INTEGRATED HEALTH AND NUTRITION SMART SURVEY

KAJIADO COUNTY

05th – 14th SEPTEMBER, 2012

FINAL REPORT

CONCERN WORLDWIDE KENYA

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List of Abbreviations

*ANC*_____*Ante-Natal Clinic*

*ASAL*_____*Arid and Semi-Arid Lands*

*CI*_____*Confidence Interval*

*CSB*_____*Corn Soya Blend*

*ENA*_____*Emergency Nutrition Assessment*

*FDGs*_____*Focus Group Discussions*

*GAM*_____*Global Acute Malnutrition*

*GOK*_____*Government of Kenya*

*HAZ*_____*Height –for-Age Z-score*

*HiNi*_____*High Impact Nutrition Intervention*

*ITNs*_____*Insecticide Treated Nets*

*MOMS*_____*Ministry of Medical Services*

*MoPHS*_____*Ministry of Public Health and Sanitation*

*MOH*_____*Ministry of Health*

*MUAC*_____*Mid-Upper Arm Circumference*

*NIA*_____*Neighbors Initiative Assistance*

*PLW*_____*Pregnant and Lactating Women*

*SAM*_____*Severe Acute Malnutrition*

*SD*_____*Standard Deviation*

*UNICEF*_____*United Nation Children Fund*

*WAZ*_____*Weight-for-Age Z-score*

*WHZ*_____*Weight-for- Height/Length Z-scores*

*WHO*_____*World Health Organization*

Executive Summary

The survey took place between 5th and 14th September 2012. Its general objective was to estimate the prevalence of malnutrition in children aged 6-59 months in Kajiado County, which constitutes Kajiado North, Kajiado central and Loitoktok districts. Specifically, the survey aimed at assessing the current prevalence of acute and chronic malnutrition in children aged 6 – 59 months, in addition to looking at Infant Young Child Nutrition (IYCN) practices, morbidity among under five children, Measles vaccination coverage and 'Vitamin A' supplementation, amongst other High Impact Nutrition Indicators (HINI). The survey also assessed the nutritional status of women of child bearing age, food security and food consumption patterns, water and sanitation situation as well as.

The survey was a cross sectional study with nutrition and food/ livelihood component according to SMART methodology and current best practices using 2 staged cluster sampling methodology. Focus group discussions and interviews with key informants were also done. The sample size was calculated using the estimated under 5 population size of 170,427 children (20% of the total projected[1] population for 2012) and the prevalence of malnutrition of previous survey in May 2011 (8.6%). 936 children (6-59moths), 244 children 0- 5 months and 699 households were included in this survey.

Using the new 2006 WHO standards, results show a prevalence of Global Acute Malnutrition (GAM), measured in weight for height Z-scores (WHZ), for children aged 6-59 months in this population as 4.7% (3.4 - 6.5%.) for both genders and a prevalence of Severe Acute Malnutrition (SAM) of 0.6 % (0.2 - 1.6) with no statistical significant differences between the 2 genders for either severe or global malnutrition[2] although boys were slightly more moderately and severely malnourished than girls. The prevalence of SAM using Mid Upper Arm Circumference (MUAC) defined as less than 11.5 cm, was 0.8 % (0.4 - 1.5%). GAM using MUAC (< 12.5cm) was 3.1% (2.2 - 4.4%), with another 12% of children being at risk: MUAC 12.5 – 13.4 cm.

Younger children age group 6- 29 months were more moderately malnourished with MAM rate of 4.4 % for wasting compared to the older children 30- 59 months old whose MAM was 4%. On the other hand, the severe Acute Malnutrition rate of the latter was higher at 0.3% (1 child) with no younger children being severely malnourished. The 1 severe case was the same, presenting also with oedema giving a prevalence of odema at 0.3.

Given that this survey was done at a different season with the previous one done in May 2011, comparing the current GAM prevalence with the last one is not advisable. The prevalence of

[1] The Geometric Growth Model was used to project the population for 2012 based on the 2009 census data as the base population and the annual growth rate of 3.6 % as provided by KNBS

[2] P value is 0.699 and confidence intervals overlap and the difference likely due to chance. GAM for boys is 5.8 % (4.0 - 8.4 95% C.I.) and girls 3.7 % (2.1 - 6.4 95%) while SAM is 0.7 % (0.2 - 2.9 95% C.I.) and 0.5 % (0.1 - 1.9% respectively.

malnutrition among children under the age of 5 years was low and is classified as acceptable[3] according to WHO classification.

The prevalence of stunting was however found to be high: 34.5 % (30.0 - 39.3 9%), with 11.3 % (8.6 - 14.6 95% C.I.) being severely stunted. Boys were more stunted than girls: 37.0 % (31.2 - 43.2 95%) and 32.1 % (27.0 - 37.7%) respectively for global stunting and with severe stunting prevalence of 12.3 % (8.8 - 17.0 %) for boys and 10.2 % (7.1 - 14.5%) for girls. It was also noted that the older children (30- 59 months) were more severely stunted at 13.4% compared to the younger 6- 29 months (9.4%). There was no significant difference in moderate stunting 23.5% for younger children and 23% for older children.

The proportion of chronic malnutrition in Kajiado is more than twice the national target of 16%[4]. In developing countries, the prevalence of stunting has been noted to start to rising at about three months of age and then slows at around two years of age. For children in the age group below two to three years, low height-for-age probably reflects a continuing process of failing to grow and for older children, it reflects a state of having failed to grow. Given that there is no significant difference in the age groups in Kajiado, this is an important fact when one is planning interventions to address stunting and further emphasizes the critical window of opportunity that exists for optimal nutrition from preconception to two years.

Other issues identified related to nutrition were:

1. 37.6% of the children sampled had been sick 2 weeks prior to the survey, most of them (19%) with ARI, followed by 7.9% fever, then 5.6% diarrhea. 24 cases (46.2%) of those diarrhoea cases was dysentery (have blood) and most of the diarrhoea (54.2%) were managed through use of ORS, 1.7% used Zinc, 11.9% used homemade solutions, 10.7% used septrin while another 6.8% used herbs. Only 34.9% of the children above 1 year were de-wormed have been de-wormed in the last 6 months- very low coverage only half of the households surveyed (52.8%) have mosquito nets, with most of them (89.9%) having received them from the MoH.

2. 87.2% of those children who had been sick sought some form of medical assistance: 47.3% went to public clinics/ dispensaries, 20.1% went to private clinics while 15% bought over the counter drugs. 1.6% used consulted local herbs for treatment.

3. Measles immunization amongst children 9 months and above is high at 85.5% with 57.3% being confirmed by the presence of vaccination card. Although no cases of measles were reported 2 weeks prior to the survey, key informant interviews and FGD discussions showed concern on suspected cases of measles particularly reported in North Kajiado. District statistics from the District health information system (DHIS) since January to September showed a total 441 suspected measles cases with Central reporting 108 of the cases; North: 253 and South: 80. Measles campaign was done in the North immediately the week after the survey, 15th- 19th,

[3] WHO classifies prevalence of global acute malnutrition as <5% acceptable, 5- 9.9% as poor, 10- 14.9% as serious and >=15% as critical.
[4] UNICEF *et all*. Undated. Kenya HINI Leaflet: Nutrition strategies and programs in Kenya.

September with 59,811 children vaccinated,

4. The overall Vitamin A supplementation in the last 6 months 6- 59 months is low 46.9. 44% of children 12- 59 months received Vitamin A supplement, while among the 6- 11 months coverage was 64%. 24% of 12- 59 months received twice, while 72% received once. The coverage of Oral Polio Vaccine (OPV 1) and OPV 3 was 96.4% and 92.5% respectively while BCG coverage was 85.5%, although some villages especially in Kajiado North had poor vaccination coverage.

5. Infant young child feeding practices are still a main challenge in the county. 76.1% of children 0-5 months initiated breastfeeding within the first one hour. However the exclusive breastfeeding rate still low (44.7%) although this is a significant improvement from 2011 when it was 14.7% (p value = 0.000). Practicing EBF among both HIV AIDs infected mothers and non-infected informed mothers remains a challenge. EBF however due to the fact that most mothers are bread winners and spend considerable time in the agricultural farming groups. Moreover, complimentary feeding after 6 months is also limited by the restricted diet that is locally available, which is mainly milk, maize meal, rice and occasionally beans. 303 out 390 children under 2 years (77.7%) were still breastfeeding although 46.4% of these were given other foods (including water) before they reached 6 months and 48.3% were given complementary feeding at 6 months.
6. 75.8% of the children 6- 23 that were still breastfeeding consumed 3 or more food groups, while the non-breastfed who ate 4 or more food groups were 69.8%. On meal frequency for the 6-23 months, 74.3% among those breastfeeding ate at least 3 meals, although of concern is the low percentage of the non-breastfeeding who ate at least 4 meals (42.3%). The percentage of households that usually eat 3 meals a day was 69.4% and this was very comparable to no. of households that had eaten the 3 meals the day prior to the survey (69.1%). Fewer people than usual ate more than 3 meals (3.4% against usual 7.1%) while slightly more people ate 1 or 2 meals than usual.
7. While the main source of food consumed is purchases 83.7% followed by own production at 11.9%, the main source of livelihood is livestock keeping (38.3%), followed by casual labour (14.4%) and farming (12.2%) and petty trade at 10.9%. The last general food distribution (done in early September) by Neighbourhood Initiative Assistance (NIA) consisted of 6kg of cereals, 1.2 kg pulses with 0.6 kg CSB, 0.4L of vegetable oil- all per person. Aid is distributed only at the climax of hunger season (July, Aug, Oct), only targeting rural areas in the county. 86,720 (21% of county population) are registered for food AID and 32.8% of sampled households received relief food at least once in the last 3 months (June- August 2012). although 33.5% reported that the food received lasted for less than one week, 31.2% reported that it had lasted for only one week
8. Maternal nutrition: The prevalence of malnutrition among 640 women was found to be 2.6%%, with 10.9% of mothers in Kajiado being at risk of being malnourished. 18.5% (MUAC < 21 cm and < 23 cm respectively. The pregnant and lactating women were slightly more malnourished (3.1%), with 12.8% at risk. Vitamin A supplementation amongst lactating women was low with at least 29.8% (n=22) of the sampled women receiving the supplement. 54% of all the women interviewed were given iron supplements in the last pregnancy, while 15.9%received folic acid. Most women interviewed (61.7%) gave birth at home with no assistance of skilled workers deliveries, although 3.1% were helped by a skilled attendant. Only 27.8% of the women delivered their last child in a health facility despite the fact that anemia has been noted to affect many child bearing women in the area. The high home deliveries have been attributed to several factors, including poor health care access with health facilities being up to 70 km away in

some areas, Poor infrastructure and lack of good communication networks worsens the health access as well as a highly patriarchal community in which the woman is not listened to as much & mothers in laws play a key role in determining child bearing and care practices.

9. On average the amount of water used daily per house hold is 58 Liters although this ranges from 10 Litre to 200 Litres. The average water used per person per day in Kajiado is 11 Litres. This is less than the minimum required as per sphere standards recommendation of 15 L per person per day[5]. Among the sources of water mentioned by the responded were water taps (33.5%), tanker (2.2%), unprotected wells (41.5%) while the rest were getting their water from lagas and earthen dams. Of the 64% of the households that does not have access to safe drinking water, 27.1% of them treat their water before drinking while 74.7% do not treat the water. The most common method of treating water among the households that practice water treatment was boiling (67.4%) 35.9% of households have access to safe water source while 45.5% have access to a toilet. Hand washing at critical times[6] was found to be 23.6%

In conclusion the prevalence of acute malnutrition of children in Kajiado County has improved. Although the prevalence of wasting is low and at acceptable levels, concern is on the high prevalence of stunting levels, hence high chronic malnutrition. "Stunting in children below the age of five is a stronger indicator of hunger and one of its determinants, poverty, than other anthropometric indicators or estimates of per capita income. This is because stunting indicates the chronic restriction of a child's potential growth, reflecting the cumulative effects of inadequate food intake and poor health conditions that result from endemic poverty' (United Nations Standing Committee 2010)[7]. In order to successfully and sustainable address stunting, it is critical that an integrated approach is applied.

HINI components are still low especially Vitamin A coverage (and in particular among the 12- 59 months who took the supplements twice in the last 1 year); Zinc supplementation in managing diarrhoea is low. De-worming coverage is also low as well as exclusive breastfeeding rates. Although the overall county immunization coverage for measles, OPV and BCG are excellent, some pockets of concern have very poor coverage, especially in Kajiado North. There is still stigmatization of HIV/AIDS: It is taboo to discuss the subject openly.

Short term/ mid term

- Frequent measles vaccination campaigns especially in areas where access to health facilities is a main challenge, with timely interventions when suspected cases are highlighted.
- Mothers of infants and young children require much health and nutrition education, as the available research shows that effects on linear growth seem to be best with interventions that also provide specific educational messages such as importance diet diversity and emphasize of

[5] Sphere Handbook.**The Sphere Project-** Humanitarian Charter and Minimum Standards in Disaster Response

[6] Hand Washing at critical times includes washing hands after visiting toilet, before handling food, after cleaning Childs bottom, before feeding the child and before eating

7 Jane Badham, Lara Sweet. 2010; Stunting: An Overview. SIGHT AND LIFE Magazine

the critical window of opportunity that exists for optimal nutrition from preconception to two years.

- Scaling up HINI indicators is essentially (especially Vitamin A supplementation, de-worming and using Zinc for diarrhoea management) as well as iron supplementation for PLWs through strengthening of outreach services to supplement long distance/ access to health facilities.
- Roll out of micronutrient supplementation program in districts that have not yet started (e.g. central) with refresher training for health facility staffs especially in Kajiado central on enhanced management of diarrhoea in order to promote Zinc usage.
- District based surveillance systems could be established to help individual districts monitor the HINI indicators at relatively lower costs.
- Implementation of the community strategy which also addresses challenges of access to the health facilities should be supported by MoH and its partners in the various districts.
- Specific pocket areas where the GAM/ SAM might be of concern e.g. flower farms, slums etc can be addressed by continuous surveillance and if need be appropriate targeted interventions done in those areas.
- Streamline and adherence to the admission criteria to targeted nutrition program among all partners working in IMAM.
- Partners should invest in more Livelihood intervention programs and scale up interventions such as adopting livelihood diversifications to have a shift from over-dependence on pastoralist & adopt income generating activities e.g. small scale trade, more market participation e.g. selling livestock products, bee keeping & honey production.
- It is necessary to have health education sessions on HIV targeting all community members (both infected and non infected/ affected at the community level to help reduce stigma and also to address information gap on IYCN in the context of HIV.
- DHMT Central and the district hospital should look into the concerns raised about the district hospital and work at restoring community confidence on service delivery.

Long term

1. MoH & Partners need to invest in address the Health care access challenges (distance, attitude) by constructing more health facilities and the need to continually encourage hospital deliveries.
2. Cultural reasons for home deliveries should be addressed through continuous health education while exercising best practices in behaviour change communication.
3. Scale up WASH program to cover all areas of the county in both urban, semi urban and the rural areas

Table 1: Summary of Indicators

Demographic			
Number of HH Surveyed		699	
Number of Children 6 – 59 Months Surveyed f		936	
Number of Children 0 – 23 Months Surveyed for IYCN		556	
Number of Children 0 – 5 Months Surveyed for EBF		244	
Average Number of Persons per Household		5.6 (SD=2.3)	
Proportion of Children Under 5 Years		28.8% (27.7 – 29.8, 95% CI)	
Nutrition Status of Children 6 – 59 Months			
	N	**n**	**% (95% C.I)**
Prevalence of GAM	885	42	4.7% (3.4 – 6.5)
Prevalence of SAM	885	5	0.6% (0.2 – 1.6)
Prevalence of GAM based on MUAC (<125 mm)	782	29	3.1%
Prevalence of SAM based on MUAC (< 115 mm)	782	7	0.7%
Prevalence of Underweight	873	145	16.6% (13.2 – 20.7)
Prevalence of Severe Stunting	873	25	2.9% (1.8 – 4.5)
Prevalence of Stunting	843	281	34.5% (30.0 – 39.3)
Prevalence of Severe Stunting	843	95	11.3% (8.6 – 14.6)
Children Morbidity			
	N	**n**	**%**
Proportion of Children Sick 2 Weeks Preceding the Survey	926	348	37.6%
Proportion of Children with ARI	348	176	50.6%
Proportion of Children with Fever	348	73	21.0%
Proportion of Children with Diarrhea	348	52	14.9%
Proportion of Children with Eye Infection	348	24	6.9%
Health Seeking Behavior among the children sick 2 weeks prior	313	273	87.2%
Vaccination Coverage			
	N	**n**	**%**
OPV 1 Coverage	911	878	96.4%
BCG Coverage	911	885	97.2%
OPV 3 Coverage	911	843	92.5%
Measles Coverage among Children 9 – 59 Months	836	715	85.5%
Vitamin A Coverage 6 – 11 Months 12 – 59 Months Overall	 130 755 885	 83 332 415	 64.0% 44.0% 46.9%
De-worming Coverage	755	263	34.9%
Zinc Supplementation	52	1	1.7%
Maternal Indicators			
	N	**n**	**%**
Proportion of Caregivers Malnourished (MUAC < 21cm)	638	17	2.6%

Proportion of Caregiver at Risk of Malnutrition (MUAC >=21 and <23)	638	70	10.9%
Proportion of PLW	638	131	20.5%
Proportion of PLW who were Malnourished (MUAC < 21cm)	131	4	3.1%
Proportion of PLW at risk of Malnutrition (MUAC >=21 and <23)	131	20	14.9%
Proportion of Caregiver Supplemented with Vitamin A	75	22	29.8%
Proportion of Caregivers Supplemented with Iron	638	446	69.9%
Proportion of Caregivers Delivering at Home with No Assistance of Skilled Worker	647	399	61.7%
Infant and Young Children Feeding Practices			
	N	**n**	**%**
Continued Breastfeeding (6 – 23 Months)	390	303	77.7%
Introduction to Complementary Feeding before 6 Months (6-23 Months)	377	175	46.4%
Introduction to Complementary Feeding at 6 Months (6 – 23 Months)	377	182	48.3%
Timely Initiation to Breastfeeding (Within 1 Hr)	244	186	76.1%
Exclusive Breastfeeding	244	109	44.7%
Minimum Meal Frequency	322	222	68.8%
Minimum Dietary Diversity	322	234	72.4%
Water, Sanitation and ITNs			
	N	**n**	**%**
Proportion of Households with Access to Safe Drinking Water	699	251	35.9%
Proportion of Households with Access to Toilet Facility	654	297	45.4%
Proportion of Households with ITNs	676	354	52.3%

CHAPTER 1
BACKGROUND

1.1 Introduction

Kajiado County is located in the Rift Valley and comprises of three districts; Kajiado North, Kajiado Central and Loitoktok Districts. It covers a total area of 21,900.9 Square kilometers, with an estimated population of 687,312 out of which 137,466 are children under five years old, according to the 2009 Census. There are five different livelihoods namely; Pastoral, Agro pastoral, Pastoral/Leasing, Mixed farming and Formal employment/Casual waged labor/Business. The landscape consists of plains and some volcanic hills and valleys. The region is very dry with only seasonal rivers and is officially designated as a semi-arid region.

The annual rainfall ranges between 500-1250mm and is poorly distributed in amounts and spread. In recent years there have been long periods of drought when there has been little or no rains to support a predominantly pastoralist population. The indigenous people of the area are Maasai but there is an increasing influx of people from other tribal groups contributing to increased pressure on the land and other resources, including water.

Although generally the long rains in 2012 were above normal in most of the areas in the county, the southern parts of the county where the Loitoktok District falls experienced failed rains for 2 consecutive seasons and the impact was especially felt as the short rains are mostly depended on in the Southern parts for farming. Loitoktok district is already being faced with human wildlife conflict owing to the competition of available pasture and water for the livestock and wild animals. Despite adequate pasture that is likely to last for the next two months, in most of the county, the amount of water available is minimal and is drastically reducing and is likely to result in livestock migration to the neighboring districts, which may result in increased prevalence of livestock diseases as well as reduced milk availability at household level. This may negatively affect the nutrition status of children.

Overall the food and nutrition security situation has improved compared to last year, based on the data and information collated during the August 2012 Long Rains Assessment, as a result of : good long rains performance, improved water availability and trekking distances for both human and livestock (4-6KM[8]), good animal body conditions, however, the milk availability at household level was found to be low, owing to the low household stocks of livestock stemming from the trailing effects of the 2009 and subsequent droughts. The nutrition situation according the MUAC data for children less than 5 years of age had improved slightly from 10.8% to 9.8% (MUAC less than 135MM)[9]. This improvement in the food security situation resulted in recommendation by the Kenya Food Security Steering Group for a slight reduction in the number of beneficiaries under the Protracted Relief and Recovery Operations.

However, aggravating factors that are likely to alter the current nutrition and food security situation include the poor rains in the Southern region (the main source of food for the County) that are likely to

[8] Kajiado District Early Warning System Bulletin-July 2012
[9] Arid Lands

result in a deterioration of food security in the agro pastoral areas in the South where below average rainfall in most of the rain-fed farming areas were received in the last 2 season, suggesting an inevitable shortfall of harvest, while in some locations, total crop failure was experienced. The prevailing unfair terms of trade in some areas 2012 is yet another factor, with current cereal-meat ratio being unfavorable due to scarcity and souring food prices., for instance, a 90kg bag of maize costs between sh 3000 and 4000 while a Goat sells for between sh 4,000 and 4,500. In addition, pulses and cereals prices are still high with most of them being sourced from Namanga and neighboring districts of Tanzania. Livestock diseases for instance the Contagious Caprine Pleuro Pneumonia (CCPP) that was reported in most pastoral areas in the month of July are also likely to affect livestock production.

The prevalence of human diseases which have direct impact on the nutrition status of children less than 5 years is also high, with secondary data indicating diarrhea and Acute Respiratory infections being prevalent[10]. The chronic long-term challenges such as poor child feeding and care practices among the pastoralist community as was evidenced in the KAP survey conducted in early 2012[11] are also likely to negatively impact on the nutrition status of children under 5 years. For instance Exclusive Breastfeeding rates and timely introduction of solid and semi-solid foods stood at 33.9% and 27.5% respectively, both of which are suboptimal and way below the national recommendations, notwithstanding the nutrition and health and nutrition education that was undertaken by Concern and its partner (NIA) since 2009 in the Kajiado Central and Loitoktok Districts. This is in addition to the poor dietary diversity (25.3%) and low rates of continued breastfeeding at 1 year (43.2%),are all factors that negatively affect the nutrition status.

1.2 Rationale of the Survey

In order to assess the levels of malnutrition and the performance of the HiNi indicators in the greater Kajiado District, Concern Worldwide in collaboration with MoPHS and UNICEF carried out a nutrition survey. This survey was conducted between 5th September and 14th September 2012 and helped in evaluating the extent of malnutrition among the children aged 6-59 months and recommended appropriate interventions

1.3 Objectives

1.3.1 Overall Objective

The general objective of the survey was to estimate the prevalence of malnutrition in children aged 6-59 months in the Kajiado County.

[10] Preliminary findings of the Kajiado County Long Rains Assessment-August 2012
[11] Concern Worldwide Kajiado and Oloitoktok KAP survey 2012

1.3.2 Specific Objectives:

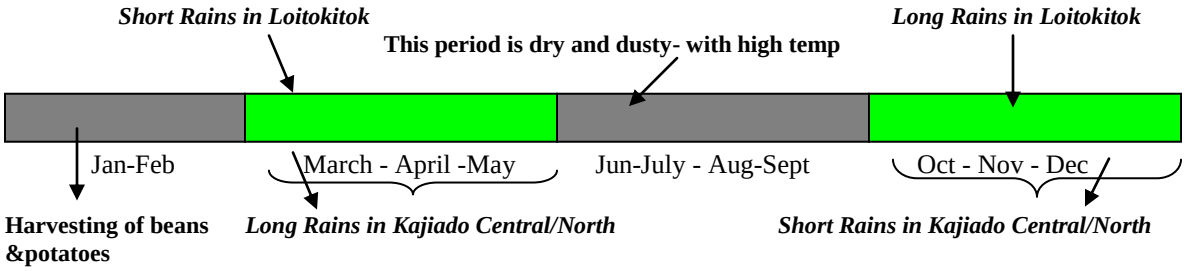
- To estimate the current prevalence of acute malnutrition in children aged 6 – 59 months
- To estimate Measles, de-worming, BCG vaccination and 'Vitamin A' supplementation coverage for children 9-59 months and 6-59 months respectively
- To assess the current food security situation of the surveyed population
- To measure the Wash indicators
- To measure the Morbidity rates of children 6-59 months 2 weeks prior to the survey
- To measure the IYCN indicators

1.4 Timing of the Survey

The survey was undertaken between 5th September and 14th September, 2012. Training, including standardization test and piloting of the data collection tools were conducted from 5th and 8th September, 2012 and thereafter data collection from 9th to 14th September, 2012. Data entry was done in the evening following data collection

1.5 Seasonal Calendar

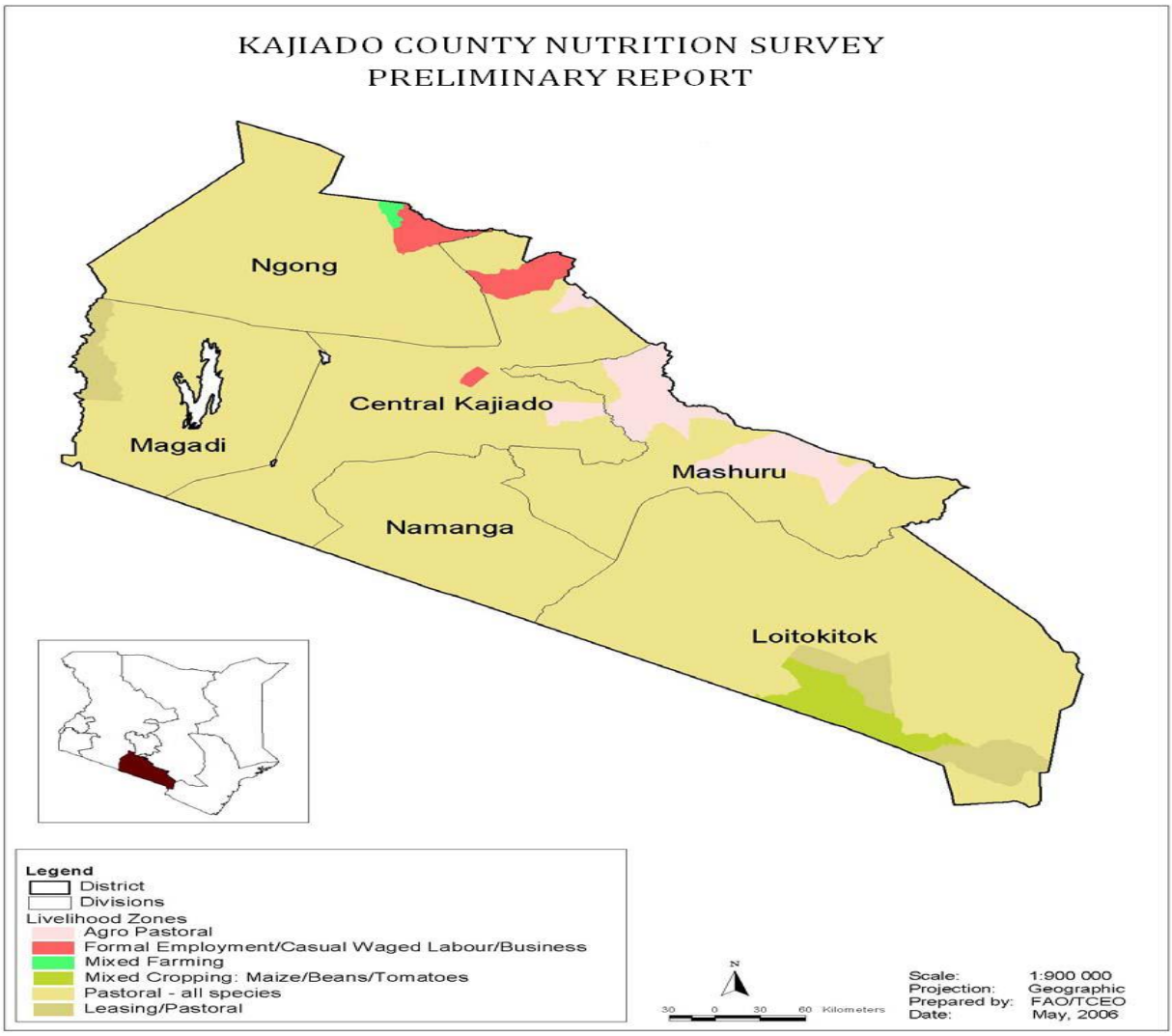
Figure 1: Seasonal calendar for Greater Kajiado District



1.6 Area Surveyed

The survey was conducted in Kajiado County which comprises of three districts namely; Kajiado North, Kajiado Central and Loitokitok Districts and covered all the eight divisions namely; Central, Ngong, Magadi, Mashuru, Loitokitok, Ewaso Kedong, Isinya and Namanga. Kajiado County is found in the Southern part of the Rift Valley Province bordering Tanzania. Located in the Arid and Semi-Arid Lands (ASALs), pastoralism dominates the area with some agro-pastoralist areas in Kajiado and some distinct agrarian areas in Loitokitok; agricultural produce from these areas in Loitokitok also supplies markets in Kajiado District. The area is predominantly inhabited by the Maasai but changes in the traditional land tenure system (shift from communal to individual and increase in privatization) are causing them to consider selling the land. This implies a threat to the traditional communal grazing arrangements that enabled livestock to be moved around flexibly to good grazing areas.

Figure 2: Map of the Larger Moyale District



1.7 Methodology

1.7.1 Study Design

The survey applied a two stage cluster sampling using the SMART methodology with the clusters being selected using the probability proportional to population size (PPS).

1.7.2 Study Population

The target population for this survey was the children aged 6 – 59 months for the anthropometric component, 0 – 5 for the EBF rates and the caregivers of the targeted children.

1.7.3 Sample Size

The sample size was calculated using the SMART survey calculator. The projected village population sizes for 2012 for the county were used as the sampling frame. The population was projected using the Geometric Population Growth Models with the annual growth rate being 3.6%[12].

1.7.4 Sample Size Calculation for the Anthropometric/Malnutrition

The malnutrition/anthropometric sample size was based on the following parameters:

1. Malnutrition prevalence: The estimated prevalence of malnutrition of 8.6[13] was used based on the 2011 survey
2. The design effect: taking in to consideration the heterogeneity of the survey area and the results of last year survey a design effect of 2 was used
3. The precision: As the estimated malnutrition prevalence was 8.6%, a precision of 3% was required to obtain an accurate estimate of malnutrition prevalence.
4. Under 5 populations: The total under 60 month's population of the survey area was **170,427** (20% of the total projected[14] population for 2012)
5. The May 2011 nutrition survey identified 1.4 under-five population per household.

Table 2: Anthropometry sample size for Kajiado County

Population	U5 Pop.	Estimated Prevalence	Precision	Design Effect	% of Non-Response	Sample Size	HH to be Included	# Cluster
764,246	170,427	8.6%	3%	2	3%	730	658	36

Based on the above information, every cluster had 19 households which were sampled and expected to produce at least 21 children between 6 and 59 months.

All accessible villages were included in the initial sample selection with each village considered a cluster and clusters sampled with probability proportional to size. In addition, all the villages within Kitengela, Ngong, Rongai and Kiserian Townships were excluded from the sampling frame in order to eliminate the

[12] Growth Rate as Projected by the Kenya National Bureau of Statistics

13 May 2011 survey result

[14] The Geometric Growth Model was used to project the population for 2012 based on the 2009 census data as the base population and the annual growth rate of 3.6 % as provided by KNBS

bias of areas surrounding Nairobi as well as factoring in the element of most partners in the greater Kajiado work in divisions further from Nairobi and the high population density in Ngong township (52.6% of all county population lives in urban Ngong).

All villages along with their respective populations were entered into the ENA software and clusters selected accordingly using the SMART ENA software. At stage two each team used the modified EPI method in household selection. Within the selected households all children 6-59 months were measured.

1.7.6 Sample Size Calculation for the IYCF

For the IYCF sample size, it was decided that the sample be calculated separately for the EBF targeting under 6 months children and the other components of IYCF. The EBF rate was used for the calculation of the EBF sample size. The following were the parameters which were considered for the sample size:

1. The EBF rate – 15%
2. Precision – 5%
3. Design Effect – 2

Based on the above parameters, the sample size for the under-6 months (0-5) children was found to be 243 children. The 243 children were distributed equally among all the 36 clusters such that every cluster needed to produce 7 children. Further, the 7 children from every cluster were selected from the households where the anthropometric survey was done. However, in case the 7 children were not found from the selected households, they were then selected purposively.

Table 3: IYCF Sample Size

Indicator	Estimated Prevalence	Design Effect	Sample Size
Timely initiation of breastfeeding (children 0-23 months)	59%	2	311
Exclusive breastfeeding under 6 months	15%	2	243
Timely complementary feeding	50%	2	341
Continued breastfeeding	50%	2	341

1.7.7 Cluster Selection

All accessible villages were included in the initial sample selection with each village considered a cluster and clusters sampled with probability proportional to size. All villages along with their respective populations were entered into the ENA software and clusters selected accordingly. At stage two household were selected using the modified EPI method. Within the selected households all children 6-59 months were measured.

1.7.8 Data Collected and Data Collection Methods and Tools

Both qualitative and quantitative data collection methods were used to collect the survey data; the following data were collected:

1. Anthropometry (weight, height, edema, MUAC, age, sex) for children and MUAC for mothers

2. Vaccination information (measles, BCG, and Vitamin A supplementation)
3. Incidences of childhood illnesses in the last 2 weeks prior to the survey
4. Other child care, food security and hygiene data at household level
5. IYCN data

1.8 Organization of the Survey

- **Coordination/Collaboration:** before the survey was conducted meetings were held with the respective district authorities and key stakeholders to brief them about the purpose, objectives and methods for the survey. The survey details were discussed with the District Health Management Team, key partners on the ground (NGOs and UN) and conducted in collaboration with the District Health Office. The authorities were requested to officially inform the communities (villages) that will be involved in the assessment.
- **Recruiting the Survey Team:** recruitment was done in collaboration with the District Health Office to give ownership and participation in the assessment. Six teams of four were selected to include two measurers, one enumerator and a team leader.
- **Training of the Survey Team:** The teams were given 4-day training prior to field work, including a standardization test to ensure standardization of measurement and recording practice. All data collectors were trained on taking anthropometric measurements, completion of questionnaires and sampling methodology. The data collection forms and questionnaires were pilot tested in clusters not selected to be part of the larger survey, to ensure that the interviewers and respondents understand the questions and that interviewers follow correct protocols
- **Team work in the field:** Six teams each with four members who had been trained were formed consisting of 1 team leader, interviewer and 2 measurers. In addition, supervisors from Concern, MoH, and other partners (UNICEF Feed the Children and Mercy USA) were closely supervising the team throughout the survey. In moving from one randomly selected household to another, the teams were guided by a village leader, or a community volunteer, depending on the village and who was available.

1.9 Data Entry, Analysis and Report Writing

- **Data Analysis:** the data entry and analysis was done using ENA for SMART, CSPro and SPSS Statistical softwares. In addition, to improve on the data entry quality, there was double data entry.
- **Preliminary Results and Final Report:** the preliminary findings were submitted by the consultant to the DHMT, stakeholders and Concern within two weeks of completion of the survey fieldwork at District and National level and included the prevalence of global acute malnutrition as well as the prevalence of moderate and severe acute malnutrition, vaccination and other relevant information. This final report was also submitted within one month of data collection and includes a description of methods used, to demonstrate appropriateness of sampling, data collection and data analysis. The report uses existing secondary data to support the findings of the assessment.

CHAPTER 2
RESULTS AND DISCUSSION

2.1 Household Demographic Characteristics

The total number of households that participated in the survey was 699 from which 936 children aged 6 to 59 months were measured. The total number children aged 0 – 23 months from the survey was 556 while there were 244 children surveyed for the EBF practices. The average number of persons per household in Kajiado County was 5.6 (S.D=2.3) which is almost the same with the average household size of 5.7 (S.D=2.1) found in the 2011 survey[15]. This implies that the composition of the household in Kajiado County has remained the same. In addition the number of children aged 0 – 5 months per household being 0.12 (S.D=0.3) while the average number of children aged 6 – 59 months per household was 1.3 (S.D=0.6). The proportion of under 0 -5 years old from the sampled households was found to be 28.8% (27.7 – 29.8, 95% C.I).

Table 4: Demographic Characteristics

DEMOGRAPHY	Number	
Number of HH surveyed	699	
Number of children 6-59 months surveyed	936	
Number of children 0-23 months surveyed for IYCN	556	
Number of children 0-5 months surveyed for EBF	244	
Average number of persons per HH	5.6	S.D = 2.3
Average number of children (0-5 months) per HH	0.12	S.D=0.3
Average number of children (6-59 months) per HH	1.3	S.D = 0.6

2.2 Distribution of Sample by Sex and Age

According to the results of the survey, 50.9% of the sampled children aged between 6 and 59 months were boys while the 49.1% were girls (Table 4). Irrespective of the fact that there were more boys than girls in the sample, the overall sex ratio was 1.0 demonstrating un-biased sample since the recommended range of the sex ration is 0.8-1.2[16]. The results also show that the age group 42- 53 particularly the boys were under-represented in the sample which was attributed mainly to absenteeism of the boy child who mostly had accompanied their fathers in the herding as reviewed during key informant interview, in addition to the fact that several older children, (4 and 5 year olds), were also away in schools. These factors could also have attributed to the over representation of the younger 6 - 17 months. The results of the age – sex distribution are presented below:

[15] Kajiado SMART Survey, 2011

[16] Assessment and Treatment of Malnutrition in Emergency Situations, Claudine Prudhon, Action Contre La Faim (Action Against Hunger), 2002.

Table 5: Distribution of Age and Sex of Sample

	Boys		Girls		Total		Ratio
AGE (mo)	no.	%	no.	%	no.	%	Boy: Girl
6-17	133	50.2	132	49.8	265	29.3	1.0
18-29	121	54.3	102	45.7	223	24.7	1.2
30-41	98	51.6	92	48.4	190	21.0	1.1
42-53	80	50.0	80	50.0	160	17.7	1.0
54-59	28	43.1	37	56.9	65	7.2	0.8
Total	460	50.9	443	49.1	903	100.0	1.0

2.3 Nutrition Status of Children 6 – 59 Months

2.3.1 Wasting

Table 6: Prevalence of Acute Malnutrition Based on Weight-for-Height Z-Scores (and/or Oedema) and by Sex

	All n = 885	Boys n = 448	Girls n = 437
Prevalence of Global Malnutrition (<-2 z-score and/or edema)	(42) 4.7 % (3.4 - 6.5 95% C.I.)	(26) 5.8 % (4.0 - 8.4 95% C.I.)	(16) 3.7 % (2.1 - 6.4 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(37) 4.2 % (3.1 - 5.7 95% C.I.)	(23) 5.1 % (3.6 - 7.2 95% C.I.)	(14) 3.2 % (1.7 - 5.8 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(5) 0.6 % (0.2 - 1.6 95% C.I.)	(3) 0.7 % (0.2 - 2.9 95% C.I.)	(2) 0.5 % (0.1 - 1.9 95% C.I.)

The prevalence of oedema is 0.3 %

The above table presents the prevalence of acute malnutrition based on Weight-for-Height Z-scores (and/or oedema). The results indicate a Global Acute Malnutrition (GAM) rate of all children as 4.7% (3.4 – 6.5 95% C.I) which is acceptable[17] based on the WHO standards. The prevalence of Severe Acute Malnutrition (SAM) for all children was established to be 0.6% (0.2 – 1.6 95% C.I) which implies that the SAM prevalence fell short of the emergency levels[18]. Further analysis of the GAM rates by gender showed that the prevalence of GAM among the boys [5.8% (4.0-8.4 95% C.I)] was higher than among the girls' [3.7% (2.1-6.4 95% C.I.)]. However the difference was statistically insignificant as the confidence intervals were overlapping. In addition, the prevalence of SAM was found to be high in boys [0.7% (0.2-2.9 95% C.I.)] than in girls [0.5% (0.1-1.9 95% C.I.)] though the difference was insignificant (p=0.699).

[17] WHO cut off points for wasting using Z score (-2 Z scores in populations: <5%; 5-9% poor; 10-14% serious; >15% critical)

[18] Emergency Level SAM >4%

Figure 3: Distribution of Weight-for-Height Z Scores for the Sampled Children

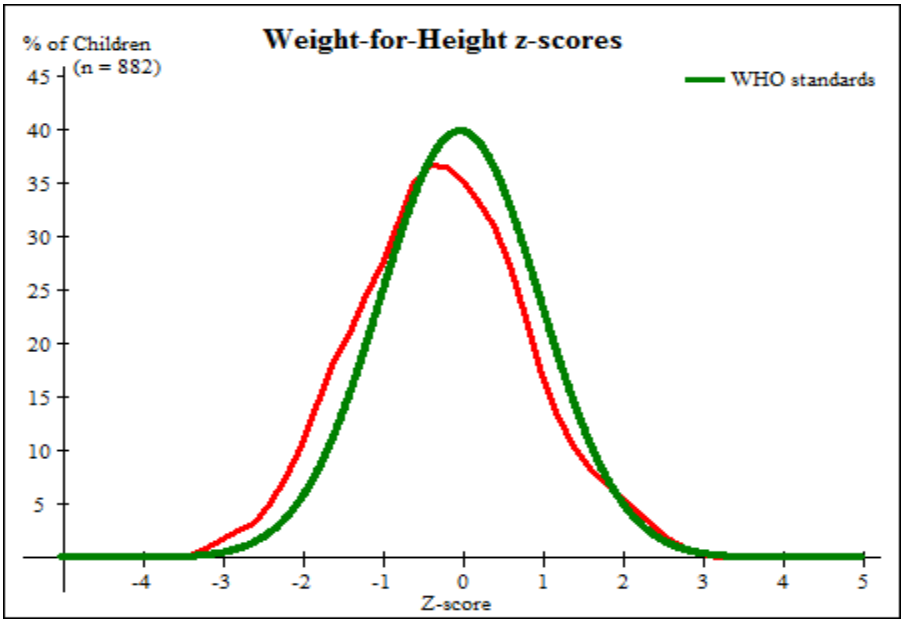


Figure 3 above compares the nutrition distribution curve of the sampled population with the WHO curve. The mean of the nutrition distribution of the sampled population was established to be -0.24 with a standard deviation of 1.07 which indicates a shift to the left of the sample curve when compared with the standard population curve implying a poorer nutrition status compared with the WHO reference population.

Table 7: 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. 3 (0.3 %)
Oedema absent	Marasmic No. 11 (1.2 %)	Not severely malnourished No. 891 (98.5 %)

According to the above table, 11 children (1.2%) were marasmic (severely wasted) while 3 children (0.3%) had oedema, hence had kwarshiokor.

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 (mo)	**N**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
6-17	254	0	0.0	9	3.5	243	95.7	2	0.8
18-29	221	0	0.0	12	5.4	209	94.6	0	0.0
30-41	181	0	0.0	6	3.3	174	96.1	1	0.6
42-53	152	1	0.7	6	3.9	145	95.4	0	0.0
54-59	65	0	0.0	4	6.2	61	93.8	0	0.0
Total	**873**	**1**	**0.1**	**37**	**4.2**	**832**	**95.3**	**3**	**0.3**

Further analyses were done on the prevalence of GAM rates by age groups. The children aged 54 to 59 months were found to be more malnourished (6.2%) compared to any other age group. In addition, the age group 30 to 41 was found to be the least malnourished (3.3%) compared with the other age groups. However, there was significant difference between the prevalence of GAM in the two groups (p=0.376) i.e. those aged between 54-59 and those aged 30-41, these were the groups with the highest GAM prevalence and least GAM prevalence respectively.

Table 9: Prevalence of acute malnutrition based on the percentage of the median and/or oedema

	n = 905
Prevalence of global acute malnutrition (<80% and/or oedema)	(20) 2.2 % (1.4 - 3.5 95% C.I.)
Prevalence of moderate acute malnutrition (<80% and >= 70%, no oedema)	(15) 1.7 % (1.0 - 2.9 95% C.I.)
Prevalence of severe acute malnutrition (<70% and/or oedema)	(5) 0.6 % (0.2 - 1.6 95% C.I.)

The above table presents the results of the prevalence of acute malnutrition based on the percentage of the median and/or oedema. The weight-for-height percentage of the median (WHM) is a less sensitive indicator of acute malnutrition compared to the Z score. As expected the prevalence of GAM and SAM by WHM were 2.2 %(1.4 - 3.5 95% C.I.) and 0.6 % (0.2 - 1.6 95% C.I.) respectively which were lower than the GAM and SAM using the Z score.

Table 10: Distribution of MUAC by Nutrition Status

Indicator	**Criteria**	**n**	**%**
Severe Acute Malnutrition based on MUAC < 11.5 cm and/or Oedema	<11.5 cm	7	0.7
Moderate Acute Malnutrition based on MUAC 11.5 – 12.4 cm	>= 11.5 - <12.5 cm	22	2.4
At Risk based on MUAC 12.5 – 13.4 cm	>=12.5 - <13.5 cm	112	12.0
Normal	>=13.5 cm	782	84.9

MUAC is the commonly used indicator for admission in nutrition programmes in Kenya (both Supplementary Feeding Programme (SFP) and Out Patient Therapeutic Programme (OTP)). According to

the MUAC index, the prevalence of GAM was 3.1% and SAM was 0.7% while 12.0% of the children were at risk of malnutrition.

2.3.2 Underweight - Weight-for-Age (WFA)

The measure of underweight gives a mixed reflection of both the current and past nutritional experience by a population and is very useful in growth monitoring. Children whose WFA Z scores fell below -2 standard deviations of the WHO reference population or had bilateral oedema were classified as underweight. Children whose WFA Z score fell below -3 standard deviation of the WHO reference population or had bilateral oedema were classified as severe underweight. The table below presents the prevalence of underweight in Kajiado County.

Table 11: Prevalence of Underweight Based on Weight-for-Age Z-Scores by Sex

	All n = 873	**Boys n = 441**	**Girls n = 432**
Prevalence of Underweight (<-2 z-score)	(145) 16.6 % (13.2 - 20.7 95% C.I.)	(77) 17.5 % (13.8 - 21.9 95% C.I.)	(68) 15.7 % (11.8 - 20.7 95% C.I.)
Prevalence of Moderate Underweight (<-2 z-score and >=-3 z-score)	(120) 13.7 % (10.7 - 17.5 95% C.I.)	(65) 14.7 % (11.2 - 19.2 95% C.I.)	(55) 12.7 % (9.5 - 16.9 95% C.I.)
Prevalence of Severe Underweight (<-3 z-score)	(25) 2.9 % (1.8 - 4.5 95% C.I.)	(12) 2.7 % (1.6 - 4.5 95% C.I.)	(13) 3.0 % (1.6 - 5.5 95% C.I.)

According to the above table, 16.6% (13.2 – 20.7 95% C.I) of all the children were underweight which according to the WHO classification was considered medium[19]. The prevalence of underweight was high among the boy 17.5% (13.8 – 21.9 95% C.I) than in girls 15.7% (11.8 – 20.7 95% C.I). However the difference in the prevalence of underweight among the genders was insignificant as the confidence intervals were overlapping. In addition, the results showed that the prevalence of severe underweight was 2.9% (1.8 – 4.5 95% C.I) with girls being more severely underweight 3.0% (1.6-55 95% C.I) more than the boys 2.7% (1.6 – 4.5 95% C.I) though the difference among the gender was insignificant (p=0.709).

[19] Who guide lines for wasting: <10% - low, 10% – 19% - Medium, 20% – 29% - High, and > 30% Alarming/Critical

2.3.2 Stunting – Height-for-Age (HFA)

Stunting (height for age) is an indicator of chronic (long-term) malnutrition arising from persistently poor food security situation, micronutrient deficiencies, recurrent illnesses and other factors which interrupt normal growth. Unlike wasting, stunting is not affected by seasonality but rather related to the long-term effects of socio-economic development and long-standing food insecurity situation. Table 11 presents the prevalence of stunting desegregated by gender

Table 12: Prevalence of Stunting Based on Height-for-Age Z-Scores and by Sex

	All n = 843	Boys n = 422	Girls n = 421
Prevalence of Stunting (<-2 z-score)	(291) 34.5 % (30.0 - 39.3 95% C.I.)	(156) 37.0 % (31.2 - 43.2 95% C.I.)	(135) 32.1 % (27.0 - 37.7 95% C.I.)
Prevalence of Moderate Stunting (<-2 z-score and >=-3 z-score)	(196) 23.3 % (20.0 - 26.9 95% C.I.)	(104) 24.6 % (20.1 - 29.9 95% C.I.)	(92) 21.9 % (17.5 - 26.9 95% C.I.)
Prevalence of Severe Stunting (<-3 z-score)	(95) 11.3 % (8.6 - 14.6 95% C.I.)	(52) 12.3 % (8.8 - 17.0 95% C.I.)	(43) 10.2 % (7.1 - 14.5 95% C.I.)

The prevalence of stunting was found to be 34.5% (30.0-39.3 95% C.I) which according to the WHO classification of stunting was high[20]. Further analyses showed that the prevalence of stunting among the boys 37.0% (31.2-43.2 95% C.I) than in girls 32.1% (27.0-37.7 95% C.I) though the difference was insignificant (p=0.135). Moreover, the prevalence of severe stunting was also high at 11.3% (8.6-14.6 95% C.I) with the prevalence being high in boys 12.3% (8.8-17.0 95% C.I) than in girls 10.2% (7.1-14.5 95% C.I) though the difference was insignificant (p=0.411).

Table 13: Prevalence of Stunting by Age Based on Height-for-Age Z-Scores

		Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
Age (mo)	**N**	**n**	**%**	**n**	**%**	**n**	**%**
6-11	121	9	7.4	17	14.0	95	78.5
12-23	240	21	8.8	69	28.8	150	62.5
24-35	169	23	13.6	42	24.9	104	61.5
36-47	163	20	12.3	38	23.3	105	64.4
48-59	150	22	14.7	30	20.0	98	65.3
Total	843	95	11.3	196	23.3	552	65.5

The above figure shows the stunting rates in Kajiado County by various age groups. The prevalence of severe stunting was highest in the age group 48-59 (14.7%) and lowest in the age group 6 – 11 (7.4%). In addition, the prevalence of stunting increased with age.

[20] Who guidelines for stunting: < 20% - Low, 20%-29% - Medium, 30%-39% - High and >40% - Alarming/Critical

2.4 Children's Morbidity

2.4.1 Morbidity Two Weeks Prior to Survey

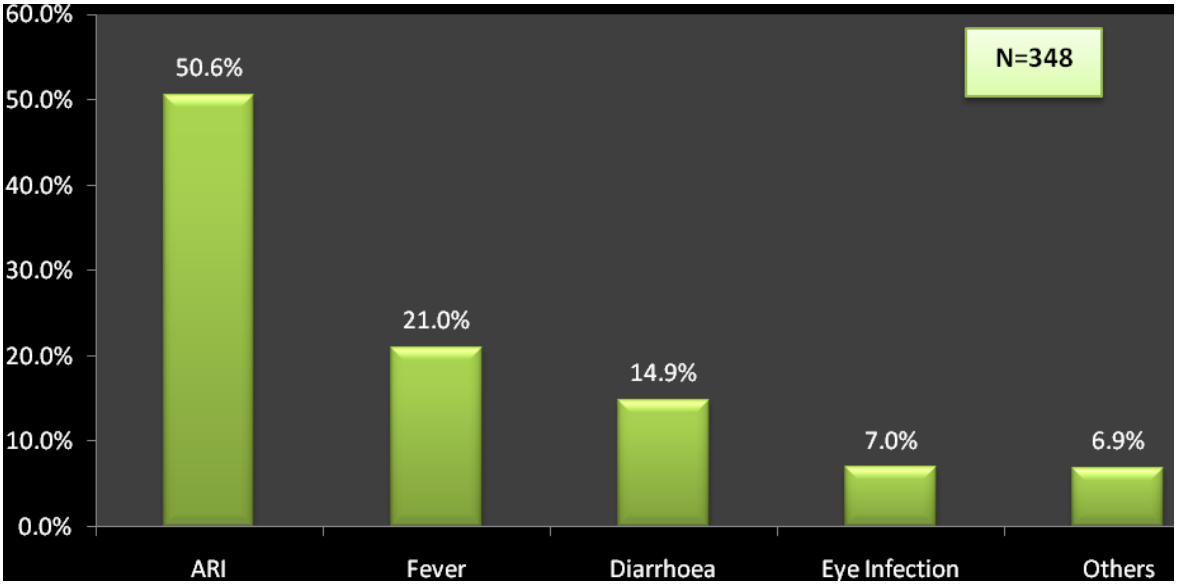
A two-week child morbidity recall (inclusive of the day of the survey) was assessed to establish the prevalence of common illnesses among the children less than 5 years in Kajiado County. The results of the survey showed that 37.6% of the sampled children had been sick during the recall period.

Table 14: Proportion of Children Sick during the Two Weeks Recall Period

Proportion of children sick during the recall period	37.6% (348)	926

Among the sick children, Acute Respiratory Infection (ARI) was the most prevalent infection during the period where 50.6% of the sampled children had suffered from the sickness; this was followed by fever at 21.0%, then the prevalence of diarrhea was 14.9% while other sicknesses contributed to 13.9%. Clearly, the analysis shows that there was a high rate of childhood diarrhea among the sampled children. This is shown in the figure below:

Figure 4: Morbidity



Although none of the children had suffered measles two prior to the survey, measles cases have been recorded especially in Kajiado North. One health facility (Eiiti) in Oldorko Sub-Location, Ngong Division reported 19 suspected cases between April and September, a period of six months. The cases of suspected measles from the DHIS for Kajiado County between January and September 2012 were 441 where 253 cases were from Kajiado North, 108 cases from Kajiado Central and the rest (80) from Loitokitok. However, a measles campaign was done in Kajiado North the week after the survey, 15th to 19th September where 59,811 children were vaccinated.

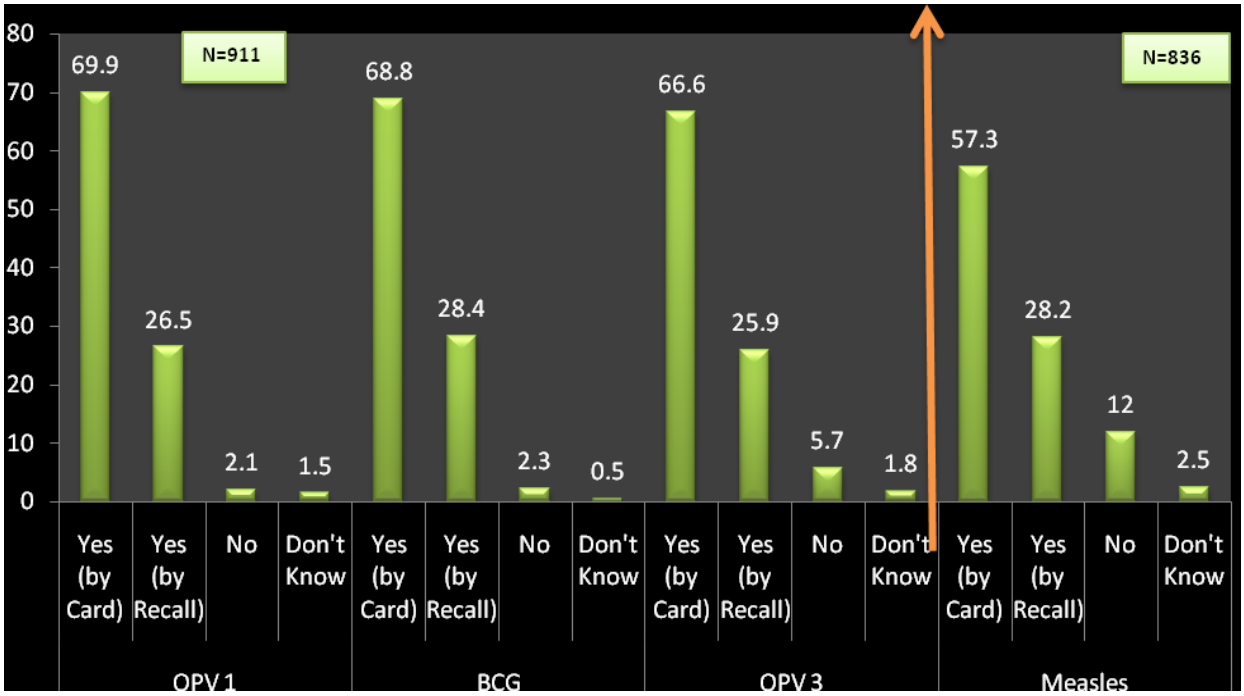
2.4.2 Health Seeking Behavior

District		Private Clinic	Shop/ Kiosk	Public Clinic	Mobile Clinic	NGO/ FBO	Local Herbs	No Assistance	TOTAL
Kajiado Central	N	11	18	56	1	2	1	13	102
	%	**10.8**	**17.6**	**54.9**	**1.0**	**2.0**	**1.0**	**12.7**	**100**
Kajiado North	N	22	13	53	0	2	2	14	106
	%	**20.8**	**12.3**	**50.0**	**0**	**1.9**	**1.9**	**13.2**	**100**
Loitokitok	N	30	16	39	2	3	2	13	105
	%	**28.6**	**15.2**	**37.1**	**1.9**	**2.9**	**1.9**	**12.4**	**100**
Total	N	63	47	148	3	7	5	40	313
	%	**20.1**	**15.0**	**47.3**	**1.0**	**2.2**	**1.6**	**12.8**	**100**

The health seeking behavior by the caregivers of the sick children was assessed by asking the respondents whose children had been sick in the 2 weeks recall period if they sought any medical interventions. The results showed that the health seeking behavior among the caregivers was commendably high at 87.2% for those who sought medical attention once their children were sick. Nevertheless, 12.8% of the caregivers did not seek any medical attention once their children were sick Preference was given to the public clinic/hospital where 47.3% of the caregiver reported having sought health service. Further 20.1% of the caregivers sought medical attention from the private clinics while 15.0% of the caregivers had sought medical attention from the shops and clinics.

2.5 Vaccination Coverage

Figure 5: OPV, BCG and Measles Coverage



The results above show that the OPV 1, OPV 3 and BCG coverage were commendably high in the County above the national target of 80%. Overall, the OPV 1 coverage was 96.4% where 69.9% of this proportion was affirmed by the card and 26.5% was affirmed by recall. In addition, the coverage of BCG was 97.2% where 68.8% was confirmed by the card and the rest (28.4%) was confirmed by recall. The coverage of OPV 3 was estimated to be 92.5% where 66.6% was confirmed by card 25.9% by recall. On measles, it's only children who were nine months and above who are eligible for vaccination. The measles coverage was estimated to be 85.5% where 57.3% was confirmed by card and the rest (28.2%) was confirmed by recall. This shows that the coverage of measles was high above the national target of 80%. However, when compared with the last years' survey results there was a significant reduction of the OPV 1, OPV 3 and measles coverage's. This is demonstrated in the table below:

Table 15: Comparison of Vaccination Coverage for 2012 and 2011

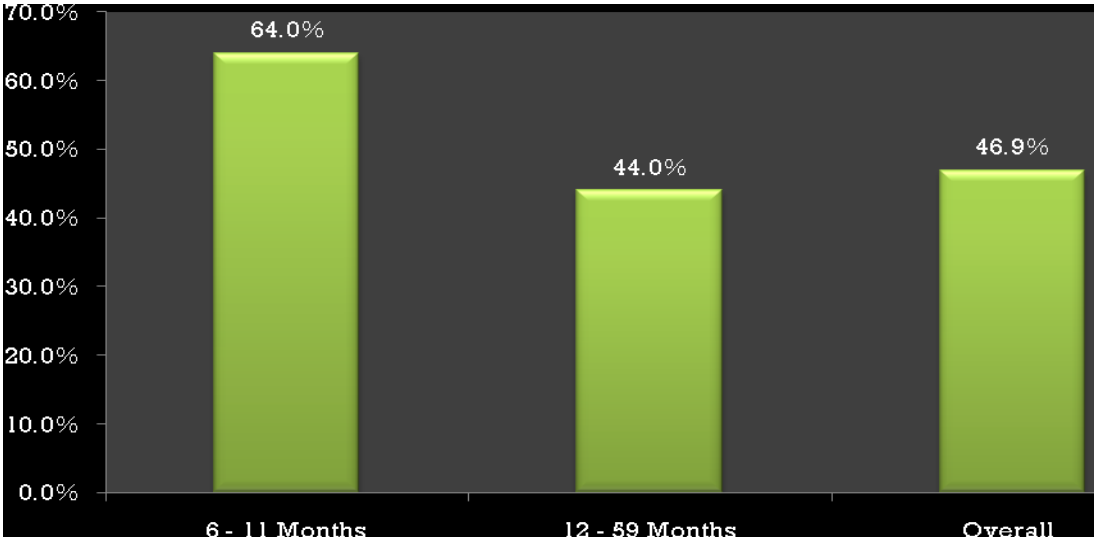
	2012		2011		P-Value	Comments
	Proportion	N	Proportion	N		
OPV 1	96.4% (878)	911	98.7% (739)	749	**0.002**	**Significant Reduction**
BCG	97.2% (886)	911	No Data			**Not comparable**
OPV 3	92.5% (842)	911	96.8% (719)	743	**0.000**	**Significant Reduction**
Measles	85.5% (714)	836	90.1% (607)	674	**0.006**	**Significant Reduction**

Also worth noting is that although the county coverage immunization coverage is excellent, in some sub locations and village pockets, the coverage was significantly low. See annex for immunization analysis by clusters.

2.6 Vitamin A Supplementation and De-Worming

Vitamin A supplementation is among the High Impact Nutrition Intervention (HiNi). The supplementation starts at 6 months, and ideally should be repeated every 6 months until a child reaches the age of 5 years. Children between 6 and 11 months are supposed to be supplemented once while those aged between 12 and 59 months are supposed be supplemented twice in twelve months.

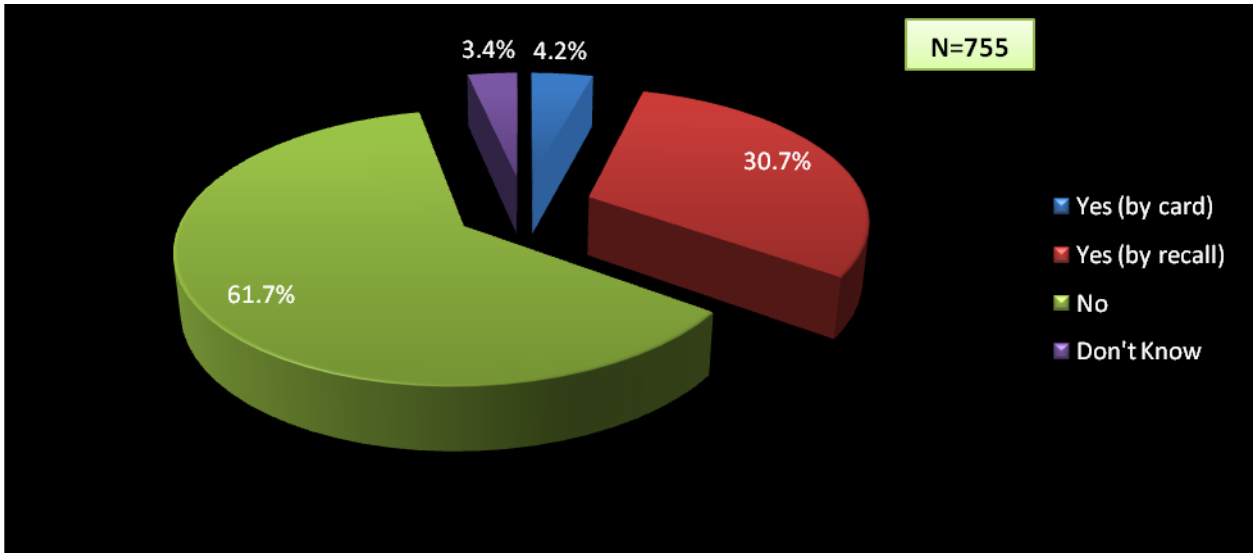
Figure 6: Vitamin A Supplementation



The overall prevalence of Vitamin A supplementation was 46.9% where the prevalence was highest (64%) among the children aged 6 – 11 months while among the children aged 12 to 59 months, the prevalence was 44.0%. in addition, among the children aged 12 – 59 months who are supposed to be supplemented twice in a year, majority (72%) of them were supplemented once and those who were supplemented twice were 24% and 4% had been supplemented thrice. The coverage of Vitamin A supplementation was significantly below the national target of 80%.

On de-worming which is given to children 12 to 59 months the survey established the prevalence as 34.9% using both the card and recall as shown in the figure below. This prevalence is way below the national target of 80%.

Figure 7: Prevalence of De-worming



The table below presents the comparison between Vitamin A Supplementation and De-worming for 2011 and 2012 surveys.

Table 16: Comparison of Vitamin A and De-worming for 2011 and 2012

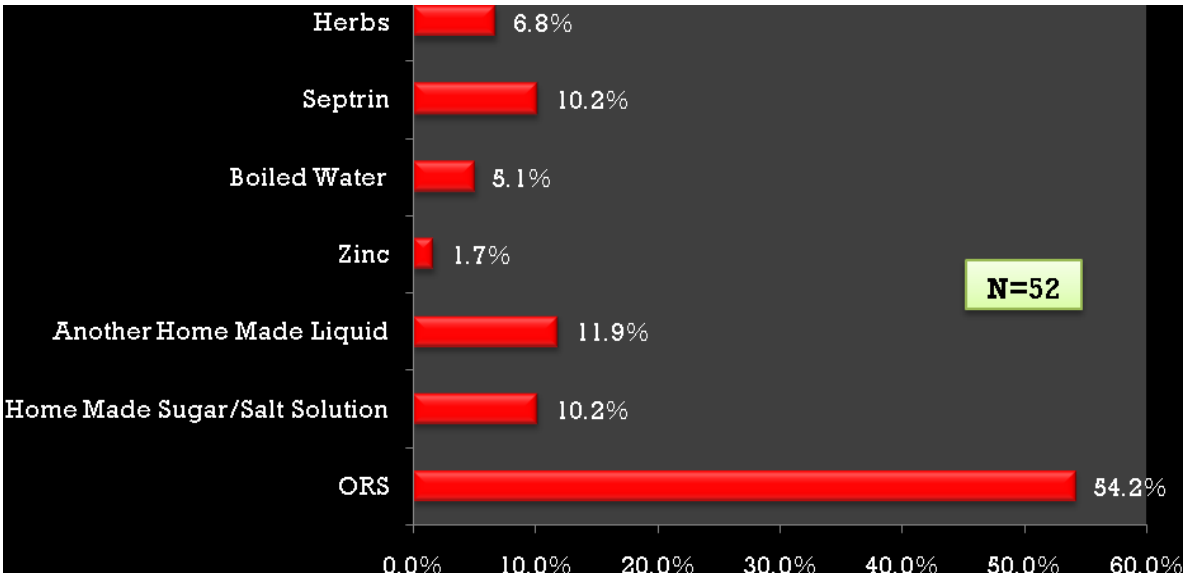
	2012		2011		P-Value
	Proportion	N	Proportion	N	
De-worming	34.9% (263)	755	36.2% (225)	622	0.6162
Vitamin A Supplementation					
6 – 11 Months	64% (83)	130	No Data	No Data	No Data
12 – 59 Months	44% (332)	755	No Data	No Data	No Data
6 – 59 Months	46.9% (415)	885	60.8% (458)	753	**0.0000**

According to the above results, the prevalence of de-worming among the children had decreased from 36.2% to 34.9% though the decrease was insignificant (p=0.6162). On the other hand the overall prevalence of Vitamin A among the children had decreased significantly from 60.8% in 2011 to 46.9% in 2012 (p=0.0000)

2.7 Zinc Supplementation

Zinc supplementation has been shown to be effective for preventing diarrhea in children. When used as a therapy for acute or persistent diarrhea, zinc reduces the duration of the episode as well as its severity and complications. WHO/UNICEF[21] recommends use of zinc for 10-14 days for all episodes of diarrhea among children under 5 years. Zinc supplementation paired with low los osmolality ORS have been recognized as important approaches to tackle childhood diarrhea[22]. One of the HiNi intervention targets is to increase therapeutic zinc supplementation for diarrhea to 50%.

Figure 8: Management of Diarrhea



Among the children who suffered from diarrhea two weeks before the survey, 54.2% (n=28) were given ORS, 11.9% (n=6) were given home-made liquid. Only 1.7% (n=1) was supplemented with zinc. The zinc supplementation prevalence was therefore way below the target yet the zinc is available in most of the health facilities and staffs have been trained on enhanced management of diarrhoea. The low zinc coverage could be attributed to the health workers not telling the beneficiaries the use of supplements while the beneficiaries only know that ORS was essential in management of diarrhoea but assumed Zinc was just like any other drug.

2.8 Maternal Indicators

2.8.1 Maternal Physiological and Nutrition Status

Nutrition status of the women was determined for all mothers/caregiver in the child bearing age (15-49 years) whose children aged 0 – 59 months had been included in the anthropometric survey. Of the

[21] WHO/UNICEF Joint Statement: Clinical Management of Acute Diarrhea, 2004
[22] Best Practice Paper-Micronutrient Supplements for Child Survival (Vitamin A and Zinc) (2008)

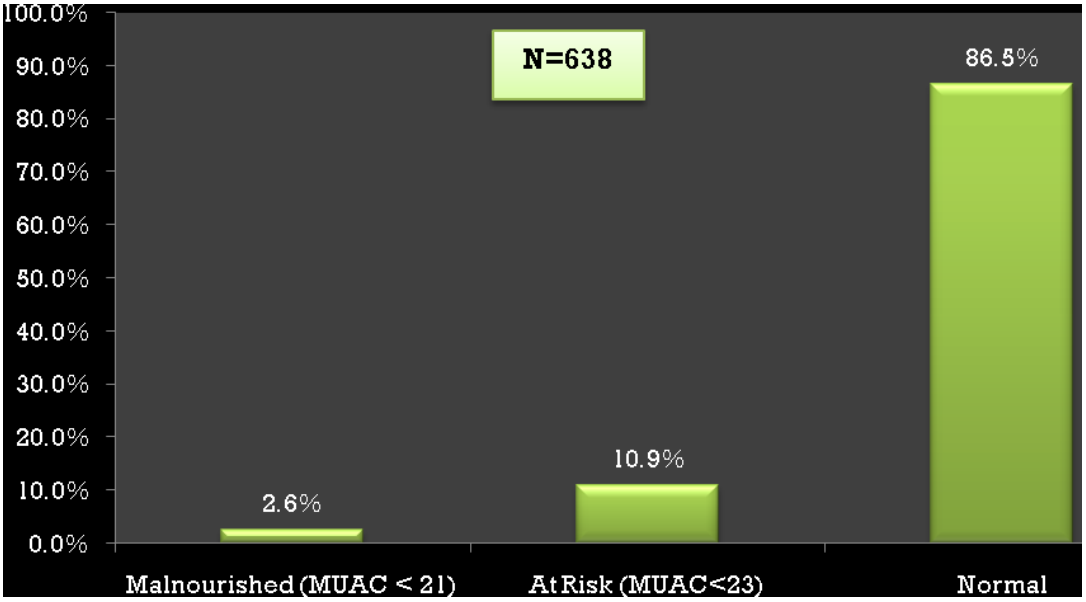
caregivers included in the survey, 97.7% (n=638) were aged between 15 and 49 while the rest 2.1% (n=14) were aged over 49 years.

Table 17: Maternal Physiological Status

Status	Frequency	Percent
Currently breastfeeding (<6 months)	75	11.8
Currently breastfeeding (>6 months)	310	48.6
Pregnant and breastfeeding	2	0.3
Not pregnant/not breastfeeding	181	28.4
Pregnant	56	8.8
No Response	14	2.2
Total	**638**	**100.0**

The survey results showed that of the women aged 15 – 49 years, 48.6% (n=310) were currently breastfeeding with children being more than 6 months, 28.4% (n=181) were neither pregnant nor breastfeeding, 11.8% (n=75) were at the time of the survey breastfeeding with their children being less than 6 months old.

Figure 9: Maternal Nutrition



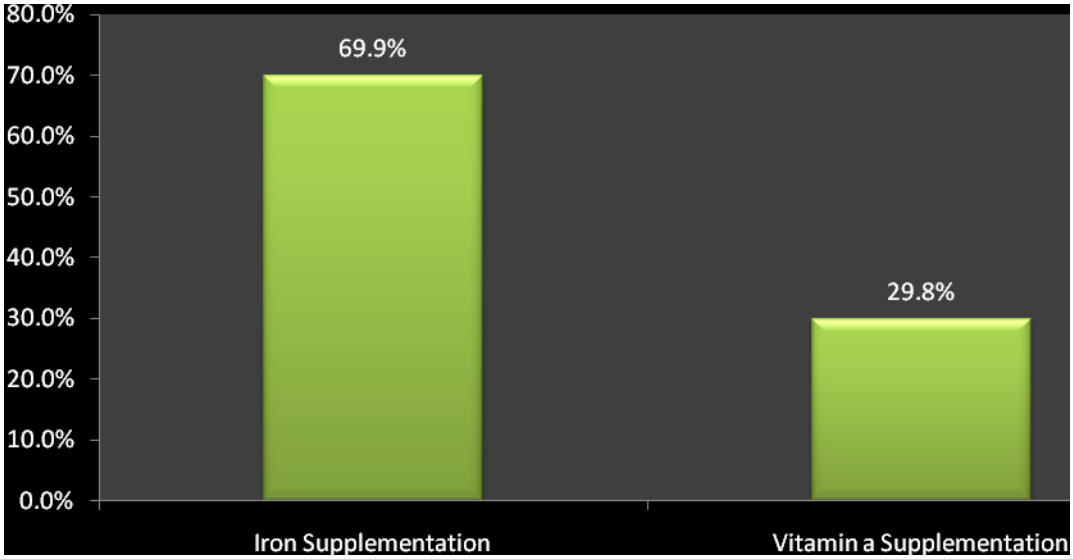
On maternal nutrition status, the study established that that 2.6% (n=17) were malnourished where there MUAC measurement was below 21 cm. Further, 10.9% (n=70) were at risk of malnutrition since their MUAC measurement was between 21 and 23. In addition, for the pregnant and lactating women, 3.1% of them were malnourished with 14.5% of the mothers being at risk of malnutrition. Based on the

above then the risk of malnutrition was low for the non-pregnant and lactating women than those who were pregnant and lactating through the difference was insignificant.

2.8.2 Micronutrient Supplementation

HiNi advocates for iron and vitamin A supplementation among the pregnant and lactating women respectively. Iron supplementation in pregnancy is important in controlling anemia and routine iron supplementation is the current cornerstone of efforts to reduce iron-deficiency anemia. In addition, maternal vitamin A supplementation within two weeks of birth is crucial and recommended by WHO as a mean of boosting the content in breast milk as well as promotes recovery following delivery. Since iron supplementation and vitamin A are recommendation from the WHO then the caregivers were asked whether they had received any form of iron supplementation during their last pregnancy while those that were breastfeeding were asked whether they had received vitamin A. The target for the two as per the HiNi project is 80% coverage. The figure below presents the coverage of vitamin A and iron supplementation among the caregivers:

Figure 10: Maternal Iron and Vitamin A Supplementation

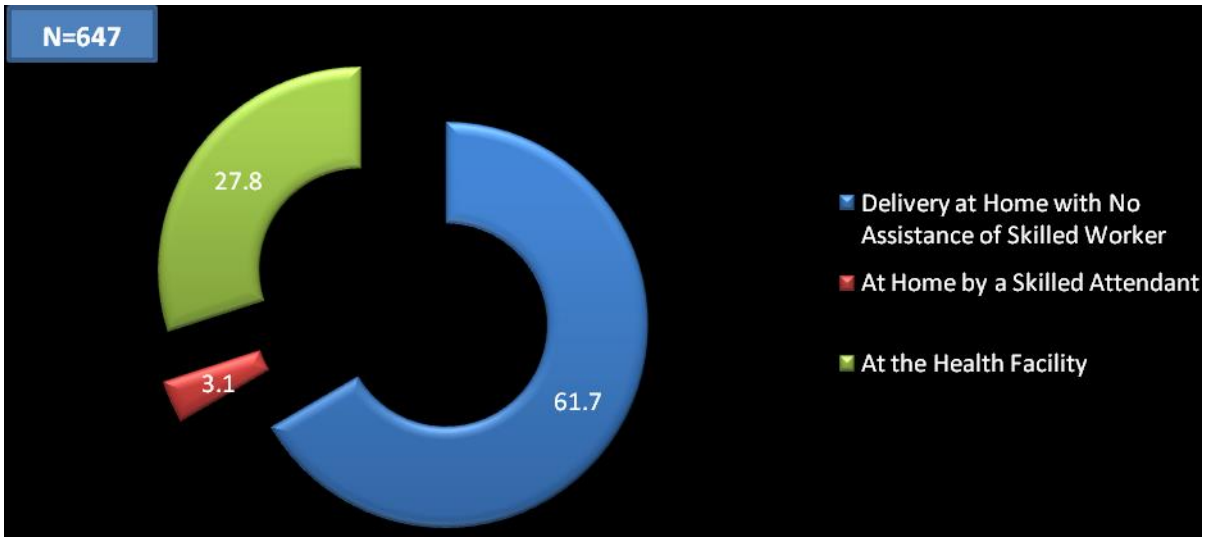


The results of the survey showed that the iron supplementation among the mothers was 69.9% while the prevalence of vitamin A supplementation was 29.8%. Though the prevalence of iron supplementation was high at 69.9%, this prevalence was below the national target. In addition, the prevalence of vitamin A supplementation was way below the national target of 80%. The low coverage of vitamin A supplementation recorded in this survey would be attributed to the fact that as demonstrated most women deliver at home (Figure11) and only call for assistance in case of complications (as revealed by the key informants). In addition, as a cultural practice among the Maasai, after delivery, the new mothers' stays indoors for almost three months and they most of the times sends the child with a friend or relative for the first immunization. Others bring their children at 6 weeks when it is not safe to administer the Vitamin A supplement which is supposed to be administered within the first four weeks after birth. With a 77.9% reporting rate in DHIS (91.7% Loitoktok, 85.2% North

Kajiado & 55.3% Central) in last quarter April- June, 5663 <1 received Vit A, 5581 > 1yrs old, 2145 PLWs & 179 therapeutic VIT A .

A high proportion of women delivering at home was also reported in the county. According to the survey, 61.7% (n=399) of the caregiver delivered their last born child at home with no assistance from a skilled worker. In addition, 3.1% (n=20) of the caregiver delivered their last born child at home but with assistance of skilled attendants and the rest 27.8% (n=288) delivered at a health facility. This is shown in the figure below:

Figure 11: Place of Delivery



Reasons for the high proportion of home deliveries include: Poor health care access, with some health facilities being up to 70 km away in some of the sub locations. Poor infrastructure and lack of good communication networks worsens the health access. Highly patriarchal Maasai community in which the woman is not listened to & mothers in laws play the key role in determining child bearing and care practices. Due to the respect given to the older and, more experienced mothers, children born at home are still high. Culturally, labor is considered a natural process and therefore women are expected to be able to manage it without necessarily going to hospital. The cost of hospital delivery is also high (they have to buy delivery items in addition to 300ksh), compared to home deliveries where midwives charge 500/= or 700/= for delivering a female or male child respectively. Key informant interviews highlighted the fact that given the fact that Most PLWs are anemic due to poor dietary practices it is important that mothers are continually encourage to go for health facility deliveries. One of the partnering NGOs, Good Hands Organization, has been distributing complete delivery items together with an Antenatal package to 22 dispensaries in the county.

2.9 Infant and Young Children Feeding

Information of infant and young child feeding practices was obtained. In particular, much of the information was obtained based on a 24-hour recall, in line with the WHO guidelines to minimize recall bias and thus enhance more valid information.

Table 18: Infant and Young Children Feeding Practices

Indicator	2012		2011		P-Value
	Proportion	N	Proportion	N	
Continued Breastfeeding	77.7% (n=390)		No Data		
Timely Initiation to Breastfeeding (within the 1st one hour)	76.1% (186)	244	58.7% (175)	298	0.000
Exclusive Breastfeeding	44.7% (109)	244	14.7% (11)	75	0.000
Meal Frequency (6-8 months) - at least 2 meals (breastfed children)	89.6% (47)	49	No Data		
Meal Frequency (6-23 months) - at least 3 meals (breastfed only)	74.5% (200)	269	68.8% (121)	176	0.164
Meal Frequency (6-23 months) - at least 4 meals (non-breastfed only)	42.3% (22)	53	No Data		
2+ Meals for 6 - 8 months breast fed, 3+ 6 - 23 months breastfed and 4+ non breastfed	68.8% (222)	322	No Data		

Breastfeeding is very important for the young children since it strengthens the immunity of the young child among many other advantages. It is recommended that continuous breastfeeding should be continued up to 2 years. The results of the survey showed that among the children 6 – 23 months old, 77.7% (n=390) of them were still breastfeeding. Nevertheless, 46.4% (n=175) of the children 6 – 23 months were introduced to other foods apart from breast milk before they reached 6 months while 5.3% (n=20) were started on complementary feeding after 6 months.

The results of the survey showed that 76.1% (n=186) of the children age 0 – 5 months were initiated to breastfeeding within the 1st one hour. This was a significant improvement when compared with the previous survey result which was at 58.7% (n=158) (p=0.000). Exclusive breastfeeding practice up to 6 months is an important practice. WHO recommends that children 0 – 5 months be given nothing else besides breast milk. The results showed that the exclusive breastfeeding rate was 44.7% (n=109) which had significantly improved from 14.7%[23] (n=11) in 2011 (p=0.000). This was slightly higher than the national exclusive breastfeeding rate established by the Kenya Demographic Health Survey of 31.9%[24]. Of the children who were not practicing exclusive breastfeeding, 18.9% were given plain water, 24.5% were given other liquids including sweetened water, glucose and porridge while the 50.2% were given cow milk and 6% of them were given fruit juice and fruits.

[23] Kajiado County SMART Survey, 2011
[24] Kenya National Bureau of Statistics, Kenya Demographic Health Survey, 2008-09

On the meal frequency, the proportion of children 6-8 months who fed at least twice and were breastfeeding was 89.6% (n=47) while the proportion of children 6 – 23 months who fed at least three meals for the breastfed children was 74.5% (n=200) though there was no significant change with the previous result of 2011 which was 68.8% (n=121) (p=0.164). For the children 6 – 23 months who had fed at least four meals and were not breastfeeding this proportion was 42.3% (n=22) while the proportion of those children 6 – 23 months who had fed two or more meals and either breastfed or non-breastfed was 68.8% (n=222).

Table 19: Food Groups among 6 - 23 Months

Food Type	n	Percent
Grains, Roots and Tuber	327	48.8
Legumes, Nuts, Seeds	154	23.0
Dairy Products	301	44.9
Flesh Products	39	5.8
Eggs	11	1.6
Vitamin A Rich Fruits and Vegetables	149	21.3
Other Fruits and Vegetables	102	15.2
Oils and Fats	300	44.8

The above table presents the eight food categories that the children 6 – 23 months old were fed the previous day preceding the survey. The caretaker was asked what the child had eaten/drank in the last 24 hours. According to the results, grains, roots and tuber were the most prevalent group of food that the children had eaten the previous day 48.4% (n=327); this was followed by daily products (milk and milk products) where 44.9% (n=301) of the children had consumed dairy products.

The above food groups were coded as "1" if the child consumed and "0" if the child did not consume. To generate the dietary diversity score, all the eight food groups were summed and a single variable generated which ranged between 0 and 8. The higher the score meant that the child consumed from more food groups while the less the score then the child consumed from less food groups. The generated indicator was used to generate the required indicators for the various categories of children as indicated in the table below:

Table 20: Dietary Diversity

Indicator	2012		2011		P-Value
	Proportion	N	Proportion	N	
Consuming 3+ Food Groups (Breastfed Children)	75.8% (204)	269	No Data		
Consuming 4+ Food Groups (Non-Breastfed Children)	69.8% (37)	53	No Data		
Consuming 3+ or 4+ Food Groups (Breastfed and Non-Breastfed)	72.8% (234)	322	No Data		

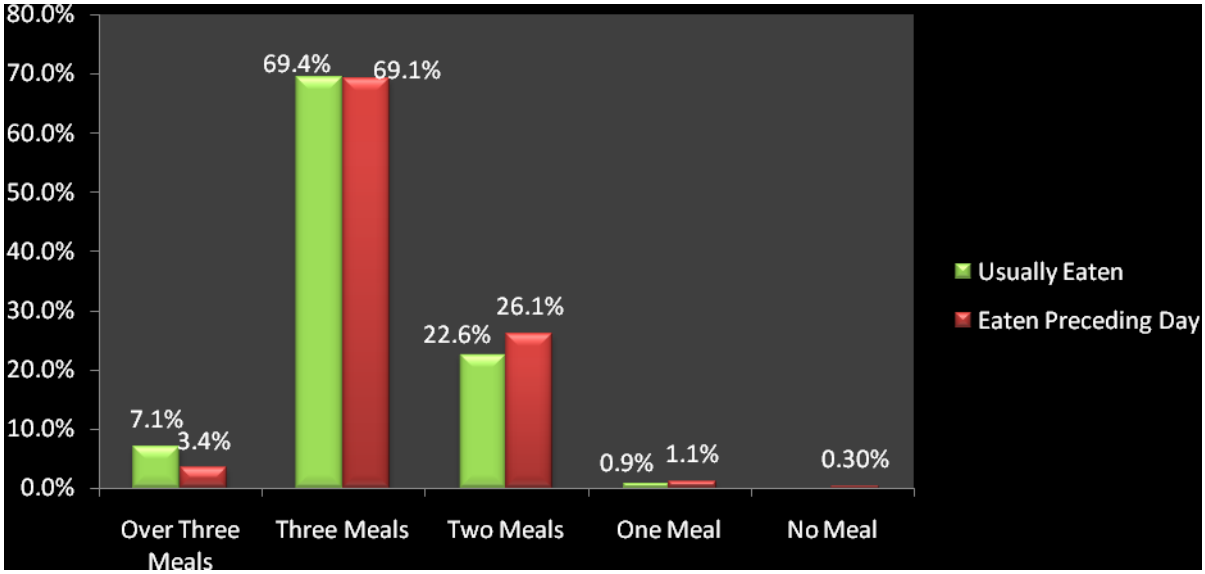
The proportion of children 6-23 months old who were consuming three and more food groups among the breastfeeding children was 75.8% (n=204) while those who were feeding on four or more food groups and were not being breastfed was 69.8% (n=37). In addition, the proportion of children 6 – 23

months old who were consuming three or more food groups or four and above food groups for the breastfed and non-breastfed respectively was 72.8% (n=234). The result shows that the dietary diversity among the children aged 6 – 23 months was high since in all the three indicators for dietary diversity, they were more than 50%. Finally, the mean dietary diversity score among the children 6 – 23 months was 3.7 (S.D=1.4).

2.10 Household Food Security and Livelihood Source

2.10.1 Household Food Consumption and Dietary Diversity

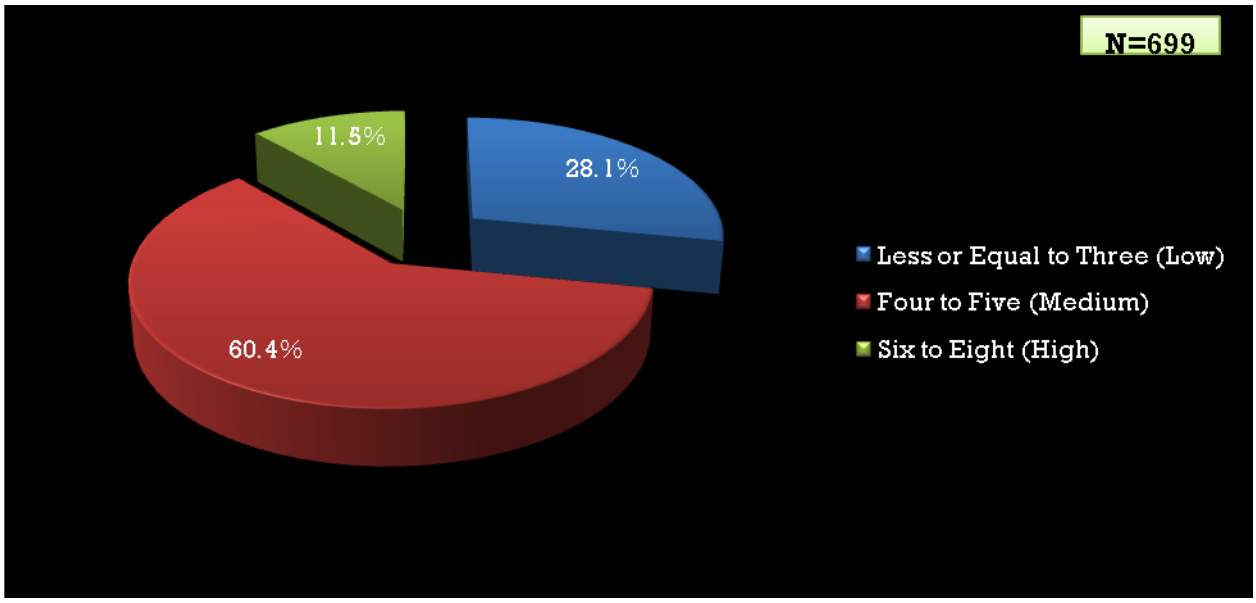
Figure 12: Household Food Consumption



The above figure presents the percentages of meals which are usually eaten by the respondents per day and the percentage of meals eaten the day preceding the survey. According to the results of the survey, majority of the respondents (69.4%) usually eat 3 meals per day, this was almost the case when 69.1% of the respondents confirmed eating 3 meals the day preceding the survey. However, fewer people than usual ate over three meals the day preceding the survey (3.4% against usual 7.1%). In addition more people ate one meal and two meals that they usually eat. However, the difference was not significant between the number of meals usually eaten and what the respondents had eaten the previous day preceding the survey ($p>0.05$). In addition, an analysis of difference between proportions shows that there was no significant difference between the proportion of households reporting having taken three meals the day preceding the survey (69.1%) and the normal/usual proportion (69.4%) of members taking three meals a day ($p>0.05$). This may suggest that the prevailing household food security situation in the community was normal.

The 24-hours' food intake recall by the household members over 5 years old was used as a proxy to assess household dietary diversity in the community.

Figure 13: Food Dietary Diversity Score



According to the above figure, 60.4% (n=422) of the population over 5 years had consumed food between four and five food groups which is classified as medium. In addition, 28.1% (n=) had eaten from less than or equal to three food groups which is considered low and the rest 11.5% (n=80) had eaten from over six food groups which is considered high. Overall 70% of the population reported having consumed from at least four food groups which is commendable and recommended, leaving approximately 30% of the population sampled that had eaten from less than four food groups.

Table 21: Food Groups among Over 5 Years

Food Type	n	Percent
Grains, Roots and Tuber	657	98.1
Legumes, Nuts, Seeds	374	55.3
Daily Products	481	71.8
Flesh Products	133	19.9
Eggs	23	3.4
Vitamin A Rich Fruits and Vegetables	345	49.4
Other Fruits and Vegetables	180	26.9
Oils and Fats	583	87.0

The above table demonstrates that the most prevalence food group among the sampled population was grains, roots and tuber which had been consumed by 98.1% (n=657) of the sampled population. This was followed by those fats and oils which had been consumed by 87% (n=583) of the sampled population and the daily products had been consumed by 71.8% (n=481) of the sampled population. Of worry is the small proportion of the respondents who had consumed flesh products (meat, liver e.t.c.) and eggs which may be attributed to high prices of these products in the market for the non-pastoralist and for the Maasai community, traditionally, eggs, poultry and fish were traditionally not eaten. In

addition, Maasai diet has also evolved from meat and milk to include mainly "githeri[25]", maize meal and rice with potatoes and cabbages. The evolution may be attributed to the frequent droughts in the recent past which reduced their livestock significantly and with this being their main source of livelihood it is not then tenable to slaughter these animals now and then.

2.10.2 Food Aid

World Food Programme in partnership with Neighborhood Initiative Assistance (NIA) as the lead agency in Kajiado has been distributing General Food Distribution (GFD). Kajiado falls within the Agro-pastoralist zone and a new approach which factors in seasonality and a new calendar for distributing food aid for these areas has been adopted. The target areas are the rural areas of Kajiado County and the target population has been 86,720 individuals. The last distribution before the survey was conducted in August. The table below presents the food aid distribution in Kajiado County.

Table 22: Food Aid

		Proportion	N
	Received Food Aid	32.8%	656
Source of Food Aids	WFP/NIA	98.2%	216
	Child Fund	1.0%	
	Other	0.8%	
Frequency of Food Aid	One	59.2%	
	Two	24.6%	
	Over Three	16.2%	
Uses of Food Aid Received	Consumed by HH Members	80.4%	
	Shared with Kins	19.2%	
	Bartered for other Item	50.0%	
Duration Food Aid Lasted	< 1 Week	33.5%	
	1 Week	31.2%	
	2 Weeks	13.6%	
	3 Weeks	10.0%	
	4 Weeks or More	11.8%	

Among the surveyed households, 32.8% (n=216) had received food aid within the three months preceding the survey. In addition, among those who had received food aid, nearly all had received from the World Food Programme in conjunction with NIA, 1% had received from Children Fund while 0.8% had received food aid from other sources. Further, 59.2% of the households that had received food aid reported that they had received it once with the three months preceding the survey while 24.6% reported that they had received it twice. WFP/ NIA confirmed distributing food twice in the targeted period. The survey showed that 80.4% of those who had received food aid consumed it with the household hold members, 50% of them said that they had battered a portion of the food aid for other items while 19.2% reported that they had shared a portion with their kins. On the longevity of the food

[25] Mixture of Maize and Beans

aid, 33.5% reported that it lasted for less than one week, 31.2% reported that it had lasted for only one week while 13.6% reported that the food aid had lasted for 2 weeks and the rest (21.8%) for more than 3 weeks. Among the items mentioned by the respondents as having been received during the food aid were CSB, Oil, Pulses, Maize/Maize Meal, wheat meal, rice among others. The actual ration per person is displayed in the figure below:

Table 23: Actual Ration per Person in Kajiado

Ration	Quantity per Person
Cereals	6Kgs
Pulses	1.2Kg
Vegetable Oil	o.4L
CSB	O.6Kg

2.10.3 Livelihood Sources

Table 24: Livelihood Sources

		Percent
Occupation of HH Head	Pastoralist	37.6%
	Farmer	11.6%
	Local Merchant/Petty Trade	15.5%
	Daily Laborer/Wages	12.9%
	Jobless	1.0%
	Military	0.4%
	Employed	8.9%
	Charcoal Burning	1.0%
	Sand Harvesting	0.7%
	Others	6.2%
Main Source of Livelihood	Livestock	38.3%
	Farming	12.2%
	Agriculture-Pastoral	1.4%
	Trader	3.6%
	Salaried Employment	9.7%
	Petty Trade	10.9%
	Charcoal Burning	0.7%
	Casual Work	14.4%
	Others	4.7%
Main Source of Food Consumed	Own Production	11.9%
	Purchases	83.7%
	Gifts from Friends/Family	0.3%
	Food Aids	0.1%

The results in the above table show that the main occupation of the household head was pastoralist at 37.6%, this was followed by the local merchant/petty traders at 15.5% and daily laborers accounted to 12.9% of the sampled population. In addition, the main source of livelihood in Kajiado County was livestock at 38.3% followed by casual work at 14.4%and then agriculture at 12.2%. Finally, the main

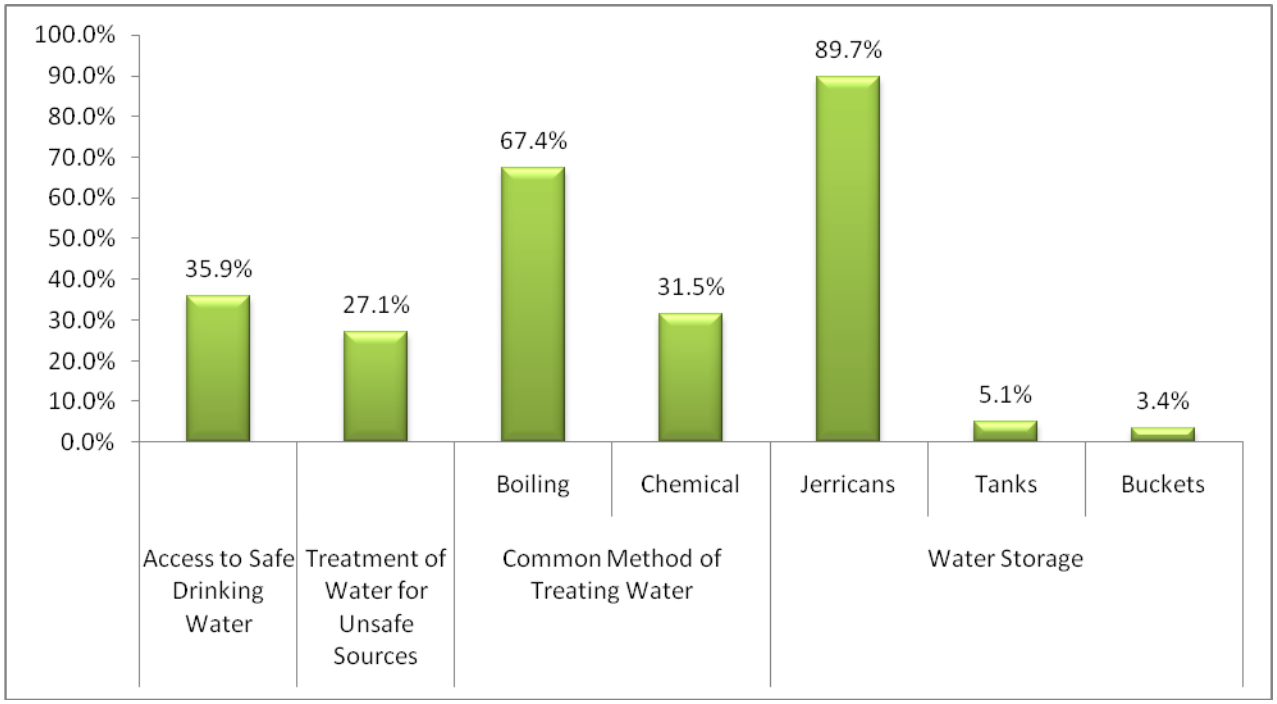
source of food consumed was from purchases which was mentioned by 83.7% of the sampled households, this was followed by own production at 11.9%.

2.11 Water, Sanitation and ITNs

2.11.1 Water

The results of the survey showed that 35.9% (n=251) of the households had access to safe drinking while 64.1% (n=448) had no access to safe drinking water[26]. Among the sources of water mentioned by the responded were water taps (33.5%), tanker (2.2%), unprotected wells (41.5%) while the rest were getting their water from lagas and earthen dams. Of the 64% of the households that does not have access to safe drinking water, 27.1% of them treat their water before drinking while 74.7% do not treat the water. The most common method of treating water among the households that practice water treatment was boiling (67.4%), followed by use of chemicals (31.5%) and finally solar disinfection (1.0%). On average the households sampled consumed 58 liters per day with the average water used per person per day in Kajiado being 11 Litres. This is less than the minimum required as per sphere standards recommendation of 15 L per person per day[27]. On the water storage, 89.7% (n=599) of the households sampled use Jerricans, 5.1% (n=34) use Tank while 3.4% (n=23) use buckets. This is shown in the table below:

Figure 14: Water



[26] Unsafe water means water from unprotected wells, laga and earthen dam/pans
[27] Sphere Handbook.**The Sphere Project-** Humanitarian Charter and Minimum Standards in Disaster Response

The above finding shows that a high percentage of the sampled households in Kajiado County do not have access to safe drinking water. In addition, among the households which do not have access to safe drinking water as recommended do not treat the water since the results demonstrates that there is minimal treatment of water at the household level among the sampled households. The role of untreated water as the main cause of childhood diarrhea cannot be underestimated. Nevertheless, it is encouraging from the results to find out that the most prevalence method of water treatment is boiling.

2.11.2 Sanitation

According to the survey, 45.4% (n=297) of the households sampled had access to either a toilet or a latrine facility while the rest 54.6% (357). The high proportion of households with no toilets would probably be attributed to migratory and socio-cultural lifestyles of the predominantly pastoralist communities resident in these areas.

On the type of the toilet which were available among the sampled households were; pit latrine (57.4% - n=163), traditional pit latrine (21.1% - n=60), ventilated improved pit latrine (20.4% - n=58), bucket (0.7% - n=2) and flush toilet (0.4% - n=1). In addition to the availability of toilets, the respondents were asked whether the toilets were in use where 99.3% (n=279) reported that the toilets were in use while only 0.7% (n=2) who reported that their toilets were not in use. In addition, among the households who reported that they did not have toilets, 95.8% (n=339) said they used a bush as a toilet while the rest 4.2% said that they used an open field as a toilet. On the disposal of the children feaces, 54.9% (364) of the households sampled reported that they disposed of the feaces immediately in the nearby bush or farm, 42.1% (279) reported that they disposed of the feaces immediately and hygienically. Hand washing at critical times[28] was found to be 23.6% (n=138). The use of open bush/field for faecal disposal coupled with consumption of water from open sources combined with poor hand washing at critical times poses a risk of contamination of drinking water, a pre-disposing factor to diarrheal diseases.

2.11.3 Insecticide Treated Mosquito Nets (ITNs)

Treated mosquito nets are provided free of charge to pregnant mothers attending the Ante-Natal Clinics (ANCs). According to the survey, 52.8% (n=354) of the sampled households reported having mosquito nets. The result above indicate that almost 1 out every 2 households do not have a mosquito net and therefore it is paramount for the Ministry of Health with other partners to devise mechanisms of distributing the ITN to the households in the community. Out of the households that had mosquito nets, 89.9% of them reported having obtained it from the Ministry of Health, 6.3% reported that they bought it from a shop while 0.6% said that they received the mosquito net form an agency. In addition, among the households which reported having mosquito nets, 54.3% said that they had only one, 33.2% reported that they had two nets while 12.5% reported that they had more than three nets. On the treatment of the mosquito nets, 41.5% of the nets had been treated while 9.5% had not been treated. It should be understood that all the MoH nets are treated and hence the 11.3% of the nets which were not treated were from other sources as indicated above. Among the nets which were from other source, only 9.5% were treated while 1.8% was not treated. For those nets which were treated from the

[28] Hand Washing at critical times includes washing hands after visiting toilet, before handling food, after cleaning Childs bottom, before feeding the child and before eating

household level, 47.8% had been treated more than 6 months ago while the rest (52.2%) had been treated less than 6 months ago. On the usage of the mosquito nets, slightly above 50% of the users were children less than 5 years while the other users included children older than 5 years (20%), and parents (15%). Nevertheless, it is worth noting that the results showed that approximately 5% of the households which had mosquito nets, these nets were not used by anybody in the household. This information is displayed on the table below:

Table 25: Insecticide Treated Mosquito Nets (ITNs)

		Proportion	N
	Availability of Mosquito Nets	52.8%	670
Source of Mosquito Nets	Shop	6.3%	354
	Agency	0.6%	
	MoH	89.9%	
	Other	3.2%	
Mosquito Nets Currently in Use	One	54.3%	
	Two	33.2%	
	Three and More	12.5%	
Treatment of Mosquito Net	Yes	9.5%	
	Already Treated	41.5%	
Time Last Treated Net	Less than a Month Ago	26.1%	33
	Between 1 and 6 Months Ago	26.1%	
	More than 6 Months Ago	47.8%	

3.0 Conclusion

In conclusion the prevalence of acute malnutrition of children in Kajiado County has improved. Overall the food and nutrition security situation has improved compared to last year as result of good long rains performance and improved water availability leading to good animal body conditions. The availability of milk, which is the staple food, at household level is however low, owing to low household stocks of livestock stemming from the trailing effects of the 2009 and subsequent droughts. Aggravating factors that are likely to alter the current nutrition and food security situation include poor rains in the Southern region, suggesting an inevitable shortfall of harvest, while in some locations, total crop failure was experienced.

Although the prevalence of wasting is low and at acceptable levels, concern is on the high prevalence of stunting levels, hence high chronic malnutrition. "Stunting in children below the age of five is a stronger indicator of hunger and one of its determinants, poverty, than other anthropometric indicators or estimates of per capita income. This is because stunting indicates the chronic restriction of a child's potential growth, reflecting the cumulative effects of inadequate food intake and poor health conditions that result from endemic poverty' (United Nations Standing Committee 2010)[29].

In order to successfully and sustainable address stunting, it is critical that an integrated approach is applied. While stand-alone nutrition interventions are important, it is equally important to ensure a multi-sectoral approach that tackles, among others, women's empowerment, maternal education, the promotion of exclusive breastfeeding for the first six months, decreasing infections, the disease burden, improved access to healthcare, improved sanitation, and increased agricultural production& other livelihood programs.

HINI components are still low especially Vitamin A coverage (and in particular among the 12- 59 months who took the supplements twice in the last 1 year); Zinc supplementation in managing diarrhoea is low. De-worming coverage is also low as well as exclusive breastfeeding rates. Although the overall county immunization coverage for measles, OPV and BCG are excellent, some pockets of concern have very poor coverage, especially in Kajiado North. There is still stigmatization of HIV/AIDS: It is taboo to discuss the subject openly.

[29] Jane Badham, Lara Sweet. 2010; Stunting: An Overview. SIGHT AND LIFE Magazine

4.0 Recommendations

Short term/ mid term

- Frequent measles vaccination campaigns especially in areas where access to health facilities is a main challenge, with timely interventions when suspected cases are highlighted.
- Mothers of infants and young children require much health and nutrition education, as the available research shows that effects on linear growth seem to be best with interventions that also provide specific educational messages such as importance diet diversity and emphasize of the critical window of opportunity that exists for optimal nutrition from preconception to two years.
- Scaling up HINI indicators is essentially (especially Vitamin A supplementation, de-worming and using Zinc for diarrhoea management) as well as iron supplementation for PLWs through strengthening of outreach services to supplement long distance/ access to health facilities.
- Roll out of micronutrient supplementation program in districts that have not yet started (e.g. central) with refresher training for health facility staffs especially in Kajiado central on enhanced management of diarrhoea in order to promote Zinc usage.
- District based surveillance systems could be established to help individual districts monitor the HINI indicators at relatively lower costs.
- Implementation of the community strategy which also addresses challenges of access to the health facilities should be supported by MoH and its partners in the various districts.
- Specific pocket areas where the GAM/ SAM might be of concern e.g. flower farms, slums etc can be addressed by continuous surveillance and if need be appropriate targeted interventions done in those areas.
- Streamline and adherence to the admission criteria to targeted nutrition program among all partners working in IMAM.
- Partners should invest in more Livelihood intervention programs and scale up interventions such as adopting livelihood diversifications to have a shift from over-dependence on pastoralist & adopt income generating activities e.g. small scale trade, more market participation e.g. selling livestock products, bee keeping & honey production.
- It is necessary to have health education sessions on HIV targeting all community members (both infected and non infected/ affected at the community level to help reduce stigma and also to address information gap on IYCN in the context of HIV.
- DHMT Central and the district hospital should look into the concerns raised about the district hospital and work at restoring community confidence on service delivery.

Long term

4. MoH & Partners need to invest in address the Health care access challenges (distance, attitude) by constructing more health facilities and the need to continually encourage hospital deliveries.
5. Cultural reasons for home deliveries should be addressed through continuous health education while exercising best practices in behaviour change communication.
6. Scale up WASH program to cover all areas of the county in both urban, semi urban and the rural areas

Appendices

Appendix i: Plausibility Checks – WHO Standards 2006

Indicator	Survey Value	Recommended Value	Comments
Digit preference score - weight	2	<10	Good
Digit preference - height	7	<10	Acceptable
WHZ (Standard Deviation)	1.07	0.8-1.2	Acceptable
WHZ (Skewness)	0.09	-1 to +1	Symmetrical
WHZ (Kurtosis)	-0.14	-1 to +1	Normal
Percent of flags WFH	2.2%	<3%	Acceptable
Age distribution (%)			
Group1 6-17 months	29.3%	20%-25%	Poor
Group 2 18-29 months	24.7%	20%-25%	Acceptable
Group 3 30-41 months	21.0%	20%-25%	Acceptable
Group 4 42-53 months	17.7%	20%-25%	Poor
Group 5 54-59 months	7.2%	Around 10%	Acceptable
Age Ratio : G1+G2/G3+G4+G5	1.17	Around 1.0	Poor
Overall Sex Ratio	1.04	0.8-1.2	Acceptable
Overall Survey Score	12%		Poor

Appendix ii: Cluster Sampled

District	Sub-Location	Village	Population	Cluster Number
Kajiado Central	Mailwa	Endoinyo	312	1
	Loodokilawi	Esampu Kike	84	2
	Olkiloriti	Naboisho	289	3
		Paranae	140	4
		Majengo A	4983	5
	Emukutan	Indepen	902	6
	Olkeriai	Noonolepen	419	7
	Bissil	Upper Town	775	8
	Namanga	Soweto	1757	9
		Hospital/Kichinjio	873	10
Kajiado North	ENKIRIGIRRI SUB LOCATION	Majengo A	3924	11
	KITENGELA SUB LOCATION	Community	325	12
	KISAJU SUB LOCATION	Empatipat	863	13
	LOODARIAK SUB LOCATION	Sinato	246	14
	KIMUKA SUB-LOCATION	Indikirro	413	15
	OLDORKO SUB-LOCATION	Eitii	543	16
		Ngila	275	17
	NAJILE SUB-LOCATION	Enkusero Keri	469	18
	OLOIKA SUB-LOCATION	Oloika	1009	19
	Entasopia - Ngurumani	Oltepesi	335	20
	Mosoi Range	Commercial	4613	21
	Kipeto	Olorien	1071	22
	Oloyiankalani	Esilanka	733	23
Loitokitok	Nkama	Mpayiai D	254	24
	Olorika	Olorika C	598	25
	Chulu	Iltuleta A	1128	26
		Iloirero A	970	27
	Oltiasika	Ilchalai I	733	28
	Kimana	Lormeuti	1424	29
		Kimana Tikondo	1237	30
	Olchoro	Langata/Olchro	439	31
		Olchoro Centre A	542	32
	Enkong Narok	Olmoti/Angata Rongai	714	33
	Rombo	Ngasakinoi B	346	34
		Olmaroroi B	584	35
	Njukini	Enderkesi A	527	36

Appendix iii: Data Collection Tools

Nutrition Survey Questionnaire

AREA IDENTIFICATION		
District …….		
Division …….		
Location …….		
Sub location ……		
Village/Cluster …….		
Cluster No.……		☐☐
Household No. ……		☐☐
Household coordinates	Latitude	
	Longitude	
Team Number		☐
Name of Team Leader		_____
Name of Interviewer		

	_____
Date of Interview	**Date Month year**
Time of starting interview	
Time of finishing interview	

A. Household Questionnaire

(The respondent for the household questionnaire should mainly be the primary caregiver)

PLEASE CIRCLE THE CORRECT ANSWER USING A WELL SHARPENED PENCIL

No.	*Questions and Filters*	**Categories**
	HOUSEHOLD DEMOGRAPHICS SECTION	
1	Title of Respondent	Mother……..1 Father……2 Relative……3 Grandmother/ grandfather……4 Other(Specify) …….5
2	What is the total number of household members? (Household members living under the same roof and share the same dish)	Number .....

3	Number of children under five years? (From among the total)	Total Number (0- 59 months) ..... …….. Under six months…….
4	IS there a child in the Stabilization centre from this household? (Ngong DH, Kajiado DH, Loitoktok DH, Rombo HC, Fatima HC, Mbirikani HS)	Yes ……..1 No…….. 2
5	What is the sex of the head of this household?	Male ..... 1 Female ..... ……2
6	**What is the** MAIN **occupation of the head of this household?**	Pastoralist ……..1 Farmer..... 2 Local merchant/ petty trade..... 3 Daily laborer/ wages..... 4 Fishermen ……5 National service ..... 6 Jobless..... 7 Military..... 8 Employed ……9 Charcoal burning……10 Sand harvesting……11 Other (specify) 12
7	What is the **caretakers'** marital status?	Married living together..... 1 Married living separately..... 2 Divorced..... 3 Widowed..... 4 Single..... 5

A. Child questionnaire (6-59 months) in sampled households: Cluster Name **Cluster no.** **Date:**

Q/N	**Variable**	**Child # 1**	**Child # 2**	**Child #3**
C1	Sex of child	Male.....1 Female.....2	Male.....1 Female.....2	Male.....1 Female.....2
C2	Date of Birth (Date/month/year)	Date ..... ☐☐ Month..... ☐☐	Date ..... ☐☐ Month..... ☐☐	Date ..... ☐☐ Month..... ☐☐
C2a	Age in months	☐☐☐☐	☐☐☐☐	☐☐☐☐
C2b	How age was determined	1. Health card. 2. Birth certificate 3. Baptism card	1. Health card. 2. Birth certificate 3. Baptism card	1. Health card. 2. Birth certificate 3. Baptism card
C3	Weight (Kg)- (nearest 0.1)	Weight ☐☐.☐	Weight ☐☐.☐	Weight ☐☐.☐
C4	Height (cm)- (nearest 0.1)	☐☐☐.☐ Height .	☐☐☐.☐ Height .	☐☐☐.☐ Height .
C5	Pitting Oedema both feet: *(please Circle the correct answer)*	Yes .....1 No 2	Yes .....1 No 2	Yes .....1 No 2
C6	MUAC (to the nearest 0.1 cm)	_____.____	_____.____	_____.____
C7	Has child received OPV1	Yes (by card) .....1 Yes (by recall) .....2 No .....3 Don't Know.....4	Yes (by card) ..... 1 Yes (by recall)..... 2 No ..... 3 Don't Know..... 4	Yes (by card) .....1 Yes (by recall) .....2 No .....3 Don't Know.....4
C8	Has child received BCG	Yes (by card) .....1 Yes (by recall) .....2 No .....3 Don't Know.....4	Yes (by card) ..... 1 Yes (by recall)..... 2 No ..... 3 Don't Know..... 4	Yes (by card) .....1 Yes (by recall) .....2 No .....3 Don't Know.....4
C9	Has child received OPV3	Yes (by card) .....1 Yes (by recall) .....2 No .....3 Don't Know.....4	Yes (by card) ..... 1 Yes (by recall)..... 2 No ..... 3 Don't Know..... 4	Yes (by card) .....1 Yes (by recall) .....2 No .....3 Don't Know.....4
C10	Measles vaccination	Yes by card.....1 Yes by recall.....2	Yes by card..... 1 Yes by recall..... 2	Yes by card.....1 Yes by recall.....2

		No……3 Don't know……4	No……3 Don't know……4	No……3 Don't know……4
C11	Has the child received Vitamin A cap. **(Last 6 months**)? *show capsule*	Yes .....1 No 2	Yes ..... 1 No 2	Yes .....1 No 2
C12	How Many Times has the child received Vitamin A in the **last one year**	……..00…… …01 ……..02…… …03	……..00…… 01 ……..02…… 03	……..00…… 01 ……..02…… 03
C13	Has the child taken any drug for intestinal worms within **the last 6 months?** *Show samples if available*	Yes (by card) .....1 Yes (by recall) .....2 No .....3 Don't Know.....4	Yes (by card) ..... 1 Yes (by recall)..... 2 No ..... 3 Don't Know..... 4	Yes (by card) .....1 Yes (by recall) .....2 No .....3 Don't Know.....4
C14	Has this child been sick in the last 2 weeks? *(**Fever:** High temperature with/ without shivering, **ARI:** severe, persistent cough or difficulty breathing, D**iarrhoea: 3** or more watery stools per day, **Measles**: redish eyes, small rashes on face with fever, cough & running nose)*	Not ill ..... A Diarrhea..... B Fever..... C Measles (Msanduku)……D ARI ..... E Others..... F	Not ill ..... A Diarrhea..... B Fever..... C Measles(Msanduku .....D ARI ..... E Others..... F	Not ill ..... A Diarrhea..... B Fever..... C Measles(Msanduku .....D ARI ..... E Others..... F
C15	When the child was sick **in the last 2 weeks,** where did you seek health assistance?	Traditional Healer .....1 CHW.....2 Private Clinic .....3 Shop/Kiosk.....4 Public Clinic.....5 Mobile Clinic .....6 NGO/FBO .....7 Relative or Friends .....8 Local Herbs .....9 No Assistance Sought.....10	Traditional Healer..... 1 CHW ..... 2 Private Clinic..... 3 Shop/Kiosk ..... 4 Public Clinic ..... 5 Mobile Clinic..... 6 NGO/FBO..... 7 Relative or Friends ..... 8 Local Herbs..... 9 No Assistance Sought 10	Traditional Healer..... 1 CHW ..... 2 Private Clinic..... 3 Shop/Kiosk ..... 4 Public Clinic ..... 5 Mobile Clinic..... 6 NGO/FBO..... 7 Relative or Friends ..... 8 Local Herbs..... 9 No Assistance Sought 10

D1	If the child suffered from Diarrhoea in the **last 2 weeks,** what was he /she given to drink since the diarrhoea started?	1. Fluid made from a special packet called oralite or ORS. 2. Homemade sugar/ salt solution. 3. Zinc 4. Another homemade liquid (underline the specific type of liquid) – porridge, soup, youghurt, coconut water, fresh fruit juice, tea, milk, or rice water. 5. Other (specify) _____	1. Fluid made from a special packet called oralite or ORS. 2. Homemade sugar/ salt solution. 3. Zinc 4. Another homemade liquid (underline the specific type of liquid) – porridge, soup, youghurt, coconut water, fresh fruit juice, tea, milk, or rice water. 5. Other (specify) _____	1. Fluid made from a special packet called oralite or ORS. 2. Homemade sugar/ salt solution. 3. Zinc 4. Another homemade liquid (underline the specific type of liquid) – porridge, soup, youghurt, coconut water, fresh fruit juice, tea, milk, or rice water. 5. Other (specify) _____
D2	Was it given to the child	Yes……1 No ……..2	Yes……1 No ……..2	Yes……1 No ……..2
D3	Was the diarrhoea Watery	Yes ……..1 No…….. 2	Yes ……..1 No…….. 2	Yes ……..1 No…….. 2
D4	Was the diarrhoea bloody (enkalokani osarke)/ mucous?	Yes ……..1 No…….. 2	Yes ……..1 No…….. 2	Yes ……..1 No…….. 2
C15	Is the child enrolled in a feeding program *Show samples of PNut, CSB if necessary*	Yes (OTP)……1 Yes (SFP) ……2 No ……3 Don't Know……4	Yes (OTP)…… 1 Yes (SFP)…… 2 No…… 3 Don't Know …… 4	Yes (OTP)…… 1 Yes (SFP)…… 2 No…… 3 Don't Know …… 4
C16	Caretaker's relationship to child	Mother……1 Grand mother ……2 Father ……3 Aunt ……4 Sibling ……5 Other ……6	Mother …… 1 Grand mother…… 2 Father…… 3 Aunt …… 4 Sibling…… 5 Other…… 6	Mother …… 1 Grand mother…… 2 Father…… 3 Aunt …… 4 Sibling…… 5 Other…… 6

MATERNAL NUTRITIONAL STATUS FOR MOTHERS WHOSE CHILDREN HAVE BEEN MEASURED		
AN1	How old are you **(include mainly 15 yrs- 49 years old)**	< 15 years .....01 15 -49 years.....02 >49 years 03
AN2	What is the woman's current physiological status? *(Sensitive question: Are you pregnant?)* *(Iroshi? Iyata eninkununo? Ira entuaa? Iyeata enitiu?)*	Currently Breastfeeding (<6 months) 01 Currently Breastfeeding (>6 months) 02 Pregnant and breastfeeding _____03 Not pregnant/not breastfeeding____04 Pregnant _____05
AN3	MUAC (cm), left arm	_____.___ or **> 26.0 cm**
AN3	Where did you deliver your last child (insert name)?	Delivery at home with no assistance of skilled worker_____1 At the home by a skilled attendant_____2 At the health facility _____3
AN4	In your last pregnancy, were you given/ bought any of the following: *Show samples if available*	Iron follate/ ferrous sulphate_____ 01 Iron Syrup – Haematon_____ 02 Folic acid _____03 None of the above _____04 Do not know _____05
AN5	Did use the iron supplements	Yes ……01 No……02

AN5	Ask the breastfeeding/lactating mothers only "have you received any vitamin A supplementation" *Show samples if available*	Yes _____01 No_____02 Do not know _____03

FOOD CONSUMPTION PATTERNS AND DIETARY DIVERSITY

CF1	Are you still breastfeeding this child/ children aged **6- 23 months**: 1= Yes, 2= No 3=Do not know	1	2	3
CF2	At what age (in months) did you start giving (Name) **(6- 23 m)** other foods and drinks (including water)			
FC3	How many meals/ times did this **6-23 months** old child/ children eat yesterday			
FC4	How many meals/ times did this **24 – 59 months** child/ children eat yesterday			
FC5	How many meals did other household members **(>5 years)** eat yesterday			
FC6	Including food eaten in the morning, how many meals does your family **usually eat per day**			

FC7. What food did you consume yesterday for:

1. Breakfast 2. Lunch

3. Supper 4. Snacks

Please indicate which of the following food groups were consumed **YESTERDAY** by age category. *Do not leave any blank*

0 = did not consume, 1 = Consumed

	Food Group	**Examples**	**6-23 months**	**24-59 months**	**>5 years**
FG1	**Grains, Roots and Tubers**	Sorghum, maize, spaghetti, bread, white tubers, white potatoes, white yams, cassava or foods from roots, white sweet potatoes, rice, matoke,			
FG2	**Legumes and Nuts**	Beans, lentils, green grams, cowpeas, dried peas			
FG3	**Dairy Products**	milk, yogurt, cheese (cow, goat, camel, fermented milk, powdered milk), cream			

FG4	**Flesh Foods (meat, fish, poultry and liver/organ meats)**	meat, poultry, kidney, heart or other organ meats or blood based foods, spleen, fresh or dried fish or shell fish smoked, salted or fried, munono			
FG5	**Eggs**				
FG6	**Vitamin A Rich Fruits and Vegetables**	pumpkin, carrots, yellow-orange flesh sweet potatoes, ripe mango, papaya, dark green leafy vegetables (cassava leaves, pumpkin leaves, cowpeas leaves, sukuma wiki, spinach) managu.			
FG7	**Other Fruits and Vegetables**	Banana, watermelon, cucumber-like vegetables, cabbages,			
FG8	**Oils and Fats**	Cooking fat or oil, butter, ghee(eng'orno), margarine, munono			
FG9	**Others**	**Black t**ea, black Coffee			

FOOD SECURITY			
FS01	What is the **MAIN source** of livelihood for this household currently? *Circle only one (1) response.*	Livestock.....1 Farming .....2 Agriculture-pastoral.....3 Fishing .....4 Trader 5	Salaried Employment .....6 Petty trade.....7 Charcoal burning.....8 Casual work.....9 Other (specify) 10
FS02	What is the **MAIN source** of food consumed? *Circle only one (1) response.*	Own production.....1 Purchases.....2 Gifts from friends/ family.....3 Food aid.....4	Borrowed.....5 Gathering /wild .....6 Traded or bartered.....7 Other (specify).....8
FS03	Does this Household own/ have any livestock?		Yes .....1 No 2
FS04	If yes, which ones? (multiple answers allowed)	Goats .....1 Sheep.....2 Cattle 3	Camels .....5 Chicken .....4 Donkey .....3 Others- specify 7
FA1	Has your HH received food aid in the last three (3) months? (June to Now) **IF ANSWER IS NO SKIP TO MALARIA section**		1 = Yes 2 = No

FA2	If Yes what were the sources?	1=WFP/ NIA 2=Government 3= Red cross	4= AMREF 5=Child fund 6= Others (specify)
FA3	How many times did this household receive the food aid in the last 3 months (Since June)		
FA4	What food commodities were received (multiple answers allowed).	1=CSB ("Uji") 2=Oil 3=Pulses 4=Maize/Maize Meal	5=Rice/Wheat/Sorghum 6= Food vouchers
FA5	Of the food aid received for what purpose was it used? (multiple answers allowed)	1=Resold in the market 2=Bartered for other item 3=Shared with kin 4=Saved for seed	5=All consumed by the HH members 6=Fed the Animals (Goats/Cow) 7= Other (specify)
FA6	How many days on average did the food commodities last?	1=<1 week 2=1 Week 3=2 weeks	4 =3weeks 5= 4 weeks and more

Malaria Control		
No.	*Questions and Filters*	**Categories**
M1	Does this household have a mosquito net? **IF ANSWER IS NO GO TO WATER & SANITATION SECTION**	Yes .....01 No…. ..... …….02
M2	Where did you get it from?	Shop.....01 An Agency.....02 Ministry of Health..... 03 Others ……04
M3	How many mosquito nets are currently in use? Enter actual number	
M4	Have you ever treated your net? (soaked of dipped it in dawa or chemical to repel mosquito or insects)	Yes .....01 No .....02 Already treated ……03

M5	If yes, when did you last treat it?	Less than one month ago .....01 Between one and six months ago .....02 More than six months ago..... .03
M6	Who slept under the mosquito net last night? (probe – enter all responses mentioned)	Children less than 5 year _____ 01 Children over 5 years _____ 02 Pregnant women _____ 03 Mother _____ 04 Father _____ 05 Mother & child _____06 Nobody uses_____ 07 Others_____ 08 Specify_____

Water & Sanitation

WS1	What is the **MAIN** source of **drinking** water?	River _____ 01 Water Tap_____ 02 Borehole _____ 03 Unprotected Well_____ 04 Protected Well _____ 05 Public Pan (silange)_____06 Tanker_____ 07	Dam _____08 Laga _____09 Lakes……10 Rain roof catchments water……..11 Rock catchments……12 Other (Specify) _____13 _____
WS2	On average, how many LITRES of water does the household use per day (probe **for all** water used in the HH)		_____ Liters
WS3	Do you do anything to the water **before drinking** it?	Boiling_____ 01 Use traditional herbs _____ _____02 Use chemicals (water guard/ pur/chlorine) _____03	Filters/ Sieves _____04 Decant _____05 Solar disinfection ……..06 Nothing_____ 07

WS4	How do you store your drinking water? **(Record all responses)**	Jerricans _____ 01 Bucket_____ 02 Sufuria _____ 03 Pot_____ 04	Tank/ kentank _____05 No special container _____06 Other _____07 Specify_____
WS5	Does your household have **access** to a toilet/ latrine facility (probe further/observe)		Yes ..... 01 No _____02
WS6	If yes, what type of toilet/ latrine facility do you have	Bucket .....01 Traditional Pit Latrine.....02 Ventilated improved pit latrines 03	Flush Toilet ..... 04 Pit latrines.....05 Other ..... 06 Specify _____
WS7	If yes, is the latrine currently in use?		Yes ..... 01 No _____02
WS8	If No, where do you help yourself (probe further)	Bush .....01 Open Field .....02 Near/ along the river bed 03	Behind the house..... 04 Cat method of disposal..... 05 Other ..... 06 Specify_____
WS9	How are children's feaces disposed ***(OBSERVE)?***	Disposed off immediately and hygienically .....01 Not Disposed (scattered in the compound) 02	Disposed off immediately in the nearby bush or farm ..... 03 Use of dogs ..... 04 Others..... 05 Specify_____
WS10	When do you usually wash your hands ***(multiple answers possible)***	After defecation/visiting toilet.....01 Before handling food .....02 After cleaning child's bottom.....03 Before feeding the child.....04	Before eating ..... 05 None of the above..... 06 Other ..... 07 Specify_____
WS11	What do you use to clean/wash your hands?	Water only .....01 Water and soap.....02	Water and sand ..... 04 Other 05

		Water and ash.....03	Specify_____
WS12	Is the compound clean? (***(OBSERVE)?*** No visible feaces near the house, no rubbish all over)		Yes ..... 01 No 02

ANY COMMENTS

……
……
……
……
……
……

EBF Questionnaire

CHILD <6 MONTHS FORM: *This page must be filled in for every household with a child aged <6 months; every child in this range should be included.

DISTRICT:_____	**Date of survey**	**CLUSTER NO.**	**TEAM NO**	**NAME OF TEAM LEADER:_____**

	EB1	EB2	EB3	EB4	EB5	EB6	EB7	EB8	EB9	EB10	EB 11	EBF12
HHLD no.	Child No.	Age of child in mon	When did you start breastfeeding this child after the delivery? 0 = Never 1 = < 1 hr 2 = 1 to 3 hrs 3 = 3 to 6 hrs 4 = 6 to 24 hrs 5 = > first day 6 = Other (specify)	During the first 3 days after delivery, did you give [Name] the fluid/liquid that came from your breasts? 1= Yes, 2= No, 3= DNK	In the first 3 days after delivery, was the child given anything to drink other than breast milk? 1. Nothing 2. Plain water; 3. Sugar water or glucose water; 4 Powdered milk (Milki, Nido, Safariland, Coast), Fresh milk 5. Infant formula (nun), 6. Gripe water; 7. Butter or cream from milk 8. Cow's Fat e.*g ghee* 9. Other (specify)	Are you still breastfeeding this child: 1= Yes, **2= No** **If Yes, go to EBF7 if No, go to EBF 8**	Did you breastfed this child yesterday? 1 = Yes 2 = No	If No, why? Use code 1 = No milk; 2= Mother did not want to breast feed; 3= child refused 4=Traditional beliefs (child will die) 5= Medical advice 6= Mother died 7=other (Specify) _____	Was the child given any water **yesterday?** 0 = No 1 = Yes, plain water 2. ORS (chemka, chumvi sukari) 3.commercial juices- Afia, Quencher 4. Water & sugar	**Yesterday** was the child given any breast milk substitute e.g. animal milk - reconstituted powdered milk, (Halwa, Milki, Nido, Safari land, ghee) ? 0 = No 1 = Yes	Was the child given any other food/liquid **yesterday?** 1 = Yes 2 = No Specify	Mothers MUAC IN CMS
	1											
	2											
	3											
	4											
	5											
	6											
	7											

Appendix iv: Local Calendar of Event

Kajiado North

MONTH	Seasons	2007	2008	2009	2010	2011	2012
January	Schools open		56 PEV	44 Floods in NGONG	32	20	8
FEBRUARY			55 PEV	43	31	19	7
MARCH			54	42	30	18 Isinya district separeted	6 Floods begin
APRIL			53	41	29	17	5 Floods
MAY **J**			52	40	28	16 Bomb blast kiling 5 children	4 Fight between Purko & keekonyokie clans in Mosiro started
JUNE			51	39	27	15 Bishop Segel killed	3 Death of Saitoti
JULY	Cold month		50 Start of Severe drought	38	26	14	2 Killed 6 lions in Kitengala
AUGUST		Division of PCEA church to join POMC	49	37 Mercy USA nutritition prog starts	25 Referundum	13 Influx of somali sheep & goat	1
SEPTEMBER			48	36 National census	24	12	
OCTOBER		59	47	35	23	11	
NOVEMBER		58	46	34 End of Severe drought	22	10	
DECEMBER		57 National General ellections	45	33	21	9	

First check for date of birth on health cards, immunization cards, etc. If possible then calculate the exact age in months if possible. If no reliable card, then use the local calendar together

with the respondent's recall

Loitokitok

MONTH	Seasons	2007	2008	2009	2010	2011	2012
January	Schools open		56 PEV	44	32	20	8
FEBRUARY	Harvesting beans	Rift valley outbreak	55	43	31	19	7
MARCH			54	42	30	18 Machuru district separeted	6 Beginning of heavy rains
APRIL	Harvesting maize		53	41	29	17 Emali-Loitoktok road officially opened	5
MAY J	Schools open		52	40	28	16	4
JUNE			51	39	27	15 Bishop Segel killed	3 Death of Saitoti
JULY	Cold month		50 Start of Severe drought	38	26	14	2
AUGUST			49	37 Severe drought/ The time when animals died	25 Manyatta/ kangere rite of passage Mutuati graduation Referurendum	13	1
SEPTEMBER	Farms preparations School opening		48	36 National census	24	12	
OCTOBER	Planting season	59	47	35	23	11 Trachoma mass treatment	
NOVEMBER		58	46	34 End of Severe drought	22	10	
DECEMBER		57 National General ellections	45	33	21	9	

First check for date of birth on health cards, immunization cards, etc. If possible then calculate the exact age in months if possible. If no reliable card, then use the local calendar together with the respondent's recall

Kajiado Central

MONTH	Seasons	2007	2008	2009	2010	2011	2012
January	Schools open		56 PEV	44	32	20	8
FEBRUARY	Harvesting beans		55	43	31	19	7
MARCH			54	42	30	18 Machuru district separeted	6 Beginning of heavy rains
APRIL	Harvesting maize		53	41	29	17	5
MAY **J**			52	40	28	16	4
JUNE			51	39	27	15 Bishop Segel killed	3 Death of Saitoti
JULY	Cold month		50 Start of Severe drought	38	26	14	2
AUGUST			49	37	25 Manyatta/ kangere rite of passage Referundum	13	1
SEPTEMBER	Farms preparations		48	36 National census	24	12	
OCTOBER	Planting season	59	47	35	23	11	
NOVEMBER		58	46	34 End of Severe drought	22	10	
DECEMBER		57 National General ellections	45	33	21	9	

First check for date of birth on health cards, immunization cards, etc. If possible then calculate the exact age in months if possible. If no reliable card, then use the local calendar together with the respondent's recall

Appendix v: Results Outputs by District

Immunization Coverage

Measles Vaccination

			Measles Vaccination				
			Yes (by card)	Yes (by recall)	No	Don't Know	Total
District	Kajiado Central	Count	119	82	22	5	228
		% within District	52.2%	36.0%	9.6%	2.2%	100.0%
	Kajiado North	Count	142	92	44	12	290
		% within District	49.0%	31.7%	15.2%	4.1%	100.0%
	Loitokitok	Count	218	62	34	4	318
		% within District	68.6%	19.5%	10.7%	1.3%	100.0%
Total		Count	479	236	100	21	836
		% within District	57.3%	28.2%	12.0%	2.5%	100.0%

Vitamin A Supplementation

				Yes	No	Total
6 - 11 MONTHS	District	Kajiado Central	Count	29	15	44
			% within District	65.9%	34.1%	100.0%
		Kajiado North	Count	14	16	30
			% within District	46.7%	53.3%	100.0%
		Loitokitok	Count	40	16	56
			% within District	71.4%	28.6%	100.0%
	Total		Count	83	47	130
			% within District	63.8%	36.2%	100.0%
12 - 59 MONTHS	District	Kajiado Central	Count	82	119	201
			% within District	40.8%	59.2%	100.0%
		Kajiado North	Count	106	156	262
			% within District	40.5%	59.5%	100.0%
		Loitokitok	Count	144	148	292
			% within District	49.3%	50.7%	100.0%
	Total		Count	332	423	755
			% within District	44.0%	56.0%	100.0%

De-worming

			Has the child taken any drug for intestinal worms within the last 6 months?				
			Yes (by card)	Yes (by recall)	No	Don't Know	Total
District	Kajiado Central	Count	12	52	120	11	195
		% within District	6.2%	26.7%	61.5%	5.6%	100.0%
	Kajiado North	Count	9	75	163	12	259
		% within District	3.5%	29.0%	62.9%	4.6%	100.0%
	Loitokitok	Count	10	102	177	2	291
		% within District	3.4%	35.1%	60.8%	.7%	100.0%
Total		Count	31	229	460	25	745
		% within District	4.2%	30.7%	61.7%	3.4%	100.0%

Morbidity

	Not Sick	Diarrhea	Fever	Measles	ARI	Others	
Kajiado Central	149	11	27	0	61	17	265
	56.2%	4.2%	10.2%	0.0%	23.0%	6.4%	100.0%
Kajiado North	187	21	29	1	52	17	307
	60.9%	6.8%	9.4%	0.3%	16.9%	5.5%	100.0%
Loitokitok	241	20	17	5	61	10	354
	68.1%	5.6%	4.8%	1.4%	17.2%	2.8%	100.0%
Total	577	52	73	6	174	44	926
	62.3%	5.6%	7.9%	0.6%	18.8%	4.8%	100.0%

Health Seeking Behavior

			When the child was sick in the last 2 weeks, where did you seek health assistance							
			Private Clinic	Shop/Kiosk	Public Clinic	Mobile Clinic	NGO/FBO	Local Herbs	No Assistance Sought	Total
District	Kajiado Central	Count	11	18	56	1	2	1	13	102
		% within District	10.8%	17.6%	54.9%	1.0%	2.0%	1.0%	12.7%	100.0%
	Kajiado North	Count	22	13	53	0	2	2	14	106
		% within District	20.8%	12.3%	50.0%	.0%	1.9%	1.9%	13.2%	100.0%
	Loitokitok	Count	30	16	39	2	3	2	13	105
		% within District	28.6%	15.2%	37.1%	1.9%	2.9%	1.9%	12.4%	100.0%
Total		Count	63	47	148	3	7	5	40	313
		% within District	20.1%	15.0%	47.3%	1.0%	2.2%	1.6%	12.8%	100.0%

Access to Toilet

			Does your household have access to a toilet/latrine facility		
			Yes	No	Total
District	Kajiado Central	Count	85	102	187
		% within District	45.5%	54.5%	100.0%
	Kajiado North	Count	117	109	226
		% within District	51.8%	48.2%	100.0%
	Loitokitok	Count	95	146	241
		% within District	39.4%	60.6%	100.0%
Total		Count	297	357	654
		% within District	45.4%	54.6%	100.0%

Urban Rural Indicators on Wash

Access to Safe Water

			Safe Water Source		
			Safe	Unsafe	Total
Urban Rural	Urban	Count	116	65	181
		% within Urban Rural	64.1%	35.9%	100.0%
	Rural	Count	135	383	518
		% within Urban Rural	26.1%	73.9%	100.0%
Total		Count	251	448	699
		% within Urban Rural	35.9%	64.1%	100.0%

Treatment of Unsafe Water

			Do you do anything to the water before drinking it		
			Yes	No	Total
Urban Rural	Urban	Count	14	40	64
		% within Urban Rural	37.5%	62.5%	100.0%
	Rural	Count	90	266	356
		% within Urban Rural	25.3	74.7%	100.0%
Total		Count	114	306	420
		% within Urban Rural	27.1	72.9%	100.0%

Access to Toilet

			Does your household have access to a toilet/latrine facility		
			Yes	No	Total
Urban Rural	Urban	Count	147	29	176
		% within Urban Rural	83.5%	16.5%	100.0%
	Rural	Count	150	328	478
		% within Urban Rural	31.4%	68.6%	100.0%
Total		Count	297	357	654
		% within Urban Rural	45.4%	54.6%	100.0%

Type of Toilet Available for those who have Access

			If yes, what type of toilet currently in use					
			Bucket	Traditional Pit Latrine	Ventilated improved pit latrine	Flush toilet	Pit Latrine	Total
Urban Rural	Urban	Count	2	19	35	1	85	142
		% within Urban Rural	1.4%	13.4%	24.6%	.7%	59.9%	100.0%
	Rural	Count	0	41	23	0	78	142
		% within Urban Rural	.0%	28.9%	16.2%	.0%	54.9%	100.0%
Total		Count	2	60	58	1	163	284
		% within Urban Rural	.7%	21.1%	20.4%	.4%	57.4%	100.0%

Usage of Toilet for those who have Access

			If yes, is the latrine currently in use		
			Yes	No	Total
Urban Rural	Urban	Count	140	1	141
		% within Urban Rural	99.3%	.7%	100.0%
	Rural	Count	139	1	140
		% within Urban Rural	99.3%	.7%	100.0%
Total		Count	279	2	281
		% within Urban Rural	99.3%	.7%	100.0%

EBF Rates by District

District	EBF Rate	n
Kajiado Central	39.7%	25
Kajiado North	48.3%	43
Loitokitok	44.6%	41

Appendix vi: Immunization Coverage by Cluster/Villages

		OPV1		BCG		OPV3		Measles Vaccination	
		Yes (by card)	Yes (by recall)	Yes (by card)	Yes (by recall)	Yes (by card)	Yes (by recall)	Yes (by card)	Yes (by recall)
Kajiado Central	Endoinyo	77.0	19.0	76%	20.00	69.23	19.23	53.85	23.08
	Esampu Kike	59.0	41.0	52.2	47.83	54.55	45.45	35.00	60.00
	Naboisho	86.0	11.0	89.3	10.71	85.71	10.71	39.29	28.57
	Paranae	92.0	8.0	92.3	7.69	88.46	7.69	73.91	13.04
	Majengo A	71.0	25.0	66.7	29.17	70.83	20.83	66.67	25.00
	Indepen	72.0	28.0	72.0	28.00	60.00	28.00	52.00	32.00
	Noonolepen	***41.0***	***59.0***	***40.7***	***59.26***	***40.74***	***48.15***	***32.00***	***60.00***
	Upper Town	58.0	38.0	58.3	37.50	60.87	34.78	45.83	41.67
	Soweto	62.0	31.0	57.1	32.14	62.07	31.03	58.62	27.59
	Hospital/Kichinjio	65.0	35.0	60.9	34.78	62.50	37.50	50.00	45.45
Kajiado North	Majengo A	68.0	32.0	68.2	31.82	68.18	31.82	59.09	27.27
	Community	***50.0***	***46.0***	***50.0***	***50.00***	***46.15***	***46.15***	***42.31***	***46.15***
	Empatipat	83.0	17.0	78.3	21.74	73.91	21.74	65.22	26.09
	Sinato	79.0	21.0	78.6	21.43	51.85	25.93	29.63	18.52
	Indikirro	77.0	19.0	73.1	19.23	48.00	20.00	48.00	20.00
	Eitii	***31.0***	***62.0***	***19.0***	***76.19***	***30.77***	***53.85***	***15.38***	***46.15***
	Ngila	***28.0***	***41.0***	***27.6***	***48.28***	***17.86***	***42.86***	***21.43***	***46.43***
	Enkusero Keri	91.0	6.0	91.2	5.88	91.18	2.94	76.47	5.88
	Oloika	52.0	48.0	52.2	47.83	52.38	47.62	45.00	45.00
	Oltepesi	54.0	23.0	51.9	48.15	56.00	20.00	38.46	23.08
	Commercial	57.0	43.0	57.1	42.86	57.14	42.86	52.38	47.62
	Olorien	55.0	45.0	55.0	45.00	55.00	45.00	50.00	35.00
	Esilanka	68.0	32.0	68.2	31.82	68.18	31.82	54.55	36.36
Loitokitok	Mpayiai D	54.0	42.0	54.2	41.67	52.17	43.48	54.17	37.50

	Olorika C	90.0	7.0	90.0	6.67	86.67	6.67	62.07	3.45
	Iltuleta A	79.0	21.0	79.3	17.24	79.31	13.79	77.78	18.52
	Iloirero A	90.0	7.0	89.7	6.90	89.29	7.14	82.76	6.90
	Ilchalai I	68.0	25.0	67.9	25.00	67.86	25.00	57.14	25.00
	Lormeuti	61.0	39.0	62.1	37.93	57.14	42.86	51.85	40.74
	Kimana Tikondo	68.0	27.0	68.2	27.27	61.90	28.57	45.00	30.00
	Langata/Olchro	61.0	36.0	61.3	35.48	61.29	35.48	51.72	41.38
	Olchoro Centre A	96.0	5.0	100.0	-	100.00	-	72.73	-
	Olmoti/Angata Rongai	96.0	4.0	95.8	4.17	91.67	4.17	91.67	4.17
	Ngasakinoi B	86.0	14.0	86.2	13.79	86.21	13.79	70.37	14.81
	Olmaroroi B	83.0	17.0	82.6	17.39	82.61	17.39	82.61	17.39
	Enderkesi A	79.0	18.0	82.8	17.24	75.86	17.24	44.83	10.34