NUTRITION ASSESSMENT

BARDERA TOWN
GEDO REGION
SOMALIA.

Food Security Analysis Unit (FSAU/FAO)
United Nations Children's Fund (UNICEF)
World Food Programme (WFP)

April 2006

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Abbreviations and acronyms

ARI	Acute Respiratory Infections
FAO	Food and Agriculture Organisation
FSAU	Food Security Analysis Unit
GAM	Global Acute Malnutrition
HAZ	Height- for- Age Z scores
HDDS	Household Dietary Diversity Score
HFA	Height for Age
IDA	Iron Deficiency Anaemia
IDP	Internally Displaced Person
KM	Kilo Metres
MCH	Maternal and Child Health
MT	Metric Tonnes
MUAC	Mid Upper Arm Circumference
NCHS	National Centre for Health Statistics
NGOs	Non-Governmental Organisations
LEZ	Livelihood Economic Zones
LNGO	Local Non-Governmental Organisation
INGO	International Non-Governmental Organisation
NIDs	National Immunisation Days
OR	Odds Ratio
RR	Relative Risk
SACB	Somalia Aid Coordination Body
SMART	Standardised Monitoring & Assessment of Relief and Transitions
UN	United Nations
UNDP	United Nations Development Programme
UNHCR	United Nations High Commission of Refugees
VAD	Vitamin A Deficiency
UNICEF	United Nations Children's Fund
WAZ	Weight for Age Z Scores
WFP	World Food Programme
WHO	World Health Organisation
WHZ	Weight for Height Z scores

ACKNOWLEDGEMENTS

EXECUTIVE SUMMARY

Bardera Town is located in Bardera District, Gedo region. It is the largest town in Gedo region with an estimated population size of 51,800 (WHO, 2005 NIDS figures further verified by survey team). The town is located along the Juba River with three main forms of livelihoods namely: urban (67%), riverine (19%) and agropastoral (13%).

According to the FSAU 2005/2006 Food Security and Nutrition Post Deyr analysis, Gedo region, including Bardera town, is classified to be in the humanitarian emergency phase. Similarly, malnutrition levels within the region have remained high[1]. Since Bardera town was not included in the regional assessment, the need for up to date nutrition information for the town remained.

From 20th to 27th April 2006 FSAU in collaboration with WFP, UNICEF and SRCS undertook a nutrition and mortality assessment in Bardera town. Using a two stage cluster sampling methodology (30 clusters by 20 children[2]), a total of 558 children aged 6 – 59 months and measuring 65 – 109.9 cm in height/length, 200 non pregnant and 74 pregnant women aged 15 – 49 years from 291 households were randomly assessed. Mortality data was collected from 902 households.

The global acute malnutrition (weight for height <-2 Z score or oedema) was 19% (CI: 15.9 – 22.6) while the severe acute malnutrition (weight for height <-3 Z score or oedema) was 3.9% (CI: 2.5 – 6.0). The results indicate a critical nutrition situation according to WHO classification. Compared to the long term estimates of malnutrition for the town, the results indicate a worsening nutrition situation (see maps on page 6).

The crude and underfive mortality rates were 0.83 (CI: 0.59 – 1.07) and 1.69 (CI: 0.98 – 2.41) deaths/10,000/day respectively. Both mortality rates indicate an acceptable situation. Diarrhoea and measles were the main illnesses associated with deaths among underfives while among persons aged five or more was suspected malaria and measles. About 24.3% of the pregnant women were malnourished (MUAC <23 cm) while among the non pregnant, 10% were malnourished (MUAC <18.5 cm). About 1% of households reported cases of night blindness.

Overall, about 61% of the children had suffered from one or more communicable childhood diseases during the two weeks prior to the assessment. The high prevalence of measles is explained by a recent measles outbreak in the town following which an immunization campaign was conducted. Access to health services in the town is limited with only one functional MCH, supported by SRCS.

About 20% of the households had consumed three or fewer food groups in the twenty four hours prior to the assessment. Purchase was the main food source for nearly all (96.2%) households yet the main source of income for about 64% of the households was irregular casual labour. Casual labour was mainly within the construction sector, riverine farms and restaurants. Water for household consumption was mainly obtained from the river and other unprotected sources. Children consuming water from unprotected sources were more at risk of diarrhoel diseases than those consuming from protected sources (p<0.05). Additionally, children who had recently joined resident households following the drought were 2.06 times more likely to be malnourished than those who were within their original homes.

Suboptimal childcare practices were evident in the study area, negatively affecting children's nutritional status. Among the children aged 6 – 24 months, only 35.3% were still breastfeeding at the time of assessment. The majority of the children had stopped breastfeeding before the age of one year. About 20% of the children were introduced to complementary foods at the age of six months and above.

Immunisation services and humanitarian support are among factors mitigating malnutrition in the town. About

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[1] A nutrition assessment conducted by FSAU and partners in March 2006 covering the region (except Bardera town) showed a global acute malnutrition rate of 23.8% (CI:21.1 – 26.7).
[2] Based on the regional prevalence of malnutrition, the desired sample size was calculated, which guided the number of children to be assessed in each cluster.

90% of children aged 9 – 59 months were immunised against measles with the majority (73.1%) having been immunised in the six months prior to the assessment. Vitamin A supplementation in the past 6 months or before and polio immunization coverage were 79% and 73% respectively. However, these are below the minimum SPHERE recommendation of 95%.   Humanitarian support includes health services by SRCS/UNICEF, food aid by ICRC and local organizations/communities and a feeding programme run by African Muslim Aid (AMA).

Following data analysis and discussion of assessment findings with partners recommendations made include 1) Initiate sustainable income generating activities, 2) Improve water quality for household level consumption through establishment of water purification systems, 3) Continued & improved provision of health services in the town, 4) Rehabilitation of malnourished children and women, 5) Intensify health & nutrition education and 6) Continued monitoring of situation.

SUMMARY OF FINDINGS

| Indicator	No	%	95% CI
Total number of households surveyed	291	100	
Mean household size	6.3 (SD=2.5)		
Mean number of children less than five years per household	2.07 (SD=0.85)		
Total number of children assessed	558	100	
Child Sex:			
Males (boys)	291	52.2	47.9 – 56.3
Female (girls)	267	47.8	43.6 – 52.1
Global Acute Malnutrition (WHZ<-2 or oedema)	106	19.0	15.9 – 22.6
Severe Acute Malnutrition (WHZ<-3 or oedema)	22	3.9	2.5 – 6.0
Oedema	4	0.7	0.2 – 2.0
Global Acute Malnutrition (WHM<80% or oedema)	75	13.4	10.7 – 16.5
Severe Acute Malnutrition (WHM<70% or oedema)	17	3.0	1.7 – 4.8
Proportion of malnourished non pregnant women (MUAC<18.5; N=200).	20	10.0	5.8 – 14.4
Proportion of severely malnourished non pregnant women (MUAC<16.0)	19	9.5	6.2 - 15
Proportion of malnourished pregnant women (MUAC<23.0; N=74).	18	24.3	15.1 – 35.6
Proportion of severely malnourished pregnant women (MUAC<20.7)	8	10.0	4.8 – 20.2
Proportion of children with diarrhoea in 2 weeks prior to assessment	144	25.8	22.3 – 29.7
Proportion of children with ARI within two weeks prior to assessment	150	26.9	23.3 – 30.9
Children with suspected malaria in 2 weeks prior to assessment	133	23.8	20.4 – 27.6
Suspected measles within one month prior to assessment (N=546)	110	19.7	16.5 – 23.3
Children (9-59 months) immunised against measles (N=546)	490	89.7	86.8 – 92.1
Children who have ever received polio vaccine (N=558)	406	72.8	68.8 – 76.4
Children who received vitamin A supplementation in last 6 months or before (N=558)	441	79	75.4 – 82.3
Proportion of households who consumed ≤3 food groups	57	19.8	15.3 – 24.8
Proportion of households who consumed ≥4 food groups	231	80.2	75.1 – 84.7
Proportion of children 6-24 months who are breastfeeding (N=215)	76	35.3	29.0 – 42.1
Proportion of children introduced to other foods before 4 months	266	48.9	44.6 – 53.2
Under five Death Rate (U5DR) as deaths/10,000/ day	1.69		0.98 – 2.41
Crude Death Rate (CDR) as deaths/10,000/ day	0.83		0.59 – 1.07

1   INTRODUCTION

1.1   Overview

Bardera Town is located in Bardera District, Gedo region. It is the largest town in Gedo region with an estimated population size of 51.800 (WHO, 2005 NIDS figures further verified during the survey team training).

Map Highlighting Bardera Town

Bardera is one of the most populated towns in Gedo region in South West Somalia. Bardera, which is a densely populated town, is inhabited principally by three main livelihoods as follows; (i) Urban (not dependent on crop/livestock production), (ii) Agro-pastoral (relative dependency on crops and livestock), (iii) Riverine (rely on irrigated farming). Bardera is located along the Juba River in the south-eastern corner of Gedo region, which borders Sakow, Middle Juba region to the south and Dinsor and Qansandheere, Bay region to the east and El- waak and Garbaharey Gedo region to the North West and North East respectively.

According to the FSAU 2005/2006 Post Deyr analysis, Gedo region, including Bardera town, has been classified to be in the Humanitarian Emergency phase. This was mainly attributed to two consecutive seasons of cereal production failure for example the production in the last Deyr season was 14% of post war average (PWA), following on from Gu 2005 of 7% of PWA while in June 2005, river floods destroyed around 80-90% of maize production of the region. The failed rainfall and livestock/crop production led to increased IDPs in main settlements & towns in riverine areas like Bardera town. There was also unusual and large human out-migration to riverine areas within Gedo, as well as to Juba valley and Bay/Bakool regions with some rural villages being entirely abandoned.
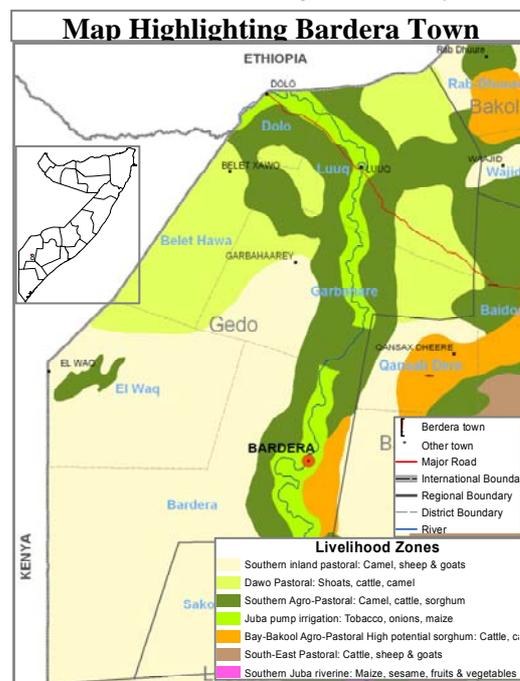
1.2   Assessment Justification

Following the 2005/06 FSAU post Deyr analysis[3], Gedo region was classified as facing conditions of humanitarian emergency phase. Further, a nutrition assessment[4] conducted by FSAU and partners covering the region (with the exception of Bardera Town) in March 2006 showed a global acute malnutrition (weight for height <-2 Z score or oedema) rate of 23.8% (CI: 21.1 – 26.7%). Past FSAU analysis have estimated the malnutrition levels in Bardera town to be 10% - 14.9%, slightly better than those of other areas in Gedo region. However, following the prolonged drought situation in the region, Bardera town was equally in a vulnerable situation with reports of poor families moving into the town. As such, there was need for updated nutrition information in the town, hence the nutrition assessment.

1.3   Assessment Objectives

   i)   To estimate the level of acute malnutrition and nutritional oedema among children aged 6 - 59 months or with height/length of 65 - 109.9 cm.
   ii)   To estimate the level of malnutrition among adult women aged 15-49 years in Bardera town.

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[3] FSAU Technical Series report No. IV.8, 22 February, 2006. @005/06 Post Deyr Analysis.
[4] Gedo Region Nutrition Assessment, FSAU and partners. March 2006

iii)   To identify factors likely to have influenced malnutrition in young children
iv)   To estimate the prevalence of some communicable childhood diseases namely measles, diarrhoea, malaria, and ARI in the town.
v)   To estimate coverage of vitamin A supplementation, measles and polio vaccination among children in Bardera town.
vi)   To estimate the crude and under-five mortality rates in Bardera town.
vii)   To assess general feeding and weaning practices in Bardera Town

2   BACKGROUND INFORMATION:

2.1   General Overview

Bardera town is one of the oldest towns in Somalia and hosts various Somali clans. Since the collapse of the central government in Somalia, the town has witnessed several rounds of inter-clan fighting and famine from 1991-1993 and 2002-2003. For the last five years Bardera town has lacked a legitimate local administration. This gap in leadership has been filled by the district elders, clan and religious leaders who intervene and resolve issues of concern.

2.2   Humanitarian Interventions

Humanitarian support in the town includes health services by SRCS/UNICEF, a feeding programme run by African Muslim Aid (AMA), adhoc food aid distribution by ICRC and by local organizations/communities for example Drought Relief committee of Mogadishu business community and Somalis in Diaspora. AMA supports two feeding centres with about 1000 underfive beneficiaries and 500 pregnant or highly vulnerable women. Beneficiaries are provided with one meal per day consisting of rice/maize, beans and oil. Additionally, severely malnourished children are provided with some powder milk.

2.3   Nutrition

The nutrition situation in Bardera town has remained at 10% - 14.9% according to FSAU long term (1999-2005) malnutrition estimates. Compared to the long term malnutrition estimates in other parts of Gedo region, Bardera district indicates a better of nutrition situation. Although no recent detailed nutrition assessment has been conducted in Bardera town, a nutrition assessment conducted in Gedo region (with the exception of Bardera town) in March 2006 by FSAU and partners indicated a critical nutrition situation with a global acute malnutrition (weight for height $<$-2 Z score or oedema) rate of 23.8% (CI: 21.1 – 26.7). Following the prolonged drought, Bardera town was in an equally vulnerable position with reports of population movement into the town in search of food, water and employment opportunities.

2.4   Water and Environmental Sanitation

The main source of water for Bardera town is Juba river. There is no water purification system in place and the water is mainly drawn on donkey carts or carried by women on their backs. During the drought period, most water catchments had dried up, river water level was below normal while the water quality of most shallow wells was contaminated and/or salty and unfit for human and livestock consumption. The early onset of the 2006 Gu rains provided some relieve and improved water availability and access.

The overall sanitation condition of Bardera town is poor, and the situation in IDP camps is particularly bad as people do not use latrine and this has negative effects on water quality. Carcasses of animals that had died as a result of the drought were evidently seen scattered in the outskirts of the town which polluted the environment and a potential health hazard to Bardera residents. Additionally, garbage from the town was also not propoersly disposed.

2.5   Health Issues

In Bardera town there is no functioning hospital and the only health facility is an MCH/OPD run by Somalia Red Crescent Society (SRCS), which is considered inadequate to serve the health needs of the town. The MCH/OPD provides primary healthcare. There are also 25 private pharmacies though the standard of these remains limiting.

2.6   Food Security

Bardera district, has experienced two consecutive seasons of failed rains (Gu'05 and Deyr'05/06), which has caused the worst drought in living memory. This drought was locally named as *Sima*, which means "equalizer" of all areas and peoples. The 2006 Gu rains started earlier than usual, on March 30, and continued till April 7. The rainfall resumed on 19th to 23rd April. The overall rainfall condition (intensity and distribution) was considered normal to above normal. Despite the early onset of the Gu rains, seed availability and accessibility for the poor and middle wealth groups were considered significantly below normal in all livelihoods. Even among the better off and upper range of middle wealth groups who managed to plant, the crop was attacked by insects (locally known as diir diir) at seedling stage, and they were forced to replant.

Food prices for cereals and other items are generally high and are not expected to improve until the Gu harvest in August 2006. In February 2006, WFP distributed food ration to targeted vulnerable areas in Bardera district while ICRC distributed maize, oil and beans in the most affected areas in Bardera district in January 2006.

Livestock in surrounding villages including cattle, shoats and camel are in very poor condition. This has impacted negatively on milk production, and hence its consumption in Bardera town. While the wealthier families can afford alternative forms of milk (powder milk), the poor have very limited access.

Around 500 -700 families who out-migrated from villages surrounding Bardera town are currently residing in the town as IDPs, they are mainly concentrated in Kurman, Kaskey and Bulokulow sections of the town. These people have out-migrated from mainly the Southern Agropastoral and High Potential Sorghum livelihood zones as a result of the drought. These IDPs lack proper shelter and mainly depend on food aid.

3.   METHODOLOGY

3.1 Assessment Design

A cross-sectional study was conducted among the population of Berdera town. Both qualitative and quantitative data collection techniques were used.   Quantitative data was collected through a standard household questionnaire for nutrition (see appendix 2).   Retrospective mortality data for 90 days prior to the assessment was also collected among the study households using the standard mortality questionnaire (see appendix 3). Qualitative data was collected by an interagency team comprising of assessment supervisors and coordinators through focus group discussions and key informant interviews to provide further understanding of possible factors influencing nutritional status.

3.2   Sample Size determination

The sample size was determined using Nutrisurvey software using the following details:
Estimated population   = 51,800
Number of underfives   = 10,360
Estimated Global acute malnutrition   = 23.8%[5]
Desired precision   = ± 5%
Design effect   = 2

A desired sample size of 543 underfive children was obtained. To ease calculations on the number of children per cluster and taking into account attrition, a sample size of **600** was used. The two stage cluster sampling methodology was used which translated to **30 clusters of 20 children** each.

Mortality data will be collected using the standard procedure of *30 clusters by 30 households.*

3.3   Sampling procedure

Using a two-stage cluster sampling methodology, 30 clusters were randomly selected based on population proportion to size. A list of all settlements/sections within the town, with their respective populations formed the sampling frame for the assessment area from which 30 clusters were randomly drawn using Nutrisurvey software. Using WHO 2005 Polio population figures and the input of key informants from the district and assessment enumerators, all settlements/sections of the town were listed in the sampling frame and their population estimates further verified for authenticity by the assessment team. A total of 15 settlements/sections were identified and input into Nutrisurvey software and 30 clusters were randomly identified as summarized in appendix 1.

From the 30 randomly selected clusters, a total of 567 children aged 6-59 months and/or height/length of 65-109.9 cm from 291 households[6] were assessed.

In each of the clusters, mortality questionnaires were administered to 30 randomly selected households. The same sampling frame used for nutrition assessment was employed in cluster selection for the mortality assessment. In total, mortality data was collected from 902 households irrespective of whether or not the household had a child under-five.

3.3.1   Study population and sampling criteria

The study population consisted of people living in Bardera town and comprised all the children aged 6-59 months or measuring 65-109.9 cm for height/length. Sampling procedure as outlined in the SMART Guidelines

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[5] As per findings of Gedo region (except Bardera Town) nutrition assessment in March 2006.
[6] A household was defined as persons who live together and eat from the same pot at the time of assessment.

was followed in this assessment. On the visit to each cluster, the centre was identified and a pen was spun to determine the direction to follow in moving to the edge of the cluster. On reaching the edge of a cluster, a pen was spun a second round, until the pen pointed inward the cluster/village to determine the direction to follow in the systematic selection of the households with children aged 6 to 59 months. The households in this direction were counted / established as the team crossed to the other edge and given numbers. A random number within the total number of households encountered was drawn to enable random selection of the first household to be visited. From the first household, the team always moved in right direction to the next household. This procedure was followed until the required 20 children were obtained in a cluster. All sampled households were visited, the supervisor noting whether children in the target age group were present or not. In households with children in the target age group, the household and mortality questionnaires were administered. All eligible children in the households were measured and if a child or primary caregiver was absent, an appointment was booked for a later visit in the course of the assessment. In households without the target agegroup of children, only the mortality questionnaire was administered.

3.4 Data Collection

3.4.1   Anthropometric Measurements

The anthropometric data were collected using the procedure stipulated by the WHO (1995) for taking anthropometric measurements. Adherence to this procedure was ensured. The protocol used was as follows:

Weight: Salter Scale with calibrations of 100g-unit was used. This was adjusted before weighing every child by setting it to zero. The female children would be lightly dressed before having the weight taken while clothes for the male children were removed. Two readings were taken for each child, shouted loudly and the average recorded on the questionnaire.

Height: For height, a vertical or horizontal measuring board reading a maximum of 175cm and accurate to 0.1cm was used to take the height or length of a child. The child would stand on the measuring board barefooted; have hands hanging loosely with feet parallel to the body, and heels, buttocks, shoulders and back of the head touching the board. The head would be held comfortably erect with the lower border of the orbit of the eye being in the same horizontal plane as the external canal of the ear. The headpiece of the measuring board was then pushed gently, crushing the hair and making contact with the top of the head. Height/length was then read to the nearest 0.1cm. Two readings were recorded and the computed average used in the analysis.

Length: For children aged 6 to 24 months or between 65cm to 84.5cm length instead of height was taken. The child was made to lie flat on the length board. The sliding piece was placed at the edge of the bare feet as the head (with crushing of the hair) touched the other end of the measuring device. Then two readings were taken and the average computed.

Arm Circumference: The Mid Upper Arm Circumference was measured using a MUAC tape to the nearest 0.1 cm. Two readings were taken and the average recorded for each child.

3.4.2   Child Age Determination

Where useful documents like growth monitoring/clinic attendance cards and birth certificates were available, they were use to determine the child's age. Calendars of events (appendix ???) were also used as proxies to age determination. Though not entirely accurate, ages were still regarded as important indicators and were approximate/average pointers for identification. The nutrition indicator employed as preference was *weight for height* as the best nutrition status (acute malnutrition) for emergency and transitory populations.

3.4.3   Oedema

Oedema, defined as bilateral oedema on the lower limbs was assessed by gently pressing the feet to check if a depression is left after at least three seconds of pressing and was confirmed if present by the supervisor and then recorded.

3.4.4   Morbidity

Morbidity pattern was assessed by asking about incidences of common communicable diseases i.e. diarrhoea, acute respiratory infection, serious febrile illness in the two weeks and suspected measles in one month prior to the assessment.

- ♦ Diarrhoea is defined for a child having three or more loose or watery stools per day
- ♦ ARI asked as oof wareen or wareento. Three signs asked for are cough, rapid breathing and fever
- ♦ Suspected malaria/acute febrile illness: - the three signs to be looked for are periodic chills/shivering, fever, sweating and sometimes a coma.
- ♦ Measles (Jadeeco): a child with more than three of these signs– fever and, skin rash, runny nose or red eyes, and/or mouth infection, or chest infection

3.4.5   Mortality

The mortality assessment was done concurrently with nutrition assessment in which a 30 by 30 cluster sampling methodology was used. The assessment methodology used for the nutrition assessment was adopted with the exception that households were selected as the second sampling unit. At least 30 households were randomly selected in each cluster and the mortality questionnaire administered to a responsible member of that household. All households within the selected cluster were eligible for inclusion in the mortality assessment, whether there was a child under the age of five or not. Households were systematically surveyed until the 30th household. Each household surveyed was asked the composition of their members in two parts- those members less than 5 years and the total number of household members. The household was then asked how many if any of the household members had died, left or arrived in the last three months (appendix 3). A total of 902 households were included in the assessment.

The crude and undefive mortality rates were generated automatically by the Nutrisurvey software as deaths per 10,000 persons per day using a recall period of 109 days. If a member had died, the respondent was asked to describe the signs and symptoms of the illness likely to have caused the death.

Mortality rates can be interpreted according to the following reference

- • For under-five years old children
  -Under-five mortality rates >= 2 deaths/10,000/day indicate a situation of alert
  -Under five mortality rate >=4 deaths/10,000 children/day indicate an emergency
- • For the total population
  -Mortality rates >=1 deaths/10,000 persons/day indicate an alert situation
  -Mortality rates >=2 deaths/10,000 persons/day indicate an emergency.

3.4.6   Dietary Diversity

Dietary diversity as household dietary diversity score (HDDS) was determined by taking a simple count of various food groups consumed in a given household over the past twenty four hours. A total of 12 FAO recommended food groups were considered which included Cereals & cereal products; Roots & tubers; Vegetables; Fruits; Meat and meat products, Eggs; Fish; Legumes; Milk & its products; Fats & oil; Sugar & honey and Miscellaneous.

3.4.7   Vitamin A Deficiency

During the assessment, Vitamin A deficiency (VAD) prevalence was estimated by assessing if any member(s) of the households experienced night blindness.

3.5 Description of assessment activities

Table 1: Chronology of activities for the Bardera Town Nutrition Assessment

Major Activity	Dates. 2006
Preparation of tools, methodology & review of secondary data (Nairobi)	3rd – 11th Jan
Resource mobilization; Joint planning meetings with partners (Nairobi)	5th – 22nd Jan
Training of enumerators in Garbarharey	19th - 22nd April
Cluster Identification	22nd Apr
Pre-testing	23rd Apr
Collection of data	24th – 27th Apr
Entry of data in Wajid	29h – 2nd May
Preliminary analysis in Wajid	2nd May
Presentation of preliminary results and debriefing on assessment process to partners in Wajid	3rd May
Presentation of preliminary results and debriefing on assessment process to partners and community in Bardera Town	13th May
Further data cleaning, analysis and draft report write up	8th - 14th May
Circulation of draft report to partners	15th May
Circulation of final assessment report	21st May

Five teams each consisting of two enumerators and one supervisor conducted the assessment with each team handling two clusters in a day. An elder from each cluster assisted the teams in identification of the cluster, its centre and boundaries. Supervisors were from FSAU and WFP while the enumerators were from SRCS. Enumerators were selected on the basis of their experience with previous assessments, familiarity with health issues, need for participation in future nutrition activities and ability to learn nutrition assessment procedures during training. Overall support, supervision and co-ordination were done by two FSAU Senior Nutritionists.

3.6 Quality Control Procedures

A comprehensive training of enumerators and supervisors was conducted covering interview techniques, sampling procedure, inclusion and exclusion criteria, sources and reduction of errors, taking of measurements, standardisation of questions in the questionnaire, levels of precision required in measurements, diagnosis of oedema and measles, verification of deaths within households, handling of equipment, and the general courtesy during the assessment.

Standardisation of measurement and pre-testing of the questionnaire and equipment was carried out in Bulogras village which is located in the outskirts of Bardera town. Pre-testing involved familiarising assessment teams with village/cluster entry; administering the questionnaire, sampling procedure, correct taking of measurements and recording. After the field exercise, views were exchanged to address the difficulties identified; appropriateness of the questions reviewed and necessary changes made.

Quality of data was also ensured through (i) monitoring of fieldwork by assessment coordinators, (ii) crosschecking of filled questionnaires on daily basis and recording of observations and confirmation of measles, severe malnutrition and death cases by supervisors. All households sampled were visited and recorded including empty ones (iii) daily review undertaken with the teams to address any difficulties encountered, (iv) progress evaluation was carried out according to the time schedule and progress reports shared with partners on regular basis, (v) continuous data cleaning upon and after entry which made it easy to detect any outliers/ mistakes and to replace or repeat households depending on magnitude of error (vi) monitoring accuracy of equipment (weighing scales) by regularly measuring objects of known weights and (vii) continuous reinforcement of good practices. All measurements were loudly shouted by both the enumerators reading and recording them to reduce errors during recording.

3.7 Data Processing & Analysis

3.7.1   Data entry, Cleaning, Processing and Analysis

Data was entered and analysed using Nutri survey and EPIINFO computer based packages. Running and tabulating all variable frequencies was carried out as part of data cleaning. The EPINUT component of EPIINFO was used to convert the measurements (weight, age and height) into nutritional indicators and comparison made with the National Centre for Health Statistics (NCHS) references as designed by WHO (1983). Analysis of certain variables e.g. total food groups consumed was also counterchecked in Microsoft Excel.

3.7.2   General Characteristics of Study Population

Frequencies and cross-tabulations were used to give percentages, confidence intervals, means and standard deviations in the descriptive analysis and presentation of general household and child characteristics.

3.7.3   Creation of Nutritional Status Indices

The anthropometric measurement of weight and height were used to compute the WFH nutritional status indicators of the studied children. Weight For Height (WFH) expressed the weight of the child as a percentage of the expected weight for the standard child of that height as given by NCHS. WFH measures acute malnutrition or wasting. Using EPINUT, Z-scores were generated and the anthropometric indicator, WFH, was used to classify children into categories of nutritional status as follows:

<-3 Z-Scores or oedema	= Severe acute malnutrition
≥-3 Z-Scores and <-2 Z-Scores	= Moderate acute malnutrition
≥ -2Z-Scores	= Normal
<-2 Z-score or oedema	= Global/total acute malnutrition

Similarly, MUAC measurements were also used to classify children into categories of nutritional status and mortality risks as follows according SACB Nutrition assessment guidelines:

<11.0 cm or oedema	= Severe malnutrition
≥11.0 and < 12.5	= Moderate malnutrition
≥12.5 and < 13.5	= At risk of Malnutrition
≥13.5	= Normal
<12.5 cm or oedema	= Total acute malnutrition

For adults, the following categories were used:
a) For non pregnant/adult women[7]:

<16.0 cm plus Bilateral oedema	= Severe Acute malnutrition
≥16 cm and < 18.5 cm	= Moderate Acute Malnutrition
≥18.5 cm	= Normal
<18.5 cm plus Bilateral oedema	= Total Acute Malnutrition

b) For pregnant women[8]:

<20.7 cm	= Severe acute malnutrition
≥20.7cm and <23 cm	= Moderate acute malnutrition
≥23.0 cm	= Normal
<23.0 cm	= Total acute malnutrition

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[7] UN ACC/SCN
[8] SPHERE Guidelines

4 ASSESSMENT RESULTS

4.1 Household Characteristics of Study Population

Table 2: Household Characteristics

	N	*% (CI)*
Household size (Mean):	6.3 (SD=2.5)	
Mean No of Underfives	2.07 (SD=0.85)	
Household residence status (N=291)		
Residents	287	98.6% (96.5%-99.6)
Internally displaced	3	1% (0.2-3%)
Returnees	1	0.3% (0-1.9%)
Reason for movement (n=4):		
Food shortage	3	75% (19.4-99.3)
Water Shortage	1	25% (0.6-80.5)
Household housing additional members(N=274)		
Yes	18	6.6% (3.9-10.2%)
No	256	93.4% (89.8-96.1%).

A total of 291 households were assessed with a mean household size of 6.3 (SD=2.5). The household size ranged from 3 to 20 persons.

The number of under fives in households ranged from 1 to 4 with a mean of 2.07 (SD=0.85).

Nearly all (98.6%) of the surveyed households were residents. The minority (1.3%) non residents were all from within Gedo region and had lived in Bardera Town for a period of one to six months. Food and water shortage were cited as the main reasons for movement.

About 6.6% of the households reported to host additional persons or families since October 2006. Children who had recently joined residential households were 2.06 times more likely to be malnourished than those who had not (p=0.003).

4.2 Livelihood and Source of Income

Table 3: Distribution of households by means of livelihood and income sources

Livelihoods (N=291)	N	%
Urban	196	67.4 (61.6-72.7%)
Riverine	56	19.2 (14.9-24.3)
Agro-pastoral	38	13.1 (9.4-17.5%)
Pastoral	1	0.3 (0.0-1.0%)
Income Source (N= 291)		
Casual labour	187	64.3 (58.5-69.8%)
Petty trade	42	14.4% (10.6-19%)
Crop sales	23	7.9 (5.1-11.6%)
Animal and animal product sales	21	7.2 (4.5-10.8%)
Remittances	14	4.8 (2.7-7.9%)
Salaried employment	4	1.4 (2.7-7.9%)

The commonest means of livelihood was urban (67.4%). About 19% reported riverine as the main means of livelihood and these were relying on Juba river to undertake farming activities.

Casual labour was reported as the main source of income for majority (64.3%) of the households. Casual labour was mainly within the construction sector, riverine farms and restaurants.

4.3 Water Access and Quality

The assessment results indicate that river was the dominant source of drinking water among 96.2% households. Households access this water by fetching it directly from the river, purchasing it from donkey cart vendors or women who carry the water on their backs. There is no water purification system in the town.

Slightly more than half (51.5%) of the households spent less than 30 minutes to access water while 38.8% spent

30 – 60 minutes. The results further indicate that a significant (56%) population owned 3 or more water containers of 20 litres capacity. At household level, water was stored in covered containers by 63.5% households.

Table 4a: Water Access and Quality

Water access and Quality	N	(%)
Main source of drinking water (N=291):		
River	280	96.2% (93.3-98.1)
Unprotected well	5	1.7% (0.6-4)
Water catchment	3	1% (0.2-3%)
Protected wells	3	1% (0.2-3%)
Average time taken to the nearest water point: (N=291)		
<30 minutes	150	51.5% (45.6-57.4)
30 – 60 minutes	113	38.8% (33.2-44.7)
>1 hour	28	9.6% (6.4-13.6)
Number of clean water storage containers(N=291)		
1 - 2 containers	128	44%(38.2-49.9)
3 - 4 containers	89	30.6% (25.3-36.2)
4 – 5 containers	29	10% (6.8-14)
> 5 containers	45	15.5% (111.5-20.1)
Mode of water storage(N=291)		
Covered containers	110	37.8% (32.2-43.6)
Open containers	106	36.4% (30.9-42.2)
Constricted neck (Ashuun)	75	25.7% (20.8-31.2)

4.4 Sanitation and Hygiene Practices

Table 4b: Sanitation & Hygiene

Sanitation and hygiene	N	% (CI)
Access to Sanitation facility (N=291):		
Traditional pit latrine	177	60.8% (55-66.5)
Open pit	81	27.8% (22.8-33.4)
Improved Pit Latrine (VIP)	17	5.8% (3.4-9.2%)
No latrine at all (Bush)	16	5.5% (3.2-8.8%)
Main washing agent for washing utensils (N=291)		
Soap	144	49.5% (43.6-55.4)
Ash	96	33% (27.6-38.7)
None	51	17.5% (13.3-22.4)
Main washing agent for washing hands (N=291)		
Soap	187	64.2%(58.4-69.7)
Ash	78	26.8% (21.8-32.3)
None	26	8.9% (5.9 – 12.8)
Method of prepared food storage(N=291)		
Do not store	127	43.6% (37.9-49.6)
Put in pots beside the fire	78	26.8% (21.8-32.3)
Put in covered containers	77	26.5% (21.5-31.9)
Suspended in ropes/hooks	9	3.1% (1.4-5.8)

Overall, only 5.5% of the households did not have access to a sanitation facility and were using the bush. Traditional pit latrine was the commonly used sanitation facility.

About 50% and 64.2% of the households used soap as the main washing agent for washing utensils and hands respectively.

A significant (43.6%) proportion of households did not store prepared food, all food prepared for a certain meal was eaten at one go. Among those who stored, the food was mainly either put in pots beside the fire or put in covered containers.

4.5   Formal and Informal Support

Table 6: Formal and informal support

	N	% (CI)
Informal support (N =288)		
Received:		
Yes	12	4.2% (2.1-7.3)
No:	276	95.8% (92.8-97.8)
Type of support (N=12)		
Loans	6	50%(22.2-77.7)
Remittances within Somalia	4	33.3% (9.2-13.3)
Remittances from abroad	2	16.7% (2-45)
Formal support (N =288)		
Received:		
Yes	27	9.4% (6.2-13.3)
No	261	90.6% (86.6-93.7)
Type of support (N=27)		
Free food	23	85.1% (66.2-95.8)
Supplementary food	2	7.4% (0.9-24.2)
Veterinary care	2	7.4% (0.9-24.2)

Only 4.2% and 9.4% households had received some form of informal and formal support respectively. Loans were the commonest form of informal support received while free food was the main form of formal support received.

4.6 Health Seeking Behaviour

Table 5: Health seeking behaviour

	N	*%*
Where was healthcare assistance sought when child was sick (N=341):		
Private clinic or pharmacy	203	59.5%(54-64.7)
Public health facility	55	16.1%(12.3-20.4)
No assistance	47	13.7%(10.3-17.9)
Home medication	25	7.3%(4.8-10.6)
Traditional healer	11	3.2%(1.6-5.6)

Among the children who were sick in the two weeks prior to the assessment, majority (59.5%) of the caretakers sought healthcare assistance from a private clinic or pharmacy. Others forms of assistance sought included public health facility, home medication and traditional healers. About 14% of the sick children did

not have caretakers seek for any medical assistance.

4.7   Characteristics of Assessment Children

A total of 567 children aged 6 – 59 months were assessed. However, only 558 children were included in the data analysis. Nine children were excluded as they had extreme weight for height Z score values. Among the 558 children 52.2% were boys while 47.8% were girls. Majority (29.4%) of the children were in the 18 – 29 months agegroup while the 54 – 59 months agegroup had the least children.

Table 7: Distribution of children according to age and sex

	Boys		Girls		Total	
Age	*N*	*%*	*n*	*%*	*N*	*%*
6-17 months	51	17.5	46	17.2	97	17.4
18-29 months	78	26.8	86	32.2	164	29.4
30-41 months	75	25.8	66	24.7	141	25.3
42-53 months	66	22.7	56	21	122	21.9
54-59 months	21	7.2	13	4.9	34	6.1
Total	291	52.2	267	47.8	558	100

4.8 Nutritional Status of Children Using Anthropometry

Table 8: Summary of Global Acute malnutrition and Severe Acute Malnutrition

Malnutrition Rates	No	Proportion
Global Acute Malnutrition (<-2 Z score or oedema)	106	19% (CI: 15.9 – 22.6)
Severe Acute Malnutrition (<-3 Z score or oedema)	22	3.9% (CI: 2.5 – 6.0)
Oedema	4	0.7% (CI: 0.2 – 2.0)

Using weight for height indicator, the global acute malnutrition (WFH <-2 Z scores or oedema) was 19% (CI: 15.9 – 22.6) while severe acute malnutrition (WFH <-3 Z scores or oedema) was 3.9% (CI: 2.5 – 6.0). A total of 4 oedema cases were reported.

Table 9:   Distribution of children by nutritional status (weight/ height z-score or oedema) and child sex

Nutrition status categories	Males (n=291)		Females (n=267)		Total (N=558)	
	No	% (CI)	No	% (CI)	No	% (CI)
Global acute malnutrition (WFH<-2 z score/oedema)	61	20.9(16.4-26.1)	45	16.8 (12.5-21.8)	106	19% (CI: 15.9 – 22.6)
Severe acute malnutrition (WFH <-3 z score/oedema)	9	3.1 (1.4-5.7)	13	4.8 (2.6-8.1)	22	3.9% (CI: 2.5 – 6.0)
Oedema	0		4	1.5% (0.4-5.7)	4	0.7% (CI: 0.2 – 2.0)

About 21% of the boys were malnourished while 17% of the girls were malnourished. However, there was no statistically significant difference between children's nutritional status and sex. All the four oedema cases were among girls. Distribution of the weight-for-height Z scores were skewed towards the left depicting a poorer nutrition situation according to international (WHO) standards (see figure below).
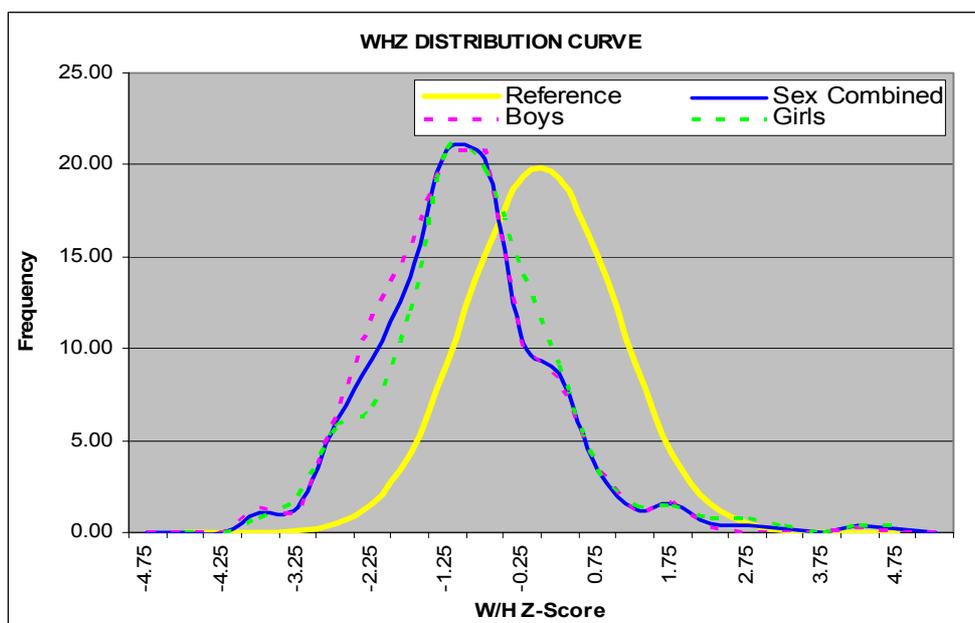
Table 10: Distribution of Acute Malnutrition by Age group

Age groups	Severe (WH<-3Z o oedema)		Moderate (WH>=-3Z< - 2Z)		Normal (WH>=-2Z		Total	GAM (Total malnourished (WH<-2Z or oedema)	
	No	*%*	*No*	*%*	*No*	*%*	*No*	*No*	*%*
6-17 months	3	13.6	17	20.2	77	17	97	20	18.9
18-29 months	6	27.3	25	29.8	133	29.4	164	31	29.2
30-41 months	6	27.3	15	17.9	120	26.5	141	21	19.8
42-53 months	7	31.8	23	27.4	92	20.4	122	30	28.3
54-59 months	0	0	4	4.8	30	6.6	134	4	3.8
Total	**22**	**3.9**	**84**	**15.1**	**452**	**81**	**558**	**106**	**19**

The age group 18 -29 months had the highest (29.2%) proportion of malnourished followed by the 42 – 53 months category (28.3%). The lowest proportion of malnourished children was reported in the 54 – 59 months category.

Table 11: Malnutrition prevalence using WFH percentage of median categories

Nutrition status categories	Males (N=291)		Females (N=267)		Total(N=558)	
	No	*Proportion (%)*	*No*	*Proportion (%)*	*No*	*Proportion (%)*
Global acute malnutrition (WFH<80% or oedema)	41	14% (10.3-18.6)	34	12.7% (8.9-17.3)	75	13.4%(10.7-16.5)
Severe acute malnutrition (WFH<70% or oedema)	7	2.4% (0.9-4.8)	10	3.7% (1.8-6.7)	17	3%(1.7-4.8)

Using weight for height percent median the a total of 13.4%(10.7-16.5) children were malnourished (weight for height <80% or oedema) and 3%(1.7 - 4.8) were severely malnourished (weight for height <70% or oedema).

Table 12. Nutrition status of Children by MUAC

Malnutrition	Males (N=291)		Females(N=267)		Total (N=558)	
	N	%	N	%	N	% (95% CI)
Severe (MUAC <11 cm) or oedema	10	3.4	17	6.4	27	4.8 (3.2-.69)
Moderate (MUAC >=11 and <12.5cm)	41	14.1	48	18	89	15.9 (13-19.2)
At risk (MUAC 12.5- <13.5 cm)	54	18.6	54	20.2	108	19.3 (16.1-22.8)
Normal (MUAC >=13.5 cm)	186	63.9	148	55.4	334	59.8 (55.6-63.9)
Total Malnutrition (MUAC <12.5 cm or Oedema)	51	17.5%	65	24.3	116	20.8 (17.4-24.3)

Using mid upper arm circumference (MUAC) 20.8% (CI:17.4 – 24.3) of the children were malnourished (MUAC <12.5 cm or oedema).

4.9 Morbidity, Measles Immunisation, Polio Vaccination and Vitamin A Supplementation

Table 13: Morbidity, measles immunisation, polio vaccination and vitamin A supplementation

	No.	%(CI)
Incidence of major child illnesses (N=558)		
ARI within two weeks prior to assessment	150	26.9 (23.3-30.9)
Diarrhoea within two weeks prior to assessment	144	25.8 (22.3-29.7)
Malaria (suspected) within two weeks prior to assessment	133	23.8 (20.4-27.6)
Measles within one month prior to the assessment	110	19.7 (16.5-23.3)
Measles Immunization Coverage (N=546)		
Children (9-59 months) immunised against measles –	490	89.7 (86.8-92.1)
Immunized past six months	399	73.1 (69.1-76.6)
Immunized before six months	91	16.7 (13.7-20.1)
None	56	10.3 (7.9-13.2)
Children who have ever received Polio dose (N=406)		
Yes	406	72.8 (68.8-76.4%)
No	152	27.2 (23.6-31.2%)
Vitamin A supplementation in last 6 months or before (N=558)		
Yes	441	79 (75.4-82.3%)
No	117	21 (17.7-24.6%)

Overall, about 61% of the children had suffered from one or more communicable childhood diseases during the two weeks prior to the assessment. The prevalence of the diseases was as follows: ARI (26.9%), diarrhoea (25.8%), malaria (23.8%) and measles (19.7%).

About 90% of children aged 9 – 59 months were immunised against measles with the majority (73.1%) having been immunised in the six months prior to the assessment. Vitamin A supplementation in the past 6 months or before and polio immunization coverage were 79% and 73% respectively.

4.10   Vitamin A Deficiency

Among the 291 households, 3 reported cases of night blindness an indication vitamin A deficiency. Two cases were reported among children aged less than six years and one case aged six or more.

4.11   Feeding practices

Table 13: Children feeding practices

Children aged 6-24 months (N=215)	N	% (CI)
Is child breastfeeding?		
Yes	76	35.3 (29-42.1%)
No	139	64.7 (57.9-71%)
Frequency of breast-feeding (N=76)		
On demand	41	53.9% (42.1-65.4)
< 3times	24	31.6% (21.3-43.2)
3-6 times	11	14.5% (7.4-24.4)
Age stopped breastfeeding (N=482):		
<6 months	75	15.5% (12.4-19.1)
6 - 11 months	196	40.6% (36.2-45.1)
12 – 18 months	136	28.2% (24.2-32.4)
More than 18 months	71	14.7% (11.6-18.2)
Never breastfed	4	0.8% (0.2-2.1)
Introduction of Complementary feeding (N=544)		
0 - 3 months	266	48.9% (44.6-53.2%
4 – 6 months	167	30.7 (26.9-34.8%)
>6 months	111	20.4 (17.1-24.1%)
Feeding frequency(N=544)		
Once	63	11.6 (9.1-14.7%)
2 times	198	36.3 (32.3-40.5%)
3 – 4 times	176	32.4(28.5-36.6%)
5 or mores times	107	19.7 (16.5-23.4%)

About 35% of children aged 6 – 24 months were still breastfeeding at the time of assessment. Majority (54%) of the breastfeeding children were breastfed on demand.

Among the children not breastfeeding at the time of assessment, 56.1% had stopped before the age of one year.

A minority 20% of the children were introduced to complementary foods at the age of six months and above.

More than half of the children were fed 3 or more times in a day.

4.12   Dietary Diversity

Table 14: Distribution of dietary diversity among households

No of food groups consumed (N=288)	N	% (CI)
4 or more food groups	231	80.2 (75.1-84.7%)
3 food group	52	18.1 (13.8-23%)
2 food groups	4	1.4 (0.4-3.5%)
1 food groups	1	0.3 (0-1.9%)
Main source of food (N=288)		
Purchasing	277	96.2 (93.3-98.1%)
Borrowing	6	2.1 (0.8-4.5%)
Gift from friends or family	4	1.4 (0.4-3.5%)
Own production	1	0.3 (0-1.9%)

A significant (80.2%) proportion of the households had consumed a diversified[9] diet in the past twenty four hours prior to the assessment.

The main food source for nearly all (96.2%) households in Bardera town was purchasing. Other sources of food included borrowing (2.1%), gifts from friends or family (1.4%) and own production for a negligible 0.3%.

[9] A household was considered to have consumed a diversified diet when four or more food groups were consumed.

As shown on the figure below, the commonly consumed food groups were cereals, sugars/honey, oils/fats and milk/milk products. Food groups rich in proteins and micronutrients were not consumed by a high proportion of the households.
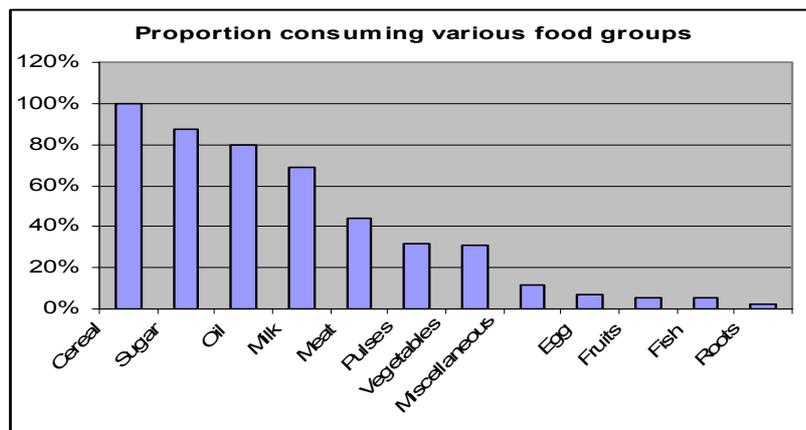
The range of total food groups eaten was 1-8 with the mean food groups being 4.74 (SD=1.38).

4.13   Adult Malnutrition by MUAC

Table 15.   Adult nutrition status by MUAC

	N	%	95% CI
Non Pregnant (N=200)			
Severe acute malnutrition (MUAC<16.0 cm)	19	9.5	5.8-14.4%
Total malnourished (MUAC≤18.5)	20	10	6.2-15%
Normal	180	90	85-93.8%
Pregnant women (N=74)			
Severe Risk (MUAC≤20.7 cm)	8	10	4.8-20.2%
Total malnourished (MUAC≤23.0 cm)	18	24.3	15.1-35.6%
Normal	56	75.7	64.3-84.9%

Among the 200 non pregnant women assessed, 10% (CI: 4.8-20.2%) were malnourished (MUAC <18.5 cm).

About 24.3% of the pregnant women were malnourished (MUAC <23 cm).

4.14   Relationship Between Malnutrition and Other Factors

Table 16: Risk factors and relation to total malnutrition (WHZ<-2)

Exposure variable	N	(%)	Crude RR	95% CI	p-value
Child sex:					
Male	61	21	1.24	0.88 – 2.06	0.21
Female	45	16.8			
Age group					
6-24 months	42	19.5	1.05	0.74 – 1.49	0.79
25-59 months	64	18.7			
Hygiene					
Use of detergents to wash hands before handling food:					
Yes	96	19.1	1.07	0.59- 1.93	0.81
No	10	17.9			
Morbidity patterns					
ARI					
Yes	30	20	1.07	0.74 – 1.57	0.71
No	76	18.6			
Malaria					
Yes	22	16.5	0.84	0.55 – 1.28	0.40
No	84	19.8			
Measles					
Yes	21	19.1	1.01	0.65 – 1.55	0.97
No	85	19.0			
Diarrhoea:					
Yes	21	14.6	0.71	0.46 – 1.1	0.11
No	85	20.5			
Health programmes					
Vitamin A Supplement:					
Yes	86	19.5	1.14	0.73 – 1.77	0.55
No	20	17.1			
Measles vaccine (N=546)					
Yes	96	19.6	1.37	0.7 – 2.67	0.33
No	8	14.3			
Dietary & feeding patterns					
Breastfeeding (N=215)					
Yes	13	17.1	0.82	0.45 – 1.48	0.5
No	29	20.9			
Frequency of feeding					
Less than 5 times	82	18.2	0.81	0.65 – 1.32	0.68
5 or more times	24	22.4			
Dietary diversity					
≤ 3 food groups	16	14.5	0.72	0.44 – 1.88	0.18
≥ 4 food groups	90	20.1			
Joined resident household recently (N=545)					
Yes	15	35.7	2.06	1.32 – 3.23	0.003
No	87	17.3			
Household residential status					
Residents	103	18.6	0.31	0.15 – 0.65	0.04
Non residents	3	60.0			

Analysis on possible risk factors associated with children's nutritional status was undertaken with the variables enlisted on table 16.

Household residential status and if a children had recently joined a residential household were significantly associated with children's nutritional status. Children from non resident holds were 0.31 times mores likely to be malnourished compared to their counterparts from resident households. Similarly, children who had recently joined resident households following the effects of the drought were 2.06 times more likely to malnourished than the children from resident households.

4.15   Death Rates

A total of 902 households were surveyed for mortality indicator with a recall period of 109 days prior to the assessment being used. The results generated by the Nutri survey software were as presented below:

Death rates;
For children aged 0-59 months (under-five mortality or death rate)

$$\text{0-5DR} = \dfrac{\textbf{Number of deaths of children 0-5 years}}{\left(\dfrac{\textbf{Mid point Population* of children 0-5}}{\textbf{10, 000}}\right) \text{x} \begin{array}{c}\textbf{Time}\\\textbf{interval}\end{array}} = \textbf{Deaths/10,000/day}$$

* Mid point population = (Population at present + Population at beginning of recall)/2
  Population at beginning of recall = (population present + left + deaths) – (joined + births)

Under five population in surveyed households	= 1133
Number of under fives who joined the households	= 6
Number of under fives who left the households	= 17
Number of births during recall	= 23
Number of under five deaths	= 21

Under five death rate (deaths /10,000 children per day)   = **1.69 (CI: 0.98 – 2.41)**

This under five death rate reflects a normal situation according to the international standards (WHO classification).

For the total population (Crude mortality/death rate):

$$\text{CDR} = \dfrac{\textbf{Number of deaths}}{\left(\dfrac{\textbf{Total Mid point Population}}{\textbf{10, 000}}\right) \text{x} \quad \textbf{Time interval}} = \textbf{Deaths/10,000/day}$$

Total population in surveyed households	= 4858
Total people who joined the households	= 46
Total people who left the households	= 36
Total number of births	= 23
Total number of deaths in the households	= 44

CMR as deaths per 10,000 persons per day   = **0.83 (CI: 0.59 – 1.07)**

The crude mortality rate reflects a normal situation according to WHO classification.

Main causes of mortality in Bardera town
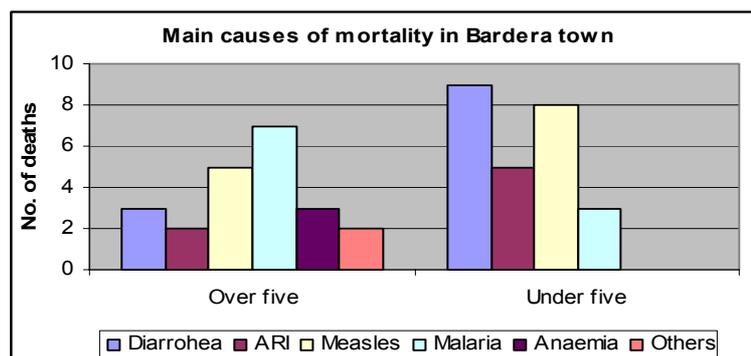
Among persons more than five years old, measles and malaria were the main causes of death. Other causes included diarrhoea, anaemia and ARI.

Deaths among children aged less than five were mainly caused by diarrhoea and measles. Other causes included ARI and malaria.

4.16   Qualitative Information

Qualitative information was collected from observations, focus group discussions and key informants. The discussions were centred on feeding and care practices, health care, food security, and water and sanitation issues.

4.16.1 Care and Feeding Practices

Focus group discussions indicated that most of the mothers introduced food other than breast-milk within the first few hours after delivery. Children were mainly given milk or water mixed with sugar. Breastfeeding usually commenced after between 48 - 72 hours. The mothers believe that the child could diarrhoea if they breastfeed colostrum immediately after delivery or the baby does not have the strength to suckle in addition to the breastfeeding increasing the mothers abdominal pain. It was noted that this was a common practice among Somali women. Mothers mostly weaned their children at the age of six months with foods available in the household at the time. Weaning foods include porridge made from maize or sorghum and *canjera*[10] with milk, oil and sugar added to a soft consistency.

When children are sick certain foods are not given, if a child has diarrhoea, measles, fresh milk and fatty foods are not given. Pregnant women are not allowed to eat nutritious foods such liver, milk and fatty meat as means of controlling foetal growth. This is related to fears of complications during delivery should the baby grow too large in the absence of adequate obstetric services.

4.16.2 Food Security

Over the last two seasons, it was noted that most households had reduced the number of meals to one or two, the quantity and food groups eaten. The AMA supported supplementary feeding programme contributed to some of the meals consumed. Following the drought milk availability in the market had declined as most of the cattle and shoats in the district had died while the camel and the remaining cattle out-migrated to Bay and Juba Valley regions. The better-off households had substituted cattle milk with powder milk while this was not affordable among the poor households. The mothers reported that use of vegetables and fruits are not common for the last two seasons. It was reported that the irrigation farmers were opting grow maize and beans which they could harvest before maturity for sale as fodder as opposed to growing fruit and vegetables.

4.16.3 Health Related Issues

At the moment there is no functioning hospital in Bardera town, the only public health facility operating in Bardera town is MCH/OPD run by Somali Red Crescent Society (SRCS) who supported by ICRC and UNICEF. This MCH/OPD provides health services like treating common diseases and immunization services to mothers and under fives. Referrals of serious or complicated cases e.g. severely malnourished children, Obstetric and gun shot wounds are made to MSF Switerzerland supported hospital in Dinsor which is more than 80 km away from Bardera town.

4.16.4 Coping Strategies:

Qualitative information collected through the focus group discussion revealed that the commonly used coping strategies by many of the households assessed include sale of water for household consumption, casual employment in riverine farms or as domestic helps, family splitting and sale of firewood.

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[10] A Somali pancake made from a mixture of maize or sorghum and wheat.

5   DISCUSSION

5.1   Nutrition and mortality situation

The global acute malnutrition (weight for height <-2 Z score or oedema) rate was 19% (CI:15.9 – 22.6). This indicates a critical nutrition situation according to WHO categorization. The assessment findings are slightly higher than the long term estimates of global acute malnutrition (10 – 14.9%) for Bardera town. The crude and underfive mortality rates were 0.83 (CI: 0.59 – 1.07) and 1.69 (CI: 0.98 – 2.41) deaths/10,000/day respectively. Diarrhoea and measles were the main causes of death among underfives while among persons aged five or more was malaria and measles. Although both mortality rates are elevated compared with the baseline situation in Sub-Saharan Africa[11], both fall below what are normally judged to be emergency levels for the region or according to WHO classification.

5.2   Morbidity, Vitamin A supplementation and Immunization coverage

Overall, about 61% of the children had suffered from one or more communicable childhood diseases during the two weeks prior to the assessment. The prevalence's were as follows malaria (23.8%), diarrhoea (25.8%), ARI (26.9%) and measles (19.7%). The high prevalence of measles is explained by a recent measles outbreak in the town following which an immunization campaign was conducted. Diseases are among the immediate cause of malnutrition among populations in Bardera town. The high prevalence of disease has great potential to negatively affect the immune system of this population and hence predispose it to malnutrition. About 90% of children aged 9 – 59 months were immunised against measles with majority (73.1%) of these having been immunised within the past six months prior to the assessment. Polio immunization and vitamin A supplementation coverage were 73% and 79% respectively. However, these are below the minimum SPHERE recommendation of 95%. Vitamin A enhances body immunity hence protects against common infections. This means that those who are vitamin A deficient are more susceptible to illnesses and their food utilization in the body is compromised hence more likely to be malnourished. Access to health services in the town is limited with only one functional MCH, supported by SRCS.

5.3   Child care practices

Suboptimal childcare practices were evident in the study area, negatively affecting children's nutritional status. Among the children aged 6 – 24 months, only 35.3% were still breastfeeding at the time of assessment. The majority of the children had stopped breastfeeding before the age of one year. About 20% of the children were introduced to complementary foods at the age of six months and above. Ideally, children should be introduced to complementary feeding[12] at the age of 6 months. This is important as it minimises the risk of diarrhoeal disease from contaminated weaning foods, and the potential risk of growth faltering if foods are inappropriately delayed. In the study, majority of the children were introduced to complementary foods before the age of 6 months a factor that predisposes children to diarrhoeal diseases. The suboptimal childcare practices predispose the study children to poor nutrition.

5.4   Dietary Issues and food security

About 20% of the households had consumed a less diversified diet i.e. three or fewer food groups in the twenty four hours prior to the assessment. Purchase was the main food source for nearly all (96.2%) households yet the main source of income for about 64% of the households was irregular casual labour. Casual labour was mainly within the construction sector, riverine farms and restaurants. Additionally, children who had recently joined resident households following the drought were 2.06 times more likely to be malnourished than those who were within their original homes.

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[11] In Sub-Saharan Africa, the baseline for CMR and U5MR is 0.44 and 1.14 deaths/10000/day respectively. The emergency threshold for CMR and U5MR is 0.9 and 2.3 deaths/10000/day respectively. (Source, Sphere Guidelines)
[12] Complementary feeding is when other foods or liquids are provided along with breastmilk

5.2 Water and sanitation

Nearly all the population obtained water for domestic use from the river and other unprotected sources. This water is not treated as there is no water purification system in place. Children consuming water from unprotected sources were more at risk of diarrhoel diseases than those consuming from protected sources ($p < 0.05$). Although majority (about 94%) of the households had access to sanitation facilities, sanitation within the town still remains a concern. Animal carcases were evident in the outskirts of the town while rubbish was also not properly disposed. This together with poor drinking water quality has contributed to incidences of diarrhoea.

6 CONCLUSIONS AND RECOMMENDATIONS

The observed global acute malnutrition of 19% (CI:15.9 – 22.6) indicates a critical nutrition situation as per WHO classification. Compared to the long term estimates of malnutrition for the town, the results indicate a worsening nutrition situation. Household residential status or children recently joining residential households are among the key factors influencing nutritional status among children in Bardera town. Poor water quality, inadequate child care practices, limited access to health services and food insecurity remain the underlying causes of malnutrition. The crude and underfives mortality rates are within the acceptable levels according to WHO classification.

Following data analysis and discussion of assessment findings with partners recommendations made include:
  i)   Initiate sustainable income generating activities
  ii)   Improve water quality for household level consumption through establishment of water purification systems
  iii)   Continued & improved provision of health services in the town
  iv)   Rehabilitation of malnourished children and women
  v)   Intensify health & nutrition education
  vi)   Continued monitoring of situation.

7   APPENDICES

Appendix 1:   Selection of clusters for the Bardera Town Nutrition Assessment, April 2006

	Geographical unit	**Estimated Population Size**	**Clusters**
1	Dulcad	3000	1
2	Qalaliyow	4200	2, 3, 4
3	Sayid Warsame	2800	5
4	Bulo-Garas	4000	6, 7, 8
5	Bulo-Gumar	1500	9
6	Bulo-Laysan	1000	
7	Bulo-Kaskey	6000	10, 11, 12, 13
8	Horseed	7000	14, 15, 16, 17
9	Bulo-Kulow	4000	18, 19
10	Iftin	3600	20, 21
11	Waaberi One	2000	22
12	Waaberi two	3200	23, 24
13	Hilaac	1200	25
14	Musawac	1800	26
15	Kurmaan	6500	27, 28, 29, 30
	Total	**51,800**	

Appendix 2: Bardera Town Nutrition Assessment Household Questionnaire

Date_____ Team Number _____ Cluster Number _____ Name of enumerator _____

Name of Village/Town _____ District _____ Household Number _____ Name of the Respondent _____

Q1-8 Characteristics of Household

Q1 How many people live in this household (Household size)[13] ?_____

Q2 How many children are below five years in this household (Number of < 5 years)? _____

Q3 What is your present household residence status? 1= Resident[14] 2=Internally displaced[15] 3=Returnees[16] 4=Internal immigrant[17] 5=Other (specify) _____

If answer to the above is 1, then administer Q3b and move to Question 7.

Q3b Are additional people currently being hosted by your household since October 2005 (last Deyr season)? 1=Yes (Number of persons _____) 2=No

Q4 Place of origin 1=Within Gedo region (specify district _____) 2=Outside Gedo region (specify region _____)

Q5 Duration of stay in months _____

Q6 Reason for movement: 1= Insecurity 2=Lack of jobs 3= Food shortage 4=Water shortage 5=Others; specify_____

Q7 What is the livelihood systems used by this household? 1= Pastoral 2=Agro- pastoral 3=Urban 4= Riverine (irrigated agriculture; fishing)

Q8 What is the household's main source of income? 1= Animal & animal product sales 2= Crop sales 3= Petty trade 4= Casual labour

5= Salaried employment 6= Remittances 7= Other, specify _____

Q9-16 Feeding and immunization status of children aged 6 – 59 months (or 65 – 109.9 cm) in the household.

Sno	First Name	Q9	Q10	Q11	Q12	Q13	Q 14	Q15	Q16
		(If 6-24 months) Are you breastfeeding[18] the child? (if no, skip to Q14) 1=Yes 2=No	If breast feeding, how many times/day? 1=<3 times 2=3-6 3=On demand	If not breast feeding, how old was the child when you stopped breast-feeding? 1=<6 months 2=6-11 months 3=12 – 18 months 4=≥18 months 5= Never breastfed	At what age was child given water/ foods other than breast milk 1=0-3 months 2=4-5 months 3=6 months or more.	How many times do you feed the child in a day *(besides breast milk)*? 1= Once 2= Twice 3= 3-4 times 4= 5 or more times	Has child been provided with Vitamin A in the last 6 months *(show sample)* *1=Yes* *2=No*	**(If ≥9 months old)** Has child been Vaccinated against measles? 1=In past 6 months 2=Before 6 months 3=None	How many times has the child ever been given polio vaccine orally *1=1-2 times* *2=3 and above* *3=Never*
1									
2									
3									
4									

Q17-27 Anthropometry and morbidity for children aged 6 – 59 months or (65 – 109.9cm) in the household

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[13] *Number of persons who live together and eat from the same pot at the time of assessment*

[14] *A person who dwells in a particular place permanently or for an extended period*

[15] A *person or groups of persons who have been forced or obliged to flee o to leave their homes or places of habitual residence, in particular as a result of or in order to avoid the effects of armed conflict, situations of generalized violence, violations of human rights, or natural or human-made disasters, and who have not crossed an internationally recognized State Border" source, guiding principles on internal displacement*

[16] *Refugees who have returned to their country (Somalia) or community of origin, Somalia, either spontaneously or through organized repatriation [UNHCR definition]*

[17] *A person who moves (more or less permanently) to a different administrative territory due to a wide range of reasons (e.g. job related, security)*

[18]*Child having received breast milk either directly from the mothers or wet nurse breast within the last 12 hours*

Sno *As per table on page 1*	First Name	Q17a Has (name of child) recently joined this household following the drought or insecurity since October 2006? 1=Yes 2=No	Q17b Child Sex 1=Male 2=Female	Q18 Age in months	Q19 Oedema 1=yes 2=no	Q20 Height (cm)	Q21 Weight (kg)	Q22 MUAC (cm)	Q23 Diarrhoea[19] in last two weeks 1= Yes 2= No	Q24 Serious ARI[20] in the last two weeks 1=Yes 2=No	Q25 Febrile illness/ suspected Malaria[21] in the last two weeks 1=Yes 2=No	Q26 (If ≥9 month) Suspected Measles[22] in last one month 1=Yes 2=No	Q27 [Applicable for a child who suffered any of the diseases in Q23 – 25 Where did you seek healthcare assistance when (Name of child) was sick? 1=No assistance sought 2=Own medication 3=Traditional healer 4=Private clinic/ Pharmacy 5= Public health facility
1													
2													
3													
4													

28: Anthropometry (MUAC) for adult women of childbearing age (15-49 years) present at the household

Sno	Name	Age (years)	MUAC	Physiological status 1=Pregnant 2=Non pregnant	Illness in last 14 days? If yes, what illness?
1	*Mother:*				
2					
3					
4					

Q29   Does any member of the household have difficulty seeing at night or in the evening when other people do not? 1= 2- <6 years   2= ≥ 6 years 3= None

Q30-33 Access to water (quality and quantity)
Q30 Main source of drinking water   1 =piped   2= Unprotected well   3= Water catchments   4= Protected well, boreholes or spring   5 = River   9=other

Q31 Average time taken to and from the nearest water point *(including waiting and collecting time)* 1= <30 min   2=30 – 60 min   3= 1-2 hrs   4= more than 2 hrs
Q32 Number of water collecting and storage containers of 10-20 litres in the household: 1=1-2 containers   2= 3-4 containers   3=4-5 containers 4= more than 5
Q33 What is the method of water storage in the household?   1=Covered containers   2=Open containers   3=Constricted neck/end *(Ashuun)*

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[19] Diarrhoea is defined for a child having three or more loose or watery stools per day
[20] *ARI asked as oof wareen or wareento. The three signs asked for are cough, rapid breathing and fever*
[21] *Suspected malaria/acute febrile illness: - the three signs to be looked for are periodic chills/shivering, fever, sweating and sometimes a coma*
[22] *Measles (Jadeeco): a child with more than three of these signs– fever and, skin rash, runny nose or red eyes, and/or mouth infection, or chest infection*

Q34-40 Sanitation and Hygiene (access and quality)
Q34 Type of toilet used by most members of the household: 1=Improved pit latrine (VIP)   2=Traditional pit latrine   3=Open pit   4=Designated area   5=Bush
Q35 Distance between toilet and water source in metres _____
Q36 what main washing agent do you use in your household to wash utensils? 1=Soap   2=Shampoo   3=Ash   4=Plant extracts   5=None
Q37 what main washing agent do you use in your household to wash hands? 1=Soap   2=Shampoo   3=Ash   4=Plant extracts   5=None
Q38 How do you store prepared food?   1= Suspend in ropes/hooks   2=Put in pots beside the fire   3= Put in covered containers   4= Don't store   5=   Other,   specify _____

Q 39 Food Consumption Diversity

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

Food group consumed: What foods groups did members of the household consume in the past 24 hours (from this time yesterday to now)? Include any snacks consumed.	Did a member of your household consume food from any of these food groups in the last 24 hours? *1=Yes* *0=No*	*Codes:*
		1= Own production 6=Borrowed 2=Purchases 7=Gathering/wild 3=Gifts from friends/families 8=Others, specify_____ 4=Food aid 9=N/A 5=Bartered
Type of food		**What is the main source of the dominant food item consumed? (Use codes above)?**
1. Cereals and cereal products *(e.g. maize, spaghetti, pasta, caanjera, bread)*?		
2. Meat, poultry, offal *(e.g. goat/camel meat, beef; chicken/poultry)*?		
3. Eggs?		
4. Roots and tubers *(e.g. potatoes, arrowroot)?*		
5. Vegetables *(e.g. leafy vegetables, tomatoes, carrots, onions)?*		
6. Fruits (e.g. water melons, mangoes, grapes)?		
7. Pulses/legumes, nuts *(e.g. beans, lentils, green grams, cowpeas)?*		
8. Milk and milk products *(e.g. goat/camel/ fermented milk, milk powder)?*		
9. Oils/fats *(e.g. fat, butter, ghee, margarine)?*		
10. Sugar and honey?		
11. Fish and sea foods *(e.g. fired/boiled/roasted fish, lobsters)?*		
12. Miscellaneous *(e.g. spices)?*		
Q40 In general what is the main source of food in household?		_____
Q41 Total number of food groups consumed *(filled by enumerator)*: _____		

Q42 - 43 Informal and formal Support or Assistance in last three months *(circle all options that apply)*
Q42   Which of these informal supports did you receive in last three months
         1=Zakat from better-off households   2=Remittances from Abroad   3=Remittances from within Somalia

4=Gifts	5=Loans	6=None	7=Other (specify) _____

Q43   Which of this formal international or national aid support did you receive in last three months?

1= Free cash	2=Free food	3=Cash for work	4=Food for work	5=Supplementary food
6=Water subsidy	7 Transportation of animals subsidy		8=Veterinary care	9=None 10=Other (specify) _____

Appendix 3:Bardera Town Nutrition Assessment Mortality Questionnaire

Household No: _____   Date: _____   Team No: _____   Cluster No: _____   Enumerator's Name: _____

No.	1: First Name	2: Sex (1=M; 2=F)	3: Age (yrs)	4: Born since 5/ 1/ 2006	5: Arrived since 5/1/ 2006	6: Reason for leaving	7: Cause of death
a) How many members are present in this household now? List them.							
b) How many members have left this household (out migrants) since **January 5, 2006**? List them							
c) Do you have any member of the household who has died since **January 5, 2006**? List them							

Codes

Reason for migration
1= Civil Insecurity   6= Other, specify
2= Food Insecurity
3= Employment
4=Divorce
5=Visiting

Cause of death
1= Diarrhoeal diseases   5= HIV/AIDS
2= ARI   6= Anaemia
3= Measles   7= Birth complications
4= Malaria   8= Other, specify

Summary*

	Total	U5
Current HH Members		
Arrivals during the Recall period		
Number who have left during Recall period		
Births during recall		
Deaths during recall period		

* For Supervisor Only

Appendix 4: Prevalence of chronic malnutrition based on height for age Z-score

	Males (n=291)		*Females (n=267)*		*Total (N=558)*	
	% (95% CI)	*No*	*% (95% CI)*	*No*	*% (95% CI)*	*No*
Total chronic malnutrition (HFA<-2 z score)	30.9% (25.7% - 36.6%)	90	27.3% (22.1% - 33.1%)	73	29.2% (25.5% - 33.2%)	163
Severe chronic malnutrition (HFA<-3 z score)	13.7% (10.0% - 18.2%)	40	16.1% (11.9% - 21.1%)	43	14.9% (12% - 18.1%)	83

The prevalence of chronic malnutrition defined as height for age <-2 Z score was 29.2% (25.5% - 33.2%) and severe chronic malnutrition, defined as height for age <-3 Z score, was 14.9% (12% - 18.1%)

Appendix 6: Prevalence of underweight based on weight for age Z-score

	Males (n=291)		*Females (n=267)*		*Total (N=558)*	
	% (95% CI)	*No*	*% (95% CI)*	*No*	*% (95% CI)*	*No*
Total Underweight Malnutrition (W/A<-2 z score)	34.7% (29.2% - 40.4%)	101	36.7% (30.9% - 42.8%)	98	35.7% (31.7% - 39.8%)	199
Severe Underweight Malnutrition (W/A<-3 z score)	12.7% (9.1% - 17.1%)	37	13.1% (9.3% - 17.7%)	35	12.9% (10.2% - 16.0%)	72

The prevalence of underweight malnutrition defined as weight for age <-2 Z score was 35.7% (31.7% - 39.8%) while the prevalence of severe underweight malnutrition, defined as weight for age <-3 Z score, was 12.9% (10.2% - 16.0%).

Appendix 7: Assessment Teams Composition

Enumerators	Agency
1. Deeqa Omar	SRCS
2. Raxmo Nuur	SRCS
3. Qudro Mohammed	SRCS
4. Abdirizak Buulow	SRCS
5. Hussein Culdbou	SRCS
6. Mohammed Abdullahi	SRCS
7. Mohammed Adan Farah	SRCS
8. Asad Mahammed Ali	SRCS
9. Adan Ibraah	SRCS
10. Abdiqadir Abbdirizak Geriow	SRCS
Supervisors/Team leaders	
1. Abukar Yusuf Nur	FSAU/FAO
2. Abdirahman Hersi	FSAU/FAO
3. Mohammed Moalim Hussein	FSAU/FAO
4. Abdinasir Adan Muse	WFP
5. Mohammoud Hersi	WFP
Coordinators	
1. Sicily Matu Nyamai	FSAU/FAO
2. Mohammed Borle	FSAU/FAO

Appendix 8:   Child Referral Form

REFERRAL FORM FOR MALNOURISHED CHILDREN

Name of the village: _____   Date:_____

Name of the child:_____   Sex of child: _____

Age of child: _____   Name of caretaker: _____

Child diagnosed with (state the condition): _____

Child referred to: _____

Child referred by: _____

……………………………………………………………………………………………………

REFERRAL FORM FOR MALNOURISHED CHILDREN

Name of the village: _____   Date:_____

Name of the child:_____   Sex of child: _____

Age of child: _____   Name of caretaker: _____

Child diagnosed with (state the condition): _____

Child referred to: _____

Child referred by: _____

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