# Samburu County SMART Survey Report

**June 2017**

# Acknowledgement

Samburu County SMART survey 2017 was made successful through the contribution of a number of partners. The survey was led by the County Department of Health.

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

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## List of Abbreviations

| | |
|---|---|
| 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 |
| MoH | 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 |
| WHO | World Health Organization |
| WRA | Women of Reproductive age |

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# Executive Summary

## *Introduction*

Samburu County government department of health in corroboration with nutrition sector partners carried out SMART survey which covered all the 3 sub counties in Samburu County. The survey was carried out in June 2016.

Samburu County lies in the northern part of Kenya and covers an area of 21,022.1 sq. km. The County has an estimated population of 274,079 people among whom 51,884 are under-fives based on 2009 KNBS census. The purpose of this survey was to find out the nutrition situation in Samburu County. The results will form a solid basis for planning appropriate future interventions. 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 in Samburu County. Specifically, the survey aimed at determining the nutrition status of children 6 to 59 months, the nutritional status of women of reproductive age (15-49 years) based on maternal mid upper arm circumference, immunization coverage; measles (9-59 months), OPV1/3 and Vitamin A for children aged 6-59months. The survey also was meant to determine deworming coverage for children aged 12 to 59 months, the prevalence of common illnesses as well to assess maternal and child health care practices, water, sanitation and hygiene practices and prevailing situation of household food security in the County.

## *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 (537 households) was used as the survey sample size. Based on logistical factors, it was possible to visit 15 households per cluster per day translating to a minimum of 36 clusters. Simple random sampling was used in household selection.

Data Collection was done for 6 days by 6 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 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.

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 2016 | | June 2017 | |
| Prevalence of GAM based on WHZ (<-2SD) and or edema | 538 | 14.5(12.0-17.4) | 524 | 18.3 (14.6- 22.7 |
| Prevalence of SAM based on WHZ (<- 3 SD) and/or edema | | 2.4 (1.4- 4.2) | 524 | 3.8 (2.4- 6.1) |
| Prevalence of stunting based on HFA (<-2SD) | 517 | 34.8(28.9-41.3) | 517 | 34.0(28.4- 40.1) |
| Prevalence of Severe stunting based on HFA (<-3SD) | | 10.8(8.0-14.5) | | 10.6 (8.2- 13.7) |
| Prevalence of underweight based on WFA(<-2 z score) | 542 | 25.7(20.2-32.2) | 525 | 34.3 (28.6- 40.4) |
| Prevalence of severe underweight based on WFA(<-3 z score) | | 6.6(4.6- 9.4) | | 6.6 (4.6- 9.4) |
| **CHILD MORBIDITY (Based on 2 weeks recall)** | | | | |
| **Indicator** | **Type of illness** | **% June 2016** | **n(June 2017** | **% June 2017** |
| Illness in the last 2 weeks prior to the survey | All | 40.9 | 21 | 40.8 |
| | Fever with chills | 40.4 | 44 | 20.3 |
| | ARI | 63.5 | 126 | 58.1 |
| | Watery diarrhea | 32.8 | 50 | 22.6 |
| | Bloody diarrhea | 21.7 | 3 | 1.4 |
| Therapeutic Zinc supplementation for diarrhea management | | 36.5 | 25 | 50 |
| **VITAMIN A SUPPLEMENTATION AND DEWORMING** | | | | |
| **Indicator** | **No. of times** | **% (June 2016** | **n(June 2017)** | **% June 2017** |
| Vitamin A Supplementation (6- 11m) | Once | 69.0 | 30 | 47.6 |
| Vitamin A Supplementation 12- 59m) | Once | 80.4 | 336 | 71.0 |
| Vitamin A supplementation 12 to 59 m) | Twice | 36.3 | 127 | 26.8 |
| Vitamin A supplementation 6- 59 months | Once | | 366 | 78.5 |
| Vitamin A supplementation 6- 59 months | Twice | | 126 | 32.8 |
| Deworming (12- 59 m) | Once | 66.0 | 299 | 63.2 |
| Deworming (12- 59 m) | Twice | 18.2 | 155 | 32.8 |

| | | | | |
|---|---|---|---|---|
| **IMMUNISATION** | | | | |
| Antigen | **Means of Verification** | **% June 2016** | **n(June 2017)** | **%(June 2017)** |
| BCG | Presence of Scar | 92.9 | 475 | 89.3 |
| OPV1 | Card and Recall | 95.4 | 493 | 92.7 |
| OPV3 | Card and Recall | 92.2 | 454 | 85.4 |
| Measles at 9 months | Card and Recall | 84.7 | 411 | 81.4 |
| Measles at 18 months | Card and Recall | 14.7 | 103 | 24.5 |
| **MATERNAL NUTRITION** | | | | |
| **Indicator** | **Description** | **% June 2016** | **n(June 2017)** | **% June 2017)** |
| MUAC< 21.0 cm | Women of reproductive age | 10.5 | 37 | 10.0 |
| MUAC< 21.0 cm | Pregnant and lactating | 9.6 | 25 | 7.0 |
| Women supplemented with FeFo | Mothers of children less than 2 years | 63.3 | | 77 |
| Pregnant women consuming FeFo | 270 days | 0.0 | 0 | 0.0 |
| Pregnant women consuming FeFo | 90 days and above | 24.7 | 67 | 56 |
| Average time for IFA consumption (days) | Mean No. of days FeFo was consumed | 64 days | | 89.7 days |
| **WATER HYGIENE AND SANITATION** | | | | |
| **Indicator** | **Description** | **% June 2016** | **n(June 2017)** | **% June 2017** |
| Households obtaining drinking water from safe sources | | 35.0 | | 36.6 |
| Households obtaining water from sources less than 500 m | | 42.6 | | 26.0 |
| Household treating their drinking water | | 14.7 | | 9.2 |
| Handwashing in the 4 critical times | | 5.6 | 25 | 5.0 |
| **HOUSEHOLD AND WOMEN DIETARY DIVERSITY** | | | | |
| **Indicator** | **Description** | **% June 2016** | **n(June 2017** | **%June 2017** |
| Households consuming more than 5 food groups | | 81.2 | 133 | 25.0 |
| Women consuming more than 5 food groups (MDD-W) | | 24.7 | 54 | 21.3 |
| **FOOD CONSUMPTION SCORE AND COPING STRATEGY INDEX** | | | | |
| Households with acceptable FCS | | 94.5 | 389 | 71.5 |
| Coping Strategy Index | Index is given as a number not Percentage | 11.9 | | 26.0 |

### *Conclusion*

Overall the nutrition Status of children in Samburu County deteriorated in comparison with a SMART survey conducted in the same season in 2016. Currently the nutrition status of children in the County was in critical phase (IPC Phase 4) with a global acute malnutrition of 18.3%. There was a notable deterioration of children who were underweight compared to a survey carried out in June 2016 where the underweight was 29.5% compared to June 2017 (34.3). Stunting levels remained almost static at 34.0% compared to 34.8% in June 2016.

In terms of morbidity, the situation remained the same as it was in 2016 at 40.8% compared to 40.9% in June 2017. Major illnesses affecting children in the County were, ARI (58.1%) and watery diarrhea 22.6%. There was significant reduction of watery diarrhea infections from 21.7% to 1.4% in June 2017 compared to June 2016. Morbidity can be linked with high wasting in the County. High number of diarrhea cases in the county can be attributed to poor performance in WASH indicators. The open defecation in the County remains high at 78.0 % with only 9.2% treating their water this is despite the fact that 63.4% of them obtained their drinking water from sources which are classified as unsafe sources. Few caregivers wash their hands in the 4 critical moments. Partly 5% washed their hands during the 4 critical moments.

In regard to vitamin A supplementation and deworming, few children were supplemented with vitamin A compared to the previous survey. While 47.6% of children 6 to 11 months were supplemented with vitamin A, 69% had been supplemented with vitamin A. Among children aged 12 to 59 months 71.0% were supplemented with vitamin A once compared to 80.4% were supplemented in 2016. Twice supplementation remained low at 26.8% compared to 36.3 % in 2016. Deworming rates in the county remained low in the County. While 63.2% of children 12 to 59 months were dewormed in the past one year only 32.8% were dewormed twice. Low supplementation and deworming was attributed to low attendance to the health facilities among the under-fives and stock outs in the County.

Maternal nutrition status was based on MUAC measurement among women of reproductive age as well as iron and folic acid consumption among mothers of children under two years. The prevalence of malnutrition among pregnant and lactating women remains high at 7.0%. Though 77.0% of women were supplemented with iron and folic acid during their immediate previous pregnancy, the proportion that consumed iron and folic acid remains quite low. None of them consumed the supplements for the recommended 270 days and 6% consumed the supplements for more than 180 days. The mean number of iron and folic acid was 89.7 days.

There was a notable deterioration in food security indicator in the County compared to 2016 Survey. The number of households consuming more than 5 food groups deteriorated from 44.5% in 2016 to 25.2% in 2016. Major food consumed included cereals, sugars, oils and fats. Persistent drought may have contributed to deterioration of situation. According to NDMA monthly bulletin the situation in all livelihood zones was alert though improving. Milk production remained high. There was oversupply of both goats and sheep in the market leading to reduced prices.

### *Recommendations*

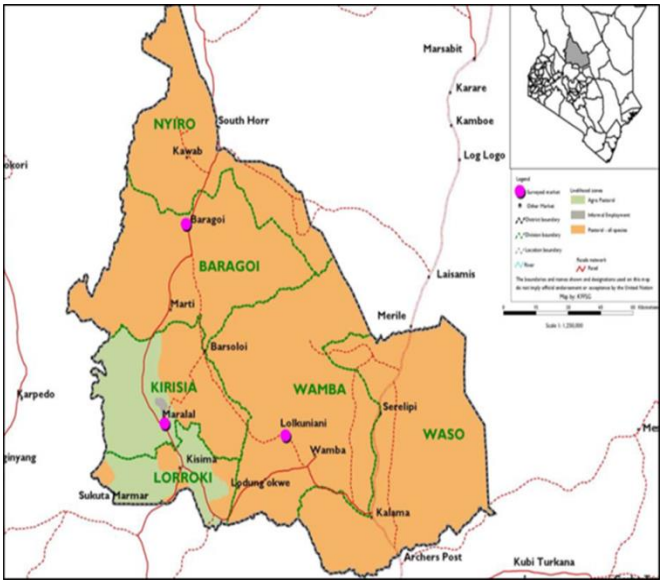
Based on the survey findings the following actions were recommended

- Strengthen of acute malnutrition treatment by upscaling IMAM services especially in the newly opened health facilities as well as addressing LMIS bottlenecks
- Strengthen the County Multisectoral coordination platforms in the County by regularly holding Multisectoral coordination forums, formation of a common results framework and participation in development of annul work plans for nutrition related sectors will help to reduce high stunting in Samburu County
- Intensify supplementation of vitamin A in the health facilities and institutionalization of Vitamin A to ECDEs as well as collaboration with the Ministry of Education in planning of Malezi bora will help to address the challenge of low vitamin A and deworming in the County.
- Upscaling of water treatment by issuing more households with water treatment chemicals
- Supplying water to the households by drilling more boreholes as per the County plans to address the water accessibility challenge
- Establishment of home demonstration gardens for vitamin A rich foods to address low intake of vitamin A rich foods

# 1.0. Introduction

## 1.1. Background

Samburu County lies in the northern part of Kenya and covers an area of 21,022.1 sq. km (Samburu County CIDP 2013- 2017). It is situated in the northern part of Great Rift Valley. To the north west the County borders Turkana County. The County also borders the following Counties; Baringo to the Southwest, Marsabit to the Northeast, Isiolo to the East and Laikipia County to the South. The County lies between latitudes 0˚30' and 2˚35' N and between the longitudes 36˚15' and 38˚10' E. The County estimated population based on 2009, Kenya National Bureau of Statistics (KNBS) population census projection is 274,079 people with an under-five population of 51,884.




Administratively, Samburu County is further divided in to 3 sub counties namely; Samburu North, Samburu East and Samburu Central. Samburu County is divided in to 3 livelihood zones namely pastoral, agro pastoral and formal employment/business/petty trade. Approximately 85% of the County is lowland range land, the rest is highland where rain fed agriculture is practiced.

*Figure 1: Samburu County Map*

## 1.2. Justification of the Survey

According to a SMART survey carried out in Samburu County (June 2016), the global acute malnutrition was at critical state (14.5%) while SAM was 2.4%. According to the February 2017 Short Rains Assessment, Samburu County was classified 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). Analysis of the County drought situation indicated that Samburu County remained at Alarm phase in the between January and May 2017 with deteriorating trend between January and March 2017. With the onset of long rains in April 2017, there was an improving trend in April and May. In June the phase went up to alert phase.

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 2017. 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 | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Season | Drought | | | Long Rains | | Continental Rains | | | Short Rains | | | |

*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 in Samburu County.

## 1.5. Specific Objectives

- To determine the nutrition status of children 6 to 59 months
- To determine the nutritional status of women of reproductive age (15-49) years based on maternal mid upper arm circumference (MUAC).
- To determine immunization coverage; measles (9-59 months), OPV1/3 and Vitamin A for children aged 6-59months.
- To determine deworming coverage for children aged 12 to 59 months.
- To determine the prevalence of common illnesses (diarrhea, measles and ARI).
- To assess maternal and child health care practices.
- To assess water, sanitation and hygiene practices.
- To assess the prevailing situation of household food security in the County.

# 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 274, 049 people. 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

| Data entered in ENA for SMART | Value | Rationale |
|---|---|---|
| Estimated Prevalence (GAM) | 17.4% | The upper confidence limit for 2016 SMART survey where prevalence was 14.5% (12.0- 17.4, 95% C.I). Since the situation drought situation is worse as at May 2017 (Alarm phase) across all livelihood zone compared to May 2016 where the situation ranged from normal to alert. The upper limit was used |
| ±Desired precision | 4.0% | Based on SMART survey nutrition guidelines and guided by the current prevalence |
| Design Effect | 1.4 | Guided by June 2016 SMART Survey to cater or clusters heterogeneity |
| Average household size | 5.9 | Based on 2016 SMART Survey |
| Proportion of children under 5 | 18.9% | DHIS County estimates |
| Non- Response rate | 3.0% | Due to the frequent movements in most parts of the county hence non response anticipated |
| **No of households** | **540** | |
| **No of children** | **526** | |

## 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 (540 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 15 households per cluster per day translating to a minimum of 36 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 15 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 6 days (from 26th June to 1st July 2017) 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.

## 2.6. Data Analysis

Anthropometric data processing was done using ENA software version 2015 (July). World Health Organization Growth Standards (WHO-GS) data cleaning and flagging procedures was used to identify outliers which would enable data cleaning as well as exclusion of discordant measurements from anthropometric analysis. 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 and exported to SPSS for further analysis. All the other quantitative data were analyzed in 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;

- Thorough was done in 4 days for all survey participants, the training dwelt on SMART methodology, survey objectives, interviewing techniques and data collection tools.
- Ensuring all anthropometric equipments were functional and standardized. On daily basis each team was required to calibrate the tools.
- During the training exercise, standardization test was done; in addition, piloting of tools was done to ensure all the information was collected with uniformity.
- Conducting a review of data collection tools during training and after the pilot test.
- All the survey teams were assigned a supervisor during data collection.
- The anthropometric data collected was entered daily 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 532 children aged 6 to 59 months in 527 households. Thirteen households sampled did not participate in the survey as they were found absent upon repeat visits. The non-response rate was therefore 2.4%. Based on household data, where information of 2088 household members were collected in 527 households, the average household size was 4.0.

### 3.1.2. Marital and Residency of the Respondents

All respondents (100%) were residents during the time of the survey. Majority of the respondents (79.6%) were married, 12.8% were windowed while 6.5% were single.

### 3.1.3. School enrollment and Highest Education level for adults

Overall 71.3% 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 (41.7%) and the distance to the nearby school (35.1%). Other reasons mentioned are as shown in table 4 below.

Table 4: Reasons for not attending school

| Reasons for not attending schools | Number | Percentage |
|---|---|---|
| Family labor responsibilities | 70 | 41.7 |
| No school nearby | 59 | 35.1 |
| Child is still young | 28 | 16.7 |
| Migrated or moved from the school area | 4 | 2.4 |
| Household doesn't see the value of schooling | 3 | 1.8 |
| Married | 2 | 1.2 |
| Chronic illness | 1 | 0.6 |
| No food in school | 1 | 0.6 |

As far as the highest education level attained by adults is concerned, 70.4% of the adults had none with 13.9% having primary education as the highest education level as shown in figure 2 below.

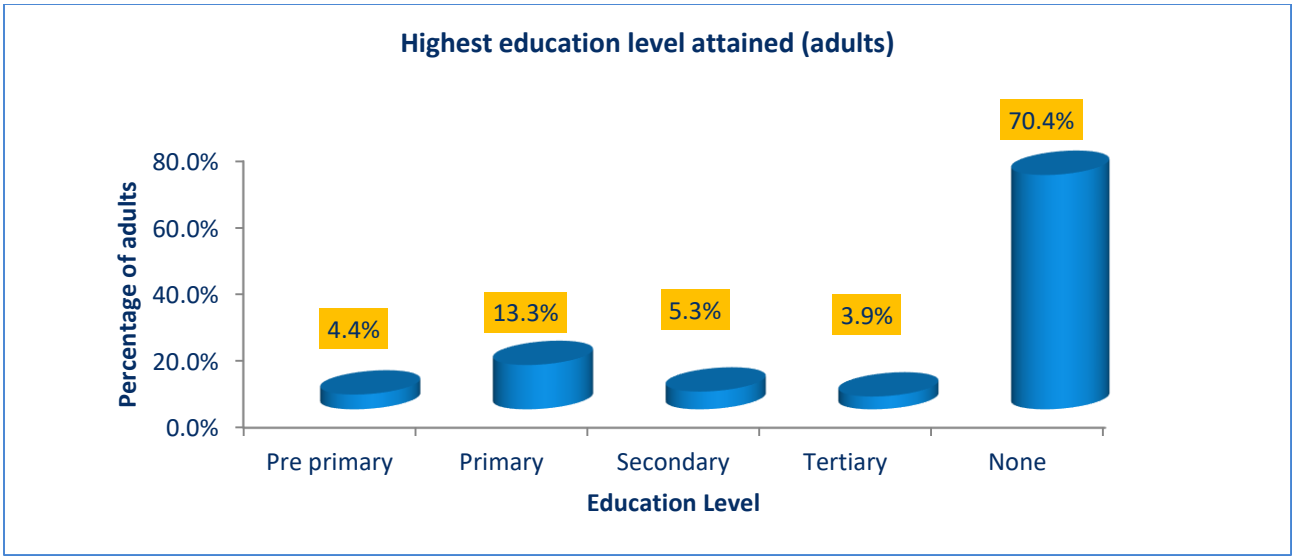



Figure 2 : Highest education Level

### 3.1.4. Income Source & Main Occupation

The main source of income for household heads in majority of household visited was sale of livestock (49%) followed by petty trading (15.0%). Table 5 below is a summary of other sources of income by household heads. In terms of occupation, majority of the household who participated in the survey were livestock herders (57.0%) with 11% practicing waged/casual labor as shown in table 5.

Table 5: Income source and Main occupation of household head

| Main occupation | n | Percent | Main Income Source | n | Percent |
|---|---|---|---|---|---|
| Livestock Herding | 317 | 57 | No income | 69 | 13 |
| Own farm labor | 28 | 5 | Sale of livestock | 257 | 49 |
| Employed/Salaried | 27 | 5 | Sale of livestock products | 2 | 0.3 |
| Waged labor/casual | 61 | 11 | Sale of livestock | 23 | 4 |
| Petty trading | 32 | 6 | Petty trading | 78 | 15 |
| Marchant/trader | 3 | 1 | Casual labor | 64 | 12 |
| Firewood/Charcoal | 27 | 5 | Permanent job | 24 | 5 |
| Fishing | 0 | 0 | Sale of personal assets | 0 | 0 |
| Income by children | 29 | 5 | Remittances | 4 | 1 |
| Others | 29 | 5 | Others | 3 | 6 |

## 3.2. Child Nutrition Status

### 3.2.1. Children distribution of age and Sex

A total of 528 children under age of 5 years were assessed during the survey. They included 268 boys and 260 girls representing a sex ratio of 1.0 (p= 0728) meaning that, overall boys and girls are equally represented. Table 6 below is a summary of sex distribution of boys and girls assessed. Figure 3 illustrates the age sex distribution of children. Under five nutrition status was assessed using anthropometric measurements. These included weight, height and MUAC. Analysis was based on 2006 WHO reference standards.

Table 6: Age and Sex distribution

| | Boys | | Girls | | Total | | Ratio |
|---|---|---|---|---|---|---|---|
| Age (Months) | no. | % | no. | % | no. | % | Boy: Girl |
| 6-17 | 55 | 48.2 | 59 | 51.8 | 114 | 21.6 | 0.9 |
| 18-29 | 68 | 47.6 | 75 | 52.4 | 143 | 27.1 | 0.9 |
| 30-41 | 72 | 54.1 | 61 | 45.9 | 133 | 25.2 | 1.2 |
| 42-53 | 54 | 50.9 | 52 | 49.1 | 106 | 20.1 | 1.0 |
| 54-59 | 19 | 59.4 | 13 | 40.6 | 32 | 6.1 | 1.5 |
| Total | 268 | 50.8 | 260 | 49.2 | 528 | 100.0 | 1.0 |

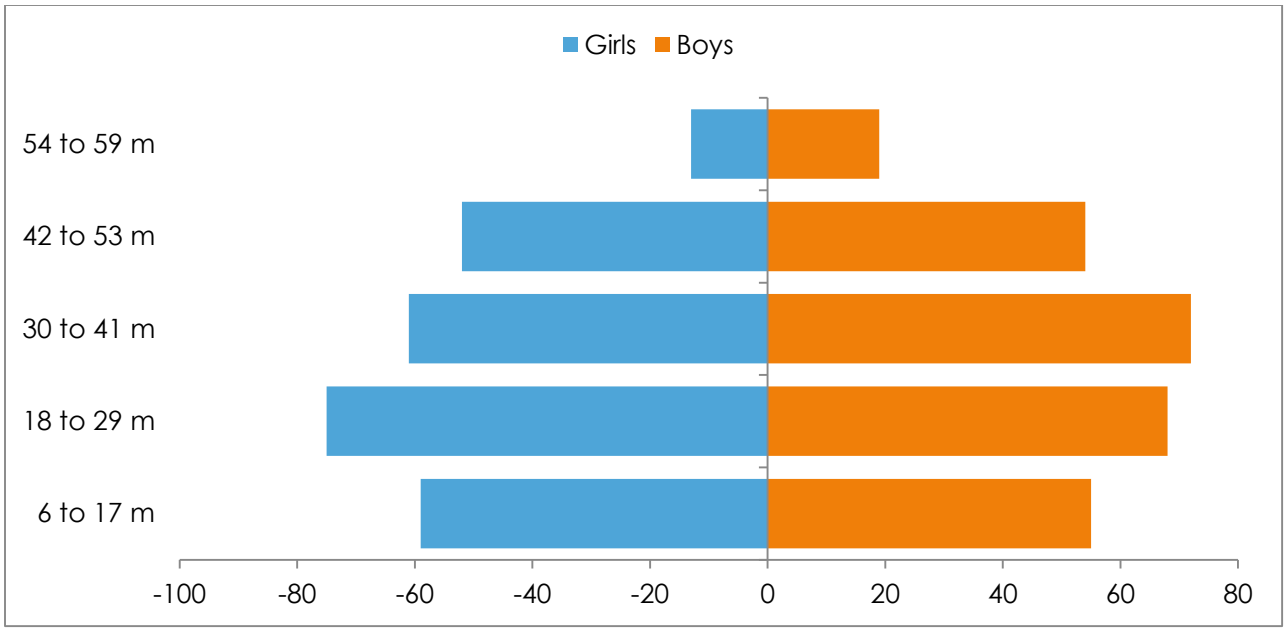



Figure 3: Age sex Pyramid (under five)

### 3.2.2. 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*

Analysis of acute malnutrition included 524 (266 boys and 258 girls) children aged 6 to 59 months with exclusion of 4 children who were flagged off as outliers. From the assessment the GAM rate for Samburu County was **18.3% (14.6 – 22.7, 95% C.I.)** while SAM rate was **3.8% (2.4- 6.1, 95% C.I.).** as indicated in table 6 below.

Table 7: *Prevalence of acute malnutrition based on Weight for Height z-score (WHO 2006 Standards)*

| | **All** n = 524 | **Boys** n = 266 | **Girls** n = 258 |
|---|---|---|---|
| **Prevalence of global malnutrition (<-2 z-score and/or oedema)** | (96) 18.3 % (14.6 - 22.7 95% C.I.) | (61) 22.9 % (17.7 - 29.2 95% C.I.) | (35) 13.6 % (9.2 - 19.6 95% C.I.) |
| **Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)** | (76) 14.5 % (11.1 - 18.7 95% C.I.) | (47) 17.7 % (12.7 - 24.1 95% C.I.) | (29) 11.2 % (7.3 - 16.9 95% C.I.) |
| **Prevalence of severe malnutrition (<-3 z-score and/or oedema)** | (20) 3.8 % (2.4 - 6.1 95% C.I.) | (14) 5.3 % (2.9 - 9.3 95% C.I.) | (6) 2.3 % (1.0 - 5.5 95% C.I.) |

Figure 3 below is a graphical representation of distribution of weight for height of children surveyed in relation to the WHO standard curve (reference children). The curve slightly shifts to the left with a mean of -1.08(SD ±1.05) an indication of under nutrition in comparison to reference children.

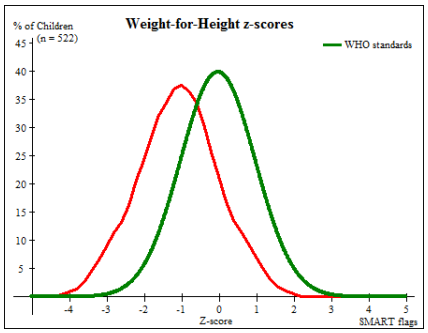



Figure 4: Graphical representation of WFH for children assessed compared to reference children

### *Analysis of Acute malnutrition by Age*

Further analysis was done on prevalence of acute malnutrition based on sex and age as indicated in table 8 below. From the analysis older children (30 to 59 months) were more affected by severe and moderate malnutrition as compared to younger children (6 to 29 months).

Table 8: Prevalence of acute malnutrition by age based on WFH Z-score and or edema

| | | Severe wasting (<-3 z-score) | | Moderate wasting (>= -3 and <-2 z-score ) | | Normal (> = -2 z score) | | Oedema | |
|---|---|---|---|---|---|---|---|---|---|
| Age (mo) | Total no. | No. | % | No. | % | No. | % | No. | % |
| 6-17 | 110 | 8 | 7.3 | 11 | 10.0 | 91 | 82.7 | 0 | 0.0 |
| 18-29 | 141 | 1 | 0.7 | 16 | 11.3 | 124 | 87.9 | 0 | 0.0 |
| 30-41 | 133 | 5 | 3.8 | 19 | 14.3 | 109 | 82.0 | 0 | 0.0 |
| 42-53 | 106 | 4 | 3.8 | 22 | 20.8 | 80 | 75.5 | 0 | 0.0 |
| 54-59 | 32 | 2 | 6.3 | 8 | 25.0 | 22 | 68.8 | 0 | 0.0 |
| Total | 522 | 20 | 3.8 | 76 | 14.6 | 426 | 81.6 | 0 | 0.0 |

### *Analysis of Acute Malnutrition based on the presence of edema*

Presence of bilateral edema is a sign of severe acute malnutrition. Analysis was therefore done based on this indicator. As shown in table 9 below, no edema case was recorded among the children surveyed.

Table 9: Prevalence of acute malnutrition and edema based on WFH Z- score

| | <-3 z-score | >=-3 z-score |
|---|---|---|
| **Oedema present** | Marasmic kwashiorkor<br>No. 0<br>(0.0 %) | Kwashiorkor<br>No. 0<br>(0.0 %) |
| **Oedema absent** | Marasmic<br>No. 23<br>(4.3 %) | Not severely malnourished<br>No. 507<br>(95.7 %) |

### *Prevalence of Acute Malnutrition by MUAC*

Malnutrition can also be diagnosed using 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. Analysis of the nutrition status for children aged 6 to 59 months based on MUAC and or presence of oedema resulted to GAM of 5.1% (3.5- 7.4, 95% C.I.) and SAM of 0.6% (0.2- 1.8, 95% C.I.) as indicated in table 10 below.

Table 10: Prevalence of acute malnutrition based on MUAC cutoffs (and/or edema) and by sex

| | All<br>n = 532 | Boys<br>n = 269 | Girls<br>n = 261 |
|---|---|---|---|
| **Prevalence of global malnutrition (< 125 mm and/or oedema)** | (27) 5.1 % (3.5 - 7.4 95% C.I.) | (13) 4.8 % (3.0 - 7.8 95% C.I.) | (14) 5.4 % (2.9 - 9.6 95% C.I.) |
| **Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)** | (24) 4.5 % (3.0 - 6.6 95% C.I.) | (12) 4.5 % (2.8 - 7.0 95% C.I.) | (12) 4.6 % (2.4 - 8.7 95% C.I.) |
| **Prevalence of severe malnutrition (< 115 mm and/or oedema)** | (3) 0.6 % (0.2 - 1.8 95% C.I.) | (1) 0.4 % (0.0 - 2.9 95% C.I.) | (2) 0.8 % (0.2 - 3.1 95% C.I.) |

### 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). As indicated in table 11 below, the prevalence of underweight among children aged 6 to 59 months in Samburu County was 34.3% (28.6 – 40.4, 95% C.I.) while severe underweight was 7.0% (4.9- 10.1, 95% C.I.) as illustrated in table 11 below

Table 11: Prevalence of underweight based on WFA Z score and by sex

| | All<br>n = 525 | Boys<br>n = 266 | Girls<br>n = 259 |
|---|---|---|---|
| **Prevalence of underweight (<-2 z-score)** | (180) 34.3 % (28.6 - 40.4 95% C.I.) | (107) 40.2 % (33.0 - 47.9 95% C.I.) | (73) 28.2 % (21.8 - 35.6 95% C.I.) |
| **Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)** | (143) 27.2 % (22.9 - 32.0 95% C.I.) | (84) 31.6 % (25.5 - 38.3 95% C.I.) | (59) 22.8 % (17.6 - 28.9 95% C.I.) |
| **Prevalence of severe underweight (<-3 z-score)** | (37) 7.0 % (4.9 - 10.1 95% C.I.) | (23) 8.6 % (5.4 - 13.7 95% C.I.) | (14) 5.4 % (3.1 - 9.2 95% C.I.) |

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

World Health Organization defines stunting as height for age less than – 2 SD from median height for age of reference population. Childhood stunting is an outcome of maternal undernutrition as well as inadequate infant and young child feeding. It is associated with impaired neurocognitive development, a risk maker of non-communicable diseases and reduced productivity later in life (WHO 2013). Analysis of stunting prevalence based on height for age revealed an overall stunting rate of 34.0% (28.4- 40.1, 95% C.I.) and a severe stunting (HFA< -3 in reference to standard population) rate of 10.6% (8.2- 13.7, 95% C.I.) as shown in table 12 below. Boys were more stunted than girls. Table 13 illustrates stunting by age.

Table 12: Prevalence of Stunting based on Height for Age z- score and by sex

| | All n = 517 | Boys n = 262 | Girls n = 255 |
|---|---|---|---|
| **Prevalence of stunting (<-2 z-score)** | (176) 34.0 % (28.4 - 40.1 95% C.I.) | (101) 38.5 % (31.5 - 46.1 95% C.I.) | (75) 29.4 % (22.8 - 37.0 95% C.I.) |
| **Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)** | (121) 23.4 % (19.1 - 28.4 95% C.I.) | (62) 23.7 % (18.7 - 29.5 95% C.I.) | (59) 23.1 % (16.9 - 30.8 95% C.I.) |
| **Prevalence of severe stunting (<-3 z-score)** | (55) 10.6 % (8.2 - 13.7 95% C.I.) | (39) 14.9 % (10.7 - 20.3 95% C.I.) | (16) 6.3 % (3.6 - 10.6 95% C.I.) |

Table 13: Prevalence of Stunting by age

| | | Severe stunting (<-3 z-score) | | Moderate stunting (>= -3 and <-2 z-score ) | | Normal (> = -2 z score) | |
|---|---|---|---|---|---|---|---|
| Age (months) | Total no. | No. | % | No. | % | No. | % |
| 6-17 | 111 | 9 | 8.1 | 19 | 17.1 | 83 | 74.8 |
| 18-29 | 139 | 16 | 11.5 | 42 | 30.2 | 81 | 58.3 |
| 30-41 | 128 | 17 | 13.3 | 24 | 18.8 | 87 | 68.0 |
| 42-53 | 105 | 12 | 11.4 | 28 | 26.7 | 65 | 61.9 |
| 54-59 | 32 | 1 | 3.1 | 8 | 25.0 | 23 | 71.9 |
| Total | 515 | 55 | 10.7 | 121 | 23.5 | 339 | 65.8 |

Figure 5 below shows the graphical representation of distribution of HFA of surveyed children in relation to reference children (based on WHO standards). There is a slight drift to the left implying that the surveyed children were stunted in comparison to WHO standard curve with a mean± SD of –1.44±1.22.

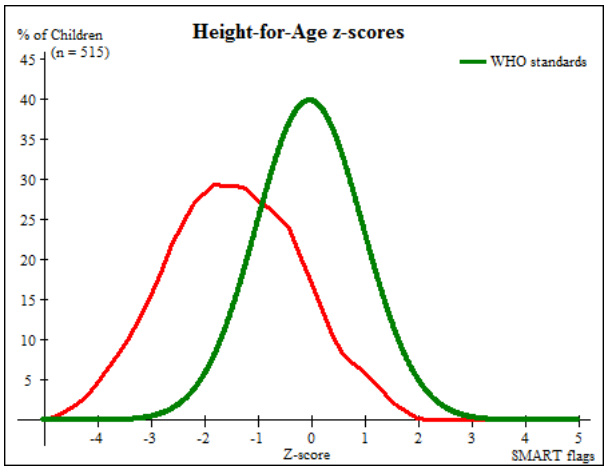



Figure 5: Graphical representation of HFA distribution in comparison with WHO reference

## 3.3. Children Morbidity and Health Seeking

### 3.3.1. Prevalence of Morbidity

Based on the UNICEF conceptual framework of the causes of malnutrition, disease is categorized as one immediate cause alongside inadequate diet. There is a relationship between the two whereby disease may alter food intake while inadequate intake of some key nutrients may lead to infection. Ultimately they all lead to one outcome; malnutrition.

Assessment was done on the diseases that affected children 6 to 59 months in the past 2 weeks. Caregivers were asked whether their children had been ill in the past 2 weeks prior to the survey date. Those who gave an affirmative answer to this question were further probed on what illness affected their children and whether and where they sought any assistance when their child/children were ill. Those who indicated that their child/children suffered from watery diarrhea were probed on the kind of treatment that was given to them.

Among the children assessed, 40.8% had been ill in the past 2 weeks prior to the survey date. Among those who were sick, majority of them (58.1%) suffered from ARI, followed by watery diarrhea (22.6%) and fever with chills (20.3%). Table 14 below is a summary of morbidity of children surveyed.

Table 14: Prevalence of Common illnesses among children 6- 59 months

| | Prevalence | |
|---|---|---|
| | n | Percentage |
| Total Illness | 217 | 40.8 |
| Fever with chills | 44 | 20.3 |
| ARI | 126 | 58.1 |
| Watery diarrhea | 50 | 22.6 |
| Bloody diarrhea | 3 | 1.4 |
| Other infections (Skin infections, eye and ear infections e.t.c | 14 | 6 |

### 3.3.2. 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 (50%) of those who suffered from watery diarrhea were supplemented with zinc while 61.2% were supplemented with ORS.

### 3.3.3. Health Seeking Places

Among those caregivers whose children were reportedly sick in the past 2 weeks, 62.2% sought some assistance. Among those who sought assistance, majority did it in a public clinic (74.8%) while 12.6% did it from a private clinic or pharmacy 8.9% did so from local herbalists. Overall 89.6% of those who sought assistance did so from appropriate places where they were likely to obtain treatment and proper care such as public clinic, private clinic or pharmacy, mobile clinic, NGOs and FBOs as illustrated in figure 5 below.

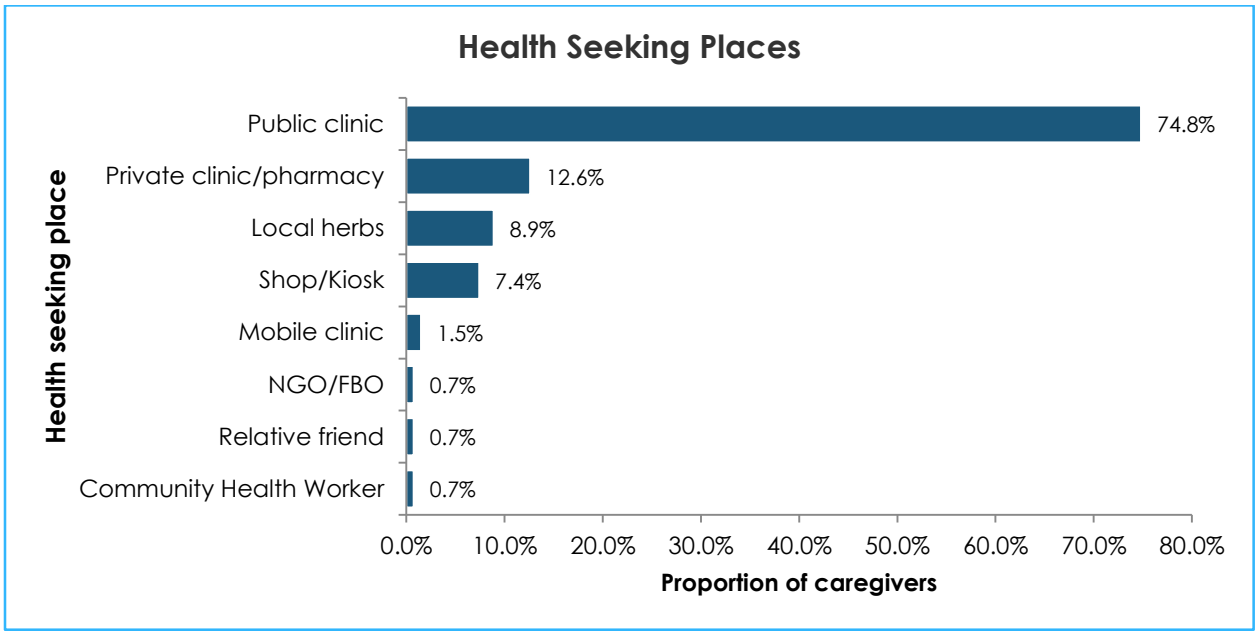



Figure 6: Health Seeking Places

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

### 3.4.1. 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, 89.3% of children were confirmed to have been immunized by BCG based on the presence of a scar. Those who were immunized by OPV1 and OPV3 were 92.7% and 85.4% respectively while 81.4% had been immunized for measles. However quite a small number (partly 24.5%) would confirm to have been immunized with the second dose of measles antigen at 18 months as indicated in figure 7 below.

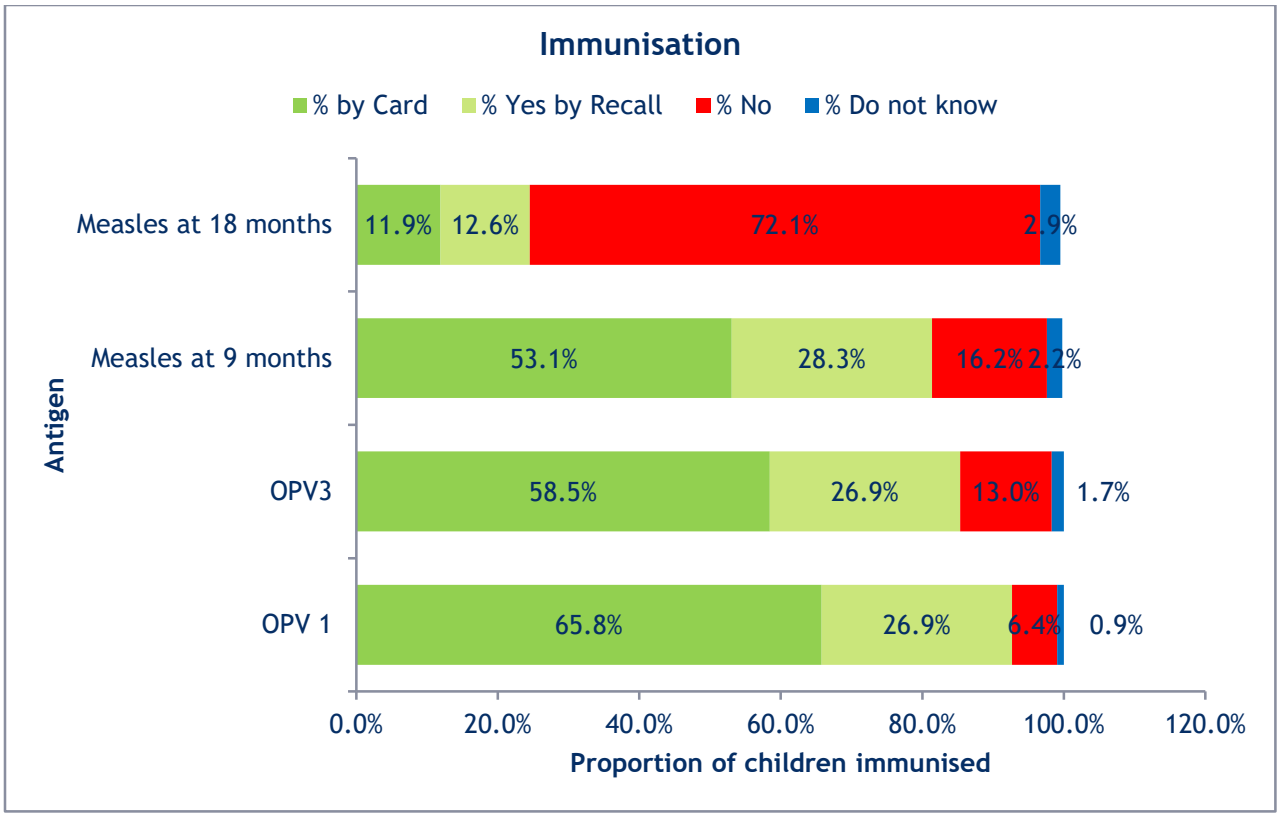



Figure 7: Immunization Coverage

### 3.4.2. 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).

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

To assess vitamin A supplementation, parents or 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. Among those who were supplemented, 38.8% was confirmed by the use of health cards with 61.2% who were confirmed by recall. Analysis of vitamin A supplementation for children aged 6months to 1 year indicates that 47.6% of this age group had been supplemented with vitamin A. Among those aged 12 to 59 months, 26.8% had been supplemented with vitamin A for 2 times in the past one year. Table 15 below summarizes vitamin A supplementation in Samburu County.

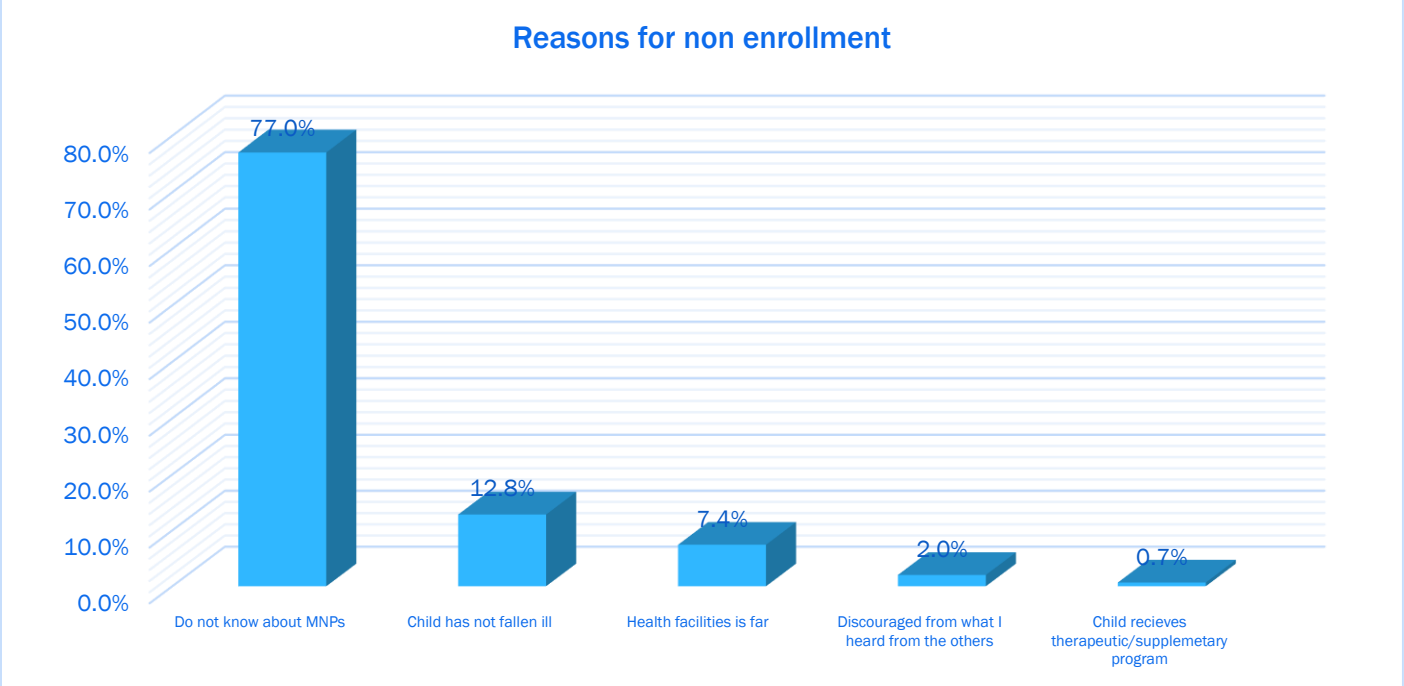
Table 15: Vitamin A Supplementation

| Age group | N | n | Percentage Supplemented |
|---|---|---|---|
| 6- 11 months | 63 | 30 | 47.6 |
| 12- 59 months (Once) | 473 | 336 | 71.0 |
| 12- 59 months (Twice) | 473 | 127 | 26.8 |
| 6- 59 months (Once) | 532 | 366 | 68.8 |
| 6- 59 months (Twice | 532 | 126 | 23.9 |

### 3.4.3. Home Fortification with MNPs

Micronutrient powders (MNPs), also known as Sprinkles contain a mix of micronutrients in powder form that are packaged in single-dose sachets and can be added directly to any semi-solid complementary foods prepared in the household without substantially affecting taste or color of the food. Iron and other essential MNs such as zinc, iodine, B vitamins, and vitamins A, C, and D may be added to the MNP sachets (micronutrients forum 2009). The Kenya National Guidelines on home fortification with MNPs for children aged 6 to 23 months recommend that each child to receive 10 sachets of MNPs per month. The MNPs should be consumed every third day and no more than 1 sachet per day. MNPs should be given for 6 months. The recommended delivery points are the health facilities.

Analysis of micronutrients supplementation was done with reference to the past 6 months period before the survey. Almost all children (86.7%) aged 6 to 23 months had not been enrolled in an MNP program. The major reason for non-enrollment was that they did not know of MNPs (77.0%) and that the child had not fallen ill. Figure 8 below illustrates other reasons for non-enrollment in an MNP program.



## 3.5. Maternal Nutrition

### 3.5.1. 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 and development and the size of the fetus and its overall health and that of the mother.

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.

### 3.5.2. Maternal Nutrition Status

A total of 354 women were assessed during the survey. More than half (52%) were lactating while 40% were neither pregnant or lactating. While 7% were pregnant. Overall 10.0 % has a MUAC of less than 21cm. Among the PLW, 7% had a MUAC of less than 21cm thus classified as malnourished.

### 3.5.3. Iron and Folic Acid Supplementation

Among mothers of children less than 24 months, 77% were supplemented with iron and folic acid during their pregnancy for the youngest child (below 24 months). The mean Fefo consumption period was 89.7 days. None of the surveyed women consumed FeFo for the recommended 270 days while 6% consumed Fefo for more than 180 days. Table 16 below illustrate the consumption of iron and folic acid.

Table 16: Iron and folic acid supplementation

| IFAS Consumption in days | Number of Women | Proportion |
|---|---|---|
| <90 days | 67 | 44 |
| 90 to 180 days | 77 | 50 |
| >180 days | 10 | 6 |

## 3.6. Water Hygiene and Sanitation

### 3.6.1. 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.

Approximately 63.4% of the households obtained their drinking water form sources classified as unsafe such as unprotected shallow wells (31.1%), river/spring (23.5%), earth pan/dam (7.1%), river/spring (6.8%) and water trucking/water vendor (1.0%). As illustrated in figure 8 below, 36.6% obtained their drinking water from piped water system, borehole/protected spring/protected shallow well which are classified as safe water sources.

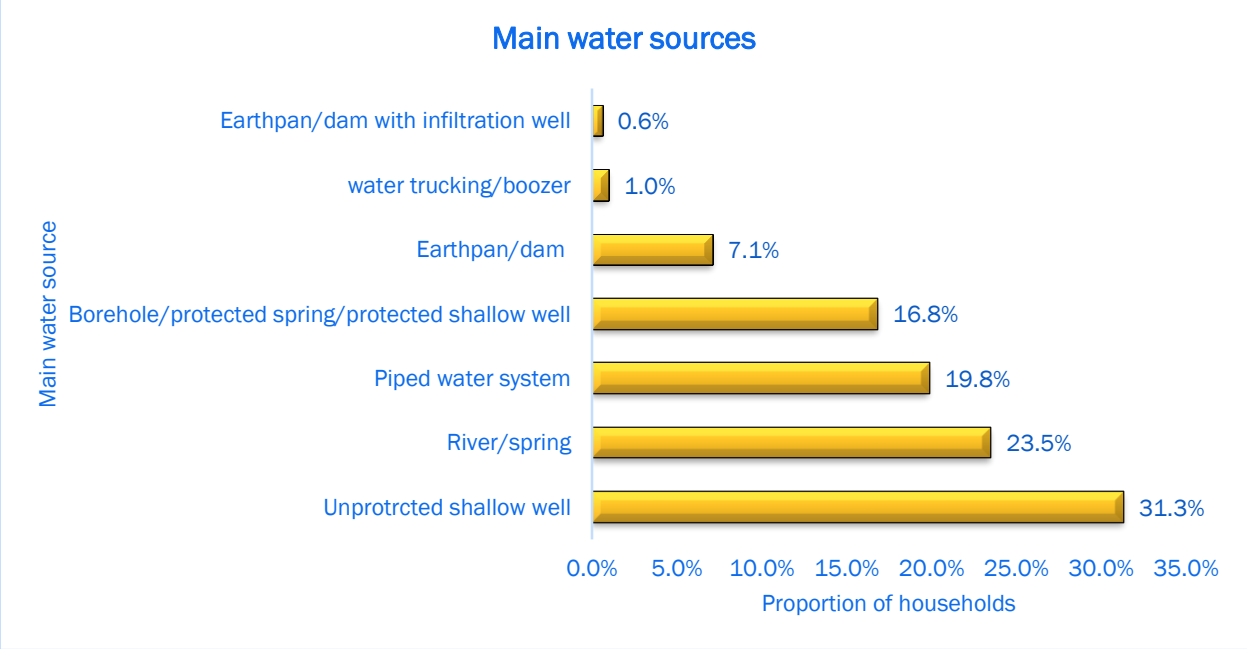



Figure 8: Main Sources of drinking water

Analysis of distances to water sources indicated that, majority of the households (45%) obtained their water from sources between 500 meters to 2km an equivalent of between 15 minutes to 1hour. Those who fall under the recommended sphere standards were 25.6% while 28.5% obtained their drinking water from sources which are more than 2km (1 to 2 hours) as illustrated in table 15 below. There was an increase in the proportion of households that obtained their drinking water from far distance sources compared to 2016 SMART survey where those who obtained their water from sources more than 2km was 13.7% while 43.3% obtained their water from sources between 500m and 2km.

In regard to queuing time, only 18.5% of the households surveyed queued for water. Among those who queued, 39.1% did so for less than 30 minutes, while 50.5% waited for between 30 and 60 minutes in the queue. 11% spent more than an hour.

Table 17: Trekking distances to the water sources

| Distance to the water sources and equivalent time | No of households | Proportion (%) |
|---|---|---|
| Less than 500 m (less than 15 min | 135 | 25.6 |
| More than 500 m and less than 2 km (15 min – 1 hr) | 237 | 45.0 |
| More than 2 km | 150 | 28.5 |
| Others | 0 | 0 |

### 3.6.2. Water Treatment, Storage Payment and Consumption

Only 9.2 % of the household surveyed treated their water. Among those who treated their water 81.0% boiled it, 13.0% used traditional herbs, 4.0 % used chemicals such as chlorine, pur and or water guard while 2.0 % used pot filters as shown in figure 9 below.

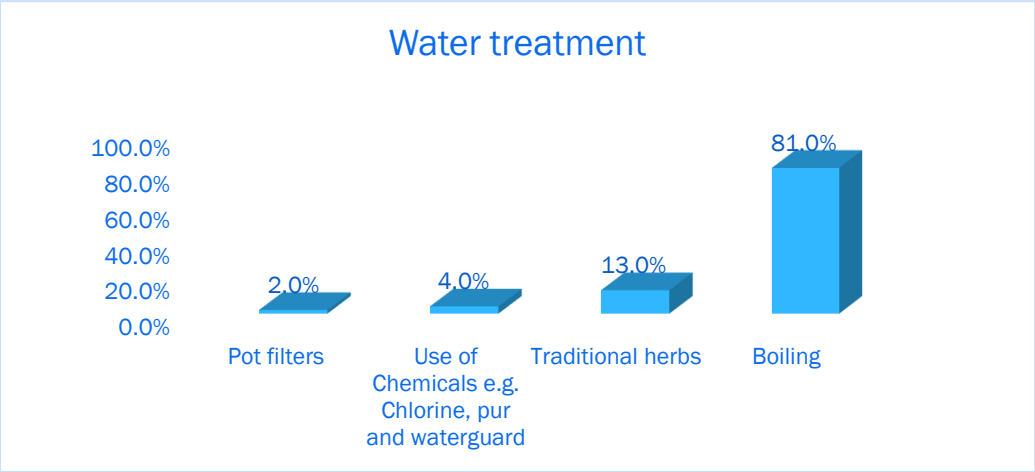



Figure 9: Water treatment methods

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 (92.4%) where it is less likely to have physical water contamination. The rest (7.6%) indicated that they stored their water in open containers/jerry cans exposing it to physical contamination. Partly 4.2% of the households consumed less than 15 liters of water a day prior the survey date. The mean water consumption per household was 40.9 litres

Only 21.4 % of the households paid for their water. Among those who paid for water, 74.1% did in terms of jerricans, the rest (25.9%) did so on monthly basis.

### 3.6.3. Handwashing

The importance of hand washing after defecation and before eating and preparing food, to prevent the spread of disease, cannot be over-estimated. Users should have the means to wash their hands after defecation with soap or an alternative (such as ash), and should be encouraged to do so. There should be a constant source of water near the toilet for this purpose. (SPHERE Handbook 2004).

Majority of respondents (73%) washed their hands based on 24-hour recall. Analysis of hand washing in the 4 critical times indicated that majority of the caregivers (58%) washed their hands before eating. Quite a number (47%) indicated that they washed their hands before cooking while 30% mentioned after visiting the toilet. Only 10% indicated that they did so after taking children to toilet as indicated in table 18 below.

Table 18: Handwashing Moments

| Handwashing Moments | Number of Households | Percentage of Households |
|---|---|---|
| After Toilet | 156 | 73 |
| Before Cooking | 250 | 30 |
| Before Eating | 304 | 47 |
| After taking children to toilet | 53 | 58 |
| Handwashing in 4 critical moments | 25 | 5 |
| Handwashing with soap and water | 134 | 25 |

### 3.6.4. 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 78% of the households. Toilet ownership remained low at 22% as indicated in figure 10 below.

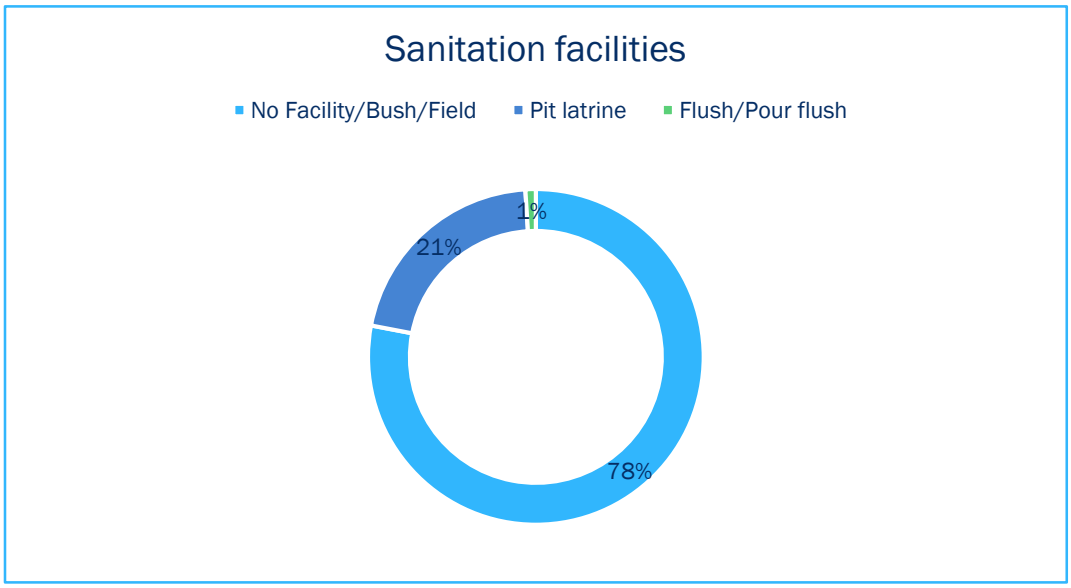



Figure 10: Access to Sanitation facilities

## 3.7. Household and Women Dietary Diversity

### 3.7.1. Household Dietary Diversity (HDD)

The household dietary diversity score (HDDS) is meant to reflect, in a snapshot form, the economic ability of a household to access a variety of foods. 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.

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 used. The groups were combined at the analysis stage to come up with 12 food groups. As shown in figure 11 below, there was a high consumption of 3 food groups namely; Cereals (81.0%), Sweets and Sugars (75.9%), Oils (73.6%), oils and fats (93.0%).

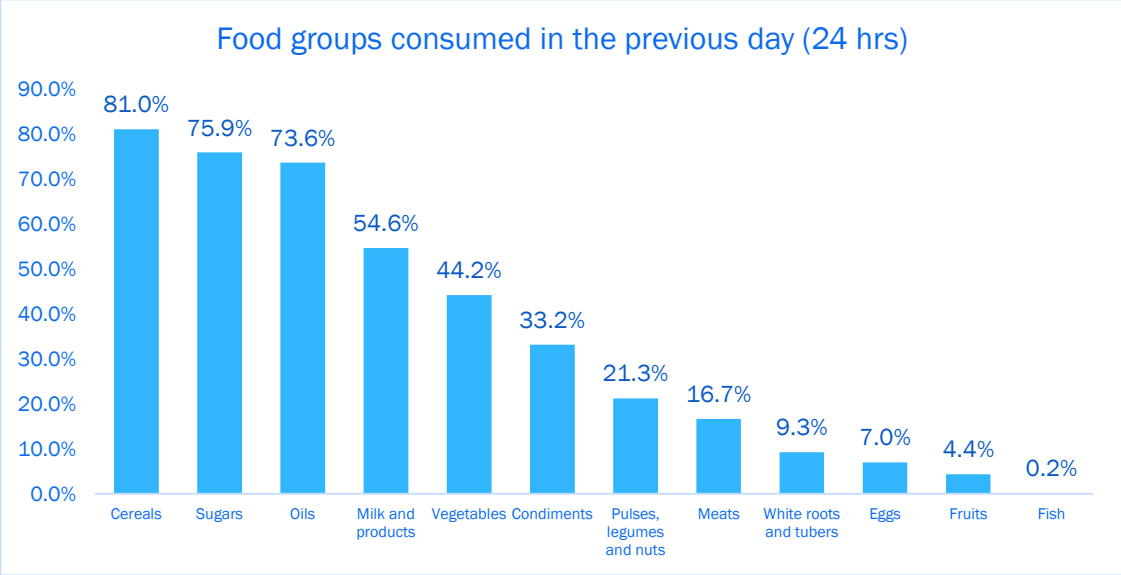



Figure 11: Food groups consumed at the household level during the previous day (24 hrs)

Few households (2.7%) consumed less than 3 food groups classified as low dietary diversity. 16.1% consumed 4 to 5 food groups classified as medium dietary diversity while a majority (82.1%) consumed more than 5 food groups classified as high dietary diversity. 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 19: Household dietary diversity

| Indicator | June 2016 | June 2017 | |
|---|---|---|---|
| | | | |
| Households consuming < 3 Food groups | 2.7% | 110 | 21% |
| Households consuming 3 to 5 food groups | 46.3 | 284 | 54% |
| Households consuming more than 5 food groups | 44.5% | 113 | 25% |

### 3.7.2. 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 12 below, the most consumed food was dairy products (93.0%) and starches (85.4%).

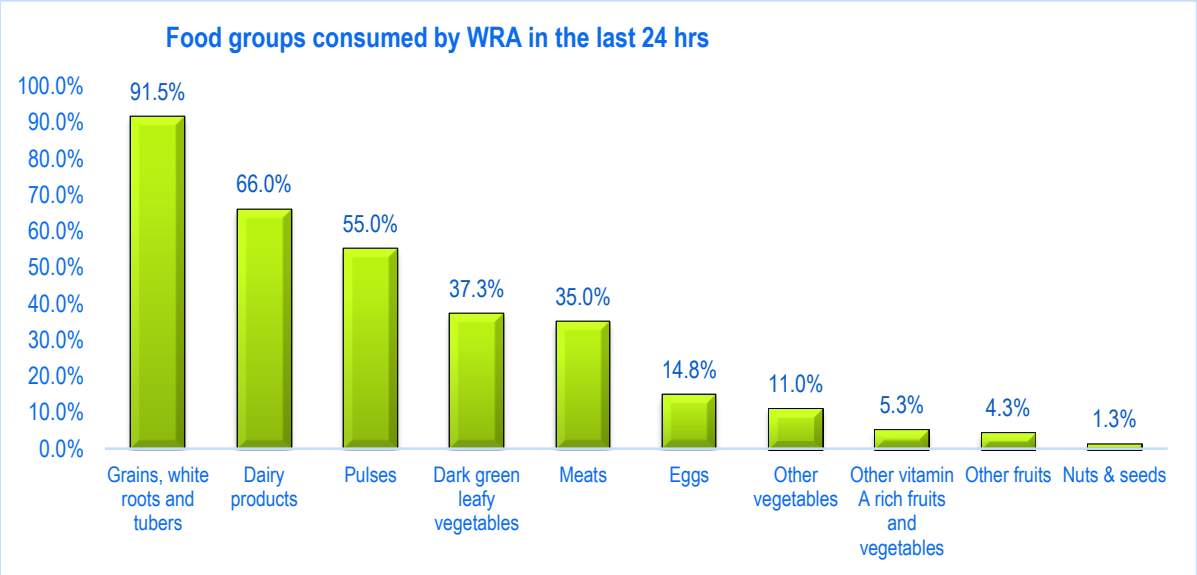



Figure 12: Food groups consumed (Women)

Table 20 : Minimum Dietary Diversity Score for Women (MDD-W)

| Indicator | Number | Percentage | |
|---|---|---|---|
| | June 2017 | June 2016 | June 2017 |
| **Women consuming at least 5 food groups** | 85 | 24.7 | 21.3 |
| **Women consuming less than 5 food groups** | 315 | 75.3 | 77.8 |
| **Mean number of food groups consumes** | | 3.5 | 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 21: Food Consumption Score Classification

| Main Threshold | Nomenclature | No of Households | Proportion |
|---|---|---|---|
| **Poor (0 to 21)** | Poor food consumption mainly cereals and sugars | 67 | 12.8 |
| **Bonder line (21.5 to 35** | Bonder line food consumption cereals, Legumes, milk, oils | 71 | 15.7 |
| **Acceptable (< 35.5** | Good food consumption, cereals, legumes, milk, condiments, flesh meat, vegetables, oils, sugars | 389 | 71.5 |

Further analysis was done on diet quality based on vitamin A rich, iron rich and protein rich diets. As illustrated in figure 13 below, majority of households which were classified under poor and borderline categories consumed none of vitamin A and iron rich foods. Less than a half of these households (55.7%) consumed somehow or frequently consumed protein rich foods (mainly dairies). Among the households that were categorized as having acceptable consumption, 100% frequently or somehow consumed protein rich foods while 81.2% and 11.5% did so in case of iron rich and vitamin A rich foods respectively.

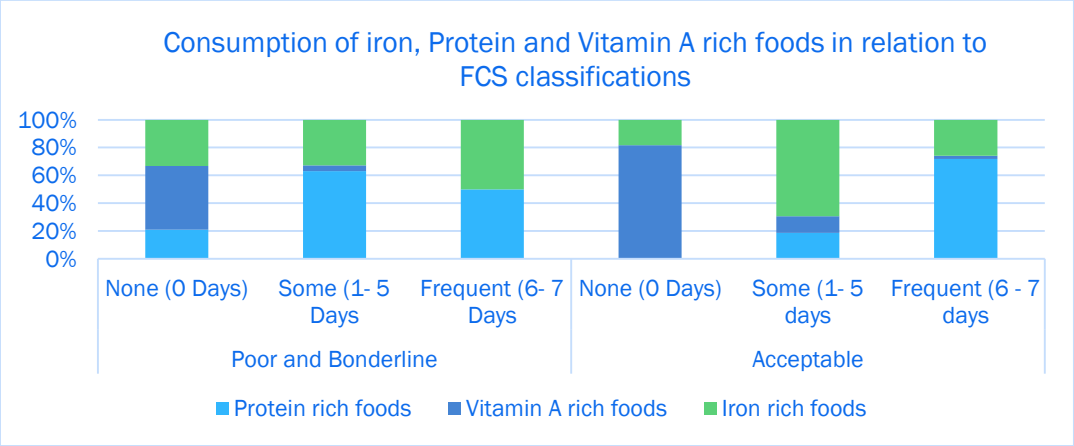



Figure 13: Consumption of iron, protein and vitamin A rich foods in relation to FCS classification

## 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). 51.6 % household were food insecure in the past 7 days (they at one point lacked food or did not have money to buy food at one point. Table 19 below summarizes the coping strategies adopted by the households in such instances.

Table 22: 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 | 182 | 4.5 | 1 | 4.5 |
| Borrow food | 191 | 1.8 | 2 | 3.6 |
| Limit Portion Sizes | 180 | 4.4 | 1 | 4.4 |
| Restrict consumption of food by adults so that children can feed | 156 | 3.1 | 3 | 9.3 |
| Reduce number of meals | 181 | 4.2 | 1 | 4.2 |
| Total Weighted Coping Strategy Score | | | | **26.0** |

Comparison was also done with immediate 2 preceding survey which were conducted in the same month i.e. June 2014 and June 2016 . The total weighted CSI on June 2014 SMART survey was 11.9 while in June 2016 it was 17.6. Figure 14 below illustrates the comparison of 2016 and 2014 assessment. There was an increase in CSI meaning households were more food insecure compared to June 2014.

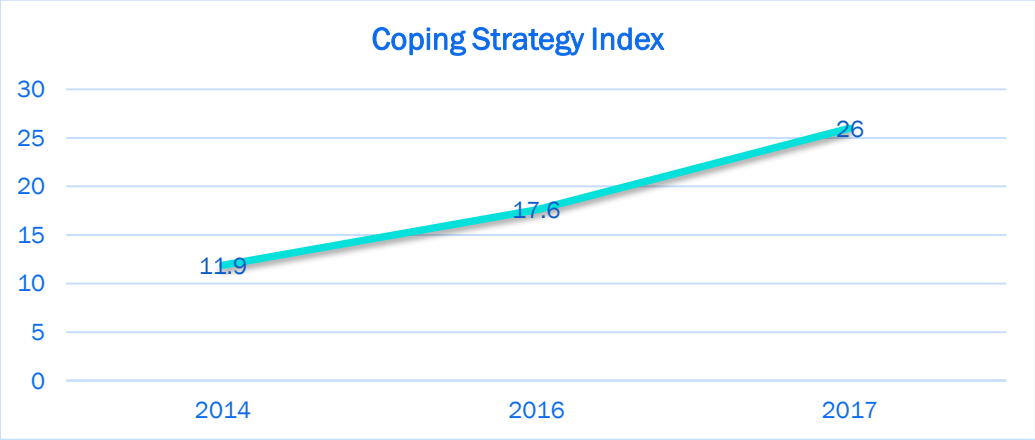



Figure 14: Coping Strategy Index

# 4.0. Conclusion and Recommendations

## 4.1. Conclusion

Overall the nutrition Status of children in Samburu County deteriorated in comparison with a SMART survey conducted in the same season in 2016. Currently the nutrition status of children in the County was in **critical phase** (IPC Phase 4) with a global acute malnutrition of 18.3% (14.6- 22.7, 95% C.I). In comparison to 2016, the situation deteriorated though not significantly (p=0.1609). There was a notable deterioration of children who were underweight compared to a survey carried out in June 2016 where the underweight was 29.5% compared to June 2017 (34.3%) though there was no significant statistical difference (p = 0.2194). Stunting levels remained almost static at 34.0% compared to 34.8% in June 2016. As in the preceding survey, boys are more stunted than girls even though it was not statistically significant (p= 0.3208).

In terms of morbidity, the situation remained the same as it was in 2016 at 40.8% compared to 40.9% in June 2017. Major illnesses affecting children in the County were, ARI (58.1%) and watery diarrhea 22.6%. There was significant reduction of watery diarrhea infections from 21.7% to 1.4% in June 2017 compared to June 2016. Morbidity can be linked with high wasting in the County. High number of diarrhea cases in the county can be attributed to poor performance in WASH indicators. The open defecation in the County remains high at 78.0 % with only 9.2% treating their water this is despite the fact that 63.4% of them obtained their drinking water from sources which are classified as unsafe sources. Few caregivers wash their hands in the 4 critical moments. Partly 5% washed their hands during the 4 critical moments.

In regard to vitamin A supplementation and deworming, few children were supplemented with vitamin A compared to the previous survey. While 47.6% of children 6 to 11 months were supplemented with vitamin A, 69% had been supplemented with vitamin A. Among children aged 12 to 59 months 71.0% were supplemented with vitamin A once compared to 80.4% were supplemented in 2016. Twice supplementation remained low at 26.8% compared to 36.3 % in 2016. Deworming rates in the county remained low in the County. While 63.2% of children 12 to 59 months were dewormed in the past one year only 32.8% were dewormed twice. Low supplementation and deworming was attributed to low attendance to the health facilities among the under-fives and stock outs in the County.

Maternal nutrition status was based on MUAC measurement among women of reproductive age as well as iron and folic acid consumption among mothers of children under two years. The prevalence of malnutrition among pregnant and lactating women remains high at 7.0%. Though 77.0% of women were supplemented with iron and folic acid during their immediate previous pregnancy, the proportion that consumed iron and folic acid remains quite low. None of them consumed the supplements for the recommended 270 days and 6% consumed the supplements for more than 180 days. The mean number of iron and folic acid was 89.7 days.

There was a notable deterioration in food security indicator in the County compared to 2016 Survey. The number of households consuming more than 5 food groups deteriorated from 44.5% in 2016 to 25.2% in 2016. Major food consumed included cereals, sugars, oils and fats. Persistent drought may have contributed to deterioration of situation. According to NDMA monthly bulletin the situation in all

livelihood zones was alert though improving. Milk production remained high. There was oversupply of both goats and sheep in the market leading to reduced prices.

## 4.2. Recommendations

Based on the survey findings, the following actions were recommended

Table 23 : Recommendations

| Findings | Recommendations | Actors | Timelines |
|---|---|---|---|
| High wasting was high at 18.3% | ▪ Upscaling IMAM services to the newly opened health facilities<br>▪ Strengthen LMIS reporting | CNC, UNICEF, KEMSA, NHP plus | July 2017 |
| High Stunting Levels at 34.0% | Strengthen the existing multi-stakeholders' forum for scaling up nutrition (SUN MSP). | CHMT, partners, MoE, MoA, MoGSS | Quarterly |
| | Hold quarterly multi-sectoral forums for scaling up nutrition. | CHMT partners | Quarterly |
| | Formation of a common results framework for scaling up nutrition | MoE, MoA | Quarterly |
| | Participate in the development of annual work plans for other sectors (MoA, MoE,MoGSS). | MoA, MoE, MoGSS | September 2017 |
| Low Vitamin A Supplementation (twice among 12-59 months-26.8%) | Collaboration of MoH with MoE in integrating VAS and deworming in outreaches and ECDs during malezi bora | CHMT and Patner | July 2017-September 2018 |
| | Institutionalizing VAS and deworming through ECD centres | MoE | Malezi Bora Months |
| | Intensify supplementation in health facilities, outreaches | County government | Malezi Bora Months |
| | Avail MOH 216 to all immunizing facilities | County government/MoH | November 2017 |
| Low Immunization coverage (OPV 3-58.5% & Measles at 9 months-53.1%) | Conduct routine immunization on a daily basis for high volume facilities | County Nursing Officer | September 2017 |
| Treatment of water is low at 9.2% | Triggering of more villages | MoH, Amref, Feed the Children, NDMA | January 2018 |
| | Sensitization/ health education | MoH, Feed the Children, BBC media, NHP plus | July 2017 - June 2018 |
| | Upscaling of water treatment by issuing more people with water treatment chemicals | MoH, Amref, NDMA, Feed the children | July 2017- June 2018 |
| Long trekking Distances to the water Sources | Drilling more boreholes | County government of Samburu | June 2018 |
| Poor hand washing practices ( 5% at the 4critical times and 25% | Hand washing demonstrations with soap and water in the community and schools by CHVs and ECD teachers | MoH | July 2017- July 2018 |

| | | | |
|---|---|---|---|
| washing with soap and water) | | | |
| Low intake of vitamin rich food | Establishment of demo gardens for Vitamin A rich foods at the HH level | NHP plus, MoH | July 2017 |

## References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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

# Appendices

## Appendix 1: Plausibility check for: Samburu County.as

**Standard/Reference used for z-score calculation: WHO standards 2006**

(If it is not mentioned, flagged data is included in the evaluation. Some parts of this plausibility report are more for advanced users and can be skipped for a standard evaluation)

### Overall data quality

| Criteria | Flags* | Unit | Excel. | Good | Accept | Problematic | Score |
|---|---|---|---|---|---|---|---|
| Flagged data | Incl | % | 0-2.5 | >2.5-5.0 | >5.0-7.5 | >7.5 | |
| (% of out of range subjects) | | | 0 | 5 | 10 | 20 | **0** (1.1 %) |
| Overall Sex ratio | Incl | p | >0.1 | >0.05 | >0.001 | <=0.001 | |
| (Significant chi square) | | | 0 | 2 | 4 | 10 | **0** (p=0.728) |
| Age ratio(6-29 vs 30-59) | Incl | p | >0.1 | >0.05 | >0.001 | <=0.001 | |
| (Significant chi square) | | | 0 | 2 | 4 | 10 | **0** (p=0.177) |
| Dig pref score - weight | Incl | # | 0-7 | 8-12 | 13-20 | > 20 | |
| | | | 0 | 2 | 4 | 10 | **0** (6) |
| Dig pref score - height | Incl | # | 0-7 | 8-12 | 13-20 | > 20 | |
| | | | 0 | 2 | 4 | 10 | **0** (7) |
| Dig pref score - MUAC | Incl | # | 0-7 | 8-12 | 13-20 | > 20 | |
| | | | 0 | 2 | 4 | 10 | **2** (8) |
| Standard Dev WHZ | Excl | SD | <1.1 | <1.15 | <1.20 | >=1.20 | |
| . | | | and | and | and | or | |
| . | Excl | SD | >0.9 | >0.85 | >0.80 | <=0.80 | |
| | | | 0 | 5 | 10 | 20 | **0** (1.05) |
| Skewness WHZ | Excl | # | <±0.2 | <±0.4 | <±0.6 | >=±0.6 | |
| | | | 0 | 1 | 3 | 5 | **0** (-0.01) |
| Kurtosis WHZ | Excl | # | <±0.2 | <±0.4 | <±0.6 | >=±0.6 | |
| | | | 0 | 1 | 3 | 5 | **1** (-0.20) |
| Poisson dist WHZ-2 | Excl | p | >0.05 | >0.01 | >0.001 | <=0.001 | |
| | | | 0 | 1 | 3 | 5 | **3** (p=0.008) |
| OVERALL SCORE WHZ = | | | 0-9 | 10-14 | 15-24 | >25 | **6** % |

The overall score of this survey is 6 %, this is excellent.

## Appendix 2: Sampled Clusters

| Sub County | Ward | Location | Sub- Location | Geographical unit |
|---|---|---|---|---|
| Samburu East | Wamba West | Londungokwe | Lpus | Lopikutuk |
| Samburu East | Waso | Waso East | Losesia | Losesia |
| Samburu East | Wamba North | Nairimirimo | Swari | Lkwasi |
| Samburu East | Waso | Waso East | Archers Post | Nakwamor |
| Samburu East | Wamba North | Ngilai Central | Ngilai | Noolotoro |
| Samburu East | Wamba West | Londungokwe | Sessia | Mabati |
| Samburu East | Waso | Sereolipi | Sereolipi | Sirata |
| Samburu East | Wamba North | Nairimirimo | Lpus Leluai | saasab |
| Samburu East | Waso | Ndonyo Wasin | Ndonyo Wasis | Lturoto oibor |
| Samburu North | El barta | El barta | Baragoi | Mnanda |
| Samburu North | Ndoto | Loikumkum | Loikumkum | Lchalai |
| Samburu North | Ndoto | El barta | Masikita | Masikita |
| Samburu North | Nachola | Nachola | Nachola | Lingatuny |
| Samburu North | Nyiro | South Horr | South Horr | Anderi |
| Samburu North | Nyiro | Lorjorin | Lorjorin | Lonjorin |
| Samburu North | Ndoto | Illaut | Illaut | Lechet |
| Samburu North | Nachola | Nachola | Nachola | Nachola |
| Samburu Central | Loosuk | Loosuk | Pura | Kutari |
| Samburu Central | Angata Nanyokie | Angata Nanyokie | Angata Nanyokie | Nkirenyi |
| Samburu Central | Loosuk | Loosuk | Loosuk | Lchingei |
| Samburu Central | Loosuk | Loosuk | Tinga | Lolmisigiyoi |
| Samburu Central | Angata Nanyokie | Barsaloi | Barsaloi | Embakasi |
| Samburu Central | Mararal | Mararal urban | Mararal Town | Lonjonito |
| Samburu Central | Mararal | Mararal Town | Lpartuk | Lower Nomotio |
| Samburu Central | Mararal | Mararal Town | Mararal | Kosovo 1 |
| Samburu Central | Mararal | Mararal | Shabaa | Soit pus |
| Samburu Central | Mararal | Mararal urban | Ng'ari | Nyobit |
| Samburu Central | Mararal | Mararal | Nkuroto | Lareobor |
| Samburu Central | Mararal | Mararal Town | Mararal Town | Biashara 2 |
| Samburu Central | Mararal | Mararal urban | Milimani | Lolkirdingai |
| Samburu Central | Poro | Poro | Seketet | Lpangash |
| Samburu Central | Poro | Sirata Oirobi | Sirata | Sirata Upper |
| Samburu Central | Baawa | Opiroi | Opiroi | Njiosioni |
| Samburu Central | Baawa | Baawa | Lkirotrit | Ikiloritng/Ngambo |
| Samburu Central | Suguta Marmar | Suguta Marmar | Suguta Marmar | Angata Rongai A |
| Samburu Central | Suguta Marmar | Suguta Marmar | Logorate | Sengei |

| | | | | |
|---|---|---|---|---|
| Samburu Central | Lodokejek | Lodokejek | Lodokejek | Lkichaki |
| Samburu Central | Suguta Marmar | Suguta Marmar | Lomolog | ngerio/Lolmolog |
| Samburu Central | Suguta Marmar | Amaiya | Longewani | Lkitasingi |
| Samburu Central | Lodokejek | Kisima | Lmisigiyo | Lekiji |

## Appendix 3: Survey Teams

| Team No | | Team Members | Roles and Responsibilities |
|---|---|---|---|
| **Team One** | | | |
| | **1** | JOSEPH GICHUKI | Team Leader |
| | **2** | BONIFACE LEADUMA | Enumerator |
| | **3** | BERNADET LOYAIT | Enumerator |
| | **4** | NAEKU LOOBUK | Enumerator |
| **Team Two** | | | |
| | **1** | JOSEPH ROTICH | Team Leader |
| | **2** | AGNES KAAMAN | Enumerator |
| | **3** | EMMANUEL LESORONGOL | Enumerator |
| | **4** | SAMUELA LEMONGI | Enumerator |
| **TEAM THREE** | | | |
| | **1** | PETER MBUNGUA | Team Leader |
| | **2** | PAULINE YONO | Enumerator |
| | **3** | STEVE LETIPILA | Enumerator |
| | **4** | FATUMA ABDI | Enumerator |
| **Team 4** | | | |
| | 1 | ANGELA LORURUA | Team Leader |
| | 2 | JENIFFER LEKARABI | Enumerator |
| | 3 | BEN LODUNGOKIOK | Enumerator |
| | 4 | PASKALINA AKIRU | Enumerator |
| **Team 5** | | | |
| | 1 | RAMADHAN ABDULLAHI | Team Leader |
| | 2 | LYDIA LEMARKAT | Enumerator |
| | 3 | HENRY LENTAYA | Enumerator |
| | 4 | ROSE CHEPKORIR | Enumerator |
| **TEAM 6** | | | |
| | 1 | JOSPHAT LUVUZE | Team Leader |
| | 2 | MAUREEN NYAKO | Enumerator |
| | 3 | MICHAEL LEKARATO | Enumerator |
| | 4 | MARIA LODOKIYIAA | Enumerator |

| Supervision Team | | |
|---|---|---|
| Name | Organization | Responsibilities |
| Daniel Githinji | County government of Samburu | County Nutrition Coordinator- Team Leader |
| Francis Lesiantam | County government of Samburu | Supervisor |
| Bosco Lususui | County government of Samburu | Supervisor |
| Alex Louwa | International Medical Corps | Supervisor |
| Janet Gatimu | International Medical Corps | Supervisor |
| Simon Eris | NHP Plus | Supervisor |
| Sarah Kagwiria | International Medical Corps | Supervisor |
| Sarah | World Vision | Supervisor |
| Benson Musau | United Nation Children Fund | Technical Support |
| Mark Murage | International Medical Corps | Technical Support |