# INTEGRATED SURVEY

# GARBATULLA DISTRICT, ISIOLO COUNTY, KENYA

# MAY 2013

FUNDED BY: UNICEF

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**ABBREVIATIONS**

| | |
|---|---|
| **ACF-USA** | Action Against Hunger |
| **ASAL** | Arid and Semi-Arid Land |
| **CI** | Confidence Interval |
| **CLTS** | Community Led Total Sanitation |
| **NDMA** | National Drought Management Authority |
| **EBF** | Exclusive Breastfeeding |
| **ENA** | Emergency Nutrition Assessment |
| **EWS** | Early Warning System |
| **FAA** | Food for Assets |
| **FGD** | Focus Group Discussion |
| **GAM** | Global Acute Malnutrition |
| **GFD** | General Food Distribution |
| **GOK** | Government of Kenya |
| **HINI** | High Impact Nutrition Interventions |
| **HDDS** | Household Dietary Diversity Score |
| **NGO** | Non-Governmental Organization |
| **IYCN** | Infant and Young Child Nutrition |
| **KCSE** | Kenya certificate of secondary education |
| **KEMSA** | Kenya Medical Supply Agency |
| **MAM** | Moderate Acute Malnutrition |
| **MCH** | Mother Child Health |
| **MOH** | Ministry of Health |
| **MTMSGs** | Mother to Mother Support Groups |
| **MUAC** | Mid Upper Arm Circumference |
| **OPV** | Oral Polio Vaccine |
| **OTP** | Outpatient Therapeutic Program |
| **PPS** | Population Proportion to Size |
| **RC** | Reserve Cluster |
| **SAM** | Severe Acute Malnutrition |
| **SMART** | Standardized Monitoring and Assessment of Relief and Transitions |
| **UNICEF** | United Nations Children's Fund |
| **W/H** | Weight for Height |
| **WFP** | World Food Program |
| **WHO** | World Health Organization |

## 1. EXECUTIVE SUMMARY

Garbatulla district lies in Isiolo County in the arid and semi-arid lands of Kenya. This area is normally characterized by recurrent droughts, low and erratic rainfall patterns. A survey was undertaken in each of the two districts using Standardised Monitoring in Relief and Transitions (SMART) methodology in May 2013. Other data sets on probable immediate and underlying causes of malnutrition were also gathered during the survey to include Maternal, Infant and Young Child Nutrition (MIYCN), health, Water, Sanitation and Hygiene (WASH), and food security and livelihood (FSL).

**SUMMARY OF KEY FINDINGS FOR GARBATULLA DISTRICT**

A total of 457 children aged 6-59 months were assessed for their nutritional status through anthropometric measurements from 429 sampled households. Table 1 highlights results obtained in May 2013 for nutrition and some health indicators and compares them with former results obtained in the same district since May 2010. Seasonal comparability indicates that malnutrition rates have significantly declined since May 2011. The survey findings triangulated with secondary information suggest several factors which could be related to the improved nutrition status: favourable climatic conditions, improved household food access and availability, significant decrease on diarrheal incidences with improved micronutrient supplementation, relatively improving hygiene and sanitation practices and concerted efforts by humanitarian agencies and government of Kenya (GOK) on ground.

**Table 1:** Summary of Nutrition and Health indicator results, Garbatulla District, May 2010 to May 2013. Results presented in brackets are expressed with 95.0% confidence interval (CI).

| | | | SMALL SCALE SURVEYS | | | SMART SURVEY |
|---|---|---|---|---|---|---|
| **INDEX** | **INDICATOR** | | **MAY 2010** | **MAY 2011** | **MAY 2012** | **MAY 2013** |
| WHO 2006 | *WHZ- scores* | **Global Acute Malnutrition** *Weight for height< -2 z and/or oedema* | 14.0% (10.4 -18.7) | 21.6% (17.0 - 27.1) | 14.5% (10.3 – 20.1) | **8.6% ( 6.0 - 12.3)** |
| | | **Severe Acute Malnutrition;** *Weight for height < -3 z and/or oedema* | 1.4% (0.6 - 3.2) | 4.3% (2.1 - 8.6) | 2.3% (1.2 - 4.4) | **1.3% ( 0.5 - 3.6)** |
| | *HAZ- scores* | **Stunting** *Height for age <-2 z-score* | 21.6% (17.3 - 26.7) | 15.4% (11.6 - 20.0) | 16.9% (12.6-22.4) | **18.5% (14.7 - 23.0)** |
| | *WAZ-scores* | **Underweight** *Weight for age <-2 z-score* | 18.3% (14.5 - 22.8) | 22.7% (17.5 - 28.8) | 27.0% (21.2 -33.7) | **19.3% (15.1 - 24.3)** |
| | MUAC | **Global Acute Malnutrition:** *MUAC <125 mm or oedema* | | 6.3% (3.9 – 10.0) | 5.8% (3.7 - 8.8) | **2.6% ( 1.4 - 5.0l)** |
| | | **Severe Acute Malnutrition:** *MUAC <115 mm or oedema (<115mm)* | | 0.3% (0.0 - 2.3) | 1.0% (0.3 - 3.0 ) | **0.2% ( 0.0 - 1.7)** |
| Measles immunization coverage | | By card | N/A | 66.8% | 67.4% | **66.0%** |
| Vitamin A coverage | | 6-11 months ; At least once | N/A | 68.7% | 75.0% | **92.4%** |
| | | 12-59 months; once | N/A | 58.7% | 39.2% | **42.2%** |
| | | 12- 59 months; at least twice | N/A | 16.3% | 50.5% | **51.7%** |

## 2. INTRODUCTION

Garbatulla is a district in Isiolo County, Kenya. It is the arid and semi-arid rural area inhabited by the Borana community. The major livelihood zone is pastoralist.

Several humanitarian organizations implement various interventions in Garbatulla district. Monitoring of these interventions and their impact has been of priority through various methods including nutrition surveys. These have been implemented since 2010 by ACF in close collaboration with the Ministry of Health (MOH), Ministry of Agriculture (MOA) and National Drought Management Authority (NDMA). It is important to note that ACF also runs a surveillance system (based on small scale survey, SSS) with rounds of data collection in September and February.

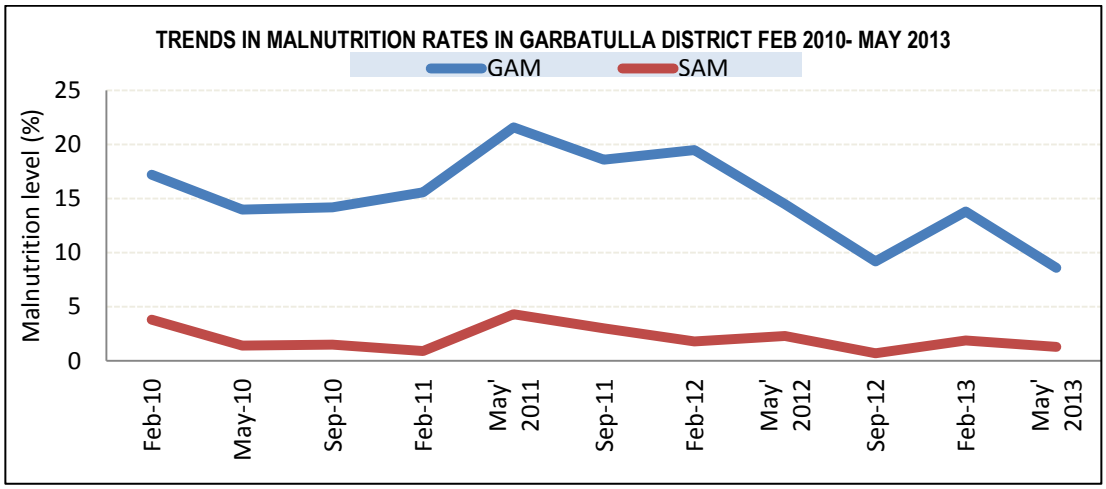



**Figure 1**: Malnutrition trends in Garbatulla District, February 2010 - May 2013[1]

The malnutrition trends illustrated in figure 1 indicates that Garbatulla district has progressed from emergency phase in May 2011 to alert levels in 2012 to poor levels in May 2013.

This report presents key findings obtained from a nutrition survey (SMART methodology) carried out in May 2013. It is important to note that in the past SMART surveys have usually been conducted at the peak of the dry season (September). However, this survey was implemented in May 2013. The survey timing was reviewed based on the need to have county status[2] findings in support for planning purposes. Secondly, experience from the past surveys has shown that May is the most crucial month in the assessment of consequences of both short and long rains; thus ideal for prompt planning[3] for any humanitarian assistance needed during the onset of the long dry season.

[1] Graph includes both round of small scale survey (Surveillance system) and Nutrition SMART survey database
[2] In May 2013, the three surveys at district level were done for the entire county
[3] Note that those survey findings were disseminated at county and national level within 2 weeks after end of data collection

## 3. SURVEY OBJECTIVES

The main objective of the survey was to estimate the prevalence of acute malnutrition amongst children aged 6-59 months in Garbatulla district, while the specific objectives were:

- To determine the prevalence of acute and chronic malnutrition in children aged 6-59 months;
- To determine the immunization coverage for measles, Oral Polio Vaccines (OPV type 1 and 3), and vitamin A supplementation in children aged 6-59 months;
- To estimate the nutritional status of female caregivers (aged 15-49 years) using MUAC measurements, and estimate coverage of iron folic acid supplementation for 90 days during pregnancy in women of reproductive age.
- To collect information on possible underlying causes of malnutrition such as household Food Security and Livelihoods (FSL), maternal and child health and care practices, Infant and Young Children Nutrition (IYCN) and water, sanitation, and hygiene practices (WaSH).

## 4. METHODOLOGY

### 4.1. Sample Size

Following the SMART methodology as stipulated in the guidelines for conducting SMART surveys in Kenya, a two-stage sampling design was applied for the survey using ENA for SMART November 2012 software and the parameters used are listed in Table 1. The sample size calculator for IYCN indicators was used to determine sample size for IYCN indicators (Table 1).

### 4.2. Sampling procedure; selecting clusters, households and children

33 clusters were sampled using Probability Proportional to population Size (PPS), with population estimates obtained from Kenya Bureau of Statistics (Census 2009).

For IYCN indicators, the number of households (HHs) to be included in the survey was calculated using the indicator with the highest sample size, i.e., minimum meal frequency (Table 2) and 22 households per cluster were assessed. For each of the 33 clusters sampled, households were sampled by use of simple random sampling. All the selected HHs were interviewed for IYCN questionnaire with the anthropometric/household questionnaire being administered in the first 13 households (Table 2).

**Table 2:** Sampling methodology

| Data entered on ENA software | Anthropometric Survey | RATIONALE |
|---|---|---|
| Estimated prevalence of GAM | 16.9 | Highest GAM CI in March 2013 |
| Desired precision | 4.1 | Based on previous survey results |
| Design effect | 1.2 | Design effect obtained in February 2013 SSS |
| Average household size | 6 | Results obtained from September 2012 SMART |
| Percent of under five children | 18.4 | Population estimate from census report 2009 |
| Percent of non-respondent | 1 | To cater for any unforeseen circumstances |
| Households to be included | **426** | **33 CLUSTERS X 13 households** |

| IYCN SAMPLING | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Estimated prevalence (SMART 2011)** | **± desired precision** | **Design effect** | **Sample size in number of children** | **Average HH[4] size** | **% children under 5** | **% non-response HH** | **HH to be included** |
| **Exclusive breastfeeding** | 67.7 | 8 | 1.5 | 208 | | | | |
| **Timely initiation of breastfeeding** | 48.4 | 8 | 1.5 | 239 | 6 | 18.4 | 1 | 560 |
| **Minimum dietary diversity** | 57.1 | 8 | 1.5 | 222 | 6 | 18.4 | 1 | 732 |
| **Minimum meal frequency** | 55.2 | 8 | 1.5 | 198 | 6 | 18.4 | 1 | 739 |

**Table 3:** summary of sampling criteria

| Indicator | Minimum no. of children expected per cluster | Sampled households to be visited per cluster |
|---|---|---|
| Anthropometric/household survey | N/A | 13 |
| EBF | 6 (0-5 months) | 22 |
| Other IYCN Indicators | 7 (6-23 months) | 22 |

[4]Household

### 4.3. Case definitions and inclusion criteria

Data were gathered from the sampled households to make inferences with regard to the survey objectives between 24th and 29th May 2013. The following information was gathered:

**Anthropometric Indicators**: The following data were collected from all eligible children aged 6-59 months:

- **Age**: The child's immunization card, birth certificate or birth notification was the primary source for this information. In the absence of these documents, a local calendar of events developed with community members, enumerators and key informants was used to estimate age.

- **Sex:** This was recorded as either 'f' for female or 'm' for male.

- **Weight**: Digital standing scale was used to measure the children's weight. In order to enhance quality of data and accuracy in measurements, all scales were checked daily using a standard weight to confirm measurements and any faulty scales replaced. All scales were calibrated to zero before taking any measurements

- **Height:** Recumbent length was taken for children less than 2 years of age while those greater or equal to 2 years of age were measured standing up using a height board.

- **MUAC**: Mid Upper Circumference (MUAC) was measured on the left arm, at the middle point between the elbow and the shoulder, while the arm was relaxed and hanging by the body's side. MUAC was measured to the nearest mm. In the event of a disability the right arm was used or for those who are left-handed, MUAC was taken on the right arm. Maternal MUAC tapes were used to measure MUAC in women of reproductive age.

- **Bilateral Oedema:** This was assessed by the application of moderate thumb pressure for at least 3 seconds to both feet.

- **Vaccination**: **Measles:** The status of this was determined amongst all children aged 9-59 months. The child's vaccination card was used as a source of verification. In circumstances where this was not available, the caretaker was probed to determine whether the child had been immunized against measles or not. All children with confirmed immunization (by date) on the vaccination card, the status were recorded as "1" (Card) otherwise as "3" (Not immunized). Oral confirmation from the mother without proof of card was recorded as "2" (Recall). If the caregiver was not sure about the status, was recorded''4'' (Do not know). Oral Polio Vaccines (**OPV1 and OPV3) status** was calculated for all children aged 0-59 months

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

- **De-worming:** Determined by whether the child had received drugs for intestinal worms in the last 6 months. This was recorded as "0" for No, "1" for Yes by card, ''2'' for Yes by recall and ''3'' for Do not know.

- **Vitamin A coverage**: This was determined by the number of times the eligible child had received vitamin A in the past year. The response received (number of times) was probed and eventually recorded on the anthropometric questionnaire.

- **Morbidity:** This was gathered over a two week recall period by interviewing/probing the mothers/caretakers of the target child and eventually determined based on the respondent's recall. This information was however not verified by a clinician.

**Other data sets**: Other variables related to High Impact Nutrition Intervention (HINI), WASH, FSL and IYCN were gathered.

### 4.4. Questionnaire, training and supervision

**Questionnaire**

The questionnaire used to collect nutrition, health, WASH and FSL information was the same as one used in the past rounds of surveys and was pre-tested before the actual data collection (see annex 2&3). Focus group discussions and observations were used to triangulate the survey findings.

**Survey teams and Supervision**

The survey team was composed of 6 team leaders, 24 enumerators and 2 data entry clerks eventually forming 6 teams.

The team leaders were relevant Government of Kenya (GOK) partners (Ministry of health, ministry of Agriculture and National Drought Management Authority) and ACF staff. Enumerators and data entry clerks were drawn from the community (with Grade C+ and above in KCSE results). Coordination and supervision of the entire process was led by the District Nutrition Officer under technical support from ACF Staff. Quality control of the entire survey process was undertaken with the following steps put in place in order to achieve acceptable data for both internal and external use (see annex 1 for plausibility report, and Table 5).

- Validation of the survey planning and methodology by the Nutrition Information Working Group (NIWG).
- Survey team training with emphases on standardization and pilot test.
- Daily data entry and primary analysis of all datasets.
- Daily supervision and feedback to the teams.

**Training**

The survey team supervisors were trained on SMART methodology for four days (14th to 17th May 2013) in Isiolo by Master SMART trainers. The skills gained were utilized in training the survey enumerators for four days at Alpha Raha children's Centre in Garbatulla from 20th to 23rd May 2013. The enumerator training mainly covered the survey procedures, standardization test (10 children) and pilot test (4 households per team, see annex 4 for training schedule).

### 4.4. Data Entry and Analysis

Anthropometric measurements data was entered on daily basis by the survey supervisors and analysed using ENA for SMART software November 2012 version with reference to WHO 2006 standards. SMART flags (±3 SD of WHZ from the observed WHZ mean) were excluded from the final analysis. All other data were entered by the data entry clerks and analysed using SPSS Version 19.0 and Microsoft Excel. The following are definitions used during analysis:

**Weight for height index**

This was estimated from a combination of the weight for height (WFH) index values combined with the presence of oedema. This index was expressed in WFH indices in Z-scores (or WHZ), according to WHO 2006 reference standards.

**Z-Score:**

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

**MID UPPER ARM CIRCUMFERENCE (MUAC)**

MUAC measurements were undertaken to determine the nutrition status of children and of their mothers (or caretakers) of reproductive age (15-49) years in the sampled household. During the survey, all severe and moderately malnourished children as per MUAC cut offs (Table 4) were referred to nearby facilities.

**Table 4:** Threshold values of the anthropometric measurements of MUAC

| MUAC Guideline | Interpretation |
|---|---|
| MUAC<115mm and/or bilateral Oedema | Severe acute malnutrition(SAM) |
| MUAC >=115mm and <125mm *(no bilateral oedema)* | Moderate acute malnutrition(MAM) |
| MUAC >=125mm and <135mm *(no bilateral Oedema)* | At risk of acute malnutrition |
| Maternal MUAC Cut-Offs | |
| MUAC < 21cm | Malnourished |
| MUAC ≥21cm≤21.5cm | At risk |
| MUAC >21.5cm | Normal |

**Infant and young child nutrition (IYCN)**

- Timely initiation of breast feeding: *Proportion of children born in the last two years put to breast within an hour of delivery*
- Exclusive breastfeeding rates: *Proportion of children less than 6 months exclusively fed on breast milk in 24 hour recall period*
- Minimum Dietary Diversity: *Proportion of children aged 6 to 23 months fed on minimum number of food groups in 24 hour recall period*
- Minimum meal frequency: *Proportion of children aged 6 to 23 months received minimum number of meals in 24 hour recall period*
- Minimum acceptable diet: *Proportion of children aged 6 to 23 months received minimum number of food groups and minimum number of meals in 24 hour recall period*

# 5. FINDINGS

**Data quality analysis**

The data quality analysis is tabulated in Table 5 and in appendix 1 (plausibility check on anthropometric results). The design effect for this survey was 1.26 (DEFF=1.26) indicating a relative homogeneous group with regards to global acute malnutrition.

**Table 5**: Summary of overall data quality from plausibility check

| CRITERIA | Missing/ flagged data | Overall sex ration | Overall age distribution | Digit pref. score Weight | Digit pref. score Height | Standard deviation WHZ | Skewness WHZ | Kurtosis WHZ | Poisson distribution WHZ | Overall score WHZ |
|---|---|---|---|---|---|---|---|---|---|---|
| SCORE | 0 (1.3%) | 0 (p=0.743) | 0 (p=0.260) | 0 (4) | 0 (6) | 0 (0.99) | 0 (0.20) | 0 (0.10) | 0 (p=0.091) | 2% |
| Interpretation | Excellent | Excellent | Excellent | Excellent | Good | Excellent | Excellent | Excellent | Excellent | Excellent |

## 5.1. ANTHROPOMETRY/NUTRITION

### 5.1.1. Distribution by age and sex

A total of 451 children were included in the final analysis for the anthropometric measurements as six data sets were out of range. Results obtained showed an overall sex ratio of 1.0 which fell within the acceptable rage of 0.8- 1.2 (Table 6). This indicates that boys and girls were generally equally represented. Overall, there was under representation of the older children. This could probably be attributed to age recall (for 32% of surveyed children, age was determined with the use of a calendar of local events).

**Table 4:** Distribution of age and sex of sample

| MONTHS | Boys | | Girls | | Total | | Ratio |
|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | Boy: girl |
| **6-17** | 64 | 50.0 | 64 | 50.0 | 128 | 28.0 | 1.0 |
| **18-29** | 53 | 50.0 | 53 | 50.0 | 106 | 23.2 | 1.0 |
| **30-41** | 48 | 52.2 | 44 | 47.8 | 92 | 20.1 | 1.1 |
| **42-53** | 37 | 42.5 | 50 | 57.5 | 87 | 19.0 | 0.7 |
| **54-59** | 23 | 52.3 | 21 | 47.7 | 44 | 9.6 | 1.1 |
| **Total** | 225 | 49.2 | 232 | 50.8 | 457 | 100.0 | 1.0 |

### 5.2.2. Distribution of Acute Malnutrition in WHZ-score and by sex, WHO Standards

The majority (91.4%) of children aged between 6 to 59 months in Garbatulla district had normal nutrition status. Among malnourished children, boys were found to be more malnourished than girls. This difference was also observed in small scale SMART survey (Surveillance system) results in February 2013, first time since February 2010. Due to favourable climatic conditions in 2013, minimal livestock movements have been experienced in Garbatulla district. Through observation and informal interviews, it was identified that the boy child is given the responsibility of grazing the livestock throughout the day and come home later in the evening; most of times skipping lunch meals. This could partially contribute to the high rates of malnutrition in boys (compared to girls) with further investigations underway to establish more root causes of the significant difference.

**Table 5:** Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex. Results shown in bracket are expressed with 95% confidence interval (CI).

| | **All** n = 451 | **Boys** n = 220 | **Girls** n = 231 |
|---|---|---|---|
| **Prevalence of global acute malnutrition** (<-2 z-score and/or oedema) | **8.6%** (6.0 - 12.3) | 13.2% (8.7 - 19.5) | 4.3% (2.2 - 8.3) |
| **Prevalence of moderate acute malnutrition** (<-2 z-score and >=-3 z-score, no oedema) | **7.3%** (5.1 - 10.3) | 10.9% (7.0 - 16.6) | 3.9% (2.0 - 7.5) |
| **Prevalence of severe acute malnutrition** (<-3 z-score and/or oedema) | **1.3%** (0.5 - 3.6) | 2.3% (0.8 - 6.2) | 0.4% (0.1 - 3.1) |

No cases of bilateral oedema were reported.

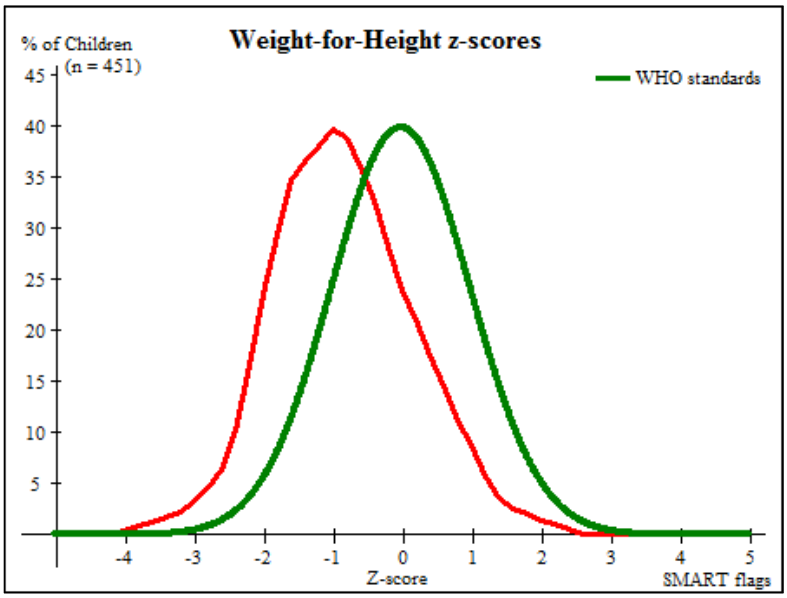
### 5.1.3. Distribution of Acute Malnutrition in WHZ-score and by Age, WHO Standards

**Table 6:** Prevalence of acute malnutrition by age based on WHZ scores &/or oedema, WHO references

| | | **Severe wasting (<-3 z-score)** | | **Moderate wasting (>= -3 and <-2 z-score )** | | **Normal (> = -2 z score)** | | **Oedema** | |
|---|---|---|---|---|---|---|---|---|---|
| **Age (months)** | **Total no.** | **No.** | **%** | **No.** | **%** | **No.** | **%** | **No.** | **%** |
| **6-17** | 124 | 0 | 0.0 | 7 | 5.6 | 117 | 94.4 | 0 | 0.0 |
| **18-29** | 105 | 0 | 0.0 | 6 | 5.7 | 99 | 94.3 | 0 | 0.0 |
| **30-41** | 91 | 1 | 1.1 | 9 | 9.9 | 81 | 89.0 | 0 | 0.0 |
| **42-53** | 87 | 1 | 1.1 | 7 | 8.0 | 79 | 90.8 | 0 | 0.0 |
| **54-59** | 44 | 4 | 9.1 | 4 | 9.1 | 36 | **81.8** | 0 | 0.0 |
| **Total** | 451 | 6 | 1.3 | 33 | 7.3 | 412 | 91.4 | 0 | 0.0 |

**Table 7:** Distribution of acute malnutrition and oedema based on weight-for-height z-scores

| | <-3 z-score | >=-3 z-score |
|---|---|---|
| **Oedema present** | Marasmus- kwashiorkor<br>0 (0.0%) | Kwashiorkor<br>0 (0.0%) |
| **Oedema absent** | Marasmus<br>8 (1.8%) | Not severely malnourished<br>449 (98.2%) |




Marasmus accounted for 1.8% of the cases (Table 9).

The standard deviation of WHZ was 0.99 which falls within the acceptable range of 0.8 – 1.2.

The survey population curve (Figure 2, red curve) shows a slight displacement to the left of the reference curve (Figure 2, green curve). This is an indication of poor nutritional status. It is important to note that design effect of 1.31 was unveiled indicating relatively homogenous population in Garbatulla district.

**Figure 2:** Weight for Height distribution in z-score compared to the WHO standards

A GAM point estimate at 8.6% obtained in May 2013 indicates poor nutritional status but worthy to note that it's the best nutritional status unveiled in Garbatulla district since February 2010. Prevalence of GAM fell below the emergency and alert thresholds of 15.0% and 10% respectively.

**Table 8:** Prevalence of acute malnutrition based on MUAC cut offs (and/or oedema) and by sex. Results shown in bracket are expressed with 95% confidence interval (CI).

| | All<br>n = 457 | Boys<br>n = 225 | Girls<br>n = 232 |
|---|---|---|---|
| **Prevalence of global malnutrition**<br>(< 125 mm and/or oedema) | (12) 2.6%<br>(1.4 - 5.0) | (4) 1.8%<br>(0.5 - 6.0) | (8) **3.4%**<br>(1.8 - 6.5) |
| **Prevalence of moderate malnutrition**<br>(< 125 mm and >= 115 mm, no oedema) | (11) 2.4%<br>(1.3 - 4.3) | (4) 1.8%<br>(0.5 - 6.0) | (7) 3.0%<br>(1.5 - 6.0) |
| **Prevalence of severe malnutrition**<br>(< 115 mm and/or oedema) | (1) 0.2%<br>(0.0 - 1.7) | (0) 0.0%<br>(0.0 - 0.0) | (1) 0.4%<br>(0.1 - 3.2) |

**Table 9:** Prevalence of underweight based on weight-for-age z-scores by sex. Results shown in bracket are expressed with 95% confidence interval (CI).

| | **All** n = 451 | **Boys** n = 221 | **Girls** n = 230 |
|---|---|---|---|
| **Prevalence of underweight** (<-2 z-score) | (87) 19.3 % (15.1 - 24.3) | (41) 18.6 % (12.7 - 26.2) | (46) 20.0 % (15.2 - 25.9) |
| **Prevalence of moderate underweight** (<-2 z-score and >=-3 z-score) | (74) 16.4 % (12.8 - 20.8) | (31) 14.0 % (9.5 - 20.2) | (43) 18.7 % (14.2 - 24.2) |
| **Prevalence of severe underweight** (<-3 z-score) | (13) 2.9 % (1.7 - 4.9) | (10) 4.5 % (2.4 - 8.4) | (3) 1.3 % (0.4 - 3.9) |

**Table 10:** Prevalence of stunting based on height-for-age z-scores and by sex. Results shown in bracket are expressed with 95% confidence interval (CI).

| | **All** n = 438 | **Boys** n = 217 | **Girls** n = 221 |
|---|---|---|---|
| **Prevalence of stunting** (<-2 z-score) | (81) 18.5% (14.7 - 23.0) | (43) 19.8% (14.6 - 26.3) | (38) 17.2% (12.4 - 23.4) |
| **Prevalence of moderate stunting** (<-2 z-score and >=-3 z-score) | (69) 15.8% (12.2 - 20.1) | (37) 17.1% (12.0 - 23.6) | (32) 14.5% (10.1 - 20.3) |
| **Prevalence of severe stunting** (<-3 z-score) | (12) 2.7% (1.7 - 4.3) | (6) 2.8% (1.3 - 5.6 ) | (6) 2.7% (1.3 - 5.6) |

## 5.2. SOCIO-DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS

The majority (85.1%) of households in Garbatulla district were male headed. The average household size was 6.

Livestock keeping continues to be the main household occupation followed closely by daily wage labor. Households practicing farming as their main occupation are still very minimal (Figure 4).

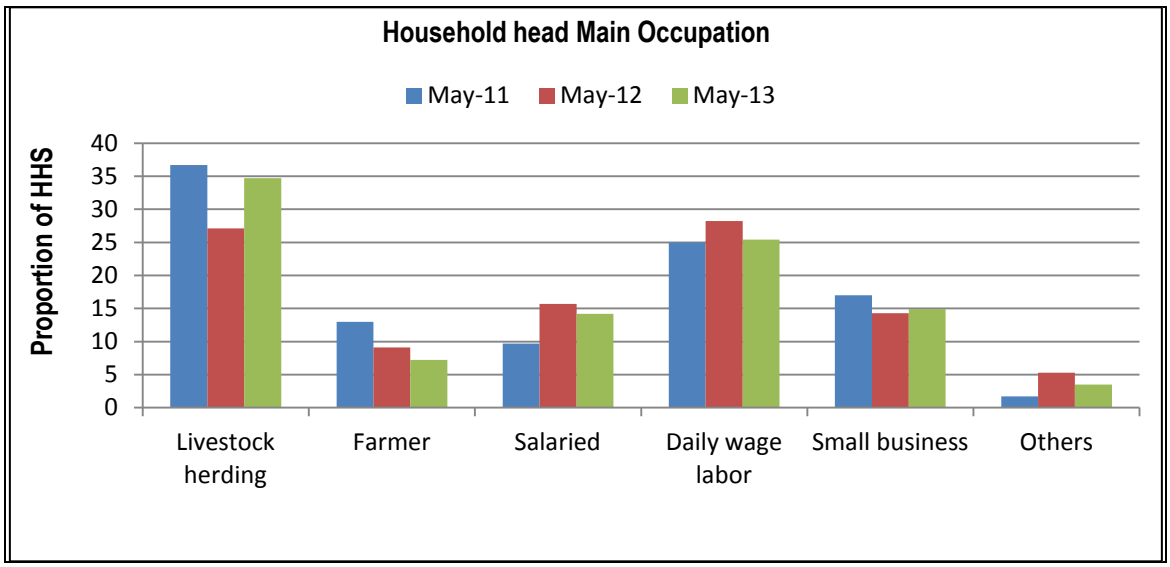



**Figure 3:** Household head main occupation

## 5.3. HEALTH

### 5.3.1. Morbidity

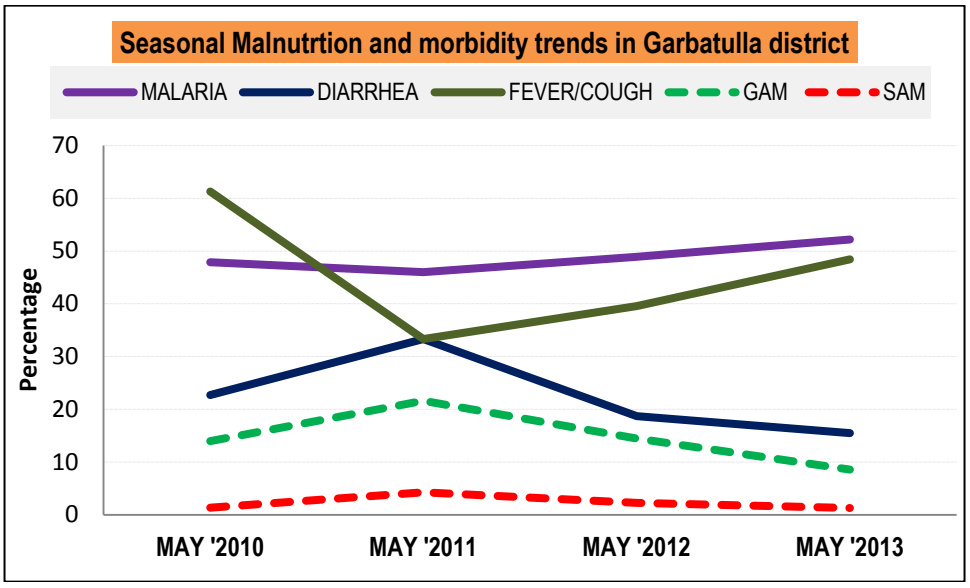



**Figure 4**: Seasonal trends of morbidity and malnutrition levels in Garbatulla district

Figure 4 shows that the occurrence of fever/cough was on the increase in May 2013 while the occurrence of malaria observed since 2 years was constantly around 50% (slight variations observed for malaria were not statistically significant). Cough and difficulties in breathing are partly attributed to the dust conditions experienced in Garbatulla during this season. It is interesting to note the relative direct relationship observed between occurrence of diarrhoea and GAM rates as both trends follow the same pattern.

77.8% of the sick children sought some assistance, with the majority of them (67.6%) attending public clinics. Traditional healers were still a significant source with approximately 7.0% of households seeking health services from them.

Therapeutic zinc supplementation during diarrhoeal episodes; key in reduction of severity, duration, and thus the impact of diarrhoea has shown a tremendous improvement with current coverage above the national target of 50% despite the inconsistency in supply of zinc supplements (Figure 5). The improved coverage nevertheless could probably be associated with the on-job training sessions on the use of zinc supplementation amongst other micronutrients through the HINI program. However, inconsistent supplies of zinc tablets were reported.

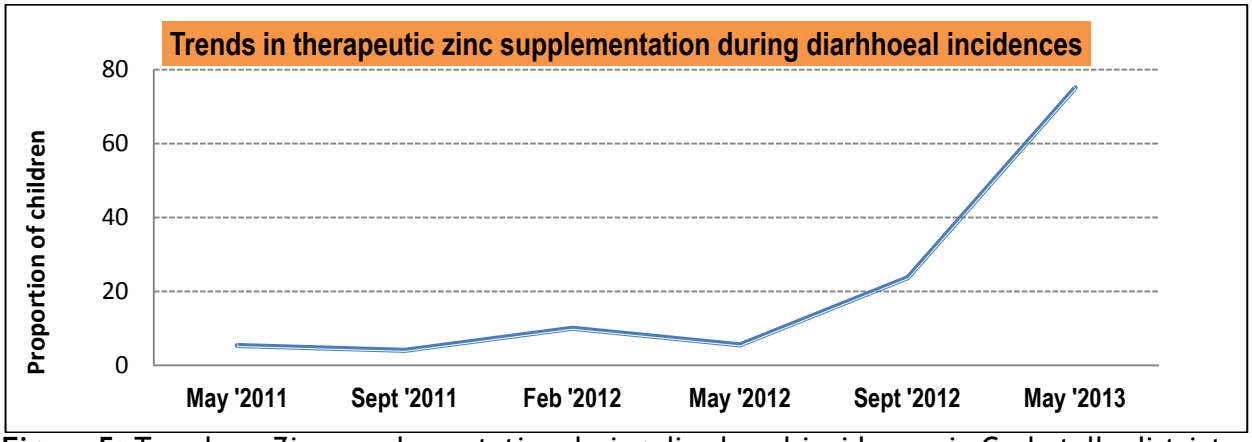



**Figure 5:** Trends on Zinc supplementation during diarrhoeal incidences in Garbatulla district

### 5.3.2. Mosquito net ownership and utilization

**Table 11:** Mosquito bed net ownership and usage

| | May 2011(%) | May 2012(%) | May2013 (%) |
|---|---|---|---|
| **OWNERSHIP** | 79.2 | 77.8 | 69.7 |
| **USAGE** | | | |
| Children <5 years old | 69.3 | 71.5 | 89.6 |
| Every body | 68.7 | 84.4 | 78.9 |
| Nobody | | | 2.0 |

Mosquito bed ownership indicates a gradual decline from May 2011 (Table 13), however usage by children less than five years has shown an improvement[5].

### 5.3.3. Immunization and vitamin A supplementation

Generally, immunization coverage in Garbatulla district is above the national target of 80% with a significant proportion verified through recall (probably linked to lack of Mother Child booklets as well as poor documentation by the health personnel).

[5] Differences observed with regards to proportion of household owning and using bed nets were statistically significant and the gradual decline was observed despite the fact that mosquito net distributions are still ongoing at health facilities for pregnant and new born.

Measles immunization trends are illustrated in Figure 6 and coverage by card and recall of OPV1 and OPV3 is shown in table 14.

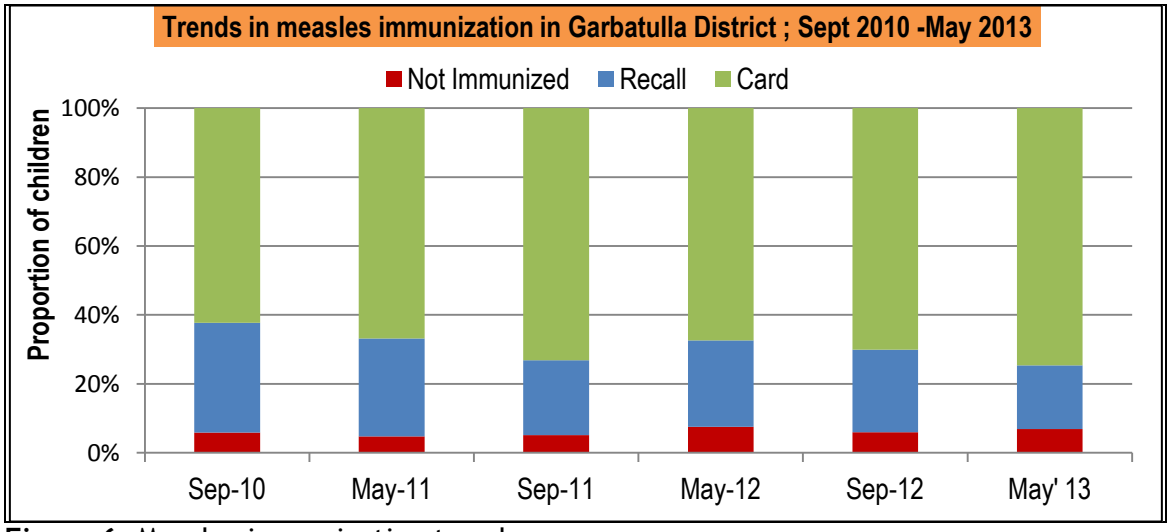



**Figure 6:** Measles immunization trends

**Table 12:** OPV1 and OPV3

| | BY CARD (%) | BY RECALL (%) | NOT IMMUNIZED (%) | DO NOT KNOW (%) |
|---|---|---|---|---|
| OPV1 | 69.5 | 16.2 | 3.9 | 10.5 |
| OPV3 | 66.7 | 15.4 | 7.4 | 10.5 |

A gradual increase of vitamin A supplementation coverage is noticed among the children less than one year, with coverage above the national target of 80% (Table 15). Unfortunately, supplementation among older children is only half the national target and this is highly attributed to inconsistency in attending routine maternal and child health services (usually taking place soon after the measles immunization).

All in all, a general improvement on Vitamin A supplementation was observed from 38.8% in September 2012 to 57.7% in May 2013. This is attributed to implementation of combined outreach activities since in September 2012 facilitated by ACF, Kenya Red Cross and Ministry of Health.

**Table 13:** Vitamin A supplementation trends

| Age group | Number of times | May 2011 (%) | Sept. 2011 (%) | Feb 2012 (%) | May 2012 (%) | Sept. 2012 (%) | May 2013 (%) |
|---|---|---|---|---|---|---|---|
| 6-11 months | At least once | 68.7 | 55.6 | 67.6 | 75.0 | 72.6 | 92.4 |
| 12-59 months | Once | 58.7 | 50.7 | 53.0 | 39.2 | 51.9 | 42.2 |
| | At least twice | 16.3 | 37.3 | 39.9 | 50.5 | 34 .7 | 51.7 |

The majority of households (80.4%) reported to have received the vitamin A capsules from health facilities with 10.5% and 9.1% from mass campaigns and outreaches respectively. Documentation of the same is poor with 47.6% of the cases verified through recall.

**Table 14:** Deworming rates

| Deworming for the past 6 months (12-59 months) | May 2013 (%) |
|---|---|
| Not dewormed | 21.5 |
| Deworming verified by card | 36.0 |
| Deworming verified by recall | 39.4 |
| Do not know | 3.1 |

Deworming rates stands at 75.4% (Table 16) slightly below the national target of 80%. The estimated coverage has improved from 68.8% obtained in September 2012.

### 5.3.4. Maternal Health and Nutrition

The current iron / folic acid supplementation rate amongst pregnant women lies above the national target of 50.0%. After a decline observed between May and Sept 12, the iron/folic acid coverage seems to have stabilized (but remains below the coverage observed a year ago, Figure 7).

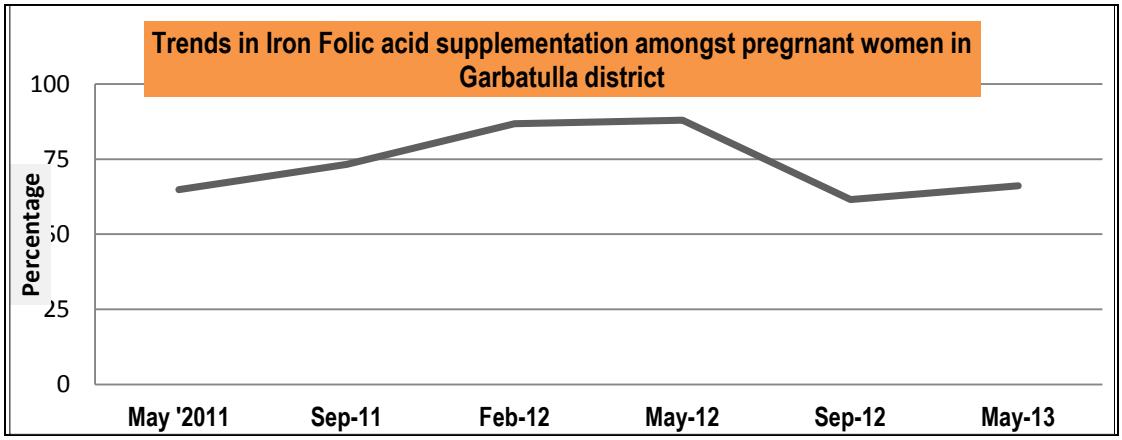



**Figure 7:** Iron Folic Acid supplementation

The nutritional status of women of reproductive age (15-45 years) was determined using maternal MUAC tapes (and a 210 mm threshold). The graph in Figure 8 indicates trends obtained since May 2012. All in all, the nutritional status of pregnant and lactating women has greatly improved compared to three months ago (last round of surveillance) as well as compared to May 2012.

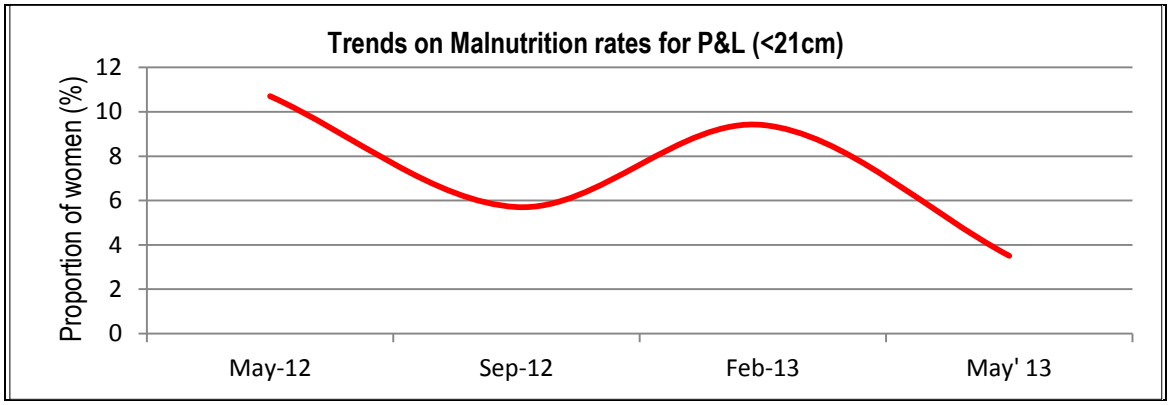



**Figure 8:** Trends on malnutrition rates by MUAC amongst the pregnant and lactating women

### 5.3.5. Infant and young child nutrition (IYCN)

Exclusive breastfeeding (24 hour recall), timely initiation of breastfeeding (within 1st hr of delivery) and minimum meal frequency showed improvement in May 2013 (Table 17) compared to the past two years. The three indicators lie above the national target of 50% for exclusive breastfeeding, 80% for timely initiation of breastfeeding and 60 % for minimum meal frequency. Although minimum meal frequency improved, the proportion of non breast fed children did not meet the national target. Minimum dietary diversity significantly dropped to 33.2% way below the national target of 60%. Through observation and informal interviews; this decline was attributed to availability of milk, which is regarded as complete meal both for children under five years old and adults[6], thence other food groups were rarely consumed.

**Table 15:** IYCN Indicators

| Indicator | Sept 2011 (%) | Sept 2012 (%) | May 2013 (%) |
|---|---|---|---|
| Timely initiation of breastfeeding (within 1st hr of delivery) | 57.6 | 48.4 | 91.7 |
| Exclusive breastfeeding | 69.4 | 67.7 | 86.6 |
| **Dietary Diversity** | | | |
| Proportion of breastfed children 6-23 months consuming ≥3 food groups | 38.9 | 61.0 | 30.2 |
| Proportion of non-breastfed children 6-23 months consuming ≥4 food groups | 7.1 | 21.7 | 47.5 |
| Proportion of both breastfed and non-breastfed children 6-23 months consuming ≥ 3 or ≥4 food groups respectively | 34.7 | 57.1 | 33.2 |
| **Minimum Meal Times** | | | |
| Proportion of breastfed children 6-8 months and 9- 23 months having at least 2 meals and≥ 3 meals a day respectively | 31.3 | 59.8 | 68.3 |
| Proportion of non-breastfed children 6-23 months having ≥4 meals a day | 7.1 | 8.7 | 32.5 |
| Proportion of breastfed children 6-8 months, 9-23 months and non-breastfed 6-23 months having ≥2, ≥3 and≥4 meals a day respectively | 28.2 | 55.2 | 62.0 |
| **Minimum Acceptable diet** | 34.1 | 56.1 | 47.6 |

[6] Refer to section 5.4. (Household Food frequency and Dietary Diversity score)

## 5.4. FOOD SECURITY AND LIVELIHOODS

### 5.4.1. Livestock Ownership

Approximately 76% of households in Garbatulla district reported to own livestock and an increase of the mean number of livestock owned per household save for goats was observed compared to September 2012 (Figure 9). According to NDMA EWS bulletin April 2013, pasture quantity and quality improved in most parts of the county following long rainfall season which could therefore be attributed to the observed increase in livestock numbers[7]. The distance of access to forage improved from 17 km (March 2013) to less than 10 km radius (April 2013)[8]. It is important to note that, pasture did not improve in some parts of Sericho and Garbatulla as rains were poorly distributed. Information from focus group discussions as well as from NDMA indicated that goats were affected by outbreak of diseases (including infectious disease such as black quarter and lumpy skin diseases).

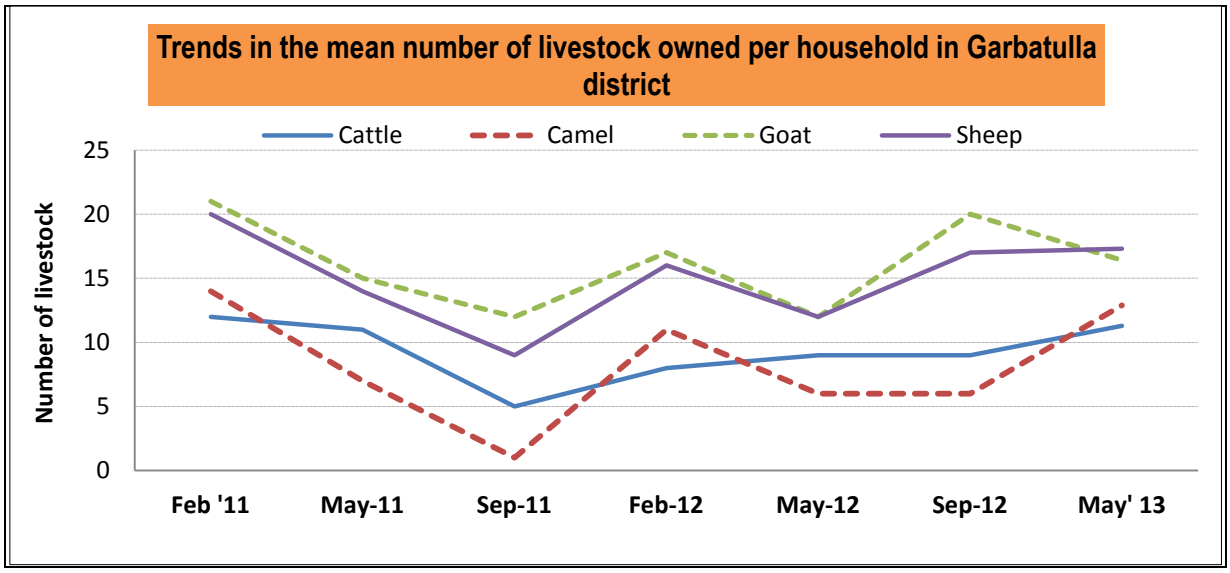



**Figure 9**: Mean livestock owned per household

Livestock births (as shown in picture 1) were cited as the main reasons behind increase in livestock quantities with sale of livestock (more so goats) and diseases being the predominant causes of livestock decrease. Figure 10 shows the seasonal trends of livestock status. No livestock were reported to have died due to drought in May 2013 (as opposed to May 2011).

**Picture 1:** Newly born lambs and kids in a homestead at Korbesa

[7] Note that increase in income/purchasing capacity that could also have explained the increase in livestock number was not assessed during the survey
[8] NDMA Early Warning System (EWS) Bulletin April 2013

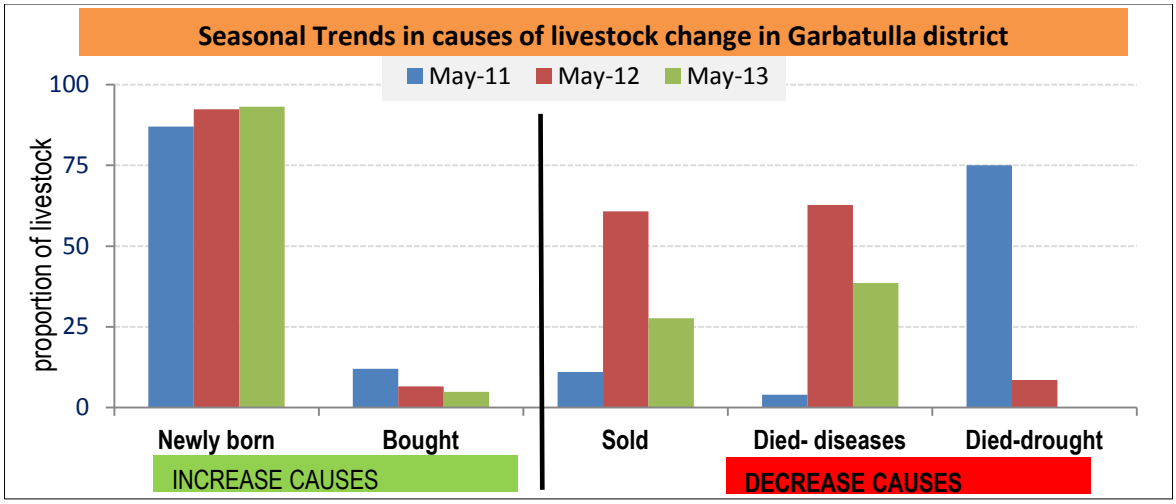



**Figure 10:** Causes of change in livestock three months prior to the survey

### 5.4.2. Household Food Frequency and Dietary Diversity Score

Household dietary diversity was assessed based on 24 hour recall and results are presented in table 18. Dairy products and cereals were highly consumed. Through observation and informal interviews, milk availability at the household level had improved with livestock concentrated in the wet grazing areas near settlement sites.

Sixteen food groups were included and the dietary diversity score was 7.2.

**Table 16**: Food groups consumed by >50% of households by dietary diversity tercile (24 hour recall)

| Lowest dietary diversity (=< 3 food groups- 2.6%) | Medium dietary diversity (4 and 5 food groups-19.6%) | High dietary diversity (=> 6 food groups-77.8%) |
|---|---|---|
| Cereals | Cereals | Cereals |
| Milk and milk products | Milk and milk products | Milk and milk products |
| | Oils/Fats | Pulses and legumes |
| | Sweets/sugars | Oils/Fats |
| | | White tubers roots and plantains |
| | | Sweets/sugars |
| | | Other vegetables |
| | | Flesh meats and offals |

A seven-day recall was used to determine household food frequency and results indicated that dairy products were consumed on daily basis. Vegetables, fruits and animal proteins on the other hand were rarely consumed, thus the poor dietary diversity revealed above. The dietary diversity score trends are shown in Figure 11.

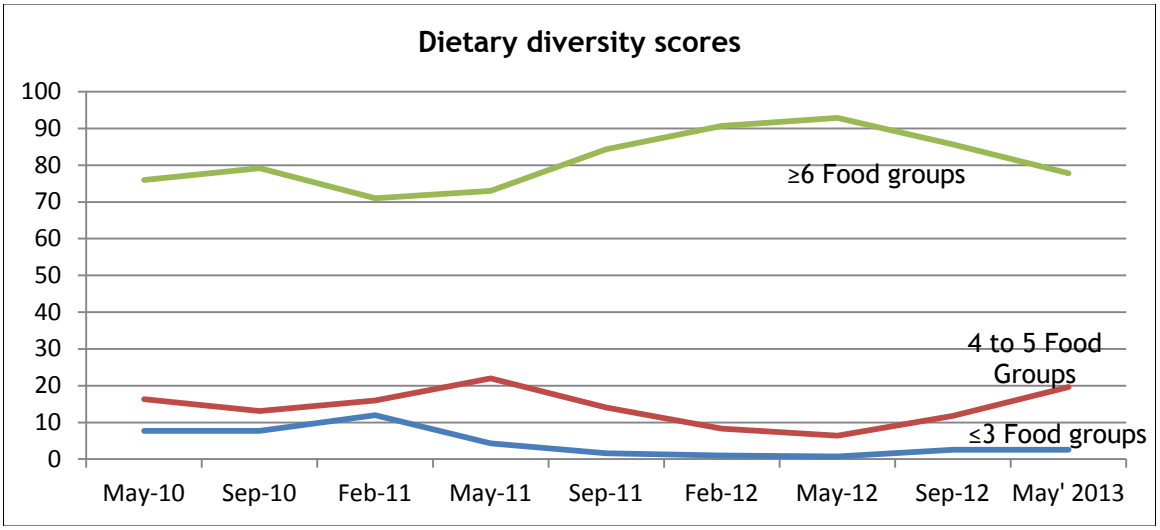



**Figure 11:** Dietary diversity score trends

**Table 17:** Household food frequency (7 day recall)

| Food Group | No. of households (out of 429) | Average No. Of days consumed (past 7 days) | Main food source |
|---|---|---|---|
| **Milk /milk products** | 427 | 6.5 | Purchase |
| **Sweets** | 361 | 6.4 | Purchase |
| **Oils/fats** | 423 | 5.9 | Purchase |
| **Cereals** | 427 | 5.7 | Purchase |
| **Condiments** | 225 | 5 | Purchase |
| **Other vegetables** | 275 | 4.3 | Purchase |
| **Pulses/legumes** | 385 | 4.0 | Purchase |
| **Eggs** | 99 | 3.3 | Own production |
| **White tubers/plantains** | 242 | 3.2 | Purchase |
| **Fish** | 5 | 3.0 | Purchase |
| **Vitamin A fruits** | 92 | 2.7 | Purchase |
| **Dark green vegetables** | 236 | 2.7 | Purchase |
| **Flesh meat & Offal** | 282 | 2.7 | Purchase |
| **Vitamin A rich vegetables and tubers** | 90 | 2.4 | Purchase |
| **Other fruits** | 33 | 2.4 | Purchase |
| **Organ meat** | 119 | 2.2 | Purchase |

The main household food source was purchase except for eggs (sourced from own production, Table 19). Food production in Garbatulla district is minimal; depending mainly on irrigation along the Ewaso Nyiro River and parts of Kinna division which is inadequate. This predisposes the households to the market uncertainties as experienced in the Month of April 2013 when the prices of maize increased from 20 KSH to 35 KSH per Kilogram[9] as the roads were rendered impassable by the floods. Important to note is that, observations pointed out that some areas were very dry and

[9] NDMA EWS Bulletin April 2013

not in the same level in terms of food security with the other areas of the district which included Malkadaka and Escot locations.

### 5.4.3. Household Coping Strategy Index

Household Coping Strategy Index was based on 7-day recall period prior to the survey date and results are presented in Table 20. Worthy to note is that less than a quarter of the households were practicing the most severe strategy indicating that food security at household level was overall relatively good and this could as well be backed up by the improved nutritional status revealed. However the score increased from 17.4 in February 2013.

**Table 18:** Household Coping Strategy Index

| | Question | Proportion of households employing the strategy | Frequency score (0-7) | Severity score[10] (1-3) | Weighted Score = Frequency x Weight |
|---|---|---|---|---|---|
| 1 | Rely on less preferred and less expensive foods? | 39.9% | 3.3 | 1 | 3.3 |
| 2 | Borrow food, or rely on help from a friend or relative? | 28.7% | 2.1 | 2 | 4.2 |
| 3 | Limit portion size at mealtimes? | 39.6% | 2.8 | 1 | 2.8 |
| 4 | Restrict consumption by adults in order for small children to eat? | 20.3% | 1.8 | 3 | 5.2 |
| 5 | Reduce number of meals eaten in a day? | 39.6% | 3.2 | 1 | 3.2 |
| Total Weighted coping strategy Score: | | | | | 18.7 |

## 5.5. WATER SANITATION AND HYGIENE

Rainfall was received in the region from the last week of March to 3rd week of April 2013. This was poorly distributed in Sericho and part of Garbatulla divisions. Overall, the amount and intensity of rains was above normal in Isiolo County resulting in flash floods in some areas causing damage to settlement and rendering some roads impassable[11]. During the survey period, the floods had ceased and the situation normalised.

[10] 1 is less severe and 3 is the most severe score
[11] NDMA EWS Bulletin April 2013

**Table 19:** Main water source for drinking, February 2010-May 2013

| SOURCE | Feb 2010 | May 2010 | Feb 2011 | May 2011 | Sept 2011 | Feb 2012 | May 2012 | Sept 2012 | Feb 2013 | May 2013 |
|---|---|---|---|---|---|---|---|---|---|---|
| **SAFE** | | | | | | | | | | |
| Piped water system from borehole/ Earth pan/Dam with infiltration well | 38.7 | 31.7 | 44.6 | 67.3 | 60.7 | 69.3 | 82.1 | 64.4 | 73.0 | 85.1 |
| **UNSAFE** | | | | | | | | | | |
| Water trucking[12] | N/A | N/A | N/A | 3.3 | 11.1 | N/A | 0.7 | 3.0 | N/A | N/A |
| Unprotected shallow well | 33.0 | 36.7 | 26.8 | 9.6 | 15.5 | 17.7 | 10.4 | 28.2 | 22.7 | 14.9 |
| Water pan/dam | N/A | N/A | N/A | 0.3 | 2.4 | 6.7 | 6.1 | 2.6 | 4.0 | N/A |
| Water seller/ donkey cart | 0.3 | 10.0 | 5.4 | 6.3 | 0.8 | N/A | 0.7 | 3.5 | 0.3 | N/A |
| Others *water sources* | 3.3 | 7.0 | 9.7 | 13.0 | 9.5 | 6.3 | N/A | N/A | N/A | N/A |

Table 21 indicates that safe sources were the main water source for drinking water utilized by 78.3% of households in Garbatulla district. Though a minority were using unsafe water sources, 77.4% of those using unsafe sources were not treating the water before drinking (Table 22).

**Table 20:** Trends in Water treatment methods in Garbatulla District

| Treatment | Sep 2011 | Sep 2012 | May 2013 |
|---|---|---|---|
| Nothing | 70.2% | 69.6% | 84.1% |
| Boiling | 9.9% | 12.4% | 6.7% |
| Chemicals | 15.2% | 12.0% | 10.5% |
| Traditional herb | N/A | N/A | 0.9% |
| Pot filters | N/A | N/A | 0.9% |
| Others | 15.7% | 8.9% | N/A |

Generally, water treatment practices have deteriorated since the last survey in Sept 2012 (Table 23). Use of pot filters is very minimal despite of distributions done in 2012 to a significant proportion of households in Garbatulla district.

**Table 21:** Distance to water source

| Distance to water source | Sept 2011 | Sept 2012 | May 2013 |
|---|---|---|---|
| ≤500 m | 76.8% | 63.3% | 72.3% |
| more than 500 meters – 2 km | 23.2% | 21.9% | 23.3% |
| more than 2 km | N/A | 14.8% | 4.2% |

[12] water trucking was categorized as unsafe because the source of water is unknown

Water points should be within a distance of 500m from the households according to 2011 SPHERE standards; and a majority (72.3%, Table 23) met this standard in May 2013.

Approximately 49.9% of households reported to have been queuing for water at the water point with the majority (64.9%) queuing for more than 30 minutes (Table 24). This is not normal for the season and could be attributed to the floods which interfered with infrastructure including water points.

**Table 22:** Queuing time at water sources

| Duration of queuing | May 2011 % | Sept 2011 % | Feb 2012 % | May 2012 % | Sept 2012 % | Feb 2013 % | May 2013 % |
|---|---|---|---|---|---|---|---|
| Less than 30 minutes | 64.9 | 75.4 | 59.5 | 71.9 | 40.8 | 68.6 | 35.1 |
| More than 30 minutes | 35.1 | 24.6 | 40.5 | 28.1 | 59.8 | 31.4 | 64.9 |

Payment for water was normal for the season with a majority (65.5%) reporting to pay for water. About 83.9% of these pay ≤3 shillings per 20 litre Jerican with monthly bills ranging between KSH. 100-400. Extreme costs were reported from Duse village (15 KSH/20 litres). Trends indicate that the majority of households in Garbatulla district store drinking water in closed containers (Table 25) and the improvement could be a result of the continuing Public Health Promotion activities.

**Table 23:** Storage of water

| | Feb 2011 % | May 2011 % | Sept 2011 % | Feb 2012 % | May 2012 % | Sept 2012 % | May 2013 % |
|---|---|---|---|---|---|---|---|
| **Open Container** | 4.7 | 11.3 | 3.6 | 18.0 | 3.2 | 13.0 | **5.8** |
| **Closed Container** | 94.7 | 88.3 | 95.8 | 80.3 | 96.4 | 79.4 | **94.2** |
| **Any Container** | 0.7 | 0.3 | 0.6 | 1.7 | 0.4 | 7.6 | **N/A** |

Open defecation in the district stands at 14.6% which is a significant improvement from 31.1% obtained in September 2012. The number of households in possession of latrines[13] has declined with shared latrines significantly increasing with an average of four households using one latrine.

Hand washing at the four critical times was also assessed and results presented in Table 26.

[13] Some of the latrines are built by community and some were done by NGOs during emergencies

**Table 24:** Trends in hand washing at critical times

| | FEB 2011 % | MAY 2011 % | SEPT 2011 % | FEB 2012 % | MAY 2012 % | SEPT 2012 % | MAY 2013 % |
|---|---|---|---|---|---|---|---|
| After toilet | 54.5 | 84.0 | 91.8 | 99.7 | 93.9 | 95.0 | 95.3 |
| Before cooking | 91.2 | 55.3 | 67.1 | 39.3 | 63.9 | 64.4 | 61.5 |
| Before eating | 52.7 | 95.3 | 89.0 | 96.0 | 93.2 | 93.7 | 97.5 |
| After taking children to the toilet | 72.0 | 48.7 | 21.9 | 48.7 | 61.4 | 70.9 | 53.3 |
| AVERAGE PROPORTION | **67.6** | **70.8** | **67.4** | **70.9** | **78.1** | **81.0** | **76.9** |

The majority (85.3%) of caretakers reported to wash their hands during critical moments, however, the proportion washing hands after taking children to the toilet has declined and those practicing appropriate hand washing with soap and water has shown gradual declined since May 2012[14] (Figure 12).

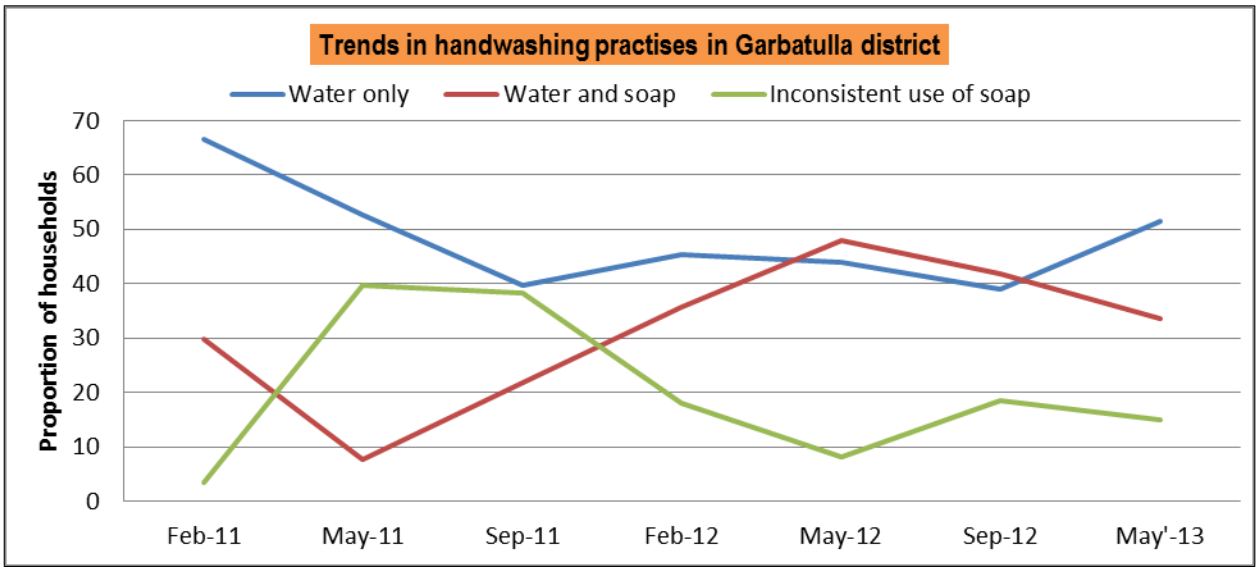



**Figure 12:** Appropriate hand washing practices

## 6. CONCLUSION AND RECOMMENDATIONS

Point estimate at 8.6% (6.0-12.3 95% CI) and 1.3% (0.5- 3.6 95% CI) for GAM and SAM respectively indicate poor nutrition levels in Garbatulla district. It is worth to note that this is the best nutritional status unveiled in the district since February 2010 and trends analysis indicates that malnutrition rates have significantly declined since May 2011. The survey findings triangulated with secondary information suggest out several reasons to which the improved nutrition status could be related to:

[14] Note that soap is often only distributed during emergencies, during the present survey no soap distributions were ongoing

- The last two rainy seasons performed fairly well offering favourable climatic conditions which have led to improved water and pasture availability. Animal productivity increased tremendously. Household food access and availability improved as only few households reported to have practiced the most severe coping strategy.
- Significant decrease of diarrheal occurrence and improved of zinc supplementation during diarrheal episodes.
- Relatively improving hygiene and sanitation practices which could be associated with reduction in diarrhoea prevalence. Public Health promotion has been done during outreach activities as well as training on PHAST[15].
- Concerted efforts by humanitarian agencies and GOK on ground.

Despite the improved nutritional status, a number of factors still stand out:

- Vitamin A supplementation for children above one year was below national threshold of 80%. In addition, poor documentation of immunization and micronutrient supplementation was observed.
- Inconsistency in therapeutic zinc supplement supplies coupled with insufficient mother child booklets.
- Poor hygiene and sanitation practices such as poor water treatment and hand washing without soap.
- Livestock diseases affecting especially goats were widely reported.

Poor nutrition status in Garbatulla district was unveiled in May 2013. Trends indicate significant improvement; however, more efforts are needed in maintaining or reducing the rates further bearing in mind the long dry season ahead. The possible recommendations and strategies to achieve this are listed in Table 30.

[15] Participatory Hygiene and Sanitation

**Table 25:** Recommendations

| FINDINGS | POSSIBLE LINKS TO MALNUTRITION | RECOMMENDATIONS |
|---|---|---|
| **NUTRITION** | Vitamin A (57.7%) and deworming (75.4.2%) below the national target of 80% | • Strengthen the combined outreach activities and map out new outreach sites |
| | Zinc supplementation has improved but still below national target of 50%<br>Inconsistent supplies of zinc and iron folic acid tablets reported | • Emphasize on protocol procedures in administration of zinc during On-the-Job Training (OJT) and Joint Support Supervision<br>• Strengthen PULL[16] system for drugs at the County level |
| | Poor documentation of immunization and micronutrient supplementation<br>Inadequate supplies of Mother Child booklets reported | • Health staff and community sensitization on the importance of documentation vaccination<br>• To advocate for the booklets at County level |
| **WASH** | Poor water treatment and handling practices; Pot filters distributed but not utilized<br><br>Low hand washing after taking children to the latrine and decreasing use of soap | • Continued hygiene promotion with emphasize on local acceptable water treatment methods<br>• Follow up of pot filters for evaluation of use and acceptance<br>• Refine hand washing messages to focus on key hand washing times and promotion of soap alternatives |
| | Open defecation still significant; CLTS piloted in one village but community yet to construct latrines waiting for slab subsidy (to be provided by KRC) | • Continue with rigorous latrine promotion to trigger demand.<br>• Promotion of open defecation free zones through promotion of latrines made from locally available materials |
| **FSL** | Sustainability of crop and animal production:<br>Low crops production<br>Low dietary diversity<br>20.4% practicing the most severe coping strategy | • Strengthen / enhance farmers capacity on production methods<br>• Improve knowledge around food and nutrition<br>• Improve road network to enhance distribution of farm & livestock products<br>• Continue to support Dedha (*Local elder who control grazing patterns)* Committees- control grazing zones |

[16] In PULL system, Health facilities order for supplies based on need

## 7. APPENDICES

**ANNEX 1: Plausibility check for: KENGBTSMART2013.as**
**Standard/Reference used for z-score calculation: WHO standards 2006**
(If it is not mentioned, flagged data is included in the evaluation. Some parts of this plausibility report are more for advanced users and can be skipped for a standard evaluation)

**Table 26:** Overall data quality

| Criteria | Flags | * Unit | Excel. | Good | Accept | Problematic | Score |
|---|---|---|---|---|---|---|---|
| **Missing/Flagged data (% of in-range subjects)** | **Incl** | **%** | **0-2.5** | **>2.5-5.0** | **>5.0-10** | **>10** | |
| | | | 0 | 5 | 10 | 20 | 0 (1.3 %) |
| **Overall Sex ratio *(Significant chi square)*** | **Incl** | **p** | **>0.1** | **>0.05** | **>0.001** | **<0.000** | |
| | | | 0 | 2 | 4 | 10 | 0 (p=0.743) |
| **Overall Age distribution *(Significant chi square)*** | **Incl** | **p** | **>0.1** | **>0.05** | **>0.001** | **<0.000** | |
| | | | 0 | 2 | 4 | 10 | 0 (p=0.130) |
| **Digit preference score - WEIGHT** | **Incl** | **#** | **0-5** | **5-10** | **10-20** | **>20** | |
| | | | 0 | 2 | 4 | 10 | 0 (4) |
| **Digit preference score - HEIGHT** | **Incl** | **#** | **0-5** | **5-10** | **10-20** | **>20** | |
| | | | 0 | 2 | 4 | 10 | 2 (6) |
| **Standard Deviation WHZ** | **Excl** | **SD** | **<1.1** | **<1.15** | **<1.20** | **>1.20** | |
| | | | 0 | 2 | 6 | 20 | 0 (0.99) |
| **Skewness WHZ** | **Excl** | **#** | **<±1.0** | **<±2.0** | **<±3.0** | **>±3.0** | |
| | | | 0 | 1 | 3 | 5 | 0 (0.20) |
| **Kurtosis WHZ** | **Excl** | **#** | **<±1.0** | **<±2.0** | **<±3.0** | **>±3.0** | |
| | | | 0 | 1 | 3 | 5 | 0 (0.10) |
| **Poisson Distribution WHZ-2** | **Excl** | **p** | **>0.05** | **>0.01** | **>0.001** | **<0.000** | |
| | | | 0 | 1 | 3 | 5 | 0 (p=0.091) |
| OVERALL SCORE WHZ = | | | 0-5 | 5-10 | 10-15 | >15 | 2.0% |

The overall score of this survey is 2 %, this is excellent.
**There were no duplicate entries detected.**
**Percentage of children with no exact birthday: 32 %**

**ANNEX 2: Prevalence of acute malnutrition by age, based on MUAC cut off's and/or oedema**

| | | Severe wasting (< 115 mm) | | Moderate wasting (>= 115 mm and < 125 mm) | | Normal (> = 125 mm ) | | Oedema | |
|---|---|---|---|---|---|---|---|---|---|
| Age in months | Total no. | No. | % | No. | % | No. | % | No. | % |
| 6-17 | 128 | 1 | 0.8 | 7 | 5.5 | 120 | 93.8 | 0 | 0.0 |
| 18-29 | 106 | 0 | 0.0 | 3 | 2.8 | 103 | 97.2 | 0 | 0.0 |
| 30-41 | 92 | 0 | 0.0 | 0 | 0.0 | 92 | 100.0 | 0 | 0.0 |
| 42-53 | 87 | 0 | 0.0 | 1 | 1.1 | 86 | 98.9 | 0 | 0.0 |
| 54-59 | 44 | 0 | 0.0 | 0 | 0.0 | 44 | 100.0 | 0 | 0.0 |
| Total | 457 | 1 | 0.2 | 11 | 2.4 | 445 | 97.4 | 0 | 0.0 |

**ANNEX 3: Prevalence of underweight by age, based on weight-for-age z-scores**

| | | Severe underweight (<-3 z-score) | | Moderate underweight (>= -3 and <-2 z-score ) | | Normal (> = -2 z score) | | Oedema | |
|---|---|---|---|---|---|---|---|---|---|
| Age in months | Total no. | No. | % | No. | % | No. | % | No. | % |
| 6-17 | 124 | 2 | 1.6 | 16 | 12.9 | 106 | 85.5 | 0 | 0.0 |
| 18-29 | 104 | 4 | 3.8 | 13 | 12.5 | 87 | 83.7 | 0 | 0.0 |
| 30-41 | 92 | 2 | 2.2 | 15 | 16.3 | 75 | 81.5 | 0 | 0.0 |
| 42-53 | 87 | 3 | 3.4 | 21 | 24.1 | 63 | 72.4 | 0 | 0.0 |
| 54-59 | 44 | 2 | 4.5 | 9 | 20.5 | 33 | 75.0 | 0 | 0.0 |
| Total | 451 | 13 | 2.9 | 74 | 16.4 | 364 | 80.7 | 0 | 0.0 |

**ANNEX 4: Prevalence of stunting by age based on height-for-age z-scores**

| | | Severe stunting (<-3 z-score) | | Moderate stunting (>= -3 and <-2 z-score ) | | Normal (> = -2 z score) | |
|---|---|---|---|---|---|---|---|
| Age (month) | Total no. | No. | % | No. | % | No. | % |
| 6-17 | 122 | 2 | 1.6 | 16 | 13.1 | 104 | 85.2 |
| 18-29 | 102 | 3 | 2.9 | 20 | 19.6 | 79 | 77.5 |
| 30-41 | 89 | 2 | 2.2 | 18 | 20.2 | 69 | 77.5 |
| 42-53 | 82 | 4 | 4.9 | 11 | 13.4 | 67 | 81.7 |
| 54-59 | 43 | 1 | 2.3 | 4 | 9.3 | 38 | 88.4 |
| Total | 438 | 12 | 2.7 | 69 | 15.8 | 357 | 81.5 |

**ANNEX 5: Mean z-scores, Design Effects and excluded subjects**

| Indicators | n | Mean z-scores ± SD | Design Effect (z-score < -2) | z-scores not available* | z-scores out of range |
|---|---|---|---|---|---|
| Weight-for-Height | 451 | -0.84±0.99 | 1.31 | 0 | 6 |
| Weight-for-Age | 451 | -1.09±1.04 | 1.45 | 0 | 6 |
| Height-for-Age | 438 | -0.92±1.15 | 1.18 | 0 | 19 |

*** contains for WHZ and WAZ the children with oedema.**

**ANNEX 6: Status of recommendations put forth in September 2012**

The table below summarises key action points and status of recommendations from the previous SMART survey undertaken in September 2012

| FINDINGS | POSSIBLE LINKS TO MALNUTRITION | RECOMMENDATIONS | STATUS AS AT MAY 2013 |
|---|---|---|---|
| NUTRITION | Vitamin A (38.8%) and Deworming (68.2%) below the national target of 80% | • Combined outreach activities to be undertaken which will ensure that all services reach every targeted child | • ACF Integrated Bi monthly outreaches in 7 sites in GBT.<br>• KRCS outreaches in 7 sites once a month (*3 sites in collaboration with ACF).*<br>• KRCS is currently planning to map out new outreach sites to scale up. |
| | Zinc supplementation below national target of 50% | • Conduct assessment at all facilities to determine knowledge of health staff regarding the same. | • HINI gap assessment done in September by ACF in all health facilities in GBT<br>• OJT on therapeutic zinc supplementation for diarrhoeal management done to health workers and emphasis during routine JSS and monitoring by ACF and DHMT |
| | Low mosquito ownership and utilization | • Community sensitization on importance of mosquito net thus improve maintenance and utilization | • PSI distribution of the ITNS and OJT to health workers who subsequently disseminate the info to P&L mothers. |
| WASH | Sharing of the same water point with livestock | • Continued provision of kiosks to provide access to human use with the provision of animal troughs to utilise waste water at appropriate distances | • Water pipeline constructed from *Kombola to Gafarsa*<br>• Water distribution pipeline constructed from *Kulamawe* 2km |
| | Observed high breakage of protected shallow wells and piped water systems | • Strengthen Water committees and linkage with relevant GoK ministries<br>• Strengthen capacities of local artisans to make repairs | • Training of water committee's has been done in *Sericho, Badana, Bilique, Iresaboru, Modogashe, Gafarsa, Kombola, Muchuro, Kinna, Rapsu, Gubadida, Kulamawe, Yaqbarsathi, Barambate, Tanna, Malkadaka* |

| | | | |
|---|---|---|---|
| | Poor water treatment and handling practices | • Continued hygiene promotion<br>• Follow up of pot filters for evaluation of use and acceptance | • PHP done by HINI Wash officer during ACF outreaches<br>• 21 CHWs in GBT and 14 CHWs in Merti trained on PHAST who developed CAPs which is a tool in training MTMSGs using the PHAST methodology.<br>• Distribution of pot filters done |
| | Open defecation | • Rigorous latrine promotion to trigger demand.<br>• Promotion of open defecation free zones (piloting of CLTS) and promotion of cat method. | • Triggering of community members using CLTS methodology in *Manyatta Demo* in Garbatulla. 17 latrine pits were dug in *Manyatta Demo* and resulted in 1 pit latrine completed. Main challenge for this was promise of slab subsidy by KRCS which slowed down the CLTS process. |
| **FSL** | Sustainability of crop and animal production | • Build capacity of farmers on production methods and enhance access to agricultural inputs<br>• Improve market access to nutritious foods via voucher systems and support to traders<br>• Improve household utilization and processing of foods<br>• Improve knowledge around food and nutrition<br>• Address seasonal food gaps through enhancing storage, processing and marketing infrastructure<br>• Market linkages for sale of farm & livestock products<br>• Strengthen Dedha (*Local elder who control grazing patterns)* Committees- control grazing zones | • Training of farmers in *Gubadida, Muchuro and Iresaboru areas*<br>• Seeds and tools distributed in GBT district<br>• Training of kitchen gardening and distribution of vegetable seeds and tools in *Gafarsa and Malkadaka*<br>• Duse market completion for livestock market<br>• In Garbatulla, strengthened 6 locational Rangeland Management Committee's *(Dedha Committee's)* who received an extensive two day training on issues regarding range land management<br>• ACF- FSL facilitated establishment of District Focal Rangeland Management Committee formed by representatives of the 6 locational Rangeland Management Committee's *(Dedha Committees')* |