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Integrated SMART Survey
Nutrition, WASH, Food Security and Livelihoods

Garbatulla District

Kenya

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ABBREVIATIONS

ALRMP	Arid Lands Resource Management Project
ASAL	Arid and Semi-Arid Lands
BSFP	Blanket Supplementary Feeding Programme
CI	Confidence Interval
DNO	District Nutrition Officer
ENA	Emergency Nutrition Assessment
GAM	Global Acute Malnutrition
GFD	General Food Distribution
HDDS	Household Dietary Diversity Score
MUAC	Middle Upper Arm Circumference
SMART	Standardized Monitoring and Assessment of Relief and Transition
WFH	Weight for Height
WFP	World Food Programme
WHO	World Health Organization

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- The various government ministries for their support and active participation all through the survey processes.
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- Garbatulla District Commissioner and his team for the immense support in ensuring smooth survey process to include mobilization and sharing relevant information necessary for planning such as population movement in the district, district boundaries etc.
- ACF staff at the national and field base for ensuring quality in logistical and administrative issue;
- Data collectors and field survey supervisors for their hard work and dedication;
- Survey drivers for timely and efficient transport and delivery.

1. EXECUTIVE SUMMARY

Garbatulla District of Isiolo County comprises of three divisions with a total population of approximately 43,147 persons[1]. The three divisions are Sericho, Kinna and Garbatulla. It is characterized by erratic unreliable rainfall patterns, recurrent droughts with vast dry land covered with shrubs forming most of its topography.

ACF-USA has been operational in this area since March 2010. Since then, ACF in collaboration with the various relevant government ministries and stakeholders have undertaken a number of activities including one nutrition survey and 4 small scale surveys. As indicated in the table below, malnutrition rates in Garbatulla district have either been close or slightly above WHO emergency threshold (GAM >15.0% and SAM >4%).

Table 1: Malnutrition rates in Garbatulla District (February 2010 – May 2011)

TYPE OF SURVEY	Small Scale Survey		Integrated SMART survey	Small Scale Survey	
TIME FRAME	**FEBRUARY 2010**	**MAY 2010**	**SEPT. 2010**	**FEBRUARY 2011**	**MAY 2011**
N=Sample size	367	356	857	333	332
Prevalence of GAM[2] *(<-2 z-score and/or Oedema)*	17.2% (12.4 - 23.2)	14.0% (10.4.-18.7)	14.2% (11.9 – 16.9)	15.6% (12.4 - 19.4)	21.6% (17.0 - 27.1)
Prevalence of SAM[3] *(<-3 z-score and/or Oedema)*	3.8% (2.4 - 6.1)	1.4% (0.6 - 3.2)	1.5% (0.8 – 2.8)	0.9% (0.3 - 2.8)	4.3% (2.1 – 8.6)

The prevailing malnutrition rates could be attributed to a number of compounding factors highlighted during the survey such as drought, inconsistent supply of relief and supplementary food rations, high food prices, population increment as well as poor water and sanitation situation. In response to the above emergency malnutrition rates, a number of concerted efforts have been put in by the various stakeholders to curb and possibly lower the malnutrition rates. These include scaling up of all essential services delivered through outreach sites. It is on this basis and the need to understand the situation that ACF deemed it necessary to undertake an integrated SMART survey in the area. The survey had two main objectives. These were to determine the acute malnutrition rates in the areas amongst children aged 6-59 months as well as the crude mortality rates in population. Specific survey objectives were to:

a. Assess the prevalence of acute malnutrition in children aged 6-59 months.
b. Estimate coverage of measles and vitamin A.
c. Estimate morbidity rates in children 0 - 59 months
d. Estimate crude and under five mortality rate.
e. Assess possible factors that have an impact on nutrition such as food security and livelihood; WASH, maternal and child health practices.

.1.1. Methodology

The Standardized Monitoring and Assessment of Relief and Transitions methodology was utilized in undertaking the Garbatulla district survey. Standard nutrition, food security, WASH[4] and disaster risk reduction indicators were used. During the survey exercise, anthropometric, mortality and other additional qualitative data was gathered simultaneously.

Two stage sampling methodology with proportion to population size was utilized to undertake this survey. In the first stage, clusters were determined. The Kenya National Bureau of Statistics 2009 Census data was used as the

[1] Source: 2009 KNBS census
[2] Global Acute Malnutrition
[3] Severe Acute Malnutrition
[4] Water, Sanitation and Hygiene

reference source of population data. This was then triangulated with information obtained from the local authority to reflect the prevailing situation on ground such as population movements. Sample size was determined on the basis of estimated prevalence rates of malnutrition (GAM), desired precision and design effect using the ENA for SMART software (2011 version).

The second stage entailed selection of households. In each of the 42 clusters, 12 households were randomly selected using the revised EPI method. Subsequent households were thereafter identified through proximity. In the household, all eligible children were measured and all relevant data collected as per the questionnaire. Children aged 6-59 months were targeted for the anthropometric survey while those aged 0-24 months were targeted in the assessment of infant and young child feeding practices. In the event that no eligible child for the anthropometric part of the survey was found in a household, all the other questionnaires (mortality, household and IYCF) were administered accordingly.

.1.2. Survey Results

The whole survey process was undertaken from 5th – 17th of September 2011 with the actual data collection exercise being undertaken between 8th and 16th September 2011. This timing was deemed appropriate for this survey to ensure comparability of survey findings with that of September 2010.

During this period, a total of 542 children were assessed for the anthropometric survey. However, 3 out of range data sets were omitted from the final analysis by the SMART software. During this exercise, other data sets were gathered concurrently to determine not only the mortality rates but also other factors that may have an impact on the nutrition status of the population. As such, 504 households were assessed for the mortality survey.

A number of agencies operate in this area in close liaison with various government bodies. The table below highlights this with their various operation areas.

Table 2: Agencies operating in Garbatulla District

Agency	Main activity/ areas
ACF USA	Nutrition , Food security and Livelihoods, WASH
Save the Children USA	Monitoring and Evaluation of High Impact Nutrition Indicators
World Vision Kenya	Livelihood support, community empowerment, and child support.
Action Aid	Food supply for GFD, SFP and BSFP
Kenya Red Cross	Health

The table below highlights the key findings from the survey

Table 3: Summary Of Key Findings

INDEX	*INDICATOR*		*RESULTS*[5]
WHO (n=539)	*Z- scores*	***Global Acute Malnutrition (GAM)*** W/H < -2 z and/or Oedema	18.6% [14.8 – 22.9]
		Severe Acute Malnutrition (SAM) W/H < -3 z and/or Oedema	3.0 % [1.8 - 4.8]
NCHS (n-539)	*Z-scores*	***Global Acute Malnutrition (GAM)*** W/H < -2 z and/or Oedema	17.6% [14.1 – 21.7]
		Severe Acute Malnutrition (SAM) W/H < -3 z and/or Oedema	0.9 % [0.4 – 2.2]
	% Median	***Global Acute Malnutrition (GAM)*** W/H < 80% and/or Oedema	9.2 % (7.0 - 12.1.)
		Severe Acute Malnutrition (SAM) W/H < 70% and/or Oedema	0.2 % (0.0 - 1.4.)
Total crude retrospective mortality (90 days)/10,000/ day Under five crude retrospective mortality/10,000/day			0.14% [0.05 – 0.36] 0..17% [0.02- 1.25]
Measles immunization coverage: (*Verifiable by card)*			73.1 %

[5] Results in brackets are at 95% confidence intervals

MUAC ANALYSIS FOR CHILDREN AGED 6 -59 MONTHS	
Prevalence of global acute malnutrition: MUAC < 125 mm or Oedema	5.5% (3.8% - 8.0%)
Prevalence of severe acute malnutrition: MUAC < 115 mm or Oedema	1.3% (0.5% - 3.2%)
VITAMIN A SUPPLEMENTATION COVERAGE	
Children aged **6-11 months** who received vitamin A supplementation in past one year	55.6 %
Children aged **12-59 months** who received vitamin A supplementation in past one year ONCE	50.7 %
Children aged **12-59 months** who received vitamin A supplementation in past one year TWICE	34.2 %
MORBIDITY	
Proportion of children aged 0-59 months with illness two weeks prior to the survey	45.2%
Proportion of children 0-59 months of age with diarrhea in 2 weeks prior to the survey	32.0 %
Proportion of children 0 – 59 months with chills like malaria in 2 weeks prior to the survey	29.8 %
Proportion of children 0-59 months of age with fever, cough or difficulty in breathing two weeks prior to the survey	63.6 %
Proportion of children 0-59 months of age with other forms of illness	9.6 %
MANAGEMENT OF DIARRHOEA	
Proportion of children who took ORS in diarrhea conditions	78.1 %
Proportion of children who received zinc supplements during diarrhea incidence.	4.1 %
Proportion of children who took home made sugar solutions during diarrhea conditions.	32.9 %
OTHER HIGH IMPACT NUTRITION INTERVENTION INDICATORS	
Iron supplementation amongst pregnant women	73.3%
Proportion of children 24 – 59 months who received de-worming drugs in the past 6 months to the survey	69.9 %
INFANT AND YOUNG CHILD NUTRITION	
Early initiation of breastfeeding (*within an hour; n=223*)	70.6 %
Exclusive breastfeeding rates (n (0-5 months)= 108	69.4 %
Proportion of infants aged 12-15 months fed on breast milk (n=47)	89.4 %
Proportion of infants aged 6-8 months receiving solid, semi solid or soft foods (n=59)	57.6 %
MOSQUITO BED NET OWNERSHIP AND USAGE	
Proportion of household who own mosquito nets	79.2 %
Proportion of households with mosquito nets, who reported that all family member slept under a mosquito net the night before the survey (n=225)	56.3 %
WATER AND HYGIENE	
Proportion of households who access safe water source (n=306)	60.7 %

Time taken to the main water source for drinking	***Less than 15 minutes (n=264)***	52.4 %
	15 – 30 minutes (n=123)	24.4 %
	30 minutes to 1 hour(n=46)	9.1 %
	More than one hour(n=71)	14.1 %
Proportion of households who did not practice any form of water treatment (n=354)		70.2 %
FOOD SECURITY		
Proportion of households who own livestock (n=353)		70.0 %
Mean household dietary diversity score		6.8
Main source of food: Purchase		32.0%
Main source of food: Food aid		28.0%
Main expenditure: Food		62.3%
Main coping strategy: Reliance on food aid		20.4%

2. INTRODUCTION

Garbatulla District lies in the greater Isiolo County and is divided into three divisions namely; Sericho, Kinna and Garbatulla. The area is characterized by vast dry land covered with shrubs. As is characteristic of ASAL[6] areas, the area has erratic unreliable rainfall, recurrent droughts with hot and dry climate. The district has one district hospital situated in Garbatulla division. This is supported by other health centres situated in various parts of the district.

Figure 1 below shows the malnutrition trends in the district since February 2010. As observed, most of the GAM rates were either close to or above the emergency threshold of 15.0%. These had been as a result of a number of factors that range from immediate, underlying to basic causes such as disease incidences, high food prices, compromised food security and livelihood, poor water and sanitation and drought.

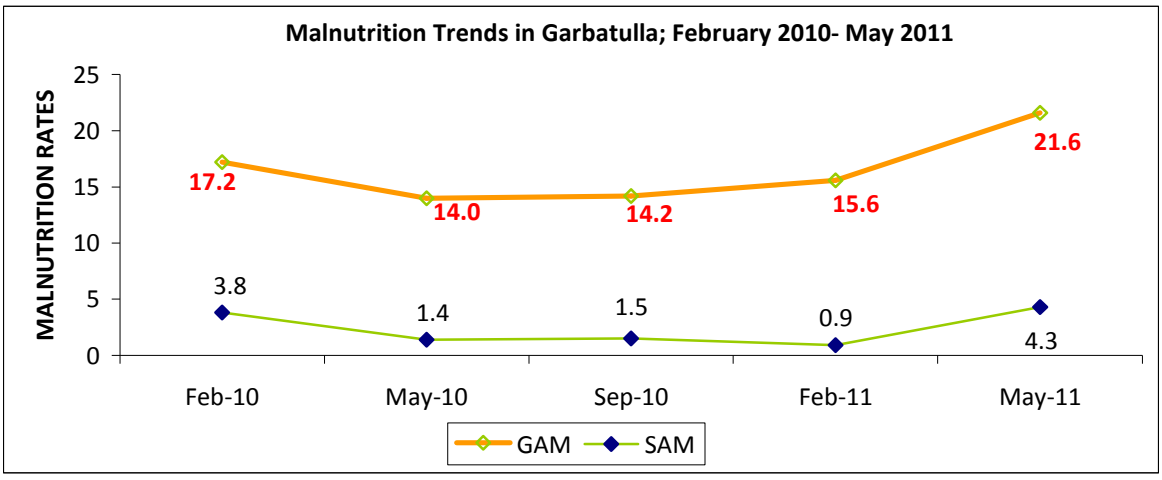


Figure 1: Malnutrition trends in Garbatulla District, February 2010- May 2011.

[6] Arid and Semi Arid region

3. SURVEY OBJECTIVES

The integrated SMART survey had two main objectives. These were to determine the acute malnutrition rates as well as the crude mortality rates in the population. Specific survey objectives were to:

- ✓ Assess the prevalence of acute malnutrition in children aged 6-59 months
- ✓ Estimate coverage of measles and vitamin A
- ✓ Estimate morbidity rates in children 0 - 59 months
- ✓ Estimate crude and under five mortality rate
- ✓ Assess possible factors that have an impact on nutrition such as food security and livelihood; WASH, maternal and child health practices

4. METHODOLOGY

4.1. Sampling

Standardized Monitoring and Assessment of Relief and Transitions methodology was utilized in undertaking the Garbatulla district survey. Standard nutrition, food security, WASH[7] and disaster risk reduction indicators were used. Anthropometric and other data sets on the aforementioned indicators were gathered simultaneously.

Two stage sampling methodology with proportion to population size was utilized to undertake this survey. Clusters were determined in the first stage. Kenya National Bureau of Statistics 2009 Census data was used as the reference source of population data. This was then triangulated with information obtained from the local authority to reflect the prevailing situation such as population movements and district boundaries. Sample size was thereafter determined on the basis of estimated prevalence rates of malnutrition (GAM), desired precision and design effect using the ENA for SMART software (2011 version) as indicated in the table below.

Table 4: Survey planning information

Data entered on ENA software	Anthropometric survey	Retrospective mortality survey
Estimated prevalence	27.1 %	2.31
Desired precision	5.0	1.0
Design effect	1.5	1.5
Recall period		97[8] days
Average household size	6[9]	6
Percent of under five children	18.4	
Percent of non-respondent	1.0	1.0
Households to be included	**504**	**271**
Children to be included	496	
Population to be included		1610

The second stage entailed household selection. In each of the 42 clusters, 12 households were randomly selected using the revised EPI method. Subsequent households were thereafter identified through proximity. In the household, all eligible children were measured and all relevant data collected as per the questionnaire. Children aged 6-59 months were targeted for the anthropometric survey while those aged 0-24 months were targeted in the assessment of infant and young child feeding practices. In the event that no eligible child for the anthropometric part of the survey was found in a household, all the other questionnaires (mortality, household and IYCF) were administered accordingly.

[7] Water, Sanitation and Hygiene
[8] This has been chosen in line with the key event **(Madaraka Day- June 1st 2011)** to mark the beginning of the recall period.
[9] Mean number of males and females as per GBT SSS 4 May 2011

4.2. Training and organization of survey teams

The survey teams were trained for 4 days. This was an intensive training carried out between 5th and 8th September 2011. The training focused on a number of issues namely: survey objectives, implementation and questionnaire administration. Both the standardization[10] and pilot tests were carried out during the training. The actual survey was thereafter carried out by 6 teams comprising each comprising of 4 enumerators (2 measurers and 2 data collectors) and one team leader. The team leaders were representatives from the various focal government ministries in the area such as the Ministry of Health and Ministry of Arid lands with the entire survey coordinated and supervised by ACF team. Each team was tasked with covering one cluster per day thence the 42 clusters were completed in 7 days

4.3. Data Quality Assurance Processes

A number of steps were undertaken to ensure data quality all through the survey process right from planning to the final stage. After internal planning, ACF USA presented the survey proposal to the Nutrition Information Woking Group for validation. This was thereafter followed by a number of activities that in the long run ensured data quality with an acceptable plausibility score of 6. These included:

- ✓ A pilot test in a nearby; non clustered village
- ✓ Use of a local calendar of events in estimating the ages of children. This was used in instances where the caretakers had no documents to verify the ages of targeted children
- ✓ Daily data entry of with performance based feedback at the beginning of each day

4.4. Data Collection

The actual data collection was undertaken over a 7 day period. This was between 9th and 15th September 2011. During this period, a number of data was gathered as elucidated below.

Anthropometric data was collected from all children eligible children; the target group being children aged 6-59 months of age. A structured questionnaire was used to gather this information and the data gathered included:

- 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 was used to estimate these ages.
- **Sex:** This was recorded as either 'f' for female or 'm' for male.
- **Weight:** A bathroom scale or a 25 kg Salter hanging 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 also calibrated to zero before taking any measurements
- **Height:** Recumbent length was taken for children less than 85 cm or less than 2 years of age while those greater or equal to 85 cm or more than 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.
- **Bilateral Oedema:** This 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.
- **Measles vaccination:** The status of this was determined amongst all children aged 6-59 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 was recorded as "1" (Card) otherwise as "0" (Not immunized). Oral confirmation from the mother without

[10] The standardization test was not completed due to slight tension on ground between the Samburu and Borana. This was resolved.

proof of card was recorded as "2" (Recall). However, only children above 9 months were used to determine coverage of this in the final analysis.

Health indicators: Other relevant information about the eligible child was gathered. These were:

- **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 and "1" when the child had received the drugs.
- **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:** Information on two-week morbidity prevalence was collected by asking the mothers/caretakers if the child had been ill in the two weeks preceding the survey; and including the day of the survey. This was eventually determined based on the respondent's recall and was however not verified by a clinician. These were highlighted as diarrhoea, fever with chill like malaria or fever cough with difficulty in breathing. All other forms of illness other than the aforesaid were specified

Mortality survey: Relevant mortality data was gathered in all the 12 sampled households per cluster by use of a standard mortality questionnaire (Annex 10.4 & 10.5 with 97 days recall period). This was determined by a memorable recall event in Kenya. In this survey, this was marked by Madaraka day celebrated on the 1st of June 2011. If members of a sampled household were absent/ empty, the teams always inquired about their whereabouts from the neighbours and came back later. No sampled household was replaced.

Other data sets: A structured questionnaire was administered in the same households the mortality data was collected regardless of whether the selected household had a child 6-59 months of age. The questionnaire used to gather data on health related variables from mothers with children under five, High Impact Nutrition Indicators data, water availability and accessibility, sanitation and hygiene practices, crop and livestock production, food sources, dietary diversity, income, expenditure and coping strategies data.

4.5. Data Entry and Analysis

Anthropometric and mortality data were analyzed in ENA for SMART software November 2008 version. Daily data entry was undertaken for the anthropometric and mortality data sets so as to ensure close supervision and quality of data as the survey progresses. This data set was eventually analyzed. Extreme vales flagged by the software were excluded from the final analysis. The household questionnaire data sets were entered and analyzed using SPSS Version 13.0 and Microsoft Excel

5. INDICATORS, GUIDELINES AND FORMULAS USED

5.1. Acute Malnutrition

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 both in The WFH indices are expressed in both Z-scores and percentage of the median, according to WHO 2005 and NCHS 1977 reference standards.

Z-Score:

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

Percentage of Median

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

MID UPPER ARM CIRCUMFERENCE (MUAC)

MUAC analysis was also undertaken to determine the nutrition status of targeted children. During the survey, all severe and moderately malnourished children as per MUAC cut off's referred to nearby facilities. The following MUAC criteria were thus applied.

Table 5: MUAC guidelines

MUAC Guideline	Interpretation
MUAC<115mm and/or bilateral oedema	SAM with high risk of malnutrition
MUAC >=115mm and <125mm	MAM with risk of mortality
MUAC >=125mm and <135mm	Risk of malnutrition
MUAC > 135mm	Adequate nutritional status

5.2. Retrospective Mortality

The Crude Death Rate is defined as the number of people in the total population who died between the start of the recall period and the time of the survey. 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
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

5.3. Infant And Young Child Feeding

Timely initiation of breast feeding: Proportion of infants born in the last two years attached to breast within an hour of delivery

Exclusive breastfeeding rates: Proportion of infants less than 6 months exclusively fed on breast milk

Continued breast feeding rates: Proportion of children aged 12- 15 months who are still breast fed

Complimentary feeding rates: Proportion of infants aged 6 – 8 months who receive solid, semi solid or soft foods

5.4. Household Dietary Diversity Score (Hdds)

Household dietary diversity score focuses on the various food groups (12) and is used as a proxy measure of a household's socio-economic level. The score is calculated by summing up the number of food groups consumed by the household over a 24 hour recall period. The score are thereafter categorised as low dietary diversity (<= 3 food groups); medium (4-5 food groups) and high dietary diversity (>= 6 food groups)

6. SURVEY LIMITATIONS/CONSTRAINTS

The nutrition survey was a cross sectional study. This means that it gives the nutritional status of a given area at a given time. The causes of malnutrition also highlighted in this report are the probable causes of malnutrition as no causal analysis or studies were undertaken.

7. RESULTS OF THE ANTHROPOMETRIC SURVEY

7.1. Distribution by age and sex

542 children aged 6-59 months were assessed during this study. The table below highlights the distribution of these children by various age groups. 51.3% and 48.7% of these children were male and female respectively. The overall boy-girl ratio 1.10 falls within the recommended range of 0.8 – 1.2[11] demonstrating representative-ness in sample selection.

Table 6: Distribution of age and sex of sample

MONTHS	Boys		Girls		Total		Ratio
	N	%	n	%	n	%	Boy: girl
6-17	75	54.3	63	45.7	138	25.5	1.2
18-29	64	48.1	69	51.9	133	24.5	0.9
30-41	61	46.9	69	53.1	130	24.0	0.9
42-53	63	57.3	47	42.7	110	20.3	1.3
54-59	15	48.4	16	51.6	31	5.7	0.9
Total	278	51.3	264	48.7	542	100.0	1.1

The sex ratio across the various age groups fell within the acceptable ranges of 0.8 – 1.2. However, this was not the case with children aged 42- 53 months. This ratio fell above the 1.2 upper limits. The deviation could be attributed to the use of calendar of events in approximating the ages of children in instances where verification documents such as birth certificates, birth notifications or health cards were unavailable. Analysis of these data sets indicates that 22.1% (120) of ages of these children were determined through recall.

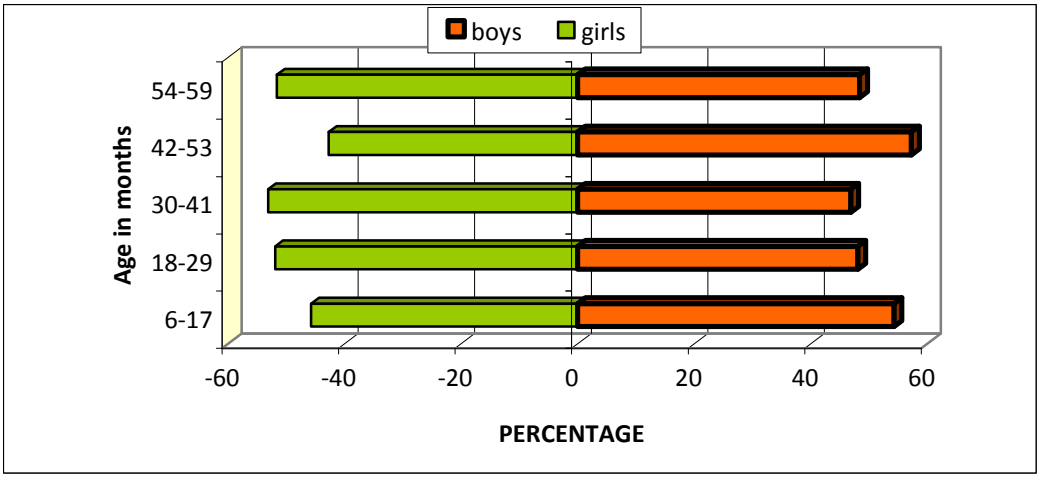


Figure 2: Distribution of sex by age group

7.2. Anthropometry

7.2.1. Distribution of Acute Malnutrition in Z-score, WHO Standards

This section covers the distribution of malnutrition mainly based on with WHZ with a smaller section covering the percentage of the median. These have been represented both by either the NCHS references of the WHO standards with the later taking precedence

Table 7: Prevalence of acute malnutrition by age based on WHZ[12] scores &/or oedema, WHO references

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

[12] WHZ: Weight for Height z score

		Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age (mths)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	137	7	5.1	12	8.8	118	86.1	0	0.0
18-29	133	3	2.3	30	22.6	100	75.2	0	0.0
30-41	128	2	1.6	19	14.8	107	83.6	0	0.0
42-53	110	4	3.6	15	13.6	91	82.7	0	0.0
54-59	31	0	0.0	9	29.0	22	71.0	0	0.0
Total	539	16	3.0	85	15.8	438	81.3	0	0.0

No cases of bilateral oedema were reported

Table 8: Distribution of acute malnutrition and Oedema based on weight-for-height z-scores

	<-3 z-score	>=-3 z-score
Oedema present	Marasmus- kwashiorkor 0 (0.0 %)	Kwashiorkor 0 (0.0 %)
Oedema absent	Marasmus 17 (3.1 %)	Not severely malnourished 525 (96.9 %)

The sampled population curve below shows a slight displacement to the left of the reference curve. This is an indication of poor nutritional status. Indeed the global acute malnutrition rates lie above the emergency thresholds of 15.0%. The standard deviation of 0.99 *(WHO standards)* falls within the acceptable range of 0.8 – 1.2

The GAM unveiled fell above the emergency and alert thresholds of 15.0%. The SAM cases on the other hand fell below the emergency thresholds of 4.0% but above the alert (2.0%) thresholds. Findings tabulated below are expressed at 95.0% confidence interval

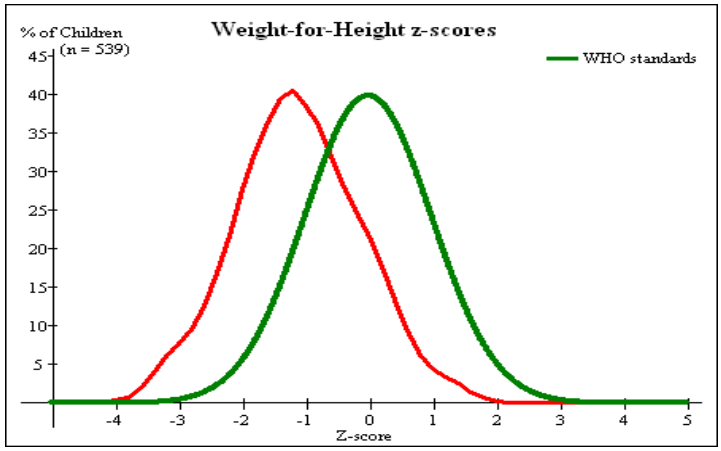


Figure 3: Weight for Height distribution in Z-score compared to the WHO standard

Table 9: Global and Severe Acute Malnutrition in Z-score

	WHO Reference	NCHS Reference
Prevalence of GAM	18.6% [14.8 – 22.9]	17.6% [14.1 – 21.7]
Prevalence of SAM	3.0 % [1.8 - 4.8]	0.9 % [0.4 – 2.2]

The CDC calculator was used to determine the probability of exceeding the threshold at 85.0%. GAM and SAM of 16.6% and 2.2% respectively was unveiled.

7.2.2. Distribution of Acute Malnutrition in Percentage of the Median, NCHS reference

Table 10: Prevalence of malnutrition by age, based on W/H[13] percentage of the median and oedema

		Severe wasting (<70% median)		Moderate wasting (>=70% and <80% median)		Normal (> =80% median)		Oedema	
Age (mths)	Total no.	No.	%	No.	%	No.	%	No.	%
6-17	137	1	0.7	11	8.0	126	92.0	0	0.0
18-29	133	0	0.0	19	14.3	114	85.7	0	0.0
30-41	129	0	0.0	10	7.8	120	93.0	0	0.0
42-53	110	0	0.0	6	5.5	104	94.5	0	0.0
54-59	31	0	0.0	3	9.7	28	90.3	0	0.0
Total	540	1	0.2	49	9.1	492	91.1	0	0.0

7.2.3. Distribution of Middle Upper Arm Circumference

Table 11: Distribution of MUAC in Garbatulla District

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	**3**	3.3	**1**	0.4	**0**	0.0	**4**	0.8
115 = MUAC < 125	**11**	12.1	**6**	2.6	**0**	0.0	**17**	3.2
125 >= MUAC < 135	**27**	29.7	**40**	17.6	**22**	10.6	**89**	16.9
MUAC.>= 135	**50**	54.9	**180**	79.3	**186**	89.4	**416**	79.1
Total	**91**	100.0	**227**	100.0	**208**	100.0	**526**	100.0

8. RESULTS OF RETROSPECTIVE MORTALITY SURVEY

One of the survey objectives was to determine the crude and under five mortality rates in the population of Garbatulla district. This was done retrospectively over a 97 day recall period. 97 days was selected based on the recall event which in this case was Madaraka Day. Madaraka day is a national public holiday in Kenya marked on the 1st June.

A total 504 households were assessed for this section. The table below presents the mortality survey findings.

Table 12: Summary of mortality data

	Total population	Children under five years of age
Number of current households residents	2889	643
Number of people who joined	47	10
Number of people who left	281	10
Number of births	54	54
Number of deaths	4	1

[13] W/H: Weight for Height

Based on the above information, the calculated retrospective mortality rates were:

- The crude mortality rate (CMR) is **0.14 (0.05 – 0.36)** /10,000/day.
- The under five mortality (U5MR) is **0.17 (0.02 – 1.25)** /10,000/day.

All the above fall below the CMR and U5MR emergency thresholds in Sub Saharan Africa[14] of 0.8 and 2.1 respectively

Table 13: Trends in mortality rates

	SEPTEMBER 2010	SEPTEMBER 2011
Crude Mortality Rate	**2.31** (1.84 – 2.9) /10,000/day.	**0.14** (0.05 – 0.36) /10,000/day.
Under Five Mortality Rate	**2.34** (1.49 – 3.67) /10,000/day.	**0.17** (0.02 – 1.25) /10,000/day.

9. RESULTS OF QUALITATIVE ASSESSMENT

Additional data was gathered during this assessment through a structured questionnaire, observations and interviews with key informants. During this exercise, a number of methods were used; these included probing, interviews and proportionate piling. A total of 504 households were sampled during this survey and findings of the analysis are presented in the section below.

9.1. Socio-Demographic Characteristics Of The Respondents

The social and demographic characteristics of a household have some part to play in the overall nutrition situation of the household members. This is because of its impact on a number of issues such as the household's purchasing power and decision making. In this study, a household was defined as a person or group of persons related or unrelated by blood, residing in the same compound, having one household head and eating from the same cooking pot.

A total of 2889 people were present during the survey period. This gives an average household size of approximately 5 (5.7 persons) in the 504 sampled households. Further analysis indicates that 88.7% (447) of the sampled households in Garbatulla district were headed by males while female headed households accounted for a slight 11.3% (57). Additionally, 84.5% (426) of these households had children less than five years of age.

The main occupation of the household heads varied with majority relying on livestock herding 32.9% (166) and daily wage labour 31.0% (156). The aforementioned and other forms of occupation are tabulated below in order.

Table 14: Household head main occupation

HOUSEHOLD HEAD MAIN OCCUPATION	
Occupation	**%**
Livestock herding	32.9
Daily wage labour	31.0
Small business/ petty trade	14.7
Employed (Salaried)	12.7
Farmer/ own farm labour	6.0
Others	2.4

Occupations of household heads varied from one region to the other. For example, most of the farmers reported were in Kinna division. As observed during the data collection exercise, part of this division is served by Bisan Athi, a permanent river that acts as a source of water for this area. The residents especially those in Rhapsu and Kone Kallo villages had taken advantage of this for cultivation of their land.

On the whole, the main source of occupation of households was livestock herding (32.9%). Livestock quantities in this area had reduced, with limited wage labour, petty trade and employment opportunities available. The aforementioned predisposes a community to malnutrition as the capacity to obtain basic needs such as food is limited.

[14] Source: SPHERE HANDBOOK 2011

9.2. Health And Nutrition

Health and nutrition issues such as inadequate food intake and disease have a direct link to malnutrition. This section thus presents the findings on issues pertaining to these such as morbidity, measles, vitamin A supplementation, de-worming, infant and young child nutrition and bed net coverage.

A two week recall period was used to establish morbidity rates amongst children less than five years of age. In all 504 sampled households, 426 (84.5%) had children aged 0—59 months. 45.2% of these reported to have one or more forms of illness two weeks to the survey. The table below indicates the trends on morbidity

Table 15: Morbidity trends in Garbatulla amongst children aged 0-59months

	Sept.2010	May 2011	Sept. 2011
Diarrhea	14.7%	33.3%	32.0%
Vomiting	4.7%	9.9%	10.1%
Fever with chills like malaria	51.3%	41.4%	32.0%
Fever, cough, difficulty in breathing	75.1%	40.5%	63.6%
Others	17.3%	11.7%	9.6%

This can be presented as shown below.

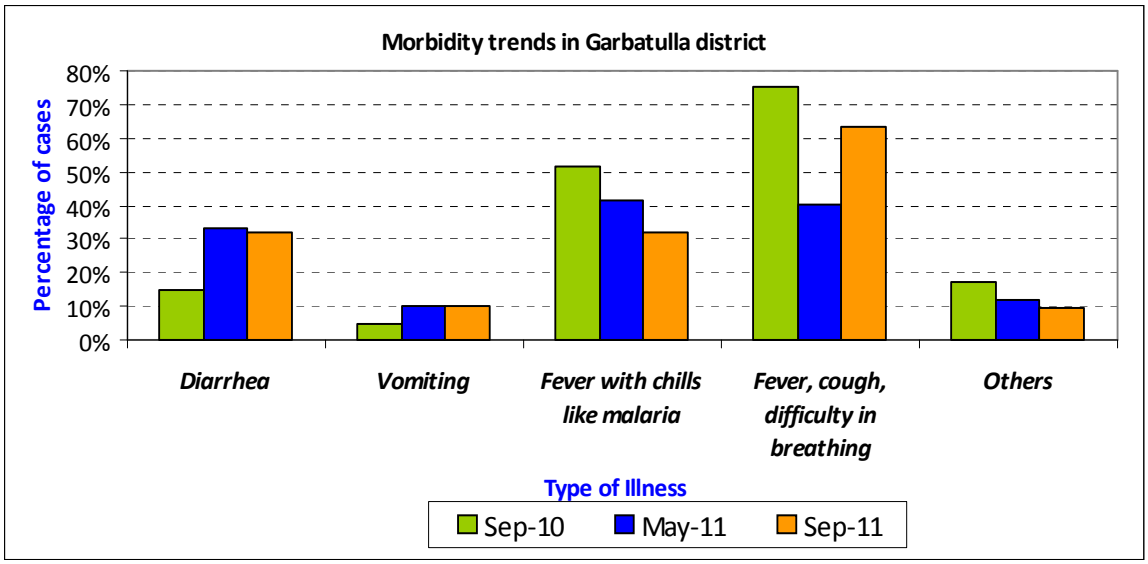


Figure 4: Morbidity trends in Garbatulla district

The figure above indicates a steady decline in malaria and "others" disease incidences. Decline in malaria cases could be attributed to factors such as drought that has limited female anopheles mosquito breeding areas as well as mosquito bed net ownership and usage. As illustrated in the table below, mosquito bed net ownership has been above 75.0%. Usage on the other hand by children under five years of age has indicated a rise of about 15.7%. Cases of diarrhoea and vomiting seem to be static. However, disease incidence due to fever, cough and difficulty breathing, have increased since May 2011.

Table 16: Mosquito bed net ownership and usage

	Sept 2010	May 2011	Sept 2011
Mosquito bed net ownership	80.9%	76.0%	79.2%
Mosquito bed net usage by all household member	56.8%	68.7%	56.3%
Mosquito bed net usage by children under five years of age		69.3%	85.0%

More than 1.5 million children under five continue to die each year as a result of acute diarrhoea. However, the number can dramatically be reduced through critical therapies such as prevention and treatment of dehydration with ORS and fluids available in the home, breastfeeding, continued feeding, selective use of antibiotics and zinc supplementation for 10–14 days.[15] Diarrhoea accounted for 32.0% of morbidity cases in Garbatulla district. These cases could be attributed to a number of issues such as effects of other diseases as well as poor hygiene and sanitation noted in the area. For example hand washing at critical times was common. However, use of clean water and soap at these points to break the faecal oral route was undertaken by only 24.4%. Diarrhoea cases in Garbatulla district were managed as follows.

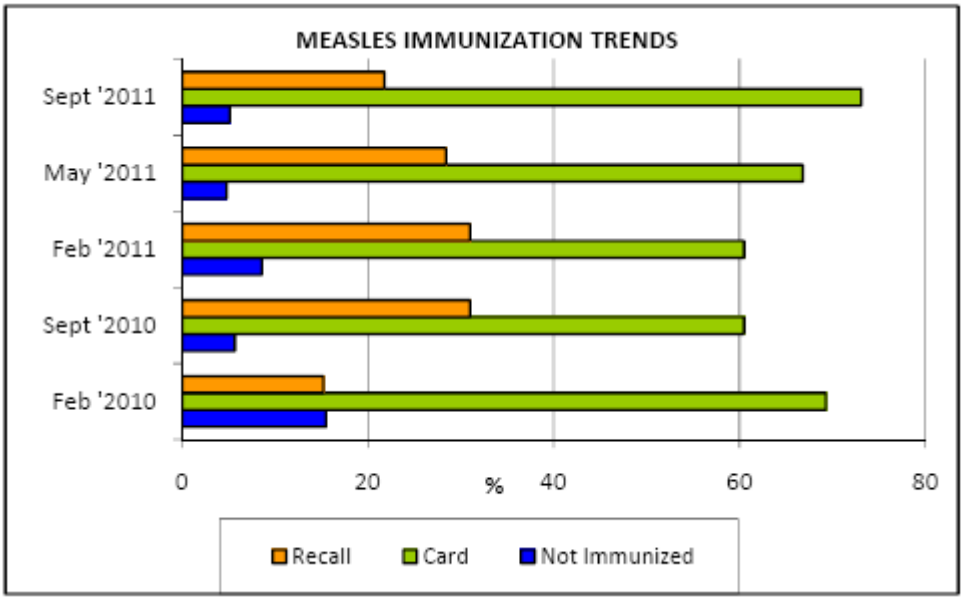
Table 17: Management of diarrhoea cases

	n	%
Oral Rehydration Salt (ORS)	57	78.1
Homemade sugar salt solution	24	32.9
Homemade liquids like porridge	4	5.5
Zinc	3	4.1
Others	1	1.4

Prolonged dehydration due to diarrhoea can lead to death; underscoring the importance of rehydration. It is therefore commendable to note the use of additional fluids to the children more so ORS that accounted for 78.1%. However, zinc supplementation in diarrhoeal incidences is of concern in this area as it (4.1%) falling way below the national target of 50.0%. Further probing revealed that there were shortages at facility level in supply. Apparently, the KEMSA kit lacked some micro-nutrients for supplementation indicating a need for advocacy in this area.

Appropriate and timely health seeking behavior minimizes severity of illness. 81.1% (185) of the children who were ill sought assistance from various areas with majority using public clinics 87.0% (161) Other points of medical assistance were mobile clinics (8.2%), shops (5.9%), private clinic (2.2%) with friends, traditional healers and local herbs each accounting for 1.1%.

Measles is an infectious disease that has a direct relationship with the nutrition status of a child. During the survey period, measles vaccination status was gathered and this was based on recall or verification from an immunization card. Analysis was then done for children aged 9 months and above and findings tabulated below.



The figure to the left indicates the measles immunization trends since February 2010. Generally, the proportion of children not immunized seems to be on the decline with September 2011 indicating the highest children immunized with cards to verify immunization status.

[15] WHO/UNICEF joint statement: clinical management of diarrhoea . 2004

Figure 5: Measles immunization trends

ACF Kenya has been undertaking a multi-sector program in Garbatulla district to include nutrition, food security and WASH. The nutrition program's overall objective is to reduce the level of acute malnutrition in the area. As such, the agency runs a number of activities under this in close liaison with the Ministry of Health/Public Health and sanitation to meet its goal. These include on job training, capacity building, blanket supplementary feeding program (BSFP), targeted feeding programs both through facility, HINI[16] and outreach programs just to mention but a few.

Implementation of BSFP[17] in Garbatulla started in September, 2011. During this month, various activities were undertaken that included community mobilization, screening of children for malnutrition, registration, food distribution, vitamin A supplementation and vaccination. Monitoring of the entire process was also done. Of the 3, 110 children less than 3 years targeted, 2,966 were reached.

High impact nutrition indicators were also assessed during this survey. These include vitamin A supplementation rates, coverage of de-worming as well as iron supplementation amongst pregnant women. During the survey exercise, samples of these drugs were shown and explained to the respondents during the interviews.

Iron folic acid supplementation for pregnant mothers is expected to contribute to a 20.0% reduction in maternal mortality[18]. Iron supplementation rates of 73.3% were unveiled. Caretakers with children less than two years of age were targeted for this section so as to minimise recall bias. These rates are therefore generally good as they are above the national target of 50.0%.

The table below represents the trends in vitamin A supplementation over a one year recall period.

Table 18: Vitamin A supplementation trends [19]

VITAMIN A SUPPLEMENTATION TRENDS	Feb. 10	May 10	Feb.- 11	May 11	Sept. 11
Vitamin A supplements received at least once	67.0%	86.8%	71.8%	77.6%	81.9%
Never received	33.0%	13.2%	28.2%	22.4%	18.1%
Total number of children	367	326	333	332	542

Further analysis by age groups was undertaken amongst those who had received Vitamin A supplementation. The findings indicate that vitamin A supplementation amongst the 6-11 months and 12- 59 months age brackets were 56.6% and 86.1% respectively.

Table 19: Vitamin A supplementation by age group

Age group	Number of times	Percentage
6-11 months	Once	55.6%
12- 59 months	Once	50.7%
	Twice	34.2%
	Thrice[20]	3.1%

The later bracket represents a larger percentage as this age group received the supplements more than once over the year as indicated below. Secondly, the increase in coverage of supplementation during the last round of data collection could partly be attributed to the inception of an all inclusive outreach programme.

De-worming not only promotes physical growth and cognitive development amongst children but also aides in anaemia prevention. A six month recall period was used to establish if the target children had received any drugs for intestinal worms. Analysis was thereafter undertaken for children aged 24 – 59 months. The findings show that 69.9% of children had been received this in September 2011 as compared to 65.1% in May 2011. Despite the slight improvement in de-worming, the coverage still falls short of the national target of 80.0% necessitating the need for health education on its importance.

According to the 2003 landmark Lancet Child Survival Series, exclusive breastfeeding up for the first six months of life and breastfeeding up to 12 months were ranked first; with timely initiation of complementary feeding ranked

[16] High Impact Nutrition Indicators
[17] Blanket Supplementary Feeding Programme
[18] Nutrition Strategies and Programes in Kenya: UNICEF &GOK. JUNE 2010
[19] Vitamin A supplementation National Target; 80.0%
[20] Caretakers reported that the children were given during routine supplementation as well as during illness

third in the prevention of mortality amongst children under five years of age. The report further indicates that these two interventions alone were estimated to prevent almost one-fifth of under-five mortality in developing countries. The survey thus sought to establish the levels of core IYCN[21] indicators and the findings are represented in the section that follows.

Timely initiation of breastfeeding *(within an hour)* was practiced by 70.6% of caretakers in Garbatulla district. This is just at the national target of 70.0%; an indication that it could change either way *(better or worse).*

Table 20: Initiation of breastfeeding after birth

Initiation of breast feeding after birth	%
Within 1 hr	70.6
After 1 hr but within 24 hrs	22.8
After 24 hrs	6.6

22.8% and 6.6% of caretakers initiated breastfeeding within 24 hours and after a day respectively.

Exclusive breast feeding rates of 69.4%[22] (C.I 60.8% - 78.1%[23]) were unveiled in the surveyed population. It is important to note that a 24 hour recall period with triangulation over the past 6 months was used to establish this amongst infants aged 0- <6 months. As earlier noted, majority of residents in Garbatulla belong to the Borana community. In this culture, mothers are expected to breastfeed their children up to three years of age. This thus explains the commendable continued breast feeding rates of 89.4%. Findings of other IYCN indicators were as follows:

a) Timely Complimentary feeding: **57.6%**

b) Children ever been breastfeed: **97.5%**

c) Children fed on colostrums: **96.0%**

The Infant and young child feeding practices in Garbatulla still have a long way to go in achieving impact in reducing mortality amongst many others. Indeed, as illustrated above, other than those indicators that surrounds the child bearing process such as feeding the child on colostrum or continued breastfeeding that is pegged on culture, most of the other indicators either lie below or exactly at the national benchmark. Sensitization on these key issues is thus of importance.

The Health and nutrition situation on the whole has played some part in the malnutrition rates unveiled. This is attributed to the high morbidity rates, low micronutrient supplementation as well as a compromised infant and young child nutrition practices

9.3. Food Security And Livelihoods

9.3.1. Livestock Ownership and Milk Production

The main residents in Garbatulla district are the Borana people who are mainly pastoralists with livestock herding being the main occupation (32.9%) of household heads. 70.0% of households own livestock. This thus underscores the significance of livestock in this area not only as a form of wealth but also as a source of food *(in form of milk and me*at), income[24] and dowry payment in times of marriage. The table below represents the mean number of livestock per household by type. The highlighted section indicates these quantities in the month of September 2011.

[21] Infant and Young Child Nutrition
[22] Above the NATIONAL TARGET OF 50.0%
[23] At 95.0% confidence interval
[24] Sale of livestock and livestock products for income accounts for 25.2% in September 2011

Table 21: Mean number of livestock owned per household since February – September 2011

Month in 2011	Cattle			Camel			Goat			Sheep			Donkey			Chicken		
	Feb	May	Sept	Feb	May	Sept	Feb	May	Sept	Feb	May	Sept	Feb	May	Sept	Feb	May	Sept
Mean No. per HH	12	11	**5**	14	7	**1**	21	15	**12**	20	14	**9**	3	2	**1**	6	6	**2**
Same (%)	29.4	28.6	5.1	29.4	64.5	11.1	9.3	12.8	3.7	15.1	9.3	1.7	65.1	65.1	57.2	19.8	23.8	7.3
Increase (%)	27.1	9.2	1.1	50.0	3.2	11.1	42.9	12.2	6.6	40.8	12.4	2.9	20.5	12.8	3.8	40.7	21.0	42.4
Decrease (%)	**43.5**	**62.2**	**93.8**	**20.6**	**32.3**	**77.8**	**47.8**	**75.0**	**89.7**	**44.1**	**78.3**	**95.5**	**14.5**	**22.1**	**39.0**	**39.6**	**55.2**	**50.3**

As illustrated in the table, the mean number of animals by type has decreased in the month of September 2011. The trends in livestock ownership by type have also indicated a steady decline since February 2011 except for chicken. The table below presents the development this since the month of February 2011.

An overall view of the statistics presented above shows that the proportion of most animals has decreased, with sheep accounting for the largest decline (95.5 %) followed by cattle (93.8%), goats (89.7%), camel (77.8%), chicken (50.3%) and donkeys (39.0%). Nevertheless, some households also reported an increase in livestock ownership while others remained constant. However, as illustrated above these proportions are less compared to that of the previous two months. Livestock changes were attributed to a number of reasons such as births, purchase, sale, wild animals as well as death due to disease or drought. An average of these changes amongst all animals was calculated and is presented in the figure 6 below. The figure only captures the key reasons of changes with animal deaths due to drought accounting for the highest portion (60.8%). The animals predominantly affected by these were cattle (91.2%), goat (80.9%) and sheep (80.2%).

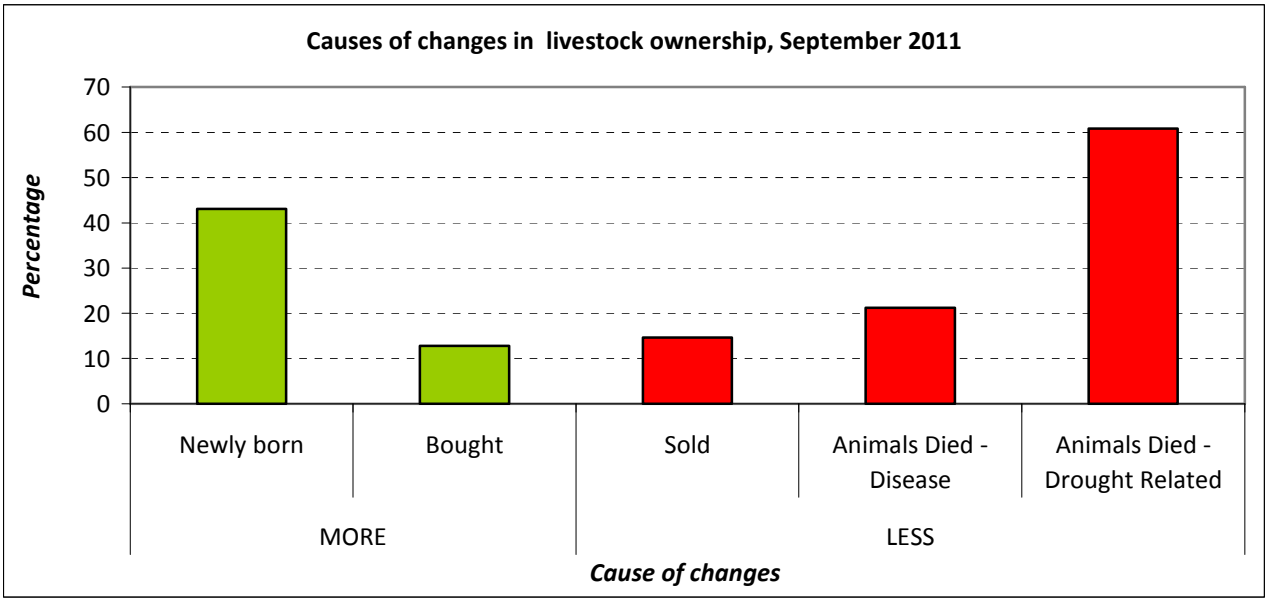


Figure 6: Causes of livestock changes; September 2011

Most death due to disease was amongst donkeys (46.4%) with; chicken (32.4%), sheep (30.1%) and goat (13.3%) being the main animals sold. Most households that reported an overall increase in livestock numbers were due to offspring (43.1%), with donkeys (73.3%) and chicken (52.4%) accounting for the highest portion of these.

During the data collection exercise, most households were away during the day either looking for fodder or having taken their animals to pasture. The average distance to forage, pasture and water for the livestock during the thirty days before the survey were 4.6, 7.2 and 5.0 kilometres respectively.

Out of the 354 (70.0%) households that owned livestock, only 20.6% milked these animals the day preceding the survey with the average amount of milk produced by cattle, goat and sheep being 0.1, 0.1 and 0.6 litres respectively. It is important to note that this is quite a little amount of milk produced bearing in mind the average household size of 5.7 persons. The mean amount of milk consumed by the household *(previous day to survey)* was 0.6 litres with the main source of this milk being purchase followed by gift and own production. Indeed, during the survey period, households reported to purchase powdered milk from the available shops at Ksh. 10.0 per table spoon. This was actually reported to be the main source of milk as most animals were away in grazing areas.

9.3.2. Household Dietary Diversity

Dietary diversity is a measure of a household's food access and consumption and has some association with a household's economic status. During the integrated survey in Garbatulla district, this measure was assessed through the use of the household dietary diversity score (HDDS) over a 24 hour recall. The table below indicates the trends amongst the various food groups since September 2010.

Table 22: Household dietary diversity by Food group; September 2010 – September 2011

	Sep-10	Feb-11	May-11	Sep-11
Cereals	99%	99%	99%	96%
Roots & Tubers	65%	50%	39%	59%
Vegetables	33%	41%	40%	32%
Fruits	12%	14%	10%	7%
Eggs	19%	12%	9%	6%
Meat	37%	32%	23%	20%
Fish	22%	9%	4%	16%
Legumes/Pulses	73%	70%	66%	75%
Dairy	85%	81%	77%	91%
Fats	90%	77%	91%	97%
Sugars	93%	95%	97%	98%
Condiments	40%	77%	88%	80%

The highlights in the table point out food groups that account for the highest percentages indicating the commonly consumed foods. It is important to note that most of these foods such as cereals, legumes/pulses and fats are provided in the general food rations. Other foods such as milk and condiments are purchased.

The mean dietary diversity score in September 2011 was 6.8. Further analysis was undertaken to classify these as either low, medium and high and compared to that of September 2010. The findings were as follows.

Table 23: Household Dietary Diversity score classification

MONTH	SEPTEMBER	
YEAR	2010	2011
Low dietary diversity: *(<= 3 food groups)*	7.7%	1.6%
Medium dietary diversity: *(4-5 food groups)*	13.1%	14.1%
High dietary diversity: *(>= 6 food groups)*	79.2%	84.3%

9.3.3. Sources of Food

Proportionate piling was used to determine household food sources retrospectively[25]. Overall, purchase, food aid and credit forms the predominant sources of food in the month of September as illustrated below. There is an increase in purchase of food since May 2011. This could be attributed to the provision of cash transfer to vulnerable households that could in turn have increased purchasing power.

[25] Recall period: 30 days to the survey

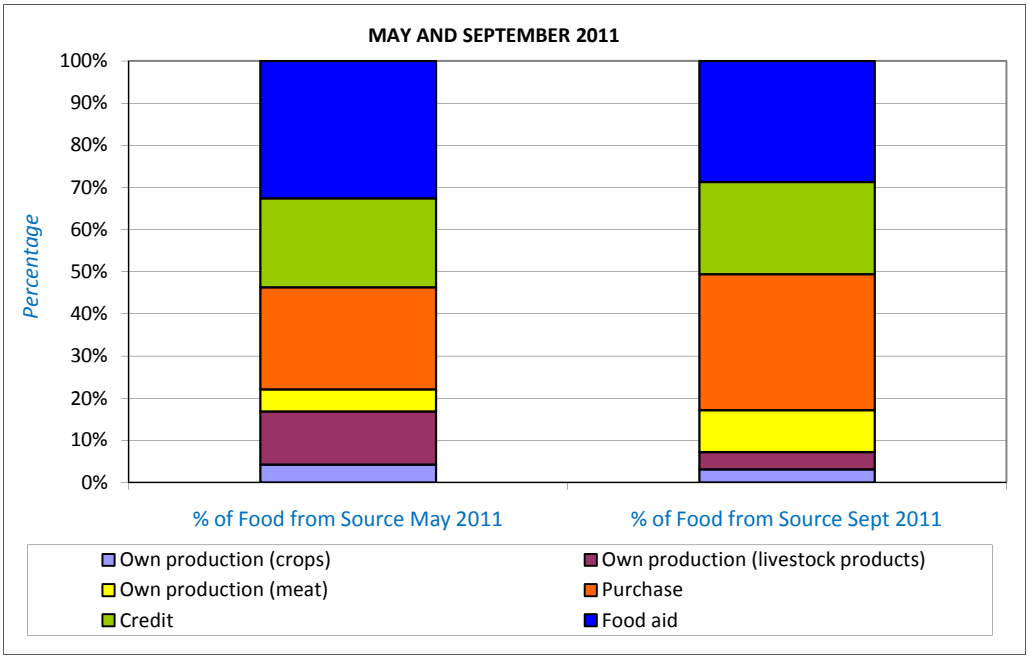


Figure 7: Sources of food in Garbatulla district

Most households reported to purchase that which was not available or not provided in the food aid ration *(for households targeted)*. This entailed food items such as condiments, milk and sugar. Indeed, consumption of powdered milk was high amongst this community with a table spoon going at ten shillings each. It is also important to remember that purchases in September 2011 account for the main source of food against a point in time where high food prices were ranked by an average of 36.9% as the highest, second or third highest stressor experienced. This stresses the meagre resources on the household that could eventually impact negatively on the household's food security status.

Food assistance mainly consists of cereals, pulses and oil. In Garbatulla district, this is supplied by the government and World Food Program through Action Aid. Distribution is done in various forms such as food for work. Direct food assistance is community targeted to vulnerable households in the area. Just as it was an important source of food in May 2011, food aid in September 2011 accounts for the second highest source of food. Unlike what was reported in May 2011, there was consistency in the frequency of supply of food assistance between May and September 2011.

Own production (crops, livestock production and meat) accounted for less than 10% each of food sources in Garbatulla district. This could probably be due to the drought situation that limited viability of most of these activities in parts of the district like Sericho division. As observed during the survey, the Ewaso Nyiro river water had spilled over into parts of Garbatulla district such as Malkadaka, Badana and Sericho. Some households in these areas had already begun using this water for other ventures such as farming and there concern was more in terms of sustainability of these projects.

9.3.4. Household Income and Expenditure

Proportionate piling was also used to determine household's income and expenditure. These two variables were determined separately. In both cases a thirty day recall period was used to determine the proportion of these retrospectively.

The figure below illustrates the various sources of income alongside the percentage of households. Livestock sales, unskilled wage labour and food aid sales form the three main sources of income as they account for the highest

percentages of the total income. The sale of livestock by close to half (54%) of the sampled households demonstrates an erosion of valuable assets to this community's livelihood. Food assistance is provided to buffer vulnerable households at critical points and an equivalent of day's dietary requirements is supplied. However, 38% of households sold part of the food assistance received to obtain other commodities. Informal interviews indicated that this was traded in mainly for oil, sugar and milk.

Unskilled wage labour accounted for 13.1% of the total income as reported by 38% of households.

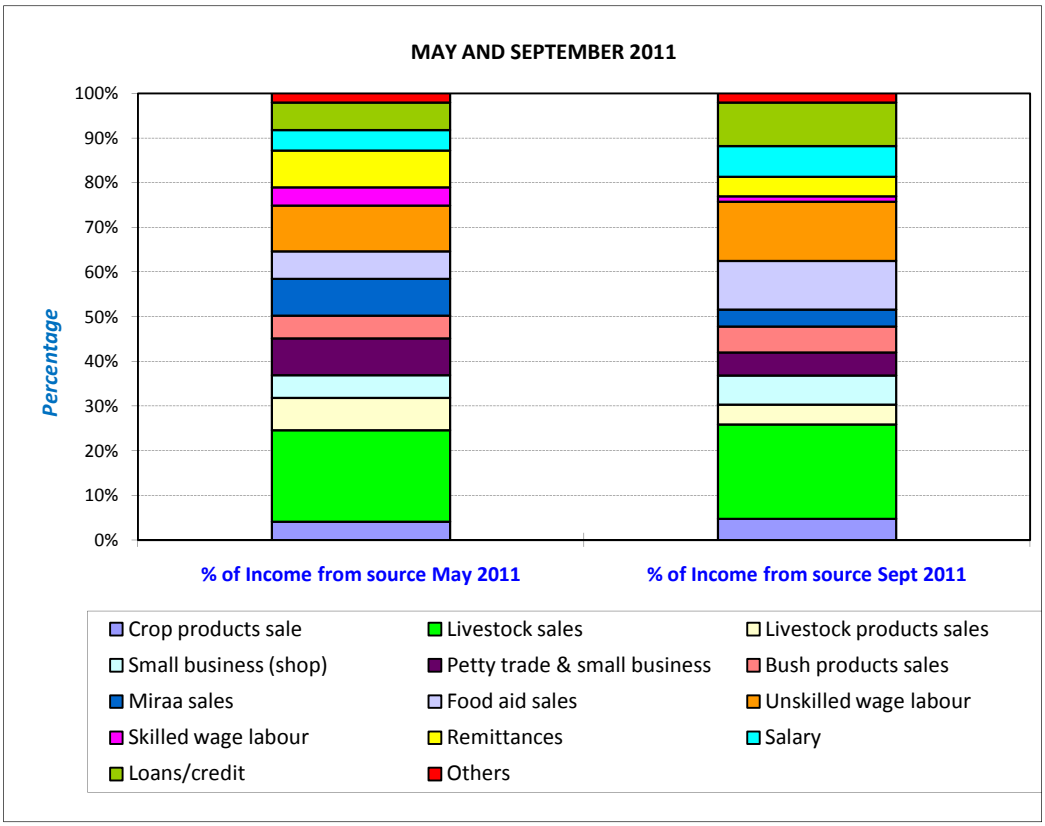


Figure 8: Comparison of household sources of income in Garbatulla district

The figure below also indicates that most (70.2%) of households spent their income on repayment of debt in September 2011. This is in line with households' income source whereby 39.0% relied on loans and credit to meet there requirements. Even though fuel and household items only accounted for 3.7% and 3.2% of household expenditure respectively, the proportion of households spending on these was more than 65.% in each case

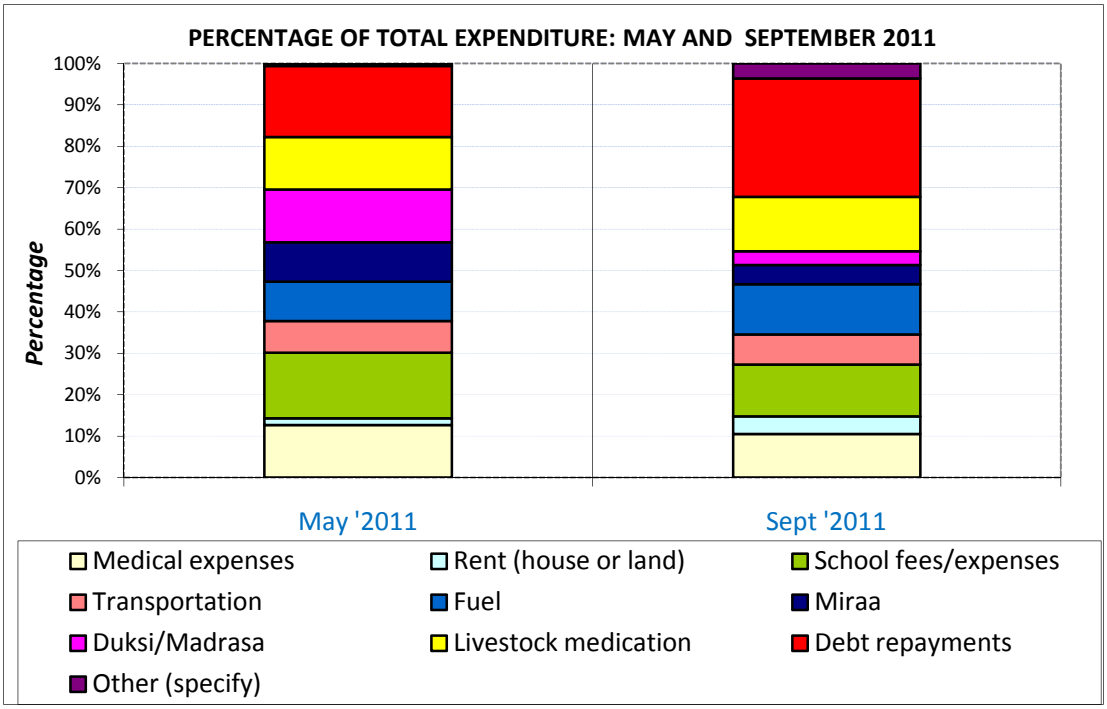


Figure 9: Comparison of household expenditure trends in Garbatulla district

Food stuffs accounted for the highest portion (62.3%) of the total expenditure in September 2011 distributed as shown in figure 10 below:

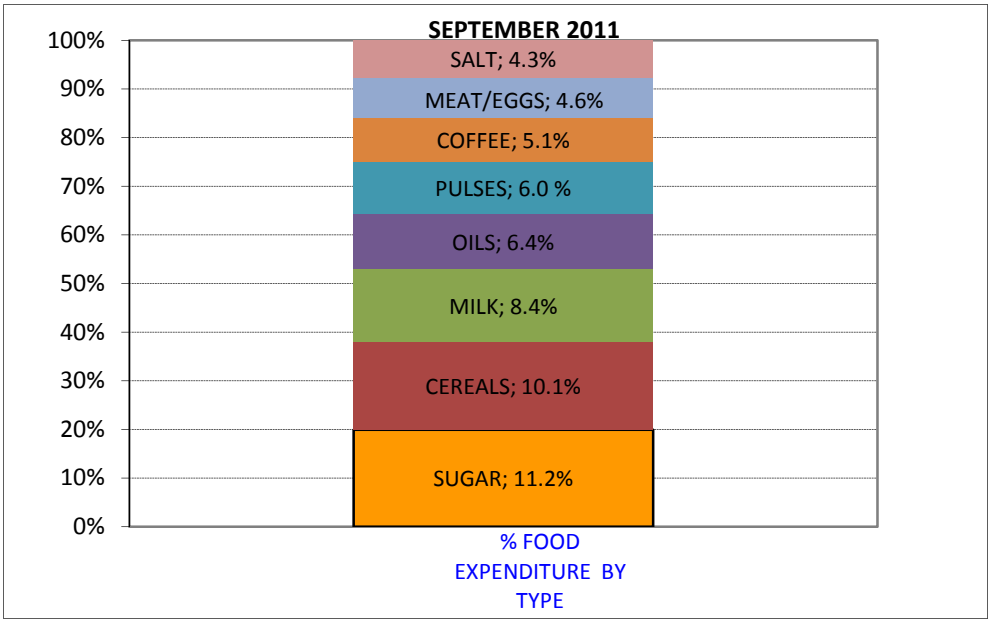


Figure 10: Percentage of food expenditure by type

Household expenses were either by cash (74.7%), credit (18.3%) or barter trade (6.9%) with the figure below showing prices of essential commodities.

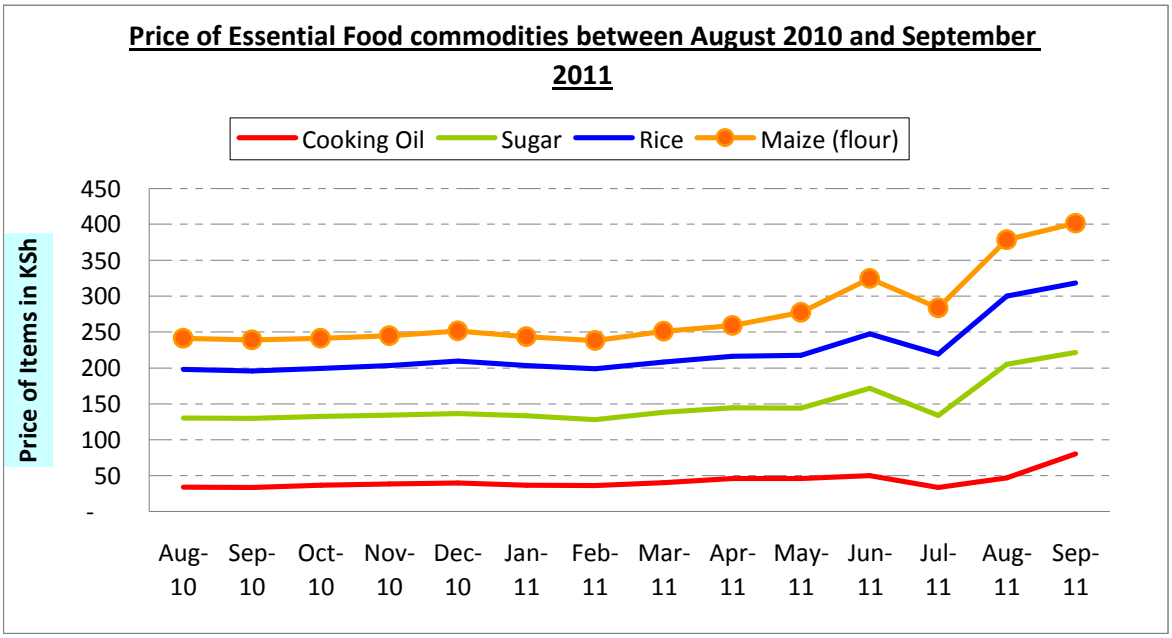


Figure 11: Price of essential food commodities: *August 2010 – September 2011*

9.3.5. Stress factors and coping strategies

A number of stress factors were experienced by households. These were determined over a three month period. Indeed a number of stressors were reported to have negatively affected households. In order to determine the extent of each, the various stressors were ranked in terms of priority. Findings of this are expressed below.

Table 24: Stress experienced by households

Kind of stress	Highest (%)	Second highest (%)	Third highest (%)
Reduced water availability	27.3	34.3	**38.3**
Reduced pasture	22.1	32.6	**45.3**
Unusual high level of livestock death	**48.0**	31.3	20.7
Unusual high level of livestock disease	18.2	36.4	**45.5**
Unusual high food prices	**45.6**	33.3	31.9
Reduced income	12.1	35.5	**52.3**
Reduced credit access	12.5	**57.5**	30.0

Low livestock birth (69.0%), unusual high level of livestock death (48.0%) and unusual high food prices were the stressors that were reported as having affected households the most and ranked as the highest. Other shocks of importance included reduced access to credit and reduced income. However, more than 60% of households had not recovered from either of these stresses. They undertook a number of measures to cope as shown below.

Table 25: Coping strategies employed by households in times of stress in 2011

	Feb-11	May-11	Sep-11
Ate less	5	11.1	6.4
Sold small animals	4.5	3.8	1.2
Spent less on food	3.5	5.7	3.7
Skipped days without eating	3	1.2	2.3
Borrowing	2	1.7	2.5
Sold large animals	4	0.9	1.9
Moved location	13	21	5.6

Spent less on NFI	1.5	4.3	5.0
Purchased on credit	8	8.2	11.9
Alternative income	3.5	3.6	5.6
Spent more on water	3	2.1	1.7
Spent savings	5	3	3.7
Relied on food aid	15.5	15.1	20.4

The main coping strategies employed by households in September 2011 were reliance on food aid (20.4%) and credit purchase (11.9%).

Worth noting is the proportion of households who did nothing to cope which had moved from 16.4% in May to 25.0% in September 2011. This could be an indication of exhaustion of most other possible coping mechanisms a factor that could have prompted the increase in reliance on food aid. As noted in the preceding sections, sale of food aid was a form of income. This therefore means that households not only relied on food aid for food but also as a source of income.

9.4. Water and Hygiene

General context

The drought situation was at the worst peak during the survey period. There were no rains reported in the communities for close to a year now. Surface water sources such as earth pans remained dry while some wells have been reported to have dried up. Notable improvement however was on River Ewaso Nyiro which was reported to have some water flow from rains in the upstream locations. This has accounted for livestock migration to areas along the river. Water trucking is ongoing to several locations where water sources have dried up.

Before the survey ACF carried emergency response program on water which included 6 main boreholes maintenance, distribution of PUR and Pot filters to 500 households accessing water from unsafe water sources.

Findings from Survey

Current water sources in Garbatulla district included boreholes, piped water (from borehole/spring), rivers, earth pans and water trucking. The water trucks were spotted in parts of Sericho division where access to other sources of water was limited. The aforementioned water sources were eventually grouped as either safe or unsafe. This grouping is purely based on the source of water and not so much on the safety from point of collection to consumption.

Table 26: Main water source for drinking, September 2011

SOURCE	n	%
SAFE		
Piped water system from borehole	306	60.7
UNSAFE		
Water trucking[26]	56	11.1
Unprotected shallow well	78	15.5
Earth pan/Dam	12	2.4
Water seller/ donkey cart	4	0.8
Others *like Rivers e.g. Bisan Athi and Ewaso Nyiro*	48	9.5

[26] Classified as unsafe as the original source could not established though most were from boreholes.

The figure below thus gives a graphical representation of the situation over a period of time.

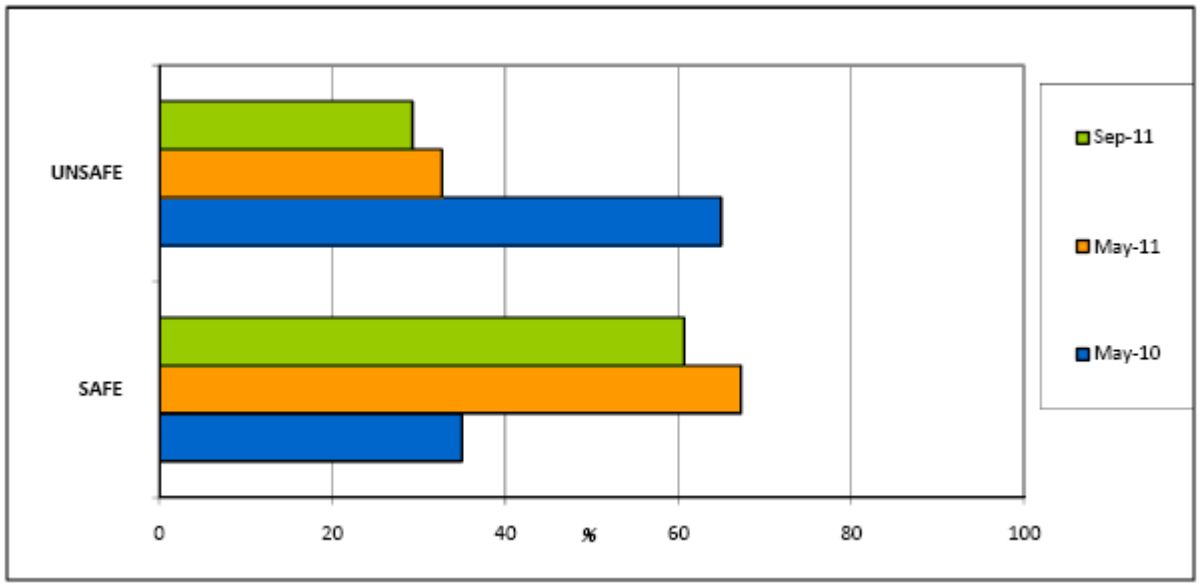


Figure 12: Water quality trends in Garbatulla District

No direct assessment was done to establish the causes of increase in utilization of safe water from 2010 to 2011. However, successive failure of rains has contributed to lack of recharge of open water sources and subsequent drying up of most unsafe water sources like earth pans in 2011 could probably be inferred to as a contributing factor to this change. Additionally, observations in Duse village during the September 2011 data collection exercise indicated breakdown of safe water sources. Sampled household in this area (Duse) thus relied on earth pans as their main source of drinking water contributing to the decline in the consumption of safe water.

Table 27: Alternative water sources

WATER SOURCES	%
Piped water source	**30.5**
Earth pans	**8.5**
Unprotected shallow well	**33.3**
Water trucking	**9.2**
Others	**17.0**

During the past three months to the survey, 28.0% of households had relied on alternative water sources for drinking as indicated in the table to the left. A number of reasons were cited for the change in water source. These include water drying up at source (50.4%), water availability at a nearby source (9.9%) as was the case in areas near *Ewaso Nyiro* River and breakdown of water source (39.0%) like in Duse village. 62.3% of sampled household pay for water with the price per 20 liter jerrican ranging from 2 – 30 shillings per site with other sections paying a monthly fee of Kshs 300- 400.

SPHERE 2011 recommends a maximum distance of 500 meters (30 minutes) from any household to the nearest water points. Most households (76.8%) in Garbatulla district were within these standards with specific highlights indicated in the figure below. However, 23.2% spent more than 30 minutes to the nearest water point. A case in point is that observed at Duse village in Kinna division. In this area, the water piping system was malfunctioning and the households had to walk long distances to an alternative water source in Molit.

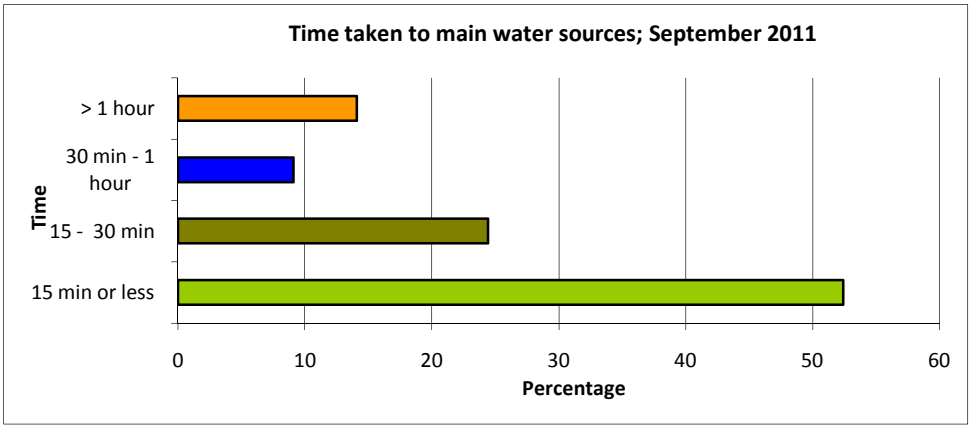


Figure 13: Time taken to main water source for drinking

Excessive queuing time at water points are an indicator of insufficient water availability due to either an inadequate number of water points or inadequate yields at water sources[27]. According to these standards, queuing time at water points should be no more than 30 minutes. 58.9 %of household in Garbatulla district queue for water with the queuing time ranging as indicated in the table below.

Table 28: Queue time at the water source

Duration of queuing	May 2011 %	Sept 2011 %
Less than 15 minutes	34.1	20.2
15 – 30 minutes	30.8	55.2
More than 30 minutes	35.1	24.6

Even though there is a decline of about 10.5% on the households that had to queue for longer than the SPHERE recommended standards, the queuing time at these points predisposes these households to a number of risks. These include consumption of water from unprotected water sources as well as reduced time in undertaking other compelling tasks for survival such as appropriate child care, income generating activities amongst others like protection issues.

The mean amount of water consumed by households per day excluding what was used by animals was 55.16 liters. Based on average household size of 5.7; the amount of water utilized per person per days translates to 9.67 liters. This falls short of both the SPHERE and national standards of 15 and 20 liters per person per day respectively. On the whole, more than 90% of sampled households consumed less than the SPHERE (94.6%) or national standards (99.6%) in September 2011. The figure below highlights the trends in per capita water consumption. A number of factors could attribute to the aforementioned. These include increase in the cost of water (16.7%), long distances and queuing time at water points.

[27] The Sphere project; Humanitarian Charter and Minimum standards in Humanitarian Response; 2011

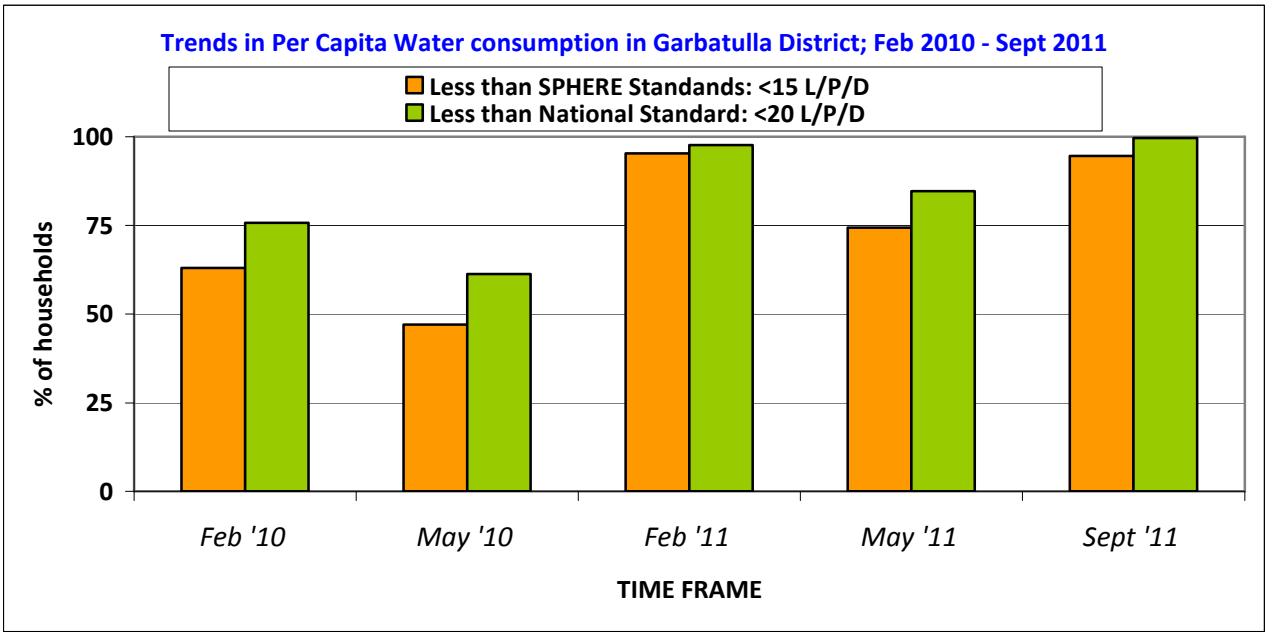


Figure 14: Trends in per capita consumption; February 2010 – September 2011

Water treatment prior to consumption is important in minimizing risk to water related illness. In the sampled population, quite a large proportion (70.2%) did nothing to the water before consumption. It is important to highlight that even though some of the water sources were safe, contamination between point of collection and consumption are still vital factors to consider before consumption.

Table 29: Water treatment methods

WATER TREATMENT METHODS	%
Nothing	70.2
Boiling	9.9
Chemicals e.g. *Alum stone/chlorination*	15.2
Traditional tree	11.1
Sitting to settle	1.4
Pass through cloth	1.4
Others	1.8

Chemicals were the main form of water treatment methods. ACF is one of agencies that supported communities with no safe water access with supply of water treatment materials and reagents such as PUR sachets and pot filters.

Table 30: Unsafe water sources vs. water treatment methods in Garbatulla district, September 2011.

WATER SOURCE	n	WATER TREATMENT	
		Nothing (%)	Sitting to settle (%)
Water trucking	56	60.7	23.2
Unprotected shallow well	78	64.1	12.8
Earth pan	12	16.7	0.0
water seller	4	75.0	0.0
Others	48	43.8	14.6

Further analysis was undertaken on the water treatment options against the unsafe sources of water. The table to the left highlights these indicating that most of the households getting their water from water trucking, unprotected wells and water sellers actually did nothing to the water before consumption

It is commendable to note that most (95.8) households stored water in closed containers.

Hand washing practices were assessed during this survey because of its importance in eliminating the faecal-oral route of infection transmission. Hands washing after visiting the latrine accounted for very high percentages of 92.7% mainly due to the Muslim culture of most residents. Other relatively important hand washing times reported were before eating (87.7%), before cooking (62.5%), after taking children to the latrine (20.2%), before breastfeeding (19.2%), when dirty (7.5%) or after handling animals (4.2%). Effective hand washing entails the use of clean water and an effective soap or alternative such as ash. In Garbatulla, this was practised by only 24.6 as most (43.8%) used only water or soap and water when they could afford it (31.5%) creating a gap in effectiveness of the process.

Further analysis was undertaken to determine hand washing practises amongst households with children reporting to have diarrhoea in the past two weeks to the survey and these are represented below.

Table 31: Households reporting diarrhoea cases vs. hand washing practices

HAND WASHING TIME	%
Doesn't wash hands	1.4
When dirty	5.5
Before latrine	21.9
After visiting the toilet	91.8
Before cooking	67.1
Before eating	89.0
Before breastfeeding the child	17.8
After taking the child to the toilet	21.9
After handling animals	2.7

WHAT WAS USED DURING HAND	%
Only water	39.7
Water and soap	21.9
Soap when households can afford	38.4

10. DISCUSSIONS AND CONCLUSION

Action Against Hunger has undertaken a number of activities in Garbatulla since February 2010. The agency in collaboration with various line ministries undertook an assessment at inception. This acted as the bench mark for the agency upon which to peg its program implementation and achievements. Monitoring the situation has also been a key concern of ACF in its operational areas. It is on this account that a sentinel surveillance site was set up in the district to gather early warning data for action. Four rounds of these have so far been undertaken in Garbatulla district with two integrated SMART surveys. The highest malnutrition rates were noted in May 2011. At that time, above emergency GAM and SAM levels of 21.6% and 4.3% respectively were observed. These rates triggered responses to include an all inclusive outreach package, rehabilitation of boreholes, amongst many other responses. A blanket supplementary feeding program was also started in the area with the first phase targeting children less than three years of age, and lactating mothers of infants less than 6 months.

It is important to note that the February and May 2010/2011 findings presented below are from the surveillance system. These findings use a different methodology and have thus been presented here to act as a proxy but not for comparison purposes. The current global acute malnutrition rate (18.6% (14.8 – 22.9)) is above WHO emergency threshold *(see trends in the table below)*. Even though the results indicate a numerical change on the levels when compared to September 2010; the change is not statistically significant (p<0.005).

Table 32: Results of survey and surveillance in Garbatulla District, WHO standards

	GAM[28]	MAM[29]	SAM[30]
FEB 2010: *SSS*	17.2% (12.4 - 23.2)	13.4% (9.1 - 19.1)	3.8% (2.4 - 6.1)
MAY 2010:*SSS*	14.0% (10.4.-18.7)	12.6% (9.2 – 17.1)	1.4% (0.6 - 3.2)
SEPT 2010 *SMART Survey*	14.2% (11.9 – 16.9)	12.7% (10.5 – 15.3)	1.5% (0.8 – 2.8)
FEB 2011: *SSS*	15.6% (12.4 - 19.4)	14.7% (11.6 - 18.5)	0.9% (0.3 - 2.8)
MAY 2011:*SSS*	21.6% (17.0 - 27.1)	17.3% (13.4 – 22.1)	4.3% (2.1 – 8.6)
SEPT 2011 *SMART Survey*	**18.6%** **(14.8 – 22.9)**	**15.6%** **(12.4 – 19.5)**	**3.0%** **(1.8 – 4.8)**

(Key: *SSS*- Small Scale survey)

The UNICEF conceptual framework of malnutrition can be used to explain the probable causes of malnutrition in this area. Diseases weaken an individual immune system causing them to have other side effects such as reduced food intake and diarrhoea. In Garbatulla district, almost half of the sampled children had suffered from one form of illness or another such as diarrhoea, vomiting, malaria symptoms and cough. Diarrhoeal cases amongst these age groups were mainly managed through oral rehydration salts with the use of micronutrient supplementation such as zinc being at merely 4.0%. This fell short of the national bench mark of 50.0%.

One of the core functions of vitamin A is to boost an individual's immunity thence the importance of supplementation. It is therefore commendable to note that supplementation trends of these have indicated commendable trends just like those of measles immunization. Nevertheless, awareness on Vitamin A is of importance as the current rates of 81.9% are slightly above the national target of 80.0% and could shift either way minimizing efforts gained so far. The same applies to de-worming amongst children aged 24 – 59 months where the coverage of 68.9% way below the national bench mark of 80.0%

Optimal infant and young child nutrition, especially exclusive breastfeeding is estimated to prevent potentially 1.4 million deaths every year among children under five[31]. Infant and young child feeding nutrition in this area still

[28] Global Acute Malnutrition
[29] Moderate Acute Malnutrition
[30] Severe Acute Malnutrition
[31] 2008 Lancet Nutrition Series

needs to be improved. This is because most of the core indicators lie exactly at the national threshold or below. Findings so far have indicated that exclusive breastfeeding rates and timely initiation of breastfeeding are ok. However, complimentary feeding rates of 57.5% is still of concern as this contributes to stunting in the first two years of life.

The food security and livelihood situation in this area is compromised. The main source of livelihood for household heads was livestock herding followed by daily wage labour. Livestock quantities had decreased with most declines reported amongst sheep, cattle and goats. Livestock deaths *(due to drought or disease*) were noted as the main causes for this reduction. Food aid and purchase were the main sources of food. The food aid was sold to purchase other items that the household needed. These factors coupled with stresses experienced by the households at this point in time predispose them further to risks of malnutrition. The most employed coping strategies were reliance on food aid and credit purchase.

The general water and hygiene situation require increased intervention to curb further deterioration. On the whole, most households (60.7%) relied on safe water sources for drinking. However, significant number of households reported to seek alternative water sources three months to the survey. Reported reasons behind these changes included water drying up at the source and breakdown of water source. Most of these households were therefore forced to seek alternative water from unsafe water sources due to lack of access to safe water from the normal sources increasing the number of people accessing water from unsafe water sources. More so it was noted that majority of the households (70.2%) do not treat water contributing to risk of water borne diseases.. Although there was commendable number of households practices good methods of water storage, there was no water treatment to confirm safety of water accessed at household level. Despite the fact that hand washing at critical points was commendable, appropriate use of soap and water to break the faecal oral route was low at 24.4%. An average of 9.67 liters of water was utilized per person per day. This fell short of both the SPHERE and national standards of 15 and 20 liters per person per day respectively. All the above factors continue to predispose the community to underlying causes of malnutrition.

The nutrition situation in Garbatulla district can be summed up as being in emergency phase. This is attributed to the various factors discussed above such as disease, inadequate maternal and child health practices, poor water and sanitation situation as well as an unstable food security and livelihood circumstance.

11. RECOMMENDATIONS

Malnutrition rates in Garbatulla district lie above emergency thresholds. As illustrated in the preceding chapters, these are attributable to a number of interrelated factors that need not only the intervention of one stakeholder but all. Based on the findings of the study, the following recommendations are put forward.

SHORT TERM RECOMMENDATIONS

Health and Nutrition

- Undertake the blanket supplementary feeding program targeting all children under five years of age, pregnant and lactating mothers with infants less than 6 months of age
- Undertake an appropriate health and hygiene promotion programme based on the low percentage (24.4%) of appropriate hand washing practices and water treatment methods
- Inclusion of micronutrients such as Zinc in the KEMSA kit. (Zinc in diarrhea management -1.4%)
- Health education on the importance of micronutrient supplementation and de-worming is necessary. This is because the findings fall below the stipulated national targets.
- A "new[32]" population was noted during the survey in areas along Ewaso Nyiro River and Escort. The population seemed quite malnourished with most hospital referral coming from this area. The feasibility

[32] Population comprised of pastoralist families that had moved from other areas in search of pasture. Most of those in Escort were believed to be from Somalia

on inclusion of this age group into BSFP[33] should be looked into. Meanwhile, the DC should present this to the special programs department for additional inclusion in the GFD[34]

- Further strengthening of IYCF[35] practices especially complimentary feeding practises as coverage of this was low.

Food Security &Livelihoods

The household diversity score indicates less consumption of nutritious foods such as vegetables and fruits. To foster intake and availability of this, the feasibility of having a voucher system to augment what is available while improving market economy is necessary.

Water and Sanitation

- Although a good number of people access safe water, proper water treatment and handling promotion should be addressed at household level to ensure safe water consumption in all areas (*whether with access to safe or unsafe wate*r).
- Provide maintenance to the broken down safe water sources. This will help to increase per capita water consumption and reduce distances to water sources while at the same time maintain access to safe water.
- Water trucking in selected areas on short term basis especially where alternative water sources are very far or costly for community to afford like in Duse.

MEDIUM TERM RECOMMENDATIONS

Health and Nutrition

- Health education on the importance of micronutrient supplementation and de-worming is necessary. This is because the findings fall below the stipulated national targets.
- Further strengthening of IYCF[36] practices especially complimentary feeding practises as coverage of this was low.

Food Security &Livelihoods

- Diversification of livelihoods options. The massive death and dwindling numbers of livestock in the district is a pointer to change of livelihood options. There is a need to integrate the high number of pastoralist drop out clusterered along satellite centers for sustainable livelihood activities. For example, working with groups and individuals on income generation activities based on sound business proposals can diversify income sources of the households

Water and Sanitation

- Hygiene promotion campaigns on water treatment to address the low coverage of appropriate water treatment practices.
- Establishment of new water sources to increase per capita water consumption and reduce distances to water sources while at the same time maintain access to safe water.

[33] Blanket supplementary Feeding
[34] General Food Distribution
[35] Infant and Young Child Feeding
[36] Infant and Young Child Feeding

LONG TERM RECOMMENDATIONS

Health and Nutrition

- The surveillance system has been able to tap findings so far and enable the various stakeholders like ACF take appropriate action before the situation worsens. The need to continue with this system is thus necessary
- Continue to undertake the High Impact Nutrition Interventions in the area while drawing lessons learnt for future programming and action

Food Security &Livelihoods

- Own production *(accounts for less than 15%)* of food sources. The feasibility of establishing a recovery program while taking advantage of water from *Ewaso Nyiro* river should be looked into to minimize reliance on food aid
- The community in Garbatulla highly relies on livestock as a source of their livelihood. Quantities of these have continued to decline creating the need for targeted restocking. As such, Selective restocking with pregnant browsers (i.e. in-kid/in-calf browsers Goats and Camels) as these are better suited to cope with the impact of the drought than the grazers (sheep and goats)
- Fodder Production to protect the core breeding stock of the communities, fodder production along riverine areas would complement this activity and reduce the impact of the recurrent drought on the core breeding stock

Water and Sanitation

- In order to address the water and hygiene gaps effectively, long term solution should focus on IWRM with strong focus to community involvement and linkage to other water sector stakeholders. Some of proposed interventions are establishment and strengthening of existing water user committees to be able to handle conflicts arising at various water points. At a higher level, there is need to capacity build the water user committees to mobilize resources such as funds in future to improve water access and hygiene challenges.

12. ANNEX

Annex 1: SMART Survey Anthropometric Form (September 2011) Target group 6-59 months old children

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

Child no.	HH no.	Sex F/M	Age in Mths	Weight ##.# kg	Height ###.# cm	Oedema (Y/N)	MUAC ##.# cm	Age verified by: 1= Card 2= Recall	Measles Vaccination 0=Not immunized 1= Card 2= Recall	In the last one year how many times received Vitamin A	In the last six months has the child received drugs 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			
													Diarrhoea 0= No 1= Yes	Fever with chills like malaria 0= No 1= Yes	Fever, cough, difficult breathing 0= No 1= Yes	Other (specify) 0= No 1= Yes
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																
11																
12																

Annex 2: Calendar of Events

MONTH	Seasons	2006	2007	2008	2009	2010	2011
JANUARY	BIRRA, HOT AND DRY SEASON		56	44 Post election violence	32	20 New year	8 New year
FEBRUARY			55	43	31	19	7
MARCH			54	42	30 Cholera outbreak in Gafarsa	18	6
APRIL	GAN, LONG RAINS		53 End of Drought	41	29 Samburu/Boran a conflict	17	5
MAY			52	40	28	16 Electronic voter registration	4
JUNE	HAGAY, ADOLES, COLD SEASON		51	39	27	15 Electronic voter registration	3
JULY			50	38	26	14 Referendum campaigns	2
AUGUST			49	37	25	13 Ramadan, vote of Referendum	1
SEPTEMBER	BON , DRY SEASON		48 Ramadhan	36 Beginning of Ramadhan	24 Ramadhan	12 Id al Fitri	0
OCTOBER	AGAY, SHORT RAINS	59 Ramadhan	47 IDDul-Fitr, Heavy rains start	35 End of Ramadhan	23 Id al Fitri	11	
NOVEMBER		58 IDDUL-Fitr and Referendum	46 GBT becomes a District	34 Obama elected as USA president	22	10 Idul Adha	
DECEMBER		57 **Start of Severe Drought**	45 **General Election**	33	21	9	

Annex 3: Cluster Mortality Questionnaire

Division: _____ Location: _____ Sub location:

_____ Date: _____ Cluster number: _____Team number: _____

HH	Current HH Member		Current HH members 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									
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18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
32									
Total									

Annex 4: Household enumeration data collection form for a death rate calculation survey

District : _____Division:_____Location:_____Village: _____

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

	1	2	3	4	5	6	7	8
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 *(M/F)*	Date of birth/or age in years	Born during recall period?	Died during the recall period	Cause of death *(use codes below)*
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		

Cause of death codes:

1: Watery diarrhoea 2: Bloody diarrhoea 3: Measles 4: Fever with chills like malaria 5: Fever, cough, difficulty in breathing
6: Malnutrition 7: *Others specify:*_____

Annex 5: Survey movement plan and sampled clusters

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
TEAM 1: *DAN*	**Garfasa Market 2**	**Badana**	**Didimtu**	**Bisan Dero**	**Rapsu**	**Jillo Dima**	**Boji South**
TEAM 2: *PURITY*	**Garfasa Market 4**	**Biliqi Nur**	**Modogashe**	**Mullo**	**Koticha Cb**	**Kinna Town**	**Matagari**
TEAM 3: *MARTIN*	**Garfasa Market 6**	**Sericho North**	**Central B**	**Muchuro South**	**Koticha B**	**Barambate**	**Koropu**
TEAM 4: *ABDI M*	**Forty Four**	**Sericho North**	**Bulla Juu**	**Kombola Noth**	**Koticha D**	**Shauri Yako**	**Kiwanjani**
TEAM 5: *ELSY*	**Siribde**	**Sericho South**	**Eldera**	**Elman**	**Cherab Dicha**	**Taqwa**	**Town**
TEAM 6: *FLORENCE*	**Lalafto**	**Sericho South**	**Belgash**	**Escort**	**Kone Kallo**	**Bulla S**	**Duse**

VILLAGE	CLUSTER
Boji South	1
Boji North	RC
Matagari B	2
Koropu	3
Demo B	RC
Kiwanjani	4
Town	5
Escort	6
Elman	7
Gafarsa Mkt 2	8
Gafarsa Mkt 4	9
Gafarsa Mkt 6	10
Muchuro South	11
Kombola North	12
Bisan Dero	13
Mullo	14
Madina	RC
Koticha B	15
Koticha CB	16
Koticha D	17
Rapsu B	18
Cherab Dicha	19
Jillo Dima	20

VILLAGE	CLUSTER
Kinna Town	21
Duse	22
Kone Kallo	23
Yaq-Barasadi	RC
Shauri Yako	24
Bulla Town	RC
Taqwa	25
Bulla S	26
Barambate	27
Eldera Tc	28
Belgash	29
Biliqi Nuru	30
Sericho North	31, 32
Sericho South	33, 34
Modogashe	35
Didimtu	36
Central B	37
Bulla Juu	38
Fourty Four	39
Siribde	40
Lalafto	41
Badana	42