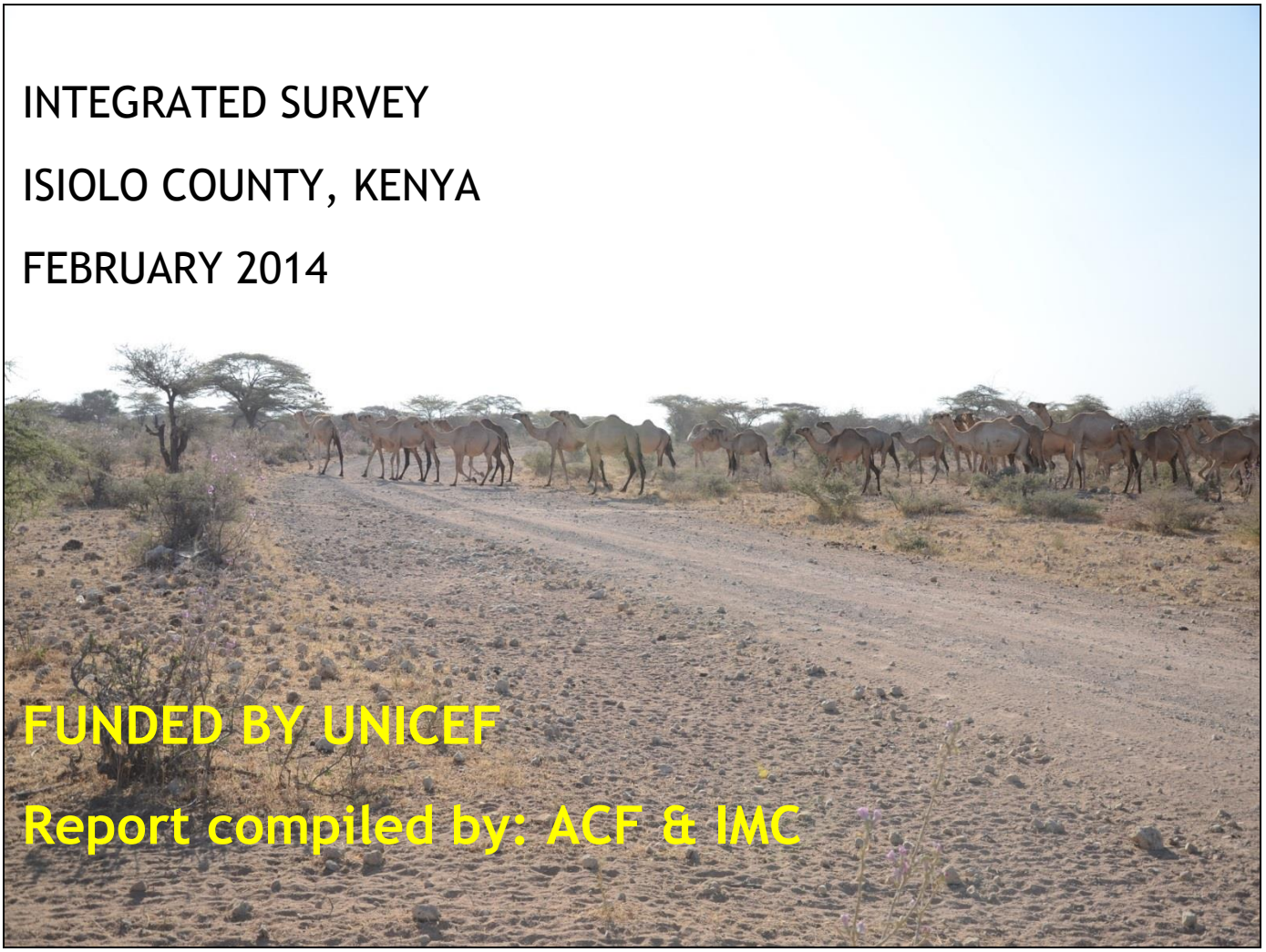
INTEGRATED SURVEY

ISIOLO COUNTY

FEBRUARY 2014



ACKNOWLEDGEMENT

Given the size and the geographic distribution of the population of Isiolo County covered by the Integrated Nutrition survey February 2014, it is evident that the success was due in large part to the coordination efforts of the survey team. Action against hunger (ACF) and International Medical Corps (IMC) would like to thank the following contributors for the successful implementation of the first County integrated nutrition survey in Isiolo County;

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ABBREVIATIONS

ACF	**Action Against Hunger | ACF - International**
CI	Confidence Interval
CNO	County Nutrition Officer
FFA	Food for Assets
GAM	Global Acute Malnutrition
GFD	General Food Distribution
HFA	Height-for-Age
HHs	Households
HINI	High Impact Nutrition Interventions
IMAM	Integrated Management of Acute Malnutrition
IMC	International Medical Corps
KFSSG	Kenya Food Security Steering Group
KNBS	Kenya Bureau of statistics
MOA	Ministry of Agriculture
MOH	Ministry of Health
MOW	Ministry of Water
MUAC	Mid Upper Arm Circumference
NDMA	National Drought Management Authority
OPV	Oral Polio Vaccine
PPS	Probability Proportional to Population Size
SAM	Severe Acute Malnutrition
SFP	Supplementary Feeding Program
WFH	Weight-for-Height

1. EXECUTIVE SUMMARY

Isiolo County is in the Pastoral North East cluster and covers an area of 25,000 square kilometers. The first county integrated nutrition survey was implemented by Ministry of Health in collaboration with Action against Hunger and International Medical Corps between 28th January and 7th February 2014. The survey utilized Standardized Monitoring and Assessment in Relief and Transitions (SMART) methodology and piloted the SMART tool proposed by Nutrition Information Working Group (NIWG). The survey covered the three sub counties namely Isiolo, Merti and Garbatulla.

SUMMARY OF KEY FINDINGS

A total of 498 households were sampled and nutritional status assessed for a total of 498 children aged 6-59 months. One edema case (grade 1) was recorded. Four Z scores out of range were excluded from the analysis. Table 1 shows results for health and nutrition obtained in February 2014 compared with weighted anthropometric results for May 2013. The results indicate an increase; though insignificant, in Global Acute Malnutrition rate from poor (May 2013) to serious level (February 2014) with p value of 0.055. The worsening situation could be attributed mainly to the poor performance of short rains. The County food insecurity phase classification remains at stressed[1] level.

Table 1: Summary of Nutrition and Health results, Isiolo County, May 2013 and February 2014

			Integrated nutrition survey[2]	
INDEX	**INDICATOR**		**May 2013 (weighted results)**	**February 2014 (SMART)**
WHO 2006	WHZ-scores	**Global Acute Malnutrition** Weight for height <-2 z and/or oedema	8.2% (6.9 - 9.8)	11.5% (8.7-15.2)
		Severe Acute Malnutrition; Weight for height <-3 z and/or oedema	0.9% (0.5 - 1.6)	1.0% (0.4-2.3)
	HAZ-scores	**Stunting** (<-2 z-score)	20.8% (18.7 - 23.1)	23.2% (19.5-27.3)
		Severe stunting (<-3 z-score)	4.5% (3.5 - 5.8)	4.8% (3.1-7.6)
	WAZ-scores	**Underweight** (<-2 z-score)	17.2%(15.3 - 19.3)	21.1% (17.1-25.7)
		Severe underweight (<-3 z-score)	3.1% (2.3 - 4.1)	3.4% (2.0-5.8)
	MUAC	**Global Acute Malnutrition** MUAC <125 mm and/or oedema	2.7%	3.4 % (1.9-5.9)
		Severe Acute Malnutrition **MUAC <115 mm and/or oedema**	0.5%	0.6 % (0.2-1.9)

[1] Short Rains Assessment February 2014

[2] **Results presented in brackets are expressed with 95.0% confidence interval (CI)**

Measles immunization coverage	9 Months by card	N/A	62.2%
	18 Months by card	N/A	18.9%
Vitamin A coverage	6-11 months ; At least once	N/A	95.5%
	12-59 months; once	N/A	27.5%
	12- 59 months; at least twice	N/A	70.4%
INDICATOR	**SPHERE Emergency thresholds**		
CMR	2/10,000/day	N/A	0.57 (0.31-1.04)
U5MR	4/10,000/day	N/A	<0.001

The above findings indeed require close monitoring of the situation.

Nutrition situation in Isiolo County is at serious level. A number of interrelated factors that need intervention are attributable to this increase. Therefore, based on the findings, the following recommendations are put forward.

Table 2: Summary of Recommendations for survey findings

Findings	Recommendations
Nutrition and Health	• Include severe acute malnutrition as part of the weekly (disease) surveillance • Upscale Food for Assets beneficiaries • Improving the Food-By-Prescription and Protection Rations • Model mothers and or group counseling on the importance of Iron/folate supplementation during pregnancy
Food Security and Livelihood situation	• Nutrition education and food demonstrations to improve dietary diversity • Link agricultural extension workers with home economic and nutrition staff to increase awareness on nutrition education • Diversification of livelihoods for pastoral communities • Community education and support on livestock off takes during drought
Water, Sanitation and Hygiene	• Strengthen community health promotion through the public health department • Behavior change communication through triggering Community Led Total Sanitation (CLTS)

2. INTRODUCTION

2.1 BACKGROUND INFORMATION

Isiolo County is in Pastoral North East cluster[3] and covers a surface area of 25, 336 square Kilometers with an estimated population of 143,294[4]. It is an arid and semi-arid land characterized by recurrent droughts, hot and dry climate with low and erratic rainfall patterns. It borders Marsabit County to the North, Meru County to the South, Garissa County to the East and Laikipia County to the West.

It consists of three Sub Counties namely Isiolo, Garbatulla and Merti. Isiolo County is inhabited by among other groups the Borana, Somali, Turkana, Samburu and Meru. Pastoralism, all species and cattle, goats and sheep, is the main source of livelihood in the county (67%) with little agro-pastoralism (26%) being practiced along Ewaso-Nyiro River whereas firewood selling, casual waged labor and some formal employment in big towns form 7% of the livelihood zones.

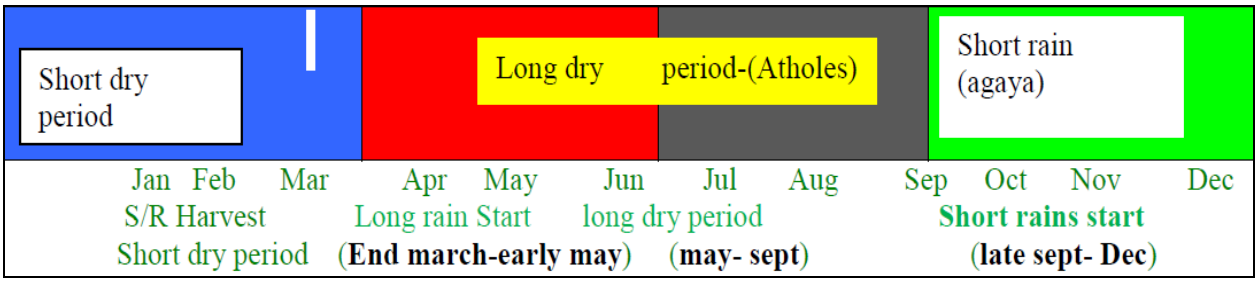

Figure 1: Isiolo Seasonal Calendar[5]

There was delayed onset of the short rains in the country with cumulative total rainfall of 200 mm recorded over an average of 21 days in Isiolo County. Pockets within the pastoral livelihood of Sericho and Oldonyiro received much less rains ranging from five to 25 percent of normal. On the whole, most households in the area remain stressed (IPC Phase 2) during the post-harvest period due to below average short rains[6].

Action against hunger (ACF) and International Medical Corps (IMC)in partnership with MOH have been supporting the implementation and scale up of HINI (High Impact Nutrition Interventions) and strengthening the health system in Isiolo County since January 2011. Currently, IMC has its operations in Isiolo Sub County, while ACF has its operations in Garbatulla and Merti Sub Counties. Previous Nutrition Integrated surveys were conducted separately for each of the three sub counties. In May 2013 Nutrition Integrated surveys were carried out concurrently in Isiolo, Garbatulla and Merti Sub Counties. Weighted analysis from the anthropometric results for the three Sub Counties showed a poor nutritional status with GAM of 8.2% (6.9-9.8 95% C.I) and a SAM of 0.9% (0.5-1.6 95% C.I).

[3] KFSSG short rains 2014
[4] KNBS 2009 Population Census report
[5] Isiolo NDMA Monthly Bulletins-January 2014
[6] Famine Early Warning Systems Network Issue January, 3,2014

The February 2014 study was the first integrated nutrition SMART survey to be conducted for the entire county. This shift, of both time (from September) to February as well as area of coverage was prompted by a couple of reasons namely:

- The need to feed into seasonal assessments, for this case the short rains assessment
- Need for adequate and all conclusive data for planning and programming at County level more so with the devolution dispensation

An integrated survey was undertaken by ACF and IMC in close collaboration with among other stakeholders to include MOH, NDMA, MOA, and MOW carried out integrated nutrition survey from 2nd to 7th February 2014 to assess the nutrition situation in Isiolo County. The survey formed a baseline for other subsequent integrated nutrition surveys in the County.

3 OBJECTIVES OF THE SURVEY

The main objective of the survey was to estimate the prevalence of acute malnutrition amongst children aged 6-59 months in Isiolo County. The specific objectives were;

1. To determine the prevalence of under nutrition in children aged 6-59 months;
2. To determine the immunization coverage for measles, Oral Polio Vaccines (OPV type 1 and 3), and vitamin A supplementation in children aged 6-59 months;
3. To determine maternal nutritional status based on MUAC measurements
4. To estimate coverage of iron / folic acid supplementation during pregnancy in women of reproductive age;
5. To collect information on possible underlying causes of malnutrition such as household food security, water, sanitation, and hygiene practices
6. To estimate the retrospective crude and under five mortality rates in Isiolo County
7. To build the capacity of the MOH, MOA, MOW and NDMA field monitors

4. METHODOLOGY

4.1 TYPE OF SURVEY

The integrated health and nutrition survey was undertaken in Isiolo County using the SMART methodology in February 2014. Prior to the survey secondary data review of various existing data (NDMA monthly bulletins, District Health Information System (DHIS) and SMART May 2013 from the three sub counties) was undertaken. Only relevant data was gathered during the actual data collection exercise to address existing gaps as per the national survey guidelines with available secondary data used to buffer and augment the findings.

SMART methodology was employed during the anthropometric survey in planning, training, data entry and analysis. Other data sets were also gathered concurrently to include data on WASH (Water Sanitation and Hygiene), Food security and livelihood. 36 clusters of 14 households each were sampled.

4.2 SAMPLING PROCEDURES

A two stage sampling methodology was employed. In the *first stage* 36 clusters were sampled using probability proportional to population size *(PPS)*. Population data was obtained from Kenya Bureau of Statistics *(Census 2009)* then triangulated with population data from the administrative leaders. This was based on various values as indicated in table 2 and 3.

The *second stage* involved obtaining an updated and complete list of households from village elder at the cluster/village level. 14 households were then selected using simple random sampling. All the households sampled were interviewed using the mortality, household questionnaire and anthropometric measurements taken on all children aged 6-59 months.

Table 3: Sampling Methodology for Anthropometric Survey

Data entered on ENA software	Anthropometric Survey	Rationale
Estimated prevalence of GAM	8.2	May 2013 weighted Integrated SMART survey
±Desired precision	3.0	The lower the malnutrition prevalence, the higher the precision
Design effect	1.4	Design effect obtained in May 2013 weighted Integrated SMART survey
Average household size	6	From KNBS (Kenya National Bureau of statistics) 2009 census data
Percent of under five children	18.4	Population estimate from DHIS and Census report 2009
Percent of non-respondent	1	To cater for any unforeseen circumstances
Households to be included	**498**	

Table 4: Sampling Methodology for Mortality Survey

Data entered on ENA software	Mortality Survey	Rationale
Estimated Death Rate per 10,000/day	0.14	Average of Isiolo & Garbatulla Sub Counties' May 2013 Mortality
±Desired precision	0.2	The lower the malnutrition prevalence, the higher the precision
Design effect	2	To cater for any Heterogeneity in the County
Recall Period in days	108	Recall event is October 20th 2013, Mashujaa day
Average household size	6	May 2013 weighted Integrated SMART
Percent of non-respondent	3	This is higher than anthropometry since mortality is a sensitive issue
Population to be included	**2711**	
Households to be included	**466**	

4.3 TRAINING FRAMEWORK

The enumerator training took place in Isiolo town at *Northern Galaxy Hotel* from 28th January to 1st February 2014. The training package included an intense exercise of 5 days focusing on survey objectives, sampling, and data collection tools, anthropometric measurements, interviewing techniques, field procedures and questionnaire administration. A total of 37 persons were trained. A standardization test was also done on 10 children with aim of testing the participants' precision and accuracy in taking anthropometric measurements. A pilot test of 2 households per team in nearby villages (not sampled) was also conducted on the final day of the training. The experiences and arising challenges were shared and addressed.

4.4 SURVEY TEAMS AND SUPERVISION

The survey team was composed of 6 team leaders, 18 enumerators and 3 data entry clerks eventually forming 6 teams. The team leaders were obtained from relevant GOK[7] ministries. 15 NDMA field monitors and 6 community members used in the previous surveys were considered for enumerator and data entry clerk positions. The County Nutrition Officer under technical support from ACF and IMC Staff led the coordination and supervision of the entire process. Data quality assurance process was maintained by observing the following steps;

- Validation of the survey planning and methodology at the Nutrition information working group
- Survey team training in adherence to SMART standards to include undertaking of both standardization and pilot test
- Daily support and supervision of teams at the cluster level
- Daily feedback session through plausibility and questionnaire checks
- Continuous daily data entry and primary analysis of all datasets

4.5 CASE DEFINITIONS AND INCLUSION CRITERIA

For a period of six days data was gathered from the sampled clusters to make inferences with regard to the survey objectives.

The following information was gathered from all eligible children aged 6-59 months

- **Age**: The primary source for this information was the child's immunization card, birth certificate or birth notification. In the absence of these documents, a local calendar of events developed from discussions with community members, enumerators and key informants. Age calculation chart was used for ease of identifying age in months (see Annex 2).
- **Child's Sex:** This was recorded as either '**f**' for female or '**m**' for male.
- **Weight:** A seca[8] digital weighing scale was used to measure the children's weight. The teams on daily basis calibrated the electronic scale using a standard weight to ensure accuracy of emphasis was placement of weight scale to a hard flat surface, minimal or no movement of the child and accurate recording of measurements to the nearest 0.1kg
- **Height:** A height board was used to measure children above 2 years of age while length was taken for children less than 2 years of age. Of emphasis was ideal placement of cursor as per instructions on height measurements (SMART/IMAM[9] guideline) ensuring minimal or no movement of the child and maintaining height readings at eye level to the nearest 0.1cm.

[7] Government of Kenya

[8] A digital floor scale manufactured by Seca gmbh & co.kg. Hammer Steindamm 9-25.22089 Hamburg. Germany.

[9] Integrated Management of Acute Malnutrition

- **MUAC:** Mid Upper Arm Circumference was measured on the left arm, at the middle point between the tip of the elbow and the tip shoulder bone while the arm is at right-angle, then followed MUAC measurements of the arm while it is relaxed and hanging by the body's side. MUAC was measured to the nearest mm. In the event of a disability on the left arm or a left-handed child, the right arm was used. Of emphasis during the exercise was correct identification of mid-point and placement of MUAC tape on arm not too tight or too loose.
  Maternal MUAC tapes were used to measure MUAC in women of reproductive age.
- **Bilateral Oedema:** This was assessed by the application of moderate thumb pressure for at least 3 seconds on both feet. If a depression formed upon pressure application, then presence of bilateral oedema was confirmed.
- **Measles vaccination:** The child's vaccination card was used as a source of verification. In circumstances where this was not available, the caregiver was probed to determine whether the child had been immunized against measles or not (done subcutaneously on the right upper arm). All children with confirmed immunization (by date) on the vaccination card, the status were recorded as "1" (Card) otherwise as "3" (Not immunized). Oral confirmation from the caregiver without proof of card was recorded as "2" (Recall). Children between 9 to 18 months or greater were used to determine coverage of this in the final analysis**.**
- **OPV1 (**1st dose at 6 weeks) **and OPV3** (3rd dose at 14 weeks) was tabulated for all children aged 6-59 months.
-

Other relevant information about the eligible child was also gathered as follows:

- **De-worming:** Determined by whether the child had received drugs for intestinal worms in the past one year. This was recorded as "0" for No, "1" for Yes by card, ''2'' for Yes by recall and ''3'' for Do not know.
- **Vitamin A coverage**: This was determined by the number of times the eligible child had received vitamin A in the past year. The response received (number of times) was probed and eventually recorded on the anthropometric questionnaire.
- **Morbidity:** This was gathered over a two week recall period by interviewing/probing the mothers/caretakers of the target child and eventually determined based on the respondent's recall. This information was however not verified by a clinician.
- **Other data sets**: the Household questionnaire was used to gather data on other variables related to HINI indicators, WASH (Water Sanitation and Hygiene) and FSL (Food Security and Livelihood).

4.6 DATA ENTRY AND ANALYSIS

Daily data entry was undertaken for all data sets so as to ensure close supervision and quality of data as the survey progressed. Anthropometric data was analyzed in ENA for SMART software September 2013 version. All other data sets were entered and analyzed using Microsoft Excel and SPSS version 19.

4.7 INDICATORS, GUIDELINES AND FORMULAS USED IN ACUTE MALNUTRITION

Weight for height (WFH) index

This was estimated from a combination of the weight for height *(WFH*) index values *(and/or oedema)* and by sex based on WHO[1] standards 2006. This index was expressed in WFH indices in Z-scores, according to WHO 2006 reference standards.

Z-Score:

- Severe acute malnutrition is defined by WFH < -3 SD and/or existing bilateral oedema
- Moderate acute malnutrition is defined by WFH < -2 SD and >-3 SD and no oedema.
- Global acute malnutrition is defined by WFH < -2 SD and/or existing bilateral oedema.

Mid upper arm circumference (MUAC)

MUAC analysis was also undertaken to determine the nutrition status of sampled children. The following MUAC criteria were applied.

Table 5: MUAC guidelines

MUAC Guideline	Interpretation
MUAC<115mm and/or bilateral Oedema	Severe acute malnutrition
MUAC >=115mm and <125mm *(no bilateral oedema)*	Moderate acute malnutrition
MUAC >=125mm and <135mm *(no bilateral Oedema)*	Risk of malnutrition
MUAC > 135mm (no bilateral Oedema)	Adequate nutritional status

During the survey, all severe and moderately malnourished children as per MUAC and Weight-for-Height cut offs were referred to the nearby health facilities.

5. FINDINGS

5.1 GENERAL CHARACTERISTICS OF STUDY POPULATION AND HOUSEHOLDS

The survey involved 2,576 persons with an average household population of 5.2 persons per household. The average number of children below 5 years of age in a household was 2.5. Assessment of occupation in adults (>18 years) showed that unemployment was at 36.2%. The major forms of occupation reported were waged casual labor (18.4%) and livestock herding (15.8%). Other reported forms of occupation were petty trade(8.6%), salaried employment(6.4%), own farm labor(2.9%), firewood and charcoal selling(2.2%), domestic help(1.8%), merchants/traders(1.3%) and other forms of occupation(6.2%).

The survey assessed enrollment in schools for the school going age (3-18 years) with the findings showing that majority (83.3%) were enrolled in school at different levels. The main reasons for not attending school were children thought to be under age (37.3%), distance to the nearby school (19.3%), households too poor to buy school items(12%), family labor responsibilities (10.7%) and some households not seeing the value of schooling.

5.2 ANTHROPOMETRY

5.2.1 Distribution by Age and Sex

The anthropometric survey involved 498 children; attaining a boy: girl ratio of 1.05 which is within the estimated range of 0.8-1.2 with a p-value of 0.591. This shows that the boys and girls were equally represented in the sample as shown in table 6.

Table 6: Distribution of age and sex of sample

	Boys		Girls		Total		Ratio
AGE (months)	**no.**	**%**	**no.**	**%**	**no.**	**%**	**Boy: girl**
6-17	70	54.7	58	45.3	128	25.7	1.2
18-29	70	55.1	57	44.9	127	25.5	1.2
30-41	59	48.4	63	51.6	122	24.5	0.9

42-53	44	48.9	46	51.1	90	18.1	1.0
54-59	12	38.7	19	61.3	31	6.2	0.6
Total	255	51.2	243	48.8	498	100.0	1.0

5.2.2 Nutritional Status of Children 6-59 Months

This study used the World Health Organization 2006 growth Standards. As observed in table 7 494 children were included in the final analysis; four datasets were having z-scores out of range. GAM prevalence of 11.5% (8.7-15.2 95% CI) and a SAM prevalence of 1.0% (0.4- 2.3 95% CI) was unveiled. Boys and girlswere equally malnourished. One case of edematous child was reported.The serious state(WHO 2000[10] classification) of malnutrition rate among under-fives was attributed to increased childhood illnesses namely acute respiratory infections (50.2%) and malaria(48.6%) where 49.6% of children were sick two weeks prior to the survey. It was also attributed to compromised household food security with households embracing more than one coping mechanisms and poor state of dietary diversity as result of limitation to food access and availability, increased food prices and seasonal variations (poor performances of both long and short rain seasons).Water scarcity in parts of Garbatulla sub County might also be linked as a probable cause of malnutrition among under-fives.

Table 7: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or Oedema) and by sex[11]

	All n = 494	**Boys n = 253**	**Girls n = 241**
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(57) 11.5% (8.7-15.2)	(35) 13.8% (9.4-19.9)	(22) 9.1% (5.7-14.2)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(52) 10.5% (7.8-14.0)	(31) 12.3% (8.4-17.5)	(21) 8.7% (5.5-13.6)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(5) 1.0% (0.4- 2.3)	(4) 1.6% (0.6- 4.0)	(1) 0.4% (0.1- 3.1)

Gaussian curve (Figure 2) indicates that the sample curve has deviated to the left of the reference population with a mean and standard deviation based on WHZ [12](n=494) at–0.78 and ±0.99 respectively. This indicates relatively poor nutritional status of the study population.

[10] WHO (1995/2000), Classification of public health significance for children aged less than five years
[11] Results shown in bracket are expressed with 95% CI
[12] Weight-for-height Z-scores

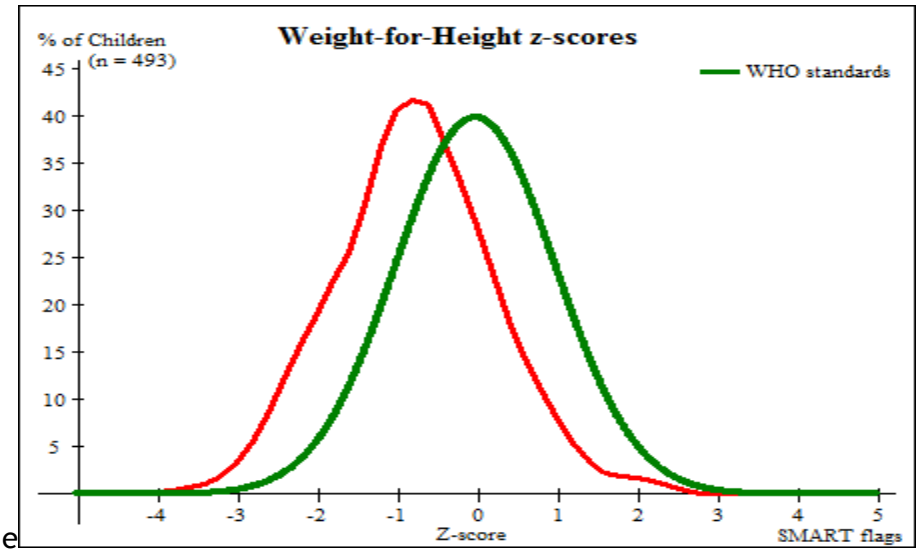

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Figure 2: Frequency distribution of WFH for <5s

The overall malnutrition levels for severe and moderate malnutrition was at 0.8% and 10.5% respectively. Malnutrition levels by age groups as shown in table 8 reflects high malnutrition rates by WHZ <-2SD in children aged 30-41 months (n=20 out of 121) and 54-59 months (n=5 out of 35) though not significant.

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

		Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age (Months)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	128	1	0.8	11	8.6	115	89.8	1	0.8
18-29	125	0	0.0	11	8.8	114	91.2	0	0.0
30-41	121	2	1.7	18	14.9	101	83.5	0	0.0
42-53	89	0	0.0	8	9.0	81	91.0	0	0.0
54-59	31	1	3.2	4	12.9	26	83.9	0	0.0
Total	494	4	0.8	52	10.5	437	88.5	1	0.2

5.2.3 Distribution of acute malnutrition and Oedema based on weight-for-height z-scores

In Isiolo survey, one child was diagnosed with Oedema (0.2%) while six children were categorized as marasmus (1.2%). The results are as shown in table 9.

Table 9: Distribution of acute malnutrition and Oedema based on weight-for-height z-scores

	<-3 z-score	>=-3 z-score
Oedema present	Marasmic kwashiorkor No. 1 (0.2 %)	Kwashiorkor No. 0 (0.0 %)

Oedema absent	Marasmic No. 6 (1.2 %)	Not severely malnourished No. 491 (98.6 %)

5.2.4 Prevalence of Acute Malnutrition by MUAC

MUAC is used as a good indicator to identify malnourished children with a high risk of death in need of treatment[13]. Based on MUAC measurements, GAM prevalence in Isiolo County was 3.4% (1.9 - 5.9 95% C.I.) which was insignificantly different from 2.7% (1.9- 3.7 95% CI) unveiled in May 2013.

Table 10: Prevalence of acute malnutrition based on MUAC cut offs (and/or Oedema) and by sex expressed with 95% CI

	All **n = 498**	**Boys** **n = 255**	**Girls** **n = 243**
Prevalence of global malnutrition (< 125 mm and/or oedema)	(17) 3.4 % (1.9 - 5.9)	(6) 2.4 % (0.9 - 5.7)	(11) 4.5 % (2.3 - 8.6)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(14) 2.8 % (1.5 - 5.1)	(4) 1.6 % (0.5 - 5.3)	(10) 4.1 % (2.1 - 7.8)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(3) 0.6 % (0.2 - 1.9)	(2) 0.8 % (0.2 - 3.1)	(1) 0.4 % (0.1 - 3.1)

5.2.5 Prevalence of underweight by Weight-for-age (WFA) Z-scores

Moderate malnutrition (underweight) is defined as a z-score between <-2 and -3 and severe malnutrition as a z-score < -3. The survey unveiled underweight rate of 21.1 % (17.1 - 25.7 95% C.I.) which is not significantly different from 17.2% (15.3 - 19.3 95% C.I) unveiled in May 2013.

Table 11: Prevalence of underweight based on weight-for-age z-scores by sex results expressed with 95% CI

	All n = 494	**Boys** n = 253	**Girls** n = 241
Prevalence of underweight (<-2 z-score)	(104) 21.1 % (17.1 - 25.7)	(65) 25.7 % (19.6 - 32.9)	(39) 16.2 % (11.7 - 21.9)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(87) 17.6 % (13.8 - 22.2)	(55) 21.7 % (16.2 - 28.5)	(32) 13.3 % (9.3 - 18.6)
Prevalence of severe underweight (<-3 z-score)	(17) 3.4 % (2.0 - 5.8)	(10) 4.0 % (2.0 - 7.7)	(7) 2.9 % (1.2 - 6.7)

5.2.6 Stunting

Stunted growth reflects a process of failure to reach linear growth potential as a result of sub-optimal health and/or nutritional conditions. Stunting rate was 23.2 % (19.5 - 27.3 95% C.I.) which was insignificant different to 20.8% (18.7 - 23.1 95% C.I) in May 2013.The poor state of stunting can be attributed to deterioration of child health and nutrition status over

[13] www.cmamforum.org

time. This is well illustrated in NCA[14] report through causal pathways where different causes of malnutrition among children are evident linked to increased malnutrition rates in the County despite ongoing interventions. A good example as highlighted in this report is evident in maternal health status where low intake of iron-folate supplementation among pregnant mothers at (24.3%), might predispose the baby to birth defects, low birth weight etc. If this baby who is of low birth weight does not receive optimal IYCN practices, its vulnerable to frequent child illnesses due to compromised immune status coupled with low dietary intake. The child growth status will be compromised, as child age increases "short stature" will be evident. As shown in figure 3 below, height of the same child will be below true height of reference population of same age and sexy that's the reason why HAZ curve (survey results) lies left of the reference (WHO).

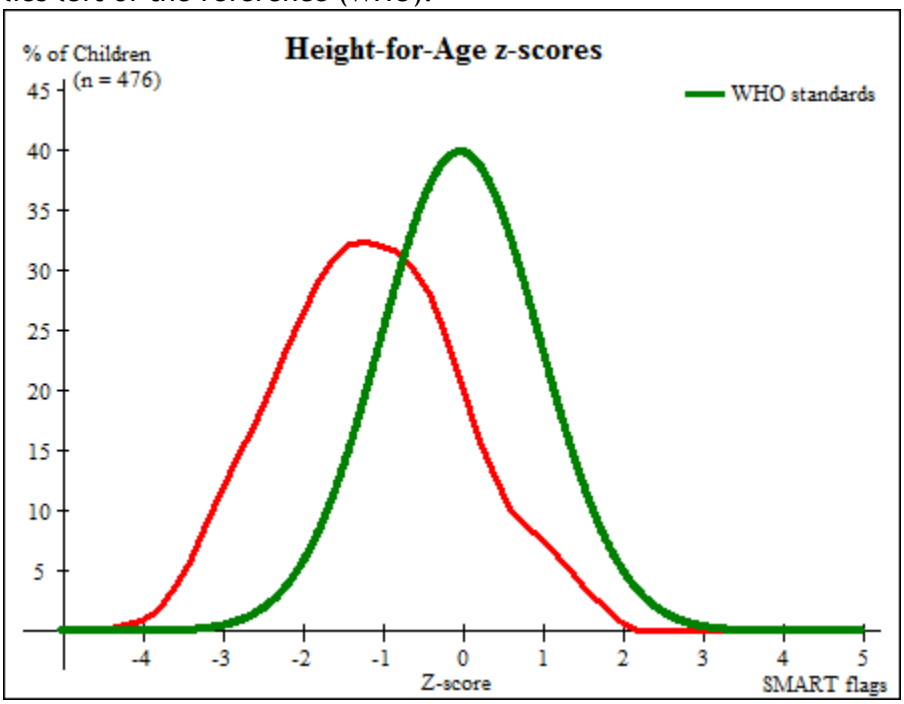

Figure 3: Gaussian curve based on height for age z-scores of children<5 years

Table 12: Prevalence of stunting based on height-for-age z-scores and by sex results expressed with 95% CI

	All n = 475	**Boys** n = 242	**Girls** n = 233
Prevalence of stunting (<-2 z-score)	(110) 23.2 % (19.5 - 27.3)	(64) 26.4 % (21.3 - 32.3)	(46) 19.7 % (15.3 - 25.0)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(87) 18.3 % (14.8 - 22.5)	(49) 20.2 % (15.7 - 25.8)	(38) 16.3 % (11.9 - 21.9)
Prevalence of severe stunting (<-3 z-score)	(23) 4.8 % (3.1 - 7.6)	(15) 6.2 % (3.5 - 10.7)	(8) 3.4 % (1.6 - 7.0)

[14] ACF (2013/14), Nutrition causal analysis conducted in Isiolo County

5.3: MORTALITY AND HEALTH

5.3.1 Results of retrospective mortality

The mortality survey involved a total of 2622 individuals inclusive of 530 children 0-59 months of age. The responses were prompted based on a recall period of 108 days (20th October 2013). This was based on the "Mashujaa" day celebrations- a national holiday which is acknowledged by households and likely to be remembered most. Analysis of the mortality results is as shown in table 13.

Table 13: Results of retrospective mortality

Parameters	Total population	Children (0-59months)
Number of all current households members	2622	530
Number of people who joined	69	9
Number of people who left	50	1
Number of births		21
Number of deaths	16	0

There were no reported cases of under-five mortality in the survey. The crude mortality rate was below the emergency thresholds. The crude mortality was as a result of typhoid, malaria, vomiting, TB/HIV, accidents and unconfirmed causes. The results are as shown in table 14.

Table 14 Moratlity rates

	Feb 2014	**SPHERE emergency thresholds**
CMR (total deaths/10,000 people / day)	0.57 (0.31-1.04)	2/10,000/day
U5MR (deaths in children under five/10,000 children under five / day)	<0.001[15]	4/10,000/day

5.3.2 Child Immunization, Vitamin A Supplementation and Deworming

Immunizations stimulate the body's natural resistance to disease thereby strengthening immunity. The Ministry of Health through the Division of Vaccines and Immunization aims to increase access to immunization services nationwide in order to reduce morbidity and mortality due to vaccine preventable diseases. Of importance is the reduction of infant and child morbidity and mortality in line with the United Nations Millennium Development Goals (MDG)[16]

In Isiolo County, OPV1 & 3 was 68.7% and 69.7% by card while OPV1 &3 was 28.7 by recall. The overall rate surpasses the national target of 80%. BCG immunization was at 89.2% verified by the presence of a scar. Measles vaccination at 9 months was at 62.2% by card and 27.2% by recall while measles immunization at 18 months was low at 18.9% and 10.2% by card and recall respectively.

Vitamin A is a critical micronutrient for the survival and physical health of children exposed to disease. In Kenya, up to 85 % of children are vitamin A deficient, putting them at risk of illness and death.[17] Supplementation of children above one year didn't meet the national

[15] John Hopkins & IFRC (2006), epidemiology and surveillance; public health guide in emergencies
[16] Kenya comprehensive multiyear plan for 2011-2015
[17] the micronutrient initiative

target of 80% as seen in table 15 below.The low coverage of vitamin A supplementation among children 12-59 months is attributed to low health seeking behavior, frequent stock out of the commodity at the County coupled with health worker strike of November to December 2013.

Table 15: Vitamin A supplementation

Vitamin A Supplementation		
6-11 months	At least once	95.5%
12- 59 months	1 time	27.5%
	At least 2 times	70.4%

The nutritional impairment caused by soil-transmitted helminthes is recognized to have a significant impact on growth and physical development. To reduce the worm burden, WHO recommends periodic drug treatment (deworming) of all children living in endemic areas. WHO also recommends health and hygiene education, and provision of adequate sanitation[18]. Deworming in Isiolo County was assessed in children 12-59 months. The deworming rates were low with only 37% and 32.2% dewormed once and twice respectively in the past year as per the MOH recommendations. The low coverage of deworming among children 12-59 months is attributed to stock outs in various parts of the County worsened by health worker strike of late 2013 in demand of their salary increase from national and County governments.

5.3.3 Child morbidity

Assessment of childhood illnesses was based on a two week recall period prior to the survey date. Almost half of the children (49.6%) reported to be sick 2 weeks prior to the survey. The most common illnesses were Acute Respiratory Infections (50.2%) and fever like malaria (48.6%). The other illnesses reported were watery diarrhea (12.6%), bloody diarrhea (0.8%) and other illnesses at 6.9%. The seasonal calendar for Isiolo County shows that in the month of October to December there is a general trend of increased child illnesses namely; Malaria and diarrhea. This can be attributed to water borne illnesses as result of water contamination with human waste as majority of households do not practice optimal sanitary disposal of human waste coupled with increased reservoirs for inhabiting vectors namely, mosquito causing malaria etc. The short fall of short rains of December, brings forth short dry spell in month of January to February, the dry spell is characterized by heavy wind which blows dust and foreign particles in the air leading to increased upper respiratory tract infections among vulnerable population especially under-fives.

5.3.4 Health Seeking Behavior

The survey further assessed the health seeking behavior of the caregivers when the children were sick. The analysis showed that majority of the caregivers (64.2%) took their children to public clinics. 19.6% of the caregiver took their children to private clinics while 7.8% of the children were assisted by NGOs (Non-Governmental organizations). Other areas where the mothers sought assistance were shops (2.5%), traditional healers (2.5%), community health workers (2.0%) and mobile clinics (2.0%) while 1.5% of the sick children were treated with herbs at home. A significant number of caregivers however did not seek any form of assistance during illness (17.4%)

[18] e-Library of Evidence for Nutrition Actions (eLENA)

5.3.5 Therapeutic Zinc supplementation in treatment of watery Diarrhea

Studies have shown that zinc supplementation reduces the duration and severity of diarrheal episodes and likelihood of subsequent infections for 2–3 months[19]. In Isiolo County 71% of the children with watery diarrhea were supplemented with zinc. The proportion is below the national targets of 80% due to stock outs in the months of January 2014.

5.3.6 Maternal Health Care

The survey assessed iron folate supplementation in pregnancy and maternal nutrition status based on MUAC for Pregnant Lactating Women (PLW). Based only on the current pregnancy, the mothers were asked to state if they had received iron folate supplements and the number of days they had consumed the iron folate tabs. Only 24.3% of the pregnant mothers reported to have received the pills. The adherence to the supplementation was poor, with none of the mothers meeting the 90 days minimum requirement of intake. This can be attributed to insufficient health education on the importance of the supplements to the mothers, health worker strike of November to December 2013 coupled with lack of medical supplies at the County level in the month of December 2013 and January 2014.

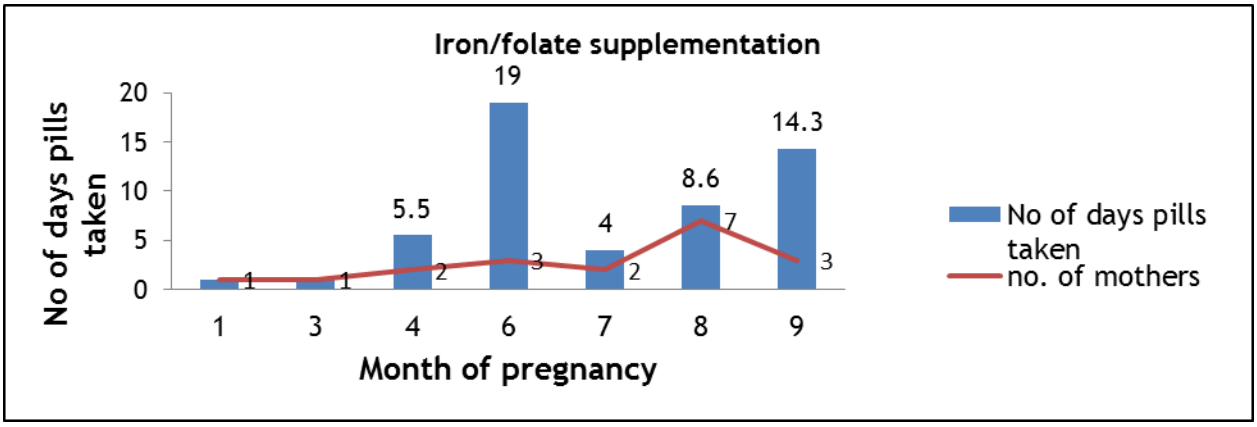

Figure 4: Iron folic supplementation in pregnancy

The nutritional status of all the mothers was analyzed as shown in *table 16*.

Table 16: Maternal nutritional Status

MUAC	n	<21CM
All women (15-49 yrs.)	25	6.0%
PLW	17	6.4%

All the PLW with a MUAC measurement of less than 210 millimeters were referred to the nearest supplementary feeding centers for management.

5.3.7 Mosquito net ownership & utilization

Most of the households (71.4%) reported to own at least one mosquito net. Assessment of utilization of the nets during the previous night among the vulnerable groups showed that 55%

[19] Bhutta ZA et al. Therapeutic effects of oral zinc in acute and persistent diarrhea in children in developing countries: pooled analysis of randomized controlled trials. American Journal of Clinical Nutrition, 2000, 72(6):1516–22.

and 45% of children less than five years and pregnant mothers respectively slept under the mosquito net.

5.4 FOOD SECURITY AND LIVELIHOOD

5.4.1 Food Security Information

Food security situation remained stressed (Integrated Phase 2 Classification). This could be attributed to poor performance of short rains[20]. From observation pasture and browse deteriorating in most areas due to inadequate October to December short rains. Scarcity of water for livestock was noted as most sources dried up forcing households in the pastoral livelihood to trek for longer distances. There was decline in livestock prices which could reduce household income and therefore household access to food at a time when they are highly dependent on the market. Milk production and availability slightly declined.

5.4.2 Household Dietary Diversity

Household dietary diversity (HDDS) is used as a proxy to measure the economic ability of households to access a variety of foods. The household dietary diversity was based on 24-hour recall period. The highlights in *figure 4* show food groups that account for the highest percentages. This indicates that these were the commonly consumed foods. It is important to note that the main source of these foods to include milk, cereals, fats and sugars was purchase at 94.2%.

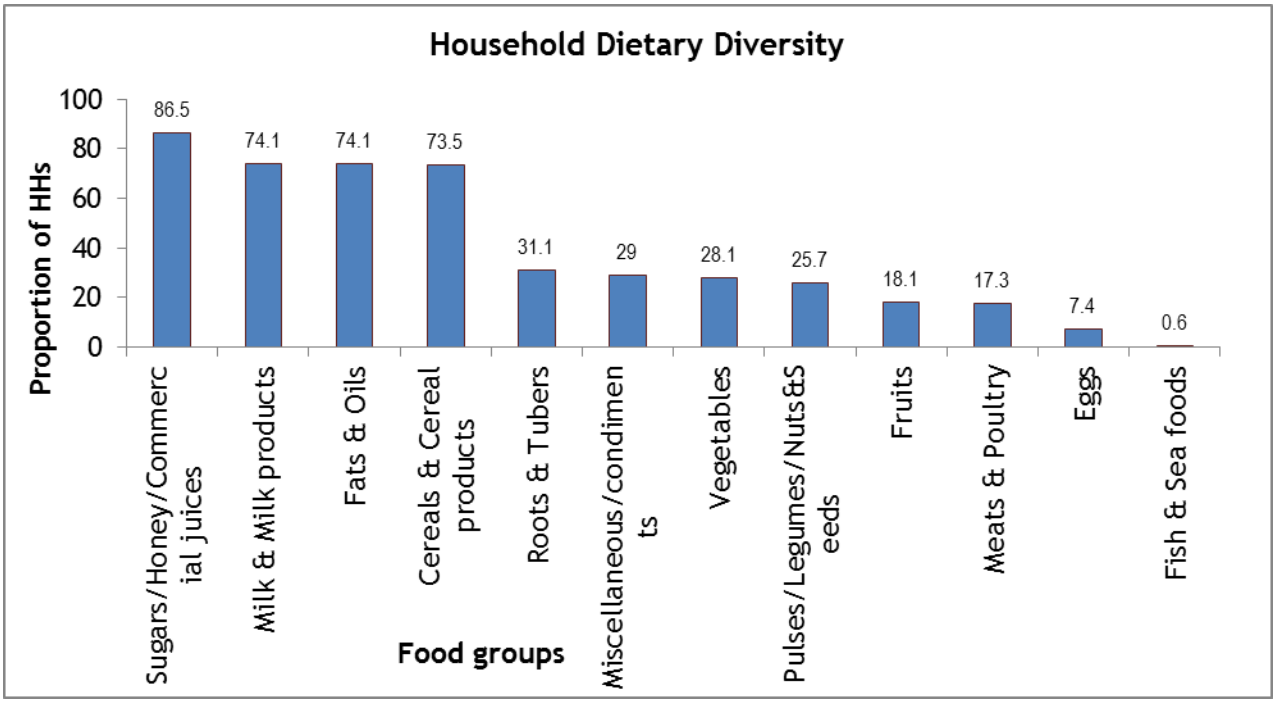

Figure 5: Household dietary diversity

[20] Short rain seasons assessment report for Isiolo County by KFSSG, March 2014

Table 17: Food groups consumed by >50% of households by dietary diversity tercile (24 hour recall)

Lowest dietary diversity (=< 3 food groups- 28.7)	Medium dietary diversity (4 and 5 food groups-38.4%)	High dietary diversity (=> 6 food groups-32.9%)
Sweets/Sugars	Cereals	Cereals
	Milk and milk products	Milk and milk products
	Oils/Fats	Condiments
	Sweets/sugars	Oils/Fats
		White tubers roots and plantains
		Sweets/sugars
		vegetables

Majority of the households did not meet the acceptable dietary diversity of six food groups and above. The generalized poor dietary diversity was highly attributed to increased food prices[21] , poor infrastructure in some areas leading to market inaccessibility of variety and the poor performance of the short rains.

5.4.3 Food Consumption Score (FCS)

FCS measured at household level, combines measurements of dietary diversity, the frequency with which different foods are consumed and the relative nutritional importance of various food groups[22]. A 7 day recall period was used to obtain food consumption frequency of each food group then multiplied by an assigned weight based on nutrients content. The household food consumption score indicated that most households were within the acceptable food consumption threshold (>35.5). This is attributed to daily consumption of cereals, milk & milk products, sugars and oils.

Table 18: Food Consumption Score

Main Threshold	Nomenclature	Findings
0-21	Poor food consumption…mainly cereal	2.0%
21.5-35	Borderline food consumption Cereal, protein or milk (3-4/week), oil, sugar	7.8%
>35.5	Good food consumption Cereal, protein and milk (>5/week), or fruit or vegetable, oil, sugar	90.2%

5.4.4 Coping Strategy weighted Index

A total of 445 households were embracing coping mechanisms with a total weighted coping strategy score of 23.5. This was an increase compared to May 2013 SMART surveys average weighted score of 18.4. Most household relied on less preferred and less expensive food. This was attributed to increased food prices, seasonal variations with limitations in access to certain food items affecting household access to food since most of the households are highly

[21] Isiolo NDMA Monthly Bulletins-January 2014

[22] Ruel, M.T., *Is Dietary Diversity an Indicator of Food Security or Dietary Quality? A Review of Measurement Issues and Research Needs*. Discussion paper 140. Washington D.C, 2003

dependent on purchases. The most severe coping strategy index was embraced by more than half of the households with a score of 7.2.

Table 19: Coping Strategy (Isiolo SMART-2014)

Coping strategy	Proportion of HH (445)	Frequency score (0-7)	Severity score (1-3)	Weighted score=Freq*weight
Rely on less preferred & less expensive food	**91.2**	2.8	1	5.6
Borrow food	77.7	2.4	2	4.8
Limit portion sizes	88.3	2.8	1	2.8
Restrict consumption of food by adults for young children to eat	**70.6**	**2.4**	**3**	**7.2**
Reduced number of meals	86.3	3.1	1	3.1
Total weighted coping strategy score				**23.5**

5.5: WATER SANITATION and HYGIENE

5.5.1 WATER

The survey was conducted after the short rains during the short dry period. The delayed onset and early cessation of the October to December short rains contributed to the low recharge to water sources thus the water availability was not sufficient. This made the existing water shortage worse in some areas in the County. For instance, during the survey period Modogashe and Belgesh locations in Garbatulla Sub County are among areas that were observed to be facing acute water shortage.

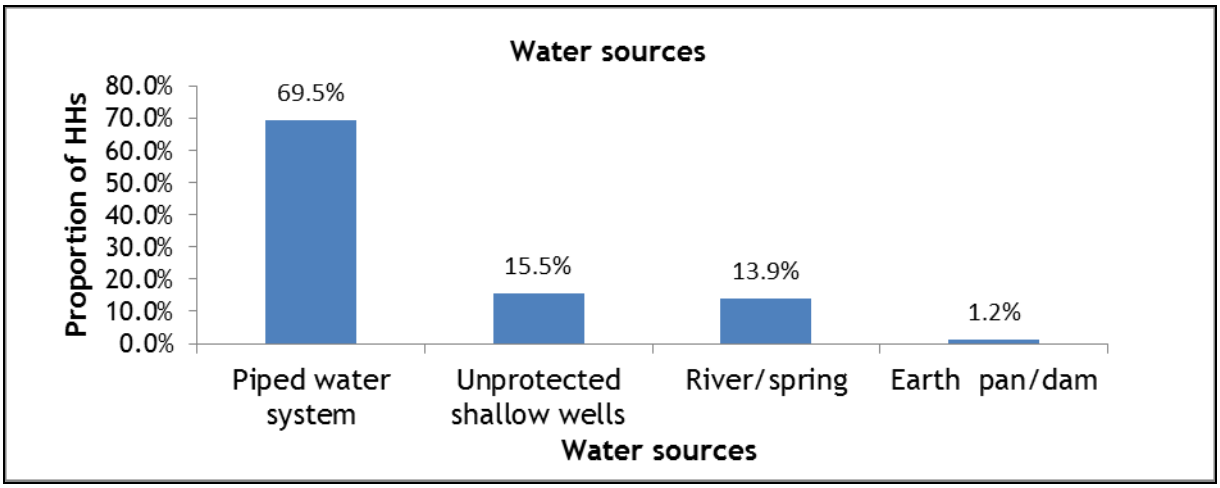

Figure 6: Main water source for drinking

Safe water sources only from piped water system[23] were the main sources for drinking water utilized by 69.5% of the households in Isiolo County. Treatment of water before drinking is still a great challenge with 80.5% of the households not treating the water before drinking. In

[23] Piped water system from protected boreholes and shallow wells

majority of the households (95.6%), it was observed that women were involved in fetching water at the source for household consumption.

Majority of the sampled households did not meet the SPHERE and national standards in water consumption, 15lpd for sphere, national 20lpd for high potential areas or 15lpd for medium potential, as shown in figure 6. The average amount of water consumed in Isiolo County was 15.3 litres.

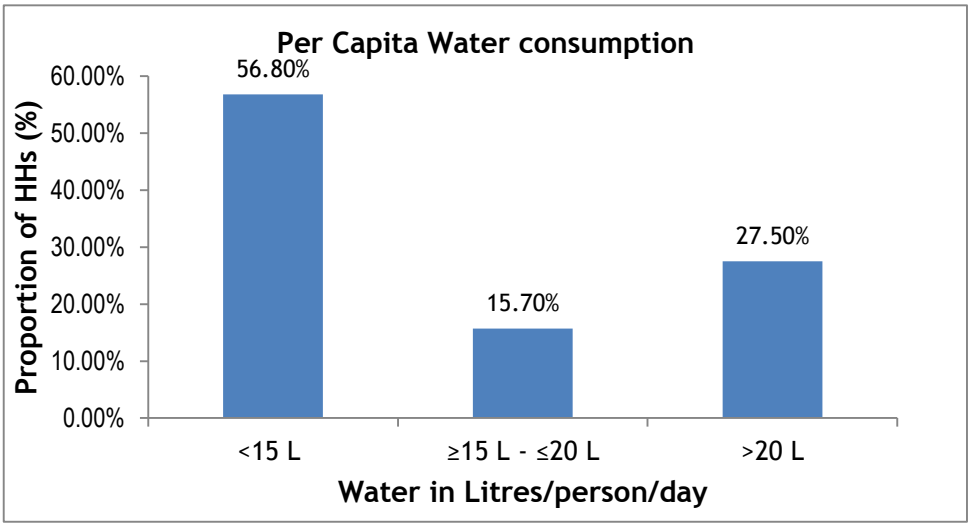

Figure 7: Per Capita Water consumption

Table 20: Distance to main water source

Distance to main water source	Proportion of households
≤500m	63.1%
>500meters-2km	17.5%
More than 2km	19.5%

Majority of the households (63.1%) had water points within a distance of 500 meters from the homestead. Only 27.5% of the households queued for water with 64.4% and 15.8% of these queuing for less than 30 minutes and more than one hour respectively. More than half of the households (52.4%) in Isiolo County using piped water pay for it with majority (64.4%) spending less than 3 ksh per 20 litres-jerrican. Villages situated in towns paid an average monthly fee of 300 Ksh for those homesteads are connected to piped water system.

5.5.2 HYGIENE PRACTICES

Proper storage of water using closed containers was embraced by 94.8% of households. In prevention of the spread of diarrheal diseases, appropriate hand washing at critical times is very vital. 84.9% of caregivers reported washing hands after toilet, 63.5% before cooking, 89.6% before eating and 56.8% after taking children to toilet. Generally, 60.4% washed their hands at least during three critical times. However, 8.8% of the respondents did not wash their hands during any of the four critical times.

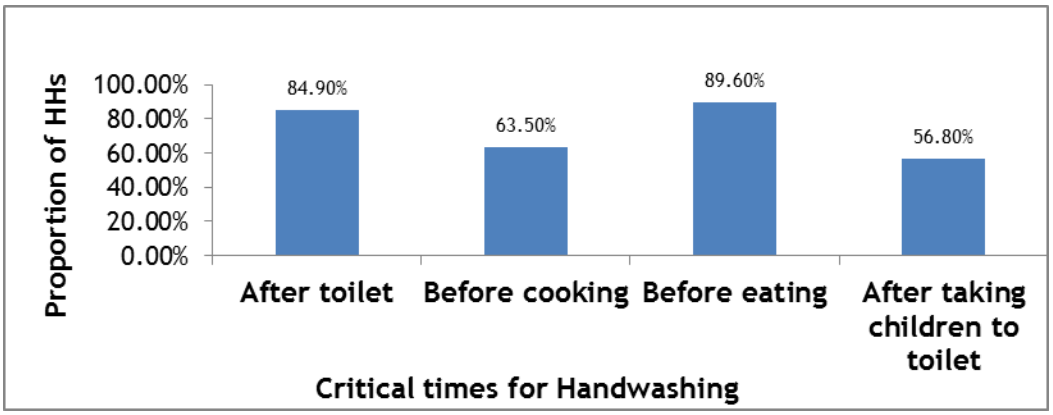

Figure 8: Critical times for hand washing

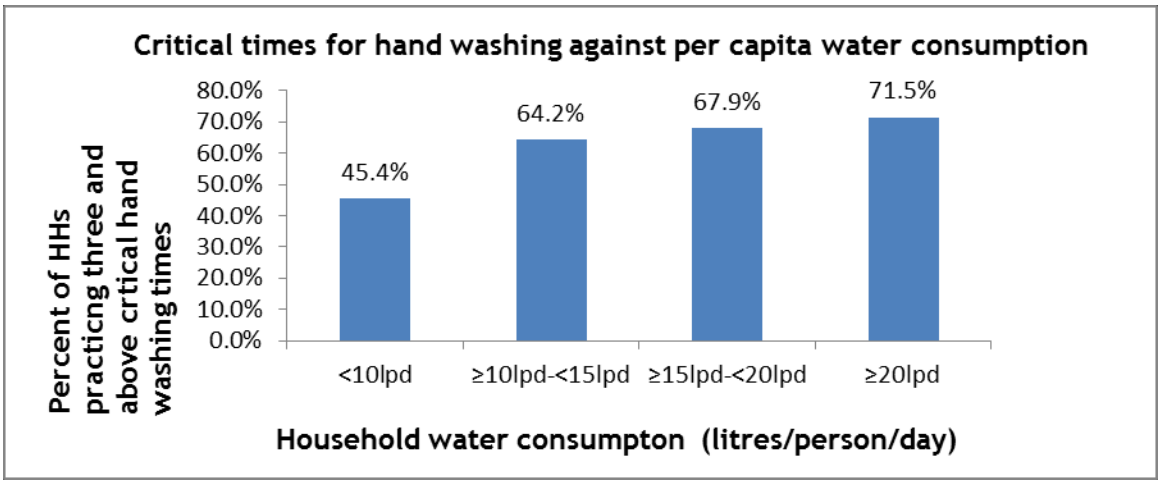

Figure 9: Critical times for hand washing against per capita water consumption

Effective hand washing entails the use of clean water and soap. Majority (70.7%) used soap and water to wash their hands (Table 21).

Table 21: Appropriate hand washing practices

Appropriate hand washing practices	Proportion of Households
Only water	28.7%
Soap and water	70.7%
Soap when I can afford	0.6%

5.5.3 SANITATION PRACTICES

Open defecation is still being practiced in the County by 23.7% of the households.

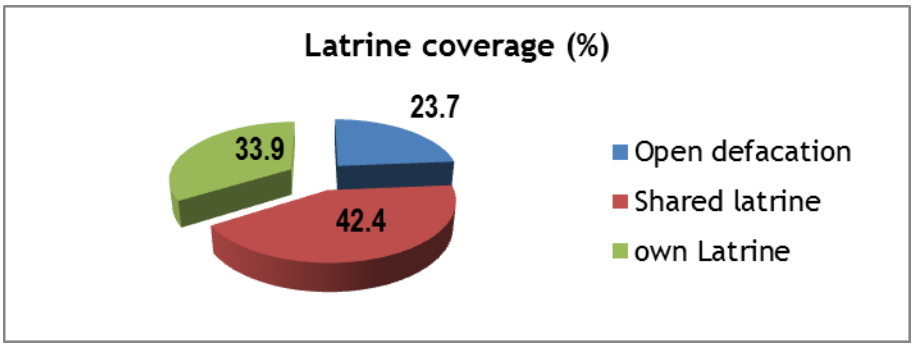

Figure 10: Latrine coverage in Isiolo County

6. CONCLUSION AND RECOMMENDATIONS

Malnutrition rates in Isiolo County indicate insignificant increase from 8.2 % in May 2013 to 11.5% though not seasonal comparable; this deterioratedfrom poor to alert/serious level. The increase could be attributed to a number of factors triangulated from both primary and secondary data.

- Increased child illnesses namely; ARI, Malaria and watery diarrhea at 50.2%, 48.6% and 12.6% respectively. Attributed to seasonality change, poor water, sanitation and hygiene practices (23.7% practicing open defecation) coupled with insufficient medical supplies in month of December to January 2014 and health worker strike of November to December 2013

- Poor performance of short rains of October to December 2013, early cessation affected recharge of water in water bodies' ie. water pans/dam thus resulting to water scarcity in various parts of the County namely; Belgesh and Modogashe of Garbatulla sub County.

- Households have increased coping mechanisms as result of compromised household food security with most households (414) embracing one or more coping strategies. The most severe coping strategy of restriction of food consumption by adults for young children to eat had a weighted score of 7.2 with 70 Households embracing the strategy. This can be attributed to increased food prices as most households are dependent on food purchases, unfavorable seasonal variations leading to limitation in access to certain foods. This is also evident with declining dietary diversity at the household level.

Based on these findings and discussions from both CSG (County steering Group) and CNTF (County Nutrition Technical Forum), the following recommendations were put forward as seen in table 22 below.

Table 22: Discussions and Recommendations

Findings	Discussions/way forward	By who
Nutrition and Health -GAM rates 11.5% -SAM rates 1.0% -Nutrition situation from poor to serious -Low Iron/Folate supplementation for pregnant women at all stages of pregnancy	. -Need to scale up disease surveillance and include severe acute malnutrition as part of the weekly surveillance -Use of the mothers in the cash transfer program as they are more responsible in ensuring household food availability. -Improving the Food – By – Prescription program and Protection Rations so as to supplement IMAM programs and avoid sharing. -Need to have a Contingency plan to respond to the situation before it worsens -Need to carry out health education to mothers on the importance of the supplement at the facility level. -Need to change the approaches used on health education by using model mothers and or group counseling rather than individual counseling.	-Ministry of Health -From all the surveillance departments WFP -WFP & Ministry of Health
Food Security and Livelihood situation - Poor dietary diversity from the HDDS -Coping Strategy Index has increased from 18.5 to 23.5 --From the ministry of livestock and observation pasture is deteriorating	-Need for diversification of livelihoods for pastoral communities; need to support agro-pastoralists to open more land for irrigation; Transfer of technology for agro-pastoralists to improve from subsistence farming to large scale farming -Community education on the importance of livestock off takes during drought; based on situation scenario. -Nutrition education and food demonstrations to improve on diversity and maximize the use of locally available foods. -Identification of key nutritious foods that can be produced within the County hence they are available at an affordable price to act as a game changer. -Link with home economic and nutrition staff to increase awareness on nutrition education among agricultural extension workers.	Ministry of Agriculture and partners Ministry of Livestock and partners Ministry of Agriculture and partners
Water and Sanitation Hygiene 23.7% still practicing open defecation Lack of water in areas such as Modogashe and Belgesh (from WASH technical team)	-Health education on importance of using latrines Make the community members open defecation free (ODF) to ensure behavior change through triggering Community Led Total Sanitation (CLTS) -Water trucking to these areas required as an immediate temporary action to save the situation. -Permanent water sources installed as part of longer solution to water problems. -Review the supply chain system for the water treatment	-MOH -County government through Ministry of Water

-Water treatment; 80.5% doing nothing to their drinking water	chemicals to the community. -Provision of water treatment chemicals through the health facilities. -Need to strengthen community health promotion through the public health department and also to understand the community knowledge gaps.	-MOH, MOW & Partners

7 APPENDICES

ANNEX 1: Survey Quality

Table 23: Overall survey quality

CRITERIA	Missing/ flagged data	Overall sex ratio	Overall age distribution	Digit pref. score Weight	Digit pref. score Height	Digit pref. score MUAC	Standard deviation WHZ	Skewness WHZ	Kurtosis WHZ	Poisson distribution WHZ	Overall score WHZ
SCORE	0 (1.1 %)	0 (p=0.622)	4 (p=0.002)	0 (4)	0 (7)	**0 (4)**	0 (0.99))	0 (0.11)	0 (0.16)	1 (p=0.019)	**5%**
Interpretation	Excellent	Excellent	Acceptable	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Good	**Excellent**

The overall score of the survey was 5%, this is excellent.

ANNEX 2: CHART FOR CALCULATING AGE IN MONTHS

DATE OF BIRTH	AGE IN MONTHS	DATE OF BIRTH	AGE IN MONTHS
2009-March	59	2012-June	20
2009-April	58	2012-July	19
2009-May	57	2012-August	18
2009-June	56	2012-September	17
2009-July	55	2012-October	16
2009-August	54	2012-November	15
2009-September	53	2012-December	14
2009-October	52	2013 -January	13
2009-November	51	2013 - February	12
2009-December	50	2013 - March	11
2010-January	49	2013- April	10
2010-February	48	2013 - May	9
2010-March	47	2013 - June	8
2010-Apri	46	2013 - July	7
2010-May	45	2013 - August	6
2010-June	44	2013 - September	5
2010-July	43	2013- October	4
2010-August	42	2013-November	3

2010-September	41	2013-December	2
2010-October	40	2014 - January	1
2010-November	39	2014-February	0
2010-December	38		
2011-January	37		
2011-February	36		
2011-March	35		
2011-April	34		
2011-May	33		
2011- June	32		
2011-July	31		
2011-August	30		
2011-September	29		
2011-October	28		
2011-November	27		
2011-December	26		
2012-January	25		
2012-February	24		
2012-March	23		
2012- April	22		
2012-May	21		