SMART NUTRITION SURVEY

Greater Kitui districts, Kitui County

Republic of Kenya,

Final report

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EXECUTIVE SUMMARY

The larger Kitui District is found on the southern Eastern Province. The district borders Mwingi district to the north, Taita Taveta district to the south, Tana River district to the east, and Makueni and Machakos districts to the west and northwest respectively. The larger Kitui District comprises of ten new districts which includes; Kitui Central, Kitui West, Mutomo, Katulani, Nzambani, Mutitu, Kisasi, Ikutha, Yatta and Matinyani districts. The district had originally ten administrative divisions namely Central, Mutomo, Mwitika, Mutitu, Chuluni, Ikutha, Yatta, Mutonguni, Matinyani and Mutha as its old administrative units, which are considered as the units of analysisin their respective livelihood zones. According to 2009 National Census report, the district has a total population of 627,761 persons and occupies an area of 20,450.7 square kilometers.

The district lies between 400m to 1,830m above sea level and generally slopes from the west to east with the highest regions being Kitui Central, Mutitu Hills and the Yatta Plateau. The climate is semi-arid with very erratic and unreliable rainfall. Most parts of the district are hot and dry throughout the year resulting in very high evaporation rates. Rainfall is distributed within two seasons yearly and varies from 500-1050mm with about 40% reliability. About 40% of the district's total area is categorized as arable while gazetted forests cover less than 1%. The soil types range from sedimentary rocks in the central parts, red sandy soils in the eastern parts, to clay black cotton soils but these soils are generally low in fertility3. The abundant sandy soils and clay soils are exploited on commercial basis for building sand and brick making in pockets where they occur. About 90% of Kitui's population is rural-based, therefore solid waste management is not a major challenge. However, human activities such as clearing of land for agriculture, settlements, charcoal burning and cutting of indigenous trees for curving have put the district at the doorstep of desertification. Perhaps of most serious consequence is the felling of trees for charcoal production that has reached commercial levels. The district produces nearly 300,000 bags of charcoal annually causing loss of biodiversity and severe land degradation in the fragile ecosystem. The most affected region is Northern Yatta (Kwa Vonza, Southern Yatta),Kitui South and East. There is urgent need to curb the felling of trees to protect livelihoods in the district.

Due to limited rainfall received in the district, water resources are scarce and are composed of seasonal rivers that form during rainy seasons and immediately dry up after the rains. Although a major water source, the Athi River is the only perennial river found in the district and flows along the border with Machakos District. Several pans and dams also supply water and are supplemented by underground water sources (boreholes, wells and springs that are found in hilly areas). However, the ground water supplies are also insufficient due to low yields and high salinity. Although the water facilities are many, most are poorly maintained and unreliable and dry up during dry seasons leaving households without adequate supplies for domestic and livestock use.

Nearly 90% of households in the region do not have access to clean water points and those who do trek 5kms to get to the nearest sources. Water development remains a top priority and its provision could render the district with increased potential. Proposed viable water projects are marred by poor implementation due to lack of sufficient funding. In the 1997-2001 planning period, only 32.4% of the proposals submitted for water development were successfully implemented8. Kitui district also suffers from poor infrastructure and most areas lack proper road connections. Over 95% of the 1,854 kms road length in the district is either earthed or mud roads that are impenetrable in rainy seasons9. The poor maintenance and status of the roads has equally been blamed on inadequate financial support. On the other hand, no clear provisions and guidance for private sector participation. This has made the transport and marketing systems for crop and Livestock largely unsatisfactory. The most affected regions are Mutitu, Mwitika and Mutha. Despite having telephone booths and 16 post offices, the communication facilities are insufficient and unautomated except in the district's headquarters of Kitui town. Likewise, energy supply is inadequate and potential development areas lack electricity connections. Firewood and charcoal provide for most of households' energy needs (98% of the households. Although, there are 11 financial institutions in the district, credit volume transacted is low and many potential borrowers lack access for various developmental needs.

Livestock production is the backbone of Kitui's economy and together with crop farming account for nearly three-quarters of household earnings11. Cattle, sheep and goats are the most important types, with the entire stock estimated at758, 500 animals. Ranching is practiced in the low potential areas of Ikutha, Mutomo and Mwitika. Lack of water and pasture, high disease incidence, poor breeds and insufficient marketing are the key factors hampering derivation of maximum benefits from the sub-sector. Other livestock activities in the district are poultry production and beekeeping. Mixed farming, mainly for subsistence, is practiced in the medium potential divisions of Chuluni, Yatta andKitui Central and various crops such as maize, beans,sorghum, pigeon peas, millet and cassava are cultivated.

Low agricultural productivity and erratic rains have resulted in perennial food shortages in the district. Consequently, Kitui relies heavily on food supplies from other districts to meet its food needs for the better part of the year. With the exception of cereals, the markets supply the bulk of food consumed in the mixed farming livelihood zone, which supports about 57% of Kitui's population

Because of inadequate food production and access, malnutrition is rife. Malarial outbreaks are also common in nearly all parts of the district. Though the district has 92 health facilities, including 4 hospitals and 5 nursing homes, these are largely inadequate given the vastness of the district and concentration in Central and Kabati divisions.

General objective of survey

The overall goal of the anthropometric survey is to estimate the prevalence of malnutrition in children age 6-59 months and the death rate of the entire population in Larger Kitui. Also, the survey will provide data for HINI indicators that are not routinely covered / collected by the MOPHS health systems in Larger Kitui Districts (marginal mixed farming livelihood in order to track progress and lessons for scale up for HINI interventions.

Specific Objectives:

1. To estimate the current prevalence of acute malnutrition in children aged 6-59 months and to compare the overall nutritional changes with previous GAM and SAM
2. To estimate the retrospective crude and under five death rates and morbidity among under five children and as well compare with previous CMR and U5MR.
3. To estimate Measles, BCG vaccination and Vitamin A supplementation for children 9-59 months and 6-59 months respectively
4. To assess the current food security situation of the surveyed population, prevalence of some common diseases (Diarrhea, Fever, and Cough) and to identify factors likely to have influenced malnutrition in young children
5. To assess child and infant care and feeding practices among caretakers with children 0-23 months
6. To describe the situation of water and sanitation, appropriate hygiene practices including hand washing among caretakers

Methodology

Standardized Method for Relief and Transition (SMART) was used for planning, training and data collection for the nutrition survey. The Survey enumerators were trained for 4 days, standardization test was done to select the data recorders and pilot was done to make sure that enumerators are equipped with the necessary skills for data collection.

Using precision of 3 %, prevalence of 9.3% and design effect of 1.5, a sample size of 441 children was obtained. In the mortality session, an estimated prevalence of 0.24, a desired precision of 0.3 and a design effect of 1.5 resulted in a sample size 1,563 with a recall period of 107 days. A total of 950households were sampled for the survey and a total of 42 clusters were selected for the survey.

At the second stage, a selection of the households to be visited within each cluster was done. Simple random method was used to select the households, the village elders gave the list of the households in a given village, using table of random numbers the households were selected. In cases where the villages had huge number of households, segmentation was done; the population was subdivided in to equal segments and one segment was selected using table of random numbers, the household were then listed, and the required households selected from the list by simple random method.

In each selected household, all children aged 6-59 months were included. If there was more than one wife (care taker) in the household1, each wife was considered separately regardless of whether they were cooking together. If there were no children in a household, the house remained a part of the "sample" that contributed zero children to the nutritional part of the survey. The household was recorded on the nutritional data sheet as having no eligible children.

Nutrition, mortality and vaccination coverage, IYCF and Water and Sanitation results

Table 1: Summary results **Nutrition, mortality and vaccination coverage and IYCF**

Anthropometric and Mortality data results				
Nutritional Status		**All**	**Boys**	**Girls**
Child Nutrition Status W/H (WHO)- Z scores (618)	Global Acute Malnutrition (GAM) (<-2 z-score and/or oedema)	4.9% [3.4-16.9]	5.7%[3.8-8.6]	3.9%[2.1-87.4]
	Severe Acute Malnutrition (SAM) (<-3 z-score and/or oedema)	1.1% [0.6- 2.3]	1.6%[0.6-3.7]	0.7%[0.2-2.6]
Child Nutrition status W/H (NCHS)- Z-scores(618)	Global Acute Malnutrition (GAM) (<-2 z-score and/or oedema)	4.9%[3.3-7.1]	6.1%[4.0-9.0]	3.6[1.7-7.4]
	Severe Acute Malnutrition (SAM) (<-3 z-score and/or oedema)	0.0% [0.0-0.0]	0.0% [0.0-0.0]	0.0% [0.0-0.0
Child Nutrition Status H/A (WHO)- Z scores (618)	Prevalence of stunting (<-2 z-score)	47.4% [41.9-53.0]	48.4%[41.9-55.0]	46.4%[39.5-53.4]
	Prevalence of severe stunting (<-3 z-score)	19.4% [15.4-24.2]	19.4%[14.1-26.2]	19.4%[14.9-25.0]
Child Nutrition Status H/A (NCHS)- Z scores (618)	Prevalence of stunting (<-2 z-score)	42.7[37.3-48.3]	43.3%[37.2-49.6]	42.1%[35.0-49.5]
	Prevalence of severe stunting (<-3 z-score)	14.1%[10.9-18.0]	12.4%[8.1-18.6]	15.8%[11.7-20.9]
Child Nutrition Status W/A (WHO)- Z scores (619)	Prevalence of underweight (<-2 z-score)	25.7% [21.3-30.6]	26.8%[20.9-33.5]	24.6%[19.7-30.2]
	Prevalence of severe underweight (<-3 z-score)	5.0% [3.7- 6.7]	4.8%[2.9-7.7]	5.2%[3.4-8.0]
Child Nutrition Status W/A (NCHS)- Z scores (619)	Prevalence of underweight (<-2 z-score)	34.2%[29.3-39.6]	34.4%[28.3-41.0]	34.1%[28.5-40.2]
	Prevalence of severe underweight	5.7%[4.2-7.6%]	4.5[2.5-7.8]	6.9%[4.8-9.8]

[1] A household refers to a caretaker and his/her children

	(<-3 z-score)			
Mortality	Crude Death rate/10,000/day	047 [0.31-0.70]		
	0-5 Death rate/10,000/day	1.07[0.44-2.58]		
Child MUAC (619)	SAM (<115 mm) GAM (<125mm)	1.3%[0.5-3.1%] 4.2%[2.2-7.8]	1.3%[0.5-3.1] 2.5%[1.0-6.5]	2.6%[1.1-6.1] 5.9%[3.0-11.3]
Maternal nutrition status (lactating and pregnant mothers)	Malnourished < 21.0 cm	1.7%		
Vaccination coverage, Vitamin A and Iron supplementation				
Measles coverage ≥ 9 months (568)	Card According to mother	54.5% 40.5%		
DPT3 (405)	Card According to mother	58.6% 35.8%		
Vitamin A coverage (last 6 months) (406)	Received Not received	68.9% 31.1%		
Vitamin A coverage (6-11) Last 6 months (61)	Received Not received	68.9% 31.1%		
Vitamin A coverage (12-59) Last 6 months (545)	Received Not received	65% 35%		
Mother Iron supplementation (last pregnancy)	Yes	69.2%		
Morbidity for the last 2 weeks				
Child Illness in the last 2 weeks	Yes	28.2%		
Child Slept under mosquito net last night	Yes No	70.8% 29.2%		
Infant and young child feeding practice[2]				
Exclusive breastfeeding	0-5 Months (n=81)	65.8%		
Early Initiation of breast feeding	6- 23 Months (n=206)	65.7%		
Continued breastfeeding at 1year	12-15 Months (n=37)	90.2%		
Introduction of solid, semi-solid or soft foods	6-8 Months (n=44)	96%		
Minimum diet diversity	6-23 Months (n=247)	7.5%		

[2] As per Indicators for assessing infant and young child feeding practices Part 3 Country profiles

Minimum meal frequency	6-23 Months(n=247)	82%
Minimum Acceptable diet	6-23 Months(n=176)	7.5%

1.0 INTRODUCTION

The larger Kitui District is found on the southern Eastern Province. The district borders Mwingi district to the north, Taita Taveta district to the south, Tana River district to the east, and Makueni and Machakos districts to the west and northwest respectively. The larger Kitui District comprises of ten new districts which includes; Kitui Central, Kitui West, Mutomo, Katulani, Nzambani, Mutitu, Kisasi, Ikutha, Yatta and Matinyani districts. The district had originally ten administrative divisions namely Central, Mutomo, Mwitika, Mutitu, Chuluni, Ikutha, Yatta, Mutonguni, Matinyani and Mutha as its old administrative units, which are considered as the units of analysisin their respective livelihood zones. According to 2009 National Census report, the district has a total population of 627,761 persons and occupies an area of 20,450.7 square kilometers.

The district lies between 400m to 1,830m above sea level and generally slopes from the west to east with the highest regions being Kitui Central, Mutitu Hills and the Yatta Plateau. The climate is semi-arid with very erratic and unreliable rainfall. Most parts of the district are hot and dry throughout the year resulting in very high evaporation rates. Rainfall is distributed within two seasons yearly and varies from 500-1050mm with about 40% reliability. About 40% of the district's total area is categorized as arable while gazetted forests cover less than 1%. The soil types range from sedimentary rocks in the central parts, red sandy soils in the eastern parts, to clay black cotton soils but these soils are generally low in fertility3. The abundant sandy soils and clay soils are exploited on commercial basis for building sand and brick making in pockets where they occur. About 90% of Kitui's population is rural-based, therefore solid waste management is not a major challenge. However, human activities such as clearing of land for agriculture, settlements, charcoal burning and cutting of indigenous trees for curving have put the district at the doorstep of desertification. Perhaps of most serious consequence is the felling of trees for charcoal production that has reached commercial levels. The district produces nearly 300,000 bags of charcoal annually causing loss of biodiversity and severe land degradation in the fragile ecosystem. The most affected region is Northern Yatta (Kwa Vonza, Southern Yatta),Kitui South and East. There is urgent need to curb the felling of trees to protect livelihoods in the district.

3.1 METHODOLOGY

3.1 Type of Survey and Sample Size

A two-stage cluster sampling method was used. The anthropometric surveys target children aged between 6 and 59 months utilizing SMART methodology, which ensures accuracy and precision of data collected. Selection of accessible villages was done with the help of village elders. Information on population figures for was collected thorough the 2010 census results and the village elders a list of selected villages for the survey are at the annex.

The geographical units and their respective population were then inputted into the ENA for SMART software November 2011for planning the survey.

At the first stage, the sample size was determined by inputting necessary information into the ENA for SMART both anthropometric and mortality surveys. The information included estimated population sizes, expected prevalence rates of mortality and malnutrition, the desired precision and the design effect.

3.2 Sample Size Calculation

Using precision of 3%, prevalence of 9.3% and design effect of 1.5, a sample size of 588 children was obtained. In the mortality session, an estimated prevalence of 0.24, a desired precision of 0.3 and a design effect of 2 resulted in a sample size 2,478 with a recall period of 107 days. A total of 950 households were sampled for the survey and a total of 42 clusters were selected for the survey.

At the second stage, a selection of the households to be visited within each cluster was done. Simple random method was used to select the households, the village elders gave the list of the households in a given village, using table of random numbers the households were selected. In cases where the villages had huge number of households, segmentation was done; the population was subdivided in to equal segments and one segment was selected using table of random numbers, the household were then listed, and the required households selected from the list by simple random method.

In each selected household, all children aged 6-59 months were included. If there was more than one wife (care taker) in the household[3], each wife was considered separately regardless of whether they were cooking together. If there were no children in a household, the house remained a part of the "sample" that contributed zero children to the nutritional part of the survey. The household was recorded on the nutritional data sheet as having no eligible children.

3.3 Data Collection

For each selected child, information was collected during the anthropometric survey. The information included

- → **Age:** recorded with the help child health cards/mother and health booklet and a local calendar of events
- → **Gender:** male or female
- → **Weight:** children were weighed without clothes, with a SALTER balance of 25kg (precision of 100g).
- → **Height:** children were measured on a measuring board (precision of 0.1cm). Children less than 87cm were measured lying down, while those greater than or equal to 87cm were measured standing up.
- → **Mid-Upper Arm Circumference:** MUAC was measured at mid-point of left upper arm for measured children (precision of 0.1cm).
- → **Bilateral Oedemas:** assessed by the application of normal thumb pressure for at least 3 seconds to both feet.
- → **Measles vaccination:** assessed by checking for measles vaccination on EPI cards or by asking caretakers.
- → **DPT 3:** assessed by checking for measles vaccination on EPI cards or by asking caretakers.
- → **Vitamin A:** Asked the mother/caretaker whether the child received Vitamin A in the last 6 months

[3] A household refers to a caretaker and his/her children

3.4 Indicators, Guidelines, and Formula's Used

3.4. 1 Acute Malnutrition

- **Weight for Height Index**

Acute malnutrition rates are estimated from the weight for height (WFH) index values combined with the presence of Oedemas. The WFH indices are expressed in both Z-scores and percentage of the median, according to both NCHS[4] and WHO references[5]. The complete analysis is done with the WHO reference.

The expression in Z-scores has mainly statistical meaning, and allows inter-study comparison. The percentage of the median, on the other hand, is used for the identification criteria of acute malnutrition in nutrition programs.

Guidelines for the results expressed in Z-score:

- Severe malnutrition is defined by WFH < -3 SD and/or existing bilateral Oedemas on the lower limbs Moderate malnutrition is defined by WFH < -2 SD and ≥ -3 SD and no Oedemas.
- Global acute malnutrition is defined by WFH < -2 SD and/or existing bilateral Oedemas.

Guidelines for the results expressed in percentage of median:

- Severe malnutrition is defined by WFH < 70 % and/or existing bilateral Oedemas on the lower limbs
- Moderate malnutrition is defined by WFH < 80 % and ≥ 70 % and no Oedemas.
- Global acute malnutrition is defined by WFH <80% and/or existing bilateral Oedemas

- **Children's Mid-Upper Arm Circumference (MUAC)**

The weight for height index is the most appropriate index to quantify wasting in a population in emergency situations where acute forms of malnutrition are the predominant pattern. However the mid-upper arm circumference (MUAC) is a useful tool for rapid screening of children at a higher risk of mortality. MUAC measurements are significant for children with age of one year and above. The guidelines are as follows:

MUAC < 115 mm	Severe malnutrition and high risk of mortality
MUAC ≥ 115 mm and <125 mm	Moderate malnutrition and moderate risk of mortality
MUAC ≥ 125 mm and <135 mm	At risk of malnutrition
MUAC ≥ 135 mm	Good nutritional statuses

[4] NCHS: National Center for Health Statistics (1977) NCHS growth curves for children birth-18 years. United States. Vital Health Statistics. 165, 11-74.

[5] WHO reference, 2005

3.4.2 Stunting

- **Height for Age index**

Stunting rates are estimated from the height for age (HFA) index values. The HFA indices are expressed in Z-scores according to both NCHS and WHO references. The complete analysis is done with the WHO reference.

Guidelines for the results expressed in Z-score:

- Severe stunting is defined by HFA < -3 SD
- Global stunting is defined by HFA< -2 SD.

3.4.3 Underweight

- **Weight for Age index**

Underweight rates are estimated from the Weight for age (WFA) index values. The WFA indices are expressed in Z-scores according to both NCHS and WHO references. The complete analysis is done with the WHO reference.

Guidelines for the results expressed in Z-score:

- Severe underweight is defined by WFA < -3 SD
- Global underweight is defined by WFA< -2 SD.

3.4.4 Mortality

Mortality data was collected using Standardized Monitoring and Assessment of Relief. The crude mortality rate (CMR) is determined for the entire population surveyed for a given period. The CMR is calculated using ENA for SMART.

The formula below is applied:

Crude Mortality Rate (CMR) = 10,000/a*f/ (b+f/2-e/2+d/2-c/2),

Where:

a = Number of recall days (107)

b = Number of current household residents

c = Number of people who joined household

d = Number of people who left household

e = Number of births during recall

f = Number of deaths during recall period

The result is expressed per 10,000-people / day. The thresholds are defined as follows[6]:

[6] Health and nutrition information systems among refugees and displaced persons, Workshop report on refugee's nutrition, ACC / SCN, Nov 95.

Total CMR:

Alert level:	1/10,000 people/day
Emergency level:	2/10,000 people/day

Under five CMR:

Alert level:	2/10,000 people/day
Emergency level:	4/10,000 people/day

3.4.5 IYC Indicators[7]

1. **Early initiation of breastfeeding:** Proportion of children born in the last 23 months who were put to the breast within one hour of birth.

$$\frac{\text{Children born in the last 23 months who were put to the breast within one hour of birth}}{\text{Children born in the last 23 months}}$$

2. Exclusive breastfeeding under 6 months: Proportion of infants 0–5 months of age who are fed exclusively with breast milk.

$$\frac{\text{Infants 0–5 months of age who received only breast milk during the previous day}}{\text{Infants 0–5 months of } \textbf{age}}$$

3. **Continued breastfeeding at 1 year:** Proportion of children 12–15 months of age who are fed breast milk.

$$\frac{\text{Children 12–15 months of age who received breast milk during the previous day}}{\text{Children 12–15 months of age}}$$

4. **Introduction of solid, semi-solid or soft foods:** Proportion of infants 6–8 months of age who receive solid, semi-solid or soft foods.

$$\frac{\text{Infants 6–8 months of age who received solid, semi-solid or soft foods during the previous day}}{\text{Infants 6–8 months of age}}$$

5. **Minimum dietary diversity:** Proportion of children 6–23 months of age who receive foods from 4 or more food groups.

$$\frac{\text{Children 6–23 months of age who received foods from} \geq 4 \text{ food groups during the previous day}}{\text{Children 6–23 months of age}}$$

6. **Minimum meal frequency:** Proportion of breastfed 6–23 months of age, who receive solid, semi-solid, or soft foods (but also including milk feeds for non-breastfed children) the minimum number of times or more.

$$\frac{\text{Breastfed children 6–23 months of age who received solid, semi-solid or soft foods the minimum number of times or more during the previous day}}{\text{Breastfed children 6–23 months of age}}$$

[7] WHO, 2010. **Indicators for assessing infant and young child feeding practices. Part 3 country profiles**

7. **Minimum acceptable diet:** Proportion of children 6–23 months of age who receive a minimum acceptable diet (apart from breast milk).:

$$\frac{\text{Breastfed children 6–23 months of age who had at least the minimum dietary diversity and the minimum meal frequency during the previous day}}{\text{Breastfed children 6–23 months of age}}$$

8. **Children ever breastfed:** Proportion of children born in the last 24 months who were ever breastfed.

$$\frac{\text{Children born in the last 23 months who were ever breastfed}}{\text{Children born in the last 24 months}}$$

9. **Continued breastfeeding at 2 years:** Proportion of children 20–23 months of age who are fed breast milk.

$$\frac{\text{Children 20–23 months of age who received breast milk during the previous day}}{\text{Children 20–23 months of age}}$$

3.4.5 Health, food security and water and sanitation data

Health, food security and water and sanitation data were collected from same households the where anthropometry data was collected. The questionnaire was administered to the head of the household and/or to the spouse. The Questionnaires were in English language, surveyors competent in reading English were chosen to administer the questionnaires.

3.5 Data quality control assurance

The use of an anthropometric standardization test for the survey team, thorough enumerator training, close supervision during the actual survey for consistency, completeness and clarity of the questionnaires ensured that data collected was of good quality. Common historical events listed in the seasonal calendar were used to clarify the dates of childbirth in cases where the mother or the caretakers were not certain about the information.

3.6 Field Work

The surveys were carried out by six teams, each team comprising five members: 1 team leader, 2 data collectors and 2 measurers. All teams received 4 day intensive training in Kitui town prior the start of the survey. This training provided the theoretical background for team leaders, data collectors and the measurers. All team members did a pilot survey for one day before actual start of data collection. This train included the standardization test. All teams were closely supervised during their field work throughout the whole survey time by consultant, MOH and WVK staff

3.7 Data Analysis

Data processing and analysis for both anthropometric and mortality were carried out using ENA for SMART November 2011 version using both NCHS and WHO references. Excel was used to carry out analyses on MUAC, measles immunization coverage, household composition. Health, food security, water and sanitation data was analysed using SPSS version 16.

3.8 Challenges faced during survey

- No challenges were experienced during the survey implementation.

4.0 RESULTS AND DISCUSSION

This section provides results and discussions from the data collected on nutrition/ anthropometrics, mortality as well as immediate and underlying causes of malnutrition such as morbidity, water and sanitation and food security. The topics are discussed in the following sections under the respective headings and sub-headings. Quantitative results are presented in tables, graphs and charts as applicable.

4.1 Health and nutrition status

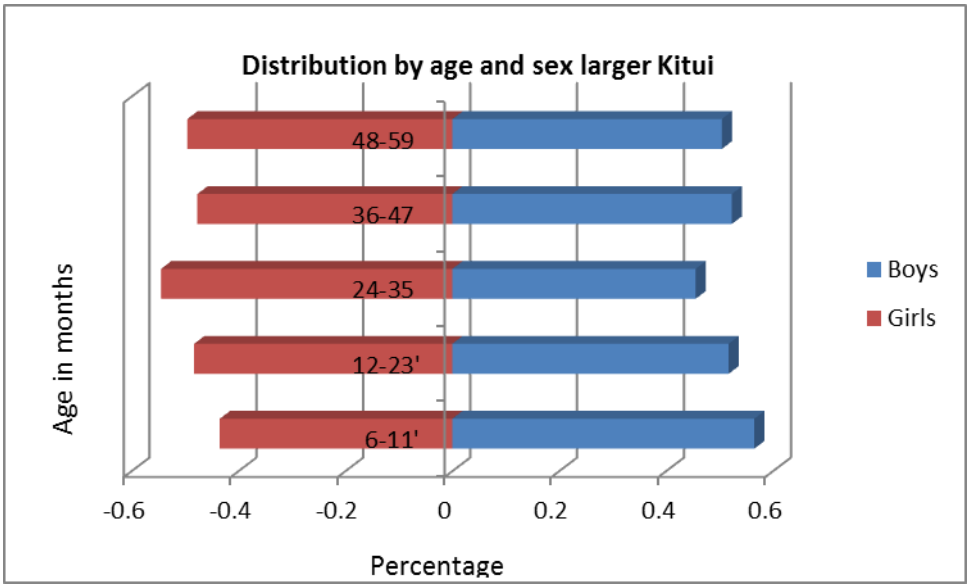
4.1 .1 Distribution by Age and Sex

The distribution of the nutrition survey sample by sex and age group shows that the total boy/girl sex ratio of the survey was within the normal limits (0.8 - 1.2). Similarly, sex ratio within the age groups indicates a normal distribution.

Table 2. Distribution of age and sex Larger Kitui County

Age group (months)	Boys		Girls		Total		Ratio
	no	%	No	%	no	%	Boy: girl
6-11	35	56.5	27	43.5	62	10.0	1.3
12-23	89	51.7	83	48.3	172	27.8	1.1
24-35	60	45.5	72	54.5	132	21.3	0.8
36-47	69	52.3	63	47.7	132	21.3	1.1
48-59	61	50.4	60	49.6	121	19.5	1.0
Total	314	50.7	305	49.3	619	100.0	1.0

Figure 1: Distribution by Age and sex Greater Lager Kitui



4.1.2 Distribution of Acute malnutrition by Z-scores

The global acute malnutrition was 4.9 % while severe acute malnutrition was 1.1 % according to WHO standards

Table 3. Weight for height distribution by age Kitui in Z-scores (WHO reference)

Age (months)	Total no.	Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-11	62	2	3.2	2	3.2	58	93.5	0	
12-23	171	1	0.6	8	4.7	162	94.7	0	
24-35	132	1	0.8	4	3.0	127	96.2	0	
36-47	132	2	1.5	4	3.0	126	95.5	0	
48-59	121	1	0.8	5	4.1	115	95.0	0	
Total	618	7	1.1	23	3.7	588	95.1	0	

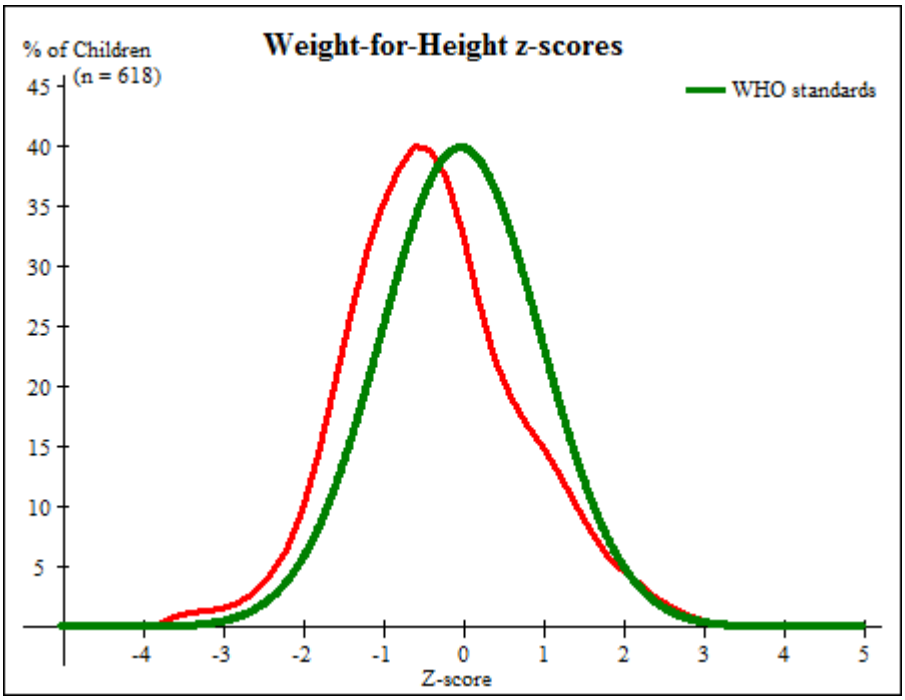
Table 4. Weight for height versus Oedema Greater Kitui (WHO reference)

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

Oedema absent	Marasmic No. 7 (1.1 %)	Not severely malnourished No. 611 (98.9%)

No child was found with bilateral oedema.

Figure 2: Weight for height distribution Kitui



The slight displacement of the sample curve to the left side of the reference curve indicates a significant number of malnourished children detected in the surveyed population. The mean Z-Score of the sample was -0.35 and the Standard Deviation was 1.07 (WHO reference). The SD is within the interval 0.80 -1.20, which shows that the sample is representative of the population.

4.1.4. Distribution of Underweight in Z scores Kitui (WHO reference

The global underweight was 25.7% while severe underweight was 5.0%

Table 6: Prevalence of underweight based on Weight-for age Z scores

Age (months)	Total no.	Severe underweight (<-3 z-score)		Moderate underweight (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-11	62	4	6.5	5	8.1	53	85.5	0	0.0
12-23	172	8	4.7	28	16.3	13	79.1	0	0.0
24-35	132	3	2.3	35	26.5	94	71.2	0	0.0

36-47	132	9	6.8	27	20.5	96	72.7	0	0.0
48-59	121	7	5.8	33	27.3	81	66.9	0	0.0
Total	619	31	5.0	128	20.7	46	74.3	0	0.0

4.1.5 Distribution of stunting in Z scores Kitui (WHO reference)

The prevalence of stunting was **47.4%** while severe stunting was **19.4%**

Table 7: Prevalence of stunting by age based on height-for-age Z scores

Age (months)	Total no.	Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
		No.	%	No.	%	No.	%
6-11	62	7	11.3	13	21.0	42	67.7
12-23	171	32	18.7	48	28.1	91	53.2
24-35	132	26	19.7	40	30.3	66	50.0
36-47	132	26	19.7	39	29.5	67	50.8
48-59	121	29	24.0	33	27.3	59	48.8
Total	618	120	19.4	173	28.0	325	52.6

4.1.6 Risk of mortality: children MUAC and mothers/care takers MUAC

All children measured were included in the MUAC analysis. As shown in the following table, the rates of acute malnutrition according to the MUAC status of the children were 1.3% and 4.2% severe and global malnutrition respectively, 1.4% of the PLW were malnourished according to MUAC cut of 21.0 cm.

Table 5: Child MUAC distribution larger Kitui district

	All n = 619	**Boys** n **=** 314	**Girls** n **=** 305
Prevalence of global malnutrition **(< 125 mm and/or oedema)**	(26) 4.2 % (2.2 - 7.8 95% C.I.)	(8) 2.5 % (1.0 - 6.5 95% C.I.)	(18) 5.9 % (3.0 - 11.3 95% C.I.)
Prevalence of moderate malnutrition **(< 125 mm and >= 115 mm, no oedema)**	(18) 2.9 % (1.5 - 5.6 95% C.I.)	(8) 2.5 % (1.0 - 6.5 95% C.I.)	(10) 3.3 % (1.6 - 6.6 95% C.I.)
Prevalence of severe	(8) 1.3 %	(0) 0.0 %	(8) 2.6 %

malnutrition **(< 115 mm and/or oedema)**	(0.5 - 3.1 95% C.I.)	(0.0 - 0.0 95% C.I.)	(1.1 - 6.1 95% C.I.)

4.1.7 Vaccination coverage and Vitamin A supplementation

- **Measles Vaccination Coverage larger kitui districts**

Table below presents the measles vaccination coverage among the surveyed population. The source of Information on immunization was either the child's health card or the mother's recall. A child was considered fully vaccinated if he/she had received the last dose of the EPI programme (from 9 months of age).

Table 6: Measles vaccination coverage larger kitui districts

Population ≥ 9 months=568	N	%
Immunized with Card	304	53.5
Immunized without card	230	32.6
Not immunized	34	6.0

- **Vitamin A coverage, de-worming and iron supplementation**

Vitamin A coverage was established for the survey as shown by table below. Caretakers were asked if their child had received a vitamin A supplementation in the six months. The rates of supplementation appeared to be average. Only 90.8 of the children above 1 year received de-worming tablets. Mothers iron supplementation was above average as only 37.3% received iron supplementation in their last pregnancy.

Table 8 Vitamin A coverage

	6-11(n=61)		12-59 (n=545)		6-59 (n=606)	
Population =543	**N**	**%**	**N**	**%**	**N**	**%**
Received	42	65.6	352	61%	397	65.5
Not received	19	31.1	193	35%	209	35.5

- **DPT 3 Coverage**

The children who had received the complete three doses of DPT3 were 58.1% according to card and 36.5% according to caretaker as shown in table below

Table 9: DPT 3 coverage

Population =605	N	%

Card	351	58.1
Mother	221	36.5
Not immunized	27	5.4

4.19 Mortality

The retrospective death rate was calculated based on the data collected on the 107 days recall.

Table 10: Mortality results

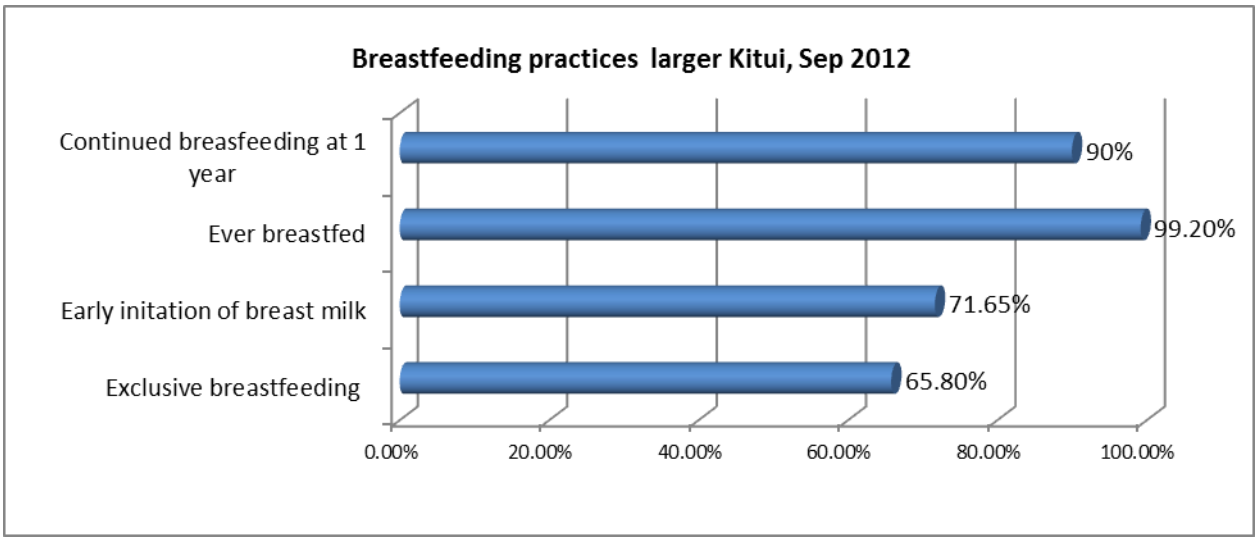
Demographic data	**Kitui**
Number of current HH residents	5161
Number of people who joined HH	105
Number of births during recall	31
Number of death during recall	26
Number of 0-5	702
Number of 0-5 who joined HH	20
Number of deaths 0-5 during recall	8
Crude Death rate	0.47[0.31-0.70]
0-5 death rate	1.07[0.44-2.58]

The mortality rates remained below WHO emergency thresholds.

4.1.8 Breastfeeding and complementary feeding

Mothers were asked when they do start breastfeeding their new born baby and when they introduce complementary food.

Figure 3: Breastfeeding indicators, Larger Kitui Sep 2012



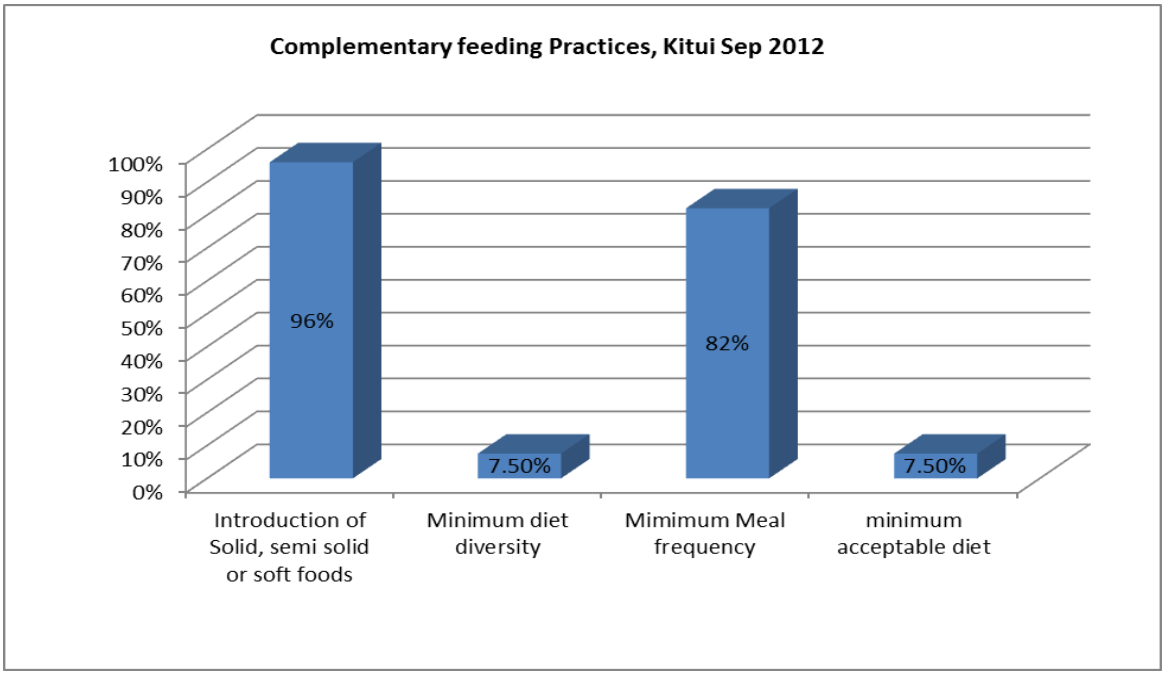
The initiation of breastfeeding, continued breastfeeding at 1 year, continued breastfeeding at 2 years were good as shown by the figure above. Most of the children were ever breast fed. Exclusive breastfeeding (0-5 months) was 65.8% which was good

The FGDs discussants consistently reported that most mothers exclusively BF for the first 3 days or one week of life and start food or water after the first month. FGDs revealed that some children below 6 months of age are gripe water with sugar particularly after birth or first week.

Most of FGD participants also agreed or strongly agreed to the fact that the mother should give water when she thinks that he is thirsty even if he is below 6 months of age.

According to the FGDs conducted husbands and mothers themselves reported that most mothers give colostrum's to their new born babies. There were no traditional beliefs preventing the feeding of colostrum's in the community. Moreover, most respondents agreed that it was useful for the baby to feed on the colostrum's.

Figure 4: Introduction of complementary foods in Larger Kitui



Introduction of semisolid, solid and soft foods was good at 96% while the minimum meal frequency was also good at 82%; the minimum diet diversity and minimum acceptable diet scored very poor 7.5%.

4.1.9 Child morbidity and treatment seeking

In the survey 28.2% of the children had sickness in the last 2 weeks, out of them 44.7% had fever, 46 had ARI/Cough while 32 % had watery diarrhoea 8.5 % had skin infections.

Among the mothers who had sick children 84% of them sought treatment for their sick children, in health centers.

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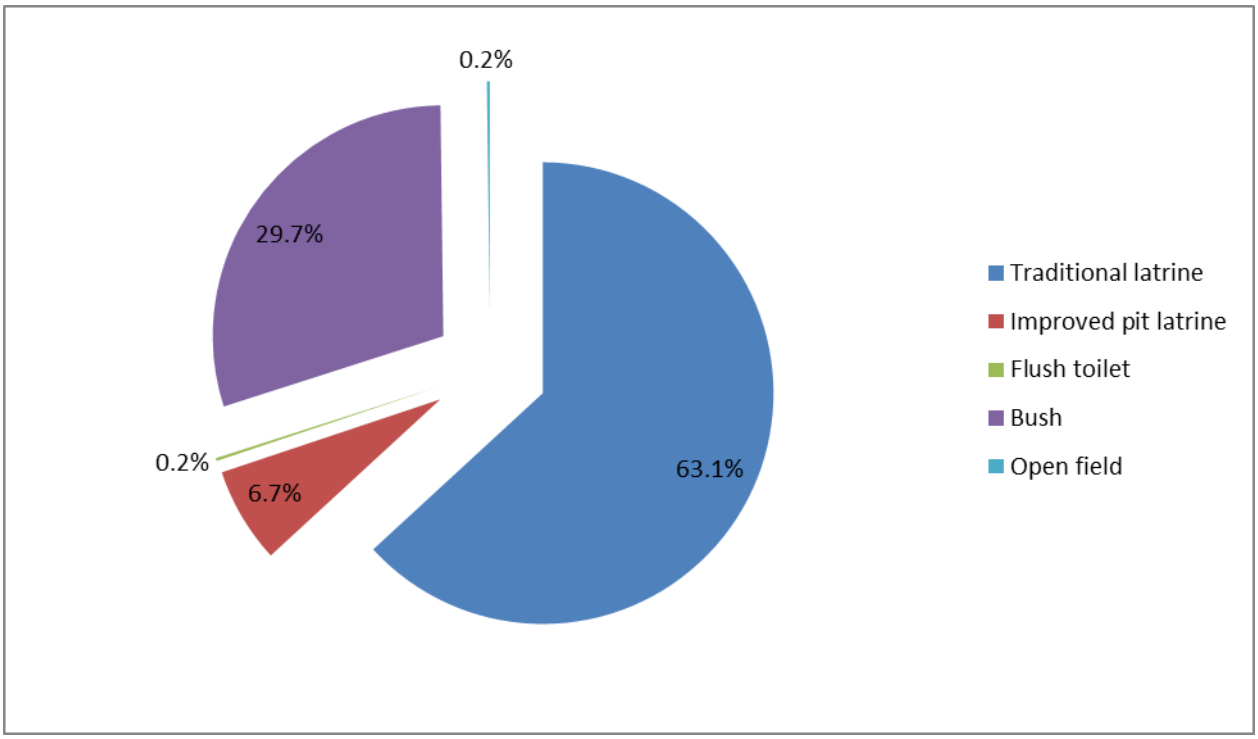
4.2 Water and Sanitation

4.2.1 Water source and use

There were several sources of drinking water for the residents 35.4% got water form rivers and streams, 33% from unprotected wells, 16.7% from boreholes, 9.3% from water tap and 4.1% from protected wells. Though majority of the respondents did not get water from safe source, 67.2% of them did not treat drinking water; of those who treated their drinking water 20% used chemical while 13% boiled the water.

4.2.2 Hand washing practice and Latrine ownership.

91.3% of the respondents washed their hands 52.9% washed their hands with water only, 36.9% with water and soap while 1.5% washed their hands with water and ash.



Out of the households covered by the survey, 63.1% had improved latrine, 6.7% improved latrine and 29.9% did not have latrine

4.3 Food security

The main household activities included casual labor at 65.7%, sale of firewood/charcoal at 11.7% and employed at 8%. Most of the respondents 77.2% kept livestock and almost all the households also planned crops that included maize, beans, sorghum, green grams and also some vegetables especially in the areas that border Athi River.

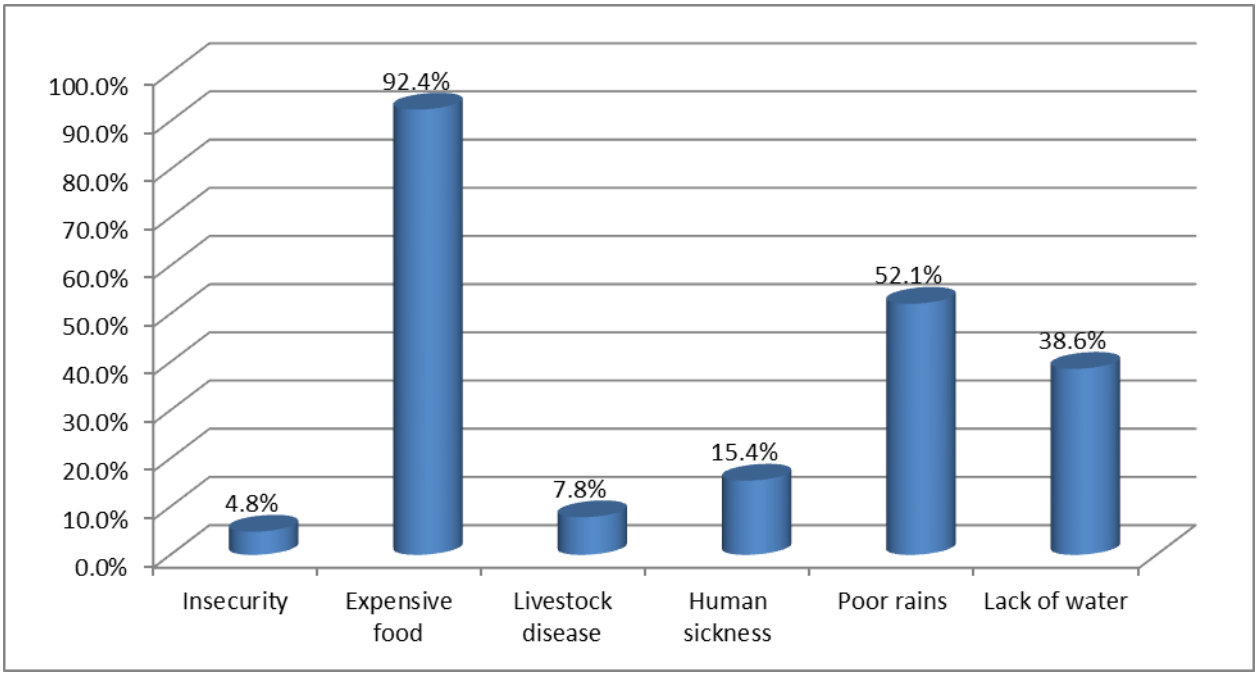
At the time of survey as a result of poor rains and harvest 95.2% depended on purchase as their main source of food. The table below shows the coping mechanisms that were used by the communities in the region.

Table 7. Coping strategy

Coping strategy	%
Less preferred cheap food	19.1%
Borrowing/kinship	51.0%
Reducing of portions t meals	17.1%
Restrict adult consumption for children	18.2%
Reduce number of meals	53.4%
Sell animals than usual	4.8%

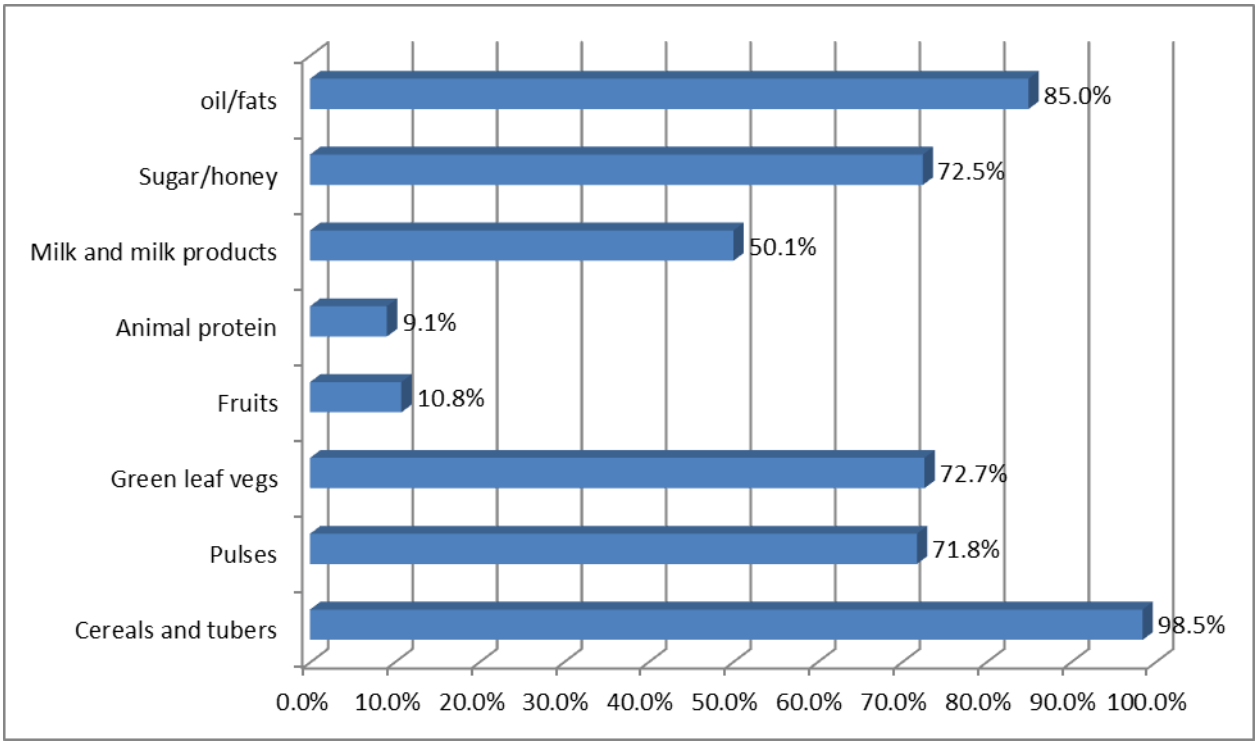
What was affecting the community at the time of the survey was expensive food at 92.4% poor rains 52.1% and lack of water at 38.6% as shown in the figure below

Figure 5: Shocks



Food diversity was measured during the survey and the food diversity score was 4.7, meaning that most of the respondents ate less than half of the 12 food groups with majority of them 100% ate cereals, 27% vegetables, condiments 31.4%, meat 26.1% and fish 23.9% while none consumed potatoes and legumes. The figure below shows the food diversity.

Figure 6: Food diversity Kitui Sep 2012



5.0 Discussions CONCLUSIONS AND RECOMMENDATIONS

The male to female ratio of 1.0 indicates that the sampled children were equally represented. Although the age/sex distribution indicates very slight variation among the different age groups, it was in the acceptable range. Therefore, there was no bias on sex and age distribution of children in the selected HHs.

The prevalence rate of global acute malnutrition of 4.9% and Am of 1.1% that is slightly below April 2011 survey that had 6.5% Gam and 0.9% SAM is stable at the alert stage. However, the presence of aggravating factors including the very low HH dietary diversity with reports of child hood illnesses especially water borne.

5.1 Health and Nutrition

WVK, catholic church and MOH run health services and nutrition activities within the region, the nutrition activities include treatment of Severe and moderate acutely malnourished children. This program manages all children who are malnourished in the community given that most of the children take their children in the health centres; malnourished children are captured during the Health centres visit and treated. This could be the reason why most of the malnourished children have been treated hence reducing the GAM rates in the region.

Most of the DHMT is the region especially in the districts that the survey was done have supported nutrition programs through the support of UNCIEF, WVK and Catholic Church. The nutrition programs have done well in stabilizing the nutrition situation in the region. WVK has supported the DHMT in community outreach that has made it possible to reach wide coverage and also provide services to villages that have no health facilities improving health and nutrition services in the region. The CDF and MOH has also contributed significantly in building new health centres in the region that has improved coverage though there is need for more staffing to make sure that all communities have access to quality medical care.

Community units have been formed by most of DHMT in the area, but they are insufficient as they don't cover all the villages and a lot need to be done to make sure that all the DHMT have sufficient community units, this will enhance prevention aspects of malnutrition hence further reducing the malnutrition levels in the region.

Measles and DPT 3 immunization was quite high over 90% of the children were immunized which is a good indicator; the vitamin A supplementation was average while de-worming was low, a lot need to be done on vitamin A supplementation and de-worming to improve the health status of the children in the region.

Infant and young child feeding (IYCF) practices were good especially, early initiation to breastfeeding, continued breast feeding and meal frequency, while exclusive breast feeding and food diversity was quite good, which could be attributed to the robust approach the MOH in collaboration with partners in the region in spreading the message of the importance of breastfeeding. . The food diversity showed that most of the children did not consume 4 of the recommended food groups which could contribute to poor growth resulting them to being either underweight or stunted.

Several challenges also face the communities especially on child delivery as most of the deliveries are done at home; this was as result of lack of enough facilities that can do deliveries and also transportation costs from far places. Health personnel assisted deliveries can go a long way in making sure mortalities are prevented during birth and that the mothers are given proper education on IYCF after delivery improving the health and nutrition status of the mother and the new born.

5.2 Water and Sanitation

The water sources were not potable and majority of the households did not treat their water before drinking predisposing them to water borne diseases, though the mother washed hands while undertaking different tasks in the household. Washing of hands with soap was not commonly practiced in the region predisposing the community to water borne diseases. As a result of lack of enough water for the community skin diseases and rashes were quite prevalent in the most of the areas. Almost 1/3 of respondents no latrines hence they disposed human waste openly which is a health hazard.

Hygiene and sanitation is very important in maintaining the health status of the community. From the survey is clear that hygiene and sanitation in the community is wanting, these could exacerbate the health status of the community by introducing disease causing vermin's that could introduce sickness to the vulnerable groups and the rest of the community.

5.3 Food Security

The current food security in the area was not good as most of the households their main source of food was purchases, though majority of the households planted crops the rains were not good for

them to harvest any significant food for their household use. According to Key informants that included Agricultural officers and livestock officers, there is a lot of emphasis by the community members on the planting of maize and beans in the area while in the recent past the rains have not been good, the region being semi-arid requires traditional orphan crops that include sorghum and green grams that require minimal ranis and they are of high value. The livestock's that included goats and cows mostly were doing well during the time of the survey as there was available pasture for the animals, the livestock officers in the district were in agreement that livestock plays an important role in the region in providing food security as the communities sales some of the crops to buy food, but a lot need to be done to have the correct breeds and proper feeding mechanism to improve livestock production. Kitui region was known for honey production in the past years this has drastically reduced as a result of tree cutting for charcoal that have reduced the activities of the bees in the region hence reducing honey production. The region has great potential in honey production if farmers take it seriously and environmental degradation is stopped.

There is also an uptake of growing of traditional crops which survive under minimal rain fall that is usually experienced in the region that has enhanced the food security of the populace. The food diversity score was poor and this could be attributed to lack of appropriate nutrition education on importance of these foods and also lack of enough money to buy the rest of the foods.

In order to improve the nutritional status of the population in general and children under five years old in particular, the following recommendations are drawn from the survey findings.

Short Term recommendations

1. Continue Management of Acute Malnutrition
2. Continue with Cash for work or food for asset programs
3. Continued support of health outreach activities to reach hard to reach villages
4. Water provision through borehole construction and earth dams
5. EPI activities should be strengthened to ensure good coverage

Long Term Recommendations

1. IYCF activities to be strengthened through formation of more mother support groups
2. Community units should be established in all areas and representative of the population
3. Hygiene and sanitation messages should be enhanced
4. Establish proper community mobilization services to ensure
5. More advocacy and encouragement of traditional high value crops
6. Advocacy on keeping high value livestock's and reclaim bee keeping industry through formation of bee keepers groups and trainings.

7. Education and advocacy on farmers on storage of their harvest
8. Advocacy on other coping mechanisms to reduce high rates of charcoal burning
9. Lobby for recruitment of more staff in all carders and especially nutritionist in all the districts represented at DHMT

6.0 ANNEXES

Annex 1: Assignment of clusters Greater Kitui

Geographical unit	Population size	Cluster	District
KANYONGONYO	2802		LOWER YATTA
ZAMBIA	2096		LOWER YATTA
MAKUSYA	4232	1	LOWER YATTA
ILIKA	512		LOWER YATTA
NDUNGUNI	2068	2	LOWER YATTA
NYANYAA	2398		LOWER YATTA

KAWANGO/KATHOME	4577	3	LOWER YATTA
MUVITHA/KATHEMBONI	2619		LOWER YATTA
KITHIANI	1041	4	LOWER YATTA
KISEUNI	1950		LOWER YATTA
KYAMATU	3609	5	MUTITO
NZANZU	1388		MUTITO
MUTHUNGUE	3916	RC	MUTITO
MAKONGO	2620		MUTITO
KILAA	2455	6	MUTITO
KAVINGO	2515		MUTITO
KIKUU	349		MUTITO
KATIKONI	1464		MUTITO
SYOU	1634	7	MUTITO
TWAMBUI	1964		MUTITO
MALANI	1775		MUTITO
MAKUKA	1743	RC	MUTITO
NDETANI	541		MUTITO
KATUMBI	1550		MUTITO
KATHUA	1282		MUTITO
YIUKU	2017	8	MUTITO
MASASASINI	1353		MUTITO
KITOO	3796	9	MUTITO
MUSUKINI	3348		MUTITO
ITIKO	2010	10	MUTITO
MALATANI	4607	11	MUTITO
KASUNGINI	2424		MUTITO
THUA	4342	12	MUTITO
NGUNGI	1586		MUTITO
KAWALA	2644	13	MUTITO
KYAIMU	1402		MUTITO
MANYOENI	2546		MUTITO
KAVUTEI	1999	14	MUTITO
MWALA	4325	15	MUTOMO
KITOO	4899		MUTOMO
KANDAE	2618	16	MUTOMO
KIBWEA	3367	RC	MUTOMO
UAE	3225		MUTOMO
KAWELU	6016	17	MUTOMO
NDUUNDUNE	2833	RC	MUTOMO

KATHUNGU	5842	18	MUTOMO
ILUSYA	1633		MUTOMO
ITHUMULA	4027	19	MUTOMO
KIANGWA	3980	20	MUTOMO
MAKELE	2428		MUTOMO
KYATUNE	4272	21	MUTOMO
NGWANI	3942	22	MUTOMO
YONGELA	2755		MUTOMO
VOTE	2120	23	MUTOMO
NDATANI	2353		MUTOMO
NGAANI	4180	24	MUTOMO
KATENE	2274		MUTOMO
KALAMBANI	2028	25	MUTOMO
ISAA	2199		MUTOMO
KALIA KATUNE	2596		MUTOMO
NDAKANI	3578	26	MUTOMO
KENGO	2031		MUTOMO
KIVYUNI	2382	27	MUTOMO
KIIMANI	1811		MUTOMO
KIATI	2059	28	MUTOMO
NDILILI	1382		MUTOMO
MIVUNE	1385		MUTOMO
KITUVWI	1945		MUTOMO
MWANIANGA	1814	29	IKUTHA
KEITUNDA	1844		IKUTHA
KYANYAA	1232		IKUTHA
KIVANDENI	1971	30	IKUTHA
SIMISI	2546		IKUTHA
EKANI	3260	31	IKUTHA
ILAMBA	1285		IKUTHA
NDILI	3380	32	IKUTHA
MAAINI	908		IKUTHA
KYOANI	2919		IKUTHA
NGAWUNI	1515	33	IKUTHA
KIANGU	3949		IKUTHA
KASAALA	3293	34	IKUTHA
NZAMBA	3572	RC	IKUTHA
UIINI	3272		IKUTHA
NGWATE	3368	35	IKUTHA
KITUTI	8662	36,37	IKUTHA
KISIIO	3089		IKUTHA
KILAWA	3550	38	IKUTHA

MALUMA	4970	39	IKUTHA
MUAMBANI	2539		IKUTHA
MONGUNI	2059	40	IKUTHA
KALIVU	3684		IKUTHA
MAKAIE	3702	41	IKUTHA
KATILINI	3182	42	IKUTHA

Annex 2: Anthropometric and Health survey data form

QUESTIONNAIRE C: 6-59 MONTHS FORM: ANTHROPOMETRIC & HEALTH QUESTIONNAIRE

***This page must be filled in for every household with a child aged 6-59 months; every child in this range should be included for 23 households**

DATE:_____ DISTRICT:_____ DIVISION:_____ VILLAGE_____ CLUSTER NO. [ ] [ ] TEAM NUMBER [ ] [ ] INTERVIEWER_____TEAM LEADER _____

CH01	CH02	CH03	CH04	CH05	CH06	CH07	CH08	CH09	CH10	CH11	CH12	CH13	CH14	CH15	CH17	CH18	CH19	CH20	CH21	CH22
Child no.	HH ref. no.*	Sex ---------- 1= Male 2= Female	Age in months (use local calendar of events, and enter the same in the HH death rate form)	Age Verification 1 = Vaccination card 2 = Birth certificate 3 = Baptism card 4 = Recall	Weight (kg) Measure to nearest 0.1kg Write down the decimal and do not round off (e.g. 12.1)	Height (cm) Measure to nearest 0.1cm Write down the decimal and do not round off (e.g. 78.3)	Edema 0 = No 1 = Yes	MUAC (cm) Measure to nearest 0.1cm Write down the decimal and do not round off (e.g. 11.7)	Is the child currently in any feeding programme? 0=No 1=SFP 2=OTP 3=SC 88= DNK	How many capsules of vitamin A has the child received in the last 1 year? Show the RED and BLUE capsules *If None, enter zero (0)	Has the child taken any drug for intestinal worms within the last 6 months? 0 = No 1 = Yes, Card 2 = Yes, Recall 3-Child <12 m 88= DNK	Illness in the last TWO (2) WEEKS 0 = Not sick 1 = Fever/Malaria 2 = ARI /Cough 3 = Watery diarrhoea 4 = Bloody diarrhoea 5 = Other (specify) 88 = DNK See case definitions below	If the child had diarrhoea in the last TWO (2) WEEKS, did the child the child get zinc supplementation? 0 = No 1 = Yes 2=N/A 88 = DNK	Has child received OPV1 vaccination? 0 = No 1 = Yes, Card 2 = Yes, Recall 88= DNK	Has child received OPV3 vaccination? 0 = No 1 = Yes, Card 2 = Yes, Recall 8 = DNK	Has child received measles vaccination? 0 = No 1 = Yes with EPI card 2 = Yes recall 8=DNK 88 = Child <9m (Indicate to the UPPRER RIGHT Shoulder)	How old are you? Record Age in years. If the caretaker is not between 15-49 yrs, move to the next section	(Measure MUAC of primary caregiver only if female between 15 and 49 years) e.g. 23.7cm.	What is the mother's physiological status 1= Pregnant 2= BF with child <6m 3=BF with child > 6 m 4=Pregnant and breastfeeding 5=None of the above	In your last pregnancy, did you consume iron tablets? 0 = No 1 = Yes 88 = DNK
1																				
2																				
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20																				

HH definition: Group of people living under same roof & sharing food from the same pot for a period of at least 6 months. In home with multiple wives, those living and eating in different houses are cons

Annex 4: Household mortality form

(To be conducted in EVERY HH from the random starting point

Team No:…..Date:../…../…… Cluster N0:/….. County:……district…… Village……

1	2	3	4	5	6	7	8	9
		Joined HH		Left HH				
HH ref' No.	TOTAL people in the HH (now)	Of the total, how many are children <5 years	TOTAL people who have joined HH since the 1st April 2011 and are present now	Of the total, how many are <5s	TOTAL people who have left HH since the Ist july 2012	Of the total, how many are <5s	No. of births since the April 1st	TOTAL No. of dealths in the family since ist july	Of these deaths how many were children <5 who died since the 1 st July
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
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19									
20									
21									
22									
23									
24									
25									
26									

Name Team Leader…… Signature……

Annex 5. Infant and young Child feeding questionnaire

INFANT AND YOUNG CHILD FEEDING QUESTIONNAIRE

(To be conducted in every HH with children 0-24 months)

Team No:…….. Date:…...../…..…/……... Cluster No:/…….. County:…… Pdistrict…….. Village……

		21	22	23	24	25	26	27	28	29
Child No.	HH Ref No.	Age in Months	Has this child ever been breastfed? 1 = Yes 2 = No	How do you manage the first milk after birth 1= Breast fed the child 2= expressed out that milk 3= not expressed but not breastfeed for days	Is this child still breastfeeding now? 1 = Yes 2 = No	How long after birth did you first put the child to the breast? **1** = Immediately in 1st hour **2** = More than 1 hour **3** = After first day	When did you start giving water to the child? Indicate month, weeks, days or 0= Not yet	At what age did you begin to feed this child daily with any food/fluids other than breastmilk? Indicate month, weeks, days or 0= Not yet	What different types of food were given to the child yesterday during the day and night? **1** =Grains/cereal s/tubers **2** = Meat/Fish/Poultry/Organ meats **3** = Legumes/ Nuts **4** = Dairy products **5** = Fruits/vegetables 6**=** Vitamin A rich fruits & Vegetables **7** = Eggs	Since this time yesterday, how many times was this child given solid,semi solid and soft foods? (put number)
1										
2										
3										
4										
5										
6										
7										
8										
9										
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17										
18										
19										
20										

Name Team Leader…… Signiture……

Annex 6: Water and Sanitation questionnaire

(To be conducted in every HH visited for the anthropometric questionnaire)

Team No:……...Date:…../…../…… Cluster N0:/…… County:……Payam……. Village……

	30	31	32	33	34	35	36	37
HH Ref No.	What is the household's **main** drinking water source? --- **1**=Borehole **2**= Protected Shallow well **3**=HH connection / Stand pipe /Tanker **4**=Protected spring **5**=Dam / Pond **6**= River /Stream **7**= Open shallow well **8**= rain water roof harvesting **9=**other (specify)	How long does it take to collect HH water (including travel to and from and waiting)? --- **1** = ≤30 mins **2** = ≤1hr **3** = ≤ 2hrs **4** = ≤ 4hrs **5** = >4hrs	How many litres (jerrycans) of water did the HH use yesterday in total (excluding water for clothes washing)? (define how many litres in a jerrycan if the popn all use the same)	What is done to the water before households members drink it? **1.** Nothing **2**.Boiling **3.**Filtering with a cloth **4.** Letting it settle **5.** Chlorination **6.** Tree leaves **7.**Others(Specify)	Do you Wash Hands? 1= Yes 2= No	If yes, when do you usually wash your hands ? (more than one if appropriate - do not promt) --- 1. After defecation/visiting toilet 2. Before handling food 3. After eating 4. Before feeding the child 5. After cleaning children's bottom. 6. None of the above 7. Others specify	What do you use to wash hands? --- **1** = water only **2** = water + soap **3** = water + ash 4 = Water and Sand 5=Other (specify)	Where does the household usually go to dispose human waste? (include more than one if necessary)? --- **1** = Latrine **2** = Hole **3** = Designated open area **4** = Undesignated open area **5** = Flush Toilet **6**= Other (specify)

Name Team Leader…… Signature……

Annex 7: Food security questionnaire

(To be conducted in every HH visited for the anthropometric questionnaire)

Team No:…….. Date:.../...../…… Cluster N0:/….. County:……. Payam…….. Village……

	38	39	40	41	42	43	44	45	46	47	48
HH Ref No.	Who is the head of the household? 1. Adult Male 2. Adult Female 3. Child Male 4. Child Female	Main Occupation of the household head (enter code from list) 1. Livestock herding 2. Own farm labour 3. Employed(salaried) 4. Daily Labour 5. Small business/Petty trade 6. Unemployed 7. Retired 8. Housewife 9. Domestic help 10. Firewood/charcoal 11. Weaving/basketry 12. Fishing 13. Others (specify)	Highest educational status of the household head 1. None 2. Non formal 3. Primary Level 4. Secondary Level 5. Above secondary 6. Youth polytechniques 7. Other (Specify) ____	Highest educational status of the Spouse 1. None 2. Non formal 3. Primary Level 4. Secondary Level 5. Above secondary 6= Youth polytechniques 7. Other (Specify) ____	Does the household currently own livestock? 1. Yes 2. No 3. custodian of someelse cattle (If no skip to question 46)	If yes, which ones do you have? 1. Cattle 2. Goats 3. Sheep 4. Poutry 5. Donkey 6. Camels 7. Pigs 8. Rabbits	Did household milk any animal yesterday? 1. Yes 2. No	If yes what was the total amount milk produced? (ask in cups and convert it into litres)	Is the household currently engaged in crop farming? 1. Yes 2. No	If YES, type of crops have you planated in the current season? 1. Maize 2. Sorghum 3. Simsim 4. Beans 5. Tomatoes 6. Onion 7. Pawpaw 8. Mango 9. Watermelon 10. Orange 11. Kales/sukuma wiki 12. ground nuts 13. Pumpkins 14. Okra 15. Millet 16. Cowpeas 17. Cassava 18. Sweet potatoes 19. Coconut 20. Pigeon peas 21. Bananas 22.Sugarcane 23. Arrow roots 24. French beans 25. Green grams 26. Rice 27. Cabbage 28. Sunflowers 29. capscicm (hoho) 30. Mashrooms 31. Others (specify)	What is the main source of the dominant food item consumed 1=Own production 2= purchases 3=gifts from friends/ family 4= food aid 5= traded or bartered 6=borrowed 7=Gathering /wild 8= Others specify

Name Team Leader…… Signature……

(To be conducted in every HH visited for the anthropometric questionnaire)

Team No:…….. Date:.../...../…… Cluster N0:/….. County:……. Payam…….. village:……
sublocation……. Village……

	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
HH Ref No.	Did the household eat the following yesterday during the day or night?												Including food eaten in the morning, how many meals does your family normally eat per day? (Please indicate the number of meals consumed e.g. 1, 2, 3, 4, 5 ,6)	Including food eaten in the morning, how many meals did your family eat **YESTERDAY?**	Have you received **FOOD AID** (general food distribution) in the last **three (3)** months? (1= yes 2=no)
	1. Any maize meal, pasta, rice, bread, or any food made from maize, sorghum, millet or wheat (1= yes, 0 =no)	2. Any potatoes, yams, beets or other foods from roots or tubers (1= yes, 0 =no)	3. Any vegetables? (1= yes, 0 =no)	4. Any fruits? (1= yes, 0 =no)	5. Any eggs? (1= yes, 0 =no)	6. Any meats (cattle, chicken, poultry/fowl, sheep, lamb, and organ meats (heart, liver, kidney, etc)? (1= yes, 0 =no)	7. Any fish or dried fish? (1= yes, 0 =no)	8. Any foods made from beans, peas, lentils, or nuts? (1= yes, 0 =no)	9. Any milk, yogurt, cheese, or other milk product? (1= yes, 0 =no)	10. Any foods made with oil, fat, ghee, or butter? (1= yes, 0 =no)	11. Any sugar or honey? (1= yes, 0 =1)	12. Any other condiments (coffee, chillies, tea)? (1= yes, 0 =no)			

Name Team Leader……
Signature……

Annex 8: Plausibility checks

Indicator	Acceptable values/range	Survey	Comments
Digit preference - weight	0	0 (4)	Excellent
Digit preference - height	0	0 (4)	Excellent
WHZ (Standard Deviation)	0	0 (1.05)	Excellent
WHZ (Skewness)	0	0(1.05)	Excellent
WHZ (Kurtosis)	0	0 (0.13)	Excellent
Percent of flags	0	0(0.5%)	Excellent
Age distribution (%)			
Group1 6-17 mo	20%	22.1%	
Group 2 18-29 mo	20%	25.7%	
Group 3 30-41 mo	20%	22.9%	
Group 4 42-53 mo	20%	19.7%	
Group 5 54-59 mo	10%	9.5%	
Age Ratio : G1+G2/G3+G4+G5		1.0	
Sex Ratio			
General acceptability	0	0	Excellent

Annex 9: Calender of events

MONTH	Seasons	2007	2008	2009	2010	2011	2012
JANUARY (MWEI WA MBEE)	Openining of schools first term and weeding.		56 continuation of PEV, VP apponitment	44	32	20	8
FEBRUARY (MWEI WA KELI)	Form one report to school. Harvesting of beans, cow peas, sorghum, millet. Form four results, start of harvesting of maize		55 MOU signanture btw PNU and ODM. End of PEV	43	31 Good harvest of green grams (ndengu)	19	7 Death of Michuki
MARCH MWEI WA KATATU)	Preparation of land for planting, start of long rains (uuwa), planting of crops		54 Out break of aflotoxins (sumu wa mbemba) that claimed several lives	42	30 Piped water from Ikanga reaches Mutomo and Electricity	18	6
APRIL (MWEI WA KANA)	Closing of schools, Easter holiday, start of weeding		53	41	29	17 ACF nutrition survey	5
MAY (MWEI WA KATANO)	Opening of schools second term, Labour day (sikuku ya athukumi)	WVK start office in Mutomo	52	40	28	16	4 Measles out break and campaigns
JUNE (MWEI WA THANZATU)	Primary schools games, Madalaka celebrations		51	39	27	15	3 Saitoti choper crush
JULY (MWEI WA MUONZA)	Harvesting peas		50	38	26	14 Tanariver residents invaded Mutha and parts of Mutito with lots of camels	2 Launch of drilling rig in Mutomo by WVK in collaboration with MOW
AUGUST (MWEI WA NYANYA)	circumcision season (Nzaiko), closing of schools, making of bricks). Harvesting season of maize, making teraces and putting manure to farms		49	37 Census, drought	25 Referendum of the new constitution	13	1 Olympics, Army recruitments, Teachers employment both primary and secondary
SEPTEMBER (MWEI WA KENDA)	Opening of schools third term, land preparation, start of planting		48	36 cholera outbreak- kivindu-vindu, mealses campaign	24	12	
OCTOBER (MWEI WA IKUMI)	Start of short rains (Nzwa), selling of weak cattle (masoma), Start of KCSE exams	59	47	35 Good rain, 1st SMART survey done by ACF, Mbanda ya moko nundu wa ukosa nzau	23	11 KDF start operation Linda Inchi in Somalia, inception of WVK nutrition program	
NOVEMBER (MWEI WA IKUMI NA UMWE)	Start of KCPE exams, start of weeding	58	46	34	22	10	
DECEMBER (MWEI WA IKUMI NA ILI)	sikuku, wedding ceremonies, Jamuhuri days	57 Elections , start of post election violence	45	33	21	9	