International Medical Corps

APHIA PLUS IMARISHA

TANA RIVER COUNTY SMART SURVEY REPORT

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HARAMBEE

unicef

ACKNOWLEDGEMENT

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LIST OF ABBREVIATIONS

ARI- Acute Respiratory Infection
BCG- *Bacillus Calmette–Guérin*
CI- Confidence Interval
CIDP- County Integrated Development Plan
CNTF- County Nutrition Technical Forum
CSI- Coping Strategy Index
DHIS- District Health Information Management System
ECD- Early Childhood Development
ENA- Emergency Nutrition Assessment
EPI- Expanded Program on Immunization
FBO- Faith Based Organization
FeFo- Iron Folate
HCU- Health Care Units
HDD- Household Dietary Diversity
HFA- Height for Age
HINI- High Impact Nutrition Interventions
IDP- Internally Displaced People
IMAM- Integrated Management of Acute Malnutrition
IMC- International Medical Corps
KAP- Knowledge Attitude and Practice
KEMSA- Kenya Medical Supplies Agency
KEPI- Kenya Expanded Program on Immunization
MAM- Moderate Acute Malnutrition
MIYCN- Maternal Infant and Young Child Nutrition
M&E- Monitoring and Evaluation
MOH- Ministry of Health
MUAC- Mid Upper Arm Circumference
NCSH- National Centre for Health Statistics
NDMA- National Drought Management Authority
NGO- Non Governmental Organization
NNAP- National Nutrition Action Plan
ODF- Open Defecation Free
OPV- Oral Polio Vaccine
ORS- Oral Rehydration Salts
PLW- Pregnant and Lactating Women
PPS- Proportion to Population size
SAM- Severe Acute Malnutrition
SMART- Standardized Monitoring Assessment of Relief and Transition
SRA- Short Rains Assessment
VAS- Vitamin A supplementation
WHO- World Health Organization
WFA- Weight for Age
WFH- Weight for Height

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EXECUTIVE SUMMARY

International Medical Corps, the MOH, Aphia Imarisha and Samaritan Purse jointly conducted a SMART survey in Tana River County. The main goal of the survey was to determine the prevalence of malnutrition among the children aged 6- 59 months old, pregnant and lactating mothers in the County. Standardized Monitoring Assessment for Relief and Transition Method (SMART) was used to conduct the survey. Two stage sampling was adopted in this survey. The first stage involved sampling of villages (clusters) from a sampling frame using ENA for SMART software November 2013. Villages were selected based on proportion to population size (PPS) principle. The second stage involved selection of households from the selected clusters using simple random sampling method. Household was used as a basic sampling unit.

In calculating the sample size, ENA for SMART software was used. A sample of 466 children and 515 households was obtained. Standard questionnaire was used as the basic data collection tool. The data collection exercise took place for 5 days (9th to 13th June 2014). Prior, training of survey teams took place at a central point (Hola town) for 5 days (4th to 8th June 2014). A total of seven teams participated in the survey. Each team comprised of a team leader and three enumerators. All team leaders were MOH personnel. A team of four people was also engaged for data entry as data clerks. Table 1 below is a summary of survey findings

Table 1: Results Summary Table

Tana River County SMART survey Result Summary				
ANTHROPOMETRIC RESULTS				
WHO 2006		95% CI		95% CI
Design Effect= 1.23	N	April 2013	N	June 2014
Prevalence of Global Acute Malnutrition (<-2 z-score)	646	(89) 13.8 % (10.4 - 18.0 95% C.I.)	561	(42) 7.5 %(5.3 - 10.4 95% C.I.)
Prevalence of Severe Acute Malnutrition (<-3 z-score and/or edema		(14) 2.2 % (1.3 - 3.7 95% C.I.)		(5) 0.9 % (0.4 - 2.0 95% C.I.)
Prevalence of stunting (<-2 z-score)	632	(213) 33.7% (29.2 – 38.6)	549	28.6 % (23.4 - 34.4 95% C.I.)
Prevalence of severe stunting (<-3 z-score)		(61) 9.7 % (7.2 – 12.8)		(50) 9.1 % (6.5 - 12.7 95% C.I.)
Prevalence of underweight (<-2 z-score)		(170) 26.4 % (21.7 -31.6)	560	20.2 % (16.2 – 24.9 95% C.I.)
Prevalence of severe underweight (<-3 z-score)		(52) 8.1 % (5.7-11.3)		4.6 % (2.9 - 7.3 95% C.I.)
IMMUNISATION				
Measles Coverage (Children ≥ 9 months) by card and recall		90.3%		88.3%
BCG Scar (Scar present and Card)		74.4%		92.6%
OPV1 (Yes by Card and Recall)		98.6%		97.8%

OPV3 (Yes by Card and Recall)		95.7%		92.8%
VITAMIN A AND DEWORMING				
Children aged 6- 11 months who were supplemented with vitamin A **once**	41	45%	43	78.2%
Children aged 12 – 59 who were supplemented with vitamin A **once**	262	47%	152	30.0%
Children aged 12- 59 who were supplemented with vitamin A **twice**	175	31.4%	211	40.9%
Children 12 month old and above who were dewormed **once**	241	43.2%	125	24.2%
Children 12 months old and above who were de-wormed **twice**	88	15.8%	76	14.7%
CHILD MORBIDITY				
Indicator		Percentage	N	Percentage
Illness in the last 2 weeks (6- 59 months)	All		335	58.9%
	Fever like Malaria	51%	141	42.1%
	ARI	36.8%	177	52.8%
	Watery diarrhea		43	12.8%
	Bloody diarrhea		3	0.9%
	Others	3.6%	20	6%
Therapeutic Zinc Supplementation		21.2%	27	62.8%
MATERNAL NUTRITION				
Iron folate supplementation for pregnant moth-ers		54%	215	67.3%
Iron folate supplementation at least for 90 days			5	1.1%
PLW with MUAC less than 21 cm		6.9%	9	3.3%
People who slept under mosquito nets	Under fives	45.5%	509	78.1%
	PLW	27%	211	78.4%
WATER SANITATION AND HYGIENE PRACTICES				
Access to Sanitation Facilities		42.3%	140	28.0%
FOOD SECURITY				
Low Dietary Diversity (3 Food Groups)	362	61.3%		1.4%
Medium Dietary Diversity (4-5 Food Groups)	201	34.0%		17.6%
High Dietary Diversity (>6 Food groups)	23	3.9%		81.0%

Though there has been a great improvement in most indicators as indicated in table 1 above, a lot of effort need to be put in areas such as under five deworming as well as vitamin A supplementation especially for children aged 12 to 59 months. Ensuring pregnant women are supplemented at least for the recommended 90 days or more need also to be an area of focus. Other recommendations proposed are as follows.

- ✓ There is a need to strengthen the ongoing nutrition interventions in the County which may account for the drop in malnutrition rates. Such interventions include treatment of malnutrition cases and further preventing malnutrition from occurring by linking treatment programs with

food security and livelihood, IYCN, maternal nutrition and health education and promotion programs

- ✓ A KAP survey needs to be done in the county to give in depth information on the household practices especially the WASH and child care practices.
- ✓ The CNTF needs to review the recommendations from the previous surveys for further follow up.
- ✓ Low rates of VAS 12-59 months and deworming are due to poor integration of services and data hence there is need to integrate supplementation at the ECDs to Health facility by use of CWC cards.
- ✓ Creation of awareness on VAS and deworming to caregivers. Health workers and all stakeholders (County health management teams, NGOs, FBOs, CBOs and local administrators and line ministries) should take every opportunity to remind caregivers the need to take their children to the health facilities for routine supplementation.
- ✓ Strengthening documentation of service delivery outside the health facility, i.e. HCUs, outreaches and ECDs.
- ✓ Continued strengthening of HCUs by MOH and other health promotion stakeholders (NGOs, FBOs and CBOs) to boost latrine usage and coverage.
- ✓ Establishment of ODF villages. This initiative should be led by Ministry of health and need to be supported by other stakeholders in the county.

INTRODUCTION

1.1. BACKGROUND INFORMATION

Tana River County is located in the Coastal region of Kenya. The County which occupies an area of approximately 38,437 km^2 has an estimated population of 269, 164 people[1]. 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 is further subdivided in to 3 sub counties namely Bura, Galole and Tana Delta.

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. It is situated in the Eastern side of the county and provides livelihood opportunity to resident population through flood receded crop farming. Generally the county experiences bi- modal rainfall pattern which is mostly erratic with long rains falling between April and June and short rains being experienced between October and December.

As indicated in figure 1 below, the county has 4 main livelihood zones namely; Pastoral, Marginal mixed farming, Mixed farming and National park. The pastoral and marginal mixed farming livelihood zones rely on the short rains while the mixed farming areas are dependent on the long rains (March – June). 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 being experienced in July and hottest months being September and January. It therefore experiences two dry spells every year occurring in December to March and July to October.

According to Short Rains Assessment reports (October- December 2013), the County food security situation was classified as “Stressed Food Insecurity Phase”. The performance of the Short rains 2013 was below normal in all livelihoods resulting in low crop acreage put to crop hence lower production. Distances to domestic water sources were within the seasonal norm while distances to livestock water sources were increasing as livestock move farther in search of pasture and browse.

[1] 2013, DHIS Population Estimates

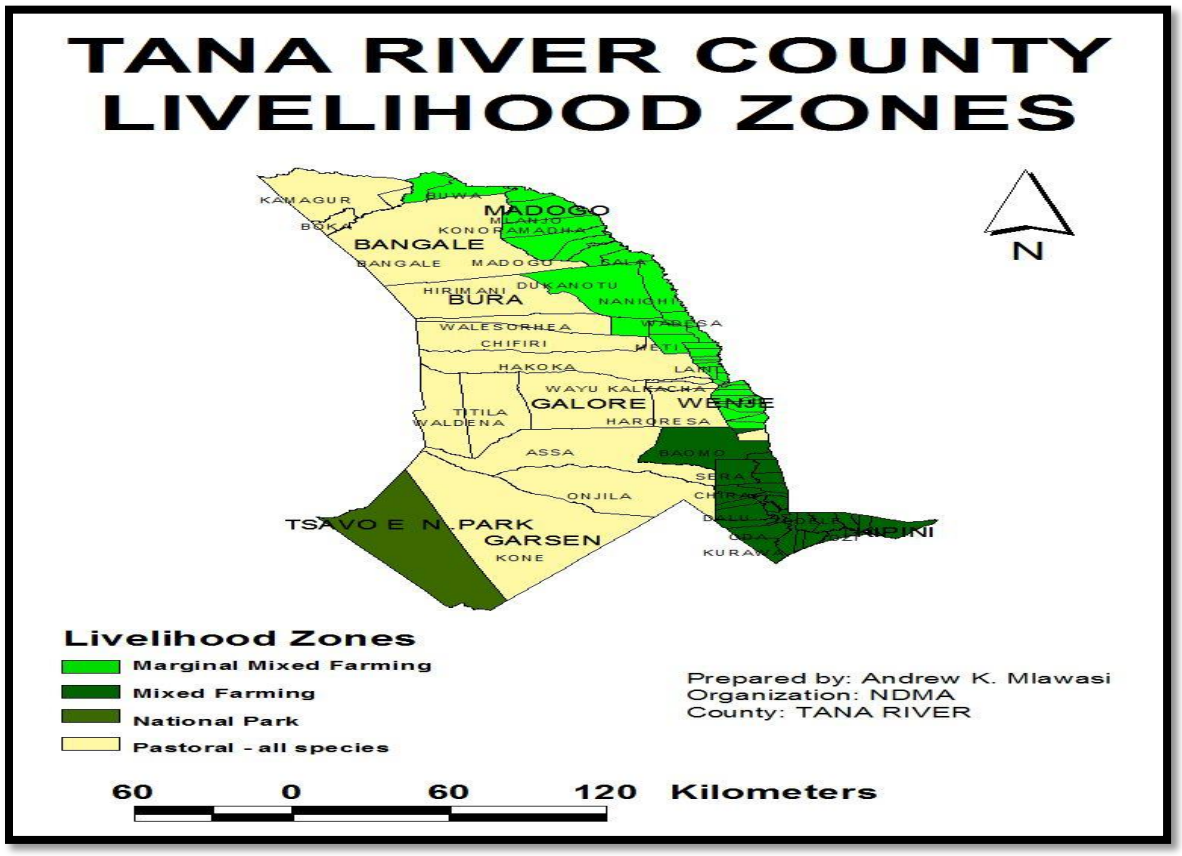

Figure 1:Tana River County administrative boundaries and livelihood zones

Source: National Drought Management Authority

1.2. RATIONALE OF THE SURVEY

The purpose of the survey was to find out the nutrition situation in Tana River County. The results will form a solid basis for planning appropriate future interventions.

1.3 SURVEY GOAL

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

1.4. SPECIFIC OBJECTIVES OF THE SURVEY

The specific objectives of the survey were;

- To assess the prevalence of malnutrition in children aged 6-59 months.
- To determine the nutritional status of women of reproductive age (15-49) years based on maternal mid upper arm circumference (MUAC).
- To determine immunization coverage; measles (9-59 months), OPV1/3 and Vitamin A for children aged 6-59months.
- To determine deworming coverage for children aged 12 to 59 months.

- To determine the prevalence of common illnesses (diarrhea, measles and ARI).
- To assess maternal and child health care practices.
- To assess water, sanitation and hygiene practices.
- To assess the prevailing situation of household food security in the County.

2.0. METHODOLOGY

2.1 SURVEY TYPE

Standardized Monitoring Assessment for Relief and Transition Method (SMART) was used to conduct the survey. The entire exercise was done in consideration with all guidelines as stipulated by the Ministry of Health. The data collected during the exercise included household, anthropometric, morbidity and child immunization data.

2.2. SAMPLING

2.2.1. Sampling Method

Two stage sampling was used in this survey. The first stage involved sampling of villages (clusters) from a sampling frame using ENA for SMART software November 2013. Villages were selected based on proportion to population size (PPS) principle. The second stage involved sampling of households from the selected clusters using simple random sampling method.

2.2.2 Sampling Frame

The sampling frame constituted of an updated list of all villages in Tana River County which were accessible, secure and not deserted with their respective population. In second stage sampling, sampling frame used was the updated list of household in a sampled village.

2.2.3. Sample Size Calculation

In calculation of sample size, necessary information was entered in ENA software (November 2013). The data entered in ENA software in order to obtain the children number and household number required for sampling included; estimated prevalence which was based on the April 2013 SMART survey. Estimated prevalence of 13.8%, which was the point estimate for the survey. The rationale was that there was no significant change in terms of food security and malnutrition compared to April 2013 in reference to the available information. A desired precision of 4% was used based on the anticipated prevalence in comparison with previous survey results[2]. A design effect of 1.5 was used due to slight variation in livelihood zones. The figures were entered in ENA software and this gave out **466** children. Further, information was required to obtain households which were used as the sampling units. To obtain the number of households, the following information was required; average household size. The average household size in Tana River County based on the 2013 CIDP and April 2013 SMART survey was 6. The proportion of under-fives was also required. In this case DHIS figure (17.3%) was used. Lastly a non-response rate of 3% was used based on the situation where migration in search for pasture was happen-

[2] The GAM rate was 13.8 %(10.4-18.0, 95% CI)

ing. The figures were entered on the ENA software to obtain **515** as the households that were sampled during the second stage sampling.

2.2.4. Description of Sampling Method

With consideration of data quality and logistical consideration, 15 households were sampled in each cluster. This translated to 35 clusters (515/15). The clusters (35) were sampled using ENA for SMART (November 2013).

From each of the 35 clusters, 15 households were sampled using simple random sampling based on a list of households that was provided by respective village elders/chiefs. Questionnaires were administered in each of the 15 household sampled.

2.3. SURVEY TEAMS TRAINING AND ORGANIZATION

Seven teams participated in the survey. Each team was comprised of a team leader and three enumerators (2 data collectors/ assistants and 1 measurer). All team leaders were MOH personnel. A team of four people was engaged for data entry as data clerks. The County Nutrition Coordinator, IMC nutrition, M&E departments, Aphia Imarisha and Samaritan Purse program staff were tasked with supervisory roles. The survey team leaders, data clerks and enumerators were first recruited through a process which included; advertisement of positions, shortlisting of candidates and rigorous interviews conducted in a central place in Hola and Garsen for Tana River/Tana North and Tana delta Sub Counties respectively.

The survey teams were rigorously trained together for 5 days in Hola town from 4th to 8th June 2014. The training topics included; introduction to SMART methodology, malnutrition, anthropometric measurements, sampling methods, data collection tools, accurate measurements and recording, interviewing techniques and administration of the questionnaires. On the fourth day, a standardization test was done to ascertain the accuracy and precision of taking anthropometric measurement by the enumerators. On the fifth day, pretest was done to a nearby village (Mwangaza) which had not been sampled for the survey.

2.4 DATA COLLECTION

Data collection exercise took place for the sampled villages from 9th to 13th June 2014.

2.4.1. Data Collection tools and Indicators Measured

One questionnaire was used in collection. The questionnaire had the following sections:

Identifying information: This included data collector's name, team leader's name, survey date, County, Sub- County name, Division, location, sub- location and village names also included was cluster number, Household and team numbers.

Demographic Information: Household demographics, namely; household composition by age groups, sexes, school enrollment attendance and completion, residency status, household income, procession and usage of mosquito nets was collected under this section.

Anthropometric information: Children aged 6- 59 months anthropometric data was collected under this section. Such information included, Child's date of birth, sex, weight, height, MUAC and presence or absence of edema.

Health seeking Behavior: Mothers/Caregivers were requested to provide morbidity (sickness) status of their children in the past 2 weeks, the type of illness and in case of watery diarrhea, whether therapeutic zinc supplementation was given. They were also asked to provide information on whether they sought any assistance during this period and in case they did where they got it from.

Vitamin A Supplementation, Deworming and Child Immunization: Under this section, information on vitamin A supplementation for children aged 6 to 59 months, the number of times the child was supplemented in the last one year and whether supplementation was done at the health facility/outreach or during a mass campaign. Deworming information for children aged 12 to 59 months was also captured under this session. Other information collected included immunization for BCG, OPV1 and OPV3 and also measles.

Maternal Nutrition: The nutrition status of women of reproductive age (15 to 49 years) was assessed using MUAC. The physiological status of this group was also assessed. This was done in order to establish whether there were differences in nutrition status of normal women, pregnant and lactating women (who are normally under nutrition stress). Iron- folate supplementation and the number of days it was done was also assessed.

Water Hygiene and Sanitation: The main sources for drinking water of each household were assessed. Trekking distances, queuing time was assessed based on sphere standards. Also assessed were water treatment and storage practices and also water payment rates. On hygiene and sanitation hand washing during the four critical moments and human waste disposal practices were interrogated.

Food security Information: Household food security was assessed using food frequency and household dietary diversity (HDD) based on a 7 days recall. The information on the main source of dominant food items in each of the 16 food groups was also collected. The last part under this section was coping strategies through which coping strategy index was computed.

2.5. DATA ENTRY AND ANALYSIS

Anthropometric data entry, processing and analysis was done using the SMART/ENA software November 2013 Version. All the other quantitative data were entered and analyzed in the SPSS (Version 17.0). A team of 4 data entry clerks was trained and tasked for data entry with strict supervision by IMC M & E team. On a daily basis, anthropometric data were entered and plausibility check was run. This was done to ensure quality of data on a daily basis. Teams were informed of any quality issues noted on a daily basis before they move to the field. It also gave the supervisors an opportunity to know weak teams and areas that needed their special attention.

2.6. DATA QUALITY CONTROL

To ensure the data collected was reliable and valid, a number of checks were adopted as follows

1. Thorough training of teams was done in 5 days for all survey participants, the training dwelt on SMART methodology, survey objectives, interviewing techniques and data collection tools
2. Ensuring all anthropometric equipments were functional and standardized. This test was done on a daily basis before the teams left for field.
3. During the training exercise, standardization was done, in addition piloting of tools was done to ensure all the information was collected with uniformity
4. Review of data collection tools during training and after the pilot test was conducted.
5. All the survey teams were assigned a team leader for supervision during data collection.
6. 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 next day.
7. Teams were followed up by the supervisors to ensure all errors were rectified on time. More attention was given to the teams with notable weaknesses.
8. Adequate logistical planning beforehand and ensuring the assigned households per clusters can be comfortably surveyed.

2.7. SURVEY LIMITATIONS

1. The survey was a cross-sectional study and the results obtained were at a point in time. Therefore interpretation should be done with this point in mind.
2. Due to bad weather and poor infrastructure in the County, it was not possible to reach one cluster sampled[3]

3.0 RESULTS AND DISCUSSIONS

3.1 GENERAL CHARACTERISTICS OF STUDY POPULATION AND HOUSEHOLDS

The survey involved collection of information from 500 households in 34 clusters (villages)[4] and recorded an average household size of 5.34. Majority of the sampled households (98%) were residents and

[3] The cluster was initially accessible but it rained 2 days before the actual data collection it Tiandaza Cluster.
[4] 1 cluster was inaccessible due to poor roads

only 1.8% and 0.2% who indicated refugee and IDP as their residency status. In terms of occupation of household heads, 24.4% were waged casual laborers and 20.6% worked in their own farms. Other occupations are as indicated in table 2 below.

Majority of the respondents (28.4%) earned their living from casual labor. Other respondent indicated petty trading (23.8%) and sale of crops (15.8%) as their income sources. Sale of livestock and livestock products was indicated by 16.2% of the respondents as their source of income. Only 8.2% were permanently employed. In terms of marital status, 91% of the respondents were married, 6% were windowed and 1.4% were single. Only 1.0% were divorced with the remaining 0.6% being separated.

Table 2: Household heads occupations

Household head occupation	n	Percentage
Livestock herding	84	16.8
Own farm labour	103	20.6
Employed (salaried	46	9.2
Waged labour (casual)	122	24.4
Petty trade	55	11.0
Merchant/trader	5	1.0
Firewood/charcoal	48	9.6
Fishing	15	3.0
Others (specify)	22	4.4
Total	500	100.0

3.2 DISTRIBUTION OF AGE AND SEX

A total of 567 children aged 6 to 59 months were assessed. These included 271 boys and 296 girls. This gave a boy girl sex ratio of 0.92 (p=0.335). This figure fall within the acceptable sex ratio target of 0.8 to 1.2. Therefore there was no bias in selection of children based on their gender.

Table 3: Age Sex Distribution

	Boys		Girls		Total		Ratio
AGE (months)	no.	%	no.	%	no.	%	Boy: girl
6-17	69	51.5	65	48.5	134	23.6	1.1
18-29	73	52.1	67	47.9	140	24.6	1.1
30-41	49	39.2	76	60.8	126	22.1	0.7

42-53	57	47.9	62	52.1	120	21.1	0.9
54-59	23	46.9	26	53.1	49	8.6	0.9
Total	271	47.8	296	52.2	567	100.0	0.9

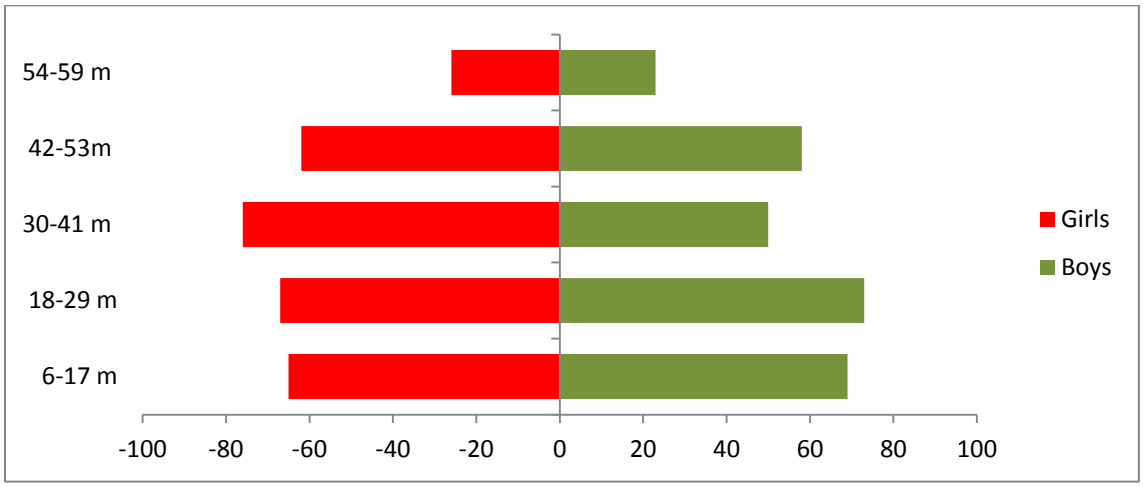

Figure 2: Population Age and Sex pyramid

3.3 NUTRITION STATUS OF CHILDREN AGED 6 TO 59 MONTHS

The analysis of nutrition status of children aged 6- 59 months was based on World health Organization Standards 2006. This was informed by the fact that the standards are representative of children population in different parts of the world in comparison to NCSH (National Centre for Health Statistics) reference which were developed from a cohort of only American children in 1978[5]. Malnutrition in under-fives (specifically in 6- 59 months' old children) is presented in four forms i.e. acute malnutrition (wasting), chronic malnutrition (stunting), and underweight and micronutrient deficiency. For anthropometric measurements nutrition indices are used to measure the first three forms of malnutrition. The indices are then compared to the reference or standard value. For **wasting,** Weight for Height (WFH) is used, for **stunting**; Height for Age (HFA) is used, while Weight for Age (WFA) is used in the determination of **underweight.**

3.3.1 Prevalence of Acute Malnutrition

Moderate and severe wasting represents an acute form of under nutrition, and children who suffer from it face a markedly increased risk of death. Globally in 2011, 52 million children under 5 years of age were moderately or severely wasted, an 11 per cent decrease from the estimated figure of 58 million in 1990. More than 29 million children under 5, an estimated 5 per cent, suffered from severe wasting (UNICEF 2013).

Severe acute malnutrition is defined by presence of nutrition bilateral pitting edema or severe wasting. A child is considered a SAM case if WFH is less than -3 z-score (standard deviation) and/or edema. Moderate acute malnutrition is defined as moderate wasting and is designated by WFH between less than -2

[5] Introducing the New WHO Child Growth Standards Report of a Regional Workshop. Bangkok, Thailand, 5-7 June 2006

z-score and greater -3 z-score (standard deviation). Global Acute Malnutrition (GAM) refers to the sum prevalence of malnutrition (all SAM and MAM cases/ <-2 z-score).

The analysis of acute malnutrition for the Tana River County involved 561 children (267 boys and 294 girls, with exclusion of 10 cases which were flagged. From this assessment, the Global Acute Malnutrition (GAM) rate was **7.5% (5.3- 10.4, 95% CI)** while the Severe Acute Malnutrition rate was **0.9% (0.4-2.0, 95% CI)** as shown in table 4 below.

Table 4: Overall Prevalence of Acute Malnutrition WFH z score (WHO 2006 Standards)

	All n = 561	**Boys** n = 267	**Girls** n = 294
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(42) 7.5 % (5.3 - 10.4 95% C.I.)	(22) 8.2 % (5.8 - 11.5 95% C.I.)	(20) 6.8 % (3.7 - 12.1 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(37) 6.6 % (4.7 - 9.2 95% C.I.)	(20) 7.5 % (5.1 - 10.9 95% C.I.)	(17) 5.8 % (3.2 - 10.3 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(5) 0.9 % (0.4 - 2.0 95% C.I.)	(2) 0.7 % (0.2 - 3.0 95% C.I.)	(3) 1.0 % (0.3 - 3.1 95% C.I.)

Figure 3 below is a graphical representation of overall WFH distribution of under-fives. In comparison to the standard WHO 2006 curve there is a slight shift to the left (-0.53±1.07).

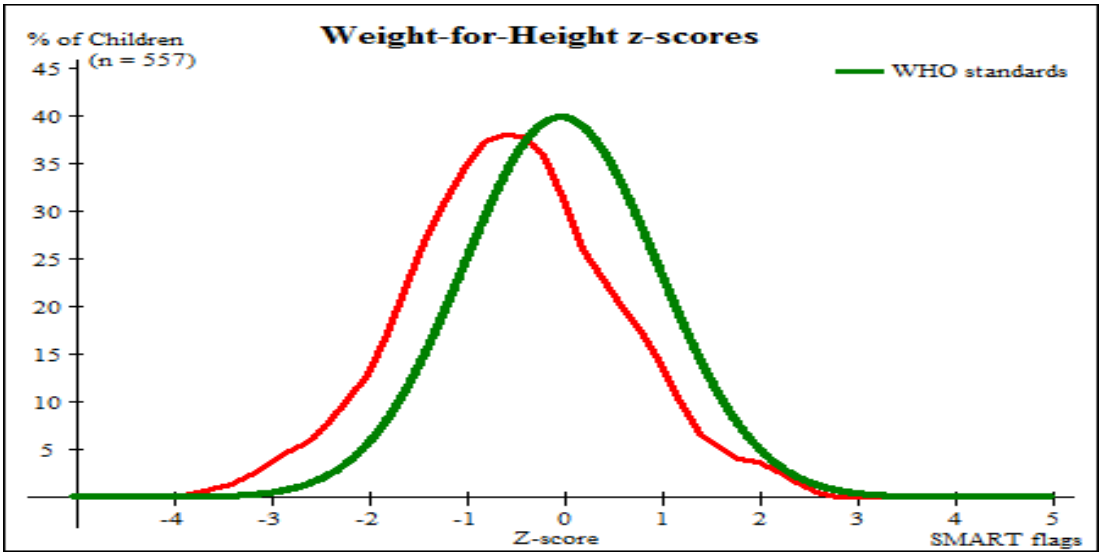

Figure 3: Graphical Representation of WFH for under-fives

Analysis of malnutrition with age indicate that more younger children 6 to 30 months are affected by malnutrition compared to older children 30 to 59 months as indicated in table 4 below.

Table 4: Prevalence of Acute Malnutrition by age based on Weight for Height z- score

		Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Edema	
Age (months)	Total no.	No.	%	No.	%	No.	%	No.	%
6-17	131	2	1.5	11	8.4	118	90.1	0	0.0
18-29	136	1	0.7	10	7.4	125	91.9	0	0.0
30-41	125	0	0.0	6	4.8	119	95.2	0	0.0
42-53	116	1	0.9	7	6.0	108	93.1	0	0.0
54-59	49	1	2.0	3	6.1	45	91.8	0	0.0
Total	557	5	0.9	37	6.6	515	92.5	0	0.0

3.3.2. Distribution of acute malnutrition and edema based on weight-for-height z-scores.

Analysis was done for presence and absence of bilateral edema as a sign of SAM. However, no edema case was recorded in the survey as indicated in table 5 below.

Table 5: 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. 11 (1.9 %)	Not severely malnourished No. 560 (98.1 %)

3.3.3 Prevalence of Acute Malnutrition by MUAC

Apart from the WHO standards 2006, MUAC is used for screening to determine malnutrition in children 6- 59 months. According to Kenya guideline on Integrated Management of Acute Malnutrition (2009), A very low MUAC (<11.5cm for children under five years) is considered a high mortality risk and is a criteria for admission with severe acute malnutrition. MUAC reading of 11.5 cm to < 12.5 cm is an indicator of MAM. Analysis of nutrition status for children 6 to 59 months based on MUAC of less than 12.5 cm and presence or absence of edema resulted to a GAM rate of 4.2 % (2.7 – 6.4 95% C.I.) and a SAM rate of (based on MUAC less than 11.5 cm and/or oedema) of 0.9 % (0.3 - 2.4 95% C.I.) as indicated in table 6 below.

Table 6: Prevalence of acute malnutrition based on MUAC cut off's (and/or oedema) and by sex

	All n = 571	Boys n = 273	Girls n = 298
Prevalence of global malnutrition (< 125 mm and/or oedema)	(24) 4.2 % (2.7 - 6.4 95% C.I.)	(10) 3.7 % (1.9 - 7.0 95% C.I.)	(14) 4.7 % (2.5 - 8.6 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(19) 3.3 % (2.2 - 5.1 95% C.I.)	(8) 2.9 % (1.6 - 5.4 95% C.I.)	(11) 3.7 % (1.9 - 7.0 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(5) 0.9 % (0.3 - 2.4 95% C.I.)	(2) 0.7 % (0.2 - 3.0 95% C.I.)	(3) 1.0 % (0.3 - 3.2 95% C.I.)

3.3.4 Prevalence of Under Weight based on Weight for Age (WHO- Standards).

Underweight refers to low weight relative to age. Underweight reflect both stunting and wasting. Weight for Age is therefore a composite index that measures both stunting and wasting. It is an easy measurement to take and it can be used to follow an individual child longitudinally in the community. The prevalence of underweight in Tana River County was 20.2 % (16.2 – 24.9 95% C.I.) while severe underweight was 4.6 % (2.9 - 7.3 95% C.I.) as indicated in table 7 below.

Table 7: Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 560	Boys n = 266	Girls n = 294
Prevalence of underweight (<-2 z-score)	(113) 20.2 % (16.2 - 24.9 95% C.I.)	(64) 24.1 % (19.5 - 29.3 95% C.I.)	(49) 16.7 % (11.8 - 23.0 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(87) 15.5 % (12.1 - 19.7 95% C.I.)	(53) 19.9 % (15.6 - 25.0 95% C.I.)	(34) 11.6 % (7.8 - 16.8 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(26) 4.6 % (2.9 - 7.3 95% C.I.)	(11) 4.1 % (2.3 - 7.3 95% C.I.)	(15) 5.1 % (3.0 - 8.5 95% C.I.)

3.3.5 Prevalence of Stunting

Stunting means low height/length for age (HFA) compared to WHO reference standards. It is an indicator for poor linear growth. Childhood stunting is an outcome of maternal under nutrition and inadequate infant and young child feeding (IYCF). It is a correlate of impaired neurocognitive development and a risk marker of non- communicable diseases and reduced productivity later in life[6] . According to the KDHS 2008/2009, 35.3% (serious level) of children under 5 in Kenya were stunted. From the survey findings, the stunting rate for Tana River County was 28.6 % (23.4 - 34.4 95% C.I.) with severe stunting being 9.1 % (6.5 - 12.7 95% C.I.).

[6] Childhood Stunting: challenges and opportunities. Report of a webcast colloquium on the operational issues around setting and implementing national stunting reduction 14 October 2013 – WHO Geneva

Table 8: Prevalence of stunting by age based on height-for-age z-scores

	All n = 549	Boys n = 263	Girls n = 286
Prevalence of stunting (<-2 z-score)	(157) 28.6 % (23.4 - 34.4 95% C.I.)	(86) 32.7 % (26.2 - 39.9 95% C.I.)	(71) 24.8 % (19.1 - 31.6 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(107) 19.5 % (15.7 - 23.9 95% C.I.)	(59) 22.4 % (17.0 - 29.0 95% C.I.)	(48) 16.8 % (12.1 - 22.7 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(50) 9.1 % (6.5 - 12.7 95% C.I.)	(27) 10.3 % (7.4 - 14.1 95% C.I.)	(23) 8.0 % (4.9 - 13.0 95% C.I.)

Figure 4 below show the frequency distribution of HFA for children aged 6 to 59 months. From the curve, there is a shift to the left from the standard curve with a mean of – 1.33± 1.22 SD indicating there more is stunting as compared to the normal WHO standards.

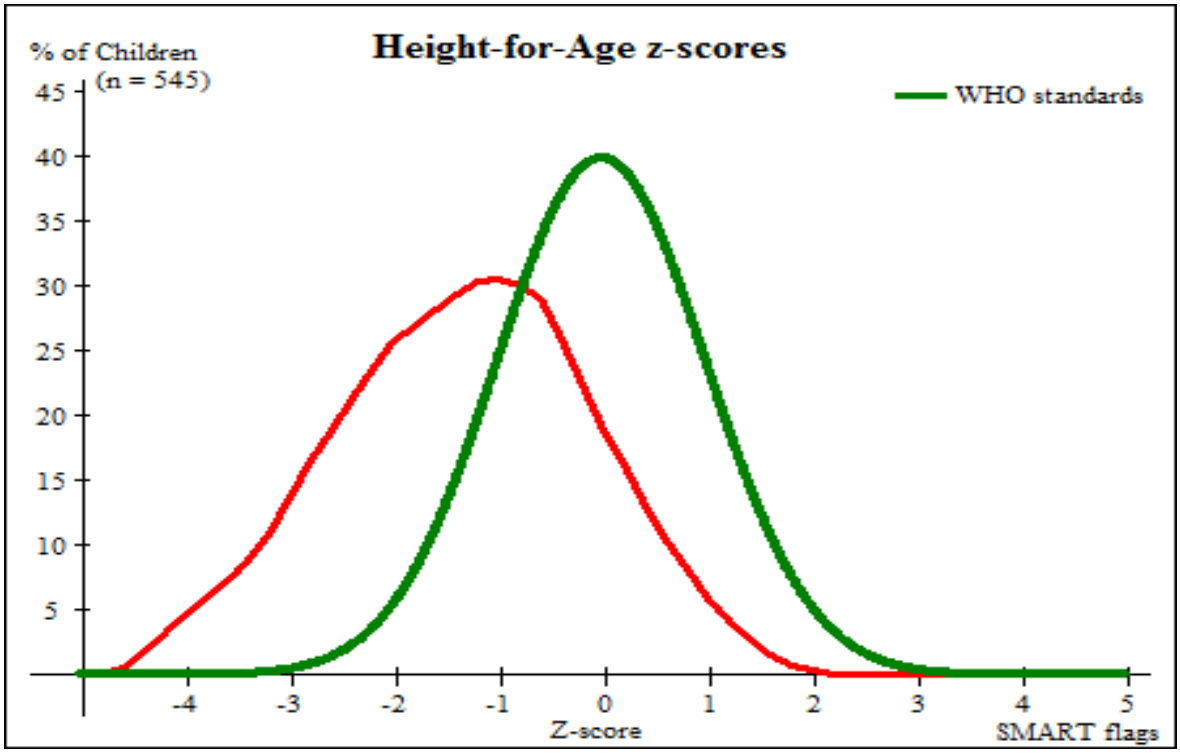

Figure 4: Frequency Distribution of HFA for 6-59 months old children

3.4. CHILDHOOD IMMUNIZATION, VITAMIN A SUPPLEMENTATION AND DEWORMING

Immunization, Vitamin A supplementation and deworming play a critical role in child survival for children below 5 years of age.

3.4.1 Childhood Immunization

According to the MOH child survival and development strategy 2008- 2015, there was a significant increase in immunization coverage between 2001 and 2008 attributed to successful supplemental immunization activities for polio, measles, maternal and neonatal tetanus which ultimately reduced the incidences of EPI targeted diseases. This survey did not assess the overall immunization coverage for Tana River County but 4 antigens namely OPV1 and OPV3, measles and BCG. Generally, 97.8% and 92.8% of children were vaccinated with OPV1 and OPV3 respectively. 88.3% were vaccinated against measles at 9 months with only 16.3% who had been vaccinated at 18 months. All the 4 antigens apart from measles immunization at 18 months had surpassed KEPI coverage target of 80% as indicated in figure 5 below. The survey also revealed that 92.6% of children were vaccinated by BCG antigen as evidenced by the presence of a scar.

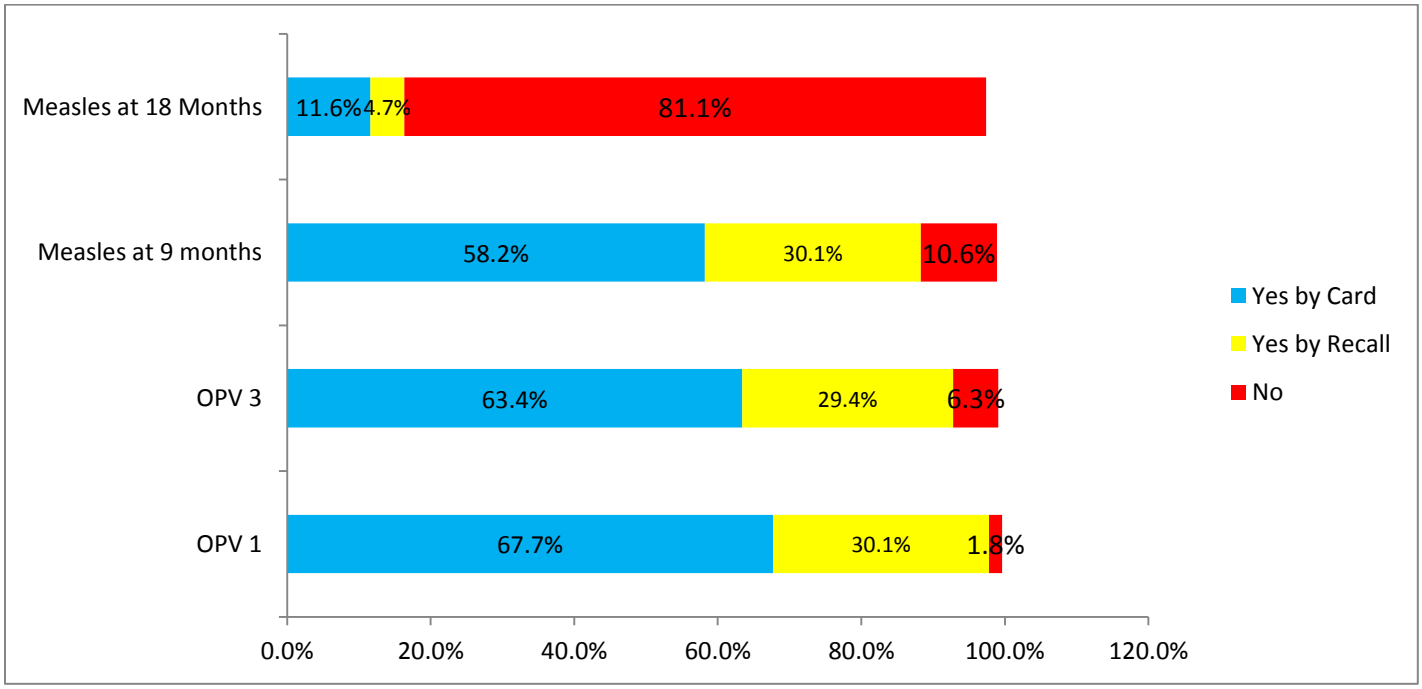

Figure 5: Immunization Coverage for Tana River County

3.4.2. Vitamin A Supplementation and Deworming

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[7]. Guaranteeing high supplementation coverage is therefore critical, not only for eliminating vitamin A deficiency as a public-health problem, but also as a central element of the child survival agenda. According to Kenya Demographic and Health Survey 2008/2009, vitamin A coverage among 6-11 months in Kenya was estimated to be 81.8%. For 12-59 months, the coverage was estimated to be 14.3%, with an average coverage of 6-

[7] Vitamin A Supplementation: A Decade of Progress, UNICEF 2007

59 months being at 30%. 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). The primary source of information for Vitamin A supplementation was child health card or booklet. In case such information was not available, mothers/care givers were probed on whether supplementation was done, for how many times and the place of supplementation (whether it was done in a health facility, outreach site or during mass campaigns). According to the survey, 78.2% of the children aged 6- 11 months were supplemented with vitamin A at least once, and only 40.9% children aged 12 to 59 months who had been at least supplemented twice. Much of supplementation took place at the health facilities and outreach sites as 74.5% of vitamin A supplementation for children 6 to 11 months took place at either the health facility or outreach sites. Similarly, 64.9% of children aged 12 to 59 were supplemented at the same service delivery points.

Deworming was assessed for children 12 to 59 months old. The key indicator was children who were dewormed at least twice a year. From the findings only 14.7% of this category of children had been dewormed twice. The number dewormed once was 24.2% as indicated in table 9 below.

Table 9: Vitamin A Supplementation

	Factor	Number	Percentage June 2014
Vitamin A Supplementation			
6 – 11 Months	1 time	43	78.2%
12 to 59 months (Once)	1 time	152	30.0%
12 to 59 Months (Twice)	2 times	211	40.9%
Deworming (≥ 12 Months	1 time	125	24.2%
	2 times	76	14.7%

3.5 CHILD MORBIDITY

Mothers/Caregivers of children aged 6 to 59 months were asked whether their children were sick in the past two weeks. 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.

More than half of the children assessed (58.9%) were reported to have been sick in two weeks preceding the survey date. Of the sick children 52.8% suffered from ARI while 42.1% suffered from fever like malaria. Only 12.8% were affected by watery diarrhea while 0.9% suffered from bloody diarrhea.

3.5.1. Health Seeking Behavior

While they were sick, majority (77.3%) of mothers/care giver sought assistance from appropriate service delivery points namely; public, private or mobile clinics FBOs or NGOs. From such places they are likely to get assistance from trained health personnel with proper diagnosis and treatment being done. Apparently a number of them (11.1%) sought assistance either from a shop/kiosk, relatives and friends, traditional healers or local herbs. In such places, they were likely to be misdiagnosed and receive inappropriate treatment as the service providers lacked expertise and knowledge of offering treatment ser-

vices. Another 15.8% never sought any assistance. Figure 6 below summarizes the health seeking behavior in Tana River County.

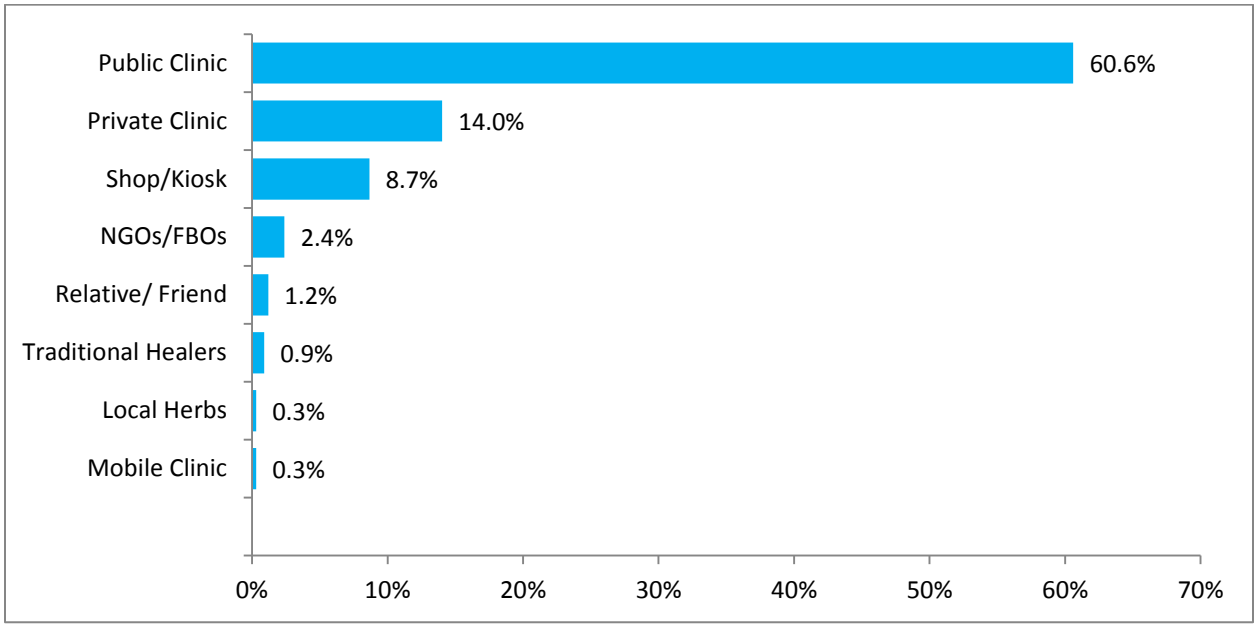

Figure 6: Health Seeking Behavior

Therapeutic Zinc Supplementation

According to WHO[8] , 16% of under-five deaths in Kenya occur as a result of diarrheal diseases. Use of zinc supplements with ORS to treat children with diarrhea reduces deaths in children less than five years of age. Zinc for the treatment of diarrhea reduces diarrhea mortality by 23% and is associated with a 14–15% reduction in incidence of pneumonia or diarrhea. Use of zinc supplements has been found to reduce the duration and severity of diarrheal episodes and the likelihood of subsequent infections for two to three months. 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. The survey recorded 62.8% of therapeutic treatment of watery diarrhea using zinc supplements.

3.6 MATERNAL NUTRITION

It is estimated that 41.8% of pregnant women worldwide are anemic[9]. At least half of this anemia burden is assumed to be due to iron deficiency with the rest due to other conditions such as folate, vitamin B12 or vitamin A deficiencies, chronic inflammation, parasitic infections and inherited disorders. A pregnant woman is considered to be anemic if her hemoglobin concentration during the first and third trimester of gestation is lower than 11 g/dl.

Low hemoglobin concentration as indicative of moderate or severe anemia during pregnancy has been associated with an increased risk of premature delivery, maternal and child mortality, and infectious

[8] WHO, Kenya Mortality Fact sheet 2006

[9] Essential Nutrition Actions: improving maternal, newborn, infant and young child health and nutrition

diseases. Growth and development may also be affected, both in utero and in the long term. Conversely, hemoglobin concentrations greater than 13 g/dl may also be associated with negative pregnancy outcomes such as premature delivery and low birth weight.

Interventions aimed at preventing iron deficiency and IDA in pregnancy include iron supplementation, fortification of staple foods with iron, health and nutrition education, control of parasitic infections, and improvements in sanitation. During pregnancy, women need to consume additional iron to ensure they have sufficient iron stores to prevent iron deficiency. Therefore, in most low- and middle-income countries, iron supplements are used extensively by pregnant women to prevent and correct iron deficiency and anemia during gestation.

According to Kenya National MIYCN Policy Guideline 2013; nutrition needs of pregnant/lactating women should be prioritized and met through access to the minimum required healthy diet in terms of frequency, energy content and variety. The guideline advocates for provision and promotion of intake of iron/folate through antenatal health services and support the establishment of monitoring and support system to address maternal anemia.

One of the National MIYCN strategy target is to Increase the percentage of women who reported taking iron and folic acid supplementation for at least 90 days in the most recent pregnancy from the current 3% to 50% by 2017.

Maternal nutrition was assessed by measuring MUAC of women of reproductive age (15 to 49 years and also iron folate supplementation for pregnant women based on their most current pregnancy. Overall, 490 women of reproductive age were screened for malnutrition during the survey. The assessment revealed that 3.9% of women were malnourished (with MUAC <21.0 cm). Further analysis indicate that 3.3% of pregnant and lactating women were malnourished (<21.0 cm).

The analysis of iron folate supplementation indicates that 67.3% had been supplemented with iron folate during their last pregnancy. However those that were supplemented for the minimum required of days (90 days) remain very low with only 1.1% who took iron folate supplement for over 90 days. Figure 7 below shows the number of days for FeFo supplementation in the County.

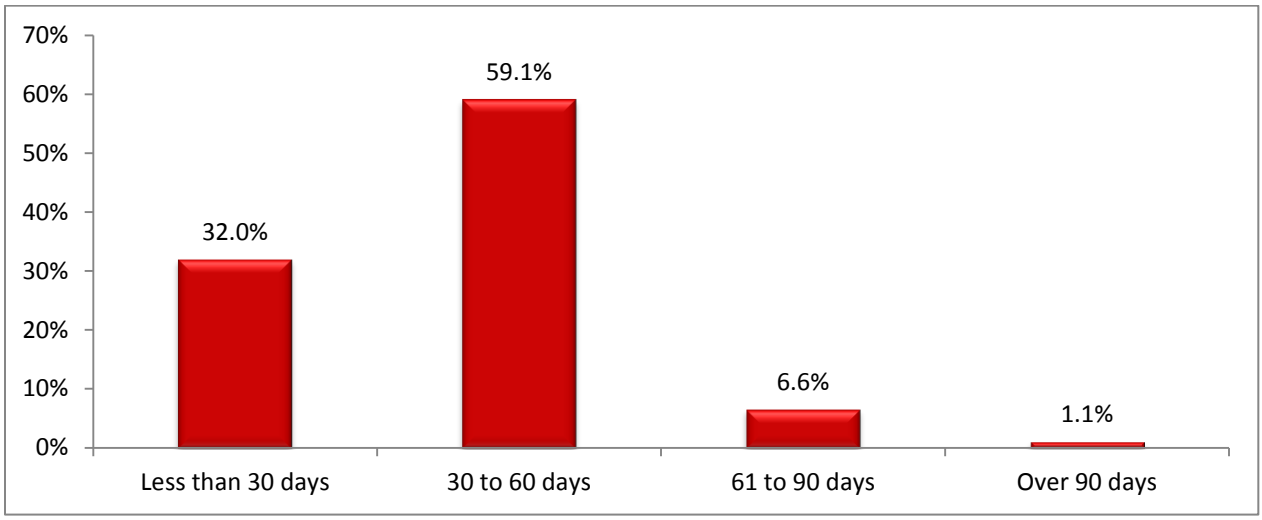

Figure 7: Iron Folate Supplementation in days

3.7 MOSQUITO NETS OWNERSHIP AND UTILISATION

Overall 82.0% of Tana River residents own at least one mosquito net. Regarding mosquito utilization, 71.3% of Tana River residents sleep under a mosquito net. Among the under-fives, pregnant and lactating mothers, the utilization based on the previous day was 78.1% and 78.4% respectively.

3.8. WATER SANITATION AND HYGIENE

3.8.1 Main Source of Water, Distance and Time

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[10]. 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.

Majority of Tana River County residents (57.4%) obtain their drinking water from safe sources namely; piped water, borehole, protected spring or protected shallow wells. The rest (42.6%) obtained their water for drinking from sources whose safety can be compromised hence need proper treatment before drinking. Such sources included; earth pan/dam (18.6%) and River/spring (15.4%). Other sources are as shown in table 10.

[10] The Sphere project- Humanitarian Charter and Minimum Standards in disaster response 2004

Table 10: Main Sources of Drinking Water

Water Source	No of Households	%
Piped System/borehole/ protected spring/protected shallow well	287	57.4
Unprotected shallow well	20	4.0
River/Spring	77	15.4
Earth pan/dam	93	18.6
Earth pan/dam with infiltration well	12	2.4
Water trucking/Water vendor	11	2.2
Total	**500**	**100.0**

Analysis of access (proximity to water points) indicated that almost two thirds of population (65.4%) had their water sources in a distance of less than 500 meters or less than 15 minutes walking distance. Another 30.8% obtained their water from sources 500meters to 1 kilometer far or a walking time of between 15 minutes to 1 hour. Only 3.8% obtained their water more than 2 kilometers far away from their homes

As far as queuing is concerned, only 42.8% responded affirmatively when asked whether they queued for water. For those who queued, Majority (61.5%) queue for less than 30 minutes and 31.2% queued for between 30 and 60 minutes. Only 7.2% queue for water for more than 1 hour.

3.8.2. Water Treatment

Majority of Tana River residents (75.6%) do not treat their drinking water despite the fact that quite a number who do not obtain their water from safe sources. Use of chemicals (Chlorine, Pur and Water guard) was the most used method of water treatment at 18.4%. Very few people (only 4.6%) boil their drinking water. Other methods used for water treatment included; use of pot filters (2.0%) and use of herbs (1.8%).

3.8.3 Water Consumption, Storage and Payment

Despite the fact that majority of Tana River residents do not treat their water, it is apparent that majority of them(91.2%) store their drinking water properly in closed containers/jerry cans where it is less likely to have physical water contamination. The rest 8.8% indicated that they stored their water in open containers/jerry cans exposing it to physical contamination. Notably majority of residents' water consumption per day was less than 15 liters minimum according to SPHERE standards. Only 20.6% consumed more than this amount. Among those who pay for water per liter, majority (77%) pay Ksh 5 or less as indicated in table 11 below.

Table 11: Payment of water(Ksh/Liter

Payment (Ksh)/liter	No	%
1 to 5	121	77%
6 to 10	5	3%
11 to 20	20	13%
21 to 30	7	4%
31 to 40	0	0%
41 to 50	5	3%
Total	**158**	**100%**

Among those who paid on monthly basis, majority (69.2%) paid Ksh 50 or less per month. 15% paid between Ksh 51 and Ksh 100 per month as shown in table 12.

Table 12: Household payment of water in Ksh. per month

Payment Ksh/Month	Number	%
1 to 50	92	69.2%
51 to 100	20	15.0%
101 to 200	4	3.0%
201 to 300	4	3.0%
301 to 400	3	2.3%
401 to 500	5	3.8%
over 500	5	3.8%
Total	133	100.0%

3.8.4. Hygiene Practices Hand Washing

Hand washing in 4 critical times helps to reduce diarrheal diseases among the under-fives. The critical moments include; after visiting the toilet, before cooking, before eating and after changing the baby's nappies. Assessment of hand washing in the 4 critical times in Tana River county indicated that majority of them (93.2%) washed their hands before eating. Most of the respondents (82.0%) also reported to be washing their hands after visiting the toilet while 55.4% wash their hands before cooking. Only 35.0% wash their hands after changing baby's nappies as indicated in figure 8 below.

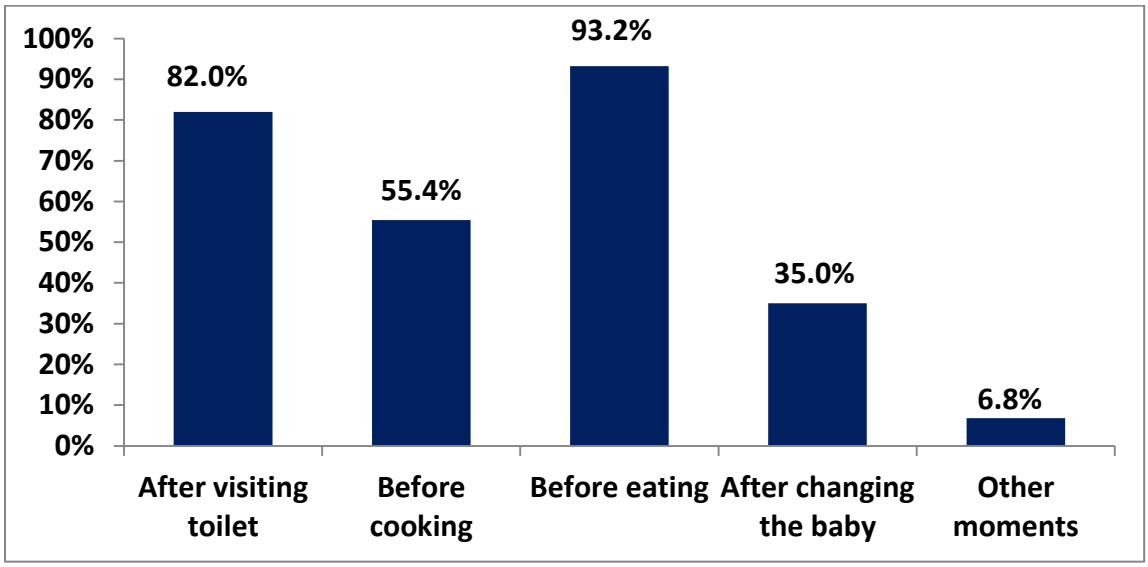

Figure 8: Hand washing in 4 critical moments

Overall 18.6% of the respondents reported to wash their hands in all the 4 critical moments. When washing hands 60.1% used water and soap while 36.9% used water only as indicated in figure 9 below.

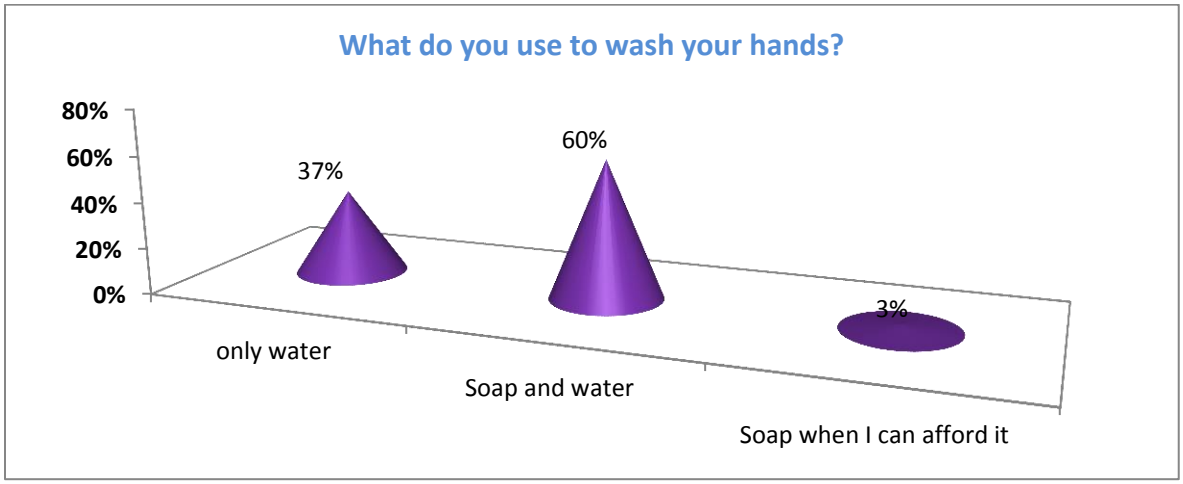

Figure 9: What do you use to wash your hands

3.8.5. 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.

Open defecation rate in the County remains relative high. Over half of the population use bushes as their relieving points. The latrine ownership in Tana River County is 28% with 20.4% using neighbors or shared traditional pit/improved latrine as indicated in figure 10 below.

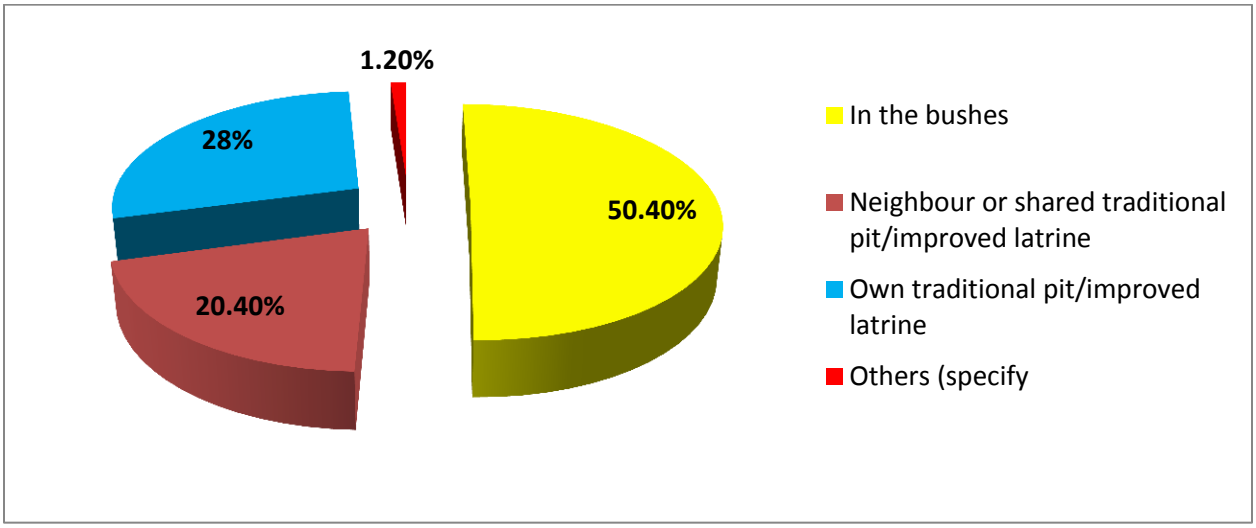

Figure 10: Sanitation Facilities Ownership and Usage

3.9. FOOD SECURITY AND LIVELIHOOD

3.9.1 Sources of Household Income

The main current source of income for household was assessed. The major sources reported were as follows; casual labor (28.4%), petty trading (23.8%) and sale of crops (15.8%) other sources reported were as indicated in table 13.

Table 13: Main Current Household Income Sources

Income Source	N	%
Casual labour	142	28.4%
Petty Trading	119	23.8%
Sale of Crops	79	15.8%
Sale of livestock product	50	10.0%
Permanent Job	41	8.2%
Sale of Livestock	31	6.2%
Remittances	12	2.4%
No income	10	2.0%
Sale of personal assets	3	0.6%
Others (specify	13	2.6%

3.9.2 Household Dietary Diversity

Dietary diversity is a qualitative measure of food consumption that reflects household access to a variety of foods, and is also a proxy for nutrient adequacy of the diet of individuals[11]. The assessment of HDD was based on food frequency consumption for the past 7 days based on 12 food groups. Analysis shows that majority of household consumed energy rich foods namely cereals and cereal products (99.6%), Sugar, honey and sweeteners (95.8%), oils and fats (92.0%). Milk and milk products, pulses/legumes which are protein sources are consumed by quite a number of households at 81.6% and 65.8% respec-

[11]FAO, EU Guidelines for measuring household and individual dietary diversity 2011

tively. It is also important to note that vegetables which are important source of vitamins and minerals are consumed by 77.0% of the households. However there is low consumption of meats and poultry, eggs, fruits, roots and tubers as indicated in figure 11 below.

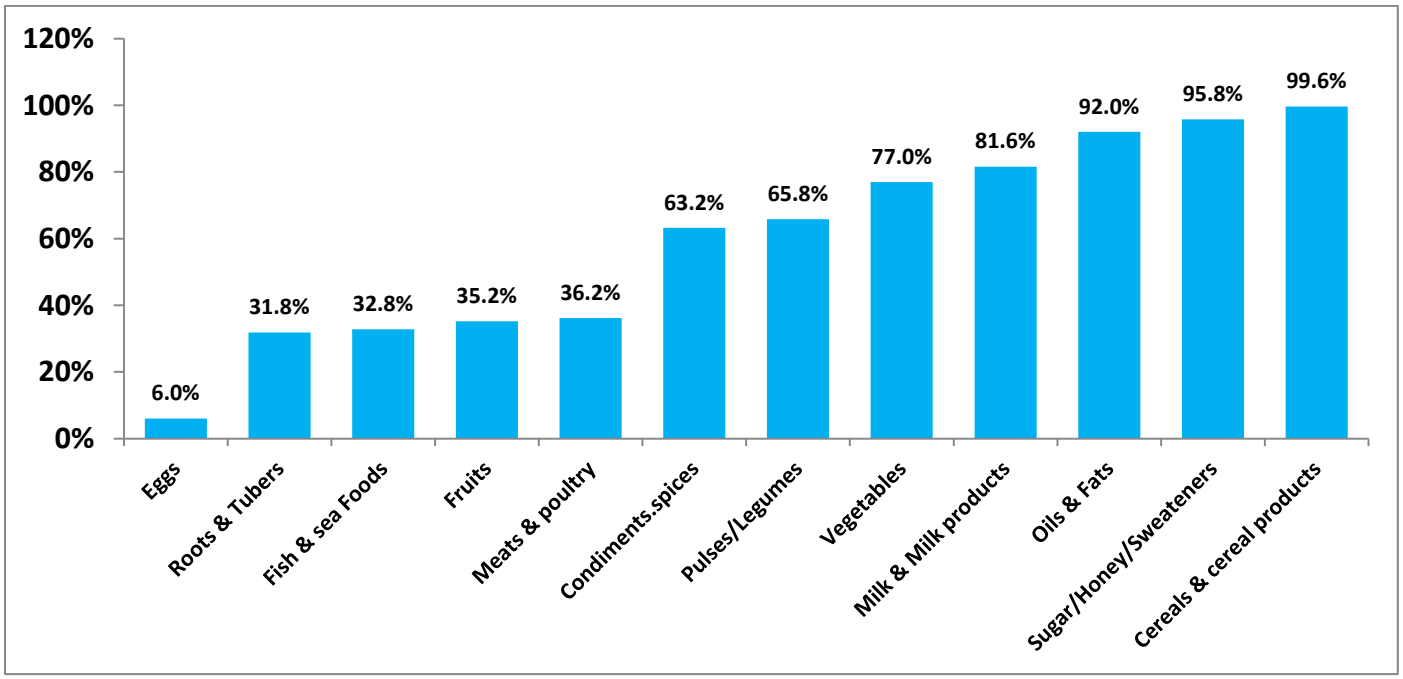

Figure 11: Food consumed at household level

Analysis of dietary diversity indicated that, majority of Tana River County residents consumed diets with six or more food groups (High Dietary Diversity) compared to those who consumed diets with 4 to 5 or those who consumed foods with 3 or less food groups as indicated in table 14 below.

Table 14: Household Dietary Diversity

HDDS	% Households
Low Dietary Diversity (3 Food Groups)	1.4%
Medium Dietary Diversity (4-5 Food Groups)	17.6%
High Dietary Diversity (>6 Food groups)	81.0%

3.9.3. Household Coping Strategies

The Coping Strategies Index (CSI) is an indicator of household food security. CSI is a measure of food insecurity and the higher it is the greater the food insecurity. A series of questions about how households manage to cope with a shortfall in food for consumption results in a simple numeric score are asked. In its simplest form, monitoring changes in the CSI score indicates whether household food security status is declining or improving. The CSI is based on the many possible answers to one single question: "What do you do when you don't have adequate food, and don't have the money to buy food?"[12]

[12] Coping Strategies Index, Field Methods Manual 2008

At least 38.6% of the households had experienced food insecurity in the previous 7 days. Table 15 below is a summary of coping strategies adopted by such households. Overall, the coping strategy index was 8.3.

Table 15: Coping Strategies

Coping Strategy	No. of HHDs employing the strategy	Frequency score (0-7)	Severity score (1-3)	Weighted Score = Frequency x Weight
Rely on less preferred and less expensive foods?	193	1.5	1	1.5
Borrow food, or rely on help from a friend or relative?	193	0.8	2	1.6
Limit portion size at mealtimes?	193	1.7	1	1.7
Restrict consumption by adults in order for small children to eat?	193	0.5	3	1.5
Reduce number of meals eaten in a day?	193	2.0	1	2.0
TOTAL HOUSEHOLD SCORE				**8.3**

4.0. CONCLUSION AND RECOMMEDATIONS

4.1. CONCLUSION

There was an improvement in most of nutrition indicators in the county compared to the previous survey done on April 2013. Most important is the rate of wasting which dropped to 7.5 %(5.3 - 10.4 95% C.I.) from 13.8 (10.4 - 18.0 95% C.I.). Underweight as well as stunting rates were also lower compared to the previous survey. The two indicators were rated at 26.4 % (21.7 - 31.6 95% C.I.) and 33.7 % (29.2 - 38.6 95% C.I.) in April 2013 but dropped to 20.2 % (16.2 - 24.9 95% C.I.) and 28.6 % (23.4 - 34.4 95% C.I respectively.

Notable improvement were also realised in other HINI indicators for example Vitamin A supplementation for 12 to 59 months twice a year from 31.4% to 40.9%, number of pregnant women being supplemented with FeFo from 54% to 67.3% and therapeutic zinc supplementation during diarrhoea episodes from 21.2% to 62.8%.

Despite this fact, the rates were below the 2013/14 NNAP targets and more efforts need to put in place to ensure such targets are achieved.

Major gaps were however noted in areas such as deworming, number of pregnant women receiving iron folate supplementation for at least 90 days, measles immunisation at 18 months, water treatment, hand washing in the four critical moments, and access to sanitation facilities. This was attributed to low supply of dewormers, mass supplementation being done in schools where parents who were respondent to aware as well as some mothers attending the ANC clinics late. Some mothers do not take the pills up to the required period (90 days) due to the side effects attached to it. Measles immunisation at 18 months has just been introduced in the health care system and it is expected to be low at the moment. To address these gaps, the following recommendations were proposed.

4.2. RECOMMENDATIONS

- ✓ There is a need to strengthen the ongoing nutrition interventions in the County which may account for the drop in malnutrition rates. Such interventions include treatment of malnutrition cases and further preventing malnutrition from occurring by linking treatment programs with food security and livelihood, IYCN, maternal nutrition and health education and promotion programs
- ✓ A KAP survey and barrier analysis needs to be done in the county to give in depth information on the household practices especially the WASH and child care practices.
- ✓ The CNTF needs to review the recommendations from the previous surveys for further follow up.
- ✓ Low rates of VAS 12-59 months and deworming are due to poor integration of services and data hence there is need to integrate supplementation at the ECDs to Health facility by use of CWC cards.
- ✓ Creation of awareness on VAS and deworming to caregivers. Health workers and all stakeholders (County health management teams, NGOs, FBOs, CBOs and local administrators and line

ministries) should take every opportunity to remind caregivers the need to take their children to the health facilities for routine supplementation.

- ✓ Strengthening documentation of service delivery outside the health facility, i.e. HCUs, outreaches and ECDs.
- ✓ Advocating for inclusion of all nutrition commodities including de wormers (Albedazole) in the KEMSA kit. More support need to be given to the MOH to ensure adequate supply of all the nutrition commodities
- ✓ Continued strengthening of HCUs by MOH and other health promotion stakeholders (NGOs, FBOs and CBOs) to boost latrine usage and coverage.
- ✓ Establishment of ODF villages. This initiative should be led by Ministry of health and need to be supported by other stakeholders in the county.

5. APPENDICIES

APPENDIX 1: SAMPLED VILLAGES

Geographical unit	Population size	Cluster
TULA	**536**	1
LEHALE	400	2
KAMUNYO	539	3
MADOGO 'A'	2401	4
HAGARSOT	457	5
BARA /KONE BURKITI	464	6
VILLAGE 5	373	7
SUKELE/MSIKITI GOMBENI/NAGELE	1185	8
MITOBINI GHAIGOPA	253	9
SABUKIYE	564	10
DARIME/KAMITHE	637	11
ONDUKE GELMADHI	281	12
CHIFIRI	404	13
BUBUBU	296	14
MIKINDUNI B	717	15
OVO	397	16
LIBERIA 'B'	202	17
KIBUYU AB	446	18
MAKERE	386	19
HANDAMPIA 'B'	592	20
MNAZINI	3500	21
KITERE	2000	22
HAMESA C	1000	23
DANISA A	1020	24
MIJIKENDA	540	25
DIDA ADE 2	500	26
ODA ORMA	1900	27
TIANDAZA	270	28
MTO KILIFI	335	29
CHAMWANAMUMA	1700	30
ODOLE	1200	31
ONGONYO	744	32
UMANDENI B	513	33
MJINI	464	34
CHAKAMBA	900	35
ASAKO 'A'	376	RC
HATATA	552	RC
FANJUA	764	RC
MAZIWA A	600	RC

APPENDIX 2: ANTHROPOMETRIC PLAUSIBILITY REPORT SUMMARY

Indicators	Acceptable value range/values	Survey value	Comment
Digit preference - weight	<10	4	Excellent
Digit preference - height	<10	8	Good
WHZ (Standard Deviation)	0.8-1.2	1.07	Excellent
WHZ (Skewness)	-1 to +1	0.03	Excellent
WHZ (Kurtosis)	-1 to +1	0.02	Excellent
Percent of flags WFH	<3%	1.8%	Excellent
Percent of flags HFA	<5%	3.9%	Good
Percent of flags WFA	<5%	2.1%	Excellent
Age Distribution (%)			
Group1 6-17 months	20%-25%	23.6%	Good
Group 2 18-29 months	20%-25%	27.4%	Good
Group 3 30-41 months	20%-25%	22%	Good
Group 4 42-53 months	20%-25%	21.0%	Good
Group 5 54-59 months	Around 10%	8.6%	Good
Age Ratio : G1+G2/G3+G4+G5	Around 0.85	0.94	Good
Sex Ratio	0.8-1.2	0.92	Excellent (p= 0.335)
General acceptability		2%	Excellent
Design Effect		1.23	

APPENDIX 3: SURVEY TEAMS

Team	Team Members
Team 1	**Kenneth Yakko Galana**
	Jesrov wayu
	Gladys Hakofa
	Mumina dida Hassan
Team 2	**Osman Iddi Maro**
	Hassan Mohammed Osman
	Ibrahim Bile Adhan
	Hassan Mohammed Santuri
Team 3	**Julius Maluki**
	Martini Nalario
	Fatuma Haboya Musa
	Fafi Kassim
Team 4	**Zippora Munyoki**
	Mohammed Haji Barre
	Pricillah Chepkemei
	Mohammed Abdi
Team 5	**Flora Abio**
	Pauline Wanjiru Kamotho
	Rebecca Koshi Paul
	Bodole Issa Guyo
Team 6	**Tumaini Chalo Tsofua**
	Harry Muteti
	Habela mitsotsi
	Rahma Safi Roba
Team 7	**Kahindi Tuva**
	Guyo Fangare
	Amina Galgalo
	Abdul Fatal Ibrahim
SUPERVISION TEAM	
1	**Kennedy Musumba**
2	**Omar Makopa**
3	**Mark Murage**
4	**Stephen Kimanzi**
5	**Salim Athman**
6	**Doris Kawuor**
7	**David Mbugua**

APPENDIX 4: STANDARDISATION TEST FORMS

Enumerator #..... Name……

1st Measure:

Child #	Weight (kg)	Height (cm)	MUAC (mm)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Enumerator #..... Name……

2nd Measure:

Child #	Weight (kg)	Height (cm)	MUAC (mm)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

APPENDIX 5: AGE CALCULATION CHART

AGE CALCULATION CHART FOR UNDER 5 (*record Age in Months)*			
Adequately Verify the age of the child. Accurate as at June 2014 : Please cross- check against date of birth of child and date of survey to establish actual age)			
DATE OF BIRTH	**AGE IN MONTHS**	**DATE OF BIRTH**	**AGE IN MONTHS**
Jul. 2009	59	Oct 2012	20
Aug. 2009	58	Nov 2012	19
Sep. 2009	57	Dec 2012	18
Oct. 2009	56	Jan 2013	17
Nov. 2009	55	Feb 2013	16
Dec.2009	54	Mar 2013	15
Jan. 2010	53	Apr 2013	14
Feb. 2010	52	May 2013	13
Mar.2010	51	Jun 2013	12
Apr. 2010	50	Jul 2013	11
May. 2010	49	Aug 2013	10
Jun.2010	48	Sep 2013	9
Jul. 2010	47	Oct 2013	8
Aug. 2010	46	Nov 2013	7
Sep. 2010	45	Dec 2013	6
Oct. 2010	44	Jan 2014	5
Nov. 2010	43	Feb 2014	4
Dec. 2010	42	Mar 2014	3
Jan. 2011	41	Apr 2014	2
Feb.2011	40	May 2014	1
Mar. 2011	39	Jun 2014	0
Apr.2011	38		
May. 2011	37		
Jun.2011	36		
Jul. 2011	35		
Aug 2011	34		
Sep. 2011	33		
Oct. 2011	32		
Nov. 2011	31		
Dec. 2011	30		
Jan. 2012	29		
Feb. 2012	28		
Mar. 2012	27		
Apr. 2012	26		
May.2012	25		
Jun. 2012	24		
Jul. 2012	23		
Aug. 2012	22		
Sep. 2012	21		

APPENDIX 6: SURVEY QUESTIONNAIRE:

`1.IDENTIFICATION 1.1 Data Collector_____ 1.2 Team Leader_____ 1.3 Survey date (dd/mm/yy)----------								
1.4 County	1.5 Sub County	1.6 Division	1.7 Location	1.8 Sub-Location	1.9 cluster name	1.10 Cluster No	1.11 HH No	1.12 Team No.

2. Household Demographics								
2.1	**2.2**	**2.3**		**2.4**	**2.5**	**2.6**	**2.7**	**2.8**	**2.9**
Age Group	**Please give me the names of the persons who usually live in your household.**	**Age (months for children <5yrs and years for over 5's)**		**Childs age verified by** 1=Health card 2=Birth certificate/ notification 3=Baptism card 4=Recall	**Sex** 1= Male 2= Female	**If 3 yrs and under 18 Is child enrolled in school?** 1 = Yes 2 = No	**Main Reason for not attending School (Enter one code from list)** 1=chronic Sickness 2=Weather (rain, floods, storms) 3=Family labour responsibilities 4=Working outside home 5=Teacher absenteeism 6=Too poor to buy school items e.t.c 7=Household doesn't see value of schooling 8 =No food in the schools 9 = Migrated/ moved from school area 10=Insecurity 11-No school Near by 12=Married 13=others (specify)……..	**What is the highest level of education attained?(level completed) adults only** 1 = pre primary 2= Primary 3=Secondary 4=Tertiary 5= None 6=others(specify)	**If the household owns mosquito net/s, who slept under the mosquito net last night? (***Probe-enter all responses mentioned (Use 1 if "Yes" 2 if "No and 3 if not applicable)*
		YRS	MTH						
< 5 YRS	1								
	2								
	3								
	4								
>5 TO 18 YRS	5								
	6								
	7								
	8								
	9								
	10								
	11								

	12								
ADULT	13**(HH)**								
	14)								
	15								
	16								

2.10	**How many mosquito nets does this household have? _____ (Indicate no.)**	
2.11	**Main Occupation of the Household Head – HH.** **(enter code from list)** 1=Livestock herding 2=Own farm labour 3=Employed (salaried) 4=Waged labour (Casual) 5=Petty trade 6=Merchant/trader 7=Firewood/charcoal 8=Fishing **9=Others (Specify)** |____|	**2.12.** What is your **main** current source of income 1. =No income 2. = Sale of livestock 3. = Sale of livestock products 4. = Sale of crops 5. = Petty trading e.g. sale of firewood 6. =Casual labor 7. =Permanent job 8. = Sale of personal assets 9. = Remittance 10. Other-Specify |____|
2.13	Marital status of the respondent 1. = Married 2. = Single 3. = Widowed 4. = separated 5. = Divorced. |____|	**2.14. What is the residency status of the household**? 1. IDP 2.Refugee 3. Resident |____|

Fever with Malaria: High temperature with shivering	**Cough/ARI:** Any episode with severe, persistent cough or difficulty breath-ing	**Watery diarrhoea:** Any episode of three or more watery stools per day	**Bloody diarrhoea:** Any episode of three or more stools with blood per day

3. CHILD HEALTH AND NUTRITION (ONLY FOR CHILDREN 6-59 MONTHS OF AGE; IF N/A SKIP TO SECTION 3.6)

Instructions: *The caregiver of the child should be the main respondent for this section*

3.1 CHILD ANTHROPOMETRY

*(**Please** fill in **ALL REQUIRED** details below. Kindly maintain the same child number as part 2)*

A Child No.	B	C	D	E	F	G	H	I	J	K	L	3.2	3.3
	what is the relation-ship of the respondent with the child/children 1=Mother 2=Father 3=Sibling 4=Grandmother 5=Other (specify)	SEX F/m	Exact Birth Date	Age in months (**To be filled only if the exact date cannot be ob-tained)**	Weight (KG) XX.X	Height (CM) XX.X	Oedema Y= Yes N= No	MUAC (cm) XX.X	Has your child (NAME) been ill in the past two weeks? <u>If No, please skip part K and proceed to 3.4)</u> 1.Yes 2. No	If YES, what type of illness (multiple responses possible) 1 = Fever with chills like malaria 2 = ARI /Cough 3 = Watery diarrhoea 4 = Bloody diarrhoea 5 = Other (specify) *See case definitions below*	If the child **<u>had watery diarrhoea</u>** in the last TWO (2) WEEKS, did the child get THERAPEUTIC zinc supplementa-tion? *Show sample and probe further for this component check the remain-ing drugs(confirm from mother child booklet)* 1 = Yes 2 = No 3 = Do not know	**When the child was sick did you seek assis-tance?** 1.Yes 2. No	**If the response is yes to question # 3.2 where did you seek assistance? (More than one response possible-** 1. Traditional healer 2.Community health worker 3. Private clinic/ pharmacy 4. Shop/kiosk 5.Public clinic 6. Mobile clinic 7. Relative or friend 8. Local herbs 9.NGO/FBO
01													
02													
03													
04													

3.4 Kindly maintain the same child number as part 2 and 3.1 above										**MATERNAL NUTRITION FOR MOTHERS OF REPRODUCTIVE AGE (15-49 YEARS)***(Please insert appropriate number in the box)*				
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**3.5**	**3.6**	**3.7**	**3.8**	**3.9**
Child No.	How many times has child received Vitamin A in the past year? (show sample)	How many times did you receive vitamin A capsules from the facility or out reach	If Vitamin A received how many times verified by **Card?**	How many times has child received drugs for worms in the past year? **(12-59 Months)** *(show Sample)*	Has the child received BCG vaccination? **1 = scar** **2=No scar**	Has child received OPV1 vaccination **1=Yes, Card** **2=Yes, Recall** **3 = No** **4 = Do not know**	Has child received OPV3 vaccination? **1=Yes, Card** **2=Yes, Recall** **3 = No** **4 = Do not know**	Has child received measles vaccination at 9 months *(On the upper right shoulder)?* **1=Yes, Card** **2=Yes, Recall** **3 = No** **4 = Do not know**	Has child received the second measles vaccination (18 to 59 months) *(On the upper right shoulder)?* **1=Yes, Card** **2=Yes, Recall** **3 = No** **4 = Do not know**	Woman ID. **(all ladies in the HH aged 15-49 years from the demographics page)**	What is the mother's / caretaker's physiological status 1. **Pregnant** 2. **Lactating** 3. **None of the above**	Mother/ caretaker's MUAC reading: **____.__cm**	During the pregnancy of the (name of child below 24 months) did you take iron pills, sprinkles with iron, iron syrup or iron-folate tablets? (name that appears in HH register) 1. **Yes** 2. **No** 3. **Don't know** 4. **N/A**	If Yes, for how many days? (approximate the number of days)
01														
02														
03														
04														

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

4.1 **What is the MAIN source of drinking water for the household NOW?**

1. Piped water system/ borehole/ protected spring/protected shallow wells
2. Unprotected shallow well
3. River/spring
4. Earth pan/dam
5. Earth pan/dam with infiltration well |____|
6. Water trucking /Water vendor
7. Other *(Please specify)*

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

1=less than 500m (Less than 15 minutes)
2=more than 500m to less than 2km (15 to 1 hour)
3=more than 2 km (1 – 2 hrs)
4=Other(specify) |____|

4.2.2a **Do you queue for water?**

1. Yes
2. No **(If No skip to question 4.3)** |____|

4.2.2b. If yes how long?

1. Less than 30 minutes |____|
2. 30-60 minutes
3. More than 1 hour

4.3a **Is anything done to your water before drinking *(Use 1 if YES and 2 if NO)*. if No skip to 4.4**

|____|

4.3b If yes what do you do? (*MULTIPLE RESPONSES POSSIBLE) (Use 1 if YES and 2 if NO)*.

1. Boiling…… …… |____|
2. Chemicals (*Chlorine,Pur,Waterguard*)…… |____|
3. Traditional herb…….. |____|
4. Pot filters…….. |____|
5. Other (specify_____)…… |____|

4.4 **Where do you store water for drinking?**

1. Open container / Jerrican
2. Closed container / Jerrican |____|

4.5 How much water did your household use YESTERDAY (excluding for animals)?

(Ask the question in the number of 20 liter Jerrican and convert to liters & write down the total quantity used in liters)

|____|

4.6 **Do you pay for water?**

1. Yes
2. No **(If No skip to Question 4.7.1)** |____|

4.6.1 If yes, how much per 20 liters jerrican _____ KSh/20ltrs

4.6.2 If paid per month how much |____|

4.7.1 **Yesterday (within last 24 hours) at what instances did you wash your hands? (MULTIPLE RESPONSE-** (Use 1 if "Yes" and 2 if "No")

1. After toilet……
2. Before cooking…….. |____|
3. Before eating……
4. After taking children to the toilet…… |____|
5. Others……

|____|

|____|

|____|

4.7.2	**If the caregiver washes her hands, then probe further; what did you use to wash your hands?** 1. Only water 2. Soap and water 3. Soap when I can afford it 4. traditional herb 5. Any other specify |____|	**4.8 Where do members of your household Mainly relieve themselves?** 1. In the bushes, open defecation 2. Neighbor or shared traditional pit/improved latrine 3. Own traditional pit/improved latrine 4. Others Specify |____|

5.0: Food frequency and Household Dietary Diversity

	Did members of your household consume any food from these food groups in the last *7 days?(food must have been cooked/served at the household)* ***1=Yes*** ***2=No***	**If** *yes*, **mark days the food was con-sumed in the last 7 days?**								What was the **main** source of the **dominant food item** consumed in the HHD? **1.Own production** **2.Purchase** **3.Gifts from friends/families** **4.Food aid** **5.Traded or Bartered** **6.Borrowed** **7.Gathering/wild fruits** **8.Other (specify)**
Type of food*		**D1**	***D2***	**D 3**	**D 4**	**D5**	**D 6**	**D7**	**TOTAL**	
5.1. Cereals and cereal products *(e.g. sorghum, maize, spaghetti, pasta, anjera, bread*)?										
5.2. Vitamin A rich vegetables and tubers: Pumpkins, carrots, orange sweet potatoes										
5.3. White tubers and roots: White potatoes, white yams, cassava, or foods made from roots										
5.4 Dark green leafy vegetables: Dark green leafy vegetables, including wild ones + lo-cally available vitamin A rich leaves such as cassava leaves etc.										
5.5 Other vegetables *(e,g, tomatoes, egg*										

plant, onions)?										
5.6. Vitamin A rich fruits: + other locally available vitamin A rich fruits										
5.7 Other fruits										
5.8 Organ meat (iron rich): Liver, kidney, heart or other organ meats or blood based foods										
5.9. Flesh meats and offals: Meat, poultry, offal *(e.g. goat/camel meat, beef; chicken/poultry)?*										
5.10 Eggs?										
5.11 Fish: Fresh or dries fish or shellfish										
5.12 Pulses/legumes, nuts *(e.g. beans, lentils, green grams, cowpeas)*?										
5.13 Milk and milk products *(e.g. goat/camel/ fermented milk, milk powder)?*										
5.14 Oils/fats *(e.g. cooking fat or oil, butter, ghee, margarine)?*										
5.15 Sweets: Sugar, honey, sweetened soda or sugary foods such as chocolates, sweets or candies										
5.16 Condiments, spices and beverages:										

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