for the newly recruited health care workers previously not	MoH and nutrition partners	Continuous

		trained on IMAM		
11	Scale up community led total sanitation approach to increase awareness on sanitation including latrine utilization	• Conduct Health workers and CHVs sensitisation on CLTS, • Conduct community sensitisation on CLTS. • Roll out CLTs jointly with the communities.	MoH(public health) and nutrition and WASH partners	Continuous
12	Institutionalize Vitamin A supplementation and de-worming at the Early Child Education Development(ECDE)centers and scale up during annual child health campaigns	• Sensitize ECD teachers on vitamin A supplementation and deworming. • Provide supplies and reporting tools to the ECD teachers. • Monitor on quarterly basis VAS supplementation at the ECD Centers.	MoH(nutrition& public health), MoE(ECDEs) and nutrition partners	Quarterly
13	Procurement and timely distribution of essential nutrition commodities to health facilities	• Provide health facilities with the required reporting tools. • Develop commodity consumption reports and requests.	MoH/UNICEF/WFP	Quarterly
14	Disseminate and implement multi-sectoral nutrition social behavior change communication(SBCC) strategy to address maternal and child care knowledge, attitude, behavior and practices.	• Validate and disseminate MIYCN SBCC strategy and messages. • Implement SBCC strategy through integration into the existing programme and platforms.	MoH and nutrition partners	October 2017
16	Scale up implementation of IMAM surge to 30 additional health facilities	• Scale up of IMAM surge from the current 11 pilot health facilities to an additional 30 health facilities. • Monitor the implementation of the IMAM surge in the implementing health facilities.	MoH and nutrition partners	November 2017
17	Conduct a Knowledge attitude behavior and practices assessment	• Mobilize resources to conduct the assessment. • Carry out assessment and revise the MIYCN strategy based on these findings.	MoH and nutrition partners	December 2017
18	Conduct a coverage assessment	• Mobilize resources to conduct a Semi-quantitative assessment of access and coverage. • Conduct the assessment to identify barriers and booster to access of nutrition services.	MoH,MOAW and Partners	December 2017

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[1] 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.

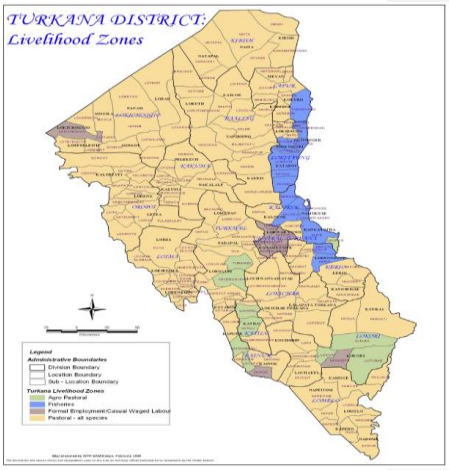


Figure 1: Map of Turkana County

1.1 Food security situation

According to January 2017 SRA, Turkana county was classified in the Stressed Phase (IPC Phase 2). However, Todonyang, Kibish and Nadapal in Turkana North sub-county and Kapedo and Lomelo in Turkana East sub-county were in Crisis Phase (IPC Phase 3). The whole county would however, be classified in the Crisis Phase without the on-going humanitarian interventions. The proportion of households with an adequate food consumption score had increased from 32 percent in December 2015 to 40 percent during the same period in 2016 implying improved food consumption at household level. The coping strategy index reduced from 25 to 19, implying that households were employing fewer, less severe consumption-based coping strategies. Although an improvement in food consumption and coping strategies had been noted, it was attributed to the sustained humanitarian assistance coupled with employing of emergency livelihood-based coping strategies by 41 percent of the population to meet their food gaps. The proportion of children at risk of malnutrition was stable at 19 percent from October through to December 2016. The prevalence of the global acute malnutrition (GAM) was stable at 23 percent though remaining at serious levels according to World Health Organization standards compared to 21 percent in 2015.

There was no exact onset of the rains in the county as the amounts received in all dekads of the season were below 10 mm. Normally, the onset is in the first dekad of October. Generally, most parts of the county received between 25- 75 percent of their normal rainfall. The temporal distribution was poor as most rains were received in October and November with December recording almost nil rainfall. Cessation was early in the third dekad of November compared with the third dekad of December normally (SRA 2017,Report)

[1]Kenya National Bureau of Statistics (KNBS) 2009 Census Report

1.2 Humanitarian and Development partners

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

1.3 Main Objective

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

1.4 Specific Objectives

1. To determine the prevalence of acute malnutrition among under five year old children, women of reproductive age.
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 childhood illnesses;
6. To collect information on possible underlying causes of malnutrition such as household food security, water, sanitation, and hygiene practices.
7. To assess availability of fortified food products among households
8. To estimate the crude and under five mortality rate

1.5 Timing of Turkana SMART surveys

The surveys were conducted in June 2017 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 3: 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 4: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

The SMART Method was used to conduct the survey in planning, training, data entry and analysis. Other data sets collected concurrently included data on Water Sanitation and Hygiene (WASH) and Food security and livelihood (FSL),Mortality and Causes.The entire exercise was done in consideration with all guidelines as stipulated by the MoH at county and national level. The survey methodology was presented to the County Steering Group (CSG) and National Nutrition Information Working Group (NIWG) for validation before commencement of data collection.

2.1 Sample size calculation

The Sample size was determined using ENA for SMART software (9thJuly 2015). The table below outlines factors considered when determining the sample size calculation

Table 5:Sample size calculation

	Central	North	South	West	Rationale
Estimated prevalence of GAM	25.9%	30.7%	22.9%	20.2%	NDMA May 2017 bulletin indicate an alert situation in all zones with a worsening trend in across the county, thus upper confidence level was used.
±Desired precision	5%	5%	5%	5%	Limits of CI doesn't influence decision making/control quality hence reduce bias and previous survey values
Design effect	[2]1.6	[3]1.5	[4]1.6	[5]1.5	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	614	609	674	501	
Children to be included	494	490	542	403	
Number of clusters	41	41	45	34	

Table 6: Mortality sample size calculation

Parameter	TC	TS	TN	TW	Rationale
Estimated death rate per 10,000 per day	0.36	0.36	0.36	0.36	Based on Sub Saharan Africa Region estimated death rates (UNICEF SOWC 2012)

[2]Previous surveys values
[3]Rule of thumb/Slight cluster variations and previous survey values
[4]Due to the slight differences in the means of livelihood
[5]Based on the heterogeneity of the villages(clusters) and previous survey values

Desired precision	0.3	0.3	0.3	0.3	SMART -with death rates less than 1.0 deaths/10,000/day, a precision of ±0.3 is appropriate.
Design effect	1.5	1.5	1.5	1.5	Design effect of 1.5 is generally acceptable.
Recall period in days	120	120	120	120	Recall period based on 3 weeks (20th February to 20th June 2017) after DP`s county wide tour on 1st & 2nd February 2017.
Average HH size	6.0	6.0	6.0	6.0	Based on KNBS census 2010 and previous SMART survey results
Percent N/Response	2.0%	2.0%	2.0%	2.0%	Based on previous survey.
Total No of HH to be surveyed	356	356	356	356	Based on ENA calculator
No. HHs per day	12	12	12	12	Skip Logic: Administer Mortality Qst in first 4 HHs and skip every 5th household selected for Anthro.
Population to be included	2091	2091	2091	2091	

Table 7: Summary of clusters and Households included in the survey

Survey Zone	No of HH	No of Children	No. of Clusters	No. HH / day/team	Mortality Questionnaire
Turkana Central/Loima	639	514	43	15	12
Turkana South/East	587	473	40	15	12
Turkana North	664	534	45	15	12
Turkana West	503	404	34	15	12

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 (9thJuly 2015 version).The second stage sampling involved segmentation of the sampled sub locations using the estimated populations provided 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 households in the village provided by the village elder. Taking into account the time spent on travelling to each household, introductions and breaks, 15 households were sampled per cluster for the anthropometric and 12 households for the mortality survey per cluster.Table6 shows a summary of the actual number of sampled clusters, households and children per survey zone

The definition of a household was a shelter or more whose resident sate 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 between6-59months of age staying in the selected household were included in the sample .The respondent was the primary caregiver 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 ofwomen for determination of nutritional status

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

2.3 Survey team

The survey was coordinated by the 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)/ UNICEF. Five teams in each survey zone undertook the survey. Each team comprised of two enumerators and one team leader.

2.4 Survey team training

2.4.1 Supervisors training

The survey core team [from Health Management Team (HMT) and nutrition partners]was sensitized on supervisor’s module for SMART for a day. The training was supported by 1 UNICEF technical advisor and representatives from nutrition implementing partners.

2.4.2 Enumerators training

A five-days training 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 administerthequestionnaireandrecordresponseswereconducted.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 7 -9days.survey zones coordinators with support from implementing partners’ officers supervised the teams throughout the data collection period. Teams administered the standardized questionnaire to the mother or primary caregiver. Each survey team explained the purpose of the survey and issues of confidentiality and obtained verbal consent before proceeding with the interview. The teams used ODK questionnaire in tablets to record the responses. The data was uploaded to Save the Children servers at the end of each day. Anthropometry data was downloaded daily, reviewed/analyzed for plausibility and feedback provided to the teams. Feedback was provided through use of daily customized scorecards.

2.6 Variables Measured

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

Weight: Children were measured using a digital weighing scale

Height: Recumbent length was taken for children less than 87cm or less than 2 years of age while height measured for those greater or equal to 87cmormorethan2 years of age.

MUAC: Mid Upper Arm Circumference (MUAC) was measured on the left arm, at the middle point between the elbow and the shoulder, while the arm was relaxed and hanging by the body's side. MUAC was measured to the nearest Cm. MUAC measurements were taken for children 6-59months of age and for women in the reproductive age (1545yearsof 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 allchildren6-59months, information on BCG, OPV1, OPV3 and measles vaccinations status was collected using health cards and recall from caregivers. When estimating measles coverage, only children9monthsofageorolderweretakenintoconsideration as they are the ones who were eligible for the vaccination.

Vitamin A supplementation status: For all children6-59monthsofage, information on Vitamin A supplementation in the6monthspriortothesurveydatewascollectedusingchildhealthand immunization campaign cards and recall from caregivers.

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

De-worming status: Information was solicited from the caregivers as towhetherchildren12-59 months of age had received de-worming tablets or not in the previous one year, .This information was verified by health care where available.

Food security status of the households: Food consumption score, Minimum dietary diversity score women source of predominant foods and coping strategies data was collected.

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

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

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

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

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

Table 8: WFP corporate FCS thresholds

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

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

1. eating less-preferred foods (1.0),
2. borrowing food/money from friends and relatives (2.0),
3. limiting portions at 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 children under five years

Table 9: 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

Mortality Indices

The crude mortality rate (CMR) was determined for the entire population surveyed for a given recall period of 120 days (20th February to 20th June 2017). The CMR using the current census method was calculated as follows[6]:

$$\text{CMR} = \frac{10{,}000 \text{ people}}{\text{Number of recall days}} \times \frac{\text{number of deaths during recall}}{\text{number of current residents}} = \text{Deaths/10,000/day}$$

+1/2 (No. of deaths during recall)

-1/2 (No. of births during recall)

The proportion of deaths among children under-five years of age (U5MR) was also calculated the same way using the under-five population data. The thresholds were defined as follows[7]:

Table 10: Proportion of deaths among total population (CRM) and children under 5 years (U5MR)

	Total population CMR	Under-five population U5MR
Alert level:	1/10,000 people/day	2/10,000 children/day
Emergency level:	2/10,000 people/day	4/10,000 children/day

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 and Mortality data was cleaned and analysed using ENA for SMART software (9thJuly2015). The nutritional indices were cleaned using SMART flags in the ENA for SMART software. Weighting of the survey zone results was done in order to obtain county data. Table 9 summarises other criterion that was used for exclusion.

Table 11: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.

[6] Save the Children (November 2004) "Emergency Nutrition Assessment Guidelines for field workers"
[7]The Sphere Standards, 2004

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 was 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 supplementation 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.
3. Two of the sampled clusters Lokwamusing (Turkana south/East) and Meyan (Turkana North/Kibish) could not be accessed due to insecurity .

2.9 Ethical considerations

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

CHAPTER THREE: RESULTS AND DISCUSSIONS

3.0 HOUSE HOLD DEMOGRAPHICS AND SOCIO ECONOMIC INDICATORS

3.1 Household demographic characteristics

3.1.1 Number of households surveyed

In summary 2,393 households were surveyed across Turkana county. There was a non-response rate of 0.8% in Turkana North this is because of one cluster (Meyan) was left un-complete due to a rowdy village member. While Turkana South had a non-response rate of 1.4% since one of the sampled clusters, (Lokwamusing) could not be visited due to insecurity. However, the non-response rates were within the 2% that had been factored in during sample size calculation. All clusters in the other survey zones were surveyed as per the approved methodology.

Table 12: Number of households surveyed

	Central	North	South	West
	Count	Count	Count	Count
Total actual surveyed households	645	659	579	510
Households sampled	639	664	587	503
Non response rate	0%	0.8%	1.4%	0%

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

The average household size in the county was 4.96 and the mean number of children under five years per household was 1.12.The proportion of under-fives surveyed out of the entire household members in the survey was 22.6% as illustrated in the table below.

Table 13: Age cohort distribution

	Central		North		South		West		County	
	Count	%	Count	%	Count	%	Count	%	Count	%
n	3281		2601		3245		2760		11887	
Less than 5 years	735	22.4%	703	27.0%	660	20.3%	594	21.5%	2692	22.6%
5 years to less than 18 years	1143	34.8%	809	31.1%	1340	41.3%	978	35.4%	4270	35.9%
18 years and above (Adult)	1403	42.8%	1089	41.9%	1245	38.4%	1188	43.0%	4925	41.4%

Table 14: Sex distribution for the various age cohorts

			sex		Total
			Male	Female	n
Central	Less than 5 years	Count	363	372	735
		%	49.4%	50.6%	
	5 years to less than 18 years	Count	558	585	1143
		%	48.8%	51.2%	
	18 years and above (Adult)	Count	588	815	1403
		%	41.9%	58.1%	

North	Less than 5 years	Count	356	347	703
		%	50.6%	49.4%	
	5 years to less than 18 years	Count	397	412	809
		%	49.1%	50.9%	
	18 years and above (Adult)	Count	393	696	1089
		%	36.1%	63.9%	
South	Less than 5 years	Count	353	307	660
		%	53.5%	46.5%	
	5 years to less than 18 years	Count	677	663	1340
		%	50.5%	49.5%	
	18 years and above (Adult)	Count	554	691	1245
		%	44.5%	55.5%	
West	Less than 5 years	Count	302	292	594
		%	50.8%	49.2%	
	5 years to less than 18 years	Count	493	485	978
		%	50.4%	49.6%	
	18 years and above (Adult)	Count	488	700	1188
		%	41.1%	58.9%	
County	Less than 5 years	Count	1374	1318	2692
		%	51.0%	49.0%	
	5 years to less than 18 years	Count	2125	2145	4270
		%	49.8%	50.2%	
	18 years and above (Adult)	Count	2023	2902	4925
		%	41.1%	58.9%	

3.1.3 Residency and marital Status

Majority (98.7%) of the surveyed respondents were resident whereas 1.3% had IDP residency status in the county. Turkana West (2.9%) and North (2.3%) had the highest IDP households; this was associated with the Turkana population residing in Uganda and Todonyang areas respectively displaced early in the year.

Table 15: Residency

	Central		North		South		West		County	
	Count	%	Count	%	Count	%	Count	%	Count	%
IDP	0	0.0%	15	2.3%	1	.2%	15	2.9%	31	1.3%
Refugee	0	0.0%	0	0.0%	1	.2%	0	0.0%	1	.0%
Resident	645	100.0%	644	97.7%	577	99.7%	495	97.1%	2361	98.7%
Total	645	100.0%	659	100.0%	579	100.0%	510	100.0%	2393	100.0%

Immigrant Children in the households

The survey sought to find out if there children who had immigrated into the households and the reason behind their migration. Only 9.6% of the sampled household reported to hosting children who had in migrated

Table 16: Children migration

	Central		North		South		West		County	
Are there children who have come to live with you	Count	%	Count	%	Count	%	Count	%	Count	%
n	645		659		579		510		2393	
yes	57	8.8%	44	6.7%	86	14.9%	42	8.2%	229	9.6%
No	588	91.2%	615	93.3%	493	85.1%	468	91.8%	2164	90.4%

Reasons for Children migration

Main reasons for children migration were lack of access to food (35.8%) and death of caregiver; other reasons were school (15.7%) and abandonment by caregivers (Father/Mother).

Table 17: Reasons for Children migration

	Central		North		South		West		County	
	Count	%	Count	%	Count	%	Count	%	Count	%
n	57		44		86		42		229	
Did not have access to food	14	24.6%	20	45.5%	19	22.1%	29	69.0%	82	35.8%
Father and Mother left home	3	5.3%	10	22.7%	15	17.4%	1	2.4%	29	12.7%
Care giver died	18	31.6%	11	25.0%	24	27.9%	6	14.3%	59	25.8%
School	8	14.0%	2	4.5%	24	27.9%	2	4.8%	36	15.7%
other	14	24.6%	1	2.3%	4	4.7%	4	9.5%	23	10.0%

Among the respondents surveyed, 80 % of them were married while 12.2% widowed; Turkana central had the highest proportion of the widowed population at 16.3%.

Table 18: Summary of caretakers' marital status

	Central		North		South		West		County	
	Count	%	Count	%	Count	%	Count	%	Count	%
Married	488	75.7%	545	82.7%	470	81.2%	412	80.8%	1915	80.0%
Single	15	2.3%	30	4.6%	14	2.4%	18	3.5%	77	3.2%
Widowed	105	16.3%	64	9.7%	65	11.2%	57	11.2%	291	12.2%
separated	30	4.7%	17	2.6%	25	4.3%	20	3.9%	92	3.8%
Divorced	7	1.1%	3	.5%	5	.9%	3	.6%	18	.8%
Total	645	100.0%	659	100.0%	579	100.0%	510	100.0%	2393	100.0%

3.1.1 Occupation of the household main provider

The main occupation of the household's main provider was livestock herding (36.1%), charcoal (21.4%) and sale of firewood and petty trade (14%).Despite the livestock herding being the main occupation of households provider it was not the leading current income source for the household`s, thus the need for further study to understand the contributing factors.

Table 19: Summary of household's main provider occupation

		Livestock herding	Own farm labour	Employed (salaried)	Waged labour (Casual)	Petty trade	Merchant /trader	Firewood /charcoal	Fishing	others
Central	Count	205	4	19	87	88	14	52	57	119
	%	31.8%	.6%	2.9%	13.5%	13.6%	2.2%	8.1%	8.8%	18.4%
North	Count	338	0	10	23	48	3	208	16	13
	%	51.3%	0.0%	1.5%	3.5%	7.3%	.5%	31.6%	2.4%	2.0%
South	Count	126	67	23	94	103	11	138	1	16
	%	21.8%	11.6%	4.0%	16.2%	17.8%	1.9%	23.8%	.2%	2.8%
West	Count	195	16	11	48	97	6	114	0	23
	%	38.2%	3.1%	2.2%	9.4%	19.0%	1.2%	22.4%	0.0%	4.5%
County	Count	864	87	63	252	336	34	512	74	171
	%	36.1%	3.6%	2.6%	10.5%	14.0%	1.4%	21.4%	3.1%	7.1%

3.1.2 Education

Highest Education level for adults

In the entire county, 83.3% of the adult population had no formal education with only 8.2% and 4.1% having primary and secondary education respectively. Only 1.6% of the sampled population had tertiary education, which is basic eligibility for formal employment.

Table 2019: Education Levels

Zone		Education level					
		Pre primary	Primary	Secondary	Tertiary	None	Total
Central	**Count**	37	178	81	34	1071	1401
	%	2.6%	12.7%	5.8%	2.4%	76.4%	100.0%
North	**Count**	27	33	15	9	1004	1088
	%	2.5%	3.0%	1.4%	.8%	92.3%	100.0%
South	**Count**	55	115	72	26	976	1244
	%	4.4%	9.2%	5.8%	2.1%	78.5%	100.0%
West	**Count**	15	76	35	12	1050	1188
	%	1.3%	6.4%	2.9%	1.0%	88.4%	100.0%
County	**Count**	134	402	203	81	4101	4921
	%	2.7%	8.2%	4.1%	1.6%	83.3%	100.0%

School enrollment for age group 3 years to 18 years

In the county, 71.5% of the children aged 3-18 years in the sampled households were attending formal education. Turkana South had the highest proportion of children 3-18 years attending formal education at 82.8%, followed by North (71.4%), Central (68.8%) and West had the least at 60.2%.

Table 21: School enrollment for age group 3 years to 18 years

Zone	Central		North		South		West		Total	
School enrolment (3 -18 yrs.)	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	969	68.8%	763	71.4%	1283	82.8%	724	60.2%	3739	71.5%
No	439	31.2%	305	28.6%	267	17.2%	478	39.8%	1489	28.5%
Total	1408	100.0%	1068	100.0%	1550	100.0%	1202	100.0%	5228	100.0%

Reason for not attending school

Main reasons for not attending school reported were; family responsibility 27.1%, lack of a nearby school 25.7% and does not see value of school 19.8%.

4.0 CHILD HEALTH & NUTRITION

4.1 Anthropometry

Out of all sampled children in the County 75.1% of them had a health card, birth certificate/notification or baptism card and these were used to verify their age.Age determination for 24.9% of the children was based on recall, hence prone to recall bias. This might have affected indices with age as a variable such as stunting and underweight. Table 14below show the age verification means per survey zone.

Table 22:Summary of Children age verification means

Zone	Central		North		South		West		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Health card/Mother child booklet	586	79.7%	547	77.8%	570	86.4%	292	49.2%	1995	74.1%
Birth certificate/notification	8	1.1%	1	.1%	4	.6%	2	.3%	15	.6%
Baptism card	5	.7%	3	.4%	0	0.0%	3	.5%	11	.4%
Recall	136	18.5%	152	21.6%	86	13.0%	297	50.0%	671	24.9%
Total	735	100.0%	703	100.0%	660	100.0%	594	100.0%	2692	100.0%

4.1.1 Age and sex distribution of the sampled children

On overall there were younger children selected in the sample across all survey zones, thus the affecting equal representation among across the age cohorts. The overall sex ratio (boys: girls) was within the acceptable range of 0.8-1.2 across all the four survey zones, depicting an equal representation of the sexes thus less bias.

Table 23: Distribution of age and sex of sample

	Turkana Central n=657	Turkana North n=635	Turkana south n=570	Turkana West n=523

AGE (mo)	Total %	Ratio Boy: girl	Total %	Ratio Boy: girl	Total %	Ratio Boy: girl	Total %	Ratio Boy: girl
6-17	26.6	0.9	26.1	1.1	25.1	1.4	25.2	1.3
18-29	23.9	1.2	24.1	1.5	26.3	1.2	24.3	1.0
30-41	22.2	0.9	23.6	1.0	25.1	1.0	22.0	0.8
42-53	21.2	0.8	19.7	1.0	17.4	1.0	21.8	1.0
54-59	6.1	1.4	6.5	0.9	6.1	1.2	6.7	0.9
Total	100.0	1.0	100.0	1.1	100.0	1.1	100.0	1.0

4.2 Prevalence of Acute Malnutrition

According to the Integrated Phase Classification (IPC) for acute malnutrition**, the situation is extremely critical (*IPC Phase 5*;** GAM ≥30 percent**) in Turkana South, Central and North Survey zones. Turkana West (23.4%), showed significant deterioration (**critical Nutrition Situation ***IPC Phase 4***).

However, it is worthwhile to noteboththe2015, 2016 and 2017-point estimates of Acute Malnutrition have been on the rise over the last 3 years. These results estimate that about ***1 in 4 children is acutely malnourished***.

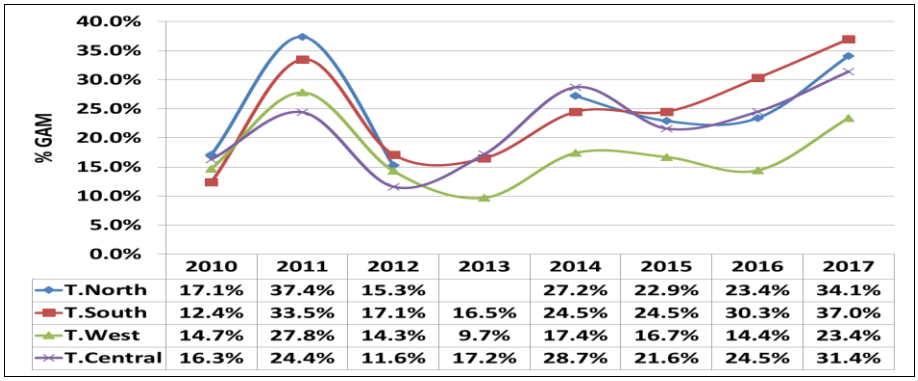
There was no edema case identified across the four surveys. The Weight for Height standard deviation of ±1.02 to ± 1.1across as all the survey zones was within the acceptable range of 0.8-1.2.The design effect ranged from 1.15 to 1.81 across all survey zones. Turkana west design effect of 1.81 indicated heterogeneity in the sample selected due to urban settlements in Kakuma and Lokichogio.

Table 24:Prevalence of malnutrition weight-for-height z-scores (WHO Standards 2006)

Turkana	Central	North	South	West	County
Wasting (WHO 2006)	n=640	n=625	n=560	n=512	n=2337
Global Acute Malnutrition (GAM) -June 2017	(201) 31.4 % (27.5 - 35.6 95% C.I.)	(213) 34.1 % (30.1 - 38.3 95% C.I.)	(207) 37.0 % (32.3 - 41.9 95% C.I.)	(120) 23.4 % (18.7 - 28.9 95% C.I.)	31.0% (28.7 - 33.3)
Global Acute Malnutrition (GAM) -June 2016	(174)24.5% (20.2- 29.4)	(154)23.4% (19.4-28.1)	(249)30.3% (26.7-34.1)	(81)14.4% (11.1-18.5)	23.3% (21.1 – 25.5)
Severe Acute Malnutrition (SAM)-June 2017	(51) 8.0 % (5.8 - 10.8 95% C.I.)	(54) 8.6 % (6.4 - 11.5 95% C.I.)	(67) 12.0 % (9.6 - 14.9 95% C.I.)	(33) 6.4 % (4.4 - 9.4 95% C.I.)	8.7% (7.5 - 10.0)
Severe Acute Malnutrition (SAM)-June 2016	(40)5.6% (4.2-7.5)	(27)4.1% (2.5-6.7)	(73)8.9% (7.1-11.0)	(10)1.8 (1.0-3.3)	5.3% (4.5-6.3)

The levels of acute malnutrition have varied in severity across the four survey zones of Turkana since the severe drought in 2011.Figure 2below illustrates the changes in acute malnutrition over time per survey cluster, this further reveals persistently high GAM rates (exceeding WHO emergency thresholds of 15%) for over the last five years.

This again highlights no obvious recovery from the persistent shocks from drought, floods, and conflict facing the community.



	2010	2011	2012	2013	2014	2015	2016	2017
T.North	17.1%	37.4%	15.3%		27.2%	22.9%	23.4%	34.1%
T.South	12.4%	33.5%	17.1%	16.5%	24.5%	24.5%	30.3%	37.0%
T.West	14.7%	27.8%	14.3%	9.7%	17.4%	16.7%	14.4%	23.4%
T.Central	16.3%	24.4%	11.6%	17.2%	28.7%	21.6%	24.5%	31.4%

Figure 2: Trends of Global Acute Malnutrition in Turkana County (2010-2017)

NB: The results for 2009, which used a different methodology (LQAS) and 2013 Turkana North (results were not validated due data quality issues) are not captured.

4.2.1 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 4 surveys zones. Table 25 below shows the prevalence of global acute malnutrition by sex per survey.

Table 25: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or edema) and by sex(95% Confidence interval)

	Sex	Central n=640 M =313,F=327	North n=625 M =328,F=297	South n= 560 M =296, F=264	West n=512 M =257,F =255	County n= 2328 M= 1176 F=1136
Prevalence of global malnutrition(<-2z-scoreand/oredema)	Boys	(107) 34.2 % (28.5 - 40.4 95% C.I.)	(126) 38.4 % (32.3 - 44.9 95% C.I.)	(122) 41.2 % (34.5 - 48.3 95% C.I.)	(69) 26.8 % (21.7 - 32.7 95% C.I.)	34.7% (31.8 - 37.7)
	Girls	(94) 28.7 % (23.9 - 34.1 95% C.I.)	(87) 29.3 % (25.0 - 34.0 95% C.I.)	(85) 32.2 % (26.4 - 38.6 95% C.I.)	(51) 20.0 % (14.3 - 27.3 95% C.I.)	27.1%(24.1 - 30.4)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	Boys	(80) 25.6 % (20.4 - 31.6 95% C.I.)	(97) 29.6 % (23.9 - 35.9 95% C.I.)	(78) 26.4 % (21.4 - 32.0 95% C.I.)	(46) 17.9 % (13.5 - 23.4 95% C.I.)	
	Girls	(70) 21.4 % (17.6 - 25.8 95% C.I.)	(62) 20.9 % (16.8 - 25.7 95% C.I.)	(62) 23.5 % (18.2 - 29.8 95% C.I.)	(41) 16.1 % (10.9 - 23.1 95% C.I.)	

Prevalence of severe malnutrition (<-3 z-score and/or oedema)	Boys	(27) 8.6 % (5.4 - 13.5 95% C.I.)	(29) 8.8 % (6.1 - 12.6 95% C.I.)	(44) 14.9 % (11.2 - 19.4 95% C.I.)	(23) 8.9 % (5.8 - 13.6 95% C.I.)	10.4% (8.8 - 12.3)
	Girls	(24) 7.3 % (5.1 - 10.5 95% C.I.)	(25) 8.4 % (5.7 - 12.3 95% C.I.)	(23) 8.7 % (6.4 - 11.8 95% C.I.)	(10) 3.9 % (2.2 - 7.0 95% C.I.)	6.9%(5.6 - 8.3)

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

As shown in table 26 below, there were older children who were malnourished across the four survey zones.

Table 26: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema

Zone	Age	Total	Severe wasting		Moderate wasting		Normal		Oedema	
	(mo)	no.	No.	%	No.	%	No.	%	No.	%
Central	**6-17**	167	18	10.8	24	14.4	125	74.9	0	0.0
	18-29	154	13	8.4	39	25.3	102	66.2	0	0.0
	30-41	145	10	6.9	36	24.8	99	68.3	0	0.0
	42-53	136	8	5.9	41	30.1	87	64.0	0	0.0
	54-59	38	2	5.3	10	26.3	26	68.4	0	0.0
	Total	640	51	8.0	150	23.4	439	68.6	0	0.0
North	**6-17**	161	15	9.3	32	19.9	114	70.8	0	0.0
	18-29	150	15	10.0	28	18.7	107	71.3	0	0.0
	30-41	149	13	8.7	47	31.5	89	59.7	0	0.0
	42-53	125	6	4.8	40	32.0	79	63.2	0	0.0
	54-59	40	5	12.5	12	30.0	23	57.5	0	0.0
	Total	625	54	8.6	159	25.4	412	65.9	0	0.0
South	**6-17**	140	18	12.9	38	27.1	84	60.0	0	0.0
	18-29	149	15	10.1	31	20.8	103	69.1	0	0.0
	30-41	140	15	10.7	32	22.9	93	66.4	0	0.0
	42-53	96	15	15.6	27	28.1	54	56.3	0	0.0
	54-59	35	4	11.4	12	34.3	19	54.3	0	0.0
	Total	560	67	12.0	140	25.0	353	63.0	0	0.0
West	**6-17**	128	11	8.6	23	18.0	94	73.4	0	0.0
	18-29	123	10	8.1	19	15.4	94	76.4	0	0.0
	30-41	113	9	8.0	14	12.4	90	79.6	0	0.0
	42-53	113	2	1.8	27	23.9	84	74.3	0	0.0
	54-59	35	1	2.9	4	11.4	30	85.7	0	0.0
	Total	512	33	6.4	87	17.0	392	76.6	0	0.0

There was no oedema case identified across all the four survey zones.

Table 27:**Distribution of acute malnutrition and oedema based on weight-for-height z-score**

	Central		North		South		West	
	<-3 z-score	**>=-3 z-score**	**<-3 z-score**	**>=-3 z-score**	**<-3 z-score**	**>=-3 z-score**	**<-3 z-score**	**>=-3 z-score**
Oedema	Maras	Kwashi	Maras	Kwash	Mars	Kwash	Maras	Kwash

present	kwash No. 0 (0.0 %)	No. 0 (0.0 %)	kwash No. 0 (0.0 %)	No. 0 (0.0 %)	Kwash No. 0 (0.0 %)	No. 0 (0.0 %)	kwash No. 0 (0.0 %)	No. 0 (0.0 %)
Oedema absent	Maras No. 58 (8.8 %)	Not SAM No. 598 (91.2 %)	Maras No. 56 (8.8 %)	Not SAM No. 578 (91.2 %)	Maras No. 73 (12.8 %)	Not SAM No. 497 (87.2 %)	Maras No. 40 (7.7 %)	Not SAM No. 482 (92.3%)

4.2.3 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[8].This means, overall significantly lower cases of malnourished children are identified using MUAC when compared to weight for height. Turkana North (15.2%) had the highest GAM rate followed by Turkana south (13.1%).While SAM was highest in Turkana west (3.4%) followed by Turkana North (2.5%).The table 29 below summarizes prevalence of malnutrition by MUAC.

Table 20:Prevalenceof Malnutrition based on MUAC per survey

Prevalence of Acute malnutrition MUAC	**Central**	**North**	**South**	**West**
2017	n=657	n=635	n=570	n=523
2016 n	n=720	n=661	n=831	n=567
Severe under nutrition (< 115 mm) -June 2016)	(17) 2.4 % (1.3 - 4.2)	(10) 1.5 % (0.8 - 2.8)	(19) 2.3 % (1.2 - 4.4)	(7) 1.2 % (0.5 - 3.3)
Severe under nutrition (< 115 mm) -June 2017)	(11) 1.7 % (0.9 - 3.2)	(16) 2.5 % (1.5 - 4.2)	(11) 1.9 % (1.2 - 3.2	(18) 3.4 % (2.0 - 5.8)
Moderate undernutrition (≥115–<125 mm)-June 2016)	(45) 6.3 % (4.5 - 8.6)	(60) 9.1 % (6.5 - 12.6)	(68) 8.2 % (6.3 - 10.6	(41) 7.2 % (4.9 - 10.5)
Moderate undernutrition (≥115–<125 mm)-June 2017)	(70) 10.7 % (7.9 - 14.2)	(80) 12.6 % (10.0 - 15.8)	(64) 11.2 % (8.6 - 14.5)	(46) 8.8 % (6.2 - 12.4)
Global Acute Malnutrition (≤125 mm)-June 2016)	62) 8.6 % (6.4 - 11.5)	(70) 10.6 % (7.6 - 14.6)	(87) 10.5 % (8.1 - 13.4	(48) 8.5 % (5.8 - 12.2)
Global Acute Malnutrition (≤125 mm)-June 2017)	(81) 12.3 % (9.4 - 16.1)	(96) 15.1 % (12.0 - 18.9)	(75) 13.2 % (10.4 - 16.5)	(64) 12.2 % (9.0 - 16.5)

[8]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

4.3 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 .In comparison to same time last year there was an increase in the prevalence of underweight in the county. Turkana south had the highest prevalence of underweight (43.6%) followed by Turkana North (40.8%) and Turkana Central (39.8%) respectively, as illustrated in the table 30 below. There is a slight increase in the prevalence of underweight in June 2016 compared to June 2015 in all the surveys zones.

Table 21: Prevalence of underweight

Underweight (WHO 2006)	Central	North	South	West	County
2017	n=643	n=620	n=566	n=520	n=2328
2016	**n=771**	**n=653**	**n=821**	**n=563**	**n=2718**
Prevalence of global underweight-June 2016)	(241) 33.9 % (29.6 - 38.4)	(201) 30.8 % (25.6 - 36.5)	366) 44.6 % (40.4 - 48.8)	(157) 27.9 % (23.1 - 33.2)	(943) 34.7% (32.1 - 37.4)
Prevalence of global underweight-June 2017)	(256) 39.8 % (34.8 - 45.0)	(253) 40.8 % (35.7 - 46.1)	(247) 43.6 % (38.6 - 48.9)	(169) 32.5 % (27.3 - 38.2	38.9%(35.9 - 41.9)
Prevalence of severe underweight-June 2016)	(71) 10.0 % (7.3 - 13.5)	(59) 9.0 % (6.7 - 12.1)	(146) 17.8 % (14.6 - 21.4)	(34) 6.0 % (3.8 - 9.5)	(297)10.9% (9.5 - 12.4)
Prevalence of severe underweight(June 2017)	(81) 12.6 % (9.8 - 16.0	76) 12.3 % (9.2 - 16.1	(96) 17.0 % (14.1 - 20.3	(62) 11.9 % (8.5 - 16.5)	13.5%(11.9 - 15.4)

4.4 Prevalence of stunting

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

Global stunting was highest in Turkana South (29.0%) followed by Turkana central (27.8%).There is a slight decline in the prevalence of stunting compared to same time last year in the county.

Table 22:Prevalence of Stunting

Stunting (WHO 2006)	Central	North	South	West	County
2017	n=633	n=598	n=562	n=516	N=2295
2016	**n=688**	**n=633**	**n=813**	**n=557**	**n=2691**
Prevalence of global stunting (<-2 z-score) June 2017	(170) 26.9 % (22.7 - 31.4)	(166) 27.8% (22.9 - 33.2)	(163) 29.0% (24.6 - 33.9)	(132) 25.6 % (20.1 - 32.0)	27.1% (24.4 - 30.0)
Prevalence of global stunting (<-2 z-score) June 2016	(187) 27.2 % (22.4 - 32.5)	(159) 25.1% (20.9 - 29.9)	(273)33.6% (29.3 -38.1)	(144) 25.9 % (21.3 - 31.0)	(763)28.2% (25.7 - 30.9)

Prevalence of severe stunting (<-3 z-score)-June 2017	(39) 6.2 % (4.4 - 8.6)	(51) 8.5 % (6.0 - 12.0)	(39) 6.9 % (5.0 - 9.6)	(31) 6.0 % (3.6 - 9.9)	6.6% (5.3 - 8.2)
Prevalence of severe stunting (<-3 z-score)-June 2016	(56) 8.1 % (5.4 - 12.1)	(41) 6.5 % (4.7 - 8.9)	(85) 10.5 % (7.8 - 13.9)	(36) 6.5 % (4.5 - 9.1)	(218)8.0% (6.7 - 9.4)

4.5 Indirect Coverage of Integrated Management of acute Malnutrition programme

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

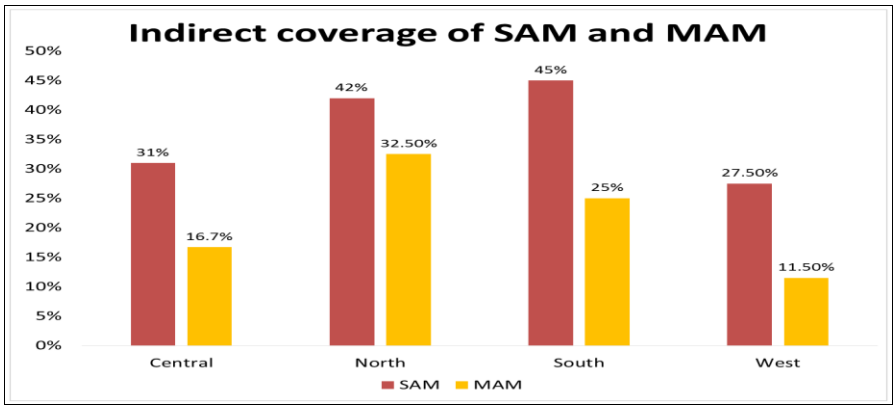


Figure 3: Indirect coverage of IMAM Programme

4.6 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 affects food intake which is also categorized as an immediate cause. It was important therefore to assess morbidity and whether it had some effect on malnutrition.

4.6.1 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.

Only 37.8% of the children 6-59 months were reported to have been ill within the past two weeks of survey in the county. Turkana North had the least prevalence of reported morbidity as shown in the table 32 below

Table 23: Children ill

Ill		Central	North	South	West	County
	N	658	637	571	525	2391
yes	**Count**	267	146	254	236	903

	%	40.6%	22.9%	44.5%	45.0%	37.8%
no	Count	391	491	317	289	1488
	%	59.4%	77.1%	55.5%	55.0%	62.2%

Among those who were sick in the county, majority (61.2%) were affected by acute respiratory infection (ARI)/Cough. Fever chills like malaria affected 43.0%, while 23.4% suffered from watery diarrhea. Traditionally studies have shown a positive correlation between child morbidity and malnutrition. Table 33 below summarizes prevalence of child morbidity.

Table 24:Prevalence of child morbidity 2 weeks prior to the survey

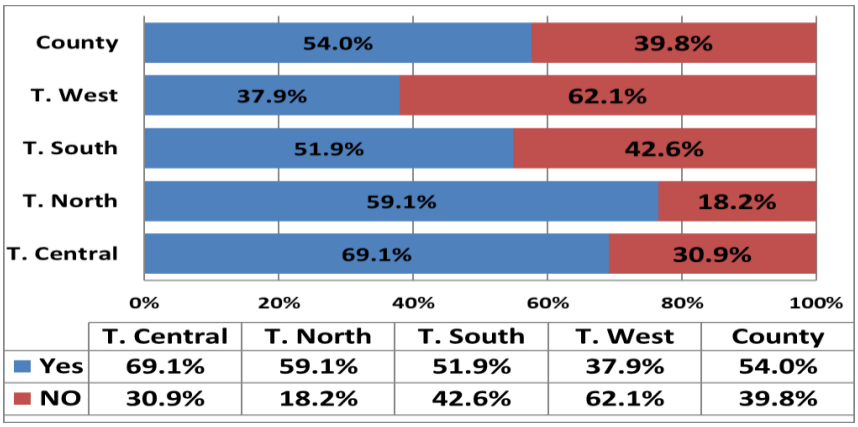
	Central		North		South		West		County	
	Count	%	Count	%	Count	%	Count	%	Count	%
N	267		146		254		236		903	
Fever-malaria	90	33.7%	79	54.1%	113	44.5%	106	44.9%	388	43.0%
ARI-Cough	173	64.8%	90	61.6%	171	67.3%	119	50.4%	553	61.2%
Watery diarrhoea	55	20.6%	44	30.1%	54	21.3%	58	24.6%	211	23.4%
Bloody diarrhoea	2	.7%	4	2.7%	3	1.2%	3	1.3%	12	1.3%
Other specify	15	5.6%	6	4.1%	18	7.1%	8	3.4%	47	5.2%

4.6.2 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[9]. 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 survey sought to establish the number of children who suffered from watery diarrhea and supplemented with zinc. The findings are illustrated in the figure below.

[9] 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.



	T. Central	T. North	T. South	T. West	County
Yes	69.1%	59.1%	51.9%	37.9%	54.0%
NO	30.9%	18.2%	42.6%	62.1%	39.8%

Figure 4: Therapeutic Zinc supplementation

4.6.3 Health Seeking Behavior

The caretakers who reported that their children had been ill during the past two weeks were asked if they sought any health assistance; in the county, 77.3% of them reported to had sought assistance.

Table 25: Those who sought health assistance

		Central	North	South	West	County
	n	267	146	254	236	903
yes	Count	204	124	203	167	698
	%	76.4%	84.9%	79.9%	70.8%	77.3%
no	Count	63	22	51	69	205
	%	23.6%	15.1%	20.1%	29.2%	22.7%

Mothers and caregivers whose children were sick in the past 2 weeks and had sought assistance were further asked where they had first sought it. Majority (81.7%) of the caretakers reported to have sought care form pubic clinics. It is worthwhile to note that Turkana North had the highest proportion that sought assistance form mobile clinics; this is in comparison with the other survey zones. Table 35 below summarizes the health seeking behavior per survey zone in Turkana County.

Table 26: First Point of seeking health assistance

	Central		North		South		West		County	
	Count	%	Count	%	Count	%	Count	%	Count	%
n	204		124		203		167		698	
Traditional healer	0	0%	6	4.8%	0	0	0	0%	6	.9%
CHW	0	0%	4	3.2%	0	0	2	1.2%	6	.9%
Private clinic	14	6.9%	2	1.6%	6	3.0%	14	8.4%	36	5.2%
Shop	2	1.0%	1	.8%	1	.5%	0	0%	4	.6%
Public clinic	173	84.8%	98	79.0%	186	91.6%	113	67.7%	570	81.7%
Mobile clinic	9	4.4%	12	9.7%	1	.5%	9	5.4%	31	4.4%

Relative/friend	0	0%	1	.8%	0	0%	2	1.2%	3	.4%
Local herbs	5	2.5%	2	1.6%	1	.5%	9	5.4%	17	2.4%
NGO/FBO	4	2.0%	20	16.1%	8	3.9%	29	17.4%	61	8.7%
Others	0	0%	0	0%	1	.5%	0	0%	1	.1%

4.7 Childhood Immunization, Vitamin A Supplementation and Deworming

4.7.1 Childhood Immunization

Kenya aims to achieve 90% under one immunization coverage by the end of second medium term plan (2013- 2017). The Kenya guideline on immunization defines a fully immunized child as one who has received all the prescribed antigens ***and at least one Vitamin A dose*** under the national immunization schedule before the first birthday. This survey assessed the coverage of 4 vaccines namely, BCG, OPV1, OPV3, and measles at 9 and 18 months. From the assessment, 94.8% of children were confirmed by scar to have been immunized by BCG[10].
Table 36 - 40 below summarizes the coverage of the assessed 4 vaccines per survey zone in Turkana County

Table 27: Child BCG immunization Coverage

		T. Central	T. North	T. South	T. West	County
	n	658	637	571	525	2391
Scar	Count	641	610	550	466	2267
	%	97.4%	95.8%	96.3%	88.8%	94.8%
No scar	Count	17	27	21	59	124
	%	2.6%	4.2%	3.7%	11.2%	5.2%

Table 28: Child OPV 1 coverage

		T. Central	T. North	T. South	T. West	County
OPV 1	**n**	658	637	571	525	2391
Yes card	**Count**	510	492	470	235	1707
	%	77.5%	77.2%	82.3%	44.8%	71.4%
Yes recall	**Count**	127	108	85	223	543
	%	19.3%	17.0%	14.9%	42.5%	22.7%
No	**Count**	16	19	13	65	113
	%	2.4%	3.0%	2.3%	12.4%	4.7%
Do not know	**Count**	5	18	3	2	28
	%	.8%	2.8%	.5%	.4%	1.2%

[10]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.

Table 29: OPV 3 Coverage

		T. Central	T. North	T. South	T. West	County
	n	658	637	571	525	2391
Yes Card	**Count**	479	458	435	205	1577
	%	72.8%	71.9%	76.2%	39.0%	66.0%
Yes Recall	**Count**	112	105	86	208	511
	%	17.0%	16.5%	15.1%	39.6%	21.4%
No	**Count**	61	48	46	111	266
	%	9.3%	7.5%	8.1%	21.1%	11.1%
Do not know	**Count**	6	26	4	1	37
	%	.9%	4.1%	.7%	.2%	1.5%

Table 30: Child measles Vaccination coverage at 9 months

		T. Central	T. North	T. South	T. West	County
	n	620	601	539	493	2253
Yes Card	Count	417	419	387	175	1398
	%	67.3%	69.7%	71.8%	35.5%	62.1%
Yes Recall	Count	114	99	83	191	487
	%	18.4%	16.5%	15.4%	38.7%	21.6%
No	Count	82	57	64	125	328
	%	13.2%	9.5%	11.9%	25.4%	14.6%
Do not know	Count	7	26	5	2	40
	%	1.1%	4.3%	.9%	.4%	1.8%

Table 31: Child measles Vaccination coverage at 18 Months

		T. Central	T. North	T. South	T. West	County
	n	485	468	422	393	1768
Yes Card	Count	171	171	113	73	528
	%	35.3%	36.5%	26.8%	18.6%	29.9%
Yes Recall	Count	60	37	35	105	237
	%	12.4%	7.9%	8.3%	26.7%	13.4%
No	Count	239	228	265	211	943
	%	49.3%	48.7%	62.8%	53.7%	53.3%
do not know	Count	15	32	9	4	60
	%	3.1%	6.8%	2.1%	1.0%	3.4%

4.7.2 Vitamin A supplementation

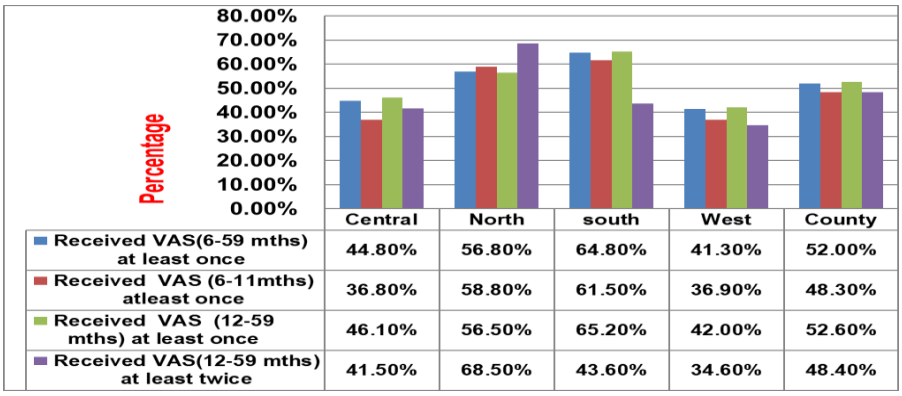
In its series on child survival, the medical journal The Lancet lists vitamin A supplementation among the key interventions achievable at a large scale that have proven potential to reduce the number of preventable child deaths each year[11]. Moreover, vitamin A supplementation is recognized as one of the most cost-effective interventions for improving child

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

survival. 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[12]. Therefore, vitamin A supplementation is critical, not only for eliminating vitamin A deficiency as a public-health problem, but also as a central element for child survival.

To assess vitamin A supplementation, parents and caregivers were probed on whether children had been supplemented, for how many times in the past one year. Reference was made to the child health card and in case the card was not available recall method was applied.

According to the survey, 48.2% of the children aged 6- 11 months were supplemented with vitamin A at least once, and only 52.0% children aged 12 to 59 months who had been at least supplemented once while only 48.4% received twice as recommended by MOH policy. The performance of vitamin A supplementation especially among children 12-59 months is poor compared to the ministry of health target of 80%. Figure 5 below shows vitamin A supplementation coverage per survey zone in Turkana County.



	Central	North	south	West	County
Received VAS(6-59 mths) at least once	44.80%	56.80%	64.80%	41.30%	52.00%
Received VAS (6-11mths) atleast once	36.80%	58.80%	61.50%	36.90%	48.30%
Received VAS (12-59 mths) at least once	46.10%	56.50%	65.20%	42.00%	52.60%
Received VAS(12-59 mths) at least twice	41.50%	68.50%	43.60%	34.60%	48.40%

Figure 5: Vitamin A supplementation coverage

Majority (75.5%) of vitamin A supplementation was done at the health facilities, 14.4% from outreaches, 8.6% from outreaches and only 1.1% from ECDE centers. This indicates the need to integrate Vitamin A supplementation into other existing points of care including ECDs and Outreaches.

3.7.3 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 13.6% of this category of children was de-wormed at least twice as per the WHO recommendations. 31.7% of the children were de-wormed at least once. This coverage is extremely low compared to the Country's target of 80%. This could be attributed to low community awareness on the importance of deworming or low access to the service, thus the need for further research to confirm this. Table 41 below shows coverage of de-worming per survey zone in Turkana County.

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

Table 32:De-worming coverage among children 12-59 months old

		T. Central	T. North	T. South	T. West	County
	n	570	550	501	461	2082
Not dewormed	Count	332	269	250	289	1140
	%	58.2%	48.9%	49.9%	62.7%	54.8%
Dewormed once	Count	171	173	177	138	659
	%	30.0%	31.5%	35.3%	29.9%	31.7%
Dewormed twice	Count	67	108	74	34	283
	%	11.8%	19.6%	14.8%	7.4%	13.6%

5.0 MATERNAL NUTRITION

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

5.1 Women physiological status

The women were asked their current physiological status where by pregnant (11.1%), lactating (47.5%) and pregnant and lactating (0.3%) respectively. The table below details the physiological status of women of reproductive age across the four survey zones.

Table 33: Women physiological status

		Central	North	South	West	County
	n	600	521	519	493	2133
Pregnant	Count	69	55	56	57	237
	%	11.5%	10.6%	10.8%	11.6%	11.1%
Lactating	Count	275	296	210	233	1014
	%	45.8%	56.8%	40.5%	47.3%	47.5%
Pregnant and Lactating	Count	0	3	1	3	7
	%	0.0%	.6%	.2%	.6%	.3%
None of the above	Count	256	167	252	200	875
	%	42.7%	32.1%	48.6%	40.6%	41.0%

5.2 Acute Malnutrition

Maternal nutrition was assessed by measuring MUAC of all women of reproductive age (15 to 49 years) in all sampled households, irrespective of their physiological status .In the county 13.0% of the women of reproductive age were found to be malnourished (MUAC<21CM) and 87.0% were well nourished (MUAC >21CM).

Table 34: Nutrition status of women of reproductive age

		Central	North	South	West	County
	n	598	521	519	491	2129
MUAC<21	Count	76	93	54	54	277
	%	12.7%	17.9%	10.4%	11.0%	13.0%
MUAC>21	Count	522	428	465	437	1852
	%	87.3%	82.1%	89.6%	89.0%	87.0%

Nutrition status of pregnant and lactating women

A further MUAC measurements analysis for those who reported to be pregnant or lactating was carried out where by.12.0 % were malnourished (MUAC<21.0CM) and 88% were well nourished.

Table 35: Nutrition status of Pregnant and lactating women

		Central	North	South	West	County
MUAC<21	Count	43	52	30	26	151
	%	12.5%	14.7%	11.2%	8.9%	12.0%
MUAC>21	Count	300	302	237	265	1104
	%	87.5%	85.3%	88.8%	91.1%	88.0%
	Count	343	354	267	291	1255

5.3 Iron and Folic Acid Supplementation (IFAS)

According to WHO, daily IFAS is recommended as part of the ante natal care to reduce the risk of low birth weight, maternal anaemia, iron deficiency and neural tube defects commonly referred to as NTDs. WHO Guidelines recommends that all Pregnant Women should receive Iron and Folic Acid Supplementation (IFAS) regardless of anaemia status in countries where anaemia is >40%,and kenya is one of them. IFA formulations are : 60mg iron /400µg folic acid should be given as a combined pill throughout pregnancy in accordance with WHO 2012 . Iron and Folic Acid Supplementation (IFAS) has been shown to reduce Low birth weight, which is primary cause of neonatal deaths. Folic Acid supplementation with 400µg reduces incidence of NTDS if taken before conception and within 28 days of pregnancy. Similarly, IFAS sustains strength during pregnancy and ensures enough blood stores in the body during and after delivery. IFAS is a component within Focused Antenatal Care (FANC).

During the survey, iron folic supplementation was assessed by asking mothers of children below 2 years if they consumed iron folate in their most recent pregnancy.

The assessment findings showed that 85.8% of women with children below 2 years across the county had been supplemented with iron folate supplements during their last pregnancy.

Table 36: Caretakers with children aged 24 months and below who were supplemented with Iron Folic acid in their last pregnancy

		Survey Area				
		Central	North	South	West	County
	n	324	287	300	261	1172
Yes	Count	296	235	269	205	1005
	%	91.4%	81.9%	89.7%	78.5%	85.8%
No	Count	27	44	23	42	136

	%	8.3%	15.3%	7.7%	16.1%	11.6%
Do not Know	Count	1	8	8	14	31
	%	.3%	2.8%	2.7%	5.4%	2.6%

Out of those that reported to have consumed IFAS tablets in the last pregnancy, they had taken for 90 days (66.6%), >90 to 180 days (33.1%) and more than 180 days (0.3%).This indicates poor utilization of IFAS and thus the need to create more demand for IFAS among pregnant women through behavior change communication approaches.

Table 37:Number of days caretakers with children aged 24 months and below consumed IFAS in their last pregnancy

		Central	North	South	West	County
	n	296	235	269	205	1005
< 90 days	Count	237	159	159	114	669
	%	80.1%	67.7%	59.1%	55.6%	66.6%
90>or equal to 180 days	Count	59	76	110	88	333
	%	19.9%	32.3%	40.9%	42.9%	33.1%
>180 days	Count	0	0	0	3	3
	%	0.0%	0.0%	0.0%	1.5%	.3%

5.4 Mosquito Nets Ownership and Utilization

Overall, 27.3% of Turkana County residents own mosquito net as illustrated in the table below

Table 38:Mosquito nets ownership

	Central		North		South		West		County	
	Count	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**
n	**645**		**659**		**579**		**510**		**2393**	
HH owns mosquito net	281	43.6%	117	17.8%	114	19.7%	141	27.6%	653	27.3%
HH does not own mosquito net	364	56.4%	542	82.2%	465	80.3%	369	72.4%	1740	72.7%

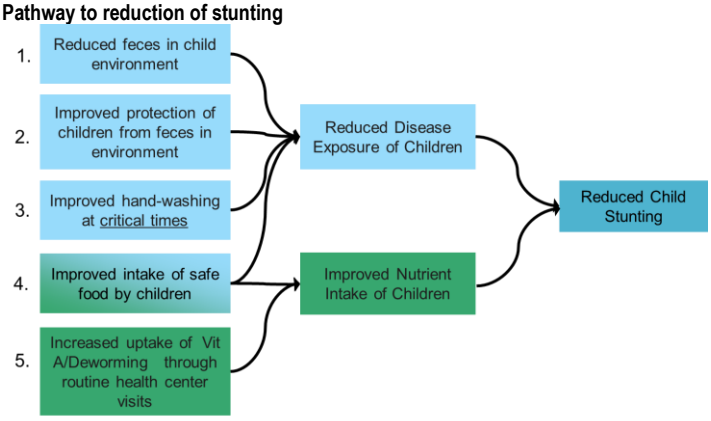
6.0 WATER SANITATION& HYGIENE

International human rights consider access to water and sanitation as a human right.[13] 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.

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

Research has shown that poor WASH indicators are linked to under nutrition and more so on High Stunting levels. Diarrhea, the leading killer of young children is closely linked to poor/inadequate WASH (Pruss-Ustun et al, 2014), which often causes undernutrition, which in turn reduces a child's resistance to subsequent infections, thus creating a vicious circle. An estimated 25% of stunting is attributable to five or more episodes of diarrhea before 24 months of age (Checkley et al, 2008). Below is a pathway to reduce stunting among children 0-2years of age showing the prominence of WASH interventions.

Figure 6: Pathway to reduction of stunting



**Conceptual framework is non-exhaustive and focused for this particular intervention.*

6.1 Main Source of Water

The respondents were asked where they were currently obtaining water for household use. In summary 29.5% and 25.2% were using boreholes and piped water systems respectively in the county, these sources are considered relatively safe sources since they are protected. Other unprotected water sources included dug well (25.2%), surface water (13.0%), water kiosk (5.4%) and spring (1.5%). It worthwhile to note that Turkana Central (19.5%), West (16.3%) and South (14.5%) had the highest proportions of populations relying on surface water sources (dams, ponds, stream) which were mostly co-shared with the livestock further increasing chances of contamination . Due the high proportion of the population relying on unsafe water sources, there is eminent need to sensitize the community on water treatment while at the same time ensure access to water treatment chemicals. Table 48 below, summarizes main sources of water per survey zone.

Table 39: **Main current sources of water**

	Central		North		South		West		County	
	Count	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**
n	**645**		**659**		**579**		**510**		**2393**	
Piped water system	153	23.7%	110	16.7%	220	38.0%	101	19.8%	584	24.4%
Tube well / borehole	134	20.8%	292	44.3%	101	17.4%	179	35.1%	706	29.5%
Dug well	171	26.5%	228	34.6%	109	18.8%	94	18.4%	602	25.2%
Spring	1	0.2%	7	1.1%	0	0.0%	28	5.5%	36	1.5%
Rainwater	0	0.0%	0	0.0%	0	0.0%	1	0.2%	1	0.0%

Tanker-truck	2	0.3%	0	0.0%	16	2.8%	0	0.0%	18	0.8%
Cart with small tank	0	0.0%	0	0.0%	1	0.2%	0	0.0%	1	0.0%
Water kiosk	54	8.4%	3	0.5%	48	8.3%	24	4.7%	129	5.4%
Surface water (river, dam, lake, pond, stream, canal, irrigation channel)	126	19.5%	19	2.9%	84	14.5%	83	16.3%	312	13.0%
other	4	0.6%	0	0.0%	0	0.0%	0	0.0%	4	0.2%

6.1.1 Type of Piped water

Those households that main current household water sources was piped water were further asked to define the type of piped water they were using. In summary 45.7% of those, using piped water it was a public tap shared by several households. Turkana central had the highest proportion of household with piped water into their dwelling indicating that these households had ease in access to water facility.

Table 40: Type of piped water

	Central		North		South		West		County	
	Count	%	Count	%	Count	%	Count	%	Count	%
n	153		110		220		101		584	
Piped into dwelling	59	38.6%	2	1.8%	27	12.3%	9	8.9%	97	16.6%
Piped to yard / plot	26	17.0%	4	3.6%	39	17.7%	2	2.0%	71	12.2%
Piped to neighbour	29	19.0%	9	8.2%	66	30.0%	40	39.6%	144	24.7%
Public tap / standpipe	34	22.2%	95	86.4%	88	40.0%	50	49.5%	267	45.7%
other	5	3.3%	0	0.00%	0	0.00%	0	0.00%	5	.9%

6.1.2 Type of Dug Well Used

Out of those that used water from dug water well in the county, 96.2% of them were relying on unprotected wells with only 3.8% of them using protected well which was presumed to be less exposed to contamination.

Table 41: Type of dug well used

	Central		North		South		West		County	
	Count	%	Count	%	Count	%	Count	%	Count	%
n	171		228		109		94		602	
Protected well	0	0.00%	0	0.00%	21	19.3%	2	2.1%	23	3.8%
Unprotected well	171	100.0%	228	100.0%	88	80.7%	92	97.9%	579	96.2%
Total	171	100.0%	228	100.0%	109	100.0%	94	100.0%	602	100.0%

Of those main current water sources was springs, all of them were using unprotected wells.

6.2 Distance to Water Source and Queuing Time

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

6.2.1 Distance to water sources

Analysis of distances to water sources indicated that slightly over half (56.3%)of the households obtained their water from sources less than500m (less than 15 minutes walking distance),33.7% took between 15 min to 1 hour (approximately 500m to 2km) while the rest (8.7%) 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

Table 42: Distance to water sources

	Central		North		South		West		County	
	Count	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**
n	645		659		579		510		2393	
Less than 500m (Less than 15 minutes)	280	43.4%	367	55.7%	384	66.3%	316	62.0%	1347	56.3%
More than 500m to less than 2km (15 to 1 hour)	260	40.3%	258	39.2%	165	28.5%	124	24.3%	807	33.7%
More than 2 km (1 – 2 hrs)	73	11.3%	34	5.2%	30	5.2%	70	13.7%	207	8.7%
others	32	5.0%	0	0.0%	0	0.0%	0	0.0%	32	1.3%

6.2.2 Queuing time to water sources

Slightly over half (66.2%) of the households were not queuing for water, which indicates improved access to water for the households.

Table 43: Proportion of Households Queuing for water

Do you que for water	**Central**		**North**		**South**		**West**		**County**	
	Count	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**
n	**645**		**659**		**579**		**510**		**2393**	
Yes	157	24.3%	174	26.4%	255	44.0%	223	43.7%	809	33.8%
No	488	75.7%	485	73.6%	324	56.0%	287	56.3%	1584	66.2%

Out of those that were queuing for water in the county ,slightly over half (52.3%) of the respondents were waiting for less than 30 minutes while a third of them were queuing for 30 and 60 minutes as indicated in the table below.

Table 44: Queuing time at water source

Queuing Time	**Central**		**North**		**South**		**West**		**County**	
	Count	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**
n	157		174		255		223		809	
Less than 30 minutes	75	47.8%	83	47.7%	120	47.1%	145	65.0%	423	52.3%
30-60 minutes	57	36.3%	81	46.6%	120	47.1%	57	25.6%	315	38.9%
More than 1 hour	25	15.9%	10	5.7%	15	5.9%	21	9.4%	71	8.8%

6.3 Methods of drinking water treatment and storage

6.3.1 Household water treatment

Despite most of the households obtaining water from unsafe sources, only 11.4% of the households in the county were treating their water before drinking. Turkana Central (2.3%) had the least proportion of the population that treated water as indicated in the table below.

Table 45: Drinking Water treatment

	Central		North		North		West		County	
Anything done to water before drinking	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**
n	645		659		579		510		2393	
Yes	15	2.3%	115	17.5%	60	10.4%	83	16.3%	273	11.4%
No	630	97.7%	544	82.5%	519	89.6%	427	83.7%	2120	88.6%

Majority of the households were treating through boiling 56.8% and chemicals 44.3%,while 11.7% of the household were using traditional methods to treat drinking water. This extremely low proportion of households that treat drinking water, coupled with the low latrine coverage and high rates of open defecation could be one of the main contributors of malnutrition in the County as already explained above (relationship between undernutrition and poor WASH).

Table 46: Methods used for treating drinking water

	Central		North		South		West		County	
Water Treatment method	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**
n	15		115		60		83		273	
Boiling	14	93.3%	50	43.5%	29	48.3%	62	74.7%	155	56.8%
Chemicals	2	13.3%	78	67.8%	18	30.0%	23	27.7%	121	44.3%
Traditional	0	0	6	5.2%	26	43.3%	0	0.00%	32	11.7%

6.3.2 Storage of Drinking water

Out of the sampled households across the county only 63.5% were storing their drinking water in a closed container preventing it from contamination.

Table 47: Storage of drinking water

	Central		North		South		West		County	
	Count	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**
n	**645**		**659**		**579**		**510**		**2393**	
Open container / Jerrican	318	49.3%	287	43.6%	200	34.5%	69	13.5%	874	36.5%
Closed container / Jerrican	327	50.7%	372	56.4%	379	65.5%	441	86.5%	1519	63.5%

6.4 Water Payment

In the county 34.6 % of the surveyed households buy water for domestic use. Turkana south had the highest proportion (52.7%) purchasing water for domestic use.

Table 48: **Payment for water**

	Central		North		South		West		County	
Do you pay for water	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**
n	645		659		579		510		2393	
Yes	196	30.4%	227	34.4%	305	52.7%	100	19.6%	828	34.6%
No	449	69.6%	432	65.6%	274	47.3%	410	80.4%	1565	65.4%

About 70.8% of the household in the county paid for water on a monthly basis with Turkana North having the highest proportion that was paying for water monthly in comparisons to the other three survey zones. Half of the households from Turkana West were paying for water per a 20 L jerrican.

Table 49: Domestic water payment mode

	Central		North		South		West		County	
Water payment mode	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**
n	196		227		305		100		828	
Per 20 litre jerrican	74	37.8%	11	4.8%	107	35.1%	50	50.0%	242	29.2%
Per month	122	62.2%	216	95.2%	198	64.9%	50	50.0%	586	70.8%

Out of those households that were paying for water per 20 L jerican in the county ,92.6% were purchasing water for less than 10 Ksh per 20 L jerrican. Table 59 shows the percentage of households paying for water and cost of water per 20 liter jerican per survey zone.

Table 50: Cost of water per 20 Liter jerrican

	Central		north		south		west		County	
	Count	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**
n	74		11		107		50		242	
<10 Ksh	63	85.1%	4	36.4%	107	100.0%	50	100.0%	224	92.6%
>10 to<20	5	6.8%	0	0.00%	0	0.00%	0	0.00%	5	2.1%
>20 to<30	2	2.7%	0	0.00%	0	0.00%	0	0.00%	2	.8%
>30	4	5.4%	7	63.6%	0	0.00%	0	0.00%	11	4.5%

Out of the households paying for water monthly, 60.1% were paying less than 100 Ksh per month .Turkana Central (24.6%) and West (18.0%) had the highest proportion of households paying more 400 Ksh per month as illustrated in the table 60 below.

Table 51: cost of water per month

	Central		North		South		West		County	
Cost per Month	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**
n	122		216		198		50		586	
<100	58	47.5%	122	56.5%	138	69.7%	34	68.0%	352	60.1%
>100 to 200	11	9.0%	75	34.7%	27	13.6%	5	10.0%	118	20.1%

>200 to <300	18	14.8%	4	1.9%	20	10.1%	2	4.0%	44	7.5%
>300 to<400	5	4.1%	7	3.2%	4	2.0%	0.00%	0	16	2.7%
>400	30	24.6%	8	3.7%	9	4.5%	9	18.0%	56	9.6%

6.5 Hand washing

Hand washing with soap is the single most cost-effective intervention in preventing diarrhea diseases[14].The four critical hand washing moments include; after visiting the toilet/latrine, before cooking, before eating and after taking children to the toilet/latrine.

As illustrated in the table below 69.1% of the caretakers were aware of the hand washing practices. Turkana Central had the least proportion of the households that were aware of hand washing practices as compared to the rest of the survey zones.

Table 52: Awareness of hand washing practices

	Central		North		South		West		County	
	Count	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**
n	645		659		579		510		2393	
Yes	322	49.9%	486	73.7%	452	78.1%	394	77.3%	1654	69.1%
No	273	42.3%	97	14.7%	68	11.7%	107	21.0%	545	22.8%
DNK	50	7.8%	76	11.5%	59	10.2%	9	1.8%	194	8.1%

Assessment of hand washing in the 4 critical times in Turkana County indicated that most of the households were practicing hand washing before eating (92.4%),68.2% after visiting the toilet,57.7% before cooking and only 32.4% after taking the baby toilet. It worthwhile to take note of the low proportions practicing handwashing after fecal disposal, which predisposes the households to contamination.

Table 53: Handwashing at critical times

	Central		North		South			West		County	
	Count	**%**	**Count**	**%**	**Count**	**%**	**Count**	**Count**	**%**	**Count**	**%**
n	322		486		451		451	394		1653	
After Visiting the Toilet	216	67.1%	370	76.1%	279	61.9%	279	263	66.8%	1128	68.2%
Before cooking	138	42.9%	337	69.3%	266	59.0%	266	212	53.8%	953	57.7%
Before eating	306	95.0%	447	92.0%	417	92.5%	417	357	90.6%	1527	92.4%
After taking the baby toilet	59	18.3%	253	52.1%	89	19.7%	89	135	34.3%	536	32.4%

Handwashing at all four critical times

When handwashing with soap is carried out properly at the four critical times, it breaks key contamination routes. This includes contact with an object or food that eventually goes into one's mouth. Contamination refers to the transmission of disease-causing germs from one human to another or via contact with human or animal feces. (A single gram of human

[14]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.

feces can contain up to one trillion germs.[15]) Adults and children who practice proper handwashing will enjoy direct health benefits and other benefits.

Only 15.5% of the respondents reported washing hands at all the four critical times (before eating, before cooking, after visiting the toilet, after changing the baby diaper),this indicates that a large proportion of the community is exposed to contamination by diarrheal causing germs.

Table 54: Handwashing at all the four critical times

	Central		North		South		West		County	
	Count	%	Count	%	Count	%	Count	%	Count	%
n	645		659		579		510		2393	
Less than four times	597	92.6%	463	70.3%	539	93.1%	422	82.7%	2021	84.5%
All four times	48	7.4%	196	29.7%	40	6.9%	88	17.3%	372	15.5%

Handwashing with soap

Handwashing with soap is one of the most effective and inexpensive interventions for preventing diarrheal diseases and pneumonia, which together account for 3.5 million child deaths annually worldwide.[16]

The survey indicated that only 38.3% of the households were using soap and water for hand washing, with majority 42.9% using only water.Handwashing without soap does not offer effective protection against germs.

Table 64 below shows what is used for handwashing

Table 55: What is used for handwashing

	Central		North		South		West		County	
	Count	%	Count	%	Count	%	Count	%	Count	%
n	**322**		**486**		**452**		**394**		**1654**	
Only water	136	42.2%	247	50.8%	171	37.8%	155	39.3%	709	42.9%
Soap and water	142	44.1%	186	38.3%	191	42.3%	115	29.2%	634	38.3%
Soap when I can afford it	44	13.7%	50	10.3%	89	19.7%	123	31.2%	306	18.5%
Traditional herb	0	0.0%	3	.6%	1	.2%	1	.3%	5	.3%

6.6 Latrine Utilization

Overall, 86.1% of the households reported relieving themselves in the bushes (open defecation) while the rest use own latrine, neighbors or shared traditional pit/improved latrines). Turkana North (92.6%) and West (87.5%) recorded the highest Open defecation rate with Turkana Central (82.9%) and south (81.0%) having the lowest but poor rate. Flush toilet usage was highest in Turkana Central (1.1%) mainly due to the Lodwar town where some residents have flush latrines and access to piped water within the households. Table 65 below show latrine ownership and utilization per survey zone.

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

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

Table 56: Latrine ownership and utilization

	Central		North		South		West		County	
	Count	%	Count	%	Count	%	Count	%	Count	%
n	645		659		579		510		2393	
Flush / pour flush	7	1.1%	1	.2%	0	0.0%	0	0.0%	8	.3%
Pit latrine	96	14.9%	47	7.1%	107	18.5%	57	11.2%	307	12.8%
Composting toilet	0	0.0%	0	0.0%	0	0.0%	1	.2%	1	.0%
Hanging toilet / hanging latrine	7	1.1%	1	.2%	1	.2%	6	1.2%	15	.6%
No facility / bush / field	535	82.9%	610	92.6%	469	81.0%	446	87.5%	2060	86.1%
other	0	0.0%	0	0.0%	2	.3%	0	0.0%	2	.1%

7.0 FOOD SECURITY

7.1 Household income sources

Household income is critical to ensure households are able to produce and purchase foods that are nutritious for the all-household members. Majority of Turkana County Households (56.9%) relied on petty trading as their main source income followed by casual labour (12.2%). In the respective survey zones, Turkana North had the highest proportion with income from petty trading at 67.1% followed by west (66.5%). Turkana Central had the highest proportion of households with no income source at 23.9% followed by North (9.7%). Traditionally Livestock herding is the main economic activity in the county however, only 10.9% and 10.6% of the households were obtaining their incomes from sale of livestock and livestock products respectively. This depicts as changing livelihood among the residents of Turkana County that requires further research for in-depth understanding.

Table 57: Household's source of income

		Household_main_source_of_income										
Zone	Measure	Sale of livestock	No income	Sale of livestock products	Sale of crops	Petty trading	Casual labor	Permanent job	Sale of personal assets	Remittance	others	Income earned by Children
Central	Count	79	154	1	4	264	91	18	0	5	24	5
	%	12.2%	23.9%	.2%	.6%	40.9%	14.1%	2.8%	0.0%	.8%	3.7%	.8%
north	Count	79	64	33	0	442	23	7	2	1	8	0
	%	12.0%	9.7%	5.0%	0.0%	67.1%	3.5%	1.1%	.3%	.2%	1.2%	0.0%
south	Count	61	28	9	26	317	110	13	0	10	0	5
	%	10.5%	4.8%	1.6%	4.5%	54.7%	19.0%	2.2%	0.0%	1.7%	0.0%	.9%
west	Count	43	8	22	6	339	68	8	0	3	12	1
	%	8.4%	1.6%	4.3%	1.2%	66.5%	13.3%	1.6%	0.0%	.6%	2.4%	.2%
County	Count	262	254	65	36	1362	292	46	2	19	44	11
	%	10.9%	10.6%	2.7%	1.5%	56.9%	12.2%	1.9%	.1%	.8%	1.8%	.5%

7.2 Source of Dominant Foods

In the entire County the main source of starches (84%), legume (88.4%), vegetables and fruits (82%) and milk (86.9%) was purchase. It is important to note that majority of the household in Turkana West (29%) were consuming milk from

own production followed by Turkana North (14%). Turkana south had the least proportion of households consuming milk from own production at 5.3% meaning households access to milk for children was an issue.

Table 58: Source of dominant foods

			Own production	Purchase	Gifts from friends/ families	Food aid	Traded or Bartered	Borrowed	Gathering/ wild fruits
Meat and Offals	Central	Count	41	151	19	0	0	18	0
		%	17.9%	65.9%	8.3%	0.0%	0.0%	7.9%	0.0%
	north	Count	60	155	2	1	7	4	2
		%	26.0%	67.1%	.9%	.4%	3.0%	1.7%	.9%
	south	Count	43	214	3	1	1	9	0
		%	15.9%	79.0%	1.1%	.4%	.4%	3.3%	0.0%
	west	Count	82	138	11	1	0	0	0
		%	35.3%	59.5%	4.7%	.4%	0.0%	0.0%	0.0%
	County	Count	226	658	35	3	8	31	2
		%	23.5%	68.3%	3.6%	.3%	.8%	3.2%	.2%
Pulses and Legumes	Central	Count	0	503	7	1	0	19	0
		%	0.0%	94.9%	1.3%	.2%	0.0%	3.6%	0.0%
	north	Count	0	407	6	16	22	7	8
		%	0.0%	87.3%	1.3%	3.4%	4.7%	1.5%	1.7%
	south	Count	1	471	8	23	2	16	1
		%	.2%	90.2%	1.5%	4.4%	.4%	3.1%	.2%
	west	Count	5	322	7	62	10	2	0
		%	1.2%	78.9%	1.7%	15.2%	2.5%	.5%	0.0%
	County	Count	6	1703	28	102	34	44	9
		%	.3%	88.4%	1.5%	5.3%	1.8%	2.3%	.5%
Milk	Central	Count	21	184	1	0	0	0	0
		%	10.2%	89.3%	.5%	0.0%	0.0%	0.0%	0.0%
	north	Count	5	30	0	0	0	1	0
		%	13.9%	83.3%	0.0%	0.0%	0.0%	2.8%	0.0%
	south	Count	20	353	5	0	0	0	0
		%	5.3%	93.4%	1.3%	0.0%	0.0%	0.0%	0.0%
	west	Count	48	116	2	0	0	0	0
		%	28.9%	69.9%	1.2%	0.0%	0.0%	0.0%	0.0%
	County	Count	94	683	8	0	0	1	0
		%	12.0%	86.9%	1.0%	0.0%	0.0%	.1%	0.0%
Cereals	Central	Count	2	588	7	4	1	16	0
		%	.3%	95.1%	1.1%	.6%	.2%	2.6%	0.0%
	north	Count	0	484	15	50	28	8	6
		%	0.0%	81.9%	2.5%	8.5%	4.7%	1.4%	1.0%
	south	Count	10	505	9	31	3	17	0
		%	1.7%	87.8%	1.6%	5.4%	.5%	3.0%	0.0%

	west	Count	9	329	14	106	26	1	0
		%	1.9%	67.8%	2.9%	21.9%	5.4%	.2%	0.0%
	County	Count	21	1906	45	191	58	42	6
		%	.9%	84.0%	2.0%	8.4%	2.6%	1.9%	.3%
Vegetables	Central	Count	3	226	2	0	0	0	0
		%	1.3%	97.8%	.9%	0.0%	0.0%	0.0%	0.0%
	north	Count	0	17	0	0	0	0	0
		%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	south	Count	6	305	3	0	0	1	1
		%	1.9%	96.5%	.9%	0.0%	0.0%	.3%	.3%
	west	Count	5	108	1	0	0	0	0
		%	4.4%	94.7%	.9%	0.0%	0.0%	0.0%	0.0%
	County	Count	14	656	6	0	0	1	1
		%	2.1%	96.8%	.9%	0.0%	0.0%	.1%	.1%

7.3 Foods Groups Consumed by Households

Foods mostly consumed in Turkana households are cereals, oils/fats and pulses & legumes. Fish consumption was higher in Turkana Central and North compared to other survey zones which might be associated with access to the lake. Vitamin A rich vegetables, fruits and eggs were the least consumed foods across all survey zones. This may be an indication that households are not consuming diversified diets and hence exposing the populations to deficiencies especially micronutrients.

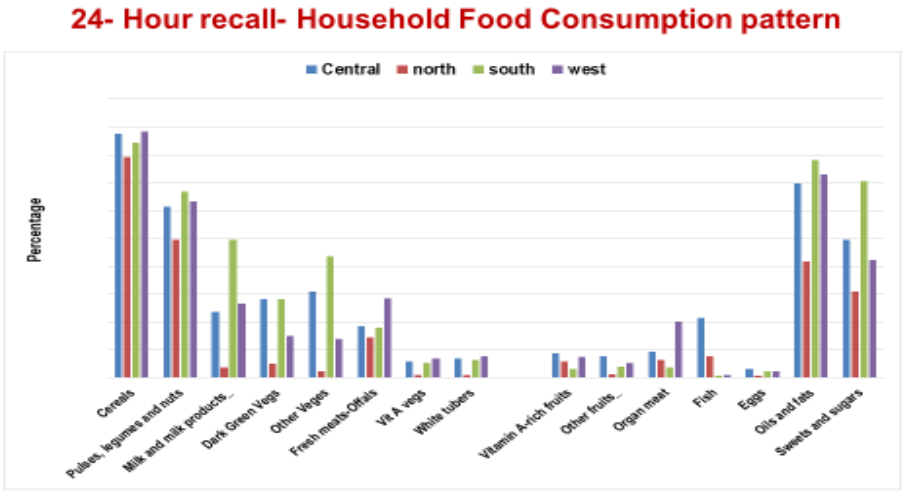


Figure 7: Food groups consumed by households from 24 hour recall

7.4 Household Food Consumption Score (FCS)

Among the survey zones, Turkana North had the highest proportion of households with poor FCS at 40.8% followed by Turkana West at 31.4%. Turkana South had the highest proportion of households reporting to have acceptable FCA at 71.3%. However, there was notable differences among the various Sub Counties within the various survey zones. For example in North survey zone, Kibish Sub County was had the highest number of households reporting to have poor FCS (61.3%) compared to 35.1% for Turkana North Sub County. In Turkana South survey zone, about 59% of households in Turkana East were reported to have acceptable FCS as compared to 76.8% in T. South Sub County.

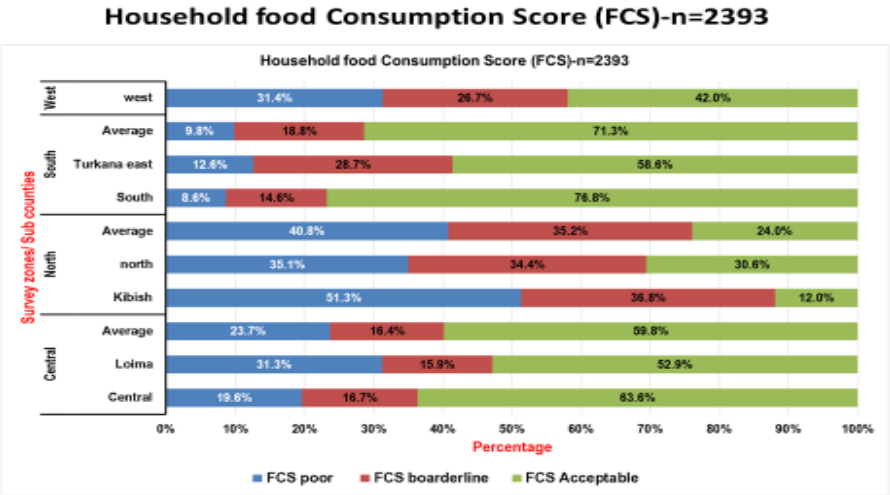


Figure 8: Household food consumption score

7.5 Household Consumption of Protein, Vitamin A and Heme Iron Rich Food Groups by Poor/Borderline and Acceptable Food Consumption Score Groups in Turkana County

The figure below shows that despite most households consuming more of protein and Vitamin A rich foods, most of the households with poor/borderline food consumption score have a low frequency of consumption of protein rich foods and vitamin A rich foods and as such they are likely not to be consuming enough to meet their nutrient needs. Consumption of iron rich food is even much worse among poor/borderline and acceptable food consumption groups with over 70% of households reporting to never have consumed these foods in the last one week.

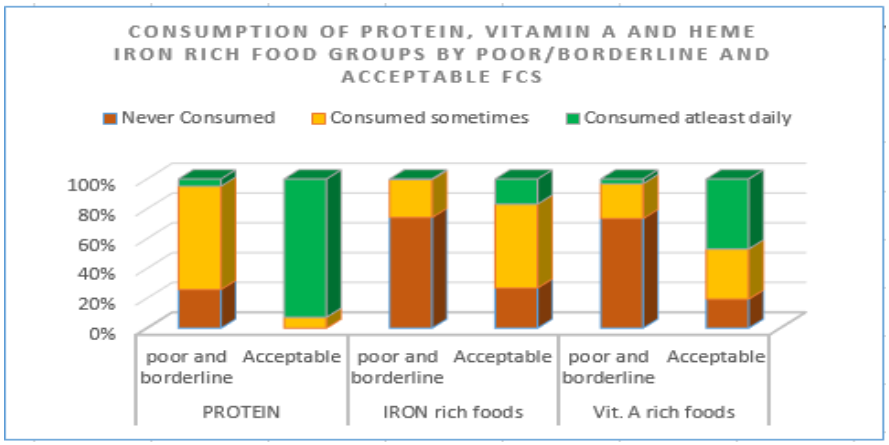


Figure 9: Household Consumption of Protein, Vitamin A and Heme Iron Rich Food Groups by Poor/Borderline and Acceptable Food Consumption Score Groups

7.6 Minimum Dietary Diversity -Women Score (MDD-W)

MDD-W is a dichotomous indicator of whether or not women 15–49 years of age have consumed at least five out of ten defined food groups the previous day or night. The ten defined food groups include ;1) Grains, white roots and tubers and plantains; 2) pulses(beans ,peas and lentils); 3)Nuts and seeds,4)Dairy; 5)Meat ,poultry and fish; 6)Eggs; 7)Dark green Leafy vegetables; 8)Other vitamin A rich fruits and vegetables; 9)Other vegetables; 10)Other fruits. The proportion of women 15–49 years of age who reach this minimum in a population can be used as a proxy indicator for higher micronutrient adequacy, one important dimension of diet quality.

A higher proportion of the WRA (80.5%) in Turkana County were consuming less than five food items from the 10 food groups in the MDD-W. Turkana North had the least proportion of WRA(2.3%) consuming at least five food items from the 10 food groups in the MDD-W .The low proportions of WRA consuming food items from at least five of the ten food groups indicates lower proxy micronutrient adequacy among the WRA in the county and this is likely to affect birth outcomes.

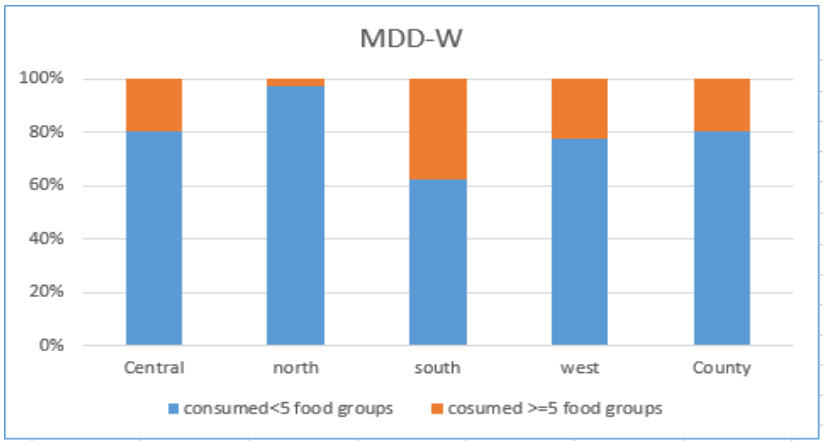
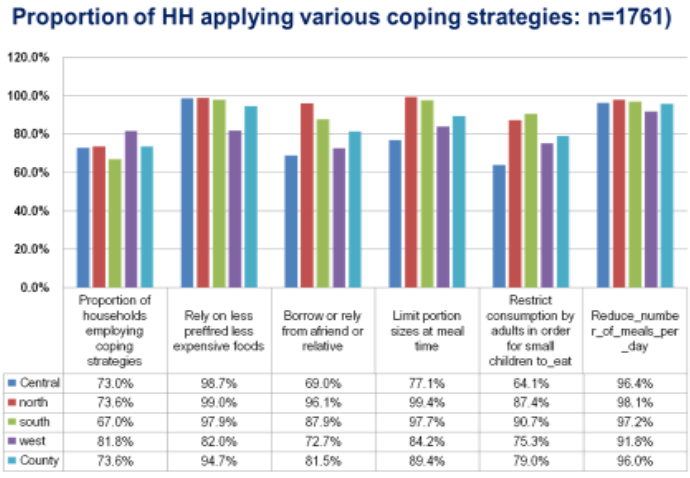


Figure 10: Minimum Dietary Diversity -Women Score

7.7 Household Coping Strategy Index (Reduced CSI)

About 74% of the households in the county reported facing food shortage and thus employing various coping strategies. Majority of the households (96%) adopted a coping strategy to reduce the number of meals taken per day. Turkana South had the highest proportion of households (90.7%) that reported to have been restricting food consumption by adults in order for the children to eat. The various coping strategies employed are as shown in the figure below



	Proportion of households employing coping strategies	Rely on less preffred less expensive foods	Borrow or rely from afriend or relative	Limit portion sizes at meal time	Restrict consumption by adults in order for small children to_eat	Reduce_number_of_meals_per_day
Central	73.0%	98.7%	69.0%	77.1%	64.1%	96.4%
north	73.6%	99.0%	96.1%	99.4%	87.4%	98.1%
south	67.0%	97.9%	87.9%	97.7%	90.7%	97.2%
west	81.8%	82.0%	72.7%	84.2%	75.3%	91.8%
County	73.6%	94.7%	81.5%	89.4%	79.0%	96.0%

Figure 11: Proportion of households employing various coping strategies

7.8 Mean Coping Strategy Index (CSI)

The CSI for the County had not significantly changed compared to that of June 2016. However, the score had worsened in both Turkana south and Central Sub Counties indicating an increase in proportion of food insecure households as illustrated in the figure below.

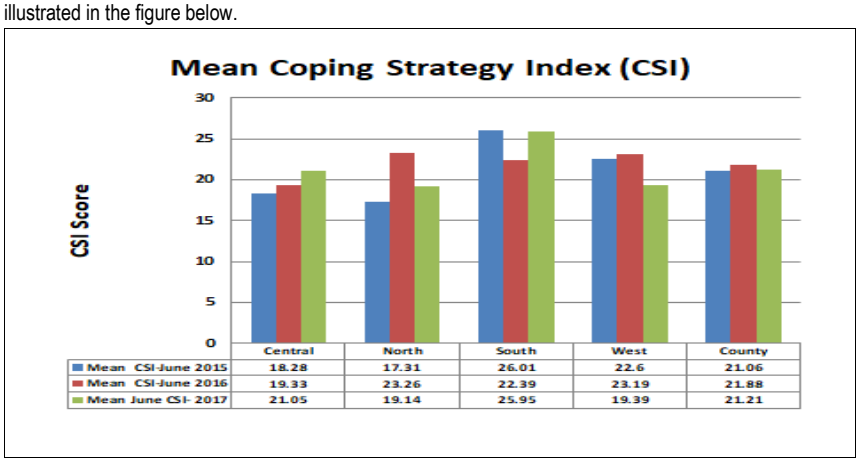


Figure 12: Mean Coping Strategy Index

8.0 MORTALITY

As illustrated in the table below crude mortality rate for Turkana North/Kibish was at alert level while in all other survey zones it was at acceptable levels. Under five mortality level was within acceptable levels across all the four survey zones. The high crude mortality rate was associated with deaths in Kakelae village in Kaaleng division. However, the actual cause of death could not be verified due to in ability of the community to provide a clear verbal autopsy and no post-mortem had been carried out to ascertain the cause of the deaths.

Table 59: Crude Mortality rate

Zone	CMR	DE	U5	DE
North	**1.18** (0.72-1.92)	2.2	**0.42** (.10-1.79)	1.6
Central	**0.48** (0.28-0.84)	1.24	**0.6** (0.18-1.95	1.4
South	**0.45** (0.24-0.85)	1.4	**0.17** (0.02-1.23)	1.0
West	**0.73** (0.38-1.41)	1.9	**0.39** (0.10-1.55)	1.0
Alert	Alert ; 1/10,000/day		1/10,000/day	
Emergency	Emergency;2/10,000/day		4/10,000/day	

9.0 CONCLUSION

The June 2017 Turkana County nutrition survey results indicate that the nutrition situation of children under 5 years is **extremely critical** (**Phase5 IPC classification; GAM WHZ ≥30 percent**) with a weighted Global Acute Malnutrition (GAM) rate of 31.0 % and severe acute malnutrition (SAM) rates of 8.7%. Turkana South Survey Zone (Turkana South and East) reported the highest GAM rates at 37% including 12% SAM, followed by Turkana North Zone (Turkana North and Kibish) at 34.1%, Turkana Central Zone (Turkana Central and Loima) at 31.4% and Turkana West at 23.4%. This means **one** in **EVERY three** children in Turkana County suffers from acute malnutrition and is at increased risk of dying. It is the worst malnutrition levels ever recorded since the 2011 Horn of Africa crisis. Turkana west showed a significant deterioration compared to 2016, 2015 and 2014. Additionally, the nutrition survey showed that the malnutrition status of pregnant and lactating women has almost doubled to 12% from 7% in 2016. With an estimated **54,371** and **5,648** malnourished children U5 and PLW respectively, Turkana County is second to Mandera County and accounting for 13% of the national caseload.

When compared to June 2016, the survey results further showed no change in WASH indicators with less than 15% of households in Turkana County practising hand washing at four critical times while over 85% of households practise open defecation. However, access to water improved in 2017 compared to 2016 as a significant number of households now rely on a variety of domestic water sources- mainly Boreholes, dug wells and piped systems despite the trekking distance to water sources remaining high due to the effect of drought.

This report continues to consistently identify chronic food insecurity, poor dietary diversity and, sub-optimal child care and feeding practices including poor hygiene and sanitation, low access to essential health and nutrition services and especially for the schedulable services, as well as insecurity as the major drivers of the high levels of acute malnutrition in the county. Compared to February 2017, the overall nutrition situation continues to remain of great concern and the situation is at risk of further deterioration in the coming months due to the anticipated worsening of the food security situation. It is estimated that **351,900** people are in need of immediate food assistance until January 2018, an increase from **276,200** in February 2017[17]. In addition to heightened emergency response, addressing the underlying factors has to be a priority for all actors.

[17] NDMA 2017. The 2017 Long Rains Assessment Report.

10.0 RECOMMENDATIONS

Table 6061: Recommendations

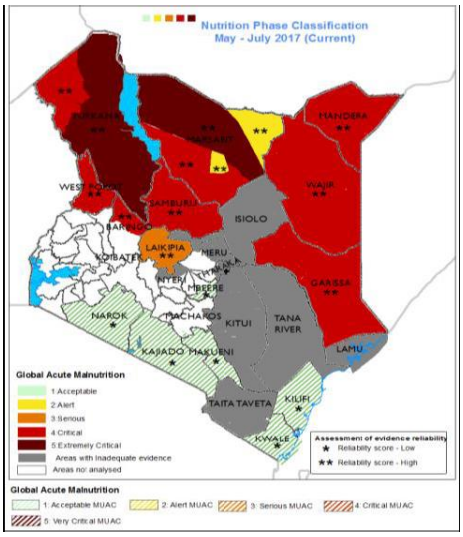
	Action	Activity	By whom	By when
1	Update and activate nutrition contingency and response plans across all the four survey zones.	• Hold joint meeting to revise the contingency plans. • Ongoing quarterly review of the contingency plans.	MoH,NDMA and nutrition partners	Immediately
2	Scale up continuous active case finding for malnutrition for the expected caseload(U5) of 53,373 (severe 15,023 and moderate 39,350) and 5648 pregnant and lactating women in the June 2017 and referral for timely management	• Sensitize the CHVs on rapid nutrition screening and referrals. • Conduct routine screening through the existing community health units. • Conduct rapid nutrition mass screening using MUAC and WFH in the hot spot areas. • Conduct quarterly mass screening. • Integrate nutrition screening in the BSFP distributions.	MoH(nutrition and community health strategy) and nutrition partners	Continuous
3	Increase access to life saving health and nutrition services through integrated outreaches for populations with limited access to these services.	• Carry out mapping of communities with limited access to health and nutrition for outreach support. • Conduct biweekly integrated health and nutrition outreaches in the in the mapped communities with limited access to health care. • Monthly monitoring of the outreaches.	MoH and nutrition partners	immediately
4	Develop simplified nutrition survey packs/briefs easily synthesized for nutrition advocacy and mobilization.	• Hold meetings with decision makers to disseminate the findings of the SMART survey and generate sector response plans.	MoH and nutrition partners	immediately
5	Develop and implement nutrition service delivery score card at health facilities	• On a quarterly basis populate the scorecard with nutrition data. • Quarterly meetings to deliberate on the output of nutrition score cards.	MoH and nutrition partners	Quarterly.
6	Conduct comprehensive on the job training and mentorship targeting facility health workers, community health extension workers(CHEWs) and Community health workers(CHWs)	• Sensitize all the HMTs, Health facility in charges and CHEWs on findings of SMART survey and rapid nutrition screening. • Train all the newly recruited nutritionists on IMAM including the SURGE model.	MoH and nutrition partners	Immediately
7	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	• Hold meetings with MtMSGs to sensitize them on the current nutrition situation and generate community led actions. • Link MtMSGs to existing livelihoods interventions.	MoH,NDMA and nutrition partners	Continuous
8	Cconduct community dialogue sessions and sensitization meetings with caregivers, community leaders/key influencers on appropriate childcare practises including micronutrient supplementation, deworming, handwashing, drinking water treatment and latrine utilization.	•Develop a brief pack for community dialogue meetings. •Integrate MIYCN messaging into BSFP distributions and outreach clinics. •Hold meetings with community leaders, communities, MtMSGs and caretakers to sensitize them on recommended child care and	MoH and nutrition partners	Continuous

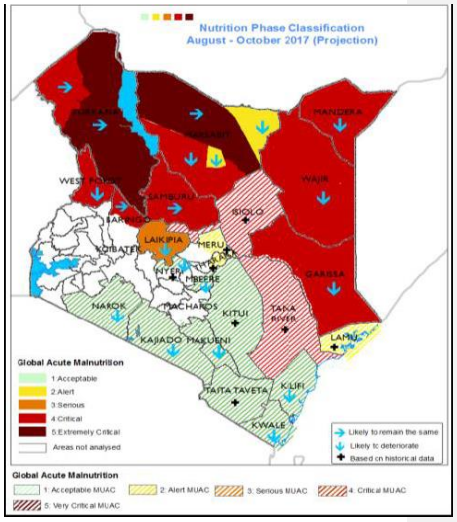
		health & nutrition practices.		
9	Advocate and create public awareness on micronutrient supplementation (micronutrient powders,IFA,Vitamin A),de-worming and dietary diversification.	• Conduct community dialogues with focus on micronutrients supplementation and deworming. • Integrate micronutrient supplementation and deworming into the integrated outreaches and nutrition calendar events. • Conduct micronutrient supplementation and deworming at the ECDs.	MoH and nutrition partners	Continuous
10	Continue capacity building of health care workers especially newly recruited staffs through OJT and joint support supervision on a quarterly basis	• Mobilize resources for training of health workers. • Conduct IMAM training for the newly recruited health care workers previously not trained on IMAM	MoH and nutrition partners	Continuous
11	Scale up community led total sanitation approach to increase awareness on sanitation including latrine utilization	• Conduct Health workers and CHVs sensitisation on CLTS, • Conduct community sensitisation on CLTS. • Roll out CLTs jointly with the communities.	MoH(public health) and nutrition and WASH partners	Continuous
12	Institutionalize Vitamin A supplementation and de-worming at the Early Child Education Development(ECDE)centers and scale up during annual child health campaigns	• Sensitize ECD teachers on vitamin A supplementation and deworming. • Provide supplies and reporting tools to the ECD teachers. • Monitor on quarterly basis VAS supplementation at the ECD Centers.	MoH(nutrition& public health), MoE(ECDEs) and nutrition partners	Quarterly
13	Procurement and timely distribution of essential nutrition commodities to health facilities	• Provide health facilities with the required reporting tools. • Develop commodity consumption reports and requests.	MoH/UNICEF/WFP	Quarterly
14	Disseminate and implement multi-sectoral nutrition social behavior change communication (SBCC) strategy to address maternal and child care knowledge, attitude, behavior and practices.	• Validate and disseminate MIYCN SBCC strategy and messages. • Implement SBCC strategy through integration into the existing programme and platforms.	MoH and nutrition partners	October 2017
16	Scale up implementation of IMAM surge to 30 additional health facilities	• Scale up of IMAM surge from the current 11 pilot health facilities to an additional 30 health facilities. • Monitor the implementation of the IMAM surge in the implementing health facilities.	MoH and nutrition partners	November 2017
17	Conduct a Knowledge attitude behavior and practices assessment	• Mobilize resources to conduct the assessment. • Carry out assessment and revise the MIYCN strategy based on these findings.	MoH and nutrition partners	December 2017
18	Conduct a coverage assessment	• Mobilize resources to conduct a Semi-quantitative assessment of access and coverage. • Conduct the assessment to identify barriers and booster to access of nutrition services.	MoH,MOAW and Partners	December 2017

11.0 APPENDICES

Appendices to SMART survey

Appendix 1:IPC for Acute malnutrition Maps





Appendix 2:Summary of plausibility report

	Indicator	Acceptable values/range	CENTRAL	SOUTH	NORTH	WEST
1	Flagged data (% of out of range subjects)	<7.5	**0** (2.4Excl)	**0** (1.8% excel)	**0** (1.4 Excel)	**0** (1.9% Excel)
2	Overall sex ratio (significant CHI square)	>0.001	**0** (p=0.726 Excel)	**0** (p=0.132 Excel)	**0** (p=0.219 Accep)	**0** (p=0.965 Excel)
3	Age ratio (6-29vs 30-59) Significant CHI square	>0.001	**4**(p=0.018 Accep)	**4** (p=0.009 Accep)	**4** (p=0.030 Accep)	**0** (p=0.101 Excel)
4	Dig. prevalence score-weight	<20	**0** (2 Excel)	**0** (4 Excel)	**0** (4 Excel)	**0** (5 Excel)
5	Dig. prevalence score-height	<20	**0** (7 Excel)	**0** (7 Good)	**0** (5 Excel)	**2** (8 Good)
6	Dig. prevalence score-MUAC	<20	**0** (6 Excel)	**0** (3 Excel)	**0** (2 Excel)	**0** (4 Accep)
7	Standard Dev..height WHZ	>0.80	**0** (1.02 Excel)	**5** (1.10 Goodl)	**0** (1.02 Excel)	**0** (1.06 Excel)
8	Skewness WHZ	<±0.6	**0** (-0.01 Excel)	**0** (-0.03 Excel)	**0** (0.07 Excel)	**0** (-0.04 Excel)
9	Kurtosis WHZ	<±0.6	**1** (-0.28 Good)	**1** (-0.34 Good)	**0** (-0.08 Excel)	**0** ()0.15 Excel
10	Poisson WHZ -2	>0.001	**0** (p=0.355 Excel)	**0** (p=0.252 Excel)	**0** (p=0.231 Accept)	**5** (p=0.000 Prob)
11	**OVERALL**	**<24**	**5% Excellent**	**10% Good**	**4% Excellent**	**7% Excellent**

Appendix 3: Mean z-scores, Design Effects and excluded subjects

	Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Central	Weight-for-Height	640	-1.51±1.02	1.19	1	16
	Weight-for-Age	643	-1.69±1.08	1.71	1	13
	Height-for-Age	633	-1.23±1.20	1.50	0	24
North	Weight-for-Height	625	-1.59±1.02	1.15	1	9
	Weight-for-Age	620	-1.77±1.02	1.73	0	15
	Height-for-Age	598	-1.30±1.18	1.97	0	37
South	Weight-for-Height	560	-1.64±1.10	1.36	0	10
	Weight-for-Age	566	-1.89±1.07	1.50	0	4
	Height-for-Age	562	-1.39±1.08	1.44	0	8
West	Weight-for-Height	512	-1.33±1.06	1.81	1	10
	Weight-for-Age	520	-1.62±1.07	1.70	0	3
	Height-for-Age	516	-1.25±1.09	2.36	0	7

Appendix 4: Sampled Clusters

Turkana Central					
Divisionn	**Location**	**Sublocation**	**Geographical unit**	**Population size**	**Clusterr**
Central	Lodwar Township	Lodwar Township	CARLIFONIA	6600	1,RC
Central	Lodwar Township	Lodwar Township	LODWAR TOWN	1457	2
Central	Lodwar Township	Nakwamekwi	ELUKTOLIASI	3463	3
Central	Lodwar Township	Nakwamekwi	NGASAJA	3848	4
Central	Lodwar Township	Napetet	LODOPUA	1002	5
Central	Lodwar Township	Napetet	NATOTOL	6546	RC,6
Central	Kanamkemer	Kanamkemer	Hewan	10319	7,8
Central	Kanamkemer	Kanamkemer	NATUMAOI	408	9
Central	Kanamkemer	Nawaitorong	LOKADWARAN	1642	10
Kerio	Kerio	Kerio	LOBOITOM	738	11
Kerio	Kerio	Nakurio	KAIRIAMA	1949	12
Kerio	Kerio	Nakurio	MUGUR	2452	13
Kerio	Kerio	Nadoto	KURA	3925	14
Kerio	Kerio	Nadoto	NANGOLEKURUK	1149	15
Kerio	Kangirisae	Nakoret	KAMARIAE	331	16
Kerio	Lorengelup	Lorengelup	LODWAT	742	17

Kalokol	Kalokol	Kalokol	DAPAL	2265	18
Kalokol	Kalokol	Kalokol	LOWOIANGIKENY	3484	19
Kalokol	Kalokol	Kalokol	NARIAMAWOI	1622	20
Kalokol	Kalokol	Kapua	LOKATUKON	1973	21
Kalokol	Namukuse	Namukuse	ABUTE	3094	22
Kalokol	Namukuse	Namukuse	AKWAMEKWI	2500	23
Kalokol	Namukuse	Lochere Ekeny	NAKURIO	1541	24
Kalokol	Kangatosa	Eliye	NAKAPELKURUK	907	25
Kalokol	Kangatosa	Lomopus	ETITIPU	432	26
Loima	Loima	Lochor Ekunyen	LOMUKUSEI	232	27
Loima	Loima	Puch	KALELAKOL	1849	28
Loima	Loima	Puch	NAURENDUDUNG	2377	29
Loima	Loima	Namoruputh	LOBOLE	864	30
Loima	Lorengippi	Lorengippi	Lorengippi Centre	2459	RC
Loima	Lokiriama	Lokiriama	LOKIRIAMA	1600	31
Loima	Lokiriama	Lochor Lomala	LOCHOR- ALOMALA	5839	32
Loima	Lokiriama	Atala Kamusio	ATALOKAMUSIO	1538	33
Turkwel	Turkwel	Lorugum	LOGOGO	804	RC
Turkwel	Turkwel	Turkwel	KALOMEGUR	2466	34
Turkwel	Turkwel	Turkwel	TURKWEL	1996	35
Turkwel	Turkwel	Kalemnyang	KANGALITA	2918	36
Turkwel	Turkwel	Lobei	LOBEI CENTRE	2151	37
Turkwel	Nadapal	Nadapal	NAURIENPUU	1255	38
Turkwel	Nadapal	Napeikar	NAOYAWOI	3235	39
Turkwel	Lomeyan	Lomeyan	KAKEEM	1793	40
Turkwel	Lomeyan	Lomeyan	NAMEYANA	772	RC
Turkwel	Lomeyan	Nachuro	KANGATARUK	3176	41
Turkwel	Lomeyan	Nachuro	NAKITOEKIRION	1295	42
Turkwel	Lomeyan	Kaapus	NAKWAMUNYEN	4003	43
Turkana South					
Division	**Location**	**Sub-location**	**Geographical unit**	**Population size**	**Cluster**
Lokori	Lokori	Lokori	ANYANGALIM	416	1
Lokori	Lokori	Lokori	LAINI MOJA	779	RC
Lokori	Lokori	Kangitit	LODOUPUA_B	1021	2
Lokori	Lokori	Lotubae	APETET	1602	3

Lokori	Lokori	Lotubae	LOTUBAE DISPENSARY	1436	4
Lokori	Lokori	Lotubae	KAMBI MAJI_KAREN	916	RC
Lokori	Lokori	Lotubae	NAMUKUSE	874	5
Lokori	Kochodin	Kochodin	NAKUKULAS	1427	6
Lokori	Katilia	Katilia	KATIIR	158	7
Lokori	Katilia	Katilia	LOMUNYENAKWAAN	422	8
Lokori	Katilia	Elelea	ECHOKE	351	9
Lokori	Katilia	Parkati	PARKATI	9329	10,11
Lokori	Lochakula	Lochakula	NGIMEYANA	194	12
Lomelo	Napeitiom	Napeitom	Napeitom	4203	RC
Lomelo	Napeitiom	Napeitom	ECHWAA	2102	13
Lokichar	Lokichar	Lokichar	LOKICHAR CENTRE	5093	RC
Lokichar	Lokichar	Lokichar	LOKORDOYO	2021	RC
Lokichar	Lokichar	Kapese	KAPESE CENTRE	3805	14
Lokichar	Lokichar	Kapese	LOMOKAMA	2530	15
Lokichar	Lokichar	Kapese	NALEMSEK	2854	16
Lokichar	Kalapata	Kalapata	KAESAM	369	17
Lokichar	Kalapata	Kalapata	KATIIR	2820	18
Lokichar	Kalapata	Loperot	LOPEROT	4427	19
Lokichar	Kalapata	Nakalale	CHOKCHOK	1916	20
Lokichar	Kalapata	Nakalale	NAKALALEI	3512	21
Lokichar	Lochwaa ngikamatak	Lochwaa ngikamatak	KIMABUR	2544	22
Lokichar	Lochwaa ngikamatak	Lochwaa ngikamatak	Locheremoit	5419	23
Lokichar	Lochwaa ngikamatak	Lochwaa ngikamatak	LOCHWAA	4948	24
Lokichar	Lochwaa ngikamatak	Naposumuru	KAEKORISOL	2526	25
Lokichar	Lochwaa ngikamatak	Naposumuru	NAPUSIMORU	2205	26
Kainuk	Kainuk	Kainuk	NADAPAL	2241	27
Kainuk	Kainuk	Kakongu	KAKONG	1883	28
Kainuk	Kaptir	Kalomwae	JULUK	1174	29
Kainuk	Kaptir	Nakwamoru	NAKWAMORU	1609	30
Kainuk	Kaptir	Nakwamoru	NAOYARAGAE	4677	31
Katilu	Katilu	Katilu	ANGARABAT	4343	32
Katilu	Katilu	Katilu	KATILU CENTRE	4823	33
Katilu	Katilu	Katilu	LOPUR BETHLEHEM	3291	34
Katilu	Katilu	Katilu	NYANGAITA	1232	35
Katilu	Katilu	Lokapel	LOKAPEL	3029	36

Katilu	Katilu	Kalemngerok	ARUMRUM-ALOCHA	1317	37
Katilu	Katilu	Kalemngerok	ACHUKULE	2136	38
Katilu	Katilu	Kanaodon	KAGITANKORI	1618	39
Katilu	Katilu	Kanaodon	KANGAKIMAK	3209	40
Turkana west					
Division	**Location**	**Sublocation**	**Geographical unit**	**Population size**	**Cluster**
Oropoi	Letea	Loritit	ALEMSEKON	1001	1
Oropoi	Letea	Tulubalany	Tulubalany	4202	2
Oropoi	Letea	Katelemot	KATELEMOT	4007	3
Oropoi	Letea	Lokipoto	LOKIPOTO	15437	4,5
Oropoi	Letea	Loito	LOITO	5388	6
Oropoi	Kalobeyyei	Nalapatui	NALAPATUI	4016	7
Oropoi	Kalobeyyei	Oropoi	NAWONTOS	1448	8
Oropoi	Kalobeyyei	Songot	KANGINYANGAKIPO	196	9
Oropoi	Loreng	Namor-Kirionok	Namor-Kirionok	2491	RC
Kakuma	Kakuma	Lopur	Lopur	21997	10,11,12
Kakuma	Kakuma	Lopur	NALEMSEKON	16214	13,14,15
Kakuma	Kakuma	Tarach	LOCHORANGERENG	3750	16
Kakuma	Kakuma	Nadapal	KOMUDEI	2091	17
Kakuma	Kakuma	Nadapal	NGIKWAKAIS	967	RC
Kakuma	Kakuma	Namorungole	IDPs	856	18
Kakuma	Kakuma	Namorungole	NAKWAMUNYEN	930	19
Kakuma	Pekelech	Lokore	LORUS	314	20
Kakuma	Pekelech	Lopusiki	LOBANGA	133	21
Kakuma	Nakalale	Nakalale	Nakalale	3886	22
Kakuma	Nakalale	Kobwin	NADUAT	1323	RC
Lokichoggio	Lokichoggio	Lokichoggio	KABANGAKENY	5768	23
Lokichoggio	Lokichoggio	Lokariwom	LOCHERAKAL	6459	24
Lokichoggio	Lokichoggio	Lokariwom	NADAPAL	2296	RC
Lokichoggio	Songot	Songot	NGARIEMETO	1070	25
Lokichoggio	Lorao	Lokangae	LOKANGAE A	3608	26
Lokichoggio	Lorao	Lokangae	LOKANGAE B	5838	27
Lokichoggio	Lorao	Lotikipi	APONG	3806	28
Lokichoggio	Mogila	Mogila	KANYANGANGIRO	2488	29
Lokichoggio	Mogila	Mogila	LORUS	5982	30
Lokichoggio	Nanam	Nanam	AMINA	669	31
Lokichoggio	Nanam	Nanam	Lomeyan	9447	32,33

Lokichoggio	Loteteleit	Loteteleit	TODUPLOBENYO	925	34

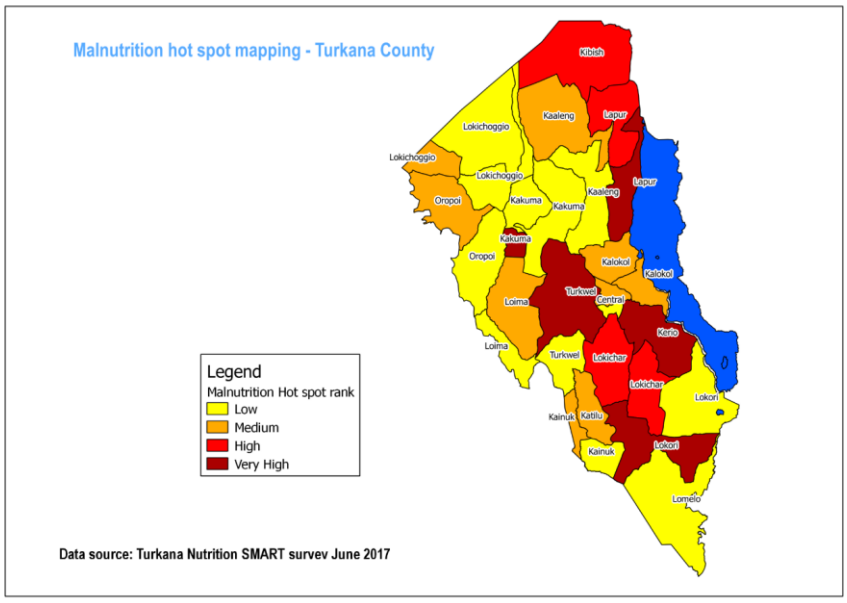
Appendix 5: Calender of events June 2017

	Annual	2012	2013	2014	2015	2016
June	**long rains**	**60**	**48**	**36** **North:** Opening of kaikor high school **West:** Kenya oil-CEPSA	**24** Trachoma campaign. **North:** Opening of administrative office by Nanok	**12** Trachoma campaign **Central:** Land disputes
July	**dry cool season**	**59** **South:** handing over School buses by Nanok	**47** **West:** HSNP (Lopetun)	**35**	**23** Garissa university attack **North:** Closure of Kenya oil	**11** IEBC registration of voters **Kibish:** 1st Kibish fire **South:** Burial of mzee longiti **Central:** Death of Prof. Elim of MKU lodwar **West:** Nakururum-crocodile attacks a child
August	**dry cool season** **death of Hon Ewoton**	**58** **South**: setting of drilling/ exploration camp by Tullow oil	**46** Elections	**34** **East:** Commissioning of Lotubai Girls-	**22**	**10** **South:** Conservancy meeting at Uhuru Highschool **North:** Death of elebuka **South:** Auction of Tullow properties **West**: n'gatuk akanau/ Raid of Kamau's cows/ burial of KDF sodier-Lokwee **South:** Preparation of farms- Lotubai
September	**dry cool season**	**57** **County:** opening of schools	**45**	**33**	**21 South:** Logogon/kapelibok bridge construction.	**09** **Central:** Kalokol MCA dies Polio campaign

					North: Closing of Kenya oil at Lowarengak	
	short rains		**44** Governors swearing in	**32**	**20** **South**: Closure of Tullow camps **East:** Nadome massacre/ peace meeting with Pokot	**08** Measles/rubella campaign **West:** Nanok epuyo busses **Central:** Gas/oil conference
October		**56** HNSP Mass registration	**43**	**31** **Central:** Arrival of Kenya oil in Kerio	**19** **South:** Longlasting peace btw the Pokots and Turkana **North:** Closing of SCI/MERLIN outreaches	**07** **West-**SMART survey/ Kalobeyei opened/ **South-** Peace event on Madaraka day- Pokot warriors attended
Novembe r	**short rains** **short rains**	**55**	**42** **North:** 1st police recruitme nt in kibish **East-** Naukotom ic raid-	**30** **North:** Shooting of senator **West:** Selection of ward administrator s	**18** Obama visit Kenya **East-** Ruto visit to Katilia	**06** **North-** Cash transfer- Orphans/disabili ty Chief Meyan dies Killing of merille elder at Todonyang' mission **West:** Kenya oil closes Nanok initiation (ASAPAN)
Decembe r	**dry season**	**54** Baragoi Massacre. **North/west :** Help-age (Nakaskout)	**41** **West:** Locheer ekaal floods	**29** 1st Tobongu' Lore	**17** 2nd Tobongu' Lore	
January		**53** Trachoma/ TT campaigns Teachers' strike	**40** Opening of schools	**28** Trachoma campaign Opening of schools	**16** **Teachers strike** **Central:** Official opening of MKU Lodwar **West:** Governor	

					visit to west.	
February	**dry season**	**51** HSNP registration -2nd phase starts	**39**	**27** Kapedo massacre **East:** Burning of KCSE exams at Kasarani	**15** **Kibish:** 2nd Kibish fire outbreak **West:** Medical camp in kapetadie	
March	**(Short rains).** **December**	**50** Doctors' strike Mass voter registration - BVR Solar eclipse **South:** Nov: Suguta valley massacre/ arrest of Nanok	**38** Solar eclipse- Eliye springs. **South:** Lorogon siege	**26** Lomelo massacre	**14** Pope visit to kenya **South-** Death of Kalapata ward administrator	
April		**49**	**37**	**25** **West:** Death of ekakoron. **North:** Boiling of aloe-vera	**13** **West:** Morwanayieche ceremony Atanayece/Death of OCS **South:** Death Of Principal- Katilia boy's high school.	

Appendix 6: Map of hot spots



Appendix 7: IDENTIFIED HOT SPOT CLUSTERS

Turkana Central

	CLUSTER	SUB-LOCATION		CLUSTER	SUB-LOCATION
1	LODOPUA	NAPETET	10	KALELOKOL	PUCH
2	LOBOITOM	KERIO	11	LOBOLE	NAMORUPUTH
3	KAIRIAMA	NAKURIO	12	KALOMEGUR	TURKWEL
4	MUGUR	NAKURIO	13	KANGALITA	KALEMNYANG
5	KURA	NADOTO	14	NAOYAWOI	NAPEIKAR
6	NANGOLEKURUK	NADOTO	15	KAKEEM	LOMEYAN
7	LODWAT	LORENGELUP	16	KANGATATUK	NACHURO
8	NAKURIO	NAKURIO	17	NAKWAMUNYEN	KAAPUS
9	NAKAPELKURUK	ELIYE			

Turkana North

No	CLUSTER	SUB-LOCATION	No	CLUSTER	SUB-LOCATION
1	Mana Longoria	Kachoda	8	Natete	Kokuro
2	Epur	Kataboi	9	Todonyang Plain	Todonyang
3	Narding	Kataboi	10	Kaemosa	Natapar
4	Topernawi	Katiko	11	Karach 1	Karach 1
5	Lotirmoe	Lomekwi	12	Ngirikokwa	Kaitede
6	Loalany	Kokiselei	13	Ekoopus	Nalita
7	Nabulukok	Nabulukok			

Turkana South

No	Cluster	Sub-location	No	Cluster	Sub-location
1	Anyangalim	Lokori	10	Katiir	Kalapata
2	Apetet	Lotubae	11	Nakaalei	Kalapata
3	Namukuse	Lotubae	12	Kimabur	Lochwaangikamatak
4	Nakukulas	Kochodin	13	Kaekorisogol	Naposimoru
5	Lomunyenakwaan	Katilia	14	Napusmoru	Naposimoru
6	Parkati	Parkati	15	Nadapal	Kainuk
7	Ngimeyana	Lochakula	16	Nakwamoru	Nakwamoru
8	Lomokama	Kapese	17	Lokapel	Lokapel
9	Kaesam	Kalapata	18	Arumrum -Alocha	Kalemngorok

Turkana West

No	CLUSTER	SUBLOCATION
1	TULABALANY	TULABALANY
2	LOPUR	LOPUR
3	NALEMSEKON	LOPUR
4	NAKWAMUNYEN	KALOBEYEI
5	LOMEYAN	NANAM

Appendix 8: NUTRITION SMART SURVEY QUESTIONNAIRE

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

		2. Household Demographics								
2.1	**2.2a**	**2.2b**	**2.3**	**2.4**	**2.5**	**2.6**	**2.7a**	**2.7b**	**2.8**	**2.10**
Age Group	**Please give me the names of the persons who usually live in your household.**	**Please indicate the household head (write HH on the member's**	**Age (Record age in MONTHS for children <5yrs and YEARS for those ≥ 5 years's)**	**Childs age verified by** 1=Health	**Sex** 1= Male 2= Female	**If between 3 and 18 years old, Is the child attending school?** 1 = Yes	**Main reason for not attending school (Enter one code from list)** 1=Chronic Sickness 2=Weather	**2.7a, What is the child doing when not in school?** 1=Working on family farm 2=Herding	**What is the highest level of education attained?(level completed) From 5 yrs and above**	**If the household owns mosquito net/s, who slept under the**

		column)	Years	Months	card 2=Birth certificate / notification 3=Baptism card 4=Recall 5. other _____ specify		2 = No (If yes go to 2.8; If no go t o 2.7)	(rain, floods, storms) 3=Family labour responsibilities 4=Working outside home 5=Teacher absenteeism/lack of teachers 6= Fees or costs 7=Household doesn't see value of schooling 8 =No food in the schools 9 = Migrated/ moved from school area (including displacements) 10=Insecurity/ violence 11-No school Near by 12=Married 13. Pregnant/ taking care of her own child 13=others (specify)…… ……..	Livestock 3=Working for payment away from home 4=Left home for elsewhere 5=Child living on the street 6: Other specify _____	1 =Pre primary 2= Primary 3=Secondary 4=Tertiary 5= None 6=others(specify) Go to question to 2.9 ↓	**mosquito net last night? (***Probe- enter all responses mentioned (Use 1 if "Yes" 2 if "No and 3 if not applicable) go to question 2.11*
< 5 YRS	1										
	2										
	3										
	4										
>5 TO <18 YRS	5										
	6										
	7										
	8										
	9										
	10										
	11										
	12										
ADULT (18 years and above)	13										
	14)										

	15										
	16										

2.9	**How many mosquito nets does this household have? _____ (Indicate no.) go to question 2.10 before proceeding to question 2.11**	
2.11	**Main Occupation of the Household Head – HH.** **(enter code from list)** 1=Livestock herding 2=Own farm labour 3=Employed (salaried) 4=Waged labour (Casual) 5=Petty trade 6=Merchant/trader 7=Firewood/charcoal 8=Fishing **9=** Income earned by children **10=Others (Specify)** |____|	**2.12.** What is the **main** current source of income **of the household?** 1. =No income 2. = Sale of livestock 3. = Sale of livestock products 4. = Sale of crops 5. = Petty trading e.g. sale of firewood 6. =Casual labor 7. =Permanent job 8. = Sale of personal assets 9. = Remittance 10. Other-Specify |____|
2.13	Marital status of the respondent 1. = Married 2. = Single 3. = Widowed 4. = separated 5. = Divorced. |____|	**2.14. What is the residency status of the household**? 1. IDP 2.Refugee 3. Resident |____|
2.15	Are there children who have come to live with you recently? 1. YES 2. NO	2.15b If yes, why did the child/children come to live with you? 1= Did not have access to food 2=Father and Mother left home 3=Child was living on the street, 4=Care giver died 5= Other specify _____

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

3.	4.	5. CHILD HEALTH AND NUTRITION (ONLY FOR CHILDREN 6-59 MONTHS OF AGE; IF N/A SKIP TO SECTION 3.6) **Instructions:** *The caregiver of the child should be the main respondent for this section* ***3.1 CHILD ANTHROPOMETRY 3.2 and 3.3 CHILD MORBIDITY*** *(**Please** fill in **ALL REQUIRED** details below. Maintain the same child number as part 2)*												
A **Child No.**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**3.2 a**	**3.2 b**	**3.3 a**	**3.3 b**	**3.3 c**
	what is the relationship of the respondent with the child/children 1=Mother 2=Father 3=Sibling 4=Grandmother 5=Other (specify)	SEX Female ……F Male ……M	Exact Birth Date	Age in months	Weight (KG) XX.X	Height (CM) XX.X	Oedema Y= Yes N= No	MUAC (cm) XX.X	Is the child in any nutrition program 1. Yes 2. No If no skip to questions 3.2	If yes to question J. which nutrition program? 1.OTP 2.SFP 3.BSFP Other Specify _____	Has your child (NAME) been ill in the past two weeks? 1.Yes 2. No If No, skip to 3.4	If YES, which illness (multiple responses possible) 1 = Fever with chills like malaria 2 = ARI /Cough 3 = Watery diarrhoea 4 = Bloody diarrhoea 5 = Other (specify) *See case definitions above*	**When the child was sick did you seek assistance?** 1.Yes 2. No	**If the response is yes to question # 3.2 where did you seek assistance? (More than one response possible-** 1. Traditional healer 2.Community health worker 3. Private clinic/ pharmacy 4. Shop/kiosk	If the child **had watery diarrhoea** in the last TWO (2) WEEKS, did the child get: 1. ORS 2. Zinc supplementation? *Show sample and probe further for this component* *check the remaining drugs(confirm from mother child booklet)*

														5.Public clinic 6. Mobile clinic 7. Relative or friend 8. Local herbs 9.NGO/FBO	
01															
02															
03															
04															

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

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

	sample)			**Card?**	drugs for worms in the past year? *(show Sample)*				**know**	**4 = Do not know**
01										
02										
03										
04										

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

	3.5 Enrolment in an MNP program		3.6 Consumption of MNPs			
	3.5.1. Is the child enrolled in the MNP program?(show the example of the MNP sachet) (record the code in the respective child's number) Yes =1 No=0 If no go to 3.5.2, If yes go to section 3.6.1	3.5.2 If the child, 6-23months, is not enrolled for MNP, give reason. (Multiple answers possible. Record the code/codes in the respective child's number. DO NOT READ the answers) Do not know about MNPs ……1 Discouraged from what I heard from others ……2 The child has not fallen ill, so have not gone to the health facility …. ……3 Health facility or outreach is far ……4 Ch ild receiving therapeutic or supplementary foods ……5	3.6.1 Has the child consumed MNPs in the last 7 days?(shows the MNP sachet) (record the code in the respective child's number) YES = 1 N0= 0 If no skip to 3.6.3	3.6.2 If yes, how frequent do you give MNP to your child? (record the code in the respective child's number) Every day ……1 Every other day ……2 Every third day ……3 2 days per week at any day ….4 Any day when I remember…..5	3.6.3 If no, since when did you stop feeding MNPs to your child? (record the code in the respective child's number) 1 week to 2 weeks ago ….1 2 week to 1 month ago ….2 More than 1 month ……3	3.6.4 What are the reasons to stop feeding your child with MNPs? (Multiple answers possible. Record the code/codes in the respective child's number. DO NOT READ the answers) Finished all of the sachets ……1 Child did not like it ……2 Husband did not agree to give to the child ……3 Sachet got damaged ……4 Child had diarrhea after being given vitamin and mineral powder ……5 Child fell sick……6 Forgot ……7

		Other reason, specify ……6 Skip to 3.7				Child enrolled in IMAM program …8 Other (Specify)_____ ..9
Child 1						
Child 2						
Child 3						
Child 4						

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

	4.0 WATER, SANITATION AND HYGIENE (WASH)/- *Please ask the respondent and indicate the appropriate number in the space provided*		
4.1	**What is the MAIN source of drinking water for the household <u>NOW</u>?** **piped water** piped into dwelling ..... 11 piped to yard / plot ..... 12 piped to neighbour ..... 13 public tap / standpipe ..... 14 tube well / borehole ..... 21 **dug well** protected well..... 31 unprotected well..... 32 **spring** protected spring ..... 41 unprotected spring ..... 42 rainwater ..... 51 tanker-truck ..... 61 cart with small tank ..... 71 water kiosk ..... 72 surface water (river, dam, lake, pond, stream, canal, irrigation channel) ..... 81 **packaged water** bottled water ..... 91 sachet water 92	**4.2 a What is the trekking distance to the current main water source?** 1=less than 500m (Less than 15 minutes) 2=more than 500m to less than 2km (15 to 1 hour) 3=more than 2 km (1 – 2 hrs) 4=Other(specify) |____|	4.2b – Who MAINLY goes to fetch water at your current main water source? 1=Women, 2=Men, 3=Girls, 4=Boys

	1.		
4.2.2a	**How long do you queue for water?** 1. Less than 30 minutes 2. 30-60 minutes 3. More than 1 hour 4. Don't que for water 1.	**.3 Do you do anything to your water before drinking? (*MULTIPLE RESPONSES POSSIBLE) (Use 1 if YES and 2 if NO).*** |____| 1. Nothing 2. Boiling…… …… |____| 3. Chemicals (*Chlorine,Pur,Waterguard*)…… |____| 4. Traditional herb…….. |____| 5. Pot filters…….. |____| 5.	
4.3a	|____|	**6.**	
4.4	**Where do you store water for drinking?** 1. Open container / Jerrican 2. Closed container / Jerrican |____|	**4.5 How much water did your household use YESTERDAY (excluding for animals)?** *(Ask the question in the number of 20 liter Jerrican and convert to liters & write down the total quantity used in liters)* |____|	
4.6	**Do you pay for water?** 1. Yes 2. No (**If No skip to Question 4.7.1**) |____|	**4.6.1 If yes, how much per 20 liters jerrican _____ KSh/20ltrs**	**4.6.2 If paid per month how much** |____|
4.7.1a	We would like to learn about where members of this household wash their hands. Can you please show me where members of your household most often wash their hands? *Record result and observation.* **OBSERVED** FIXED FACILITY OBSERVED (SINK / TAP) IN DWELLING .....1 IN YARD /PLOT.....2 MOBILE OBJECT OBSERVED (BUCKET / JUG / KETTLE) ..... 3 NOT OBSERVED NO HANDWASHING PLACE IN DWELLING / YARD / PLOT..... 4 NO PERMISSION TO SEE 5	4.7.1b Is soap or detergent or ash/mud/sand present at the place for handwashing? YES, PRESENT.....1 NO, NOT PRESENT.....……**2**	

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

		flush to DK where 18 **pit latrine** **ventilated improved pit latrine 21** **pit latrine with slab 22** **pit latrine without slab / open pit 23** **composting toilet 31** **bucket 41** **hanging toilet / hanging latrine 51** **no facility / bush / field 95** 1. **OTHER (specify) 96**

5.0: Food frequency and Household Dietary Diversity

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

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

5.15 Sweets: Sugar, honey, sweetened soda or sugary foods such as chocolates, sweets or candies														
5.16 Condiments, spices and beverages:														

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

	4.1 FOOD FORTIFICATION (FF)/- *Please ask the respondent and indicate the appropriate number in the space provided*
1.1	**Have you heard about food fortification?** 1. Yes 2. No 3. Don't know

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

Appendix 9: Mortality Questionnaires

DEMOGRAPHY & MORTALITY QUESTIONNAIRE-Turkana June 2017

DATE OF INTERVIEW: [D][D]/[M][M]/ [Y][Y]

SURVEY ZONE:	**Village:**	**NAME OF INTERVIEWER:_____**
CLUSTER NO. [ ][ ]	**TEAM NO. [ ][ ]**	**HOUSEHOLD[18] NO. [ ][ ]**

01	02	03	04	05	06	07	08	09	10
No.	Name	Sex (M/F)	Age (years)	Joined on or after: _____ (Start date of the recall period[19] - **Feb. 20, 2017)** **WRITE 'Y' for YES. WRITE 'N' for NO.**	Left on or after:	Born on or after:	Died on or after:	Cause of death 1- Unknown 2- Traumatic(injury) 3- Non traumatic(illness)	Location of death 1-In current location. 2-In Migration. 3-In place of last residence 4-Others
a) List all the household members that are **currently living** in this household.									
1									
2									
3									
4									
5									
6									
7									

[18] Household definition -Individuals who usually eat from the same pot and sleep in the same household

[19] Recall period-3 weeks after Deputy President Ruto was here in Turkana County to initiate development projects.

8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
b) List all the household members that have **left this household** (out migrants) **since the start** of the recall period**(Feb 20th 2017)**									
1									
2									
3									
4									
5									
c) List all the household members who **died** since the start of the recall period**(Feb 20th 2017)**									
1									
2									
3									
4									
5									

Was anyone in the household pregnant at the start of the recall period **(Feb 20th 2017)?** No [ ] Yes [ ] If yes, how many? _____

Summary

Details	U5	Total
Current HH Members		
Arrivals during the Recall period		
Number who have left during Recall period		
Births during recall		
Deaths during recall period		

Summary for mortality Questionnaire

SUMMARY data collection form for mortality rate calculation (one sheet/cluster)-Turkana June 2017 Mortality survey

Survey Zone_____ Village:_____ Cluster number:____ Total HH_____ Date:_____
Team number:_____ Team Leader _____

HH	Current HH member		Arrived since (Feb 20th 2017 to date (exclude births)		Left since(Feb 20th 2017 to date (exclude deaths)		Births since (Feb 20th 2017 to date)	Died since (Feb 20th to date)	
	Total	< 5	Total	<5	Total	< 5		Total	< 5
	SD1	SD2	SD3	SD4	SD5	SD6	SD7	SD8	SD9

NB: update this form with information from the demography and mortality questionnaire summary

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