

REPUBLIC OF KENYA



MANDERA COUNTY GOVERNMENT

DEPARTMENT OF HEALTH SERVICES



SMART SURVEY REPORT

PREVALENCE OF ACUTE MALNUTRITION, FOOD SECURITY & RETROSPECTIVE MORBIDITY SURVEY REPORT

Supported by



July 5, 2019



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Abbreviations & Acronyms

BCG	Bacillus Calmette–Guérin
CHMT	County Health Management Team
CI	Confidence Interval
CMR	Crude Mortality Rate
CSI	Coping Strategy Index
ENA	Emergency Nutrition Assessment
EPI	Expanded Program on Immunization
FSL	Food Security and Livelihood
GAM	Global Acute Malnutrition
HAZ	Height for Age Z-score
ID	Index of Dispersion
IDP	Internally Displaced Persons
IFAS	Iron Folate Supplementation
IMAM	Integrated Management of Acute Malnutrition
MAM	Moderate Acute Malnutrition
MIYCN	Maternal Infant and Young Child Nutrition
MUAC	mid Upper Arm Circumference
NIWG	Nutrition Information Working Group
ODK	Open Data Kit
OPV	Oral Polio Vaccine
PPS	Probability proportional to size
SAM	Severe Acute Malnutrition
SD	Standard Deviation
SMART	Standardized Monitoring and Assessment in Relief and Transitions
U5MR	under Five Mortality Rate
UNICEF	United Nations Children’s Fund
VAS	Vitamin A supplementation
WAZ	Weigh for Age Z-score
WFP	World Food Program
WHO	World Health Organization
WHZ	Weight for Height Z-score

Executive Summary

Mandera County department of health in collaboration with nutrition partners and Nutrition Information Working Group (NIWG) conducted a County wide SMART survey covering all seven sub counties in June 2019. The main goal of the survey was to determine the prevalence of malnutrition among the children aged 6-59 months old and women of reproductive age (WRA) in Mandera County.

The specific objectives of the survey were;

- To estimate the prevalence of acute malnutrition in children aged 6-59 months
- To determine the coverage of immunization (BCG, Measles and OPV1 and OPV 3) of children aged 0-59 months.
- To estimate the coverage of Vitamin A supplementation, deworming and Zinc supplementation among the targeted children.
- Estimate the coverage of iron folate supplementation for women of reproductive age.
- To determine the nutrition status of women of reproductive age (15-49 years) based on MUAC
- To determine possible underlying causes of malnutrition.
 - Determine dietary diversity score, household food consumption score, household coping index, identify current hygiene practices, water sources and distance to water sources.
- To recommend appropriate interventions based on survey findings.
- Review progress and status of July 2018 survey recommendations

The Standardized Monitoring of Relief and Transitions (SMART) methodology was used which included a two-stage cluster sampling. A total of 465 children aged 6-59 months from 526 households in 36 clusters were selected for anthropometric measurements. Household related data that includes; food security and livelihoods, water sanitation and hygiene as well as access to health care were also collected in the 526 households during the survey.

The survey covered the entire Mandera County except ten villages Arabia, Fino, Odha, Alungu, Harwale, Elram A&B Sheikh Barow, Damasa and Omar'jilaow - that were excluded from the sampling frame due to insecurity. The survey was carried out from 22nd June to 1st July, 2019. The population involved were children 6-59 months for anthropometry survey with the primary respondents being mothers/care takers of the children in the household for the household and mortality questionnaires. In addition, the nutrition status of reproductive women aged 15-49 years was also assessed.

The prevalence of Global Acute Malnutrition (GAM) rate for the County was **21.9 % (18.1 - 26.4% C.I.)**, and the severe acute malnutrition (SAM) rate was **4.0 % (2.4 - 6.7% C.I.)**. Compared to the July 2018 survey results there is an increase in GAM and SAM rates, with no significant difference statistically ($p > 0.0950$). 17.0% (113) of children in Survey Area were reported to have been ill within two weeks prior to survey. Compared to that of last year illness, the level of morbidity has slightly increased which correlate poor long rain performance and inadequate food security situation. The common illnesses mentioned were; ARI/cough 48%, Watery diarrhea (22%) and Fever with chills like Malaria 27%. ARI/cough is more common than watery diarrhea compared to same period last year due to poor long rain performance, hence dusty environment exacerbate URI/cough and allergic reactions. Vitamin A supplementation for 6-11months was at 59.2% which is below the national target of 80%

and slight increase compared to July 2018; with 14.6% of the sampled children 12-59 months had received the recommended two doses of vitamin A in the last one year, which is also an increase compared to the previous year. More so, Vitamin A supplementation for children 6-59 months indicates 54.5% which is an increase compared to 2018 (33.0%).

Generally, Vitamin A supplementation for various age cohorts has increased compared to previous year but below the national target of >80%.

Most children received vitamin A supplements at health facility (85%), 10% received from outreach site and 3% from other sources such as campaigns.

In conclusion the nutrition situation in Mandera County remains in **critical phase** according to WHO classification for severity of nutrition situation with significant rate of malnutrition increase. The risk factors for acute malnutrition such as low coverage of health services, poor child care practices, low dietary diversity, sanitation and hygiene must be addressed as part of comprehensive recovery strategy in the county.

57.6% (346) children have been dewormed once in the past one year with 7.5% (45) dewormed at least twice.

The results of key indicators are summarized in table 1 below.

Table 1: Summary of Key findings

Demographic Household Characteristics	n	Findings
Nutritional Status (6 – 59 months) Weight- for-Height Z – scores (Wasting) WHO 2006 Standards		
GAM: Weight for Height (WHZ) <-2 Z score or Oedema	143	21.9 % (18.1 - 26.4 95% C.I.)
Prevalence of SAM (<-3 z-score and/or oedema)	26	4.0 % (2.4 - 6.7 95% C.I.)
Nutritional Status (6 – 59 months) Weight- for-Age Z – scores (Underweight) WHO 2006 Standards		
Prevalence of underweight (<-2 z-score)	122	18.6 % (15.3 - 22.4 95% C.I.)
Prevalence of Severe Underweight (<-3 Z-score)	27	4.1 % (2.8 - 6.1 95% C.I.)
Nutritional Status (6 – 59 months) Height- for-Age Z – scores (Stunting) WHO 2006 Standards		
Prevalence of Stunting (<-2 Z-score)	84	13.1 % (10.3 - 16.7 95% C.I.)
Prevalence of Severe Stunting (<-3 Z-score)	15	2.3 % (1.4 - 3.9 95% C.I.)
Immunization coverage (6-59 months)		
BCG		95.9%
OPV1		86.8%
OPV3		84.4%
Measles 9 months		80.6%
Measles 18 months		43.6%

Vitamin A (6-11 months)		59.2%
Vitamin A (12-59 months)		Once - 53.9% Twice – 14.6%
Deworming (12-59 months)	346	Once – 57.6% Twice – 7.5%
Child Morbidity (0 – 59 months)		
Sickness two weeks prior to survey	113	17.0%
Acute Respiratory Infection /cough		48.0%
Fever with chill		27.0%
Watery diarrhoea	31	22.0%
Bloody diarrhoea		0.0%
Others –		2.0%
Maternal malnutrition based on MUAC of <210mm		
All women of reproductive age	14	3.2%
Pregnant and Lactating women	9	2.9%
Pregnant and Lactating women at risk	32	10.3%
Maternal nutrition status of women of reproductive age		
Iron folate coverage	262	91.3%
Iron folate supplementation Duration	253	<90 days – 96.6% 91-180 days - 3.1% Above 80 days – 0.4%

1 INTRODUCTION

1.1 Geographic Description of the Survey Area

Mandera County is located in the North Eastern part of Kenya and it borders Ethiopia to the North, Somalia Republic to the East and Wajir County to the South and South West. It is divided into 7 sub- counties; Mandera East, Mandera North, Lafey, Mandera South, Mandera West, Kutulo and Banisa Sub-counties. Mandera is located between longitudes 40° 40' 0.12" East and Latitude 3° 25' 0.01" North in the arid lands of Kenya. Mandera County covers an area of 25,991.5Km² which is sparsely populated making accessibility of resources a challenge for the populations living in the county. It has 1300 km of classified road network of earth surface which becomes impassable when impounded with rains.

It is characterized by low lying rocky hills located on the plains that rise gradually from 400 meters above sea level in the south at Elwak to 970 metres above sea level on the border of Ethiopia. The rest of topography is low lying, characterized by dense vegetation with thorny shrubs of savannah type found along foots of isolated hills. The flat plains make drainage very poor, causing floods during heavy rain downpours. Mandera County has three main livelihood zones i.e. a pastoral economy zone in the east and agro-pastoral economy zone in the west and an irrigated cropping zone in the north along the Daa River. Mandera County has a population of 1,325,000 people according to the 2009 National census. The population ratio in these zones represent pastoral zone of 28.4%, agro pastoral zone of 39.2% and irrigated cropping zone of 32.4% (there is mixed livelihood of agro-pastoralism). Rainfall is scanty and unpredictable averaging at 255mm per year. It has hot temperatures ranging at a mean annual average of 24 0C in July to a high of 42 0C in February/March. The county is prone to unpredictable climate changes, leading to either severe droughts or heavy rains.

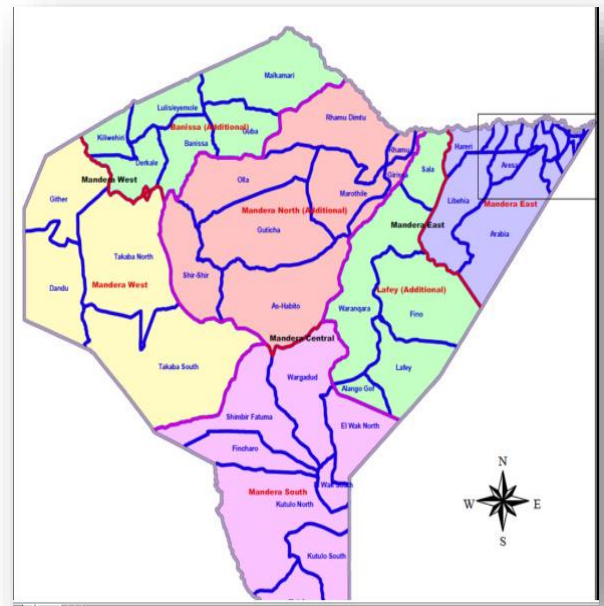


Figure 1: Mandera County zones

1.2 Health and Nutrition situation:

The nutrition status of the community is associated with many factors that range from poor socio-economic and civil security, food insecurity, poor childcare practices and poor health seeking behaviors, frequent disease outbreaks, water, sanitation and hygienic infrastructure which lead to a cycle of malnutrition that only reduces slightly during the post rain season. The county's health, social and economic infrastructure is improving; there is increasing operationalization of health facilities representing 13.5% increase compared to July 2018 and recruitment of health workers from 638 to 834 respectively. Despite these progress, disease

specific challenges exist as a result of limited health system infrastructure, lack of access to services at the community level, limited specialized health care services and high staff turnover which inhibits county efforts to sustain improved quality of health care. Currently the county also receives cases from neighboring countries – Somalia and Ethiopia, increasing the number of severe malnutrition cases requiring inpatient treatment through the County referral hospital, Banisa, Kutulo and Elwak Sub County hospitals and outpatient services sought from health facilities and dispensaries along border points.

Survey Justification

The SMART Nutrition survey conducted in June 2018 showed a GAM level of 16.6% depicting a critical situation, thus the need to assess;

- The effects of short rains and long rains on nutrition and health status of children under five years.
- The impact of various interventions on nutrition and health status of children under five years and pregnant and lactating mothers.
- To gauge the performance of routine HINI package and other child survival interventions in the seven sub counties.
- The overall health, nutrition and food security situation which informs surveillance at county level as well as the long rains assessment and response planning.

1.3 Survey Objectives

The overall objective of the survey was to determine the prevalence of acute malnutrition in children aged between 6-59 months in Mandera County

Specific Objectives:

The specific survey objectives were;

1. To estimate the prevalence of acute malnutrition in children aged 6-59 months.
2. To determine the morbidity rates among children 6-59 months, two weeks prior to survey start.
3. To determine the coverage of immunization (BCG, Measles and OPV1 and OPV 3) of children aged 0-59 months.
4. To estimate the coverage of Vitamin A supplementation, deworming and Zinc supplementation among the targeted children.
5. Estimate the coverage of iron folate supplementation for women of reproductive age.
6. To determine the nutrition status of women of reproductive age based on MUAC
7. To determine possible underlying causes of malnutrition.
8. To recommend appropriate interventions based on survey findings.
9. Review progress and status of July 2018 survey recommendations.

1.4 Survey timing

Table 2: Survey timing calendar

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

The survey will be conducted towards the start of July when the hunger season set in and toward the end of long rains.

2 METHODOLOGY

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

2.1 Sample size

The Sample size was determined using ENA for SMART software (9th July 2015). The table below outlines factors considered when determining the sample size calculation. The parameters used were drawn from the SMART survey conducted in July 2018 in Mandera County. The table 3 below summarizes the sample size calculations.

Table 3: Sample size calculation for anthropometric

Survey parameter	Anthropometry sample	Rationale
Estimated prevalence	20.4%	Based on contextual data (DHIS, SRA, NDMA and EWS) the situation is projected to deteriorate. Thus using SMART survey results of 2018, 16.6 % ((13.3 - 20.4 95% C.I.)
Desired Precision	4.6%	Some population migrated to neighboring county and Countries. This is to reach required sample children for the survey.
Design effect	1.45	Based on the survey July 2018
Average household size	6.0	Based on KNBS estimates
% under five children	16.9%	Based on KNBS estimates
% non-response	3%	Based on previous assessments, ongoing community mobilization is expected to create

		awareness of upcoming assessment.
Children to be included	465	
Households to be included	526	
Number of clusters	36	

2.2 Survey Design

A cross-sectional descriptive nutrition SMART survey was conducted for children aged 6-59 months for the anthropometric measurements and mothers of children below 5 years of age as primary respondents to the household questionnaires. The study covered both the residents and internally displaced persons (IDPs) within the seven sub counties. Quantitative data was captured by taking children’s physical anthropometric measurements using calibrated weighing scales, height boards and MUAC tapes. The readings were recorded in the tablet. Validated semi structured questionnaires built in the ODK software, were used to collect data on child health, food security and WASH. Qualitative data was collected through observation. Taking into account the time spent on travelling to each household, introductions and breaks, 15 households were sampled per cluster.

2.3 Sampling

The study area and population were drawn from the entire residents/ inhabitants of the seven sub-counties of Mandera County. A multi stage sampling technique was used for this purpose. The first stage was assignment of clusters based on proportion to population size (PPS), the population for each location/ village was established based on the 2009 census projected by 3.0% growth per annum. Clusters were defined as villages within Mandera County. A sampling frame of 390 villages was used and based on PPS, 36 clusters were randomly generated using ENA for SMART. However, ten villages were excluded from the sampling frame due to insecurity reasons.

2.3.1 Sampling procedure:

The second stage involved random selection of households, and selection was done as per the National guidelines for Nutrition Assessments in Kenya. Simple random method was employed to select the surveyed households.

Upon entry into the household the survey team leader did an introduction, clearly explaining the objectives of the survey and as well assuring household members of confidentiality as well as the identity of the survey respondent.

2.3.2 Selection of the households

The definition of a household was a shelter or more whose residents ate from the same “cooking pot”. Updated list of households in the villages were developed in conjunction with the village chiefs and elders through the Sub county nutritionist and County health record information

officer, while excluding abandoned households. Using a table of random numbers 15 households were randomly selected from the updated household lists. In case the village had a large number of households, segmentation was done after which one segment would be randomly selected to represent the village.

2.3.3 Selection of children for anthropometry

All children between 6-59 months of age staying in the selected household were included in the sample. In cases where there was no eligible child, the household was still considered part of the sample and only the household questionnaires (general questionnaires) were administered. The respondent was the primary caregiver of the index child/children. If a child and/or the caregiver were temporarily absent, then the survey team re-visited the household to collect the data at an appropriate time.

2.3.4 Selection of women for determination of nutritional status

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

2.4 Case Definitions

In all selected households, all children 6-59 months were included in the anthropometric survey. The age of the children was determined using a local historical and seasonal calendar of events and birth record if available. If there were no children 6-59 months in the household, the household was still interviewed for WASH and Food Security and Livelihoods (FSL). Data on, morbidity, WASH and food security was collected by recall.

The following case definitions were used in the assessment:

- **Household:** Group of persons who live together under the same roof and eat from the same pot for at least a period of 3 months preceding the assessment. In homes with multiple spouses, those living and eating in different houses are considered as separate households. Wives living in different houses but eating from the same pot are considered as one household.
- **Head of household:** One who controls and makes key decisions on household resources (livestock, assets, income, and food), health and social matters for and on behalf of the household members
- **Respondent:** The person responsible for food preparation on the recall day. For the child, this refers to the mother or caregiver.
- **Diarrhea:** having three or more loose or watery stools per day
- **Measles vaccination:** a jab in the upper arm given to children after 9 months and 18 months of age at health clinics or by mobile health teams.
- **Meal:** food served and eaten at one time (excluding snacks) and includes one of the three commonly known: - breakfast, lunch and supper/dinner
- **Oedema:** Swollen limbs leaving depression 3 seconds after pressing on both feet (bilateral)

2.5 Indicators, guidelines and formulas used in acute malnutrition

2.5.1 Weight for Height (WHZ) index

This was estimated from a combination of the weight for height (WHZ) index values (and/or oedema) and by sex based on WHO standards 2006. This index was expressed in WHZ indices in Z-scores, according to WHO 2006 reference standards.

Z-Score:

Severe acute malnutrition is defined by $WHZ < -3$ SD and/or existing bilateral Oedema

Moderate acute malnutrition is defined by $WHZ < -2$ SD and > -3 SD and no Oedema.

Global acute malnutrition is defined by $WHZ < -2$ SD and/or existing bilateral Oedema.

2.5.2 Mid Upper Arm Circumference (MUAC)

MUAC measurements was also undertaken to determine the nutrition status of eligible children and mothers/caretaker (15-49 years of age) from sampled households. The following MUAC criteria were applied.

Table 4: MUAC Guideline

MUAC Guideline Children 6 - 59 Months	Interpretation
MUAC < 115mm and/ or bilateral oedema	Severe acute malnutrition
MUAC 115mm and <125mm (no bilateral oedema)	Moderate acute malnutrition
MUAC 125MM and 135mm (no bilateral oedema)	At Risk of Malnutrition
MUAC >135 MM	Adequate nutrition
Maternal MUAC Cut off	Interpretation
MUAC < 21cm	Malnourished
MUAC 21 - 23 cm	At risk of malnutrition
MUAC > 23cm	Normal

- **Global Acute Malnutrition (GAM):** weight-for-height Z scores less than -2 and/or presence of oedema ($WHZ < -2$ and/oedema)
- **Severe Acute Malnutrition (SAM):** weight-for-height Z scores less than -3 and/or presence of oedema ($WHZ < -3$ and/oedema)
- **Global Acute Malnutrition based on MUAC (GAMMUAC):** Mid Upper Arm Circumference less than 125 mm and/or presence of oedema ($MUAC < 125$ mm and/oedema); and severe acute malnutrition as $MUAC < 115$ mm and/oedema
- **Wasting:** weight-for-height Z scores less than -2 ($WHZ < -2$); and severe wasting as $WHZ < -3$.
- **Underweight:** weight-for-age Z scores less than -2 ($WAZ < -2$); and severe underweight as $WAZ < -3$.
- **Stunting:** height-for-age Z scores less than -2 ($HAZ < -2$); and severe stunting as $HAZ < -3$.

2.6 Questionnaires, Training and data collection

2.6.1 Survey Questionnaires/ tools

The survey adopted the data collection tools recommended by the Nutrition Information Working Group (NIWG) for conducting standard integrated nutrition surveys but converted to Open Data Kit (ODK) format to enable data collection using android smart phones. The questionnaires were written in English and the enumerators translated them to Somali/Garre/Rahanweyne language during the training and used the same in the field. The questionnaire included Anthropometry (6-59 months); household questionnaire (maternal; food security and livelihoods; Water, Sanitation and Hygiene practices; Morbidity; food consumption and dietary diversity).

Age: Determined from child card where available, using a local historical and seasonal calendar of events in case no card was available.

Weight: was measured using a bathroom Scales for children between 6 to 59 months. The reading was done by an enumerator and verified by team leader then recorded to nearest 0.1kg.

Height/Length: was measured using a standard UNICEF height/length board – taking a standing height for children 24-59 months (or 87 cm) and recumbent length for children 6-23 months (or <87 cm). Both height and length were measured to the nearest 0.1 cm. Measurement was done by a measurer and recorder with assistance from the child’s mother/caretaker.

MUAC: Mid-upper arm circumference measurements for children 6-59 months were taken using a flexible and non-stretch tape (UNICEF) in cm to the nearest 0.1 cm.

Survey team

The survey was coordinated by the County Nutrition Coordinator and supervised by members from MOH and Sub county nutrition officers were team leaders. The team was supported by officers from implementing partners and the Nutrition and Dietetics Unit-National MoH. The survey was undertaken by seven teams that comprised of two enumerators and one team leader.

2.6.2 Survey Team Composition

The survey had seven teams of three members each (1 team leader and 2 survey measurers). At the village level, the team was joined by a village guide who is knowledgeable about the village. Each team visited 15 households for anthropometry and household survey in a cluster. The survey teams visited one cluster per day. All children aged 6-59 months in all selected households were measured regardless of attaining the required number of children per cluster for the last household.

2.6.3 Survey Team Training and supervision

A four days training workshop was held from 22nd to 25th June 2019 at Mandera town. The training focused on: the purpose and objectives of the survey; familiarization with the questionnaire by reviewing the purpose for each question; recording of data using ODK software; how to take accurate anthropometric measurements; cluster and household selection. Demonstrations on how to take anthropometric measurements were conducted. Enumerators training also emphasized on field procedures, measurements, interviewing techniques as well as anthropometric standardization as recommended by SMART methodology. The protocol and tools were reviewed and discussed for a better understanding by the survey team. Possible problematic situations that might arise during the training were described and solutions for them given.

Pre testing of the survey questionnaire was conducted on the last day of the training in two of the cluster not sampled, using ODK. This was to gauge the enumerator's level of understanding, ability to follow sampling procedures and ease in use of tablets; take and record measurements correctly as well as interact effectively with respondents. After the pre-testing, a debriefing session with the survey team was held where difficulties that arose were addressed.

2.7 Data Collection

Data collection took 5 days for six teams and 6 days for one team started on 26th June to 1st July 2019 under the supervision of 3 CHMT members and the County Nutrition coordinator and Nutrition staff from Save the Children International and Kenya Red Cross. During data collection, all the field procedures were followed to select eligible households, identify children for anthropometric measurement as well as the respondents for the interviews.

Survey teams first reported to the area chief or village elder for the respective selected clusters/villages updated the list of households and were then assigned a village guide. Using table of random numbers, households to be visited were randomly selected. Village guide then took teams around the village to the selected households.

Each day after data collection, all the teams were able to submit the data electronically. A central data manager was on stand-by to be able receive, review, export data, filter and give feedback teams through the field supervisor or what-sup group created for the Survey.

2.7.1 Variables Measured

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

Weight: Children were measured using a digital weighing scale

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

MUAC: Mid Upper Arm Circumference (MUAC) was measured on the left arm, at the middle point between the elbow and the shoulder, while the arm was relaxed and hanging by the body's side. MUAC was measured to the nearest Cm. MUAC measurements were taken for children 6-59 months of age and for women in the reproductive age (15-45 years of age).

Bilateral oedema: Assessed by the application of normal thumb pressure for at least 3 seconds to both feet at the same time. The presence of a pit or depression on both feet was recorded as oedema present and no pit or depression as oedema absent.

Morbidity: Information on two-week morbidity prevalence was collected by asking the mothers or caregivers if the index child had been ill in the two weeks preceding the survey and including the day of the survey. Illness was determined based on respondent's recall and was not verified by a clinician.

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

Vitamin A supplementation status: For all children 6-59 months of age, information on Vitamin A supplementation in the 6 months prior to the survey date was collected using child health and immunization campaign cards and recall from caregivers.

Iron-Folic Acid supplementation: For all female caregivers, information 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 to whether children 12-59 months of age had received de-worming tablets or not in the previous one year. This information was verified by health card where available.

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

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

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

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

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

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

Table 5: FCS thresholds

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

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

1. Eating less-preferred foods (1.0),
2. Borrowing food/money from friends and relatives (2.0),
3. Limiting portions at mealtime (1.0),
4. Limiting adult intake (3.0), and
5. Reducing the number of meals per day (1.0)

CSI index per household was calculated by summing the product of each coping strategy weight and the frequency of its use in a week (no of days).

2.8 Data Processing & Analysis

Anthropometric data entry and processing was done using the ENA for SMART software 9th July 2015 where the World Health Organization Growth Standards (WHO-GS) data cleaning and flagging procedures were used to identify outliers that enabled data cleaning as well as exclusion of discordant measurements from anthropometric analysis. The SMART/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. Additional data for children aged 6-59 months, women aged 15-49 years, WASH, and food security indicators were cleaned and analysed using Epi-Info, ENA Epi Info and Excel. The result of this survey was compared to WHO standard cut-off points

Table 6: Definition of boundaries for exclusion

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

2.9 Survey Limitations

The main challenges were:

- a) Determining the exact age of some children was a major challenge particularly with the use of calendar of events. The main difficulties relate to accuracy on recall (recall bias) and at some villages, respondents could not relate well with some of the events. The challenge in determination of accurate age may impact of some survey findings.
- b) There was poor recording of vitamin A, Iron folate and de-worming in the health cards and recall issues. Some of the mothers indicated that their children had received Vitamin A and de-worming while it was not recorded in the health cards.
- c) During sampling ten villages (Arabia, Fino, Alungu, Harwale, Malbi, Odha, Elram A&B Sheikh Barow, Damasa and Omar'jilaow) were excluded from the sampling frame due to insecurity.
- d) Inadequate weighing scales; electronic mother and child scales (2 in 1) were not enough and requested

2.9 Ethical considerations

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

4 SURVEY RESULTS

4.1 Anthropometric Results

The survey targeted 465 children between the ages 6 – 59 months, however, the survey managed to sample 673 children between the ages 6 – 59 months; 324 being male while female were 349. A total of 337 households were surveyed. The majority of the households were resident's permanent (98.5%), resident's nomadic pastoralist 1.1%, 0.0% IDP and Refugee 0.4% respectively. The average household size for the sampled households was 5.0 persons.

4.1.1 Distribution by age and sex

Anthropometric measurements were taken on a total of 689 children (340 boys and 349 girls) aged 6-59 months to assess acute malnutrition. The distribution of the assessed children by age and sex shows that the younger (6-29 months) and older (30-59 months) were equally represented as were boys and girls, both with the ratio of around 1.0 as expected. The age distribution according to Table 7 below is within the expected limits which show that there was no selection bias during data collection process.

Table 7: Distribution of age and sex of sample

AGE (mo)	Boys		Girls		Total		Ratio Boy: girl
	no.	%	no.	%	no.	%	
6-17	75	46.9	85	53.1	160	24.0	0.9
18-29	78	44.6	97	55.4	175	26.3	0.8
30-41	80	53.3	70	46.7	150	22.5	1.1
42-53	62	48.1	67	51.9	129	19.4	0.9
54-59	25	48.1	27	51.9	52	7.8	0.9
Total	320	48.0	346	52.0	666	100.0	0.9

4.1.2 Prevalence of acute Malnutrition based on Weight-for-Height Z scores (WHZ)

The prevalence of Global Acute Malnutrition (GAM) rate for the County was **21.9 % (18.1 - 26.4% C.I.)** and the severe acute malnutrition (SAM) rate was) **4.0 % (2.4 - 6.7% C.I.)**. In this assessment no cases of oedema were observed. The findings indicate a *critical* GAM phase of malnutrition according to WHO classification with no significant difference ($p=0.0950$) when compared to the same period in July 2018 which had a GAM level of **16.6%** and SAM of **2.8%** respectively. See Table 8 below.

Table 8: Prevalence of acute malnutrition based on weight-for-height z-scores and/or Oedema and by sex

Indicator	Total (N)	All	Boys	Girls
GAM: Weight for Height (WHZ) <-2 Z score or Oedema	652	(143) 21.9 % (18.1 - 26.4 95% C.I.)	(73) 23.5 % (18.3 - 29.8 95% C.I.)	(70) 20.5 % (16.6 - 25.0 95% C.I.)
Prevalence of SAM (<-3 z-score and/or oedema)	652	(26) 4.0 % (2.4 - 6.7 95% C.I.)	(19) 6.1 % (3.6 - 10.1 95% C.I.)	(7) 2.0 % (0.9 - 4.6 95% C.I.)
MUAC < 12.5 cm	666	(58) 8.7 % (6.8 - 11.1 95% C.I.)	(27) 8.4 % (5.9 - 11.9 95% C.I.)	(31) 9.0 % (6.7 - 11.8 95% C.I.)
MUAC < 11.5 cm	666	(16) 2.4 % (1.3 - 4.5 95% C.I.)	(11) 3.4 % (1.8 - 6.5 95% C.I.)	(5) 1.4 % (0.5 - 4.1 95% C.I.)

The findings indicate a shift to the left of the sample curve (figure 2 below) with a mean score of -1.08 ± 1.11 which indicates that, overall, the population exhibits a poor nutritional status compared with the WHO reference population.

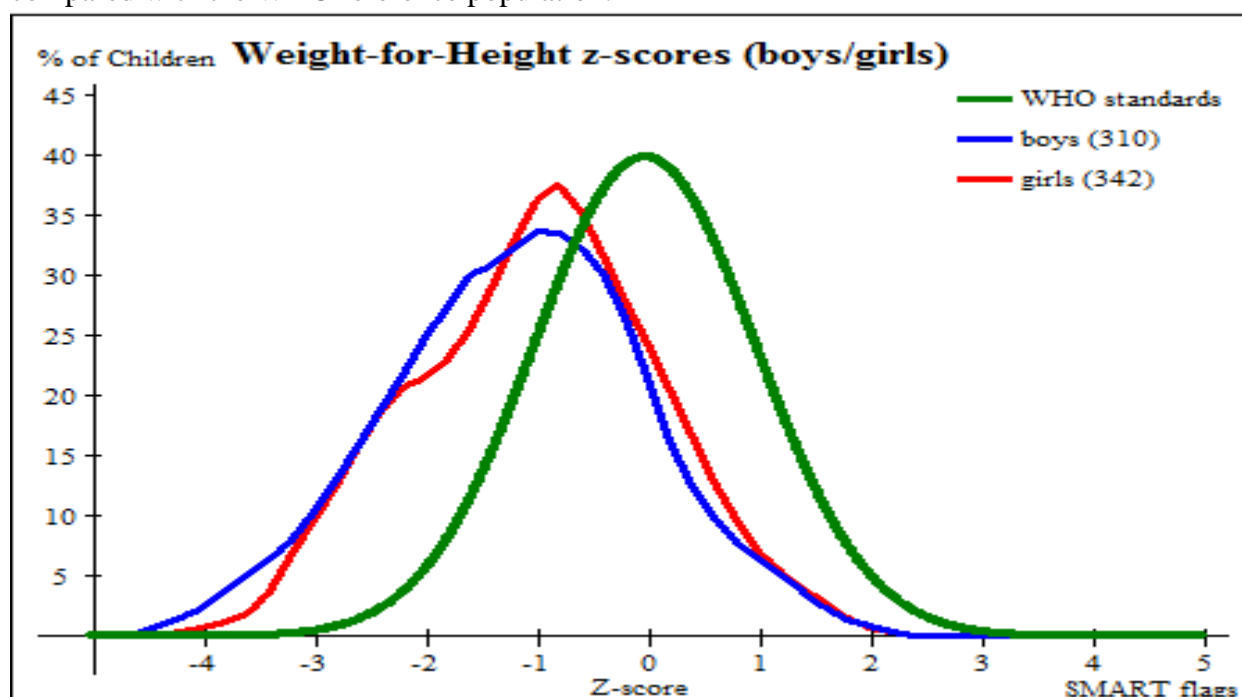


Figure 2: Weight for height z-scores curve

The standard deviation was good and is within the range of ($<1.15 \pm 0.99$). The design effect determined was 1.6 that shows a slight existence of intra cluster differences.

The cases of malnutrition appeared to have aggregated into certain clusters as indicated table 9 below.

Table 9: Clusters with high rate of malnutrition

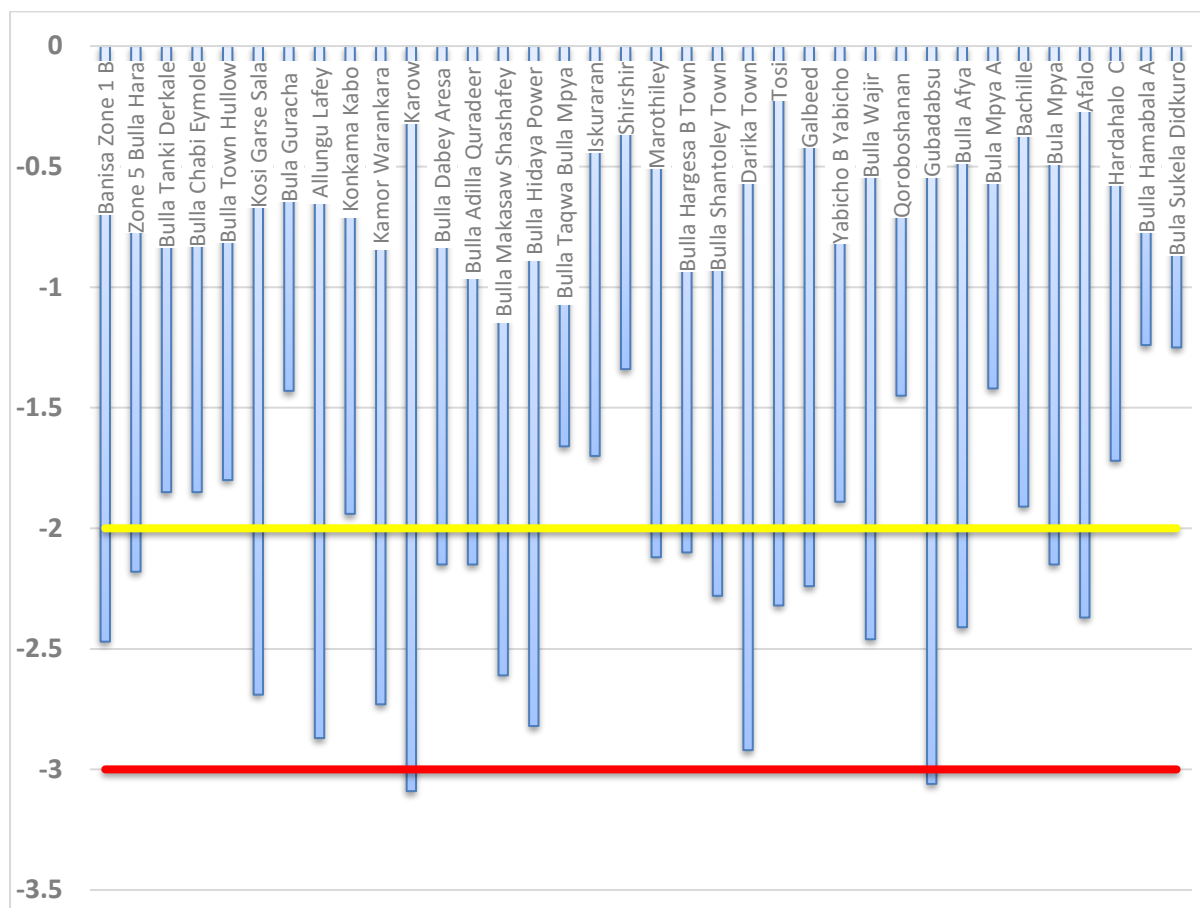


Table 9 above indicates clusters with high cases of acute malnourished children. There are 21 clusters that had cases of acute malnutrition. 19 clusters had cases of WHZ >-3SD to <-2SD while 2 cluster had cases with WHZ < -3SD.

The prevalence of acute malnutrition (WHZ<-2 and/or Oedema) by age is presented in Table 10 and shows a higher proportion of acutely malnourished among the children aged 54-59 months. This could be attributed to declining childcare practices as mothers concentrated on the younger children.

Table 10: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or Oedema

Age (mo)	Total no.	Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (>= -2 z score)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	153	10	6.5	18	11.8	125	81.7	0	0.0
18-29	175	7	4.0	29	16.6	139	79.4	0	0.0
30-41	147	5	3.4	26	17.7	116	78.9	0	0.0
42-53	127	2	1.6	26	20.5	99	78.0	0	0.0
54-59	50	2	4.0	18	36.0	30	60.0	0	0.0

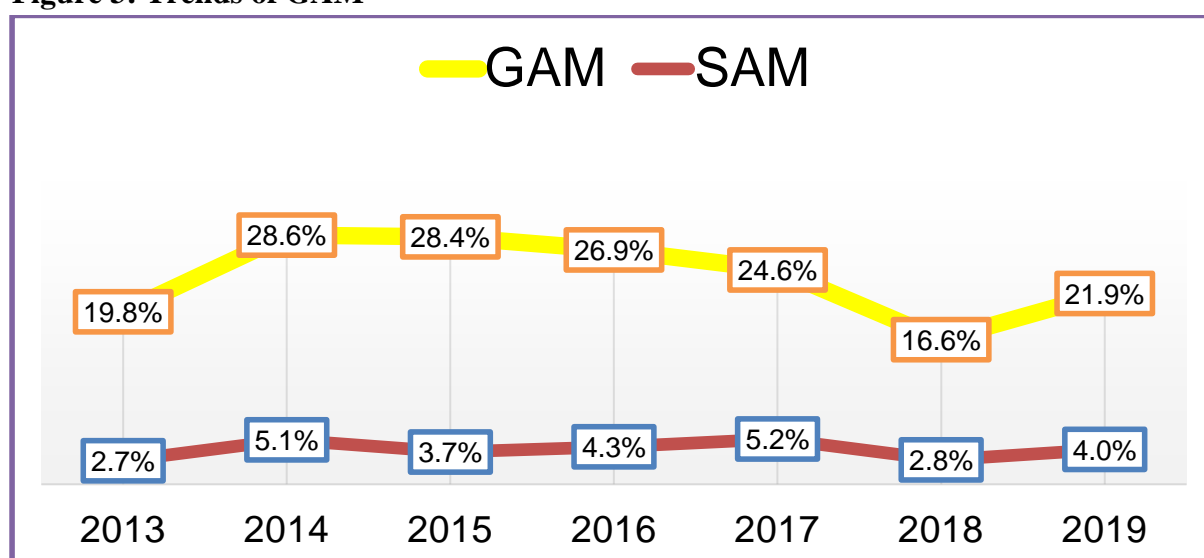
Total	652	26	4.0	117	17.9	509	78.1	0	0.0
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Table 11: Distribution of acute malnutrition and Oedema based on weight-for-height z-scores

	<-3 z-score	>=-3 z-score
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 35 (5.3 %)	Not severely malnourished No. 631 (94.7 %)

There was no case of Marasmic kwashiorkor or kwashiorkor reported

Figure 3: Trends of GAM



3.1.3 Prevalence of acute Malnutrition based on Mid Upper Arm Circumference (MUAC)

MUAC is the best indicator for mortality and is used in the community (for screening) to identify individual children in need of referral and as an admission criterion for feeding programs. Generally, MUAC usually tends to indicate lower GAM levels compared to WHZ-Scores. The prevalence of malnutrition using MUAC is significantly lower compared to using Weight for Height Z-scores. This could be associated with the physiology of this population in Mandera, similar to the Somali and South Sudanese, with a high comic index. As shown in Table 12 below, the prevalence of global acute malnutrition based on MUAC (<125 mm) and/or Oedema was 8.7% (6.8 – 11.1 95% CI) and of severe acute malnutrition MUAC<115 mm and/or Oedema) was 2.4 % (1.3 – 4.5 95% CI)

Table 12 shows the distribution of acute malnutrition based on MUAC by age. The mean MUAC for the measured children was 140.3 mm with a standard deviation (SD) of ± 11.8 for the sample n=688 children aged 6-59 months. From the GAM prevalence by MUAC, girls

seemed to be more malnourished than boys; GAM 9 % & 8.4 % respectively. See Table 12 below

Table 12: Prevalence of acute malnutrition based on MUAC cut offs (and/or Oedema) and by sex

	All n = 666	Boys n = 320	Girls n = 346
Prevalence of global malnutrition (< 125 mm and/or oedema)	(58) 8.7 % (6.8 - 11.1 95% C.I.)	(27) 8.4 % (5.9 - 11.9 95% C.I.)	(31) 9.0 % (6.7 - 11.8 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(42) 6.3 % (4.8 - 8.3 95% C.I.)	(16) 5.0 % (3.1 - 8.0 95% C.I.)	(26) 7.5 % (5.5 - 10.2 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(16) 2.4 % (1.3 - 4.5 95% C.I.)	(11) 3.4 % (1.8 - 6.5 95% C.I.)	(5) 1.4 % (0.5 - 4.1 95% C.I.)

Table 13: Prevalence of acute malnutrition by age, based on MUAC cut offs and/or Oedema

Age (mo)	Total no.	Severe wasting (< 115 mm)		Moderate wasting (>= 115 mm and < 125 mm)		Normal (>= 125 mm)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	160	11	6.9	23	14.4	126	78.8	0	0.0
18-29	175	4	2.3	12	6.9	159	90.9	0	0.0
30-41	150	1	0.7	6	4.0	143	95.3	0	0.0
42-53	129	0	0.0	1	0.8	128	99.2	0	0.0
54-59	52	0	0.0	0	0.0	52	100.0	0	0.0
Total	666	16	2.4	42	6.3	608	91.3	0	0.0

4.1.3 Prevalence of Underweight based on Weight-for-Age Z scores (WAZ)

The weight-for-age (WAZ) index provides a composite measure of wasting and stunting, and commonly used to monitor the growth of individual children in Mother-child booklet since it enables mothers easily visualize the trend of their children's increase in weight against age. A low WFA is referred to as underweight. The prevalence of children underweight was 18.6% (15.3-22.4 95% CI) while severely underweight was 4.1% (2.8- 6.1 95% CI). (Table 14 & 15). There was significant difference in underweight rates between boys and girls.

Table 14: Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 656	Boys n = 311	Girls n = 345
Prevalence of underweight (<-2 z-score)	(122) 18.6 % (15.3 - 22.4 95% C.I.)	(67) 21.5 % (16.5 - 27.6 95% C.I.)	(55) 15.9 % (12.7 - 19.8 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(95) 14.5 % (11.7 - 17.8 95% C.I.)	(52) 16.7 % (12.2 - 22.5 95% C.I.)	(43) 12.5 % (9.5 - 16.2 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(27) 4.1 % (2.8 - 6.1 95% C.I.)	(15) 4.8 % (2.7 - 8.6 95% C.I.)	(12) 3.5 % (2.0 - 5.9 95% C.I.)

Table 15: Prevalence of underweight by age, based on weight-for-age z-scores

Age (mo)	Total no.	Severe underweight (<-3 z-score)		Moderate underweight (>= -3 and <-2 z-score)		Normal (>= -2 z score)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	155	8	5.2	19	12.3	128	82.6	0	0.0
18-29	173	7	4.0	25	14.5	141	81.5	0	0.0
30-41	147	8	5.4	24	16.3	115	78.2	0	0.0
42-53	129	2	1.6	19	14.7	108	83.7	0	0.0
54-59	52	2	3.8	8	15.4	42	80.8	0	0.0
Total	656	27	4.1	95	14.5	534	81.4	0	0.0

3.1.5 Prevalence of Stunting based on Height-for-Age Z scores (HAZ)

Height for Age (HAZ) measures linear growth and is therefore a reflection of the cumulative effects of long-term nutritional inadequacy and or recurrent chronic illness episodes. It is not affected by seasonality but is related to the long-term effects of socio-economic development and long-standing food insecurity situations. The survey findings indicate a prevalence of 13.1 % (10.3 - 16.7 95% C.I.), (HAZ<-2) with severe stunting (HAZ<-3) at 2.3 % (1.4 - 3.9 95% C.I.). This according to WHO classification indicates serious levels of malnutrition. The results showed that more stunted boys as compared to girls. See table 16 &17

Table 16: Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 639	Boys n = 301	Girls n = 338
Prevalence of stunting (<-2 z-score)	(84) 13.1 % (10.3 - 16.7 95% C.I.)	(45) 15.0 % (10.8 - 20.4 95% C.I.)	(39) 11.5 % (8.8 - 15.0 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(69) 10.8 % (8.5 - 13.6 95% C.I.)	(35) 11.6 % (8.3 - 16.1 95% C.I.)	(34) 10.1 % (7.7 - 13.1 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(15) 2.3 % (1.4 - 3.9 95% C.I.)	(10) 3.3 % (1.8 - 6.2 95% C.I.)	(5) 1.5 % (0.6 - 3.3 95% C.I.)

Table 17: Prevalence of stunting by age based on height-for-age z-scores

Age (mo)	Total no.	Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z- score)		Normal (>= -2 z score)	
		No.	%	No.	%	No.	%
6-17	152	6	3.9	14	9.2	132	86.8
18-29	164	4	2.4	26	15.9	134	81.7
30-41	144	3	2.1	15	10.4	126	87.5
42-53	128	2	1.6	11	8.6	115	89.8
54-59	51	0	0.0	3	5.9	48	94.1
Total	639	15	2.3	69	10.8	555	86.9

The mean Z scores for wasting (WHZ), underweight (WAZ) and stunting (HAZ) were - 0.99±0.99, --1.11±0.99 and 0.84±1.12 respectively, all indicating poorer nutrition situation compared to WHO reference population. The standard deviations for WHZ, WAZ and HAZ were within the acceptable range of 0.8-1.2. The sample design effect values showing slight inter cluster variability. See table 18

Table 18: Mean z-scores, Design Effects and excluded subjects

Indicator	n	Mean z- scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	652	-1.08±1.11	1.60	0	14
Weight-for-Age	656	-1.09±1.06	1.32	0	10
Height-for-Age	639	-0.69±1.11	1.37	0	27

* contains for WHZ and WAZ the children with oedema.

4.2 Children's Morbidity and health seeking behaviour

According to UNICEF conceptual framework on causes of malnutrition, disease is an immediate cause of malnutrition. It also affects food intake which is also categorized as an

immediate cause. It is important therefore to assess morbidity and whether it had some effect on malnutrition. During the survey period, 17.0% of children 6-59 months were reported to have been ill two weeks prior to survey. Most children (27%) suffered from fever, followed by ARI at 48% and watery diarrhea 22%. Table 19 summarizes the reported illnesses.

Table 19: Prevalence of reported child illness and health-seeking behavior

Child Morbidity in two weeks prior to survey (N=673)	n	%
Prevalence of reported illness (6-59 months)	113	17.0%
Fever with chills like malaria		27%
ARI /Cough		48%
Watery diarrhea		22%
Bloody diarrhea		0%
Other (specify)		0.7%

Caregivers with sick children who have reported to have sought treatment was at 72.6% higher than those in the same period in 2018 at 63.8%. This could be attributed to improved access to health services and adoption of positive health seeking behaviors by caregivers. For the 80.47% of care givers who sought treatment, 67% were from public health clinics and 10% from community healthcare workers.

Figure 4 below summarizes health seeking behaviors. From such places they are likely to get assistance from trained health personnel with proper diagnosis and treatment being done.

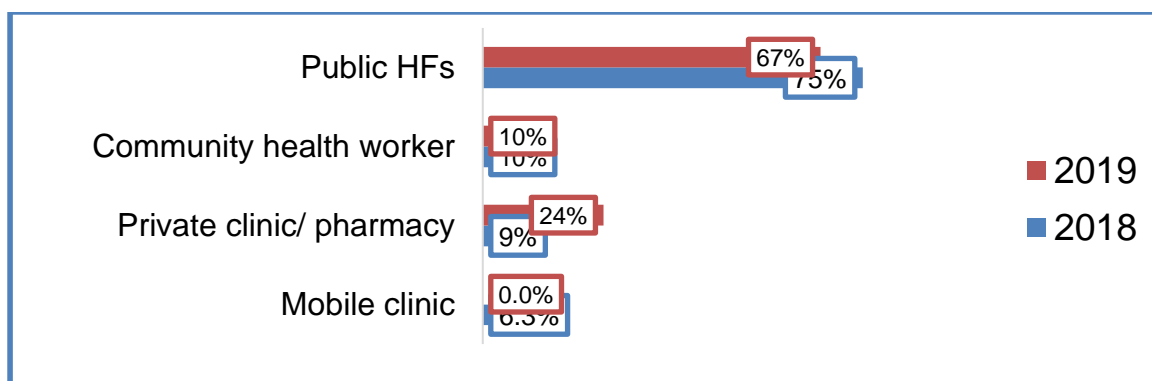


Figure 3: Health seeking practice

81.8% of the household own at-least a net and 3 mosquito nets on average, with majority having between 1-2 nets and few own up to a maximum of 10 nets See figure 5

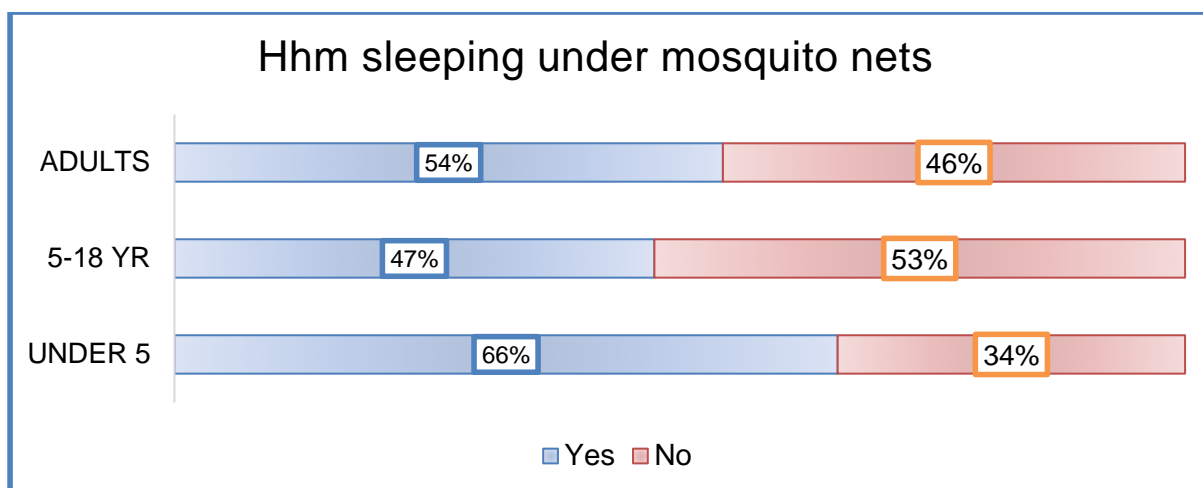


Figure 4: Mosquito nets use

3.3 Micronutrient supplementation and Deworming Vitamin A supplementation

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

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

To assess vitamin A supplementation, parents and caregivers were probed on whether children had been supplemented, for how many times and the place of supplementation. Reference was made to the child health card and in case the card was not available recall method was applied. In Kenya the government has adopted target of 80% coverage of vitamin A Supplementation (VAS) among children aged 6-59 months. The national guideline recommends that a child should be supplemented at-least every six months¹. The survey established that the recommended vitamin A supplementation is at 59.2% for children 6 -11 months and 53.9% for children 12-59 months at once while twice or more doze stands at 14.6%; compared to 2018 there is increased vitamin A supplementation but below the national target. The increased coverage is attributed to vitamin A scale up done during *Malezi bora*. Caregivers do not take their children for supplementation after measles vaccination, health workers not exploiting opportunities to supplement and recall issues as mostly results were based on recall. Almost all the children who received vitamin A obtain them from either the health facility or during outreach sessions, however, documentation for the same is still poor. See Figure 6 below

¹ The Kenya National Technical Guidelines for Micronutrient Deficiency control, August 2008.

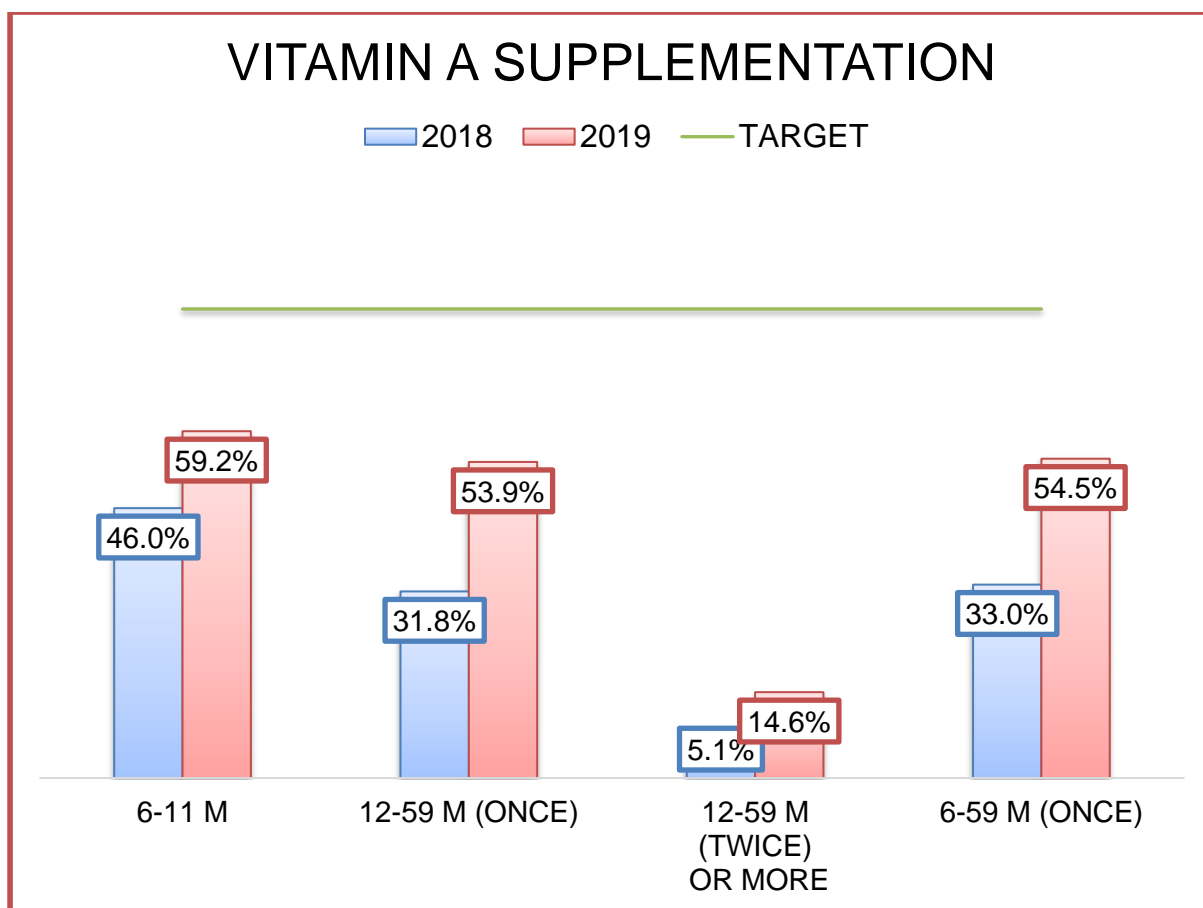


Figure 5: Vitamin A coverage among children 6-59 months

Zinc supplementation in diarrhoea

Zinc supplementation has been shown to reduce the duration and severity of diarrhoeal episodes as well as the prevention of subsequent episodes. Zinc supplementation in Mandera County is still suboptimal as only 74.0% and 84% of children with diarrhoea are likely to receive on Zinc and ORS respectively, while 71% Receive Both Zinc & ORS. This is slightly below the national target of 80% for Zinc and this could be because of poor health seeking behaviours of caregivers do not seek treatment for their sick child medication during diarrhoeal episodes. However, there is no significant change of zinc supplementation compared to last year same period. See Figure 7

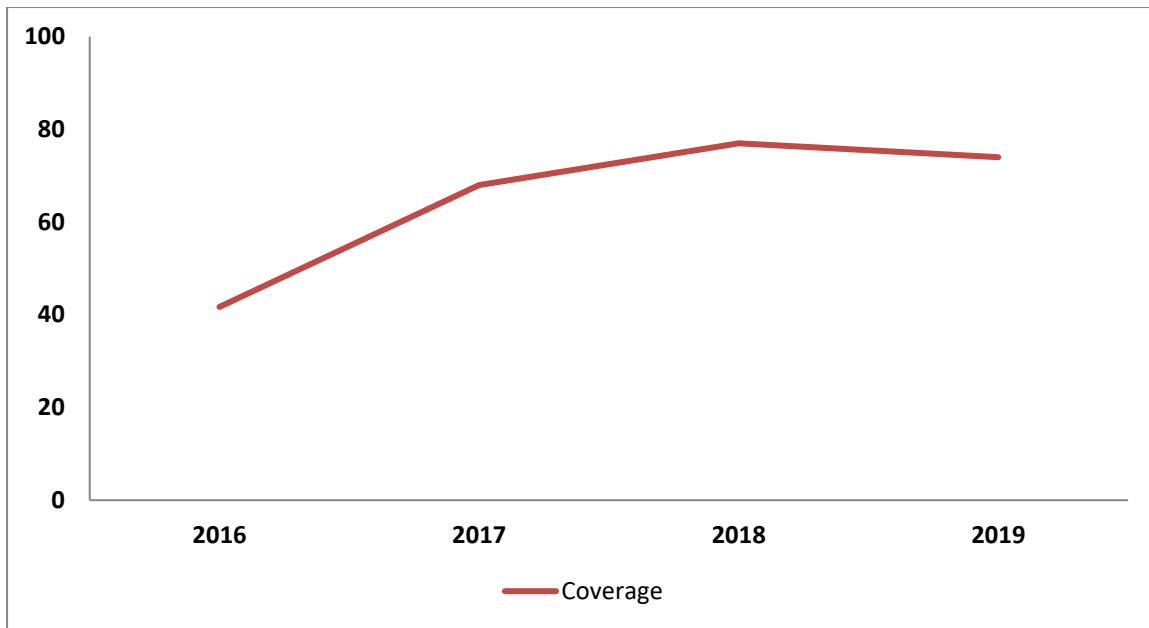


Figure 6: Zinc supplementation in diarrhea

Deworming

De-worming is important in controlling parasites such as helminths, schistosomiasis (bilharzias) and prevention of anaemia. WHO recommends that children in developing countries exposed to poor sanitation and poor availability of clean safe water to be de-wormed once every 6 months. De-worming was assessed for children aged 12-59 months old. The survey established deworming coverage to be at 57.6% for children dewormed once; this is a great improvement from last year although low compared to national coverage target of 80%. The low coverage could be attributed to service uptake by health workers who rarely give dewormers to children as well as inadequate recording. See Figure 8 below.

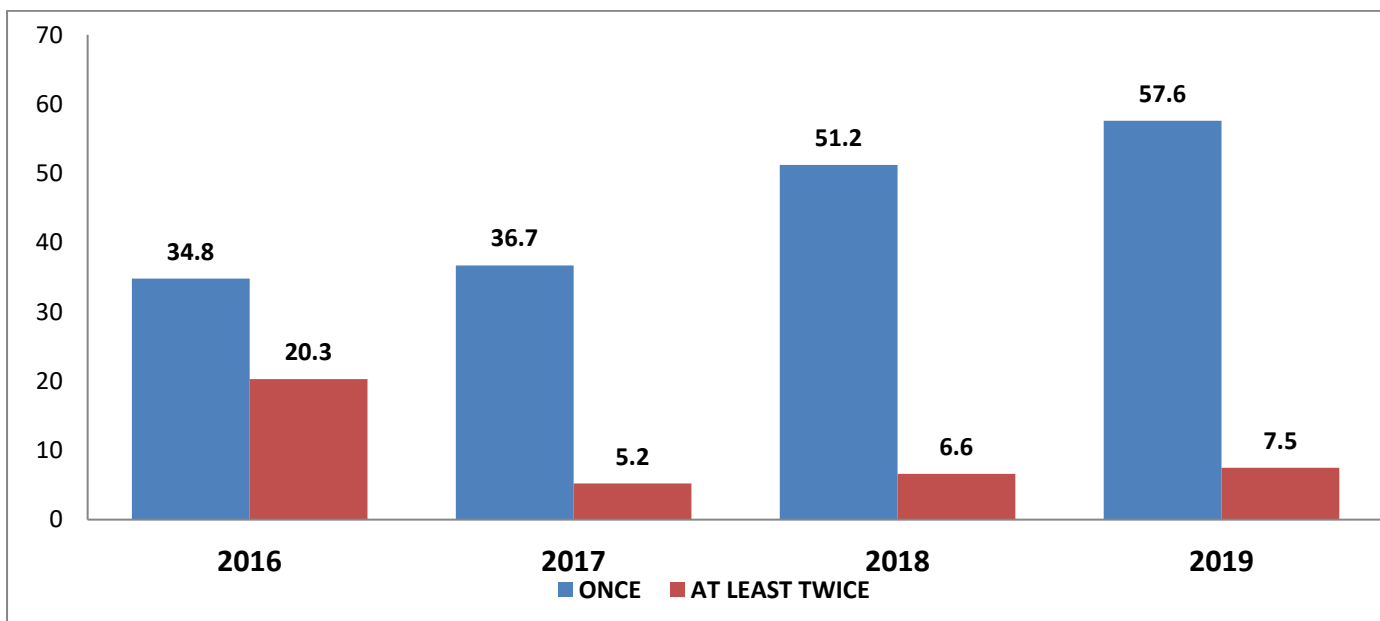


Figure 7: Deworming rates

4.4 Vaccination results

Kenya aims to achieve 90% under one immunization coverage by the end of second medium term plan (2013- 2017). The Kenya guideline on immunization defines a fully immunized child as one who has received all the prescribed antigens and at least one Vitamin A dose under the national immunization schedule before the first birthday. This is meant to reduce child mortality and morbidity due to vaccine preventable diseases. This survey assessed the coverage of 4 vaccines namely, BCG, OPV1, OPV3, and measles at 9 and 18 months. The survey showed that BCG coverage was 95.9%, while 86.8% receive OPV 1 and 83.8% receive OPV 3 verified both by card and recall. Additionally, all children aged 9 months and above ought to be vaccinated against measles. The survey results show that only 80.6% receive the first dose of measles with only 43.6% receiving a second dose at 18 months. The low coverage of second doses of measles at 18 months may be attributed to low awareness among caregivers. See Figure 9.

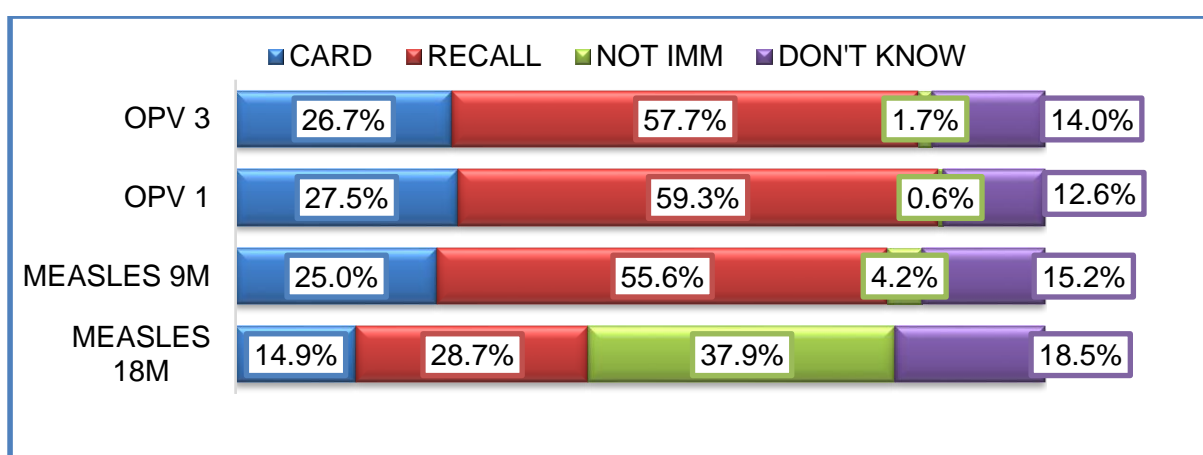


Figure 8: Immunization coverage

4.5 Maternal nutrition status and Iron folate supplementation

The consequences of poor nutritional status and inadequate nutritional intake for women during pregnancy not only directly affect women’s health status, but also have a negative impact on birth outcome and early development for children. 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. Household food insecurity is a key indicator/determinant for poor adult nutritional status. A high number of malnourished PLWs increase the risk of growth retardation of the fetus and consequently an increase in low birth weight and malnutrition burden spreads to both U5 children and caretakers from the same household faced with food insecurity and related vulnerabilities, a common scenario during nutrition emergency levels. The survey assessed iron-folate supplementation in pregnancy, which indicates 91.3% of mothers with children below 24 months were issued with iron and folic acid during their immediate previous pregnancy but the mean number of days for iron and folic acid consumption was 11.2 days. Maternal nutrition based on MUAC for women of reproductive age was at 3.2%, pregnant and lactating women at 2.9%

4.5.1 Acute Malnutrition

Maternal nutrition was assessed by measuring MUAC of all women of reproductive age (15 to 49) in all sampled households. Analysis was further focused on pregnant and lactating women. The nutritional status of care givers as measured by MUAC showed a prevalence of malnutrition of 2.9% among PLWs. The table below shows the results for the maternal nutrition

Table 20: Women of child bearing age nutritional status based on MUAC

Indicator	N (Total)	n	Percentage
MUAC	All women of reproductive age		
< 21 cm (malnourished)	433	14	3.2%
21 - 23 cm (at risk)	433	45	10.4%
MUAC	Pregnant and lactating women		
< 21 cm (malnourished)	310	9	2.9%
21 - 23 cm (at risk)	310	32	10.3%

4.5.2 Iron and Folic Acid Supplementation (IFAS)

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

WHO recommends daily consumption of 60mg elemental iron and 0.4mg folic acid throughout the pregnancy. These recommendations have since been adopted by Kenya government in its 2013 policy guidelines on supplementation of iron folic acid supplementation (IFAS) during pregnancy. During the survey, iron folic supplementation was assessed by asking mothers of children below 2 years if they consumed iron folate in their most recent pregnancy. The assessment findings showed that 77.0% (231) of mothers with children below 24 months received iron and folic acid during their immediate previous pregnancy. The mean number of days for iron and folic acid consumption was 17.1 days.

Table 21: IFAS Coverage among pregnant women

IFAS consumption in days	% 2018	No of Women	Percentage 2019
Less than 90 days	90.5%	253	96.6%
90 to 180 days	9.1%	8	3.1%
Above 180	0.4%	1	0.4%

4.6 Water, Sanitation & Hygiene (WASH)

Water and sanitation are deeply interrelated. Sanitation is essential for the conservation and sustainable use of water resources, while access to water is required for sanitation and hygiene practices. Furthermore, the realization of other human rights, such as the right to the highest attainable standard of health, the right to food, right to education and the right to adequate housing, depends very substantially upon the implementation of the right to water and sanitation. Increasingly current evidence on poor WASH indicators is being linked to under nutrition and more so, on high stunting levels. Diarrheal, the leading killer of young children is closely linked to poor/inadequate WASH (Pruss-Ustun et al, 2014), which often causes undernutrition, which in turn reduces a child’s resistance to subsequent infections, thus creating a vicious circle.

4.6.1 Water Access and Quality

The main water sources (Fig 10) in the County are piped water/protected springs at 41.4% and earth pan/dam at 30.0%. This indicates no significance change compared to same period 2018. Majority of the population (58.6%) are utilizing unsafe water sources which is a risk factor for water borne diseases.

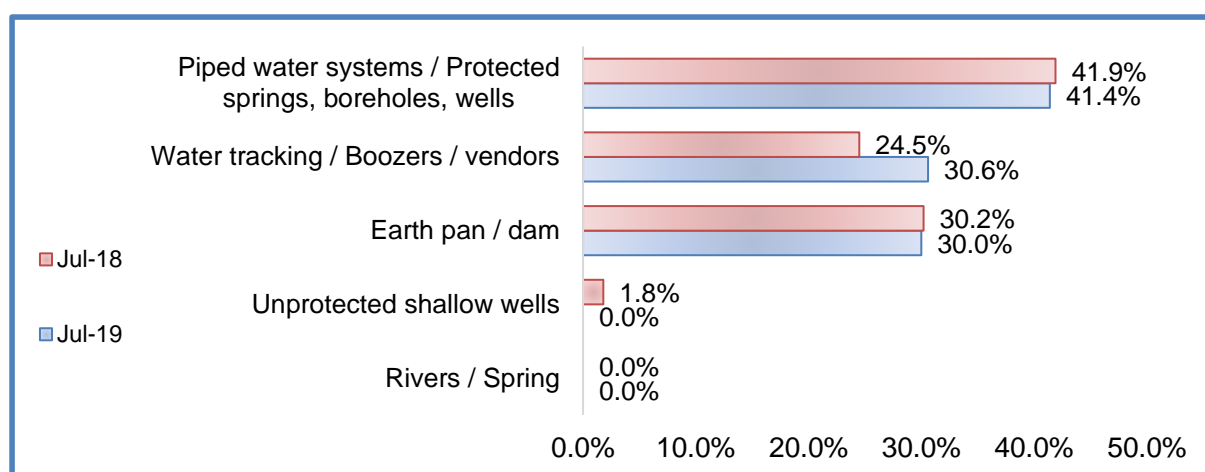


Figure 9: Water, sanitation and hygiene practices

Despite of the fact that household got water from unsafe sources, 73.8% are not treating their household drinking water and main reasons for not treating the water are unavailability of treatment chemicals, inadequate knowledge on water treatment and alter taste of water. 10% mentioned their water is treated from the main source. Those treat, 72.0% use boiling and 27.3% use chemicals respectively as a method of water treatment for domestic use. (Table 22)

Table 22: water treatment and storage used

Water Treatment method	Jul-18	n	Jun-19
Use of chemicals	86.7%	36	27.3%

Boiling	12.2%	95	72.0%
Use of herbs	0.0%	1	0.8%
Use of filter	1.1%	0	0.0%
Other	0.0%	0	0.0%

According to SPHERE handbook for minimum standards for WASH, the maximum distance from any household to the nearest water point should be 500 meters. It also gives the maximum queuing time at a water source which should be no more than 15 minutes and it should not take more than three minutes to fill a 20-litre container. The survey measured time taken to collect water, queuing and travel time. 49.3% of the population is taking less than 15 minutes to travel and it less compared to 2018, 93.2% queue and fetch water for less than 30min, see the Table 23 & 24 below. Majority of the households using 80 liters per day. Given an estimated household size of 5 persons, the assessed households have a mean water utilization of 18 liters/ person/day, which is within the recommended average water requirement for drinking, cooking and personal hygiene of 15 liters/ person/day².

Table 23: Water, Sanitation & Hygiene Practices

Distance to Water Sources	July 2018	N	Jun 2019
Less than 500m (Less than 15 minutes)	63.8%	264	49.3%
500m to 2km(15min to 1hr)	33.6%	224	41.8%
More than 2km(1 to 2hrs)	2.6%	48	9.0%
Other	0.0%	0	0.0%

Table 24: Storage and Queuing time for water

22.9% (123) of the households queue for water in June 2019			
Queuing time	July 2018	N	July 2019

² The Sphere Handbook, Humanitarian Charter and Minimum Standards in Humanitarian Response, 2011

< 30 minutes	93.2%	91	74.0%
30 to 60 minutes	5.5%	29	23.6%
More than 1 hr.	1.4%	3	2.4%

4.6.2 Access to Sanitation Facilities

A large proportion of the surveyed households have access to sanitary facilities and most use latrines (87.4%) for defecation. However, the practice of open defecation is at 12.6% Table below, however open defecation can be more in nomad population compared to settled population. This also is a risk factor for waterborne diseases given that majority of the household are using water from earth pan (surface run off) which is mostly untreated.

4.6.3 Hand washing Practices

Hand washing with soap is the single most cost-effective intervention in preventing diarrheal diseases. The four critical hand washing moments include; after visiting the toilet/latrine, before cooking, before eating and after taking children to the toilet/latrine. Most households had their members wash hands after toilet visit (93.3%) and before eating (83.0%) with 71.2% washing hands before cooking and 41.2% after taking child to the toilet. Hand washing practice should be in at least three or more incidences as expected, the practice has reported in 34.5% of the population. Majority of the households 52.1% use water only for hand washing with only 32.3% cleaning their hands with soap and water. The practice remained more the same compared to previous survey thus more of hygiene promotion and education is required. Table 25 highlight the hand-washing practices.

Table 25: Hygiene and sanitation practices

HYGIENE	Jul-18	n	Jun-19
After toilets	94.2%	346	93.3%
Before cooking	66.1%	264	71.2%
Before eating	92.4%	308	83.0%
After taking children to toilet	50.5%	153	41.2%
Hand-washing in all 4 critical times	39.7%	128	34.5%

Handwashing by soap and water	47.9%	120	32.3%
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4.7 Food Security & Livelihoods

4.7.1 Households' Source of Income and Food

Household income is critical to food security at household level; the income sources and level have direct effect on availability and access for food items. The main occupation of the household will determine the main source of income in most period of the year, though this might change depending on the seasons among other socio-economic factors. The study shows the main occupation of the household head (which mainly reflect as the main source of income for household) is casual labor at 39.0% followed by livestock herding at 36.4%, Table 26 below shows the occupation of the household heads

Table 26: Main occupation of the household

Main Occupation of household head	% - 2018	n - 2019	% - 2019
Livestock herding	33.0%	196	36.4%
Crop farming/Own farm labor	4.3%	32	5.9%
Employed (salaried)	3.1%	20	3.7%
Waged labor (Casual)	39.4%	210	39.0%
Petty trade	8.1%	34	6.3%
Merchant/trader	2.0%	13	2.4%
Firewood/charcoal	5.2%	18	3.3%
Fishing	0.0%	0	0.0%
Others	4.8%	15	2.8%

The major household income within 30 days before the survey was sale of casual labor, reported by 39.6% of the sample households followed by sale of livestock products at 21.9% and sale of livestock 14.7%. The County is pastoralist and is mainly dependent on livestock and their product as a main source of income but this was not the case due to the resent burn of sale of livestock to contain the spread and control the effects of rift-valley fever (Figure 11).

Main Source of Income	% - 2018	N - 2019	% - 2019
No income	9.3%	24	4.5%

Sale of livestock	19.1%	79	14.7%
Sale of livestock products	8.3%	118	21.9%
Sale of crops	3.5%	23	4.3%
Petty trading e.g. sale of firewood	14.4%	40	7.4%
Casual labor	40.7%	213	39.6%
Permanent job	2.8%	23	4.3%
Sale of personal assets	1.1%	12	2.2%
Remittance	0.7%	6	1.1%

Figure 10: Household Current source of income

4.7.2 Households' Food Consumption and Dietary Diversity

The Food consumption score or “weighted diet diversity score” is a score calculated using the frequency of consumption of different food groups consumed by a household during the 7 days before the survey. The FCS is used to identify the most food insecure households. The prevalence of households with poor and borderline food consumption provides essential information on people’s current diets and is helpful in deciding the most appropriate type and scale of food security intervention as well as the right target group for the assistance. Seven-day recall was used to collect data on food consumption. All the food items were grouped into 16 specific food groups using the food frequency data. The food consumption score was created by multiplying the frequency of food items consumed in last 7 days by a weight given to specific food groups. Each weight has been calculated based on nutrient density. The thresholds for the food consumption groups were presented using typical thresholds as illustrated in the table below: Majority of the households (86.1%) had acceptable score, proportion (7.7%) falling in the borderline while 6.2% had a poor food consumption score, the most food unsecured households as shown in figure below (figure 12). The reduced in households falling under acceptable food consumption score was as a result of persistent drought followed by floods episodes as most families were receiving remittance and food donations which did not consider food diversification.

Table 27: Household food consumption score

Threshold	Nomenclature	Proportion of Households a	
		July 2018 N=540	July 2019 N=538
0 - 21	Poor food consumption...manly cereal and sugar	12.3%	6.2%
21.5 - 35	Borderline food consumption Cereal, legumes, milk, oil, sugar	22.1%	7.7%
>35.5	Good food consumption Cereal, legumes, milk, condiment, flesh meat, vegetable, oil, sugar	65.6%	86.1%

3.7.3 Household Food Consumption Frequency

Cereals and cereal products, sugar and sweets, oils and fats were the main staple food consumed by respectively. The sampled households less consume eggs, vegetables and fruits. This is because of un-availability of fruits and vegetable in markets of rural communities; only found in big towns within the County. Low consumption of eggs in the County is an attribute of strong belief (eggs causes the fetus to grow big in the mother’s womb during pregnancy and leads to obesity in children respectively). The widespread low consumption frequency of iron rich foods in Mandera County could indicate a higher risk of iron deficiency anemia and further explaining the relatively high rates of chronic and acute undernutrition prevailing in the county.

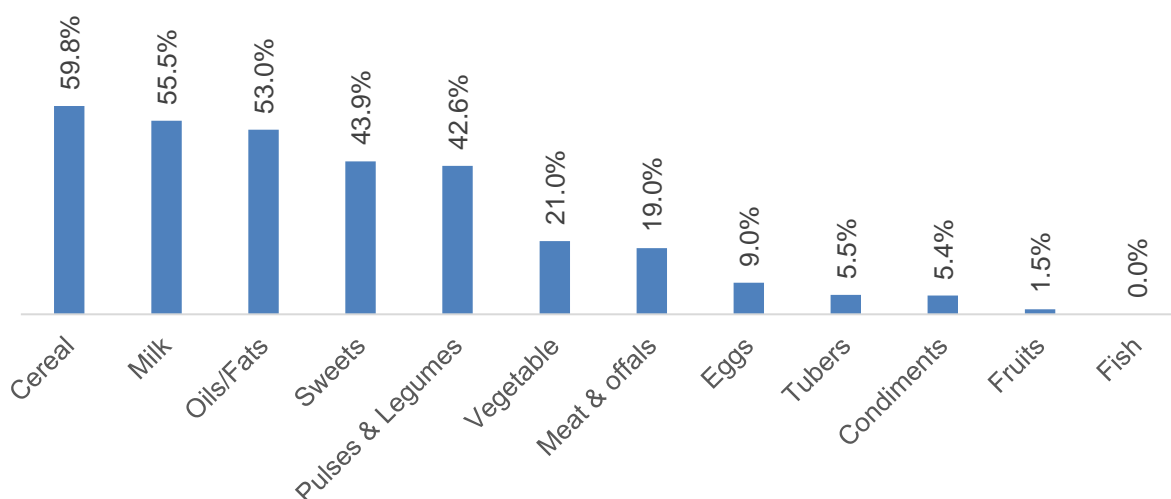


Figure 11: Household Food Consumption Frequency

Figure 12: Food frequency

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

More than 74.9% were consuming less than five food groups recommended, thus a risk factor for maternal malnutrition.

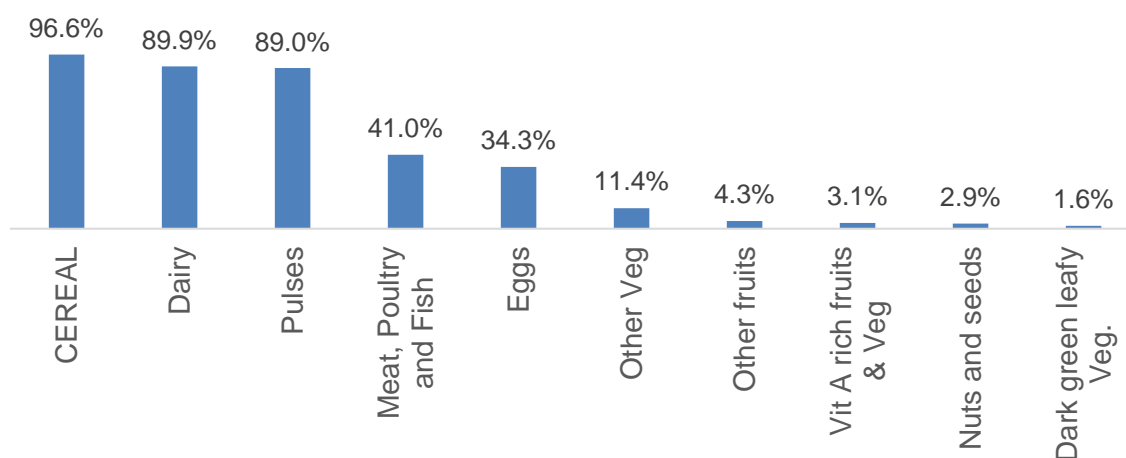


Figure 13: Minimum Dietary Diversity

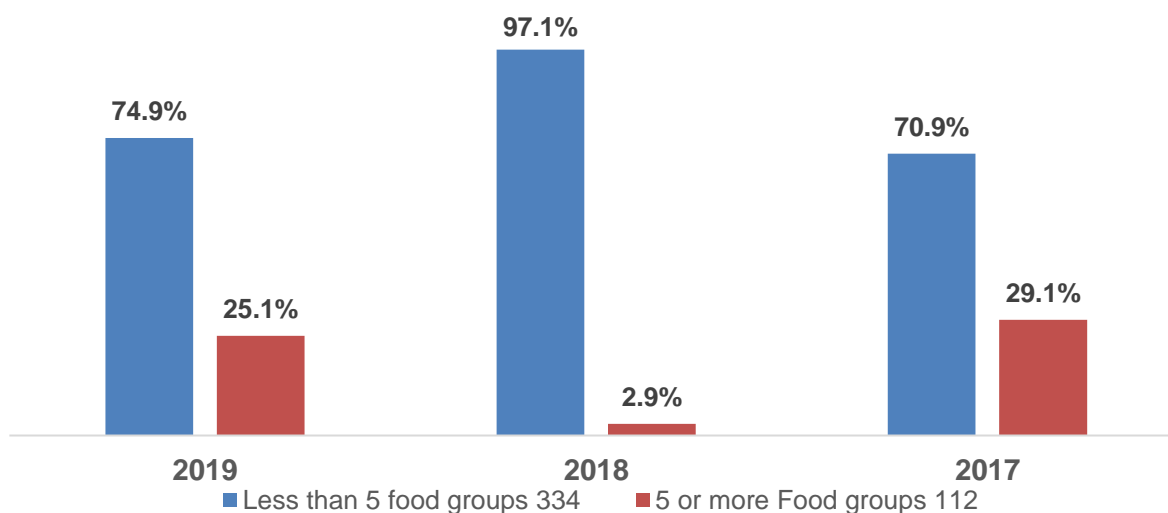


Figure 14: Women dietary diversity

4.7.5 Household's Livelihood Shocks and Coping Strategies

Assessment of coping strategies showed that 21.7% households applied at least a coping strategy in the previous week. The main adopted coping strategies were; relying on less preferred and less expensive foods while the list preferred is Restrict consumption by adult.

Figure 15: Adopted coping strategies

The mean CSI reduced slightly from 12.1 in 2018 to 10.8 in 2019, an indication that households have continued to engage in different food insecurity coping strategies.

Table 28: Weighted coping strategy index

Coping Strategy	No. of Households	Frequency Score (0-7)	Severity Score (1-3)	Weighted Score
Rely on less preferred or less expensive foods	95	1.2	1	1.23
Borrow foods from relatives or friends	85	1.5	2	2.94
Limit Portion sizes	104	1.3	1	1.35
Restrict consumption by adults so that children can feed	82	1.3	3	3.91
Reduce the number of meals	108	1.3	1	1.34
Total Weighted Coping Strategy Index	10.8			

5 DISCUSSION

5.1 Health and Nutrition status

The prevalence of Global Acute Malnutrition (GAM) (WHZ<-2 and/or Oedema) of 21.9 % (18.1 - 26.4 95% C.I.) And Severe Acute Malnutrition (SAM) rate of 4.0 % (2.4 - 6.7 95% C.I.) Indicate a *critical* phase of Malnutrition in Mandera according to the WHO classification. When compared to 2018 survey results indicates there was no significant change (P value=0.0950). The GAM increased from 16.6 % (13.3 - 20.4 95% C.I.) to 21.9 % (18.1 - 26.4 95% C.I.) while SAM rate (WHZ<-3 or Oedema) from 2.8% (3.6- 7.4 95% CI) to 4.0 % (2.4 - 6.7 95% C.I.).

The increased malnutrition rate was mainly attributed to scale down of integrated health and nutrition outreaches for hard to reach villages affected access to health and nutrition services. Other major factors that contribute to high levels of acute malnutrition in the county are; poor childcare practices, inadequate utilization of child survival interventions, poverty, unavailability of varied nutritious foods particularly fruits and vegetable in rural areas, suboptimal child care and feeding practices. Health system challenges resulting from frequents staff turnover has been a challenge to improve service delivery and also stock outs of nutrition

commodities in the County has also led to high defaulter rate, especially RUSF commodity for moderate malnourish children, hence inconsistency of treatment for children in the program.

Immunization is meant to reduce child mortality and morbidity due to vaccine preventable diseases. This survey assessed the coverage of 4 antigens namely, BCG, OPV1, OPV3, and measles at 9 and 18 months. The survey showed that BCG coverage was 95.9% by scar, while OPV 1 and OPV 3 were at 27.5% and 26.7% respectively as verified by card. Additionally, all children aged 9 months and above ought to be vaccinated against measles. The survey results show that only 25.0% receive the first dose of measles at 9 months with only 14.9% receiving a second dose at 18 months. The low coverage of measles may explain the frequent outbreak of measles in Mandera East, Mandera west and Mandera North Sub Counties due to lack of herd immunity. The low coverage of second doses of measles at 18 months may be attributed to low awareness among caregivers. Immunization is an essential part of child's right to the highest attainable standards of health. Immunization protect against dangerous diseases, a child who is not immunized is more likely to become sick, undernourished or could die. This underscores the importance of vaccinations in children growth and survival; low immunization coverage could lead to increased morbidity resulting to malnutrition.

Resource allocation is key to addressing the critical nutrition status in the County which is the third highest in the country which requires multisectoral approach on addressing the underlying factors as a priority with preventive measures being put in place to cushion the population from a further deterioration of the nutrition situation which has direct negative impact on their wellbeing and continues to fuel the cycle of intergenerational transfer of malnutrition.

5.2 Water and Sanitation

Access to potable water was of concern with only 41.4% of the population accessing water from safe sources, that is 30.0% from the earth pans, 30.6% water trucking/boozers/water vendors and 41.4% piped water systems/boreholes/wells. 58.6% of the households got water from unsafe sources with 73.8% of the households not treating their household water, however 72.0% boil the water. 86.7% of caregivers are aware the importance of hand washing but only 34.5% practise hand-washing in all the 4 critical times. Most caregivers wash their hands before eating and after visiting the toilet, with only 32.3% wash their hands using water and soap. Access and use of latrine was reported by 87.4% of the respondent while 12.6% do open defecation (bushes). The poor hygienic practices and practice of open defecation can explain the incidents of water borne diseases such as watery diarrhoea. Many illnesses can be prevented by good hygienic practices: washing hands with soap and water (or a substitute, such as ash and water) after defecating or cleaning a child who has defecated, using clean toilets or latrines, disposing of faeces away from play field and living areas and water sources, washing hands before handling food, using water from a safe source, disinfecting drinking water if its safety is in question, and keeping food and water clean.

Hygiene promotion and education need to be scaled up in the county.

5.3 Food Security

Based on the food security outcome indicators the county is classified as Stressed phase. All the three Livelihood zones are classified under crisis (IPC phase3) IPC food security phase classification. This classification is according to long rains assessment conducted in July 2019. The nutritional survey conducted in June 2019 indicated Global Acute Malnutrition (GAM) rates of 21.9 percent, and Severe Acute Malnutrition (SAM) rate of 4.0 percent indicating critical situation according to WHO classification. 21.7 percent of the households experienced food insecurity in the past 7 days with an average CSI of 8.32%. The total weighted coping index was 10.8% with majority relied on less preferred or less expensive food, reduced number of meals and limited portion sizes.

5.4 Possible factors triggering Malnutrition

Morbidity and inadequate dietary intake are the immediate causes of malnutrition underlined by food insecurity, poor maternal and child care and poor/unhygienic environment. Malnutrition is mainly caused by food insecurity that is persistent in the county and also illnesses caused by poor water, sanitation practices and poor health seeking behaviour.

- Morbidity levels are aggravated by the poor WASH conditions characterized limited access of sanitation facilities and poor hand-washing practices at critical times.
- Insecurity has also contributed largely to the high malnutrition rates in the county since people move from one place to another thus disrupting livelihood. This interferes with the household food security.
- Low micronutrient supplementation and deworming contributes to poor nutrition status of maternal and children under five years.

6 CONCLUSIONS & RECOMMENDATIONS

6.1 Conclusions

The nutrition situation is classified as critical based on the IPC with a GAM of 21.9% and a SAM of 4.0%. The survey result indicates increase in malnutrition rates; compared to July 2018 survey result; GAM of 16.6% and SAM of 2.8% there was significant improvement in terms of the reduction of malnutrition prevalence in children. Due to spatial long rains received within the County, livestock milk productivity reduced as well the market prices plummeted with deteriorating body condition of the key species limiting milk consumption by families, and food purchase through sale of livestock resulting food insecurity at household level ,coupled with increase in morbidity, poor hygiene and child care practices. Integrated approaches should be undertaken to reduce risk factors such as; unsafe drinking water, poor sanitation facilities, and improved coverage of nutrition programs would play a critical role in both preventing and treating morbidity and malnutrition while continuing to improve the household food security.

6.2 Recommendations

The *critical* nutrition situation in the county, is attributed to multiple and interrelated factors that call for continued integrated intervention efforts to address both immediate needs in addition to developing long-term strategies to enhance access to basic services; support to sustain livelihood systems and social protection mechanisms. Specific recommendations include:

Table 29: Recommendations

Findings	Recommendations	Actors	Timelines
21.9% GAM & 4.0% SAM. Compared to 2018 GAM and SAM level increased.	<ul style="list-style-type: none"> • Bi-weekly monitoring caseloads. • Scale up integrated outreach services for hard to reach areas. • Conduct mass screening and continuous active case finding. • Zero stock out of essential nutrition supplements. 	<p>KRCS/SCI</p> <p>UNICEF/WFP</p>	<p>DEC 2019</p> <p>Continuous</p>
Very low supplementation of Vitamin A and deworming for children 6-59 months and 12-59 months respectively.	<ul style="list-style-type: none"> • Scale up vitamin A and worming for children in every semester of the year. • Harmonize routine data collection from various service points in health facilities. 	SCHMT	Routine
58.6% Households get water from unsafe sources.	<ul style="list-style-type: none"> • Provide aqua tabs to households and chlorinate water from sources. 	County government	Continuous
Only 34.5% of household's practice four critical hand washing	<ul style="list-style-type: none"> • Health education on 4 critical times of hand washing 	MOH/SCI/KRCS	Continuous

practice.			
The mean number of days for iron and folic acid consumption was 11.2 days.	<ul style="list-style-type: none"> Health education on importance of iron and folic acid during pregnancy. Counselling 	MOH	Continuous

7 APPENDICES

Appendix 1: Plausibility checks

CRITERIA	SCORE	INTERPRETATION
Missing/Flagged data	0 (2.3 %)	Excellent
Overall sex ratio	0 (p=0.332)	Excellent
Over all age distribution	4 (p=0.027)	Acceptable
Digit preference score (Weight)	0 (3)	Excellent
Digit preference score (Height)	0 (4)	Excellent
Digit preference score (MUAC)	0 (3)	Excellent
Standard deviation WHZ	5 (1.12)	Good
Skewness (WHZ)	0 (-0.06)	Excellent
Kurtosis (WHZ)	1 (-0.30)	Good
Poisson Distribution	0 (p=0.052)	Excellent

Overall Score	10%	Good
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Appendix 2: Assignment of Clusters

SUB COUNTY	WARD	CLUSTER	POP19	SAMPLE
Banisa	Banisa	Banisa Zone 1 B	3503	1
Banisa	Banisa	Zone 5 Bulla Hara	4091	2
Banisa	Derkale	Bulla Tanki Derkale	1650	3
Banisa	Kiliweheri	Bulla Chabi Eymole	4740	4
Banisa	Malka Mari	Bulla Town Hullo	1858	5
Kotulo	Kotulo	Kosi Garse Sala	4210	6
Kotulo	Kotulo	Bula Guracha	900	7
Lafey	Lafey	Allungu Lafey	4,381	8
Lafey	Lafey	Konkama Kabo	2,900	9
Lafey	Warankara	Kamor Warankara	2,925	10
Mandera East	Khalalio	Karow	2,574	11
Mandera East	Libehiya	Bulla Dabey Aresa	4,954	12
Mandera East	Libehiya	Bulla Adilla Quradeer	3,360	13
Mandera East	Neboi	Bulla Makasaw Shashafey	4,800	14
Mandera East	Neboi	Bulla Hidaya Power	4,050	15
Mandera East	Township	Bulla Taqwa Bulla Mpya	3,410	16
Mandera North	Ashabito	Iskuraran	2,317	17
Mandera North	Guticha	Shirshir	5,006	18
Mandera North	Marothiley	Marothiley	5,000	19
Mandera North	Rhamu	Bulla Hargesa B Town	5,708	20
Mandera North	Rhamu	Bulla Shantoley Town	6,400	21
Mandera North	Rhamu	Darika Town	5,000	22
Mandera North	Rhamu	Tosi	3,052	23
Mandera North	Rhamu Dimtu	Galbeed	3,653	24
Mandera North	Rhamu Dimtu	Yabicho B Yabicho	4,159	25
Mandera South.	Elwak South	Bulla Wajir	3,739	26
Mandera South.	Elwak South	Qoroboshanan	2,759	27
Mandera South.	Shimbir	Gubadabsu	240	28
Mandera South.	Wargadud	Bulla Afya	4,100	29
Mandera West	Dandu	Bula Mpya A	4,331	30
Mandera West	Dandu	Bachille	4,129	31
Mandera West	Gither	Bula Mpya	3,000	32
Mandera West	Lagsure	Afalo	3,856	33
Mandera West	Takaba	Hardahalo C	3,620	34
Mandera West	Takaba	Bulla Hamabala A	4,731	35

Mandera West	Takaba South	Bula Sukela Didkuro	3,600	36
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