NUTRITIONAL ANTHROPOMETRIC AND MORTALITY SURVEY

FINAL REPORT

WAJIR EAST DISTRICT

NORTH EASTERN PROVINCE, KENYA

11th - 20th April 2011

Acknowledgements

Special thanks are expressed to;
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List of Abbreviations and Acronyms

ALDEF		Arid Lands Development Focus
ALRMP II	-	Arid Lands Resource Management Project II
APHIA	-	Aids Population Health Integrated Assistance Project
ASAL	-	Arid and Semi-Arid Lands
CDR	-	Crude Death Rate
CI	-	Confidence Interval
CMR	-	Crude Mortality Rate
CSB	-	Corn Soya Blend
ENA	-	Emergency Nutrition Assessment
EPI	-	Extended Programme of Immunization
GAM	-	Global Acute Malnutrition
GFD	-	General Food Distribution
HAZ	-	Height-for-Age Z-score
HSNP	-	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
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
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 East district is one of the 8 districts within the larger Wajir County. The district currently comprises of 6 divisions namely Wajir Bor, Tarbaj, Kutulo, Central, Mansa and Khorofharar. The district lies around 3° north of the Equator and borders Somalia to the East, Wajir South to the South, Wajir West to the West, Wajir North to the North West and Mandera Central District to the North. The district, measuring approximately 14,471 km², is one of the districts gazetted as part of the Arid and Semi-Arid Lands of Kenya (ASAL). Wajir town is the district headquarters and is the largest urban town in Wajir County. The population is predominantly Muslim and of Somali ethnicity, and is divided into clans, with community elders being in charge of daily affairs. Fai is the predominant clan and other clans include Masare, Garre, Degodia, Murule, Ogaden and Ajuran.

The main livelihood activity in the district is pastoralism and being predominantly arid, the district experiences chronic food insecurity and high incidences of malnutrition. The population is currently estimated at 226,086 persons.

Save the Children has been present in Wajir east since 2009 with interventions in nutrition (OTP, SFP, SC), health and food security and livelihoods. Save the Children in collaboration with the ministry of health and on behalf of the district steering group undertakes annual nutrition surveys (before the long rains) to monitor the nutrition situation.

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 11th -20th April, 2011 and covered the 6 administrative divisions of Wajir East District namely: Central, Wajir Bor, Kotulo, Khorofharar, Mansa and Tarbaj.

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 35 clusters were selected and 555 households were visited.

Data was collected on anthropometry, morbidity, vaccination and de-worming status, Vitamin A supplementation, hygiene and sanitation practices. This data was triangulated with data from another assessment conducted at about the same time on food security and livelihoods.

Retrospective information on mortality was collected using the current household census method, with a recall period of 105 days, from all households visited including those without children under the age of five. A total of 555 households were visited and 647 children from 6 to 59 months were assessed for anthropometry and other indicators. The final analysis was on 626 children after exclusion of 21 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:
Acute Malnutrition and Mortality

INDEX	INDICATOR		RESULTS
WHO(2006) N=626	*Z- score*	*Global Acute Malnutrition* W/H< -2 z and/or oedema	(143) **22.8%** (19.0% -27.2% 95% C.I)
		Severe Acute Malnutrition W/H < -3 z and/or oedema	(27) **4.3%** (2.8% - 6.6% 95% C.I)
NCHS(1977) N=626	*Z-score*	*Global Acute Malnutrition* W/H< -2 z and/or oedema	(151) 24.1% (19.7% -29.2% 95% C.I)
		Severe Acute Malnutrition W/H < -3 z and/or oedema	(9) 1.4% (0.7%- 2.8% 95% C.I)
MUAC ANALYSIS [N=632]	Global Acute Malnutrition - MUAC (<125 mm)		(29) 4.6%
	Severe Acute Malnutrition - MUAC (<115 mm)		(1) 0.2%
	At risk of malnutrition - MUAC (≥125 and <135mm)		(138) 21.8%
	Oedema present		0 (0%)
Total Crude Retrospective Mortality (total deaths/10,000 people / day)			**0.18** (0.06 – 3.97 95% CI)
Under 5Mortality Rate (deaths in children under five/10,000 / day)			**0.17** (-0.06 – 0.97 95% CI)

Immunization, supplementation and De-worming status

BCG SCAR	Present	87.3% (565)
	Absent	10.7% (69)
Measles 9-59 months	By card	32.4 %(204)
	According to caretaker	53.9% (344)
	Not immunized	13.2%(84)
	Don't know	0.9%(6)
Penta valent 1/OPV 1	By card	35.7% (231)
	According to caretaker	54.9%(353)
	Not immunized	8.5%(55)
	Don't know	0.9%(6)
Penta valent 3 /OPV 3	By card	33.7%(218)
	According to caretaker	54.6%(353)
	Not immunized	10.8%(70)
	Don't know	0.9%(6)
Deworming (12-59 months)	Given	17.8%(115)
	Not given	78.7%(509)
Vitamin A supplementation	By card	8.0%(52)
	According to caretaker	11.4% (74)
	Not immunized	77.9% (504)
	Don't know	2.5% (17)

Conclusion
In light of the above findings, the prevalence of Global Acute Malnutrition (GAM) rates in this survey is considered "critical" with GAM of 22.8% (19.0% - 27.2% 95% C.I) and Severe Acute Malnutrition (SAM) of 4.3% (2.8% - 6.6% 95% C.I). These rates indicate an increase in malnutrition as compared with the 2010 nutrition survey conducted in the district with GAM of 17.2 % (14.7 - 20.1 95% C.I) and SAM of 3.4% (2.1- 5.1 95% C.I). Further analysis with the CDC

calculator indicates a 98.9% probability that the prevalence rates in the 2011 survey is higher than that in 2010 hence indicating a worsening situation.

The deteriorating malnutrition situation of Wajir East was further compounded by increased child morbidity as more than half of the respondents reported that children in the survey had one or more symptoms of illnesses in the two weeks prior to the survey of which fever and respiratory infections were found to be the leading causes with 34.5% followed by diarrhoea at 28.2 %. Low coverage of Vitamin A supplementation, de-worming and poor hygiene and sanitation contributed to the worsening situation. Though crude and under five mortality rates are below emergency levels, there was a slight increase in mortality compared to last year. The situation therefore requires a comprehensive multi-sectoral response in order to address the immediate and underlying causes of malnutrition. Save the Children in Kenya therefore proposes the following recommendations:

Recommendations

Immediate
- Scale up treatment of acute malnutrition and childhood illnesses among children in the district through health and nutrition outreach teams
- 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 Early Child hood development centers (ECDs)
- Scale up provision of water trucking to areas affected by water stress as well as fuel subsidies as an emergency mitigation measure
- Conduct mass chlorination or promote household water treatment methods for safer drinking water
- Implement préventive nutrition interventions (ex. blanket supplementary Feeding) targeting all under fives to cover the long dry spell
- Continued health outreach in locations inaccessible to health facilities to offer basic primary health care package
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Medium term

- Strengthen continuous nutrition surveillance through regular nutrition assessments and ongoing MUAC screening (early warning system)
- Strengthening of hygiene and sanitation practices to reduce the incidence of diarrhoeal diseases including health education to educate the community on domestic treatment of drinking water.
- Strengthening of MoH capacities to manage malnutrition and childhood illnesses. There is need for continued advocacy and support both at the national and district level to be able to achieve this.

Long term
- Provision of toilet facilities through community participatory approaches coupled with awareness campaigns on the importance of using such facilities.
- There is need for promoting rain water harvesting technologies to boost water storage and increase availability
- Disaster risk reduction strategy in programming. This includes but not limited to strategic destocking, educating the community on disaster risk management and encouraging the communities to establish pasture range reserve /reseeding to avoid mass losses of animals during drought.

2 Introduction

Wajir East district is one of the 8 districts within the larger Wajir County. The district currently comprises of 6 divisions namely Wajir Bor, Tarbaj, Kutulo, Central, Mansa and Khorofharar. The district lies around 3° north of the Equator and borders Somalia to the East, Wajir South to the South, Wajir West to the West, Wajir North to the North West and Mandera Central District to the North. The district, measuring approximately 14,471 km², is one of the districts gazetted as part of the Arid and Semi-Arid Lands of Kenya (ASAL). Wajir town is the district headquarters and is the largest urban town in Wajir County. The population is predominantly Muslim and of Somali ethnicity, and is divided into clans, with community elders being in charge of daily affairs. Fai is the predominant clan and other clans include Masare, Garre, Degodia, Murule, Ogaden and Ajuran.

The survey area covered all four divisions of the district (Fig 1). The current estimated population living in this area is 226,086[1].

Figure 1: Map of Wajir East district
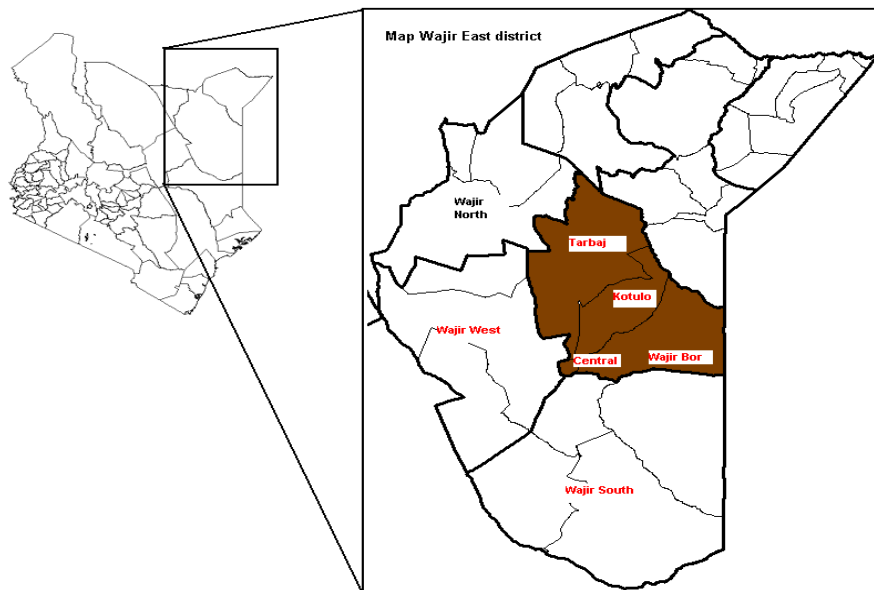
Geography

Wajir East District is a featureless plain, which is prone to flooding during the rainy season. The district has some seasonal swamps and perennial river beds/drainage lines ('laghas') that flow in the rainy season. These serve as dry season grazing zones and also allow some cultivation when it rains. The area receives bimodal rains with the onset of the long rains in April. 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 September/October to December. The average annual rainfall is 250-300mm and quantitatively, it rains more during the short rains than during the long rains[2]. However the rains have become increasingly unpredictable and erratic.

The topography of the district is a slightly elevated plateau, which lies between 150-200m above sea level. The mean annual temperature of the district is 29°C and ranges from 28°-39°C. The district lies within the sahelian climatic region, which is characterized by long dry spells and

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[1] Current Estimates from DDO's Office- Wajir Town based on 2009 census
[2] District Development Office- Summary document for Key Investment Opportunities in Wajir East District

short rainy seasons. In the classification of areas by aridity, the district is categorized as Zone VII (i.e. 100% Arid with cyclic droughts).

Livelihoods

In Wajir East District the population is mainly nomadic/semi nomadic pastoralists, herding camels, cattle, sheep and goats. There are three main livelihood activities in the district. As shown in the adjacent map, most of the area covers the Pastoral Camel Zone (Eastern Bush land) where predominantly camel herding occurs. The source of income from livestock is about 70% for this livelihood. This includes the sale of milk (camel and goat milk), sale of live animals, hides and skins which are sold to terminal markets. Small pockets of agro-pastoral activity are found in Tarbaj and Wajir Bor divisions. The crops cultivated include maize, sorghum, beans, cowpeas (kunde) [3], tomatoes, sweet pepper and pawpaw. In addition, small-scale irrigated horticulture is emerging in peri-urban areas (kitchen gardens) with crops such as watermelon, pawpaw, lemons and vegetables thriving[4].

Figure 2: Livelihood zones

There are peri-urban and urban settlements in the district's Central Division which has the highest population density of 27 persons per sq. km. This is due to the fact that Wajir town is the county headquarters with government offices, large businesses, markets, employment opportunities (formal/waged labour) and informal sector Income generating Activities (IGAs). Informal IGAs include sselling of Miraa (Qat), sale of quarry products, daily casual labour, fetching of firewood and sale of Gum Arabica/ resin. Other peri-urban/urban settlements can be found in and around the divisional headquarters which serve as market centres and watering points. These have grown steadily as a result of people who have 'dropped out' of the pastoralist lifestyle following recurrent shocks. Other pull factors that have also encouraged settlement include free primary education, school feeding programmes, better access to healthcare, increased water points and markets in urban/semi-urban settings.

Current Climatic Conditions and Food Security

Since the El Niño phenomenon of 1997 the rains have been more unpredictable in time and quantity. Except for the years 2002 and 2003, the rainfall has been below normal resulting in the need for emergency response combining food aid with other interventions in North Eastern Province. The greater Wajir district has been on food aid distribution since October 2004. This was as a result of 2004-05 drought and subsequent failure of rainfall over the years. It is estimated that during this period 2004-2006 up to 25% of camel and goats and 50% of cattle died from the consequences of the poor rains. There was also stress migration to Ethiopia, Somalia and other parts of Kenya in search of fodder. The combination of loss of livestock and migration lead to serious negative implications for milk production and availability. In 2009 again, the government declared a national emergency following poor rains in addition to high food prices. The current situation is dire following the la Niña phenomena that started in 2010. The inadequate amount of rainfall in consecutive seasons is worsening the situation leading to low livestock production and crop failure in the agro-pastoral zones.

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[3] District Steering Group Combined Report for Wajir North, East, West and South Districts-Rapid Assessment and Sectoral Report on the Impact of the Short Rains in the District- January 2009.
[4] Ministry of Agriculture- Wajir East Food and Crop Situation Report-April 2009

Figure 3: Seasonal timeline

Short Dry Spell (Jilaal)			Long Rainy Reason (Gu')			Long Dry Spell (Hagai)			Short Rainy Season (Deyr)		
January	February	March	April	May	June	July	August	September	October	November	December
Migration, Conflicts, Watering of Livestock, Pressure on boreholes			Pasture mating Planting	Surveys, season,		Livestock diseases, Labour Demand			Calving, Kidding Period	Migration, Conflict	

Humanitarian interventions in Wajir East district

Save the Children has been implementing programmes in Wajir East district since August 2009. Our current integrated approach; Nutrition, Health, Food security and Livelihoods Support programmes, aim to address the underlying causes of malnutrition through strengthening health systems, treatment for acute malnutrition and enhancement of house hold food security and livelihoods in the medium term while at the same time linking these to long term livelihood strategies.

The World Food Programme (WFP) through Arid lands Development Focus (ALDEF) has been carrying out general food distribution (GFD) in this area. The GFD food basket provides 75% ration scale of 2,100Kcal/person, the daily per capita energy requirement[5] and is as follows:

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

GFD distribution for the month of March 2011 was not available due to breakdown in pipeline but the distributions resumed in April 2011.The Ministry of special programmes through the District Commissioner's office occasionally supplies food to the region and this is usually divided equally among the divisions. School feeding programme is also available in all government schools which is run by WFP.

Other actors on the ground include:
- OXFAM GB supporting ALDEF administratively to implementing Hunger Safely Net Programme (HSNP) and water and sanitation programmes.
- Kenya Red Cross society undertaking emergency relief operations
- Aids Population Health Integrated Assistance project (APHIA II) has been supporting the MoH in combating HIV /AIDS and in matters related to reproductive health.

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 this survey were to estimate:
- The prevalence of acute and chronic malnutrition in children aged 6-59 months;
- The crude and under five mortality rate and causes of death;

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[5] Based on UNHCR/UNICEF/WFP/WHO Guidelines for Food and Nutrition Needs in Emergencies

- The proportion of households with access to improved water and sanitation;
- The coverage and content of the general food distribution;
- The food access and dietary diversity at household level;
- The Coverage of measles and BCG vaccination among target children;
- The Coverage rate of Vitamin A. supplementation and de worming;
- The Morbidity rates of children 6-59 months 2 weeks prior to the survey;
- To recommend appropriate interventions based on the survey findings;

3 Methodology

The **2-stage cluster** survey methodology was employed in accordance with the National Guidelines for Nutrition and Mortality Assessments in Kenya. The ENA for SMART software sample size calculation gave 540 children as the minimum number required for the cluster anthropometric survey. The target population for the anthropometric survey was children aged 6-59 months. The survey tool used was the recommended Nutrition, Food Security and Mortality Household Questionnaire modified to collect only the information required. Data was collected on anthropometry, morbidity, vaccination and de-worming status, Vitamin A supplementation, hygiene and sanitation practices. At the time of the survey, two other assessments i.e. a coverage survey using Semi Quantitative Evaluation of Access and Coverage (SQUEAC) and a food security assessment were in progress hence data for these were not collected during the survey. A Knowledge Practices and Coverage (KPC) survey was planned to be undertaken in June to assess Infant and Young Child Feeding practices and hence this was not covered in this survey.

A total population of 226,086 was estimated for the survey area covering the six divisions. Information on population figures was obtained from the District Development Officer in Wajir east based on projections from the 2009 National Census. The survey training took place from 11th to 14th April 2011 while data collection was conducted from 15th to 20th April 2011.

3.1 Sampling procedure and sample size for anthropometric data 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 (45,217 children). In addition to the under five population, the following basic assumptions were made:
- The estimated prevalence of malnutrition at 17.2 %[6]
- Design effect of 2.
- Level of precision at 4.5%
- The average number of persons per household of 6. .
- A 3 % non respondent rate was included.

The above data was entered into ENA/SMART software and generated 540 children as minimum sample size. The corresponding number of households to get 540 children was determined as 516 households.

3.1.2 Sample size calculation for mortality

The sample size for mortality was determined by using the following factors:
- Total population of 226, 086
- The estimated Crude Mortality Rate (CMR) was 0.11 deaths/10,000/day[7]

- Level of the desired precision was 0.2
- Design effect was 2
- Recall period of 105 days was used
- Average family size was 6

The ENA for SMART software automatically calculated the sample size for mortality as 2,348 persons based on the above-mentioned data. Considering average household size of 6 persons, and expected non response rate of 3%, the ENA for SMART software further generated 403 households as the minimum sample size.

As the sample size for mortality (403 HHs) was smaller than the sample size for anthropometry (516 HHs), it was decided to use the higher sample size for greater precision.

Based on an understanding of the terrain and distances, the team were comfortable to visit 15 households per cluster per day. Therefore, in order to determine the total number of clusters required for the survey the sample size 516 was divided by 15 to give 35 clusters. A total of 555 households for anthropometry and mortality were visited from the 35 clusters.

The clusters were randomly selected using ENA for SMART with 5 clusters allocated as reserve clusters. During data collection, 1 cluster Jowyare was replaced as all the residents had migrated towards the Somali border in search of water and pasture .The first sampling unit was the village. Some villages had more than one cluster assigned to them, making it necessary to further sub divide them into smaller units so as to minimize bias. This was done by subdividing the village into equal parts with the help of the village elders.

3.2 Sampling procedure: selecting households and children

The modified EPI method was used to select households and children in the cluster. The definition of a household was a shelter or more whose residents eat from the same "cooking pot". The principle of randomness was used in the selection of households. Each survey team with the help of a village guide, moved to the approximate centre of the selected cluster (village) from where a pen was spun to randomly determine the starting direction. The teams walked to the edge of the cluster along the direction the tip of the pen faced. At the edge the pen was spun again towards the inside of the village, the team then moved along the identified direction and carried out a census of all the households to the edge of the village. The first household to be visited was randomly selected from the list of households using the lottery system. Thereafter, the next household to be visited was to be on right. The team then carried out interviews in all eligible subsequent households until they reached the target households. In the event that the team reached the end of the cluster and had not attained the target households, a different direction was determined randomly by spinning a pen and the process repeated until the expected households per cluster was achieved.

All children between 6-59 months of age staying in the selected household were measured. The respondent was the primary care giver of the child/children. If a child and/or the caregiver were temporarily out of the house, then the survey team re-visited the house to collect the data at an appropriate time. This process was repeated until the required number of households per cluster was attained. In the last household, all the children within the defined parameter were included in the survey. Child age was determined using health cards and recorded in months. A local calendar of events was developed and used to assist mothers recall their children's age.

A retrospective mortality questionnaire using the current household census method was conducted for all the households sampled in each cluster, regardless of whether a child under five years was present

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[7] Estimated based on the CMR from the 2010 survey

3.3 Case definitions and inclusion criteria

Age: The exact age of the child was recorded in months, based on information gathered from the caregiver and confirmed with information from health or birth certificates. A local calendar of events was used for those children whose mothers could not remember the date of birth of their children and those who did not have any documentation of the date.

Weight: Children were measured using electronic scale (uniscale) to the nearest 100g. All children were weighed with minimal clothing and no shoes.

Height: 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. Height was recorded to the nearest 0.1cm.

MUAC: Mid Upper Arm Circumference (MUAC) was measured on the left arm, at the mid point between the elbow and the shoulder, while the arm was relaxed and hanging by the body's side. MUAC was measured to the nearest cm.

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.

Morbidity data: Information 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.

Vaccination status/vitamin supplementation/De-worming: During the survey the caretakers were asked to produce the child's vaccination card (normally distributed during the campaign) as evidence of vaccination. If no card was available the carer was asked if she could remember the vaccination being given.

- Measles vaccination: assessed by checking for measles vaccination on EPI cards and/or verbal confirmation from the caretakers.
- OPV 1 vaccination: assessed by checking for OPV 1 vaccination on EPI cards and/or verbal confirmation from the caretakers.
- OPV 3 vaccination: assessed by checking for OPV 3 vaccination on EPI cards and/or verbal confirmation from the caretakers.
- BCG vaccination: assessed by checking for the characteristic BCG scar on the child's left arm.
- Vitamin A supplementation: assessed by asking caretakers if the child had received a Vitamin A supplement in the last 6 months. A sample of Vitamin a capsule was shown to aid in recall.
- De-worming: assessed by asking caretakers if the child had been de-wormed in the last 3 months.

Mortality data: Retrospective mortality data was collected using the current household census method in all the visited households, including those with no children less than five years old.

The recall period was 105 days starting from 1st January 2011 which coincided with the New Year celebration **Sanadka Bilawgisa** for easy recall. 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, 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 survey team was competitively selected through an interview process undertaken by Save the Children. Team selection was based on academic qualifications (minimum Kenya School Certificate Level of Education), good interviewing skills, experience in undertaking previous surveys as well as an understanding of the Somali language. A total of 11 enumerators were recruited and 1 seconded from arid lands, 4 from MoH, 1 from Ministry of Agriculture and 1 representative from the District Development Office. This translated to 6 teams composed of 1 team leader (interviewer) and 2 anthropometric measurers. 4 data entry clerks were also recruited and trained.

Overall, the survey was coordinated and supervised by Save the Children Nutrition coordinator and assisted by the District Nutrition officer and 1 monitoring and evaluation officer from Save the children who had received prior training on conducting the survey.

The survey enumerators were trained for 4 days by the supervisors. Group work, practical sessions, role plays, discussions and various interactive processes were used during the training to ensure that learning had taken place.

The training covered:
- 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 District Nutrition Officer (DNO) 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 entry and analysis

Anthropometric, mortality and quantitative data entry and analysis was conducted using EPIInfo/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. Data was entered on a daily basis and the plausibility check done. Any irregularity in the data was discussed with the team the following day

in the morning before they set off to the field.

3.6 Nutritional indices

Acute malnutrition indices:

Weight-for-Height (WFH) index
Acute malnutrition rates were estimated from the weight for height (WFH) index values and referenced to the WHO and NCHS references and are reflective of current nutritional conditions. WFH indices were expressed both in Z-scores and percentage of the median, producing slightly different estimates in the prevalence of wasting.

Guidelines for the results expressed in Z-scores:
- 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

MUAC
Like weight for height, MUAC is used to quantify wasting in a population.
The guidelines used are as follows:
MUAC <11.5 cm severe acute malnutrition and high risk of mortality
MUAC ≥11.5 cm and <12.5ccm moderate acute malnutrition and moderate risk of mortality
MUAC≥12.5 cm and <13.5 cm high risk of malnutrition
MUAC≥13.5 cm adequate nutritional status

Chronic Malnutrition Index:
Height-for-age (HFA) – Stunting
Height-for-age is a measure of linear growth and therefore an unequivocal reflection of cumulative past nutritional inadequacy.
- Children whose HFA Z scores fell below -2 standard deviations from the median of the NCHS and WHO reference populations were classified as stunted (to reflect Global Stunting).
- Children whose HFA Z scores fell below -3 standard deviations from the median of the NCHS and WHO reference populations were classified as severely stunted.

Weight-for-age (WFA) – Underweight
The measure of underweight gives a mixed reflection of both the current and past nutritional experience by a population and is very useful in growth monitoring.
- Children whose WFA Z scores fell below -2 standard deviations from the median of the NCHS and WHO reference populations or had bilateral oedema were classified as underweight.
- Children whose WFA Z scores fell below -3 standard deviations from the median of the NCHS and WHO reference populations or had bilateral oedema were classified as severely underweight.

Mortality Indices
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 was 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

Table 1: 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

3.7 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 2: Description of the survey sample

Number of children 6-59 months surveyed	**647**
Number of children 6-59 months analyzed by WHO	**626**
Number of children 6-59 months analyzed by NCHS	**626**
Number of total population surveyed for mortality	**3,455**
Number of children under five surveyed for mortality	**841**
Number of HH covered in the mortality survey	**555**
Number of persons who joined the household during the recall period	**84**
Number of persons who left the household during the recall period	**45**
Number of under five children who joined the household during the recall period	**6**
Number of under five children who left the household during the recall period	**2**
Number of births during the recall	**41**
Average Number of persons per HH	**6**
Average Number of children per HH	**2**
% of children under five in the population	**24**

4.2 Anthropometric results (based on WHO standards 2006):

Table 3: Acute malnutrition definitions

	WFH z-score	WFH% of the median	MUAC
Global Acute Malnutrition	< -2 SD and/or oedema	< 80% and/ or oedema	<12.5 CM and/or Oedema
Moderate Acute Malnutrition	< -2 SD and -3≥ SD	< 80% and ≥ 70%	≥11.5cm and <12.5cm
Severe Acute Malnutrition	< -3 SD and/or oedema	< 70% and/or oedema	<11.5cm and /or oedema

Table 4: Distribution of age and sex of sample

	Boys		Girls		Total		Ratio
AGE (mo)	no.	%	no.	%	no.	%	Boy: girl
6-17	67	48.9	70	51.1	137	21.7	1.0
18-29	76	45.5	91	54.5	167	26.4	0.8
30-41	83	50.9	80	49.1	163	25.8	1.0
42-53	61	51.3	58	48.7	119	18.8	1.1
54-59	27	58.7	19	41.3	46	7.3	1.4
Total	314	49.7	318	50.3	632	100.0	1.0

Figure 4: Population age and sex pyramid
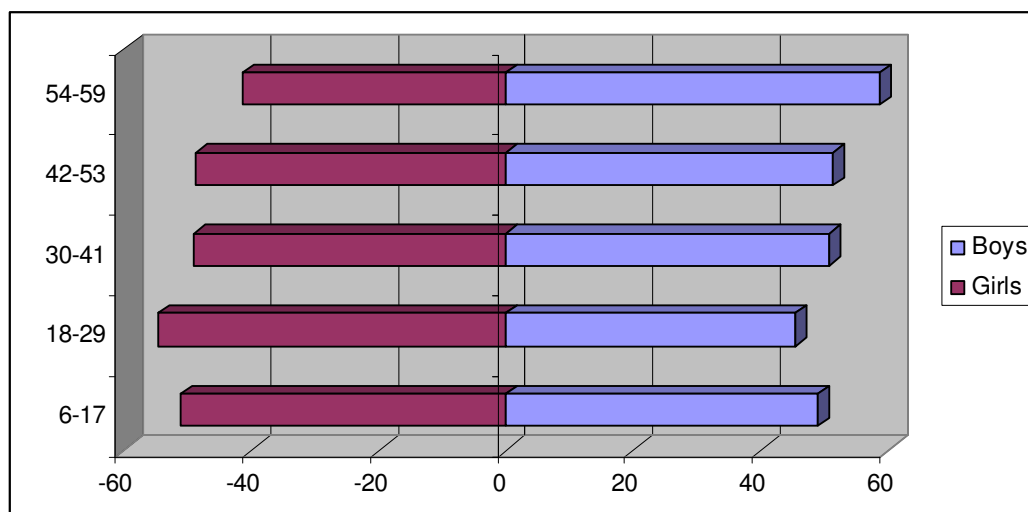
Table 5: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All n = 626	Boys n = 313	Girls n = 313
Prevalence of global malnutrition **(<-2 z-score and/or oedema)**	(143) 22.8 % (19.0 - 27.2 95% C.I.)	(81) 25.9 % (20.9 - 31.5 95% C.I.)	(62) 19.8 % (15.3 - 25.2 95% C.I.)
Prevalence of moderate malnutrition **(<-2 z-score and >=-3 z-score, no** **oedema)**	(116) 18.5 % (15.3 - 22.3 95% C.I.)	(72) 23.0 % (18.6 - 28.0 95% C.I.)	(44) 14.1 % (10.6 - 18.5 95% C.I.)
Prevalence of severe malnutrition **(<-3 z-score and/or oedema)**	(27) 4.3 % (2.8 - 6.6 95% C.I.)	(9) 2.9 % (1.4 - 5.7 95% C.I.)	(18) 5.8 % (3.5 - 9.3 95% C.I.)

The prevalence of oedema is 0.0 %. No oedema cases were reported during the survey.

Table 6: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

Age (mo)	Total no.	Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	133	6	4.5	18	13.5	109	82.0	0	0.0
18-29	167	6	3.6	24	14.4	137	82.0	0	0.0
30-41	163	4	2.5	35	21.5	124	76.1	0	0.0
42-53	117	6	5.1	30	25.6	81	69.2	0	0.0
54-59	46	5	10.9	9	19.6	32	69.6	0	0.0
Total	626	27	4.3	116	18.5	483	77.2	0	0.0

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

	<-3 z-score	**>=-3 z-score**
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 27 (4.3 %)	Not severely malnourished No. 605 (95.7 %)

Table 8: Prevalence of acute malnutrition based on the percentage of the median and/or oedema

	n = 632
Prevalence of global acute malnutrition (<80% and/or oedema)	(41) 6.5 % (4.6 - 9.2 95% C.I.)
Prevalence of moderate acute malnutrition (<80% and >= 70%, no oedema)	(41) 6.5 % (4.6 - 9.2 95% C.I.)
Prevalence of severe acute malnutrition (<70% and/or oedema)	(0) 0.0 % (0.0 - 0.0 95% C.I.)

Figure 5: Weight for Height in Z-score compared to WHO standard 2006
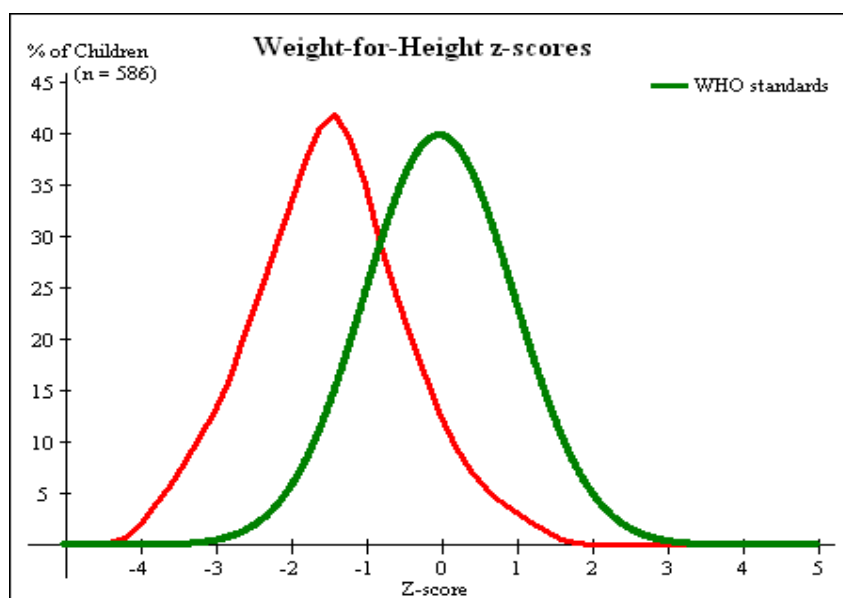
Table 9: Prevalence of malnutrition by age, based on weight-for-height percentage of the median and oedema

Age (mo)	Total no.	Severe wasting (<70% median)		Moderate wasting (>=70% and <80% median)		Normal (> =80% median)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	133	0	0.0	10	7.5	127	95.5	0	0.0
18-29	167	0	0.0	7	4.2	160	95.8	0	0.0
30-41	163	0	0.0	8	4.9	155	95.1	0	0.0
42-53	117	0	0.0	10	8.5	109	93.2	0	0.0
54-59	46	0	0.0	6	13.0	40	87.0	0	0.0
Total	626	0	0.0	41	6.5	591	94.4	0	0.0

Table 10: Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 630	Boys n = 312	Girls n = 318
Prevalence of underweight (<-2 z-score)	(144) 22.9 % (19.3 - 26.8 95% C.I.)	(84) 26.9 % (22.3 - 32.1 95% C.I.)	(60) 18.9 % (14.7 - 23.9 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(113) 17.9 % (15.1 - 21.2 95% C.I.)	(64) 20.5 % (16.1 - 25.8 95% C.I.)	(49) 15.4 % (12.0 - 19.6 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(31) 4.9 % (3.1 - 7.7 95% C.I.)	(20) 6.4 % (4.0 - 10.1 95% C.I.)	(11) 3.5 % (1.7 - 6.8 95% C.I.)

Table 11: Prevalence of underweight by age, based on weight-for-age z-scores and oedema

Age (mo)	Total no.	Severe underweight (<-3 z-score) No.	%	Moderate underweight (>= -3 and <-2 z-score) No.	%	Normal (> = -2 z score) No.	%	Oedema No.	%
6-17	136	5	3.7	20	14.7	111	81.6	0	0.0
18-29	166	9	5.4	29	17.5	128	77.1	0	0.0
30-41	163	7	4.3	39	23.9	117	71.8	0	0.0
42-53	119	9	7.6	20	16.8	90	75.6	0	0.0
54-59	46	1	2.2	5	10.9	40	87.0	0	0.0
Total	630	31	4.9	113	17.9	486	77.1	0	0.0

Table 12: Prevalence of stunting based on height-for-age z-scores and by sex

	All N = 615	Boys n = 305	Girls n = 310
Prevalence of stunting (<-2 z-score)	(106) 17.2 % (14.0 - 21.1 95% C.I.)	(64) 21.0 % (16.5 - 26.4 95% C.I.)	(42) 13.5 % (9.6 - 18.7 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(80) 13.0 % (10.3 - 16.3 95% C.I.)	(50) 16.4 % (12.2 - 21.7 95% C.I.)	(30) 9.7 % (6.8 - 13.7 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(26) 4.2 % (2.7 – 6.5 95% C.I.)	(14) 4.6 % (2.4 - 8.5 95% C.I.)	(12) 3.9 % (2.2 - 6.7 95% C.I.)

Table 13: Prevalence of stunting by age based on height-for-age z-scores

Age (mo)	Total no.	Severe stunting (<-3 z-score) No.	%	Moderate stunting (>= -3 and <-2 z-score) No.	%	Normal (> = -2 z score) No.	%
6-17	127	3	2.4	10	7.9	114	89.8
18-29	161	9	5.6	27	16.8	125	77.6
30-41	162	10	6.2	23	14.2	129	79.6
42-53	119	4	3.4	18	15.1	97	81.5
54-59	46	0	0.0	2	4.3	44	95.7
Total	615	26	4.2	80	13.0	509	82.8

Table 14: 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	626	-1.26±1.00	1.44	0	6
Weight-for-Age	630	-1.32±1.00	1.20	0	2
Height-for-Age	615	-0.88±1.21	1.33	0	17

* contains for WHZ and WAZ the children with oedema.

4.3 Plausibility Checks

The plausibility checks for the anthropometric data are presented in Table 15.

Table 15: Plausibility Checks for Anthropometric Data

Indicator	Survey
Digit preference weight	0 (4)
Digit preference height	4 (13)
WHZ (Standard deviation)	0 (1.00)
WHZ (Skewness)	0 (0.19)
WHZ (Kurtosis)	0 (-0.15)
Percentage of flags	0.9%
Age ration: ages 6-29: 30-59	0.93

Overall sex ratio: p = 0.874 (boys and girls equally represented)
Overall age distribution: p = 0.001 (Significant difference)
Overall age distribution for boys: p = 0.226 (as expected)
Overall age distribution for girls: p = 0.005 (Significant difference)
Overall sex/age distribution: p = 0.000 (significant difference
Overall data quality of survey is 8% this is acceptable.

4.4 Mortality results (retrospective over 105 days prior to interview)

Table 16: Mortality rates

CMR (total deaths/10,000 people / day): **0.18** (0.06-0.61) (95% CI)
U5MR (deaths in children under five/10,000 children under five / day): **0.17** (0.06-0.97) (95% CI)

A total of 3,451 people were included in the mortality survey out of this, 841 were children under the age of 5 years. Through verbal autopsy, 3 children under five were reported to have died due to watery diarrhoea and 1 adult due to unknown causes.

4.5 Children's morbidity

Of the children surveyed, 57.3 % (371) were reported to have been ill 2 weeks prior to the survey. The prevalent disease was fever, cough and difficulty in breathing at 34.8 % (n=195) and watery diarrhoea at 23.8% (n=133)

Figure 6: Symptom breakdown in the children in the two weeks prior to interview (n=371)

Morbidity

A bar chart titled "Morbidity" showing Diseases on the vertical axis and Percent on the horizontal axis (0.0% to 40.0%):

- Toothache
- Stomachache
- Malnutrition
- Accident
- SkinInfections
- EyeInfections
- Measles
- IntestinalParasite
- FeverCoughDifficultBreathi
- FeverWithChillsLikeMalaria
- Vommiting
- Diarrhea
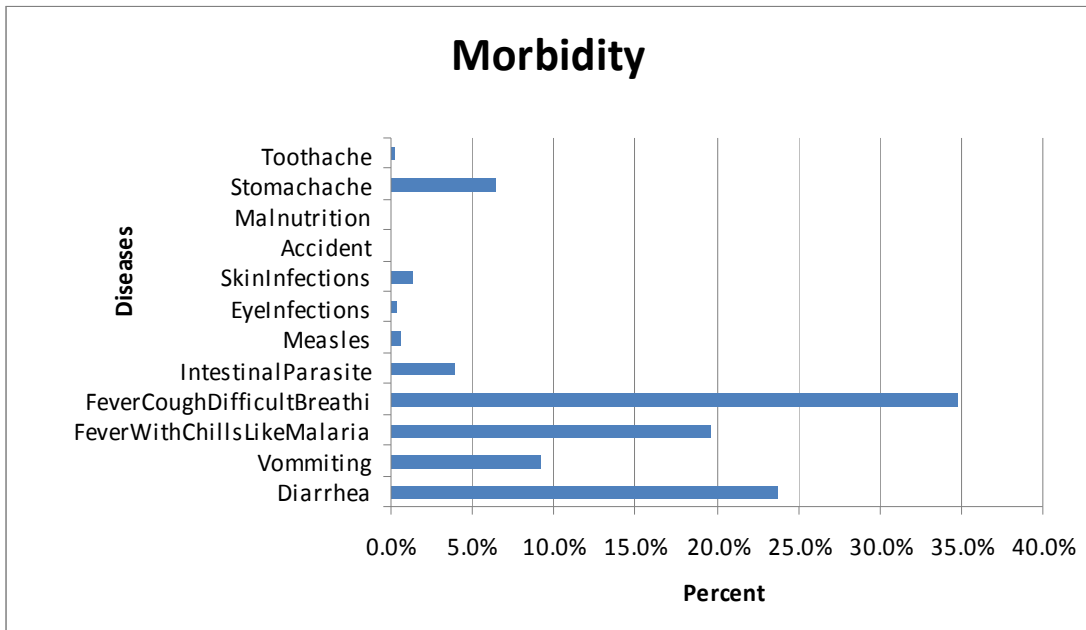
4.5.1 Health seeking behaviour

A majority of the respondents (55.6 %) reported that they took their sick child to a public clinic /government hospital, whilst 9.8% took to a private clinic, 3.9% to a mobile clinic, 4.9% to the spiritual leader, 0.5% sought help from relatives and friends and 1.2 % from Community Health Workers (CHWs).

Figure 7: Health care sought (n=371)

Health Care Sought

A bar chart titled "Health Care Sought" showing Services on the vertical axis and Percent on the horizontal axis (0.0% to 60.0%):

- NoAssisstanceSought
- SpiritualLeader
- RelativeorFriend
- MobileClinic
- PublicClinic
- ShopKiosk
- PrivateClinic
- CommunityHealthWo
- TraditionalHealer
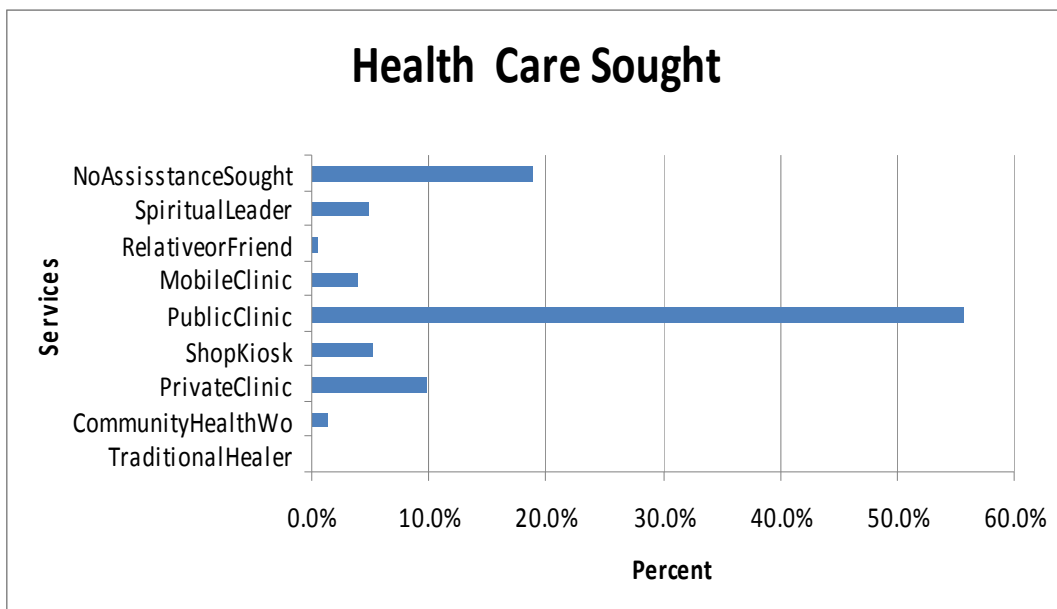
4.6 Vaccination Results

Figure 8: vaccination and Deworming coverage: BCG for 6-59 months and measles for 9-59 months

BCG SCAR	Present	87.3% (565)
	Absent	10.7% (69)
MEASLES 9-59 MONTHS	By card	32.4 %(204)
	According to caretaker	53.9% (344)
	Not immunized	13.2%(84)
	Don't know	0.9%(6)
Pentavalent 1 /OPV 1	By card	35.7% (231)
	According to caretaker	54.9%(353)
	Not immunized	8.5%(55)
	Don't know	0.9%(6)
Pentavalent 2 /OPV 3	By card	33.7%(218)
	According to caretaker	54.6%(353)
	Not immunized	10.8%(70)
	Don't know	0.9%(6)
De-worming	Given	17.8%(115)
	Not given	78.7%(509)

The BCG scar was present in 87.3% of the children surveyed. Measles immunisation was reported at 86.3%, Pentavalent 1 /OPV 1 at 90.6%, Pentavalent 3/ OPV 3 at 88.3%. Only about a third of the surveyed children who were reported as having received measles, OPV and pentavalent vaccines had immunisation cards. Only 17.8% of the surveyed children had been de-wormed in the last 3 months.

4.6.1 Vitamin A Supplementation coverage

11.4 %(74) of the surveyed children had received vitamin A supplementation by recall and 8.0% (52) by card. Of the children who reported as having received vitamin A supplementation 85.4% had received once in the last six months while 16.7% had received twice in the last six months.

Figure 9: Vitamin A supplementation for children between 6 and 59 months (n= (646)

VITA

- yes by card
- yes by recall
- NO
- dont know

2.5% 8.0% 11.4% 77.9%
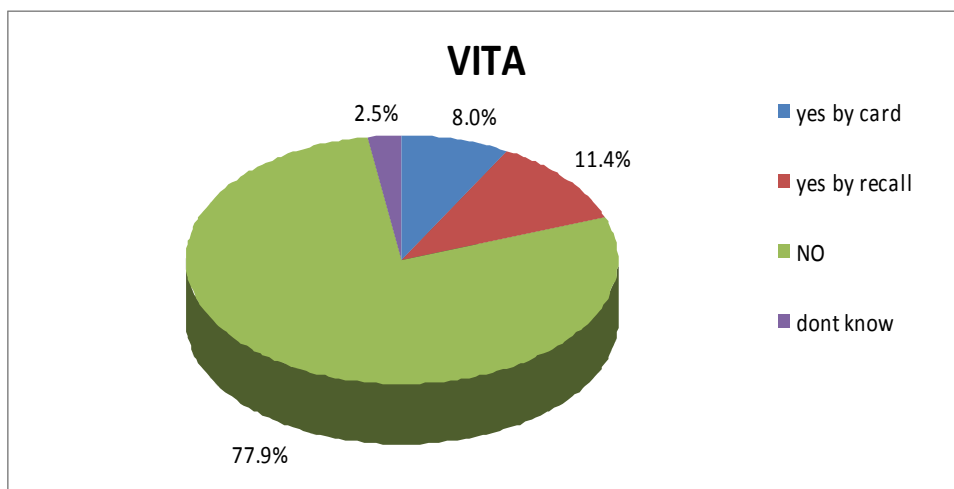
4.7 Water and sanitation

The main water source was unprotected wells as reported by 46.8 % (223) of the surveyed households followed by boreholes 20.6% (98) and 10.9% from water trucking.

Figure 10: Source of water (n=476)
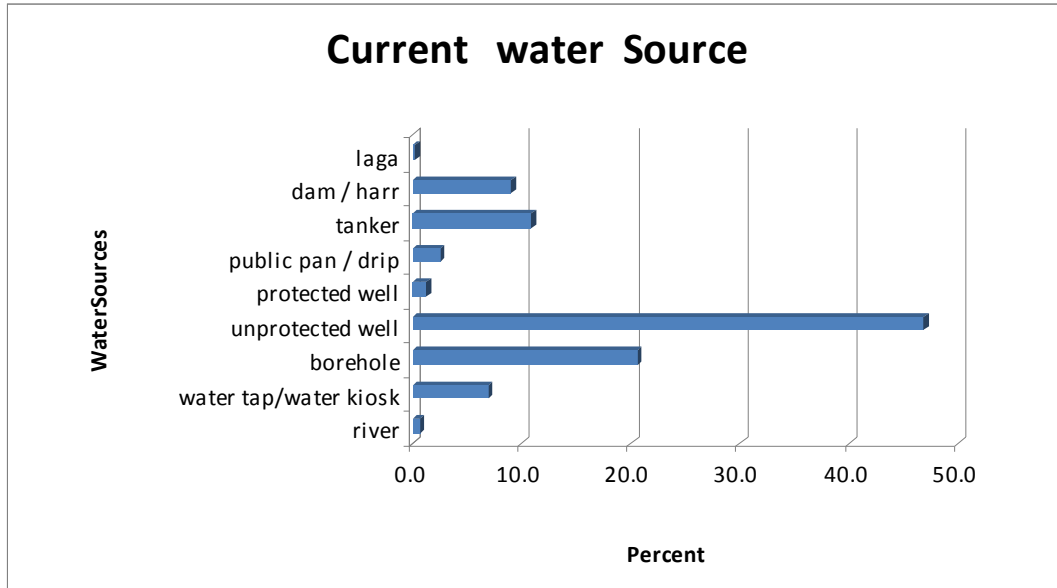
52.3% of the respondents said they spent less than 30 minutes to fetch water with 29.0% spending between 30 minutes to 1 hour while slightly over a quarter of respondents spent more than 1 hour.

Figure 11 indicates that 92.4% (438) of the respondents did nothing to the water before drinking. Only 4.6% of the respondents boiled their water before drinking.

Figure 11: methods used for water treatment before drinking
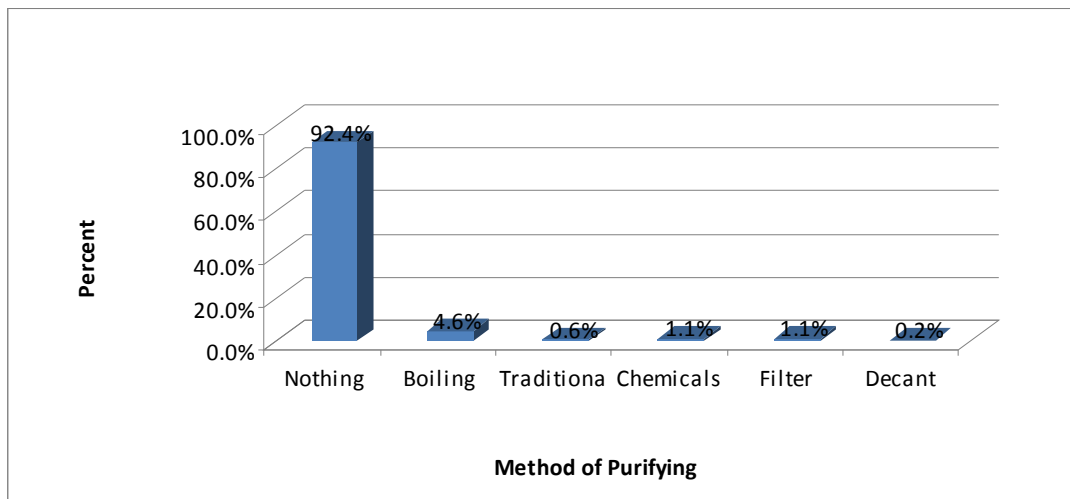
4.7.1 .Access to toilet facility

As shown on figure x nearly half of the surveyed population do not have access to appropriate toilet facilities as they use other methods such as buckets. On the other hand, slightly over 50% of the households reported having access to a toilet facility. Of these, 18.8% and 1.2 % used ventilated improved latrines (VIP) and flush toilet respectively, while 34.1% of respondents reported to have used traditional pit latrines.

Of those who did not have access to a toilet facility, 84.2% of the respondents indicated that they defecate in the bush, 10.9% in the open field, 1.6% near the laga/river, 2.2% behind the house and 1.2% reported using buckets.

Figure 12: Type of toilet facilities used by surveyed population
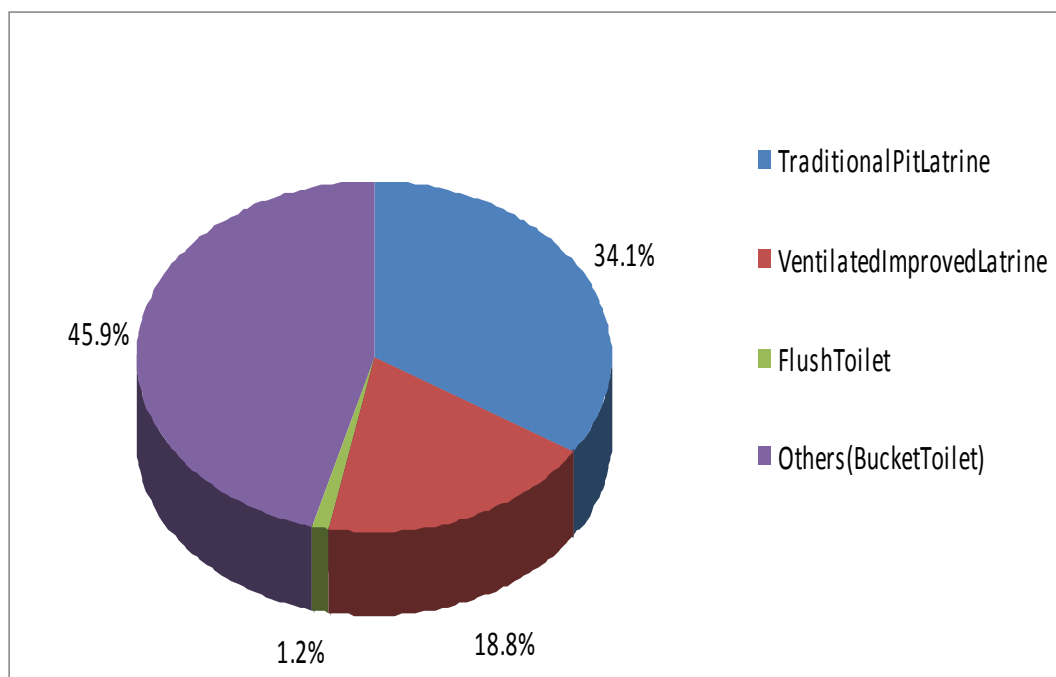
Nearly three quarters of respondents reported disposing faeces of their children in the bush. The use of open bush/field for fecal disposal coupled with consumption of water from open sources, poses a risk of contamination of drinking water, a pre-disposing factor to diarrheal diseases and acute malnutrition.

Table 17: Disposal of child faeces n=441

Bush	68.7% (n=303)
Field	12.5% (n=55)
Near the River	0.7% (n=3)
Behind the House	6.3% (n=28)
In the Latrine	11.8% (n=52)

3.11 Hand washing practices

The practice of hand washing was as shown in table 18 below with 82.8% (394) of the respondents reporting washing hands with water only.

Table 18: Hand washing practices

	Frequency	Percent
After Defecation	235	22.40%
Before Feeding	45	4.30%
Before Eating	345	32.90%
Before Prep Food	48	4.60%
When Think they are Dirty	158	15.10%
When Water Is Available	61	5.80%
After Clean Child Bottoms	54	5.20%
Others (Before Prayers)	102	9.70%
Total	1,048	100.00%

5 Discussion

5.1 Nutritional status

According to April 2011 nutrition survey results, the GAM rates stand at 22.8 %(19.0- 27.2 95% CI) and SAM at 4.3% (2.8- 6.6 95% CI). Both GAM and SAM are above the WHO emergency threshold of 15% and 4% respectively. In April 2010, Save the children conducted a similar survey in the district which indicated the GAM levels were at 17.2 % (14.7-20.1 95%) and SAM at 3.4% (2.1- 5.1 95%). Further analysis with the CDC calculator indicates a 98.9% probability that the prevalence rates in the 2011 survey is higher than that in 2010 hence indicating a worsening situation.

The Age sex ratio for 6-29months to 30-59 months was 0.93 (the value should be around 1.0). This may have been due to the use of the calendar of events which I based on recall and may have biased the results.

A decrease in GAM and SAM levels was noted in 2010 compared to the 2009 survey but the rates increased in 2011. This could partly be attributed to the fact that the 2010 nutrition survey was carried out in the middle of a scaled up emergency response (Including a blanket supplementary feeding programme) in response to the government's declaration of an emergency situation.

Figure 13**: Trends of acute malnutrition 2009 to 2011**
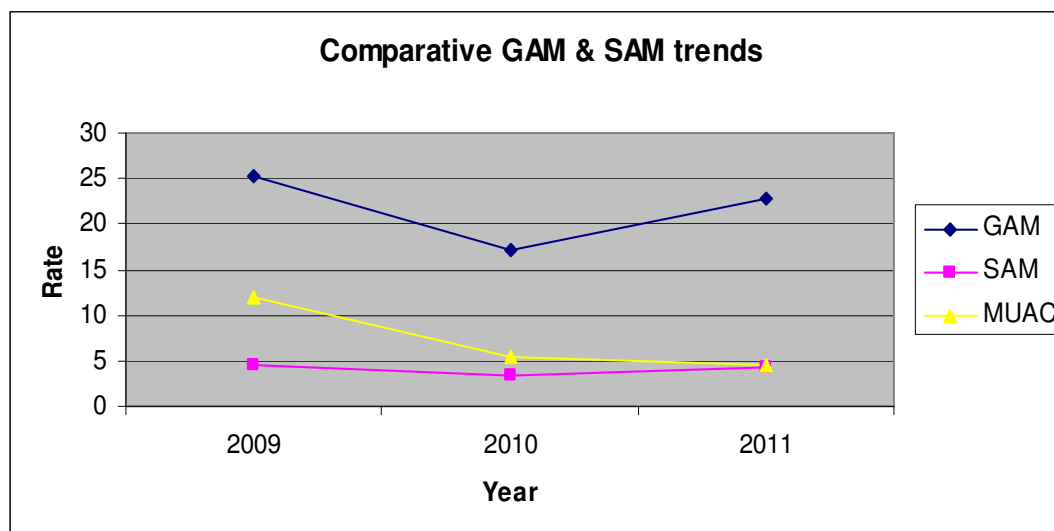
5.2 Mortality

Mortality rates remained way below WHO emergency thresholds with the survey recording CMR of 0.18(0.06-0.61 95% CI) and U5MR of 0.17(0.06-0.97 95 % CI). There was however a slight increase in both the under-five crude mortality rates compared to results of the 2010 survey at 0.09/10,000/day and 1.11/10,000/day respectively although not significant.

Figure 14: Mortality trends 2009-2011
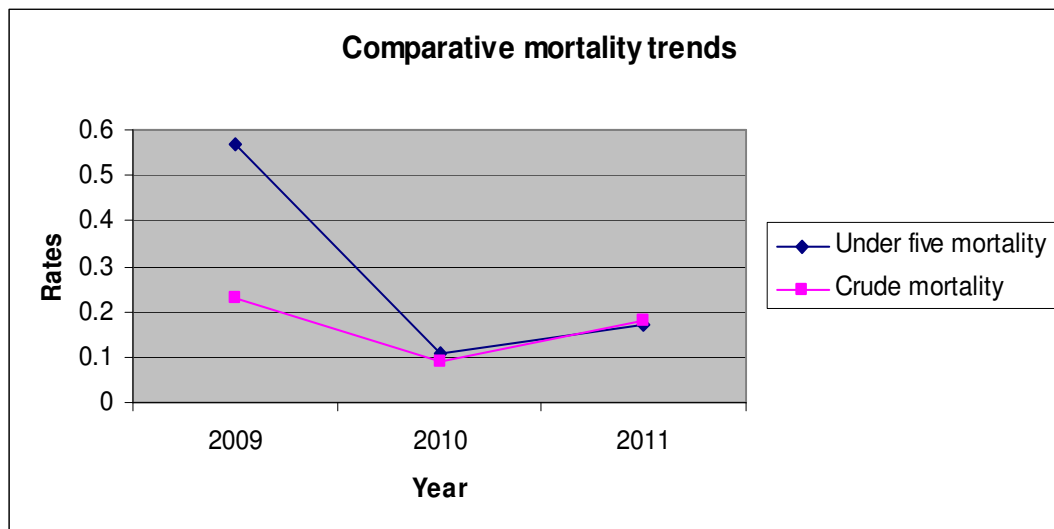
5.3 Causes of malnutrition

According to the 2010 long rains assessment report, the larger Wajir District was classified as borderline food insecure with high risk of falling into acute food and livelihood crisis in the agro pastoral livelihood zone and at risk in pastoral cattle, camel and all species livelihood zone. The 2010 short rains (October- December) performed poorly and did not support adequate pasture and browse regeneration, recharge of water and crop production.

This survey was conducted during an extended dry spell and at the time of the survey, only Dunto, Sarman and Gunana villages had received any rains.

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

Table 19: Commodity 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 as 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). With poor animal conditions, low production of milk due to migration and weakened animal body conditions because of lack of adequate pasture and water, food intake and the nutrition status of the vulnerable population become compromised

Adequate food alone does not result to improved nutritional status if care practices and other underlying factors are not addressed.

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The Deworming rate within 3 months of the survey was extremely low at 17.8%. 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.

Measles immunization rate was at 86.3%, Pentavalent 1/OPV 1 at 90.6% and Pentavalent 3/ OPV 3 at 88.3% and Vitamin A at 19.4% both by recall and immunisation card. The immunization coverage is a commendable effort by the MOH considering the constraints to the provision of health services such as poor road network in the region and the staff shortages experienced in MOH health facilities. A measles outbreak was reported in some parts of district in March 2011 calling for an upscale in immunisation followed by a measles campaign planned in May 2011. However, Vitamin A supplementation is low and adequate micronutrient supplementation is crucial in the reduction of chronic malnutrition.

Poor sanitation and hygiene practises has resulted to high prevalence of diarrhoea cases whereby the main cause of death among children under five was reported as watery diarrhoea .Households reported having taken water from un protected sources. Vulnerability to illness increases because of unhygienic practices like open field defecation which can also cause diarrhoea and can lead to malnutrition

5.4 Feeding Programme coverage

A coverage survey conducted in March 2011 using SQUEAC Methodology indicated that outpatient therapeutic program coverage is above the recommended SPHERE standards as shown in the table below:

Table 20: OTP coverage

	2011		2010	
Coverage	**Point**	**Period**	**Point**	**Period**
OTP	62.7% CI: (49.0% – 75.5%)	82.3% CI: (74.1% -88.8%)	63.7% CI: (46.6% - 78.5%)	80.6% CI: (70.0% - 88.9%)

Potential barriers to program coverage were identified to be distance from the sites, waiting time at program sites, stigma, challenges associated with transition of MoH managing malnutrition within health facilities and current drought situation which has seen communities prioritize on looking for water and pasture for the animals

6   Conclusion

In light of the above findings, the prevalence of Global Acute Malnutrition (GAM) rates in this survey is considered "critical" with GAM of 22.8% (19.0% - 27.2% 95% C.I) and Severe Acute Malnutrition (SAM) of 4.3% (2.8% - 6.6% 95% C.I). These rates indicate an increase in malnutrition as compared with the 2010 nutrition survey conducted in the district with GAM of 17.2 % (14.7 - 20.1 95% C.I) and SAM of 3.4% (2.1- 5.1 95% C.I). Further analysis with the CDC calculator indicates a 98.9% probability that the prevalence rates in the 2011 survey is higher than that in 2010 hence indicating a worsening situation.

The deteriorating malnutrition situation of Wajir East was further compounded by increased child morbidity as more than half of the respondents reported that children in the survey had one or more symptoms of illnesses in the two weeks prior to the survey of which fever and respiratory infections were found to be the leading causes with 34.5% followed by diarrhoea at 28.2 %. Low coverage of Vitamin A supplementation, de-worming and poor hygiene and sanitation contributed to the worsening situation. Though crude and under five mortality rates are below emergency

levels, there was a slight increase in mortality compared to last year. The situation therefore requires a comprehensive multi-sectoral response in order to address the immediate and underlying causes of malnutrition. Save the Children in Kenya therefore proposes the following recommendations:

7   Recommendations

Immediate
- Scale up treatment of acute malnutrition and childhood illnesses among children in the district through health and nutrition outreach teams
- 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 Early Child hood development centers (ECDs)
- Scale up provision of water trucking to areas affected by water stress as well as fuel subsidies as an emergency mitigation measure
- Conduct mass chlorination or promote household water treatment methods for safer drinking water
- Implement préventive nutrition interventions (e.g. blanket supplementary Feeding) targeting all under fives to cover the long dry spell
- Continued health outreach in locations inaccessible to health facilities to offer basic primary health care package
-

Medium term

- Strengthen continuous nutrition surveillance through regular nutrition assessments and ongoing MUAC screening (early warning system)
- Strengthening of hygiene and sanitation practices to reduce the incidence of diarrhoeal diseases including health education to educate the community on domestic treatment of drinking water.
- Strengthening of MoH capacities to manage malnutrition and childhood illnesses. There is need for continued advocacy and support both at the national and district level to be able to achieve this.

Long term
- Provision of toilet facilities through community participatory approaches coupled with awareness campaigns on the importance of using such facilities.
- There is need for promoting rain water harvesting technologies to boost water storage and increase availability
- Disaster risk reduction strategy in programming. This includes but not limited to strategic destocking, educating the community on disaster risk management and encouraging the communities to establish pasture range reserve /reseeding to avoid mass losses of animals during drought.

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

9 Appendices

Plausibility check for: Preliminary anthropometry .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 (0.9 %)
Overall Sex ratio     Incl   p     >0.1   >0.05   >0.001   <0.000
(Significant chi square)              0       2        4       10       0 (p=0.874)
Overall Age distrib   Incl   p     >0.1   >0.05   >0.001   <0.000
(Significant chi square)              0       2        4       10       4 (p=0.001)
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       4 (13)
Standard Dev WHZ      Excl   SD    <1.1   <1.15   <1.20    >1.20
                                      0       2        6       20       0 (1.00)
Skewness  WHZ         Excl   #     <±1.0  <±2.0   <±3.0    >±3.0
                                      0       1        3        5       0 (0.19)
Kurtosis  WHZ         Excl   #     <±1.0  <±2.0   <±3.0    >±3.0
                                      0       1        3        5       0 (-0.15)
Poisson dist WHZ-2    Excl   p     >0.05  >0.01   >0.001   <0.000
                                      0       1        3        5       0 (p=0.110)
Timing                Excl   Not determined yet
                                      0       1        3        5
OVERALL SCORE WHZ =                 0-5    5-10    10-15     >15       8 %
```

At the moment the overall score of this survey is 8 %, this is acceptable.

Assignment of Clusters

Geographical unit	Population size	Cluster
Barwaqo	3270	
Kalkacha	2453	1
Bagdad	818	
Bangal	818	
Bulla Hewa	818	
Wagberi1	2020	
Wagberi2	2020	2
Bulla Kom	1515	
Maalim Salad	1515	3
Lanbib	1010	
Abdiaziz	1010	
Meigag	1010	
Hodhan	2759	
Shalete	2759	RC
Godrahma	1839	
Bulla Majina	1839	

Jogoo	6833	4, RC
Bulla Isiolo	2000	5
Makoror	8221	6, 7, 8
God- Ade	6706	9, RC, 10
Bulla power	5364	
Halane	1341	
Township	7382	11, 12, 13
Alimao	4282	
Bulla Gadud	1071	
Tarbaj	11339	14, 15, 16, 17
Haragal	1620	
Katote	3240	
Dambas	9037	18
JaiJai	1004	
Elben	12197	19
Dunto	8913	20, 21, 22, 23
Mansa	10201	24
Ogoralle	2292	
Burmayo	2344	25
Sarman	7742	26
Wajir Bor	4591	27
Arbaqaranso	2754	RC
Sitawario	918	28
Handaki	918	
Riba	6451	29, 30, 31
Qarsa	2764	32, 33
Krof Harar	11450	
Dowyare	2938	34
Kotulo	8888	
El Kotulo	6244	RC, 35, 36
Lafaley	3638	37
Jowhar	3358	
Dasheq	5579	38, 39
Wargadud	3682	
Hungai	6467	40
Kajaja1	2274	
Kajaja2	2274	

Appendix 3

Calendar of events

	Annual Events	2006	2007	2008	2009	2010	2011
January *Zaka*	School opening **Hot season)** ORAHED		51	39 **Post Election Violence**	27	15 **Start of BSFP**	3
February *Ragal*	**ORAHED (Hot season)**		50	38 **Post Election Violence**	26	14	2 **Mowlud**
March	**ORAHED (Hot season)**		49	37	25	13	1
April *Maulid*	**GU (long rains)**		48	36	24 **End of Merlin program**	12 **End of BSFP/Kurahi suwir**	0
May *Bilku 2*		59	47	35	23	11 **End of BSFP Cohort site**	
June *Bilku 3*		58	46 **Election Campaign**	34	22	10	
July *Sondeer 1*	**HAGAI (Cool cloudy season)**	57	45 **Election Campaign**	33	21	9	
August *Sondeer 2*		56	44 **Election Campaign**	32	20 **census**	8 **Referendum YES/NO**	
September *Soom*		55 **Eyr**	43 **Election Campaign**	31	19	7 **Last Ramadan**	
October *Furan*	**DEYR (short rains)** Idd Ul Hajj	54 **Deyr**	42 **Election Campaign**	30	18	6 **Wajir South MP by-election**	
November *Sigitaal*		53 **Deyr**	41 **Election Campaign**	29 **Obama Election**	17	5	
December *Arafa*		52 **Death of Saddam**	40 **Elections**	28	16	4	

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 = 626	Boys n = 313	Girls n = 313
Prevalence of global malnutrition **(<-2 z-score and/or oedema)**	(151) 24.1 % (19.7 - 29.2 95% C.I.)	(89) 28.4 % (22.7 - 35.0 95% C.I.)	(62) 19.8 % (15.2 - 25.4 95% C.I.)
Prevalence of moderate malnutrition **(<-2 z-score and >=-3 z-score, no** **oedema)**	(142) 22.7 % (18.4 - 27.7 95% C.I.)	(84) 26.8 % (21.4 - 33.1 95% C.I.)	(58) 18.5 % (14.0 - 24.2 95% C.I.)
Prevalence of severe malnutrition **(<-3 z-score and/or oedema)**	(9) 1.4 % (0.7 - 2.8 95% C.I.)	(5) 1.6 % (0.7 - 3.8 95% C.I.)	(4) 1.3 % (0.5 - 3.3 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

Age (mo)	Total no.	Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z- score)		Normal (> = -2 z score)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	133	3	2.3	23	17.3	107	80.5	0	0.0
18-29	167	4	2.4	38	22.8	125	74.9	0	0.0
30-41	163	0	0.0	37	22.7	126	77.3	0	0.0
42-53	117	2	1.7	32	27.4	83	70.9	0	0.0
54-59	46	0	0.0	12	26.1	34	73.9	0	0.0
Total	626	9	1.4	142	22.7	475	75.9	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. 9 (1.4 %)	Not severely malnourished No. 623 (98.6 %)

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

	All n = 630	Boys n = 312	Girls n = 318
Prevalence of underweight **(<-2 z-score)**	(200) 31.7 % (28.5 - 35.2 95% C.I.)	(109) 34.9 % (29.8 - 40.5 95% C.I.)	(91) 28.6 % (24.9 - 32.7 95% C.I.)
Prevalence of moderate underweight **(<-2 z-score and >=-3 z-score)**	(166) 26.3 % (23.3 - 29.6 95% C.I.)	(88) 28.2 % (22.7 - 34.4 95% C.I.)	(78) 24.5 % (21.1 - 28.3 95% C.I.)
Prevalence of severe underweight **(<-3 z-score)**	(34) 5.4 % (3.4 - 8.4 95% C.I.)	(21) 6.7 % (4.0 - 11.2 95% C.I.)	(13) 4.1 % (2.1 - 7.9 95% C.I.)

Prevalence of underweight by age, based on weight-for-height z-scores and oedema

Age (mo)	Total no.	Severe underweight (<-3 z-score)		Moderate underweight (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	136	5	3.7	30	22.1	101	74.3	0	0.0
18-29	166	14	8.4	49	29.5	103	62.0	0	0.0
30-41	163	8	4.9	52	31.9	103	63.2	0	0.0
42-53	119	6	5.0	28	23.5	85	71.4	0	0.0
54-59	46	1	2.2	7	15.2	38	82.6	0	0.0
Total	630	34	5.4	166	26.3	430	68.3	0	0.0

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

	All n = 620	Boys n = 308	Girls n = 312
Prevalence of stunting (<-2 z-score)	(80) 12.9 % (10.0 - 16.5 95% C.I.)	(48) 15.6 % (11.8 - 20.4 95% C.I.)	(32) 10.3 % (6.7 - 15.4 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(63) 10.2 % (8.0 - 12.8 95% C.I.)	(41) 13.3 % (9.9 - 17.7 95% C.I.)	(22) 7.1 % (4.5 - 10.9 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(17) 2.7 % (1.6 - 4.7 95% C.I.)	(7) 2.3 % (0.9 - 5.9 95% C.I.)	(10) 3.2 % (1.7 - 6.0 95% C.I.)

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

Age (mo)	Total no.	Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
		No.	%	No.	%	No.	%
6-17	133	2	1.5	10	7.5	121	91.0
18-29	161	6	3.7	21	13.0	134	83.2
30-41	162	5	3.1	17	10.5	140	86.4
42-53	118	4	3.4	13	11.0	101	85.6
54-59	46	0	0.0	2	4.3	44	95.7
Total	620	17	2.7	63	10.2	540	87.1

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	626	-1.38±0.83	1.88	0	6
Weight-for-Age	630	-1.53±0.95	1.00	0	2
Height-for-Age	620	-0.70±1.18	1.40	0	12

* contains for WHZ and WAZ the children with oedema.

WAJIR EAST 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 **Sanadka 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 EAST 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 Sanadka Bilawgisa**	Age (Indicate in Months if <5 then circle)	Sex 1=Male 2=Female	Present now in HH (✔=YES X= NO)	In- migration Since **Sanadka Bilawgisa** to date (exclude births) (✔=YES X= NO)	Out- migration since **Sanadka Bilawgisa** to date (exclude deaths) (✔=YES X= NO)	Births since **Sanadka Bilawgisa** to date (✔=YES X= NO)	Died since **Sanadka Bilawgisa** 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

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WAJIR EAST 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