Save the Children®

Government of Kenya
MOMS/MOPHS

NUTRITIONAL ANTHROPOMETRIC SURVEY
ELWAK, KOTULO, WARGADUD AND SHIMBIR FATUMA DIVISIONS
MANDERA CENTRAL DISTRICT
MARCH 2010

FINAL SURVEY REPORT

BY

SAVE THE CHILDREN UK – KENYA PROGRAM

AND

MINISTRY OF MEDICAL SERVICES/MINISTRY OF PUBLIC HEALTH AND SANITATION

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List of abbreviations

ALRMP	Arid Lands Resource Management Project
ANOVA	Analysis of Variance
ARTI	Acute Respiratory Tract Infections
ASAL	Arid and Semi-Arid Lands
CHW	Community Health Worker
DHMT	District Health Management Team
CI	Confidence Interval
CMR	Crude Mortality Rate
COCOP	Consortium of Co-operating
CSB	Corn Soy Blend
CTC	Community Based Therapeutic Care
DSG	District Steering Group
ENA	Emergency Nutrition Assessment
EPI	Expanded Programme on Immunization
FFA	Food For Assets
GFD	General Food Distribution
GoK	Government of Kenya
HEA	Household Economic Approach Assessment
HH	Household
IDP	Internally Displaced Person
ITNs	Insecticide Treated Nets
KEPI	Kenya Expanded Programme on Immunization
KFSM	Kenya Food Security Meeting.
KFSSG	Kenya Food Security Steering Group
MoH	Ministry of Health
MoMS	Ministry of Medical Services
MoPHS	Ministry of Public Health and Sanitation
NCA	Nutrition Causal Analysis
NCHS	National Centre for Health and Statistics
OTP	Outpatient Therapeutic Programme
PHC	Primary Health Centre
PLW	Pregnant and Lactating Women
PPS	Probability proportional to size
SC	Stabilization Centre
SFP	Supplementary Feeding Programme
SMART	Standardized Monitoring and Assessment of Relief and Transitions
TFP	Therapeutic Feeding Programme
U5	Under Five Years Old
UMR	Underfive Mortality Rate
UNICEF	United Nations Children's Fund
URTI	Upper Respiratory Tract Infection
WFH	Weight for Height
WFP	World Food Programme
WHM	Weight for Height Median
WHO	World Health Organisation

1. SUMMARY OF FINDINGS

INTRODUCTION

Mandera Central is one of the districts that form the North Eastern Province (NEP) and is one of the 19 districts gazetted as part of the Arid and Semi-Arid Lands of Kenya (ASAL). The district is located in the North West horn of Kenya bordered by Mandera East District and Somalia to the east, Mandera West District and Wajir North District to the west, Wajir District to the south and Ethiopia to the north. The town of El wak is the District headquarter, which administratively consists of 7 divisions including El wak, Rhamu, Rhamu Dimtu, Ashabito, Shimbir Fatuma, Wargadud and Kotulo. Save the Children UK operates in 4 of the 7 divisions, namely; El wak, Shimbir Fatuma, Kotulo and Wargadud. Within the four divisions there are a total of 5 Government of Kenya (GOK) health facilities including El Wak district hospital. The projected population for the survey area is 64,916[1]

Generally, the district is characterized by high vulnerability to shocks and very low resilience. The entire district has been continuously affected by recurrent climatic shocks place stress on the region as a whole. As a consequence of recent drought, conflict and high food prices, the community are exposed to greater risk of food insecurity and with it malnutrition.

AREA COVERED

Save the Children in collaboration with Ministry of Health has been carrying out nutrition support interventions in Mandera Central District since August 2007. In order to gain a more accurate picture of the health and nutritional situation as well as to constitute a nutrition surveillance system, Save the Children together with MOH undertook a nutrition survey between 8th - 19th March 2010 covering El wak, Kotulo, Wargadud and Shimbir Fatuma divisions.

SPECIFIC OBJECTIVES

The survey aimed at estimating the;

- The prevalence of acute and chronic malnutrition in children aged 6-59 months;
- Crude and under five mortality rate and causes of death;
- Proportion of households with access to improved water and sanitation;
- Coverage of the general food distribution in terms of frequency and content;
- Food availability and access at HH level;
- Coverage of blanket supplementary feeding programme (BSFP)
- Coverage of measles and BCG vaccination among target children;
- Coverage rate of Vitamin A. capsules distribution;
- Morbidity rates children 6-59 months and pregnant women and mothers with <5 years children 2 weeks prior to the survey;
- To recommend appropriate interventions based on the survey findings;

METHODOLOGY

Standardized Monitoring and Assessment of Relief and Transitions (SMART) survey methodology was applied in the planning, training, field data collection and analysis of the anthropometric and mortality surveys. Children aged between 6 – 59 months were targeted. A total of 35 clusters were selected and 474 households were visited. Data was collected on anthropometry, morbidity, immunization status, Vitamin A supplementation, deworming status, coverage of BSFP, General food Distribution (GFD) and Food security and Livelihoods. A total of 952 children were surveyed, however due to incoherence in certain records, some children were excluded in the final anthropometric data analysis based on WFH. The final analysis therefore comprised of 932 children after exclusion of 20 records based on WHO 2006 reference standards.

[1] Figures obtained from the District Development Office- Mandera Central.

MAIN RESULTS

Table 1: Acute malnutrition and mortality rates

Index	Indicator	Result
WHO(2006) N=932	*Global Acute Malnutrition* W/H< -2 z and/or oedema	(245) **26.3** % (23.1 – 29.4 95% CI)
	Severe Acute Malnutrition W/H < -3 z and/or oedema	(40) 4.2 % (3.0 - 5.4 95% C.I.)
NCHS(1977) N=935	*Global Acute Malnutrition* W/H< -2 z and/or oedema	(235) 25.1 % (21.5 - 28.8 95% C.I.)
	Severe Acute Malnutrition W/H < -3 z and/or oedema	(15) 1.6 % (0.9 - 2.3 95% C.I.)
MUAC N = 968	*Global Acute Malnutrition* *MUAC <125mm and/or oedema*	(86) 8.9%
	Severe Malnutrition MUAC <115cm and/or oedema	(10) 1.0%
Total Crude Mortality Rate (90 days recall) /10,000/day Under Five Mortality Rate (90 days recall) /10,000/day		(2997) 0.28 (0.10-0.46) (95% CI) (1035) 0.46 (0.04-0.89) (95% CI)

Table 2: Morbidity

Illness	Number (n=327)	Percentage
Diarrhoea	62	19.0%
Vomiting	59	18.0%
Fever with chills like Malaria	223	68.2%
Fever, cough, difficulty breathing	207	63.3%
Intestinal parasites	18	5.5
Measles	3	0.9
Eye infections	11	3.4%
Skin Infections	25	7.6%
Accident	2	0.6%
Malnutrition	2	0.6%
Stomach ache	21	6.4%
Tooth ache	2	0.6%
Others	7	2.1%

Table 3: Immunization Coverage and Vitamin A supplementation

Measles Immunization 9-59 months (n=932)	By card	(472) 50.7%
	According to caretaker	(358) 38.5%
	Not immunized	(98) 10.5%
OPV 1 (n=968)	By card	(494) 51%
	According to caretaker	(383) 36.9%
	Not immunized	(89) 9.2%
OPV3 (n=968)	By card	(482) 49.8%
	According to caretaker	(371) 38.3%
	Not immunized	(113) 11.7%
Vitamin A (n=968)	By card	(293) 30.3%
	According to caretaker	(368) 38.0%
	Not immunized	(294) 30.4%
	Don't know	(13) 1.3%
BCG scar (n=968)	Present	(819) 84.6%

Table 4: Deworming

[N = 968]	Given	(138) 14.3%

Table 5: Food Aid per Household

	N:	% HH
Population surveyed that are registered for GFD	469	78%

Table 6: Demography of Households

	N: 469	% HH
HH with Residents	457	97.5%
Others	12	2.6%

DISCUSSION

Despite some slight improvement (not statistically significant) in the nutrition situation GAM of 26.3 %(23.1-29.4% 95%CI) and SAM of 4.2 %(3.0-5.4 95%) compared to 2009 GAM of 30.9% (26.9 -35.3 95% CI) and SAM of 7.1% (5.1-9.7 95% CI), the rates of malnutrition in Mandera central still remain high and above emergency thresholds. The mortality levels remained below emergency levels for both crude mortality and under five; 0.28/ 10,000/day and 0.46/10,000/day respectively.

High rates of morbidity, poor access to health care, consumption of unsafe water, inadequate hygiene, and sanitation and low levels of diet diversity were some of the main factors contributing to the high rates of acute malnutrition in the District. These factors have persisted over a number of years, further aggravated by the drought in 2008/2009 and this has maintained the rates of acute malnutrition at very high levels.

According to the 2009 short rains assessment, the district received adequate amounts of rainfall. However, this was not evenly distributed in all parts of the district and pasture regeneration has been poor even in areas perceived to have received adequate rainfall. This means that it will take some time before the pastoralists fully recover.

RECOMMENDATIONS

Health and Nutrition

Immediate

- Scale up uptake and access to treatment and immunization in all divisions in Mandera central.
- Continue implementing the IMAM programme and where applicable start up new outreach sites.
- Scale up community detection and referral of children with acute malnutrition.
- Promote use of insecticide treated mosquito nets.
- Upscale health education in communities to prevent spread of preventable diseases like diarrhoea, RTI and Malaria.
- Conduct regular mass deworming and Vitamin A supplementation in the district.

Medium term

- Scale up IYCF promotion and support within the community by integrating it into the existing health and nutrition programme.
- Strengthen continuous nutrition surveillance through regular nutrition surveys, Programme coverage assessments and MUAC screening.

Water and sanitation

- Most of the respondents did not do anything to their drinking water to make it safe to drink and considering that some house holds are using water from unprotected wells (which is classified as unsafe), it is important to start up water and sanitation programs aimed at providing health education and also water treatment.
- Hand washing is a hygiene practice that contributes to improved health and nutrition of the population. Though the survey report indicates that most people wash hands before eating, the use of soap was reported as very limited. Hygiene promotion should be scaled up with key interest in hand washing after defecation and at other critical times.
- Toilet access was low hence need to improve the environmental hygiene through increasing the number of latrines with health education on the importance of using them.

Food Security and livelihood support

- Promote of food for assets (FFA) programmes and encourage communities to participate in the same in order to build community and household assets that will enhance resilience to future shocks.
- GFD should continue to the most Vulnerable house holds in the district.
- Continuation of integrated nutrition, food security and livelihood support programmes.
- There is a limited diversity in terms of foods taken with many house holds reporting consuming cereals, pulses, Oils and fats, sweets and condiments. Therefore its recommended in order to improve the dietary diversity and nutritional status of the population, nutrition education and promotion of fruits and vegetables could have a significant impact. In areas where it is feasible promotion of kitchen gardening, would contribute to improve on the same and also act as an income generating activity.

2. Introduction

The report here-in provides detailed findings of a nutrition survey that was conducted in partnership between Save the Children UK and Ministry of Health. The main aim of the survey was to gain a more accurate picture of the health and nutritional situation of the population as well as to constitute a nutrition surveillance system. It was carried out by assessing the nutritional status of children under five years of age which aided in determining the prevalence of both Severe and Global Acute Malnutrition. The survey was undertaken between 8th and 19th March 2010 and covered El wak, Kotulo, Wargadud and Shimbir Fatuma divisions.

2.1 Background

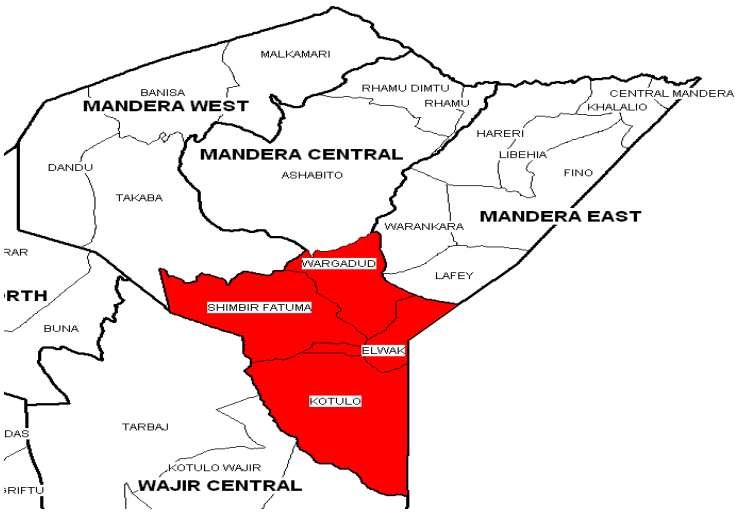
Mandera district is one of the Arid and Semi Arid districts of Kenya and is characterized by long dry spells, interspersed with low erratic rainfalls.. Recent climatic hazards such as the long dry spell occasioned by the failure of the rains in late 2008 and 2009 , coupled with clan related conflict over resources in some areas continued to have a devastating impact on the traditional livelihoods of pastoralist populations in the area. Mandera District as is the rest of the North Eastern province continues to suffer from structural deficits in the provision of health care, education and water and sanitation infrastructure. Despite many years of humanitarian and relief interventions and improved government assistance, the North Eastern Province of Kenya is still largely food insecure

Mandera central administratively consists of 7 divisions including El wak, Rhamu, Rhamu Dimtu, Ashabito, Shimbir Fatuma, Wargadud and Kotulo. Save the Children UK operates in 4 of the 7 divisions, namely; El wak, Shimbir Fatuma, Kotulo and Wargadud. Save the Children is currently implementing an integrated Nutrition, Food Security and Livelihood support project to vulnerable households in Mandera districts. The project utilizes integrated approaches to address immediate and underlying causes of malnutrition. In addition Save the Children is part of a larger consortium of agencies implementing a Hunger Safety Nets Program (HSNP) through which up to 12,000 vulnerable households in Mandera districts receive unconditional cash transfers. Together with the ministry of health, Save the Children has been implementing a nutrition programme, providing care for the acutely malnourished through decentralized Supplementary Feeding Programmes (SFP) and Out Patient Therapeutic programmes (OTP) starting in August 2007. The project is on-going as there is continued need to treat the acutely malnourished whose numbers continue to increase owing to deteriorating food security.

Relief programmes currently in the area:

- CARE: Water, hygiene and sanitation;
- Northern Aid: WATSAN, HIV/AIDS
- Kenya Red Cross: Emergency relief, WATSAN;
- Save the Children: Treatment of acute malnutrition ,Health Outreach, HSNP.
- COCOP/WFP: Food Aid
- ADRA: Primary Health Care
- Office of the President: Food Aid
- APHIA 11: MCH, HIV/AIDS

Figure 1: Map showing surveyed divisions



2.2 Survey Objectives

The objectives of the survey were to estimate:

1. Prevalence of acute and chronic malnutrition in children aged 6-59 months;
2. Crude and under five mortality rate and causes of death;
3. Proportion of households with access to improved water and sanitation;
4. Coverage of the general food distribution in terms of frequency and content;
5. Blanket Supplementary Feeding program coverage;
6. Food availability and access at HH level;
7. Coverage of measles and BCG vaccination among target children;
8. Coverage rate of Vitamin A. capsules distribution;
9. Morbidity rates children 6-59 months and pregnant women and mothers with <5 years children 2 weeks prior to the survey;
10. To recommend appropriate interventions based on the survey findings;

3. Methodology

SMART survey methodology was applied in the planning, training, field data collection and analysis of the anthropometric and mortality surveys. Children between 6 – 59 months were targeted. A total population of 64,916 was estimated for the survey area covering the four divisions. Information on population figures was obtained from the District Development Officer in Elwak township based on projections from the 1999 National Census as the official 2009 census figures were unavailable. The survey training took place from 8th to 11th March while data collection was conducted from 13th to 19th March 2010. The sampling frame was constructed using location, sub-location and village level population figures. The estimated number of households in every village was verified by area chiefs and the estimated number of U5 calculated at 20% of the total population.

3.1 Sampling Procedure and Sample Size Calculation for Anthropometric Data

For the anthropometric survey, 20% of the population for the four divisions (64,916) was calculated to determine the target population. The resultant figure of 12,983 children under five, malnutrition prevalence of 25.3%[2], precision of 4.0 and design effect (2) were used in determining the anthropometric sample size. The aforementioned data was keyed into Nutrisurvey[3] software to automatically generate the sample size of 877. This was then increased by 10% to cater for any unforeseen eventualities. The final sample size calculated as 965 children 6-59 months.

2 The highest C.I of the past malnutrition rates was used WHO standards
3 ENA by SMART software; October 2007 version

3.2 Sampling Procedure and Sample Size Calculation for Mortality Data

The 2009 mortality survey results were considered during planning for mortality survey. The estimated population (64,916), estimated prevalence (1%)[4], precision (0.6), recall period (106 days) and design effect (2) were entered into Nutrisurvey for sample size calculation after which 1,962 was generated. The two sets of sample sizes (anthropometric and mortality) were then divided by 1.87[5] and 6.0[6] respectively to get the total number of households to be surveyed. The sample size that yielded the highest outcome was chosen; in this case 965. In order to calculate the number of clusters, the sample size was divided by 26[7] to obtain the total number of clusters (35). Names of all accessible villages and corresponding population figures were typed into Nutrisurvey planning template for random cluster assignment.

The anticipated Crude Death Rate (CDR): 1.0 per 10,000 per day. This rate was chosen as it is the CDR level that is used to 'alert' an emergency and it would be the highest level expected.

The desired precision: A precision that would yield a 95% CI was selected i.e. 0.6

The recall period: A recall period of 106 days from November 26th to coincide with IDD ul Hajj was selected to enable the respondent recall the number of deaths without bias.

The formula used for calculating the CMR according to Nutrisurvey is as follows:
CMR = 10,000/a*f/ (b+f/2-e/2+d/2-c/2)
Where: a = Number of recall days (period corresponds to 3 months (106 days) preceding the survey)
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 the recall period
f = Number of deaths during recall period

Therefore, CMR is expressed per 10,000 people / day.

3.3 Selection of households and children

A local guide was acquired through the chief or his assistant in each location to move around the selected clusters. This ensured compliance and willful participation among the caretakers/respondents.
A household was defined as "members of a house who eat from the same cooking pot" even if they were not necessarily related. The EPI (Expanded Programme on Immunization) method was used to randomly select households within the selected cluster. Only the randomly sampled villages were assessed during data collection. In the clustered village, the EPI method helped determine the starting point by the help of a village elder or area chief. Once at the centre, the team randomly selected a direction by spinning a pen on the ground and noting the direction the pen pointed once on the ground. The team then moved to the periphery along the pointed direction. At the end of the village, the pen was re-spun and a direction obtained. Just like the first stage, the survey team moved along the pointed direction but this time counting and listing all households in that direction to the edge.

The first household to be visited was randomly selected by drawing a random number from the random number tables between zero and the total number of houses counted when walking to the next periphery. The subsequent households were determined by standing at the doorstep of the main house of a sampled house as if walking away the house on the right became the next HH. In villages with more than one cluster, the village was subdivided into equal parts, and the centre of each subdivision determined and households selected as described above. In a cluster that was sparsely populated, all the households in the cluster were visited. If 26 children were not found in the selected cluster, the team went to the next village not sampled, adopting the same methodology until the sample was completed. If no one was at home at a selected house, a neighbour

4 The highest C.I of the past mortality rates
5 The average number of children/household according to the 2009 nutrition survey
6 Average household size according to the 2009 nutrition survey
7 Minimum number of children who can be accurately measured each day per team based on the time spent at the field.

was consulted concerning the whereabouts of members of the household. If the members had left permanently or were not expected to return before the survey team left the village, the household was skipped and not replaced. If household members were expected to return, the survey team revisited the house at least once more before leaving the cluster.

All children between the ages 6-59 months were measured in each selected household and recorded in the anthropometry questionnaire until a minimum of 26 children had been assessed in each cluster. In the last household, all the children within the defined parameter were included in the survey, even if the minimum 26 children had already been obtained.

A retrospective mortality questionnaire using the current household census method was conducted for all the households vsampled in each cluster, regardless of whether a child under five years was present. The recall period counted 106 days from Idd ul fitr to the 1st day of the survey.

Data collection lasted for 7 days and was preceded by a four days intensive training session for field teams. A local calendar of events was used to determine the ages of children. This was developed jointly with the survey team and translated, using the local terms for months, seasons and other memeorable events (see appendix 1).

3.4 Training and supervision

The survey was executed by 5 teams each comprising of a team leader, 2 anthropometric measurers and 1 interviewer. Three of the participants were from Ministry of Health while 3 were from Arid Lands Resource Management Project (ALRMP)-Mandera and 1 from the district development office. The rest were recruited through an interview process. Three out of the MOH staff were team leaders as well as one ALRMP.

The training was conducted jointly by the Ministry of health and Save the Children.
During training, a standardization exercise was conducted, as recommended by the SMART methodology so as assess the team members' anthropometric techniques. Each team member was given a score of competence based on performing measurements with accuracy and precision. The results of the training exercise were analyzed by entering the data in Nutrisurvey for SMART and training report generated. Weaknesses noted in measurements were pointed out and retrained on.

The teams pre-tested the questionnaire in Udole location (not among the sampled clusters) on 12th March where each team interviewed 2 households under the supervision of the two SCUK Nutrition officers and the district nutritionist after which the whole team met for feedback and sharing of fieldwork experience.
In order to ensure that quality data was collected, the following steps were taken according to SMART guidelines [8]

- The teams were thoroughly and adequately trained
- All the enumerators pre-tested survey tools in the same location under the close supervision of the supervisors and thereafter shared and reviewed of survey experiences at the end of the day
- Regular standardization of the weighing scales with a known weight (1kg salt) to ensure they were always in good working order every day in the morning
- Thorough supervision of the teams by the supervisors and team leaders during data collection
- All questionnaires were checked by the team leaders before leaving the household for consistency and completeness
- Triangulation and validation of information using secondary data
- Standardization of anthropometric measurement procedures by having all members of the team take measurements from the same under five and then comparing the values
- Taking measurements for all under fives in the household to avoid bias in selecting one of them

3.5 Data collected

The interactive interviewing method was used to collect quantitative information using a structured questionnaire. The data collected included household demographic information, under five and childcare givers' anthropometry, morbidity, immunization, vitamin A supplementation, BSFP coverage, water and sanitation, food aid, food security indicators, sources of livelihood, Malaria, coping strategies and mortality.

[8] SMART (2006): Measuring Mortality, Nutritional Status and Food Security in Crises Situations: SMART METHODOLOGY

3.5.1 Children's data

Anthropometric data
The data collected for the anthropometric survey in children aged 6-59 months was as follows:

- Age, in months
- Gender
- Presence of bilateral pitting oedema
- Weight, in kg (to the nearest 100 grams)
- Height, in cm, measured to the nearest mm
- MUAC (cm)
- Weight-for-height Z Score.

Age, in months
If the child's vaccination card or birth certificate was available, the age indicated was used as entry criteria and recorded. When the birth date was unknown, the age was determined using the local calendar of events (Appendix 1).

Weight, in kg, measured to the nearest 100 grams
Two UNICEF Salter hanging scales (25kg) were assigned to each team to take the child's weight , the child was weighed without shoes and only light clothing. In the event that the caretaker would not allow undressing, a subtraction of 0.1kg/100g from the weight observed was made when the child had heavy clothing on.

Height, in cm, measured to the nearest mm
UNICEF height boards were used for measuring the length of children under 24 months (recumbent position) and the height of children of 24 months and above (standing position).
The age of the child as per the card or the calender of events was used in determining the measuring position. A precision of 0.1cm was used for recording measurements.

Presence of bilateral pitting oedema
The presence of bilateral pitting oedema was assessed for all children, by applying minimal pressure on the dorsal side of both feet for at least 3 seconds. If the pit remained after removing the pressure, the outcome was considered to be positive.

Mid-Upper Arm Circumference
The Mid-Upper Arm circumference (MUAC) was measured at the mid-point of the left upper arm (precision of 0.1 cm), using standard MUAC tapes.

WHZ
Weight-for-height Z Score (WHZ) was calculated on site using the international reference population tables (WHO 2006). The results were used to decide if referral to the SFP/OTP program was needed or not. If the WHZ was below -2 Z-score or presence of oedema, the caretaker received a referral slip.
In the analysis, the WHZ was recalculated for all children analyzed by Nutrisurvey for SMART software.

General Food Distribution
For all the surveyed households, information was collected on General Food distribution registration status.

Blanket Supplementary Feeding Programme Coverage
For all children 6-59 months of age, the caretakers were asked whether the child had received food rations from the BSFP..

Retrospective morbidity of children
Caretakers were asked for episodes of illness in the last 2 weeks (14 days) prior to the survey. The cause of illness and whether assistance had been sought was recorded. The following case definitions were used:

- Malaria (fever with chills);
- Diarrhea (watery stool >3/24H);
- Respiratory infection (fever with difficulty breathing or cough);
- Measles (fever with red rash);

- Other (specify);
- None

Vaccination status/Vitamin A supplementation and deworming:

Measles vaccination: assessed by checking for measles vaccination on EPI cards and/or verbal confirmation from the caretakers.
OPV 1 and 3: assessed by asking if the child received vaccination on the thigh with polio drops at 6 weeks and 14 weeks as well as confirmation from EPI cards.
BCG vaccination: assessed by checking for the characteristic BCG scar on the child's left arm.
*Vitamin A supplementation***:** assessed by asking caretakers if the child had received a Vitamin A supplement in the last 6 months. A sample of Vitamin A capsules (red/blue) was shown to aid in recall.
Deworming: assessed by asking whether the child had received antihelminthes in the last 3 months.

3.5.2 Mortality data

Retrospective mortality data was collected using the current household census method in all the visited households, including those with no children aged less than five years old.
The recall period was 106 days starting from Idd ul Hajj (Nov 26th). Information was collected on the age and sex of the household members, their residence status, the number of household members present within the recall period, the number of persons who arrived or left, and the number of births and deaths over the recall period. The presumed causes of death were recorded based on the following case definitions:

- Diarrhea (watery stool >3/24H);
- Bloody diarrhea;
- Measles (fever with rash);
- Fever;
- Lower respiratory tract infection (fever, cough, chest pin, difficulty breathing);
- Malnutrition;
- Injury;
- Other (specify);
- Unknown;

3.5.3 Causal indicators

Besides the household questionnaires, secondary data on the causes of malnutrition was obtained from government administrative offices and agencies working in the area. Gaps on information collected from secondary sources were explored by conducting Key informant interviews and recording observations. These were used to collect current contextual information on the child care practices, water situation, food security, access/use of healthcare facilities and the public health environment.
Other useful sources of secondary information particularly concerning the most current situation was the ALRMP Drought Monthly bulletins, KFSSG Short Rains Assessment 2009 Report and the monthly DSG meeting attended by administrative and public health officials. The information gathered was triangulated to establish patterns, trends and relationships and formed the basis for discussion.

3.6 Data Analysis

Anthropometric and mortality data entry and analysis was conducted using ENA for SMART software. Extreme value flags and WHO verification guidelines were used to identify Z score values where there was a strong likelihood that some of the data entered was incorrect; these data was not used in the analysis. The food security data. Water and sanitation, malaria, coping strategy. BSFP coverage, analysis was done on Excel spread sheet and EPI INFO 1.3.5 setup
Nutritional Indices

Acute Malnutrition Indices:

Weight-for-height (WFH) index
Acute malnutrition rates are estimated from the weight for height (WFH) index values and survey to the WHO references and are reflective of current nutritional conditions.
WFH indices were expressed in Z-scores as follows;

Table 7: Acute Malnutrition indicators

	WFH z-score
Global Acute Malnutrition	< -2 SD and/or oedema
Moderate Acute Malnutrition	< -2 SD and ≥ -3 SD
Severe Acute Malnutrition	< -3 SD and/or oedema

Global acute malnutrition (GAM) is therefore defined as 'the proportion of children presenting with a weight for height index less than -2 Z scores and/or oedema'

Mid-Upper Arm Circumference (MUAC)
MUAC, like weight for height, is used to quantify wasting in a population.

The guidelines used were as follows:
MUAC < 11.5 cm severe malnutrition and high risk of mortality
MUAC ≥ 11.5 cm and <12.5cm moderate malnutrition
MUAC ≥12.5 and < 13.5 cm moderate risk of malnutrition
MUAC ≥ 13.5 cm satisfactory nutritional status

Table 8: Maternal MUAC cut-off points

Nutritional status	**Pregnant**	**Non-pregnant**
Normal	≥ 23.0cm	≥ 21.0cm
GAM	< 23.0cm	< 21.0cm
Severe wasting	< 20.7cm	< 18.5cm

Chronic Malnutrition Index:

Height-for-Age (HFA) - Stunting
Chronic malnutrition rates are estimated from the height-for-age (HFA) index values. The HFA indices were compared with WHO references and are reflective of long-term malnutrition. HFA indices are expressed in Z-scores.

Table 9: HFA indices

	Height for Age z-score
Global Chronic Malnutrition	<-2 SD and/or oedema
Moderate Chronic Malnutrition	<-2 SD and ≥ -3 SD
Severe Chronic Malnutrition	<-3 SD and/or oedema

Global chronic malnutrition is therefore defined as 'the proportion of children presenting with a height for age index less than -2 Z scores.

Weight-for-Age (WFA)-Underweight
WFA is a composite index that reflects both wasting and stunting. The WFA indices were compared with WHO references. WFA indices are expressed in Z-scores.

Table 10: WFA indices

	Weight for Age z-score
Global Underweight	<-2 SD and/or oedema
Moderate Underweight	<-2 SD and ≥-3 SD
Severe Underweight	<-3 SD and/or oedema

Mortality Indices
The crude mortality rate (CMR) is determined for the entire population surveyed for a given period. The CMR using the current census method is calculated as follows:

$$CMR = \frac{10{,}000 \text{ people}}{\text{Number of recall days}} \times \frac{\text{number of deaths during recall}}{\text{Number of current residents}} = \text{Deaths/10,000/day}$$

+1/2 (No. of deaths during recall)

-1/2 (No. of births during recall)

The proportion of deaths among children under-five years of age (U5MR) is also calculated the same way using the under five population data. The thresholds are defined as follows:

Table 11: Proportion of deaths among children U5

	Total population CMR	Under-five population U5MR
Alert level:	1/10,000 people/day	2/10,000 children/day
Emergency level:	2/10,000 people/day	4/10,000 children/day

Survey data validation process

During data analysis, Nutrisurvey for SMART software flagged any missing data, extremes or potentially incorrect z-scores values. All flagged off Z-scores were excluded from the analysis. A triangulation of information was done to verify the findings of the quantitative data; information was collected through key informants,focus group discussions, secondary data and observation.

Presentation of the survey results were made both at the Food security technical sub DSG for Mandera central and later at the nutrition cluster from where the results were validated.

4. Results

4.1 Description of the survey sample

Table 12: Sample characteristics, Mandera Central Survey- March 2010

Household Census:

Number of total population surveyed for mortality	***2997***
Number of children under five surveyed for mortality	***1035***
Number of HH covered in the mortality survey	***474***
Number of persons who joined the household during the recall period	***95***
Number of persons who left the household during the recall period	***122***
Number of under five children who joined the household during the recall period	***15***
Number of under five children who left the household during the recall period	8
Number of births during the recall	***38***

Number of persons per HH (N: 474)	2997/474= 6.3
Number of children per HH (N: 474)	1035/474= 2.18
% of children under five in the population	34.5%

4.2 Anthropometric results (based on NCHS reference 1977)

4.2.1 Acute malnutrition

Table 13: Acute malnutrition was defined based on the following indices:

	WFH z-score	MUAC
Global Acute Malnutrition	< -2 SD and/or oedema	<12.5 CM and/or Oedema
Moderate Acute Malnutrition	< -2 SD and ≥ -3 SD	≥11.5cm
Severe Acute Malnutrition	< -3 SD and/or oedema	<11.5cm and /or oedema

Exclusion of outliers: SMART flags

Table 14: Distribution of age and sex of sample

	Boys		Girls		Total		Ratio
	no.	%	no.	%	no.	%	Boy:girl
6-17 months	88	47.3	98	52.7	186	19.2	0.9
18-29 months	123	48.2	132	51.8	255	26.3	0.9
30-41 months	138	52.3	126	47.7	264	27.3	1.1
42-53 months	87	50.9	84	49.1	171	17.7	1.0
54-59 months	41	44.6	51	55.4	92	9.5	0.8
Total	477	49.3	491	50.7	968	100.0	1.0

There were slightly more girls in the sample than boys and the overall ratio of Boys:Girls at 1.0 is within the recommended range of 0.8- 1.2[9] indicating an unbiased sample. The sex ratios across all ages were within the recommended range.

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

Figure 2: Age and sex pyramid

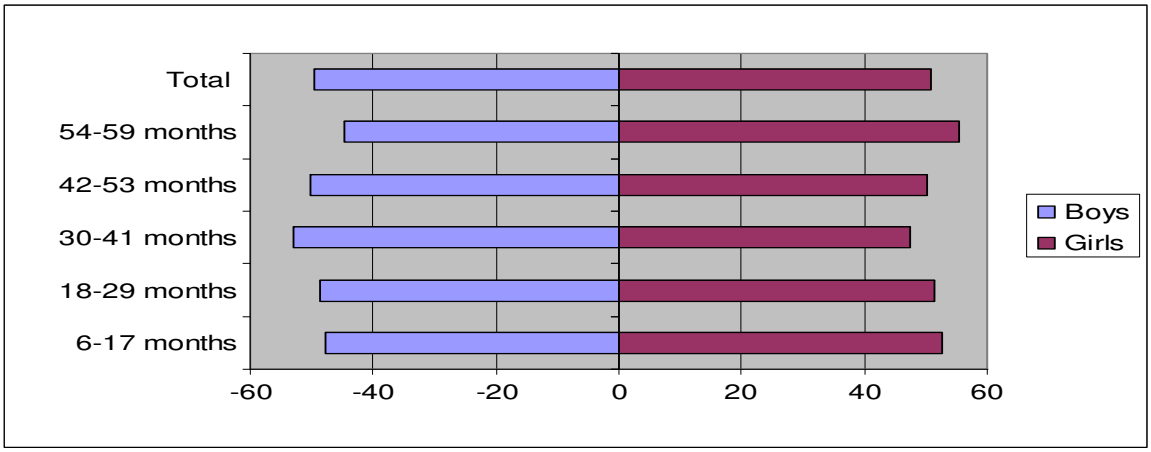


Table 15: Prevalence of acute malnutrition based on WFH z-scores (and/or oedema) and by sex

	All n = 946	Boys n = 463	Girls n = 483
Prevalence of global malnutrition (<-2 z-score and/or oedema)	**(248) 26.2 % (23.1 - 29.6 95% C.I.)**	**(133) 28.7 % (23.8 - 34.2 95% C.I.)**	**(115) 23.8 % (20.0 - 28.0 95% C.I.)**
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	**(208) 22.0 % (19.2 - 25.1 95% C.I.)**	**(116) 25.1 % (20.5 - 30.2 95% C.I.)**	**(92) 19.0 % (15.6 - 23.0 95% C.I.)**
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	**(40) 4.2 % (3.2 - 5.6 95% C.I.)**	**(17) 3.7 % (2.1 - 6.3 95% C.I.)**	**(23) 4.8 % (3.4 - 6.6 95% C.I.)**

The prevalence of oedema is 0.0 %

As per the table above, GAM of 26.2% (23.1% - 29.6%) depicts a critical nutritional situation. Analysis of the data by sex shows that a higher proportions of boys 28.7% are malnourished than girls 23.8 % with girls being more severely malnourished. However the overlapping confidence limits indicate that the difference in malnutrition between the boys and girls is NOT statistically significant hence both genders are at equal risk of malnutrition.

Figure 3: WFH graph (WHO 2006)

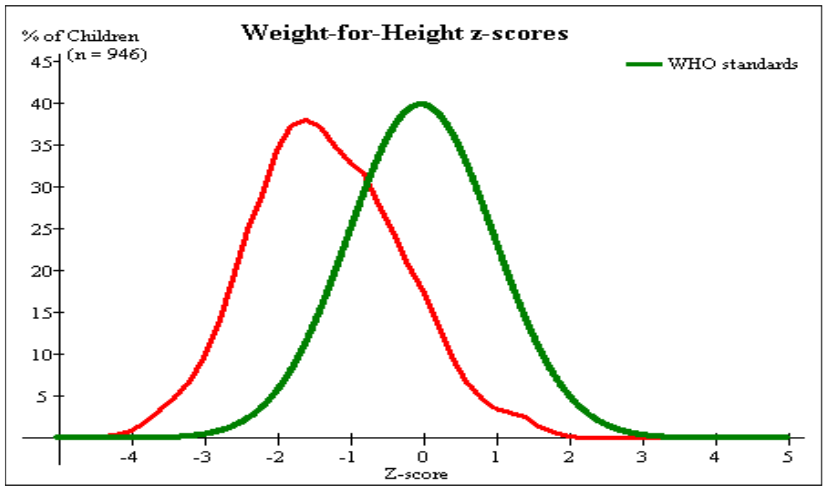


Table 16: Prevalence of acute malnutrition by age based on weight-for-height z-scores and/or oedema

		Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age (mths)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	179	2	1.1	24	13.4	153	85.5	0	0.0
18-29	244	6	2.5	33	13.5	205	84.0	0	0.0
30-41	261	13	5.0	63	24.1	185	70.9	0	0.0
42-53	170	13	7.6	60	35.3	97	57.1	0	0.0
54-59	92	6	6.5	28	30.4	58	63.0	0	0.0
Total	946	40	4.2	208	22.0	698	73.8	0	0.0

Table 17: Distribution of acute malnutrition and oedema based on weight-for-height z-scores

	<-3 z-score	>=-3 z-score
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 43 (4.4 %)	Not severely malnourished No. 925 (95.6 %)

The table above shows that the severely malnourished cases were as a result of wasting.

4.2.2 Chronic malnutrition

Table 18: Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 911	**Boys** n = 443	**Girls** n = 468
Prevalence of stunting (<-2 z-score)	(153) 16.8 % (13.8 - 20.3 95% C.I.)	(81) 18.3 % (15.1 - 22.0 95% C.I.)	(72) 15.4 % (11.5 - 20.3 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(111) 12.2 % (9.8 - 15.0 95% C.I.)	(62) 14.0 % (11.2 - 17.3 95% C.I.)	(49) 10.5 % (7.6 - 14.3 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(42) 4.6 % (3.3 - 6.5 95% C.I.)	(19) 4.3 % (2.4 - 7.5 95% C.I.)	(23) 4.9 % (3.3 - 7.3 95% C.I.)

Table 19: 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 (mths)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	170	5	2.9	21	12.4	144	84.7
18-29	239	22	9.2	31	13.0	186	77.8
30-41	247	12	4.9	41	16.6	194	78.5
42-53	164	2	1.2	12	7.3	150	91.5
54-59	91	1	1.1	6	6.6	84	92.3
Total	911	42	4.6	111	12.2	758	83.2

4.2.3 Prevalence of underweight

Table 20: Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 954	Boys n = 470	Girls n = 484
Prevalence of underweight (<-2 z-score)	(205) 21.5 % (17.9 - 25.6 95% C.I.)	(103) 21.9 % (17.3 - 27.3 95% C.I.)	(102) 21.1 % (17.2 - 25.5 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(169) 17.7 % (14.7 - 21.2 95% C.I.)	(82) 17.4 % (13.8 - 21.9 95% C.I.)	(87) 18.0 % (14.4 - 22.2 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(36) 3.8 % (2.4 - 5.9 95% C.I.)	(21) 4.5 % (2.4 - 8.1 95% C.I.)	(15) 3.1 % (1.7 - 5.5 95% C.I.)

Table 21: Prevalence of underweight by age based on weight-for-height z-scores and oedema

		Severe underweight (<-3 z-score)		**Moderate underweight (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mths)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	181	2	1.1	22	12.2	157	86.7	0	0.0
18-29	249	11	4.4	41	16.5	197	79.1	0	0.0
30-41	263	15	5.7	46	17.5	202	76.8	0	0.0
42-53	169	5	3.0	42	24.9	122	72.2	0	0.0
54-59	92	3	3.3	18	19.6	71	77.2	0	0.0
Total	954	36	3.8	169	17.7	749	78.5	0	0.0

Table 22: Mean z-scores, Design Effects and excluded subjects

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	946	-1.31±1.02	1.24	0	22
Weight-for-Age	954	-1.22±0.99	2.05	0	14
Height-for-Age	911	-0.67±1.30	1.63	0	57

* contains for WHZ and WAZ the children with edema.

4.3 Risk of Mortality: Children's MUAC

Table 23: Distribution of MUAC

Nutritional Status	**MUAC Criteria**	**N**	**Percentage**
Severe Malnutrition	<115mm	10	1.0%
Moderate Malnutrition	≥115 and <125mm	76	7.9%
At Risk of Malnutrition	≥125 and < 135	270	27.9%
Well Nourished	>135mm	612	63.2%
TOTAL		**968**	**100**

According to MUAC index, prevalence of malnutrition (MUAC <125mm) was 8.9% with severe malnutrition (MUAC<115mm) at 1.0% excluding oedema.

Mortality Results (Retrospective over 106 days prior to interview)
From the households surveyed, there were 2997 individuals alive at the time of the survey, 1035 of who were children under five years old.

Table 24: Mortality Rates

Crude Mortality Rate (total deaths/10,000 people/day)	0.28 (0.10-0.46) 95% CI
Under Five Mortality Rate (total deaths in children under five years/10,000 children under five years/day)	0.46 (0.04- 0.89) 95% CI

A total of 9 people were reported to have died, 4 of who were less than five years and 5 were adults.

Table 25: Causes of Death

	Cause of Death	< 5 Years old N= 4	>5years old N= 5
1	Diarrhoea	0%	0%
2	Bloody Diarrhoea	0%	0%
3	Measles	0%	0%
4	Fever	1 (20%)	1 (25%)
5	Lower Respiratory Tract Infection	1 (20%)	0%
6	Malnutrition	0%	0%
7	Injury	0%	2 (50%)
8	Other	0%	0%
9	Unknown	3 (60%)	1 (25%)

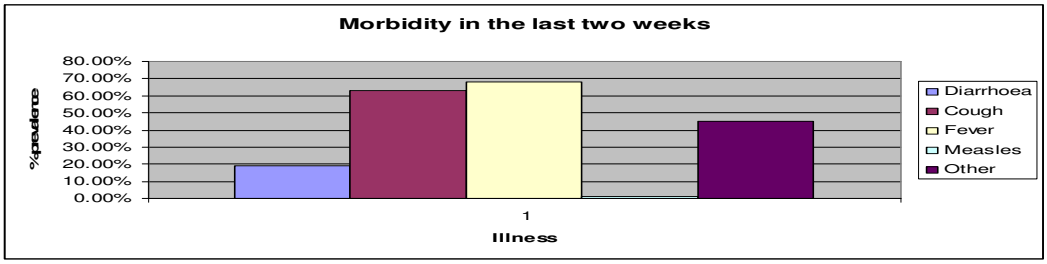
The main presumed cause of death among children under five years was unknown though most of these children were said to have died shortly after birth. Among the over five year old, two deaths were presumed to be caused by injury and the others by fever and 1 was unknown.

4.4 Child morbidity

Table 26: Prevalence of reported illness in children in the two weeks prior to interview (n=968)

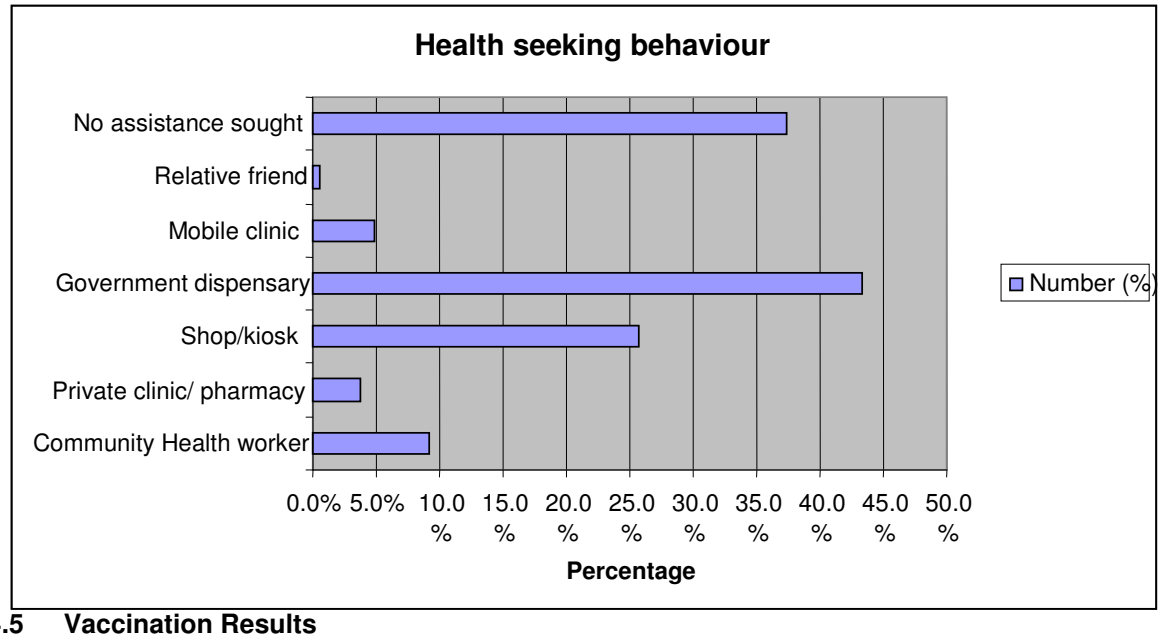
	6-59 months
Prevalence of reported illness	(327)33.7%

Figure 4: Symptom breakdown in the children in the two weeks prior to interview (n=327)



Most (43.4%) of the childcare takers interviewed reported seeking assistance from public/government clinics when their children fell sick, with 25.7.0% doing so at shops and kiosks and more than one third (37.3%) reported not seeking any assistance.

Figure 5: Health seeking behaviour



4.5 Vaccination Results

Figure 6: Vaccination and supplementation coverage

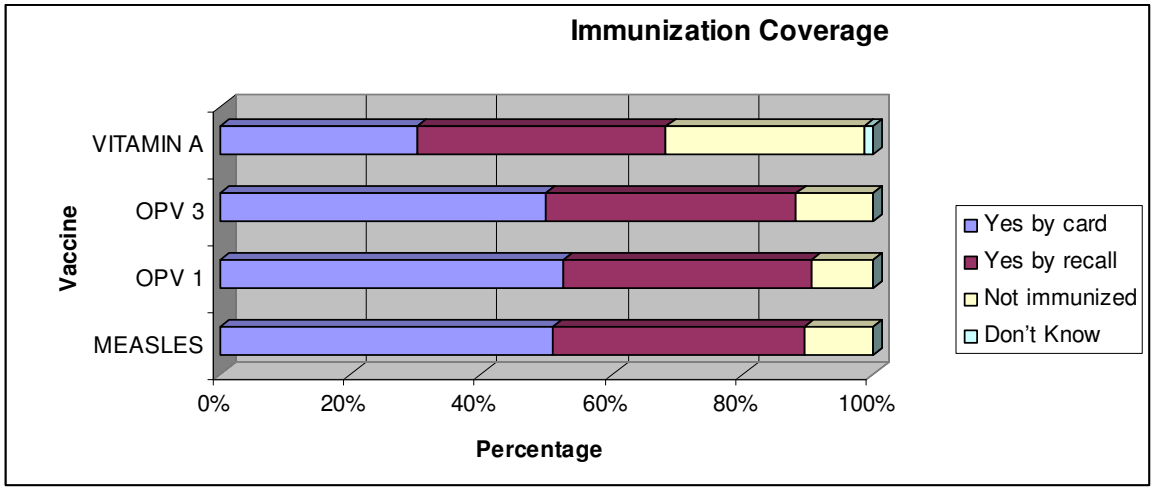


Table 27: BCG Scar and Deworming

BCG SCAR **[N= 968]**	Present Absent	(819) 84.6% (149) 15.4%
Deworming	Yes No Don't know	(138) 14.3% (785) 81.1% (45) 4.6%

The coverage of measles, OPV1 and OPV 3 by card and by recall was god at above 80% which meets the Kenya Expanded Programme on Immunization (KEPI) recommendation of 80% coverage. BCG scar was present in 84.6% of the surveyed children between ages 6 to 59 months. Deworming coverage, however was low at 14.3%.

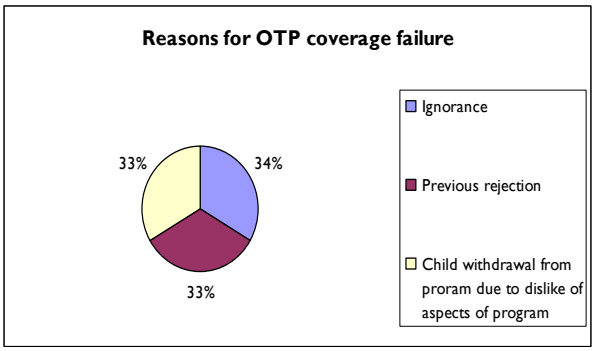
4.6 Feeding Programme Coverage

Feeding programme coverage was assessed separately using the Semi-Quantitative Evaluation of access and coverage (SQUEAC)

Table 28: Overall Program Coverage results (Quantitative and Qualitative findings)

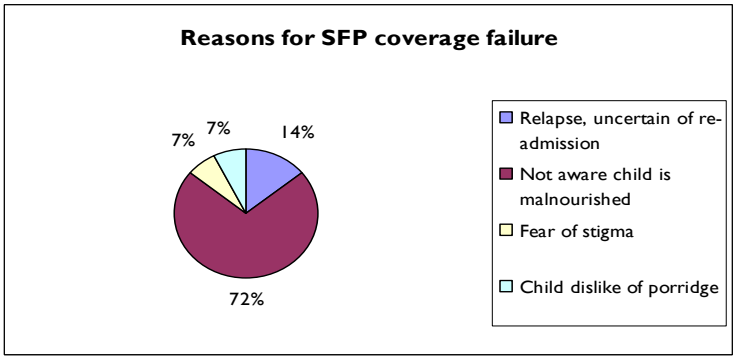
Coverage	Point	Period
OTP	**47.1%** CI: (23.3% - 71.7%)	**76.4%** CI: (60.3% - 88.6%)
SFP	**41.4%** CI: (26.1% - 58.1%)	**59.7%** CI: (45.4% - 72.9%)

Figure 7: Reasons for OTP coverage failure



NB: few non-covered cases

Figure 8: Reasons for SFP coverage failure



4.6.1 Blanket supplementary feeding

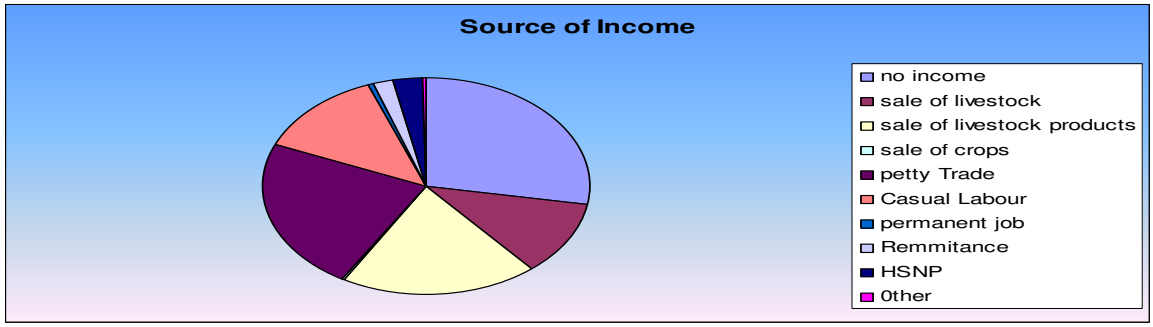
61 percent of the respondents reported having received the BSFP ration.43.8% of those who reported to have received the BSFP food items reported that only one member of the family had received, 35.6% reported two people in the family had received the ration while 18.1% reported three people had received in the HH.

4.7 FOOD SECURITY AND LIVELIHOOD

The survey outcome showed that the main three livelihood activities from the respondents were house wives (37%), livestock herding (29.3%) and wage/casual labour (13%).

The chart below presents the sources of income in assessed areas. The most reported sources of income included sale of livestock and livestock products, casual labour and petty trade. Most of the respondents however (28%) reported to not having any source of income.

Figure 9: Main sources of income



4.8 Food Aid

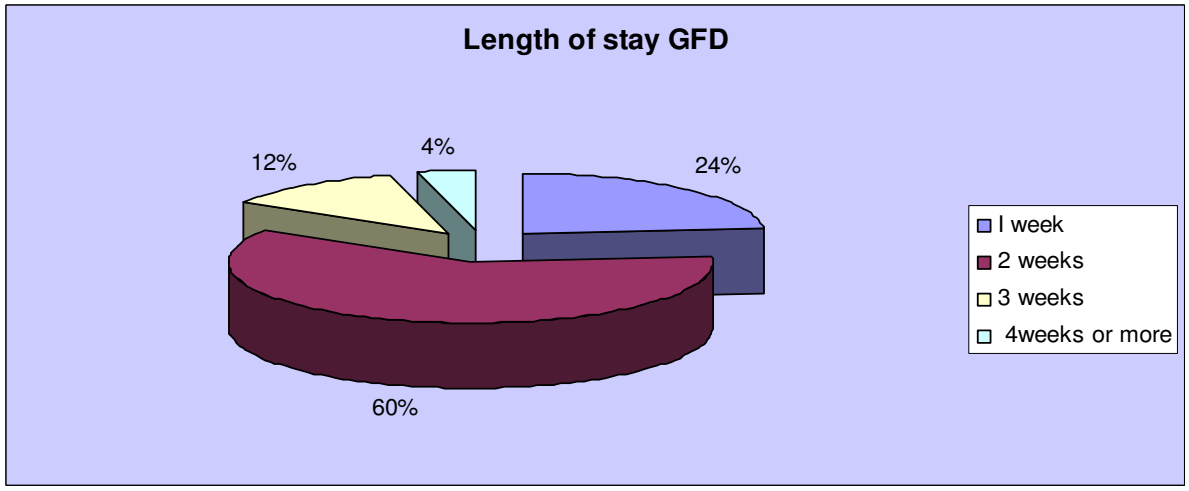
80.4% of the HHs reported having received general food aid from World Food Programme (WFP) through the lead agency Consortium of Cooperating partners (COCOOP). The food commodities received were as shown in the table below;

Table 29: Food Commodities received

Foods received	**Frequency** (N=366)	**Percent**
CSB	317	86.6%
Oil	233	63.7%
Salt	83	22.7%
Pulses	179	48.9%
Cereal	269	73.5%
Total		

Of the food commodities received 80.8% was reported to have been consumed by HH members, 6.8% was shared, 6% was fed to livestock, 4.9% was sold in the market while 2.8% was battered.

Figure 10: Duration of time food aid lasts in HH



4.9 Food consumption and Dietary diversity

Main source of food	Percent
Own production	(71)15.3%
Purchases	(338)68.4%
Food aid	(54)11.6%
Gathering/wild	(2)0.4%

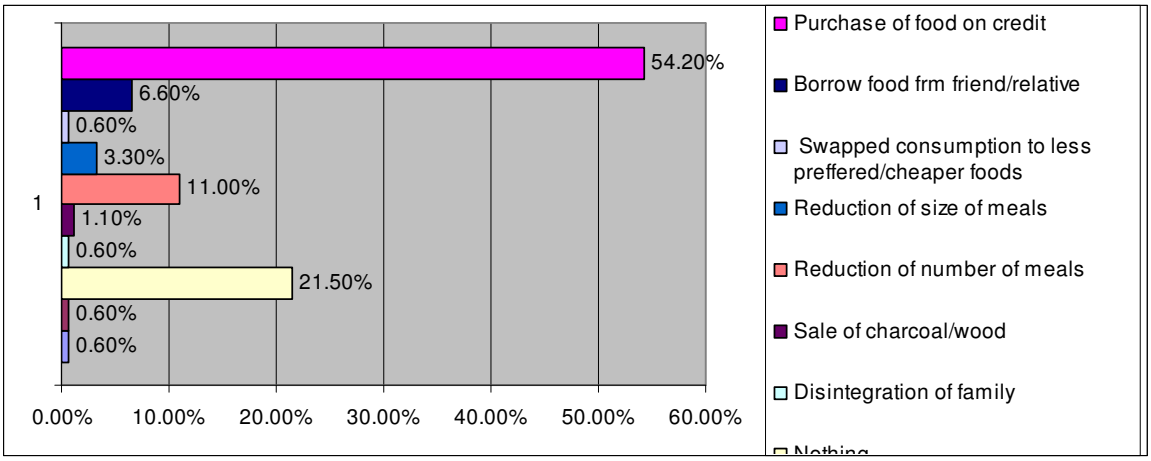
Figure 11: Dietary Diversity (7 days and 24 Hour recall)

Cereals, oils and fats, sweets and condiments account for the main food items consumed in the households. Majority of the respondents said their main source of food is purchases (68.4%) and only 11.6% of them said their main food source is food aid even though 80% of them said they receive food aid. This could be explained by the fact that for a majority (60%) food aid lasts only 2 weeks and for the rest of the month until the next food distribution which is on average every 2 months, people have to purchase their food.

4.10 Household Coping strategies

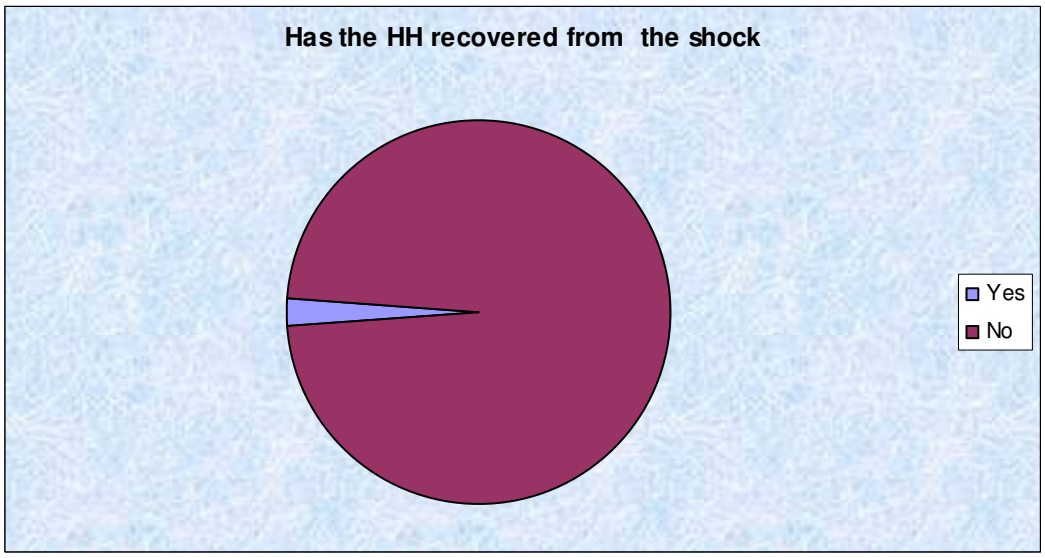
43.9% of the HH surveyed reported that they had experienced an incident in the last 6 months that affected there usual ability to eat and/or buy food of the quality, quantity or variety they preferred. The incidences included increased food prices (46.4%), drought (54.1%) livestock diseases (31.4%), Lack/loss of employment (23.2%), Sickness of HH members (6.1%), Increased HH size/IDP (2.2%) , death of HH members and flooding at 1.7% and 0.6% respectively.

Figure 12: Coping strategies employed by House holds



To answer the question whether the HH had recovered from the shock, the figure below illustrates the responses.

Figure 13: Recovery from shock



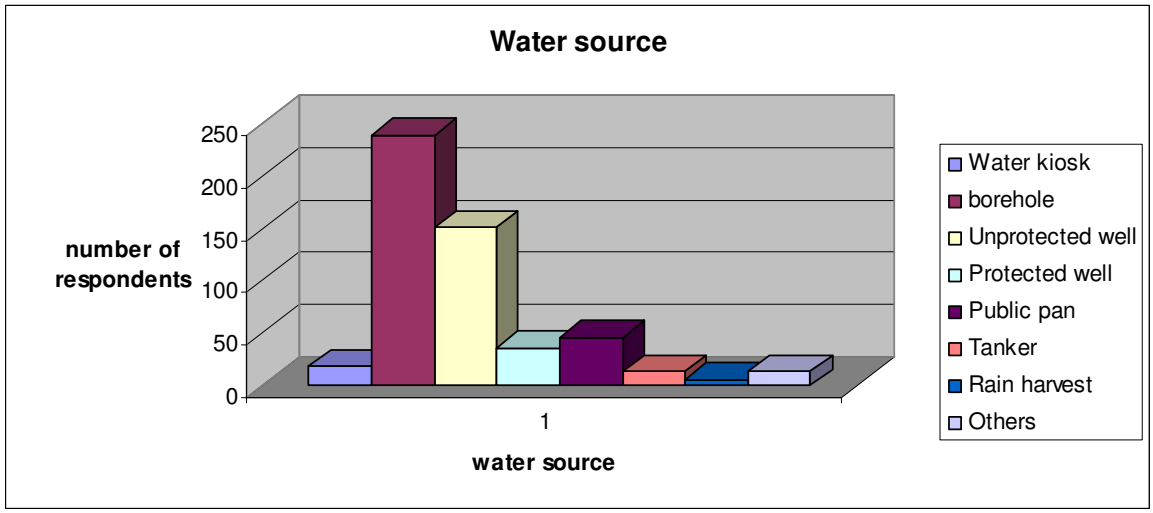
Majority of the respondents said they had experienced either shock from high food prices, drought and loss of income from labour which could also be due to the persisting drought in the area. At the time of the survey, the rains had not started and hence people are still suffering the effects of the prolonged dry spell 2008/2009 which was declared a national disaster.

4.11 WATER AND SANITATION

4.11.1 Current HH main water source

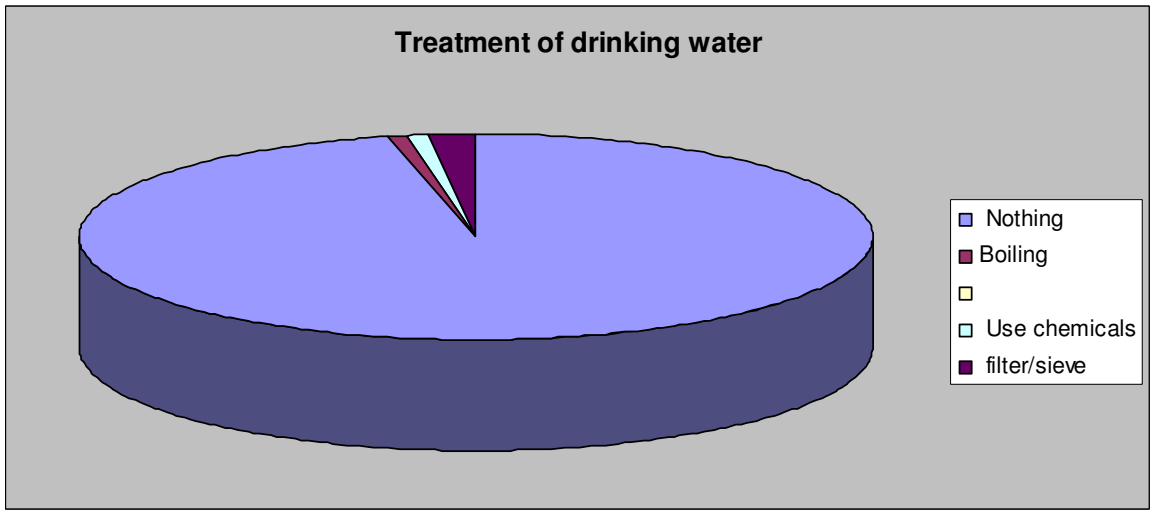
The main water source reported was borehole (45.6%), followed by unprotected well (28.8%) and public pan (8.8%)

Figure 14: Water sources



Most people took less than thirty minutes to walk to their current water source, fetch water and travel back to their homes.
96.4% did nothing to their drinking water while 0.9% boiled the water, 0.9% used chemicals and 1.9% filtered the water as represented in the figure below;

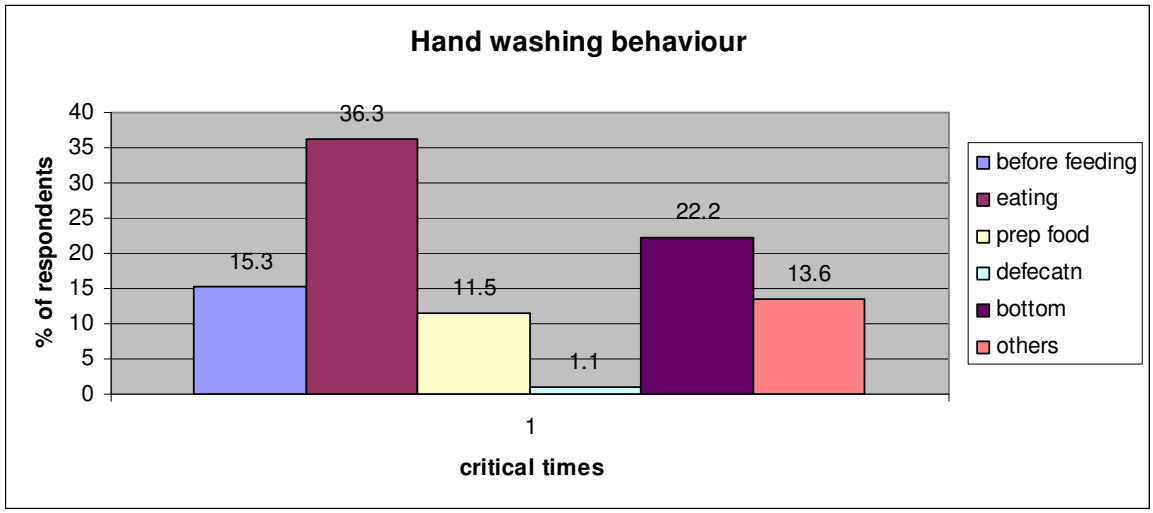
Figure 15: Treatment given to drinking water



4.11.2 Access to toilet facility

Only 21.1% of the respondents reported to having access to a toilet facility with most of them (79.6%) being traditional pit latrines. 78.9% of the respondents reported to not having access to a toilet facility. On further probing on where they defecated, 88.7% reported they defecated in bush or open field. The children's faeces were reported to be disposed in the open field/bush by the majority of the respondents.

Figure 16: Hand washing practices

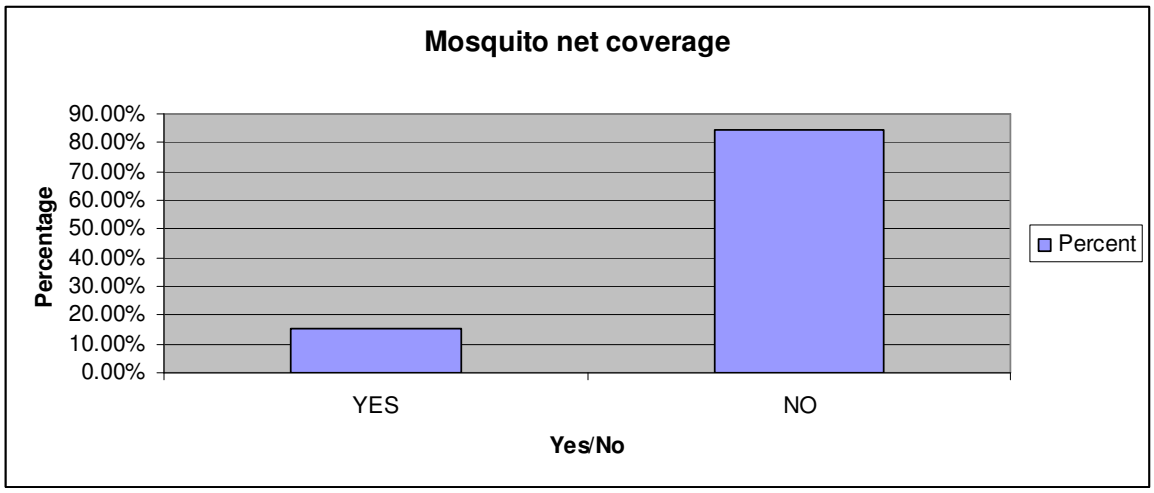


The figure above highlights that even if the hand washing is a common practice before ablutions or meals and after washing baby bottoms, it is still rarely done after defecating or before cooking. Practices can hence be considered as highly inadequate and as increasing the risks of water borne diseases.

4.12 Mosquito Net coverage

Only 15.5% of the respondents had Mosquito nets. Of those that had the mosquito nets, 38.9% got it from the MOMs/ MOPHS, 37.5% reported to having bought them in the shop while the remaining 23.6% had received them from agencies and NGOs. 72.9% reported that the nets had been pre-treated by the manufacturers. Children under five (95.8%) and PLWs (33.3%) were reported to have slept under the net the night before.

Figure 17: percentage on HH with mosquito nets



5. CONCLUSION

Both GAM and SAM, when compared to the WHO reference population, are above the WHO emergency threshold of 15% and 4% respectively in Mandera central.
The rates of GAM and SAM measured in 2010 shows some improvement as compared to the previous year though not of any statistical significance. High rates of morbidity, poor access to health care, consumption of unsafe water, inadequate hygiene and sanitation and low levels of diet diversity are some of the main factors

contributing to the high rates of acute malnutrition in the District. These factors have been persisting for the last several years, aggravated by recurrent drought cycles, and have maintained the rates of acute malnutrition at very high levels.

According to the short rains assessment report, the district received adequate amounts of rainfall however this was not evenly distributed in all parts of the district and pasture regeneration was poor even in areas perceived to have received adequate rainfall. Hence recovery from the drought is likely to take some time and as long as the underlying causes of malnutrition are not addressed, the very high GAM rates will continue to be reported in Mandera and hence concerted efforts are required to address the underlying causes.

6. RECOMMENDATIONS

Health and Nutrition

Immediate

- Scale up uptake and access to medical treatment and immunization in all divisions in Mandera central.
- Continue implementing the IMAM programme and where applicable start up new outreach sites to access many of the malnourished children as possbile.
- Scale up community detection and referral of children with acute malnutrition.
- Promote use of insecticide treated mosquito nets.
- Upscale health education in communities to prevent spread of preventable diseases like diarrhoea, RTI and Malaria.
- Conduct regular mass deworming and Vitamin A supplementation in the district.

Medium term

- Scale up IYCF promotion and support within the community by integrating it into the existing health and nutrition programme.
- Strengthen continuous nutrition surveillance through regular nutrition surveys and a robust surveillance system, Programme coverage assessments and MUAC screening.

Water and sanitation

- Most of the respondents did not do anything to their drinking water to make it safe to drink and considering that some house holds are using water from unprotected wells (which is classified as unsafe), it is important to start up water and sanitation programs aimed at providing health education and also water treatment.
- Hand washing is a hygiene practice that contributes to improved health and nutrition of the population. Though the survey report indicates that most people wash hands before eating, the use of soap was reported as very limited. Hygiene promotion should be scaled up with key interest in hand washing after defecation and at other critical times.
- Toilet access was low hence need to improve the environmental hygiene through increasing the number of latrines with health education on the importance of using them.

Food Security and livelihood support

- Promote of food for assets (FFA) programmes and encourage communities to participate in the same in order to build community and household assets that will enhance resilience to future shocks.
- GFD should continue to the most Vulnerable house holds in the district whilst at the same time condidering livelihood options to get them out of food aid dependency..
- Continuation of integrated nutrition, food security and livelihood support programmes.
- There is a limited diversity in terms of foods taken with many house holds reporting consuming cereals, pulses, Oils and fats, sweets and condiments. Therefore its recommended in order to improve the dietary diversity and nutritional status of the population, nutrition education and promotion of fruits and vegetables could have a significant impact. In areas where it is feasible promotion of kitchen gardening, would contribute to improve on the same and also act as an income generating activity.

7. ANNEXES

7.1 Annex 1: Survey questionnaire

MANDERA CENTRAL DISTRICT NUTRITION SURVEY QUESTIONNAIRES 2010

CHILDREN 6-59 MONTHS (ONE SHEET PER CLUSTER)

Name of Division	Name of Village	Cluster No	Team No	Date of Interview (dd/mm/yy)	Name of Interviewer	Name of Team Leader
				____/____/____		

HH No.	Child ID	Age in Months	Sex 1=Male 2=Female	MUAC to the nearest 0.1 cm	Oedema in both feet? 1=Yes 2=No	Height to nearest 0.1 cm	Weight to nearest 0.1kg	Has the child received measles immunization? 1=Yes (by card) 2=Yes (by recall) 3=No 4=Don't know	Has child received pentavalent 1/OPV 1? 1=Yes (by card) 2=Yes (by recall) 3=No 4=Don't know	Has child received pentavalent 3/OPV 3? 1=Yes (by card) 2=Yes (by recall) 3=No 4=Don't know	Has the child received Vitamin A in the last 6 months? (Show the mother the capsule so that she recalls or understand). 1=Yes (by card) 2=Yes (by recall) 3=No 4=Don't know	BCG scar present? 1=Yes 2=No	Has the child been dewormed in the last 3 months? 1=Yes 2=No 3=Don't know	Has the child been sick in the last 2 weeks? 1=Yes 2=No	If YES, what was the child suffering from? (More than one response possible) 1= Diarrhea 2=Vomiting 3=Fever with chills like malaria 4=Fever, cough, difficult in breathing 5=Intestinal Parasite 6= Measles 7=Eye infections 8=Skin infections 9= Accident 10=Malnutrition 11=Stomach ache 12=Toothache 13=other (specify)	When the child was sick where did you seek assistance? (More than one response possible) 1=Traditional healer 2=Community health worker 3=Private clinic/ pharmacy 4=Shop/kiosk 5=Government dispensaries/public clinc 6=Mobile clinic 7=Relative or friend 8=No assistance sought

MANDERA CENTRAL DISTRICT NUTRITION SURVEY MORTALITY QUESTIONNAIRE (ONE SHEET PER HOUSEHOLD)

Name of Division	Name of Village	Cluster No	Team No	HH No	Date of Interview (dd/mm/yy)	Name of Interviewer	Name of Team Leader
					____/____/____		

No	Current HH members (Name and ID)	Age (Indicate in Months if <5 then circle)	Sex 1=Male 2=Female	Present now in HH (Tick=YES)	In- migration Since IDD to date (exclude births) (Tick=YES	Out- migration since IDD to date (exclude deaths) (Tick=YES)	Births since IDD to date Tick=YES	Died since IDD to date Tick=YES	Cause of death*
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									

SUMMARY DATA SECTION

Current HH members total	
Current HH members <5y	
Current HH members who are males	
Current HH members who are females	
Current HH members in-migration total	
Current HH members in-migration <5y	
Past HH members out-migration total	
Past HH members out-migration <5y	
Deaths total	
Deaths <5y	
Total births	

*CAUSES OF DEATH:
1= Diarrhoea (minimum of 3 watery stools/24hrs)
2= Bloody Diarrhoea;
3= Measles (fever with rash);
4= Fever;
5= Lower respiratory tract infection (fever, productive cough, chest pain, difficulty breathing)
6= Malnutrition;
7= Injury;
8= Other;
9=Unknown

SECTION 1: BSFP (ONE SHEET PER CLUSTER)

Name of Division	Name of Village	Cluster No	Team No	Date of Interview (dd/mm/yy)	Name of Interviewer	Name of Team Leader
				____/____/____		

HH No.	1.1 Did anyone in your HH receive BSFP rations (CSB and Oil?) 1=yes 2=No	1.2 If YES, how many people (children < 110cm and Pregnant and lactating women) In your household received the rations	1.4 How many times did each person receive the BSFP ration 1= 0nce 2- Twice 3= Thrice 4 = Four times 5= Five times

SECTION 2: FOOD SECURITY, LIVELIHOODS & DIETARY DIVERSITY (ONE SHEET PER CLUSTER)

HH No	1.1 Status of the Household 1=Resident 2=Other (specify)	1..2 Sex of respondent 1=Male 2=Female	1.3 What is the woman's current physiological status? (Ask carefully and Circle) 1=Currently pregnant 2=Breastfeeding (<6months infant) 3=Breastfeeding (6-24months) 4=Pregnant and breastfeeding 5=Not pregnant/not breastfeeding 6-breastfeeding (>24months) (only women btwn 15-45 yrs)	1.4 Record MUAC (cm) only if the respondent is an adult female	1..5 What is your main livelihood activity? 1=Agricultural labour 2=Livestock herding 3=Own farm labour 4=Employed (salaried) 5=Waged (Casual) 6=Petty trade 7=Unemployed 8=Student 9=Merchant/trader 10=Housewife 11=Domestic help 12=Hunting, gathering 13=Firewood/charcoa 14=handicraft 15=Others (Specify)……	1.6 What is your current main source of income? 1=No income 2= Sale of livestock 3= Sale of livestock products 4= Sale of crops 5= Petty trading e.g. sale of firewood 6=Casual labour 7=Permanent job 8= Sale of personal assets 9= Remittance 10= HSNP 11=Other-Specify	1.7 What is your main source of food? 1=Own production 2= Purchase 3= Gifts from friends/ families 4= Food aid 5= Traded or bartered 6= Borrowed 7= Gathering 8= Food vouchers 9= Others (specify)	1.8 Are your main source/s of food sufficient for your household? 1=Yes 2= No	1.9 If your answer is NO give reasons for insufficient food sources? **(more than one answer)** 1=Poor crop harvest (probe why) 2= Loss of Livestock 3= Poor livestock production 4=Increased food prices 5=Low purchasing power 6=Other (specify)	1.10 Has your HH received general food distribution in the last three (3) months? 1 = Yes 2 = No	1.12 What food commodities were received 1= CSB 2=Oil 3=Salt 4=Pulses 5=Cereals	1.13 Of the food aid received for what purpose was it used? **(multiple answers allowed)** 1=Resold in the market 2=Bartered fo other item 3=Shared with kin 4=Fed livestock 5=Consumed by the HH members 6= Other	1.14 How many days on average did the food commodities last? 1=1 Week 2= 2 weeks 3=3weeks 4= 4 weeks and more
1													
2													
3													
4													
5													

SECTION 2: FOOD CONSUMPTION & DIETARY DIVERSITY (ONE SHEET PER HH)

Name of Division	Name of Village	Cluster No	Team No	HH No	Date of Interview (dd/mm/yy)	Name of Interviewer	Name of Team Leader
					____/____/____		

Twenty four-hour and seven day recall for food consumption in the households: The interviewers should establish whether the previous day and night/seven days were usual or normal for the households. If unusual- feasts, funerals or most members absent, then another day should be selected.

Food group consumed:	2.16 Did a member of your household consume any food from these food groups in the **last 7 days?** 1=Yes 2=No	2.17 If yes, how many days was the food consumed in the last 7 days?	2.18 Did a member of your household consume food from any these food groups in the last 24 hours (from this time yesterday to now)? Include any snacks consumed. 1=Yes 2=No	*Codes: 1= Own production 2=Purchases 3=Gifts from friends/families 4=Food aid 5= traded or Bartered 6=Borrowed 7=Gathering/wild 9= Food vouchers 10=Others, specify_____
Type of food				2.19 What is the main source of the dominant food item consumed? (Use codes above)?
1. Cereals and cereal products *(e.g. sorghum, maize, spaghetti, pasta, caanjera, bread, rice*)?				
2. Vitamin A rich vegetables and tubers: (*Pumpkins, carrots, yellow sweet potatoes)*				
3. White tubers and roots: (*White potatoes, white yams, cassava, green bananas or foods made from these roots)*				
4. Dark green leafy vegetables including wild ones *(sukuma wiki, spinach, cow peas leaves)*				
5. Other vegetables *(e,g, egg plant, onions, cabbage, green pepper)?*				
6. Vitamin A rich fruits*: (e.g. Ripe mangoes, papayas, tomatoes)*				
7. Other fruits *(e.g. oranges, bananas, lemon, water melon, guava)*				
8. Organ meat - iron rich: *(e.g. Liver, kidney, heart or other organ meats)*				
9. Flesh meats *(e.g. goat/camel / game meat, beef; chicken/poultry, canned meat)?*				
10. Eggs?				
11. Fish including canned fish				
12. Pulses/legumes, nuts *(e.g. beans, lentils, green grams, cowpeas, groundnuts)*?				
13. Milk and milk products *(e.g. goat/camel/ fermented milk, milk powder)?*				
14. Oils/fats *(e.g. cooking fat or oil, butter, ghee, margarine)?*				
15. Sweets: Sugar, honey, sweetened soda or sugary foods such as chocolates, sweets or				

candies				
16. Condiments, spices and beverages: *(dhania, tomato paste, royco, tea, coffee)*				
2.20 In general what is the <u>main</u> source of food in household? (*Use codes above) **[ ]**				
2.21 Total number of food groups consumed (filled by enumerator)**: [ ]**				

SECTION 3: WATER, SANITATION AND HYGIENE PRACTICES (ONE SHEET PER CLUSTER)

Name of Division	Name of Village	Cluster No	Team No	Date of Interview (dd/mm/yy)	Name of Interviewer	Name of Team Leader
				____/____/____		

HH No.	3.1 Currently what is your household main water source? **(Multiple answers allowed)** 1=Water tap/ water kiosk 2=Borehole 3=Unprotected well 4=Protected well 5=Public pan 6=Tanker 8=Laga 9=Rain harvest (from the roof) 10=Other (specify)	3.2 How long does it take you to go to the current main water source, fetch water and come back? 1= less than 30 min 2= 30 min- 1 hour 3= More than 1 hour	3.3 What do you do to your drinking water? 1= Nothing 2=Boiling 3=Use of traditional methods 4=Use chemicals 5=filter/sieve 6=decant (Multiple responses)	3.4 Does your household have access to a toilet facility? 1=Yes 2= No	3.5 If yes, what type of toilet facility? 1=Traditional pit latrines 2=Ventilated improved pit latrine 3=Flush toilet 4=Other Specify	3.6 If No, where do you go/use? **(probe further**) 1= Bush/ open field 2 =Near the river 3 =Behind the house 4 =Other (specify)	3.7 How do you dispose of children's feaces? 1= Bush 2=Open field 3 =Near the river 4 =Behind the house 5=Toilet facility 6 =Other (specify	3.8 At what times do you wash your hands? **(multiple answers possible)** 1 =After defecation/visiting toilet? 2 = Before feeding the child? 3 = Before eating 4 = Before preparing food 5 =After cleaning children's bottoms 6 = Other (specify)	3.9 What do you use to clean your hands? **(Multiple responses)** 1=Water only 2 = Water and soap 3=Water and ash 4=Other (specify)
1									
2									
3									
4									
5									

N/B; Let the respondent answer the questions and only code what they say; do not assume an answer before asking the question

SECTION 4: MALARIA (ONE SHEET PER CLUSTER)

Name of Division	Name of Village	Cluster No	Team No	Date of Interview (dd/mm/yy)	Name of Interviewer	Name of Team Leader
				____/____/____		

HH No	4.1 Does this household have a mosquito net? **If NO go to 5.0** 1 = Yes 2 = No	4.2 Where did you get it from 1 = A Shop 2 = An agency/NGO 3 = Ministry of Health 4=Other (specify)	4.3 Had the net been pre-treated by the manufacturer? 1 = Yes 2 = No	4.4 Who slept under the mosquito net last night? **(Probe - enter all responses mentioned)** 1) Children less than 5 years 2) Pregnant woman 3) Others
1				
2				

SECTION 5: HOUSE HOLD COPNG STRATEGIES (ONE PER CLUSTER)

Name of Division	Name of Village	Cluster No	Team No	Date of Interview (dd/mm/yy)	Name of Interviewer	Name of Team Leader
				____/____/____		

5.0 HH ID	5.1 During the Last 6 Months, did your household experience any incident that affects its usual ability to eat and/or buy foods of the quality, quantity or variety you prefer? **1= Yes** **2= No**	5.2 If yes, what incidents did your household experience in the last 6 Months? **(More than one answer possible)** Incidents code: **1 =** Insecurity, Violence 2 = Increased price of food 3 = Floods 4 = Drought/dry spell 5 = Livestock disease 6 = Sickness of household Member 7 = Death of household member 8 = Increased household size (IDPs) 9 = Loss / lack of employment	5.3 What is the main action your household took to compensate the effect of that incident? 1. Nothing 2. Reduction in the number of meals per day 3. Skip food consumption for an entire day 4. Reduction in size of meals 5. Restrict consumption of adults to allow more for children 6. Feed working members at expense of non-working 7. Swapped consumption to less preferred or cheaper foods 8. Borrow food from a friend or relative 9. Purchase food on credit 10. Consume wild foods 11. Consume immature crop 12. Consume toxic/taboo foods (acacia pod/bitter fruit) 13. Consumption of seed stock 14. Send household members to eat elsewhere 15. Withdraw child (ren) from school 16. Begging or engaging in degrading jobs 17. Individual migration out of the area 18. Household migration out of the area 19. Sale of household goods 20. Disintegration of family 21. Abandonment f children/elderly 22. Sell of charcoal/wood 23. Part of family migrating with animals to look for grazing 24. Others	5.4 How often did you do this in the last 6 months? (Relative Frequency)	5.5 Has your household recovered from the incident? **1= Yes** **2= No**

7.2 Annex 2: Selected clusters

Assignment of Clusters

Geographical unit	Population size	Assigned cluster
Bulla Afya	330	1
Dasheg Alungo	1055	
Sukela Tinfa	887	2
El Wak township	6717	3,4,5
El Wak South	9974	6,7,8,9,10,11
Eladi	3717	12,13
Wante	1901	14
Qarsadamu	370	
Dabacity	1923	15
Garse Sala	3638	16,17
Borehole 11	4332	18,19
El Rhamu	2305	20
Harwale	510	21
Kotulo	3338	22
Lehele	838	23
Kutayu	1622	24
Boji Garse	891	
Burmayo North	1483	25
Burmayo South	1139	
Shimbir Fatuma	3230	26,27
Qalanqalesa	2346	28
Fincharo	1740	29
Quramudow	2132	30,31
Elele	2597	32
Wargadud	6600	33,34,35

Annex 3: Calender of events

MONTHS	SEASONS	2005	2006	2007	2008	2009	2010
JANUARY	- Hot, dry. Cold nights - Idd Ul Hajj animal slaughter		51 Arrival of MSF/ nutrition program	39 Floods in El Wak	27 Post Election Violence	15	3
FEBRUARY	- Hot and dry. Warm nights - Zhakhat collection		50	38	26 End of PEV	14	2
MARCH	- Beginning long rains		49	37	25	13	1
APRIL	- Long rains, Cold nights - Schools close		48	36 Household Kit distribution by SCUK	24	12	
MAY	- End of rains - Schools open	59	47	35	23 Alango borehole drilled	11	
JUNE	Hot and dry	58	46 A boy hijacked from Highway hotel in El Wal and killed	34	22 Locust invasion	10	
JULY	Cold dry	57	45 U5 blanket food distribution and NFI distribution by MSF	33 Fighting with stones between Garre and Dogodia	21	9	
AUGUST	- Hot, dry, windy and dusty - Schools close	56	44	32	20 SCUK staff hijacked by Somali militia	8 Census	
SEPTEMBER	- Hot and dry - Schools open	55 Land mine at border line	43 Ramadhan	31 Ramadhan	19 Ramadhan/ Burning of Alango borehole	7 Idd ul Fitr	
OCTOBER	- Beginning of short rains	54 Ramadhan/ Destocking by KRCS	42 Onset of prolonged short rains that led to flooding later	30	18 Military Operation	6	
NOVEMBER	- Rains continue - Schools	53 Referendum vote	41	29	17 2 catholic nuns hijacked	5	
DECEMBER	End of short rains	52	40 Ban of meat consumption due to RVF/ Saddam Hussein execution	28 General elections	16 Mass out- migration from El Wak	4	

7.3 Annex 4: plausibility checks

Indicator	Score	Remarks
Digit preference - Weight	8(Acceptable)	0-5 good, 5-10 accept, 10-20 poor, >20 unacceptable
Digit preference - Height	13 (poor)	
WHZ (std. deviation)	1.02	Acceptable between 0.8 and 1.2
WHZ (skewness)	0.2	<±1.0 good, <±2.0 accept, <±3.0 poor, >±3.0 unacceptable
WHZ (kurtosis)	-0.12	
Percent of flags (Smart)	2.30%	0-5 good, 5-10 accept, 10-20 poor, >20 unacceptable
Age distribution %		
17-Jun	19.2	
18-29	26.30%	
30-41	27.20%	
42-53	17.70%	
54-59	9.20%	
Age ratio of 6-29 months to 30-59 months	0.84	The value should be around 1.0
Sex ratio	0.97	the value should be between 0.8 and 1.2
Overall sex ratio (p value)	0.653	Boys and girls equally represented