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# Integrated nutrition and Retrospective Mortality Survey Makueni County Kenya

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## LIST OF ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| **ACF-USA** | Action Contre la Faim- USA (Action Against Hunger-USA) |
| **ALRMP** | Arid Lands Resource Management Project |
| **ASAL** | Arid and Semi-Arid Land |
| **CMR** | Crude Mortality Rate |
| **ENA** | Emergency Nutrition Assessment |
| **EPI** | Expanded Program on Immunization |
| **GAM** | Global Acute Malnutrition |
| **GFD** | General Food Distribution |
| **GOK** | Government of Kenya |
| **IMAM** | Integrated Management of Acute Malnutrition |
| **IYCN** | Infant and Young Child Nutrition |
| **MAM** | Moderate Acute Malnutrition |
| **MUAC** | Middle Upper Arm Circumference |
| **NCHS** | National Centre for Health Statistics |
| **OTP** | Outpatient Therapeutic Program |
| **PPS** | Population Proportion to Size |
| **SAM** | Severe Acute Malnutrition |
| **SMART** | Standardized Monitoring and Assessment of Relief and Transitions |
| **U5MR** | Under Five Mortality Rate |
| **W/H** | Weight for Height |
| **WHO** | World Health Organization |

## 2 EXECUTIVE SUMMARY

An Integrated Health, Nutrition and Mortality survey was undertaken in three districts *(Kibwezi, Makindu and Kathonzweni Districts)* and five divisions *(Kalawa, Nguu, Mulala, Kiou and Malili)* of Makueni County in March 2012. This timing was selected to enhance comparability of findings with those of 2011.

SMART[1] methodology was used all through planning and implementation of the survey with 2011 findings being used a bench marks for planning. The main survey objective was to determine the level of acute malnutrition amongst children aged 6-59 months in Makueni County. Other specific survey objectives were to determine the retrospective Crude and under five mortality rates of the entire population, morbidity rates amongst children aged 0-59 months, estimate immunization coverage and micronutrient supplementation. The survey went ahead to assess possible factors contributing to malnutrition as per the UNICEF conceptual framework as well as develop capacity amongst focal government ministries and community members in the process of the exercise

**SUMMARY OF SURVEY FINDINGS AND RECOMMENDATIONS**

Enumerators (24) and team leaders (8) were taken through a four day intensive training on all survey components.

A total of 502 children were assessed during the survey. However, two (2) children were excluded from the final analysis due to z- scores out of range and another child excluded due to missing z- scores(child not measured due to disability and bed sores). This alongside other data sets such as mortality and household data were analyzed and triangulated with other secondary data sets

Poor global [6.6% (4.3-10.2)] and severe [0.2 % (0.0- 1.5)] acute malnutrition were unveiled in March 2012. These findings were not ($p<0.05$) statistically different from the 2011 findings. Below alert crude and under five mortality rates of were unveiled. Some of the probable contributing factors to the aforementioned poor nutrition status included high disease prevalence *(significant increase in diarrheal incidences),* low micronutrient supplementation *(vitamin A and therapeutic zinc),* poor food security and livelihood situation and increased distance to water points that limits per capita water consumption in some households.

The subsequent sections of this report therefore present the survey findings of the various sectors in details as well as possible recommendations and tools used in the study.

[1] Standardized Monitoring and Assessment of Relief and Transitions

## 3 INTRODUCTION

Makueni County is situated in the lower eastern part of the country and borders Kitui County to the East, Taita Taveta to the South, Kajiado to the West and Machakos to the North. It's a home to 884,527 people covering an area of approximately 7,965.8 $km^2$. It is sub divided into nine districts namely; Makueni, Kathonzweni, Kilungu, Mbooni East, Mbooni West, Kibwezi, Nzaui, Mukaa and Makindu. The area is classified as Arid and Semi-Arid Land *(ASAL)* with two major livelihood zones namely; marginal mixed farming and mixed farming (coffee/dairy/irrigation or food crops/cotton/livestock).

The second round SMART Survey covered Kibwezi, Makindu and Kathonzweni Districts and five Divisions (Kalawa, Nguu, Mulala, Kiou and Malili) thence comparability of the results with the first round SMART Survey both in timing and area covered.

The onset of the 2011 short rains was normal; however, the rainfall was inadequate and unevenly distributed throughout the county. The rains were therefore not available when most of the crops needed moisture most during, the flowering and fruit setting stages of growth. This led to flower drops/abortion, low fruit set and high fruit drop.

ACF-USA has been implementing Nutrition, Food Security and Livelihood activities in the County since December 2010 and October 2011 respectively. However, all the interventions phased out in March 2012.

## 4 METHODOLOGY

### 4.1 Type of survey

Standardized Monitoring and Assessment of Relief and Transition (SMART) methodology was employed in undertaking both the anthropometric and retrospective mortality survey. Additional data on health, WASH[2] and FSL[3] was gathered by use of structured questionnaires, key informant interviews, observations as well as available secondary data. This was indeed useful in the triangulation of findings

### 4.2 Sampling Methodology

Anthropometric and retrospective mortality data were gathered through a two stage sampling methodology as follows:

**Stage 1** involved determination of clusters and households to sample. Cluster calculation was undertaken in the planning template of ENA for SMART November 2011 version. Relevant information was keyed in as per table below with the 2011 survey findings and 2009 population census providing crucial planning information.

**Table 1:** Sample size calculation for anthropometric and retrospective mortality survey

| Data entered on ENA software | Anthropometric survey | Retrospective mortality survey |
|---|---|---|
| Estimated prevalence | 7.7 | 0.17 |
| Desired precision | 3.1 | 0.30 |

[2] Water, sanitation and Hygiene

[3] Food Security and Livelihood

| | | |
|---|---|---|
| Design effect | 1.33 | 1.52 |
| Recall period | | 94[4] |
| Average household size | 6.3 | 6.3 |
| Percent of under five children | 17.5% | |
| Percent of non-respondent | 2.0% | 2.0% |
| Households to be included | **423** | **207** |
| Children to be included | 411 | |
| Population to be included | | 2665 |

The higher (423) sample of households above was used to determine number of clusters. 39 clusters each comprising of 11 households was thus randomly selected by use of ENA software *(probability to population size)*

The second stage involved sampling of the eleven (11) households in each of the 39 clusters. The village elder was crucial at this stage in the provision of an updated and comprehensive list of households in the village. 11 households were there after identified from the list using simple random sampling. Questionnaires in each of the sampled household were administered accordingly.

It is important to note a proposal outlining the implementation of the survey was done, presented and validated at the Nutrition Information Working group prior to survey implementation

### 4.3 Training and organization of survey teams

The survey team comprised of 2 supervisors (ACF team), 26 enumerators and 8 team leaders with team leaders drawn from Ministry of Health (5), Arid Land Resource Management project (1), World Vision (1) and Kenya Red Cross (1). ACF provided all the needed technical support during exercise.
A four day training was undertaken focusing on a number of issues such as accuracy on anthropometric measurements, household selection, indicator description and how to accurately fill in the questionnaires. Both standardization and pilot tests were done during the training.

### 4.4 Data Quality Assurance Process

The survey process *(from planning to report writing)* entailed several data quality assurance steps. At the planning phase, close discussion and planning was undertaken with relevant stakeholders. This led to development of a proposal that was presented internally (ACF technical team) and externally *(Nutrition Information Working Group)* for validation.

Standardization and pilot tests were also undertaken during the training to enhance accuracy, precision and familiarization of survey tools/processes. The standardization test produced poor results. This therefore guided the team on which other areas to strengthen the training. As such, an additional training on anthropometric measurements was done with practical demonstrations. This training coupled with field supervision, daily data entry and feedback to the teams enhanced quality in data collection thence the excellent overall survey score of 3.0%. After data analysis, the results were presented to the NIWG[5] and ACF technical team for validation.

[4] Main Recall event: December 12th 2011; Jamhuri Day

[5] Nutrition Information Working Group

### 4.5 Data Collection

The actual data collection exercise was undertaken between 10th and 16th March 2012 under close supervision of ACF and respective team leaders. The following data was gathered.

**Anthropometric data** was gathered through a structured questionnaire amongst children aged 6 to 59 months. Data collected included:

- **Age:** Estimated by use of Mother & Child Health Booklet, Birth certificates, Birth notifications or Baptismal cards. In circumstances where the aforementioned documents were absent, local calendar of events was used *(Annex 11.2).*
- **Sex:** This was recorded as either *m* (male) or *f* (female)
- **Weight:** only Salter scales (25 kg with 0.1 kg precision) and weighing pants was used to measure children's weight. Bathroom scales were not used since are prone to errors *(sensitive to flat surfaces which were not available in most households).*
- **Height:** Height boards were used for taking length for children less than 2 years of age and height for those more than 2 years of age
- **MUAC:** Measured on the left arm, at the middle point between the elbow and the shoulder to the nearest 0.1 cm. In the event of a disability or injury on the left arm, the right arm was used.
- **Bilateral Oedema:** Nutritional oedema occurs at both feet. It was assessed by the application of moderate thumb pressure for at least 3 seconds to both feet. Only children with bilateral oedema were recorded as having nutritional oedema. This is a rare diagnosis and the survey supervisors had to verify its presence in the field.
- **Vaccination:** Mother& Child Health booklet was used for confirmation of all vaccinations. For children with confirmed immunization (by date) on the booklet, the status was recorded as "1" (Card) otherwise as "0" (No). Oral confirmation from the mother without proof of card was recorded as "2" (Mother's verification).
  **-Measles vaccination** status for children aged 9-59 months. All children less than 9 months old were excluded from measles analysis.
  **-OPV1 and OPV3** status was calculated for all children aged 6-59 months

**Health indicators**: Other relevant information about the eligible child was gathered. Physical samples of drugs were shown to the caregivers to enhance clarity of questions. These were:

- **Vitamin A coverage:** This was determined by the number of times the eligible child had received vitamin A in the past year. The response received *(number of times*) was probed and recorded on the anthropometric questionnaire.
- **De-worming:** Determined by whether the child in the target group had received any drugs for intestinal worms in the last 6 months.
- **Morbidity:** Two week recall period used to determine prevalence of morbidity amongst children 0-59 months. Data was collected by asking the mothers/caretakers over the aforementioned recall period. This was eventually determined based on the respondent's recall and not clinical verification by qualified personnel

**Mortality survey**: Relevant mortality data was gathered in all the sampled 11 households per cluster by use of a standard mortality questionnaire *(Annex 11.3 and 11.4).* A 94 recall period was used and Jamhuri day (12th December 2011) marked as the start of the recall period. If members of a sampled household were absent/ empty, the teams always inquired about their whereabouts from the neighbors and came back later. No sampled household was replaced.

**Other data sets**: A structured questionnaire *(Annex 11.7)* was used to obtain food security and livelihoods (FSL) and WASH information from every sampled household. This was regardless of

whether the household had an eligible child for the anthropometric survey or not.

**Data Entry and Analysis**

Daily data entry was undertaken for all data sets so as to ensure close supervision and quality of data as the survey progressed. Anthropometric and mortality data were entered and analyzed in ENA for SMART software November 2011 version. For the anthropometric data sets, children with missing or extreme z- scores flagged by the software were excluded from the final analysis.

The household questionnaire data sets were entered and analyzed using Microsoft Excel.

## 4.6 SURVEY VARIABLES

### 4.6.1 Acute Malnutrition

**Weight for Height Index**

The acute malnutrition rates were estimated from the combination of weight for height (WFH) index values and/or with the presence of oedema. This index was compared with the WHO Standards and NCHS reference and expressed in both Z-scores and in percentage of median.
Guidelines for the results expressed in Z-scores:

- Severe malnutrition is defined by WFH <-3 SD and/or existing bilateral oedema
- Moderate malnutrition is defined by WFH <-2 SD and >=-3 SD and no oedema
- Global Acute Malnutrition is defined by WFH <-2SD with or without existing bilateral oedema

Guidelines for the results expressed in percentage according to the median reference:

- Severe malnutrition is defined by WFH < 70% and/or existing bilateral oedema
- Moderate malnutrition is defined by WFH < 80% and >=70% and no oedema
- Global malnutrition is defined as WFH < 70% with or without existing bilateral oedema

**Mid Upper Arm Circumference**

Malnutrition rates were also estimated through MUAC analysis. The table below indicates the various criteria for MUAC measurements.

**Table 2: Definition of MUAC**

| MUAC CUT OFF | Interpretation |
|---|---|
| MUAC<115mm and/or bilateral pitting edema | Severe Acute Malnutrition with high risk of malnutrition |
| MUAC >=115mm and <125mm | Moderate acute malnutrition with risk of mortality |
| MUAC >=125mm and <135mm | Risk of malnutrition |
| MUAC > 135mm | Adequate nutritional status |

## 4.7 Mortality

Ninety four days recall period was used to collect mortality data and analysis done for both crude and under five mortality rates. The result is expressed per 10,000 people per day. It is calculated using the following formula.

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

a = Number of recall days (94)
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

**Crude Mortality Rate (CMR):**

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

**Under five Mortality Rate (U5MR)**

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

## 5 SURVEY LIMITATIONS/CONSTRAINTS

The SMART survey was a cross sectional study, thus the unveiled nutritional status were of the surveyed area at that particular time. This report therefore highlights the probable causes of malnutrition as no causal analysis studies were undertaken.

## 6 RESULTS

### 6.1 Distribution by age and sex

The sample size of the anthropometric questionnaire was 502 children aged between 6 and 59 months. The sample was unbiased as the overall sex ratio of boys to girls fell within the acceptable range of 0.8 – 1.2 (boys 52.0% and girls 48.0%).

**Table 3: Distribution of age and sex of sample**

| | Boys | | Girls | | Total | | Ratio |
|---|---|---|---|---|---|---|---|
| **AGE (months)** | **no.** | **%** | **no.** | **%** | **no.** | **%** | **Boy: girl** |
| **6-17** | 74 | 52.5 | 67 | 47.5 | 141 | 28.1 | 1.1 |
| **18-29** | 60 | 60.0 | 40 | 40.0 | 100 | 19.9 | 1.5 |
| **30-41** | 57 | 52.3 | 52 | 47.7 | 109 | 21.7 | 1.1 |
| **42-53** | 51 | 47.7 | 56 | 52.3 | 107 | 21.3 | 0.9 |
| **54-59** | 19 | 42.2 | 26 | 57.8 | 45 | 9.0 | 0.7 |
| **Total** | 261 | 52.0 | 241 | 48.0 | 502 | 100.0 | 1.1 |

The overall sex ratio of 1.1 fell within the acceptable ranges of 0.8 – 1.2. This applies for the various age categories save for the 18-29 and 54-59 categories that lie at 1.5 and 0.7 respectively. This is attributable to the use of local calendar of events in age determination

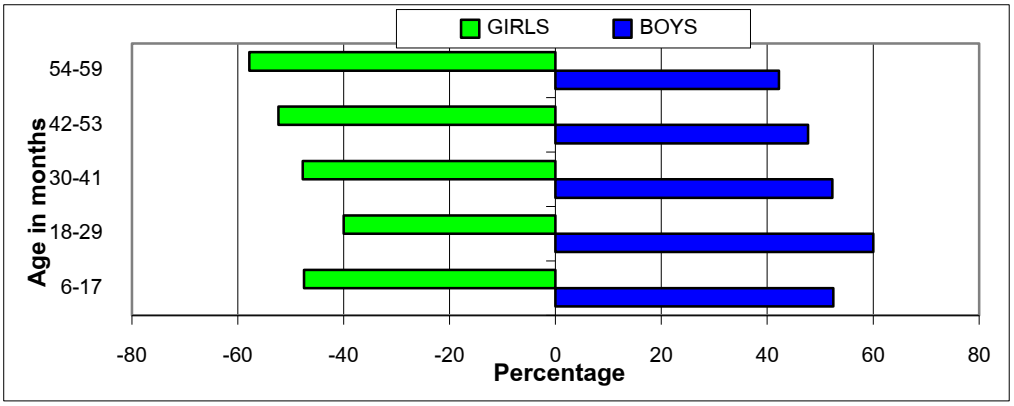



**Figure 1:** Distribution of sex by age group

## 6.2 ANTHROPOMETRY

**Distribution of Acute Malnutrition in Z-score, WHO and NCHS references**

The table below shows the distribution of acute malnutrition by age group in z-score and/or oedema as per WHO standards. It is evident that majority of the children in all age groups are normal with severely and moderately malnourished children accounting for 0.2% and 6.4% respectively and lies below the WHO emergency thresholds of 15% and 4% respectively. There were no cases of bilateral oedema.

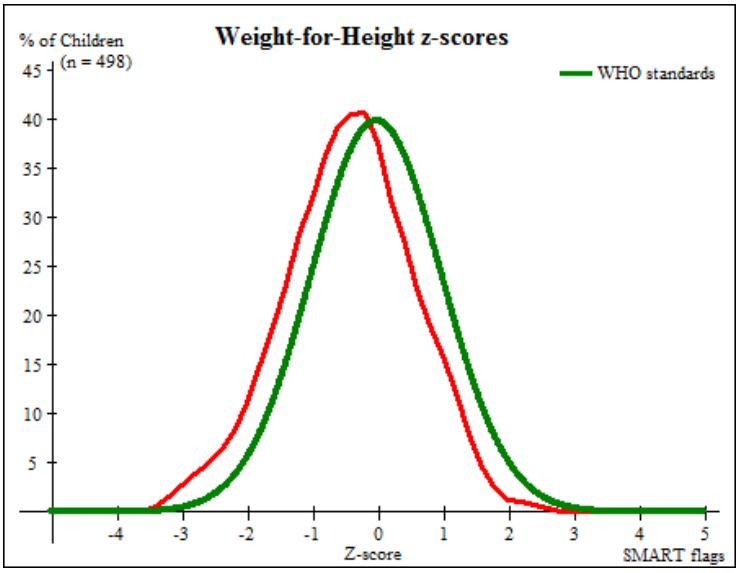
**Table 4: Prevalence of acute malnutrition by age based on WHZ-scores and/or oedema, WHO references**

| | | **Severe wasting** *(<-3 z-score)* | | **Moderate wasting** *(>= -3 and <-2 z-score )* | | **Normal** *(> = -2 z score)* | | **Oedema** | |
|---|---|---|---|---|---|---|---|---|---|
| **Age** *(mths)* | Total | **No.** | **%** | **No.** | **%** | **No.** | **%** | **No.** | **%** |
| **6-17** | 139 | 0 | 0.0 | 7 | 5.0 | 132 | 95.0 | 0 | 0.0 |
| **18-29** | 99 | 0 | 0.0 | 6 | 6.1 | 93 | 93.9 | 0 | 0.0 |
| **30-41** | 109 | 0 | 0.0 | 7 | 6.4 | 102 | 93.6 | 0 | 0.0 |
| **42-53** | 107 | 1 | 0.9 | 10 | 9.3 | 96 | 89.7 | 0 | 0.0 |
| **54-59** | 44 | 0 | 0.0 | 2 | 4.5 | 42 | 95.5 | 0 | 0.0 |
| **Total** | 498 | 1 | 0.2 | 32 | 6.4 | 465 | 93.4 | 0 | 0.0 |

Table 6 presents the categories of acute malnutrition based on the presence or absence of bilateral oedema. On the whole, none of the children had oedema, with only one child diagnosed with marasmus.

**Table 5: Distribution of acute malnutrition and oedema based on weight-for-height z-scores**

| | **<-3 z-score** | **>=-3 z-score** |
|---|---|---|
| **Oedema present** | Marasmic kwashiorkor<br>No. 0 (0.0 %) | Kwashiorkor<br>No. 0 (0.0 %) |
| **Oedema absent** | Marasmic<br>No. 1 (0.2 %) | Not severely malnourished<br>No. 497 (99.8 %) |




The sample population curve in figure 2 is displaced slightly to the left of the reference curve. This indicates a poor nutrition status of the sample population

**Figure 2:** Weight for Height distribution in Z-score compared to the WHO standard

Further analysis of the results indicates that the malnutrition rates based on gender have got no significant statistical difference (*GAM P value = 0.2773 and SAM P value= 0.44*)

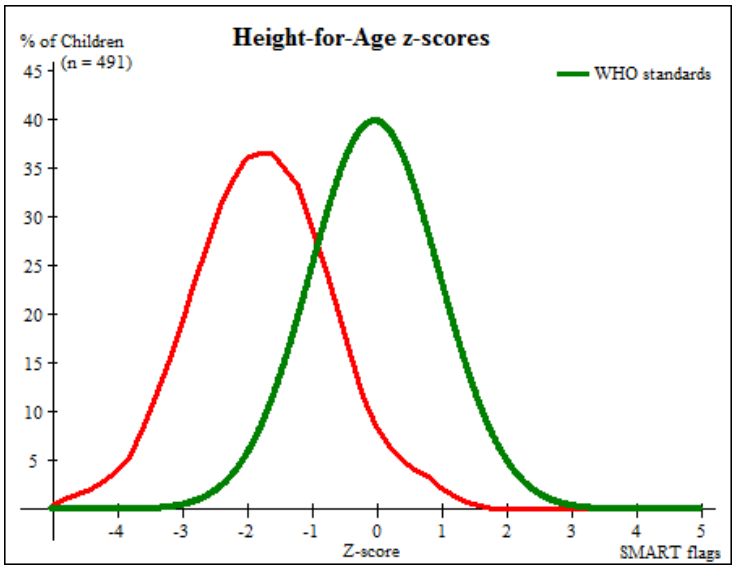
**Table 6: Global and Severe Acute Malnutrition in Z-score**

| | WHO Reference | NCHS Reference |
|---|---|---|
| **Prevalence of GAM** | 6.6%<br>(4.3- 10.2 C.I.) | 5.2%<br>(3.0- 8.9 C.I.) |
| **Prevalence of SAM** | 0.2%<br>(0.0- 1.5 C.I.) | 0.0%<br>(0.0- 0.0 C.I.) |

**Distribution of Middle Upper Arm Circumference**

**Table 7: MUAC distribution**

| MUAC in mm | >=65 cm to < 75 cm height | | >=75 cm to < 90 cm height | | >= 90 cm height | | Total | |
|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % |
| MUAC < 115 | 0 | 0.0 | 0 | 0.0 | 1 | 0.6 | 1 | 0.2 |
| 115 = MUAC < 125 | 9 | 7.8 | 3 | 1.4 | 1 | 0.6 | 13 | 2.6 |
| 125 <= MUAC < 135 | 32 | 27.3 | 32 | 15.5 | 9 | 5.4 | 73 | 14.9 |
| MUAC.>= 135 | 76 | 64.9 | 171 | 83 | 156 | 93.4 | 403 | 82.2 |
| **Total** | **86** | 15.28 | **247** | 43.87 | **230** | 40.85 | 563 | 100.00 |




It is evident from the figure on the left that stunting levels are very high in Makueni County. Trends indicate that the number of stunted children is on the increase (33.5% in 2011 and 40.9% in 2012). Moreover, the results indicate that there is significant statistical difference as p value is less than 0.05 (0.04)

**Figure 3:** Height for age; WHO standards

### 6.3 RETROSPECTIVE MORTALITY SURVEY

Findings from the mortality study are illustrated below

**Table 8:** Mortality data

| | Total population | Children (0-59 months) |
|---|---|---|
| Number of current households residents | 2806 | 562 |
| Number of people who joined | 40 | 21 |
| Number of people who left | 290 | 6 |
| Number of births | 32 | 32 |
| Number of deaths | 4 | 0 |

The trends on retrospective mortality rates are as follows:

**Table 9:** Mortality rates

| | MARCH 2011 | MARCH 2012 |
|---|---|---|
| Crude mortality rate | **0.17** (0.06 – 0.48) /10,000/day | **0.15%** (0.05 – 0.39)/ 10,000/day |
| Under five mortality rate | **0.35** (0.09 – 1.38) /10,000/day | **0.0%** (0.00-0.00) /10,000/day |

The unveiled CMR and U5MR are below the WHO and Sub Saharan Africa emergency thresholds

## 6.4 SOCIO-DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS

During data collection, a household was defined as members who live in the same dwelling and share food from the same pot. A household head on the other hand was an individual in one household setting who provides actual support and maintenance to one or more individuals who are related to him or her through adoption, blood, or marriage. An average household size of 6.4 was unveiled in March 2012 with majority (85.7%) of the households headed by men

The main (56.0%) occupation of the household head was daily wage labour amongst others as illustrated in the figure to the left

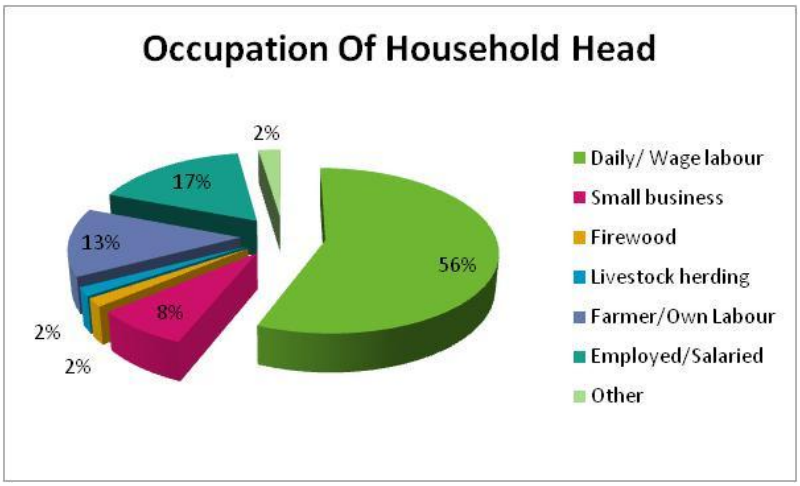



**Figure 4:** Main occupation of household heads

## 6.5 HEALTH AND NUTRITION

Most households (83.1%) sampled had children less than five years of age. The determination of disease prevalence in the area indicated that majority (67.2%) of these children had been suffering from one form of illness or another in the past two weeks to the survey. Statistical tests indicate a significant increase in diarrhea cases as compared to last year accounting in March 2012. Other children were found to suffer from Fever with chills like malaria (48.74%), Fever, cough, difficulty in breathing (53.8%), other diseases include skin infections, vomiting, swollen neck (mumps), funny rash suspect of “measles”, amoeba, ringworms, chicken pox which accounted for (23.1%) with comparisons to 2011 illustrated below.

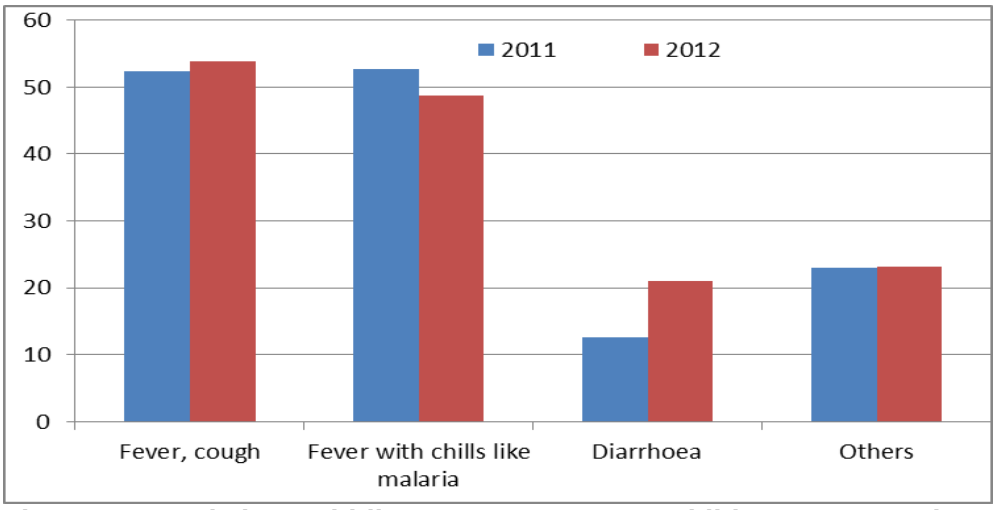



**Figure 5: Trends in morbidity patterns amongst children 0-59 months**

Over two thirds (84.4%) of caretakers sought health care for the sick children at public clinics (45.0%). Other health care seeking avenues include private clinics (33.0%), shop/kiosk (25.5%), mobile clinic (1.5%), traditional healer (5.0%), CHW's (3.0%) and relatives (0.5%) in that order. This raises concern about the quality of care as issues of self-medication arise amongst those who go to kiosks or relatives.

Therapeutic zinc supplementation during diarrhea incidences was comprised and below the national target of 50.0%. Findings indicate that out of the children who had diarrhea 50(21.0%) ,only 6% received Zinc therapeutic supplements. Most cases were given ORS[6] (48.0%), 16% homemade liquids (16.0%) such as *porridge/ soups,* and sugar salt solution (8%). A deworming coverage of 37.2% was unveiled too. This fell below the national target of 80.0%.

According to the surveyed areas of Makueni County, majority (88.2%) of mothers initiated breastfeeding within an hour after birth with the exclusive breast feeding rates lying at 51.3%. Even though this is just 1.3% above the national target and higher as compared to many other sites, the situation still needs continuous sensitization on appropriate infant and young child nutrition to foster and maintain gains made so far.

Findings of other IYCN indicators are presented in Table 10 below.

**Table 10:** IYCN Indicators

| **Dietary Diversity** | **%** |
|---|---|
| Proportion of breastfed children 6-23 months consuming ≥3 food groups *(n=83)* | 52.2 |
| Proportion of non-breastfed children 6-23 months consuming ≥4 food groups *(n=7)* | 0.2 |
| Proportion of both breastfed and non-breastfed children 6-23 months consuming ≥ 3 or ≥ 4 food groups respectively *(n=90)* | 46.4 |
| **Minimum Meal Times** | |
| Proportion of breastfed children 6-8 months and 6- 23 months having at least 2 meals and ≥ 3 meals a day respectively *(n=176)* | 93.6 |
| Proportion of non-breastfed children 6-23 months having ≥4 meals a day *(n=24)* | 64.9 |
| Proportion of breastfed children 6-8 months, 6-23 months and non-breastfed 6-23 months having ≥2, ≥3 and≥4 meals a day respectively *(n=200)* | 88.9 |

**Table 11:** Measles Vaccination Coverage

| **Response** | **2011 %** | **2012 %** |
|---|---|---|
| Not Immunized | 3.3 | 7.84 |
| Immunized by card | 74.0 | 77.1 |
| Immunized by recall | 22.7 | 16.7 |
| **>=9 months** | **100.0** | **100.0** |

The measles immunisation coverage by both card and recall were satisfactory (*see table below*) according to the WHO recommended coverage of 80.0% in order to avoid epidemic. However, more efforts should be made to document dosages given to avoid having cases reporting to have received the immunization when they have not.

It was commendable to note that the iron supplementation rate (80.1%) amongst pregnant women was above the national target of 50%.

[6] Oral rehydration Salts

Vitamin A coverage was assessed by first describing what a Vitamin A capsule looked like then asking the mother if the child received the content of that capsule in the past one year. Findings of these are illustrated in the table below.

**Table 12:** Vitamin A Coverage

| VITAMIN A SUPPLEMENTATION | | | |
|---|---|---|---|
| **Age Group** | **No. Of Times** | **2011 %** | **2012 %** |
| 6-11 | Once | 78.2 | 69.8 |
| 12-59 | Once | 40.9 | 40.9 |
| | Twice | 40.0 | 24.5 |
| | Thrice | | 2.5 |

The rates of supplementation for the children who had received Vitamin A at least twice (12 to 59 months) were 24.5% which marked a significant decrease as compared to last year 40.0% and is below the national target of 50%. This is indeed of concern bearing in mind that Malezi bora campaigns had been undertaken in November 2011.However the number of children who had received supplementation thrice accounted for 2.5%,this was the negligible percentage of whom were ill and this was used as an immune booster.

Mosquito bed net ownership in the survey site was at 409(71.1%). However, usage by all household members was just slightly above 50.0% with only 67.5% and 68.9% children and adult females respectively sleeping under a mosquito bed net the night to the survey. Working on the assumption that the adult females are either pregnant or lactating, risk of vulnerability to malaria increases. The low bed net coverage could probably explain morbidity attributed to fever with chills like malaria that contributed over 48.7% of cases.

The coverage of pentavalent vaccination (OPV 1) and (OPV3) were 80.88% and 75.7% respectively by card .The overall coverage of both by card and by recall is was generally good as it lay above the national target of 80.0%.

## 6.6 FOOD SECURITY AND LIVELIHOODS

Agriculture is currently the economic backbone in Makueni County. It is an Arid and Semi-arid region with livestock keeping and cash /food crops being the main livelihoods.

The short rains began normally in October 2011 but were inadequate and unevenly distributed throughout the county. The survey was conducted mid-march when the onset of long rains was highly expected but in vain. It was observed that some farmers had already planted however worried due to scattered rains.

Makueni County is mainly dominated by Kamba community (agro pastoralists) with almost every household (97.7%) reporting to have planted food crops in the previous planting season. Majority (81.9%) depended on the short rains while 18.1% did irrigation especially along river *Athi.* However, according to the short rains assessment, most farmers did not realize any harvest.

Maize is the main staple food in Makueni County thus largely (97.6%) cultivated. Of the 406 households who planted Maize, 26.1% (106) experienced total crop failure with 36.4% harvesting less compared to the previous harvesting season. The mean harvest for the maize crop accounted for 77.5 kg per household.

Legumes such as cow peas and green grams usually need average moisture for farmers to realize harvest and majority (*81.5% and 65.4% respectively*) of the sampled households reported to have grown them in the most recent planting season. However, these legumes did not perform as expected with 29.5% and 74.3% respectively reporting to have harvested nothing. The mean harvest was very little accounting for 27.3kg and 11kg per household respectively. The poor harvest is highly associated with the infestation of Aphids and African boll worm which destroyed the crops at their production stage. Beans were planted by 43% with total failure accounting for 44.7% while pigeon peas are yet to be harvested.
Potato/cassava and vegetables were still planted by minorities (less than 10%) as March last year. Vegetables were observed to be grown by households living along the rivers with few households practicing kitchen gardening. On the whole, there is a significant decrease on the recent harvest compared to the harvest realized in March 2011. The poor harvest is likely to compromise the food security situation and eventually nutrition status in the region as 56.0% of the farmers reported that the recent harvest will not last for more than one month.

The figure 6 below presents the crops planted along with the percentage of those farmers who planted the crops that experienced complete crop failure and harvested nothing.

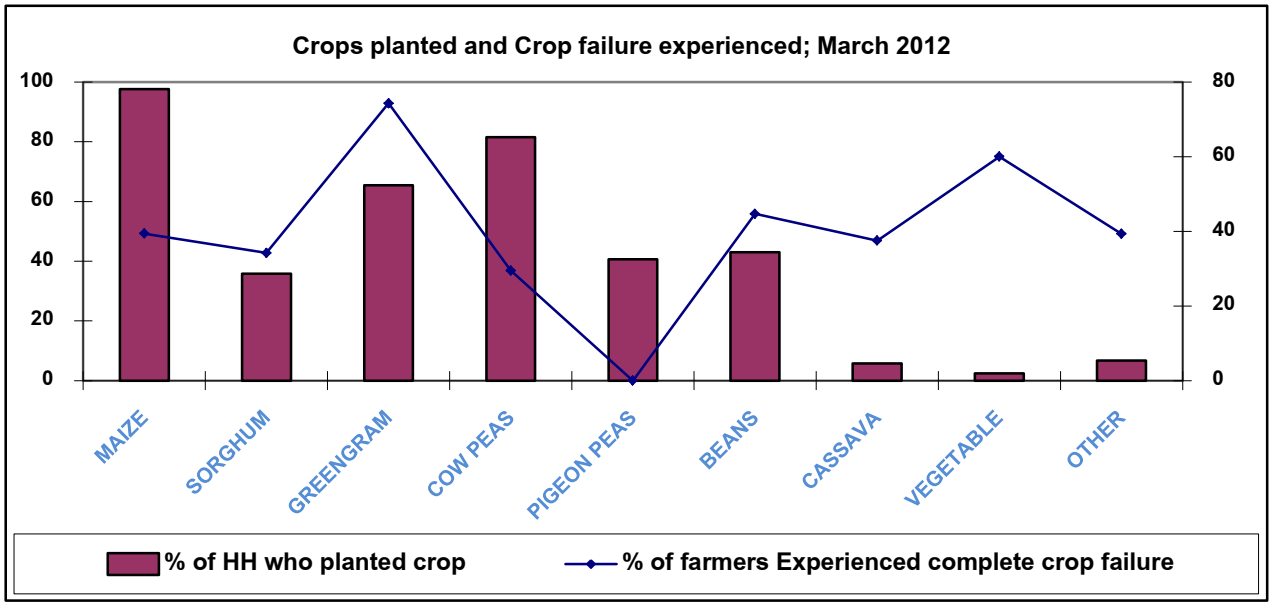


Figure 6: Crops planted and crop failure experienced

Moreover, 72.3% of the households have used their harvest only for household consumption. A number of reasons were cited for the changes in harvest. The main cause for decrease in harvest was noted to be poor rainfall (77.7%). Other causes such as pest's infestation accounted for 13.2%

The recent harvest was compared to the previous harvest and most farmers reported to have harvested less especially for the major food crops (Maize, Sorghum, Green Grams, Cow peas) as tabulated below

**Table 13: Recent harvest compared with previous harvest**

| | March 2011 | | | March 2012 | | |
|---|---|---|---|---|---|---|
| **Crop** | **Same (%)** | **More (%)** | **Less (%)** | **Same (%)** | **More (%)** | **Less (%)** |
| Maize | 10.1 | 11 | 78.9 | 27.8 | 34.5 | 36.9 |
| Sorghum | 9.8 | 13.7 | 76.5 | 34.9 | 26.2 | 38.9 |
| Green Gram | 6.5 | 20.9 | 72.6 | 26.1 | 32 | 41.5 |
| Cow pea | 7.3 | 16.4 | 76.3 | 32.7 | 27.4 | 39.2 |
| Pigeon pea | 14.7 | 17.6 | 67.6 | These were yet to be harvested | | |
| Beans | 5.5 | 21.9 | 72.6 | 33 | 30.7 | 36.3 |
| Potato | 50 | 25 | 25 | 75 | 4.2 | 20.8 |
| Veg | 42.9 | 14.3 | 42.9 | 60 | 20 | 20 |
| Other | 100 | 0 | 0 | 57.1 | 32.1 | 14.3 |

Further analysis on the average quantity per crop harvested was done. The findings indicate that Maize, Green Grams and cow peas had less harvest as compared to march last year's average harvests. However, sorghum and vegetables have shown a slight increase.

Out of the households who reported to have planted (416) in the most recent season, only 83.6% realized some harvest. Majority (86.5%) claimed to have used their harvest purely for household consumption. Sadly, the harvest would not provide for more than a month for most (59.4%) of the households though the proportion has declined as compared to last year's 72.6%. It is thus clear that the community is facing hard time necessitating the households to adopt various measures to cope with the food insecurity in the past thirty days prior to the survey date.

**Table 14:** Average number of livestock /HH

| Livestock | Average number/household | |
|---|---|---|
| | March 2011 | March 2012 |
| Cattle | 2 | 3 |
| Goat | 7 | 7 |
| Sheep | 1 | 4 |
| Donkey | 0 | 1 |
| Chicken | 11 | 10 |

Livestock herding is as well a predominant livelihood in Makueni County. 81.9% of the population reported owning livestock (not including chicken). However, those who own only chicken were 37%. The table below details the average number of livestock owned per household. As indicated in the table, there is a slight increase on cattle, sheep, donkey and chicken. Interestingly, the mean number for goats has remained the same.

The households were observed to own vast chunks of land, thus majority (80.8%) had to travel one or less a kilometre to access pasture. It was noted that some households from Mavindini and Kiboko Divisions travelled more than 10 KM in search of water for the animals. However, a bigger proportion (59.6%) of the households covered not more than a kilometre.

Dietary diversity and quality consumed at the household level is a proxy to household's food security. The sampled households were asked to list the number of different food items consumed a day prior to the survey date (24hr recall). Household Dietary Diversity Score (HDDS) of the 12 main food groups was therefore carried out. The survey results indicated in the graphical presentation below that cereals remain to be the highly consumed food accounting for (98.6%). *Githeri* (mixture of Maize and legumes) is the main staple food for the Kamba

community thus majority (63%) reported to have consumed food made from legumes. sugar and condiments were consumed by the majority but showed a slight decrease as compared to last year. Quality of protein consumed is significant on determination of quality of the diet. Protein from animal sources was consumed by a few households with meat, eggs and fish accounting for 9.4%, 6.6% and 16.9% respectively save for dairy products accounting for 66.6%.

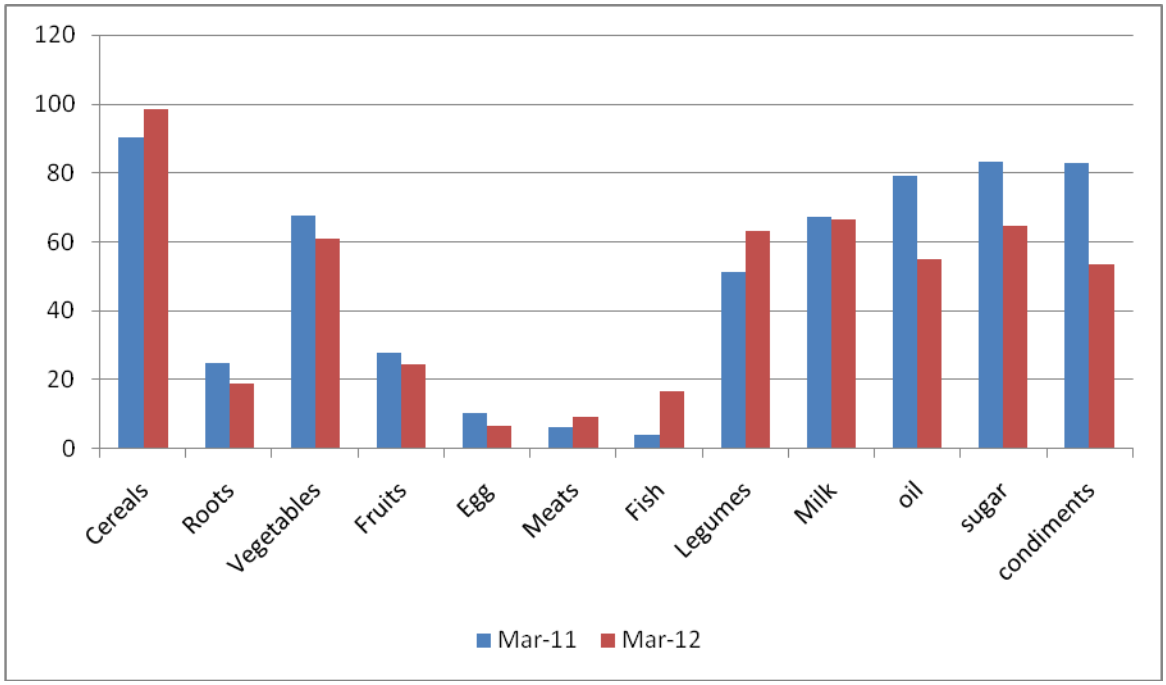



**Figure 7: 24 hour recall on the 12 food groups**

Data on Household Dietary Diversity Score is tabulated below.

**Table 15:** Household Dietary Diversity scores

| Food Dietary Diversity | March 2011 | | March 2012 | |
|---|---|---|---|---|
| | N | % | N | % |
| Low Dietary Diversity (= 3 Food Groups) | 66 | 11.5 | 84 | 19.8 |
| Medium Dietary Diversity (4 – 5 Food Groups) | 117 | 20.3 | 140 | 32.9 |
| High Dietary Diversity (6+ Food Groups) | 392 | 68.2 | 201 | 47.3 |
| Total | 575 | 100 | 425 | 100 |

The survey results indicated that quite a bigger proportion of the population did not realize any harvest. The households thus had to employ several sources of food which was determined through proportional piling with a 30 day recall period. Only 32.1% of the food came from own farm production (both crops and livestock products). It is consequently clear that most of the food in Makueni is sourced out of the County with 73.5% of the sampled households reporting to have purchased food and 53% purchasing on credit. The number of households depending on General food distribution and Food for Assets has slightly increased from 30% last year to 42% accounting for 9.8% of household food.

**Table 16:** Household coping strategies

| | March 2011 (%) | | | | March 2012 (%) | | | |
|---|---|---|---|---|---|---|---|---|
| **Coping strategy** | **Never** | **Rarely** | **Frequently** | **Always** | **Never** | **Rarely** | **Frequently** | **Always** |
| Skip meals | 58.1 | 21.6 | 19.1 | 1.2 | 42.9 | 25.1 | 26.1 | 5.9 |
| Reduce meal size | 35.3 | 27 | 35.5 | 2.3 | 25.8 | 23.5 | 39 | 11.7 |
| Eat less preferred foods | 73 | 12.7 | 14.1 | 99.8 | 29.8 | 22.3 | 28.4 | 19.5 |
| Borrow money | 55.7 | 23.7 | 19.3 | 1.4 | 41.8 | 27.2 | 25.8 | 5.2 |
| Restrict adult food intake | 67.1 | 13.6 | 18.8 | 0.5 | 60.3 | 16.7 | 20.2 | 2.8 |
| Send children | 84 | 7.8 | 8.2 | 0 | 79.1 | 2.1 | 10.8 | 8 |
| Others | 94.8 | 1.9 | 3.3 | 0 | 93.9 | 0.5 | 5.4 | 0.2 |

In this survey most (97.0%) of the sampled households reported to have been affected negatively by some livelihood shocks in the three months prior to the survey. The table below indicates the shocks in order of importance. Crop failure and unusually high prices of food remain to be ranked as the highest respectively by most households. On the other hand, unusually high levels of human and livestock diseases are of less significance as compared to March last year.

**Table 17:** Shocks experienced in order of priority

| | March 2011 | | | March 2012 | | |
|---|---|---|---|---|---|---|
| Kind of stress | Highest (%) | Second highest (%) | Third highest (%) | Highest (%) | Second highest (%) | Third highest (%) |
| Crop failure | 64.4 | 24.8 | 10.9 | 33.6 | 15.7 | 17.2 |
| Unusually high prices of food | 27.5 | 37.1 | 35.4 | 31 | 32.2 | 16.7 |
| Reduced income | 26.9 | 40.6 | 32.6 | 14.5 | I9.4 | 14 |
| Reduced water availability | 36.4 | 35.8 | 27.8 | 7.3 | 8.9 | 11.6 |
| Unusually high levels of human diseases | 20 | 32.3 | 47.7 | 4.1 | 3.6 | 2.4 |
| Reduced casual/wage earning | 14.8 | 60.9 | 24.3 | 3.4 | 8.7 | 10.4 |
| Unusually high levels of livestock diseases | 31.6 | 42.1 | 26.3 | 1.9 | 2.9 | 2.9 |

Further analysis indicates that the shocks experienced had a negative impact on household's food security. Majority (92.3%) reported that the shocks caused decrease on ability to have enough food and income and loss of household assets. The households therefore employed several strategies to cope up with the impacts of the shocks with most (26.7%, 20.2% and 8.5%) spending less on other non- food items, reducing amount of food eaten and seeking alternative income sources respectively. The least practiced coping strategies were removing children from school and selling household articles with a negligible score of 0.2%. However, a small proportion of the households have recovered with 25.2% partially recovered and the majority (62.3%) reporting not to have recovered at all.

Crop farming and livestock keeping are major livelihoods in Makueni County. However, survey results indicate that unskilled labour is the main occupation for majority (56%) of the household heads. It is also the main source of income for the majority. Agricultural, livestock and livestock product sales are among the least *(4.9%, 5.4% and 2.2% respectively)* sources of income as illustrated below. These is due to environmental factors among others whereby Makueni County has been receiving erratic and inadequate rainfall patterns thereby resulting into massive crop failure and lack of pasture and water for livestock. Therefore, it is important to note that unskilled labour is the alternative source of livelihood.

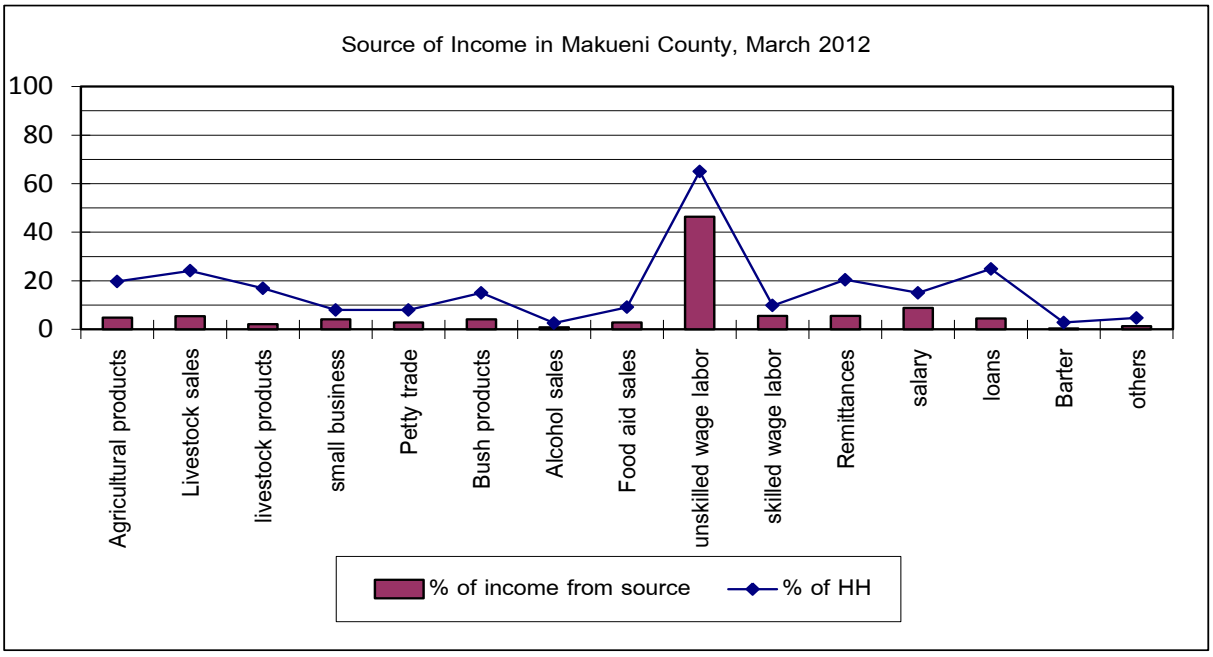



**Figure 8:** Source of income

Expenditure patterns of sampled households were determined over a 30 day recall period using proportionate pilling. Findings of these showed a similar pattern when compared to 2011 with cereals, pulses and school fees accounting for a relatively larger portion of the total expenditure. The graphical presentation below *(figure 10)* indicates that most of the households spent their income on food items.

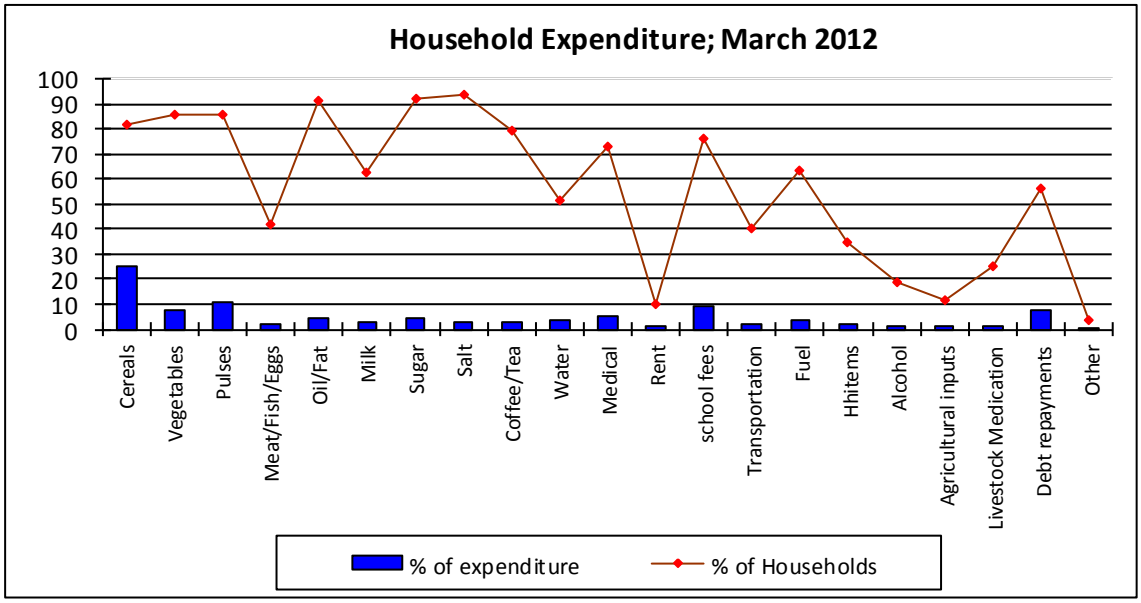



**Figure 9**: Household Expenditure

## 6.7 WATER SANITATION AND HYGIENE

One of the key determinants and components of nutritional outcome is water availability, access and safety. At the time of the survey, majority of surveyed locations were at their peak of dry season and the rainfall patterns uneven. Short rains assessment done in January 2012 reflected that there was poor performance of the short rains experienced at the end of the year.

### Water access

The table below is a breakdown of the various water sources noted and their accessibility during the survey period.

**Table 18:** Water accessibility

| MAIN SOURCE OF WATER | 2011 % | 2012 % |
|---|---|---|
| Piped water system from borehole (Safe) | 21.0 | 24.7 |
| Piped water system from spring( Safe) | 18.6 | 11.8 |
| Constructed shallow well with working hand pump (safe) | 5.9 | 11.3 |
| Unconstructed traditional shallow well on dry river | 6.9 | 25.5 |
| Unconstructed traditional shallow well not on the river | 7.1 | 4.7 |
| Constructed shallow well without hand pump | 19.5 | 4.0 |
| Secondary water seller | 1.9 | 0 |
| Water trucking to public tank | 2.1 | 3.8 |
| Earth pan/ dam | 0.2 | 3.8 |
| Household roof rain catchment | 15.7 | 1.8 |

| | | |
|---|---|---|
| Flowing river | 1.0 | 8 |
| Other | 0.2 | 0.5 |
| **Total** | **100.0** | **100.0** |

Even though there was a slight improvement (2.3%) in the proportion of households who accessed safe drinking water, a greater proportion (53.5%) of households were found to consume unsafe water from various sources highlighted in red in *Table 18*

The figure below compares the 2011 findings on per capita water consumption against the SPHERE 2011 and national standard. Even though the findings indicate an improvement when compared to 2011, majority of these household did not met the acceptable levels. This could be attributed to the general scarcity of water and accessibility as there was no rainfall and most of the water pans had dried up.

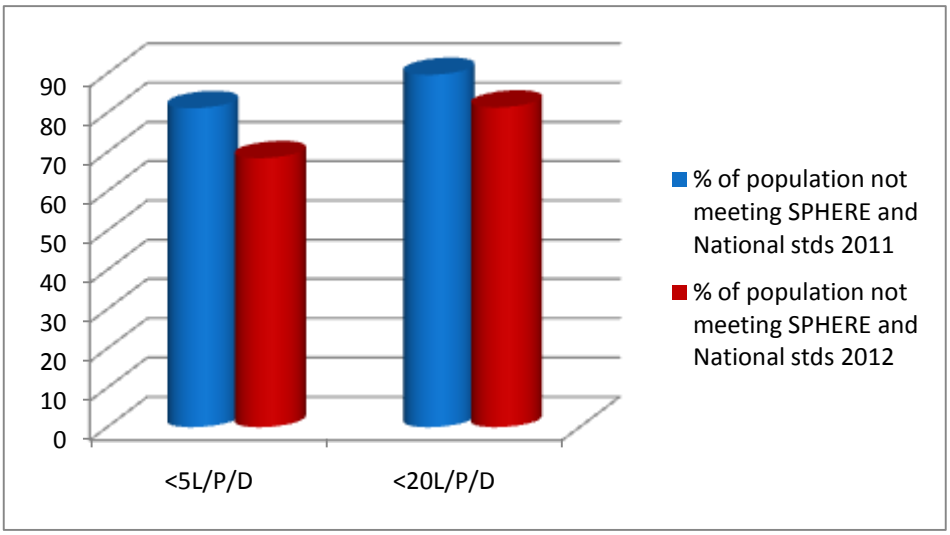



**Figure 10:** Quantity of water consumed in litres per person per day

**Water treatment:**

Most (44.8%) of households in Makueni County did nothing to the water before consumption despite unsafe water being the predominant source of water. Other water treatment options constituted chlorination (34.3%, boiling (18.3%), alum stone (8.2%), sitting to settle (16.4%), traditional tree (8.4%) and passing through cloth (9.8%) as illustrated below *(Figure 14)*

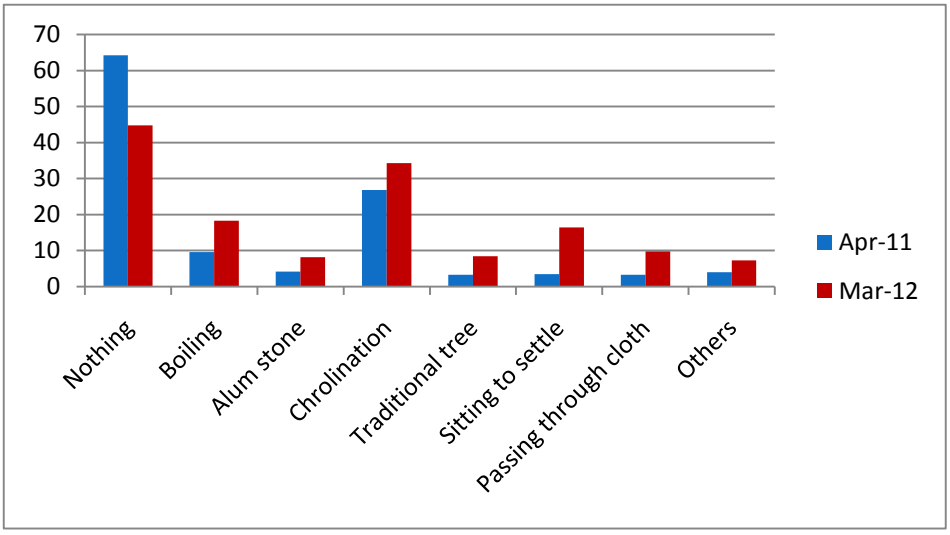



**Figure 11:** Water treatment methods

It was however commendable to observe that most households *(91.5%)* stored drinking water in closed pots/container.

Water is life and every individual should be able to access the resource with ease. This should not only be safe but sufficient, affordable and accessible for personal and domestic use of all households. SPHERE 2011 recommends a maximum distance of 500 meters/ 15 minutes from a household to the nearest water point.

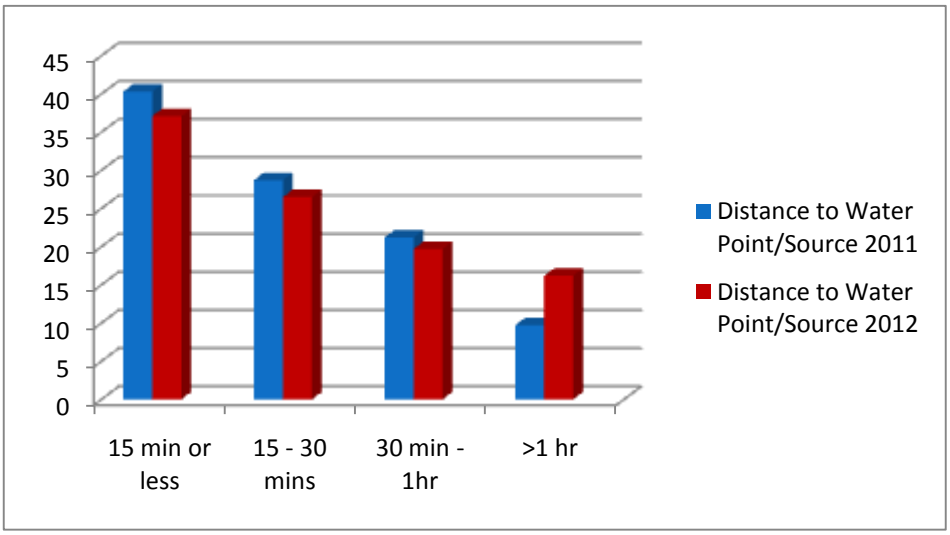



**Figure 12:** Distance to water point

According depicted in figure 15 above, majority (37.1%) of the households did not have to walk for more than fifteen minutes to the water source; this marked a slight decrease when compared to 2011 (*40.3%).* Most households *(51.7%)* however still had to queue at the water point. Variations in this are illustrated in Figure 16 below.

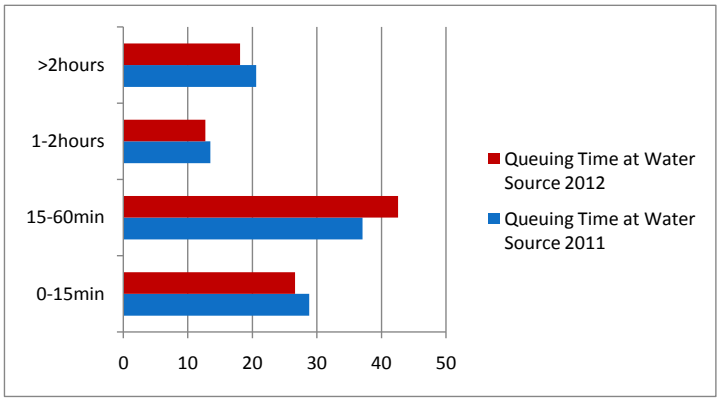



**Figure 13:** Queuing time at water source

**Sanitation:**

In the surveyed area of Makueni County, majority (80.9%) of households relieved themselves in their own traditional pit latrines with 8.7% (37) using their own ventilated improved latrine *(see figure 17).*

Only 8.2% of households were reported to share sanitation facilities .This further is a pointer that majority of the surveyed households (92.5%) used safe excreta disposal methods. Out of the households with sanitation facilities, further observations were made to determine the hygiene conditions and construction of the latrine. 79.3% of these were clean with the floors covered in traditional slabs (69.4.4%) or cement (30.6%).

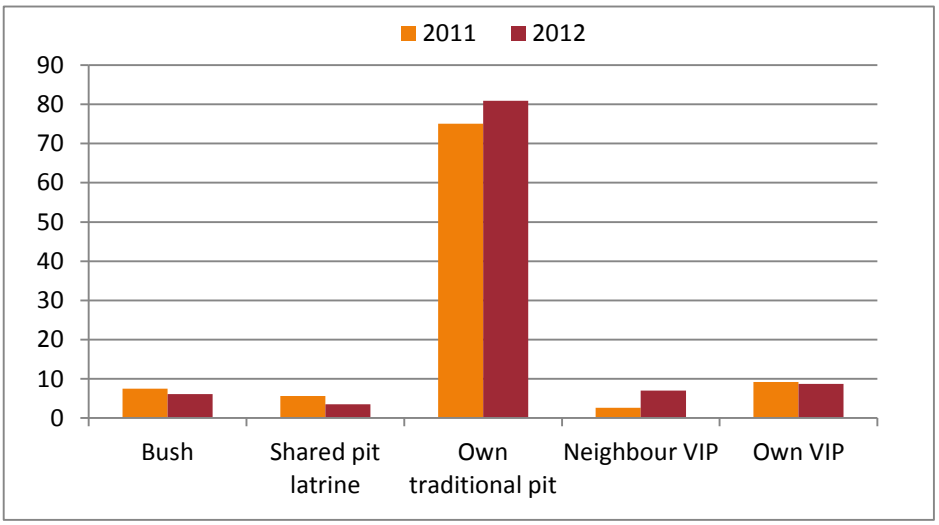



**Figure 14:** Relieving points in Makueni County

**Hygiene Practises**:

Appropriate hand washing practices is crucial as it helps eliminate the faecal-oral route of infection transmission. Hand washing was practised by almost all (99.3%) households with hand washing before eating (91.9%), after visiting the toilet (92.4%) and before cooking (80.4%) reported as the most common times. Other relatively important hand washing times reported were after handling animals (31.2%) or taking children to the toilet (36.4%), when dirty (1.4%) or before going to the latrine (8.0%). Below is a representation of the hand washing practices in 2011 and 2012.

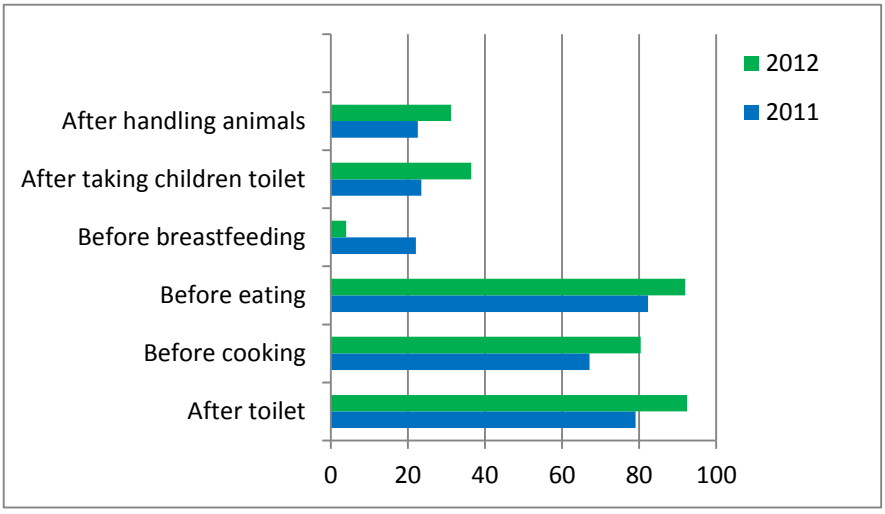



**Figure 15: Hand washing practices**

## 7 DISCUSSION

GAM AND SAM Levels of 6.6% (4.3-10.2) and SAM 0.2% (0.0- 1.5) respectively were unveiled in March 2012. These were not statistically significant to those of 2011. Even though the lie below the emergency thresholds of 15% and 4% respectively for GAM and SAM; the stunting levels unveiled were very high (40.9%).

The above findings are attributable to a number of contributing factors as illustrated by the UNICEF conceptual frame work of malnutrition. These range from direct causes of malnutrition to underlying and basic causes. Most households in Makueni County had children who had been ill with diarrhea incidences indicating statistical significance in findings. These could be attributable to symptoms of other diseases, inappropriate hand washing practices and poor water treatment methods. In most circumstances, care was sought from public clinics. Nevertheless, a considerable number relied on other conventional methods predisposing the children to negative impacts of self-medication. Therapeutic zinc supplementation in diarrheal incidences was also limited due to lack of supplies at the facility level. The Infant and young child feeding was generally at an acceptable level with most core indicators lying at the national bench mark. For example, exclusive breast feeding rates of 51.2% lie close to the national target of 50.0%. Nevertheless, practices of some of these aspects were difficult to establish during this study. Micro-nutrient supplementation of Vitamin A was also below acceptable levels despite being done a few months after *Malezi bora* activities. There is need to further study the impact of such calendar activities and come up with feasible measures of increasing impact of such valuable measures

The food security situation is also poor. Makueni County has been experiencing recurrent drought as a result of poor rainfall causing massive crop failure and depletion of pasture/browse for livestock. This has caused uncertainty in the livelihoods with majority opting for unskilled wage labor. The food insecurity at household level has a negative impact on the household food consumption with the household members skipping meals, reducing the meal size and consuming less preferred foods. The poor diet and many hours of the day spent in wage labor

lead to poorly nourished mothers who consequently give birth to under weight babies and lack enough breast milk and time for adequate care for the infants.

Water access and availability is a major issue in Makueni County as majority accessing unsafe water. This is further aggravated poor water treatment methods before consumption and increased quieting times at water points. The aforementioned factors predispose households to low per capita consumption thence increased susceptibility to poor hygiene practices that could in turn have led to the high diarrheal incidences unveiled.

# 8 CONCLUSION AND RECOMMENDATIONS

The above factors therefore lead to the conclusion that, the high stunting levels in Makueni County could be attributed to low birth weight, inadequate feeding and nutrient depletion leading to repeated illnesses of young children which are as a result of poverty and the consequent inability of families to provide appropriate care for their children.

Relevant interventions are essential in order to curb the unveiled food insecurity, poor sanitation and poor infant and young child nutrition/health in Makueni County. This will in turn help in reducing the stunting levels which have immense negative impact in the community. For instance, impaired growth in the critical first years reduces a child's cognitive development and learning ability, often leading to poor school performance and dropping out subsequently contributing to a poorer community.

**Health and Nutrition**

- Strengthen linkages with food security and livelihood and WASH to help improve nutrition outcomes that contribute to long term malnutrition (high stunting levels)
- Strengthen HINI interventions in order to improve mother child health services through outreach services, health educations and community sensitization
- Advocate for the pull system in drug request rather than the push system to ensure consistency in availability of essential drugs
- Undertake a Knowledge , attitude and practise survey on IYCN to clearly understand the various factors surrounding this.

**Food Security & Livelihoods**

- Promoting high value traditional crops and timely supply of certified seeds
- Market linkage and value addition should be entrenched in a cottage industry in the village for economic growth and income generation
- The water resources (permanent rivers) need to be tapped for irrigation farming

**Water, Sanitation and Hygiene**

- Strengthen public health promotion on appropriate hand washing and water treatment practices
- Active integration of relevant stakeholders in the construction of boreholes and earth pans in order to scale up water accessibility, availability and consumption

# 9 ANNEX

## 9.1 Sample Size and Cluster Determination[7]

| Geographical unit | Cluster | Geographical unit | Cluster |
|---|---|---|---|
| ITUKA | 1 | KIU | 37 |
| KINDUA | 2 | NZEVENI | 38 |
| KASOKA | 3 | NDALANI | 39 |
| SYEILA | 4 | **MASAMBA** | **RC** |
| KISAYANI | 5 | **YALA** | **RC** |
| KAMUITHI | 6 | **SYOKIVULU** | **RC** |
| KIVUTINI | 7 | **MUTOMO** | **RC** |
| KITHIMANI | 8 | | |
| KALIMANI | 9 | | |
| MUKUYUNI | 10 | | |
| YIMBOO | 11 | | |
| MALEMBWA | 12 | | |
| KYUASINI | 13 | | |
| KASASULE | 14 | | |
| MOLEMUNI | 15 | | |
| KAMUTHWA | 16 | | |
| VUMBUNI | 17 | | |
| MITAMAIU | 18 | | |
| KITHAYOONI | 19 | | |
| KYAMBUSYA | 20 | | |
| **KASEVENI** | 21 | | |
| **YEMUKAME** | 22 | | |
| **KIMBOO** | 23 | | |
| **KYENGONI** | 24 | | |
| **YIIATUNE** | 25 | | |
| **NDALANI** | 26 | | |
| **THITHI** | 27 | | |
| MAATHA | 28 | | |
| NGONI | 29 | | |
| MUSELELE | 30 | | |
| NGAMYONE | 31 | | |
| KAVUMBU | 32 | | |
| NGOMENI | 33 | | |
| NGUUNI | 34 | | |
| KWA WATOTO | 35 | | |

[7] Only the sampled and reserved clusters have been presented in this section.

## 9.2 CALENDER OF EVENTS MARCH 2012

| MONTH | Seasons | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|
| JANUARY | SHORT DRY SPELL *(NGETHA)* | | 50 Post-election violence | 38 | 26 | 14 | 2 |
| FEBRUARY | | | 49 Signing of the National Accord. | 37 | 25 | 13 | 1 |
| MARCH | | | 48 | 36 | 24 | 12 | 0 |
| APRIL | LONG RAINS *(MBUA YA UUA)* | 59 | 47 | 35 | 23 | 11 | |
| MAY | | 58 | 46 Tetanus Campaign | 34 | 22 | 10 | |
| JUNE | LONG DROUGHT *(THANO MUASA)* | 57 | 45 | 33 | 21 | 9 | |
| JULY | | 56 | 44 | 32 | 20 World cup | 8 | |
| AUGUST | | 55 | 43 | 31 Census | 19 Referendum | 7 | |
| SEPTEMBER | | 54 Mass sch. strike | 42 | 30 | 18 | 6 | |
| OCTOBER | SHORT RAINS *(MBUA YA NTHWA)* | 53 | 41 | 29 | 17 | 5 | |
| NOVEMBER | | 52 | 40 Obama elected | 28 | 16 | 4 | |
| DECEMBER | | 51 **General Election** | 39 | 27 | 15 | 3 | |

## 9.3 Household Mortality data form *(One sheet per Household)*

Household enumeration data collection form for a death rate calculation survey

(One sheet/household)

**District :_____Division:_____Location:_____Village: _____**

**Cluster number:_____HH number:_____Date:_____Team number:_____**

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| ID | HH member | Present now | Present at beginning of recall (include those not present now and indicate which members were not present at the start of the recall period ) | Sex | Date of birth/or age in years | Born during recall period? | Died during the recall period |
| 1 | | | | | | | |
| 2 | | | | | | | |
| 3 | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| 7 | | | | | | | |
| 8 | | | | | | | |
| 9 | | | | | | | |
| 10 | | | | | | | |
| 11 | | | | | | | |
| 12 | | | | | | | |
| 13 | | | | | | | |
| 14 | | | | | | | |
| 15 | | | | | | | |
| 16 | | | | | | | |
| 17 | | | | | | | |
| 18 | | | | | | | |
| 19 | | | | | | | |
| 20 | | | | | | | |

**Tally (these data are entered into Nutrisurvey for each household):**

| | | |
|---|---|---|
| Current HH members – total | | |
| Current HH members - < 5 | | |
| Current HH members who arrived during recall (exclude births) | | |
| Current HH members who arrived during recall - <5 | | |
| Past HH members who left during recall (exclude deaths) | | |
| Past HH members who left during recall - < 5 | | |
| Births during recall | | |
| Total deaths | | |
| Deaths < 5 | | |

## 9.4 CLUSTER MORTALITY QUESTIONNAIRE *(one sheet/cluster)*

**District: _____Division:_____Location: _____Village: _____**

**Cluster number:_____Date:_____Team number: _____**

| HH | Current HH Member | | Current HH Member Who Arrived During Recall (Exclude Births) | | Past HH Members Who Left During Recall (Exclude Deaths) | | Births During Recall | Deaths During Recall | |
|---|---|---|---|---|---|---|---|---|---|
| | TOTAL | <5 | TOTAL | <5 | TOTAL | <5 | | TOTAL | <5 |
| 1 | | | | | | | | | |
| 2 | | | | | | | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | | | | | | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | | | | | | | | |
| 16 | | | | | | | | | |
| 17 | | | | | | | | | |
| 18 | | | | | | | | | |
| 19 | | | | | | | | | |
| 20 | | | | | | | | | |
| 21 | | | | | | | | | |
| 22 | | | | | | | | | |
| 23 | | | | | | | | | |
| 24 | | | | | | | | | |
| 25 | | | | | | | | | |

## 9.5 ANTHROPOMETRIC QUESTIONNAIRE

| **1. IDENTIFICATION: Data Collector:_____ Team Leader:_____** | | | | | | |
|---|---|---|---|---|---|---|
| 1.1 DISTRICT | 1.2 DIVISION | 1.3 LOCATION | 1.4. VILLAGE | 1.5. CLUSTER NUMBER | 1.6 TEAM NUMBER | 1.7 SURVEY DATE |
| | | | | | | |

| Child no. | **HH no.** | **Sex** F/M | **Age in Month** | **WEIGHT** ##.# kg | **HEIGHT** ###.# *(cms)* | **EDEMA** (Y/N) | **MUAC** ##.# *(cms)* | **Age verified by** 1= Card 2= Recall | **MEASLSES** 0= Not immunized 1= Card 2= Recall | **Has the child received OPV1** (Penta 1) 0= No 1= Card 2= Recall | **Has the child received OPV 3** (Penta 3) 0= No 1= Card 2= Recall | **In the last 1 yr, how many times has the child received** Vitamin A *(show samples)* | **In the last ONE YEAR; has the child received DRUG for intestinal WORMS** 0= No 1= Yes | **In the past TWO WEEKS did the child suffer from any sickness?** 0=No 1= Yes | **If yes, which sicknesses** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | Fever with chills like malaria 0= No 1= Yes | Cough/ ARI 0= No 1= Yes | Watery diarrhea 0= No 1= Yes | Bloody diarrhea 0= No 1= Yes | Others *(Please specify)* 0= No 1= Yes |
| 1 | | | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | |

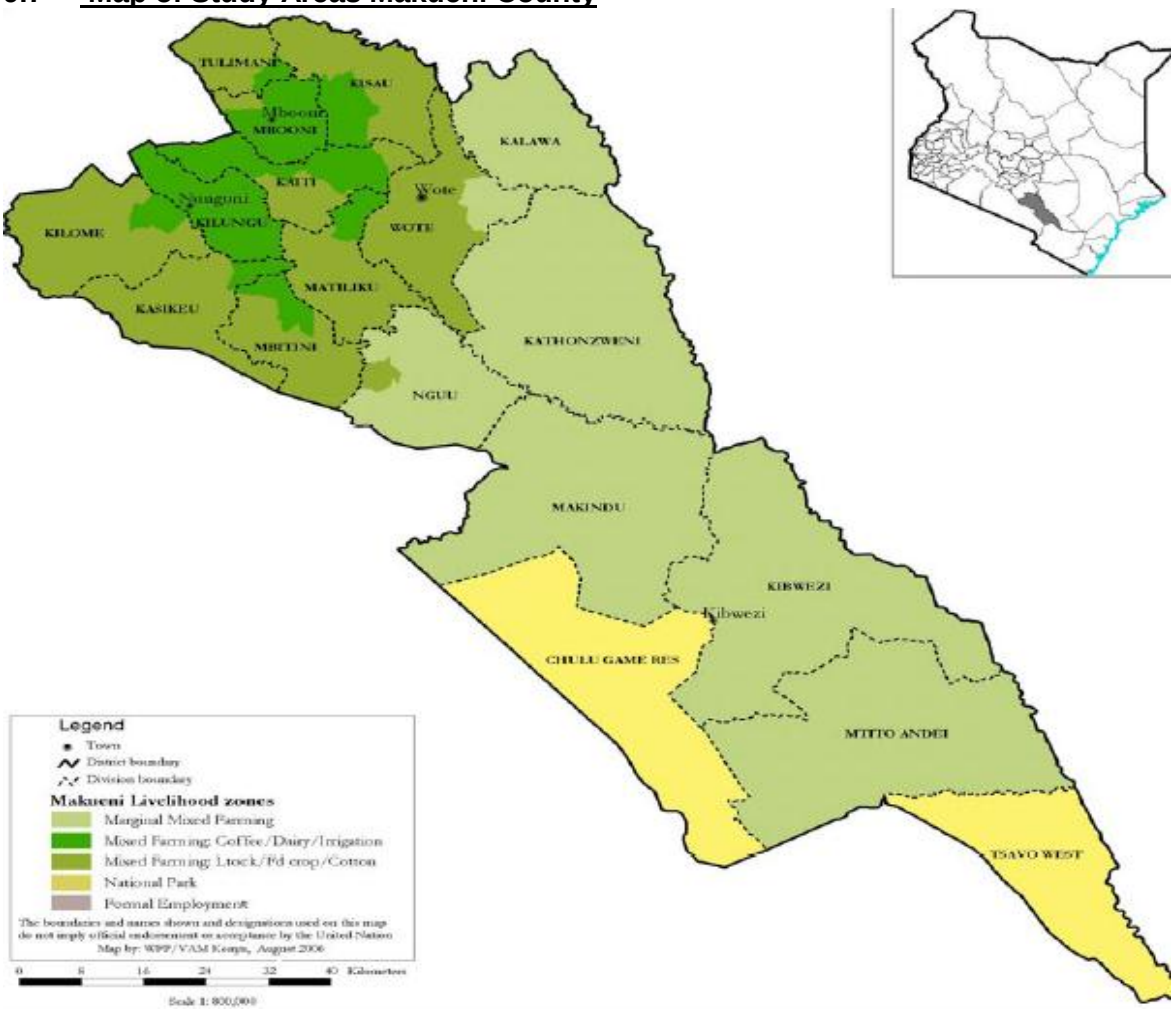
## 9.6 IYCN QUESTIONNAIRE

To be conducted in Households with children aged 0 - 23 months

**Date (D/M/Y): ……. /……./…….. Division: _____ Sub location: _____ Village Name: _____ Cluster No: _____ Team No: _____**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| Child No. | HH Ref-No | Age (in months) | Has this child ever been breastfed? 1 = Yes 2 = No *If no go to question 9* | How long after birth did you first put the child to the breast 1 = Within one hour 2 = In first day (within 24 hours) 3 = After first day ( >24 hours) | Did you feed your child with fluid or liquid that came from breasts in the first 3 days after birth COLOSTRUM 1 = Yes 2= No | Is this child still breastfeeding now? 1 = Yes 2= No | Exclusive breast feeding: Other than breast milk, what other foods did you give the child before the age of 6 months 1 =None other than breast milk 2 = Powder/animal milk/yogurt 3 = Cereals based diet 4 = Plain water 5 = Fruit Juice 6 = Sugar water 7 = Vegetables | What foods were given to the child yesterday during the day and night? 1 =Grains, roots and tubers 2 = Flesh foods (Meat /Fish / Poultry /Organ meats ) 3 = Legumes and Nuts 4 = Dairy products (milk, yoghurt, cheese) 5 = Other Fruits and vegetables 6= Vitamin A rich fruits & Vegetables 7 = Eggs 8 = Others (specify___) ( *Multiple responses are possible)* | Yesterday (During the day and at night). How many times did you feed [Name] solid and semi-solid foods? No. of times child was given food to make it full. |
| 1. | | | | | | | | | |
| 2. | | | | | | | | | |
| 3. | | | | | | | | | |
| 4. | | | | | | | | | |
| 5. | | | | | | | | | |
| 6. | | | | | | | | | |
| 7. | | | | | | | | | |
| 8. | | | | | | | | | |
| 9. | | | | | | | | | |
| 10. | | | | | | | | | |
| 11. | | | | | | | | | |
| 12. | | | | | | | | | |
| 13. | | | | | | | | | |

## 9.7 Map of Study Areas Makueni County




## 9.8 Household questionnaire

| 1. Identification | Data Collector_____ | Team Leader_____ | | | | | |
|---|---|---|---|---|---|---|---|
| 1.1 District | 1.2 Division | 1.3 Location | 1.4 Sub-location | 1.5 Cluster No | 1.6 HH No | 1.7 Team No. | 1.8 Date |
| | | | | | | | |

| 2. Household Structure | | |
|---|---|---|
| 2.1 | **Sex of household head**<br>1. Male<br>2. Female | \|____\| |
| 2.2 | **What is the main occupation of the household head**<br>1. Livestock herding<br>2. Farmer/own farm labor<br>3. Employed (salaried)<br>4. Daily labor/Wage labor<br>5. Small business/Petty trade<br>6. Firewood/charcoal<br>7. Other (Specify _____ | \|____\| |
| 2.3 | **How many household members are currently present**<br>1. Male<br>2. Female | \|____\|<br>\|____\| |

| 3. Child Health and Nutrition (Children 0-59 months of age) –( The mother/caretaker should be asked for this section) | | |
|---|---|---|
| 3.1 | **Does the household have children 0-59 months old?**<br>1. Yes<br>2. No (if No, skip to section 4) | \|____\| |
| 3.2 | **Did any of your children 0-59 months old have had sickness during the past 2 weeks?**<br>1. Yes<br>2. No (If No, skip to Question # 3.6) | \|____\| |
| 3.3 | **If yes to question 3.2 what type of sicknesses during the past 2 weeks**(USE 1 if Yes and 2 if No) **(Multiple response possible)?**<br>1. Watery Diarrhea<br>2. Bloody Diarrhea<br>3. Fever with chills like malaria<br>4. Fever, cough, difficulty in breathing<br>5. Other (specify)_____ | \|____\|<br>\|____\|<br>\|____\|<br>\|____\|<br>\|____\| |
| 3.4 | **When the child was sick did you seek assistance?**<br>1. Yes<br>2. No (If No, skip to question # 3.6) | \|____\| |
| 3.5 | **If the response is yes to question # 3.4 where did you seek - Use 1 if Yes and 2 if No)**<br>1. Traditional healer<br>2. Community health worker<br>3. Private clinic/ pharmacy<br>4. Shop/kiosk<br>5. Public clinic<br>6. Mobile clinic<br>7. Relative or friend<br>8. Local herbs<br>9. NGO/FBO | \|____\|<br>\|____\|<br>\|____\|<br>\|____\|<br>\|____\|<br>\|____\|<br>\|____\|<br>\|____\|<br>\|____\| |

| | |
|---|---|
| 3.51 | **If child had diarrhea, was he/she given any of the following to drink at any time since he/she started having the diarrhea?** (USE 1 if Yes and 2 if No) |
| | 1. A fluid made from a special packet called Oralite or ORS? \|____\| |
| | 2. A home-made sugar-salt solution? \|____\| |
| | 3. Another home-made liquid such as porridge, soup, yoghurt, coconut water, fresh fruit juice, tea, milk, or rice water? \|____\| |
| | 4. Zinc \|____\| |
| | 5. Others (specify)_____ |
| 3.52 | In your last pregnancy, did you take iron pills, sprinkles with iron, or iron syrup? |
| | 1. Yes \|____\| |
| | 2. No |
| | **3.** Don't know |

| | |
|---|---|
| 3.6 | **In the last 24 hours did the child (ren) who is < 5 years and is not breastfeeding receive milk?** |
| | 1. Yes |
| | 2. No \|____\| |
| 3.7 | **What is the mother's / caretaker's physiological status** *(Please insert appropriate number in the box)* |
| | 1. Pregnant |
| | 2. Lactating |
| | 3. None of the above \|____\| |
| 3.8 | Mother/ caretaker's MUAC reading _____cm |

| **4. WATER, SANITATION AND HYGIENE (WASH)- Ask the mother/care taker** | |
|---|---|
| 4.1 | **What is the main source of drinking water for the household <u>NOW</u>?** |
| | 1. Piped water system from borehole \|____\| |
| | 2. Piped water system from spring |
| | 3. Unconstructed traditional shallow well on dry river |
| | 4. Unconstructed traditional shallow well not on dry river |
| | 5. Constructed shallow well without hand pump |
| | 6. Constructed shallow well with a working hand pump |
| | 7. Secondary water seller |
| | 8. Water trucking to public tank |
| | 9. Earth pan/dam |
| | 10. Household roof rain catchments |
| | 11. Flowing river |
| | 12. Other (specify)__ |
| 4.2 | **How long does it take to walk to the main source of water (one way in minutes) NOW?** |
| | 1. 15 minutes or less (less than 500m) |
| | 2. 15 minutes to 30 minutes (1km) \|____\| |
| | 3. 30-1 hour (more than 1km – 2 km) |
| | 4. More than one hour (more than 2 km) |
| 4.2.2a | **Do you queue for water?** |
| | 1. Yes \|____\| |
| | 2. No **(If No skip to question 4.3)** |
| 4.2.2b | **If yes how long?** |
| | 1. 0-15 minutes \|____\| |
| | 2. 15-60 minutes |
| | 3. 1-2hrs minutes |
| | 4. More than 2 hours |

| | |
|---|---|
| 4.3 | **What is done now to the water before household members drink the water NOW? (MULTIPLE RESPONSES POSSIBLE- ( *Use 1 if NO and 2 if YES)***<br>1. Nothing \|____\|<br>2. Boiling \|____\|<br>3. Alum stone \|____\|<br>4. Chlorination \|____\|<br>5. Abarmog (traditional tree) \|____\|<br>6. Sitting to settle \|____\|<br>7. Passing through cloth \|____\|<br>8. Other (specify_____) \|____\| |
| 4.3.1 | **Where do you store water for drinking?**<br>1. Open pot / Jerrican \|____\|<br>2. Closed pot / Jerrican<br>3. Any container |
| 4.4 | **How much water did your household use YESTERDAY (excluding for animals)?**<br>*(Ask the question in the number of 20 liter Jerrican and convert to liters & write down the total quantity used in liters)* \|_____\| |
| 4.5 | **Do you pay for water?**<br>1. Yes \|____\|<br>2. No **(If No skip to Question 4.6)** |
| 4.5.1 | **If yes, how much 20ltr Jerrican (***per 20 liters jerrican***) _____ksh/20ltrs** |
| 4.6 | **When do you wash your hands? (MULTIPLE RESPONSE-** (Use 1 if "Yes" and 2 if "No")<br>1. Does not wash hands \|____\|<br>2. Does not wash hands at any special time, when they are dirty. \|____\|<br>3. Before latrine and other times not relevant specify… \|____\|<br>4. After toilet \|____\|<br>5. Before cooking \|____\|<br>6. Before eating \|____\|<br>7. Before breastfeeding \|____\|<br>8. After taking children to the toilet \|____\|<br>9. After handling animals \|____\| |
| 4.6.1 | **If the mother washes her hands, then probe: What do you use to wash your hands?**<br>1. Only water<br>2. Soap<br>3. Soap when I can afford it \|____\|<br>4. Ashes |
| 4.7 | **Where do members of your household relieve themselves?**<br>1. In the bushes, open defecation<br>2. Neighbor or shared traditional pit latrine<br>3. Own traditional pit latrine<br>4. Neighbors or shared ventilated improved pit latrine<br>5. Own ventilated improved pit latrine |
| 4.71 | **If latrine used, is it clean (**by observing for example whether feces present on the slab or round latrine)?<br>1. Yes \|____\|<br>2. No<br>3. Refused the request for observation |
| 4.72 | **How many other household use this latrine?**<br>1. None \|____\|<br>2. shared with _____ number of households |
| 4.73 | **If latrine is used, check on type of slab**<br>1. Traditional slab with wood or wood covered in clay or other material \|____\|<br>2. Cement slab |

| | |
|---|---|
| 4.8 | **Does this household have a mosquito net?**<br>1. Yes \|____\|<br>2. No (if No, skip to Question 4.8) |
| 4.8.1 | **If the household owns mosquito net, who slept under the mosquito net last night? (***Probe-enter all responses mentioned* **(Use 1 if "Yes" and 2 if "No")**<br>1. Children <5 years old \|____\|<br>2. Children between 5 and 18 years old. \|____\|<br>3. Adult females. \|____\|<br>4. Adult males \|____\|<br>5. Every body \|____\|<br>6. Nobody uses \|____\| |
| 4.8.2 | **If the household owns mosquito net (s), when did you last treat it?**<br>1. Less than one month ago<br>2. Between one and six months ago \|____\|<br>3. More than six months ago<br>4. Cannot remember |

| **5. CROP FARMING** | | |
|---|---|---|
| **5.1** | **Did you plant any crops during the most recent planting season?**<br>1. Yes<br>2. No (if No, skip to question ) | \|____\| |
| **5.2** | **How did you water your crops?**<br>1. Rain-fed only<br>2. Irrigated (Riverine/pool etc) | \|____\| |

| | **5.3 How much (in acres) did you plant for each crop type during the most recent planting season?** | **5.4 How much did you harvest (during the most recent harvest) in KG?** *Determine appropriate local measure for conversion* | **5.5 How did this compare to the previous harvest** (Same, More, Less)? | **5.6 Main cause for change** (see codes below) |
|---|---|---|---|---|
| **A:** Maize | | | Same ☐ | |
| | | | More ☐ | Why? \|___\| |
| | | | Less ☐ | Why? \|___\| |
| **B:** Sorghum | | | Same ☐ | |
| | | | More ☐ | Why? \|___\| |
| | | | Less ☐ | Why? \|___\| |
| **C:** Green Gram | | | Same ☐ | |
| | | | More ☐ | Why? \|___\| |
| | | | Less ☐ | Why? \|___\| |
| **D:** Cowpea | | | Same ☐ | |
| | | | More ☐ | Why? \|___\| |
| | | | Less ☐ | Why? \|___\| |
| **E:** Pigeon Pea | | | Same ☐ | |
| | | | More ☐ | Why? \|___\| |
| | | | Less ☐ | Why? \|___\| |
| **F:** Bean | | | Same ☐ | |
| | | | More ☐ | Why? \|___\| |
| | | | Less ☐ | Why? \|___\| |
| **G:** Potato/ | | | Same ☐ | |

| | | | | |
|---|---|---|---|---|
| Cassava | | | More ☐ | Why? \|___\| |
| | | | Less ☐ | Why? \|___\| |
| **H:** Vegetables | | | Same ☐ | |
| | | | More ☐ | Why? \|___\| |
| | | | Less ☐ | Why? \|___\| |
| **I:** Other | | | Same ☐ | |
| | | | More ☐ | Why? \|___\| |
| | | | Less ☐ | Why? \|___\| |

| | | |
|---|---|---|
| **5.7** | **How many months did/will your most recent harvest last for household consumption?** | \|____\| |
| **5.8** | **How did you use your most recent harvest?** *(Use proportional piling to get percentages)*<br>A. Household consumption<br>B. Sold<br>C. Gift (*to relatives or friends*)<br>D. Spoilt/unusable (e.g. *aflatoxin, pests, other contamination*)<br>E. Other | \|____\| |

| **6. Livestock Ownership** | | |
|---|---|---|
| **6.1** | **Does the household currently own livestock (not including chickens)?**<br>1. Yes<br>2. No (if No, skip to question ) | \|____\| |
| **6.2** | **How many livestock of each type does your household own?**<br>a. Cattle_____<br>b. Goats _____<br>c. Sheep _____<br>d. Donkey _____<br>e. Chicken_____ | [____]<br>\|____\|<br>\|____\|<br>\|____\|<br>\|____\| |
| **6.3** | **What is the average distance you/other HH members have had to travel to access pasture and/or forage and water for your livestock during the last 30 days (in km)?** *(An average of the daily distance covered)*<br>1. Pasture<br>2. Forage<br>3. Water | <br>\|____\|<br>\|____\|<br>\|____\| |

**7. Dietary Diversity, Food Sources and Coping Strategies**

| **CROP PRODUCTION CHANGES - CODES** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **MORE** | 1. More/Better Rainfall | 2. More Seed Available | 3. Better Quality Seed | 4. Grew Drought Tolerant Varieties | 5. More Land Cultivated | 6. Access to/increased access to draught power | 7. Other |
| **LESS** | 1. Reduced Rainfall/Poor Distribution | 2. Less Seed Available | 3. Poor Quality Seed | 4. Crops were Not Drought Tolerant Varieties | 5. Less Land Cultivated | 6. No Draught Power Accessible | 7. Other |

| | | |
|---|---|---|
| **7.1** | **Did the household eat the following yesterday during the day or night?**<br>**(**WRITE 1 beside the food if someone consumed it and 0 if no one did**)**<br>1. Any "*ugali*", pasta, rice, bread, or any food made from maize, sorghum, millet, wheat?<br>2. Any potatoes, yams, beets or other foods from roots or tubers?<br>3. Any vegetables?<br>4. Any fruits?<br>5. Any eggs?<br>6. Any meats (camel, cattle, chicken, poultry/fowl, sheep, lamb, and organ meats (heart, liver, kidney, etc)?<br>7. Any fish or dried fish?<br>8. Any foods made from beans, peas, lentils, or nuts?<br>9. Any milk, yogurt, cheese, or other milk product?<br>10. Any foods made with oil, fat, ghee, or butter?<br>11. Any sugar or honey?<br>12. Any other condiments (coffee, pilipili, tea)? | <br><br>☐<br>\|____\|<br>\|____\|<br>\|____\|<br>\|____\|<br>\|____\|<br>\|____\|<br>\|____\|<br>\|____\|<br>\|____\|<br>\|____\|<br>☐ |
| **7.2** | **What have been the sources of food for your household in the last 30 days? What percentage of the total came from each source?**<br>*(use proportional piling to determine the percentages)*<br>**1.** Own farm production (crops, vegetable, fruit)<br>**2.** Own livestock production (livestock products – e.g. milk, eggs)<br>**3.** Own livestock production (meat)<br>**4.** Purchase<br>**5.** Credit<br>**6.** Food aid<br>**7.** Gift<br>**8.** Other (specify) | <br>_____<br>_____<br>_____<br>_____<br>_____<br>_____<br>_____<br>_____ |
| **7.3** | **In the last 30 days have any household members done any one of the following?**<br>(Use the codes: 0= Never, 1= Rarely, 2= Frequently, 3= Always)<br>1. Skip meals (excluding Ramadan)<br>2. Reduce the size of meals<br>3. Eat less preferred foods (e.g. wild foods etc.)<br>4. Borrow (food/money to purchase food) from relatives<br>5. Restrict adult food intake to allow children to eat<br>6. Send children to eat with relatives<br>7. Other (specify) | <br>\|____\|<br>\|____\|<br>\|____\|<br>\|____\|<br>\|____\|<br>\|____\|<br>\|____\| |

| 8. Household Income & Expenditure | |
|---|---|
| 8.1 | **Please list all of the sources of income for your household in the last 30 days. What percentage of your income came from each source?**<br>*(Use proportional piling to calculate the percentages)*<br>1. Agricultural / Horticulture products sale \|_____\|<br>2. Livestock sales \|_____\|<br>3. Livestock products sales (milk, eggs, honey, hide, skin etc) \|_____\|<br>4. Small business (shop) \|_____\|<br>*5.* Petty trade *(on adhoc basis)* \|_____\|<br>6. Bush products sales (charcoal, firewood, etc.) \|_____\|<br>7. Alcohol sales \|_____\|<br>8. Food aid sales \|_____\|<br>9. Unskilled wage labour \|_____\|<br>10. Skilled wage labour \|_____\|<br>11. Remittances from family/relatives \|_____\|<br>12. Salary \|_____\|<br>13. Loans/credit \|_____\|<br>14. Barter/exchange<br>15. Other (Specify)_____ |

| 8.2 What has the household spent on the following (only if bought with cash or on credit/bartered) IN THE LAST 30 DAYS | Percentage of expenditure on each item/type (use proportional piling to calculate percentages) | 8.3 How Item was Purchased (MAIN) (1=Cash; 2=Credit; 3=Bartered item; 4=Other; 0=not purchased) |
|---|---|---|
| Cereals (Maize, rice etc) | | |
| Vegetables & fruit | | |
| Pulses (beans and peas) | | |
| Meat, Fish, Egg | | |
| Cooking oil, fats | | |
| Milk & milk products | | |
| Sugar | | |
| Salt | | |
| Coffee/Tea | | |
| Water | | |
| Medical expenses | | |
| Rent (house or land) | | |
| School fees/expenses | | |
| Transportation | | |
| Fuel | | |
| HH items & clothing | | |
| Alcohol | | |
| Agricultural inputs | | |
| Livestock medication | | |
| Debt repayments | | |
| Other (specify) | | |



| 9. SHOCKS AND DISASTER RISK REDUCTION |
|---|

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **9.1** | **In the last 3 months, has the household been negatively affected by any shocks? (circle response)** | | | 1 | **Yes** | 2 | **No** | |
| **9.2** | If yes, please rank the top three in order of importance. Write *1=highest, 2=second highest, 3=third highest (If there were less than three, just rank the highest, second highest etc)* | | | | | | | |
| | |__| | **A.** Reduced water availability | |__| | **B.** Reduction of pasture/ forage availability | |__| | **C.** Unusually high level of livestock death | |__| | **D.** Unusually high level of livestock diseases |
| | |__| | **E.** Low level of livestock birth | |__| | **F.** Unusually high prices for food | |__| | **G**. Unusually low prices for livestock | |__| | **H.** Unusually high level of human disease/illness |
| | |__| | **I.** Reduced income | |__| | **J.** Reduced /No access to credit | |__| | **K.** Reduced casual/wage earning opportunities | |__| | **L.** Crop failure |
| | |__| | **M.** Unusually low crop sale prices | |__| | **N.** Unusually high level of crop disease/ infestation | |__| | **O.** Unusually high levels of post-harvest loss (incl. aflatoxin) | |__| | **P**. Other |

For the 2 first main shocks above, please complete the following table using the codes. Please be consistent in the ranking, starting with the letter listed above for the rank 1, than rank 2

| **Problem**<br><br>**(ranked as above)** | **9.3 Did the Shock create a decrease in your ABILITY to have enough food to eat**<br>1=Yes<br>2=No | **9.4 Did the Shock create a decrease in income or a loss of assets?**<br>1=Yes<br>2=No | **9.5 What is/did the household MAINLY do to cope with/manage the impact of the shock?**<br>*Use the codes in the table below* | **9.6 Has the household recovered from the impacts of the shock?**<br><br>1=Yes<br>2=No<br>3 = Partially |
|---|---|---|---|---|
| 1. \|___\| | \|___\| | \|___\| | \|___\| | \|___\| |
| 2. \|___\| | \|___\| | \|___\| | \|___\| | \|___\| |

| | | | | |
|---|---|---|---|---|
| | 1. Reduce amount eaten/eat less | 2. Ask support (money or other) from Family/Friends (GIFT) | 3. Sold small animals – poultry, goats, sheep | 4. Begging |
| 5. Spend less on food | 6. Skipped days without eating | 7. Ask support (money or other) from Family/ Friends (BORROW) | 8. Sold large animals – camel, cattle | 9. Move to another location |
| 10. Spend less on other non-food items | 11. Additional HH members migrated | 12. Purchase on credit / loan | 13. Remove children from school | 14. Alternative income source |
| 15. Spend more money than usual on water | 16. Spent savings | 17. Sold HH articles | 18. Rely on food aid | 19. Other (describe) |

## 9.9 Market Assessment Data

| Commodity | Retail Unit | March 2011 | March 2012 |
|---|---|---|---|
| **ESSENTIAL FOOD ITEMS** | | | |
| Maize (dry) | 1 kg | 26.00 | 37.2 |
| Maize (flour) | 1 kg | 45.83 | 90 |
| Rice | 1 kg | 69.17 | 89 |
| Wheat (wheel) flour | 1 kg | 63.33 | 68 |
| Beans | 1 kg | 70.83 | 48 |
| Potatoes | 1 kg | 61.67 | 65 |
| Sugar | 1 kg | 93.67 | 99 |
| Cooking Oil (250 ml) | 1 glass | 36.33 | 53 |
| Cowpeas | 1 kg | 58.33 | 124 |
| Cow Milk (250 ml) | 1 glass | 11.67 | 8.8 |
| Water | 20 liter | 5.50 | 4.2 |
| Salt (50 gram) | 1 packet | 6.00 | 20 |
| Tea (100 gram) | 1 packet | 50.00 | 46 |
| **MEAT** | | | |
| Cow | 1 kg | 270.00 | 328 |
| Goat | 1 kg | 323.33 | 368 |
| Chicken | Per head | 483.33 | 590 |
| **LIVESTOCK** | | | |
| Cattle – Male (3 Yrs Old) | Per Head | 8083.33 | 40260 |
| Cattle – Female (3 Yrs Old) | Per Head | 7083.33 | 13180 |
| Goat – Male (Matured) | Per Head | 3900.00 | 3880 |
| Goat – Female (Matured) | Per Head | 3366.67 | 3320 |
| Sheep – Male (Matured) | Per Head | 3166.67 | 3580 |
| Sheep – Female (Matured) | Per Head | 2566.67 | 3020 |
| **VEGETABLE AND FRUITS** | | | |
| Onion | 1 kg | 98.33 | 7.5 |
| Tomato | Per Piece | 4.67 | 5.5 |
| Avocado | Per Piece | 12.50 | 18 |
| Pawpaw | Per Piece | 43.33 | 34 |
| Banana | Per Piece | 5.00 | 7.4 |
| Mango | Per Piece | 17.50 | 21 |
| Cabbage | Per Piece | 39.17 | 86 |
| Sugar Cane | Per Piece | 25.00 | 19 |
| Spinach | 1 kg | 10.00 | 8 |
| Carrot | Per Piece | 4.33 | 6 |
| Sorghum(Muvya) | 1 kg | | 80 |
| Green grams (Ndengu) | 1 kg | | 70 |
| Goat Milk | 1 glass | | 15 |
| Hot Peper (Chillies) | Per Piece | | 2 |

## 9.10 Plausibility report

| INDICATOR | SURVEY VALUE | ACCEPTABLE VALUE/RANGE | INTERPRETATION/ COMMENT |
|---|---|---|---|
| **Digit preference - WEIGHT** | 4 | (0-5 good, 5-10 acceptable, 10-20 poor and > 20 unacceptable) | EXCELLENT |
| **Digit preference - HEIGHT** | 4 | | EXCELLENT |
| **WHZ ( Standard Deviation)** | 0.98 | 0.8 – 1.2 | ACCEPTABLE |
| **WHZ (SKEWNESS)** | - 0.14 | If between minus 1 and plus 1, the distribution can be considered symmetrical. | Symmetrical |
| **WHZ (KURTOSIS)** | - 0.18 | If less than an absolute value of 1 the distribution can be considered as normal. | Normal distribution |
| **PERCENTAGE OF FLAGS** | WHZ: 0.6 %, HAZ: 2.0 %, WAZ: 0.6 % | Less than 3% - 5% of the entire sample | Acceptable range |
| **AGE DISTRIBUTION (%)** | | | |
| **Group 1:** 6-18 months | 28.1 | 20% - 25% *(Slight over representation )* | Recall (calendar of event) was used in some instances to estimate the ages of children 19.2% of ages were by recall |
| **Group 2:** 19-29 months | 19.9 | 20% - 25% | |
| **Group 3:** 30-41 months | 21.7 | 20% - 25% | |
| **Group 4:** 42-53 months | 21.3 | 20% - 25% | |
| **Group 5:** 54-59 months | 9.0 | 10.0% | |
| **Age ratio of 6-29 MONTHS to 30-59 MONTHS** | 0.92 | The value should be around 1.0 | ACCEPTABLE |
| **SEX RATIO** | 1.08 | 0.8 – 1.2 | ACCEPTABLE |
| **SEX RATIO p VALUE** | p-value = 0.372 | | BOYS and GIRLS are equally represented |
| **OVERAL SURVEY QUALITY** | 3.0 % | 0-5 = Excellent; 5-10= Good | EXCELLENT |
| **POISSON DISTRIBUTION** | **GAM:** ID=1.53 (p=0.020) **SAM:** ID=1.00 (p=0.469 | **If the p value is between 0.05 and 0.95 the cases appear to be randomly distributed among the clusters,** if ID is higher than 1 and p is less than 0.05 the cases are aggregated into certain cluster (there appear to be pockets of cases). If this is the case for Oedema but not for WHZ then aggregation of GAM and SAM cases is likely due to inclusion of oedematous cases in GAM and SAM estimates. | Severe cases seem to be randomly distributed amongst clusters while there seems to be pockets of moderately malnourished cases |