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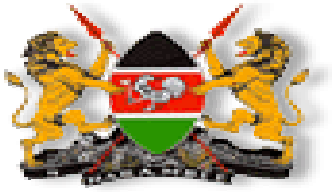

NUTRITIONAL ANTHROPOMETRIC AND MORTALITY SURVEY

FINAL REPORT

WAJIR SOUTH DISTRICT

NORTH EASTERN PROVINCE, KENYA

15th - 25th May 2011

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Abbreviations

ALRMP II	-	Arid Lands Resource Management Project II
APHIA Plus		Aids Population Health Integrated Assistance Project
ASAL	-	Arid and Semi-Arid Lands
CMR	-	Crude Mortality Rate
CI	-	Confidence Interval
CMR	-	Crude Mortality Rate
CSB	-	Corn Soya Blend
ECFF		European Commission Food facility
ECHO	-	European Commission Humanitarian Aid
ENA	-	Emergency Nutrition Assessment
EPI	-	Extended Programme of Immunization
GAM	-	Global Acute Malnutrition
GFD	-	General Food Distribution
HAZ	-	Height-for-Age Z-score
HNSP	-	Hunger Safety Net Project
KFSSG	-	Kenya Food Security Steering Group
L/HAZ	-	Length/ Height for Age –Z-score
MOH	-	Ministry of Health
MUAC	-	Mid-Upper Arm Circumference
OPV	-	Oral Polio Vaccine
OTP	-	Out-patient Therapeutic Program
SAM	-	Severe Acute Malnutrition
SC	-	Stabilization Centre
SCUK	-	Save the Children UK
SD	-	Standard Deviation
SFP	-	Supplementary Feeding Programme
SMART	-	Standardized Monitoring and Assessment of Relief and Transitions
U5MR	-	Under Five-Mortality Rate
UNICEF	-	United Nations Children's Fund
URTI	-	Upper Respiratory Tract Infection
WASDA	-	Wajir South Development Association
WAZ	-	Weight-for-Age Z-score
WFP	-	World Food Programme
WHM	-	Weight for Height Median
WHO	-	World Health Organization
WHZ	-	Weight-for-Height/length Z-scores

1 Executive summary

Wajir South is one of the districts that form the North Eastern Province (NEP) and is 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 Somalia republic to the east, Wajir West to the West, Lagdera to the south and Wajir East district to the North. The district was in 2010 subdivided into Habaswein and Wajir South districts. The larger Wajir South district administratively consists of 5 divisions including Habaswein, Sabuli, Banane, Kulaaley and Diif. Save the Children operates in all the Divisions of Wajir South districts. Within the five divisions there are a total of 14 government health facilities including Habaswein district hospital.

Rainfall is unpredictable, erratic and inadequate amounting to 250-300 mm annually on average and the district experiences an annual evapo-transpiration of 2500mm. It is also characterized by long dry spells and short rainy seasons which are erratic, unreliable and poorly distributed. Temperatures are normally high ranging between 28-40°C. Soils are mainly sandy and sandy loams.

The district population is currently estimated at 130,070[1] persons with a growth rate of 3.7%. About 60% -70% of the people depend largely on livestock for their livelihood. The main form of land use is nomadic pastoralism which is seen as the most efficient method of exploiting the range lands hence pastoral activities are practiced all over the district. The prominent ethnic group is Somali-Muslim.

Survey objectives
The overall goal of the survey was to assess the health and nutritional status of children less than 5 years of age.

The specific objectives of this survey were to estimate:

1. The prevalence of acute and chronic malnutrition in children aged 6-59 months;
2. The crude and under five mortality rate and causes of death;
3. The proportion of households with access to improved water and sanitation;
4. The coverage and content of the general food distribution;
5. The food access and dietary diversity at household level;
6. The Coverage of measles and BCG vaccination among target children;
7. The Coverage rate of Vitamin A. supplementation and de worming;
8. The Morbidity rates of children 6-59 months 2 weeks prior to the survey;
9. To recommend appropriate interventions based on the survey findings;

Area Covered
The survey was conducted from 15th to 25th May 2011 in the five divisions of Wajir South namely Habaswein, Sabuli, Banane, Diif and Kulaaley.

Methodology
A two stage cluster sampling using SMART (Standardised Monitoring Relief and Transition) methodology was employed with identification of clusters being proportional to the population size. The target population for the anthropometric survey was children aged 6-59 months. A total of 40 clusters were selected and 568 households were visited.

Data was collected on anthropometry, morbidity, vaccination and de-worming status, Vitamin A supplementation, hygiene and sanitation practices and food security.

Retrospective information on mortality was collected using the current household census method, with a recall period of 90 days, from all households visited including those without children under

[1] According to the 2009 National population census

the age of five. A total of 39 clusters and 568 households were visited and 765 children from 6 to 59 months were assessed for anthropometry and other indicators. The final analysis was on 758 children after exclusion of 7 records.

Anthropometric and mortality data were analyzed using the ENA software version October 2007. Qualitative and quantitative data was analyzed using the EpiInfo/ ENA software.

Key findings

Table 1 : Results summary for acute malnutrition

INDEX	**INDICATOR**		**RESULTS**
WHO(2006) N=758	*Z- score*	*Global Acute Malnutrition* W/H< -2 z and/or oedema	(216) **28.5** % (24.4 - 33.0 95% C.I.)
		Severe Acute Malnutrition W/H < -3 z and/or oedema	(34) **4.5** % (2.7 - 7.4 95% C.I.)
NCHS(1977) N=760	*Z-score*	*Global Acute Malnutrition* W/H< -2 z and/or oedema	(217) 28.6% (24.5-33.0 95% C.I.)
		Severe Acute Malnutrition W/H < -3 z and/or oedema	(17) 2.2% (1.4- 3.5 95% C.I.)
MUAC ANALYSIS [N=763]	Global Acute Malnutrition according to MUAC (<12.5 cm)		(35) 4.6% (3.2-6.4 95% C.I.)
	Severe Acute Malnutrition according to MUAC (<11.5 cm)		(6) 0.8% (0.3-2.0 95% C.I.)
	At risk of malnutrition according to MUAC (≥12.5 and <13.5cm)		(166) 21.8% (18.2-25.8 95% C.I.)
	Oedema present		0%

Table 2: Results summary for Mortality

Child Mortality	
CMR (total deaths/10,000 people / day)	**0.19** (0.10-0.38 95% C.I.)
U5MR (deaths in children under five/10,000 children under five/ day)	**0.22** (0.03-1.70 95% C.I.)

Table 3: Results summary for children's morbidity, immunization and supplementation

Child Morbidity	Total children sick Diarrhoea Fever, cough, difficult breathing Fever with chills like malaria	50.7% (386) 23.2% 19.5% 11.5%
BCG SCAR	Present Absent	89.3% (682) 10.7% (82)
MEASLES 9-59 MONTHS	By card According to caretaker	42.4% (324) 52.2% (399)
OPV 1	By card According to caretaker	47.8% (365) 44.9% (343)
OPV 3	By card According to caretaker	46.2% (353) 44.9% (343)
De-worming	Given	34.6%(264)
Vitamin A supplementation (in the last 6 months)	Yes (by card) Yes(by recall)	26.80% 65.10%

Table 4: Results summary for water, hygiene and sanitation

Source of water	
• Borehole	44.7% (254)
• Unprotected well	22.5% (128)
• Water tankers	19.9% (113)
Water purification	
• Did nothing to water	98.4%
Access to toilet facility	
• Yes	32%
• No	68%
Place of relief (defecation) for people with no access to toilet	
• Open field defecation	74.8
• Access HH/public latrine	32%
Hand Washing	
• Before eating food	86.4% (491)
• After visiting toilet	50.4% (286)
• After cleaning children's bottoms	32.4% (184)
• Before preparing food	24.8% (141)

Table 5: Results Summary for food and income sources

Livelihood activity	
• Livestock herding	40.7%
• Wage/casual	18.5%
• Petty trade	14.2%
• Firewood/charcoal	3.4%
Source of food	
• Purchase	87.9%
• General food distribution (Feb, March, April 2011)	74
Food consumption (7 day recall period)	
• Cereal	99.3%
• Sweet sugar honey	95.0%
• Oil/fats	90.1%
• Dark green leafy vegetables	4.1%
• Vitamin A rich foods	4.1%
Source of income	
• Sale of livestock	38.9% (219)
• Petty trade	19.7% (111)
• Casual labour	17.9% (101)

Conclusions

The prevalence of acute malnutrition in wajir south district is considered "critical" with global acute malnutrition (GAM) of 28.5 % (24.4 - 33.0 95% C.I.) and Severe Acute Malnutrition (SAM) rate of 4.5 % (2.7 - 7.4 95% C.I.). Compared with the survey undertaken in 2010 which indicated GAM of 23.2% (19.1 – 27.8 95% CI) and SAM of 4.6% (3.3-6.4), the acute malnutrition rates have increased though not statistically significant due to overlapping confidence intervals. However, based on the CDC calculator 2 sample t-test, there is a 95.8% chance that the two surveys are different and it is possible that the nutrition situation may have worsened and this may be typical for the season and further aggravated by the extended dry conditions that are affecting food prices, access to water and animal milk for children. The presence of other chronic underlying factors such as high morbidity rates among children, Low de-worming coverage, poor water, sanitation and hygiene situation and poor access to health care services have contributed to the worsening situation.

Recommendations

Immediate

- Scale up treatment of the malnourished especially at the health facilities through increasing support to MOH staffs (Capacity building, On-the job trainings, regular supervisions and Logistical support). Ensure that IMAM stocks are available at all times.
- Scale up community mobilization activities through the empowerment of the community in the detection and referral of acutely malnourished children less than 5 years.
- Mass campaigns to improve Vitamin A and De-worming coverage (including targeting ECDs and Madrasa)
- Scale up provision of water trucking and water storage equipments to areas affected by water scarcity as well as provide fuel subsidies and repairs/ maintenance as an emergency mitigation measure.

Medium term

- Continued health outreach in locations inaccessible to health facilities to offer basic primary health care package
- Strengthen continuous nutrition surveillance through regular nutrition assessments and ongoing MUAC screening
- Strengthening of hygiene promotion to encourage practices to reduce the incidence of diarrhoeal disease including health education to educate the community on domestic treatment of drinking water.

Long term

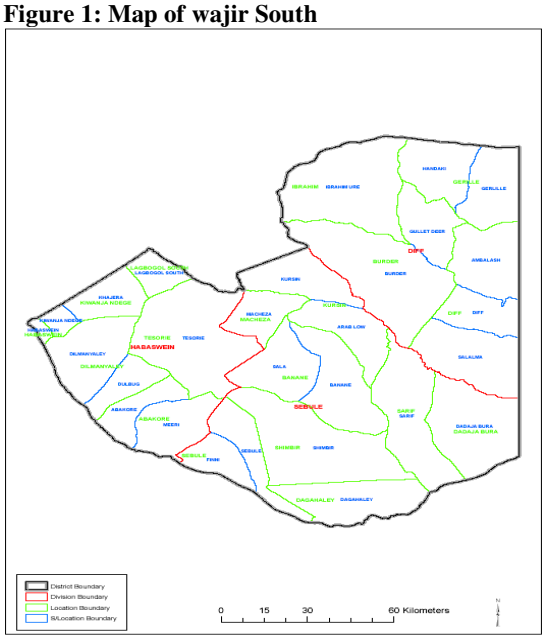
- Provision of toilet facilities through community participatory approaches i.e Community Led Total Sanitation (CLTS) coupled with awareness campaign on the importance of using such facilities.
- Disaster risk reduction strategy in programming .This includes but not limited to strategic de stocking, educating the community on management of disaster risk reduction and encouraging the communities to establish pasture range reserve /reseeding to avoid mass losses of animals (livelihood) during drought

2 Introduction

Wajir South is one of the districts that form the North Eastern Province (NEP) and is one of the 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 Somalia republic to the east, Wajir West to the West, Lagdera to the south and Wajir district to the North. The district was in 2010 further subdivided into Habaswein and Wajir South districts. The town of Habaswein is the District head quarter of the larger Wajir south district, which administratively consisted of 5 divisions including Habaswein, Sabuli, Banane, Kulaaley and Diif. Save the Children operates in all the Divisions of Wajir South districts. Within the five divisions there are a total of 14 Government health facilities including Habaswein district hospital.

The larger Wajir South district has a total population of 130,070. The population is predominantly Muslim and of Somali ethnicity, and is divided into clans, with community elders being in charge of daily affairs. Ogaden is the predominant clan and other clans include Masare, Garre, Degodia, Murule and Ajuran.

Figure 1: Map of wajir South



The District consists largely of a featureless plain. There are three swamps namely Boji, Lagbogol and Lorian all of which are found in Habaswein division. The area receives bimodal rains with the onset of the long rains in April-May. The months succeeding the long rains, June to September, are very dry but vegetation continues to thrive because the lower temperatures reduce the rate of evaporation. The short rains fall from October to December. The annual precipitation is about 280mm which varies in amount and distribution from year to year. The district's climatic condition is characterized by recurrent droughts and unreliable rainfall that hinders crop production and growth of pasture for livestock keeping. These cyclic shocks have retarded development in the area since gains of a particular season are wiped out by drought and famine[2].

Save the Children has been implementing programmes in Wajir South district since July 2009. Save the Children's strategy for Wajir South aims at improvement of and access to health facilities, the protection and improvement of the nutritional status of beneficiaries and improved food security and livelihoods of beneficiaries through community management structures and social protection. Our current integrated approach including health, Nutrition, Food security and Livelihoods Support program, aims to address the immediate and underlying causes of malnutrition through enhancement of house hold food security and livelihoods in the medium term while at the same time linking this to long term livelihood support.

The World food programme (WFP) through its implementing partner Wajir South Development Association (WASDA), has been undertaking General food Distribution (GFD) in the area since 1994. All GFD are distributed are at a 75% ration scale of the daily per capita energy requirement[3] as follows

[2] Wajir South District Development plan 2008-2010(Final Draft)
[3] Based on the UNHCR/UNICEF/WFP guidelines for food and nutrition in emergencies

Table 6: Food aid basket

Commodity	Ration sizes
Cereals	10.35kgs
Pulses	1.80kgs
CSB	1.20kgs
Vegetable Oil	0.60kgs

The ministry of special programmes through the office of the president has also been supplying relief food commodities to various communities and institutions as agreed by the District Steering Group (DSG).

Table 7: Other relief programmes in the area

Organization	Activities
OXFAM GB	Hunger Safety Net Project (HSNP), Hygiene and Sanitation
APHIA plus	Health (HIV)
World Vision Wajir South ADP	Sponsorship, Water and Sanitation, education and Health
VSF Suisse	Improved Community Response to Drought (ICDR Project)
Save The Children UK (SCUK)	Integrated management of acute malnutrition, health, food security and livelihoods, WASH for health facilities.
WFP/ WASDA	Food Aid, Disaster Risk Reduction, school feeding programme
Kenya Red Cross (KRC)	Emergency Relief, Water and Sanitation

2.1 Survey objectives

The overall goal of the survey was to assess the health and nutritional status of children less than 5 years of age.

The specific objectives of the survey were to estimate;-

1. The prevalence of acute and chronic malnutrition in children aged 6-59 months;
2. The crude and under five mortality rate and causes of death;
3. The proportion of households with access to improved water and sanitation;
4. The coverage and content of the general food distribution;
5. The food access and dietary diversity at household level;
6. The Coverage of measles and BCG vaccination among target children;
7. The Coverage rate of Vitamin A. supplementation and de worming;
8. The Morbidity rates of children 6-59 months 2 weeks prior to the survey;
9. To recommend appropriate interventions based on the survey findings;

3 Survey Methodology

The survey employed the standardised monitoring of relief and transitions (SMART 2006) sampling methodology. Emergency Nutrition Assessment (ENA) for SMART software was used to determine sample size for anthropometry and retrospective mortality. Children from 6 to 59 months of age were included in the sampling. Two stage cluster sampling was applied to assign clusters and to select the survey population. A local events calendar was used to aid mothers in accurate determination of the ages of their children. The principle of Probability Proportional to Population Size (PPS) was used in the identification of clusters using ENA for SMART software version 2010.

A total population of 130,070 was estimated for the survey area covering the five divisions. Information on population figures was obtained from the District Development Officer (DDO) in Wajir south based on projections from the 2009 National Census. The survey training took place from 15th to 18th May 2011 while data collection was conducted from 19th to 25th May 2011.

3.1 Sampling procedure and sample size for Anthropometric and mortality data

3.1.1 Sample size calculation for anthropometry

The sample size was calculated using the ENA for SMART software package. The number of children under 5 (U5) in the survey area was estimated at 20% of the total population (26,014 children). In addition to the under five population data, the following basic assumptions were made:

1. Estimated prevalence of malnutrition is 23.2 %[4]
2. Design effect is 1.5 and the standard margin of error is 4% (95% CI).
3. The average number of persons per household is 7 and 0.86 Children per household.
4. A 5% non-responder rate was included in the calculations.

The above data was entered to ENA/SMART software and generated 642 children as minimum sample size. The corresponding number of household to get 642 children was determined be 536 households, taking into consideration a non response rate of 5%.

3.1.2 Sample size calculation for mortality

The sample size for mortality was determined by using the following factors:

- Total population of 130,070
- The estimated Crude Mortality Rate (CMR) was 0.4 deaths/10,000 persons /day (Wajir south 2010 nutrition survey).
- Level of the desired precision was 0.3%
- Design effect was 1.5
- Recall period of 90 days
- Average family size of 7

ENA/SMART software automatically calculated the sample size for mortality as 2,846 persons using the above-mentioned data. Considering average household size of 7 persons, and expected non response rate of 5%, ENA further generated 428 households as the minimum sample size.

As the sample size for anthropometry (536 HHs) was larger than the sample size for mortality (428 HHs), it was decided to use the higher sample size higher precision for mortality results.

Given the operational circumstances and based on the fact that one cluster had to be completed in a day, 14 households were estimated to be visited in one day which yielded 39 clusters (536/14).

A recall period of 90 days was selected to enable the respondents recall the number of deaths without bias. The retrospective data was obtained within a period of 3 months specific dates being 19th February to 19th May 2011- first day of the survey data collection.

[4] Based in 2010 nutrition survey results

3.2 Sampling procedure: selecting households and children

EPI[5] method was employed to select the households. A household was defined as people who sleep under the same roof and eat from one cooking pot. Members of a household may not necessarily be related to one another. If there were several structures within the same compound but each had their own cooking pots, then they were regarded as separate households. Each survey team with the help of a village guide moved to the centre of the village where they spun a pen and walked to the direction the pen faced to the edge of the village. While at the edge of the village, the team spun a pen again and walked along this second line counting each house on the way. Using random numbers list, the team selected the first house to be visited by randomly selecting a number between 1 and the total number of households counted. The randomly selected number became the first household and thereafter they moved in the right direction after every household. The respondent was the primary caregiver of the child/children. For the empty households the team confirmed from the neighbours if the owners were coming back the same day, they noted on the absentees form and went back later. In case the household members had migrated the teams noted and walked to main entrance where they selected the next household by moving to the right direction from that household.

In the event that the team reached the end of the cluster and had not attained the target households, a different direction was determined by randomly spinning a pen and the process repeated until the expected households per cluster was achieved. All children aged between 6 and 59 months of the same household were included in the survey for anthropometric measurements. If the children were absent their names were noted in the absentees form and the teams returned back later to the same household to measure the children.

A retrospective mortality questionnaire using the current household census method was conducted for all the households sampled in each cluster, regardless of the presence of children under five years.

3.3 Case definitions and inclusion criteria

Age: All children aged 6-59 months in the households visited were included in the anthropometric survey. Caregivers were requested by the survey teams to produce the Child Welfare Clinic (CWC) cards or birth certificates to verify age and other information required i.e. Immunisation and Vitamin A supplementation status. In case the care givers did not have the CWCs cards, age was determined using a local events calendar which was developed during the survey teams training based on remarkable events that had taken place. Age for children 6-59 months was recorded in months.
Weight: Children were measured using the electronic scale (UNISCALE[6]). All children were weighed with minimal clothing and no shoes. In case of children who could not stand on the scale, the caregivers were requested to stand on the weighing scale then after their weight was noted the scale was switched to read the weight of the child.
Height: was measured using the height board to the nearest 0.1cm. Recumbent length was taken for children less than 87 cm or less than 2 years of age while those greater or equal to 87 cm or more than 2 years of age were measured standing up.
Bilateral oedema: Assessed by the application of normal thumb pressure for at least 3 seconds to both feet at the same time. The presence of a pit or depression on both feet was recorded as oedema present and no pit or depression as oedema absent.

[5] SMART Methodology, 2006
[6] Recommended as a valid weighing instruments in the guidelines for nutrition and Mortality assessments in Kenya

MUAC: Mid Upper Circumference (MUAC) was measured at the midpoint of the left upper arm to the nearest 0.1cm using the standard MUAC tapes.
Morbidity data: Information on two-week morbidity prevalence was collected by asking the mothers or caregivers if the child had been ill in the two weeks preceding the survey and including the day of the survey. Illness was determined based on respondent's recall and was not verified by a clinician.
Immunization status: For all children 6-59 months, information on Penta valent 1 and OPV 1 and Pentavalent 3 and OPV 3 and measles vaccination was collected using health cards and recall from caregivers. The vaccination coverage was calculated as the proportion of children immunized based on records and recall.
BCG: For all children 6-59 months, the information was collected by checking whether the characteristic BCG scar was present or not.
Vitamin A supplementation status: For all children 6-59 months of age, information on Vitamin A supplementation was collected using the child welfare cards and recall from caregivers. Information on how many times the child had received supplementation in the last 6 months was collected. Vitamin A capsules were also shown to the mothers to aid in recall.
De-worming status: Information was solicited from the care takers as to whether their child/children 6-59 months had been de-wormed in the last 3 months. A local calendar of events was used to refer to 3 months recall period "**Sedax bilood aan sodhafney"**
Water and sanitation: information on access to clean drinking water and toilet facility was collected in all households visited.
Food security, livelihood and dietary status: Information on livelihoods activities, source of food, registration for general food distribution and coping strategies was collected in all the households visited.
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 90 days starting from 19th February 2011. Information was collected on the age and sex of the household members, the number of household members present within the recall period, the number of persons who arrived or left within the recall period, and the number of births and deaths over the recall period. The presumed causes of death were recorded based on the following case definitions:

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 (Specify);
9= Unknown

3.4 Questionnaire, training and supervision

The overall survey was coordinated and supervision by 2 Save the Children nutrition coordinators, I Save the Children and 1 UNICEF Nutrition Support Officer. For data collection, a total of 6 teams were recruited for the survey. The survey teams comprised 1 team leader and 3 enumerators/measurers. The 11 enumerators were selected through an interview process while team leaders were staffs from line ministries including 4 MOH staffs, 1 Ministry of Agriculture staff, 1 staffs from District Development Office and 1 staff from arid lands.

The survey was preceded by a 4 days thorough training by Save the Children staff and the nutrition support officer and covered the following topics;-

- A brief introduction on Signs and symptoms of malnutrition, conceptual framework of malnutrition;
- The objectives and purpose of the survey;
- The survey design and methodology;
- Sampling procedure;
- Household selection, data collection procedures, accurate completion of questionnaires and interview skills;
- How to take anthropometric measurements using standardized procedures. Standardization test for the measurements were conducted;
- Development of a calendar of events ; and
- Pre-testing of the questionnaires and the data collection procedure were undertaken before the actual survey. This was followed by the review of the questionnaires based on the feedback from pre-testing where no changes were made.

During training, a standardization test was also done and groups formed based on individual team member's strength. Based on the standardization report, team members with difficulty in taking measurements were retrained again until it was ascertained they could make accurate measurements. Teams were closely supervised by 3 supervisors (2 Save the Children staff and the Nutrition Support Officer (NSO) throughout the survey period. Teams were trained to check anthropometric measurements twice before recording and the team ensured that all questions had been filled before leaving the household. At the end of every day during the de-briefing session, all the questionnaires were checked and any errors or omissions in data recording were verified and if information was missing the particular households were revisited.

3.5 Data analysis

Data entry was done by 4 data entry clerks who were supervised by Save the Children Monitoring and Evaluation Officer. Anthropometry data was entered on ENA for SMART 2010 version on a daily basis and the plausibility checks done. Any irregularity in the data was discussed with the team the following day in the morning before they set off to the field. Due to vastness of the district teams spent in the field but questionnaires were sent to the base on a daily basis. Anthropometric, mortality and quantitative data entry and analysis was conducted using EPI info version 3.5.1, ENA for SMART 2010 and SPSS version 16 software. The software flagged off any extreme, potentially incorrect or out of range values. Additional analysis for frequencies was conducted using windows SPSS and ms excel.

3.6 Nutritional indices

Acute malnutrition indices: Weight-for-height (WFH) index
Acute malnutrition rates are estimated from the weight for height (WFH) index values and oedema. The values were derived from comparison of children in the survey to WHO 2006 references and are reflective of current nutritional conditions.

Table 8: WFH indices

	Weight for Height 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

MUAC
The guidelines used are as follows:
MUAC <11.5 cm severe acute malnutrition and high risk of mortality
MUAC ≥11.5 cm and <12.5cm moderate acute malnutrition

MUAC≥12.5cm and <13.5cm at risk of moderate malnutrition
MUAC≥13.5cm adequate nutritional status

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 standards and are reflective of long-term/ chronic malnutrition. HFA indices are expressed in Z-scores.

Table 9: Height for Age indices

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

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

Mortality Indices

The crude mortality rate (CMR) is determined for the entire population surveyed from the time of the recall period to the time of survey. The CMR using the current census method is calculated as follows:

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

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 10: Mortality Thresholds

	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

Close supervision of data entry was done on daily basis and data cleaned and validated at the end before actual analysis. Validation of the data was based on the following parameters:

- Out of usual range values – flags
- Age and sex distribution
- Digit preference scores
- The standard deviation
- Skewness (This is a measure of the degree of asymmetry of the data around the mean)
- Kurtosis (This shows the relative flatness of the data compared to a normal distribution).

During data analysis, the ENA for SMART software flagged any missing data, extremes or potentially incorrect z-scores values. All flagged z-scores were excluded from the analysis.

The survey results were also presented to the Nutrition Information Working Group under the Nutrition technical Forum for validation during which the survey was validated.

4 Results

4.1 Survey sample description

Table 11: Survey Sample Selection

Number of children 6-59 months surveyed	**765**
Number of children 6-59 months analysed by WHO	**758**
Number of children 6-59 months analysed by NCHS	**760**
Number of total population surveyed for mortality	**4030**
Number of children under five surveyed for mortality	**989**
Number of HH covered in the mortality survey	**568**
Number of persons who joined the household during the recall period	**72**
Number of persons who left the household during the recall period	**241**
Number of under five children who joined the household during the recall period	**16**
Number of under five children who left the household during the recall period	**54**
Number of births during the recall	**39**
Average Number of persons per HH	**7**
Average Number of children per HH	**2**
% of children under five in the population	**20**

Of all the households visited with children between 6-59 months, 12 children were absent. The children had either been taken to the grazing lands "baadia" following the livestock movements in order to access milk or to their grandmothers who took care of them when their mother gave birth to younger siblings.

4.2 Anthropometric results (based on WHO standards 2006):

Table 12: Acute Malnutrition definitions:

	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 and <12.5cm
Severe Acute Malnutrition	< -3 SD and/or oedema	<11.5cm and /or oedema

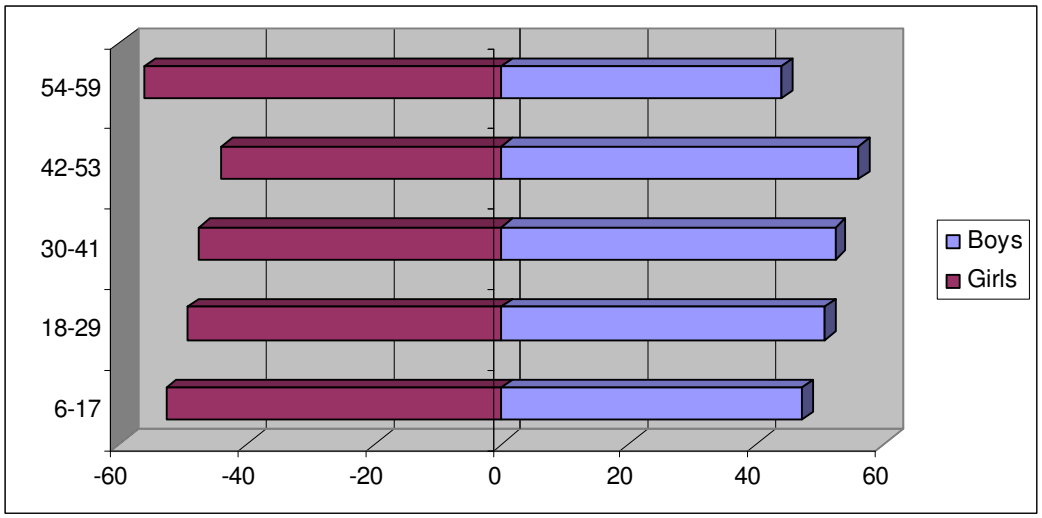
Table 13: Distribution of age and sex of sample

	Boys		**Girls**		**Total**		**Ratio**
AGE (mo)	**no.**	**%**	**no.**	**%**	**no.**	**%**	**Boy: girl**
6-17	70	47.3	78	52.7	148	19.4	0.9
18-29	102	50.7	99	49.3	201	26.3	1.0
30-41	99	52.4	90	47.6	189	24.8	1.1
42-53	89	56.0	70	44.0	159	20.8	1.3
54-59	29	43.9	37	56.1	66	8.7	0.8
Total	389	51.0	374	49.0	763	100.0	1.0

Of the children measured 51% were boys while 49% were girls. The overall sex ration was 1.04 which is within the recommended range of 0.8-1.2[7].

[7] Assessment and treatment of Malnutrition in Emergency situations, Claudine prudon, Action Contre la Faim(ACF), 2002.

Figure 2: Population age and sex pyramid



There was an over representation of girls aged 54-59 months which may be attributed to age recall bias as age determination was based on local events calendar. Compared with previous surveys, this does not represent a typical pattern for that age group.

Table 14: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All n = 758	**Boys** n = 387	**Girls** n = 371
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(216) 28.5 % (24.4 - 33.0 95% C.I.)	(117) 30.2 % (24.7 - 36.5 95% C.I.)	(99) 26.7 % (21.9 - 32.1 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(182) 24.0 % (20.6 - 27.7 95% C.I.)	(99) 25.6 % (20.7 - 31.1 95% C.I.)	(83) 22.4 % (18.0 - 27.5 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(34) 4.5 % (2.7 - 7.4 95% C.I.)	(18) 4.7 % (2.6 - 8.2 95% C.I.)	(16) 4.3 % (2.3 - 7.8 95% C.I.)

The prevalence of oedema is 0.0 %.

Table 15: 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 (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	145	7	4.8	20	13.8	118	81.4	0	0.0
18-29	199	5	2.5	42	21.1	152	76.4	0	0.0
30-41	189	12	6.3	40	21.2	137	72.5	0	0.0
42-53	159	4	2.5	51	32.1	104	65.4	0	0.0
54-59	66	6	9.1	29	43.9	31	47.0	0	0.0
Total	758	34	4.5	182	24.0	542	71.5	0	0.0

Table 16: 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. 35 (4.6 %)	Not severely malnourished No. 728 (95.4 %)

The Weight-for-height distribution curve of anthropometric survey result as compared to WHO 2006 standard is presented below (Figure 3). The curve shifted to the left with mean z-score of -1.41 and Standard Deviation of 0.98 indicating that the surveyed populations' nutritional status is poor as compared to the standard. The standard deviation is within acceptable range. The design effect determined was 1.68, which shows little intra cluster variations. Overall quality of the score of this survey is 6% which is within the acceptable range (Annex 1).

Figure 3: Comparative graph of GAM and WHO 2006 Reference Population

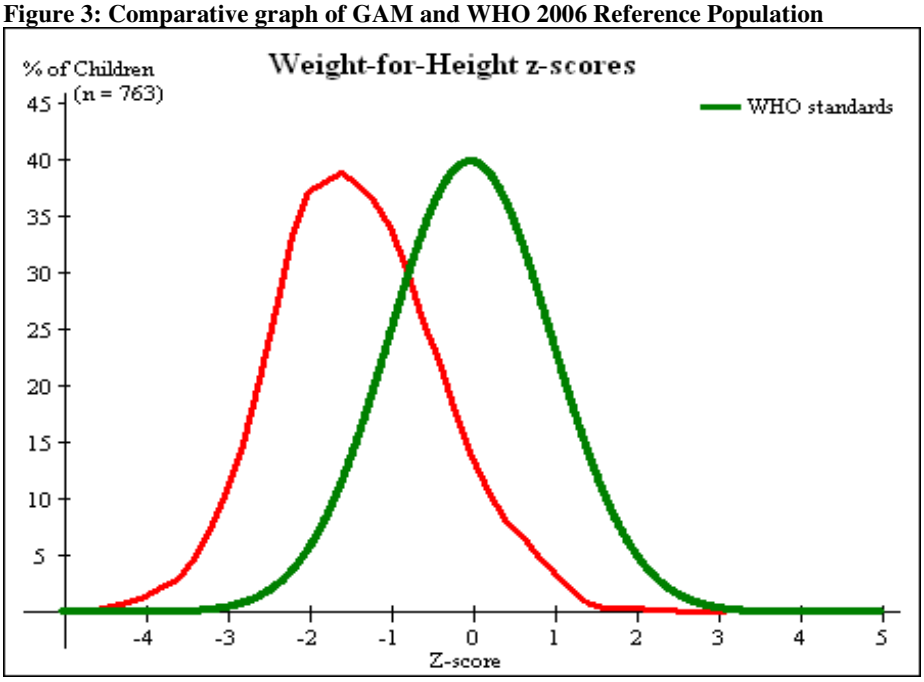


Table 17: Prevalence of acute malnutrition based on the percentage of the median and/or oedema

	n = 763
Prevalence of global acute malnutrition (<80% and/or oedema)	(68) 8.9 % (6.5 - 12.2 95% C.I.)
Prevalence of moderate acute malnutrition (<80% and >= 70%, no oedema)	(66) 8.7 % (6.4 - 11.8 95% C.I.)
Prevalence of severe acute malnutrition (<70% and/or oedema)	(2) 0.3 % (0.1 - 1.1 95% C.I.)

Table 18: Prevalence of malnutrition by age, based on weight-for-height percentage of the median and oedema

		Severe wasting (<70% median)		Moderate wasting (>=70% and <80% median)		Normal (> =80% median)		Oedema	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	145	1	0.7	9	6.2	138	95.2	0	0.0
18-29	199	0	0.0	11	5.5	190	95.5	0	0.0
30-41	189	0	0.0	18	9.5	171	90.5	0	0.0
42-53	159	0	0.0	11	6.9	148	93.1	0	0.0
54-59	66	1	1.5	17	25.8	48	72.7	0	0.0
Total	758	2	0.3	66	8.7	695	91.7	0	0.0

Table 19: Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 757	**Boys** n = 387	**Girls** n = 370
Prevalence of underweight (<-2 z-score)	(187) 24.7 % (20.7 - 29.2 95% C.I.)	(105) 27.1 % (21.7 - 33.4 95% C.I.)	(82) 22.2 % (17.9 - 27.1 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(155) 20.5 % (17.1 - 24.3 95% C.I.)	(87) 22.5 % (17.8 - 28.0 95% C.I.)	(68) 18.4 % (15.0 - 22.3 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(32) 4.2 % (2.9 - 6.2 95% C.I.)	(18) 4.7 % (2.8 - 7.7 95% C.I.)	(14) 3.8 % (2.3 - 6.2 95% C.I.)

The weight-for-age (WFA) index is a combination measure of both acute and chronic malnutrition (wasting and stunting) therefore it indicates a mixed reflection of current and past nutritional experience of the community. A higher percent of underweight was seen in boys than girls from the community surveyed.

Table 20: 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 (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	143	2	1.4	26	18.2	115	80.4	0	0.0
18-29	200	11	5.5	44	22.0	145	72.5	0	0.0
30-41	189	13	6.9	31	16.4	145	76.7	0	0.0
42-53	159	5	3.1	38	23.9	116	73.0	0	0.0
54-59	66	1	1.5	16	24.2	49	74.2	0	0.0
Total	757	32	4.2	155	20.5	570	75.3	0	0.0

Table 21: Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 732	**Boys** n = 373	**Girls** n = 359
Prevalence of stunting (<-2 z-score)	(89) 12.2 % (9.5 - 15.4 95% C.I.)	(51) 13.7 % (10.2 - 18.1 95% C.I.)	(38) 10.6 % (7.4 - 15.0 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(72) 9.8 % (7.6 - 12.6 95% C.I.)	(39) 10.5 % (7.5 - 14.4 95% C.I.)	(33) 9.2 % (6.3 - 13.3 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(17) 2.3 % (1.4 - 3.9 95% C.I.)	(12) 3.2 % (1.8 - 5.7 95% C.I.)	(5) 1.4 % (0.6 - 3.3 95% C.I.)

The height-for-age (HFA) indices assesses linear growth and hence it reflects the cumulative effects of chronic nutritional inadequacy and/or recurrent chronic illness which may result in a child having a low HFA (referred to as stunting) indicated by shortness when compared to his/her age cohorts. It is not affected by seasonality but is rather related to the effects of socio-economic development and long-standing food security situation in a community. The results (Table 21) indicate a global stunting rate of 12.2% (9.5-15.4 CI) and severe stunting rate of 2.3% (1.4-3.9 CI) 95%. According to the results boys are more affected than girls though not significantly different.

Table 22: 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 (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	142	2	1.4	12	8.5	128	90.1
18-29	187	4	2.1	28	15.0	155	82.9
30-41	184	7	3.8	14	7.6	163	88.6
42-53	155	4	2.6	14	9.0	137	88.4
54-59	64	0	0.0	4	6.3	60	93.8
Total	732	17	2.3	72	9.8	643	87.8

Mean weight for height Z scores WHO Standards 2006

The mean weight-for-height Z scores was -1.41±0.98 with a design effect of 1.68 whereas the weight-for-age mean Z scores -1.25±1.03 with a design effect of 1.81 and the height-for-age was –0.59±1.23 with a design effect of 1.42. There were no Z scores that were not available whereas 5 were out of range for weight-for-height and 6 for weight-for-age and 31 for height-for-age. (Table 23). The later could be due to challenges of caregivers' recall of age.

Table 23: 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	758	-1.41±0.98	1.68	0	5
Weight-for-Age	757	-1.25±1.03	1.81	0	6
Height-for-Age	732	-0.59±1.23	1.42	0	31

* contains for WHZ and WAZ the children with oedema.

Plausibility Checks

The plausibility checks for the anthropometric data are presented in Table 24.

Table 24: Plausibility Checks for Anthropometric Data

Indicator	Survey
Digit preference weight	0 (4)
Digit preference height	2 (8)
WHZ (Standard deviation)	0 (0.98)
WHZ (Skewness)	0 (0.16)
WHZ (Kurtosis)	0 (-0.11)
Percentage of flags	0.7%
Age ration: ages 6-29: 30-59	0.84

Overall sex ratio: p = 0.587 (boys and girls equally represented)
Overall age distribution: p = 0.004 (Significant difference)
Overall age distribution for boys: p = 0.011 (significant difference)
Overall age distribution for girls: p = 0.219 (as expected)
Overall sex/age distribution: p = 0.001 (significant difference
Overall data quality of survey is 6% this is acceptable.

4.3 Mortality results (retrospective over x months/days prior to interview)

Table 25: Mortality rates

CMR (total deaths/10,000 people / day): **0.19** (0.10-0.38 95% CI)
U5MR (deaths in children under five/10,000 children under five / day): **0.22** (0.03-1.70 95% CI)

Information on mortality was collected. A total number of 4,030 people were included in the mortality survey. Out of these, 989 of them were children below 5years of age. Of all deaths reported during the survey 2 (22.2%) deaths occurred in children under five years while the other 7 (77.8%) deaths occurred in persons over five years. Both mortality rates were within the acceptable levels for emergency situations.
The causes of deaths for the children under five years were unknown. One of the children was a neonate. However, causes of death for adults were lower respiratory tract infections (2), injury (1) and unknown causes (4).

4.4 Children's morbidity

As shown on table 27 below, more than half (50.7%) of the children (386) under five years were reported to have been ill two weeks prior to the survey. The prevalent illnesses were diarrhoea (23.3%), pneumonia (19.5%) and Malaria (11.5%).

Table 26: Prevalence of reported illness in children in the two weeks prior to interview (n=386)

	6-59 Months
Illness	50.7%
Diarrhea	23.3%
Vomiting	10.1%
Fever with chills like malaria	11.5%
Fever, coughs, difficulty in breathing	19.5%
Intestinal parasites	0.1%
Measles	0.0%
Eye infection	0.4%
Skin infection	1.7%
Accident	0.0%
Malnutrition	0.4%
Stomach ache	1.7%
Tooth ache	0.3%

Figure 4: Symptom breakdown in the children in the two weeks prior to interview (n=386)

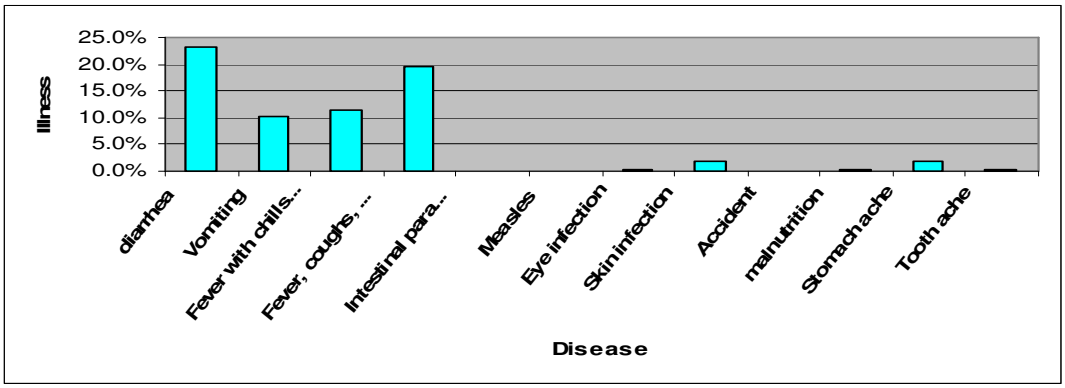
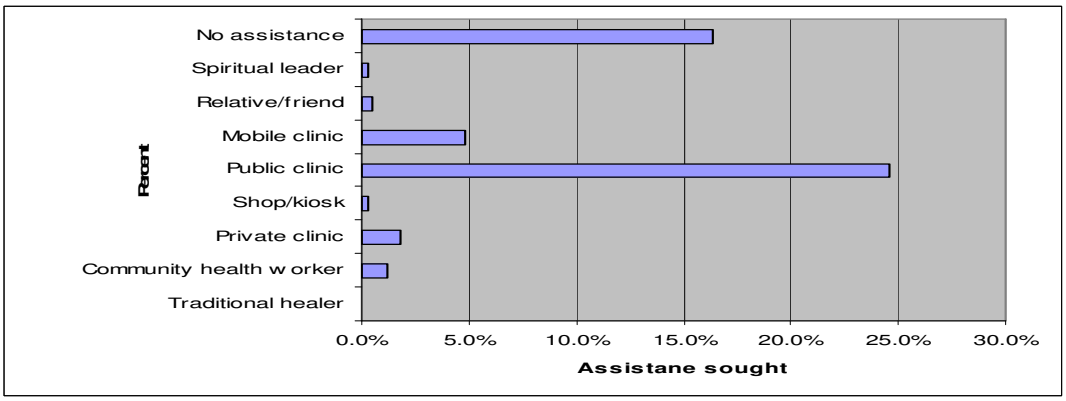


Figure 5: Caretakers' health seeking behaviour



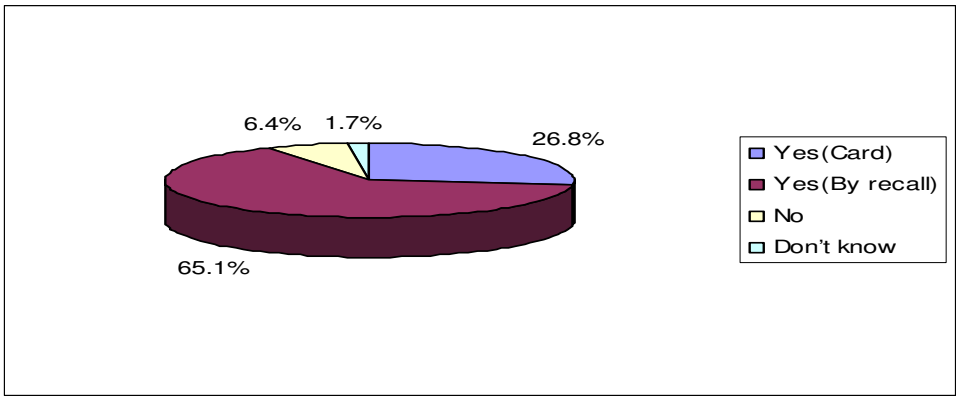
Health seeking behaviour of caretakers determines the preference and quality of health care services obtained whenever a child falls ill. Quality of health care services and duration taken before a sick child receives medical attention contributes to the severity of the illness. Of the 386 children reported to be ill within the last two weeks, 17 % did not seek medical assistance.

Table 27: Vaccination and de-worming coverage

BCG SCAR	Present	89.3% (682)
	Absent	10.7% (82)
MEASLES 9-59 MONTHS	By card	42.4% (324)
	According to caretaker	52.2% (399)
	Not immunized	5.2% (40)
	Don't know	0.1% (1)
OPV 1	By card	47.8% (365)
	According to caretaker	44.9% (343)
	Not immunized	6.9 % (53)
	Don't know	0.4% (3)
OPV 3	By card	46.2% (353)
	According to caretaker	44.9% (343)
	Not immunized	8.5% (65)
	Don't know	0.4% (3)
De-worming	Given	34.6%(264)
	Not given	60.2%(460)
	Don't know	5.2%(40)

Using both card and confirmation from the carers, there is good coverage for all the vaccinations, which are above the recommended Kenya Expanded Programme on Immunization (KEPI) target of 80%. Only a quarter of the respondents have immunization cards. Only 34.6% of the under fives surveyed reported to been de-wormed in the last 3 months.

Table 28: Vitamin A supplementation coverage



Majority (91.9%) of the children surveyed reported to have received Vitamin A supplementation in the last 6 months. This could have been highly attributed to measles and malezi bora campaign which was conducted just before the onset of the survey.

4.5 Water and sanitation

Almost half (44.7%) of the households surveyed said boreholes were the main current sources of water, with 22.5% (128) getting water from from unprotected wells and 19.9% (113) from water tankers as shown in the graph below. Most of the water pans were reported to be dry at the time of survey

Figure 6: Sources of water

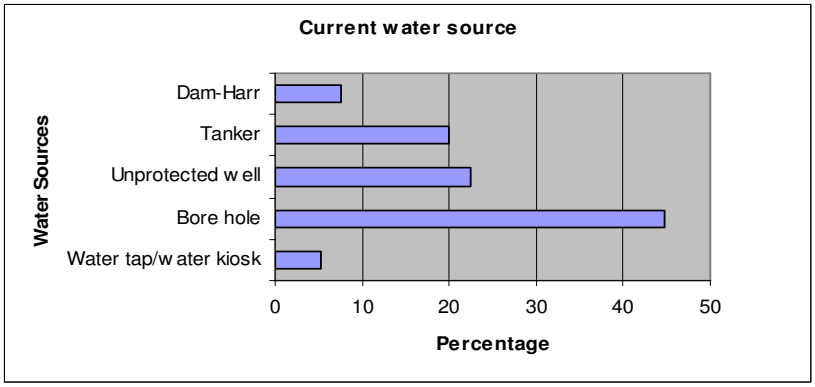
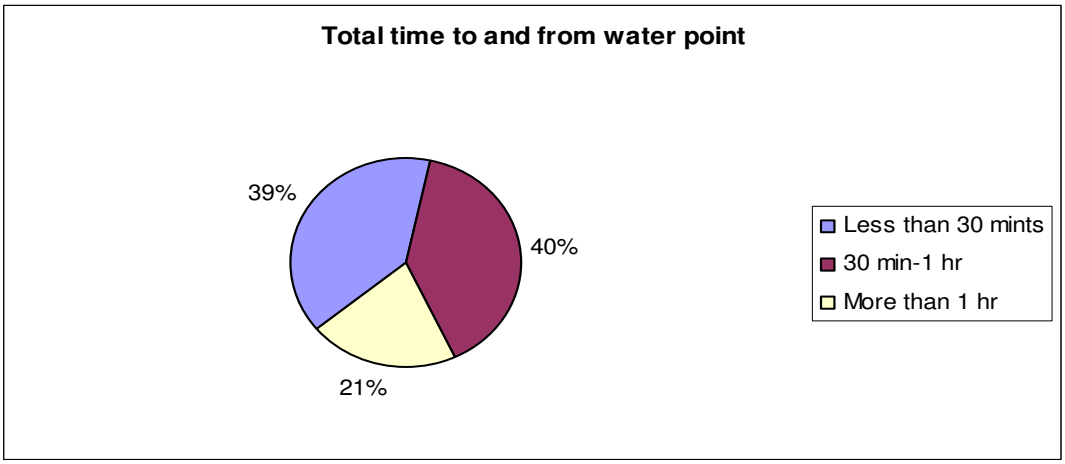


Figure 7: Time spent on water collection



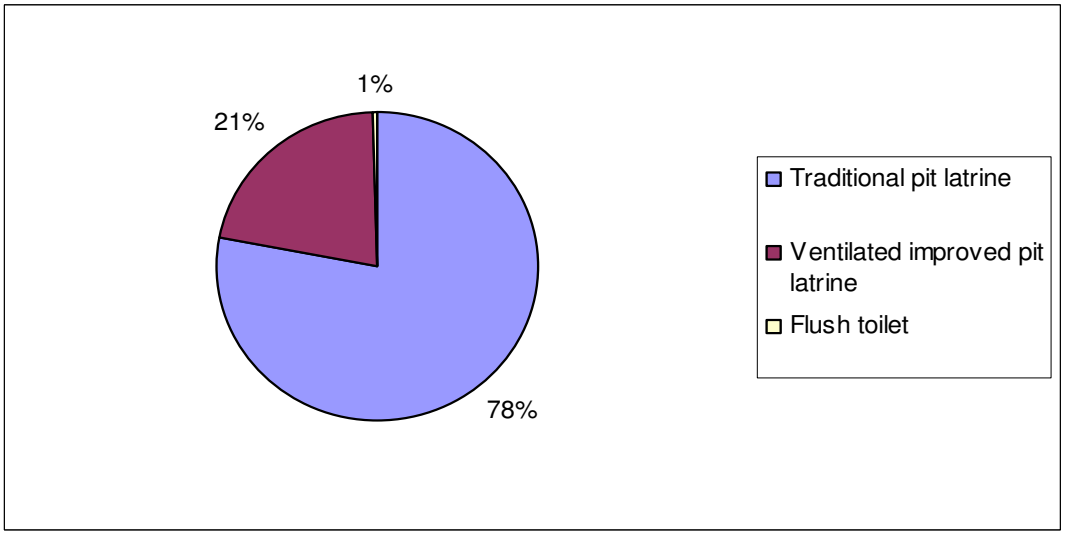
Water treatment

Majority (98.4 %) of the households interviewed did not do anything to their water before drinking. It was noted in some locations like Sarif and Dadajabulla that the communities reported high cases of diarrhoeal diseases which was attributed to the consumption of dirty water.

Access to toilet facilities

A third (32%) reported having access to a toilet facility. Of those who reported not to have access 74.8% reported to be defecating in the field.

Figure 8: Types of toilet facilities



Hand washing

Only 20.6% of the households reported to be washing wash hands with water and soap and 0.2 % with water and ash. The rest wash with water only. The community reported to be washing hands as shown in the table below.

Table 29: Hand washing time

Hand washing time	Count	%
After visiting the toilet	286	50.4%
Before feeding the child	107	18.8%
Before eating	491	86.4%
Before preparing food	141	24.8%
When dirty	135	23.8%
When water available	53	9.3%
After cleaning children's bottoms	184	32.4%
Other (Before prayers)	209	36.8%

5 Food Security

5.1 Food diversity at household levels

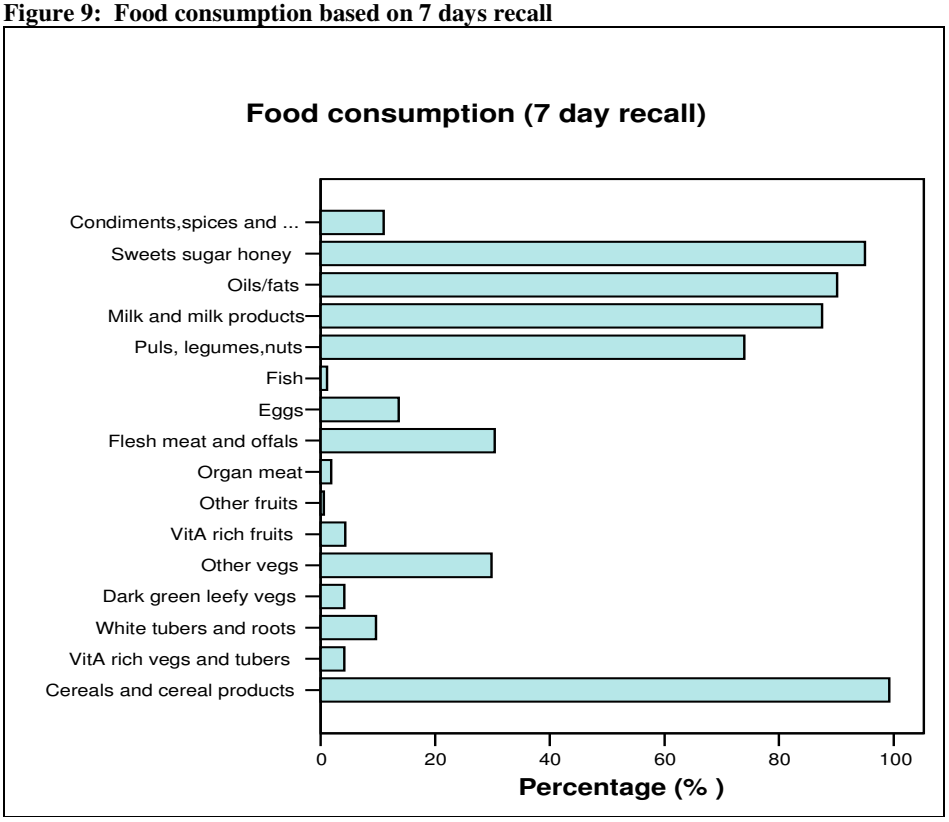
The main source of food was purchases at 87.9 % with 38.9% of the respondents indicating livestock sale as the main source of income.
Analysis done on the survey findings was based on the foods consumed in the last 7 days and 24-hour recall period. The graphs below show that the most common consumed foods by the households were sugar, cereal based items (mainly pasta, maize meal and CSB) and oils/fats. In the households surveyed the major sources of protein were milk especially powdered, pulses and legumes.

It is worth noting that 15.2 % of the households visited reported to be receiving meat vouchers from the European Commission Food Facility (ECFF) programme implemented by Save the Children jointly with other partners. In addition, a very small proportion of households consumed meat despite this being a pastoralist community, eggs, vegetables and fruits. The low consumption of meat was explained by the poor animal body condition and low productivity of the animals due to the ongoing drought which had led to out-migration of animals to neighbouring districts and even cross border by the time of the survey. Vegetables and fruits were not consumed due to their unavailability.

Households also cited high food prices and migration of livestock had led households to consume less preferred foods. This in turn led to reduction in sizes and number of meals consumption by the households. Of the households interviewed, 74% had received food aid from WFP in the last three months. However there was no food aid received in the month of March due to a food pipeline breakdown though the rations resumed in April.

Figure 9 shows that almost all (99.3%) respondents reported to have used cereals over the seven days prior the survey, followed by Sweets sugar honey (95.0%) and oil/fats (90.1%). These results are indications on how this pastoralist community could not access one of their main staple diets such as meet. On other hand, the proportion of respondents used green leafy and vitamin A rich vegetables are negligible being 4.1% each.

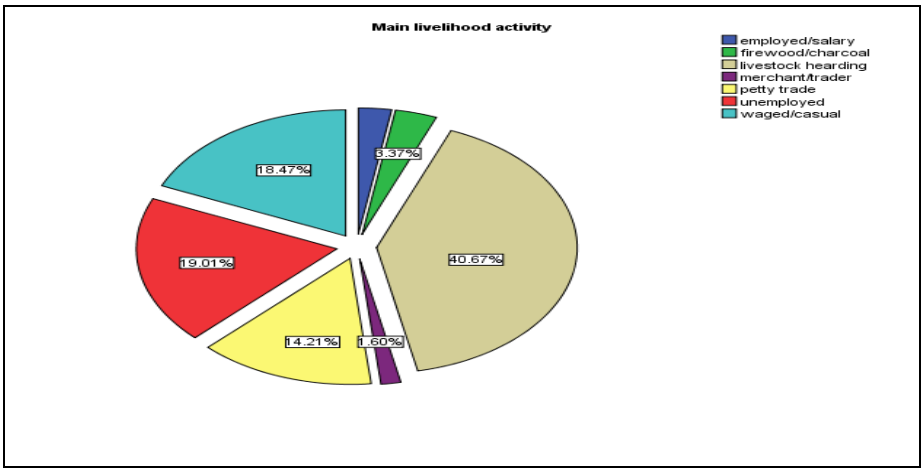
Figure 9: Food consumption based on 7 days recall



5.2 Main livelihood activities

The survey showed that 40.6% of the households' main livelihood activities were livestock herding. This was followed by waged labour (18.7%) and casual work mainly included providing donkey carts services. In addition, 14.2% practised petty trade through small kiosks near trading centres.

Figure 10: Livelihood activities



Sources of income

As indicated table 31 below, Sale of livestock (38.9%) was the most important source of income in the area, followed by petty trading (19.7%) and casual labour (17.9%).

Table 30: Main sources of income

Income Source	Frequency	Percent
Casual labour	101	17.9
HSNP	5	.9
no income	64	11.4
Other	2	.4
permanent job	19	3.4
petty trading	111	19.7
Remittance	10	1.8
Sale of crops	1	.2
Sale of livestock	219	38.9
Sale of livestock product	26	4.6
Sale of personal assets	5	.9
Total	563	100.0

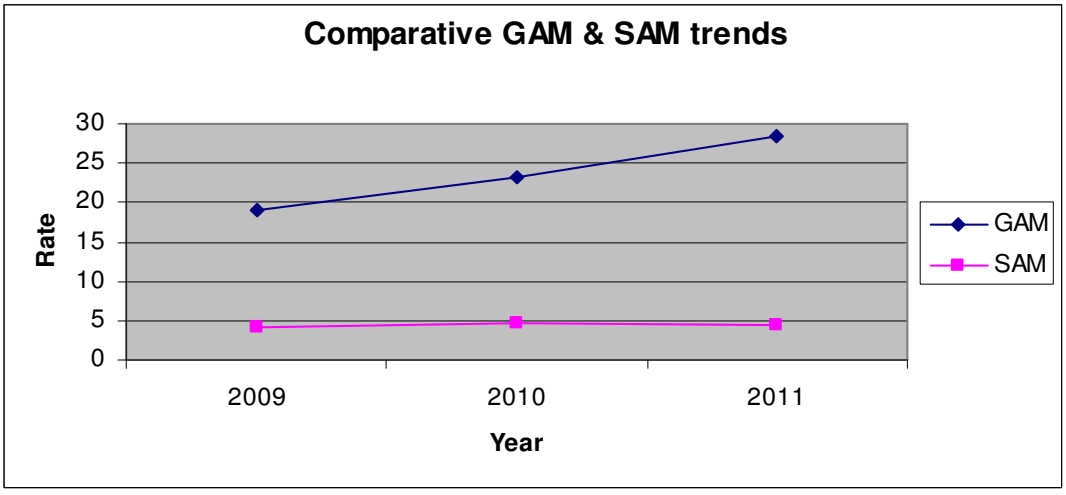
6 Discussion

6.1 Nutritional status

A total of 765 children aged between 6 – 59 months were measured and included in the analysis in this survey. The overall age and sex ratio fell within the acceptable range (0.8 – 1.2).

The GAM rates at 28.5% (24.4-33.0) 95 CI scores are above the emergency threshold of >15%[8]. Compared with the survey undertaken in 2010 which indicated GAM of 23.2% (19.1 – 27.8 95% CI) and SAM of 4.6% (3.3-6.4), the acute malnutrition rates have increased though not statistically significant due to overlapping confidence intervals. However, based on the CDC calculator 2 sample t-test, there is a 95.8% chance that the two surveys are different and it is possible that the nutrition situation may have worsened and this may be typical for the season and further aggravated by the extended dry conditions that are affecting food prices, access to water and animal milk for children.

Figure 11: Comparison of malnutrition rates based on WFH z-scores in Wajir South (2009-2011)



5-

Table 31: Comparison of acute malnutrition expressed by MUAC 2010 and 2011:

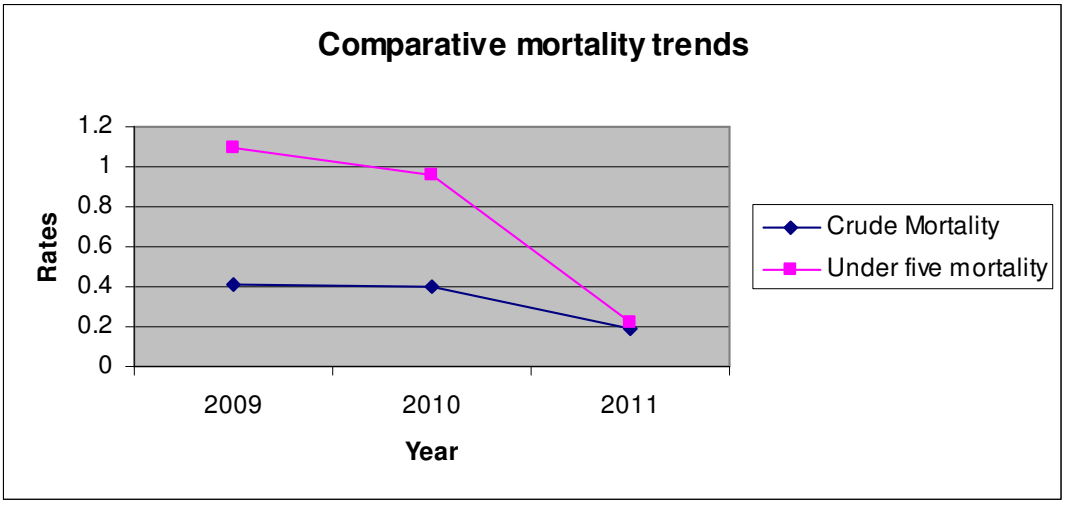
Divisions covered		April 2010	May 2011
Habaswein, Diff, Sabuli Kulaaley, Banane	GAM (MUAC< 12.5 cm)	**6.1%**	**4.6%**
	SAM(MUAC<11.5 cm)	**2.3%**	**0.8%**
	At Risk (<13.5 cm)	**14.5%**	**21.8%**

MUAC is a better predictor of mortality that weight for Height. A comparison between the surveys undertaken in 2010 and 2011 reveal that in 2011, there were less children acutely malnourished but more children at risk of malnutrition.

6.2 Mortality

According to the survey results, the Crude Mortality Rate (CMR) of 0.19 (0.10-0.38) and under five mortality rate (U5MR) of 0.22 (0.03-1.70) were within normal ranges. Compared with the previous two years, the mortality rates decreased slightly. During the survey, it was noted that the community was under reporting deaths especially amongst very young children as death is considered an act from God.

Figure 12: Comparison of mortality rates 2009 and 2011



6.3 Feeding Programme coverage

A coverage survey conducted in March-April 2011 using the Semi Quantitative of Access and Coverage (SQUEAC) indicted that the Outpatient Therapeutic programme (OTP) coverage was in line with SPHERE standards as indicated in the table below.

Table 32: Feeding programme coverage

	2010	2011
	OTP	OTP
Point coverage	**61.1%** (43.2% - 77.1 95% C.I.)	**50%** (29.4% – 70.7 95% C.I.)
Period Coverage	**77.6%** (65.5% - 87.4 95% C.I.)	**75.7%** (63.8% -85.3 95% C.I.)

However, compared to 2010 results the coverage seems to have gone down slightly. The potential barriers to OTP coverage were reported to be, current drought situation with community taking most of their time searching for water and pastures, community apathy, waiting time in the

programme, health seeking behaviour, stigma and challenges associated with transition to MOH managing malnutrition within the health facilities.

6.4 Causes of malnutrition

A high rate of morbidity was reported with Half (50.7%) of the children reporting to have been ill with diarrhoea, Acute Respiratory infections (ARI), Malaria and vomiting accounting for over 90% of all the causes of morbidity.

The De-worming status for the last 3 months according to the survey was found low at 34.6%. This finding is worrying considering the poor water availability and accessibility experienced in most parts of the district as well as poor sanitation that predisposes the children to helminthes infestation, making de-worming a crucial exercise.

This survey was carried out in May after the almost total failure of long rains, resulting in an extended dry period and elevated rates of malnutrition could be expected at this time. Pockets of areas in Diif and Banane divisions received some rainfall and this resulted in mass migration of people from neighbouring districts.

Immunization coverage was above the national targets and this is largely due to the efforts of MOH and Save the Children who are providing health and immunization outreach services in most of the hard to reach areas. Following a measles outbreak in some parts of the district, measles campaign and Vitamin A supplementation was conducted in the district 2 weeks prior to the survey. The total measles campaign coverage was 72% and this was achieved through support to MOH and from partners.

As a result of the failed rains, water scarcity was being experienced by the communities with 61% of the households reporting to be taking more than 30 minutes to the nearest water source.

Market prices of food commodities have increased drastically as per the North Eastern drought assessment conducted by Save the Children in April 2011.

Table 33: Food prices

Price Rises of Basic Food Commodities				
Item	**Current Price-Ksh**	**Unit**	**Pre-drought prices-Ksh**	**% change**
Maize	2400	50kg	800	300
Rice	100	1kg	60	167
Sugar	120	1kg	80	150
Beans	80	1kg	65	123

While prices of basic commodities are increasing, the prices of livestock have gone down due to poor quality and animals are in a weak physical condition. Most community members rely on their animals for milk and also sell livestock to be able to purchase other food and non food items (NEP Drought Assessment report April 2011). Discouraging livestock prices were being offered for the animals and ranged as follows;

Cattle – 4,500 – 8,000/- for a mature bull (Normal 16,000 - 22,000/-)
Sheep – 600 – 800/- for a mature ram (Normal 1,500 – 2,500)
Goats – 700 – 1,500/- for a mature buck (Normal 1,800 – 3,500)
Camels – 7,000 -18,000/- for a mature male camel (Normal 20,000 – 50,000)

Milk from cattle and goats was very scarce in the areas visited and the little available from camels was highly overpriced between 80-100/-per litre (against normal 15/-) hence unaffordable to majority of households (Wajir DSG 2010 short rains Assessment). Meat was also scarce and

expensive going for 320/- per kg against a normal of 200/- per kg.

Poor sanitation and hygiene practises have resulted to high prevalence of diarrhoea cases. Households reported using untreated water from unprotected sources. Vulnerability to illness increases because of unhygienic practices like open field defecation which can also cause diarrhoea which can lead to malnutrition

During the survey there was a general cry from the community for support through the following interventions

- Blanket supplementary feeding programme covering all children under five years
- Water trucking in the areas without permanent water sources
- Health outreaches to areas with no access to health facility
- Provision of filters and water treatment chemicals
- Provision of foliage for the livestock

7 Conclusions

The prevalence of acute malnutrition in wajir south district is considered "critical" with global acute malnutrition (GAM) of 28.5 % (24.4 - 33.0 95% C.I.) and Severe Acute Malnutrition (SAM) rate of 4.5 % (2.7 - 7.4 95% C.I.). Compared with the survey undertaken in 2010 which indicated GAM of 23.2% (19.1 – 27.8 95% CI) and SAM of 4.6% (3.3-6.4), the acute malnutrition rates have increased though not statistically significant due to overlapping confidence intervals. However, based on the CDC calculator 2 sample t-test, there is a 95.8% chance that the two surveys are different and it is possible that the nutrition situation may have worsened and this may be typical for the season and further aggravated by the extended dry conditions that are affecting food prices, access to water and animal milk for children. The presence of other chronic underlying factors such as high morbidity rates among children, Low de-worming coverage, poor water, sanitation and hygiene situation and poor access to health care services have contributed to the worsening situation.

8 Recommendations

Immediate

- Scale up treatment of the malnourished especially at the health facilities through increasing support to MOH staffs (Capacity building, on-the job trainings, regular supervisions and logistical support).
- Provision of blanket supplementary feeding programme to prevent acute malnutrition among children, pregnant women and lactating mothers from deteriorating.
- Scale up community mobilization activities through the empowerment of the community in the detection and referral of acutely malnourished children less than 5 years.
- Mass campaigns to improve Vitamin A and De-worming coverage (including targeting ECDs and Madrasa)
- Scale up provision of water trucking and water storage equipments to areas affected by water stress as well as fuel subsidies and repairs/ maintenance as an emergency mitigation measure.

Medium term

- Continued health outreach in locations inaccessible to health facilities to offer basic primary health care package
- Strengthen continuous nutrition surveillance through regular nutrition assessments and ongoing MUAC screening
- Strengthening of hygiene promotion to encourage practices to reduce the incidence of diarrhoeal disease including health education to educate the community on domestic treatment of drinking water.

Long term

- Provision of toilet facilities through community participatory approaches i.e Community Led Total Sanitation (CLTS) coupled with awareness campaign on the importance of using such facilities.
- Disaster risk reduction strategy in programming .This includes but not limited to strategic de stocking, educating the community on management of disaster risk reduction and encouraging the communities to establish pasture range reserve /reseeding to avoid mass losses of animals (livelihood) during drought

9 References

1. SPHERE minimum standards 2004
2. KFSSG Short Rains Assessment 2011 Report
3. Wajir DSSG Short rains 2010 report
4. North Eastern Province Drought Assessment report April 2011
5. Save the Children Wajir South Nutrition survey report 2009, 2010

10 Appendices

Appendix 1

Plausibility check for: WS NutriENA result06062011.as

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

Overall data quality

Criteria	Flags*	Unit	Good	Accept	Poor	Unacceptable	**Score**
Missing/Flagged data	Incl	%	0-2.5	>2.5-5.0	>5.0-10	>10	
(% of in-range subjects)			0	5	10	20	**0** (0.7 %)
Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<0.000	
(Significant chi square)			0	2	4	10	**0** (p=0.587)
Overall Age distrib	Incl	p	>0.1	>0.05	>0.001	<0.000	
(Significant chi square)			0	2	4	10	**4** (p=0.004)
Dig pref score - weight	Incl	#	0-5	5-10	10-20	> 20	
			0	2	4	10	**0** (4)
Dig pref score - height	Incl	#	0-5	5-10	10-20	> 20	
			0	2	4	10	**2** (8)
Standard Dev WHZ	Excl	SD	<1.1	<1.15	<1.20	>1.20	
			0	2	6	20	**0** (0.98)
Skewness WHZ	Excl	#	<±1.0	<±2.0	<±3.0	>±3.0	
			0	1	3	5	**0** (0.16)
Kurtosis WHZ	Excl	#	<±1.0	<±2.0	<±3.0	>±3.0	
			0	1	3	5	**0** (-0.11)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<0.000	
			0	1	3	5	**0** (p=0.050)
Timing	Excl	Not determined yet					
			0	1	3	5	
OVERALL SCORE WHZ =			0-5	5-10	10-15	>15	**6** %

At the moment the overall score of this survey is 6 %, this is acceptable.

Appendix 2
Events Calendar – Wajir South

	Annual Events	2006	2007	2008	2009	2010	2011
January *Zaka*	-School opening **Hot season)** ORAHED		**52 San-diq (Rift Valley Fever)**	**40 Post Election Violence**	**28**	**16 BSFP (uji-bathnet)**	**4**
February *Ragal*	**ORAHED (Hot season)**		**51 San-diq (Rift Valley Fever)**	**39 Post Election Violence**	**27**	**15**	**3**
March	**ORAHED (Hot season)**		50 **Wajir South District naming**	**38 Stoning of former MP at Abakore**	**26**	**14 Changing of Elector's cards(Badalat ki Kuraha)**	**2**
April *Maulid*	**GU (long rains)**		**49**	**37**	**25**	**13**	**1**
May *Bilku 2*			**48**	**36**	**24 Al-shabab Capturing Fazul in Dadajabulla**	**12 Al-shabaab attack at Dadajabulla injuring student girl**	**0**
June *Bilku 3*		**59**	**47 Election Campaign**	**35**	**23 SCUK programme initial survey**	**11**	
July *Sondeer 1*	**HAGAI (Cool cloudy season)**	**58**	**46 Election Campaign**	**34**	**22**	**10 Wajir South MP seat declared vacant (soelitan Kursiki WS)**	
August *Sondeer 2*		**57**	**45 Election Campaign**	**33**	**21 Census (Tirakop)**	**9 Referendum**	
September *Soom*		**56**	**44 Election Campaign**	**32**	**20**	**8**	
October *Furan*		**55**	**43 Election Campaign**	**31**	**19**	**7 Wajir South MP by-election**	
November *Sigitaal*	**DEYR (short rains)**	**54**	**42 Election Campaign**	**30 Obama Election**	**18**	**6 Hajj**	
December *Arafa*	Idd Ul Hajj	**53 Death of Saddam**	**41 Elections**	**29**	**17**	**5**	

Appendix 3

Assignment of Clusters

Geographical unit	Population size	Assigned cluster
DADAJABULA	8693	1, 2, 3
SARIF	5833	4
BANANE	3494	5
ARABLOW	933	
SALA	1700	
SHIMBIR	2347	6, 7
DAGAHLEY	5569	8
SABULE	2838	
JUNCTION	568	RC, 9
ABDILLEGAAB	443	
FINNI	817	
LAGBOGOL S	3781	10
ALI DUMAL	515	
TESORIE	3511	11
MERI	4400	
ABAKORE	7129	12, 13, 14, 15, 16
DILMANYALE	3356	17
DULGUB	713	
HABASWEIN C	2698	18
KANJARA	1664	19
KIWANJA NDEGE	3157	20, 21
BULLA POLYTECHNIC	818	
MATHALIBAH	714	
KARU	344	
KIBILAY	2549	22
BULLA JUU	742	23
IBRAHIM URE	4026	
DIFF	9420	24
SALALMA	4144	RC
BURDER	4186	25, 26
HUBSOY	521	
GULLETDEER	2341	RC
MACHEZA	4121	27, 28
KURSIN	3290	29
QOQAR	274	
LEHELEY	7709	30, 31, 32, 33
BOJI YAREH	616	34
EYRIB	2179	35
KULAALEY	10610	RC, 36, 37, 38, 39
EL-ADOW	3346	RC, 40

Appendix 5

Result Tables for NCHS growth reference 1977

Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All n = 760	**Boys** n = 389	**Girls** n = 371
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(217) 28.6 % (24.5 - 33.0 95% C.I.)	(115) 29.6 % (24.0 - 35.8 95% C.I.)	(102) 27.5 % (22.8 - 32.8 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(200) 26.3 % (22.7 - 30.3 95% C.I.)	(103) 26.5 % (21.5 - 32.1 95% C.I.)	(97) 26.1 % (21.5 - 31.3 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(17) 2.2 % (1.4 - 3.5 95% C.I.)	(12) 3.1 % (1.7 - 5.4 95% C.I.)	(5) 1.3 % (0.5 - 3.6 95% C.I.)

The prevalence of oedema is 0.0 %

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 (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	147	7	4.8	23	15.6	117	79.6	0	0.0
18-29	199	3	1.5	62	31.2	134	67.3	0	0.0
30-41	189	3	1.6	44	23.3	142	75.1	0	0.0
42-53	159	2	1.3	42	26.4	115	72.3	0	0.0
54-59	66	2	3.0	29	43.9	35	53.0	0	0.0
Total	760	17	2.2	200	26.3	543	71.4	0	0.0

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. 17 (2.2 %)	Not severely malnourished No. 745 (97.8 %)

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

	All n = 759	**Boys** n = 389	**Girls** n = 370
Prevalence of underweight (<-2 z-score)	(255) 33.6 % (29.0 - 38.5 95% C.I.)	(135) 34.7 % (29.0 - 40.9 95% C.I.)	(120) 32.4 % (26.8 - 38.6 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(221) 29.1 % (25.2 - 33.3 95% C.I.)	(117) 30.1 % (25.0 - 35.6 95% C.I.)	(104) 28.1 % (23.4 - 33.4 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(34) 4.5 % (3.2 - 6.3 95% C.I.)	(18) 4.6 % (2.8 - 7.6 95% C.I.)	(16) 4.3 % (2.6 - 7.0 95% C.I.)

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 (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	146	4	2.7	33	22.6	109	74.7	0	0.0
18-29	200	13	6.5	78	39.0	109	54.5	0	0.0
30-41	188	12	6.4	44	23.4	132	70.2	0	0.0
42-53	159	4	2.5	44	27.7	111	69.8	0	0.0
54-59	66	1	1.5	22	33.3	43	65.2	0	0.0
Total	759	34	4.5	221	29.1	504	66.4	0	0.0

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

	All n = 738	**Boys** n = 378	**Girls** n = 360
Prevalence of stunting (<-2 z-score)	(69) 9.3 % (7.1 - 12.2 95% C.I.)	(38) 10.1 % (7.2 - 13.9 95% C.I.)	(31) 8.6 % (5.9 - 12.3 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(61) 8.3 % (6.2 - 10.9 95% C.I.)	(31) 8.2 % (5.7 - 11.7 95% C.I.)	(30) 8.3 % (5.7 - 12.0 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(8) 1.1 % (0.4 - 2.7 95% C.I.)	(7) 1.9 % (0.7 - 4.6 95% C.I.)	(1) 0.3 % (0.0 - 2.0 95% C.I.)

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 (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	144	0	0.0	13	9.0	131	91.0
18-29	191	4	2.1	22	11.5	165	86.4
30-41	184	2	1.1	12	6.5	170	92.4
42-53	155	2	1.3	11	7.1	142	91.6
54-59	64	0	0.0	3	4.7	61	95.3
Total	738	8	1.1	61	8.3	669	90.7

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	760	-1.49±0.84	1.64	1	2
Weight-for-Age	759	-1.46±1.00	1.88	0	4
Height-for-Age	738	-0.40±1.21	1.32	0	25

* contains for WHZ and WAZ the children with edema.

WAJIR SOUTH DISTRICT NUTRITION SURVEY QUESTIONNAIRE CHILDREN 6-59 MONTHS (TWO SHEETS 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**
				_____/_____/_____		

1.1 HH No.	1.2 Child ID	1.3 Age (M)	1.4 Sex 1=M 2=F	1.5 MUAC to the nearest 0.1 cm	1.6 Oedema in both feet? 1=Yes 2=No	1.7 Height to nearest 0.1 cm	1.8 Weight to nearest 0.1kg	1.9 Measles immunization? 1=Yes (by card) 2=Yes (by recall) 3=No 4=Don't know	1.10 pentavalent 1/OPV 1? 1=Yes (by card) 2=Yes (by recall) 3=No 4=Don't know	1.12 pentavalent 3/OPV 3? 1=Yes (by card) 2=Yes (by recall) 3=No 4=Don't know	1.13 Vitamin A in the last 6 months? (Show the capsule). 1=Yes (by card) 2=Yes (by recall) 3=No 4=Don't know	1.14 If Yes, how many times has the child received Vit. A? 1=one time 2=Two times	1.15 BCG scar present? 1=Yes 2=No	1.16 Dewormed since **Sanad ka Bilawgisa**? 1=Yes 2=No 3= Don't know	1.17 Has the child been sick in the last 2 weeks? 1=Yes 2=No	1.18 If YES, what was the child suffering from? (More than one response possible)	1.19 When the child was sick where did you seek assistance? (More than one response possible)

ILLNESS: 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)

Sought Assistance from: 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=Spiritual leader 9=No assistance sought

WAJIR SOUTH 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) **Present in HH since Sedax bilood aan sodhafney**	Age (Indicate in Months if <5 then circle)	Sex 1=Male 2=Female	Present now in HH (✓=YES X= NO)	In- migration Since **Sedax bilood aan sodhafney** to date (exclude births) (✓=YES X= NO)	Out- migration since **Sedax bilood aan sodhafney** to date (exclude deaths) (✓=YES X= NO)	Births since **Sedax bilood aan sodhafney** to date (✓=YES X= NO)	Died since **Sedax bilood aan sodhafney** to date (✓=YES X= NO)	Cause of death*
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									

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 (Specify);
9=Unknown

WAJIR SOUTH DISTRICT NUTRITION SURVEY 2011: WATER, SANITATION AND HYGIENE PRACTICES (TWO SHEETS 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.	2.1 What is your household main current water source? 1=River 2=Water tap/water kiosk 3=Borehole 4=Unprotected well 5=Protected well 6=Public pan-'**Drip**' 7=Tanker 8=Dam- '**Harr**' 9=Laga 10=Rain harvest (from the roof) 11=Other (specify)	2.2 What is the total time to and from the current main water source? 1= less than 30 min 2= 30 min- 1 hour 3= More than 1 hour	2.3 What do you do to water before drinking? 1= Nothing 2=Boiling 3=Use of traditional methods 4=Use chemicals 5=filter/sieve 6=decant **(Multiple responses**)	2.4 Does your household have access to a toilet facility? 1=Yes 2= No	2.5 If yes, what type of toilet facility? 1=Traditional pit latrines 2=Ventilated improved pit latrine 3=Flush toilet 4=Other Specify	2.6 If No, where do you go/use? (**probe further**) 1= Bush 2=Open field 3 =Near the river 4 =Behind the house 5 =Other (specify)	2.7 How do you dispose of children's faeces'? 1= Bush 2=Open field 3 =Near the river 4 =Behind the house 5=Latrine 6 =Other (specify	2.8 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 = When I think they are dirty 6 = When water is available 7=After cleaning children's bottoms 8= Other (specify)	2.9 What do you use to clean your hands? 1=Water only 2 = Water and soap 3=Water and ash 4=Other (specify)

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