

NUTRITION ASSESSMENT REPORT

**ADDUN AND HAWD PASTORAL, LIVELIHOOD
SYSTEMS**

PUNTLAND AND CENTRAL SOMALIA



Food Security Analysis Unit (FSAU/FAO)
United Nation Children Funds (UNICEF)
Somali Red Crescent Society (SRCS)
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EXECUTIVE SUMMARY

The Hawd and Addun Pastoral Livelihood zones cut across Galgadud, Mudug and Nugal Regions in the central and northeast parts of Somalia (See Map 1). The regions border the Indian Ocean to the east, Zone five of Ethiopia to the west and Bari and Sool regions to the north. Galgadud Region comprises six districts (Balanbal, Cadaado, Cabudwaaq, Ceelbuur, and Dhusamareb), Mudug region has five districts (Galkayo, Hobyso, Xaradheere, Galdogob, and Jariban) and Nugal Region comprises three districts (Garowe, Eyl and Burtinle).

Between the 13th November and 21st November 2008, FSAU and partners¹ conducted an inter-agency nutrition assessment in the Hawd and Addun Pastoral Livelihood Zones (LZ). The purpose was to determine the level of wasting among children aged 6-59 months, analyze the possible factors contributing to acute malnutrition and inform on the appropriate responses. Using a two-stage probability proportionate to size (PPS) sampling methodology, 26 clusters of 28 households and 25 clusters of 26 households were selected in the Hawd and Addun LZ respectively and assessed for anthropometric & non-anthropometric indices and mortality. A total of 776 children (53.3% boys and 46.8% girls; sex ratio =1.08) aged 6-59 months were assessed from 376 households (mean household size = 5.8 ± 2.3) in the Hawd LZ. In the Addun pastoral livelihood, 640 children (49.8% boys and 50.2% girls; sex ratio =1.02) were assessed from 344 households (mean household size = 5.80 ± 2.2).

Results show a global acute malnutrition (GAM) rate of **20.8%** (CI: 14.9-26.8), and a severe acute malnutrition (SAM) rate of **5.8%** (3.2-8.4) including four (0.5%) oedema cases (0.02-1.01) in the Hawd. These indicate a **Very Critical** nutrition situation based on the WHO classification. For the Addun Pastoral livelihood, results show a GAM rate of **18.4%** (12.7-24.2) and SAM rate of **3.8%** (2.0-5.4) with no oedema case and indicate a **Critical** situation. A summary of the findings for the acute malnutrition rates is given in Table 1. Compared to findings from the May 2008 nutrition assessments in which a GAM rate of 19.3% (15.6-23.0) and SAM rate of 2.3% (0.9-3.8) was reported in the Hawd, and GAM rate of 18.4% (14.9-21.8) and SAM rate of 2.8% (1.2-4.4) in Addun LZ, there has been deterioration from *Critical* to **Very Critical** levels of acute malnutrition in the Hawd, and a Sustained **Critical** nutrition situation in the Addun LZ. These nutrition rates exceed emergency thresholds and confirm earlier analysis of a deepening humanitarian emergency, particularly in the central regions. The Crude (CMR) and Under five (U5MR) mortality rates of 0.93 (0.65-1.32) and 1.8 (0.07-2.99) in the Hawd, and 0.63 (CI:0.40-0.98) and 1.94 (1.14-3.29) in the Addun LZ fall below the emergency threshold levels of 1/10,000/day and 2/10,000/day and indicate an *acceptable* situation based on the WHO standards.

High morbidity rates in the Hawd and Addun populations continue to compromise the nutrition situation of the populations. Most children (54.4%; CI: 43.2-65.6%) in the Hawd and 40.0% (31.5-46.7) in the Addun LZ were reported to have suffered from one or more communicable childhood illnesses in the two weeks prior to the assessment. Diarrhoea was the most common illness in the Hawd Pastoral, with 27.2% (24.1-30.5) of children reportedly ill with diarrhoea in the two weeks prior to the assessment. Levels of diarrhoea were relatively low in the Addun Pastoral LZ (13.7%; 10.2-17.3) with the most common illness reported in the livelihood zone being febrile illness at 24.1% (16.1-32.0). These levels are consistent with seasonal morbidity patterns recorded from the health facilities. Rapid Diagnostic Tests (RDT) conducted for malaria, *Plasmodium falciparum* confirmed high prevalence rates of 12.5% (7.9-17.02; N=1315) in the Hawd, and 6.8% (4.4-9.1; N=1255) in the Addun LZ respectively, consistent with the respective high levels of 9.3% and 11.9% reported in the May 2008 assessments. The increase in malaria prevalence in the Hawd LZ is possibly due to reduced humanitarian assistance, notably the scale-back of malaria control efforts (mosquito net distribution and malaria treatment) in the central regions, due to deteriorating security situation.

¹ UNICEF, MOH Puntland and SRCS

Statistical analyses show strong association between malnutrition and morbidity rates. Children reported to have been ill were almost twice as likely to be acutely malnourished compared to their healthy counterparts in both the Hawd (RR=1.88; CI: 1.39-2.54), and Addun (RR=2.03;CI: 1.46-2.83) LZ.

Poor feeding practices persist in the Central and Northeast regions like in other parts of Somalia, contributing to the worrisome levels of acute malnutrition, especially in the breastfeeding age group (0-24 months). Although breastfeeding is recommended until a minimum age of 24 months, only a third of the children aged 6-24 months were reportedly being breastfed at the time of the assessments. Nevertheless, statistical analysis of distribution of acute malnutrition between the breastfeeding age groups showed no difference between the 6-24 months and the 25-59 months categories ($p>0.05$). Equally there was no statistical difference ($p>0.05$) in acute malnutrition levels among the children in the age of 6-29 months and 30-59 months age bands.

Low coverage of health programmes are important risk factors to the poor nutrition situation in the populations of Hawd and Addun LZ. Measles vaccination status for eligible children (9-59 months old) was low at only 15.7% and 23.8 % respectively. Vitamin A supplementation status was also low at 44.6% in the Hawd and 46.1% in the Addun LZ. Polio immunization recorded a relatively higher status of 75.0% and 67.3% among Hawd pastoral and Addun pastoral populations respectively. Overall, the proportion of children who have been vaccinated with these services falls below the recommended 95% level (Sphere, 2004) in both livelihoods.

The food security situation in the Hawd & Addun populations remains precarious with more serious indicators in the central regions. Poor Deyr '08/09 rains were reported in the Hawd and Addun LZ, limiting access to water and pasture. Reports from Adaado district indicated empty rainwater catchments and *Berked* and ongoing water trucking. Most of the Hawd Pastoralists remained in the area although some reportedly migrated to Zone five of Ethiopia. Addun pastoralists moved to Golol and towards Eyl district, where the situation was better. Livestock body conditions were poor due to lack of water and pasture as was production, with limited access to milk and income through sell of animals. Market improvement was reported in central regions with prices of cereal and imported commodities dropping slightly due to a depreciated US Dollar against the Somali Shilling. However, though the livestock market value is favourable, the poor livestock body conditions and presence of disease in some instances hinder their sale (Source: FSAU Field report Nov'08). Civil insecurity in the central regions continued in addition to resource based clan conflicts on pasture and water, which were reported in many parts of Galgadud and Mudug regions (*Deyr 08/09*; FSAU brief summary).

Based on the analysis of the situation, the following recommendations are made:

Immediate Interventions

- Improve the coverage for health programmes, especially for measles vaccination and vitamin A supplementation. Outreach immunization campaigns are required in both the Hawd and Addun LZs.
- Rehabilitation of acutely malnourished children through existing selective feeding programs in the Central and Northeast regions, including targeted outreach supplementary feedings programs where possible. Capacity building of the existing MCH staffs and the community to manage malnourished children could be explored.
- Provision of programmes that improve and sustain dietary diversity and consumption of micronutrient rich foods.
- Intervention programmes on malaria, particularly to target malaria hot spot areas such as Goldogob and Eyl districts, as well as Elbur, Abudwaaq and Balanbale districts.
- Intervention programmes on water, sanitation and hygiene practices, including health education,

need to intensify.

Long-term Interventions

- Encourage comprehensive and effective strategies to tackle the chronic malnutrition through participatory ways with community members and representatives from the public and private sectors in the region.
- Establish or expand the health facilities and satellite services, especially in the pastoral villages with no health facilities.
- Intensify health and nutrition education activities at the household level to address care concerns, targeting mothers, and other caregivers.
- Address the issues of limited access to safe water through rehabilitation/protection of water systems, including the wells and water catchments.
- Provision of veterinary services to control the spread of the reported livestock diseases.

Table 1: Summary of the Hawd and Addun Assessment Findings

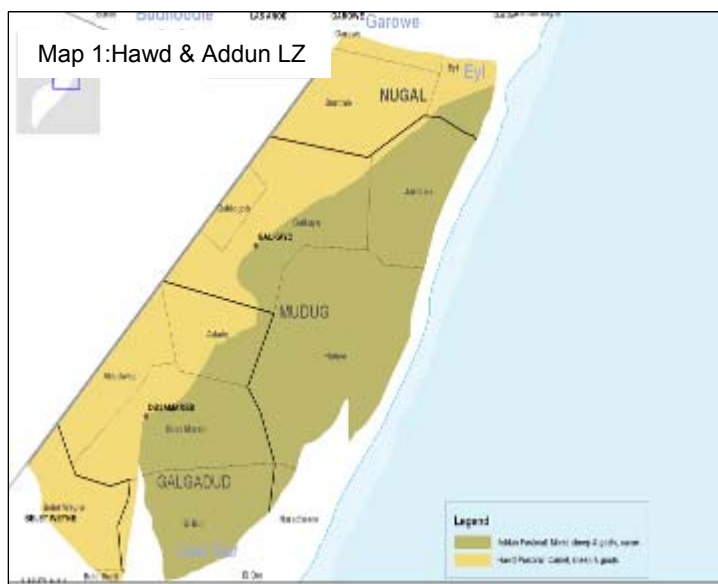
Indicator	Hawd pastoral		Addun pastoral	
	N	%	N	%
Total number of households surveyed	376	100	344	100
Mean household size	5.84	SD=2.3	5.80	SD=2.2
Total number of children assessed	776	100	640	100
Child sex:				
Males (boys)	413	53.3(50.3-56.10)	319	49.8(45.8-53.8)
Females (girls)	363	46.8(43.8-49.6)	321	50.2(46.1-54.2)
Global Acute Malnutrition (WHZ<-2 or oedema)	162	20.8 (14.9-26.8)	118	18.4 (12.7-24.2)
Severe Acute Malnutrition (WHZ<-3 or oedema)	45	5.8(3.2-8.4)	24	3.78 (2.01-5.4)
Oedema	4	0.5 (0.02-1.01)	0	-
GAM estimates by WHO Anthro (2005) Standards:	169	21.9 (16.5-28.6)	121	18.9(13.9-25.3)
SAM estimates by WHO Anthro (2005) Standards:	55	7.1 (4.5-10.9)	40	6.3(3.5-10.8)
Global Acute Malnutrition (WHM<80% or oedema)	114	14.7(10.3-19.1)	72	11.3 (6.2-16.3)
Severe Acute Malnutrition (WHM<70% or oedema)	23	2.96 (0.83-5.09)	12	1.87 (0.67-3.07)
Proportion of stunted children (HAZ<-2)	130	16.8(12.4-21.1)	99	15.5(10.09-20.84)
Proportion of underweight children (WAZ<-2)	239	30.8(22.9-38.6)	188	29.4(23.03-35.7)
Proportion of malnourished pregnant women (MUAC<23.0).	20	23.8 (10.9-36.7) (N=84)	11	21.7 (9.7-33.4) (N=51)
Proportion of severely malnourished pregnant women (MUAC≤20.7)	3	3.6(-1.6-8.76)	3	(5.8(-1.2-12.9)
Proportion of children who fell ill in two weeks prior to assessment	422	54.4 (43.2-65.5)	251	39.2 (31.5-46.9)
Proportion of children with diarrhoea in 2 weeks prior to assessment	211	27.2 (24.1-30.5)	88	13.7 (10.2-17.3)
Proportion of children with ARI within two weeks prior to assessment	169	21.8 (20.3-34.08)	102	15.9 (8.7-23.1)
Children with fever/ suspected malaria in 2 weeks prior to assessment	181	23.3(12.7-33.8)	154	24.1 (16.1-32.0)
Proportion confirmed Malaria (RDT) positive	164	12.5(7.9-17.02)	85	6.8(4.4-9.1)
Suspected measles within one month prior to assessment	7	0.9 (0.08-1.72)	1	1.4 (0.4-2.4)
Children (9-59 months) immunised against measles	114	15.7(7.6-23.6)	143	23.8 (11.7-35.9)
Children who have ever received polio vaccine	582	75.0 (64.8-85.2)	430	67.3 (56.7-77.9)
Children who received vitamin A supplementation in last 6 months	346	44.6 (29.7-59.4)	295	46.1(33.3-58.9)
Proportion of households who consumed ≤3 food groups	29	7.7 (-0.0-16.4)	51	15.3 (6.5-24.1)
Proportion of households who consumed ≥4 food groups	347	92.3(83.6-100.9)	283	84.7%(75.9-93.5)
Proportion of children 6-24 months who are breastfeeding	82	30.9 (25.4-36.9)	80	34.04 (26.5-41.5)
Proportion of households with sanitation facilities	217	57.7(43.5-71.8)	184	55.1(38.9-71.3)
Proportion of households with access to safe water	110	29.1(13.9-44.3)	28	48.3(32.5-64.2)
Under five Death Rate (U5MR) as deaths/10,000/ day	14	1.80(0.87-3.69)	13	1.94 (0.88-4.26)
Crude Death Rate (CMR) as deaths/10,000/ day	30	0.93(0.59-1.45)	19	1.04(0.63-1.72)

1. INTRODUCTION

1.1 Historical Context

The Hawd and Addun Pastoral Livelihood zones cut across Galgadud, Mudug and Nugal Regions in the Central and parts of the Northeast regions in Somalia (See Map 1). The regions border the Indian Ocean to the east, Zone five of Ethiopia to the west and Bari and Sool regions to the north. Galgadud region comprises six districts (Balanbal, Cadaado, Cabudwaaq, Ceelbuur, and Dhusamareb), Mudug region has five districts (Galkacyo, Hobyo, Xaradheere, Galdogob, and Jariban) and Nugal Region comprises three districts (Garowe, Eyl and Burtinle). The total population estimate for the three regions is 805,166. The two livelihood zones Addun and Hawd pastorals cover most parts of these regions.

The Hawd and Addun pastoral livelihood zones in the central and parts of the northeast regions in Somalia have been greatly affected by a series of shocks from both natural and man-made causes. The devastating impact of these frequent shocks gives the pastoral population limited opportunity to recover, leading to chronic food insecurity in parts of the population.

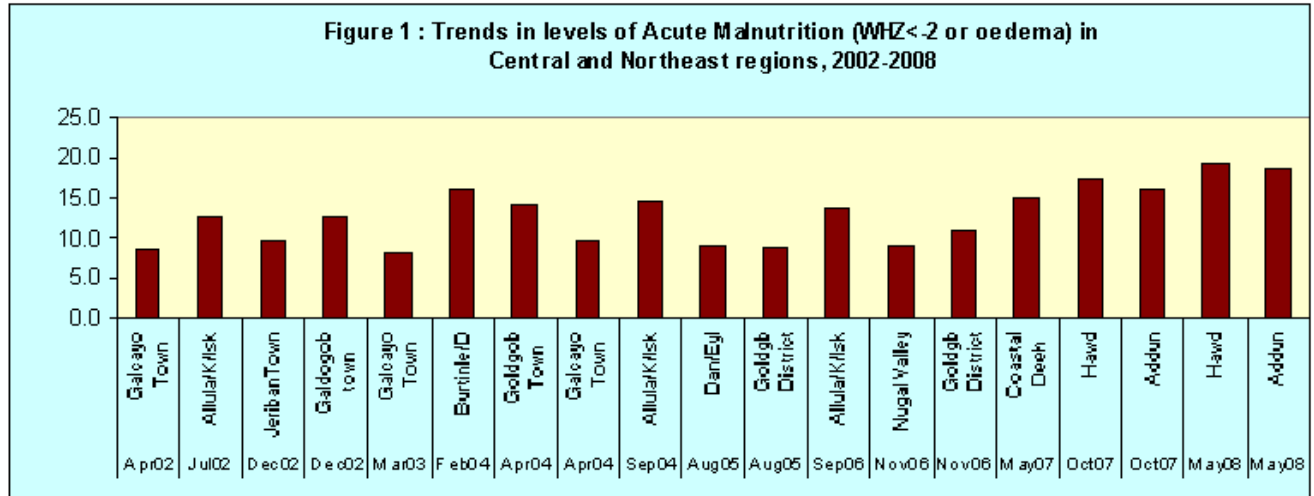


1.2 The Food Security Context

According to the Integrated Food Security and Livelihood Phase Classification, the Hawd and Addun populations in the central region have persistently faced food insecurity. In the *Deyr* '07/08, the central regions of Hawd and Addun were classified as facing Acute Food and Livelihood Crisis (AFLC) while their counterparts in the northeast faced Borderline Food Insecurity (BFI). All these areas reported a deterioration of food security indicators in the *Gu* '08, apart from Addun of the northeast, which continued to report BFI. The Hawd and Addun of central deteriorated to Humanitarian Emergency (HE) while the Hawd of northeast deteriorated to AFLC. Prolonged drought conditions (Jilaal), increased prices for food and non food commodities, poor *Gu* seasonal rains, out-migration of livestock, water and pasture unavailability, reduced livestock production and declining terms of trade were the main factors limiting access to food and dietary intake and directly contributing to a worrying nutrition situation in the area.

1.3 Nutrition Context

Historical data on nutrition surveys conducted by FSAU & partners in the central/northeast regions from 2002 until May 2008 indicates *serious* to *critical* nutrition situation (WHO classification) with global acute malnutrition (Weight-for-height z-scores <-2 or presence of bilateral oedema) levels ranging from 8.3-19.3% (See Figure 1). Following the deterioration of the food security situation in the Hawd and Addun LZ in 2007, the nutrition situation deteriorated and levels of acute malnutrition exceeded the emergency threshold of 15%. Nevertheless a direct comparison between the assessments is not possible due to the varying methods, location and timings of the assessments.



The worrisome situation in May 2008, coupled with a deteriorating food security situation and unconfirmed disease outbreaks in parts of the Hawd and Addun, called for closer monitoring of the situation and a nutrition assessment after six months.

2 ASSESSMENT OBJECTIVES

The overall objective of the two livelihood-based assessments was to establish the extent and severity of acute malnutrition, determine the causes of acute malnutrition and to monitor the trends of acute malnutrition in Hawd and Addun Pastoral livelihoods of Galgadud, Mudug and Nugal regions.

Specific Objectives

1. To estimate the level of acute malnutrition and nutritional oedema among children aged 6-59 months in the two livelihood groups of Hawd and Addun in Central and Northeast regions
2. To estimate the level of acute malnutrition among women aged 15-49 years in the two livelihood groups of Hawd and Addun in Central and Northeast regions.
3. To identify factors influencing nutrition status of the children in the two livelihood groups of the Hawd and Addun in Central and Northeast regions.
4. To estimate the prevalence of some common diseases (measles, diarrhoea, febrile illnesses and ARI) in the two livelihood groups of Addun and Hawd in Central and Northeast regions.
5. To estimate the prevalence of malaria using Rapid Diagnostic Test for *Plasmodium falciparum* in the two livelihood groups of Hawd and Addun in Central and Northeast regions.
6. To estimate the measles and polio vaccination and Vitamin A supplementation status among children in the two livelihood groups of Hawd and Addun in Central and Northeast regions.
7. To assess child feeding and care practices in the two livelihood groups of Hawd and Addun in Central and Northeast regions.
8. To estimate the crude and under-five mortality rates in the two livelihood groups of Hawd and Addun in Central and Northeast regions.

3 METHODOLOGY

Two cross-sectional assessments were conducted concurrently between the 13th November and 21st November 2008, among the Hawd and Addun pastoral populations of Central and Northeast regions. A two stage Probability Proportionate to Size (PPS) sampling methodology was used to select 26 clusters with 28 households in Hawd pastoral livelihood and 26 households in Addun livelihood from 26 and 25 clusters respectively. A list of all settlements/villages/towns within each of the assessed livelihoods in the region with their respective populations formed a sampling frame from which the clusters were selected randomly using Epiinfo-ENA software. A sample of 776 and 640 children aged 6- 59 months were assessed from the selected households in the Hawd and Addun populations respectively. Retrospective mortality data was also collected from the 28 households in every cluster in the Hawd pastoral livelihood and 26 households in each of the clusters in the Addun LZ. This was irrespective of whether or not the household had a child aged 6-59 months. For the respective estimated acute malnutrition rates, mortality rates, population sizes, desired precision, design effects and the sample size for each livelihood refer to Appendix 4.

Quantitative data (anthropometric and non-anthropometric) was collected through a standard household questionnaire (See appendix 1). Retrospective mortality data and Rapid Diagnostic Test for malaria was also collected in the study households using the standard questionnaires (See appendix 2). Qualitative data was obtained through focus group discussions and key informant interviews to provide further understanding of possible factors influencing nutritional status.

A four-day training of enumerators and supervisors was conducted covering interview techniques, sampling procedures, inclusion and exclusion criteria, sources and reduction of errors, taking of measurements (height, weight and MUAC), undertaking malaria RDTs, standardization of questions in the questionnaire, levels of precision required in measurements, diagnosis of oedema and measles, verification of deaths within households, handling of equipment and general courtesy during the assessment.

Standardization of measurements and pre-testing of the questionnaire and equipment were carried out in a section of Galkayo Town not selected as a cluster for the actual assessment. Quality of data was also ensured through (i) monitoring of fieldwork by the coordination team, (ii) crosschecking of filled questionnaires on daily basis and recording of observations and confirmation of measles, severe malnutrition and death cases by supervisors. All households sampled were visited and recorded including empty ones (iii) daily review was undertaken with the teams to address any difficulties encountered, (iv) progress evaluation was carried out according to the time schedule and progress reports shared with partners on regular basis, (v) continuous data cleaning and plausibility checks (vi) monitoring accuracy of equipment (weighing scales) by regularly measuring objects of known weights and (vii) continuous reinforcement of good practices. All measurements were loudly shouted by both the enumerators reading and recording them to reduce errors during recording.

Household and child data was entered, processed (including cleaning) and analyzed using Epiinfo software. Mortality data was entered and the Crude and Under five mortality rates generated in ENA software.

4. ASSESSMENT RESULTS

4.1 Household Characteristics of Study populations

The two livelihood-based nutrition assessments covered a total of 720 households (376 from Hawd pastoral and 344 from Addun pastoral livelihoods) with mean household sizes of 5.84 \pm 2.3 and 5.80 \pm 2.2 persons respectively. A total of 1416 children (776 from Hawd and 640 from Addun pastoral livelihoods) aged 6-59 months were assessed with a respective mean number of 2.2 \pm 0.9 and 2.1 \pm 0.7 under fives per household. The household characteristics by livelihood are presented in Table 2 below.

Characteristics	Hawd pastoral		Addun pastoral	
	N	%	N	%
Total Households	376	100	344	100
Household size (Mean):	5.84	SD=2.3	5.80	SD=2.2
Mean No of Under fives	2.2	SD=0.9	2.1	SD=0.9
Sex of Household Head:				
Male	335	89.1	282	84.4
Female	41	10.9	52	15.6
Host IDPs?	-			
Yes	54	14.4	39	11.7
No	322	85.6	295	88.3
Main Source of Income:				
Animal and its products sales	115	30.6	60	18.0
Crop sales	1	0.3	2	0.6
Trade	76	20.2	73	21.9
Casual labour	132	35.1	126	37.7
Salaries/wages	8	2.1	30	9.0
Remittances	35	9.3	41	12.3
Others	9	2.4	2	0.6
Has Mosquito net:				
Yes	262	69.7	221	66.2
No	114	30.3	113	33.8
Type of Net:				
GFSOM	91	34.5	113	51.1
Other	142	54.2	84	38.0
Not seen	29	11.0	24	11.9

The results show that the majority (89.1%) of the assessed households were male-headed. The assessed populations in both livelihoods were predominantly resident in their respective areas although 14.4% and 11.7% of households in the Hawd and Addun LZ respectively reported hosted an average of 1.9 and 1.8 IDPs per household, mainly coming from Mogadishu.. The main source of household income for the Hawd and Addun populations respectively were: casual labour (35.1% and 37.7%) petty trading (20.2% and 21.9%) and sale of livestock and livestock products (30.6% and 18.0%). Mosquito net ownership was high in all the assessed households with about 70% and 66% having access in the Hawd and Addun households respectively. Most (51.1%) of the Addun households reported to have received the bed nets from the Somalia Global Fund for

Malaria (GFSOM) while the Hawd bed nets were reportedly supplied from other sources with only 34.5% supplied by GFSOM.

4.2. Water Sources, Access and Quality

Characteristics	Hawd pastoral			Addun pastoral		
	N	%	CI	N	%	CI
Have access to safe water	110	29.3	14.2-44.3	28	8.3	0.0-18.4
Reason for lack of safe water	N=266			N=306		
Not available	242	90.6	83.9-99.5	288	94.1	90.2-98.1
Distance too far	14	5.2	0.0-13.7	10	3.3	0.0-6.1
Security concern	0	0.0	---	0	0.0	--
Can't afford	10	3.8	0.0-10.1	8	2.6	0.2-5.0
Drinking Water Source						
Tap	70	18.6	3.9-31.4	3	0.9	0.0-2.3
Truck	27	7.2	0.07-14.3	331	99.1	97.7-100.5
Tube well	5	1.3	0.0-3.5	0	0	-
Surface	273	72.6	56.7-88.5	0	0	-
Water treated at						
Source	16	4.3	1.02-7.4	3	0.9	0.0-2.2
Storage	15	3.9	1.3-6.7	11	3.3	0.4-6.2
Method of Water Treatment	N=15			N=11		
Boiling	5	33.3	0.0-70.2	1	9.1	0.0-33.4
Chlorination	10	66.7	29.8-103.5	5	45.5	0.0-103.3
Straining/Filtering	0	0.0	--	0	0.0	---
Decanting	0	0.0	--	5	45.5	0.0-103.3

Access to clean water for drinking and for domestic use remains limited and is a key concern in the study area. Only 29.3% and 8.3% of the assessed households in the Hawd and Addun LZ reportedly had access to clean safe drinking water. In both livelihoods the lack of access to adequate water is attributed to unavailability in the area. About

(99%) of the households from Addun LZ reported having access to drinking water through water trucking, while the majority (72.6 %) of the Hawd population get water from unprotected surface sources like shallow wells and water catchments (Table 3). A small proportion of the households (3.9% in the Hawd and 3.3% in the Addun) treated their drinking water during storage, mainly through chlorination or boiling or decanting. In the Hawd LZ, 4.3% treated their water at the source while only 0.9% of the Addun did.

4.3. Sanitation and Hygiene

Characteristics	Hawd Pastoral			Addun Pastoral		
	N	%	CI	N	%	CI
Have access to latrines	217	57.7	43.6-71.8	184	55.1	38.9-71.3
Type of latrine						
Open pit	13	5.9	0.6-1.4	3	1.6	-1.8-5.1
Traditional Pit	204	94.10	80.6-99.4	181	98.4	94.8-101.8
VIP	0	.0	--	0	0.0	--
Flush	0	0.0	--	0	0.0	-
Reason for lack of latrine	N=159					
Pastoral	78	49.1	30.2-67.9	44	29.3	3.2-55.5
Lack of resource	78	49.1	30.5-67.6	101	67.3	40.6-94.0
Doesn't see need	3	1.9	-0.4-4.2	5	3.3	-2.3-8.9

Poor sanitation is another key concern in the Hawd and Addun populations. Access to usable sanitation facilities remains limited, with 42.3% and 47% of the

Hawd and Addun pastoral households respectively having no access to a sanitation facility, which predisposes the population to diseases. The main reason reported for inaccessibility is lack of

resources (>49% in the Hawd, 67.3% in the Addun) to construct the latrines (Table 4). The use of open bush/ground for faecal disposal coupled with consumption of water from open sources poses a risk of contamination of drinking water, a predisposing factor to diarrhoeal infections and acute malnutrition.

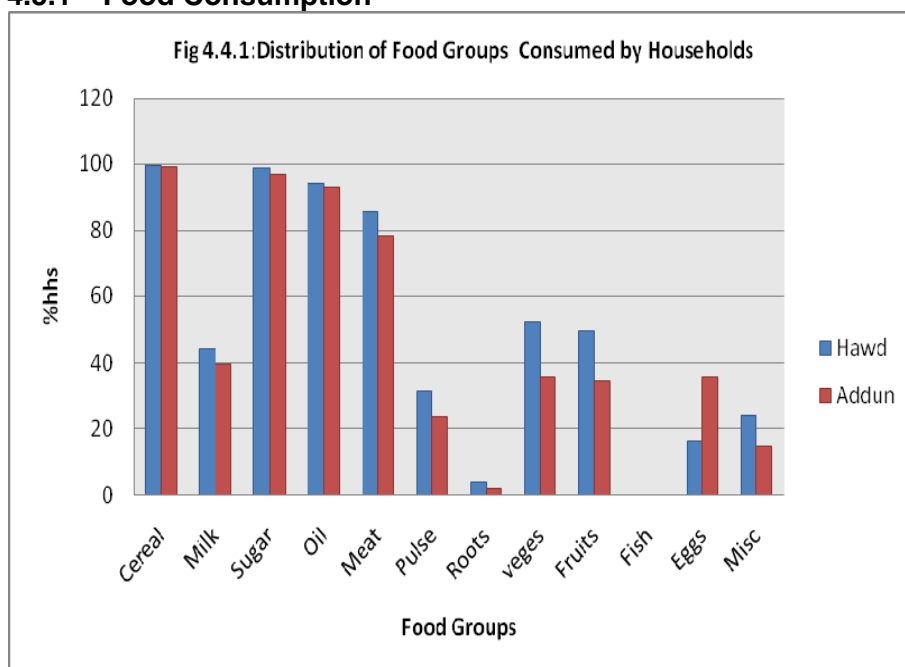
4.4 Morbidity, Immunization and Health Seeking Behaviour

Characteristics	Hawd Pastoral			Addun Pastoral		
	N	%	CI	N	%	CI
<i>Access to Health Facility</i>						
Yes	170	45.2	26.0-63.4	161	48.2	27.3-68.7
No	206	54.8	36.5-73.1	173	51.8	31.3-72.3
<i>Reason for lack of health facility</i>						
None available	12	5.8	0.6-10.3	10	5.3	1.0-9.6
Distance too far	170	77.3	62.4-92.1	153	81.4	60.9-93.8
Security concerns	4	1.8	0.2-3.4	1	0.5	0.0-1.6
Cannot afford	30	13.6	0.3-26.9	17	9.04	0.9-17.2

Access to public health facilities in both livelihood populations was deficient. Only 45.2% in the Hawd Pastoral and 48.2% in the Addun reportedly have access to health facilities, which may partly explain the health seeking behaviour in the assessed populations. As shown in table 5, most (77.3% in the Hawd and 81.4% in the Addun) attributed that the distance was the biggest hindrance to having access to the health facility followed by affordability of the service (13.6% in the Hawd and 9.04% in the Addun). In the Hawd, the SRCS runs the following urban based MCH centers: Goldogob, Badweyne, Xarfo, Hasabale and Kalabayar while the ministry of health manages the Burtinle and Bursala MCH centers. In the Addun, SRCS and the ministry of health manage the following MCH centers: Jariban, Balisbusle, Goldogob, Galkayo(North), Galkayo (South). ACF and MCF support selective feeding programs in central (Dusamareb) and Mudug (Galkayo).

4.5 Household Food Security

4.5.1 Food Consumption



As shown in figure 4.4.1, cereals provide the bulk of the food in the household diet. Other food items frequently consumed were sugar, oil and meat. Milk consumption was low among all the assessed households as a result of the consecutive rain failure experienced in the region and the ensuing poor livestock body conditions.

Moreover, fruit consumption among the Hawd was slightly higher than Addun pastoral Consumption of roots/tubers, eggs and fish remained very low in all the assessments.

In the Hawd and Addun LZ, purchase is the main source of household food. 78.5% and 72.5% of households in the Hawd and Addun respectively purchased their cereal while milk was purchased by 93.9% and 98.5% of households respectively, although only 44.4% and 39.8 % of the households consumed milk. Qualitative information from respondents mentioned that the decline in milk consumption was due to the out-migration southwards of livestock from the area leaving the remaining households without access to milk. The majority of the households (50.2% and 68.0% in Hawd and Addun respectively) reportedly consumed two meals per day, while 42.7% and 25.7% of the households consumed three meals a day. A smaller proportion (<7 %) of the households consumed only one meal per day. The average number of meals consumed in a day by the households was 2.4 (± 0.5) and 2.2(± 0.6) among the Hawd and Addun populations respectively. According to key informants, there has been a decline in the number and portions of meals consumed. This is due to reduced access to milk, meat and income with the out-migration of livestock, coupled with high food prices which have compromised access to food.

Main source of food	Hawd		Addun	
	n	%	N	%
Own production	4	1.1	1	0.3
Purchasing	303	80.6	247	74.0
Gifts	6	1.6	9	2.7
Food aid	11	2.9	47	14.1
Bartering	1	0.3	2	0.6
Borrowing	55	13.6	28	8.4
Gathering	0	0.0	0	0.0
Main source of cereals	N=376		N=334	
Own production	6	1.6	5	1.5
Purchasing	295	78.5	242	72.5
Food aid	11	2.9	9	2.7
Gifts	5	1.3	46	13.8
Borrowing	59	15.7	29	8.7
Others (barter, gather, etc)	0	0.0	2	0.6
Main source of milk	N=376		N=3344	
Purchasing	353	93.9	329	98.5
Gifts	2	0.5	0	0.0
Borrowing	20	5.3	5	1.5
Others(barter, gather, etc)	1	0.3	0	0.0
Number of meals taken/day	N=375		N=334	
One	26	6.9	21	6.3
Two	189	50.4	227	68.0
Three	160	42.7	86	25.7

4.5.2 Dietary Diversity

As indicated in Table 7, less than 1% of the assessed households consumed one or two food groups daily, usually cereal. Among the Hawd populations, the assessed households mostly consumed five or six food groups (21.8 % and 21.3%) with the least food groups a household consumed being one and the most reported in a household being ten food groups in the 24 hours prior to the assessment. Most households in the Addun Pastoral livelihood consumed four (24%) or five (20.7%) food groups with a range of one to nine food groups reported in the assessment.

As reflected in Table 7, the mean household diversity score (HDDS) for the assessed households was 5.8 ± 1.7 and 5.2 ± 1.7 in the Hawd Pastoral and Addun Pastoral livelihoods respectively. Among the Hawd Pastoral livelihood, 7.7% of the assessed households assessed consumed a poorly diversified diet (<4 food groups) in the 24 hours preceding the assessment, while in among the Addun livelihood, 15.3% of the households were not consuming a diversified diet (<4 food groups).

	Hawd		Addun	
	n	%	n	%
<i>No of food groups consumed</i>				
1 food group	1	0.3	0	0.0
2 food groups	4	1.1	2	0.6
3 food groups	24	6.4	49	14.7
4 food groups	53	14.1	80	24.0
5 food groups	81	21.5	69	20.7
6 food groups	82	21.8	50	15.0
7 food groups	60	16.0	39	11.7
8 food groups	52	13.8	38	11.4
9 food groups	17	4.5	7	2.1
10 food group	2	0.5	0	0.0
<i>No. Having Diversified Diet</i>				
1-3 food groups	29	7.7	51	15.3
≥ 4 food groups	347	92.3	283	84.7
Mean HDDS	5.8 (SD=1.7)		5.2 (SD=1.7)	

According to qualitative data collected, the displacement from Mogadishu to the central regions seems to have increased pressure on an already precarious food security situation. Nevertheless, the majority of assessed households reported to have consumed a diversified diet comprising of four or more food groups in the preceding 24 hours to the assessment period.

4.6 Morbidity, immunization and Health Seeking Behaviour

High morbidity rates were reported in the Hawd and Addun pastoral livelihoods with 54.4% and 40.0% in the Hawd and Addun respectively reportedly ill in the two weeks prior to the assessment.

For the children who fell sick within two weeks prior to the Hawd assessment, the majority (>45%) sought self medication at home, while for the Addun populations the assessed children were mostly taken to private pharmacies/clinics (29.3%). A significant proportion consulted traditional healers (7.3 % and 5.1 % respectively). A lower proportion of ill children in both livelihoods (13.5% and 19.5%) reportedly sought medical assistance from the public health facilities (Table 8). This is due to the poor access to health facilities in the area, further attributed to a limited humanitarian space.

	Hawd		Addun	
	N	%	N	%
<i>Child fell sick</i>				
Yes	422	54.4	256	40.0
No	354	45.6	384	60.0
<i>Where health service sought</i>				
Public health facilities	57	13.5	50	19.5
Private pharmacy/clinic	43	10.2	75	29.3
Traditional healers	31	7.3	13	5.1
Own medication	202	47.9	56	21.9
No assistance sought	89	21.1	62	24.2

Table 9: Morbidity, measles immunisation, polio vaccination and vitamin A supplementation				
	Hawd Pastoral		Addun Pastoral	
	n	%	N	%
Proportion of children with diarrhoea in 2 weeks prior to assessment	211	27.2 (24.1-30.5)	88	13.7 (10.2-17.3)
Proportion of children with ARI within two weeks prior to assessment	169	21.8 (20.3-34.08)	102	15.9 (8.7-23.1)
Children with fever/ suspected malaria in 2 weeks prior to assessment	181	23.3 (2.7-33.8)	154	24.1 (16.1-32.0)
Children who slept under bed net	523	67.4 (57.0-77.8)	429	67.1 (54.7-79.4)
Proportion of persons confirmed Malaria (RDT) positive	164	12.5 (7.9-17.02)	85	6.8(4.4-9.1)
Suspected measles within one month prior to assessment	7	0.9 (0.08-1.72)	1	1.4 (0.4-2.4)
Children (9-59 months) immunised against measles	114	15.7 (7.6-23.6)	143	23.8 (1.7-35.9)
Children who have ever received polio vaccine	582	75.0 (64.8-85.2)	430	67.3 (56.7-77.9)
Children who received vitamin A supplementation in last 6 months	346	44.6 (29.7-59.4)	295	46.1 (33.3-58.9)

The incidence of reported diarrhoea in the Hawd and Addun populations (27.2% and 13.7% respectively) in the two weeks prior to the assessment was high. High incidences of ARI and febrile illnesses were also reported (Table 9). These levels are consistent with seasonal morbidity patterns recorded from the MCHs. Field reports have indicated Acute Watery Diarrhoea outbreaks in Abudwak and Adaado districts by November 2008 with the outbreak reported as yet to be contained.

Analysis continues to show a strong association between acute malnutrition and morbidity rates. In the Hawd livelihood, those who were ill were almost twice as likely to be malnourished than those who were not ill (RR1.88; 1.39-2.54). Similar rates were found in the Addun livelihood, with children reported to have been ill being twice as likely to be malnourished than those who were not ill (RR=2.03; 1.46-2.83)

Overall, the measles vaccination and vitamin A supplementation status were below the recommended 95% level (Sphere, 2004) in the Hawd and Addun (Table 9): polio immunization status was relatively high at 75.0% and 67.3%; measles vaccination was very low at 15.7% and 23.8 % and Vitamin A supplementation at 44.6% and 46.1% respectively (See Table 9).

4.7 Results of the Malaria RDT assessment

A rapid diagnostic test for malaria² conducted concurrently confirmed malaria prevalence (*plasmodium falciparum*) of 12.5 % and 6.8 % in the Hawd Pastoral and Addun Pastoral populations respectively. This high prevalence is consistent with those reported in the May 2008 assessments, which reported a prevalence rate of 9.3% and 11.9% in the Hawd and Addun respectively. This is possibly due to reduced humanitarian operations in central regions due to a deteriorating security situation, hindering malaria control operations. Half of the assessed households in the Hawd and Addun pastoralists tested for malaria reportedly owned mosquito nets (53.2% and 52.6% in the Hawd and Addun respectively).

² Tests using Para checks conducted in collaboration with UNICEF

Table 10: Results of the Malaria RDT assessment

Indicator	Addun Pastoral (N=1255)			Hawd pastoral (N=1315)		
	n	%	95% CI	n	%	95% CI
Child Malnutrition						
Total number of persons assessed for malaria	1255	100		1315	100	
Sex:						
Male	597	47.6	43.1 – 52.0	621	47.2	43.8 – 50.6
Female	658	52.4	48.0 – 56.9	694	52.8	49.4 – 56.2
Treated for malaria within the previous 2 weeks	102	8.1	3.5 -12.7	36	2.7	1.1 – 4.4
Had fever within the previous 2 weeks	518	41.3	31.0 – 51.6	610	46.4	31.7 – 61.1
Have access/own bed net	660	52.6	39.8 – 65.4	700	53.2	37.5 – 68.9
Use bed net	650	51.8	34.3 – 65.2	684	52.0	35.9 – 68.2
Slept under bed net the previous night	616	49.1	36.6 – 61.6	655	49.8	33.3 – 66.3
RDT Results:						
Positive	85	6.8	4.4 – 9.1	164	12.5	7.9 – 17.0
Negative	1170	93.2	90.9 – 95.6	1151	87.5	83.0 – 92.1
Invalid	-	-	-	-	-	-

4.8 Feeding Frequency of children under age of five years

Table 11: Feeding Frequency of U5 children

	Hawd Pastoral (N=776)		Addun pastoral (N=639)	
	N	%	N	%
<i>Is child (6-24 mo) breastfeeding?</i>				
Yes	82	30.9	80	34.0
No	183	69.1	155	66.0
<i>Feeding frequency</i>				
1 time	40	5.2	19	3.0
2 times	90	11.6	120	18.8
3 times	263	33.9	223	34.9
4 times	296	38.1	281	28.3
5 times	87	11.2	96	15.0

In the Hawd Pastoral, most (38.1%) of the children aged 6-59 months were fed four times while in the Addun Pastoral, most (34.9%) of the assessed households reportedly fed children aged 6-59 months three times a day. It is recommended that children aged 6-8 months be fed 2-3 times a day, those aged >8-12 months be fed 3-4 times and those older than

a year fed for 4-5 times a day (WHO, 2003 and UNICEF, 2002). These results indicate that the majority of the young children aged 6-12 months met the recommended feeding frequency while most of children older than a year did not meet the recommendations. Qualitative information indicated that majority of the children stopped breastfeeding before 18 months, mainly due to milk scarcity, illness in the mother or pregnancy.

Only 30.9% and 34.0 % of the assessed children in the Hawd pastoral and Addun livelihoods respectively in the breastfeeding age (6-24 months) were still breastfed as recommended (Sphere, 2004). Analysis of distribution of acute malnutrition in the non breastfed group showed higher risks and levels of association with acute malnutrition than those who were still breastfeeding, but this was not statistically significant in this assessment.

4.9 Nutrition Status

4.9.1 Acute Malnutrition by Livelihoods

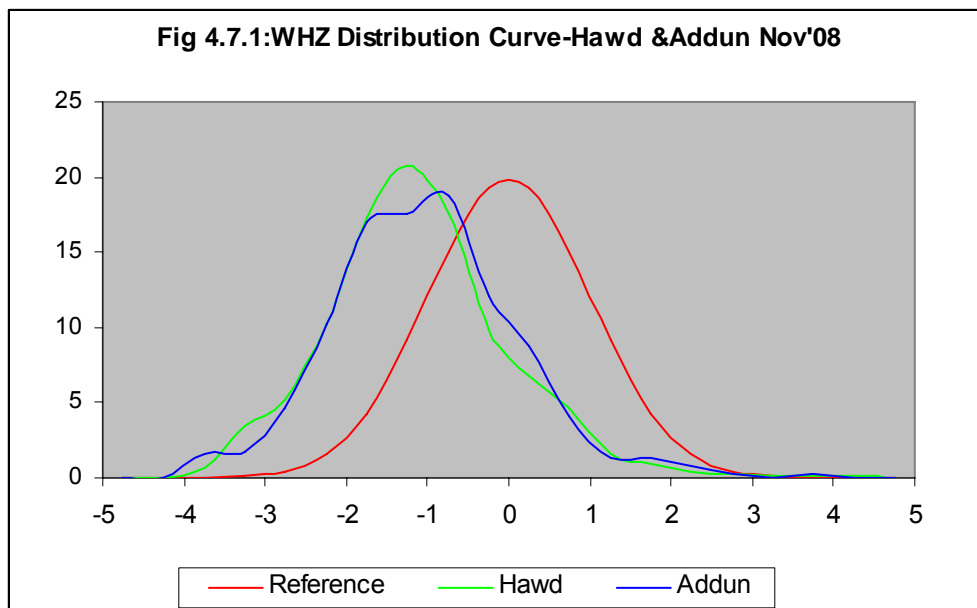
A total of 1416 children aged 6-59 months were assessed from 720 households in the Hawd and Addun livelihood zones. A total of 776 children, 53.3% boys and 46.8% girls (sex ratio =1.08) aged 6-59 months were assessed from 376 households in the Hawd (mean household size = 5.8 ± 2.3) and 640 children, 49.8% boys and 50.2% girls (sex ratio= 1.02) were assessed from 344 households (mean household size = 5.80 ± 2.2) in the Addun.

Results show a GAM rate of **20.8%** (14.9-26.8), with a SAM rate of **5.8%** (3.2-8.4) including four (0.5%) oedema cases (0.02-1.01) in the Hawd Pastoralists, indicating a **Very Critical** nutrition situation based on the WHO classification. In the Addun Pastoralists, results show a GAM and SAM rates of **18.4%** (12.7-24.2) and **3.8%** (2.0-5.4) respectively with no oedema cases, indicating a **Critical** situation. A summary of the findings for the acute malnutrition rates are given in Table 4.9.

Malnutrition rates	Hawd Pastoral		Addun pastoral	
	<i>No</i>	<i>% (CI)</i>	<i>No</i>	<i>% (CI)</i>
Global Acute Malnutrition (WHZ<-2 or oedema)	162	20.8 (14.9-26.8)	118	18.4 (12.7-24.2)
Severe Acute Malnutrition (WHZ<-3 or oedema)	45	5.8(3.2-8.4)	24	3.78 (2.01-5.4)
Oedema	4	0.5 (0.02-1.01)	0	-
GAM estimates by WHO Anthro (2005) Standards:	169	21.9 (16.5-28.6)	121	18.9(13.9-25.3)
SAM estimates by WHO Anthro (2005) Standards:	55	7.1 (4.5-10.9)	40	6.3(3.5-10.8)
Global Acute Malnutrition (WHM<80% or oedema)	114	14.7(10.3-19.1)	72	11.3 (6.2-16.3)
Severe Acute Malnutrition (WHM<70% or oedema)	23	2.96 (0.83-5.09)	12	1.87 (0.67-3.07)
Proportion of stunted children (HAZ<-2)	130	16.8(12.4-21.1)	99	15.5(10.09-20.84)
Proportion of underweight children (WAZ<-2)	239	30.8(22.9-38.6)	188	29.4(23.03-35.7)

When estimated using WHO Anthro (2005) Reference standards, similar GAM rates and almost double the SAM rates were reported. Hawd assessment reported GAM rate of 21.9 % (16.5-28.6) from 20.8% and SAM rate of 7.1% (4.5-10.9) from 5.8% (3.2-8.4).while among the Addun livelihood population the GAM rate was 18.9% (13.9-25.3) from 18.4% and SAM rate increased to 6.3% (3.5-10.8) from 3.7%.

The distributions of the weight-for-height Z scores in the two livelihood assessments were shifted to the left depicting a poorer nutrition situation according to international (WHO) standards (See Figure 4.7.1).



The mean WHZ for Hawd pastoral and Addun livelihoods are -1.20 ± 1.2 and -1.0 ± 1 respectively. A summary of the Nutrisurvey quality checks for the assessments is given in appendix 7.

4.9.2 Acute Malnutrition by Sex in the three Livelihoods

Results on acute malnutrition among the surveyed population in Addun livelihood using weight for height < -2 Z score or presence of oedema does not show any statistical difference between girls and boys, although there was a higher proportion of females in both livelihoods who were malnourished than their male counterparts (21.2% and 19.6% in the Hawd and Addun respectively).

Table 13: Distribution of children by nutritional status (WHZ-score or oedema) and child sex

Nutrition status	Hawd				Addun pastoral			
	Males		Females		Males		Females	
	n	%	n	%	n	%	n	%
GAM (WHZ<-2 /oedema)	85	20.6	77	21.2	55	17.2	83	19.6
SAM (WHZ<-3 /oedema)	26	6.3	19	5.2	9	2.8	15	4.7
GAM (WHO Anthro)	92	22.5	77	21.3	60	18.8	61	19.0
SAM (WHO Anthro)	32	7.8	23	6.4	18	5.6	22	6.9
Stunting (HAZ<-2)	80	19.4	50	13.8	49	15.4	50	15.6
Underweight (WAZ<-2)	142	34.4	97	26.7	95	29.8	93	29.0

Results on stunting (height-for-age < -2 Z-score), an indicator of long term cumulative effects of inadequate food intake and poor health conditions, show levels that are $< 20\%$ and indicate a normal situation (WHO categorization), consistent with findings from the meta data analysis of nutrition surveys undertaken in 2001-2007 (source: FSAU Nutrition Situation Post Deyr 2008/09 Technical Series Report). The results on underweight (using Weight-for-Age < -2 Z score) show Serious levels

(20-29.9%) in the Addun and Critical/Very High levels in the Hawd, consistent with findings from the meta data analysis of nutrition surveys undertaken in 2001-2007. However, it is important to bear in mind that age is still a problematic indicator to get accurate results in Somalia.

4.9.3. Acute Malnutrition by Age in the Two Livelihoods

The proportion of acutely malnourished children varied across age category in both livelihoods but generally children from all age groups recorded very critical levels of acute malnutrition. Children aged 18-29 months recorded the highest proportion in the Hawd (26.4%) while children aged 54-59 months recorded the highest proportion (31%) in the Addun population. Analysis of distribution of acute malnutrition between the breastfeeding age group 6-24 months and the 25-59 months category, shows no statistical difference ($p>0.05$). Equally there was no statistical difference ($p>0.05$) in acute malnutrition levels among the children in the age of 6-29 months and 30-59 months age bands.

Age (months)	Hawd		Addun pastoral	
	GAM	SAM	GAM	SAM
6-17	29 (16.9%)	10(5.8)	23(15.2%)	9 (6.0%)
18-29	46 (26.4 %)	15(8.6%)	26(19.3%)	5(3.7%)
30-41	24(14.(%)	6(3.7%)	24(17.4%)	2(1.4%)
42-53	36(23.7%)	9(5.9%)	19(14.3%)	4(3.0%)
54-59	27(23.1)	5(4.3%)	26(31.3%)	4(4.8%)
Total	162 (20.8)	45(5.8%)	118(18.4%)	24(3.8%)

4.9.4 Acute Malnutrition by MUAC

Malnutrition rates	Hawd Pastoral		Addun pastoral	
	No	% (CI)	No	% (CI)
Child MUAC	N= 776		N= 640	
GAM (MUAC< 12.5 cm or oedema)	62	7.9 (4.11-11.9)	24	3.8 (1.42-6.02)
SAM (MUAC< 11.0 cm or oedema)	7	0.9 (0.01-1.8)	3	0.5 (0.0-1.17)
Pregnant Women MUAC	N=84		N=51	
Total malnourished (MUAC< 23.0 cm)	20	23.8 (10.9-36.7)	11	21.7 (9.7-33.4)
Severely malnourished (MUAC≤ 20.7 cm)	3	3.6 (0.0-8.76)	3	5.8 (0.0-12.9)
Non pregnant women MUAC	N=289		N=293	
Total malnourished (MUAC≤ 18.5 cm)	5	1.7 (0.27-3.2)	1	0.34 (0.0-1.03)
Severely malnourished (MUAC< 16.0 cm)	1	0.34 (0.0-1.06)	0	0.0

Based on MUAC measurements, acute malnutrition rates (MUAC< 12.5 cm or oedema) of 7.9% (4.11-11.9) and 3.8% (1.42-6.02) were reported in the Hawd and Addun livelihoods respectively (Table 15) including 0.9 (0.01-1.8) and 0.5 (0.0-1.17) respectively at high risk of mortality

(MUAC<11 or oedema) indicating *Serious*³ nutrition situation in the Hawd pastoral and *Alert* nutrition situation in Addun areas. Although the MUAC assesses a different risk of malnutrition, they were generally consistent with weight-for-height estimates of malnutrition.

Among the assessed women, relatively high acute malnutrition rates were recorded in the pregnant women (MUAC< 23.0 cm) ranging from 23.8 % in Hawd to 27.1% in the Addun pastoral livelihood zone as indicated in Table 15. Pregnancy raises physiological and nutritional demands of women making them vulnerable to malnutrition. Low malnutrition rates (<2%) were recorded among the non pregnant women.

4.10 Mortality

A total of 30 deaths and 19 deaths were recorded in the Hawd and Addun pastoral assessments respectively in the preceding 90 days. Table 16 summarises the results of the mortality assessment.

Table 16 Mortality among the Hawd pastoral and Addun LZs in NE and Central regions				
	<i>Hawd</i>		<i>Addun</i>	
	U5	Total	U5	Total
Total HHs surveyed		789		757
Total Population assessed in HHs	891	3552	754	3251
Number who joined the HHs	8	104	9	125
Number who left the HHs	25	239	40	355
Number of births	81	81	63	63
Number of deaths	14	30	13	19
Mortality rate	1.8	0.93	1.94	0.63
	1.07-2.99	0.65-1.32	1.14-3.29	0.40-0.98

The retrospective crude (CMR) and under five (U5MR) indicate mortality rates of 0.93 (0.65-1.32) and 1.8 (0.07-2.99) in the Hawd and 0.63 (0.40-0.98) and 1.94 (1.14-3.29) in the Addun pastoral livelihoods. These are within the acceptable (CMR<1/10,000 and U5MR<2/10,000 persons/day) levels according to the WHO classification.

Diarrhoea, febrile illness, ARI and birth related complications were reported as the main factors associated with under-five mortality according respondents' recall. Among adults and children aged 5 years and above, most deaths were caused by physical injuries/killing. Diarrhoea, anaemia, malaria and birth related complications were also reported as major causes of death.

4.11 Qualitative Information

Additional Information on food security, water & sanitation and childcare practices were collected through qualitative approaches. Semi-structured interviews with key informants and community focus groups were used for collecting the information. The nutrition assessment team also stopped randomly at settlements along the road for brief consultations and ensured that the situation of rural communities and IDPs living outside the main villages was reviewed.

Poor *Deyr* '08/09 rains were reported in the Hawd and Addun LZ of Central and Northeast regions. Access to and availability of pasture and water remained very poor. Early water trucking was observed in the main settlements and water prices were noted to have increased. Reports from Adaado district indicated that the rain water catchments and *Berkeds* remained empty due to the poor

³ According to the FSAU Nutrition Indicators and Categorization Table

rains received and water trucking was already ongoing. Most of the Hawd pastoralists remained in the livelihood zone though some migrated to Zone-5 of Ethiopia. Addun pastoralists moved down to *Golol* and towards northern sector of the Hawd of Eyl district. Livestock body conditions were poor as was production; with the implication that access to milk and income from sellable animals was low.

Civil insecurity situation in the central regions and resource based clan conflicts on pasture and water were reported in many parts of Galgadud and Mudug regions, further hindering access of humanitarian agencies as well as the mobility of movement of the livestock (*Deyr '08/09* ; FSAU brief summary).

Market improvement was reported in the central regions with prices of cereal and imported commodities having dropped slightly due to a depreciated US Dollar against the Somali Shilling. However, though the livestock market value is favourable, the number of sellable animals is low due to poor body conditions following the prolonged drought and lack of water and pasture in the last consecutive seasons (FSAU Field report Nov'08).

Common diseases like diarrhoea, ARI, malaria and whooping cough are prevalent. Child feeding and child care practices remain largely suboptimal and include the introduction of sugared water to infants within the first day of birth; introduction of complementary foods (animal milk – mostly goat milk) before the recommended age of six months, sometimes as early as one month and the termination of breastfeeding before the recommended age of 24 months, predisposing infants and children to acute malnutrition. For most children, semi solid foods are introduced as early as 3-4 months of age and solid foods like rice or *canjera* are introduced at the age of 8-12 months. Main foods given to infants and children (1 – 12 months) are goat milk 3 to 4 times a day and sometimes *canjero* or rice mixed with sugar and oil/butter and porridge (flour + sugar + oil). Food insecurity/hunger, close pregnancy intervals and sometimes ill health are the major reported constraints to breastfeeding of young children below two years. Lack of clean water, cooking & storage facilities and too much domestic work for women were mentioned as the main hindrances to food preparation and storage. Women have to travel long distances at times (especially during this dry spells) or spend a lot of time away from home and do not have enough time to prepare food.

5.0 Discussion

The results in the Hawd show a GAM rate of **20.8%** (14.9-26.8) and a SAM rate of **5.8%** (3.2-8.4) including four (0.5%) oedema cases (0.02-1.01). These indicate a **Very Critical** nutrition situation based on the WHO classification. For the Addun Pastoral livelihood, results show a GAM rate of **18.4%** (12.7-24.2) and SAM rate of **3.8%** (2.0-5.4) with no oedema case indicating a **Critical** nutrition situation. A summary of the findings for the acute malnutrition rates is given in Table 1.

Compared to the May 2008 nutrition assessments findings when the Hawd pastoral livelihood reported a GAM rate of 19.3% (15.6-23.0) and SAM rate of 2.3% (0.9-3.8) and the Addun reported a GAM rate of 18.4% (14.9-21.8) and SAM rate of 2.8% (1.2-4.4) with one (0.2%) oedema case, there has been deterioration from *Critical* to **Very Critical** levels of acute malnutrition in the Hawd and a Sustained **Critical** nutrition situation in the Addun Pastoral population. These nutrition rates exceed emergency thresholds and confirm earlier analysis of a deepening humanitarian emergency in the livelihood zones, particularly in the central regions. Crude and under five year mortality rates of 0.93 (0.65-1.32) and 1.8 (0.07-2.99) in the Hawd LZ and 0.63 (0.40-0.98) and 1.94 (1.14-3.29) in the Addun LZ were reported which fall below the emergency threshold levels of *1/10,000/day* and *2/10,000/day* and indicate *acceptable* situation (WHO standards).

High morbidity rates in the Hawd and Addun populations continue to compromise the nutrition situation of the populations. Most children (54.4%; 43.2-65.6) in the Hawd and 40.0% (31.5-46.7) in the Addun LZ were reported to have suffered from one or more communicable childhood illnesses in the two weeks prior to the assessment. Diarrhoea was the most common illness in the Hawd Pastoral, with 27.2% (24.1-30.5) of children reportedly ill with it in the two weeks prior to the assessment. Levels of diarrhoea were relatively low in the Addun Pastoral LZ (13.7%; 10.2-17.3) with the most common illness reported in the livelihood zone being febrile illness at 24.1% (16.1-32.0). These levels are consistent with seasonal morbidity patterns recorded from the health facilities. Rapid Diagnostic Tests (RDT) conducted for malaria, *Plasmodium falciparum* confirmed high prevalence rates of 12.5 % (7.9-17.02; N=1315) in the Hawd, and 6.8% (4.4-9.1; N=1255) in the Addun LZ respectively, consistent with the high levels of 9.3% and 11.9% reported in the May 2008 assessments. The increase in malaria prevalence in the Hawd LZ is possibly due to reduced humanitarian assistance, notably the scale-back of malaria control efforts (mosquito net distribution and malaria treatment) particularly in the central regions, due to deteriorating security situation. Statistical analyses show strong association between malnutrition and morbidity rates. In the Hawd LZ, children reported to have been ill were almost twice as likely to be acutely malnourished compared to their healthy counterparts (RR1.88; 1.39-2.54). Similar rates were found in the Addun livelihood, with children who were ill twice as likely to be acutely malnourished than those who were not ill (RR=2.03; 1.46-2.83).

Poor feeding practices persist in the Central and Northeast regions like in other parts of Somalia, contributing to the worrisome levels of acute malnutrition, especially in the breastfeeding age group (0-24 months). Although breastfeeding is recommended until a minimum age of 24 months, only a third of the children aged 6-24 months were reportedly being breastfed at the time of the assessments. However, analysis of distribution of acute malnutrition between the breastfeeding age group 6-24 months and the 25-59 months category showed no statistical difference among them ($p>0.05$). Equally there was no statistical difference ($p>0.05$) in acute malnutrition levels among the children in the age of 6-29 months and 30-59 months age bands.

Low coverage of health programmes are important risk factors to the poor nutrition situation in the populations of Hawd and Addun LZ. Measles vaccination status for eligible children (9-59 months old) was low at only 15.7% and 23.8 % respectively. Vitamin A supplementation status was also low at 44.6% in the Hawd and 46.1% in the Addun LZ. Polio immunization recorded a relatively higher status of 75.0% and 67.3% among Hawd pastoral and Addun pastoral populations respectively.

Overall, the proportion of children who have been vaccinated with these services falls below the recommended 95% level (Sphere, 2004) in both livelihoods.

The food security situation in the Hawd & Addun populations remains precarious with more serious indicators in the central regions. Poor Deyr '08/09 rains were reported in the Hawd and Addun LZ, limiting access to water and pasture. Reports from Adaado district indicated empty rainwater catchments and *Berked* and ongoing water trucking. Most of the Hawd Pastoralists remained in the area although some reportedly migrated to Zone five of Ethiopia. Addun pastoralists moved to Golol and towards Eyl district, where the situation was better. Livestock body conditions were poor due to lack of water and pasture as was production, with limited access to milk and income through sellable animals. Market improvement was reported in central regions with prices of cereal and imported commodities dropping slightly due to a depreciated US Dollar against the Somali Shilling. However, though the livestock market value is favourable, the number of sellable animals is low due to the poor body conditions (Source: FSAU Field report Nov'08). Civil insecurity in the central regions continued in addition to resource based clan conflicts on pasture and water, which were reported in many parts of Galgadud and Mudug regions (*Deyr 08/09*; FSAU brief summary).

In conclusion, the Hawd has reported a **Very Critical** nutrition situation, indicating deterioration since the last assessment, while the Addun pastoral livelihood reported a **Critical** Situation indicating a sustained critical nutrition situation phase since the May 2008 nutrition assessments. The deterioration in the nutrition situation is attributed to limited access to food (due to poor rains, out-migration of livestock, less viable animals for sale, and declining terms of trade) as well as influx of IDPs from Mogadishu to central regions who have exerted pressure on the precarious situation, high morbidity, poor access to health care, poor child feeding practices, poor access to water and sanitation. Civil insecurity has led to the withdrawal of some of the humanitarian agencies and contributed to reduced response to the current crisis.

6.0 Recommendations

In view of the deteriorating nutrition situation in the Hawd and Addun pastoral livelihoods, intervention efforts need to be strengthened and broadened to address both immediate life saving needs and long term strategies. The assessment team also makes the following recommendations:

Immediate Interventions

- Improve the coverage for health programmes, especially for measles vaccination and vitamin A supplementation. Outreach immunization campaigns are required in both Hawd and Addun livelihood zones.
- Rehabilitation of acutely malnourished children through existing selective feeding programs in the central and north east regions, including targeted outreach supplementary feedings programs where possible. Capacity building of the existing MCH staffs and the community to manage malnourished children could be explored.
- Provision of programmes that improve and sustain dietary diversity and consumption of micronutrient rich foods.
- Intervention programmes on malaria, particularly to target malaria hot spot areas such as Galdogob, Bursalah and Hasbahale of Eyl district, as well as Elbur, Abudwaaq and Balanbale districts.
- Intervention programmes water, sanitation and hygiene practices including health education need to intensify.

Long term Interventions

- Encourage comprehensive and effective strategies to tackle the chronic malnutrition through participatory ways with community members and representative from the public, and private sectors in the region.
- Address the issues of limited access to safe water, through rehabilitation/protection of water systems including the wells and water catchments.
- Provision of veterinary services: There is also a need to urgently provide veterinary services for the livestock in the community to control the spread of the reported livestock diseases.
- Establish or expand the health facilities and satellite services especially in the pastoral villages with no health facilities.
- Intensify health and nutrition education activities at the household level to address care concerns, targeting mothers, and other caregivers. The main areas of focus should include promoting exclusive breastfeeding, appropriate young child feeding, diet diversification, and improvements in household hygiene including health care
- Intensify security and peace building efforts both at local and national level.

QNO:

Appendix 1: Hawd & Addun NUTRITION ASSESSMENT HOUSEHOLD QUESTIONNAIRE, 2008

Household Number _____ Date _____ Team Number _____ Cluster Number _____ Cluster Name _____ District: _____

Q1-6 Characteristics of Household

Q1. Household size⁴? _____

Q2. Number of children less than 5 years (0-59 months)? _____

Q3. Sex of household head⁵? 1=Male 2=Female

Q4a Are you hosting any recently (in the last 6 months) internally displaced persons? 1= Yes 2= No **Q4b** If yes, Number of persons _____

Q5a Does household have mosquito net? _____ 1= Yes 2= No **Q5b.** If yes, ask to see the net: _____ 1= GFSOM label 2=Other type 3= Not seen

Q6. What is the household's main source of income? 1= Animal & animal product sales 2= Crop sales/Farming 3= Trade 4= Casual labour
5= Salaried/wage employment 6= Remittances/gifts/zakat 7= Others, specify _____

Q7-14 Feeding and immunization status of children aged 6 – 59 months (or 65 – 109.9 cm) in the household.

First Name	Q7 Age (months)	Q8 (If 6-24 months) Are you breastfeeding ⁶ the child?	Q9 (6-59 months) How many times did you feed the child in the last 24 hours (besides breast milk)?	Q10 Has child been provided with Vitamin A in the last 6 months? (show sample)	Q11 Has child ever been vaccinated against measles?	Q12 Has the child ever been given polio vaccine orally?	Q 13 Has the child benefited from any feeding program in the last 3 months?	Q14 Did child sleep under a mosquito net last night?
		1=Yes 2= No	1= 1 time 2=2 times 3=-3 times 4= 4 times	1=Yes 2= No	1=Yes 2= No.	1=Yes 2= No	1= SFP 2= TFC 3= OTP/CTC 4= None	1=Yes 2= No

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

⁵ One who controls and makes key decisions on household resources (livestock, assets, income, and food), health and social matters for and on behalf of the household members.

⁶ Child having received breast milk either directly from the mothers or wet nurse breast within the last 12 hours

			5= 5 times or more					
1								
2								
3								
4								

Q15-24 Anthropometry and morbidity for children aged 6 – 59 months or (65 – 109.9cm) in the household

First Name <i>Follow same order as per table on page 1</i>	Age (months)	Q15 Sex 1=Male 2=Female	Q16 Oedema 1=yes 2= No	Q17 Height (cm) <i>To the nearest one tenth)</i>	Q18 Weight (kg) <i>To the nearest one tenth)</i>	Q19 MUAC (cm) <i>To the nearest one tenth)</i>	Q20 Diarrhoea ⁷ in last two weeks 1= Yes 2= No	Q21 Serious ARI ⁸ (Oof Wareen/ Wareento) in the last two weeks 1=Yes 2= No	Q22 Febrile illness/ suspected Malaria ⁹ in the last two weeks 1=Yes 2= No	Q23 Suspected Measles ¹⁰ in last one month 1=Yes 2= No	Q24 Where did you seek healthcare assistance when child was sick? (If yes in Q20 – 23) 1=No assistance sought 2=Own medication 3=Traditional healer 4=Private clinic/ Pharmacy 5= Public health facility
1											
2											
3											
4											

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

Sno	Name	Age (years)	Received Tetanus vaccine? 1= Yes 2= No	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	5=Urinal
6=Organ	7=Anaemia
8= Reproductive	9=Other, specify

⁷ Diarrhoea is defined for a child having three or more loose or watery stools per day

⁸ ARI asked as oof wareen or wareento. The three signs asked for are cough, rapid breathing and fever

⁹ Suspected malaria/acute febrile illness: - the three signs to be looked for are periodic chills/shivering, fever, sweating and sometimes a coma

¹⁰ 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

Q26 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.

<p>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.</p>	<p>Did a member of your household consume food from any these food groups in the last 24 hours?</p> <p>1=Yes 2= No</p>	<p style="text-align: right;"><i>*Codes:</i></p> <p>1= Own production 6=Borrowed 2=Purchases 7=Gathering/wild 3=Gifts from friends/ relatives 8=Others, specify____ 4=Food aid 9=N/A 5=Bartered</p>
<p>Type of food</p>		<p>What is the main source of the dominant food item consumed? (Use codes above)?</p>
<p>1. Cereals and cereal products (e.g. maize, spaghetti, rice, caanjera, bread)?</p>		
<p>2. Milk and milk products (e.g. goat/camel/ fermented milk, milk powder)?</p>		
<p>3. Sugar and honey?</p>		
<p>4. Oils/fats (e.g. cooking fat or oil, butter, ghee, margarine)?</p>		
<p>5. Meat, poultry, offal (e.g. goat/camel meat, beef; chicken or their products)?</p>		
<p>6. Pulses/legumes, nuts (e.g. beans, lentils, green grams, cowpeas; peanut)?</p>		
<p>7. Roots and tubers (e.g. potatoes, arrowroot)?</p>		
<p>8. Vegetables (e.g. green or leafy vegetables, tomatoes, carrots, onions)?</p>		
<p>9. Fruits (e.g. water melons, mangoes, grapes, bananas, lemon)?</p>		
<p>10. Eggs?</p>		
<p>11. Fish and sea foods (e.g. fried/boiled/roasted fish, lobsters)?</p>		
<p>12. Miscellaneous (e.g. spices, chocolates, sweets, beverages, etc)?</p>		
<p>Q27 In general what is the <u>main</u> source of staple food in the household? (*Use codes in 26 above) _____</p>		
<p>Q28 Total number of food groups consumed in the household: _____</p>		

Q29 How many meals¹¹ has the household had in the last 24 hours (from this time yesterday to now)? 1= One 2=Two 3= Three

¹¹ A meal refers to food served and eaten at one time (excluding snacks) and includes one of the three commonly known: - breakfast, lunch and supper/dinner

Q30-32 Access to water (quality and quantity) and Sanitation

Q30 What is the household's main source of drinking water? 1 = Tap/ piped water 2= Tanker truck 3= Tube well/ borehole 4= Spring 5= Bottled water
6= rooftop rainwater 7= Surface water (river, stream, dam, pond, open well; water catchments; berkad, etc)

Q31a Is drinking water drawn from a protected/safe source? 1= Yes 2= No

Q31b If household has no access to safe protected water what is the main reason? 1= Not Available 2= Distance too far 3= Security Concerns 4= Cannot afford

Q32a Is water treated at the:

a) Source? 1= Yes 2= No

b) Storage level? 1= Yes 2= No

Q32c If treated, what is the method of treatment? 1= Boiling 2= Chlorination 3= straining/filtering 4= Decanting/ letting it stand and settle 5= Other, specify

Q33-34 Access to Sanitation and Health Facility

Q33a Does household have access to usable sanitation facility? 1= Yes 2= No

33b Type of toilet/ sanitation facility used by most members of the household 1= Bush/open ground 2= Traditional pit latrine/ Open pit 3= VIP latrine 4= Flush toilets

Q33c If household has no access to sanitation facility, what is the main reason? 1= Pastoral/ frequent movements 2= Lack resources to construct 3= Doesn't see the need

Q34a Does the household have access to a health facility? 1= Yes 2= No

Q34b If yes, do you use the facility? 1= Yes 2= No

Q34c If No, what is the reason, circle the appropriate answer: 1= Not enough time 2= Distance too far 3= Security Concerns 4= Can't afford
5= Other Specify _____

APPENDIX 3: Traditional Calendar of Events – Hawd & Addun- November,2008.

Month	Events	2003	2004	2005	2006	2007	2008
Jan.	Beginning of Jiilal		58 Arafo/Dul-Xaj	46 Arafo/Dul-Xaj	34 Arafo/	22 Arafo/Dul-Xaj	10 Arafo/Dul-Xaj
Feb	Mid of Jiilaal		57 Sako	45 Sako	33 Sako	21 Sako	9 Sako
Mar.	End of Jiilaal		56 Safar	44 Safar TFG-Jowhar	32 Safar	20 Safar	8 Safar
Apr.	Beginning of Gu'		55 Mawliid	43 Mawliid	31 Mawliid	19 Mawliid	7 Mawliid
May	Mid of Gu'		54 Malmadoone	42 Malmadoon	30 Malmadoon	18 Malmadoo	6 Malmadoo
Jun.	End of Gu'		53 Jamadul-Awal	41 Jamadul-Awal	29 Jamadul-Awal	17 Jamadul-Awal	5 Jamadul-Awal
Jul.	Beginning of Xagaa		52 Jamadul-Akhir	40 Jamadul-Akhir	28 Jamadul-Akhir Xilligii Maxkamadah a	16 Jamadul-Akhir	4 Jamadul-Akhir
Aug.	Mid of Xagaa		51 Rajab	39 Rajab	27 Rajab	15 Rajab	3 Rajab
Sep.	End of Xagaa		50 Shacbaan	38 Shacbaan	26 Shacbaan	14 Shacbaan Fatahaadii	2 Ramadaan
Oct.	Beginning of Deyr		49 Ramadaan	37 Ramadaan	25 Ramadaan	13 Ramadaan	1 Soonfur
Nov.	Mid of Deyr		48 Soonfur	36 Soonfur	24 Soonfur	12 Soonfur	
Dec.	End of Deyr	59 Siditaal	47 Siditaal	35 Siditaal	23 Siditaal Burburkii Maxkamada	11 Siditaal	

Appendix 4: Clusters Sampling for Hawd&Addun, November 2008 assessment**Sampling variables /indicators - Hawd & Addun Nutrition Assessments- October 2008.**

	Hawd	Addun
<i>Anthropometric surveys</i>		
Estimated malnutrition prevalence	19.30%	18.40%
Children below 5 years	724	694
Desired precision	3.5	3.5
Design effect	1.5	1.5
Children to be included	724	694
Households to be included	684	656

Mortality rate survey

Population size	224330	73235
Estimated prevalence /10,000/day	0.6	0.65
Desired precision	0.3	0.4
Design effect	1.5	2
Population to be included	4265	3201
Households to be included	726	544
Clusters per HHs	26 X28	25X26

Distribution of clusters

	HAWD	ADDUN	Total clusters
North East areas	16	9	25
Central regions	10	16	26

Clusters Sampled for Addun- November 2008 Assessments

Geographical unit	Population size	Cluster
Elgaras	3650	1, 2
Ellahelay	3295	3
Jimcaale qaar	540	
Yacyac	500	
Beeraxaadle	600	
Xamur	630	4
Libile	400	
Miircowleed/Wad	1050	
Xindheere	1320	
Xagarey	600	
Xawalabadan/Januune	983	5
Afweyne/Dabdheer	650	
Oodweyn	575	

Wamooleey	660	
Elbur town	5100	6, 7
Ceelqoxle	740	RC, 8
Ceel xaashi	400	
Ceel meygaag	500	
Ceelkoombaale	450	
Habaasweyn/cadale	550	
Sarmaan nuugan/Maalin nugul	750	9
Diirinle/Ceelqurac	720	
Dab dhagax/dacdheer	760	10
Tuulo sarmaan	600	
Xingalool/Moqor	750	
Dhaantoole	640	
Warxool/dhalidhow/warxooloyareey	635	
Saarsaarey	600	
Ceelugas	590	11
Ceelgod/qoryaale	540	
Raydable	480	
Ceelugas	590	
Wsil	2500	12, 13
Ceelbeyle	500	
Dhagaxley /seego	850	
Qaayo cad	650	
Wargalo	960	
Xaaro	800	
Af –Barwaaqo	1450	
Bacaadweyne	1560	RC
Bajeelo	950	
Ceel dibir	500	
Cuul gule	1150	
Dhejimadle	600	
Galgaruun	650	14
Cegaal cadde	500	
Gawaan	1000	15
Xinlibi	1020	
Iidaan	657	
Jilible	680	16
Jiriban	5600	17, 18, 19
Salax	2575	20
Malaasle	800	
Buq/Dhobocantuug	1050	
Seemade	800	21
Bubi	800	
Balibusle	3100	22
Celbardale/Madlooyin	600	
Khurile	600	
Labilamane	600	
Galxagar	1455	23

Tawfiiq/Mareer/booc	1360	RC
Godob	4300	24
Godob Cadduun/Suuban/Godbo I tumay	600	
Warguduud	1760	25

Clusters Sampled for Hawd- November 2008 Assessments

Geographical unit	Population size	Cluster
Ba'adweyn	10500	1, 2
Abaarey	1300	
Roox/Tarcase/qorile	1750	
Hema	1900	3
Beyra	1800	
Margaago	1200	
Beer/dhagaxtur	1100	
Faratooyo/bicil	1100	
Xarfo	4300	
Qansahle	755	
Riig omane	1800	
Bursalah	8475	
Dudun	2350	4
Lanmadow/borancad	600	
K/beyr/darasalam/xerojale	800	5
Mayle	1350	
Caracaso/Qlanqaal/reydable	1250	
Hayaanle	1250	6, 7
Balanbal	1200	
Awr-culus	1400	
Xamxamaa	1300	
Yoonbays	1600	
Ilma-adeer/Laqjalis	650	8
Birta-dheer	1100	9, 10
Abaarey/Tulooman	700	
Kalabayr	3000	RC
Rebanti	1200	
Burtinle Town	25300	11
Jalam	9500	12
Bali abee/Goso/godobyar	1580	13
Bahaley/Suule	890	

Dogob	2745	
Maygaagle	500	
Magacley	1200	
Xoore/bali dacar	600	
Farjano/Ceelxidid	660	14
Xasbahale	3490	15
Diilin	750	
Dhiganle	860	
Libaaxyaale/bangeele	1055	
Huurshe	650	
Balikibir/mareere/hulkujir	950	
Shilomadow	750	
Libaaxseexay/Galmeygaag	750	
Baaltaag	625	
Buulaleey/Xodayga/balicadyare	900	16
Balicaad weyne	550	
Aricadeys	650	
Dhabad	650	
Labagalle/Balihowd	700	
Dafle	550	
Dlimbaa/Oooman/Qowlaale	920	
Balambal	3500	
Xeraale	1350	
Mareere/jilicle	740	
Lajiide/Mayeeraan	830	
Xasancowl	650	
Barkadsharif/Goohweyne	860	
Xasan barre/xasan kaahiye	720	
Axmedgurey	740	
Qabaadse/goroyohor	920	
Ruuncade	750	
Balambal oomane/wabiyarow	710	
Qorondheer/Odaale	750	
Sirqiye/Kahandhale	900	
Wabxo	3150	
Cadare/ceelul/gorof	564	
Dac	1245	
Ceel garweyne/Afcagaag	890	17, 18
Dayeeno	680	19
Biyogudud/lasxidig	320	
Cadadoyarya/Docoleey	260	
Dusmaale	560	
Docoleey	600	20
Bowdodhogore	500	
Maxas	2250	21
Suubo	810	
Ramaas	560	
Garasqalooc	600	

Goobo	650	
Xarartarabi/Galgudle	575	
Muse-Geel/hareeri gawaan	745	
Bulacle/deebta/kaadiley	684	
Goomcad/Uuleyle/tedan	650	
Moqokori	1200	
Gumare	600	
Faqi Osman	450	
Moolo-cad	500	
Ceelegeri/Shilan	405	
Adaado -section1	2160	RC
Adaado -section2	2160	22
Adaado -section3	2160	RC
Adaado -section4	2160	23
Qaradhi	700	
Godinlabe	3750	
Dhagaxdheer	730	24
Ardo	620	
Baxdo	1850	
Cadokibir	820	25, 26
Xinjilib	600	
Gidheys	750	
Qurduhanle	935	
Galinsoor	2700	
Beendhaarte	600	
Bandiiradleey	1200	

Appendix 5. Hawd & Addun November 2008 Assessment Team

Team		Names	Agency	Responsibility
1	1	Abdirizak Mohamed Ahmed	SRCS	Supervisor
	2	Seynab Ahmed Mohamed	SRCS	Team leader
	3	SH.Saciid Ahmed Hesri –RTD	SRCS	RDT
		Cabdi ibraahin Abdullahi	SRCS	Enumurator
		Halimo Diiriye	SRCS	Enumurator
2	1	Hibo Jamac Hashi	FSAU Data assistant	Supervisor
	2	Abdi Fataax Mohmaud Ahmed	Community	Team leader
	3	Maryan Abdullahi Hersi-	SRCS	NURSE RTD
	4	Khadiijo Jaamc Mohamed	SRCS	Enumurator
	5	Mahad Abdullahi Hassan	SRCS	Enumurator
3	1	ALI Sheikh Mohamed –	FSAU data assistant/	Supervisor
	2	Asad Mohamed Ahmed -	Community	Team leader
	3	Safiyo Adan Moahmed -	Community	Nurse RDT
	4	Jawahir Shire Dalab-	Community	Enumurator
	5	Saafi Ahmed Elmi	SAHED	Enumurator
4	1	Ahmed Hassan Ali	FSAU data Assistant	Supervisor
	2	Ali Warsame wehliye	SRCS	T.leader
	3	Saccdo Ahmed Mohamed -	SRCS	NURSE RDT
	4	Mahad Ahmed Shuriye	Community	enumurator
	5	Abdulqaadir Nur Afdhuub-	Community	Enumurator
5	1	Faisa Nur Farah-	FSAU data Assistant	Supervisor
	2	Omer Abdullahi Arab-	Community	Team leader
	3	Bashir Abdi Ibrahim –	Community	RDT
	4	Sacdiyo Mohamed Mohamud -	Community	enumurator
	5	Fadumo ali	SRCS	enumurator
6	1	Said Jama Hassan	supervisor	MOH
	2	Mohamed abdi Hassan	Enumurator	Local community
	3	halimo abdi daahir	Enumurator	SRCS
	4	Mohamed Ahmed Hersi	Enumurator	Community
	5	Ahmed Abdi risaaq Mire	RDT	MOH
7	1	Hidig Abdi Elmi	Supervisor	MOH
	2	Dadir Osman	team leader	Local community
	3	Yasin geele warsame	Nurse RDT	SDRA
	4	Nasro jama	Enumurator	MOH
	5	Astur Mohamed Farah	Enumurator	SDRA
8	1	Mohamed Ali Shire	supervisor	MOH
	2	Fadumo Yasin Hersi	team leader	Local community
	3	Said abdullahi Elmi	Nurse RDT	MOH
	4	Abdi Ahmed Farax	Enumurator	Local community

	5	Qaali isse	Enumerator	SRCS
9	1	Qasim Hassan Dini	Supervisor	PRN Puntland researchers network
	2	Abdinur Hassan Ahmed	team leader	MOH
	3	warsme mohmed farah	Nurse-RDT	MOH
	4	Omer saciid mohmaed	Enumerator	MOH
	5	Sahro Ahmed Mohamed	Enumerator	SRCS
10	1	Hassan Ali Awad	Supervisor	MOH
	2	halimo Abdulqadir Mohamud	team leader	Galkacyo hospital
	3	Mahmud Ahmed Muse	Enumerator	SDRA
	4	Qali Esse	RDT	SRCS
	5	Halimo ahmed Dhodi	Enumerator	SDRA
		Khalif Abdullahi Nuoh	Supervisor	
		Abdikarim Husien	supervisor	
		Mohmaed M Hassan	supervisor	
		Mohamed Hussien Nur	Supervisor	
		Fuad Hassan	Supervisor	
		Mohamed Haghi Nur	Supervisor	
		Abukar Yusuf Nur	Coordinator & report writing	
		Mohamed Abdi Borle	Coordinator	

APPENDIX 5: REFERRAL FORM FOR MALNOURISHED CHILDREN

Name of the village: _____ Date: _____

Name of the child: _____ Sex of child: _____

Age of child: _____ Name of caretaker: _____

Child diagnosed (suspected) with (state the condition): _____

Child referred to: _____

Child referred by: _____

Appendix 7. Assessments Quality checks

Plausibility check for: HAWD

Standard/Reference used for z-score calculation: NCHS reference 1977

Overall data quality

Criteria	Flags*	Unit	Good	Accept	Poor	Unacceptable	Score
Missing/Flagged data (% of in-range subjects)	Incl	%	0-2.5 0	>2.5-5.0 5	>5.0-10 10	>10 20	0 (2.3 %)
Overall Sex ratio (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<0.000 10	2 (p=0.067)
Overall Age distrib (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<0.000 10	4 (p=0.003)
Dig pref score - weight	Incl	#	0-5 0	5-10 2	10-20 4	> 20 10	2 (6)
Dig pref score - height	Incl	#	0-5 0	5-10 2	10-20 4	> 20 10	2 (8)
Standard Dev WHZ	Excl	SD	<1.1 0	<1.15 2	<1.20 6	>1.20 20	0 (1.04)
Skewness WHZ	Excl	#	<±1.0 0	<±2.0 1	<±3.0 3	>±3.0 5	0 (0.16)
Kurtosis WHZ	Excl	#	<±1.0 0	<±2.0 1	<±3.0 3	>±3.0 5	0 (0.01)
Poisson dist WHZ-2	Excl	p	>0.05 0	>0.01 1	>0.001 3	<0.000 5	0 (p=)
Timing	Excl	Not determined yet	0	1	3	5	
OVERALL SCORE WHZ =			<5	<10	<15	<25	10 %

At the moment the overall score of this survey is 10 %, this is acceptable.

Plausibility check for: ADDUN11.as

Standard/Reference used for z-score calculation: NCHS reference 1977

Overall data quality

Criteria	Flags*	Unit	Good	Accept	Poor	Unacceptable	Score
Missing/Flagged data (% of in-range subjects)	Incl	%	0-2.5 0	>2.5-5.0 5	>5.0-10 10	>10 20	0 (1.6 %)
Overall Sex ratio (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<0.000 10	0 (p=0.937)
Overall Age distrib (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<0.000 10	0 (p=0.394)
Dig pref score - weight	Incl	#	0-5 0	5-10 2	10-20 4	> 20 10	0 (5)
Dig pref score - height	Incl	#	0-5 0	5-10 2	10-20 4	> 20 10	2 (6)
Standard Dev WHZ	Excl	SD	<1.1 0	<1.15 2	<1.20 6	>1.20 20	0 (1.06)
Skewness WHZ	Excl	#	<±1.0 0	<±2.0 1	<±3.0 3	>±3.0 5	0 (0.04)
Kurtosis WHZ	Excl	#	<±1.0 0	<±2.0 1	<±3.0 3	>±3.0 5	0 (0.08)
Poisson dist WHZ-2	Excl	p	>0.05 0	>0.01 1	>0.001 3	<0.000 5	0 (p=)
Timing	Excl	Not determined yet	0	1	3	5	
OVERALL SCORE WHZ =			<5	<10	<15	<25	2 %

At the moment the overall score of this survey is 2 %, this is good.

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