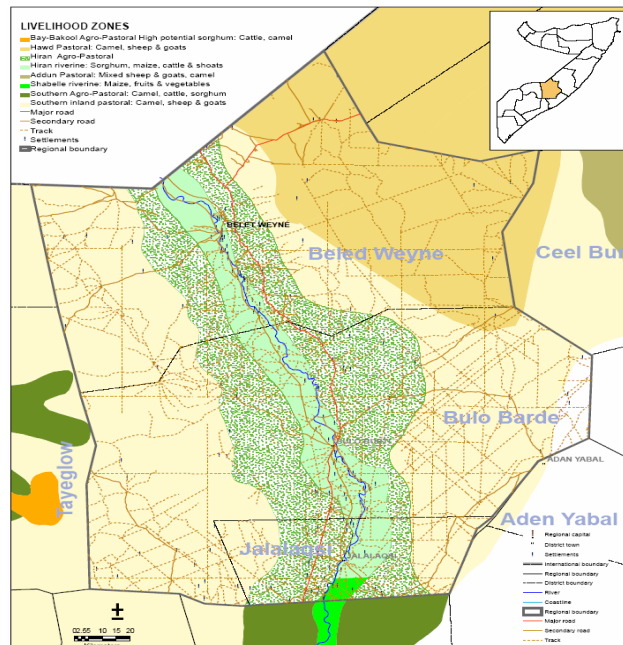


# BELET-WEYNE DISTRICT NUTRITION ASSESSMENT

## HIRAN REGION CENTRAL SOMALIA



**Food Security Analysis Unit (FSAU/FAO)  
United Nations Children's Fund (UNICEF)  
International Medical Corps (IMC)  
Save the Children UK (SC-UK)  
Cooperative for Assistance and Relief (CARE)  
Somali Red Crescents Society (SRCS)**

**MARCH 2007**



## Table of Contents

	<b>ACKNOWLEDGEMENTS.....</b>	<b>3</b>
	<b>EXECUTIVE SUMMARY.....</b>	<b>4</b>
	<b>SUMMARY OF FINDINGS.....</b>	<b>6</b>
<b>1</b>	<b>INTRODUCTION.....</b>	<b>7</b>
<b>2</b>	<b>ASSESSMENT JUSTIFICATION.....</b>	<b>8</b>
	<b>ASSESSMENT OBJECTIVES.....</b>	<b>9</b>
<b>3</b>	<b>METHODOLOGY.....</b>	<b>10</b>
<b>4</b>	<b>ASSESSMENT RESULTS.....</b>	<b>14</b>
<b>5</b>	<b>DISCUSSION AND CONCLUSION.....</b>	<b>27</b>
<b>6</b>	<b>RECOMMENDATIONS.....</b>	<b>28</b>
<b>7</b>	<b>APPENDICES.....</b>	<b>29</b>

## **ACKNOWLEDGEMENTS**

The Food Security Analysis Unit (FSAU) wishes to acknowledge contributions made by various agencies to this assessment.

FSAU provided the technical team of nutritionists that coordinated the assessment, in addition to supervisors for the teams. FSAU also compiled the assessment report, incorporating comments from partners.

The IMC, UNICEF and FSAU jointly provided funds for the assessment; IMC, SRCS, Save the Children – UK and Care International provided staff to serve as enumerators and supervisors. Local elders provided guides for the clusters assessed.

Special thanks go to mothers, caregivers, and community representatives who contributed their time and ideas by participating in the assessment, for better understanding and interpretation of the nutrition situation on the ground.

## EXECUTIVE SUMMARY

Hiran region comprises of three districts: Belet-Weyne, Bulo Burti and Jalalaqsi and has a total population size of 329,811 (UNDP population estimates, 2005). This population has been categorized into four main livelihood zones namely the agro pastoral, pastorals, riverine and Urban.

Belet-Weyne, located along the Shabelle River, is the most populated district in Hiran Region with a total population size of 144,345 people<sup>1</sup> (UNDP 2005 population estimates). Belet-Weyne Town is the regional capital and is a vibrant commercial centre because of its strategic trade links with Mogadishu in the south, Galkacyo and Bossasso to the north, Ethiopia to the northwest, and Huddur & Tiye glow in the west. The district is divided into four livelihood zones namely pastoralists (25%), agro-pastoralists, (50%) farmers (riverine) (10%) and the urban (15%).

Following the FSAU 2006/07 Post Deyr analysis, the Hiran riverine livelihood was classified in the **Humanitarian Emergency** phase due to the preceding two seasons of crop failure, huge losses from the Deyr floods, the acute watery diarrhoea outbreak and underlying vulnerability and a critical nutrition situation. The FSAU Post Deyr'06/07 analysis classified the agro pastoral and pastoral populations of Belet-Weyne District as '**Chronically Food Insecure**' as a result of continuing pastoral livelihood recovery since the Gu'06 when the livelihood group was faced with an Acute Food and Livelihoods.

The most recent nutrition assessments which were conducted in 2002 and 2003 indicated a district with a chronic critical nutrition situation. In late 2006 early 2007 following severe flooding especially along the riverine area, coupled with an escalation of the security situation in most of the southern regions analysis of existing nutrition data also highlighted a continuing critical nutrition situation. (FSAU Nutrition Update January 2007).

Thus, between 22<sup>nd</sup> and 30<sup>th</sup> March 2007, UNICEF and FSAU in collaboration with IMC and SRCS conducted a nutrition assessment in the District to determine the nutrition situation of children in the district, establish the current factors influencing the nutrition situation and to provide recommendations related to on-going and future interventions to address the problem. A mortality assessment was undertaken concurrently to estimate the retrospective under five and crude mortality for the preceding three months.

Using the standard two-stage random cluster sampling methodology, a total of 911 children aged 6-59 months and measuring 65-109.9 cm were examined. Nutritional status assessment was based on weight and height measurements and detection of oedema. Moreover, information relating to the common childhood diseases, child feeding practices, access to basic health services, safe water, sanitation and other care practices were collected through the household assessment and focus group discussions. A household mortality assessment was conducted concurrently and a total of 900 households assessed for retrospective mortality in the preceding 90 days.

The prevalence of global acute malnutrition, (Weight for Height Z scores < -2 or bilateral oedema) in the assessed children was **15.4 % (CI: 12.3 – 18.4)** while the severe acute malnutrition rate (Weight for Height Z scores < -3 or oedema) was **2.0% (CI: 1.2-3.2)**. The findings indicate a critical nutrition situation (WHO classification) which unfortunately, is consistent with findings from recent assessments conducted in Belet-Weyne District in which

---

<sup>1</sup> 30,869 are urban and 113,476 are rural

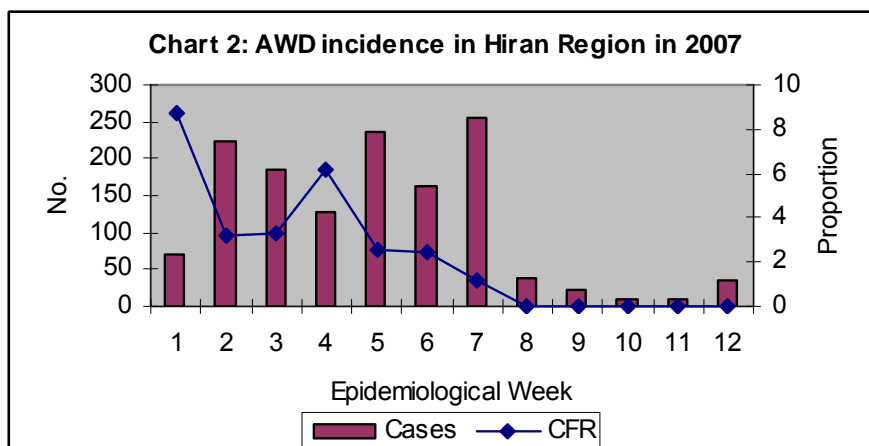
GAM levels of **17.1%** (CI: 14 - 20.9) and **21%** (CI: 18.4 - 23.8) were reported in July 2003 and May 2002 respectively (see Chart 1). The under five mortality rate was **1.45** deaths/10000/day, and the crude mortality rate (CMR), **0.64** deaths/10000/day. And indicate an acceptable situation (WHO 2004).

Morbidity was high with more than half of the children reported to have suffered from at least one communicable childhood illnesses in the preceding two weeks to the assessment. Statistical analysis indicated a significant association between morbidity and acute malnutrition ( $p=0.001$ ). Reported incidences of diarrhoea (16.1%) and ARI (27.1%) significantly influenced malnutrition ( $p<0.05$ ). The high incidences of diarrhoea could be attributed to the impact of the Deyr06/07 floods which led to contamination of the unprotected drinking water sources (with dirt and fecal matter given that about half the assessed population reported using the bush for faecal disposal), water borne diseases including the acute watery diarrhoea (AWD) outbreak since January 2007. According to the WHO AWD bulletin of June 29th, the first report of an increase in acute watery diarrhoea cases was received from Hiran Region in the first epidemiological week of 2007 with a Case Fatality Rate (proportion of deaths associated with the illness, from the reported cases) of **8.70%** and reached a peak in week 7 when reported cases began to decrease and the CFR dropped to 1.18% and has since remained at **0%** (see chart 2).

Other factors that could have negatively contributed to poor nutrition include poor child feeding practices where children are weaned too early.

Some of the factors that could have mitigated the situation include dietary diversity with

about 95% of the households consuming a diversified diet of 4 or more food groups (food groups consumed mode=6). Additionally, about a quarter of the households had received some formal support mostly in form of food aid.



Following discussions held after sharing the results with partners and detailed data analysis, the following recommendations were made:

1. Improve water quality for household level consumption through establishment of a central water purification system and encourage the population to boil drinking water
2. Enhance delivery of basic health services including intensifying EPI services/linking vitamin A supplementation with polio vaccination programmes.
3. Continued & improved provision of health services in the area through increased the capacity of community health workers.
4. Rehabilitation of acutely malnourished children and women through the existing health care centres.
5. Intensify health & nutrition education focussing on care practices and micronutrient issues.
6. Promote the availability and consumption of micronutrient rich foods at household level through kitchen gardens and conducting food preparation demonstrations
7. Improve the quality of maternal health care services in the area.
8. Continued monitoring of the nutritional and food security situation.

## SUMMARY OF FINDINGS

Indicator	No.	%
Under five children screened during the assessment.	911	100
Number of boys in the sample	485	53.2
Number of girls in the sample	426	46.8
Global acute malnutrition according to Weight for Height Index in Z-Score or presence of oedema	140	15.4 (CI:12.3–17.9)
Severe acute malnutrition according to Weight for Height Index in Z-Score or presence of oedema	18	2.0 (CI: 0.9-3.2)
Oedema	0	0
Global acute malnutrition WFH<80 % Median or presence of oedema	85	9.3 (CI: 6.8-11.8)
Severe acute malnutrition WFH<70 % Median or presence of oedema	7	0.8 (CI: 0.04-1.5)
Proportion of children reported with diarrhoea two weeks prior to the assessment.	147	16.1 (13.8-18.7)
Proportion of children reported with ARI two weeks prior to the assessment.	247	27.1 (24.3-30.1)
Proportion of children reported with Malaria two weeks prior to the assessment.	128	14.1 (11.9-16.5)
Proportion of children reported with Suspected Measles one month prior to the assessment.	48	5.4 (3.9-7.0)
Proportion of children supplemented with Vitamin A in last six months prior to the assessment.	667	73.2 (70.2-76.1)
Proportion of children aged 9-59 months, immunised against Measles (N= 853 )	588	68.9 65.8-72.1)
Proportion of children aged 6-24 months and still breastfeeding (N=263)	144	54.8 (48.5-60.9)
Proportion of children introduced to other foods before 6 months (N=261)	179	68.6
Under five mortality rate ( deaths/10,000 per day)	1.45 (CI:0.89-2.02)	
Crude mortality rate (deaths/10,000/day)	0.64 (CI: 0.4-0.69)	

# 1 INTRODUCTION

## 1.1. Background information

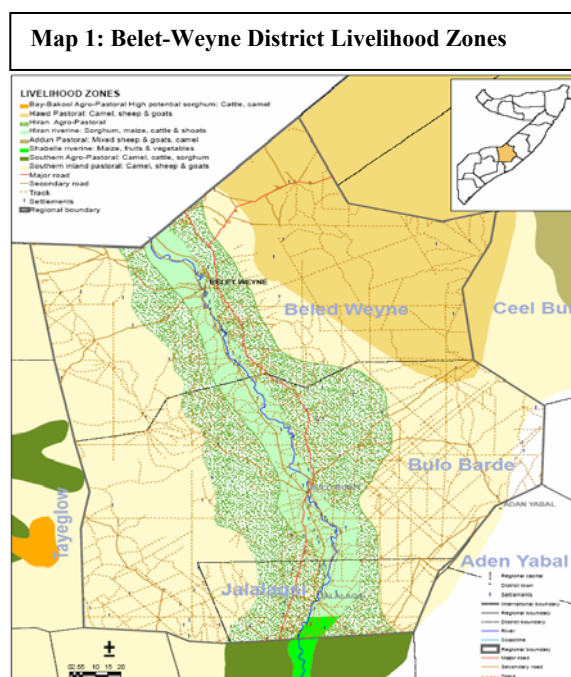
With an estimated population of 111,370<sup>2</sup>, Belet-Weyne district, located along the Shabelle River, 315 km northeast of Mogadishu, is the most populated district in Hiran region,. It shares borders on the west with Bakool region, north with Mudug, south with Middle Shabelle region, and northeast with Ethiopia. Belet-Weyne town, which is the regional capital, is a vibrant commercial centre because of its strategic trade links with Mogadishu in the south, Galkayo and Bossasso to the north, Ethiopia to the northwest, and Huddur & Tiye glow in the west. The district is divided into four livelihood groups namely, pure pastoralists (25%), agro-pastoralists, (50%) farmers (10%) and the urban (15%) and it is estimated that around 50% of the total population actually reside in or in close proximity to Belet-Weyne town.

Belet-Weyne District like other districts in central and southern Somalia continues to suffer from recurrent clan conflicts. Although the regional and the district administrative structures have been established, they are relatively ineffective primarily due to a lack of resources and constant internal strife.

## 1.2 Food security context

The population in Belet-Weyne district is categorised into four main food economy groups, namely: pure pastoralists, agro-pastoralists, pure farmers, and urban dwellers. The pastoralists keep cattle, camels, sheep and goats, while the agro-pastoralists are engaged in both livestock and rain fed crop production. The pure farmers are found along the Shabelle river and depend on both rain-fed and irrigated crop production, mainly sorghum, maize and, cowpeas. Cash crops include sesame, onions, tomatoes, green peppers, watermelon, and mangoes. They sell cowpea leaves, sorghum and maize stalks for fodder to augment household income. This group also own a small number of cattle.

Belet-Weyne town has become an important market for livestock, cereals, vegetables, fruits and other basic commodities, with strong market links with Ethiopia, Mogadishu, and the north-eastern settlements in Bay and Bakool due to its strategic position along the Mogadishu – Galkayo road. The growth of Belet-Weyne town has provided additional job and market opportunities for the town and the surrounding population.

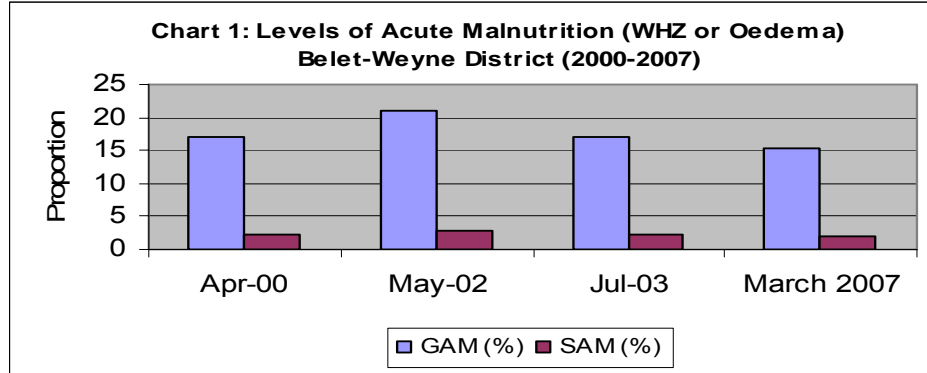


<sup>2</sup> UNDP 2005 Population Estimates

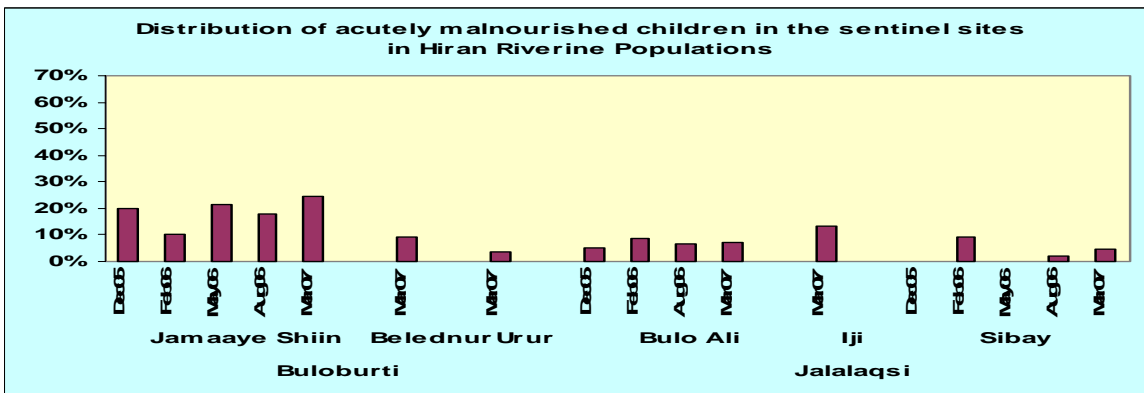
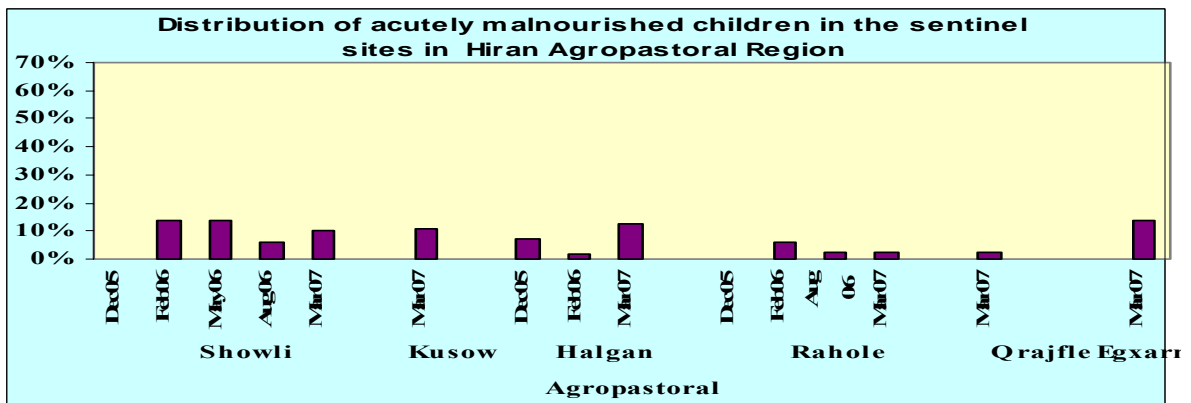
## 2 ASSESSMENT JUSTIFICATION

### NUTRITION CONTEXT

Nutrition assessments conducted in Belet-Weyne District since Year 2000 indicate critical nutrition situation with global acute malnutrition levels of 15% and above.



Results from the integrated Post Deyr 06/07 nutrition situation analysis conducted in January 2007 indicated a critical nutrition situation in the Riverine livelihood zone. Further, results from a round of sentinel sites surveillance conducted in the Hiran Agropastoral areas in March 2007 indicates variation between sites with levels of acutely malnourished children of 5% up to 12% (*see charts*). However this is lower than what was reported in the Riverine populations. Reported levels of morbidity in both agro pastoral and riverine sites remain high with over 15% of children reporting recent diarrhoea and ARI.



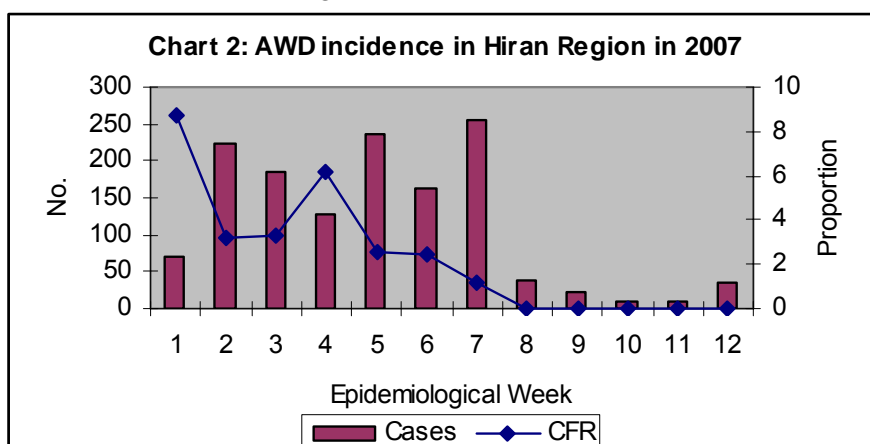


Dietary diversity in the agropastoral areas was significantly better than for the riverine populations.

Moreover the recent flooding and high incidences of acute watery diarrhoea especially along the riverine situation coupled with an escalation of the security situation in December 2006 in most of the southern regions calls for closer monitoring of the nutrition situation in order to guide humanitarian interventions to alleviate human suffering.

Thus, between 22<sup>nd</sup> March and 30<sup>th</sup> March 2007, FSAU and UNICEF, in collaboration with IMC, SRCS, SC-UK and CARE conducted an assessment aimed at determining the current nutrition situation in Belet-Weyne.

A mortality assessment was conducted concurrently to estimate the retrospective under five and crude mortality levels in the preceding three months to the assessment.



## 2.1 ASSESSMENT OBJECTIVES

1. To determine the prevalence of acute malnutrition through anthropometric measurements using weight for height for children between 6-59 months or 65-110 cm.
2. To determine the coverage of measles vaccination and vitamin A supplementation in children 6-59 months
3. To establish possible factors contributing to the nutrition situation
4. To estimate under 5 mortality and crude mortality rates in the last 3 months
5. To provide recommendations related to on-going and future interventions based on the findings.

## METHODOLOGY

### 3.1 Study Design

This study was both descriptive and analytical in nature. It utilized cross-sectional data collected through a standard household questionnaire as well as a concurrent mortality assessment (see appendices). Additional qualitative data were collected during the study through four focus group discussions and six key informant interviews designed to gain further understanding of the underlying issues influencing the current nutrition situation, and to capture diversity of understanding of the factors influencing nutritional status between population groups. Data collection took place between 22<sup>nd</sup> and 30<sup>th</sup> March 2007.

### 3.2 Sampling procedure

#### Study population and sampling criteria

For the nutrition assessment, the study population consisted of people living in the district and comprised of all children aged 6-59 months (and measuring 65 – 110cm). In order to provide valid estimates of the prevalence of malnutrition in children with a 95% confidence level, a two stage cluster sampling methodology in 911 children was undertaken with 30 children being randomly selected from each of the selected 30 clusters.

With regard to mortality, 900 households, (30 households randomly selected from 30 clusters) were to be studied.

### 3.3 Sampling methodology

A two-stage cluster sampling methodology was used in which a list of villages with population estimates for all villages in Belet-Weyne district was obtained from the UNDP population estimates for Somalia (2005). A table of cumulative population and attributed numbers was developed, and clusters selected based on population proportional to size. The sampling interval was determined by dividing the total population by 30. The calculated cluster interval was **3712**. (*See Annex: 1*). A random number **1912**, selected within the cluster interval was used to determine the location of the first cluster. The next and subsequent clusters were determined by adding the cluster interval to the preceding random number selected. A total of 16 clusters were from Belet-Weyne town and 14 clusters from rural villages.

The second stage of sampling was carried out in the cluster to select the first and subsequent households. Each team, directed by assessment guides selected from the community, went to the middle of the cluster assigned and determined a random direction by spinning a pencil. All households along the direction selected to the border of the cluster were counted and assigned numbers on a piece of paper. The assessment guide randomly selected the first household to be visited from among those numbers. Subsequent households were selected on the basis of proximity following a clockwise direction. All eligible children in each household visited were measured and weighed. If a caregiver or child was absent an appointment was made and the household revisited until the child was examined. The mortality questionnaire was administered in all randomly selected households, including those that did not have an under five child.

A total of 911 children from 444 households were assessed for weight for height and, their caregivers interviewed as to whether the children had received Vitamin A or Measles vaccination in the past 6 months, or had suffered from diarrhoea or ARI diseases two weeks prior to the assessment.

### Child age determination

Difficulties were encountered in determining the exact ages of children. Calendars of events were therefore used as proxies to age determination. Children's ages were used in the anthropometric analysis for Height for Age (stunting) and Weight for Age (underweight). Weight for Height z scores was employed in the analysis of wasting.

#### 3.4 Description of assessment activities

Major Activity	Period
Preparation of tools and methodology	1- 13 March 2007
Identification of enumerators	1- 13 March 2007
Training of enumerators	15 -18 March 2007
Cluster Identification	17 March 2007
Collection of cross-sectional data and qualitative assessment	22 to 30 March 2007
Entry of data from cross-sectional assessment	25 March to 5 April 2007
Analysis of data and preparation of preliminary result	11- 30 April 2007
Preparation of draft report	1- 29 May 2007
Circulation of final report	July 20th 2007

Five teams participated in data collection. Each team had two enumerators, one supervisor and one team leader. Enumerators were selected based on their experience with previous nutrition assessment conducted in Belet-Weyne district. IMC, SRCS, SCF-UK and the Belet-Weyne District Commissioner assisted in the identification of qualified persons. The team leaders were health and nutrition professionals from UNICEF, FSAU and IMC.

#### 3.5 Quality control procedures

A comprehensive training of enumerators and supervisors was conducted and covered: interview techniques, sampling procedure inclusion and exclusion criteria, sources of errors, taking of measurements, standardising the questions in the questionnaire, levels of precision required in measurements, diagnosis of oedema, handling of equipment, interview techniques and the general courtesy during the assessment .

Rigorous pre-testing of the questionnaire and equipment was carried out in one of the sections of the town (not selected for data collection). Each team had the opportunity to practise familiarisation in village/cluster entry, exercising the questionnaire, sampling procedure, correct taking of measurements and documentation. After the field exercise, views were exchanged to address the difficulties identified, appropriateness of the questions reviewed and appropriate changes made.

Quality of data was also ensured through; close monitoring of fieldwork by UNICEF, FSAU, IMC staff, cross-checking of completed questionnaires on daily basis, and daily reviews undertaken with the team leaders to address any difficulties encountered. Progress evaluation was carried out according to the time schedule and progress reports shared with partners on regular basis. Continuous data cleaning after entry in the field made it easy to detect outliers and mistakes in data collection. Accuracy of equipment was also monitored through checks by measuring objects of known weights.

### 3.6 Variables examined

Age – Only children aged 6-59 months were selected for examination. The age of a child was determined from the mother/caregiver's recall, the under fives card, or from a local events calendar (*See Annex 2*) when the birth date was not known or documented on a children health record.

Weight – UNICEF electronic scales were used to weigh children to the nearest 0.1 kg or 100g.

Height – Children were measured barefoot and bare head using height measuring boards graduated to the nearest 0.5cm. Children with height < 85 cm were measured lying, while those equal to or >85 cm were measured standing.

Oedema – Children were examined for the presence of bilateral pedal oedema. The occurrence of pitting as a result of thumb pressure on the foot or leg for 3 seconds was indicative of nutritional oedema.

Diarrhoea – Mothers/caregivers were interviewed regarding any episode of three or more loose, watery stools in a 24hr period within the preceding two weeks.

Acute Respiratory Infections (ARI) – collected by asking the mother/caregiver whether the child had “*oof wareen or wareento*”, a local term for pneumonia, two weeks prior to the assessment. This term was validated, by further asking if the child had cough, fever and rapid breathing.

Suspected Malaria– collected from interviewing the mother/caregiver whether the child had malaria two weeks prior to the assessment , followed by some probing by the health worker in the team to exclude other infections.

Measles immunisation status – the information was either provided by the mother or recorded from the child's vaccination card.

Suspected Measles prevalence– collected from interviewing the mother/caregiver whether the child had measles in one-month period prior to the assessment.

Vitamin A supplementation - the information was collected from interviewing the mother or recorded from the child's vaccination card.

Residential status – In all households visited, the mother/caregiver was asked whether they were originally resident from the village/town, or if they were displaced from elsewhere.

Sex of household head – The mother/caregiver was asked to state the sex of the person who takes decisions regarding welfare of all household members.

Feeding –Breastfeeding, weaning practices and feeding frequency of children were assessed by interviewing mother/caregiver of all children.

Household -was defined as a group of people living together and sharing food from the same pot. Being a polygamous community, unless in exceptional situations, the respondent was the female.

### **Mortality**

The same methodology used in identification of the under fives for the nutrition assessment (i.e. 30 clusters x 30 children) was used for the mortality assessment with the exception that in each of the 30 clusters, 30 households were selected. The team went to the household, assessed all eligible children, and administered the questionnaire on mortality. The questionnaire on mortality was administered irrespective of whether or not there was an eligible under five for anthropometric measurements, until a total of 30 households had been covered.

The overall mortality was calculated by taking the total number of deaths multiplied by a factor (10,000). This was divided by the population of the assessment households using the formulae below and divided by the time period

$$MR = n / \{[(n+N) + N] / 2\}$$

Where n = total number of persons reported dead in the households assessment

N = total number of people living in those households at the time of assessment

The mortality was calculated retrospectively for the past 3 **months**, the recall period. Mortality rates per 10,000 persons per day were obtained by dividing the figure above by 93 days that was used as the recall period. Calculation of under-five mortality rates was done using the same formulae but with a denominator of under-five children in the assessed households.

In case a member had died, the household was asked to explain the signs and symptoms of the person before he/she died.

Mortality rates can be interpreted according to the following reference

- For under-five years old children
  - Under-five mortality rates  $\geq 2$  deaths/10,000/day indicate an alert situation
  - Under five mortality rate  $\geq 4$  deaths/10,000 children/day indicate an emergency situation
- For the total population
  - Crude Mortality rates  $\geq 1$  deaths/10,000 persons/day indicate an alert situation
  - Crude Mortality rates  $\geq 2$  deaths/10,000 persons/day indicate an emergency.

### **3.7 Data entry, cleaning, processing and analysis**

Data was entered and analysed using EPIINFO computer based package. Running and tabulating all variable frequencies was carried out as part of data analysis. The “EPINUT” programme was used to convert the measurements (weight and height) into nutritional indicators and comparison made with the National Centre for Health Statistics (NCHS) references as designed by WHO (1983).

As part of the quality control checks, the Nutrisurvey software was used to review the following checks:

- Standard Deviation which should be between 0.85 and 1.10
- Skewness of WHZ: Skewness characterizes the degree of asymmetry around the mean; positive skewness indicates a long right tail, negative skewness a long left tail.
- Kurtosis of WHZ: Kurtosis characterizes the relative peakedness or flatness compared with the normal distribution, positive kurtosis indicates a relatively peaked distribution, negative kurtosis indicates a relatively flat distribution)

## 4. ASSESSMENT RESULTS.

### 4.1. Household Characteristics of Study Population

The nutrition assessment assessed a total of 444 households (HH) with a mean household size of 6.3 (SD= 2.4) persons. The mean number of the under fives per household was 2.1 (SD=0.8).

Table 3: Household Characteristics

Characteristics	n	%	95% CI
Total number of HHs assessed	444	100	
Household Size	Mean= 6.3		SD= 2.4
Number of Under fives	Mean= 2.1		SD= 0.8
<i>Residential status: (N=494)</i>			
Residents	439	98.9	97.2 – 99.6
IDPs	5	1.1	0.4 – 2.8
<i>Origin (N=5)</i>			
Within Hiran region	4	80.0	
Within southern Somalia	1	20.0	
<i>Duration of Stay (N=5)</i>			
Less than 6 months	5	100.0	
	Mean = 2.3		SD = 0.64
<i>Reason for Migration (N=5)</i>			
Lack of food	4	80.0	
Civil insecurity	1	20.0	

Almost all (98.9%) the assessed households were residents<sup>3</sup> except some few (1.1%) who were internal immigrants (1.1%), mainly from within Hiran region.

Overall the non residents had stayed in their current locations for an average of about 2.3 months with most of them having arrived into the locations at least 2 months prior to the assessment. The main reason for movement was lack of food and civil insecurity

Table 4: Distribution of households by means of livelihood and Source of Income.

<i>Livelihoods (N=444)</i>			The main livelihood systems in the district include agriculture and urban. Most of the urban dwellers also practice some form of agriculture especially in the agro pastoral (20%) areas so that agriculture is the most important means of livelihood. Casual labour (37.4%) and sale of agricultural produce (crops) (35.6%) are the most important sources of income. Petty trade (12.8%) and sale of animal
Urban	177	39.9 (35.3 – 44.6)	
Agriculture	158	35.6(31.2– 40.3)	
Pastoral	18	4.1 (2.5 – 6.5)	
Agro-pastoral	89	20.0 (16.5 – 24.1)	
Fishing	2	0.5 (0.1 – 1.8)	
<i>Main Source of Income (N=494)</i>			
Sale of animals & products	47	10.7 (8.0- 13.9)	
Petty trade	57	12.8(9.9 - 16.4)	
Casual labour	166	37.4(32.9 – 42.1)	
Remittances/ gifts	4	0.9 (0.3 – 2.5)	
Salaried employment	7	1.6 (7.0 – 12.3)	
Crops sales	158	35.6 (31.2- 40.3)	
Charcoal burning	5	1.1 (0.4 – 2.8)	

<sup>3</sup> Residents were taken as those who dwelt in the places of their residences for an extended period or permanently

and animal products (10.7%) contribute to a fair share of income. Salaried employment (1.6%), remittances (0.9%) and charcoal burning (1.1%) were the other sources of household income.

#### 4.2. Water Access and Quality

The majority (47.3%) of the assessed households drew water directly from the river. About a third (30.6%) got their water from other unprotected water sources, mainly *berkads*. Only about 10% drew water from protected wells/boreholes which are regarded as safe from contamination.

The majority (49.5%) of the households were within the recommended (Sphere guidelines 2004) distance of less than 500m to water points while in addition, 78.2% covered water storage containers to keep minimize contamination. About two thirds of the households had three or more water containers implying that they required less frequent trips to fetch water. Sphere (2004) guidelines recommend a minimum of 2 clean containers of 10-20 litres for water collection alone, in addition to enough storage containers to ensure there is always water in the household.

The challenge however is that since 77.9% of households mainly access water from unprotected sources such as the river (47.3%) and unprotected wells and *berkads* (30.6%), the water consumed is not necessarily safe and might dispose to water borne diseases.

Table 5: Water Access and Quality

	N	(% (95% CI))
<i>Main source of drinking water (N=444):</i>		
River / unprotected	210	47.3 (42.6 – 52.1)
Unprotected wells/ <i>berkads</i>	136	30.6 (26.4 – 35.4)
Tap	57	12.8 (9.9 – 16.4)
Protected wells/boreholes	41	9.3 ( 6.3-14.9)
<i>Distance to nearest water point (N=444):</i>		
≤ 500 meters	220	49.5 (44.8 – 54.3)
501m - < 1 km	128	28.8 (24.7 – 33.3)
1 – 3 km	66	14.9 (11.8 – 18.6)
More than 3km	30	6.8 (4.7 - 9.6)
<i>Number of clean water containers:(N=444)</i>		
1 - 2 containers	150	33.8 (29.4 – 38.4)
3 - 4 containers	123	27.7 (23.6 – 32.2)
5 containers	32	7.2 (5.1 – 10.1)
> 5 containers	139	31.3 (27.1 – 35.9)
<i>Method of water storage:</i>		
Covered containers	347	78.2 (74.0 – 81.9)
Open containers	65	14.6 (11.6 – 18.4)
Constricted neck ( <i>Ashun</i> )	32	7.2 (5.1 – 10.1)

### 3.1 Sanitation and Hygiene Practices.

Sanitation facilities that were most commonly used are pit latrines (50.5%) and a designated area/bush (44.4%). Improved pit latrines (3.2%) and flush toilets were very rare in the community. In most (68.4%) of these cases, the distance between latrine and water source was more than 30 meters away from the homestead as recommended (Sphere 2004) – however, about a third (31.6%) of the sanitation facilities were located closer to the water sources posing a risk of water contamination.

Table 6: Distribution of households by sanitation & Hygiene

<i>Sanitation and hygiene</i>	n	% (CI)
<i>Access to Sanitation facility (N=444)</i>		
Flush toilets	9	2.0 (1.0- 4.0)
VIP latrines	14	3.2 (1.8 – 5.4)
Traditional /open pit latrine	224	50.5 (45.7 – 55.2)
Open ground/Bush	197	44.4 (39.7 – 49.1)
<i>Distance from latrine to water source (N=247)</i>		
< 30meters	78	31.6 (25.8– 37.8)
≥ 30 meters	169	68.4 (62.2 – 74.2)
<i>Washing Agent (N=444)</i>		
Soap	385	86.7 (83.1– 89.7)
Shampoo	10	2.3 (1.1 – 4.2)
Ash	20	4.5 (2.8 – 7.0)
Plant extracts	2	0.5 (0.1 – 1.8)
None	27	6.1 (4.1 – 8.8)
<i>Method of Food Storage (N=444)</i>		
Suspended in hooks/ropes	19	4.3 (2.7 – 6.7)
Put in pots beside fire	49	11.0 (8.4 – 14.4)
Put in covered containers	158	35.6 (31.2 – 40.3)
Don't store	218	49.1 (44.4 – 43.8)

Most (86.7%) of the households used soap for washing. The rest used ash, shampoo or plant extracts. Some 6.1% of the assessed households, however, did not have or use any washing detergent and were at risk of food borne diseases through handling of food with dirty hands.

About half of the households did not store any food. However majority of those who stored food (35.6%) did so in covered containers. The rest stored food in pots besides fire suspended.

### 4.3 Health Seeking Behaviour

About 40% of the assessed children reportedly fell sick in the two weeks prior to the assessment. Majority of them (47.7) sought health care assistance from private clinics or bought drug from pharmacies. About 22% were taken to public health facilities and 7.9% of the children were taken to traditional healers. About 14% of the children did not receive any medical attention.



Table 7: Health seeking behaviour (N=911)

	n	% (CI)
<i>Child fell sick?</i>		
Yes	367	40.3 (37.1 – 43.6)
No	544	59.7 (56.4– 62.9)
<i>Where assistance was sought (N=333)</i>		
Private clinic/ pharmacy	175	47.7 (42.5 – 52.9)
Public health facility	81	22.1 (18 - 26.7)
Own medication	29	7.9 (5.4 – 11.3)
Traditional healer	29	7.9 (5.4 – 11.3)
No assistance sought	53	14.4 (11.1 – 18.6)

#### 4.4 Formal and informal support

Nine percent of the households reported having received some informal support in the three months prior to assessment. Most of the social support was in the form of small loans (4.5%) or remittances from within Somalia (1.6%). Others received gifts (1.6%), zakat (0.9%) from the better off households or remittances from abroad (0.9%)

Formal support was received by about a quarter of the households (24.1%). and was mainly in the form of free food (21.6%), cash for work (1.6%) and food for work (0.9%).

21.6% (197) of the assessed children came from households that received free food distribution. Of the 140 of the assessed children who were malnourished, only 27 (19.3%) came from households that received free food aid. However there was no statistical association between malnutrition and free food ( $P>0.5$ ). Additionally, only 0.2% of the assessed children (2) received supplementary food.

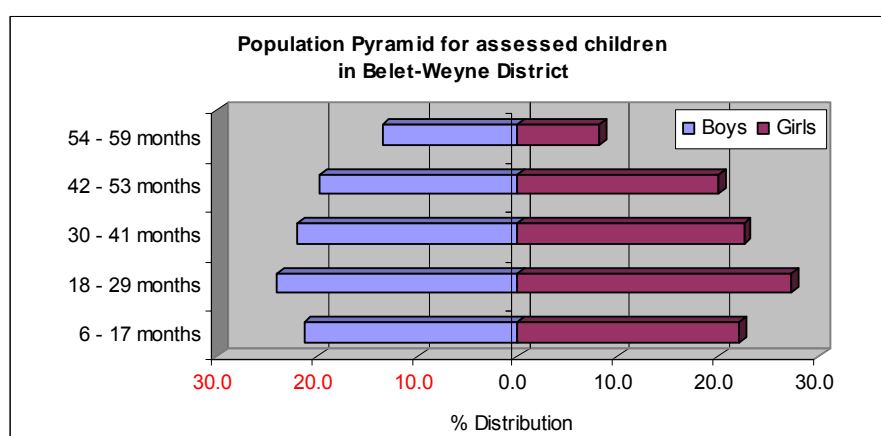
<i>Table 8: Formal and informal support</i>		
	N	% (CI)
<i>Informal support (N =494)</i>		
Received:		
Yes	41	9.2 (6.8 – 12.4)
No:	403	90.8 (87.6 – 93.2)
Type of support		
Zakat from better off households	4	0.9 (0.3- 2.5)
Remittances within Somalia	6	1.6 (0.6 – 3.1)
Remittances from abroad	4	0.9 (0.3 – 2.5)
Gifts	7	1.6 (0.3 – 3.4)
Loans	20	4.5 (2.8 – 7.0)
<i>Formal support (N = 494)</i>		
Received:		
Yes	107	24.1 (20.2 – 28.4)
No	337	75.9 (71.6 – 79.8)
Type of Support (N=107)		
Free food	96	21.6 (17.9 – 25.8)
Cash for work	7	1.6 (0.7 – 3.4)
Food for work	4	0.9 (0.3 – 2.5)

#### 4.4 Characteristics of assessment children

Table 9: Distribution of children according to age and sex

Age	Boys		Girls		Total		Ratio
	n	%	n	%	n	%	
6-17 months	103	21.2	94	22.1	197	21.6	1.1:1
18-29 months	116	23.9	116	27.2	232	25.5	1.4:1
30-41 months	106	21.9	96	22.5	202	22.2	1.1:1
42-53 months	95	19.6	85	20.0	180	19.8	1.1: 1
54-59 months	65	13.4	35	8.2	100	11.0	1: 1.1
Total	485	52.3	426	46.8	911	100	1.1:1

A total of 911 children were assessed from 444 households, 46.8% were girls and 52.3%, boys. The ratio of boys to girls was 1:1.1. Each age group as shown in table 9 represented between 19% and 25% of all the children but for those over 54 months (11.0%).



#### 4.5 Nutritional status of assessment children using anthropometry

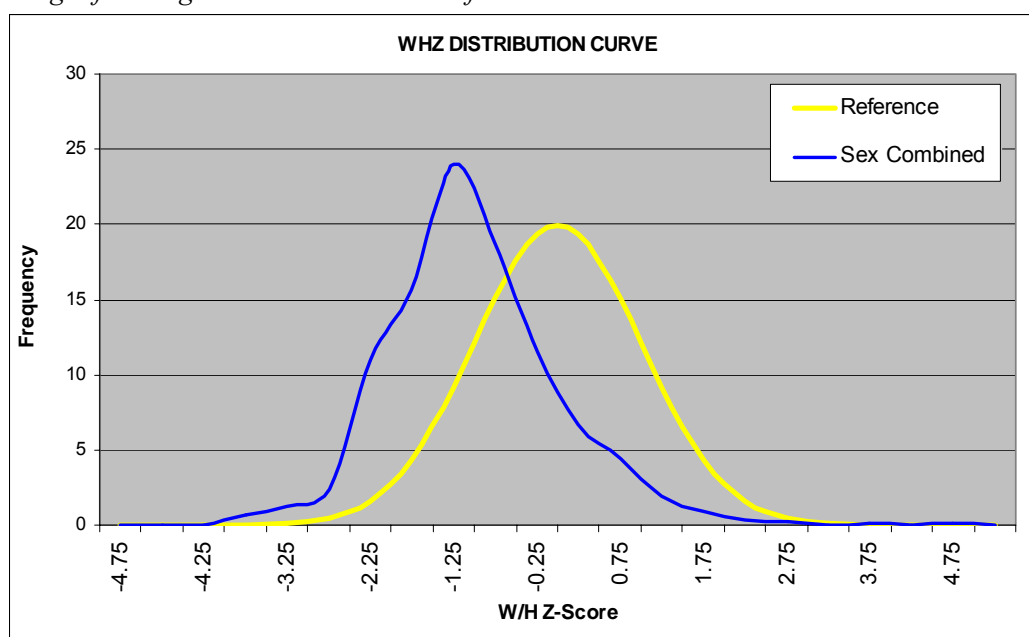
Table 10: Summary of Global Acute malnutrition and Severe Acute Malnutrition

Malnutrition Rates	No	Proportion (%)
Global Acute Malnutrition (<-2 Z score or oedema)	140	15.4 (12.3-17.9)
Severe Acute Malnutrition (<-3 Z score or oedema)	18	2.0 (0.9-3.2)
Oedema	0	0

The global acute malnutrition using WFH Z score (<-2 z-scores or oedema) was 15.4% (CI: 12.3–17.9) while severe acute malnutrition (<-3 z-score or oedema) was 2.0 % (CI: 0.9 – 3.2). No case of oedema was detected during the assessment. Distribution of the weight-for-height scores was

skewed towards the left (negative side which suggests a poorer nutrition situation according to international (WHO) standards (skewness = 0.654).

*The Weight for Height Distribution Curve of the Assessed Children*



Analysis of the data by the ‘Plausibility Check of the Nutrisurvey’ indicates skewness of 0.654, kurtosis of 1.697 and a standard deviation of 1.029 for the WHZ which is within acceptable range of 0.85-1.10.

*Table 11: Distribution of children by nutritional status (WHZ-score or oedema) and child sex*

Nutrition status category	Males		Females		Total	
	<i>N<sub>0</sub></i>	% (CI)	<i>N<sub>0</sub></i>	% (CI)	<i>N<sub>0</sub></i>	% (CI)
Global acute malnutrition (WFH<-2 z score/oedema)	76	15.7 (12.6–18.8)	64	15.0 (10.7 – 19.3)	140	15.4 (12.3–17.9)
Severe acute malnutrition (WFH <-3 z score/oedema)	13	2.7 (1.4 – 4.0)	5	1.2 (0.1 – 2.5)	7	2.0 (0.9-3.2)
Oedema	0	0	0	0	0	0

About 15.7% of the boys and 17.6% of the girls were acutely malnourished in the assessment, using weight for height <-2 Z score or presence of oedema. However statistical analysis indicates no association between sex and acute malnutrition (P=0.07).

*Table 12: Malnutrition prevalence by age categories*

Age Category	Malnourished (WFH<-2 z score/oedema)	
	<i>N<sub>0</sub></i>	% (CI)
6-29 months	76	17.7 (CI: 14.3-21.7)
30-59 months	64	13.3 (10.4-16.7)
Total	140	15.4 (12.3-17.9)

Analysis of malnutrition by age category (6-29 and 30-59 months) indicates no statistical significance (p=0.34).

Table 13: Malnutrition prevalence using WFH percentage of median categories

Nutrition status categories	Males		Females		Total	
	No	(%)	No	(%)	No	(%)
Global acute malnutrition (WFH<80% or oedema)	41	8.5 (6.3 – 10.6)	44	10.3 (6.6 – 14.0)	85	<b>9.3</b> <b>(CI: 6.8-11.8)</b>
Severe acute malnutrition (WFH<70% or oedema)	3	0.6 (0.1 – 1.3)	4	0.9 (0.5 – 2.3)	7	<b>0.8</b> <b>(0.04 – 1.5)</b>

The global acute malnutrition among children aged 6 – 59 months using weight for height <80% of median or presence of oedema was 9.3% (CI: 6.8 – 11.8) while severe acute malnutrition <70% of median or presence of oedema was 0.8% (CI: 0.04 – 1.5).

### Stunting

The level of global chronic malnutrition as indicated by Height for Age indicator (< -2Z scores) is 21% (CI: 16.1-25.9). Severe Chronic malnutrition (< -3 scores) is 8.2% (CI: 5.1-11.4). Stunting levels of 20-29% indicate a **poor**/alert situation (WHO classification).

### Underweight

The level of global underweight as indicated by Weight for Age indicator (< -2Z scores) is 29.3% (CI: 24.1-34.5). Severe Underweight (< -3 Z scores) is 6.6% (CI: 4.0-9.2). Underweight levels of 20-29.9% indicate a **serious** situation (WHO classification).

Using mid upper arm circumference (MUAC) measurements for children aged 12-59 months, a total of 3.6% (CI: 2.2 – 5.9) of the children were identified as acutely malnourished (MUAC<12.5 cm or oedema). About 0.6% (CI: 0.2 – 1.5) were identified as severely malnourished (MUAC<11.0 cm or oedema) while 15.1 % (CI: 12.7 – 17.8%) were identified at risk (12.5<MUAC <13.5 cm) of acute malnutrition.

Table 14: Nutrition status of Children (12-59 months) by MUAC

Malnutrition	Males		Females		Total (N=825)	
	N	%	N	%	N	% (95% CI)
Severe (MUAC <11 cm) or oedema	2	0.5 (0.1 - 1.8)	3	0.8 (0.2- 2.5)	5	0.6 (0.1 - 1.2)
Moderate (11≤MUAC<12.5 cm)	10	2.3 (1.2 – 4.3)	14	3.7 (2.1- 6.3)	24	3.0 (0.9-2.8)
Global (MUAC <12.5 cm) or oedema	12	2.8 (1.3 - 4.4)	17	4.5 (2.3 - 6.8)	29	3.6 (1.2 - 3.2)
At risk (MUAC 12.5- <13.5 cm)	58	13.3 (10.4– 17.0)	64	17.1 (13.5– 21.4)	122	15.1 (6.1 - 9.9)
Acceptable I (MUAC >=13.5 cm)	365	81.3 (80.0 – 87.2)	374	78.3 (73.7 – 82.3)	711	81.3 (78.4 – 83.9)
Total	443	54.2		45.8	817	100

#### 4.7 Morbidity, measles immunisation, polio vaccination and vitamin A supplementation

Morbidity in the assessed children in the two weeks (and one week for measles) prior to the assessment was high (40.3%) as seen in the high incidences of ARI (27.1%), diarrhoea (16.1%) and febrile illness (14.1%). Due to a highly contagious nature of measles, the current reported suspected findings of 5.4% calls for immediate action in the form of a measles vaccination campaign.

Table 15: Morbidity, measles immunisation, polio vaccination and vitamin A supplementation

	No.	%(CI)
<i>Incidence of major child illnesses (N=911)</i>		
ARI within two weeks prior to assessment	247	27.1 (24.3– 30.1)
Diarrhoea within two weeks prior to assessment	147	16.1 (13.8 – 18.7)
Febrile illness within 2 weeks prior to assessment	128	14.1 (11.9– 16.5)
Suspected Measles within one month prior to the assessment (N=853)	48	5.4 (3.9 – 7.0)
<i>Immunization Coverage</i>		
Children (9-59 months) immunised against measles (N=853)	588	68.9 (65.7 – 72.0)
Children who have ever received Polio dose (N= 911)	839	92.1 (90.1 – 93.7)
<i>Vitamin A supplementation (N= 911)</i>		
Children who received Vitamin A supplementation in past 6 months	667	73.2 (67.2 – 79.2)
<i>Micronutrients Deficiencies (N=444)</i>		
Households who reported night blindness		
Member with night blindness	2	0.5 (0.1 – 1.8)
< 6 years	3	0.7 (0.2 – 2.1)
≥ 6 years		

Measles vaccination coverage for eligible children (9-59 months old) was 68.9%. Most (92.1%) of the children aged 6-59 months had received at least a dose of polio vaccine. Over two thirds (73.2%) of the assessed children had received Vitamin A supplementation in the 6 months prior to the assessment. Both the measles vaccination and vitamin supplementation coverage are below the minimum recommended 95% (Sphere 2004)

#### 4.8 Vitamin A Deficiency

5 cases were reported with night blindness, with three being children less than six years. Analysis of findings could not be conducted due to lack of age data for members of the household.

#### 4.9 Feeding practices

None of the children, in the breastfeeding age group of 6-24 months, were exclusively breastfed in the first six months according to international recommendations (Facts for Life booklet, 2002) and only about 48% of the children aged 6-24 months were breastfeeding at the time of the assessment. Over half (56.3%) of the breastfeeding children were breastfed on demand and another 41.7% breastfed 3- 6 times. For those who had stopped breastfeeding before the recommended age of 24 months, most (38.0%) stopped before their first birthday (6 to 11 months). A cumulative total of about 76.4% had stopped breastfeeding by the age of 18 months. 18.1% did not breastfeed at all.

Over half (53.1) of the 303 children aged 6-24 were introduced to foods other than breast milk early in life between the time of birth and the third month of life. About a fifth was introduced to complementary food at 4 to 5 months. Only about 20% were introduced to complementary food as recommended at the age of 6 months.

About 18% of the children were fed at least once a day with mainly cereal-based meals. Majority of children were fed 3-4 times (451.2). Only 15.2% were fed 5 or more times as recommended (Facts for Life, 2002), which suggests suboptimal feeding practices for children.

<i>Table 16: Children feeding practices</i>		
<i>Children aged 6-24 months (N=303)</i>	<i>N</i>	<i>%</i>
<i>Is child breastfeeding?</i>		
Yes	144	47.5
No	159	52.5
<i>Breastfeeding frequency (N=144)</i>		
1-2 times	3	2.1
3-6 times	60	41.7
On demand	81	56.3
<i>Age stopped breastfeeding (N=159):</i>		
0 - 5 months	26	16.4
6 - 11 months	61	38.0
12 – 18 months	35	22.0
More than 18 months	7	4.4
Never breastfed	30	18.1
<i>Introduction of Complementary feeding (N=303)</i>		
0 - 3 months	161	53.1
4 – 5 months	58	19.1
6 Months	60	19.8
7 or more months	24	7.9
<i>Feeding frequency (N=303)</i>		
Once	55	18.2
2 times	47	15.5
3 – 4 times	155	51.2
5 or more times	46	15.2

**Dietary Diversity**

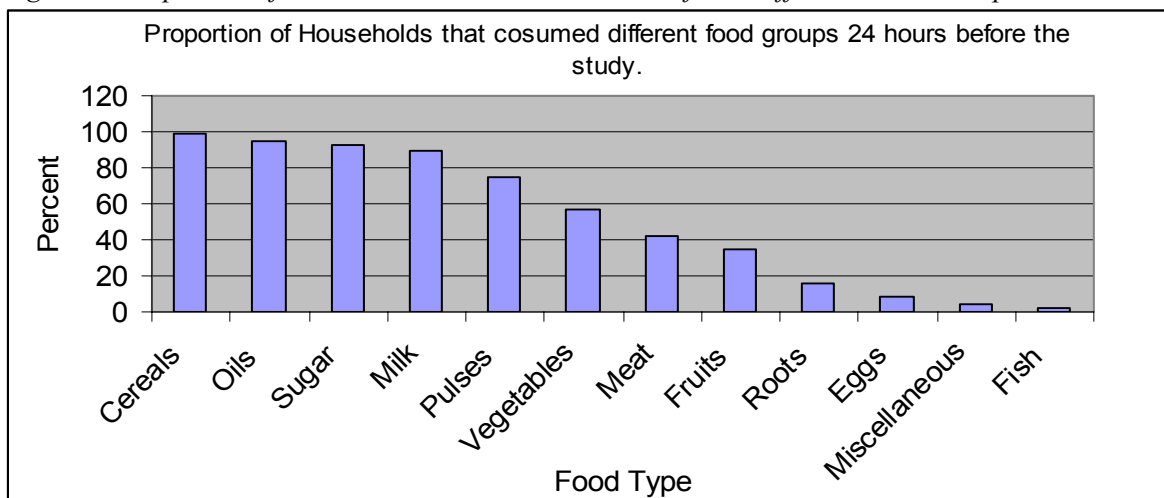
*Table 17: Distribution of dietary diversity among households*

As shown in table 17, about 4% households had consumed three or fewer food groups within 24 hours prior to the assessment. Most households (96%) consumed a diversified diet of four or more food groups. Cereals provide the bulk of the food in the household diet.

<i>No. of food groups consumed (N=444)</i>	<i>N</i>	<i>%</i>
3 or less food groups	18	4.1
4 food groups	39	8.8
5 food groups	103	23.2
6 food groups	109	24.5
7 food groups	79	17.8
8 food groups	28	13.5
9 food groups	11	6.3
10 food groups	8	1.8
1-3 food groups	18	4.1(2.5 – 6.5)
≥ 4 food groups	426	95.9 (93.5 – 97.5)
Mean HDDS Mode = 6	6.1	SD=1.6
<i>Main source of food (N=444)</i>		
Purchasing	354	89.3 (86.1- 91.8)
Own production	61	13.7 (10.7– 17.4)
Food aid	17	3.8 (2.3 – 6.2)
Gifts/donations	7	1.6 (0.7 – 3.4)
Gathering	1	0.2 (0.1 – 1.4)

Figure 4 below shows that cereals, oils, sugar, milk, and pulses were the most common diets, consumed by over 50% of the population. Vegetables and meat were also fairly common and were consumed by over a third of the households. Roots, eggs and fish were consumed by a small percentage of the households.

*Figure 4: Proportion of Households that Consumed Food from Different Food Groups*



Most (89.3%) of the households assessed mainly obtained their food through purchase, 0.2% through own production and about 7% relied on borrowing. Other households obtained their food as gifts (1.8%) or through hunting/gathering (0.2%).

#### 4.12. Relationship between malnutrition and other factors.

Table 19: Risk factors and their relation to total malnutrition.

<i>Exposure variable</i>	<i>N</i>	<i>(%)</i>	<i>Crude RR</i>	<i>95% CI</i>	<i>p-value</i>
<i>Child sex</i>					
Male	76	54.3	1.04	0.77 – 1.42	0.86
Female	64	45.7			
<i>Age group</i>					
6-24 months	52	37.1	1.19	0.87– 1.62	0.34
25-59 months	88	62.9			
<i>Morbidity patterns</i>					
<i>Illness</i>					
Yes	75	53.6	1.68	1.24 – 2.28	0.001*
No	65	46.4			
<i>Health programmes</i>					
<i>Vitamin A Supplement:</i>					
Yes	103	73.6	1.02	0.72 – 1.44	0.20
No	37	26.4			
<i>Dietary &amp; feeding patterns</i>					
<i>Breastfeeding (N=140)</i>					
Yes	26	50	1.10	0.67 – 1.81	0.81
No	26	50			
<i>Dietary diversity</i>					
≤ 3 food groups	8	5.4	1.39	0.74 – 2.63	0.45
≥ 4 food groups	132	94.3			

The data show that children who were suffering from at least one childhood illness were 1.7 times more likely to be malnourished than those who were well (p=0.001).

Further analysis revealed no significant association between malnutrition and other factors.

#### 4.13 Mortality rates

A total of 444 households were assessed for mortality indicator, with a recall period of 93 days prior to the assessment being used. The results generated by the Nutrisurvey software were as presented below:

Mortality rates for children aged 0-59 months, i.e. Under-five mortality rate (U5MR)

##### Number of deaths of children 0-5 years



$$\frac{(\text{Mid point Population* of children 0-5})}{10,000} \times \frac{\text{Time interval}}{\text{Deaths/10,000/day}}$$

\* 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 (mid point) in assessment ed households	= 1,153
Number of under fives who joined the households	= 3
Number of under fives who left the households	= 29
Number of births	= 49
Number of under five deaths	= 15

U5MR (deaths /10,000 children per day) is **1.45 (CI: 0.89 – 2.02)**.

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

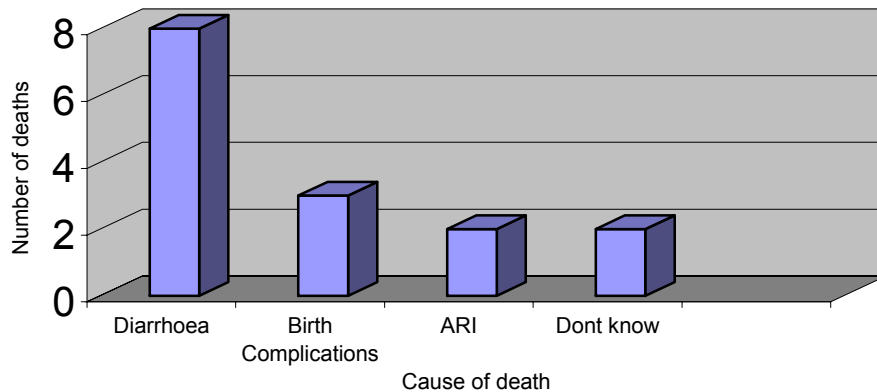
$$\text{CMR} = \frac{(\text{Total Mid point Population})}{10,000} \times \frac{\text{Time interval}}{\text{Deaths/10,000/day}}$$

Total population in assessment ed households	= 5186
Total people who joined the households	= 39
Total people who left the households	= 310
Total number of births	= 49
Total number of deaths in the households	= 26

CMR as deaths per 10,000 persons per day is **0.64 (CI: 0.40 - 0.69)**

The under five mortality and crude mortality reflect a normal situation according to the international standards (WHO classification). As shown on figure 6, diarrhoeal diseases were the main reported cause of under-five mortality. Other factors include death resulting from birth complications ARI and Meningitis .

Figure 5: Reported causes of under five mortality



#### 4.14 Qualitative information

Qualitative information was collected from observations, focus group discussions and key informant interviews. A total of 6 focus group discussions were held, with mothers and with men (elders). The discussions were centred on feeding and care practices, health care, food security, and water and sanitation issues.

##### Water and sanitation

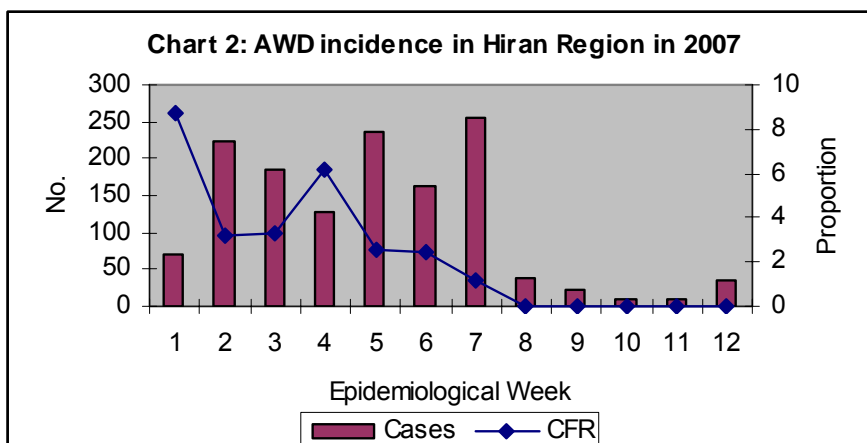
The main source of water is the river and it likely that the water is contaminated given that the town of Belet-Weyne offloads most of its waste into the river. Moreover, majority of the population uses open ground/bush to for human waste disposal including that of the children which further increases the risk of water borne diseases since water is not boiled prior to consumption. On average the distance to the water points for most of the households is less than a kilometre.

##### Main income sources.

Agriculture and casual labour are the most important sources of income. Casual labour is mainly available in Belet-Weyne town and mainly in forms of loading and offloading of goods, fetching water with donkeys for urban. In addition petty trade including renting of vehicles, charcoal burning and selling contributes to household income.

##### Common illnesses

Among the adults in the region the most commonly reported illnesses include ARI, skin diseases and Malaria. For children diarrhoea is the most commonly reported although ARI and malaria are also fairly common. According to the WHO AWD bulletin for June 29<sup>th</sup>, 2007, the trend of acute malnutrition reached a peak in the epidemiological week 7 (February) after which the number of reported cases and related case fatality rate decreased to zero (See chart 2 below).



## 5. DISCUSSION AND CONCLUSION

The assessment results indicate a Global Acute Malnutrition (Weight-for-Height <-2 Z score or oedema) of **15.4 %** (CI: 12.3 – 17.9) and Severe acute malnutrition of **2%** (CI: 0.9-3.2) compared to 2.3% (CI: 1.5% - 3.6%). This indicates a critical nutrition situation (WHO) and is consistent with findings from previous assessments [July 2003 with GAM of 17.1% (CI: 14 - 20.9) and May 2002 with GAM of 21%(CI: 18.4 - 23.8)].

Additional findings indicate the under five mortality rate of **1.45** deaths/10000/day) and crude mortality rate of **0.64** deaths/10000/day. These levels are categorized as ‘acceptable’ according to the WHO classification. Moreover, the findings indicate a reduction in mortality rates since the last assessment in 2003 when under five mortality was **3.5/10000** persons per day and Crude mortality of **1.43/10000** persons/day. This reduction in mortality is possibly explained by the response that has continued to be undertaken in the Hiran region since 2002. Additionally, the January 2007 outbreak of acute watery disease in Hiran has now been controlled and since the epidemiological week 7 (February) has dropped to 0.0%.

Analysis of qualitative data suggests child feeding practices especially breastfeeding and complementary feeding as suboptimal. In most cases, the duration of breastfeeding is less than one year against the recommended 24 months. Moreover complementary feeding is introduced so early, sometimes in the first day of life exposing the child to risk of contamination and exposure to pathogens.

Dietary diversity is good for most of the households and a good proxy indicator of food security. At the moment the level of dietary diversity suggests that most of the households (89.3%) are able to access a variety of foods through purchase, 0.2% through own production and only about 7% relied on borrowing, indicating significant recovery of their means of accessing food.

Most of the population draw water from the river as well as other unprotected water sources (*berkads*). The quality of water, especially for human consumption, is poor. The contamination of Shabelle River especially by urban waste and animals, poses a serious health risks to these residents as the water is not boiled prior to consumption.

The general sanitation of the population’s residential areas is also poor. Access to sanitation facilities is very low with majority using the bush. This kind of sanitation situation combined with unprotected water sources and suboptimal and inappropriate food and water storage methods possibly explains the prevalence of diarrhoea as key factor in morbidity, acute malnutrition and mortality.

## **6.0 RECOMMENDATIONS**

Following discussions held after sharing the results with partners and detailed data analysis, the following recommendations were made:

1. Improve water quality for household level consumption through establishment of a central water purification system and encourage the population to boil drinking water
2. Enhance delivery of basic health services including intensifying EPI services/linking vitamin A supplementation with polio vaccination programmes.
3. Continued & improved provision of health services in the area through increased the capacity of community health workers.
4. Rehabilitation of acutely malnourished children and women through the existing health care centres.
5. Intensify health & nutrition education focussing on care practices and micronutrient issues.
6. Promote the availability and consumption of micronutrient rich foods at household level through kitchen gardens and conducting food preparation demonstrations
7. Improve the quality of maternal health care services in the area.
8. Continued monitoring of the nutritional and food security situation.

## 9. APPENDICES

### Appendix 1: Sampling frame for Belet-Weyne district

District	Name of settlement	cumulative population	cluster
	Heegan 1	1200	
	Heegan 2	1200	1
	Heegan 3	1200	
	Heegan 4	1200	
	Hilaal 1	1200	2
	Hilaal 2	1200	
	Hilaal 3	1200	
	Sigalow IDP	930	3
	Wodajir 1	1000	
	Wodajir 2	1000	
	Horseed 1	1000	
	Horseed 2	1000	4
	Hantiwadag 1	1000	
	Hantiwadag 2	1000	
	Hantiwadag 3	1000	5
	Doon sahage 1	1000	
	Doon sahage 2	490	
	Bulo kheyr 1	750	
	Bulo kheyr 2	705	
	Sahan	1500	6
	Kalaew	3000	7
	Irtin	2500	
	Hormarka 1	1150	8
	Hormarka 2	1150	
	Rid Amin 1	600	
	Rid Amin 2	600	
	Hodon 1	1400	9
	Hodon 2	1400	
	Waberi 1	400	
	Waberi 2	300	
	Radar 1	670	
	Radar 2	600	10
	Xudurboor	410	
	Caloolacad	420	
	Bacaadlaaw	290	
	Hoyin	370	
	Doonkaay	275	
	Gambarlaabe	300	
	Cadileey	260	
	Ma,anqale	275	
	Tixey	160	
	Belet-Amin 1	390	
	Luq-Jelow	640	
	Ba,yar West	200	
	Jaadle	195	
	Doolo-Qoyan	710	

DUR dur	200	39640	
Qoolaaw	235	39875	
Qurdhun	200	40075	
Axmed Ileey	300	40375	
Yucubka	400	40775	
Jiiqley	170	40945	
Gumareey	300	41245	
Jiiqleey	240	41485	
Doondheere	120	41605	
Haraale	240	41845	11
Haraale	240	42085	
Raangaabo	300	42385	
Wardhabeel	300	42685	
Ceelka- Baar	400	43085	
Burjada Ciinta	150	43235	
Ceelka- Baar	400	43635	
Ceel-Baar	400	44035	
Bakale West	250	44285	
Ceel-Dheer	450	44735	
Ceel-Cali	2860	47595	12
Ceel-Cali	3190	50785	13
Ceel-Qulaay	200	50985	
Ceel- Cali	380	51365	
Dharkeynta	530	51895	
Bulo-Kahin	500	52395	
Haar Caddey	200	52595	
Buulo-Kaahin	300	52895	
Dharkeynta	400	53295	14
Siigaloow	900	54195	
Kelidheer	325	54520	
Baladusalaam	340	54860	
Doolo Madow	315	55175	
Kelidheer	325	55500	
Qarsooni-West	290	55790	
Doon kudle	400	56190	15
Ma'aruf	310	56500	
Qoydo	445	56945	
Belet-Amin 2	260	57205	
Bacad-Buke	250	57455	
Doonkudle	270	57725	
Deefooow West	185	57910	
Xamiirweyn	240	58150	
Qajaaqur	370	58520	
Xaboow	345	58865	
Qajaaqur	400	59265	
Badikeen	370	59635	
Quracle-Wabar	190	59825	
Garabmuuqde	220	60045	
Xaboow	345	60390	
Quracle	190	60580	

Garabmuuqde	250	60830	
Buqkoosaar	800	61630	16
Caag-Sabir	150	61780	
Yarmooge	250	62030	
Ceel cade	225	62255	
Farlibah	3000	65255	17
Farlibaax	3000	68255	
Xaruunley	240	68495	
Maroodile	160	68655	
Ow-Ileey	190	68845	
Sheydaankor	180	69025	
Burfiiq	400	69425	
Deefooow West	185	69610	18
Xaaji Nuur	400	70010	
Bakale East	350	70360	
Dhirimaadle	270	70630	19
Geedlabeenaad	350	70980	
Camalow	760	71740	
Dhagaxyaweyn	400	72140	
Bakale East	360	72500	
Bardaale	105	72605	
Doonka	240	72845	
Cadileey East	550	73395	
Macloow	375	73770	
Doonka	240	74010	
Cadiley	395	74405	
Warhuubo	360	74765	
Quracley	640	75405	20
Heloba,ad	360	75765	
Macloow	375	76140	
Baaey East	650	76790	
Sugow	420	77210	
Galyare	190	77400	
Helobacaad	330	77730	21
Dhakran	535	78265	
Dhoqor	520	78785	
Dhagran	535	79320	
Eelaaleey	240	79560	
Buulo-Qorax	300	79860	
Baacyar	640	80500	
Baalcad	400	80900	
Dancad	480	81380	22
Hel-Ari	300	81680	
Cadilibaah	250	81930	
Doolayaabeen	530	82460	
Keli-Dheenle	210	82670	
booco	3240	85910	23
Cadi-Libaax	250	86160	
Booco	3240	89400	24
Daayoow	470	89870	

Iriboow	230	90100	
Wad Harar	300	90400	
Goleey	340	90740	
Food Cadde	410	91150	
300-Kilometer ( Tre-jante )	850	92000	25
Ceel lahelay	290	92290	
Nuur Fanax	1235	93525	
115-Kilometer	260	93785	
Gumareey	300	94085	
Hujuub	200	94285	
Nuur Fanax	565	94850	
Faaf Gumare	300	95150	
Xujuub	200	95350	
Km 115	250	95600	26
Baar-Dheere	550	96150	
Beer Xaano	670	96820	
Dhoofa	200	97020	
Ari Ogeys	130	97150	
Ari Ogeys	130	97280	
Baar	200	97480	
Gal-Xamur	120	97600	
Bilisdiid	440	98040	
Shiniile	375	98415	
Helo-Keliyo	200	98615	
Hodlei	325	98940	
Hiiraan	720	99660	27
Baaslaawe	420	100080	
Dheriyoow	460	100540	
Baaslaawe	420	100960	
Lafoole	280	101240	
Garaash	390	101630	
Lafoole	280	101910	
Leeboow	540	102450	
Jiqey	110	102560	
Caris	175	102735	28
Ceel-Gaal	700	103435	
Indhocaad	375	103810	
Sabad Caano	240	104050	
Ilka-Cadde	400	104450	
Baraagta East	290	104740	
Jawil	625	105365	
Qooqane	370	105735	
Qarsooni Bari	575	106310	29
Bacaad	365	106675	
Qooqane	370	107045	
Dhanaane	400	107445	
Buulo-Raaxo	375	107820	
Luuq-Dheere	350	108170	
Kabxanley	550	108720	
Deefoow East	600	109320	



Jeerey	390	109710	30
Madiino	120	109830	
Tawakal	450	110280	
Deefoow East	900	111180	
Quracle Wanbar	190	111370	
rm=1910	Cluster interval	3712	

## Appendix 3: Standard Nutrition Assessment Questionnaire

### HIRAN RIVERINE/PASTORAL/AGROPASTORAL NUTRITION ASSESSMENT

#### QUESTIONNAIRE

Date \_\_\_\_\_ Team Number \_\_\_\_\_ Cluster Number \_\_\_\_\_ Name of Supervisor \_\_\_\_\_ Name of enumerator \_\_\_\_\_

Name of Village/Town \_\_\_\_\_ Household Number \_\_\_\_\_ Name of the Respondent \_\_\_\_\_

#### Q1-14 Characteristics of Household

Q1 Household size<sup>4</sup> \_\_\_\_\_

Q2 Number of < 5 years (U5s)? \_\_\_\_\_ Number of children aged 24-71 months (2 - <6 years): \_\_\_\_\_

Q3 Household residence status: 1= Resident<sup>5</sup> 2=internally displaced<sup>6</sup> 3=Returnees<sup>7</sup> 4=Internal immigrant<sup>8</sup> 5=Destitute 6=Other (specify)

*If answer to the above is 1, then move to Question 8.*

Q4 Place of origin (categorize during questionnaire design) Within Hiran region 2= Outside Hiran (within Somalia) 3= Ethiopia 4= other (specify) \_\_\_\_\_

Q5 Duration of stay \_\_\_\_\_

Q6 Reason for movement: 1= Civil insecurity/ fighting 2=Seeking jobs 3= Food shortage 4= Food/pasture/water shortage 5= Seasonal/climatic 6= Others; specify \_\_\_\_\_

Q7 What is the main livelihood systems used by this household? 1= Pastoral 2=Agro- pastoral 3=Urban 4=Fisheries 5=Agriculture

Q8 Main Source of income? 1= Animal & animal product sales 2= Crop sales 3= Petty trade 4= Casual labor 5= Salaried employment 6= Remittances/gifts 7= Others, specify \_\_

#### Q9-17 Feeding and immunization status of children aged 6 – 59 months (or 65 – 109.9cm) in the household.

<sup>4</sup> Number of persons who live together and eat from the same pot at the time of assessment

<sup>5</sup> A person who dwells in a particular place permanently or for an extended period

<sup>6</sup> A person or groups of persons who have been forced or obliged to flee or 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

<sup>7</sup> Refugees who have returned to their country (Somalia) or community of origin, Somalia, either spontaneously or through organized repatriation [ UNHCR definition]

<sup>8</sup> 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)

First Name	Q9 Age (months) (if child is more than 24 months old, skip to Q21)	Q10 (If 6-24 months) Are you breastfeeding the child? (if no, skip to Q18) 1=Yes 2=No	Q11 (If 6-24 months) If breast feeding, how many times/day? 1=2 times or less 2=3-6 3=On demand	Q12 (If 6-24 months) If not breast feeding, how old was the child when you stopped breast-feeding? 1= less than 6 months 2=6-11 months 3=12 – 18 months 4= $\geq$ 18 months 5= Never breastfed	Q13 (If 6-24 months) At what age was child given water/ foods other than breast milk? 1=0-3 months 2=4-5 months 3=6 months 4=7 months or more.	Q14 (If 6-24 months) 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	Q15 Has child been provided with Vitamin A in the last 6 months? (show sample) 1=Yes 2=No	Q16 (Only if $\geq$ 9 months old) Has child been Vaccinated against measles in the last 6 months? 1=Yes 2=No	Q17 Has the child ever been vaccinated orally? 1=Yes 2=No
1									
2									
3									

**Q18-33** Anthropometry and morbidity for children aged 6 – 59 months or (65 – 109.9cm) in the household

First Name <i>Follow same order as per preceding table (on page 1)</i>	Q18 Child Sex 1=Male 2=Female	Q19 Oedema 1=yes 2=no	Q20 Height (cm)	Q21 Weight (kg)	Q22 MUAC (cm)	Q23 Diarrhoea <sup>10</sup> in last two weeks  1= Yes 2= No	Q24 Serious ARI <sup>11</sup> in the last two weeks  1=Yes 2=No	Q25 Febrile illness/suspected Malaria <sup>12</sup> in the last two weeks  1=Yes 2=No	Q26 (If $\geq$ 9 month) Suspected Measles <sup>13</sup> in last one month  1=Yes 2=No	Q27 [Applicable for a child who suffered the diseases in Q29 – 32)  Where did you seek healthcare 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										

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

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

Codes for adult illnesses	
0= None	1= ARI
2=Diarrhoeal	3=Malaria/febrile
4=Joint ailments	5=Urinal
6=Organ ailments	7=Anaemia
8= Reproductive	9=Other, specify

<sup>9</sup>Child having received breast milk either directly from the mothers or wet nurse breast within the last 12 hours

<sup>10</sup>Diarrhoea is defined for a child having three or more loose or watery stools per day

<sup>11</sup>ARI asked as oof wareen or wareento. The three signs asked for are cough, rapid breathing and fever

<sup>12</sup>Suspected malaria/acute febrile illness: - the three signs to be looked for are periodic chills/shivering, fever, sweating and sometimes a coma

<sup>13</sup>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

**Q29** Does any member of the household have difficulty seeing at night or in the evening when other people do not? 1= 24- 71 months (U6 years) 2= $\geq$  6 years 3= None

**Q30-33 Access to water (quality and quantity)**

Q30 Main source of drinking water 1 = Tap/ piped water 2= Protected wells, boreholes 3 = Unprotected shallow wells or berkads 4=Others, specify \_\_\_\_\_

Q31 Average distance to the nearest water point 1= $\leq$ 500 meters 2=501m – 1 km 3= 1-3 km 4= more than 3 km

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*)

**Q34-37 Sanitation and Hygiene (access and quality)**

Q34 Type of toilet used by the household: 1=Flash toilet 2=Improved pit latrine (VIP) 3=Traditional pit latrine 4=Open pit 5= designated area 6=Bush (*If Bush skip to*

**Q36**)7=Others \_\_\_\_\_

Q35 Distance between toilet and water source 1= less than 30 metres 2= 30 metres or more

Q36 What washing agents do you use in your household? 1=soap 2=shampoo 3=ash 4=plant extracts 5=None

Q37 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 38. Food Consumption & Dietary 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 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
<b>Type of food</b>		<b>What is the main source of the dominant food consumed? (Use codes above)?</b>
1. Cereals and cereal products ( <i>e.g. maize, spaghetti, pasta, caanjera, bread</i> )?		
2. Meat, poultry, offal ( <i>e.g. goat/camel meat, beef; chicken/poultry</i> )?		
3. Eggs?		
4. Roots and tubers ( <i>e.g. potatoes, arrowroot</i> )?		
5. Vegetables ( <i>e.g. green or leafy vegetables, tomatoes, carrots, onions</i> )?		
6. Fruits ( <i>e.g. water melons, mangoes, grapes, bananas, lemon</i> )?		
7. Pulses/legumes, nuts ( <i>e.g. beans, lentils, green grams, cowpeas</i> )?		
8. Milk and milk products ( <i>e.g. goat/camel/ fermented milk, milk powder</i> )?		
9. Oils/fats ( <i>e.g. cooking fat or oil, butter, ghee, margarine</i> )?		
10. Sugar and honey?		
11. Fish and sea foods ( <i>e.g. fired/boiled/roasted fish, lobsters</i> )?		
12. Miscellaneous ( <i>e.g. spices, chocolates, sweets, etc</i> )?		
<b>Q39 In general what is the <u>main</u> source of food in household? (*Use codes above)</b> _____		
<b>Q40 Total number of food groups consumed (filled by enumerator):</b> _____		

**Q41 - 42 Informal and formal Support or Assistance in last three months** *(circle all options that apply)*

**Q41** Which of these informal supports did you receive within the last three months if any? [*optional/tailored to region*]

- 1=Zakat from better-off households      2=Remittances from Abroad      3=Remittances from within Somalia  
4=Gifts      5=Loans      6=None      7= Other (specify) \_\_\_\_\_

**Q42** Which of this formal international or national aid support did you receive within the last three months if any?

- 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) \_\_\_\_\_**

Checked by supervisor  
*(signed):*  
\_\_\_\_\_

**Assessment Team:**

Overall Coordination of the Assessment	Sicily Matu	FSAU Senior Project Officer
	Peter Kingori	FSAU Project Officer
Report Writing	Ahono Busili	Deputy Nutrition Project Manager
	Peter Kingori	FSAU Project Officer
Technical Guidance and Support	Grainne Moloney	FSAU Nutrition Project Manager
Supervisors (TBC)		
Enumerators (TBC)		

## Nutrisurvey Plausibility check:

### Anthropometric Indices out of usual range (mean -4.0, mean +4.0):

Line 6: HAZ (4.293), probably age is incorrect  
Line 16: HAZ (3.674), probably height is incorrect  
Line 76: HAZ (3.632), probably age is incorrect  
Line 142: WAZ (5.646), HAZ (11.790), probably age is incorrect  
Line 190: HAZ (3.912), probably age is incorrect  
Line 195: HAZ (-4.982), probably age is incorrect  
Line 226: HAZ (4.858), probably age is incorrect  
Line 247: HAZ (5.836), probably age is incorrect  
Line 254: HAZ (4.538), probably age is incorrect  
Line 273: HAZ (5.809), probably age is incorrect  
Line 292: WAZ (3.351), WHZ (3.872), probably weight is incorrect  
Line 305: HAZ (3.864), probably age is incorrect  
Line 312: WAZ (-5.992), HAZ (-5.846), probably age is incorrect  
Line 313: WAZ (-5.450), probably age is incorrect  
Line 322: HAZ (5.346), probably age is incorrect  
Line 324: HAZ (-4.629), probably age is incorrect  
Line 332: WAZ (2.950), WHZ (4.664), probably weight is incorrect  
Line 426: HAZ (-5.990), probably age is incorrect  
Line 451: HAZ (-4.937), probably age is incorrect  
Line 488: HAZ (-5.231), probably age is incorrect  
Line 544: HAZ (3.393), probably age is incorrect  
Line 595: HAZ (-5.231), probably age is incorrect  
Line 756: HAZ (4.697), probably age is incorrect  
Line 774: HAZ (3.658), probably age is incorrect  
Line 789: HAZ (-5.543), probably age is incorrect  
Line 819: HAZ (5.274), probably age is incorrect  
Line 895: HAZ (4.374), probably age is incorrect

### Age distribution:

Month 6 : #####  
Month 7 : #####  
Month 8 : #####  
Month 9 : #####  
Month 10 : #####  
Month 11 : #####  
Month 12 : #####  
Month 13 : #####  
Month 14 : #####  
Month 15 : #####  
Month 16 : #####  
Month 17 : #####  
Month 18 : #####  
Month 19 : #####  
Month 20 : #####  
Month 21 : #####  
Month 22 : #####  
Month 23 : #####  
Month 24 : #####  
Month 25 : #####  
Month 26 : #####  
Month 27 : #####  
Month 28 : #####  
Month 29 : #####  
Month 30 : #####  
Month 31 : ###  
Month 32 : #####  
Month 33 : #####  
Month 34 : #####  
Month 35 : #####  
Month 36 : #####  
Month 37 : #####  
Month 38 : #####  
Month 39 : #####



Month 40 : #####  
Month 41 : #####  
Month 42 : #####  
Month 43 : #####  
Month 44 : #####  
Month 45 : #####  
Month 46 : #####  
Month 47 : #####  
Month 48 : #####  
Month 49 : #####  
Month 50 : #####  
Month 51 : #####  
Month 52 : #####  
Month 53 : #####  
Month 54 : #####  
Month 55 : #####  
Month 56 : #####  
Month 57 : #####  
Month 58 : #####  
Month 59 : #####

**Digit preference Weight:**

Digit .0 : #####  
Digit .1 : #####  
Digit .2 : #####  
Digit .3 : #####  
Digit .4 : #####  
Digit .5 : #####  
Digit .6 : #####  
Digit .7 : #####  
Digit .8 : #####  
Digit .9 : #####

**Digit preference Height:**

Digit .0 : #####  
Digit .1 : #####  
Digit .2 : #####  
Digit .3 : #####  
Digit .4 : #####  
Digit .5 : #####  
Digit .6 : #####  
Digit .7 : #####  
Digit .8 : #####  
Digit .9 : #####

**Standard deviation of WHZ:**

Standard Deviation SD: 1.029 (The SD should be between 0.85 and 1.10)  
Prevalence (< -2) counted: 11.3%  
Prevalence (< -2) calculated with current SD: 13.8%  
Prevalence (< -2) calculated with a SD of 1: 13.1%

**Standard deviation of HAZ:**

Standard Deviation SD: 1.680 (The SD should be between 1.10 and 1.30)  
Prevalence (< -2) counted: 19.2%  
Prevalence (< -2) calculated with current SD: 20.7%  
Prevalence (< -2) calculated with a SD of 1: 8.5%

**Skewness and Kurtosis of WHZ:**

Skewness of WHZ: 0.654 => probably skewed (value >  $2*(6/n)^{1/2}$ )  
(Skewness characterizes the degree of asymmetry around the mean, positive skewness indicates a long right tail, negative skewness a long left tail)  
Kurtosis of WHZ: 1.694 => probably kurtosis problem (value >  $2*(24/n)^{1/2}$ )  
(Kurtosis characterizes the relative peakedness or flatness compared with the normal distribution, positive kurtosis indicates a relatively peaked distribution, negative kurtosis indicates a relatively flat distribution)