Republic of Kenya

Ministry of Health

THE COUNTY GOVERNMENT OF GARISSA
KENYA

GARISSA COUNTY SMART NUTRITION SURVEY REPORT- JULY 2017
Ministry of Health-Garissa

unicef

Terre des hommes
tdh.ch

care

WFP
wfp.org

INTERNATIONAL RESCUE COMMITTEE

International Medical Corps

1.0 **ACKNOWLEDGEMENT**

The Ministry of Health, Garissa County acknowledge the effort and support of all individuals and organizations that supported and participated in the survey. Specifically, I would like to thank Garissa County Government, UNICEF Kenya, WFP, TDH, IMC, CARE and IRC for their financial and technical support

I appreciate the County Executive Committee of Health, Hubbie Hussein, and County Director of Health Mr. Siyat Moge for providing leadership and enabling environment for the implementation of the survey. Great appreciation goes to Habon Abdi-Head of Family Health Services and Shale Abdi- Head of Planning, M&E for their tireless commitment and leadership in planning, resource mobilization and implementation of the survey.

Special appreciation goes to the National NIWG team for their technical support during the validation and implementation of the survey.

I also extend my special thanks to the parents for providing valuable information during the interviews and allowing their children to be measured.

Lastly, I thank all the survey teams (coordinators, team leaders, enumerators) who worked tirelessly to ensure the results were available on time.

Dr: Sofia Mohamed
Chief Officer of Health
Ministry of Health
Garissa County

1.1 List of abbreviation

BCC	Behavior Change Communication
BCG	Bacillus Calmette–Guérin
CI	Confidence Interval
CLTS	Community Led Total Sanitation
CNO	County Nutrition Officer
FFA	Food for Assets
GAM	Global Acute Malnutrition
GFD	General Food Distribution
HFA	Height-for-Age
HHs	Households
HINI	High Impact Nutrition Interventions
IMAM	Integrated Management of Acute Malnutrition
IPs	Implementing partners
LVIA	Lay Volunteers International Program
MOA	Ministry of Agriculture
MOH	Ministry of Health
MOW	Ministry of Water
MUAC	Mid-Upper Arm Circumference
NDMA	National Drought Management Authority
NIWG	Nutrition Information working group
OPV	Oral Polio Vaccine
PPS	Probability Proportional to Population Size
SAM	Severe Acute Malnutrition
SFP	Supplementary Feeding Program
TDH	Terre des hommes
UNICEF	United Nations Children's Fund
WFA	Weight for Age
WFH	Weight-for-Height
WFP	World Food Program
WHO	World Health Organization
Vs	Versus

1.1.1 TABLE OF CONTENTS

1.0 Acknowledgement i
1.1 List of abbreviation ii
1.1.1 TABLE OF CONTENTS iii
LIST OF TABLES vi
LIST OF FIGURES 1
LIST OF APPENDICES 1
EXECUTIVE SUMMARY 2
2.0 Objectives 2
3.0 Methodology 2
3.1 Data quality 2
3.2 Summary of the findings 2
4.0 CHAPTER ONE 1
4.1 INTRODUCTION 1
4.2 Nutrition and Food Security Situation 1
4.3 Objectives of the Survey 2
4.4 Seasonality of the survey timing 2
CHAPTER TWO 4
5.0 Methodology 4
5.1 Survey design 4
5.2 Sampling procedures 4
5.2.1 Selection of clusters 5
5.2.2 Selection of households within a cluster 5
5.2.3 Selection of children for anthropometry 5
5.2.4 Selection of Women for determination of nutritional status 5
5.3 The survey team composition and selection 6
5.3.1 Survey team training 6
5.4 Data collection 6
5.4.1 Important considerations noted during data collection process at household level 6
5.5 Data quality assurance activities 7
5.6 Variables Measured 7
5.7 Referrals 8
5.8 Data entry and analysis 8
5.9 Nutrition indices and thresholds used 9
5.9.1 Anthropometric indices 9
6.0 CHAPTER THREE 11
6.1 RESULTS AND DISCUSSIONS 11
6.2 Demographic results 11
6.2.1 Residency and marital status 11
6.2.2 Level of education (Adults) 11

6.2.3 Main occupation of the household head....12
6.3 Education coverage (Under 18 years)....12
6.4 Anthropometry....13
6.4.1 Age verification means....13
6.4.2 Age and sex distribution of the sampled children....13
6.5 Prevalence of Acute Malnutrition....13
6.5.1 Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or Oedema....14
6.5.2 Distribution of acute malnutrition and Oedema based on weight-for-height z-scores....14
6.6 Prevalence of Acute Malnutrition by MUAC....15
6.6.1 Trend analysis of children with MUAC <135 mm using MUAC from NDMA Early Warning bulletins....16
6.7 Prevalence of underweight by Weight-for-age (WFA) Z-scores....16
6.8 Prevalence of stunting based on height-for-age z-scores....17
7.0 CHILDREN'S MORBIDITY, Mortality AND HEALTH SEEKING BEHAVIOR....18
7.1 Child Morbidity....18
7.2 Child Mortality....18
7.3 Therapeutic Zinc Supplementation during Watery Diarrhea Episodes....18
7.4 Health Seeking Behavior....19
8.0 CHILDHOOD IMMUNISATION, VITAMIN A SUPPLEMENTATION AND DEWORMING19
8.1 Childhood Immunization....19
8.2 Vitamin A supplementation....20
8.3 De-worming....21
8.4 Micronutrient powder supplementation....21
8.4.1 MNP program enrollment rate and consumption....21
9.0 MATERNAL NUTRITION....22
9.1 Acute Malnutrition....22
9.2 Iron folic supplementation....22
10.0 WATER SANITATION AND HYGIENE....23
10.1 Main Source of Water....23
10.2 Distance to water source and queuing time....24
10.3 Cost of water....24
10.4 Water utilization....24
10.5 Methods of drinking water treatment and storage....25
10.6 Hygiene....25
10.7 Sanitation....26
11.0 Food security....26
11.1 Household dietary diversity....27
11.2 Household consumption of micronutrient rich foods....27
11.3 Household food consumption score....28

11.4 Food consumption score nutrition quality analysis (FCS-N)..... 28
11.5 Coping Strategy Index..... 29
12.0 RECOMMENDATIONs 31
APPENDICES 33

LIST OF TABLES

Table 1:Summary of the survey findings 3
Table 2:Summary of recommendations 5
Table 3:Garissa County seasonal calendar 3
Table 4: Sample size calculation for anthropometric survey 4
Table 5: Sample size calculation for Mortality survey 5
Table 6: Definition of boundaries for exclusion 9
Table 7: Threshold values for weight for height, height for age and weight for age indices based on WHO 2006 reference standards 9
Table 8: MUAC thresholds for children less than five years 10
Table 9: Maternal MUAC thresholds 10
Table 10: WFP corporate food Consumption Score thresholds 10
Table 11: Household demography 11
Table 12: Summary of caretakers' marital status 11
Table 13: Respondents level of education 11
Table 14: Summary of main occupation of the household head 12
Table 15: Reasons for not attending school 12
Table 16: Summary of children age verification means 13
Table 17: Distribution of age and sex of sample 13
Table 18: Prevalence of global acute malnutrition based on Weight-for -Height Z score (and/or Oedema) and by sex 13
Table 19: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or Oedema 14
Table 20: Distribution of acute malnutrition and edema based on weight-for-height z-scores 15
Table 21: Prevalence of acute malnutrition based on MUAC cut offs (and/or Oedema) and by sex 15
Table 22: Prevalence of underweight based on weight-for-age z-scores by sex 16
Table 23: Prevalence of stunting, height-for-age z-scores and by sex 17
Table 24: Prevalence of stunting by age based on height-for-age z-scores 17
Table 25: Prevalence of child morbidity 2 weeks prior to the survey 18
Table 26: Childhood immunization Coverage 20
Table 27: Reasons for not being in the MNP program 22
Table 28: Prevalence of malnutrition among WRA, Pregnant and Lactating Women 22
Table 29: Iron-folic Acid supplements consumption in days 23
Table 30: Distance to water source 24
Table 31: Queuing time at the water point 24
Table 32: Cost of water 24
Table 33: Methods used for treating drinking water 25
Table 34: storage of water 25
Table 35: Hand washing at critical times 26
Table 36: Latrine ownership and utilization 26
Table 37: Household food consumption score 28
Table 38: Household coping strategy 30
Table 39: Summary of the survey recommendations 31

LIST OF FIGURES

Figure 1 Garissa County livelihood zone map 1
Figure 2: Trends of Global Acute Malnutrition (WHZ) in Garissa County (2011-2016) 14
Figure 3:Percentage of children at risk of malnutrition based on MUAC(NDMA EWB) 16
Figure 4: Places of seeking health assistance 19
Figure 5:Vitamin A supplementation coverage 20
Figure 6: VAS coverage through Health facility/Outreach and verified by card 21
Figure 7: Main sources of water 23
Figure 8: Household dietary diversity (24hrs recall) 27
Figure 9: Household consumption of micronutrient rich foods 27
Figure 10: Average days food groups are consumed 28
Figure 11: Frequency of consumption of vitamin A, protein, and heme iron rich foods by FCS Acceptable households 29
Figure 12: Consumption of Vitamin A, Protein, Heme iron rich foods by FCS poor/Borderline households 29

LIST OF APPENDICES

Appendix 1 Summary of data plausibility report 33
Appendix 2: Map of the data collection sites-Based on ODK GPS coordinates 34
Appendix 3: Sampled Clusters 34

EXECUTIVE SUMMARY

Garissa County is located in the former North eastern province of Kenya and is divided into 7 sub Counties namely Garissa, Fafi, Lagdera, Ijara, Balambala, Hulugho and Dadaab. It has estimated population of 850,077 (Male 442,040; Female 408,037) with about 139,451 (Boys 73,520; Girls 65,931) children under-five years of age[1]. The department of health, Garissa County conducted a county-wide SMART survey from 4th July -12th July 2017 covering all the livelihood zones.

2.0 OBJECTIVES

The main objective of the survey was to determine the prevalence of malnutrition among the children aged 6- 59 months old, pregnant and lactating mothers. The specific objectives were;

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

3.0 METHODOLOGY

Standardized Monitoring Assessment for Relief and Transition Methodology (SMART) was used to conduct the survey. The methodology is a cross sectional design. A two stage cluster sampling process was used. The first stage involved sampling of 44 clusters (villages) using probability proportional to size (PPS). This was done using ENA for SMART software. The second stage involved random selection of 15 households surveyed from the updated list of households in the village/cluster. Household was used as the basic sampling unit. Standard SMART questionnaire in ODK collect was used in android phones to collect data. The data was synchronised with ODK aggregate hoisted by ONA servers (https://ona.io) .Data was downloaded daily for plausibility checks and at the end of the survey for final data analysis.

3.1 Data quality

A total of 930 children aged 6-59 months were assessed for their nutrition status from the sampled 660 households. The overall data quality for the weight for height z-scores (WHZ) was excellent (4%) as summarised in appendix 1.

3.2 Summary of the findings

The global acute malnutrition (GAM) prevalence was at 16.3 % while severe acute malnutrition (SAM) prevalence was at 1.5 %.This is classified as critical based on WHO thresholds. These results estimate that at least 1 in 6 children is acutely malnourished.

Table 1, summarizes the survey findings while table 2, summarizes the recommendations.

[1] Garissa County Government (2014): Garissa County Integrated Development Plan

Table 1:Summary of the survey findings

Index	Indicators		N	2017	2016
WHO 2006	WHZ-scores	**Global Acute Malnutrition** *Weight for height< -2 z and/or oedema*	779	(127) 16.3 % (13.2 - 20.0 95% C.I.)	14.7 % (11.8 - 18.2 95% C.I.)
		Severe Acute Malnutrition *Weight for height < -3 z and/or oedema*	779	(12) 1.5 % (0.9 - 2.5 95% C.I.)	2.1 % (1.4 - 3.3 95% C.I.)
	HAZ-scores	**Stunting** *Height for age <-2 z-score*	768	(82) 10.7 % (8.2 - 13.8 95% C.I.)	10.3 % (7.9 - 13.2 95% C.I
	WAZ-scores	**Underweight** *Weight for age <-2 z-score*	784	(130) 16.6 % (13.1 - 20.7 95% C.I.)	12.3 % (9.7 - 15.6 95% C.I.)
	MUAC	**Global Acute Malnutrition** *MUAC <125 mm or oedema*	791	(28) 3.5 % (2.2 - 5.7 95% C.I.)	4.1 % (2.9 - 5.6 95% C.I.)
		Severe Acute Malnutrition *MUAC <115 mm or oedema (<115mm)*	791	(3) 0.4 % (0.1 - 1.2 95% C.I.)	0.4 % (0.1 - 1.1 95% C.I.)
Maternal nutrition					
Maternal Malnutrition	Pregnant and lactating mothers (MUAC<21cm)		332	1.2%	7.6%
	Women of reproductive age(WRA)-MUAC<21cm		537	5.8%	7.2%
Iron-folate supplementation	Pregnant mothers supplemented		266	75.1	78.3%
	Duration of Iron-folate consumption	< 90 days	189	94.5%	91.2%
		90-180 days	198	5.5%	7.4%
		>180 days	198	0.0%	1.4%
Childhood Immunizations					
BCG vaccination		6-59 months; scar	930	95.4%	94.4%
Measles 1 vaccination (9-59 months)		Card	804	49.3%	32.9%
		Card and recall	804	88.7%	92.8%
Measles 2vaccination (18-59 months)		Card	663	40%	16.6%
		Card and recall	663	79.4%	66.9%
OPV1		Card and recall	930	96.4%	94.1%
OPV3		Card and recall	930	96.9%	92.0%
Vitamin A supplementation and de-worming					
Vitamin A supplementation	6-11 months	Once	85	46.4	62.4%
	12-59 months	Once	748	42.5	50.3%
	12-59 months	At least twice		18.3	13.9%
De-worming	Children 12-59 months	Once	748	39.4%	41.6%
		At least twice		16.4%	10.2%
Childhood Morbidity					

Index	Indicators	N	2017	2016
Ill in the last 2 weeks(children 6-59 months)		833	30.7%	33.6%
Fever with chill like malaria		256	29%	33.8%
ARI/Cough		256	65%	49.6%
Watery diarrhoea		256	32%	26.1%
Bloody diarrhoea		256	3%	0.7%
Therapeutic Zinc Supplementation		67	41%	59.2%
Health seeking behaviour				
Caregiver sought assistance-when child sick		256	52.8%	65.4%
Caregiver sought assistance from appropriate places of health service delivery		134	91.6%	94.9%
Micronutrient powder(MNP) program				
MNP enrolment rate		265	1.1%	6.8%
WASH				
% HH using safe water sources		657	56%	57.6%
Distance to water source				
Less than 500m		657	62.7%	47.5%
500-2Km		657	23.6%	39.3%
>2Km		657	11.3%	13.0%
Queuing time				
Less than 30 minutes		657	63.3%	13.9%
30-60 minutes		657	13.5%	28.9%
More than 1 hour		657	23.2%	57.2%
Cost of water-Ksh (mean)				
Price per 20 litres jerry can		400	KSH. 8.8	5.85
Price per month		400	KSH. 1,498.2	1,184
Water Utilization				
≥ 15 Liters per person per day				77.4%
< 15 Litres per person per day				22.6%
Water treatment				
% Households treating drinking water		657		18.6%
Hygiene				
Hand washing in all the 4 critical times		458	23.6%	33.9%
Hand washing using soap and water		458	47.8%	59.6%
Sanitation				
Open defecation		657	30.1%	32.4%
Neighbour, Shared tradition/improved latrine		657	66.7%	25.1%
Own traditional/improved latrine				42.3%
Food Security				
Household food consumption score				
Poor		657	1.7%	0.14%
Borderline			9.8%	2.29%
Good			88.5%	97.57%
Coping Strategy Index				
Weighted CSI Score			13.0	13.23
Mortality				
Crude death rate(CDR)		23	0.854/10000	
Under-five death rate (U5DR		2	0.239/10000	

Table 2:Summary of recommendations

	Action
1	Revive ORT "corners" at facility/outreach sites to ensure treatment modalities for diarrhoea cases are administered promptly
2	Conduct county wide SLEAC and a SQUEAC Surveys to esbalish barriers and booster of IMAM service coverage to inform programming.
3	Train Couny and Subcounty health management teams and frontline health workers on Nutrition IMAM surge model and initiate its implementation in the county
4	Adequate supply of nutrition commodities and stregthen timely reporting of OTP/SFP
5	Strengthen the multi-sectoral forums where partners working in Education, Health, Nutrition, Livestock and Agriculture are brought on board.
6	Scale up advocacy, communication and social mobilization on maternal infant and young child nutrition interventions through existing public forums
7	Strengthen VIT A supplies, documentation and provide OJT to front line health workers
8	Scale up screening and referral of pregnant and malnourished women for malnutrition and management
9	Promote critical hand washing practices compulsory with soap and water at facility, outreach sites and schools
10	Initiate and strengthen sectoral collaboration/linkage between nutrition and WASH through regular coordination meetings
11	Support communication for development for best sanitation practices that will increase awareness thus triggering community led total sanitation (CLTS)
12	Monitor trends of food and nutrition security situation on monthly basis Using NDMA Early Warning System for early detection and initiation of appropriate interventions to address impact of deteriorating FNS situation
13:	Scale up school enrollment drives and out of school programmes

4.0 CHAPTER ONE

4.1 INTRODUCTION

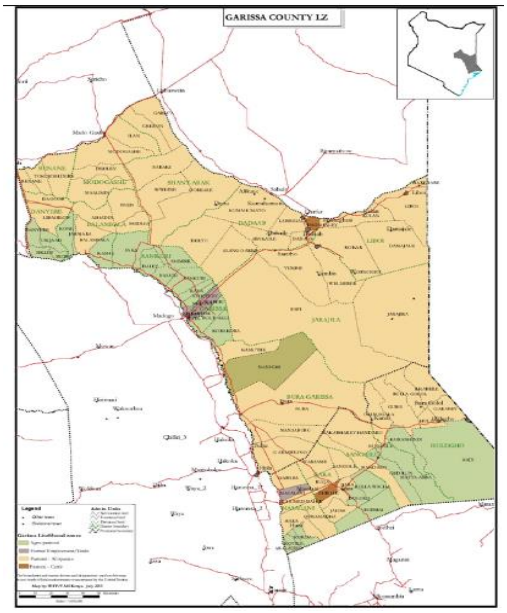


Figure 1 Garissa County livelihood zone map

Garissa County is located in the former Northeastern province of Kenya and borders Wajir County to the North, Tana River County to the West, Isiolo County to the North West, Lamu County to the South East and federal republic of Somalia to the East. The County is divided into 7 sub Counties namely Garissa, Fafi, Lagdera, Ijara, Balambala, Hulugho and Dadaab. It covers an area of approximately 44,174.5 square kilometers with an estimated population of 850,077 (Male 442,040; Female 408,037) as at 2017 projection from the last Kenya National Bureau of Statistics (KNBS 2009 Census2. Garissa is classified as Arid and Semi-Arid Lands (ASALs) and has three main livelihood zones namely; pastoral-all species (85%), pastoral cattle (5%) and agro-pastoral (7%). Formal employment/business/petty trade constitutes 3% of the population as shown in figure 1. The County has a high poverty index of 54.5%.

4.2 Nutrition and Food Security Situation

Garissa County continues to face major shocks (e.g., drought, internal/cross-border civil strife, insecurity etc.) that contribute to increased vulnerabilities among individuals living in the County. As of February 2017, Short rains reports, the county's food security situation was classified as stressed (IPC phase 2) with a majority of the households having minimally adequate food consumption.

Parts of the pastoral livelihood zones in areas of Ijara, Hulugho, Dadaab, Balambala and Lagdera sub counties were classified in the Crisis (IPC Phase 3) phase having significant food consumption gaps, high and above usual acute malnutrition and experiencing adverse effects of drought on water and pasture availability. A significant proportion of households (17%) have poor food consumption with a significant proportion of households employing coping strategies (20%) across the pastoral and agro – pastoral livelihood zones.

The assessment further found that food utilization was poor, driven by the increased disease occurrences and poor dietary intake and was likely to deteriorate further, increasing food insecurity of individuals and households. There was an increase in morbidity for children under five years of age (4 - 9 percent) and for adults (6 – 35 percent) reducing their capacity to absorb required macro and micronutrients from consumed food.

Findings of SRA were further supported by result of NDMA drought early warning bulletins from December 2016 to July 2017 which indicated that food security situation in all livelihoods in the County was **Alarm and deteriorating**[3]. Hulugho Sub County and parts of Fafi sub counties; particularly Fafi B bordering Somalia border and refugee camps remained a major concern as these areas have remained largely inaccessible due to insecurity.

[2] Garissa County Government (2014): Garissa County Integrated Development Plan
[3] Garissa County NDMA Early Warning Bulletin Dec 2016, Jan and Feb 2017

Unfortunately, food security situation in the County was expected to deteriorate further with projected poor performance of March-April-May long rains season, which was predicted to perform below normal with late onset and early cessation.

Results of Nutrition SMART survey conducted in June 2016, showed that nutrition situation in the County was **Serious** GAM WHZ 14.7% (11.8-18.2 95%C.I) and SAM 2.1% (1.4-3.3 95% C.I.) according to WHO classification. Simply put **1 out of 7** children under-five in Garissa County was acutely malnourished. Furthermore, analysis of nutrition situation using secondary data-MUAC[4] sentinel sites surveillance data indicated deteriorating trend as shown on the graph below. Proportion of children with mid upper arm circumference (MUAC) <135mm had been steadily increasing from 21.0% in December 2016 to 21.7% in January and 25.7% in February 2017 and in all cases remained above the long-term average. This deterioration was linked to and aggravated by the effect of the on-going drought and declining food security situation in the County.

Based on the foregoing, there was need to establish the extent and severity of malnutrition, understand the causes of malnutrition and to monitor the progression of the situation among residents of Garissa County to inform programming, hence the SMART survey .

4.3 Objectives of the Survey

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

The specific objectives of the survey were:

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

4.4 Seasonality of the survey timing

Nationally, SMART nutrition surveys are carried either in January-February or in June-July season to feed into short or long rains food security assessment reports, respectively.. This period is characterized by dry and cold season “Hagaa” as well as migration of livestock and households in various parts of the County in search of pasture and water as shown in table 3 below. Results of the survey are expected to feed into the long rains food security assessment.

[4] Garissa County NDMA Early Warning Bulletin, June 2017

Table 3:Garissa County seasonal calendar

"Jilal" Dry season	"Guu" long rain season	"Hagaa" dry and cold season	"Deer" Short rainy season
Dry period from January to March. Activities carried out include: ▪ Migration of livestock for pasture & water search ▪ Herd separation ▪ Livestock marketing ▪ Pressure on boreholes use	Starts late March and ends May. Activities carried out include: ▪ Selection/breeding of livestock ▪ Weeding ceremonies ▪ Restocking of livestock ▪ Deworming of livestock ▪ Male circumcision	From June to mid-October. Activities carried out include: ▪ High rate of livestock and household migration ▪ High labour demand ▪ Destocking /culling ▪ Surveillance for pasture /browse ▪ Caravan water trekking	From late October to December. Activities carried out include: ▪ Restocking of livestock. ▪ Breed improvement ▪ Planting for rain fed ▪ calving/kidding

CHAPTER TWO

5.0 METHODOLOGY

5.1 Survey design

The survey used a cross sectional study design and was undertaken in the month of July 2017 using the SMART methodology. Prior to undertaking the survey, desk review of secondary information from various existing data sources including NDMA sentinel sites monthly surveillance data, District Health Information System (DHIS), Kenya Demographic Health Survey and previous assessments was undertaken.. The SMART methodology was employed in planning, training, data collection and analysis. Other information that relates to malnutrition such as immunization, deworming, supplementation, morbidity, mortality, water sanitation and hygiene practices and food security were also collected. Survey targeted children 6-59 months of age and women of reproductive age.

5.2 Sampling procedures

A two-stage cluster sampling was used with the first stage involving selection of clusters (Villages) from a list of villages in the county and the second stage involving selection of households in a cluster. ENA for SMART software was used to select a sample size of 652 households based on a number of parameters shown in table 4 below and for mortality as shown in Table 4. This was then used to determine the number of clusters based on the number of households, which could be comfortably achieved per team per day. Taking into account the time spent on travelling to each household, introductions and breaks, 15 households were sampled per cluster (652/15 = 43.5 ≃ 44).

Table 4: Sample size calculation for anthropometric survey

Parameters for anthropometry	**Value**	**Rationale**
Estimated prevalence of GAM	18.2%	From June 2016 SMART survey results - 14.7 % (11.8 - 18.2 95% C.I.), used upper limit because of the deteriorating situation
±Desired precision	4.0%	Expected prevalence is above 15% due to the deteriorating situation, thus used rule of thump
Design effect	1.58	Previous surveys values, Design effect obtained in June 2016 survey results
Average household size	6	KNBS Census report 2010 and previous survey results
Percent of under five children	18%	Population estimate from DHIS and Census report 2009
Percent of non-respondent	3	This is the anticipated non response based on the previous surveys experience
Household to be included	**652**	
Children to be included	**615**	

Table 5: Sample size calculation for Mortality survey

Parameters for anthropometry	Value	Rationale
Estimated Death rate per 10,000 per day	0.48	From June 2014 Integrated survey results - 0.48 (0.21 - 1.09 95% C.I.),
±Desired precision	0.4	Previous survey value, Integrated survey 2014
Design effect	2	Previous survey value, Integrated survey 2014
Average household size	6	KNBS Census report 2010 and previous survey results
Percent of non-respondent	3	This is the anticipated non response based on the previous surveys experience
Recall period	94	Peak of drought, assumed as 1st of April. Water trucking activities
Population to be included	**2969**	
Households to be included	**459**	

5.2.1 **Selection of clusters**

Each village was considered as a cluster and a list of all villages and their respective population was used a sampling frame. Insecure villages were removed from the sampling frame. All the villages along with their respective populations were entered into the ENA for SMART software; the software then automatically selected the villages to be sampled with assigned cluster numbers.44 clusters were selected based on probability proportional to size using the ENA software

5.2.2 **Selection of households within a cluster**

On arrival at the selected cluster, the team liaised with the village administration to get a recent and updated list of households. 15 households were then selected randomly using simple random sampling application installed on the android based phones. A household was defined as people who sleep under the same roof and eat from one cooking pot. Members of a household may not necessarily be related to one another. If there are several structures within the same compound but each have their own cooking pots, then they were regarded as separate households.

5.2.3 **Selection of children for anthropometry**

All children between 6-59 months of age staying in the selected household were included in the sample. The respondent was the primary care giver of the index child/children. If a child and/or the caregiver were temporarily absent, then the survey team re-visited the household to collect the data at an appropriate time.

5.2.4 **Selection of Women for determination of nutritional status**

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

5.3 The survey team composition and selection

The survey team comprised of 1 survey manager, 2 survey coordinators, 6 teams and each team had 2 enumerators and 1 team leader. The survey was managed by Head of policy planning and M&E, County Department of Health. The two survey coordinators and six (6) team leaders were county health officials who have had previous experience in SMART Surveys. The enumerators (12) were recruited from the community considering their previous experience in survey and ensuring representation from all the sub counties. Representatives from the National Nutrition Information working group (from IMC, and AKHF) provided technical support specifically on use of Open data Kit applications. UNICEF and TDH provided additional technical support in the overall implementation of the survey including report writing.

5.3.1 **Survey team training**

A comprehensive training of the survey teams was carried out for 4 days. It focused on introduction to SMART survey, survey goal and objectives, sampling procedures, anthropometric measurements, mobile phone based data collection techniques (ODK), questionnaire design and field procedures

Standardization and pilot test were carried out as part of the training. The experience and feedback was shared among the team in the entire process. After the standardization various team leaders were able to organize their teams based on strength and weakness of each. Pretesting of the survey data collection tools and field procedures was done in a village not sampled for the survey. The data collection tools were reviewed based on the feedback from the field.The anthropometric measurements from pre-testing exercise were entered into the ENA for SMART software and a plausibility report generated for each team and this information was used to correct the teams' mistakes.

5.4 Data collection

The data collection was done for from 4th July to 12th July 2017 .It was done using ODK based questionnaires on android mobile phones that were administered to the child's parent or caregiver. Other tools used included Height/length board was used to take height/length measurements of the sampled children 6-59 months; Digital weighing scales were used to measure the weight of the children 6- 59 months; MUAC tape was used to measure mid upper arm circumference (MUAC) of children 6-59 months and women of reproductive age irrespective of physiological status. The completed ODK collect questionnaires were then finalised an uploaded to ODK aggregate server provided by Kobo Toolbox.

5.4.1 **Important considerations noted during data collection process at household level**

There were special cases in the field during data collection where the survey team had empty households; some of the sampled households had no eligible children.

a) **Migratory households:** household movement was noted especially in pastoral livelihood zones of Garissa County. Survey teams recorded the sampled household on the nutritional data sheet and cluster control form as having migrated and survey team proceeded to the next house according to the sampling rules.

b) **Polygamous families:** Household definition was the basis for dealing with polygamous families. Polygamous households should be counted as one as long as they are living together and sharing a common cooking pot. This was explained to the community leaders prior to data collection.

c) **Absent children:** children eligible and absent at the time of data collection were re-visited later in the day, after completion of other households within the cluster. The team went back to the house to find if the child had returned. In cases where the child was completely absent from the survey area and no chance of getting the child an example of migration where young children eligible as survey subject followed herders in search of pasture; the team recorded down the list of these children as missing children and proceeded with other sections or measurements incase other children eligible were in the sampled household.

5.5 Data quality assurance activities

Data quality assurance activities for the survey included the following;

1) Validation of the survey methodology at the nutrition information working group
2) SMART training, standardization and pilot test
3) Daily support and supervision of teams at the cluster/village level
4) Use of ODK with skip pattern and validation logic to collect data. Therefore, minimizing possibilities of errors during data recording
5) Daily feedback session from data quality checks done on the submitted data.

5.6 Variables Measured

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

Weight: Children were measured using a digital weighing scale

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

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

Bilateral oedema: Assessed by the application of normal thumb pressure for at least 3 seconds to both feet at the same time. The presence of a pit or depression on both feet was recorded as oedema present.

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 were not verified by a clinician.

Mortality: A separate mortality questionnaire was used to determine the mortality rate. The recall period was 90 days and the start date of the recall period was 4th March June 2017.

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

Vitamin A supplementation status: For all children 6-59 months of age, information on Vitamin A supplementation in last 1 year prior to the survey date was collected from mother child health booklets and recall from caregivers.

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

De-worming status: Information was collected from the caregivers as to whether children 12-59 months of age had received de-worming tablets the previous one year. This information was verified by card where available.

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

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

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

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

5.7 Referrals

Referrals for eligible survey participants who showed signs or symptoms that require immediate clinical attention and/ or below cut off points by MUAC were issued with referral letters. Very sick clients were assisted to reach the health or feeding centres.

5.8 Data entry and analysis

The survey adopted mobile technology in data collection and submission. The standard SMART questionnaire form was developed on ODK build and downloaded on ODK collect for android based mobile phones. At the end of each data collection day, the ODK collect was synchronized with ODK aggregate server provided by ONA serves (https://ona.io). The data was the downloaded in excel format for analysis purposes.Anthropometric data was analyzed using ENA for SMART software January 2015 version (Updated on 7th July 2015).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 day.

All data files were cleaned before analysis, although use of ODK reduced the amount of cleaning needed, as a number of restrictions were programmed in order to reduce data entry errors. Anthropometric data for children 6-59 months was cleaned and analysed using ENA for SMART software (February 2015).The nutritional indices were cleaned using SMART flags in the ENA for SMART software. Table 6 below summarises other criterion that were used for exclusion.

Table 6: Definition of boundaries for exclusion

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

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

5.9 Nutrition indices and thresholds used

5.9.1 Anthropometric indices

World Health Organization standards 2006 reference values were used and indices expressed in Z-scores.

Weight for height (WHZ) index: The percentage of acute malnutrition was estimated from weight-for-height (WFH) index values combined with presence of oedema (and/or oedema). The weight for height index compares the weight of the child measured to the median weight of a reference population for that particular height.

Height for age (HAZ) index: Chronic malnutrition is characterised by a deficit in height for age, which results in stunted growth. The prevalence of chronic malnutrition was estimated from the height for age index. This index compares the height of a child to the average height of a reference population for that particular age

Weight for age (WAZ) index: The prevalence of underweight was estimated from the weight for age index. The index weight for age compares the weight of a child to the median weight of a reference population for that particular age.

Table 7 below summarises the threshold values for weight for height, height for age and weight for age

Table 7: Threshold values for weight for height, height for age and weight for age indices based on WHO 2006 reference standards

	Acute malnutrition (Weight for height)	**Chronic malnutrition(height for age)**	**Acute and chronic (weight for age)**
Global	<-2SD and/or bilateral Oedema	<-2SD	<-2SD
Moderate	<-2SD and ≥3SD and Oedema	<-2SD and ≥3SD	<-2SD and ≥3SD
Severe	<-3SD and/or existing bilateral oedema	<-3SD	<-3SD

Mid upper arm circumference: MUAC measurements was also undertaken to determine the nutrition status of eligible children and mothers/caretaker (15-49 years of age) from sampled households. The following MUAC criteria were applied. Table 8 and 9 below summarizes the MUAC thresholds for children less than five years and women respectively.

Table 8: MUAC thresholds for children less than five years

MUAC Guideline	Interpretation
MUAC <115mm and/or bilateral Oedema	Severe acute malnutrition
MUAC >=115mm and <125mm *(no bilateral oedema)*	Moderate acute malnutrition
MUAC >=125mm and <135mm *(no bilateral Oedema)*	Risk of malnutrition
MUAC > 135mm (no bilateral Oedema)	Adequate nutritional status

Table 9: Maternal MUAC thresholds

Maternal MUAC cut off	Interpretation
MUAC < 21.0cm	Malnourished
MUAC ≥21.0cm-<23.0cm	At risk
MUAC >23.0cm	Normal

Household food consumption score. Data on the frequency of consumption of different food groups consumed by a household during 7 days before the survey was collected. The

Table 10 below shows WFP corporate thresholds for FCS were used to analyse the data.

Table 10: WFP corporate food Consumption Score thresholds

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

6.0 CHAPTER THREE

6.1 RESULTS AND DISCUSSIONS

6.2 Demographic results

660 households were sampled with average household size of 4.6.The mean number of children 6-59months per household was 1.64. Table 11 below shows a summary of household demography

Table 11: Household demography

	N	Males	Female
Children U5	930	476	454
Children 6-59	841	421	420
5-18 years	782	409	373
Adults	1280	611	679

6.2.1 Residency and marital status

99.7% of the respondent was residents of Garissa County. Majority (91%) of the respondents were married as shown in Table 12 below:

Table 12: Summary of caretakers' marital status

N=657	n	%
Married	601	91%
Single	3	0%
Widowed	23	4%
Separated	13	2%
Divorced	17	3%

6.2.2 Level of education (Adults)

71% of the respondents had no education and there existed a high disparity of illiteracy with more females having no education (61.7%) compared to males (38.3%) as shown in table 13 below.

Table 13: Respondents level of education

	Total (N-1280)	
	n	%
Pre-primary	13	1%
Primary	181	16%
Secondary	77	7%
Tertiary	54	5%
None	814	71%
Others	130	11%

6.2.3 **Main occupation of the household head**

The main occupation of the household head was livestock herding (39.9%), waged labor (25.4%) and Employed (15.2%) in that order. Table 14 shows a summary of the main occupations of the household head.

Table 14: Summary of main occupation of the household head

Main Occupation of household head	Numbers	Percentage
Livestock herding	262	39.9%
Own farm labor	8	1.2%
Employed (salaried)	100	15.2%
Waged labor (Casual)	167	25.4%
Petty trade	65	9.9%
Merchant/trader	9	1.4%
Firewood/charcoal	13	2.0%
Fishing	0	0.0%
Others	33	5.0%

6.3 Education coverage (Under 18 years)

Only 52% of children aged 3-18 years in the sampled households were in school. The main reasons for not being in school were others 76.6 % (in Duksi 48%) and too young (35%) as summarized in Table 15 below.

Table 15: Reasons for not attending school

Reason for not in School	N	%
Chronic Sickness	3	1%
Family labour responsibilities	27	5.0%
lack of fees or money to meet other costs	19	3.5%
Household doesn't see value of schooling	36	6.6%
Migrated/ moved from school area	3	0.6%
No school Near by	35	6.5%
Married	4	0.7%
Others	415	76.6%
Other reasons		
Duksi/Madrasa	201	48%
Too young for school	144	35%

6.4 Anthropometry

6.4.1 **Age verification means**

Only 42.8% of the children age was verified from health card, birth certificate/notification or baptism card. Age determination for 57.2 % of the children was based on recall, hence prone to bias. This might have affected indices with age as a variable such as stunting and underweight. Table 16 below shows a summary of the children age verification means

Table 16: Summary of children age verification means

N=925	n	%
Health Card	363	39.2%
Birth certificate/notification	33	3.6%
Recall	529	57.2%

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

The overall age and sex ratio of the sampled children was within acceptable range. The P values for age distribution and sex ratio were 0.0 (excellent) and 0.0 (excellent) respectively indicating no sampling bias. Table 17 below shows distribution of sampled children by age and sex.

Table 17: Distribution of age and sex of sample

	Boys		**Girls**		**Total**		**Ratio**
AGE (mo)	**no.**	**%**	**no.**	**%**	**no.**	**%**	**Boy:girl**
6-17	81	46.3	94	53.7	175	22.1	0.9
18-29	106	53.3	93	46.7	199	25.2	1.1
30-41	100	47.6	110	52.4	210	26.5	0.9
42-53	81	57.4	60	42.6	141	17.8	1.4
54-59	30	45.5	36	54.5	66	8.3	0.8
Total	398	50.3	393	49.7	791	100.0	1.0

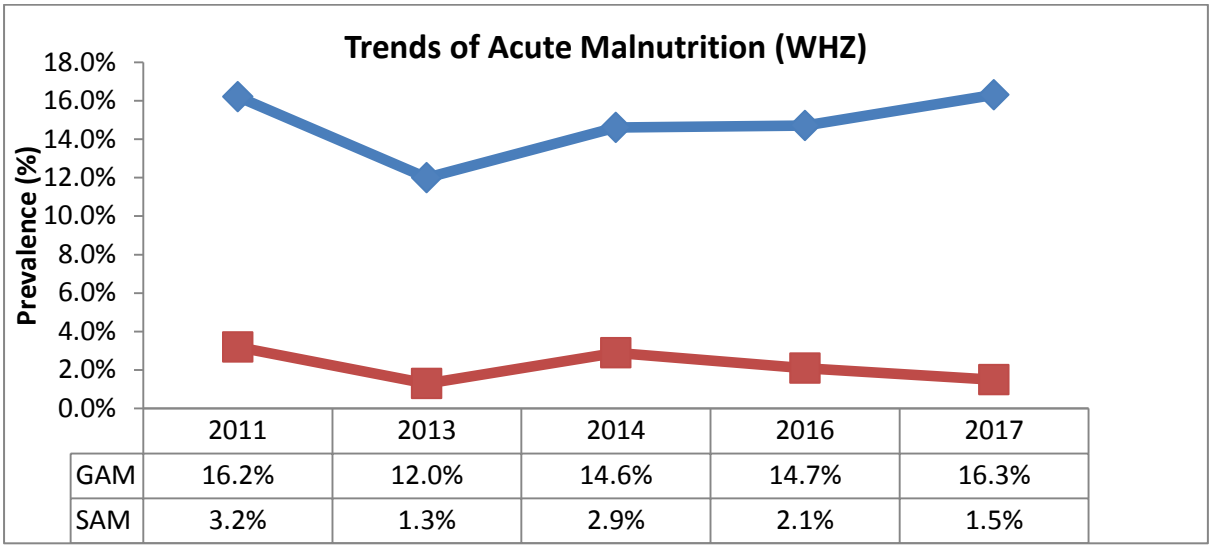
6.5 Prevalence of Acute Malnutrition

The global acute malnutrition prevalence was at 16.3% (13.2 - 20.0 95% C.I.) while severe acute malnutrition (SAM) prevalence was at 1.5% (0.9 - 2.5 95% C.I.) as shown in Table 18 below. This results show that nutrition situation in the County is currently at **critical** level according to WHO classification. These results estimate that at least 1 in 6 children is acutely malnourished

Table 18: Prevalence of global acute malnutrition based on Weight-for -Height Z score (and/or Oedema) and by sex

	All n = 801	Boys n = 403	Girls n = 398
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(127) 16.3 % (13.2 - 20.0 95% C.I.)	(59) 15.1 % (10.9 - 20.3 95% C.I.)	(68) 17.6 % (13.4 - 22.7 95% C.I.)
Prevalence of severe malnutrition (<--3 z-score or with oedema)	(12) 1.5 % (0.9 - 2.5 95% C.I.)	(5) 1.3 % (0.5 - 3.0 95% C.I.)	(7) 1.8 % (0.9 - 3.6 95% C.I.)

Figure 2: Trends of Global Acute Malnutrition (WHZ) in Garissa County (2011-2016)



	2011	2013	2014	2016	2017
GAM	16.2%	12.0%	14.6%	14.7%	16.3%
SAM	3.2%	1.3%	2.9%	2.1%	1.5%

6.5.1 Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or Oedema

Analysis of malnutrition per age group showed that children aged 30-41 were the most malnourished followed by age group 55-59 months as shown in Table 19.

Table 19: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or Oedema

		Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age (mon)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	171	3	1.8	19	11.1	149	87.1	0	0.0
18-29	192	2	1.0	21	10.9	169	88.0	0	0.0
30-41	210	6	2.9	36	17.1	168	80.0	0	0.0
42-53	141	1	0.7	19	13.5	121	85.8	0	0.0
54-59	65	0	0.0	20	30.8	45	69.2	0	0.0
Total	779	12	1.5	115	14.8	652	83.7	0	0.0

6.5.2 Distribution of acute malnutrition and Oedema based on weight-for-height z-scores

There was no oedema cases identified during the survey, however 12 Marasmus case were identified as shown in Table 20 below

Table 20: Distribution of acute malnutrition and edema based on weight-for-height z-scores

	<-3 z-score	>=-3 z-score
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 12 (1.5 %)	Not severely malnourished No. 779 (98.5 %)

6.6 Prevalence of Acute Malnutrition by MUAC

Children diagnosed as malnourished by MUAC are likely to be substantially younger, on average, than those diagnosed as malnourished by WHZ[5].This is because MUAC relies on a single absolute cut-off point independent of age, height and sex. As a child grows height, weight and MUAC all increase steadily albeit at different rates; children with exactly the same WHZ are more likely to fall below the absolute cut-off point for MUAC if they are shorter or younger.

Based on MUAC, the survey showed a global acute malnutrition prevalence of 3.5 % (2.9 - 5.6 95% C.I.) and severe acute malnutrition prevalence of 0.4 % (2.2 - 5.7 95% C.I.) as shown in table 21 below.

Table 21: Prevalence of acute malnutrition based on MUAC cut offs (and/or Oedema) and by sex

	All N = 791	**Boys** N = 398	**Girls** N = 393
Prevalence of global malnutrition (< 125 mm and/or oedema)	(28) 3.5 % (2.2 - 5.7 95% C.I.)	(12) 3.0 % (1.7 - 5.4 95% C.I.)	(16) 4.1 % (2.3 - 7.1 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(25) 3.2 % (2.0 - 5.1 95% C.I.)	(11) 2.8 % (1.5 - 5.2 95% C.I.)	(14) 3.6 % (2.1 - 6.0 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(3) 0.4 % (0.1 - 1.2 95% C.I.)	(1) 0.3 % (0.0 - 1.9 95% C.I.)	(2) 0.5 % (0.1 - 2.1 95% C.I.)

The prevalence of malnutrition using MUAC is significantly lower compared to using Weight for Height Z-scores. This could be associated with high cormic index[6] among Somali and south Sudan population. This means, overall significantly lower cases of malnourished children are identified using MUAC compared to weight for height

[5] Grellety, E., & Golden, M. H. (2016). Weight-for-height and mid-upper-arm circumference should be used independently to diagnose acute malnutrition: policy implications. *BMC Nutr*, *2*(1). doi:10.1186/s40795-016-0049-7

[6] 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

6.6.1 Trend analysis of children with MUAC <135 mm using MUAC from NDMA Early Warning bulletins

Analysis of NDMA sentinel site surveillance MUAC data from January 2016 to May 2017, show that the situation steadily deteriorated throughout the period with a peak in March 2017 at 37% as shown in figure 3 below.

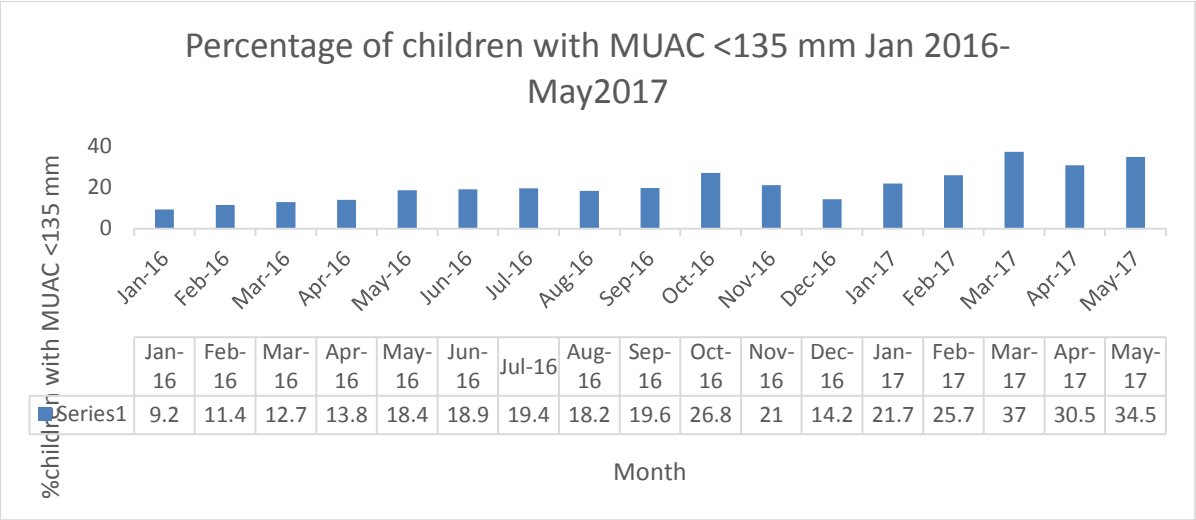


Figure 3:Percentage of children at risk of malnutrition based on MUAC(NDMA EWB)

6.7 Prevalence of underweight by Weight-for-age (WFA) Z-scores

Weight-for-age reflects body mass relative to chronological age. It is influenced by both the height of the child (height-for-age) and his or her weight (weight-for-height), and its composite nature makes interpretation complex. For example, weight-for-age fails to distinguish between short children of adequate body weight and tall, thin children. However, in the absence of significant wasting in a community, similar information is provided by weight-for-age and height-for-age, in that both reflect the long-term health and nutritional experience of the individual or population. Short-term change, especially reduction in weight-for-age, reveals change in weight-for-height.[7]

The prevalence of underweight was 16.6 % (13.1 - 20.7 95% C.I.) while the prevalence of severe underweight was 2.0 % (1.2 - 3.3 95% C.I.) as shown in table 22 below.

Table 22: Prevalence of underweight based on weight-for-age z-scores by sex

	All N = 784	**Boys** N = 396	**Girls** N = 388
Prevalence of underweight (<-2 z-score)	(130) 16.6 % (13.1 - 20.7 95% C.I.)	(66) 16.7 % (12.3 - 22.1 95% C.I.)	(64) 16.5 % (12.9 - 20.9 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(114) 14.5 % (11.5 - 18.2 95% C.I.)	(56) 14.1 % (10.3 - 19.2 95% C.I.)	(58) 14.9 % (11.9 - 18.7 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(16) 2.0 % (1.2 - 3.3 95% C.I.)	(10) 2.5 % (1.3 - 4.7 95% C.I.)	(6) 1.5 % (0.6 - 3.6 95% C.I.)

[7] WHO Child Growth Standards. (2009). Developmental Medicine & Child Neurology, 51(12), 1002-1002. doi:10.1111/j.1469-8749.2009.03503.x

6.8 Prevalence of stunting based on height-for-age z-scores

Stunting is an indicator used to access chronic malnutrition by comparing child's height to standard height of children in the same age. Stunted growth reflects a process of failure to reach linear growth potential as a result of suboptimal health and/or nutritional conditions. On a population basis, high levels of stunting are associated with poor socioeconomic conditions and increased risk of frequent and early exposure to adverse conditions such as illness and/or inappropriate feeding practices. Similarly, a decrease in the national stunting rate is usually indicative of improvements in overall socioeconomic conditions of a country.

The survey results indicated a stunting prevalence of 10.7 % (8.2 - 13.8 95% C.I.) with severe stunting at 1.8 % (1.0 - 3.2 95% C.I.) as shown in table 23 below. The results were not significantly different compared 2016 of 10.3% with a p value of 0.126.

Table 23: Prevalence of stunting, height-for-age z-scores and by sex

	All N = 768	**Boys** N= 388	**Girls** N = 380
Prevalence of stunting (<-2 z-score)	(82) 10.7 % (8.2 - 13.8 95% C.I.)	(49) 12.6 % (9.2 - 17.1 95% C.I.)	(33) 8.7 % (6.1 - 12.2 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(68) 8.9 % (6.8 - 11.4 95% C.I.)	(41) 10.6 % (7.5 - 14.8 95% C.I.)	(27) 7.1 % (4.9 - 10.2 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(14) 1.8 % (1.0 - 3.2 95% C.I.)	(8) 2.1 % (1.0 - 4.3 95% C.I.)	(6) 1.6 % (0.7 - 3.4 95% C.I.)

Further analysis was done on stunting per age category as shown in Table 24 below. The analysis shows that children aged between 18 and 41 months were the most stunted (-0.68 ± 1.13). This could be attributed to poor complementary feeding and owing to the fact that breastfeeding usually stops during this age.

Table 24: Prevalence of stunting by age based on height-for-age z-scores

		Severe stunting (<-3 z-score)		**Moderate stunting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**	
Age (MO)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	169	2	1.2	13	7.7	154	91.1
18-29	191	5	2.6	26	13.6	160	83.8
30-41	207	5	2.4	17	8.2	185	89.4
42-53	135	0	0.0	11	8.1	124	91.9
54-59	66	2	3.0	1	1.5	63	95.5
Total	768	14	1.8	68	8.9	686	89.3

7.0 CHILDREN'S MORBIDITY, MORTALITY AND HEALTH SEEKING BEHAVIOR

Child illness is one of the main contributors to malnutrition under the UNICEF conceptual framework. They accelerate malnutrition through reduced food intake such as through vomiting and nausea, reduced food absorption such as through diarrhoea. In return, malnutrition also can accelerate diseases through reduced immunity. Proper prevention and management of childhood illness is therefore a key intervention in addressing malnutrition.

7.1 Child Morbidity

Child morbidity assessment was done on a recall period of 2 weeks prior to the survey. The caregivers were probed on illness symptoms exhibited by the children and the enumerators noted the illness based on some disease definition given. Zinc supplementation was assessed for children reported to have watery diarrhea.

About a third of children assessed (30.7%) were reported to have been ill 2 weeks prior to the survey. This was almost the same case in 2016 where 33.6% were ill (P=0.208). Acute respiratory infection was the main illness reported as shown in 25 below.

Table 25: Prevalence of child morbidity 2 weeks prior to the survey

Disease	Prevalence			
	2017 (N=833)		2016 (N=809)	
	n	%	n	%
Child sick within 2 weeks	254	30.7%	272	33.6%
Fever with chills like malaria	61	24.0%	92	33.8%
ARI/Cough	136	53.6%	135	49.6%
Watery diarrhea	67	24.6%	71	26.1%
Bloody Diarrhea	6	2.4%	2	0.7%
Others (eyes& ear infections, Skin conditions etc.)	17	6.7%	13	4.8%

7.2 Child Mortality

The mortality survey involved a total of 2992 individuals inclusive of 930 children 6-59 months of age. The responses were prompted based on a recall period of 90 days with start point of recall period as 4th March 2017. Mortality results are as shown below.

	All	**Under 5yr**
Population	2992	930
Number Died	23	2
Recall Period (days)	90	90
	CMR	**U5 MR**
MR/10,000	0.854	0.239

7.3 Therapeutic Zinc Supplementation during Watery Diarrhea Episodes

Oral zinc administration provides substantial benefit in the reduction of stool output, frequency, and duration, combined with safety, efficacy, and affordability in acute diarrhea. Zinc supplementation is a simple and effective therapeutic intervention in the management of

acute diarrhea[8]. The Ministry of health has provided a guideline that prioritizes use of combined Zinc and ORS for treatment of diarrhea. The survey established that of children reported to have watery diarrhea (N=67), only 40.3% received zinc for diarrhea management.

7.4 Health Seeking Behavior

Health Seeking Behavior refers to sequence of remedial actions that individuals undertake to rectify perceived ill-health. In most developing countries, the health of the children is strongly dependent on maternal healthcare behaviour. Of the children reported to be ill (N=254), 52.8% sought assistance compared to 65.4% unveiled in 2017 (P=0.00). Figure 4 below summarizes places where caregivers sought health assistance for their sick children

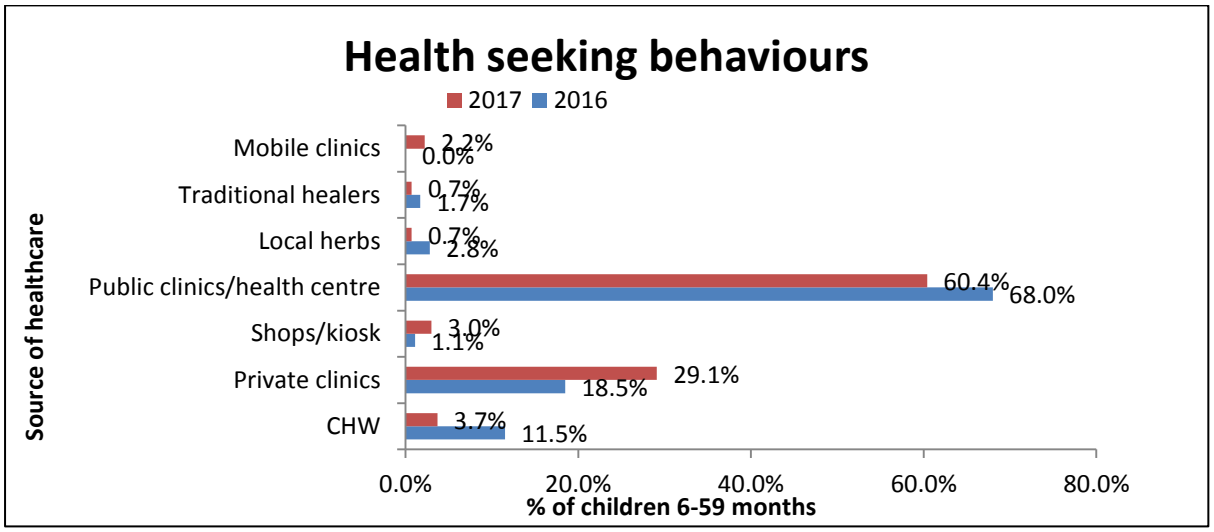


Figure 4: Places of seeking health assistance

8.0 CHILDHOOD IMMUNISATION, VITAMIN A SUPPLEMENTATION AND DEWORMING

8.1 Childhood Immunization

Kenya Ministry of Health implements a global immunization program targeting children less five years old with an aim of reducing morbidity and mortality due to vaccine preventable diseases. This is in line with the United Nations Sustainable development goal of ensuring healthy lives and promoting well-being for all at all ages by 2030(SDG 3).This survey assessed the coverage of four(4) vaccines namely, BCG, OPV1, OPV3, and measles at 9 and 18 months.

From the assessment, 95.4% of children were confirmed to have been immunized by BCG[9] evidenced by a scar on the left arm. Those who were immunized (based on card and recall) by OPV1[10] and OPV3 were 96.9% and 96.4 respectively while 94.4% had been immunized for measles at 9 months. Measles at 18 months improved from 66.9% in 2016 to 76.9%

[8] Bajait, C., & Thawani, V. (2011). Role of zinc in pediatric diarrhea. Indian Journal of Pharmacology, 43(3), 232–235. http://doi.org/10.4103/0253-7613.81495

[9] 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.

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

(P=0.00). Table 26 below summarizes the coverage of the 4 vaccines assessed in Garissa County

Table 26: Childhood immunization Coverage

Vaccine	N=809	% 2016	% 2017	% 2017 Card &recall
BCG vaccination	Scar	94.4%	95.4%	
OPV 1	Card	35.6%	52.4%	
	Recall	58.5%	44.5%	
OPV 3	Card	34.6%	52.3%	
	Recall	57.4%	44.1%	
Measles at 9 months *N=777*	Card	32.9%	49.3%	
	Recall	59.8%	45.1%	
Measles at 18 months *N=617*	Card	16.6%	40.0%	
	Recall	50.2%	39.4%	

8.2 Vitamin A supplementation

Vitamin A supplementation twice annually is a proven cost effective high impact nutrition intervention for reducing childhood mortality[11] . Improving Vitamin A status is associated with a 24% reduction in all-cause mortality, 27% reduction in deaths from diarrhea, 15% decrease in diarrhea incidence and a 50% decrease in incidence of measles[12].VAS is therefore considered a key intervention in reducing the under-five mortality rate (U5MR) hence contributing in achieving Sustainable Development Goals (SDG) 3 of ending preventable deaths of newborns and under-five children by 2030

Vitamin A assessment was through both card and recall where the caregivers were shown the samples. The source was also probed to ascertain if the children had received from facility or through campaigns and outreach. Overall, 42.8% of children 6-59 months old were reported to have received Vitamin A in past one year compared to 63.9% unveiled in 2016. Figure 5 below show the coverage of vitamin A among children 6-11 months and 12-59 months

Of all vitamin A supplemented children (N=357), Almost all were reported to have been received from facility or outreach (96.3%). 52.7% of children supplemented by Vitamin A were verified by card.

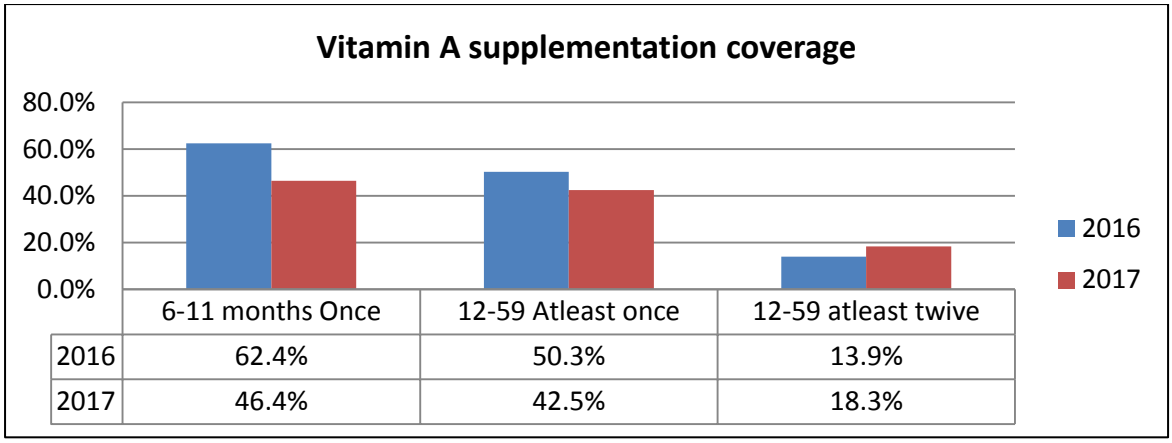
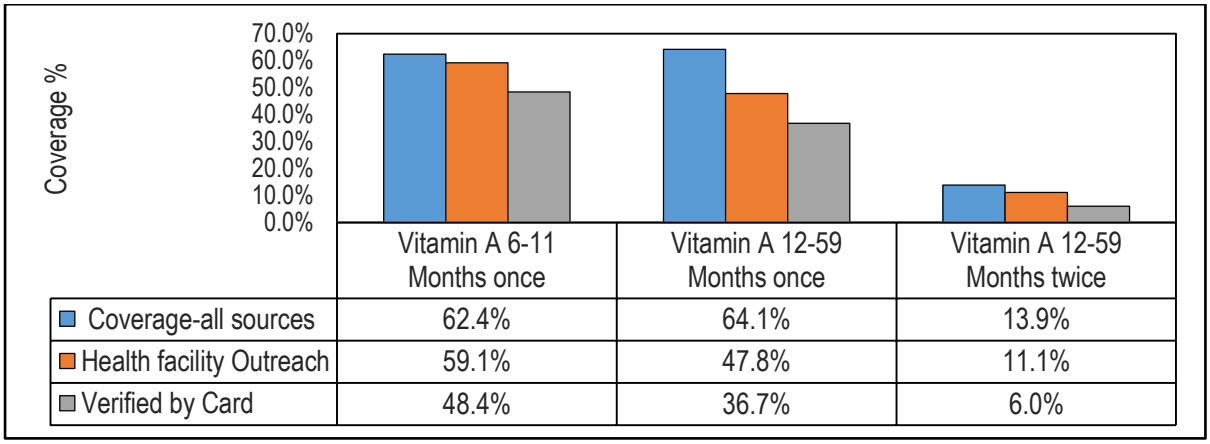


Figure 5:Vitamin A supplementation coverage

[11] UNICEF (2007) Vitamin A Supplementation: A Decade of Progress. www.unicef.org/publications/files/Vitamin_A_Supplementation.pdf (accessed June15, 2015).

[12] Mayo-Wilson, E., Imdad, A., Herzer, K., Yakoob, M., & Bhutta, Z. (2011). Vitamin A supplements for preventing mortality, illness, and blindness in children aged under 5: Systematic review and meta-analysis. *Bmj,* D5094-D5094.

As shown in figure 6 below, there was a difference of the general vitamin A supplementation coverage compared to coverage by number of times vitamin A capsules were received from health facility/outreach and number of times vitamin A capsules received verified from the mother child health card. This indicates some children could have received vitamin A from other sources such a campaigns and sub-optimal documentation of vitamin A supplementation in the mother child health cards



	Vitamin A 6-11 Months once	Vitamin A 12-59 Months once	Vitamin A 12-59 Months twice
Coverage-all sources	62.4%	64.1%	13.9%
Health facility Outreach	59.1%	47.8%	11.1%
Verified by Card	48.4%	36.7%	6.0%

Figure 6: VAS coverage through Health facility/Outreach and verified by card

8.3 De-worming

Soil-transmitted worms, including roundworms, hookworms, and whipworms, are common in tropical and subtropical areas, and particularly affect children in low-income areas where there is inadequate sanitation. Heavy worm infection is associated with malnutrition, poor growth, and anemia in children[13].De-worming was assessed for children aged 12-59 months old. Based on the findings, only 16.4% of this age cohort of children was de-wormed at least twice as per the Kenya Ministry of Health policy guidelines.39.4% of the children was de-wormed at least once.

8.4 Micronutrient powder supplementation

Multiple micronutrient powders are single-dose packets of vitamins and minerals in powder form that can be sprinkled onto any ready to eat semi-solid food consumed at home, school or any other point of use. Multiple micronutrient powders have been developed as alternative way of providing micronutrients to populations where other interventions are difficult to implement. Multiple micronutrient powders have been shown to reduce the risk of iron deficiency and anaemia in infants and young children, 6-23 months of age[14].

8.4.1 **MNP program enrollment rate and consumption**

Assessment of MNPs was done to caregivers of children aged 6-23 months (N=265) through the aid of MNPs sachets. The assessment showed that only three children (1.1%) were enrolled in MNP program with 2 of them reported to have consumed in the last 7 days. The major reason for not being enrolled was that the caregivers do not know if the program exists. Table 27 below summarizes the reasons why children are not enrolled in the MNP program

[13] D. Robinson, C. Mayaan and K. Wesier (2015). Deworming drugs for soil-transmitted intestinal worms in children: effects on nutritional indicators, haemoglobin, and school performance

[14] WHO. (2011). Use of multiple micronutrient powders for home fortification of foods consumed by infants and children 6–23 months of age

Table 27: Reasons for not being in the MNP program

Reason N=265	n	%
Do not know about MNPs	230	87.8%
Discouraged from what i heard from others	23	8.8%
The child has not fallen ill, so I have not gone to health facility	10	3.8%
Health facility or outreach is far	1	0.4%
Child receiving therapeutic of supplementary foods	1	0.4%
Others reasons (*child not malnourished, out of stock, Child young*	1	0.4%

The low enrollment rate to the MNP program could be associated to the closure of MNP program in December 2016 that was supported by UN WFP and implemented by Mercy USA in partnership with the ministry of health.

9.0 MATERNAL NUTRITION

Maternal nutrition refers to the nutritional needs of women during the antenatal and postnatal period and also may refer to the pre-conceptual period .Maternal under-nutrition affects the health of both mothers and children and, as a result, has broad impacts on economic and social development. Under-nutrition in pregnant women is directly linked to intrauterine growth retardation (IUGR), which results in low birth weight, pre-maturity, and low nutrient stores in infants. Maternal under-nutrition also diminishes a woman's productivity, causing repercussions for herself, her family, her community, and the broader society.

9.1 Acute Malnutrition

Maternal nutrition was assessed by measuring MUAC of all women of reproductive age (15 to 49) in all sampled household. Analysis was further done for pregnant and lactating women. Based on the survey findings 5.8% of all women of women of reproductive age were malnourished (MUAC≤ 21.0 cm) and 1.2% of pregnant and lactating women were malnourished using the same criteria. Table 28 below shows the prevalence of acute malnutrition among pregnant and lactating women and women of reproductive age (WRA) respectively.

Table 28: Prevalence of malnutrition among WRA, Pregnant and Lactating Women

Indicator	N	n	%
MUAC< 21cm for all women of reproductive age(WRA)	537	31	5.8%
MUAC<21cm for Pregnant and Lactating Women(PLW)	332	4	1.2%

9.2 Iron folic supplementation

Pregnant women require additional iron and folic acid to meet their own nutritional needs as well as those of the developing fetus. Deficiencies in iron and folic acid during pregnancy can potentially negatively impact the health of the mother, her pregnancy, as well as fetal development. WHO recommends daily consumption of 60mg elemental iron and 0.4mg folic acid throughout the pregnancy[15].These recommendations have since been adopted by Kenya

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

government in its 2013 policy guidelines on supplementation of iron folic acid supplementation (IFAS) during pregnancy.

During the survey, iron folic supplementation was assessed by asking mothers of children below 2 years if they consumed iron folate in their most recent pregnancy. The assessment findings showed that 75.1% of women with children below two years had been supplemented with iron folate supplements during their most recent pregnancy. The mean number of days for iron folic acid consumption was 32.6 days. 94.5% of the interviewed mothers had taken iron folate supplement for less 90 days and only 5.5% had taken IFA for 90 days or more as shown in table 29 below.

Table 29: Iron-folic Acid supplements consumption in days

Categories of IFA Consumption (In days) (N=217)	No of women(n)	**%**
< 90 days	189	94.5%
90-180 days	11	5.5%
>180 days	0	0.0%

10.0 WATER SANITATION AND HYGIENE

WASH typically refers to activities aimed at improving access to and use of safe drinking-water and sanitation as well as promoting good hygiene practices (e.g. handwashing with soap at critical times) .Lack of access to WASH can affect a child's nutritional status in many ways. Existing evidence supports at least three direct pathways: via diarrheal diseases, intestinal parasite infections and environmental enteropathy. WASH may also impact nutritional status indirectly by necessitating walking long distances in search of water and sanitation facilities and diverting a mother's time away from child care[16].This section focus on the following WASH intervention categories; Water quantity, water quality, Sanitation and Hygiene

10.1 Main Source of Water

56.1 % of households sampled obtain their drinking water from safe sources namely; piped water, borehole, protected spring or protected shallow wells as shown in figure 7 below. The rest (43.9%) obtained water from unsafe sources

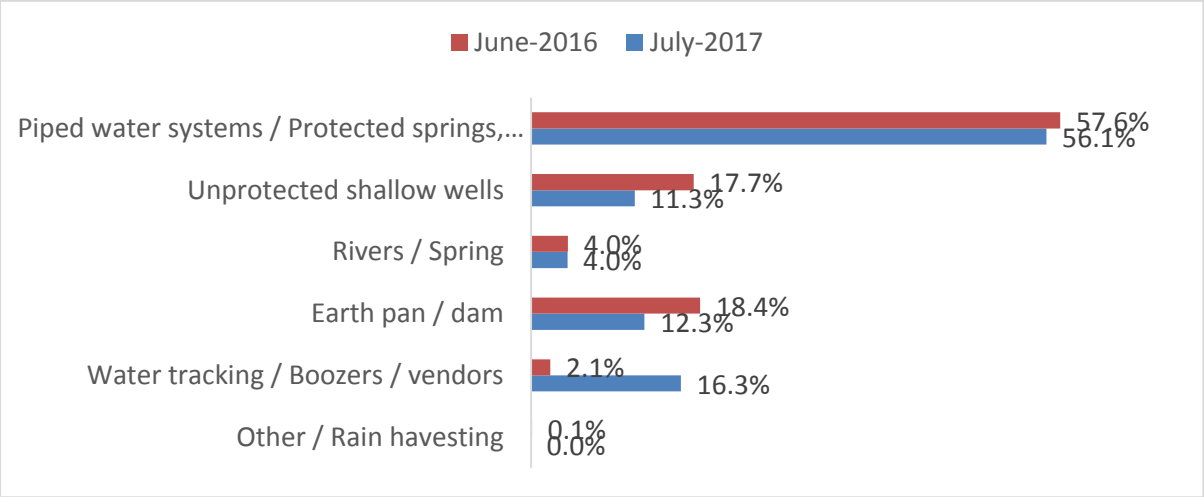


Figure 7: Main sources of water

[16] Fenn B, Bulti AT, Nduna T, Duffield A, Watson F (2012). An evaluation of an operations research project to reduce childhood stunting in a food-insecure area in Ethiopia. Public Health Nutr. 15(9):1746–54.

10.2 Distance to water source and queuing time

According to SPHERE handbook for minimum standards for WASH, the maximum distance from any household to the nearest water point should be 500 meters. It also gives the maximum queuing time at a water source which should be no more than 15 minutes. Analysis of distances to water sources indicated 47.5 % of the households obtained their water from sources not more than 500m or less than 15 minutes walking distance which was a decrease from 60.6 % in 2014.Table 30 below shows the distance to the water source.

Table 30: Distance to water source

N=657	June 2016	N	July 2017
Less than 500m (Less than 15 minutes)	47.5%	412	62.7%
500m to 2km(15min to 1hr)	39.3%	155	23.6%
More than 2km(1 to 2hrs)	13.0%	74	11.3%
Other	0.2%	16	2.4%

63.3 % of the caregivers queued for water for less than 30 minutes compared to 13.9% indicating less residents queue for long. 23.2% of the respondents queue for more than 1 hour compared to 57.2% reported in 2016 as shown in Table 31 below.

Table 31: Queuing time at the water point

Queueing time N=289	June 2016	N	July 2017
< 30 minutes	13.9%	183	63.3%
30 to 60 minutes	28.9%	39	13.5%
More than 1 hr	57.2%	67	23.2%

10.3 Cost of water

60.9 % (400) of the households pay for water, among them 42.0% (168 HH) pay daily rate per 20L Jerican while 58.0% pay monthly. The mean price of water per 20 litre Jeri can is Ksh 8.8 while the mean price per month was Ksh 1,495 as shown in Table 32 below.

Table 32: Cost of water

	N	Min	Max	Mean
How much per 20 liter Jerrica	168	3	40	8.8
How much is paid per month	232	5	5000	1,495.2

10.4 Water utilization

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

person per day. Analysis of water utilization in the sampled households showed that 77.4% use the recommended at least 15 liters per person per day.

10.5 Methods of drinking water treatment and storage

Only 6.1% of the households reported to treat their drinking water and 45.0% of them use chemicals while 55.0% boil water as shown in Table 33 below

Table 33: Methods used for treating drinking water

Water Treatment method N=40	n	Jul-17	Jun-16
Use of chemicals	18	45.0%	10.8%
Boiling	22	55.0%	88.5%
Use of herbs	0	0.0%	0.0%
Use of filter	0	0.0%	0.8%
Other	0	0.0%	0.0%

60.9% of the caregivers store their drinking water properly in closed containers/jerry cans where it is less likely to have physical water contamination. This is a drop from 93.1% reported in 2016 as show in Table 34 below;

Table 34: storage of water

N=699	n	Jul-2017	Jun-16
Open container/Jerri can	400	60.9%	6.9%
Closed container/Jerri can	257	39.1%	93.1%

10.6 Hygiene

Hygiene refer to the practice of hand washing with soap after defecation and disposal of child feces prior to preparing and handling food, before eating, and, in health care facilities, before and after examining patients and conducting medical procedures. Hand washing with soap is the single most cost-effective intervention in preventing diarrhea diseases[17].The four critical hand washing moments include; after visiting the toilet/latrine, before cooking, before eating and after taking children to the toilet/latrine. 75.0% (458) of the caregivers were aware about hand washing. Only 23.6% of the caregivers practice hand washing in all the 4 critical times. As shown in table 35 below, majority (95.2%) of the caregivers wash hands before eating

[17] Borghi, J., Guinness, L., Ouedraogo, J., & Curtis, V. (2002). Is hygiene promotion cost-effective? A case study in Burkina Faso. Trop Med Int Health, 7(11), 960-969. doi:10.1046/j.1365-3156.2002.00954.x

Table 35: Hand washing at critical times

HYGIENE	n	Jul-17	June 2016
After toilets	364	79.5%	74.3%
Before cooking	229	50.0%	53.6%
Before eating	436	95.2%	95.6%
After taking children to toilet	130	28.4%	43.9%
Hand washing in all 4 critical times	**108**	**23.6%**	**33.9%**
Hand washing by soap and water	219	47.8%	59.6%
SANITATION			
Open defecation(bushes)	198	30.1%	32.4%

Less than half (47.8%) 219 of the caregivers use soap and water for hand washing, 52.2% use water only and some use soap when they can afford it.

10.7 Sanitation

Sanitation refers to provision and use of facilities and services that safely dispose of human urine and faeces, thereby preventing contamination of the environment. Inadequate sanitation is a major cause of disease world-wide and improving sanitation is known to have a significant beneficial impact on health both in households and across communities.

30.1 % of the respondents relieve themselves in the bushes (open defecation) which a reduction from 32.4% in 2016 as shown in table 36 below. 69.9% of the households own traditional/improved latrine which is an increase from 42.3% reported in 2016. This could be attributed to the ongoing Community Led Total Sanitation (CLTS) program implemented by County Government Department of health Services with support from UNICEF.

Table 36: Latrine ownership and utilization

N=700	n	%(June 2017)	%(June 2016)
Open defecation(bushes)	227	30.1%	32.4%
Neighbor, shared tradition/improved latrine	227	69.9%	25.1%
Own traditional/improved latrine			42.3%

11.0 **FOOD SECURITY**

Food security is said to exist when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. This requires a nutritionally diverse diet. The four dimensions of food security are: availability, accessibility, stability, and meeting nutritional requirements. Garissa County was classified in Stressed Phase (IPC Phase 2) for all livelihood zones during the short rain assessment in February 2017[18] . The food security situation in the county is

[18] Garissa county 2015 short rains food security assessment report-February 2016

influenced by rainfall performance, resource-based conflicts, human-wildlife conflict, floods and prevalence of livestock diseases. The long rains performance was poor in amount which worsened livestock body condition as a result or reduced pastures and browse.

11.1 Household dietary diversity

Household dietary diversity refers to the number of unique foods consumed by household members over a given period. It is meant to reflect, in a snapshot form, the economic ability of a household to access a variety of foods

Dietary diversity was assessed based on 24 hours' recall. Sweats consumption was the highest consumed food products (92.7%) followed by milk, cereals and oils at 89.5%, 88.3% and 85.5%, respectively. Fish was the least consumed foods at 1.8% as shown in figure 8 below.

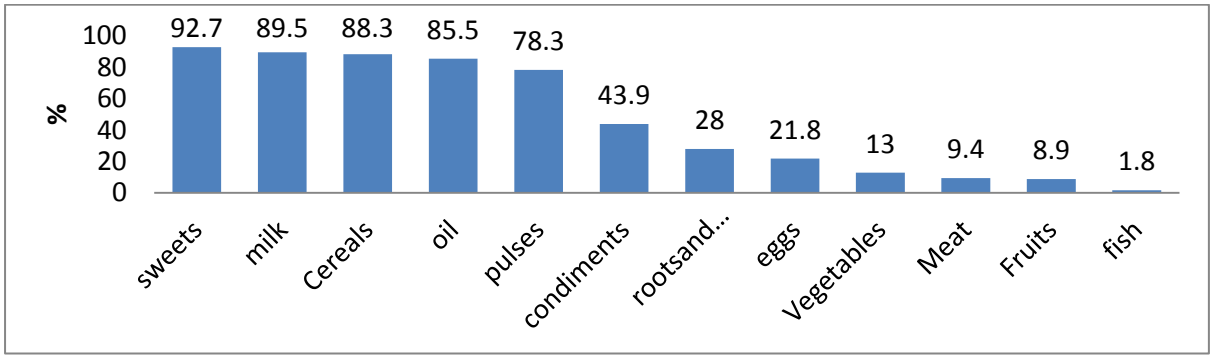


Figure 8: Household dietary diversity (24hrs recall)

Further analysis showed that 93.0% of the households were consuming at least 4 food groups while 6.9% were consuming less than 4 food groups.

11.2 Household consumption of micronutrient rich foods

Majority of the households reported to consume protein (95.5%), staples (85.5%) and Oil/Fat (80.9%) frequently. Vitamin A rich foods, Iron and fruit foods are consumed less frequently as shown in figure 9.

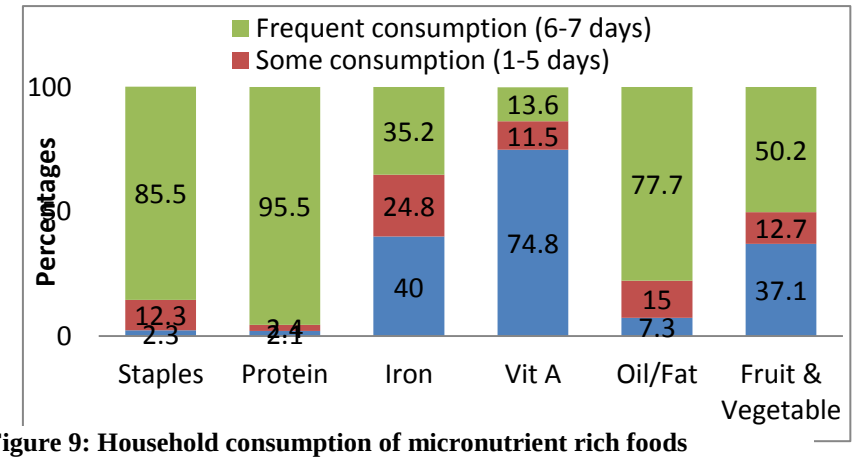


Figure 9: Household consumption of micronutrient rich foods

Foods from protein food groups were consumed on average the highest number of days (6.8) while foods from iron food groups were consumed for the least number of days (3.2) as shown in figure 10 below.

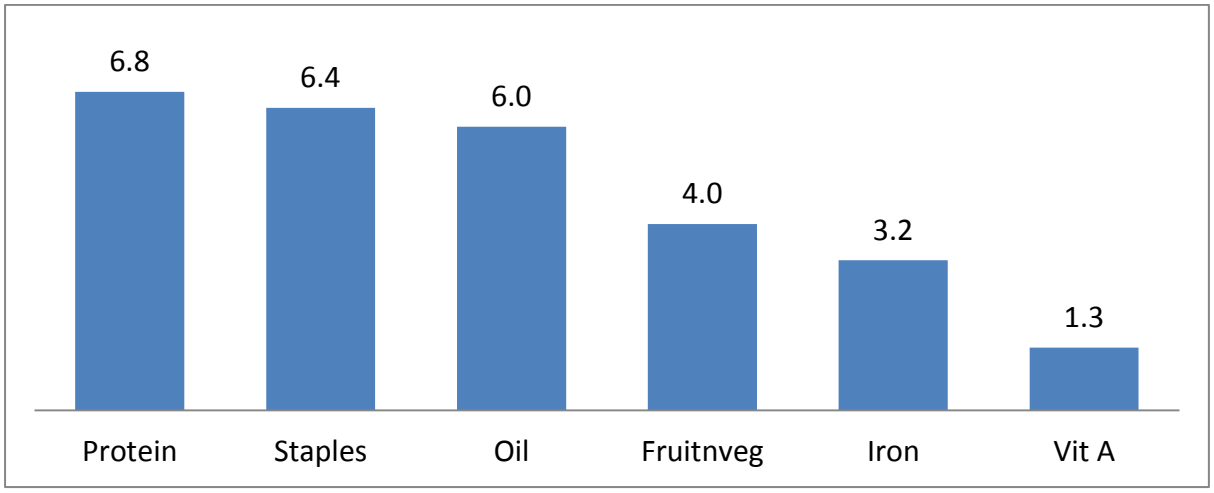


Figure 10: Average days food groups are consumed

11.3 Household food consumption score

The Food Consumption Score (FCS) is a composite score based on dietary diversity, food frequency, and the relative nutritional importance of different food groups.It is used to ccompare food consumption across geography and time, target households in need of food assistance, monitor seasonal fluctuations in food consumption and provide key diet information to early warning analyses

88.5% households had acceptable food consumption score slightly lower from 97.6% reported in 2016.Only 1.7% households had poor food consumption score as shown in Table 37 below.

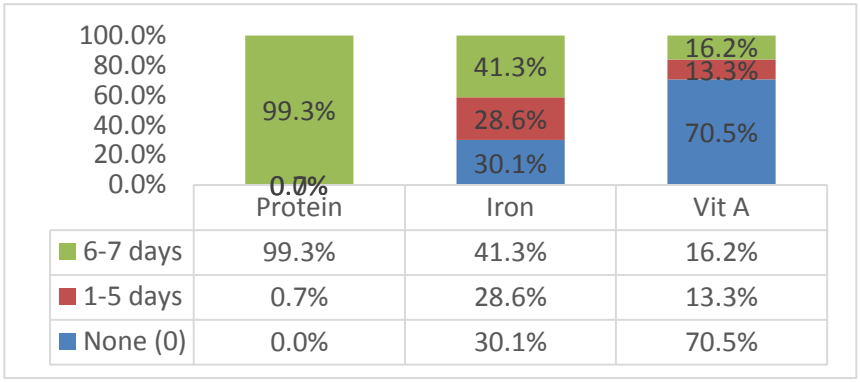
Table 37: Household food consumption score

Threshold	Nomenclature	Proportion of Households a	
		June 2017	July 2016
0 - 21	**Poor food consumption…** manly cereal and sugar	1.7%	0.14%
21.5 - 35	**Borderline food consumption** Cereal, legumes, milk, oil, sugar	9.8%	2.29%
>35.5	**Good food consumption** Cereal, legumes, milk, condiment, flesh meat, vegetable, oil, sugar	88.5%	97.57%

11.4 Food consumption score nutrition quality analysis (FCS-N)

The FCS-N is an analytical tool which uses data derived from the Food Consumption score module to provide information on three specific nutrients: hem iron, vitamin A and protein. The FCS-N helps to understand household level nutrient adequacy and attempts to improve the link between household food access/consumption and nutritional outcomes

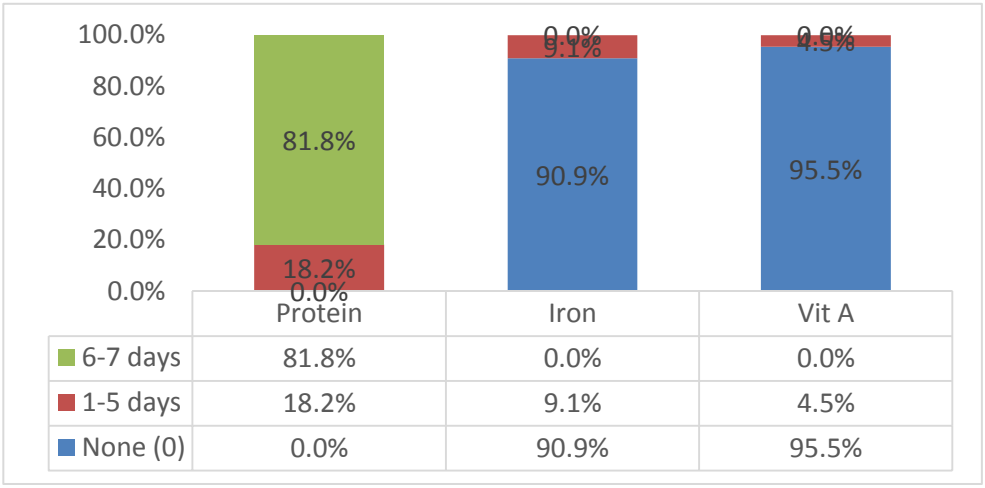
Majority of the households in the acceptable food consumption score reported to consume protein (99.3%) for 7 days or more as shown in figure 11. On the other hand 41.3% and 16.2% of the households were not consuming home-iron rich foods and vitamin A rich foods, respectively.



	Protein	Iron	Vit A
6-7 days	99.3%	41.3%	16.2%
1-5 days	0.7%	28.6%	13.3%
None (0)	0.0%	30.1%	70.5%

Figure 11: Frequency of consumption of vitamin A, protein, and heme iron rich foods by FCS Acceptable households

On the other hand, majority (81.8%) of the households in the borderline/poor food consumption score reported to consume protein rich foods for at least 7 days and none (0%) was consuming heme-iron and Vitamin A rich foods. 99.3% of households with acceptable food consumption score were consuming protein rich foods for at least 7 days as shown in figure 12



	Protein	Iron	Vit A
6-7 days	81.8%	0.0%	0.0%
1-5 days	18.2%	9.1%	4.5%
None (0)	0.0%	90.9%	95.5%

Figure 12: Consumption of Vitamin A, Protein, Heme iron rich foods by FCS poor/Borderline households

11.5 Coping Strategy Index

The coping strategy index assesses the extent to which household cope when they experience food shortage, lack food or resources to buy food. It is based on five coping strategies, the average times of each strategy in a week and a score assigned to each strategy. The weighted CSI was 13.0 with the highest numbers of the households relying on less preferred and limit portion sizes as show in table 38 below. This was an improvement compared to 2016 weighted CSI 0f 13.23.

Table 38: Household coping strategy

Coping Strategy	**No. of Households**	**Frequency Score (0-7)**	**Severity Score (1-3)**	**Weighted Score**
Rely on less preferred or less expensive foods	94	1.8	1	1.78
Borrow foods from relatives or friends	83	1.7	2	3.30
Limit Portion sizes	94	1.9	1	1.86
Restrict consumption by adults so that children can feed	63	1.4	3	4.24
Reduce the number of meals	89	1.8	1	1.81
Total Weighted Coping Strategy Index		**13.0**		

12.0 **RECOMMENDATIONS**

The table 39 below summarizes recommendation for the survey findings, responsible organization and the implementation timelines

Table 39: Summary of the survey recommendations

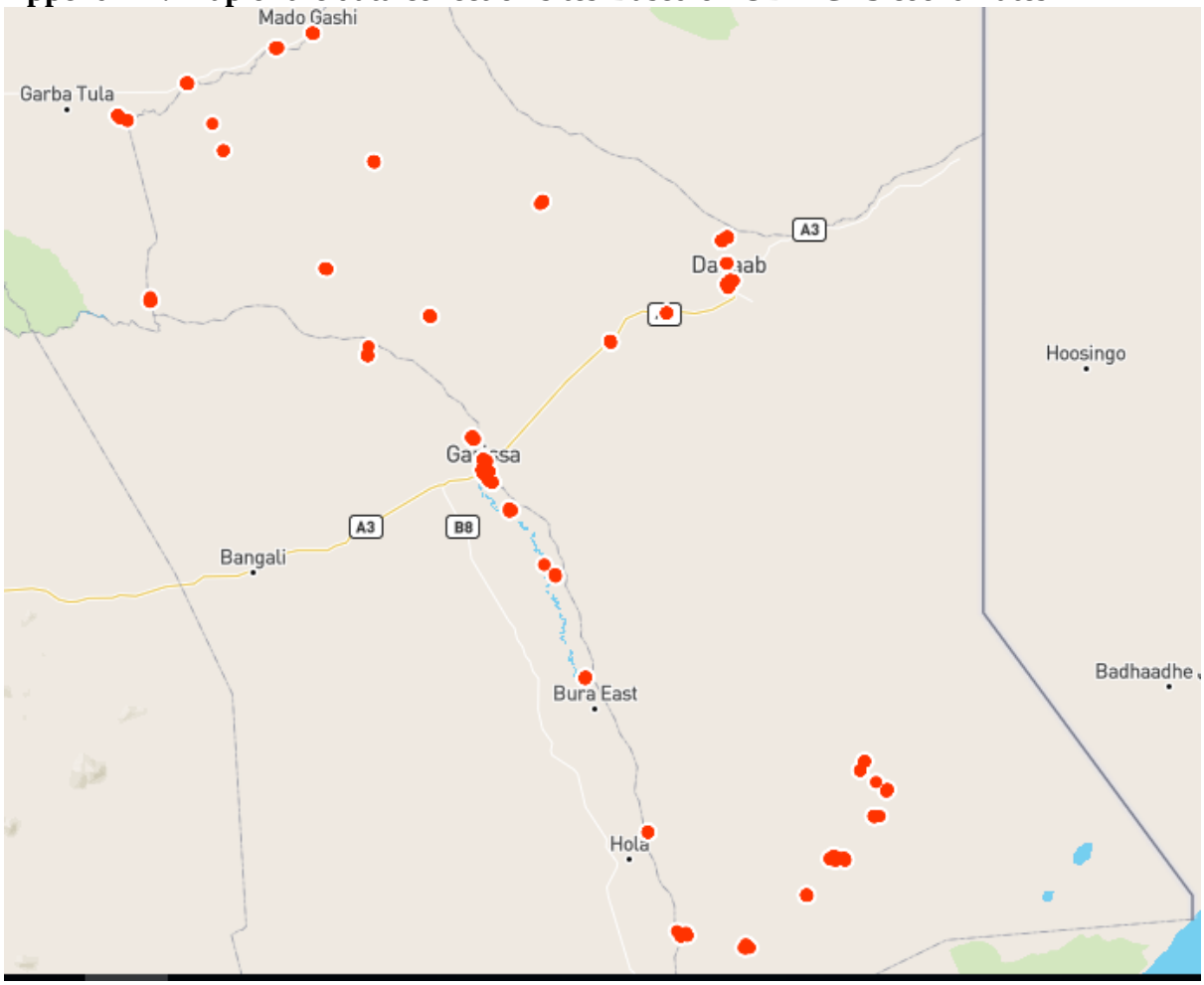
FINDINGS	WAY FORWARD	ACTION BY	TIMELINE
Health and Nutrition **GAM 16.3% (CRITICAL)**	Revive ORT "corners" at facility/outreach sites to ensure treatment modalities for diarrhoea cases are administered promptly	MOH	Oct 2017
	Continue scaling-up HINI coverage	MoH with Support by partners	Continuous
	Initiate active case findings, referral and defaulter tracing	MOH	Continuous
	Conduct county wide SLEAC and a SQUEAC Surveys to esbalish barriers and booster of IMAM service coverage to inform programming.	MoH with Support by partners	Dec 2017
	Train Couny and Subcounty health management teams and frontline health workers on Nutrition IMAM surge model and initiate its implementation in the county	MoH with Support by partners	January 2017
	Adequate supply of nutrition commodities and stregthen timely reporting of OTP/SFP	MoH with Support by partners	Monthly
School enrolment/ Education levels	Scale up school enrolment drives and out of school programme	MOEST/UNICEF/ MoH/Partners	Continuous
	Strengthen the multi-sectoral forums where partners working in Education, Health, Nutrition, Livestock and Agriculture are brought on board.	MoH with Support by partners	Continuous
Vitamin A coverage	Strengthen routine vitamin A supplementation program through existing health and community structures (CHS, mop up campaigns, ECDs etc)	MoH with Support by partners	September 2017
	Sensitize the community on the importance of VAS and deworming through local radio	MoH with Support by partners	September 2017
	Strengthen VIT A supplies, documentation and provide OJT to front line health workers	MoH with Support by partners	Monthly
Maternal Nutrition	Strengthen Iron folic acid supplementation among pregnant women	MoH with Support by partners	Continuous
	Scale up advocacy, communication and social mobilization on maternal infant and young child nutrition interventions through existing public forums	MoH with Support by partners	Continuous
	Scale up screening and referral of pregnant and malnourished women for malnutrition and management	MoH with Support by partners	Continuous
WASH	Public health education at outreach and facility level on simple water treatment techniques such as boiling to improve safety of drinking water at the household level	MoH with Support by partners	Continuous

	Promote critical hand washing practices compulsory with soap and water at facility, outreach sites and schools	MoH with Support by partners	Continuous
	Initiate and strengthen sectoral collaboration/linkage between nutrition and WASH through regular coordination meetings	MoH with Support by partners	Quarterly
	Support communication for development for best sanitation practices that will increase awareness thus triggering community led total sanitation (CLTS)	MoH with Support by partners	November 2017
	Continue provision water treatment chemicals to Households	MoH with Support by partners	Continuous
	Continue scale up of Community Led Total Sanitation (CLTS) particularly in areas with high rates of Open Defecation in the County	MoH with Support by partners	November 2017
Food security and livelihoods	Monitor trends of food and nutrition security situation on monthly basis Using NDMA Early Warning System for early detection and initiation of appropriate interventions to address impact of deteriorating FNS situation	MoH with Support by partners	Continuous
	Promote appropriate complementary feeding practices among member vulnerable populations	MoH with Support by partners	Continuous

Appendix 1 Summary of data plausibility report

CRITERIA	SCORE	INTERPRETATION
Missing/Flagged data	**0** (1.5 %)	Excellent
Overall sex ratio	**0** (p=0.859)	Excellent
Over all age distribution	**0** (p=0.451)	Excellent
Digit preference score (Weight)	**0** (2)	Excellent
Digit preference score (Height)	**0** (4)	Excellent
Digit preference score (MUAC)	**0** (3)	Excellent
Standard deviation WHZ	**0** (1.02)	Excellent
Skewness (WHZ)	**0** (0.11)	Excellent
Kurtosis (WHZ)	**1** (-0.20)	Excellent
Poisson Distribution	**3** (p=0.002)	Acceptable
Overall Score	**4%**	**Excellent**

Appendix 2: Map of the data collection sites-Based on ODK GPS coordinates



Appendix 3: Sampled Clusters

CLUSTER LOCATER FORM			
Geographical unit	**Cluster**	**Sub County**	**Ward**
Balambala Township	**RC**	Balambala	Balambala
Ohio town	1	Balambala	Balambala
Saka Town	2	Balambala	Saka
Danyare town	3	Balambala	Danyare
Garasweynow	4	Fafi	Bura
Kamuthe	5	Fafi	Nanighi
Jelow	6	Fafi	Fafi
hagarbul B	7	Fafi	Fafi
Jilomato	8	Hulugho	Hulugho
Kinisa	9	Hulugho	Sangailu
Bobtay	10	Hulugho	Sangailu
Songoley Wacha	11	Ijara	Ijara
Bula Sarman	12	Ijara	Masalani
Dahir	13	Ijara	Masalani
Mai	14	Ijara	Masalani
Ijara centre	15	Ijara	Ijara

Bula Wanga	16	Ijara	Ijara
BANANE TOWNSHIP	17	Lagdera	Banane
HAMEDDID	18	Lagdera	Banane
MADOGAHSE TOWNSHIP	19	Lagdera	Madogashe
ELDERE	20	Lagdera	Madogashe
JANJU	21	Lagdera	Madogashe
MAALIMIN TOWNSHIP	22	Lagdera	Maalim
QURAHEY	**RC**	Lagdera	Sabena
Bulla Township	23	Dadaab	Dertu
Labasigale	24	Dadaab	Labasigale
Bohole four	25	Dadaab	Damajale
Bulla Dayday A	26	Dadaab	Dadaab
Bulla Hud	27	Dadaab	Dadaab
Hamey	**RC**	Dadaab	Damajale
Bulla Kheir	28	Dadaab	Labasigale
Bulla Kawanja	29	Dadaab	Dadaab
Bulla Abak weynow	30	Dadaab	Dadaab
Bulla School	31	Dadaab	Abakaile
Bulla Crush	32	Dadaab	Dadaab
Bulla Madina	33	Garissa	Galbet
Bulla Gesto	34	Garissa	Galbet
Bulla Gadud	**RC**	Garissa	Galbet
Ngamia road	35	Garissa	Township
Chief Camp/ Bulla Hidaya/Utawala	36	Garissa	Township
Garissa Ndogo/ Maaalim Adan	37	Garissa	Township
Garissa Township	38	Garissa	Township
Bulla Punda	39	Garissa	Galbet
Raya	40	Garissa	Sankuri
Adan Hellay	41	Garissa	Sankuri
Bulla Ijara	42	Garissa	Waberi
Survey	**RC**	Garissa	Iftin
Dekabur	43	Garissa	Iftin
Bulla Iftin	44	Garissa	Iftin

The Garissa County SMART Nutrition Survey 2017 was made possible with support from various partners.