January - March 2009

Anthropometric and Retrospective mortality Surveys In the Districts of Mandera, Kenya

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1. EXECUTIVE SUMMARY

The larger Mandera district is at the extreme end of North Eastern Province covering an area of 26,470 Km^2 with approximately 325,000 inhabitant's[1].Mandera is one of the districts classified as ASAL (Arid and Semi Arid Districts of Kenya). Most of its rural areas are geographically isolated from the rest of the country and showing poor levels of infrastructures, thus politically and economically marginalized. The region is also prone to environmental degradation. Indeed the district has been facing perennial food insecurity for the past years, as a result of extreme climates, characterized by a succession of drought and floods.

In these areas mainly dominated by the pastoralist livelihoods, the availability of and the access to water is a main concern, and agricultural outcomes are extremely poor, leading to a lack of market for livestock and a lack of employment opportunities. Most people, in pastoral and marginal agricultural areas in particular, rely heavily on relief food.

The rates of acute malnutrition have remained well above the WHO emergency levels for the past decade.

The inhabitants of this region depend on unpredictable livelihoods and are highly vulnerable to shocks. The frequency of cyclical and often serious droughts has increased in the last years with widespread impacts on household food production and household food security. This has resulted into the implementation of massive food assistance operations as General Food Distributions and in the implementation of supplementary and therapeutic feeding programs among others.

Since October 2004 Action Against Hunger (ACF-USA) has been present in Mandera district to assist communities to overcome the aftermath of droughts, perennial food insecurity and water scarcity with selective feeding programs (TFC, OTP and SFP), food security & Livelihoods, water & sanitation and health promotion programs in 8 divisions in Mandera East and West districts. In order to monitor the nutritional situation, ACF-USA conducts nutrition surveys in its areas of operations every year before the long rains (*Gu'u/Gan*).

Three integrated nutrition surveys were then planned in Mandera East and West districts to be implemented from January 21st to March 11th 2009. The geographical areas surveyed were similar to those assessed in 2006, 2007 and 2008 and are listed below.

Survey 1: Mandera Central, Khalalio and Libehia Divisions
Survey 2: Banisa, Malkamari and Rhamu Dimtu Divisions
Survey 3: Takaba and Dandu Divisions

Specific objectives

The survey specific objectives are:

- To assess the prevalence of acute malnutrition in children aged 6-59 months
- To estimate the crude and under five mortality rates
- To estimate the coverage of measles among targeted children
- To estimate the coverage rates of vitamin A, capsules distributions
- To estimate the morbidity rates in children aged 6-59 months
- To evaluate the food security status of the population
- To assess knowledge, practices and coverage (e.g. sanitation, access to water, hygiene and sanitation)

Methodology

As part of the SMART methodology, a two-stage cluster sampling approach was applied to randomly identify clusters, also using the proportional to population size method. The sample for each survey was as follows:

[1] Mandera Long rain assessment 2008.

- Survey 1: 42 clusters of 19 children below 5 years (811 children surveyed on 798 planned)
- Survey 2: 42 clusters of 17 children below 5 years (743 children surveyed on 714 planned)
- Survey 3: 42 clusters of 15 children below 5 years (640 children surveyed on 630 planned)

At cluster level, households were randomly selected using the EPI method. All children aged between 6 and 59 months of the same family, defined by a caregiver and his or her own and/or adopted children living in the same household, were included in the survey for anthropometric measurements.
A retrospective mortality survey was undertaken alongside the anthropometric survey using SMART methodology. The recall period was 115 days, 116 days and 91 days for survey 1, 2 and 3 respectively.

Anthropometric and mortality data were analyzed using the ENA Software version October 2007. The entry and analysis of the nutrition, Food Security and Water & Sanitation qualitative data was done using SPSS Software version 12.

Field implementation

The survey was carried out by six teams, each team comprising of four members: 1 team leader, 1 data collector and 2 measurers. 2 team leaders belonged to ACF Surveillance and Food security staffs, 2 were from the Ministry of Health (MoH staff), 1 from the Kenyan National Bureau of statistics (KNBS) and one from the Arid Lands Resource Management Project (ALRMP) for the three surveys.
Team leaders, data collectors and measurers received a 3 days intensive training in Mandera for Mandera East survey while Training for Mandera West surveys was done in Takaba, prior to the start of the survey. This training provided them with the necessary theoretical background. The measurers were recruited in regard to clan balancing hence ensuring that all communities were equally represented in the survey teams.
This training included the standardization test. All teams were closely supervised during their field work throughout the whole survey by the Survey Program Assistant and Surveillance program Officer from ACF-USA.

Survey results (Mortality and Anthropometry)

After exclusion of irrelevant data, the following final samples were considered for analysis:

- Survey 1: 797 children according to the NCHS 1977 reference (14 exclusions) and 792 according to the WHO 2005 reference (19 exclusions),
- Survey 2: 720 children according to both the NCHS 1977 reference and the WHO 2005 reference (23 exclusions)
- Survey 3: 623 children according to the NCHS 1977 reference (17 exclusions) and 619 according to the WHO 2005 reference (21 exclusions)

The results for the three surveys are summarized in the tables below. Results between brackets are expressed with 95% confidence.

Table 1: Results summary for the Mandera East district (Central, Khalalio and Libehia divisions), January 2009

INDEX	INDICATOR		RESULTS (n=799 / 794)
WHO (2005)	*Z- scores*	*Global Acute Malnutrition* W/H< -2 z and/or oedema	20.5% [16.6 - 24.4]
		Severe Acute Malnutrition W/H < -3 z and/or oedema	2.8% [1.4 - 4.1]
	% Median	*Global Acute Malnutrition* W/H < 80% and/or oedema	5.3% [3.6 - 6.9]
		Severe Acute Malnutrition W/H < 70% and/or oedema	0.5% [0.0 - 1.1]
NCHS (1977)	*Z-scores*	*Global Acute Malnutrition* W/H< -2 z and/or oedema	19.8% [16.2 - 23.4]
		Severe Acute Malnutrition W/H < -3 z and/or oedema	1.1% [0.4 - 1.9]
	% Median	*Global Acute Malnutrition* W/H < 80% and/or oedema	9.4% [6.9 - 11.9]
		Severe Acute Malnutrition W/H < 70% and/or oedema	0.5% [0.0 - 1.1]
MUAC	*Height >= 65 cm*	*Global Acute Malnutrition* MUAC (<120mm)	1.4% [0.6 - 2.2]
		Severe Acute Malnutrition MUAC (<110mm)	0.0% [0.0 - 0.0]
Total crude retrospective mortality (last 3 months) /10,000/day			0.73 [0.38 - 1.09]
Under five crude retrospective mortality /10,000/day			0.78 [0.11 - 1.44]
Measles immunization coverage (N=768 children ≥ 9 months old)		By card	29.2% [26.0 - 32.4]
		According to caretaker	63.4% [60.0 - 66.8]
		Not immunized	7.4% [5.6 - 9.3]
Vitamin A coverage (N=797 children)		Once	50.1% [46.6 - 53.5]
		Two or more	19.9% [17.2 - 22.7]
		None	30.0% [26.8 - 33.2]

Table 2: Results summary for the Mandera West district (Malkamari, Banissa and Rhamu Dimtu), February 2009

INDEX	INDICATOR		RESULTS (n=720)
WHO (2005)	*Z- scores*	*Global Acute Malnutrition* W/H< -2 z and/or oedema	26.2% [21.5 - 30.8]
		Severe Acute Malnutrition W/H < -3 z and/or oedema	4.2% [2.6 - 5.8]
	% Median	*Global Acute Malnutrition* W/H < 80% and/or oedema	6.1% [4.0 - 8.2]
		Severe Acute Malnutrition W/H < 70% and/or oedema	0.0% [0.0 - 0.0]
NCHS (1977)	*Z-scores*	*Global Acute Malnutrition* W/H< -2 z and/or oedema	26.0% [21.7 - 30.3]
		Severe Acute Malnutrition W/H < -3 z and/or oedema	1.2% [0.3 - 2.1]
	% Median	*Global Acute Malnutrition* W/H < 80% and/or oedema	10.6% [7.7 - 13.4]
		Severe Acute Malnutrition W/H < 70% and/or oedema	0.0% [0.0 - 0.0]
MUAC	*Height >= 65 cm*	*Global Acute Malnutrition* MUAC (<120mm)	1.1% [0.3-1.9]
		Severe Acute Malnutrition MUAC (<110mm)	0.1% [0.0 - 0.4]
Total crude retrospective mortality (last 3 months) /10,000/day			0.78 [0.45 -1.12]
Under five crude retrospective mortality /10,000/day			1.48 [0.74 - 2.22]
Measles immunization coverage (N=697 children ≥ 9 months old)		By card	12.1% [9.6 - 14.5]
		According to caretaker	60.8% [57.2 - 64.5]
		Not immunized	27.1% [23.8 - 30.4]
Vitamin A coverage (N=737 children)		Once	23.4% [21.2 - 27.4]
		Two or more	14.9% [12.4 - 17.5]
		None	60.8% [57.3 - 64.3]

Table 3: Results summary for the Mandera West district (Takaba and Dandu), March 2009

INDEX	INDICATOR		RESULTS (n=623 / 619)
WHO (2005)	*Z- scores*	***Global Acute Malnutrition*** W/H< -2 z and/or oedema	32.3% [28.2 - 36.4]
		Severe Acute Malnutrition W/H < -3 z and/or oedema	5.7% [3.5 - 7.8]
	% Median	***Global Acute Malnutrition*** W/H < 80% and/or oedema	9.4 % [5.8 - 12.9]
		Severe Acute Malnutrition W/H < 70% and/or oedema	0.0% [0.0 - 0.0]
NCHS (1977)	*Z-scores*	***Global Acute Malnutrition*** W/H< -2 z and/or oedema	31.5 % [27.0 - 35.9]
		Severe Acute Malnutrition W/H < -3 z and/or oedema	2.6 % [1.3 - 3.9]
	% Median	***Global Acute Malnutrition*** W/H < 80% and/or oedema	16.1 % [12.6 - 19.5]
		Severe Acute Malnutrition W/H < 70% and/or oedema	0.3 % [0.0 - 0.8]
MUAC	*Height >= 65 cm*	***Global Acute Malnutrition*** MUAC (<120mm)	3.9% [2.4 - 5.4]
		Severe Acute Malnutrition MUAC (<110mm)	0.6% [0.0 - 1.3]
Total crude retrospective mortality (last 3 months) /10,000/day			0.91 [0.6 - 1.22]
Under five crude retrospective mortality /10,000/day			1.15 [0.51 - 1.78]
Measles immunization coverage (N=579 children ≥ 9 months old)		By card	15.0% [12.1 - 17.9]
		According to caretaker	50.6% [46.5 - 54.7]
		Not immunized	34.4% [30.5 - 38.2]
Vitamin A coverage (N=619 children)		Once	30.0% [26.4 - 33.6]
		Two or more	19.2% [16.1 - 22.3]
		None	50.8% [46.9 - 54.7]

2. INTRODUCTION

Mandera East and Mandera West Districts are two of the three newly formed districts derived from the former Mandera District in the North-Eastern Province of Kenya bordering Ethiopia to the north and Somalia to the east. The capital of Mandera East and West are Mandera Town and Takaba, respectively. Together with Mandera Central District the population is estimated at 250,372[2] inhabiting an area of 26,474 km^2 of arid land spotted with low-lying rock hills. To the north there is the seasonal river Daua which forms the border to Ethiopia and serves as a natural water supply during rainy season.

The two districts are mainly populated by pastoralist communities. About 15% of the population who live along the river are agro-pastoralists with some access to irrigation. The prominent ethnic group is Somali-Muslim. The ethnic group is, however, not homogenous, but a grouping of broad clan federations divided by language and clan conflicts that flare up from time to time. The major clans living in Mandera East district are Murle, Dogodia, Gare, and Corner; in Mandera West district the Gare and Dogodia are the major clans.

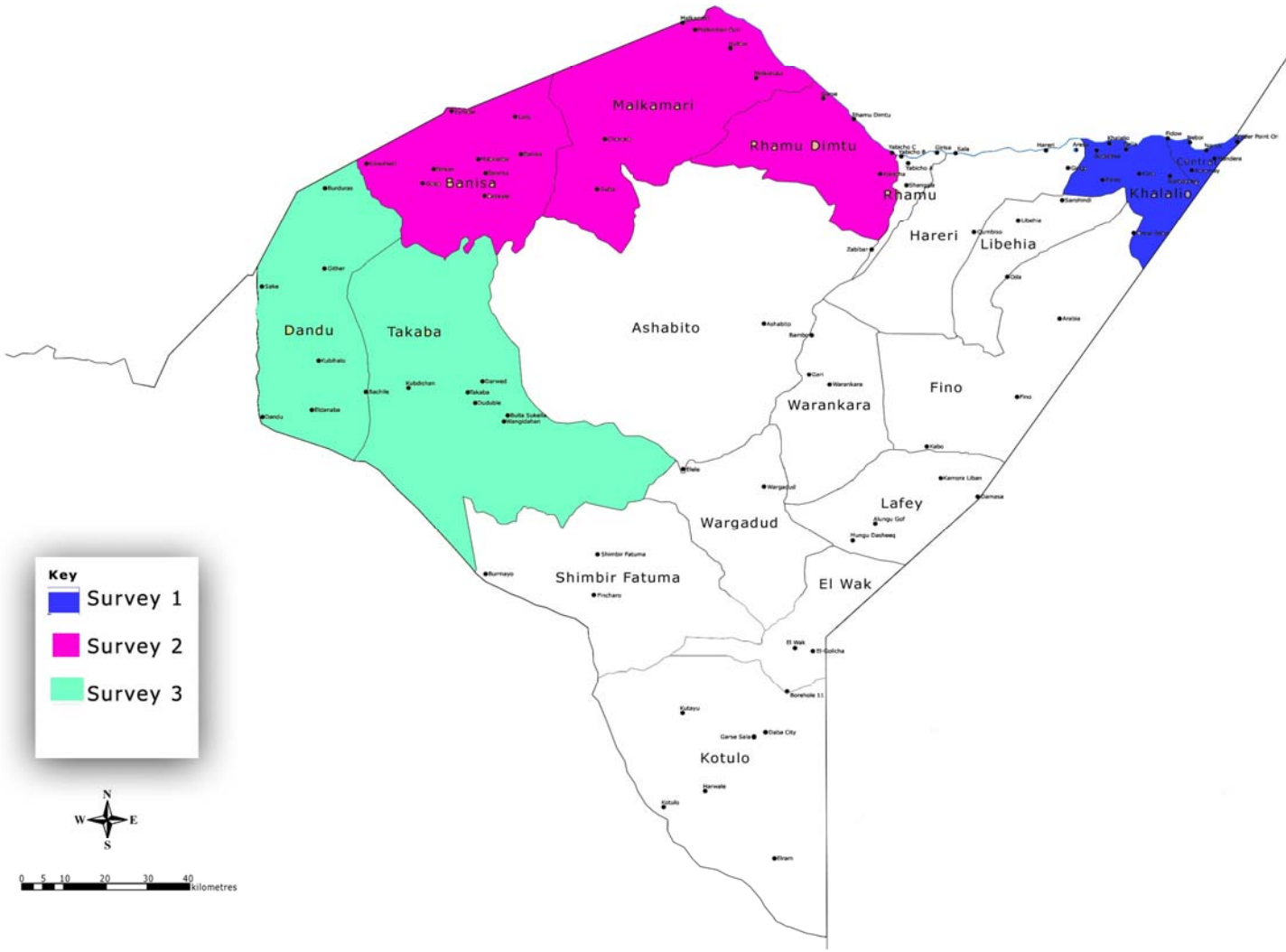
The rainfall pattern in the districts is bimodal. Long and short rains are experienced from March/April to June and September/October to December, respectively. Average annual rainfall is a low 255 mm and temperatures ranging from 24^0C to 42^0C[3]. Since the El Niño phenomenon in 1997 the area has known but a couple of normal rainy seasons, all others being below normal.

Agricultural activities are quite limited; except for the communities living along the seasonal Daua River, most of the population depends entirely on pastoral activities (keeping camels, cattle, goats and sheep). The weather conditions and lack of employment opportunities have confined communities to humanitarian assistance for decades as most of the people are poor and cannot afford to buy food for their own. The humanitarian crisis worsened in December 2005 when drought hit the region resulting in major loss of livestock and high rates of malnutrition. Furthermore, floods hit the region in December 2006 triggering waterborne diseases which deteriorated the health and nutrition status of the population even further. From December 2006 to mid 2007 Rift Valley Fever led to a ban of livestock sales in the country making residents of the North-east most vulnerable to malnutrition as most of them depend on livestock as the only source of livelihood. The availability of and the access to safe drinking water is of major concern in the region especially in Mandera West where many settlements entirely rely on water trucking during the dry season.

Food insecurity and water scarcity in the region has lead to a humanitarian crisis with aid agencies such as WFP, UNICEF, Action Against Hunger - USA, Islamic Relief and Save the Children UK implementing health, water and nutrition programs to improve the quality of life and prevent mortality in assisted communities. Action Against Hunger - USA has being implementing nutrition, hygiene and water/sanitation programs in Mandera East district since October 2004. Intervention in Mandera West started in 2005.

[2] 1999 census
[3] Mandera District KFSG short rains assessment 2008 report 4th- 8th February 2008

Map 1: Geographical locations of the three surveys



3. METHODOLOGY

3.1 Type of Survey and Sample Size

Two-stage cluster sampling using SMART methodology was applied to randomly identify clusters with the probability of being selected proportional to the population size in each cluster. Therefore, population data of all accessible settlements in the survey area was taken from Arid Lands Resources Management Project (ALRMP), Kenya, 2005 and divided by administrative boundaries according to the three survey areas. The geographical units and their respective population were then entered into ENA for SMART software October 2007 for cluster selection.

The total population for all accessible villages in the different surveys is estimated as follows:

- Survey 1: Mandera Central and Khalalio Divisions……65,294
- Survey 2: Banisa, Malkamari and Rhamu Dimtu Divisions……72,848
- Survey 3: Takaba and Dandu Divisions……30,138

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

Survey 1 Mandera central and Khalalio Division Sample size calculation

Using a malnutrition prevalence of 31.8% based on previous surveys with a precision of 4% and a design effect of 1.5; a sample size of 751 children was obtained. In the mortality session an estimated prevalence of 0.5, a desired precision of 0.3, design effect of 1.5 and 115 days for recall period resulted in a sample size of 2,692.

A buffer of 5% in sample size was included in order to compensate for missing data, thus, resulting in a sample size of 790 children in the anthropometric survey and 2,833 for the mortality.

Given the operational circumstances and the fact that one cluster needed to be finished in one working day, 19 children aged 6-59 months were estimated to be measured in one cluster which yielded a total of 42 clusters (789/19, leading to a final expected sample of 798). For the mortality, 68 people present at the time of the survey were included for each cluster (2,827/42 clusters). **See annex 1**

Survey 2 Banisa, Malkamari and Rhamu Dimtu Divisions sample size calculation

Using a malnutrition prevalence of 25.3% based on previous surveys with a precision of 4% and a design effect of 1.5, a sample size of 660 children was obtained. In the mortality session an estimated prevalence of 0.65, a desired precision of 0.4, a design effect of 1.5 and 116 days for recall period resulted in a sample size of 2,622.

A buffer of 5% in sample size was included in order to compensate for missing data, thus, resulting in a sample size of 693 children in the anthropometric survey and 2,753 for the mortality.

Given the operational circumstances and the fact that one cluster needed to be finished in one working day, 17 children aged 6-59 months were estimated to be measured in one cluster which yielded a total of 41 clusters (693/17). For the mortality session 68 people present at the time of the survey were included for each cluster (2,753/41 clusters). One extra cluster was added to balance out a disproportion of population in the nomadic setting of North-east Kenya. **See annex 2**

Survey 3 Takaba and Dandu Divisions sample size calculation

Using a malnutrition prevalence of 25% based on previous surveys with a precision of 4% and a design effect of 1.5; a sample size of 628 children was obtained. In the mortality session an estimated prevalence of 0.68, a desired precision of 0.4, a design effect of 1.5 and 91 days for recall period resulted in a sample size of 2,525.

A buffer of 5% in sample size was included in order to compensate for missing data, thus, resulting in a sample size of 633 children in the anthropometric survey and 2,651 for the mortality.

Given the operational circumstances and the fact that one cluster needed to be finished in one working day, 15 children aged 6-59 months were estimated to be measured in one cluster which yielded a total of 42 clusters (633/15). For the mortality session 63 people present at the time of the survey were included for each cluster (2,651/42 clusters). **See annex 3**

At the second stage, selection of households to be visited in each cluster was done using the EPI method. Teams were led to the centre of the cluster by a village representative randomly choosing the direction to head for by spinning a pen. The team then walked in the direction indicated by the pen until the edge of the village or cluster boundary was reached. At the edge of the village/cluster the pen was spun again, until it pointed into the body of the village/cluster. The team then walked along this second line counting each house on the way. Using a simple table of random numbers, the first house to be visited was selected at

random by drawing a number between one and the number of households counted when walking. The second house and each following were chosen by proximity, always choosing the houses on the right hand when standing with the back facing the main door. If several families were found to be living in the same compound, all families were counted and families then randomly choose by random number table. One family was chosen if 9 or less families were living in the compound. Two families were chosen if 10 or more families were found to inhabit the compound.

In the selected household, all children aged 6-59 months in were included in the nutritional survey. If there was more than one wife/caretaker in the household[4], each wife was considered separately. If there were no children in a household, the house remained a part of the "sample" that contributed zero children to the nutritional part of the survey. The household was recorded on the nutritional data sheet as having no eligible children.

The survey looked at diet diversity using pre-defined 12 food groups and a 24 hour recall period. The dietary diversity indicator is based on the premise that the more diverse the diets are, the more likely they are to provide adequate levels of a range of nutrients. Food groups have been evaluated with a yes/no answer, being scored "1" if the household had the food group the day before the survey, and "0" if not.

The mortality questionnaire was administered to all households that were selected with the above mentioned methodology.

3.2 Data Collection

Measurers and data collectors were subjected to a standardization test to ascertain their capability in taking accurate and precise measurements, so as to minimize errors during data collection.

3.2.1 Anthropometrical survey

For each eligible child aged 6-59 months, information was collected during the anthropometric survey using an anthropometric questionnaire (see annex 4). The information included:

- **Age:** Determined only with the help of a local calendar of events (See annex 5)
- **Sex:** Recorded as 'm' for male and 'f' for female
- **Weight:** Children were weighed to the nearest 100 g with a Salter Hanging Scale of 25 kg. All scales were checked daily by using a standard weight of 5 kg and adjusted (to "0" with an empty weighing pant for boys or empty weighing pant plus standard dress for girls) before each measurement. Boys were measured undressed. Girls were undressed and redressed with a standard dress before measuring the weight. If the caretaker refused to have the child weighed by the above described methodology, the child's own clothes was used to adjust the scale to zero. The child was then redressed to be weighed.
- **Height:** Children were measured on a measuring board (precision of 0.1cm). Children less than 85cm were measured lying down, while those greater than or equal to 85cm were measured standing up.
- **Mid-Upper Arm Circumference:** MUAC was measured in centimeters at mid-point of left upper arm (between olecranon and the acromion process) to the nearest 0.1 cm with a non-stretchable tape.
- **Bilateral Oedema:** Assessed by the application of moderate thumb pressure for at least 3 seconds to both feet (upper side). Only children with bilateral oedema were recorded as having nutritional oedema.
- **Measles vaccination:** Measles vaccination status for children aged 9-59 months was copied from their vaccination cards. If no card was available at the time of the survey, the caretaker was asked if the child had been immunized against measles or not. For children with confirmed immunization (by date) on the vaccination card, the status was recorded as "C" (Card) otherwise as "N" (No). Oral confirmation without proof was recorded as "M" (Mother confirmed). "N" was also recorded if the child was less than 9 months old.
- **Vitamin A coverage:** A capsule of vitamin A was shown to the mother while asking her if the child received the content of that capsule in the past. The answer was then recorded as Y for yes or N for no.

[4] A household refers to a mother and her own or adopted children

3.2.2 Mortality survey

Each family selected at random (even if there was no child aged 6-59 months), was asked to state all family members and indicate their age and sex. The family was then asked to indicate which of the listed family members were present now and at the beginning of the recall period, which members joined or left during the recall period, and whether there was any birth or death in the family during the recall period (see annex 6 for the actual questionnaire)

Following are the dates which were chosen as the start of the recall period for each survey and the total recall time:

- Survey 1: 115 days with the recall event being *Eid ul Fitr* which was on 1st of October 2008
- Survey 2: 116 days with the recall event being celebration of the start of military operations in Mandera on 24th of October 2008
- Survey 3: 91 days with the recall event being *Idd Arafat* which was on 8th December,2008

3.2.3 Food Security and Water and Sanitation

Food security and water and sanitation data were collected from same households the mortality data were collected. The questionnaire was administered to the head of the household and/or to the spouse regardless of whether the selected household had a child 6-59 months of age. If the household selected had children <5, the respondents were both the head and the mother. In the households where there were no children <5, the respondents were the head, the spouse or both depending on who was available at the time of the survey.

3.2.4 Data quality control assurance

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

3.2.5 Pilot Survey

The training was followed by a pilot survey in a village not selected for the survey. The methodology was tested; the precision and the accuracy of the data collection, and the measurement techniques were assessed. All the data collection forms were successfully tested during the exercise. The pilot survey was successful and the actual survey took place starting the following day. Since survey 2 and 3 were implemented by the same team, one pilot survey was deemed necessary.

3.2.6 Data Entry and Analysis

Anthropometric and mortality data processing and analysis was conducted using SMART/ENA 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 items were incorrect; these data were not used in the analysis. The Food Security, Water & Sanitation data entry was done in Excel Spreadsheet and SPSS Version 12. The data analysis was performed with SPSS Software Version 12.

3.3 Indicators, Guidelines and Formulas used

3.3.1 Acute Malnutrition:

- **Weight for Height**

Acute malnutrition rates are estimated from the weight for height (WFH) index values combined with the

presence of bilateral edemas. The WFH indices are expressed in both Z-scores (standard deviation or SD score) and percentage of the median, according to both NCHS and WHO references. The complete analysis is however done with the NCHS reference. The expression in Z-scores has true statistical value and allows inter-study comparison. The percentage of the median, on the other hand, is commonly used to identify children eligible for admission to feeding programs.

Guidelines for the results expressed in Z-score:

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

Guidelines for the results expressed in percentage of the median:

- Severe malnutrition is defined by WFH < 70 % and/or existing bilateral edema
- Moderate malnutrition is defined by WFH < 80 % and ≥ 70 % and no edema.
- Global acute malnutrition is defined by WFH <80% and/or existing bilateral edema

➢ **Mid-Upper Arm Circumference (MUAC)**

The weight for height index is the most appropriate index to quantify wasting in a population in emergency situations where acute forms of malnutrition are the predominant pattern. However, MUAC is a useful tool for rapid screening of children at a higher risk of mortality. MUAC measurements are significant for children with a height of 65cm or one year and above. The guidelines are as follows:

MUAC <110mm	severe acute malnutrition and high risk of mortality
MUAC ≥110mm and <120mm	moderate acute malnutrition and moderate risk of mortality
MUAC≥120mm and <125mm	high risk of malnutrition
MUAC≥125mm and <135mm	moderate risk of malnutrition
MUAC≥135mm	adequate nutritional status

3.3.2 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. The result is expressed per 10,000 people / day.

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

Crude Mortality Rate (CMR):

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

Under Five Mortality Rate (U5MR):

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

3.3.3 Data Analysis

Anthropometric and mortality data collected from the field was entered into ENA for SMART software (October 2007 version) for analysis. The qualitative data of food security, water and sanitation and child morbidity status sets were analyzed in SPSS version 12.0 and Microsoft Excel 2003.

4. RESULTS

4.1 Child nutrition and health

4.1.1 Distribution by Age and Sex

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

Table 4: Distribution of age and sex of sample for survey 1 (Central, Khalalio and Libehia divisions)

age groups (months)	Boys		Girls		Total		Ratio
	no.	%	no.	%	no.	%	Boy : girl
6 - 17	86	51.2	82	48.8	168	21.1	1
18 - 29	110	56.1	86	43.9	196	24.6	1.3
30 - 41	117	56.8	89	43.2	206	25.8	1.3
42 - 53	77	52	71	48	148	18.5	1.1
54 - 59	40	50	40	50	80	10	1
Total	430	53.9	368	46.1	798	100	1.2

Figure 1: Distribution of sex by age group, survey 1 (Central, Khalalio and Libehia divisions)

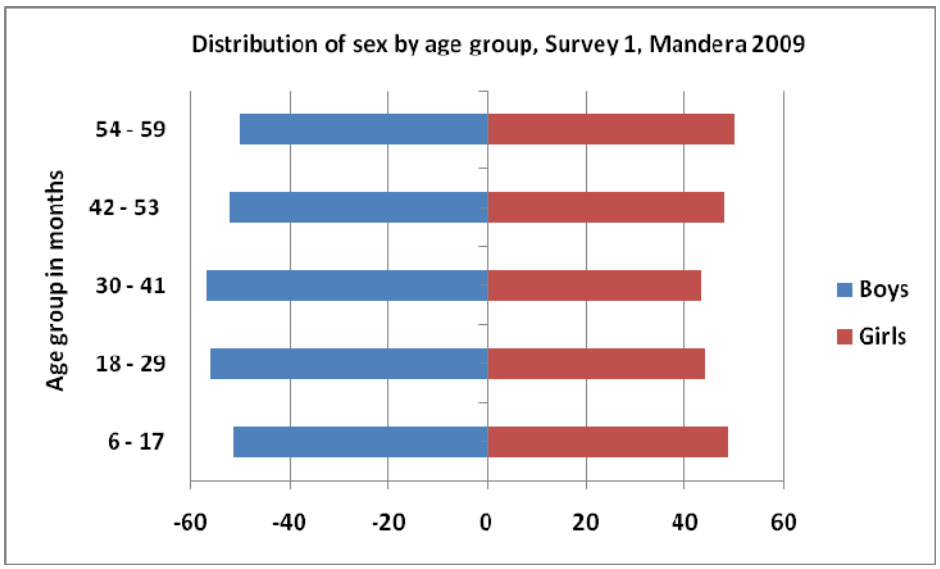


Table 5: Distribution of age and sex of sample for survey 2 (Banisa, Malkamari and Rhamu Dimtu)

age groups (months)	Boys		Girls		Total		Ratio
	no.	%	no.	%	no.	%	Boy : girl
6 - 17	88	57.5	65	42.5	153	21.3	1.4
18 - 29	109	53.7	94	46.3	203	28.2	1.2
30 - 41	77	51	74	49	151	21	1
42 - 53	77	51.3	73	48.7	150	20.8	1.1
54 - 59	33	52.4	30	47.6	63	8.8	1.1
Total	384	53.3	336	46.7	720	100	1.1

Figure 2 Distribution of sex by age group, survey 2 (Banisa, Malkamari and Rhamu Dimtu divisions)

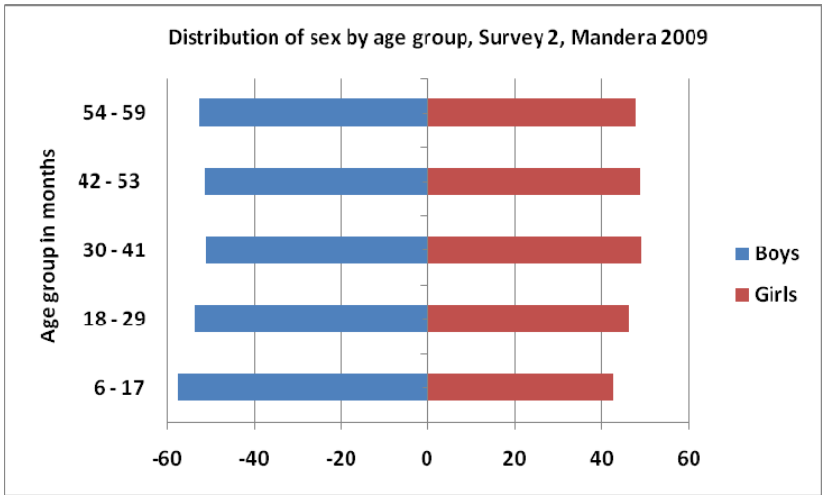
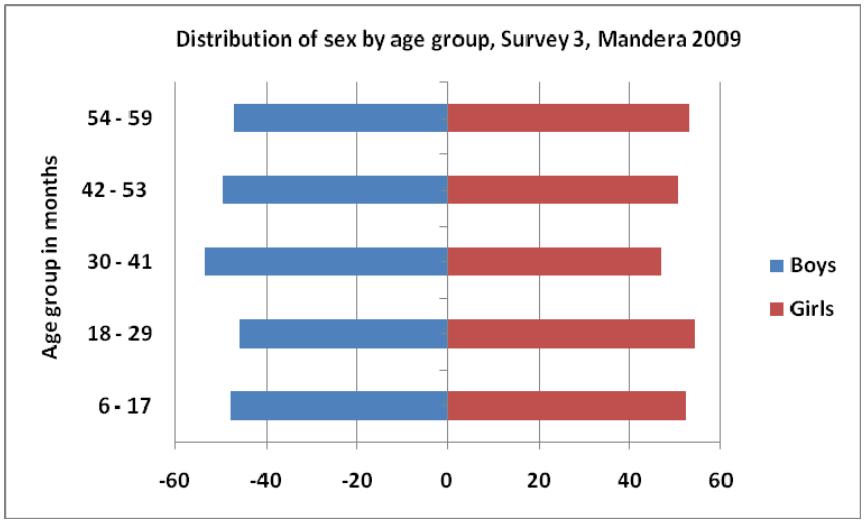


Table 6: Distribution of age and sex of sample for survey 3 (Takaba and Dandu)

age groups (months)	Boys		Girls		Total		Ratio
	no.	%	no.	%	no.	%	Boy : girl
6 - 17	74	47.7	81	52.3	155	25	0.9
18 - 29	84	45.7	100	54.3	184	29.7	0.8
30 - 41	79	53.4	69	46.6	148	23.9	1.1
42 - 53	41	49.4	42	50.6	83	13.4	1
54 - 59	23	46.9	26	53.1	49	7.9	0.9
Total	301	48.6	318	51.4	619	100	0.9

Figure 3: Distribution of sex by age group, survey 3 (Takaba and Dandu divisions)



4.1.2 Anthropometric Analysis

➢ **Distribution of Acute Malnutrition in Z-Scores**

In the entire sample, the prevalence of global acute malnutrition was 20.5%, 26.2, 32.3 for Surveys 1, 2 and 3 respectively, severe acute malnutrition 2.8%, 4.2% and 5.7% for Surveys 1, 2 and 3.

Table 7: Weight for Height distribution by age groups in Z-scores for the survey 1 (Central, Khalalio and Libehia divisions)

Age groups (months)	N	Severe wasting (<-3 z-scores)		Moderate wasting (>= -3 and <-2 z-scores)		No wasting (> = -2 z scores)		Oedema	
		n	%	n	%	n	%	n	%
6 - 17	166	3	1.8	24	14.5	138	83.1	1	0.6
18 - 29	194	2	1	23	11.9	168	86.6	1	0.5
30 - 41	206	7	3.4	35	17	164	79.6	0	0
42 - 53	148	2	1.4	35	23.6	111	75	0	0
54 - 59	80	4	5	25	31.3	51	63.8	0	0
Total	**794**	**18**	**2.3**	**142**	**17.9**	**632**	**79.6**	**2**	**0.3**

Table 8: Weight for Height distribution by age groups in Z-scores for survey 2 (Banisa, Malkamari and Rhamu Dimtu)

Age groups (months)	N	Severe wasting (<-3 z-scores)		Moderate wasting (>= -3 and <-2 z-scores)		No wasting (> = -2 z scores)		Oedema	
		n	%	n	%	n	%	n	%
6 - 17	153	6	3.9	21	13.7	126	82.4	0	0
18 - 29	203	7	3.4	45	22.2	151	74.4	0	0
30 - 41	151	7	4.6	37	24.5	107	70.9	0	0
42 - 53	150	7	4.7	34	22.7	109	72.7	0	0
54 - 59	63	3	4.8	19	30.2	41	65.1	0	0
Total	**720**	**30**	**4.2**	**156**	**21.7**	**534**	**74.2**	**0**	**0**

Table 9: Weight for Height distribution by age groups in Z-scores for survey 3 (Takaba and Dandu)

Age groups (months)	N	Severe wasting (<-3 z-scores)		Moderate wasting (>= -3 and <-2 z-scores)		No wasting (> = -2 z scores)		Oedema	
		n	%	n	%	n	%	n	%
6 - 17	155	5	3.2	27	17.4	123	79.4	0	0
18 - 29	184	11	6	43	23.4	130	70.7	0	0
30 - 41	148	10	6.8	48	32.4	90	60.8	0	0
42 - 53	83	4	4.8	30	36.1	49	59	0	0
54 - 59	49	5	10.2	17	34.7	27	55.1	0	0
Total	**619**	**35**	**5.7**	**165**	**26.7**	**419**	**67.7**	**0**	**0**

No survey showed any significant statistical difference of acute malnutrition rates per age group.

There were two children presenting with bilateral oedema for survey 1. The other two surveys did not have any child presenting with oedema.

Table 10: Weight for height versus Oedema for the survey 1 (Central, Khalalio and Libehia divisions)

	<-3 z-scores	>=-3 z-scores
Oedema present	Marasmic kwashiorkor 0 (0.0 %)	Kwashiorkor 2 (0.3 %)
Oedema absent	Marasmic 18 (2.3 %)	Normal 774 (97.5 %)

Table 11: Weight for height versus Oedema for survey 2 (Banisa, Malkamari and Rhamu Dimtu)

	<-3 z-scores	>=-3 z-scores
Oedema present	Marasmic kwashiorkor 0 (0.0 %)	Kwashiorkor 0 (0.0 %)
Oedema absent	Marasmic 30 (4.2 %)	Normal 690 (95.8 %)

Table 12: Weight for height versus Oedema for survey 3 (Takaba and Dandu)

	<-3 z-scores	>=-3 z-scores
Oedema present	Marasmic kwashiorkor 0 (0.0 %)	Kwashiorkor 0 (0.0 %)
Oedema absent	Marasmic 35 (5.7 %)	Normal 584 (94.3 %)

No case of marasmic – kwashiorkor was met during the surveys.

The figures below show the weight for height distribution curves of the surveys samples in Z-scores for comparison with both the NCHS and the WHO reference populations. The entire weight for height distribution curves of the sample are shifted to the left, with a mean Z-score of -1.15±1.00 for survey 1, -1.41±0.89 for survey 2 and -1.50±0.98 for survey 3, which indicates a suboptimal nutrition status compared to the reference population (WHO reference table).

The standard deviations were 0.86, 0.73 and 0.81 for surveys 1, 2 and 3 respectively.

Figure 4: Weight for Height distribution in z-score for the survey 1 (Central, Khalalio and Libehia divisions)

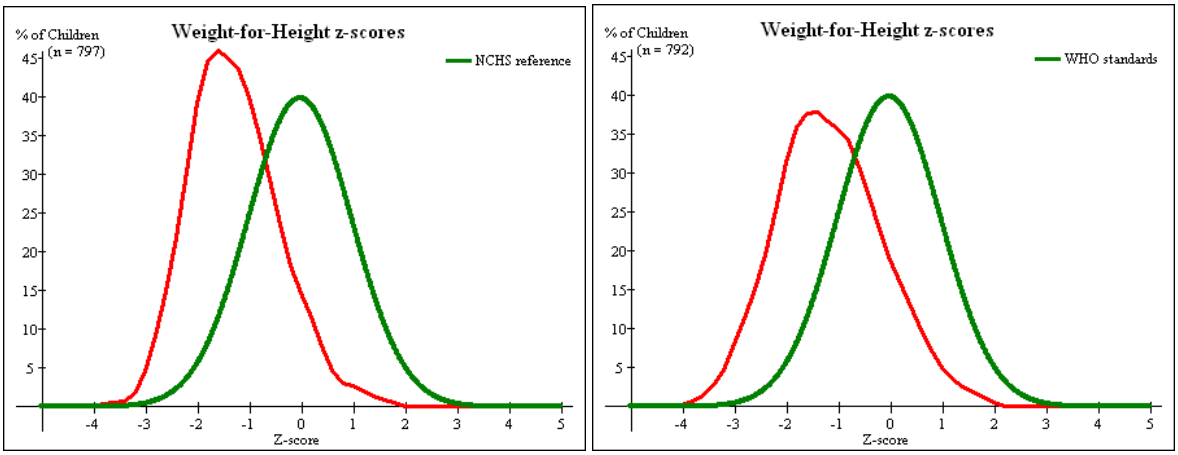


Figure 5: Weight for Height distribution in z-score for survey 2 (Banisa, Malkamari and Rhamu Dimtu)

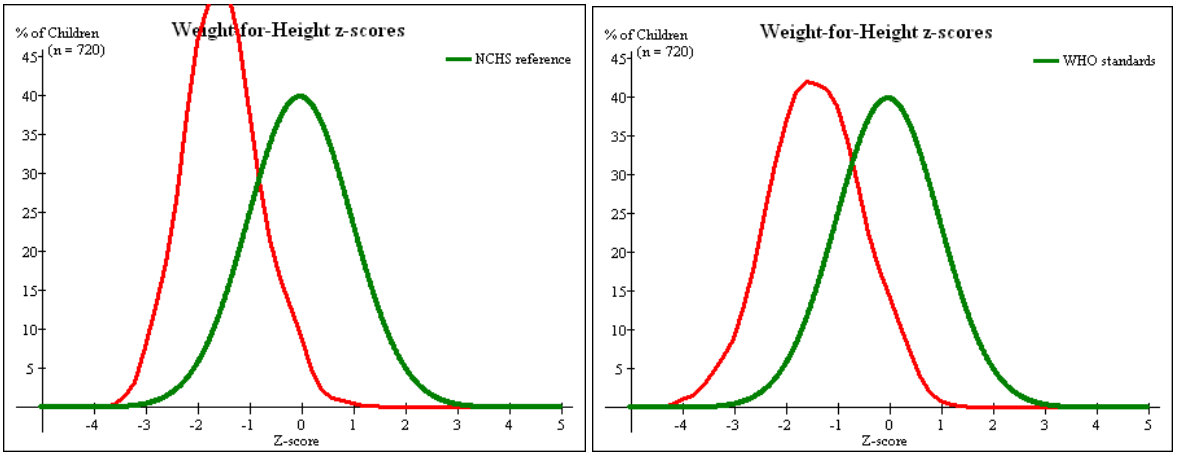
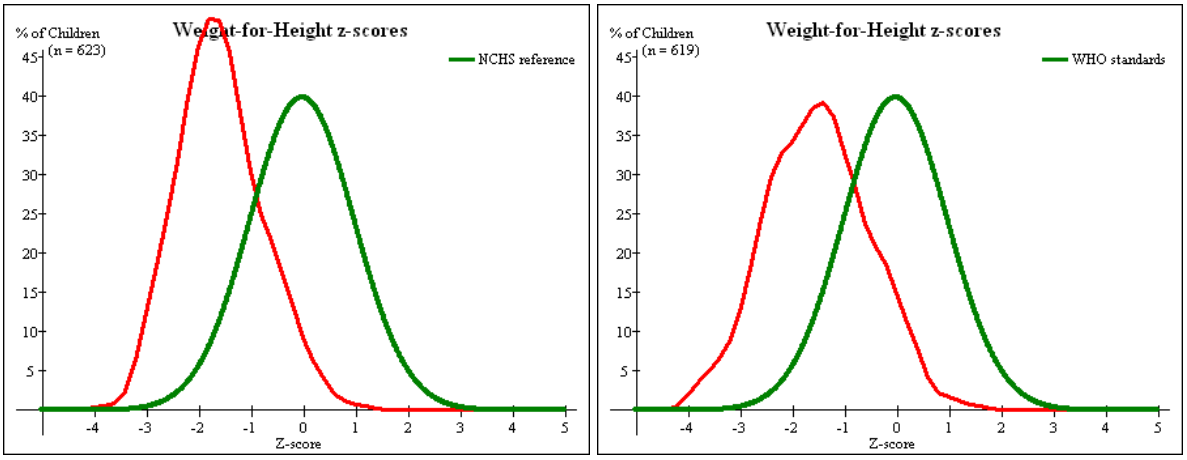


Figure 6: Weight for Height distribution in z-score for survey 3 (Takaba and Dandu)



The following tables present the comparison of the results compared between the NCHS and the WHO references.

Table 13: Global and Severe Acute Malnutrition in Z-score for survey 1 (Central, Khalalio and Libehia divisions)

	NCHS Reference	WHO Reference
Global acute malnutrition	19.8% [16.2 - 23.4]	20.5% [16.6 - 24.4]
Severe acute malnutrition	1.1% [0.4 - 1.9]	2.8% [1.4 - 4.1]

Table 14: Global and Severe Acute Malnutrition in Z-score for survey 2 (Banisa, Malkamari and Rhamu Dimtu)

	NCHS Reference	WHO Reference
Global acute malnutrition	26.0% [21.7 - 30.3]	26.2% [21.5 - 30.8]
Severe acute malnutrition	1.2% [0.3 - 2.1]	4.2% [2.6 - 5.8]

Table 15: Global and Severe Acute Malnutrition in Z-score for survey 3 (Takaba and Dandu)

	NCHS Reference	WHO Reference
Global acute malnutrition	31.5 % [27.0 - 35.9]	32.3% [28.2 - 36.4]
Severe acute malnutrition	2.6 % [1.3 - 3.9]	5.7% [3.5 - 7.8]

When comparing the survey samples to the WHO reference population, the rates of severe acute malnutrition are significantly higher than when comparison is made with the NCHS reference population.

➢ Distribution of Malnutrition in Percentage of the Median

In the entire sample, the prevalence of global acute malnutrition was 5.3%, 6.1, 9.4 for Surveys 1, 2 and 3 respectively, severe acute malnutrition 0.5%, 0.0% and 0.0% for Surveys 1, 2 and 3. The results expressed in percentage of the median are much lower than when expressed in Z-score for both global and severe acute malnutrition.

Table 16: Distribution of Weight/Height by age groups in percentage of the median for survey 1 (Central, Khalalio and Libehia divisions)

Age groups (months)	N	Severe wasting (< - 3 z-scores)		Moderate wasting (>= - 3 and < - 2 z-scores)		No wasting (> = - 2 z-scores)		Oedema	
		n	%	n	%	n	%	n	%
6 - 17	167	0	0	16	9.6	150	89.8	1	0.6
18 - 29	194	0	0	13	6.7	180	92.8	1	0.5
30 - 41	207	0	0	21	10.1	186	89.9	0	0
42 - 53	149	1	0.7	10	6.7	138	92.6	0	0
54 - 59	82	1	1.2	11	13.4	70	85.4	0	0
Total	**799**	**2**	**0.3**	**71**	**8.9**	**724**	**90.6**	**2**	**0.3**

Table 17: Distribution of Weight/Height by age groups in percentage of the median for survey 2 (Banisa, Malkamari and Rhamu Dimtu)

Age groups (months)	N	Severe wasting (< - 3 z-scores)		Moderate wasting (>= - 3 and < - 2 z-scores)		No wasting (> = - 2 z-scores)		Oedema	
		n	%	n	%	n	%	n	%
6 - 17	155	0	0	13	8.4	142	91.6	0	0
18 - 29	201	0	0	28	13.9	173	86.1	0	0
30 - 41	151	0	0	15	9.9	136	90.1	0	0
42 - 53	150	0	0	13	8.7	137	91.3	0	0
54 - 59	63	0	0	7	11.1	56	88.9	0	0
Total	**720**	**0**	**0**	**76**	**10.6**	**644**	**89.4**	**0**	**0**

Table 18: Distribution of Weight/Height by age groups in percentage of the median for survey 3 (Takaba and Dandu)

Age groups (months)	N	Severe wasting (< - 3 z-scores)		Moderate wasting (>= - 3 and < - 2 z-scores)		No wasting (> = - 2 z-scores)		Oedema	
		n	%	n	%	n	%	n	%
6 - 17	156	0	0	18	11.5	138	88.5	0	0
18 - 29	185	2	1.1	37	20	146	78.9	0	0
30 - 41	146	0	0	26	17.8	120	82.2	0	0
42 - 53	83	0	0	11	13.3	72	86.7	0	0
54 - 59	53	0	0	6	11.3	47	88.7	0	0
Total	**623**	**2**	**0.3**	**98**	**15.7**	**523**	**83.9**	**0**	**0**

No survey showed any significant statistical difference of acute malnutrition rates per age group.

There were two children presenting with bilateral oedema for survey 1. The other two surveys did not have any child presenting with oedema.

The following tables present the comparison of the results between the NCHS and the WHO references.

Table 19: Global and Severe Acute Malnutrition in % of the median (NCHS reference) for survey 1 (Central, Khalalio and Libehia divisions)

	NCHS Reference	WHO Reference
Global acute malnutrition	9.4% [6.9 - 11.9]	5.3% [3.6 - 6.9]
Severe acute malnutrition	0.5% [0.0 - 1.1]	0.5% [0.0 - 1.1]

Table 20: Global and Severe Acute Malnutrition in % of the median (NCHS reference) for survey 2 (Banisa, Malkamari and Rhamu Dimtu)

	NCHS Reference	WHO Reference
Global acute malnutrition	10.6% [7.7 – 13.4]	6.1% [4.0 – 8.2]
Severe acute malnutrition	0.0% [0.0 – 0.0]	0.0% [0.0 - 0.0]

Table 21: Global and Severe Acute Malnutrition in % of the median (NCHS reference) for survey 3 (Takaba and Dandu)

	NCHS Reference	WHO Reference
Global acute malnutrition	16.1 % [12.6 - 19.5]	9.4 % [5.8 - 12.9]
Severe acute malnutrition	0.3 % [0.0 - 0.8]	0.0% [0.0-0.0]

When comparing the survey samples to the WHO reference population, the rates of severe acute malnutrition are significantly higher than when comparison is made with the NCHS reference population.

- **Risk of Mortality: Children's MUAC**

All children measured who had a height>=65 cm were included in the MUAC analysis.
As shown in the following tables, the rates of acute malnutrition according to the MUAC status of the children were extremely low, with severe acute malnutrition rates ranging between 0.1% and 0.6% and global acute malnutrition rates ranging between 1.5% and 3.8%.

Table 22: MUAC distribution for the three surveys for survey 1 (Central, Khalalio and Libehia divisions)

MUAC (mm)	>= 65 cm to < 75 cm height		>=75 to < 90 cm height		>=90 cm height		Total	
< 110	0	0.0%	0	0.0%	1	0.3%	**1**	0.1%
110<= MUAC<120	5	4.1%	5	1.8%	1	0.3%	**11**	1.4%
120<= MUAC<125	10	8.2%	10	3.6%	2	0.5%	**22**	2.8%
125<= MUAC <135	33	27.0%	58	20.9%	31	7.8%	**122**	15.3%
MUAC>= 135	74	60.7%	205	73.7%	364	91.2%	**643**	80.5%
TOTAL	122	100.0%	278	100.0%	399	100.0%	**799**	100.0%

Table 23: MUAC distribution for the three surveys for survey 2 (Banisa, Malkamari and Rhamu Dimtu)

MUAC (mm)	>= 65 cm to < 75 cm height		>=75 to < 90 cm		>=90 cm		Total	
< 110	1	0.9%	0	0.0%	1	0.3%	**2**	0.3%
110<= MUAC<120	8	7.4%	3	1.0%	0	0.0%	**11**	1.5%
120<= MUAC<125	8	7.4%	13	4.3%	4	1.3%	**25**	3.5%
125<= MUAC <135	46	42.6%	94	31.0%	38	12.3%	**178**	24.7%
MUAC>= 135	45	41.7%	193	63.7%	266	86.1%	**504**	70.0%
TOTAL	108	100.0%	303	100.0%	309	100.0%	**720**	100.0%

Table 24: MUAC distribution for the three surveys for survey 3 (Takaba and Dandu)

MUAC (mm)	>= 65 cm to < 75 cm height		>=75 to < 90 cm		>=90 cm		Total	
< 110	2	1.7%	2	0.8%	0	0.0%	**4**	0.6%
110<= MUAC<120	5	4.2%	14	5.3%	1	0.4%	**20**	3.2%
120<= MUAC<125	12	10.0%	22	8.3%	5	2.1%	**39**	6.3%
125<= MUAC <135	56	46.7%	90	34.0%	47	20.0%	**193**	31.1%
MUAC>= 135	45	37.5%	137	51.7%	182	77.4%	**364**	58.7%
TOTAL	120	100.0%	265	100.0%	235	100.0%	**620**	100.0%

4.1.3 Measles Vaccination Coverage

Table 25 presents the measles vaccination coverage among the surveyed population. The source of information on immunization was either the child's health card or the mother's recall. A child was considered fully vaccinated if he/she had received the last dose of the EPI programme (from 9 months of age, according to the national protocol). Measles vaccination coverage (confirmed by card) has increased compared to last year. It is, however, still extremely low. It is important to mention that these results should be interpreted with caution since they are based on the caretaker's recall, when no health card was available.

Table 25: Measles Vaccination Coverage in all the divisions surveyed

	Mandera Central and Khalalio Divisions	Banisa, Malkamari and Rhamu Dimtu Divisions	Takaba and Dandu Divisions
Population >= 9 months	**768**	**697**	**579**
Immunized with card	29.2% [26.0 - 32.4]	12.1% [9.6 – 14.5]	15.0%[12.1-17.9]
Immunized without card	63.4% [60.0 - 66.8]	60.8% [57.2 – 64.5]	50.6[46.5-54.7]
Not immunized	7.4% [5.6 - 9.3]	27.1% [23.8 – 30.4]	34.4[30.5-38.2]

4.1.4 Vitamin A coverage

Vitamin A coverage was established for the three surveys as shown by table 26 below. Caretakers were asked if their child had received a vitamin A supplementation in the last year. The rates of supplementation appeared to be at a very low level.

Table 26: Vitamin A coverage

	Mandera Central and Khalalio Divisions Banisa,	Malkamari and Rhamu Dimtu Divisions	Takaba and Dandu Divisions
	797	**737**	**619**
Once	50.1% [46.6 - 53.5]	23.4% [21.2 – 27.4]	30.0%[26.4-33.6]
Twice or more	19.9% [17.2 - 22.7]	14.9% [12.4 – 17.5]	19.2%[16.1-22.3]
None	30.0% [26.8 - 33.2]	60.8% [57.3 – 64.3]	50.8%[46.9-54.7]

4.1.5 Composition of the households

All surveys showed a percentage of under fives which is normal for developing countries (Table 11). The average number of people in a household ranged from 6.5 in Banisa, Malkamari, Rhamu Dimtu divisions to 6.7 in Mandera Central, Khalalio divisions (Table 28).

Table 27: Age group proportion

Age groups	Mandera central and Khalalio		Banisa, Malkamari and Rhamu Dimtu		Takaba and Dandu	
	n	%	n	%	n	%
Under 5 years	930	21.9%	911	23.6%	984	26.3%
Adults	3,321	78.1%	2,949	76.4%	2,751	73.7%
Total	4,251	100.0%	3,860	100.0%	3,735	100.0%

Table 28: Household Composition

	Average number of people per household	Average number of <5 per household
Mandera Central and Khalalio	6.7	1.5
Banisa, Malkamari and Rhamu Dimtu	6.5	1.5
Takaba and Dandu	5.9	1.6

4.1.6 Mortality

The retrospective death rate was calculated based on the data collected on the 115 days recall period in Survey 1 and in survey 2 and 91 days in survey 3. Data were collected from families with or without children under 5 years. The results are summarized in the following table.

Table 29: Mortality Result

Demographic data	Mandera Central and Khalalio	Banisa, Malkamari and Rhamu Dimtu	Takaba and Dandu
Current resident HH	4251	3860	3735
Current resident <5 years old	930	911	984
People who joined HH	61	63	46
<5 years who joined HH	5	10	2
People who left HH	131	152	104
< 5 years who left HH	2	14	10
Birth	71	81	69
Death	36	35	31
Death < 5years old	8	15	10
Recall period (days)	115	115	91
CMR (Deaths/10,000 people/day)	0.73 (0.38 – 1.09)	0.78 (0.45 – 1.12)	0.91 (0.60 – 1.22)
U5MR (Deaths in children<5 years/10,000/day	0.78 (0.11 – 1.44)	1.48 (0.74 – 2.22)	1.15 (0.51 – 1.78

Despite the very high rates of acute malnutrition, death rates remained below the WHO emergency thresholds.

4.1.7 Attendance in TFP/SFP

The respondents were asked if the children measured were in any feeding program.
In Mandera Central, Khalalio, and Libehia division 2 children were identified to be severely malnourished but were not in ACF nutrition program; 1 child was also recovering in OTP. 38 children were moderately malnourished of which 6 were treated in ACF SFP.
No Child was identified to be severely malnourished in Malkamari, Banissa and Rhamu Dimtu survey as per the percentage of the median, but 1 child was recovering in OTP and 42 children were moderately malnourished, 6 of the children being admitted in SFP.
No child was identified as severely malnourished in Takaba and Dandu Survey as per the percentage of the median, but 1 child was recovering in OTP program and 58 children were moderately malnourished with only 5 of them already admitted in the SFP.

4.1.8 Breastfeeding and Complementary Feeding Practices

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

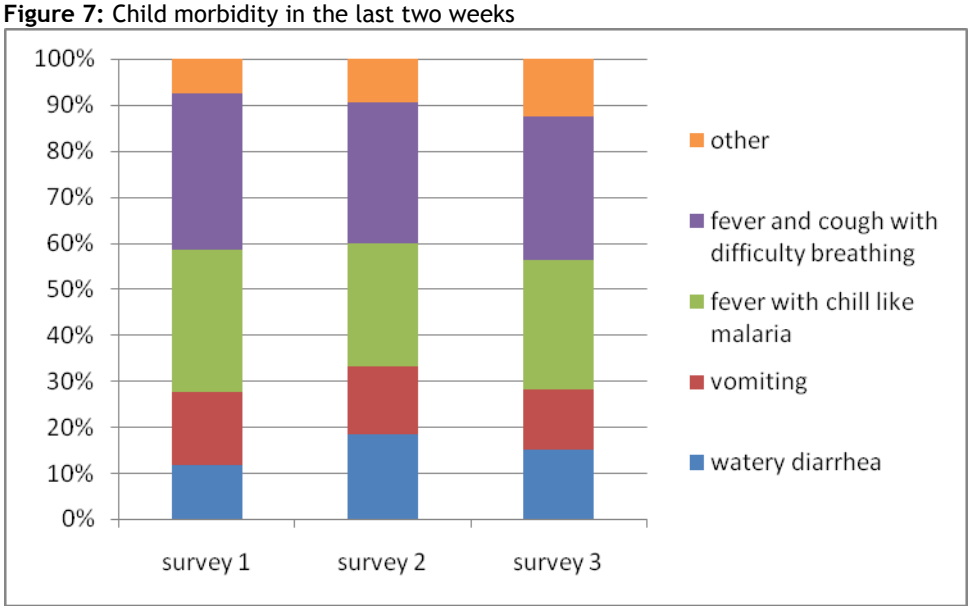
Table 30: Time of initiation of breastfeeding and time of introduction of complementary food

	Survey1		Survey 2		Survey 3	
	N	%	N	%	N	%
Initiation of Breastfeeding						
Less than 1 hour	211	59%	165	35%	277	55%
More than 1 hour but within 24 hours	115	32%	293	62%	192	38%
More than a day	33	9%	13	3%	38	8%
Total	**359**	**100%**	**471**	**100%**	**507**	**100%**
Complementary Feeding						
Less than 4 months	250	71%	219	47%	230	45%
4-6 months	77	22%	126	27%	88	17%
After 6 months	26	7%	122	26%	190	37%
Total	**353**	**100%**	**467**	**100%**	**508**	**100%**

95.1% of the mothers appeared to be breastfeeding their baby.
However, only 59%, 35% and 55% of the caretakers answered that they had put their new born baby to the breast within one hour after birth as recommended by WHO for survey 1, 2 and 3 respectively[5] .
In addition, despite WHO recommendations of not to introduce complementary food before 6 months of age, only very low percentage of mothers ensured an exclusive breastfeeding up to 6 months. The early introduction of complementary food is seen as much worse in survey 2 and 3 compared to survey 1, which could indicate either a better access to health promotion in the urban setting or could be linked with a more deteriorated food security situation (mothers spending more time for coping mechanisms and then having less time for child care practices).

4.1.9 Child Morbidity and Treatment Seeking

Figure 7: Child morbidity in the last two weeks

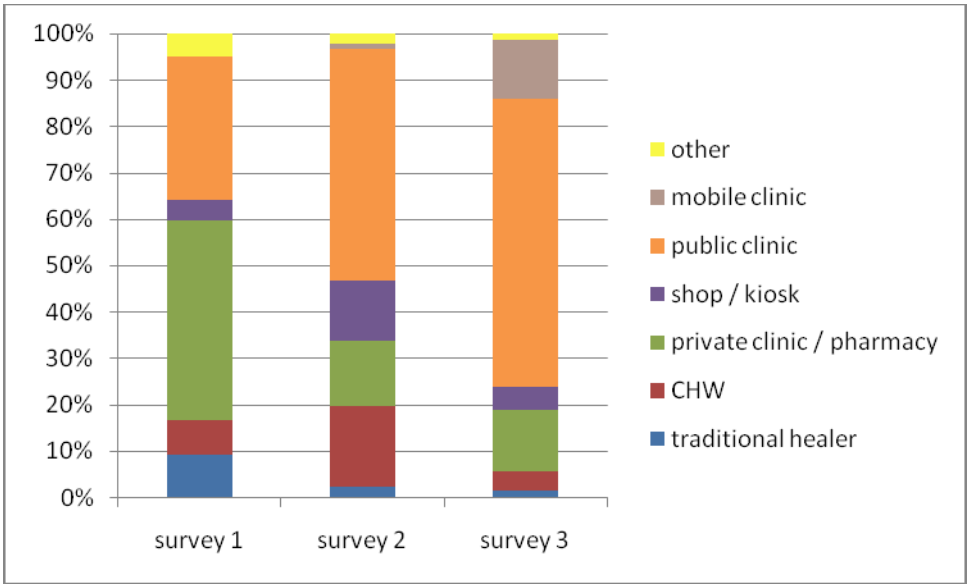


53%, 49% and 60% of the caretakers answered that their child of less than 5 years old had been sick during the last two weeks prior to the surveys in surveys 1, 2 and 3 respectively.

[5] WHO (1989): Protecting, promoting and supporting breastfeeding: special role of maternity services: a joint WHO/UNICEF Statement. Geneva, WHO

The two major diseases in the three surveys were chills like malaria, and fever and cough with difficulty in breathing. More than 10% of the households interviewed in the three surveys also reported cases of watery diarrhea as shown in figure 7 above.

Figure 8: Mothers with sick children <5 by type of assistance sought



When their children were sick, 72 % caretakers sought for assistance in Survey 1, 40 % in survey 2 and 60 % in survey 3. Such rates are likely to be linked with the availability of health services in each survey area.

Private clinics/pharmacy and public clinic are the most important sources of assistance in all the communities. Most of the caretakers interviewed in the focal group discussions reported that when they were not seeking any form of treatment, it was mainly due to the absence of any facility in the area.

4.1.10 Mosquito Net Coverage

73 %, 36 % and 30 % of the households reported that they owned a mosquito net in survey 1, 2 and 3 respectively.

90.5 % of the households in survey 1 had used the mosquito nets the night before the survey whereas 43 % and 47 % in survey 2 and 3 respectively.

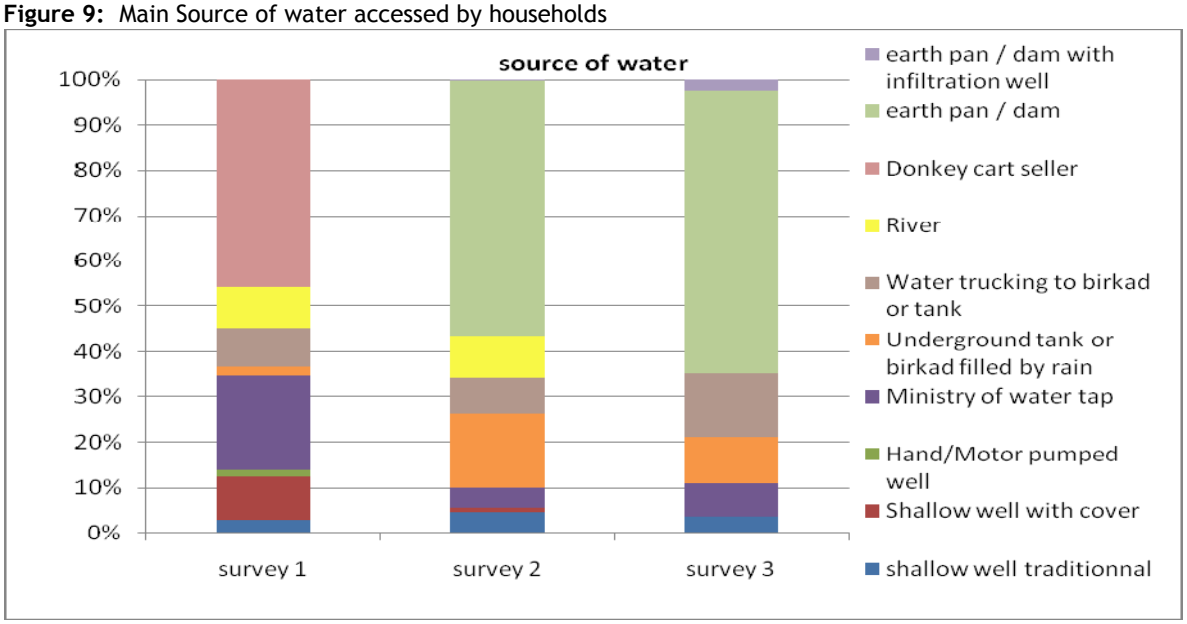
The utilization rate of the mosquito nets by children less than five years of age in households owning one showed of 26.5 %, 15.4 %and 21 % in survey 1, 2 and 3 respectively. These results are very low when considering that children less than 5 are the most vulnerable in the household.

4.2 WATER AND SANITATION

4.2.1 Water Source and Use

Figure 9 highlight the main variations in the access to water from one area to the other.

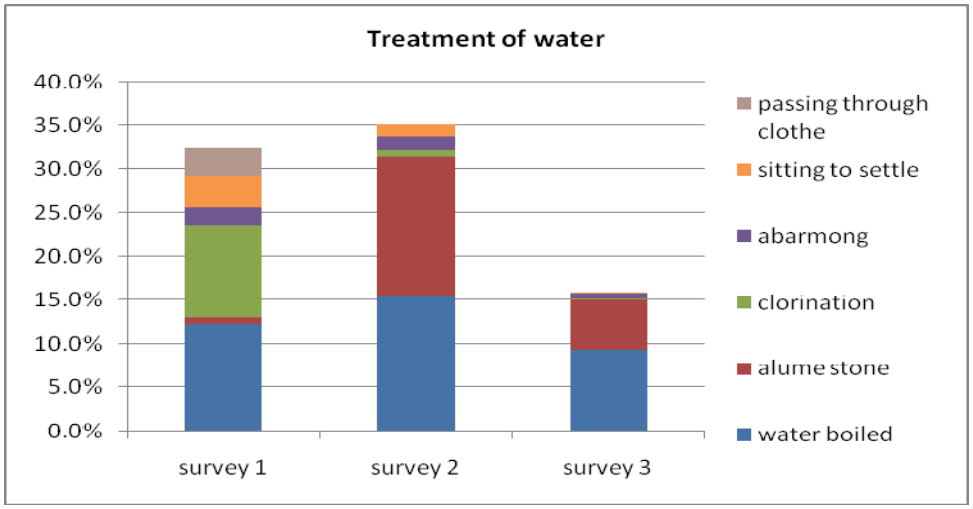
Figure 9: Main Source of water accessed by households



While households in the urban area mainly access water from Donkey cart sellers and taps, people in the riverine and the pastoral areas (surveys 2 and 3 respectively) access water from earth pans. These results seem to highlight that in all areas of Mandera districts, access to safe water is still very limited as water from donkey carts or earth pans can hardly be considered as safe.

As shown by figure 10 below, less than a third of the households treated their water before using it in the three surveys, despite the unsafe status of this water.

Figure 10: Treatment of water at household level before use



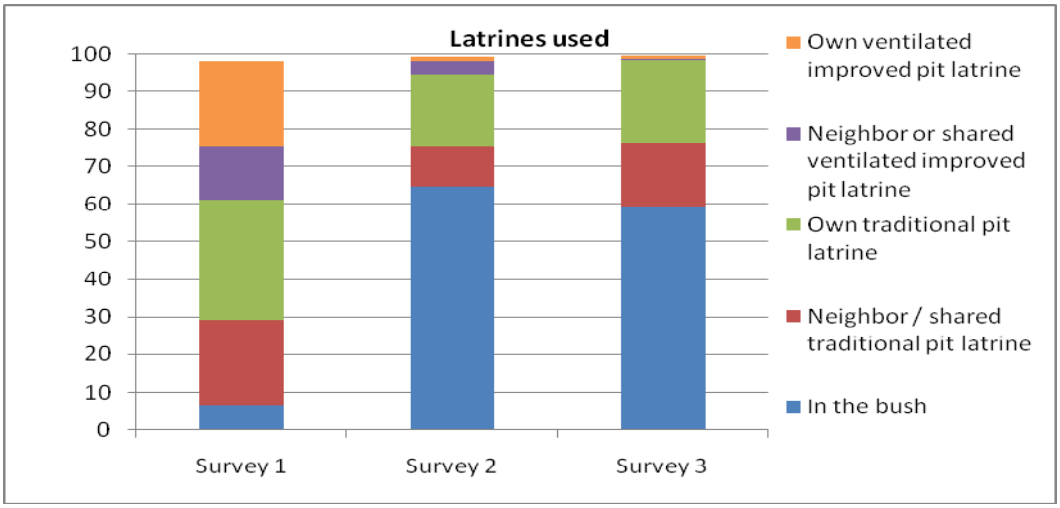
4.2.2 Hand Washing Practice

Figure 11: Distribution of households by hand washing practice

Figure 11 highlights that if the hand washing is a common practice before ablutions or meals and after using the latrines, it is still rarely done for taking care of the children or before cooking. Practices can hence be considered as highly inadequate and as increasing the risks of water borne diseases.

4.2.3 Latrine Use

Figure 12: Proportion of households by the type of toilet facility



As expected, the use of latrines is common in survey one, which is an urban setting. In the areas covered by surveys 2 and 3, defecation in the bush is the most common practice, as shown by figure 12. This is particularly worrying when considering, as detailed above, that people collect water in earth pans and have inadequate hygiene practices.

Based on interviewers' verifications, of the latrines observed about 85.3% in survey 1, 31.9% in survey 2, and 30.6% in survey 3 were clean and about 19.2%, 81.4% and 21.1% of the latrines observed had cement slabs, respectively.

4.3 FOOD SECURITY

4.3.1 Main Occupation of Household Heads

The survey outcome shows that the main three occupations of the household head in survey 1 are 40.1% daily labor, 20.5% small business and 15.5% are employed in their order of occurrence. Survey 2 and 3 had similar results of livestock herding 66.4% and 54.1%, followed by daily labor with 16.5% and 26.6%, and small/ petty business 6.1% and 7% respectively.

The educational status varies a lot between surveys and between genders. The majority of the household heads in Survey1 is 70.5% adult male, survey 2 is 96.6% adult male, and survey 3 is 94% adult male, it clearly shows that the ratio of men to women educated is higher in all survey zones. Culturally, in the rural area of Kenya, depending on the vulnerability of the family, men sent to school prior to female. According to the informant the men will be the bread winner of the family and are taking responsibility of the entire family, in case the father is sick or death. However, the female is getting married on their young age. Families are not interested in investing in education for female member of the community.

In survey 1 the level of education has been distributed slightly more than the other two surveys with there being 6.3% respondents who have above secondary level, 46.6% are educated none formally and formally for the household head and 27.9% spouses are educated. Survey 2 and 3 highest level of education is primary level with minimum respondents having secondary and above secondary education level.

4.3.2 Livestock Holding

In the assessed area, the ownership of livestock is the main determinant of wealth and food security. Livestock is not only a saleable asset, but providing income and food in the form of milk, meat, hides and skins. Pastoralists reduce their risks by combining the animal species in their herd and flocks.

It is very difficult to quantify how much livestock in average a household owns, as most of the time, part of the livestock is leaving the area in search of pasture and water. Respondents were required to indicate the number of livestock they owned (cattle, camel, goats and sheep). About 38.1% in survey 1, 94.4% in survey 2, and 93.7% in survey 3, had responded to owning livestock. In survey 1, most of the households own goats and chicken, whereas in survey 2 and 3, they own camels and goats.

Table 31: Average household livestock holding

Livestock	Central, Khalalio and Hareri **(Survey 1)**			Malkamari, Banissa and Rhamu Dimtu **(Survey 2)**			Takaba and Dandu **(Survey 3)**		
	No. HHs	Mean	S.D	No. HHs	Mean	S.D	No. HHs	Mean	S.D
Cattle	47	4.2	0.76	312	8.0	0.39	341	9.09	0.45
Camel	8	14.4	5.03	442	10.5	0.45	441	8.6	0.31
Goat	158	12.4	2.16	438	13.3	0.57	440	10.6	0.40
Sheep	88	5.8	0.71	338	5.3	0.21	303	4.05	0.18

**Note: Multiple responses, percentages do not add up to 100*

4.3.3 Crop Production

Farming is not as such a significant economic activity especially in survey 2 and 3 communities, due to the survey area being located in a semi –arid area with little viability for agriculture production, and hence most of the inhabitants are pastoralists.

Table 32: Average crop production per household in the last season

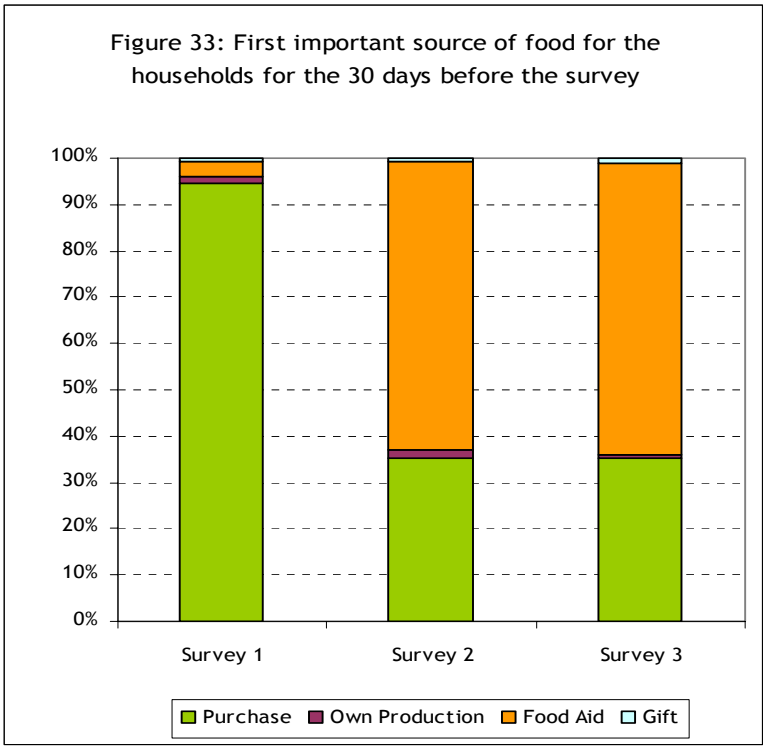
Crop	Survey 1		Survey 2		Survey 3	
	No of HHs	Mean kg	No of HHs	Mean in kg	No of HHs	Mean in kg
Maize	43	190	46	188	-	-
Tomatoes	5	134	4	14	-	-
Banana	2	30	2	2.5	-	-
Onion	3	193	-	-		-
Pawpaw	3	34	1	1	-	-
Mango	4	100	23	46	-	-
Watermelon	-	-	2	252	-	-
Orange	-	-	3	2	-	-
Sukuma Wiki	1	12	1	100	-	-

In terms of the proportion of households, the survey found out that a very small proportion of households, about 12.1% in survey 1, 10.7% in survey 2 and 0.2% in survey 3 reported that they were engaged in farming. The survey area has been facing perennial food insecurity as a result of extreme climate variability, characterized by a succession of erratic rainfall and floods over the past years.

4.3.4 Sources of Food

The graph below indicates the relative importance of food options for the three assessed area (Survey 1, 2 and 3). The graph shows in survey 1 that almost 95% of the food is purchase –cereals, sugar and oil, while survey 2 and 3 more than 50% of the food source arrived from food aid. For all three assessed sites, only about 5% of food is sourced from their own production consisting of mainly milk and meat.

Figure 33: First important source of food for the households for the 30 days before the survey



As we can notice, in all assessed areas, food purchase is significant. Communities are evolved in income generating activities, such as selling of labor, charcoal selling etc.

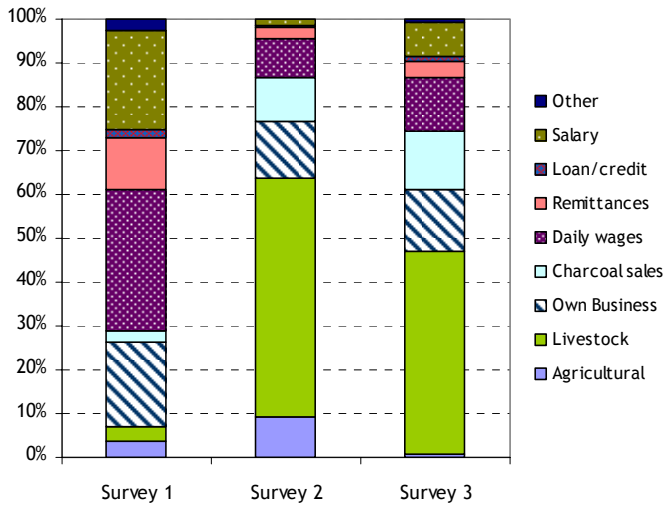
4.3.5 Income Sources

The graph presents the sources of income in assessed areas. Income is more diversified in the survey 1 compare to the other two sites.

In the two survey site, namely 2 and 3, the sale of livestock and livestock products is significant. Selling of goats and sheep is taking place, though animals are in a bad condition. In the local market with animals in poor condition, very low prices and virtually no demand is presently expressed. Terms of trade for pastoralist have reduced and inhabitants of the surveyed areas have to sell two goats in order to buy one bag of Maize. Moreover, income is supplemented with agriculture sale for Survey 2 and salary in survey 3, while in survey 1, the main sources of income was own business, daily wage and salary.

Remittances are present with 5 -10% in survey 1 and 3, and come usually from a household member who found work outside the area for a few months, and sends cash regularly. Agricultural employment in the riverine areas and charcoal burning also provide substantial income in the survey 1 and 3 areas.

Figure 34: Households sources of income

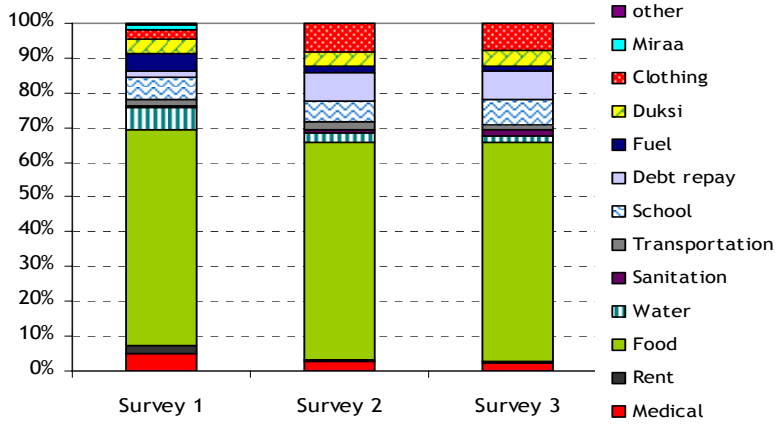


4.3.6 Expenditure

In all surveys, food was the major expense of 99.1%, 96.3% and 98.6% respectively. In survey 1, Fuel 78.1% and water 77.8% were second and third ranking whereas in survey 3 expenses on Duksi[6] 65.9% and water 51.1% were second and third ranking. Comparing the percentage to average monthly household expenditure, food, school fees and rent were the highest expenditures in survey 1; food, debt repayment and rent in survey 2 and food, School fees and debt repayment in survey 3.

[6] Duksi is a fee for attending the Islamic class

Figure 35: Propotion of Household expenses 30 days before the survey



The expenditure observed in survey 3 is equivalent to the recorded income. Households have very limited flexibility. Total monthly expenditures are about 10000 Ksh, 5165ksh and 4470 Ksh in survey 1, 2 and 3 respectively. All assessed areas spend 62% of their monthly income on staple cereal purchases. The food items they purchase are mainly sorghum and sugar. In Dry season the price of shoats is low and the price of cereal increases in the dry season, forcing pastorlists to sell livestock.

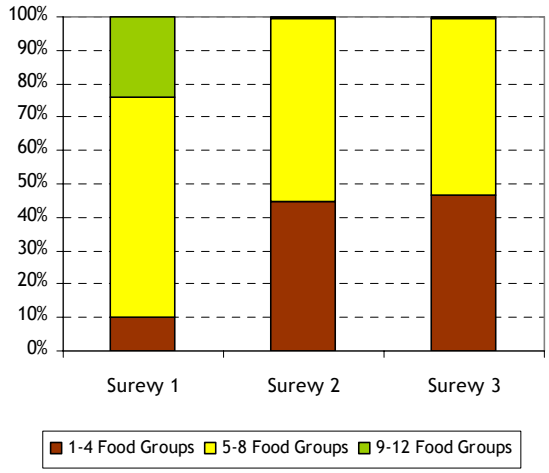
The other categories of expenditure in survey 1 include medical, school fees and water (5.1 – 6.4%), while in survey 1 and 2 the major expenditure includes debt repayment, school fees and clothing (7.5 – 8.3%)

4.3.7 Dietary Diversity

Dietary diversity is a measure of household food access and food consumption. It can be triangulated with other food related information to contribute towards providing a holistic picture of the nutrition and food security status in a community or broader location. Improved dietary diversity over time is directly associated with improved economic status of the household.

Cereals and root crop based foods like ugali, rice, porridge and potatoes lead in consumption. The diet diversity in survey 1 shows that most of the food groups were consumed by about 22%, although fish and eggs were consumed to a lesser degree. Survey 2 and 3 had average food diversity as households consumed cereals, beans, and milk/milk product, foods made with fat or ghee and sugar. These households consumed less of root and tubers, vegetables, fruits and eggs.

Figure 36: Percentage of households by food groups consumed

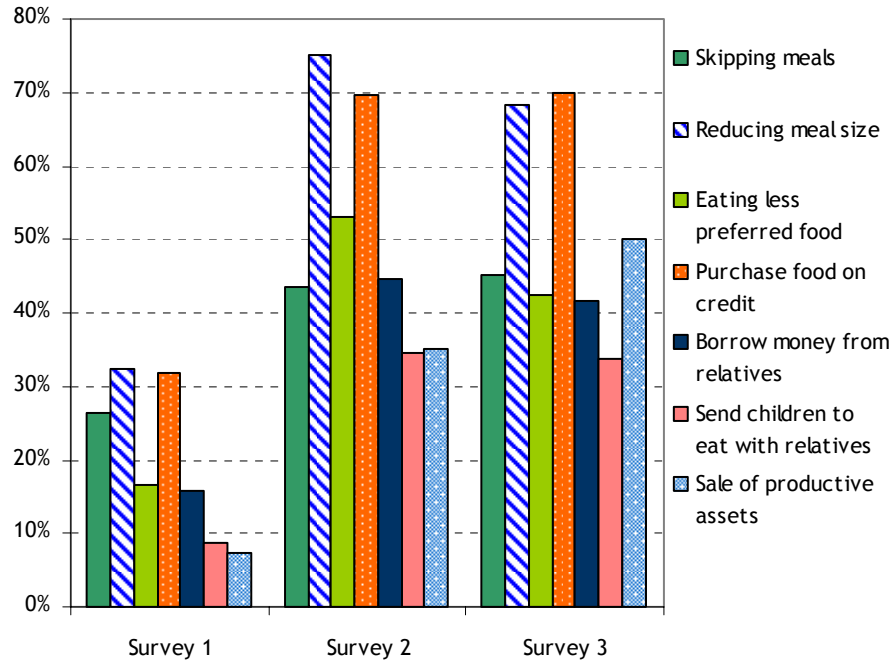


4.3.8 Coping strategies

Questions on the use of different coping strategies during the long-dry season (*Jilal*) were asked during the three surveys. The following are the main strategies adopted by the pastoralist in the assessed areas to cope or minimize the effect of the various risk factors:

- Increased sale of livestock and the sale of large animals, which would otherwise not have been sold. This was common in survey 1 and 2. This is done when milk is scarce and people have to rely on cereal purchases for prolonged periods. Usually in bad years livestock are weak and have less value hence terms of trade for pastoralist households are unfavourable.
- At the household level, common coping strategy is skipping meals, reducing meal size, eating less preferred food, purchase food in credit and borrow money from relatives.
- Sending of one or more children to work and live with the relatives in the towns and urban centers, this is practiced by most of the assessed area. However in survey 2 and 3 was significant high compare to the survey 1.
- It was reported in the assessed area that people are consuming less preferred food like posho. Posho is made of maize flour, oil, water and salt.

Figure 37: Households coping strategies During Jilal



5. CONCLUSION AND RECOMMENDATIONS

Both GAM and SAM, when compared to the WHO reference population, are above the WHO emergency threshold of 15% and 4% respectively in the central and in the riverine and in the pastoral divisions of Mandera.

The rates of GAM for the central and urban areas of Mandera are above the emergency threshold while the rates of SAM are below the 4% WHO. This survey, mentioned in this report as survey one, was conducted earlier than the others, and earlier than for the previous years, during the last week of January 2009, when the rates of acute malnutrition are known for being the lower than later in February and March.

Figures 13 and 14 below show the evolution of the rates since 2006.

Figure 13: Trends of GAM in Mandera Districts

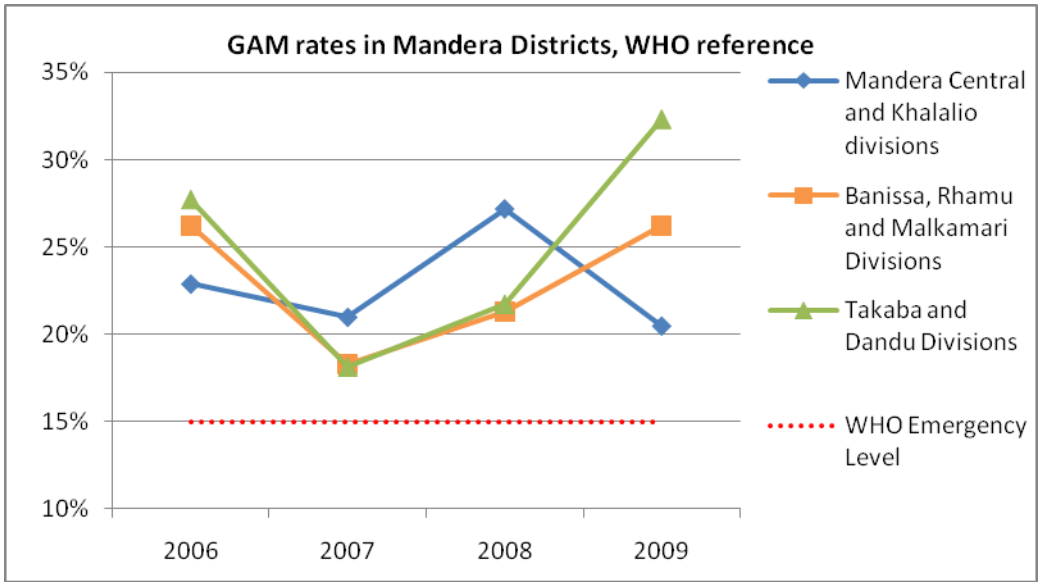
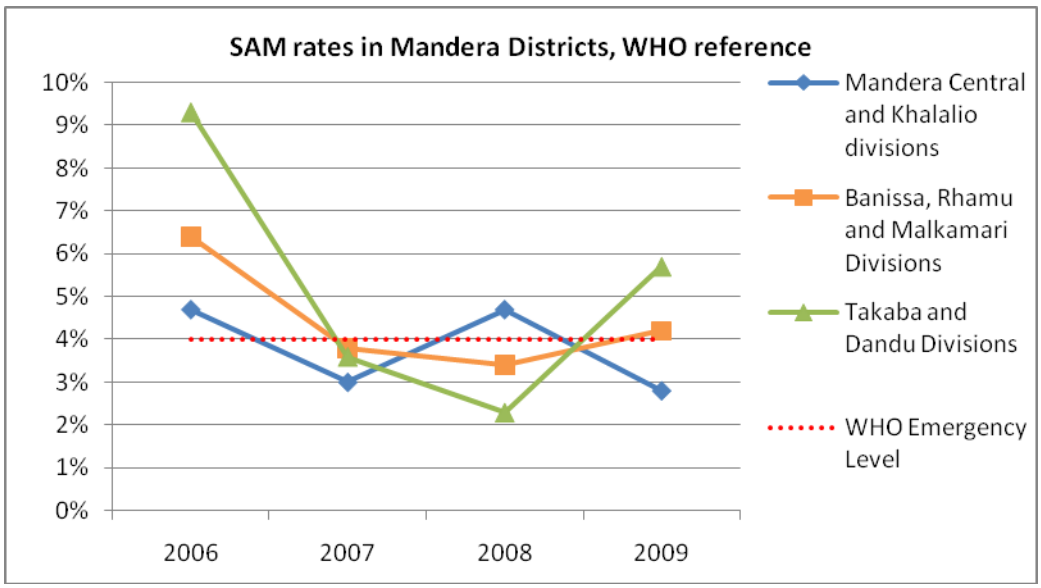


Figure 14: Trends of SAM in Mandera Districts



The rates of GAM and SAM measured in 2009 show deterioration as compared to the previous years.

High rates of morbidity, poor access to health care, consumption of unsafe water, inadequate hygiene, sanitation and child care practices practices, low levels of diet diversity are some of the main factors contributing to the high rates of acute malnutrition in Mandera Districts. These factors have been persisting for the last years, aggravated by recurrent drought cycles, and have maintained the rates of acute malnutrition at a very high level.

In addition, due to the post election violence and to the failure of the rainy seasons in 2008, harvests have not reached the expected levels at the end of the year in most parts of Kenya, leading to an increased stress on the most vulnerable regions of the country. Very limited stocks of food being available at national level, the distribution of the food harvested at the end of 2008 seem not to have reached all the districts. The eastern divisions of Mandera are part of those where the access to food remained at the lowest level, both populations in surveys 2 and 3 showing high rates of dependence to relief food distributions. Shortages of water that appeared as early as November 2008 in these divisions increased further their vulnerability.

RECOMMENDATIONS

Health and Nutrition

- Scale up the access to treatment for both health and nutrition in all the divisions of Mandera
- Scale up the community health promotion activities with a special emphasis on the Essential Nutrition Actions package and on hygiene practices.
- Scale up the community based approach to acute malnutrition (CMAM) through the empowerment of the community health workers in the detection and referral of acutely malnourished children less than 5.
- Implement the use of the WHO growth standards as the reference for detection and treatment fo acutely malnourished children in order to ensure the maximum efficiency and coverage of the nutrition programs.

Water and Sanitation

- Since most households' main source of water is from unsafe sources as well as below minimum required per day consumption, desilting water sources and rehabilitation of shallow wells will aid in increasing water quantity.
- A high number of household did not have access to toilets in Banisa, Malkamari and Rhamu Dimtu(Survey 2) and Takaba and Dandu (Survey 3).There is need to improve the environment hygiene through increasing number of latrines and bathrooms with health education on importance of using latrines and keeping them clean.
- Hand washing is another hygiene practice that contributes to improved health and nutrition of the population. Though the survey result indicates most people hand wash during ablution or before eating, the use of soap is believed to be very limited. Hygiene promotion should be scaled up with key interests in hand washing after helping a child in the latrine, during food preparation and before breastfeeding.

Food Security

- There is limited diversity in terms of diets taken, the majority consuming cereals, sugar, tea and oil. Even milk which is considered as one of the important available traditional sources of food for pastoralists, is only consumed by 75% during the reference period. Consumption of fruits and vegetables is extremely limited in all communities. In order to improve the dietary diversity and nutritional status of the population, nutritional education and promotion of fruits and vegetables would have significant impact. In areas where it is feasible promotion of vegetable gardening would contribute to improve their diet diversity and generate income so as to purchase other food items.
- A carefully defined, but flexible package of relief, recovery and development measures with adequate contingency and development measures should be the basis for supporting households to get out of this repeated emergency-relief-recovery cycle induced by regular drought spells. The introduction of income generating activities in small towns and villages should stimulate economic growth in the zone and provide income generating opportunities for community members. Regular safety net transfers would alleviate the seasonal pressure on households and increases in malnutrition.
- Effective pastoral development requires interrelated programmes and interventions at different levels –village, region and national. This should be based on local needs and knowledge. Improved livestock and livestock products marketing can contribute to the households' income, as households are able to determine the best time to sell their animals. However, this should be in conjunction with improving livestock water, health and fodder initiative, all focusing on disaster risk reduction and hence avoiding seasonal changes in animal conditions and loss.

ANNEXES

Annex 1: Assignment of Clusters Mandera Central, Khalalio and Hareri divisions

Geographical unit	Population size	Assigned cluster	Geographical unit	Population size	Assigned cluster
Central East- Mdr central	1431	1	Central-Bulla Barwako	657	
Central South- Mdr central	1431	2	Arabia-Bulla Barwako	329	30
Central West- Mdr central	1431	3	Korome-Bulla Barwako	329	
KFC- Mdr central	1431		Kamor Central- Kamor	969	
Tawakal 1- Mdr central	1431	4	Part 1- Kamor	969	31
Tawakal 2- Mdr central	1431	5	Part 2- Kamor	969	32
Bulla Amin- Mdr central	1431	6	Part 3- Kamor	969	
Bosnia- Mdr central	1431	7	Old Town- Township	707	33
Bulla Nguvu West-Bulla Jamhuria	1361	8	New Town -Township	707	
Bulla Nguvu East-Bulla Jamhuria	1361	9	Geneva -Township	707	34
Bulla Nguvu South-Bulla Jamhuria	1361	10	Customs- Township	707	
Bulla Qura-Bulla Jamhuria	1361	11	Shabah- Township	707	35
Riverside-Bulla Jamhuria	1361		Works- Township	707	
Boystown-Bulla Jamhuria	1361	12	Lemandid-Khalalio	703	36
Slaugther-Bulla Jamhuria	1361	13	Khalalio-Khalalio	601	
Society-Bulla Jamhuria	1361	14	Sharif-Khalalio	300	
Bulla Power-Bulla Jamhuria	1361	15	Bur Abor-Khalalio	1486	37
Hospital East-Bulla Jamhuria	1361	16	Fiqow-Khalalio	402	
Hospital West-Bulla Jamhuria	1361	17	Bulla Haji-Khalalio	215	
Garba Ado 1-Neboi	901		Garba-Qoley-Khalalio	831	38
Garba Ado 2-Neboi	901	18	Kamor-Ele-Khalalio	293	
Handadu-Neboi	901		Beda-Khalalio	342	
HilaShid-Neboi	451	19	Hareri-Hosle-Khalalio	874	39
Neboi-Neboi	451		Seda Jirod-Khalalio	290	
BP1-BP 1	1121	20	Karow-Khalalio	935	40
Genev-BP 1	561		Gedudiya-Khalalio	841	
Buru Buru-BP 1	357		Darika-Khalalio	665	41
Bulla Mpya/Central 1- Bulla Mpya	1770	21,22	Gingo-Khalalio	385	
Bulla Mpya/Central 2- Bulla Mpya	1770	23	Matasafara-Khalalio	359	
Salam Part 1- Bulla Mpya	1770	24	Bella-Khalalio	413	
Salam Part 2- Bulla Mpya	1770	25	Farey-Farey	466	42
Tagwa- Bulla Mpya	585				
Centre A- shaf Shafey	1433	26			
Centre B- shaf Shafey	1433	27			
Centre C- shaf Shafey	716	28			
Centre D- shaf Shafey	716				
Centre E- shaf Shafey	1433	29			

Annex 2: Assignment of Clusters Banissa, Malkamari and Rhamu Dimtu Divisions

Geographical unit	Population size	Assigned cluster	Geographical unit	Population size	Assigned cluster
Malkamari North (Malkamari)	1367	1	Derkale A (Derkale)	3139	29
Malkamari South(Malkamari)	1367	2	Derkale B (Derkale)	1570	30
Gor-Adi (Malkamari)	586		Tarama A (Derkale)	1926	31
Boqon Saar (Malkamari)	586		Tarama B (Derkale)	1926	32
Choruko West (Guba)	1725	3	Lulis North (Lulis)	2258	33,34
Choruko East (Guba)	1725	4	Lulis South (Lulis)	2258	35
Guba Centre (Guba)	1390	5	Degodia (Lulis)	1129	36
Merille (Guba)	77		Jatani (Lulis)	706	
Qodqod Centre (Guba)	77		Ogincho (Lulis)	423	
Hullow Centre North (Hullow)	1951	6	Banisa Zone 1 (Banisa)	1700	37
Hullow Centre South (Hullow)	1301	7	Banisa Zone 2 (Banisa)	1700	38
Bisiq (Hullow)	1734	8	Banisa Zone 3 (Banisa)	1700	39
Rajay (Hullow)	434		Banisa Zone 4 (Banisa)	1700	40
Malkaruka Centre (Malkaruka)	651	9	Banisa Zone 5 (Banisa)	1700	41
Nitiyaya (Malkaruka)	521		Chiracha (Banisa)	1101	42
Dhakaa Lon Fakaat (Malkaruka)	130		Matarba (Banisa)	480	
Yabicho A (Rhamu Dimtu)	738	10			
Yabicho B (Rhamu Dimtu)	1475				
Yabicho C (Rhamu Dimtu)	738	11			
Gabrrey (Garsey)	835				
Adoscna (Garsey)	835	12			
Kalicha North (Mado)	1018				
Kalicha South (Mado)	1161	13			
Rhamu Dintu (Rhamu Dimtu)	1449	14			
Qorahey (Rhamu Dimtu)	725				
Harari (Rhamu Dimtu)	242	15			
Kiliwaheri North (Kiliwaheri)	1854	16			
Kiliwaheri South (Kiliwaheri)	1854	17			
Birkan (Kiliwaheri)	1854	18			
Funateso (Kiliwaheri)	1854	19			
Goljo 1 A (Banissa)	1267	20			
Goljo 1 B (Banissa)	1267				
Goljo 2 A (Banissa)	1899	21			
Goljo 2 B (Banissa)	633	22			
Eymole 1 (Eymole)	1777	23			
Eymole 2 (Eymole)	1777	24			
Eymole 3 (Eymole)	1777	25			
Eymole 4 (Eymole)	1777	26			
Eymole Dam (Eymole)	2370	27			
Hamey (Eymole)	632	28			

Annex 3: Assignment of Clusters Takaba and Dandu Divisions

Geographical unit	Population size	Assigned cluster	Geographical unit	Population size	Assigned cluster
Saki A (Saki)	1152	1	Bulla Mpya (Darwed)	266	39
Saki B (Saki)	1152	2,3	Darwed (Darwed)	724	40
Budruras A (Budruras)	1152	4,5	IDP (Darwed)	310	
Budruras B (Budruras)	1152	6	Affallo (Darwed)	828	41
Gither A (Gither)	1152	7,8	Awacho Sambur (Darwed)	207	42
Gither B (Gither)	1152	9			
Dandu A (Dandu)	1188	10,11			
Dandu B (Dandu)	1188	12,13			
Eldanaba (Dandu)	1780	14,15			
Karshama (Dandu)	991	16,17			
Didkoba (Dandu)	991	18			
Gargaba (Dandu)	1780	19,20			
Kubihalo 1 (Kubihalo)	1611	21,22,23			
Kubihalo 2 (Kubihalo)	1611	24,25			
Kubdishen (Takaba)	541	26			
Bachile (Takaba)	324				
Yabakula (Takaba)	216				
Bulla Juu (Takaba)	720	27			
Bulla Ambala (Takaba)	720	28			
Bulla Elwak (Takaba)	720	29			
Bulla Dana (Takaba)	720	30			
Bulla Kiwanja (Takaba)	720	31			
Alokona (Takaba)	64	32			
Sukela (Didkuro)	419				
Dadot (Didkuro)	419	33			
Bulla Juu (Didkuro)	628	34			
Ambalale (Didkuro)	628				
Wangai Dahan (Wangai Dahan)	1044	35,36			
Bulla Sukella (Wangai Dahan)	261				
Bulla Shauba (Wangai Dahan)	52				
Kotto Kotto (Wangai Dahan)	261	37			
Mzee Omar (Wangai Dahan)	35				
Bulla Billow (Wangai Dahan)	87				
Dudubele (Dudubele)	386				
Harere (Dudubele)	55				
Kobadadi (Dudubele)	110	38			
Lagsure (Darwed)	621				

Annex 4. Anthropometric survey data form

Three Nutrition Surveys in Mandera East and West Districts, Kenya January – March 2009

Division: _____ Location: _____ Village: _____

Date: _____ Cluster number: _____ Team number: _____

Child no.	HH no.	Sex (F/M)	Age in months	Weight ##.# kg	Height ###.# cm	Weigh-for-height %	Oedema (Y/N)	MUAC ##.# cm	Measles Vaccination (C, M, N)	How many times did the child receive Vitamin A the last one year? (U5 only)	Child in any Nutrition centre? 1. OTP 2. SFP	If child in OTP or SFP did the household received GFD in the last 3 months 1 Yes 2. No	Remarks
1													
2													
3													
4													
6													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													

Signature: _____ (Team leader) Target number of children per cluster:_____ Name: _____

Annex 5. Calendar of events

MONTH	Seasons	2004	2005	2006	2007
JANUARY (JITOKO, BISHAKOWAD)	ORAHED, BIRA (HOT AND DRY SEASON)		48 CLAN CONFLICT	36 IDD ARAFAT	24 MEAT BAN IN NORTH EASTERN PROVINCE
FEBRUARY (JILAMA,BISHALABAD)		59 IDD ARAFAT	47 IDD ARAFAT	35 AAH ARRIVAL OF AAH IN MALKAMARI	23
MARCH (JISADI,BISHASADAHAD)		58	46 WIND STORM IN TAKABA TOWN	34 ASSAULT OF ISLAMIC RELIEF STAFF	22 LIFT OF BAN FOR MEAT
APRIL (JIAFURI,BISHAAFARAD)	GU'U, GAN (LONG RAINS)	57 INVASION OF IRAQ BY US FORCES	45	33 END OF DROUGHT,ARRIVAL OF AAH IN BANISA AND PLANE CLASH IN MARSABIT	21
MAY (JISHANI,BISHASHANAD)		56	44	32 OUT BREAK OF CHOLERA IN MANDERA TOWN	20 FLOODS OF DAUA IN MANDERA, ATTACK OF AAH STAFF BY BANDITS BETWEEN BANISA AND TAKABA
JUNE (JIJAHA, BISHALIHAD)	HAGAY ADOLES (COLD SEASON)	55	43	31 SEIZE OF POWER BY ICU IN SOMALIA	19
JULY (JITORBA,BISHATODOBAD)		54	42 LOCUST INVASION IN MANDERA WEST	30	18 KILLING OF TWO 2 KENYAN POLICEMEN IN KENYA BY SOMALI MILITIA
AUGUST (JISADED, BISHASADEDAD)		53	41	29	17 END OF UNKNOWN CAMEL DISEASE
SEPTEMBER (JISAGAL, BISHASAGALAD)	JILAL,BON (DRY SEASON)	52	40 SUN ECLIPSE	28 RAMATHAN (3RD RAMATHAN)	16 CLAN FIGHTING BETWEEN GAREH AND DEGODIA IN RHAMU
OCTOBER (JIKUDAN, BISHATOBANAD	DERR AGAY (SHORT RAINS)	51 RAMATHAN (5TH RAMATHAN)	39 RAMATHAN (4TH RAMATHAN)	27 IDD FITR, START OF THE HEAVY RAINS	15 START OF RAMATHAN (2ND RAMATHAN)
NOVEMBER (JIKUDANI,BISHAKOWITOBANAD)		50 IDD FITR	38 REFERUNDUM AND IDD FITR	26	14
DECEMBER (JIKUDLAMA, BISHASALABAITOBANAD)		49	37 START OF SEVERE DROUGHT AND PRESIDENT KIBAKI VISIT	25 IDD ARAFATAND START OF RIFT VALLEY FEVER, EXECUTION OF SADAM HUSSEIN	13

Annex 6. Household Mortality Questionnaire

Household Mortality Questionnaire (one sheet/household)

Division:_____Location:_____ Village: _____

Cluster number:_____

HH number:_____Date:_____Team number:_____

	1	2	3	4	5	6	7
ID	HH member	Present now **Y or N**	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 **For M**	Date of birth/or age in years	Born during recall period?	Died during the recall period
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

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

Current HH members – total		Y in col 2
Current HH members - < 5		
Current HH members who arrived during recall (exclude births)		X in col 3
Current HH members who arrived during recall - <5		
Past HH members who left during recall (exclude deaths)		X in col 2
Past HH members who left during recall - < 5		
Births during recall		Birth in col 3 and 6
Total deaths		Dead in col 2 and 7
Deaths < 5		

Annex 7. ACF/Mandera Integrated Survey, January 2009

Health and Nutrition, Food Security and WASH Questionnaire

1. Identification						
1.1 Division	1.2 Location	1.3 Village	1.4 Cluster No	1.5 HH No	1.6 Team Number	1.7 Date

2. Household Head Characteristics		
2.1	Who is the head of the household?	1. Adult Male |__ 2. Adult Female _| 3. Child Male 4. Child Female
2.2	**Main Occupation** of the household head (enter code from list)	1. Livestock herding |__ 2. Own farm labour _| 3. Employed(salaried) 4. Daily Labour 5. Small business/Petty trade 6. Unemployed 7. Retired 8. Housewife 9. Domestic help 10. Firewood/charcoal 11. Weaving/basketry 12. Fishing
2.3	Highest educational status of the household head	1. None 2. Non formal 3. Primary Level 4. Secondary Level 5. Above secondary 6. Other (Specify) ____
2.4	Highest educational status of the spouse	1. None |__ 2. Non formal __| 3. Primary Level 4. Secondary Level 5. Above secondary 6. Other (Specify)_____ 7. Not Applicable

3. Child Health and Nutrition (Children < 5 years old) –the mother/caretaker should be asked for this section		
3.1	Does the household have children under 5?	1. Yes |____| 2. No (skip to section 4)
3.2	Did any of your children under 5 have had sickness during the past 2 weeks?	1. Yes |____| 2. No (skip to next section 4)

3.3	If yes to question 3.2 what type of sicknesses during the past 2 weeks (Multiple response possible)?	1. Watery 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. Stomachache 12. Toothache 13. Bloody diarrhea	|___| |___| |___| |___| |___| |___| |___| |___| |___| |___| |___| |___|
3.4	When the child was sick did you seek assistance? (Under 5 only)	1. Yes 2. No (skip to next section 4)	|___|
3.5	If the response is yes to question # 3.4 where did you seek (More than one response possible)	1. Traditional healer 2. Community health worker 3. Private clinic/ pharmacy 4. Shop/kiosk 5. Public clinic 6. Mobile clinic 7. Relative or friend 8. Local herbs 9. NGO/FBO	|___| |___| |___| |___| |___| |___| |___| |___| |___|
3.6	In the last 24 hours did the child who is < 5 years and is not breastfeeding receive milk?	1. Yes 2. No	|___|
3.7	When did you begin breastfeeding the child < 2 years after birth? **Ask Questions 3.7 & 3.8 if there is child <2 years in the household, if more than one child < 2 years ask about the youngest child (if no child <2 years skip to section 4).**	1. 1. Less than one hour 2. More than one hour but within 24 hours 3. More than one day	|___|
3.8	At what age in MONTHS did this child under 2 years receive food other than breast milk? (foods includes other milk, water, fruit, juices, artificial drinks, sugar water solutions, porridge, etc.)	1. Less than 4 months 2. Between 4-6 months 3. After 6 months	|___|

4. Water, Sanitation and Hygiene (WASH)			
4.1	What is the **main source** of drinking water for the household now?	1. Shallow well traditional 2. Shallow well with cover (rehabilitated by ACF or other organizations/Government) 3. Hand/Motor pumped well 4. Ministry of water (any taps or underground tank filled by a piped water supply system) 5. Underground tank or birkad filled by rain 6. Water trucking to birkad or tank 7. Earth pan/dam 8. Earth pan/dam with infiltration well 9. Roof rain catchments 10. River 11. Dry River bed 12. Donkey cart seller	|___|
4.2	How long does it take to walk to the main source of water (in minutes)?	1. 15 minutes or less (less than 500m) 2. Between 15 minutes and 1 hour (more than 500m – 2 km) 3. More than one hour (more than 2 km)	|____|

4.3	What is (are) done now to the water before household members drink the water? (MULTIPLE RESPONSES POSSIBLE)	1. Nothing 2. Boiling 3. Alum stone 4. Chlorination 5. Abarmog (traditional tree) 6. Sitting to settle 7. Passing through cloth	|____| |____| |____| |____| |____| |____| |____|
4.4	How much water per day does your household use now (excluding for animals)?	(ask the question in the number of 20 liter Jerican and convert it into liters)	|_____|
4.5	When do you wash your hands? (MULTIPLE RESPONSES POSSIBLE) probe if use of soap	1. Does not wash hands 2. Does not wash hands at any special time, when they are dirty. 3. Abolutions 4. Before latrine 5. After toilet 6. Before cooking 7. Before eating 8. Before breastfeeding 9. After taking children to the toilet 8. After handling animals	|____| |____| |____| |____| |____| |____| |____| |____| |____| |____|
4.6	If the mother washes her hands, then probe: What do you use to wash your hands?	1. Only water 2. Soap 3. Soap when I can afford it 4. Ashes	|____|
4.7	Where do members of your household relieve themselves?	1. In the bushes, open defecation 2. Neighbor or shared traditional pit latrine 3. Own traditional pit latrine 4. Neighbors or shared ventilated improved pit latrine 5. Own ventilated improved pit latrine	|____|
4.8	If latrine used, is it clean (by observing for example whether faeces present on the slab or round latrine)?	1. Yes 2. No	|____|
4.9	If latrine used, type of slab	1. Traditional slab with wood or wood covered in clay or other material 2. Cement slab	|____|
4.10	Does this household have a mosquito net?	1. Yes 2. No (skip to next section 5)	|____|
4.11	If the household owns mosquito net, who slept under the mosquito net last night? (Probe-enter all responses mentioned)	1. Children <5 years old 2. Children between 5 and 18 years old. 3. Adult females. 4. Adult males 5. Every body 6. Nobody uses	|____| |____| |____| |____| |____| |____|

5. Livestock Ownership & Crop Production			
5.1	Does the household currently own livestock?	1. yes 2. No (skip to Q # 5.5)	|_____|
5.2	If yes, how many?	1. Cattle 2. Camels 3. Goats 4. Sheep 5. Chickens 6. Donkeys	|_____| |_____| |_____| |_____| |_____| |_____|
5.3	Did household milk any animal yesterday?	1. Yes 2. No	|_____|
5.4	If yes what was the total amount milk		

	produced? (ask in cups and covert it into liters)	_____liters
5.5	Is the household currently engaged in farming?	1. yes |_____| 2. No (skip to section 6)
5.6	If YES, type of crops planted in the last harvesting season and amount produced in kilograms?	1. Maize |_____| 2. Sorghum |_____| 3. Simsim |_____| 4. Beans |_____| 5. Tomatoes |_____| 6. Banana |_____| 7. Onion |_____| 8. Pawpaw |_____| 9. Mango |_____| 10. Watermelon |_____| 11. Orange |_____| 12. Sukuma Wiki |_____|

6. Food Sources and Coping Strategies

6.1	Rate the importance of each food source to your household food consumption **(Rank from most important to least important, use codes 1= 1st or most important, 2= 2nd important, 3= 3rd important, 4= 4th important or least important)**	1. Purchase 2. Own Production 3. Food Aid 4. Gift	|____| |____| |____| |____|
6.2	Did the household eat the following yesterday during the day or night? (**place a 1 beside the food if someone consumed it and zero if no one did)**	1. Any ugali, pasta, rice, bread, or any food made from maize, sorghum, millet or wheat 2. Any potatoes, yams, beets or other foods from roots or tubers 3. Any vegetables? 4. Any fruits? 5. Any eggs? 6. Any meats (camel, cattle, chicken, poultry/fowl, sheep, lamb, and organ meats (heart, liver, kidney, etc)? 7. Any fish or dried fish? 8. Any foods made from beans, peas, lentils, or nuts? 9. Any milk, yogurt, cheese, or other milk product? 10. Any foods made with oil, fat, ghee, or butter? 11. Any sugar or honey? 12. Any other condiments (coffee, pilipili, tea)?	|____| |_____| |_____| |_____| |_____| |_____| |_____| |_____| |_____| |_____| |_____| |_____|
6.3	How many times have you experienced the following during Jilal? **(Use the codes: 0= Never, 1= Rarely, 2= Frequently, 3= Always)**	1. Skip meals (excluding Ramadan) 2. Reduce the size of meals 3. Eat less preferred foods (e.g. wild foods etc.) 4. Purchase food on credit from local vendors 5. Borrow money from relatives 6. Send children to eat with relatives 7. Sell off productive assets (livestock, farming tools, donkey cart etc.)	|_____| |_____| |_____| |_____| |_____| |_____| |_____|

7. Income Sources and Expenditure in the last one month

7.1	What was the household's income in the last one month (amount in KSH)?	1. Agricultural / Horticulture products sale 2. Livestock and livestock products sale 3. Earning from own business (petty/small scale trading, kiosk, miraa shop, tea shop,	|_____| |_____| |_____|

		etc) |_____| 4. Sale of bush products (charcoal, firewood, etc.) |_____| 5. Wage employment |_____| 6. Remittances from family/relatives |_____| 7. Loans /credit 8. Salary 9. Other (Specify)_____	
7.2	What was the household's expenditure in the last one month (amount in KSH)?	1. Medical and health (service fees, medicine, etc.) |_____| 2. Rent (house or land) |_____| 3. Food |_____| 4. Water |_____| 5. Sanitation |_____| 6. Transportation |_____| 7. School (fees, books, uniform, etc.) |_____| 8. Debt repayments |_____| 9. Fuel |_____| 10. Duksi fee |_____| 11. Clothing |_____| 12. Mirra |_____| 13. Other (specify)_____	