Samburu County SMART Survey Report

June 2018

Acknowledgement

Samburu County June 2018 SMART survey was led by the County Government of Samburu; Department of Health and made successful through the contribution of several health partners in the county.

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

- ☐ UNICEF
- ☐ World Vision Kenya
- ☐ Nutrition and Health Program plus
- ☐ Action against Hunger
- ☐ Feed the Children
- ☐ Afya Timiza

Special thanks to the Samburu County Nutrition Technical Forum and National Nutrition Information Technical Working group for their technical guidance during the survey. Last but not least the County Government of Samburu for creating an enabling environment during the data collection exercise and the Samburu County community for taking time to provide information which will be of importance in making informed decisions in the nutrition sector programming.

List of Abbreviations & Acronyms

ARI	Acute Respiratory Infection
BCG	Bacillus Calmette- Guerin
CIDP	County Integrated Development Plan
CSI	Coping Strategy Index
DHIS	District Health Information Software
ECDE	Early Childhood Development Education
ENA	Emergency Nutrition Assessment
FAO	Food and Agriculture Organization
FCS	Food Consumption Score
GAM	Global Acute Malnutrition
HDD	Household Dietary Diversity
HFA	Height for Age
IPC	Integrated food security Phase Classification
MDD-W	Minimum Dietary Diversity for Women
MNPs	Micro nutrients powders
M o H	Ministry of Health
MUAC	Mid Upper Arm Circumference
NDMA	National Drought Management Authority
OPV	Oral Polio Vaccine
ORS	Oral Rehydration Salts
SAM	Severe Acute Malnutrition
SD	Standard Deviation
SMART	Standardized Monitoring Assessment on Relief and Transition
SPSS	Statistical Package for Social Sciences
UNICEF	United Nation Children's Fund
WASH	Water Sanitation and Hygiene
WFA	Weight for Age
WFH	Weight for Height
W H O	World Health Organization
WRA	Women of Reproductive age

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Executive Summary

Introduction

The County Government of Samburu; Department of Health in collaboration with nutrition sector partners in the county carried out SMART survey in the entire county covering all the 3 sub counties. The survey was successfully carried out in June 2018.

Samburu County lies in the Northern part of Great Rift Valley of Kenya and covers an area of approximately 21,022.2 sq KMs. The county borders five counties; Turkana County to the Northwest, Baringo County to the Southwest, Marsabit County to the Northeast, Isiolo County to the East and Laikipia County to the South. The County estimated population is 292,200 people based on 2009 KNBS with an under-five population of 55,313 based County Department of Health projections.

The SMART Survey sought to find out the County nutrition situation with the results used for evidence based decision making and for future programing. The main objective of the survey was to determine the prevalence of malnutrition among the children aged 6- 59 months old and women of reproductive age (15-49 years) in Samburu County. Specific objectives included determining the immunization coverage for measles, Oral Polio Vaccines (OPV 1 and 3), and vitamin A supplementation in children aged 6-59 months, determining the prevalence of common illnesses among children 6-59 months, collecting information on possible underlying causes of malnutrition such as household food security, water, sanitation, and hygiene practices. Other objectives included; estimation of the use of zinc in diarrheal treatment in children, determining de-worming coverage for children aged 12 to 59 months, determining minimum dietary diversity for women of reproductive age and determining the coverage of IFAS among the among women with children below 24 months.

Methodology

The survey was cross sectional and descriptive by design. Standardized Monitoring and Assessment on Relief and Transition methodology was adopted in the study. Two stage sampling was used in the survey. The first stage involved random selection of clusters from the sampling frame based on probability proportion to population size (PPS). Emergency Nutrition Assessment (ENA) for Standardized Monitoring for Assessment for Relief and Transition (SMART) July 2015 was used in calculation of sample size. Household was used as the sampling unit in the second stage sampling or basic sampling unit. The sample size obtained using ENA software (532 households) was used as the survey sample size. Based on logistical factors, it was possible to visit 14 households per cluster per day translating to a minimum of 38 clusters. Simple random sampling was used in household selection.

Data Collection was done for 6 days by 6 teams and 2 days by 2 teams. For the data collection purpose, ODK questionnaire was used. Every team was composed of 4 members. The teams were trained for 4 days prior to field work. On the 3rd day of the training, a standardization test was done by every participant. The purpose of standardization test was to test the team's accuracy and precision in taking anthropometric measurements. The data collection tool was pilot tested in a cluster not selected to be part of the survey o the fourth day of the training.

Anthropometric data processing was done using ENA software version 2015 (July). The ENA software generated weight-for-height, height-for-age and weight-for-age Z scores to classify them into various nutritional status categories using WHO standards and cut-off points. All the other quantitative data were analyzed in Ms. Excel and the SPSS (Version 20) computer package.

Results Summary

Table 1: Results Summary

RESULTS SUMMARY				
ANTHROPOMETRIC RESULTS				
WHO Standards	N	% (With 95% CI)	N	% (with 95% CI)
Design Effect (WHZ= 1.30)	June 2017		2018	
Prevalence of GAM based on WHZ (<-2SD) and or edema	524	18.3 (14.6-22.7	508	15.7 % (12.4 - 19.8)
Prevalence of SAM based on WHZ (<- 3 SD) and/or edema	524	3.8 (2.4-6.1)	508	4.1 % (2.6 - 6.5)
Prevalence of stunting based on HFA (<-2SD)	517	34.0(28.4-40.1)	486	35.8 % (30.9 - 41.0)
Prevalence of Severe stunting based on HFA (<-3SD)		10.6 (8.2-13.7)		9.7 % (7.0 - 13.2)
Prevalence of underweight based on WFA(<-2 z score)	525	34.3 (28.6-40.4)	503	31.6 % (26.0 - 37.8)
Prevalence of severe underweight based on WFA(<-3 z score)		6.6 (4.6- 9.4)		7.4 % (5.2 - 10.4)
CHILD MORBIDITY (Based on 2 weeks recall)				
Indicator	**Type of illness**	**% June 2017**	**n(June 2018**	**% June 2018**
Illness in the last 2 weeks prior to the survey	All	40.8	85	42.9
	Fever with chills	20.3	52	26.4
	ARI	58.1	126	64
	Watery diarrhea	22.6	25	12.7
	Bloody diarrhea	1.4	2	1.0
Therapeutic Zinc supplementation for diarrhea management		50		84
VITAMIN A SUPPLEMENTATION AND DEWORMING				
Indicator	**No. of times**	**% (June 2017**	**n(June 2018)**	**% June 2018**
Vitamin A Supplementation (6-11m)	Once	47.6		54.7
Vitamin A Supplementation 12-59m)	Once	71.0		41.5
Vitamin A supplementation 12 to 59 m)	Twice	26.8		28.6
Vitamin A supplementation 6- 59 months	Once	78.5		43

Vitamin A supplementation 6- 59 months	Twice	32.8		
Deworming (12- 59 m)	Once	63.2		59.3
Deworming (12- 59 m)	Twice	32.8		26.7
IMMUNISATION				
Antigen	**Means of Verification**	**%(June 2017)**	**n(June 2018)**	**%(June 2018)**
BCG	Presence of Scar	89.3		93.9
OPV1	Card and Recall	92.7	459	93
OPV3	Card and Recall	85.4	459	90
Measles at 9 months	Card and Recall	81.4	433	84.8
Measles at 18 months	Card and Recall	24.5	343	57.4
MATERNAL NUTRITION				
Indicator	**Description**	**% June 2017)**	**n(June 2018)**	**% June 2018)**
MUAC< 21.0 cm	Women of reproductive age	10.0	433	10.4
MUAC< 21.0 cm	Pregnant and lactating	7.0	246	10.2
Women supplemented with FeFo	Mothers of children less than 2 years	77		72.2
Pregnant women consuming FeFo	270 days	0.0		0
Pregnant women consuming FeFo	90 days and above	56	96	53
Average time for IFA consumption (days)	Mean No. of days FeFo was consumed	89.7 days		85.6 days
WATER HYGIENE AND SANITATION				
Indicator	**Description**	**% June 2017**	**n(June 2018)**	**% June 2018**
Households obtaining drinking water from safe sources		36.6		26.5
Households obtaining water from sources less than 500 m		26.0		45
Household treating their drinking water		9.2	87	16.5
Handwashing in the 4 critical times		5.0	76	26
HOUSEHOLD AND WOMEN DIETARY DIVERSITY				
Indicator	**Description**	**%June 2017**	**n(June 2018**	**%June 2018**
Households consuming more than 5 food groups		25.0		35.5
Women consuming more than 5 food groups (MDD-W)		21.3		34.02
FOOD CONSUMPTION SCORE AND COPING STRATEGY INDEX				

Households with acceptable FCS		71.5		68.1
Coping Strategy Index	Index is given as a number not Percentage	26.0		18.6

Conclusion

The Nutrition Status of children in Samburu County improved in comparison with a SMART survey conducted in the same season in 2017. However, the nutrition status of children in the County is still in the critical phase (WHO Classification) with a global acute malnutrition of 15.7%. There was a slight increase in children with Severe Acute Malnutrition compared to the same period in 2017 with a SAM rate of 4.1%. There was a notable deterioration of children who were stunted compared to similar season in 2017 where the stunting rate was 34.0% compared to June 2018 at 35.8%.

In regards to morbidity status, the situation remained nearly same as it was in 2017 at 40.9% compared to 42.9% in June 2018. The major illnesses affecting children in the County were, ARI/cough at 64% and fever with chills like malaria at 26.4%. Watery diarrhea reduced significantly from 22.6% in 2017 to 12.7% in 2018. High morbidity levels could be attributed to high stunting and wasting levels as well as heavy rains in the county especially for fever with chills like malaria. Though there was a considerable reduction in diarrhea cases, the prevalent cases could be attributed to high open defecation rates in the county at 74%, low rates of households treating drinking water at 16.5% and number of households getting water from improved sources at 26.5%. There was a significant improvement in handwashing behavior especially caregivers washing hands in four critical times at 26% in 2018 compared to a similar period in 2017 at 5%.

In terms of vitamin A supplementation and deworming, fewer children were supplemented with vitamin A compared to the previous period in 2017. 54.7% of children 6 to 11 months were supplemented with vitamin A. This represents an improvement compared to a similar period in 2017 at 46.7%. 41.5% of children 12-59 months were supplemented with vitamin A once with 28.6% supplemented twice. This was a deterioration compared to a similar period in 2017 where 71.0% were supplemented once and 26.8 supplemented twice. Deworming rates in the county remained low at 59.3% for children 12-59 months dewormed once. This was a slight decrease compared to similar period in 2017 at 63.2%. Children dewormed twice was much lower at 26.7%. The reduction in Vitamin A supplementation could be attributed to limited access to health services in the second semester of 2017 following a country wide nurse's strike that rendered most health facilities closed.

Maternal nutrition status among women of reproductive age (15-49 years) based on MUAC remained nearly the same at 10.4% compared to similar season in 2017 at 10.0%. However, there was a significant deterioration in nutrition status of Pregnant and Lactating women in June 2018 at 10.2% compared to June 2017 at 7%. There was a decrease in proportion of mothers with children under two years who consumed Iron and Folate supplements from 77.0% in 2017 to 72.2% in 2018. None of pregnant or lactating mothers consumed the supplements the supplements for the recommended period of 270 days. Majority at 47% consumed for less than 90 days, 48% consumed between 90 to 180 days with only 5% consuming for more than 180 days. The average number of days the PLW consumed the supplements was 85.6 days

There was significant improvement in food security indicators for both mothers and households in the County compared to similar period in 2017. The proportion of households consuming foods from more than 5 food groups improved significantly form 25.2% in 2017 to 35.5% in 2018. The proportion

of Women of reproductive age who consumed foods from more than 5 food groups also improved form 21.3% in June 2017 to 34.02% in June 2018. Major food consumed included Condiments, cereals, sugars, oils and fats, vegetables and milk and products.

Recommendations

Based on the survey findings the following actions were recommended

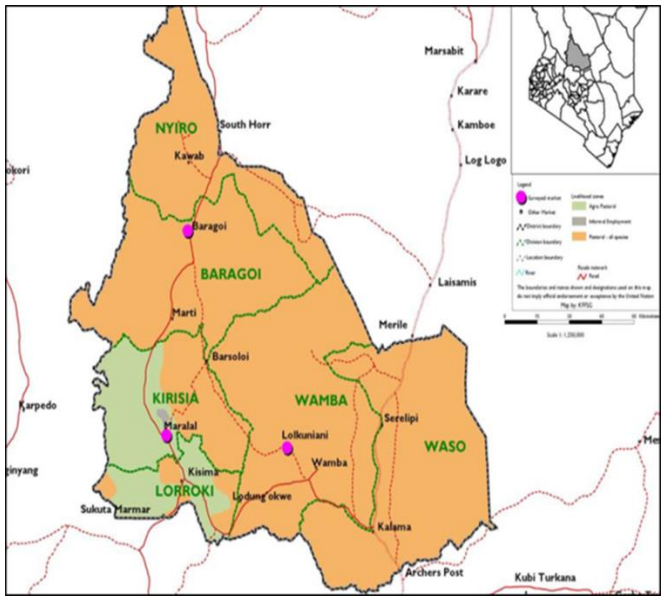
- Operationalization of BFCI in community units for community resilience
- Operationalization of County Nutrition MSP and through quarterly stakeholders meetings and monitoring through financial tracking tools
- Scale up growth monitoring in ECDEs
- Procurement and distribution of water treatment chemicals
- Hygiene promotion in all ECDE centres.
- Distribution and supplementation of MNPs
- Dietary diversifications through food demonstrations, Kitchen gardening
- Scale up of IMAM surge in all health facilities offering IMAM services
- Targeted Integrated Outreaches in selected hot spot

1.0. Introduction

1.1. Background

Samburu County is situated in the Northern part of Great Rift Valley and covers an area of approximately 21,022.2 sq KMs. The county borders five counties; Turkana County to the Northwest, Baringo County to the Southwest, Marsabit County to the Northeast, Isiolo County to the East and Laikipia County to the South.

The County estimated population is 292,200 people with an under-five population of 55,313 (2018 MoH projections)



The County has three sub-counties namely Samburu North, Samburu East and Samburu Central and three main livelihood zones: pastoral all species (56.6%), agro-pastoral (37%) and formal employment/casual waged labour (6.4%) (SRA Report Feb 2018)

Figure 1: Samburu County Map

1.2. Justification of the Survey

SMART survey carried out in Samburu County in June 2017 flagged critical nutrition status for both women and children in the county. The county global acute malnutrition was at critical state at 18.3% with a SAM rate of 3.8%. The February 2018 Short Rains Assessment conducted in Samburu County classified the county in the Stressed food insecurity phase (IPC Phase 2) in both pastoral and agro-pastoral livelihood zones with localized pockets in Nachola, Nyiro and Ndoto wards classified in Crisis (IPC Phase 3).

The results of the survey were designed to give a clear picture of the nutrition situation in the County. The results formed part of long rain assessment report and IPC nutrition analysis.

1.3. Survey Timing

Samburu County SMART Survey was done in June 2018. At this season, the County experiences continental rains. The survey fits in to long rain assessment.

Table 2: SMART Survey timing

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	…	…ec
Season	Drought			Long Rains		Continental Rains			Short Rains	

SMART Survey

Source: National Drought Management Authority

1.4. Survey Objectives

The main objective of the survey was to determine the prevalence of malnutrition among the children aged 6- 59 months old and women of reproductive age (15-49 years) in Samburu County

Specific Objectives

- To determine the prevalence of acute malnutrition among children aged 6-59 months
- To determine the nutrition status of women of reproductive age (15 to 49 years) based on MUAC
- To determine the coverage of IFAS among women with children below 24 months.
- To determine minimum dietary diversity for women of reproductive age
- To determine the immunization coverage for measles, Oral Polio Vaccines (OPV 1 and 3), and vitamin A supplementation in children aged 6-59 months
- To determine de-worming coverage for children aged 12 to 59 months
- To estimate the use of zinc in diarrheal treatment in children
- To determine the prevalence of common illnesses e.g. diarrhea, measles, ARI.
- To collect information on possible underlying causes of malnutrition such as household food security, water, sanitation, and hygiene practices

2.0. Methodology

2.1. Survey Design

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

2.2. Sampling Plan

2.2.1. Sampling Population

The study population included the entire population in Samburu County. It is estimated that the County has 292,200 people with total children 0 -59 months 55,313. All villages (clusters/sampling units) in Samburu County which are accessible, secure or not deserted were included in the primary sampling frame.

2.2.2. Sampling Methods and Sample Size Calculation

Anthropometric Sample Size Calculation

Two stage sampling was used in the survey. The first stage involved random selection of clusters from the sampling frame based on probability proportion to population size (PPS). Emergency Nutrition Assessment (ENA) for Standardized Monitoring for Assessment for Relief and Transition (SMART) July 2015 was used in calculation of sample size. Table 1 below illustrates the values used in ENA for sample size calculation and the rationale of using each value.

Table 3: Sample Size Calculation

Parameters	Estimates	Rationale
Estimated prevalence (GAM)	14.6%	• The lower limit of SMART survey 2017 where prevalence was 18.3% (14.6- 22.7, 95% C.I). Since the drought situation is better as at April 2018 (Stable) across all livelihood zone compared to April 2017 where the situation was at Alarm.
±Desired precision	3.5%	• Based on SMART survey nutrition guidelines and guided by the current prevalence
Design effect	1.2	• Guided by June 2017 SMART Survey to cater for heterogeneity
Average household size	5.9	• Based on 2017, SMART survey
Proportion of under-five	18.93%	• DHIS County estimates
Non-response rate	3.0%	• Based on SMART Survey June 2017
Households	525	• Based on ENA Calculation
Children	511	• Based on ENA Calculation
Clusters	38	• based on Sample size

2.3. Sampling Methods

2.3.1. First Stage Sampling

The first stage involved selection of clusters from a sampling frame (list of all updated clusters/villages with their respective populations). The sample size obtained using ENA software (532 households) was used as the survey sample size. Based on logistical factors (time taken to arrive from the clusters, introductions, sampling, inter household movement, lunch and time back to the base), it was possible to visit 14 households per cluster per day translating to a minimum of 38 clusters.

2.3.2. Second Stage Sampling

Simple random sampling was used in household selection. Led by a village guide, the survey teams developed a sampling frame in each of the village sampled during the 1st stage sampling in case such a list never existed. From the list the survey teams randomly selected 14 households where they administered household questionnaire (in all households) and anthropometric, morbidity and immunization questionnaire in household with children aged 6 to 59 months.

2.4. Data Collection

Data Collection was done for 7 days (from 19th June to 29th July 2018) by 6 teams. Every team was composed of 4 members who included 1 team leader, 2 measurers and 1 community guide. The teams were trained for 4 days prior to field work. The teams were trained on, the survey objectives, methodology, malnutrition diagnosis, anthropometric measurements, sampling methods, data collection tools, ODK data collection process as well as interviewing skills. A role play was included in the training to give the teams practical skills on data collection. On the 3rd day standardization test was done. The purpose of standardization test was to test the team's accuracy and precision in taking anthropometric measurements. The data collection tool was pilot tested in a cluster not selected to be part of the survey. Additionally, during the piloting the enumerators were required to undertake the entire process of the survey which included household selection, taking anthropometric measurements and also filling of the data collection forms.

The overall coordinator of the survey was Samburu County Nutrition Coordinator with 3 sub county coordinators supporting her. Supporting partners program officers also supported in supervision as well as offering technical guidance. Each of the supervisors was attached to one team to ensure thorough supervision throughout the survey. The supervisor's main responsibilities were to ensure that the methodology was followed, measurements were taken appropriately and tackling any technical issue which came up during data collection. On daily basis plausibility checks were done and gaps noted were communicated to all the teams before going to the field every morning.

2.5. Data Collection Tools and Variables

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

2.5.1 Variables Measured

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

Weight: Children weight measurements were taken using a digital weighing scale

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

MUAC: Mid Upper Arm Circumference (MUAC) on the left arm of children 6-59 months and that of women of reproductive aged 15-49 years was measured on the left arm. Determination of the midpoint of the upper arm of the left arm was done while the arm was at 90 degrees. MUAC reading was done while the arm was straight.

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: data on immunization status of all children 6-59 months was collected mainly on; BCG, OPV1, OPV3 and measles vaccinations status. Main verification for immunization status was by use of health cards and recall from caregivers.

Vitamin A supplementation status: Data on vitamin A supplementation for all children aged between 6-59 months of age was collected using child health and 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.

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 and use of of mosquito nets was collected and analyzed.

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

Minimum dietary diversity score women (MDD-W): using a 24 hour food consumption recall questionnaire on all women of reproductive Age (15-49 years). Foods consumed in the last 24 hours were enumerated and analyzed. Women consuming more at least five of the ten food groups were categorized to meet the MDD-W.

Household food consumption score (FCS). Data on the frequency of consumption of different food groups by a household during 7 days before the survey was collected and analyzed using SPSS.

2.6 Data Analysis

World Health Organization Growth Standards (WHO-GS) data cleaning and flagging procedures was used to identify outliers. This enabled data cleaning as well as exclusion of discordant measurements

from anthropometric analysis. Anthropometric data analysis was done using ENA software version 2015 (July). The ENA software generated weight-for-height, height-for-age and weight-for-age z scores to classify them into various nutritional status categories using WHO standards and cut-off points.

All the other quantitative data was analyzed using Ms. Excel and the SPSS (Version 20) computer package.

2.7 Data Quality Control Measures

To ensure data collected was valid and reliable for decision making, a number of measures were put in place. They included;

- An intensive and through training was done for 4 days for all survey participants, the training mainly focused on SMART methodology, survey objectives, interviewing techniques and data collection tools.
- A standardization test was done on the third day of training to test the team's accuracy and precision in taking anthropometric measurements. Feedback from the test was shared with participants and supervisors.
- On the fourth day of the training, piloting of tools was done to ensure all the information was collected with uniformity.
- Team, supervisors and coordination teams ensured all anthropometric equipment's were functional and standardized. On daily basis during data collection, each team was required to calibrate the tools.
- All the survey teams were assigned a supervisor during data collection.
- The anthropometric data collected was entered on daily basis on ENA software and plausibility check was run. Any issues noted were communicated to the teams before they proceeded to the field the following day.
- Teams were followed up by the supervisors to ensure all errors were rectified on time. More attention was given to the teams with notable weaknesses.
- Adequate logistical planning beforehand and ensuring the assigned households per clusters were be comfortably surveyed.

3.0. Results

3.1. General Characteristics of the Population

3.1.1. Summary of children and households

The survey involved collection of information from 510 children aged 6 to 59 months from 527 households. Five households sampled did not participate in the survey as they were found absent upon repeat visits. The non-response rate was therefore 0.9%. Based on household data, where information of 1563 household members were collected in 527 households, the average household size was 3.0.

3.1.2. Marital and Residency of the Respondents

All respondents (100%) were residents during the time of the survey. Majority of the respondents (85.39%) were married, 6.45% were windowed while 6.45% were single. The rest were either divorced or separated.

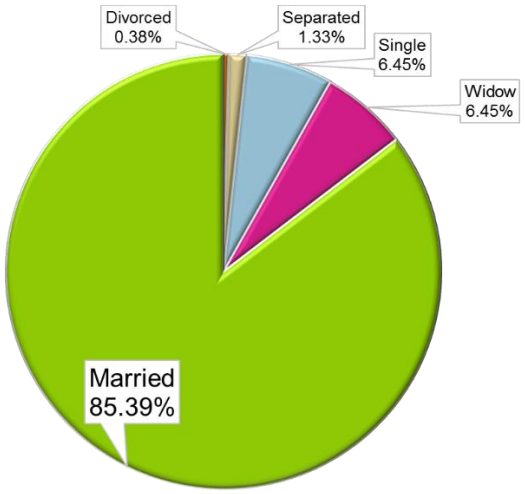


Figure 2: Marital Status of respondents

3.1.3. School enrollment and Highest Education level for adults

Overall 69% of children aged 3 to 18 years were enrolled in school. Among those who did not attend school, majority of them indicated that they did not do so due to family responsibilities (63.2%) and the distance to the nearby school (9.1%). Other reasons mentioned are as shown in table 4 below.

Table 4: Reasons for not attending school

Reason for not being in School	n	%
Family labour responsibilities	264	63.2%
Child is too young	56	13.4%
No school Near by	38	9.1%
Household doesn't see value of schooling	23	5.5%
Other (Disability, Refusal, etc.)	11	2.6%
Married	10	2.4%
Too poor to buy school items etc.	4	1.0%
Migrated/ moved from school area	3	0.7%

Working outside home	3	0.7%
Insecurity	2	0.5%
Weather (rain, floods, storms)	2	0.5%
Chronic Sickness	1	0.2%
Teacher absenteeism	1	0.2%

The majority of the household members who were older than 18 years had no education (72%). As far as the highest education level attained by adults is concerned, 70.4%, only 4% of respondents had tertiary education with 7% having secondary education. 10% had primary education with 7% having preprimary education. The following is a summary of education status figure 3 below.

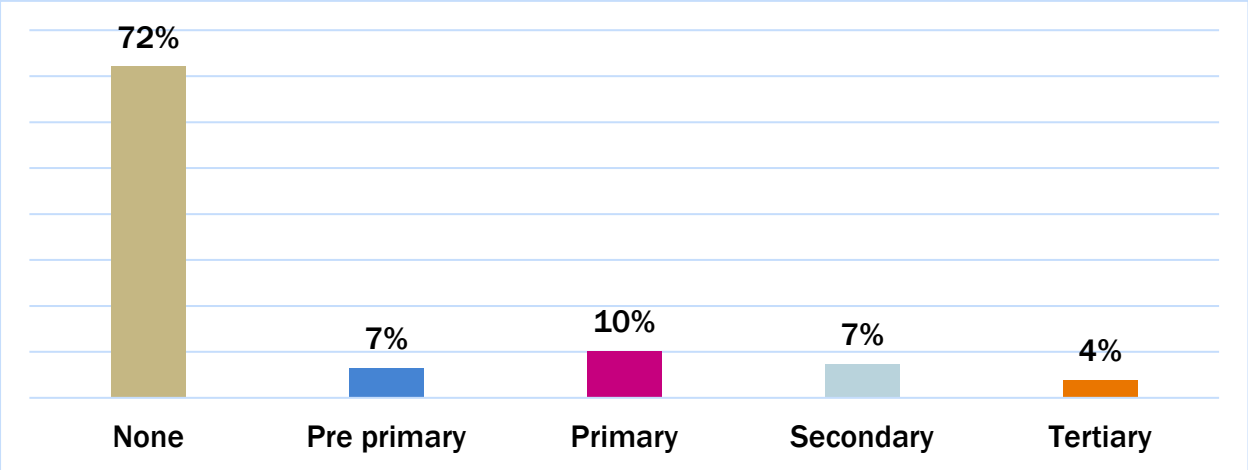


Figure 3 : Highest education Level

3.1.4. Income Source & Main Occupation

The main source of income for household heads in majority of household visited was sale of livestock (59.2%) followed by petty trading (9.5.0%) and sale of livestock products at 8.5%. other key sources were casual labor, sale of crops and employment. Main occupation for household heads was livestock herding at 67% while other occupation was crop farming 9% and waged labor 8%. Other forms of occupation included petty trade, employment, and charcoal.

The table 5 below is a summary of other sources of income and occupation by household heads.

Table 5: Income source and Main occupation of household head

Main occupation	n	Percent	Main Income Source	n	Percent
Livestock herding	353	67	Sale of livestock	312	59.2
Crop farming/own farm	47	9	Petty trading	50	9.5
Waged labor	42	8	Sale of livestock products	45	8.5
Petty trade	32	6	Casual labor	40	7.6
Employed	32	6	Sale of crops	34	6.6
Firewood/charcoal	16	3	Permanent job	27	5.1
Other	11	2	Other cash transfer	7	1.3
Marchant/trader	5	1	Income by children	6	1.1

			Sale of personal assets	2	0.4
			remittances	1	0.2

3.2. Child Nutrition Status

3.2.1. Acute Malnutrition (Wasting)

According to UNICEF nutrition glossary (2012), malnutrition is defined a state in which the body does not have enough of the required nutrients (under nutrition) or has excess of the required nutrients (over nutrition). Acute malnutrition is defined as low weight for height in reference to a standard child of a given age based on WHO growth standards. This form of malnutrition reflects the current form of malnutrition. Acute malnutrition can further be categorized as severe acute malnutrition and moderate acute malnutrition. Severe acute malnutrition is defined as weight for height < -3 standard deviation in comparison to a reference child of the same age. It also includes those children with bilateral oedema as well as those with MUAC less than 11.5cm. Moderate Acute Malnutrition on the other hand is defined as weight for height >= -3 and <-2 standard deviation in comparison to a reference child of the same age and sex, but also include those children with MUAC < 12.5 cm and >= 11.5 cm. The Sum of all children with moderate and severe acute malnutrition is referred as global acute malnutrition (GAM).

Prevalence of Acute Malnutrition based on Weight for Height by sex

The results from the survey showed that nutrition status of children 6-59 months in Samburu County is **critical** based on WHO classification of GAM though at the borderline**.**

Analysis of acute malnutrition included 508 (268 boys and 240 girls) children aged 6 - 59 months. From the assessment, the Global Acute Malnutrition (GAM) rate for the County based on Weight for height Z scores was **15.7% (12.4 – 19.8 95% C.I.)** while Severe Acute Malnutrition (SAM) rate was **4.1 % (2.6 - 6.5, 95% C.I.)** as indicated in the below. There was a slight improvement in GAM rate from similar period in 2017 where the GAM was **18.3%.** However, the SAM rate deteriorated slightly in 2018 from 2017 where the rate was **3.8%.**

Trends of Acute Malnutrition

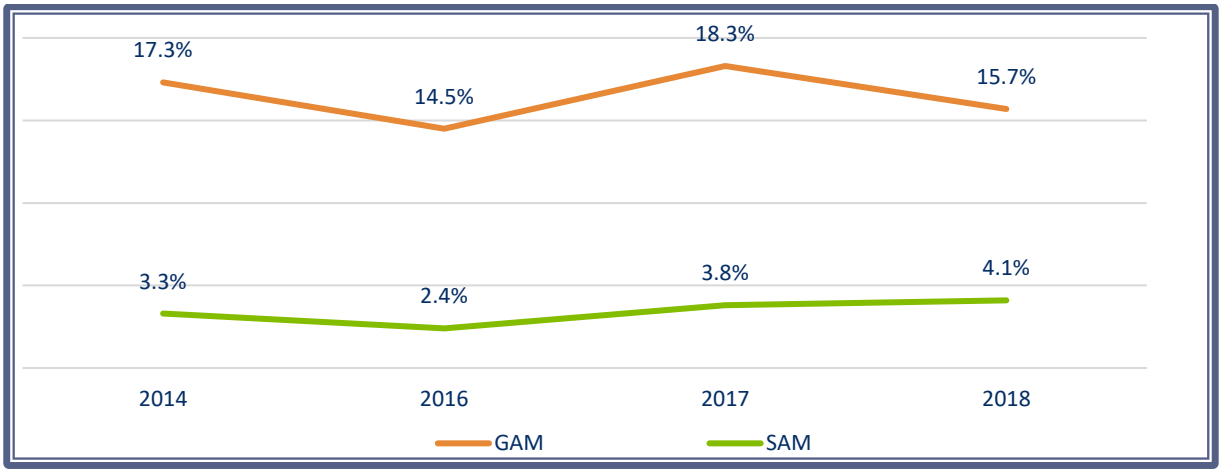


Figure 4: Trends of Acute malnutrition

Table 6: Prevalence of acute malnutrition based on Weight for Height z-score (WHO 2006 Standards)

Indicator	All n = 508	Boys n = 268	Girls n = 240
Prevalence of global malnutrition (GAM) (<-2 z-score and/or oedema)	(80) 15.7 % (12.4 - 19.8 95% C.I.)	(49) 18.3 % (14.0 - 23.5 95% C.I.)	(31) 12.9 % (8.8 - 18.6 95% C.I.)
Prevalence of severe malnutrition (SAM) (<-3 z-score and/or oedema)	(21) 4.1 % (2.6 - 6.5 95% C.I.)	(14) 5.2 % (3.2 - 8.4 95% C.I.)	(7) 2.9 % (1.3 - 6.2 95% C.I.)

3.2.2. Prevalence of Acute Malnutrition by MUAC

MUAC is a good indicator of muscle mass and can be used as a proxy of wasting (United Nation System Standing Committee on Nutrition). It is also a very good predictor of the risk of death. Very low MUAC (< 11.5 cm for children 6 to 59 months), is considered a high mortality risk and is a criteria for admission of outpatient therapeutic or in patient therapeutic program (when accompanied with complications) for treatment of severe acute malnutrition. A MUAC reading of 11.5 cm to <12.5 cm is considered as moderate malnutrition.

Based on MUAC data analysis for 510 Children (269 boys and 241 Girls), the GAM Rate was **4.7 % (2.9 - 7.5 95% C.I.).** SAM rate was determined to be **1.2 % (0.5 - 2.8 95% C.I.).** GAM by MUAC was at Alert 4.7 % (2.9 - 7.5 95% C.I.) in 2018 compared to 5.1 % (3.5 - 7.4 95% C.I.) in 2017. Results were not significantly different P= 0.7930

Indicator	All n = 510	Boys n = 269	Girls n = 241
Prevalence of global malnutrition (< 125 mm and/or oedema)	(24) 4.7 % (2.9 - 7.5 95% C.I.)	(11) 4.1 % (2.2 - 7.4 95% C.I.)	(13) 5.4 % (3.1 - 9.2 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(6) 1.2 % (0.5 - 2.8 95% C.I.)	(1) 0.4 % (0.0 - 2.8 95% C.I.)	(5) 2.1 % (0.8 - 5.4 95% C.I.)

Table 7: Prevalence of acute malnutrition based on MUAC cutoffs (and/or edema) and by sex

3.2.3. Prevalence of Underweight based on WFA

Underweight is defined as low weight for age relative to National Centre for Health and Statistics or World Health Organization reference median. In this survey, the later was used. Children with weight for age less than -2 SD in relation to a reference child are classified as underweight while those with less than -3 SD are classified as severe underweight. Underweight is a composite form of under nutrition and has elements of both acute under nutrition (wasting) as well as chronic under nutrition

(stunting). Prevalence of underweight among children aged 6 to 59 months in Samburu County was 31.6% (26.0 – 37.8, 95% C.I.) while severe underweight was 7.4% (5.2- 10.4, 95% C.I.) as illustrated in table 11 below

Table 8: Prevalence of underweight based on WFA Z score and by sex

Indicator	All n = 503	Boys n = 267	Girls n = 236
Prevalence of underweight (<-2 z-score)	(159) 31.6 % (26.0 - 37.8 95% C.I.)	(95) 35.6 % (27.8 - 44.2 95% C.I.)	(64) 27.1 % (21.1 - 34.1 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(37) 7.4 % (5.2 - 10.4 95% C.I.)	(20) 7.5 % (4.7 - 11.7 95% C.I.)	(17) 7.2 % (4.0 - 12.6 95% C.I.)

3.2.4. Prevalence of Chronic Malnutrition (Stunting) based on (HFA)

Evidence makes it clear that in children under 5 years of age, the period of greatest vulnerability to nutritional deficiencies is very early in life: the period beginning with the woman's pregnancy and continuing until the child is 2 years old. During this period, nutritional deficiencies have a significant adverse impact on child survival and growth. Chronic undernutrition in early childhood also results in diminished cognitive and physical development, which puts children at a disadvantage for the rest of their lives. They may perform poorly in school, and as adults they may be less productive, earn less and face a higher risk of disease than adults who were not undernourished as children.

Analysis of stunting prevalence based on height for age revealed an overall stunting rate of 35.8% (30.9 - 41.0 95% C.I.) and a severe stunting (HFA< -3 in reference to standard population) rate of 9.7% (7.0 - 13.2 95% C.I.) as shown in table below.

Stunting was high at 35.8 % (30.9 - 41.0 95% C.I.) in 2018 compared 34.0 % (28.4 - 40.1 95% C.I.) in 2017 which showed no significant difference P= 0.5923

Table 9: Prevalence of Stunting based on Height for Age z- score and by sex

Indicator	All n = 486	Boys n = 254	Girls n = 232
Prevalence of stunting (<-2 z-score)	(174) 35.8 % (30.9 - 41.0 95% C.I.)	(102) 40.2 % (33.8 - 46.9 95% C.I.)	(72) 31.0 % (24.2 - 38.8 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(47) 9.7 % (7.0 - 13.2 95% C.I.)	(27) 10.6 % (6.9 - 16.0 95% C.I.)	(20) 8.6 % (5.3 - 13.8 95% C.I.)

3.3. Children Morbidity and Health Seeking

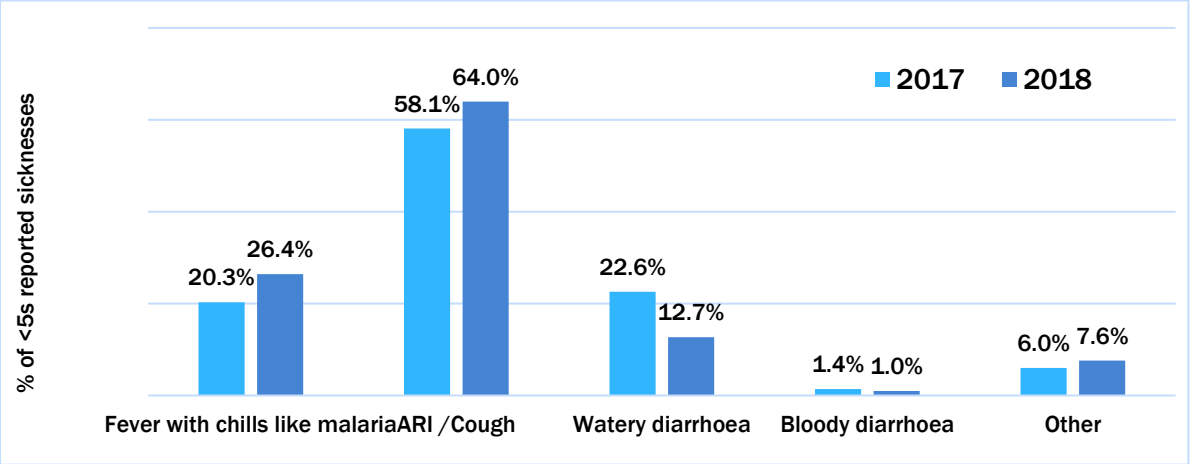
3.3.3. Prevalence of Morbidity

Disease is categorized as one immediate cause alongside inadequate diet based on the UNICEF conceptual framework on the causes of malnutrition. There is a relationship between the two whereby disease may alter food intake while inadequate intake of key nutrients leads to infection.

Data on common illnesses that affected children 6 to 59 months in the past 2 weeks prior to the survey was collected and analyzed. Caregivers of affected children 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 and source of treatment.

Among the children assessed, 42.9% of the children were reported to have been ill 2 weeks prior to the survey. Most common illnesses were ARI/cough at 64% followed by fever with chills like malaria at 26.4%. 12.7% of children were reported to have had watery diarrhea. 84.0% of children with reported watery diarrhea were supplemented with Zinc.

Figure 5: Prevalence of Common illnesses among children 6- 59 months



3.3.4. Therapeutic Zinc Supplementation for diarrhea Management

Based on compelling evidence from efficacy studies, 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. Kenya has adopted these recommendations (Innocent report 2009). According to Kenyan policy guideline on control and management of diarrheal diseases in children below five years in Kenya, all under-fives with diarrhea should be given zinc supplements as soon as possible. The recommended supplementation dosage is 20 milligrams per day for children older than 6 months or 10 mg per day in those below the age six months, for 10–14 days during episodes of diarrhea.

This survey sought to establish the number of children who suffered from watery diarrhea and supplemented with zinc. Half (84%) of those who suffered from watery diarrhea were supplemented with zinc.

3.3.5. Health Seeking Places

About 82.2% of caregivers whose children were sick in the past 2 weeks prior to the survey sought assistance. Among those who sought assistance, majority did it in a public clinic (77.2%) while 6.8% did it from community health worker, 5.6% did so from local herbalists. Overall 86.5% sought assistance from appropriate sources namely, public clinic, private clinic or pharmacy, mobile clinic and FBO/NGO as illustrated in figure: 6 below.

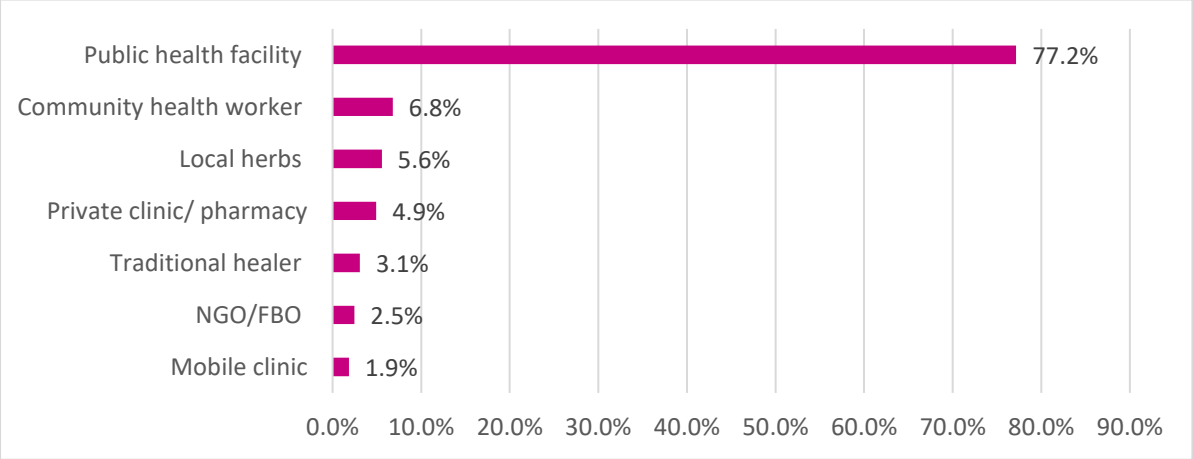


Figure 6: Health Seeking Places

3.4. Child Immunization, Vitamin A supplementation, Deworming and Home fortification with MNPs

3.4.3. Immunization

Kenya aims to achieve 90% under one immunization coverage by the end of second medium term plan (2013- 2017). The Kenya guideline on immunization define a fully immunized child is one who has received all the prescribed antigens and at least one Vitamin A dose under the national immunization schedule before the first birthday.

This survey assessed the coverage of 4 vaccines namely, BCG, OPV1, OPV3, and measles at 9 and 18 months. From this assessment, 93.9% of children had been immunized of BCG as confirmed by the presence of a scar. Those who were immunized by OPV1 and OPV3 were 93% and 90% respectively while 84.8% had been immunized for measles. 57.4% of respondents confirmed to have been immunized with the second dose of measles antigen at 18 months as indicated in figure 7 below.

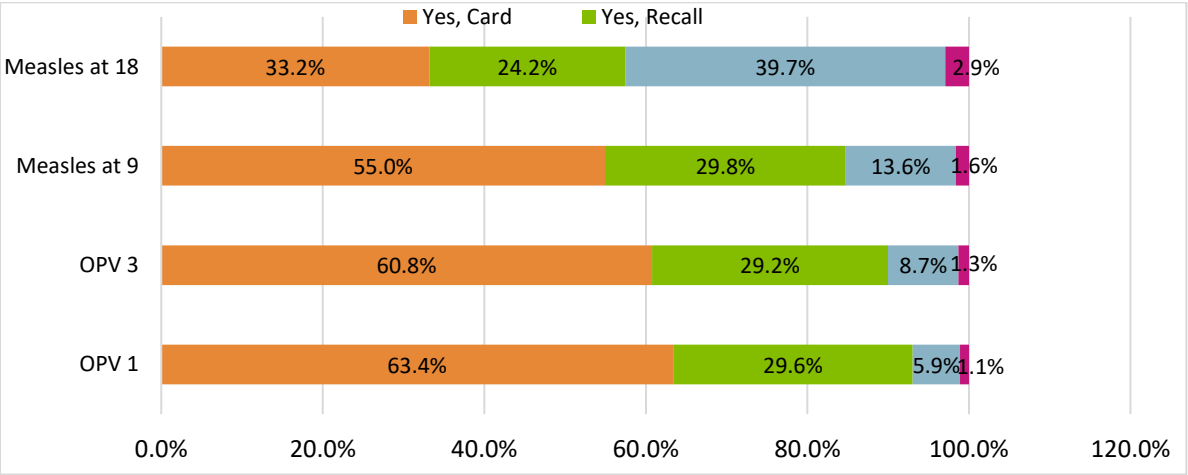


Figure 7: Immunization Coverage

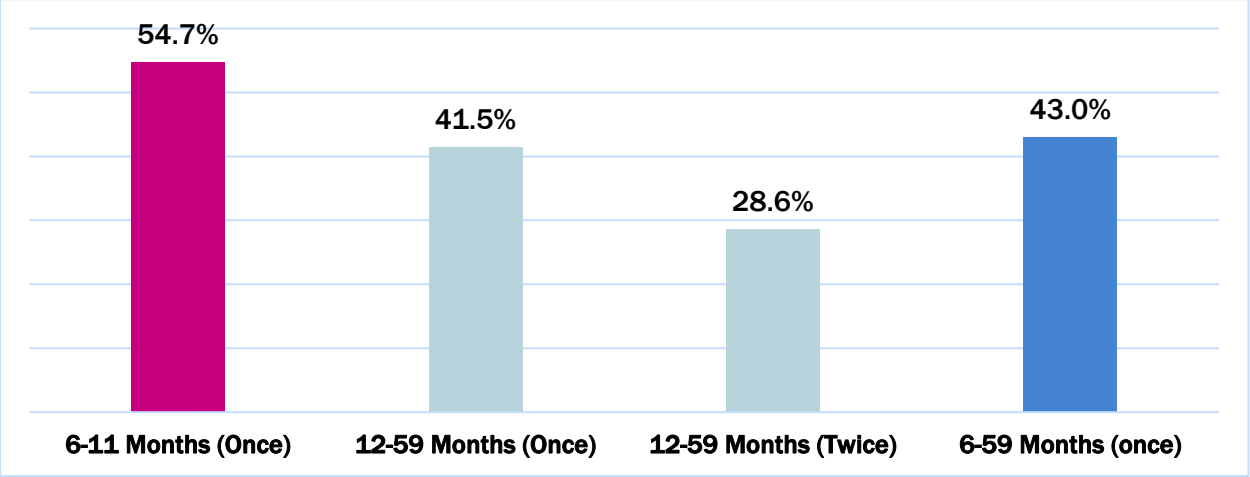
3.4.4. Vitamin A Supplementation and Deworming

Evidence shows that, giving vitamin A supplements to children reduces the rate of mortality and morbidity. Vitamin A reduces mortality risk by 24% (WHO 2011). Guaranteeing high supplementation coverage is critical, not only to eliminating vitamin A deficiency as a public-health problem, but also as a central element of the child survival agenda. Delivery of high-dose supplements remains the principal strategy for controlling vitamin A deficiency. Food-based approaches, such as food fortification and consumption of foods rich in vitamin A, are becoming increasingly feasible but have not yet ensured coverage levels similar to supplementation in most affected areas (UNICEF 2007).

Inadequate social/community mobilization, poor data management are some of the key challenges facing vitamin A supplementation among children aged 6-59 months. The county employed strategies to improve vitamin A supplementation including supplementation at ECDE centers.

To assess vitamin A supplementation, parents/caregivers were probed on the number of times the child had received vitamin A 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. 54.7% of children aged 6-11 months were supplemented with vitamin A. 41.5% of children aged 12 -59 months were supplemented once with a significantly lower proportion at 28.6% supplemented twice. 59.3% of children aged 12- 59 months were dewormed at least once in the past one year, it was only 26.7% who were dewormed at least 2 times as recommended Figure below summarizes vitamin A supplementation in Samburu County.

Figure 8: Vitamin A Supplementation



3.4.5. Mosquito Net Ownership & Utilization

A third of the surveyed population at 67% did not own mosquito nets. Of the 33% that owned the mosquito nets, utilization was spread across various age cohorts with majority that utilized the nets being pregnant and Lactating women at 36% and children aged less than five years at 31%. The rest of the population that utilized the nets was as illustrated in the table 10 below

Age cohort	n	%
>5 years	581	31
5-17 years	1138	19
>18 years	1062	26
Pregnant and Lactating Women	246	36

Table 10: Mosquito net ownership and utilization

3.5. Maternal Nutrition

3.5.3. Introduction

Maternal nutrition has a direct impact on child survival. Pre- pregnancy nutrition influences the ability of a woman to conceive determines the fetal growth, development and the size of the fetus and its overall health and that of the mother.

Evidence shows that the current total deaths in children younger than five years can be reduced by 15% if populations can access ten evidence-based interventions when implemented at scale with a coverage of 90% (Bhutta, et.al. 2013). One of these strategies, has a positive effect on child survival during 'the window of opportunity' which is also referred to as the 1st 1000 days (from conception to two years of age). One of them is optimal maternal nutrition during pregnancy, an enhanced nutrition package for the infant and young child focusing on promotion of exclusive breastfeeding. Pregnancy and lactation imposes a big nutrient-need load on mothers, which in the absence of adequate extra nutrients leads to utilization of body nutrient reserves leading to malnutrition. Gestational malnutrition leads to low birth weights and may ultimately culminate in poor child growth and development, thus there is an urgent need to address high rates of malnutrition among pregnant women.

Maternal nutrition was assessed using maternal MUAC for all women of reproductive age and iron and folic acid supplementation for women with children under two years of age. WHO recommends daily consumption of 60mg elemental iron as well as 0.4mg folic acid throughout the pregnancy (WHO 2012). These recommendations have since been adopted by Kenya government in its 2013 policy guidelines on supplementation of FEFO during pregnancy.

3.5.4. Maternal Nutrition Status

A total of 433 women of reproductive age (15-49 years) were assessed during the survey using MUAC. Slightly less than a half (47.8%) were lactating, 8.3% pregnant and while 44.3% were neither pregnant nor lactating. 10.4 % of all the assessed women had a MUAC of less than 21cm with 10.2% of pregnant and lactating women having a MUAC reading of <21 cm therefore classified as malnourished.

3.5.5. Iron and Folic Acid Supplementation

WHO recommends daily consumption of 60mg elemental iron and 0.4mg folic acid throughout the pregnancy7.These recommendations have since been adopted by Kenya government in its 2013 policy guidelines on supplementation of iron folic acid supplementation (IFAS) during pregnancy

72.2% of women surveyed who carried full term pregnancy in the past 2 years prior to the survey were supplemented with iron and folic acid. The mean number of days for iron and folic acid consumption was 85.6 days. None of the surveyed women consumed iron folate supplements for the recommended 270 days. Only 5% consumed the supplements for more than 180 days. Table below illustrate the consumption of iron and folic acid.

Table 11: Iron and folic acid supplementation

IFAS Consumption in days	Number of Women	Proportion
<90 days	86	47
90 to 180 days	87	48
>180 days	9	5

3.6. Water Hygiene and Sanitation

3.6.3. Main Water Sources, Distance and time to water Sources

Everyone has the right to water. This right is recognized in international legal instruments and provides for sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic uses. An adequate amount of safe water is necessary to prevent deaths due to dehydration, to reduce the risk of water-related disease and to provide for consumption, cooking, and personal and domestic hygienic requirements. 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. The maximum distance from any household to the nearest water point should be 500 meters. It also gives the maximum queuing time at a water source which should be no more than 15 minutes and it should not take more than three minutes to fill a 20-litre container. Water sources and systems should be maintained such that appropriate quantities of water are available consistently or on a regular basis.

Over half (52.4%) of the surveyed households obtained their drinking water form sources classified as unsafe (surface sources) other common sources of water were dug well (17.8), borehole (15.2). only 10.2% of the households accessed piped water. other sources were; rain water, water kiosk and tanker water as illustrated in figure: 9 below,

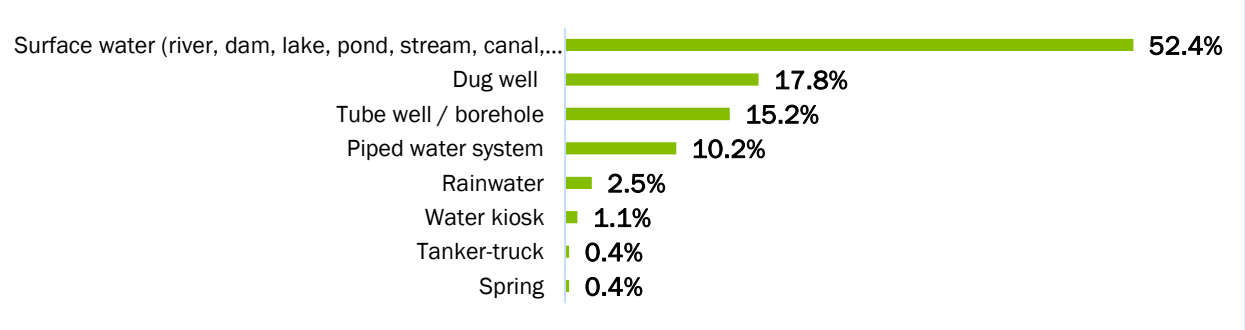


Figure 9: Main Water Sources

26.5% of the household were sourcing their drinking water from improved sources. Distances to water sources reduced significantly with more households accessing water at between less than 500 meters and less than two Kilometers at 45% and 46% respectively compared to same period in 2017. Only 9% of households' accessed water from a distance of more than 2 KMs compared to 29% in similar period in 2017 as illustrated in the figure: 10 below

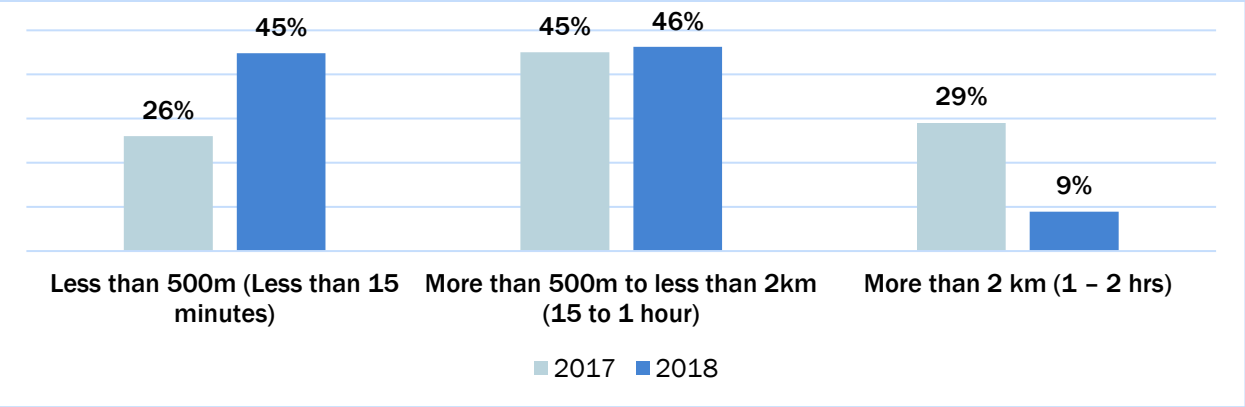


Figure 10: Distances to water sources

In regard to queuing time, there was a slight decrease in proportion of households that queued for water in 2018 at 15% compared to similar period in 2017 at 18.5%. Majority (73%) are queuing for less than one hour with 35% queuing for less than 30 minutes and 38% queuing for between 30 to 60 minutes.

3.6.4. Water Treatment, Storage Payment and Consumption

There was a notable increase in the proportion of households treating their drinking water in 2018 with 16.5 % households treating compared to 2017 where only 9.2 % of the household surveyed treated their water. There was a significant increase in use of chemicals to treat drinking water with 46% of households treating water using various chemicals including Chlorine, Pur and Water guard. 63 % of households used boiling as a method to treat their water. Other methods used were traditional herbs and pot filters shown in figure below.

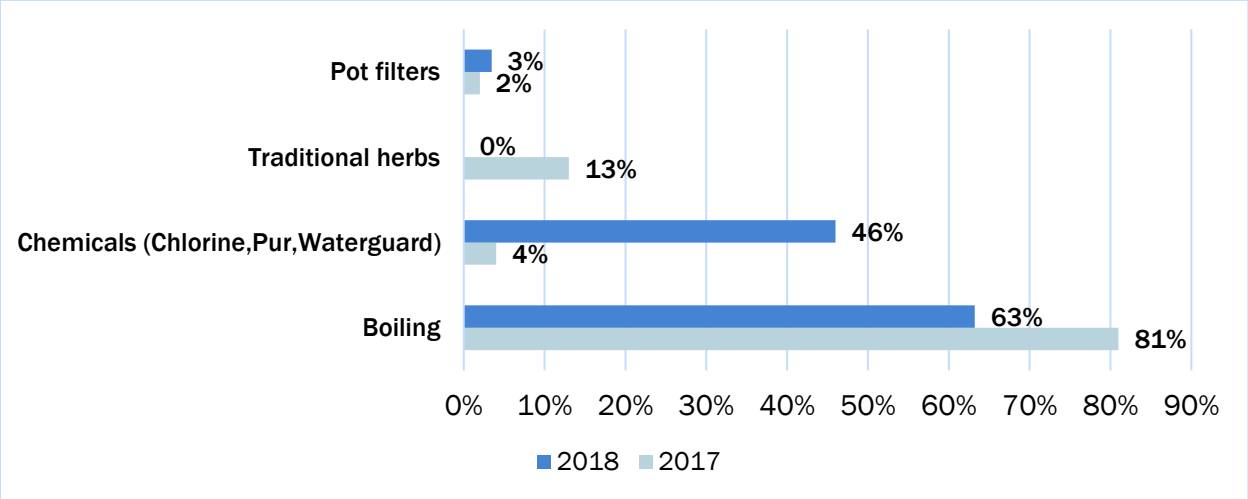


Figure 11: Water treatment methods

Figure 5: Water treatment methods

Despite the fact that majority of Samburu County residents do not treat their water, it is apparent that they store their drinking water properly in closed containers/jerry cans (94%) where it is less likely to have physical water contamination. The rest (6%) indicated that they stored their water in open containers/jerry cans exposing it to physical contamination.

Small proportion (15.7%) of HH can access the recommended amount of water per person according to sphere standard compared to 4.2% in 2017

3.6.5. Handwashing

The importance of hand washing cannot be over-estimated. Hand washing with soap is the single most cost-effective intervention in preventing diarrhea diseases (Borghi, Guinness, Ouedraogo, & Curtis, 2002). There are four critical times when handwashing should be paramount including; after visiting the toilet/latrine, before cooking, before eating and after taking children to the toilet/latrine/changing diapers.

Despite 56.5% of the respondents indicating that they are aware of the critical handwashing moments only 26% of the respondents washed hands at all 4 critical times. However, majority washed in one or several of the four critical times with 67% washing after vising toilet, 71% before cooking, 83% before eating and 43% after taking child to the toilet as indicated in table 18 below. 81.2% of those who washed hands in either of the times used soap and water.

Table 12: Handwashing Moments

Handwashing Moments	Number of Households	Percentage of Households
After Toilet	201	67
Before Cooking	211	71
Before Eating	248	83
After taking children to toilet	128	43
Handwashing in 4 critical moments	76	26
Handwashing with soap and water		81.2

3.6.6. Sanitation Facilities Ownership and Accessibility

If organic solid waste is not disposed of well, major risks are incurred due to fly breeding and surface water pollution which is a major cause of diarrheal diseases. Solid waste often blocks drainage channels and leads to environmental health problems associated with stagnant and polluted surface water. Analysis of relieving points revealed that, most household are still relieving themselves in bushes and other open places. Open defecation was practiced by 74% of the households. Toilet ownership remained low at 25% as indicated in figure 12 below.

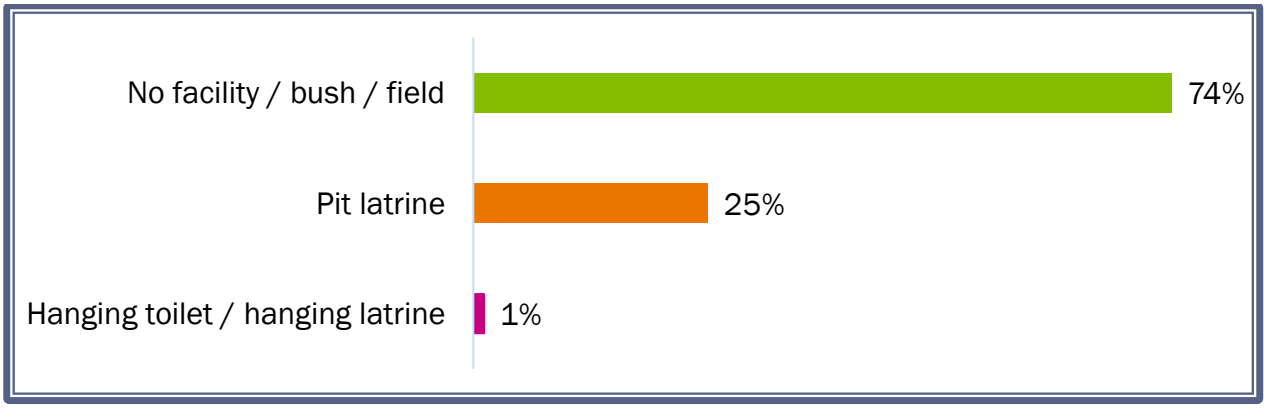


Figure 12: Access to Sanitation facilities

3.7. Household and Women Dietary Diversity

3.7.3. Household Dietary Diversity (HDD)

Studies have shown that an increase in dietary diversity is associated with socio-economic status and household food security (household energy availability) (FAO 2010). The HDDS is meant to provide an indication of household economic access to food, thus items that require household resources to obtain, such as condiments, sugar and sugary foods, and beverages, are included in the score. Individual dietary diversity scores aim to reflect nutrient adequacy. Studies in different age groups have shown that an increase in individual dietary diversity score is related to increased nutrient adequacy of the diet. Dietary diversity scores have been validated for several age/sex groups as proxy measures for macro and/ or micronutrient adequacy of the diet.

Individual dietary diversity scores aim to reflect nutrient adequacy. Studies in different age groups have shown that an increase in individual dietary diversity score is related to increased nutrient adequacy of the diet. Dietary diversity scores have been validated for several age/sex groups as proxy measures for macro and/ or micronutrient adequacy of the diet. Scores have been positively correlated with adequate micronutrient density of complementary foods for infants and young children (FANTA, 2006), and macronutrient and micronutrient adequacy of the diet for non-breast-fed children (Hatloy

et al., 1998; Ruel et al., 2004; Steyn et al., 2006; Kennedy et al., 2007), adolescents (Mirmiran et al., 2004) and adults (Ogle et al., 2001; Foote et al., 2004; Arimond et al., 2010).

Household dietary diversity assessment was based on a 24 hour recall period. At the data collection, 16 food groups as described in FAO 2010 guideline were analyzed. The groups were combined at the analysis stage to come up with 12 food groups. As shown in figure below, there was a high consumption of 3 food groups namely; condiments (75.2%), Sweets and Sugars (74%), Oils (70.6%), and cereals (69.3%)

Household Dietary Diversity based on 24 hours recall

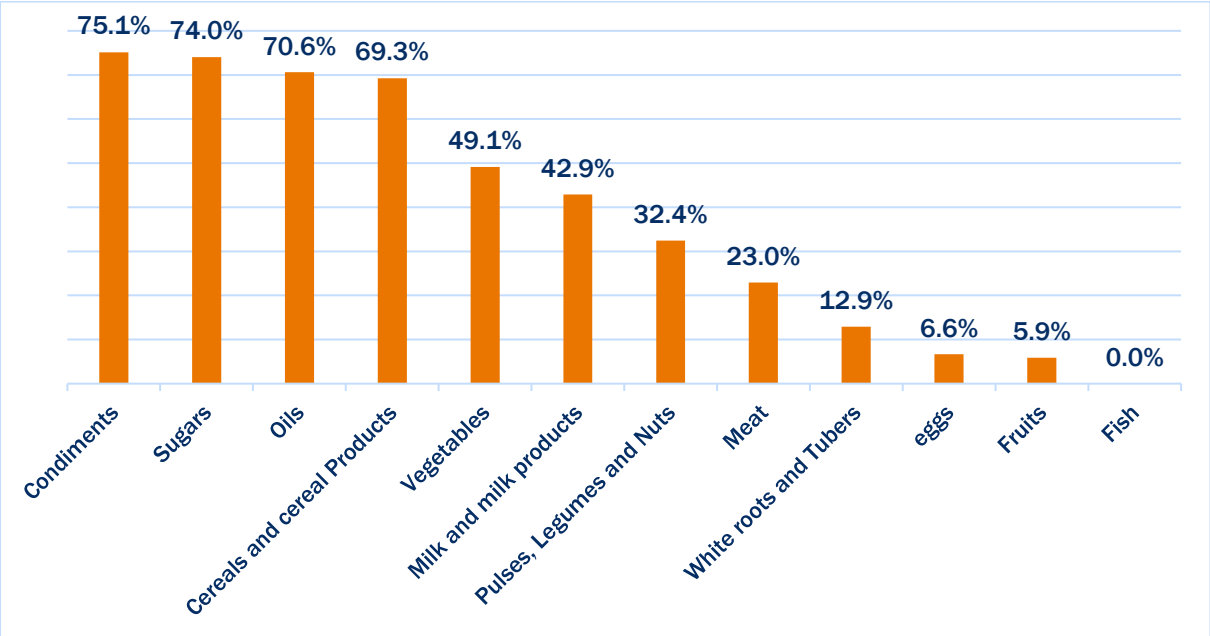


Figure 13: Food groups consumed at the household level during the previous day (24 hrs)

There was a significant increase in proportion of households that consumed foods form more than 5 food groups compared to similar period in 2017. Majority of households (41.6%) consumed between 3to 5 food groups with 18.4% consuming food from less than 3 food groups. However, this does not reflect the quality of diet consumed as the consumed included, sweets and sugars, cereals, milk and milk products, oils and fats and condiments.

Table 13: Household dietary diversity

Indicator	June 2017	June 2018
Households consuming < 3 Food groups	21%	18.4%
Households consuming 3 to 5 food groups	54%	41.6%
Households consuming more than 5 food groups	25%	35.5%

3.7.4. Minimum Dietary Diversity for WRA

The Minimum Dietary Diversity for WRA (MDD-W) indicator is a food group diversity indicator that has been shown to reflect one key dimension of diet quality: micronutrient adequacy. MDD-W is a dichotomous indicator of whether 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 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. As indicated in figure below, the most consumed food was starchy stable foods (94.0%), beans (64%) and dairy products (59%).

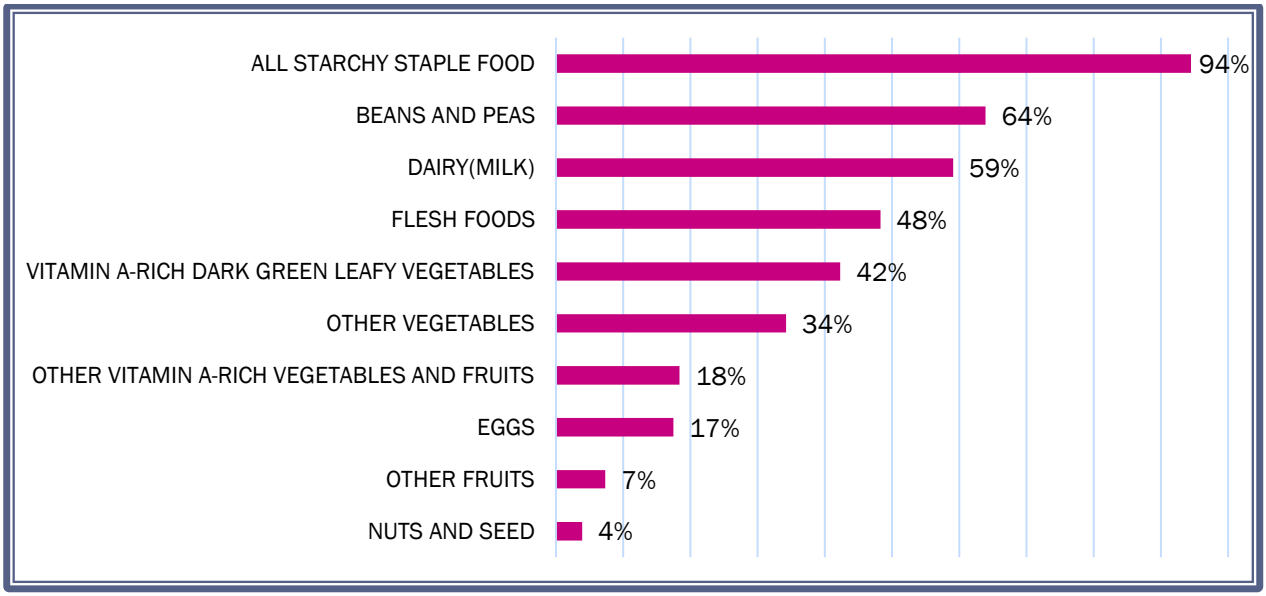


Figure 14: Food groups consumed (Women)

Table 14 : Minimum Dietary Diversity Score for Women (MDD-W)

Indicator	Number	Percentage	
		June 2017	June 2018
Women consuming at least 5 food groups		21.3	34.02
Women consuming less than 5 food groups		77.8	65.98
Mean number of food groups consumes		3.2	

3.8. Food Consumption Score (FCS)

The Food Consumption Score is a composite score based on dietary diversity, food frequency and relative nutrition importance of different food group (WFP 2015). FCS is a proxy for household food security and is designed to reflect the quality of people's diet. The FCS is considered as an outcome measure of household food security. Food consumption score classifies households in to 3 categories namely, poor, borderline and acceptable. In computing FCS, 16 food groups were collapsed to 8 groups namely; cereals, pulses, vegetables, fruits, meats (meats, fish and eggs), dairies, sugars and oils. The frequency of consumption (maximum 7 days) was multiplied by an assigned weight factor i.e. cereals (2), pulses (3), vegetables (1), fruits (1), meats (4), dairies (4), oils (0.5) and sugar (0.5). Food consumption score (FCS) was obtained by summing up the product of each food item after which classification was done as illustrated in table 14 below.

Table 15: Food Consumption Score Classification

Main Threshold	Nomenclature	2017	2018
Poor (0 to 21)	Poor food consumption mainly cereals and sugars	12.8	10.6
Bonder line (21.5 to 35	Bonder line food consumption cereals, Legumes, milk, oils	15.7	21.4
Acceptable (< 35.5	Good food consumption, cereals, legumes, milk, condiments, flesh meat, vegetables, oils, sugars	71.5	68.1

Further analysis was done on diet quality based on vitamin A rich, iron rich and protein rich diets. As illustrated in figure below, majority of households which were classified under poor and borderline categories consumed none of vitamin A and iron rich foods.

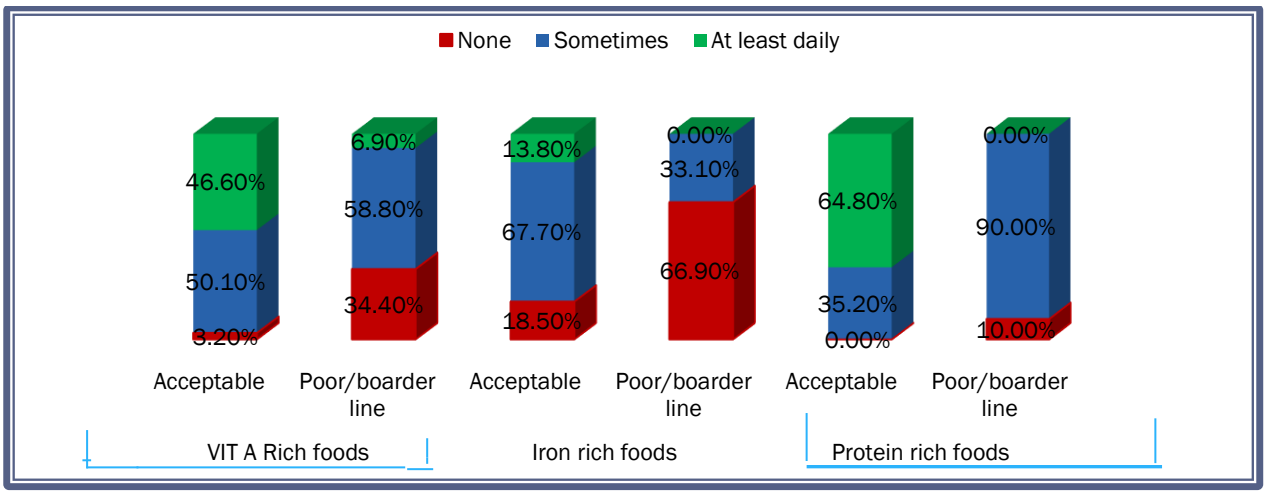


Figure 15: Consumption of iron, protein and vitamin A rich foods in relation to FCS classification

3.9. Coping Strategy Index (CSI)

The Coping Strategies Index is a simple and easy-to-use indicator of household stress due to a lack of food or money to buy food. The CSI is based on a series of responses (strategies) to a single question: "What do you do when you don't have adequate food, and don't have the money to buy food?" The CSI combines, the frequency of each strategy (how many times was each strategy was adopted) and the severity (how serious is each strategy). This indicator assesses whether there has been a change in the consumption patterns of a given household. For each coping strategy, the frequency score (0 to 7) is multiplied by the universal severity weight. The weighted frequency scores are summed up into one final score (WFP 2012). From the surveyed households, the coping strategy score reduced compared to similar period in 2017 **(26.0).** The most employed coping strategy was restriction on consumption of food by adults so that children can feed.

Table 19 below summarizes the coping strategies adopted by the households in such instances.

Table 16: Coping Strategy Mechanisms

Coping Strategy	Number of Households	Frequency Score (0 -7)	Severity Score (1- 3)	Weighted Score= Freq* Sev. Score
Rely on less preferred or less expensive foods	167	3.31	1	3.3
Borrow food	167	1.95	2	3.9
Limit Portion Sizes	170	2.37	1	2.4
Restrict consumption of food by adults so that children can feed	149	2.17	3	6.5
Reduce number of meals	170	2.48	1	2.5
Total Weighted Coping Strategy Score				**18.6**

Comparison was also done with immediate 3 preceding surveys which were conducted in the same month i.e. June 2014, June 2016 and June 2017 to determine a trend over the years. The figure below illustrates the comparison. CSI reduced to 18.6 in 2018 from a score of 26 in 2017. This indicates Household were not applying coping strategies more than in the previous year, 2017.

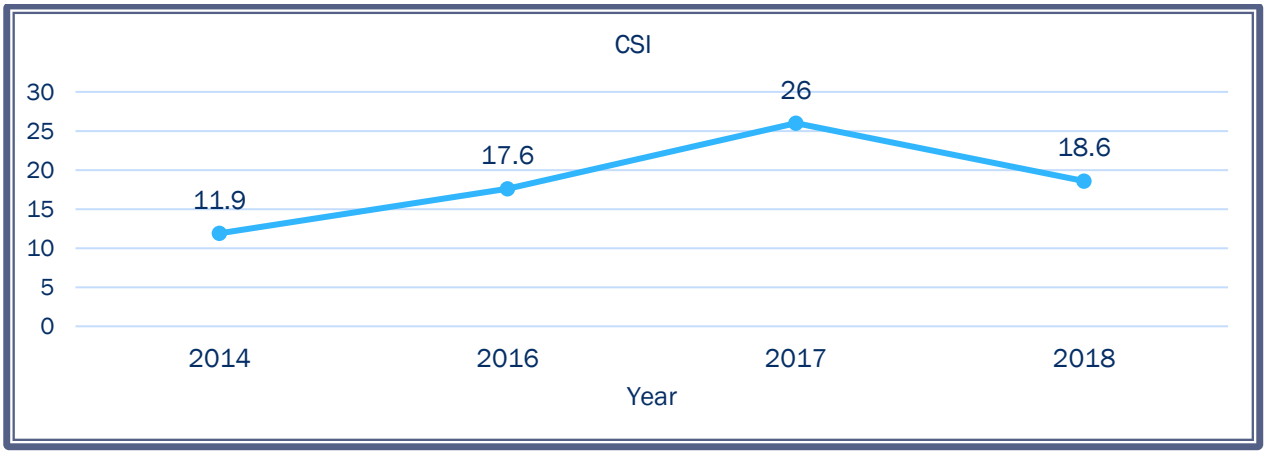


Figure 16: Coping Strategy Index

4. Conclusion and Recommendations

Table 6 : Recommendations

	Recommendation	Actors	Implementation timelines
Prevalence of stunting (<-2 z-score) (174) 35.8 %	Operationalization of BFCI in community units for community resilience	MoH, and Partners	June 2019
	Operationalization of County Nutrition MSP and through quarterly stakeholders meetings and monitoring through financial tracking tools	MoH, MoA, MoE, and partners	Quarterly
	Scale up growth monitoring in ECDEs	MoH,MoE and Partners	June 2019
Open defecation 74% Water treatment 16.5% Hand washing at all 4 Critical times 26%	Procurement and distribution of water treatment chemicals Hygiene promotion in all ECDE centres.	MoH, MoW MoH, MoE	June 2019 June 2019
Household Dietary Diversity (HH consuming foods from >5 food groups) 35.5%	Distribution and supplementation of MNPs	MoH and Partners	June 2019
	Dietary diversifications through food demonstrations, Kitchen gardening	MoA, MoH	June 2019
Prevalence of GAM 15.7 % Prevalence of Underweight 31.6 %	Scale up of IMAM surge in all health facilities offering IMAM services	MoH and Partners	June 2019
	Targeted Integrated Outreaches in selected hot spots	MoH and Partners	June 2019

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5. Kenya national guidelines on immunization (2013)
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10. FAO(2010); guidelines for measuring household and individual dietary diversity.
11. WFP (2015), Food Consumption Score, Nutrition Quality Analysis (FCS-N)
12. FAO and FHI 360, 2016. Minimum Dietary Diversity for Women: A guideline for measurement. Rome: FAO

ANNEX

ANNEX 1: Summary of plausibility report

Criteria	Flags *	Unit	Excel.	Good	Accept	Problematic	Score
Flagged data (% of out of range subjects)	Incl	%	0-2.5 0	>2.5-5.0 5	>5.0-7.5 10	>7.5 20	**0** (0.4 %)
Overall Sex ratio (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<=0.001 10	**0** (p=0.215)
Age ratio(6-29 vs 30-59) (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<=0.001 10	**4** (p=0.018)
Dig pref score - weight	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	**0** (6)
Dig pref score - height	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	**2** (9)
Dig pref score - MUAC	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	**0** (3)
Standard Dev WHZ	Excl	SD	>0.9 0	>0.85 5	>0.80 10	<=0.80 20	**0** (1.04)
Skewness WHZ	Excl	#	<±0.2 0	<±0.4 1	<±0.6 3	>=±0.6 5	**0** (0.02)
Kurtosis WHZ	Excl	#	<±0.2 0	<±0.4 1	<±0.6 3	>=±0.6 5	**1** (0.22)
Poisson dist WHZ-2	Excl	p	>0.05 0	>0.01 1	>0.001 3	<=0.001 5	**0** (p=0.120)
OVERALL SCORE WHZ			**0-9**	**10-14**	**15-24**	**>25**	**7 %**

ANNEX 2: 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 column)**	**Age (Record age in MONTHS for children <5yrs and YEARS for those ≥ 5 years's)** Years	Months	**Childs age verified by** 1=Health card 2=Birth certificate/ notification 3=Baptism card 4=Recall 5. other _____ specify	**Sex** 1= Male 2= Female	**If between 3 and 18 years old, Is the child attending school?** 1 = Yes 2 = No (If yes go to 2.8; If no go t o 2.7)	**Main reason for not attending school (Enter one code from list)** 1=Chronic Sickness 2=Weather (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	**2.7a, What is the child doing when not in school?** 1=Working on family farm 2=Herding Livestock 3=Working for payment away from home 4=Left home for elsewhere 5=Child living on the street 6: Other specify _____	**What is the highest level of education attained?(level completed) From 5 yrs and above** 1 =Pre primary 2= Primary 3=Secondary 4=Tertiary 5= None 6=others(specify) Go to question to 2.9 ↓	**If the household owns mosquito net/s, who slept under the 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*

								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)……			
< 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	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	Has your child (NAME) been ill in the past two weeks? 1.Yes 2. No	If YES, which illness (multiple responses possible) 1 = Fever with chills like malaria 2 = ARI /Cough 3 = Watery diarrhoea	**When the child was sick did you seek assistance?** 1.Yes 2. No	**If the response is yes to question # 3.2 where did you seek assistance? (More than one response possible-** 1. Traditional healer 2.Community health worker	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=Other (specify)									Specify _____ _	If No, skip to 3.4	4 = Bloody diarrhoea 5 = Other (specify) *See case definitions above*		3. Private clinic/ pharmacy 4. Shop/kiosk 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 sample)	Has the child received vitamin A supplement in the past 6 months?	How many times did the child receive vitamin A capsules from the facility or out reach	If Vitamin A received how many times in the past one year did the child receive verified by **Card?**	**FOR CHILDREN 12-59 MONTHS** How many times has child received drugs for worms in the past year? *(show Sample)*	Has the child received BCG vaccination? Check for BCG scar. **1 = scar** **2=No scar**	Has child received OPV1 vaccination **1=Yes, Card** **2=Yes, Recall** **3 = No** **4 = Do not know**	Has child received OPV3 vaccination? **1=Yes, Card** **2=Yes, Recall** **3 = No** **4 = Do not know**	Has child received measles vaccination at 9 months *(On the upper right shoulder)?* **1=Yes, Card** **2=Yes, Recall** **3 = No** **4 = Do not know**	Has child received the second measles vaccination (18 to 59 months) *(On the upper right shoulder)?* **1=Yes, Card** **2=Yes, Recall** **3 = No** **4 = Do not know**
01										
02										
03										
04										

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

	3.5 Enrolment in an MNP program		**3.6 Consumption of MNPs**			
	3.5.1. 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	3.5.2 If the child, 6-23months, is not enrolled for MNP, give reason. (***Multiple answers possible. Record the code/codes in the respective child's number. DO NOT READ the answers)***	3.6.1 Has the child consumed MNPs in the last 7 days?(shows the MNP sachet) ***(record the code in the respective***	3.6.2 If yes, how frequent do you give MNP to your child? ***(record the code in the respective child's number)*** Every day …….....……1	3.6.3 If no, since when did you stop feeding MNPs to your child? ***(record the code in the respective child's number)*** 1 week to 2 weeks ago 1	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)***

	No=0 **If no go to 3.5.2,** **If yes go to section 3.6.1**	Do not know about MNPs ….....……1 Discouraged from what I heard from others …….....2 The child has not fallen ill, so have not gone to the health facility …. …...…..3 Health facility or outreach is far ….....…4 Ch ild receiving therapeutic or supplementary foods .....5 Other reason, specify ….…….....…….6 ***Skip to 3.7***	***child's number)*** YES = 1 N0= 0 ***If no skip to 3.6.3***	Every other day .....…….…..2 Every third day …….....……..3 2 days per week at any day ….4 Any day when I remember..…5	2 week to 1 month ago ….2 More than 1 month 3	Finished all of the sachets .....1 Child did not like it .....2 Husband did not agree to give to the child .....3 Sachet got damaged …….4 Child had diarrhea after being given vitamin and mineral powder ……..5 Child fell sick.....6 Forgot ……..…..7 Child enrolled in IMAM program …8 Other (Specify)_____ ..9
Child 1						
Child 2						

Child 3						
Child 4						

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

4.0 WATER, SANITATION AND HYGIENE (WASH)/- *Please ask the respondent and indicate the appropriate number in the space provided*

4.1 **What is the MAIN source of drinking water for the household <u>NOW</u>?**

piped water
- piped into dwelling 11
- piped to yard / plot 12
- piped to neighbour 13
- public tap / standpipe 14

tube well / borehole 21

dug well
- protected well 31
- unprotected well 32

spring
- protected spring 41
- unprotected spring 42

rainwater 51
tanker-truck 61
cart with small tank 71
water kiosk 72
surface water (river, dam, lake, pond, stream, canal, irrigation channel) 81

packaged water
- bottled water 91
- sachet water 92

1.

4.2 a What is the trekking distance to the current main water source?

1=less than 500m (Less than 15 minutes)

2=more than 500m to less than 2km (15 to 1 hour)

3=more than 2 km (1 – 2 hrs)

4=Other(specify) |____|

4.2b – Who MAINLY goes to fetch water at your current main water source?

1=Women, 2=Men, 3=Girls, 4=Boys

4.2.2 a **How long do you queue for water?**

1. Less than 30 minutes
2. 30-60 minutes
3. More than 1 hour
4. Don't que for water

1.

.3 Do you do anything to your water before drinking? (*MULTIPLE RESPONSES POSSIBLE)* *(Use 1 if YES and 2 if NO).* |____|

1. Nothing
2. Boiling…… ……. |____|
3. Chemicals (*Chlorine,Pur,Waterguard*)…… |____|
4. Traditional herb……... |____|
5. Pot filters…… ….. |____|

5.

4.3a	|____|	**6.**

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

4.7.1a	We would like to learn about where members of this household wash their hands. Can you please show me where members of your household 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 l. **OTHER (specify) 96**

5.0: Food frequency and Household Dietary Diversity

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

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

5.14 Oils/fats *(e.g. cooking fat or oil, butter, ghee, margarine)?*														
5.15 Sweets: Sugar, honey, sweetened soda or sugary foods such as chocolates, sweets or candies														
5.16 Condiments, spices and beverages:														

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

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

1.2	**Respondent's knowledge on the food fortification logo (Show the food fortification logo to the respondent and record the response). Do you know about this sign?** 1. Yes 2. No 3. Don't know	|____|
1.3	**What is the MAIN source of Maize flour for the household <u>NOW</u>?** 2. Bought from the shops, supermarket e.t.c 3. Maize is taken for milling at a nearby Posho Mill 4. Bought from a nearby Posho Mill 5. Other *(Please specify)* |_____|	**1.1b Do you know if the maize flour you consume is fortified or not?** 1. Yes 2. No 3. Don't know
1.4	**What brands of the following foods does your household consume?** 1. Maize flour 2. Wheat flour 3. Margarine 4. Oils 5. Fats 6. Sugar	|_____| |_____| |_____| |_____| |_____| |_____|