

**BOSSASO IDP NUTRITION SURVEY  
REPORT  
BOSSASO DISTRICT  
BARI REGION  
SOMALIA**

August 2002



## **Acknowledgment**

UNICEF wishes to thank the: Ministry of Social Affairs (MOSA) and the Bossaso Mayor for facilitating the fieldwork in the Bossaso Internally Displaced Person (IDP) camps amidst security threats and for participating in discussions of the preliminary survey results in Bossaso town.

UNICEF is grateful to all enumerators and supervisors who provided invaluable inputs and participated in the survey and FSAU for providing contextual information relating to food security, participation in training field staff and supervising data collection.

The data could not have been obtained without the cooperation and support of the communities surveyed especially the mothers and caregivers that took time off their busy schedules to respond to the interviewers.

Bossaso, 20 August 2002

## Executive summary

UNICEF, in collaboration with MOSA, conducted a nutrition survey in the Bossaso IDP camps on 29 June-7 July 2002. Beside the main objective of assessing the nutrition status of the Galkaio under five children using weight for height measurements, the survey also sought to determine potential risk factors associated with malnutrition, household characteristics and measles, National Immunisation Days (NIDs) and vitamin A supplementation coverage of study population.

### Household and general population characteristics

Of the 984 households interviewed, one third (33%) are female-headed with the median household size being 4 (interquartile range 3-5). Slightly more than three-quarters (77%) of the study population are internally displaced with similar proportion having arrived before year 2000. Almost entirely on purchases (97%) for their food source. Income is mainly derived from casual work (53%) and small businesses (43%). Coping mechanisms revolve around borrowing (73%), begging (13%) and purchases (7%).

### Water and environmental sanitation

The IDP residents draw their drinking water mainly from taps/piped water (31%), protected wells (26%), berkads (23%) and tankers/water vendors (18%). Three quarters of the population relieve themselves in the bush/open ground whilst slightly less than a quarter of the population use pit latrines that are observed generally to be used and dirty (71%).

### Nutrition status, feeding practice and risk factors analysis

Nutrition status analysis, using EpiInfo software, of the eligible 598 children, 65-110 cm, suggests severe and global acute malnutrition rates of 7.5% (CI 5.6-10%) and 18.7% (CI 15.7-22.1%) weight-for-height (W/H) Z-Scores respectively.

About two fifths (39%) of the 6-23 months old children had stopped breastfeeding as at the time of the survey. Half of same children stopped breastfeeding with a significant proportion (84%) given complementary feeds during the recommended 6 months period of exclusive breastfeeding. About 90% of these children are fed 3-4 or more times in a day.

Analysis of potential risk factors indicate existence of significant statistical association between sanitary facility (cRR 1.6, p=0.046), age group (cRR 2.1, p=0.000), diarrhoea (cRR 1.9 p=0.000), ARI (cRR 1.6, p=0.008), measles (cRR 1.7, p=0.027), weaning age (cRR 1.7, p=0.042) and global acute malnutrition.

Chi-square test of association indicates significant association between children's age group (6-11; 12-23; 24-35; 36-47; 48-59 months) and acute global malnutrition (p=0.000) with a significant decreasing (chi-square of trend p=0.003) trend in proportion of malnourished children in respective age groups.

### Health and immunisation

Most (83%) families seek assistance when their child(ren) fall sick at private clinic/pharmacy (59%) and public health facility (44%). Lack of money (87%), however, is cited as an important reason for not seeking medical attention. Diarrhoea (21%), ARI (27%) and measles (11%) are an important cause of morbidity among the under fives.

Among the 12-23 months old children, 26.5% had received measles immunisation based on card verification only and 66% by card or history anytime before the survey. Of the infants eligible for measles immunisation, about half had not yet received their jabs as at the time of survey. Survey results suggest 72% vitamin supplementation coverage.

Survey results suggest that during the polio NIDs second round conducted on 15-17 April: 78% of the 6-59 months children population received the polio dose (the preliminary second round polio NIDs results give a 88% coverage for Bossaso district). Of those who missed out during the 2002 NIDs second round, one third said that the child was not at home, 29.5% reported that the polio team did not visit whilst 22% though the vaccine was unsafe/unimportant.

Table 1: Summary statistics

	<i>n</i>	<i>(%)</i>
Global acute malnutrition (n=598)	112	(18.7)
Severe acute malnutrition	45	(7.5)
Diarrhoea past 2 weeks	126	(21.1)
ARI past 2 weeks	162	(27.1)
Malaria past 2 weeks	53	(8.9)
Measles past 1 month	64	(10.7)
Measles immunisation – card and/or history:		
9-11 months (n=53)	27	(51)
12-23 months (n=147)	98	(66.6)
9-59 months (n=533)	376	(70.5)
OPV:		
Last round (2 <sup>nd</sup> round, April 2002)	463	(77.6)
3 doses previous year (2001)	266	(44.5)
Vitamin A supplementation (past 6 months)	431	(72.1)
<i>Are you breastfeeding child (n=265):</i>		
Yes	159	(60)
No	104	(39.2)
Never	2	(0.8)
<i>Age when child stopped breastfeeding (n=104):</i>		
0-6 months	53	(51)
7-11 months	32	(30.8)
12 months or more	19	(18.3)
<i>Weaning age (n=263):</i>		
0-6 months	221	(84)
7 months or more	42	(16)
<i>Feeding frequency (n=265):</i>		
Once	3	(1.1)
2 times	26	(9.8)
3 times	159	(60)
4 or more times	77	(29.1)

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## **1. Background**

Because of relative peace and job opportunities, Bossaso town has experienced an influx of population movement from other parts of the country and from Ethiopia. While the majority of the migrants have settled in town, several small groups continue to live in the outskirts of town in privately owned land in shelter-like structures made of such materials as wood, plastic sheets and cement bags. These relatively underprivileged persons have found it difficult to integrate within the community as they belong to other clans not found in the area.

### **1.1 Food security context**

From late last year, two major shocks – livestock ban and inflation – adversely affected the economy and negatively impacted on economic activities and people's sources of livelihood in Puntland. The resulting increase in foodstuff prices and decreased labour opportunities has considerably weakened the purchasing powers especially of the less privileged members of the community such as the IDPs, poor urban groups and poor pastoral residents.

The occasional port closures, further decreasing labour opportunities, have not helped either. As the population generally depend on imported cereals (mainly maize, pasta and rice), inflation coupled by limited foreign exchange flow and reduced remittances following the 11 September 2001 incident pushed prices of these basic items upwards. With limited social and community support, the IDPs and poor urban people appear to be struggling to meet their daily needs.

### **1.2 Health context**

There is one MCH center, one public hospital and several private clinics and pharmacies in the town. UNICEF supports the MCH center with essential drugs and EPI supplies. The MCH center serves the town population, including the IDPs, with essential health services and EPI. However the utilization of these services are very low.

Health staff from the MCH center provide three round per year of EPI outreach services to the IDPs. EPI acceleration activities conducted over 3 rounds per year and started in 2001 complements both the routine and outreach services. The prevalence of diarrhoea and other communicable diseases are known to be high and cholera cases are usually first reported from the IDP camps. This year, Bossaso experienced a cholera outbreak that adversely affected the IDP population between April and June following an unusual heavy downpour.

### **1.3 Water and Sanitation context**

Within Bossaso town, there are about 17 shallow wells with hand pumps supported by UNICEF. Water from these shallow wells is obtained free of any charge. However, with the introduction of “Bossaso Water Project” (i.e. distribution of deep-well water through city water-pipe network) by UNICEF in 2000, most of the IDP camps now have access to its piped water outlets (i.e. water kiosks: 5 are in place, 3 are under construction and 3 are in plan). The shallow well hand-pump water is currently being used only for domestic (i.e. non-drinking) purposes.

The sanitation in the IDP camps has been poor due to continuous dumping of solid wastes and human excreta in the open grounds. No land is available for garbage dumping in the city and IDPs usually take the garbage back to the camps. UNICEF has been actively involving in this sector by supporting construction of toilets, mobilising IDP communities in the promotion of hygiene practices, provision of sanitation tools and in social mobilisation activities for cholera prevention and response to epidemics/outbreak.

Some of the sanitation facilities (i.e. toilets) supported by UNICEF have been taken over by the private landowners and run for income raising purposes. However, many of them are not properly maintained. Some other private latrines do exist within the camps and these, too, charge a fee for maintenance. Generally, many IDPs continue to relieve themselves in open ground/bush.

To address the problem of garbage dumping, in 2001 before the political conflict, with collective initiatives of Bossaso Municipalities and Bossaso communities, mass-scale garbage collection was initiated with encouraging results. Bossaso Municipality with international assistance are currently looking into possibilities of finding lasting solutions for the garbage dumping sites and town planning to provide access roads.

## **2. Survey objectives**

- To assess the nutrition status of the Bossaso IDP under five children population using weight for height measurements
- To determine potential risk factors associated with malnutrition
- To determine household characteristics of study population
- To determine immunisation – measles and NIDs – and vitamin A supplementation coverage of study population

### 3. Survey methodology

#### 3.1 Study population, survey design and methods

Because of previous conflicting statistics as well as seasonal variations/movements, the survey was designed to screen all eligible children in each identified household/family grouping in the 6 IDP camps in Bossaso. Subsequently, questionnaires (see annex 2) were administered to all the 984 household heads and nutrition status assessed for 598 eligible 6-59 months old children in each household/family grouping as illustrated in table below:

IDP camp	No. Households	No. of children 6-59 months old
Absame	211	131
Ajuuran	78	42
Buulo Eeley	226	146
Shabeele and Tuur Jaale	185	108
Askar	284	171
Total	984	598

Mothers and caretakers were interviewed as to whether their eligible children had: suffered from diarrhoea, ARI and malaria in the 2 weeks prior to the survey; contracted measles in past one month; received vitamin A supplementation in past 6 months; and measles and polio immunisation status. Those with children less than 23 months were interviewed on their feeding practices. Where caretaker or child was absent an appointment was made for a later visit by the team.

The assessment of nutritional status was based on simple anthropometric data and limited only to eligible children. Weight-for-height was the indicator of choice. Diarrhoea was defined as watery stool passed at least three times a day; ARI defined as a child having fever and cough; whilst measles defined as a child with fever and rash and cough, running nose or red eyes.

#### 3.2 Measuring technique and recording

##### Weight

For weighting purposes, 25-kg salter hanging spring scales were used. The scale was adjusted to zero with the weighting pants attached to the hook, child freed of heavy clothing, the weighting pants put on and child suspended from the weighting scales by the handles of the pants. Weight was read to the nearest 0.1 kg with scale at eye level.

##### Height

Children up to 2 years (23 months or 85 cm) of age were measured on a horizontal measuring board and the length read to the nearest 0.1 cm. Those over 2 years of age (or over 85 cm) were measured standing on a horizontal surface against a vertical measuring device and height read to the nearest 0.1 cm.

##### Age



An attempt at determination of age was based on recall using a local traditional calendar/events (see annex 2) and estimates recorded in months. However, with the choice of nutrition indicator being weight-for-height, approximate age was useful in cross tabulation analysis.

### Oedema

Was diagnosed by moderate thumb pressure applied to the back of both feet or ankles for about 3 seconds. This was recorded only for children who had such thumb impression signs remaining for some time on both feet.

### **3.3 Training and supervision**

A 3-day training session for six teams – each composed of 2 enumerators and 1 team leader – was conducted prior to the survey on 29 June -2 July 2002. Plenary session included defining the role and tasks of each member of a survey team, selection of the first and subsequent households in pre-identified clusters as in the sampling frame, interviewing techniques, completion and coding of the survey form, and carrying out anthropometric measurements.

Demonstration of and practice in using questionnaires and measuring heights and weights of children was done followed by a field practical session (in one section of the IDP camp). Here, team members organised survey activities, carried out survey procedures and field-tested the questionnaires. The teams later reconvened, after fieldwork, for feedback and standardisation of procedures.

## **4. Data processing and analysis**

EpiInfo 6 software was used for data processing and analysis. Data for household and child(ren) were entered in two separate files with household numbers as the unique identifier. A questionnaire (.qes) file, with dummy variables, was first created followed by data file (created out of the .qes file) and a CHECK file for interactive checking. The CHECKs set up included must-enter, legal values, range, conditional jumps and programme check.

Depending on the length of the digits anticipated, missing variable, where applicable, were coded as 9/99/999 and excluded (recode 9/99/999=.) during analysis. With a clean data set, the EPINUT programme was used to determine the W/H Z-scores. For ease of data analysis, an analysis programme (.pgm) was written that RELATED household and child files to produce relevant tabulations and associations with nutrition indicators and cut off points as in the table below.

*Table 2: Nutrition status indicators and cut off points*

Nutritional status	W/H Z-Score	W/H % of MEDIAN
Severe acute malnutrition	< -3 or oedema	< 70% or oedema
Moderate acute malnutrition	Between -3 and < -2	between 70% and < 80%
Global acute malnutrition	< -2 or oedema	< 80% or oedema

## 5. Findings and interpretation of results

### 5.1 Description of the study population

Of the 984 households interviewed, one third (33%) are female-headed with the median household size being 4 (interquartile range 3-5). Slightly more than three-quarters (77%) of the study population are internally displaced with similar proportion having arrived before year 2000. The large majority of the population originated from the South and Central zones of Somalia (58%) and Ethiopia (40%) with the reason of movement being insecurity (56%) and lack of jobs (40%). Table 1 gives details of the household characteristics.

Table 3: Household characteristics

	<i>n</i>	<i>(%)</i>
<i>Sex – Household head (n=984):</i>		
Male	653	(66.4)
Female	331	(33.6)
<i>Household size:</i>		
	4	(3-5)
<i>Household residence status:</i>		
Resident	12	(1.2)
Resident returnee	14	(1.4)
Internally displaced	754	(76.6)
Refugee	204	(20.7)
<i>Place of origin (n=971):</i>		
Ethiopia	388	(40)
Kenya	3	(0.3)
SCZ	559	(57.6)
Mudug	4	(0.4)
NEZ	17	(1.8)
<i>Date of arrival (n=972):</i>		
2002	25	(2.6)
2001	87	(9)
2000	113	(11.6)
1999	165	(17)
1998	133	(13.7)
Before 1998	449	(46.2)
<i>Reason for movement (n=972):</i>		
Insecurity	540	(55.6)
Lack of jobs	393	(40.4)
Food shortage	39	(4)

## 5.2 Food, income sources and coping strategies

Data suggests that the population rely almost entirely on purchases (97%) for their food source. Income is mainly derived from casual work (53%) and small businesses (43%). Coping mechanisms revolve around borrowing (73%), begging (13%) and purchases (7%).

Table 4: Food, income and coping strategy

	<i>n</i>	<i>(%)</i>
<i>Main food source (n=984):</i>		
Own animal products	1	(0.1)
Household crop production	3	(0.3)
Purchases	955	(97.1)
Remittances/gifts	1	(0.1)
Begging	24	(2.4)
<i>Main source of income (n=981):</i>		
Small business	421	(42.9)
Causal work	519	(52.9)
Salaried employment	8	(0.8)
Remittances/gifts	1	(0.1)
Others – business, begging etc	32	(3.3)
<i>Coping strategy (n=984):</i>		
Remittances/gifts	5	(0.5)
Livestock sale	2	(0.2)
Splitting the family	24	(2.4)
Begging	127	(12.9)
Borrowing	716	(72.8)
Food aid	40	(4.1)
Purchases	72	(7.3)

### 5.3 Water and Environmental sanitation

The Bossaso IDP residents draw their drinking water mainly from taps/piped water (31%), protected wells (26%), berkads (23%) and tankers/water vendors (18%). Three quarter of the population relieve themselves in the bush/open ground whilst slightly less than a quarter of the population use pit latrines that are observed generally to be used and dirty (71%).

Table 5: Water and sanitation

	<i>n</i>	<i>(%)</i>
<i>Main source of drinking water (n=983):</i>		
Borehole	2	(0.2)
Open wells	11	(1.1)
Protected wells	257	(26.1)
Berkads	230	(23.4)
Tap/piped water	308	(31.3)
Tanker/truck vendor	175	(17.8)
<i>Sanitation facility (n=981):</i>		
Pit latrine	236	(24.1)
Flush toilets	6	(0.6)
Bush/open grounds	739	(75.3)
<i>Observe (n=236):</i>		
Used and clean	50	(21.2)
Unused	18	(7.6)
Used and dirty	168	(71.2)

## 5.4 Analysis of nutrition data

### 5.4.1 Distribution

Table 6: Distribution according to age and sex

	Boys		Girls		Total	
	n	(%)	n	(%)	n	(%)
6-11 months	59	(50)	59	(50)	118	(19.7)
12-23 months	83	(56.5)	64	(43.5)	147	(24.6)
24-35 months	50	(40.7)	73	(59.3)	123	(20.6)
36-47 months	50	(48.5)	53	(51.5)	103	(17.2)
48-59 months	50	(46.7)	57	(53.3)	107	(17.9)
Total	292	(48.8)	306	(51.2)	598	(100)

	Boys		Girls		Total	
	n	(%)	n	(%)	n	(%)
6-23 months	142	(53.6)	123	(50.9)	265	(44.3)
24-59 months	150	(45)	183	(49.7)	333	(55.7)
Total	292	(48.8)	306	(50.2)	598	(100)

Table 7: Distribution according to sex and nutritional status (weight/height index in Z score or oedema)

	Severe < -3 + oedema		Moderate -3 ≤ z < -2		Normal ≥ -2		Oedema n (%)
	n	(%)	n	(%)	n	(%)	
Male	22	(7.5)	40	(13.7)	230	(78.8)	5 (1.7)
Female	23	(7.5)	27	(8.8)	256	(83.7)	6 (2)
Total	45	(7.5)	67	(11.2)	486	(81.3)	11 (1.8)

	GaM < -2 + oedema		Normal ≥ -2		Total	
	n	(%)	n	(%)	n	(%)
Male	62	(21.2)	230	(78.8)	292	(48.8)
Female	50	(16.3)	256	(83.7)	306	(51.2)
Total	112	(18.7)	486	(81.3)	598	(100)

Analysis suggests no association between sex and global acute malnutrition (p=0.153)

Table 8: Distribution according to age and nutritional status (weight/height index in Z score or oedema)

	Severe < -3 + oedema		Moderate -3 ≤ z < -2		Normal ≥ -2		Oedema n (%)
	n	(%)	n	(%)	n	(%)	
6-11 months	9	(7.6)	13	(11)	96	(81.4)	0 0
12-23 months	23	(15.6)	25	(17)	99	(67.3)	9 (6.1)
24-35 months	5	(4.1)	9	(7.3)	109	(88.6)	2 (1.6)
36-47 months	7	(6.8)	8	(7.8)	88	(85.4)	0 0
48-59 months	1	(0.9)	12	(11.2)	94	(87.9)	0 0
Total	45	(7.5)	67	(11.2)	486	(81.3)	11 (1.8)

	Severe < -3 + oedema		Moderate -3 ≤ z < -2		Normal ≥ -2		Oedema n (%)
	n	(%)	n	(%)	n	(%)	
6-23 months	32	(12.1)	38	(14.3)	195	(73.6)	9 (3.4)
24-59 months	13	(3.9)	29	(8.7)	291	(87.4)	2 (0.6)
Total	45	(7.5)	67	(11.2)	486	(81.3)	11 (1.8)

	GaM < -2 + oedema		Normal ≥ -2		Total	
	n	(%)	n	(%)	n	(%)
6-11 months	22	(18.6)	96	(81.4)	118	(19.7)
12-23 months	48	(32.7)	99	(67.3)	147	(24.6)
24-35 months	14	(11.4)	109	(88.6)	123	(20.6)
36-47 months	15	(14.6)	88	(85.4)	103	(17.2)
48-59 months	13	(12.1)	94	(87.9)	107	(17.9)
Total	112	(18.7)	486	(81.3)	598	(100)

	GaM < -2 + oedema		Normal ≥ -2		Total	
	n	(%)	n	(%)	n	(%)
6-23 months	70	(26.4)	195	(73.6)	265	(44.3)
24-59 months	42	(12.6)	291	(87.4)	333	(55.7)
Total	112	(18.7)	486	(81.3)	598	(100)

There exists an association between age group and global acute malnutrition; the 6-23 month old children were at a 2-fold increase in risk of being malnourished (RR 2.1; p=0.000)

## 5.4.2 Indicators

Table 9: Indicators – proportions and confidence interval

	Proportion (%)	95% Confidence Interval (%)
Oedema	11 (1.8)	
Global acute malnutrition	112 (18.7)	(15.7 – 22.1%)
Severe acute malnutrition	45 (7.5)	(5.6 – 10%)

## 5.4.3 Interpretive analysis

Table 10: Distribution according to age and nutritional status – proportions and confidence interval

	Global acute malnutrition	
	Proportion (%)	95% Confidence Interval (%)
6-23 months	70 (26.4)	(21.2 – 32.2%)
24-59 months	42 (12.6)	(9.3 – 16.8%)

	Severe acute malnutrition	
	Proportion (%)	95% Confidence Interval (%)
6-23 months	32 (12.1)	(8.4 – 16.6%)
24-59 months	13 (3.9)	(2.2 – 6.7%)

### 5.5 Health and morbidity

Most (83%) families seek assistance when their child(ren) fall sick at private clinic/pharmacy (59%) and public health facility (44%). Lack of money (87%), however, is cited as an important reason for not seeking medical attention. The breakdown of history of morbidity prevalence is given in Table 12.

Table 11: Health seeking behaviour

	<i>n</i>	<i>(%)</i>
<i>Seek assistance when child sick (n=569):</i>		
Yes	472	(83)
No ( <i>n=97</i> ):	97	(17)
Lack of money	84	(86.6)
Reciting Koran	13	(13.4)
<i>Where (n=472):</i>		
Traditional healer	10	(2.1)
Private clinic/pharmacy	280	(59.3)
Public health facility	182	(38.6)

Table 12: Morbidity history

	<i>n</i>	<i>(%)</i>
Diarrhoea (past 2 weeks)	126	(21.1)
ARI (past 2 weeks)	162	(27.1)
Malaria (past 2 weeks)	53	(8.9)
Measles (in last one month)	64	(10.7)

### 5.6 Measles immunisation and vitamin A supplementation

Among the 12-23 months old children, 26.5% had received measles immunisation based on card verification only and 66% by card or history anytime before the survey. Of the infants eligible for measles immunisation, about half had not yet received their jabs as at the time of the survey

Table 13: Measles coverage and vitamin A supplementation

	<i>No (%) received immunisation</i>	<i>No (%) received immunisation</i>	<i>No (%) received immunisation</i>
	<i>9- 11 months (n=53)</i>	<i>12-23 months (n=147)</i>	<i>9-59 months (n=533)</i>
Yes – with card	11 (20.8)	39 (26.5)	152 (28.5)
Yes – with history/without card	16 (30.2)	59 (40.1)	224 (42)
No	26 (49.1)	49 (33.3)	157 (29.5)

*Table 14: OPV and vitamin A supplementation coverage*

	<i>n</i>	<i>(%)</i>
<i>No of times OPV received in 2001 (n=598):</i>		
Once	69	(11.5)
2 times	208	(34.8)
3 times	266	(44.5)
None	55	(9.2)
<i>OPV received in NIDs round 2 April 2002 (n=597):</i>	463	(77.6)
<i>Reason for missing OPV (n=132):</i>		
Team did not come	39	(29.5)
Child not at home	44	(33.3)
Child sleeping	11	(8.3)
Child sick	8	(6.1)
Vaccine unsafe	16	(12.1)
OPV unimportant	13	(9.8)
<i>Vitamin A supplementation coverage (n=598):</i>	431	(72.1)

Survey results suggest that during the polio NIDs second round conducted on 15-17 April:

- 78% of the 6-59 months children population received the polio dose (the preliminary second round polio NIDs results give a 88% coverage for Bossaso district)
- No association exist between sex and polio administration ( $p=0.159$ ); both boys and girls had equal opportunity of being immunised against polio
- Of those who missed out during the 2002 NIDs second round, one third said that the child was not at home, 29.5% reported that the polio team did not visit whilst 22% thought the vaccine was unsafe/unimportant.

Survey results suggest 72% vitamin A supplementation coverage during the preceding 6 months to the survey.



### 5.7 Feeding practices

About two fifth (39%) of the 6-23 months old children had stopped breastfeeding as at the time of the survey. Half of same children stopped breastfeeding with a significant proportion (84%) given complementary feeds during the recommended 6 months period of exclusive breastfeeding. About 90% of these children are fed 3-4 or more times in a day.

Table 15: Feeding practice

	<i>n</i>	<i>(%)</i>
<i>Are you breastfeeding child (n=265):</i>		
Yes	159	(60)
No	104	(39.2)
Never	2	(0.8)
<i>Age when child stopped breastfeeding (n=104):</i>		
0-6 months	53	(51)
7-11 months	32	(30.8)
12 months or more	19	(18.3)
<i>Weaning age (n=263):</i>		
0-6 months	221	(84)
7 months or more	42	(16)
<i>Feeding frequency (n=265):</i>		
Once	3	(1.1)
2 times	26	(9.8)
3 times	159	(60)
4 or mores times	77	(29.1)

### 5.8 Analysis of potential risk factors

Analysis of potential risk factors (see Table 16) indicate existence of significant statistical association between sanitary facility, age group, diarrhoea, ARI, measles, and weaning age and global acute malnutrition:

- Children whose families relieved themselves in the bush/open ground, those who had ARI in the past 2 week, those who had measles in the past one month and those given complementary feeding after 7 months were at a 1.6 to 1.7-fold increase in risk of being acutely malnourished whilst
- Young children (6-23 months old) and those with diarrhoea in the past two weeks were at a 2-fold increase in risk of being acutely malnourished

Chi-square test of association indicates significant association between children's age group (6-11; 12-23; 24-35; 36-47; 48-59 months) and acute global malnutrition ( $p=0.000$ ) with a significant decreasing (chi-square of trend  $p=0.003$ ) trend in proportion of malnourished children in respective age groups.

Table 16: Description of risk factors and results of univariate analysis with respect to prevalence of global acute malnutrition

Exposure variable	n	(%)	Crude RR	95% CI	p-value
<i>Household head sex:</i>					
Male	75	(17.9)	0.89	0.62-1.26	0.58
Female	36	(20.2)			
<i>Sanitary facility:</i>					
Bush/open ground	90	(20.6)	1.58	1.02-2.46	0.046
Pit latrine/flush toilet	21	(13)			
<i>Child sex:</i>					
Male	62	(21.2)	1.30	0.93-1.82	0.153
Female	50	(16.3)			
<i>Age group:</i>					
6-23	70	(26.4)	2.09	1.48-2.96	0.000
24-59	42	(12.6)			
<i>Diarrhoea:</i>					
Yes	38	(30.2)	1.92	1.37-2.7	0.000
No	74	(15.7)			
<i>ARI:</i>					
Yes	42	(25.9)	1.61	1.15-2.26	0.008
No	70	(16.1)			
<i>Malaria:</i>					
Yes	11	(20.8)	1.12	0.64-1.95	0.832
No	101	(18.5)			
<i>Measles:</i>					
Yes	19	(29.7)	1.7	1.12-2.29	0.027
No	93	(17.4)			
<i>Vitamin A:</i>					
Yes	72	(16.7)	0.7	0.5-0.98	0.054
No	40	(24)			
<i>Weaning age:</i>					
7 months or more	17	(40.5)	1.69	1.09-2.61	0.042
0-6 months	53	(24)			

There exists no evidence of statistical association with global acute malnutrition for household head sex, child sex, malaria, and vitamin A supplementation. Similarly, there is no significant association between age at which breastfeeding was stopped (0.259), feeding frequency (p=0.491), household residence status (p=0.781) arrival date (p=0.833) and acute global malnutrition.

Further analysis show no significant difference between means of household size of acutely malnourished and that of normal children (t-test: p=0.184).

## 6. Conclusion and Recommendations

The Bossaso IDP camps issue remains a complex subject that requires an integrated plan of action from all concerned agencies including the local authorities. Levels of malnutrition appear to be worsening, since 2000, as illustrated in the table below:

<i>Nutrition status (w/h z-score)</i>	<i>May 2000 (n=535)</i>	<i>May 2001 (n=568)</i>	<i>July 2002 (n=598)</i>
Global acute malnutrition	63 (11.7%)	89 (15.7%)	112 (18.7%)
Severe acute malnutrition	12 (2.2%)	23 (4%)	45 (7.5%)
Oedema	0	8 (1.4%)	11 (1.8%)

Suggested immediate measures to be put in place include:

- Integrated selective feeding programme for the 112 malnourished children. Arrangement for admission and management of severely malnourished children at the Bossaso hospital to be discussed with relevant implementing partners.
- Emphasis on consolidated joint interventions, by concerned agencies, to address sanitary facility concerns – UNICEF WES, local authorities and concerned agencies

There is also need to intensify health and nutrition education activities at household level targeting mothers, fathers and other caregivers to address care concerns especially for the young children (6-23 months old). The main areas of focus should include promotion of exclusive breastfeeding, appropriate young child feeding, diet diversification, and improvement in household hygiene and health care practices.

Intensification of EPI activities to ensure that all eligible children are full immunised in order to take care of vaccine preventable diseases such as measles that in this survey shows significantly statistical association with global malnutrition.

## Annexes

### Annex 1: Puntland traditional calendar

Months	Annual Events	1997	1998	1999	2000	2001	2002
JAN	Mid of Jiilaal		55	43	Soon 31	Soon fur 19	Sidatal 7
FEB	End of Jiilaal		54	42	Soon fur 30	Sidataal 18	Arafo lid Al-Ad Haa 6
MAR	Start of Gu Season		53	41	Sidataal 29	Arafo lid Al-Ad Haa 17	Sako 5
APR	Middle Gu Season		52	40	Arafo lid Al-Ad-haa 28	Sako 16	Safar 4
MAY	End of Gu Season		51	39	Meeting in Arte Shirka Carta Safar 27	Safar 15	Mowliid 3
JUNE	Start of Haga Season		50	38	Mowliid 26	End of Formal Administration in Puntland Mowliid 14	Malmadoone Bilo-Samo I 2
JULY	Middle of Haga Season		49	37	Siyaaro 25	Siyaaro 13	Bilo-Samo II 1
AUG	End of Haga Season		Establishment of Puntland State 48	36	Jamaadul Awal 24	Fighting in Bossaso Jamaadul Awal 12	
SEPT	Start of Deyr Season	59	47	35	Jamadul Akhir 23	Jamaadul Akhir 11	
OCT	Middle of Deyr Season	Flood in CSZ Daadadkii Koonfur 58	46	34	Sabuux (Rajab) 22	Sabuux (Rajab) 10	
NOV	End of Deyr	Flood in CSZ Daadkii Koonfur 57	45	33	Soon Dheere (Shacbaan) 21	Fighting in Garowe Soon Dheere (Shacbaan) 9	
DEC	Start of Jiilaal	56	44	32	Soon (Ramadan) 20	Soon (Ramadan) 8	

**Annex 2: Bossaso IDP survey questionnaire**

Household No.	Date	Team Number	Cluster Number	Name of supervisor	Section	Subsection

Name of household head	Q1 Sex 1= M 2 = F	Q2 Household size	Q3 No. of u5s

Q4 Household residence status	Q5 Place of origin (Country/region)	Q6 Date of arrival (year)	Q7 Reason for movement
1 = Resident: Go to No. 8 2 = Resident returnee 3 = Internally displaced 4 = Refugee 5 = Other – specify	1: Ethiopia 2: Kenya 3: South and Central zone 4: Mudug 5: Nugal 6: Bari 7: Somaliland 8: Other	1: 2002 2: 2001 3: 2000 4: 1999 5: 1998 6: Before 1998	1 = Insecurity 2 = Lack of jobs 3 = Food shortage 4 = Water shortage 5 = Other – specify

Q8 Household's main food source?	Q9 Household's main income source	Q10 How does this household survive during food shortages (coping strategies)?	Q11 Main source of drinking water	Q12 Sanitation Facility	Q13 When your child is sick, do you seek assistance?
1 = Animal products from own production 2 = Household crop production 3 = Purchases 4 = Remittances/Gifts 5 = Begging 6 = Wild foods collection 7 = Others – specify	1 = Small business 2 = Casual work 3 = Salaried employment 4 = Sale of crops 5 = Sales of animals and animal products 6 = Remittances/Gifts 7 = Others – specify	1= Remittances/Gifts 2= Sale of more livestock 3= Splitting of the family 4= Begging 5= Borrowing 6= Food aid 7= Purchases 8= Wild food collection 9= Others – specify	1 = Borehole 2 = Open wells 3 = Protected wells 4 = Berkads 5 = Catchments/pond 6 = Stream/river 7 = Muscid 8 = Tap/piped water 9 = Tanker/truck vendor 10 = Others – specify	1 = Pit latrines: Go to Q12b 2 = Flash toilets 3 = Bush/Open ground  Q12b Condition of the facility (Observe) 1 = Used and clean 2 = Unused 3 = Used and dirty 4 = Others – specify	1 = Yes: Go to Q13b 2 = No: Go to Q13c  Q13b Where? 1 = Traditional healer 2 = Private clinic/pharmacy 3 = Public health facility 4 = Others – specify  Q13c Why? – specify

Serial No	Name	Q14 Sex  1 = M 2 = F	Q15 Age (Months)	Q16 Oedema  1 = Yes 2 = No	Q17 Height (Cm)	Q18 Weight (Kg)

For Q28-31, ask mothers with child(ren) 6-23 months old

Serial No.	Q19 Diarrhoea in last 2 weeks?	Q20 ARI in last 2 weeks?	Q21 Malaria in last 2 weeks?	Q22 Measles in last 1 month?	Q23 Vaccinated against measles?	Q24 Vitamin A provided in the last 6 months?	Q25 Number of times OPV received during 2001 NIDs?	Q26 OPV received in last NIDs round?	Q27 Reason for missing OPV dose(s)?	Q28 Are you B/F child?	Q29 If no, how old was child when you stopped B/F?	Q30 At what age was child given foods other than breast milk?	Q31 How many times in a day do you feed child?
	1 = Yes 2 = No	1 = Yes 2 = No	1 = Yes 2 = No	1 = Yes 2 = No	1 = past 6m (card) 2 = past 6m (recall) 3 = before 6m (card) 4 = before 6m (recall) 5 = None	1 = Yes 2 = No	1 = Once 2 = 2 times 3 = 3 times 4 = None	1 = Yes: Go to Q28 2 = No	1 = team didn't come 2 = child not at home Care taker refused because: 3 = child sleeping 4 = child sick 5 = vaccine unsafe 6 = OPV not important 7 = Other -specify	1 = Yes 2 = No 3 = Never: Go to Q31	1 = 0-6m 2 = 7-11m 3 = 12m or more	1 = 0-6m 2 = 7m or more	1 = Once 2 = 2 times 3 = 3 times 4 = 4 or more