Tana River County SMART Survey

February 2018

ACKNOWLEDGEMENT

Tana River County SMART survey was made successful through the contribution of a number of partners. The County Department of Health led in the survey management.

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
FAO	Food and Agriculture Organization
BCG	Bacillus Chalmette Guerin
CIDP	County Integrated Development Plan
CLTS	Community Led Total Sanitation
CSG	County Steering Group
CHS	Community Health Strategy
CSI	Coping Strategy Index
ENA	Emergency Nutrition Assessment
GAM	Global Acute Malnutrition
IPC	Integrated Phase Classification
KEPI	Kenya Expanded Program on Immunization
MNPs	Micronutrients Powders
MUAC	Mid Upper Arm Circumference
NDMA	National Drought Management Authority
OPV	Oral Polio Vaccine
PLW	Pregnant and lactating women
SAM	Severe Acute Malnutrition
SBCC	Social Behavior Change and Communication
SMART	Standardized Monitoring Assessment on Relief and Transition
SPSS	Statistical Package for Social Sciences
UNICEF	United Nation Children Fund
WASH	Water hygiene and Sanitation
WHO	World Health Organization.

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EXECUTIVE SUMMARY

Introduction

Tana River County department of health with support from UNICEF carried out a SMART survey in the entire County in Feb 2018. Tana River County is located in the Kenyan Coastal region and is divided in to 3 sub counties namely; Bura, Galole and Garsen. The County has three main livelihood zones namely; Pastoral, Marginal mixed farming and Mixed farming. The main objective of the survey was to determine the prevalence of malnutrition among the children aged 6 - 59 months, pregnant and lactating mothers in Tana River 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 food security situation in the County.

Methodology

The survey was cross sectional and descriptive by design. Standardized Monitoring and Assessment on Relief and Transition methodology was be adopted in the study. The study applied quantitative approach. 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)[1].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 (621 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 16 households per cluster per day translating to a minimum of 37 clusters. 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 first stage sampling in case such a list never existed.

For the data collection purpose, electronic questionnaire was used. Anthropometric data processing was done using ENA software version 2015 (July). All the other quantitative data were analyzed in Ms. Excel and the SPSS (Version 20) computer package.

[1] In this method villages with more population are likely to be selected as compared to those with low population

Table 1: Results Summary

RESULTS SUMMARY				
ANTHROPOMETRIC RESULTS				
WHO 2006 Standards	N	% with 95% CI	N	% with 95% CI
Design effect (WHZ)= 1.68	Jan-17		Feb-18	
Prevalence of GAM based on WHZ (-2 z score	710	13.7% (10.1 - 18.2)	628	15.6 % (11.6 - 20.6 95%)
Prevalence of SAM based on WHZ (-3 z score) and/or edema	710	3.0% (1.3 – 6.4)	628	2.2 % (1.2 - 4.0 95 %.)
Prevalence of stunting based on HFA (<-2 z-score)	712	23.2% (19.6 - 27.2 %)	614	22.6 % (19.3 - 26.4 95%)
Prevalence of severe stunting based on HFA(<-3 z score)	712	6.0% (4.2 - 8.6)	614	5.4 % (3.8 - 7.5 95%)
Prevalence of underweight based on WFA(<-2 z score)	687	27.8% (23.7 - 32.3)	631	23.5 % (18.6 - 29.1 95%)
Prevalence of severe underweight based on WFA(<-3 z score)	687	7.1% (5.2 - 9.7)	631	5.4 % (3.5 - 8.2 95%)
CHILD MORBIDITY (Based on 2 Weeks Recall				
Indicator	Type of Illness	% Jan 2017	Feb 2018 (n)	% Feb 2018
Illness in the last 2 weeks (Children 6 to 59 months)	All	57.0%	328	51.3%
	Fever with Chills	62.1%	149	68%
	ARI	41.8%	175	8%
	Watery diarrhea	14.4%	42	19%
	Bloody diarrhea	0.3%	2	1%
Therapeutic Zinc supplementation during diarrhea episodes		7.3%	N (42)	57%
VITAMIN A SUPPLEMENTATION AND DEWORMING				
Indicator	No. of Times	% Jan 2017	Feb 2018 (n)	% Feb 2018
Vitamin A supplementation 6 to 11 Months	At least Once	63.1%	396	75%
Vitamin A supplementation 12 to 59 months (Once)	At least Once	57.0%	305	77%

Vitamin A Supplementation 12 to 59 months	At least twice	37.9%	163	41.7%
Deworming (12 to 59 Months)	At least Once	52.4%	267	40.4%
	At least Twice	13.8%	78	12.4%
IMMUNISATION				
Antigen	Means of Verification	% Jan 2017	Feb 2018 (n)	% Feb 2018
BCG	Presence of a Scar	90.4%	489	95.9%
OPV1	Recall and Card	95.4%	495	96.7%
OPV 3	Recall and Card	90.5%	473	92.3%
Measles at 9 months	Recall and Card	87.2%	422	87.9%
Measles at 18 Months	Recall and Card	47.6%	258	71.2%
MATERNAL NUTRITION				
Indicator	Description	% Jan 2017	Feb 2018 (n)	% Feb 2018
MUAC < 21.0 cm	Women of Reproductive age	3.9%	25	6.1%
MUAC< 21.0 cm	Pregnant and lactating women	4.5%	11	4.4%
Women supplemented with FeFo	Mothers with children less than 2 years	88.4%	201	86.3%
Women Consuming FeFo	At least 270 days	1.1%	1	0.5%
	At least 90 days	46.2%	148	73.6%
Average IFAS Consumption	Mean Number of days FeFo was consumed		48.1 days	
WATER SANITATION AND HYGIENE PRACTISES				
Indicator	Description	% Jan 2017	Feb 2018 (n)	% Feb 2018
Households obtaining water from safe sources	All Households	66.8%	435	72.9%
Households obtaining water from sources less than 500m	All Households	73.6%	407	69.6%
Households treating their water	All Households	25.6%	138	23.6%

Hand washing in 4 critical moments (N= 247)	Households with children under 2 years	4.7%	49	9.5%
Proportion of households that owns a toilet	All Households	31.4%	252	43.1%
Proportion of households practicing open defecation	All Households	52.3%	333	56.9%
HOUSEHOLD AND WOMEN DIETARY DIVERSITY				
FOOD CONSUMPTION SCORE AND COPING STRATEGY INDEX				
Indicator		% Jan 2017	n(Feb 2018)	% Feb 2017
Household within Acceptable food consumption score (>35.5)		83.7%	383	66.1%
Coping Strategy Index		17.4%		18.1%

Conclusion

There was a significant statistical difference between wasting for children under-five years between SMART survey July 2017 (GAM 13.7%) and Feb 2018 (GAM 15.6%). The significant changes in wasting can be viewed in the terms of acute changes rather than chronic issues. There was also significant statistical difference between other childhood malnutrition indicators; underweight and stunting. The county is in phase 4 (Critical) according to IPC classification for acute malnutrition.

Analysis was done on food security and morbidity issues which would have contributed to changes in acute malnutrition. Short rain assessment was done concurrently with the SMART survey. The food security situation in Tana River County was classified as "Stressed" (IPC Phase 2) in the mixed farming and marginal farming zones whereas the pastoral livelihood is classified as "Crisis" (IPC Phase 3).

In terms of morbidity, the proportion of children who were sick in the past 2 weeks reduced from 57.0% in Jan 2017 to 51.3 % in February 2018. There was a slight increase in fever and chill (from 62.1% to 68.0%) which could be a contributing factor to the current acute malnutrition situation in Tana River County though a decrease in ARI/Cough (from 41.8 – 8.0%) was noted.

Although there was no significant difference between 2017 and 2018 surveys, the stunting and underweight levels remained relatively high that requires County interventions. There was no significant difference in the two indicators between boys and girls.

Recommendation

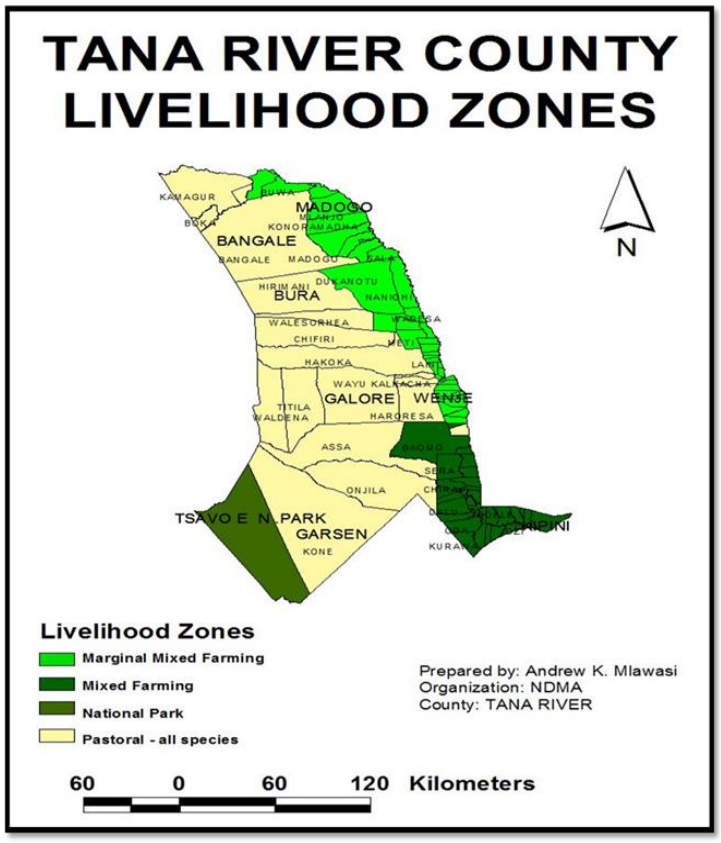
- Initiate active case findings, referral and defaulter tracing
- Advocate for re-introduction of integrated outreaches and mobile clinic in the county
- Sensitize HCP on forecasting and quantification to avoid stock outs
- Sensitize the community on the importance of Vitamin A supplementation and deworming

- Sensitize HCP on proper/appropriate documentation
- Strengthen health education to community on important of IFAS uptake and early ANC visit (SBCC)
- Train HCP on IFAS policy guidelines as well as MNPS
- Adopt and fully operationalize CLTS in the county
- Community health education on importance of treated drinking water
- Procurement and distribution of water treatment chemical; as the preferred method of treatment.
- Purchase cold chain equipment

1.0. INTRODUCTION

1.1. Background

Tana River County is located in the Coastal region of Kenya, which occupies an area of approximately 38,437 km2, has an estimated population of 324,054 people. Tana River County borders Kitui County to the West, Garissa County to the North East, Isiolo County to the North, Lamu County to the South East and Kilifi County to the South. The County has three sub counties namely: Bura, Galore and Garsen. Tana River County has four main livelihood zones namely; Pastoral, Marginal mixed farming, Mixed farming and National park as shown in figure 1.



Generally, the county experiences bimodal rainfall pattern which is mostly erratic with long rains falling between April and June and short rains between October and December.

The pastoral and marginal mixed farming livelihood zones rely on short rains while mixed farming zone rely on long rains. The mean annual rainfall ranges between 220mm and 500mm except the mixed farming zone, which receives rainfall ranging between 750mm and 1250mm. The County is generally hot and dry with temperatures ranging between 21°C and 38°C with the coldest month in July and hottest months in September and January. It therefore experiences two dry spells every year occurring in December to March and July to October.

Figure 1: Tana River map showing livelihood zones

Most of the County consists of low-lying plains with the highest points being Minjila and Bilbil. The River Tana traverses the County from Tharaka Nithi County in the North to the Indian Ocean in the South passing through Tana Delta and covering a stretch of approximately 500km, situated in the Eastern side of the county, this provides livelihood opportunity to resident population through flood receded crop farming.

1.2. Survey Justification

According to a SMART survey carried out in Tanariver County (January 2017), the global acute malnutrition was at serious state (13.7 %) while SAM was 3.0%. As at December 2017, the County was at Alarm phase of drought cycle and the situation was worsening within all the livelihood zones. The purpose of the survey was to assess the nutrition situation of children below five years and women of reproductive age in Tana River County. The survey results will feed in the food security assessments report, which will form a solid basis for planning appropriate future interventions.

1.2. Survey Objectives

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

1.3. Specific Objectives

- To assess current prevalence of acute malnutrition in children aged 6-59 months.
- To determine the nutritional status of women of reproductive age (15-49 years)
- To determine immunization coverage for measles, OPV1 & 3 and Vitamin A for children aged 6-59 months.
- To determine deworming coverage for children aged 12 - 59 months.
- To determine the prevalence of common illnesses (diarrhea, measles and ARI).
- To assess water, sanitation and hygiene practices.
- To establish the coverage of iron/folic acid supplementation and consumption during pregnancy among lactating women
- To asses health seeking behavior among caregivers of children below 5years
- To assess the prevailing situation of household food security in the County.
- To collect photos for facial recognition of malnutrition (MERON study).

1.4. Survey Timing

Tana River SMART survey was done in February 2018. According to the County seasonal calendar, this is usually a short dry spell. At this season, communities in the mixed farming livelihood zone have their farm without crop. Pastures depleting to be considered dry season in the pastoral communities. Table 1 below is the seasonal calendar for Tana River County

Tana River SMART Survey 2018

Table 2: Tana River Seasonal Calendar

Short dry spell			Long rains			Long dry spell			Short rains		
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Short rains harvest			Land Preparation	Planting/weeding Lean period for farmers		Crops at green maturity	Long rains harvest	Land Preparation.	Planting/Weeding Lean period for farmers		Crops at green maturity

Source: National Drought Management Authority

2.0. METHODOLOGY

2.1. Survey Design

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

2.2. Sampling Procedure

2.2.1. Study Population

The study population included the entire population in Tana River County, estimated that at 324,054 people. All villages (clusters/sampling units) in the County, which were accessible, secure and not deserted, were included in the sampling frame.

2.2.2. Sampling methods and sample size calculation

Anthropometric sample size calculation

The survey adopted Two-stage sampling technique. The first stage involved random selection of clusters from the sampling frame based on probability proportion to population size (PPS)[2].Emergency Nutrition Assessment (ENA) for Standardized Monitoring for Assessment for Relief and Transition (SMART) July 2015 was used in calculation of sample size.

Table 3: Sample size calculation

Parameters for Anthropometry	Value	Assumptions based on context
Estimated Prevalence of GAM (%)	13.7 %	Based on January 2017 prevalence. The County drought status is Alarm and the trend is worsening in all the livelihood zones (EWS bulletin December 2017). This status is expected to worsen.
± Desired precision	3.%	Rule of Thumb
Design Effect	1.13	Based on January 2017 SMART Survey
Children to be included	**621**	
Average HH Size	6	Based on CIDP
% Children under-5	20.06%	Based on 2009 population census projections
%Non-response Households	3 %	Estimated non response based on the current situation pop migration
Households to be included	**591**	

[2] In this method villages with more population are likely to be selected as compared to those with low population

Number of households per day	16	Based on 2017 SMART Survey Experience
Number of clusters	37	Computed from the Number of HHs per Day

2.2.3. Sample Size Description

Household was used as the sampling unit in the second stage sampling or basic Sampling Unit. The sample size obtained using ENA software (621 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 16 households per cluster per day translating to a minimum of 36 clusters. 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 first stage sampling in case such a list never existed. From the list, the survey teams randomly selected 16 households where they administered household questionnaire (in all households) and anthropometric, morbidity and immunization questionnaire in household with children aged 6 to 59 months.

2.3. Data Collection

Data Collection was done for 6 days (23rd to 28th of February 2018) by six teams. Every team was composed of four members who included a team leader, 2 measurers and a community guide. Teams were trained for 4 days prior to field work. 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. To evaluate team's accuracy and precision in taking anthropometric measurements. SMART data collection tool was piloted / tested in a none selected cluster to be part of the survey sample. Additionally, during the piloting the enumerators were required to undertake the entire process of the survey, which included household selection, taking anthropometric measurements and filling of the data collection forms.

The overall survey coordination was handled by the Tana River County Nutrition Coordinator with support from the nutrition support officer and 3 sub county nutritionist on training and supervision of survey teams, as well as technical guidance from NIWG. Supervisors was conducted to ensure data collected during the survey is of high quality. 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 were done and gaps noted were communicated to all the teams before going to the field every morning for corrections and adjustments.

2.4. Data Collection Tools and Variables

For the data collection purpose, electronic questionnaire was used. Each questionnaire consisted of identification information, household information, demographic information, anthropometric

information, morbidity, immunization, maternal, WASH and food security data. Household, demographic and food security information were collected in all the sampled households. The rest of the data was collected from only households with children aged 6 to 59 months.

2.5. 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.

2.6. 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;

I. Thorough 4 days training conducted to survey participants, the training dwelt on SMART methodology, survey objectives, interviewing techniques and data collection tools.
II. Ensuring all anthropometric equipment were functional and standardized. On daily basis, each team was required to calibrate the tools.
III. During the training exercise, standardization test was done; in addition, piloting of tools was done to ensure all the information was collected with uniformity.
IV. Conducting a review of data collection tools during training and after the pilot test.
V. All the survey teams were assigned a supervisor during data collection.
VI. 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.
VII. Teams were supervised to ensure all errors were rectified on time. More attention was given to the teams with notable weaknesses.
VIII. Adequate logistical planning beforehand and ensuring the assigned households per clusters were be comfortably survey.

3.0. RESULTS

3.1. General Characteristics of Study Population

The survey involved collection of information from 621 children in 591 household. Only 2 sampled household did not participate in the survey. The response rate was therefore 99.0%. The reason for non-response were absenteeism. The average household size recorded from this survey was 3.5. All households that participated in the survey were residents.

The main income sources of household heads were livestock herding (29%), petty trading (20%) and sale of livestock products (18%) other sources of income are as shown in table 4 below. In terms of occupation, majority of household heads were sale of livestock herders (28%), waged laborers (28%) as well as own farm laborers as shown in table 5 below. While on school enrolments, 66% of children aged 3 to 18 years are enrolled in school, 34% were not. The reasons for non-enrollment included; parents felt their children to be young for school enrollment, no school was nearby, family labor responsibilities as well as the household could not see the need for the child being in school.

Table 4: Main source of income for household head

Main Source of Income	Number	Percentage
Casual labor	168	29%
Petty trading e.g. sale of firewood	116	20%
Sale of livestock	105	18%
Sale of crops	80	14%
No income	44	8%
Sale of livestock products	31	5%
Permanent job	28	5%
Remittance	9	2%
Sale of personal assets	4	1%

Table 5: Main occupation of household head

Main Occupation of household head	Numbers	Percentage
Livestock herding	162	28%
Waged labour (Casual)	159	27%
Own farm labour	111	19%
Petty trade	48	8%
Firewood/charcoal	39	7%
Employed (salaried)	25	4%
Fishing	8	1%
Merchant/trader	7	1%
Others (Specify)	26	4%

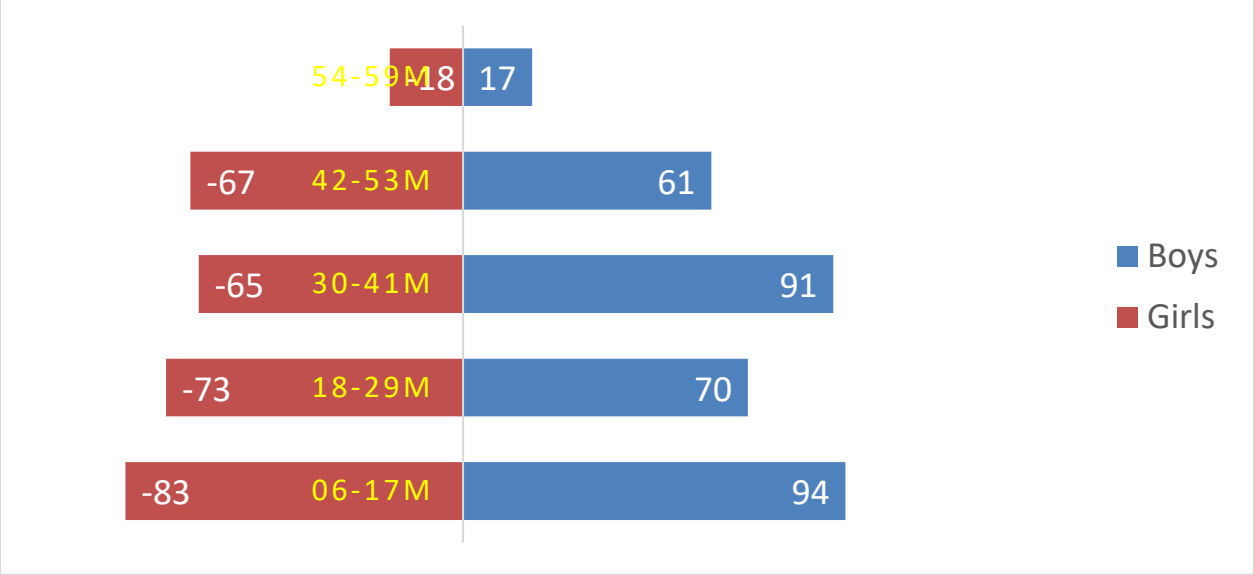
3.2. Distribution of Age and Sex (Under-fives)

The total number of children assessed during the survey was 639. This included 333 boys and 306 girls. The boy to girl ratio was 1.1 and a p-value of 0.285 (boys and girls equally represented) who participated in the survey. Table 6 below is a summary of sex and age distribution of children who were assessed. Age ratio of 6-29 months to 30-59 months: 1.00 (The value should be around 0.85), p-value = 0.036 (significant difference) which was slightly higher than expected value. Figure 2 illustrates the age and sex distribution of the children.

Table 6: Age and sex distribution of children 6 to 59 months

AGE	Boys		Girls		Total		Ratio
(month)	no.	%	no.	%	no.	%	Boy:Girl
6-17	94	53.1	83	46.9	177	27.7	1.1
18-29	70	49.0	73	51.0	143	22.4	1.0
30-41	91	58.3	65	41.7	156	24.4	1.4
42-53	61	47.7	67	52.3	128	20.0	0.9
54-59	17	48.6	18	51.4	35	5.5	0.9
Total	333	52.1	306	47.9	639	100.0	1.1

Figure 2: Age and sex distribution pyramid



3.3. Under-fives Nutrition Status

Under five nutrition status was assessed using anthropometric indicators namely, Weight for Height and MUAC (wasting or acute malnutrition), Height for Age (stunting or chronic malnutrition) and weight for age (underweight). Analysis was based on 2006 WHO reference standards.

3.3.1. Prevalence of 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 the 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 edema 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 global acute malnutrition (GAM) is the Sum of all children with moderate and severe acute malnutrition in the sample.

Prevalence of Acute Malnutrition based on Weight for Height by Sex

Analysis of acute malnutrition was based on 628 children aged 6 to 59 months (327 boys and 301 girls). There was an exclusion of 11 children who were flagged off as outliers. From the analysis, Tanariver global acute malnutrition was **15.6 % (11.6 - 20.6, 95% C.I.)** The SAM rate in the County was **2.2 % (1.2-4.0, 95% C.I.).**

Table 7: Prevalence of acute malnutrition based on Weight for Height Z- score

Indicator	Total (N)	All (% with 95% CI)	Boys (% with 95% CI)	Girls (% with 95% CI
GAM: Weight for Height (WHZ) <-2 Z score or Oedema)	628	(98) 15.6 % (11.6 - 20.6)	(57) 17.5 % (12.3 - 24.2)	(41) 13.6 % (9.1 - 19.7)
Prevalence of MAM (<-2 z-score)	628	(84) 13.4 % (10.1 - 17.6)	(48) 14.7 % (10.4 - 20.3)	(36) 11.9 % (7.8 - 17.8)
Prevalence of SAM (<-3 z-score and/or oedema)	628	(14) 2.2 % (1.2 - 4.0)	(9) 2.8 % (1.4 - 5.3)	(5) 1.7 % (0.7 - 3.8.)

The prevalence of Oedema was 0.0%

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 -0.90 SD (±1.08) an indication of under nutrition in comparison to reference children.

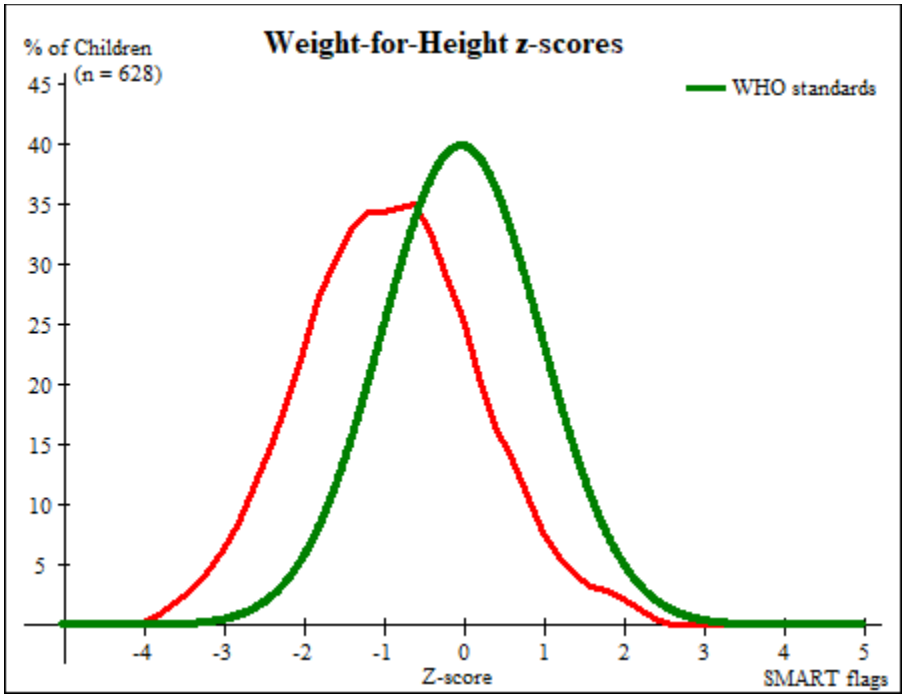


Figure 3: Graphical representation of WFH for children assessed compared to reference children

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 oedema

		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	172	4	2.3	18	10.5	150	87.2	0	0.0
18-29	140	4	2.9	13	9.3	123	87.9	0	0.0
30-41	154	5	3.2	20	13.0	129	83.8	0	0.0
42-53	127	1	0.8	28	22.0	98	77.2	0	0.0
54-59	35	0	0.0	5	14.3	30	85.7	0	0.0

Total	628	14	2.2	84	13.4	530	84.4	0	0.0

Analysis of Acute Malnutrition based on presence of Oedema

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.

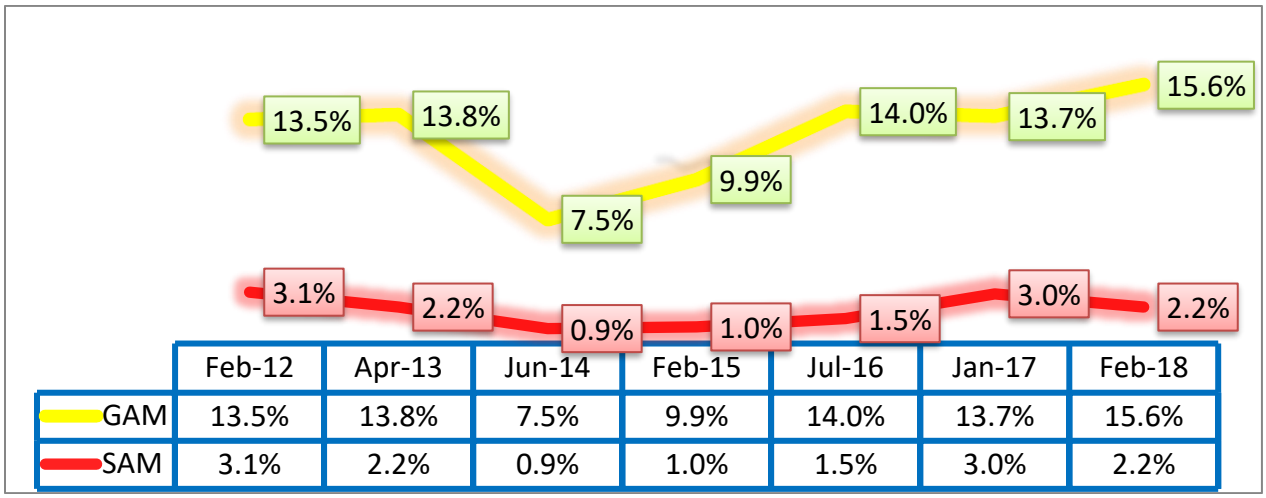
Table 9: Prevalence of acute malnutrition and Edema based on WFH Z score

	<-3 z-score	>=-3 z-score
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 20 (3.1 %)	Not severely malnourished No. 619 (96.9 %)

Trends of Acute Malnutrition in Tana River County

There was a significant increase in Malnutrition based on WFH z score compared to Jan 2017. Since the food security situation in the County has not change. The food security situation in Tana River County was classified as "Stressed" (IPC Phase 2) in the mixed farming and marginal farming zones whereas the pastoral livelihood is classified as "Crisis" (IPC Phase 3).

Figure 4: Trends of wasting prevalence in Tana River County



Prevalence of Acute Malnutrition based on 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 **5.9%** and SAM of **0.5%** as indicated in table 10 below.

Table 10: Prevalence of Acute malnutrition based on MUAC Cut offs (and or Oedema) and by sex

	All n = 639	Boys n = 333	Girls n = 306
Prevalence of global malnutrition (< 125 mm and/or oedema)	(38) 5.9 % (3.7 - 9.4 95% C.I.)	(17) 5.1 % (2.6 - 9.7 95% C.I.)	(21) 6.9 % (4.2 - 11.0 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(35) 5.5 % (3.3 - 9.1 95% C.I.)	(16) 4.8 % (2.4 - 9.5 95% C.I.)	(19) 6.2 % (3.6 - 10.4 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(3) 0.5 % (0.2 - 1.4 95% C.I.)	(1) 0.3 % (0.0 - 2.2 95% C.I.)	(2) 0.7 % (0.2 - 2.6 95% C.I.)

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 Tana River County was **23.5%** while those who were severely underweight was **5.4%**.

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

	All n = 631	Boys n = 328	Girls n = 305
Prevalence of underweight (<-2 z-score)	(148) 23.5 % (18.6 - 29.1 95% C.I.)	(78) 23.9 % (17.8 - 31.4 95% C.I.)	(70) 23.0 % (17.4 - 29.7 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(114) 18.1 % (14.1 - 22.8 95% C.I.)	(59) 18.1 % (13.5 - 23.9 95% C.I.)	(55) 18.0 % (13.3 - 24.0 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(34) 5.4 % (3.5 - 8.2 95% C.I.)	(19) 5.8 % (3.4 - 9.9 95% C.I.)	(15) 4.9 % (2.7 - 8.8 95% C.I.)

Prevalence of Chronic Malnutrition (Stunting) based on Height for Age (HFA).

WHO define stunting as height for age less than – 2 SD from median height for age of reference population. Childhood stunting is an outcome of maternal under nutrition 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 **22.6 %** In addition, a severe stunting (HFA< -3 in reference to standard population) rate of **5.4%** as shown in table 12 below. Boys were more stunted than girls were. Table 13 illustrates stunting by age.

Table 12: Prevalence of stunting based on Height for Age Z-score and by sex

	All n = 614	Boys n = 319	Girls n = 295
Prevalence of stunting (<-2 z-score)	(139) 22.6 % (19.3 - 26.4 95% C.I.)	(76) 23.8 % (19.2 - 29.2 95% C.I.)	(63) 21.4 % (16.5 - 27.2 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(106) 17.3 % (14.3 - 20.6 95% C.I.)	(57) 17.9 % (13.7 - 22.9 95% C.I.)	(49) 16.6 % (12.9 - 21.2 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(33) 5.4 % (3.8 - 7.5 95% C.I.)	(19) 6.0 % (3.8 - 9.1 95% C.I.)	(14) 4.7 % (2.7 - 8.3 95% C.I.)

Table 13: Stunting by age

		Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
Age (m)	Total no.	No.	%	No.	%	No.	%
6-17	168	7	4.2	27	16.1	134	79.8
18-29	133	9	6.8	23	17.3	101	75.9
30-41	152	10	6.6	27	17.8	115	75.7
42-53	127	6	4.7	19	15.0	102	80.3
54-59	34	1	2.9	10	29.4	23	67.6
Total	614	33	5.4	106	17.3	475	77.4

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 -**1.16±1.10**.

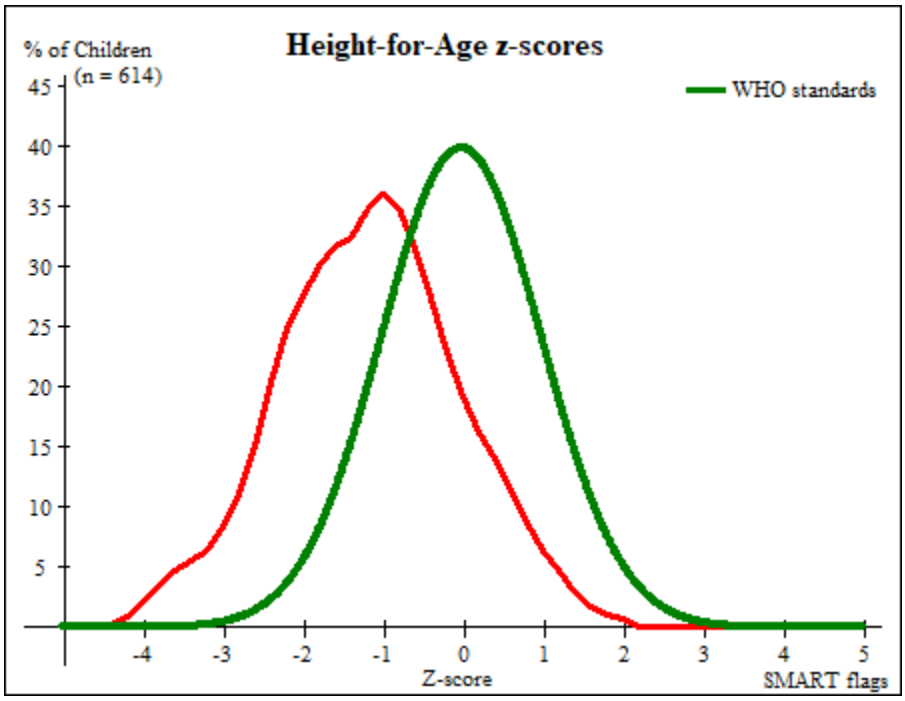


Figure 5: Graphical representation of HFA distribution in comparison with WHO standards

3.4. Children Morbidity and Health Seeking

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 51.3% were ill in the past 2 weeks prior to the survey date. Among those who were sick, majority (68%) suffered from fever with chills, 80% ARI/cough, with and 19% who suffered from watery diarrhea. These could be contributing factors to rise in acute malnutrition in the County. Table 14 below is a summary of morbidity status of children 6 to 59 surveyed.

Table 14: Children Morbidity

Diseases	% Prevalence			
	February 2018 Survey		January 2017 survey	
	n	Percent	n	Percent
All	328	51.3%	409	57%
Fever with chills	149	68%	254	62.1%
ARI/Cough	175	80%	171	41.8%
Watery diarrhea	42	19%	59	14.4%
Bloody diarrhea	2	1%	1	0.3%
Other infections	0	0%	30	7.3%

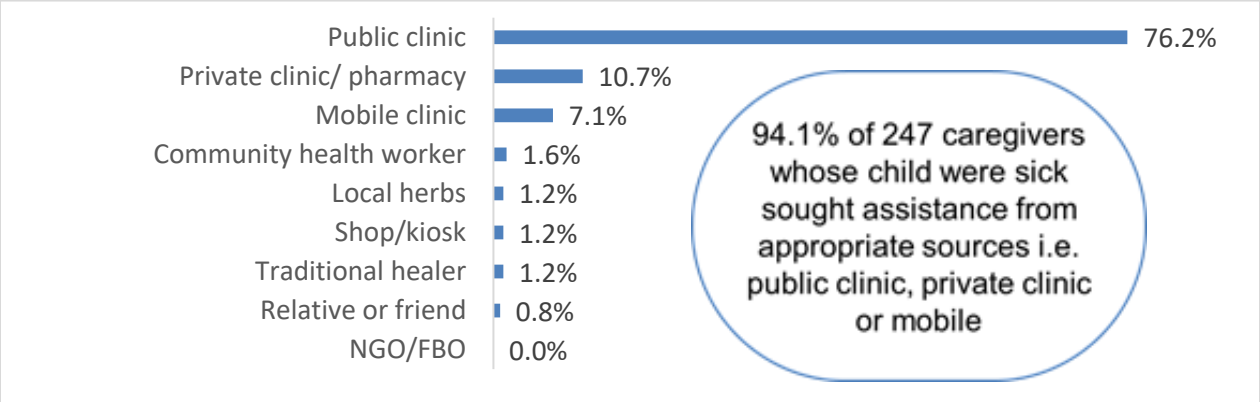
3.4.1. Therapeutic Zinc Supplementation during watery diarrhea episodes

Based on compelling evidence from studies that, the efficacy of 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. Slightly less than half **(57%)** of those who suffered from watery diarrhea were supplemented with zinc.

3.4.2. Health Seeking

Majority of caregivers (75.3%) whose children fell ill in the past 2 weeks prior to the survey date sought assistance. Among those who sought assistance, 76.1% did so in public clinic while 10.7% did so in private clinic and 3.2% did so in a shop or kiosk. Overall 87.6% of caregivers whose children were sick sought assistance from appropriate sources such as public clinic, private clinic or mobile clinic as shown in figure 6 below.

Figure 6: Health Seeking Places



3.5. *Child Immunization, Vitamin A and Micronutrients Supplementation and Deworming*

3.5.1. 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 as one who has received all the prescribed antigens ***and at least one Vitamin A dose*** under the national immunization schedule before the first birthday.

This survey assessed the coverage of 4 vaccines namely, BCG, OPV1, OPV3, and measles at 9 and 18 months. From this assessment, 95.9% 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 96.8% and 92.3% respectively while 87.9% and 71.2% had been immunized for measles at 9 and 18 month respectively, as indicated in figure 7 below.

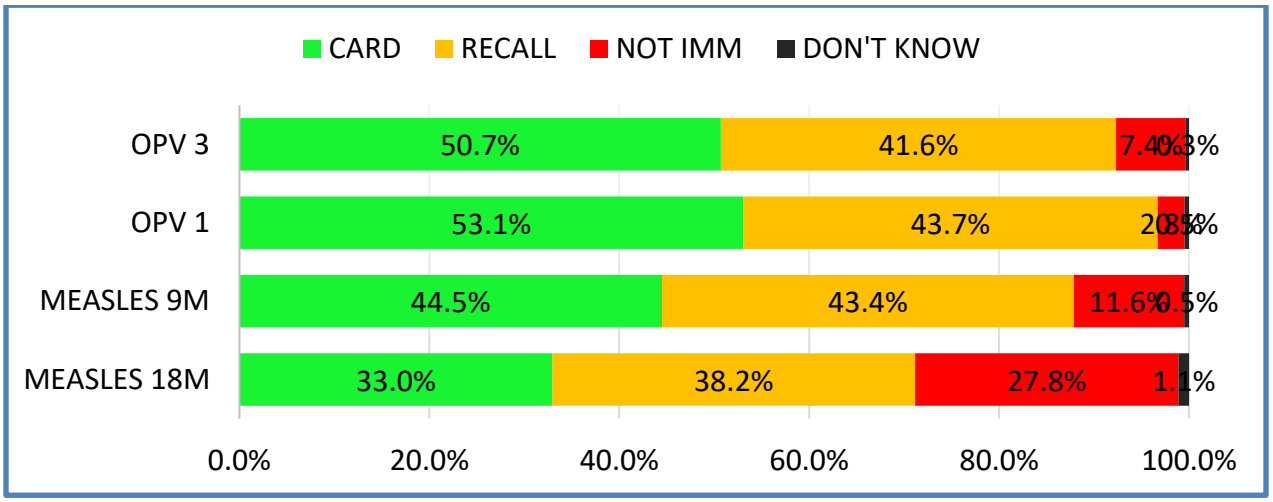


Figure 7: Immunization Coverage

3.5.2. 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 and 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 supplemented, 69.2% was confirmed by the use of health cards with 30.8% who were confirmed by recall. Analysis of vitamin A supplementation for children aged 6 - 11months indicates that 75.0% of this age group had been supplemented with vitamin A. Among those aged 12 to 59 months, 41.7% had been supplemented with vitamin A twice in the past one year. Table 15 below summarizes vitamin A supplementation in Tanariver County. Figure 8 illustrates the comparison of vitamin A supplementation between 2017 and 2018 surveys.

Assessment on deworming for children aged 12 to 59 months indicates a small uptake of deworming drugs; only 12.4% had taken de-wormers twice in the past one year. Low Vitamin A supplementation and deworming was attributed to longer distances to the health facilities as children from villages far away from health facilities were more likely not to be supplemented with vitamin A or dewormed. Mobile clinics and outreached were hardly done to reach out these villages. There was no de-wormers stock outs in the County.

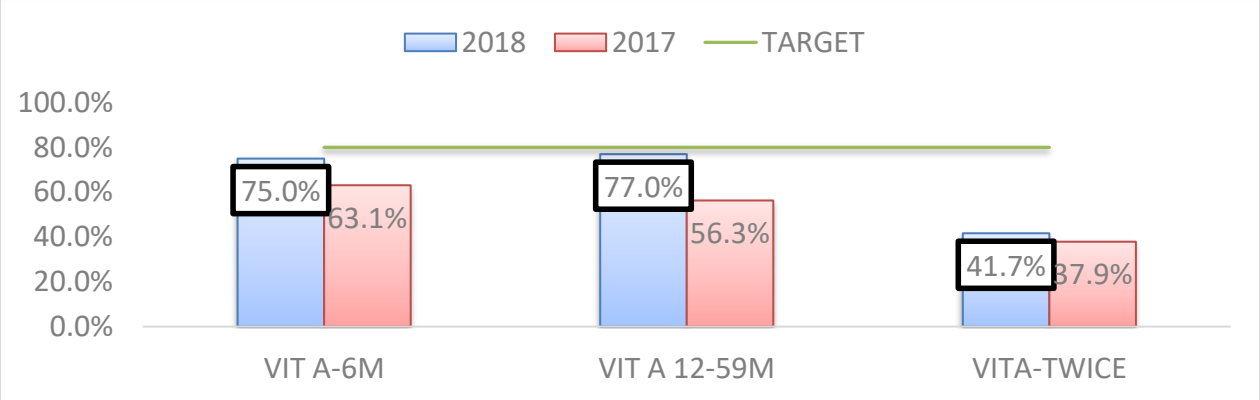


Figure 8: Trends of Vitamin A supplementation

3.6. Maternal Nutrition

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.

Overall 407 women of reproductive age participated in the survey. Almost half of them (47.0%) were lactating. Figure 9 below shows the physiological status of women who participated in the survey.

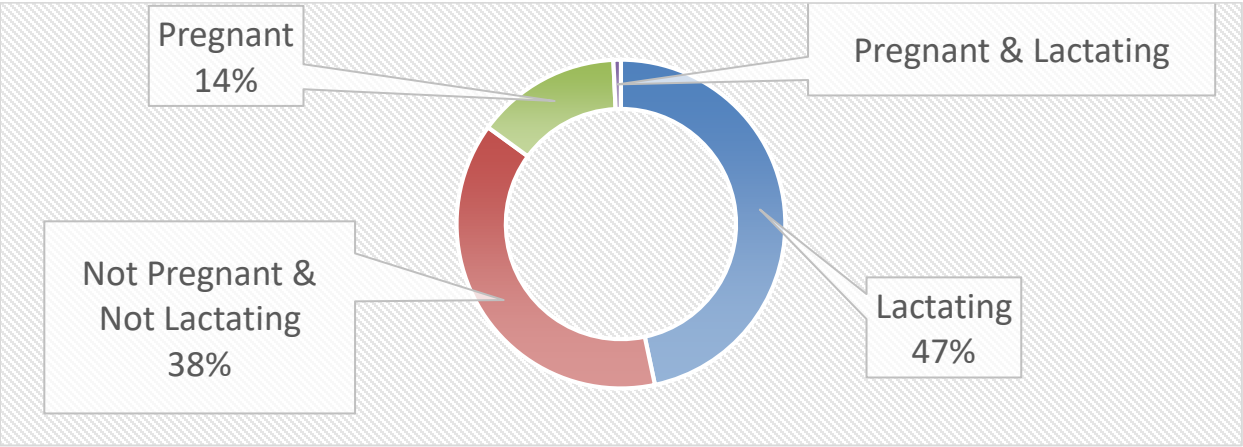


Figure 9: Physiological status of WRA

The nutrition status of women was determined using MUAC. Women with MUAC less than 21 cm are classified as malnourished while those MUAC ranged from 21cm to 22.9cm are at risk. Among the women of reproductive age, 6.1% were malnourished while 4.4% of PLW were malnourished. Table 16 below is a summary of maternal nutrition status.

Table 15: Maternal Nutrition Status

Indicator	N (Total)	n	Percentage
MUAC	All women of reproductive age		
< 21 cm (malnourished)	407	25	6.1%
21 - 23 cm (at risk)	407	36	8.8%
MUAC	Pregnant and lactating women		
< 21 cm (malnourished)	251	11	4.4%
21 - 23 cm (at risk)	251	18	7.2%

Among women with children below 2 years of age, 86.3 had been supplemented with iron and folic acid during their immediate pregnancy. The mean iron and folic acid consumption was 48.1 days. None of the surveyed women had consumed iron and folic acid in the recommended 270 days. Table 17 below is a summary of iron and folic acid consumption in days.

Table 16: IFAS Consumption in days

IFAS Consumption in days	n	Percentage
Less than 90 days	148	73.6%
90 to 180 days	52	25.9%
Above 190 days	1	0.5%

3.7. Water Sanitation and Hygiene Practices

3.7.1 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.

72.9% of the households in Tana River County obtained their water from protected sources such as piped water system, protected boreholes, springs and shallow wells. The rest obtained their drinking water from unsafe sources such as unprotected shallow well (18.8%), river or spring (5.3%), earth pan/dam (0.2%), as well as water trucking (1.0%) as shown in figure 10 below.

Analysis of distance to water sources showed that most households (69.6%) obtain their water from sources less than 500 meters or less than 15 min. The rest obtained their water from sources between 500 meters to 2km (or 15 minutes to 1 hour)(23.8%) and more than 2km or 1 to 2hours to water sources (6.7%) as shown in table 18 below. With regard to queuing for water, 37.8% of household reported to queue for water. Among those who queue for water, 65.6% queue for less than 30 minutes, 26.3% between 30 and 60 minutes while 9.3% queued for more than 1 hour.

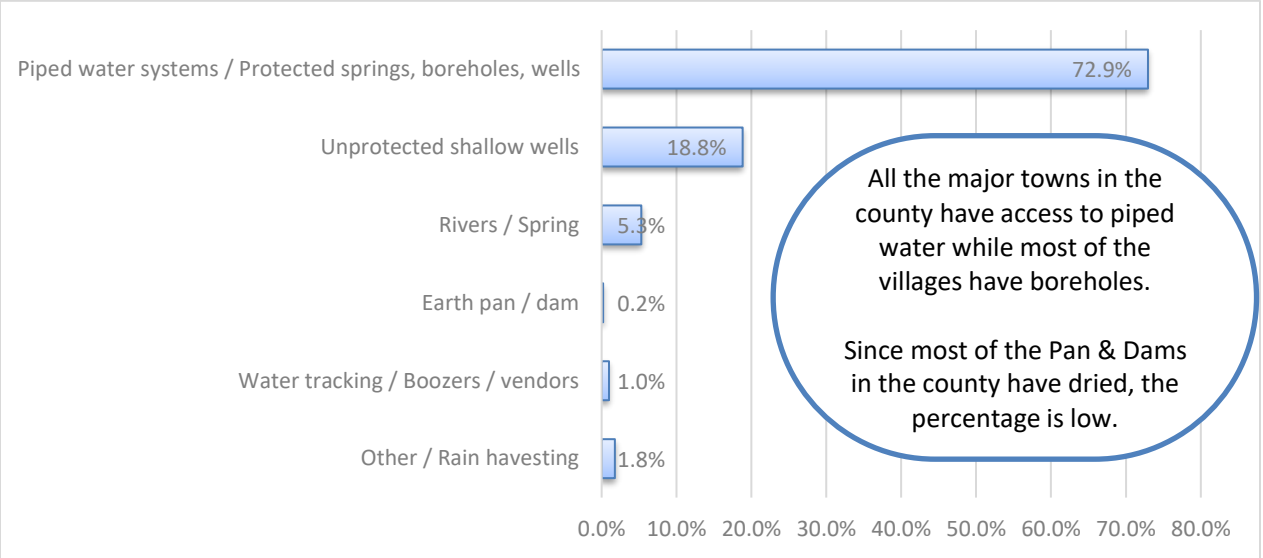


Figure 10: Main sources of drinking water

Table 17: Distances to water sources

Distances to water sources	*n*	*Percent*
Less than 500m (less than 15 min)	407	69.6%
500m to 2km (15m to 1hr)	139	23.8%
More than 2km	39	6.7%

3.7.2. Water Treatment

Only 25.6% of the household surveyed treated their water. Among those who treated their water, 63.9% used chemicals such as water guard, *PUR* among others. Others boiled their water (18.8%), use of herbs (4.2%), use of filters (10.8%).

3.7.3. Water Storage and Payment

Although majority of households do not treat their water, majority of the households store their water in closed containers (95.4%) where it is likely to have physical contamination. The rest (4.6%), store it in open container where it is exposed to physical contamination. Only 4.0% of households consumed less than 15 liters of water prior to survey date. Among the household surveyed, 60.4% purchased their water. Among those purchasing, 49.4% purchased their water on monthly basis while the rest (51.6%) did it in terms of 20-liter jerry cans.

3.7.4. Hand washing

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 (90.8%) were aware of hand washing practices. In term of practice and based on 24 hour recall, majority of the respondents (86.4%) washed their hands before eating, while 52.1% did it before cooking. Among the caregivers, only 24.2% washed their hands after taking a child to toilet. Table 19 below is a summary of hand washing practices.

Table 18: Hand washing practices

Hand washing Practice	No. of caregivers	Percentage
After toilet	398	77.1
Before cooking	269	52.1
Before eating	446	86.4
After taking a child to toilet	125	24.2
Hand washing in 4 critical moments	**49**	**9.5**
Hand washing with soap and water	309	59.9

3.7.5. 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 56.9% of the households. Toilet ownership remained low at 41.5% while others shared sanitary facilities or used neighbor's toilets to relieve themselves as indicated in figure 11 below.

Relieving point	No. of HH	Percentage
Flush / pour flush	38	6.5%
Pit latrine	205	35.0%
Hanging toilet / hanging latrine	8	1.4%
No facility / bush / field	333	56.9%
Other	1	0.2%

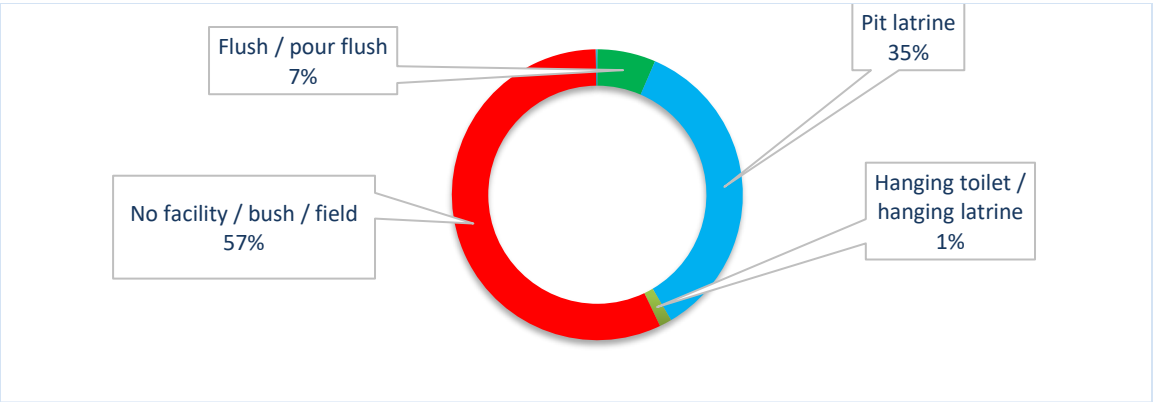


Figure 11: Relieving points

3.8. Household and Women Dietary Diversity

3.8.1. 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 7 days' 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 12 below, there was a high consumption of 4 food groups namely; Cereals (85.6%), Oils and Fats (92.2%), milk and milk products (67.4%) and sweets (88.2%) Few households (4.7%) consumed eggs.

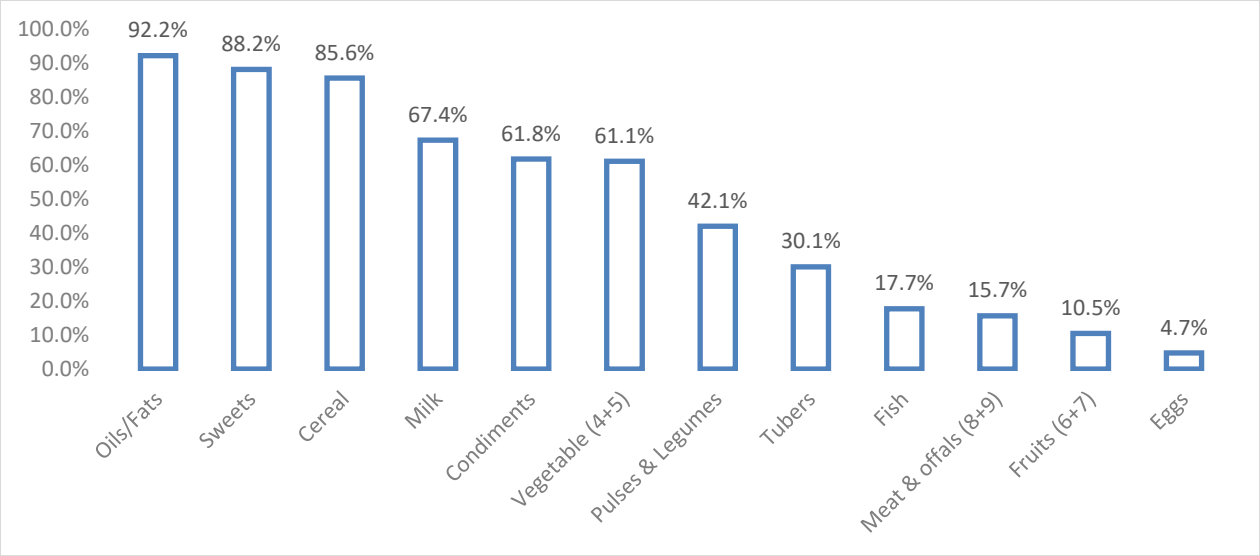


Figure 12: Foods consumed at the household level based on 7 days recall

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 13 below, the most consumed food was grains, white roots and tubers (97.2%) and dairy products (71.9%).

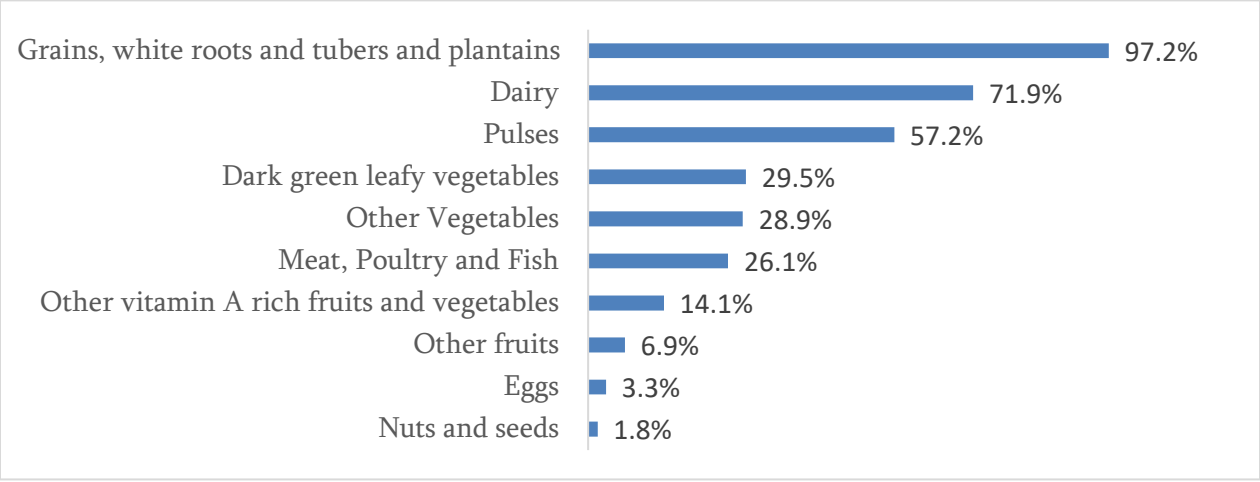


Figure 13: Women Dietary Diversity

Further analysis shows that 18.1% consumed at least 5 food groups which is the Minimum dietary diversity for women. The mean number of food groups consumed was 2.9 as shown in table 21 below.

Table 19: Minimum Women Dietary Diversity

	Number (Feb - 2018)	*(Feb. 2018)*	*(Jan. 2017)*
WRA consuming 5 FGs or more	92	18.1%	23.9%
WRA consuming less than 5 food	417	81.9%	76.1%
Mean No. of food groups		2.9	3.6

3.9. 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 22 below.

Household Classification (Thresholds)	n	(%)
Poor (0- 21)	25	**4.3%**
Borderline (21.5- 35)	171	**29.5%**
Acceptable (Above 35.5)	383	**66.1%**

Further analysis was done on diet quality based on vitamin A rich, iron rich and protein rich diets. As illustrated in figure 13 below, 43.6% of households which were classified under poor and borderline categories consume proteins and iron rich foods, while 59.6% consumed none of vitamin A rich foods, 5.1% consumed protein and vitamin A rich foods frequently. Among those households classified as acceptable, 97.0% consumed protein rich foods frequently, 79.0% consumed none of vitamin A rich foods and only 27.9% consumed iron rich foods frequently.

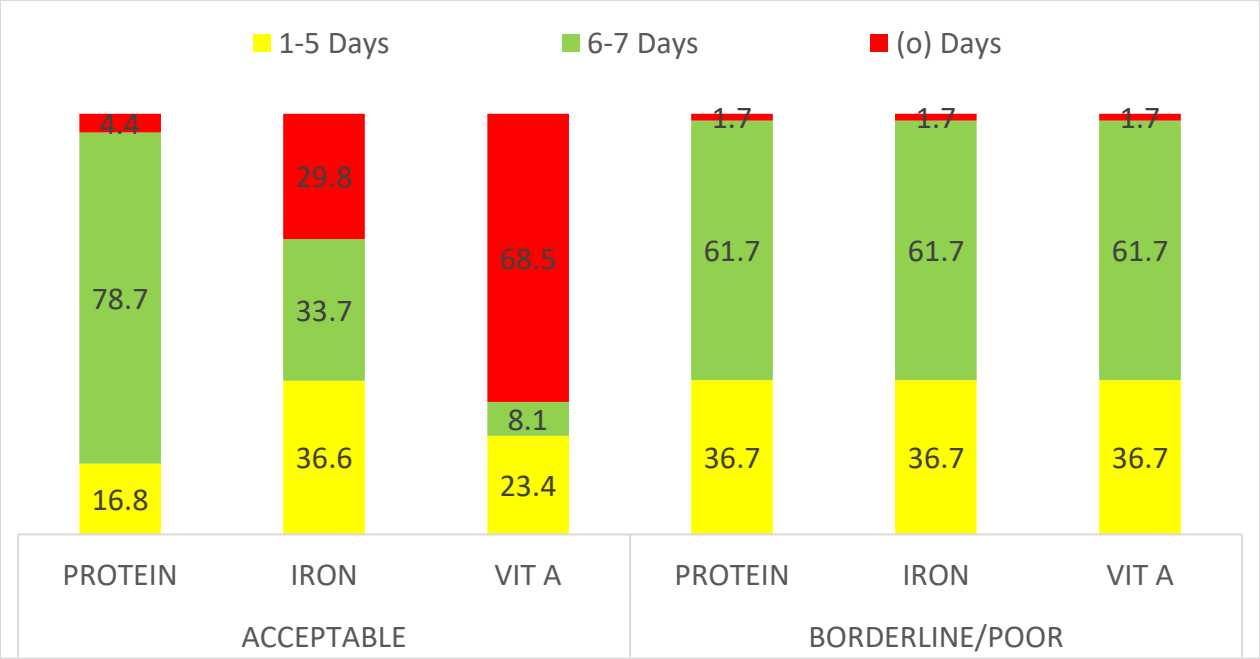


Figure 14: Micronutrients analysis based on FCS

3.10. 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). 43.6% of 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 22 below summarises the coping strategies adopted by the households in such instances.

Table 20: Coping Strategies

Coping Strategy	No. of Households	Frequency Score (0-7)	Severity Score (1-3)	Weighted Score
Rely on less preferred or less expensive foods	175	3.2	1	3.25
Borrow foods from relatives or friends	131	2.0	2	3.94
Limit Portion sizes	192	2.7	1	2.68
Restrict consumption by adults so that children can feed	91	1.6	3	4.95

Reduce the number of meals	208	3.3	1	3.31
Total Weighted Coping Strategy Index				**18.1**

Comparison was also done from June 2014 SMART survey. The total weighted CSI from 2014 SMART survey was 8.3 (Jun2014) lowest and 26.8 (Jul 2016). Figure 15 below illustrates the comparison of 2018 and 2014 assessment. There was an increase in CSI meaning households were more food insecure compared to Jan 2017.

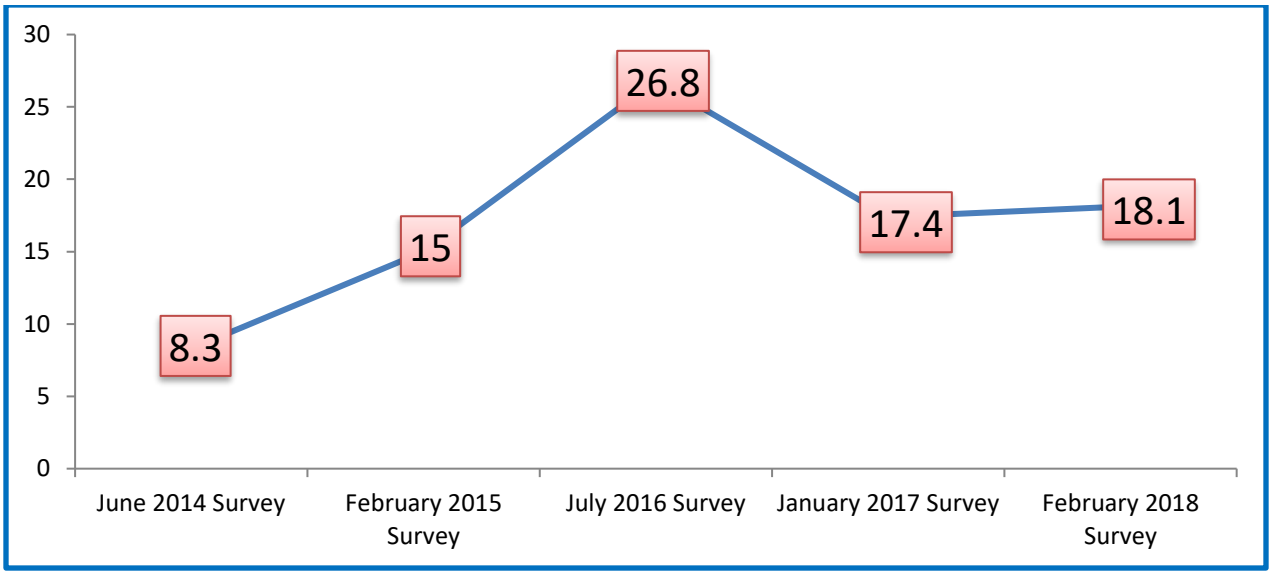


Figure 15: CSI Trend

4.0. CONCLUSION AND RECOMMENDATIONS

4.1. Conclusion.

There was a significant statistical difference between wasting for children under-five years between SMART survey July 2017 (GAM 13.7%) and Feb 2018 (GAM 15.6%). The significant changes in wasting can be viewed in the terms of acute changes rather than chronic issues. There was also significant statistical difference between other childhood malnutrition indicators; underweight and stunting. The county is in phase 4 (Critical) according to IPC classification for acute malnutrition. Analysis was done on food security and morbidity issues which would have contributed to changes in acute malnutrition. Short rain assessment was done concurrently with the SMART survey. The food security situation in Tana River County was classified as "Stressed" (IPC Phase 2) in the mixed farming and marginal farming zones whereas the pastoral livelihood is classified as "Crisis" (IPC Phase 3).

In terms of morbidity, the proportion of children who were sick in the past 2 weeks reduced from 57.0% in Jan 2017 to 51.3 % in February 2018. There was a slight increase in fever and chill (from 62.1% to 68.0%) which could be a contributing factor to the current acute malnutrition situation in Tana River County though a decrease in ARI/Cough (from 41.8 – 8.0%) was noted.

Although there was no significant difference between 2017 and 2018 surveys, the stunting and underweight levels remained relatively high that requires County interventions. There was no significant difference in the two indicators between boys and girls.

87.6% of caregivers whose children were sick sought assistance from appropriate sources such as public clinic, private clinic or mobile clinic a good sign for health seeking behavior.

Slightly less than half (57%) of those who suffered from watery diarrhea were supplemented with zinc.

There was low Vitamin A & deworming coverage with only 41.7% had been supplemented with vitamin A twice in the past one year and 12.4% had taken de-wormers twice in the past one year.

Among women with children below 2 years of age, 86.3% had been supplemented with iron and folic acid during their immediate pregnancy. The mean iron and folic acid consumption was 48.1 days. None of the surveyed women had consumed iron and folic acid in the recommended 270 days

Only 25.6% of the household surveyed treated their water and majority of respondents (90.8%) were aware of hand washing practices however, those who practiced hand washing in 4 critical moments were only 9.5%

Open defecation was practiced by 56.9% of the households while toilet ownership remained low at 41.5%

4.2. Recommendations

Based on the above findings, the following interventions are recommended.

Finding	Recommendations	Actors	Timelines
Critical GAM (Wasting) levels at 15.6%	• Map out key malnutrition hotspots and scale up mass screening & integrated outreach services within the sites • Train CHVs on community active case findings and referral • Supply all CHVs with MUAC tapes for community referral • Scale up IMAM surge activities in the County.	County Department of Health Services & Implementing partners	March 2018
Low coverage of Vitamin A (12- 59 months – 41.7% twice) Deworming (12 – 59 months 12.4% twice) attributed to poor documentation and stock out	• Sensitize HCP on forecasting and quantification to avoid stock outs • Use of ECDEs in vitamin A supplementation and deworming • Sensitize the community on the importance of VAS and deworming • Support/ strengthen integrated outreaches and VAS/Deworming campaign • Strengthen documentation through sensitization of all health workers.	Health sector county pharmacist Health sector and partners Nutrition sector	March 2018
IFAS uptake is below recommended days (90 - 180 days) at less than 25.9%. Attributed to late ANC visits and inadequate knowledge.	• Strengthen health education to community on importance of IFAS uptake and early ANC visit • Train HCP on IFAS policy guidelines • Use of local radio spots to create awareness on IFAS	CUs HCP in HF CNC	March 2018
Poor water treatment with only 23.6% treating their water despite high levels of open defecation 56.9%	• Community health education on importance of treated drinking water • Procurement and distribution of water treatment chemical; as the preferred method of treatment	County Departments of Health Services and water	From March 2018
Poor hand washing practices (Hand washing at 4 critical times reported at 9.5%)	• Scale up community hygiene promotion • Develop sanitation and Hygiene Key Messages	County Department of Health Services	March 2018
High ODF at 43.1%	• Scale up CLTS activities with the county	County Department of Health Services	Medium term

WRA consuming 5 FGs or more 18.1%	• Strengthen health education on food groups during ANC visits • Provide health education through use of CHVs. • Promote agri-nutrition initiatives in the County	County Departments of Health Services and Agriculture led by CNC supported by Partners	Medium term

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14. Tana River County SMART Survey (July 2016)

APPENDICIES

APPENDIX 1: Plausibility check for: TANA RIVER SAMPLED.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 (% of out of range subjects)	Incl	%	0-2.5 0	>2.5-5.0 5	>5.0-7.5 10	>7.5 20	0 (1.7 %)
Overall Sex ratio (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<=0.001 10	0 (p=0.285)
Age ratio(6-29 vs 30-59) (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<=0.001 10	4 (p=0.036)
Dig pref score - weight	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	0 (4)
Dig pref score - height	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	0 (6)
Dig pref score - MUAC	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	0 (6)
Standard Dev WHZ . .	Excl Excl	SD SD	<1.1 and >0.9 0	<1.15 and >0.85 5	<1.20 and >0.80 10	>=1.20 or <=0.80 20	0 (1.08)
Skewness WHZ	Excl	#	<±0.2 0	<±0.4 1	<±0.6 3	>=±0.6 5	0 (0.13)
Kurtosis WHZ	Excl	#	<±0.2 0	<±0.4 1	<±0.6 3	>=±0.6 5	0 (-0.14)
Poisson dist WHZ-2	Excl	p	>0.05 0	>0.01 1	>0.001 3	<=0.001 5	5 (p=0.000)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	9 %

The overall score of this survey is 9 %, this is excellent.

Appendix 2: Sampled Clusters

SUB COUNTY	DIVISION	LOCATION	SUB-LOCATION	VILLAGE	CLUSTER No.
BURA	MADOGO	SAKA	MULANJO	BARA /KONE BURKITI	1
BURA	BANGALE	BUWA	BUWA	BULA FURI A	2
BURA	BANGALE	BANGALI	BANGALI	BULTO BANTA	3
BURA	BANGALE	KAMAGUR	BOKA	DITOLE	4
BURA	BURA	BURA	BISKIDERA	JILO TABDO	5
BURA	BANGALE	KAMAGUR	BOKA	KAMAKILO	6
BURA	MADOGO	SAKA	KONORAMADHA	LAGBADANA B	7
BURA	MADOGO	MADOGO	MADOGO	MADOGO B	8
BURA	BURA	HIRIMANI	NANIGHI	ONJUKE JUU	9
BURA	BURA	HIRIMANI	NANIGHI	SUBO/KITHORI	10
BURA	BURA	BURA	METI	TUMAINI NORTH/MANYATA	11
GALOLE	GALOLE	MASABUBU	RHOKA	BAINAN	12
GALOLE	GALOLE	KALKACHA	HARORESA	DARGAKURA/NAGESA	13
GALOLE	GALOLE	MILALULU	BOHONI	GHALAMANI	14
GALOLE	GALOLE	KALKACHA	HARORESA	HARORESA	15
GALOLE	GALOLE	ZUBAKI	KIBUYU	HOLA SEC MANYATTA KASARANI	16
GALOLE	GALOLE	ZUBAKI	KIBUYU	KIBUYU AB	17
GALOLE	GALOLE	MAKERE	GHOREI	KIMBILIA	18
GALOLE	GALOLE	TITILA	TITILA	LIBERIA /HOSPITAL	19
GALOLE	WENJE	GWANO	MARONI	Maroni	20
GALOLE	WENJE	GWANO	WENJE	Vukoni/Chini	21
GALOLE	WENJE	GWANO	WENJE	Wenje	22
TANA DELTA	GARSEN	CHARA	CHAMWANA MUMA	ANASA	23
TANA DELTA	GARSEN	BILISA	GARSEN	CENTER 1	24
TANA DELTA	GARSEN	BILISA	CHIRA	CHIRA A	25
TANA DELTA	GARSEN	SALAMA	MAZIWA	Eskedek	26
TANA DELTA	GARSEN	SHIRIKISHO	DALU	GUMBA	27

TANA DELTA	GARSEN	BILISA	GARSEN	HAMESA C	28
TANA DELTA	GARSEN	NDERA	MNAZINI	KITERE	29
TANA DELTA	GARSEN	BILISA	GARSEN	MALAKOTENI A	30
TANA DELTA	GARSEN	SHIRIKISHO	IDSOWE	MINJILA GASSANI	31
TANA DELTA	GARSEN	NDERA	MNAZINI	MNAZINI	32
TANA DELTA	GARSEN	WACHU ODA	KURAWA	MTO KILIFI	33
TANA DELTA	GARSEN	CHARA	SEMIKARO	NDURU ORMA	34
TANA DELTA	GARSEN	SHIRIKISHO	DALU	RAMADA	35
TANA DELTA	GARSEN	CHARA	SEMIKARO	SEMIKARO	36
TANA DELTA	GARSEN	ASSA	ASSA	Tarasari	37
BURA	MADOGO	MADOGO	MADOGO	BOJI RC	RC 1
BURA	BANGALE	BUWA	KORATI	KORATI CENTRE RC	RC 2
TANA DELTA	GARSEN	SHIRIKISHO	IDSOWE	MATOMBA RC	RC 3
TANA DELTA	GARSEN	KONE MASA	ODOLE	ODOLE RC	RC 4

Appendix 3: Survey teams

Team #	Survey Team Members	
	Team leader	Name
1	JULIUS MALUKI	EDNA MALIKA KOMORA
		KASE JILLO HUSSEIN
2	PAULINE KAMOTHO	FAITH KAMBURA MBAABU
		ALI MOHAMMED BARISA
3	DORIS ADHIAMBO	ZAHRA BOCH ABAREA
		JOHORA ALI OSMAN
4	PHEDIS SANITA	SHARIFFA ABDI OSMAN

		MWANADIE HAKOFA OMAR
5	ABDIRAHMAN OMAR	AMRAN ALI HASSAN
		ERICK ONYANGO CHIEDO
6	BONAYA DEMA	AHMED IBRAHIM ALI
		ZAINABU HAWA IBRAHIM
7	ANN ZAWADI	ABDULLAHI GOLLO
		EUNICE RIZIKIAMON
8	TEAM MERON	PENINA ITONGA MAKENA
		PATIENCE CHENGO KASICHANA

Appendix 4: Survey coodination

Coordination Team	
Tana River County Department of Health	Omari Makopa (CNC Tana River County and overall survey Coordinator)
	Flora Abio (Galole Sub County nutrition coordinator)
Partner Supervisors	Nicholas Musembi (UNICEF, Nutrition Support Officer)
Technical Support	Salim Athman (M&E-National support)