

NUTRITION ASSESSMENT REPORT

MIDDLE AND LOWER JUBA PASTORAL, AGROPASTORAL AND RIVERINE LIVELIHOOD SYSTEMS

JUBA VALLEY, SOMALIA

Food Security Analysis Unit (FSAU/FAO)
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EXECUTIVE SUMMARY

The Middle and Lower Juba Regions located in the Juba valley in Southern Somalia border Kenya to the west, the Indian Ocean and the Lower Shabelle to the southeast, Gedo to the north and Bay to the east. Pastoral, agro-pastoral and riverine are the main livelihood zones in the two regions but pastoral livelihood is the most predominant accounting for 34.5% of the population. In July 2008, FSAU and its partners¹ conducted an inter-agency nutrition assessment in the Pastoral, Agro-pastoral and Riverine Livelihood Zones in Middle and Lower Juba Regions in Southwest Somalia. This was in response to the need to determine the levels of acute malnutrition and trends for the different livelihoods and to inform on the intervention responses for the region. The main objective of the survey was to determine the level of wasting among children aged 6-59 months, analyze the possible factors contributing to malnutrition, and assess dietary diversity, morbidity, care practices and mortality rates in the specific livelihood systems in the regions.

Using a two-stage PPS sampling methodology, 26, 27 and 26 clusters were selected for both anthropometric and mortality assessments from the pastoral, agro-pastoral and riverine livelihood settlements respectively with a corresponding 22 households, 26 households and 21 households assessed. A total of 2060 children (652 from pastoral, 763 from agro pastoral and 645 from riverine livelihoods) aged 6-59 months were assessed from 308; 364 and 332 households respectively.

The results show **Serious** nutrition levels according to WHO classification with GAM rates of **14.3%** (CI: 11.3 – 17.2) and SAM rates of **2.6%** (CI: 1.4 – 4.7) including 0.2% oedema cases among the assessed pastoralist populations. Similarly, the results indicate **Serious** nutrition levels in the riverine population with a GAM rate of **14.5%** (11.7 – 17.7) and a SAM rate of **2.2%** (1.3 – 3.5) including 0.3% of oedema cases. Among the agro-pastoral, results show a **Critical** nutrition situation with a GAM rate of **17.8%** (13.7 – 22.9) and a SAM rate of **2.1%** (0.9 – 4.7) including 0.3% of oedema cases. When compared with the most recent assessments, results shows a sustained serious nutrition situation in the pastoral population as was in December 2007 when a GAM rate of 14.1% (CI 11.3 – 16.9) and a SAM rate of 2.6% (CI: 1.4 – 3.9) was reported. In the agro-pastoral livelihood, results shows a deterioration from the serious levels reported in December 2007 when a GAM rate of 14.7% (CI: 10.9 - 18.5) and SAM rate of 2.6% (CI: 1.4 – 3.9) were reported. In the riverine, even though the GAM rate of 13.7% (CI: 10.0 – 17.3) recorded in December 2007 assessment was within the ranges of 10-14.9% which could have been categorized as serious, a very high SAM rate of **4.4%** (CI: 2.5 – 6.4) including twenty three (2.6%) oedema cases led to the nutrition situation of the population categorized as Critical. Hence current assessment results show an improvement of nutrition situation from Critical to Serious owing to low SAM rates and reduced oedema cases in the riverine. However, given that confidence interval ranges overlap in all the three studies, there is no statistically significant difference in the rates of acute malnutrition between the three livelihood zones and from previous assessments conducted in December 2007.

When estimated using WHO Anthro (2005) Reference standards, slightly higher GAM rates and almost double SAM rates than the NCHS (1977) Reference Estimates were reported. The pastoral livelihood reported GAM rate of **14.0%** (CI: 11.4 – 17.0) and SAM rate of **3.2%** (CI: 1.9 – 3.2), a relative decrease of 2.1% and an increase of 45.5% respectively. Agro-pastoral livelihood assessment reported GAM rate of **21.0%** (CI: 16.6 – 26.2) SAM rate of **5.2%** (CI: 3.6 – 7.5), a relative increase of 18% and 147.6% respectively; while among the riverine livelihood population a GAM rate of **16.3%** (13.0– 22.9) and SAM rate of **3.9%** (CI: 2.9 – 5.6) were reported indicating a 12.4% and 77.3% relative increase respectively. High stunting rates were higher across all livelihoods at 19.8% among pastoral, 32.6% among agro-pastoral and 40.6% among riverine populations. Equally high was the underweight rates at 25.5%, 40.2% and 40.4% among pastoral, agro-pastoral and riverine

¹ UNICEF, World Vision, World Concern, SRCS, Muslim Aid and Mercy USA, WFP, WAMO, SAF, AFREC, WAMO

livelihoods respectively.

Among the assessed women; high acute malnutrition rates were recorded among the pregnant women (MUAC < 23.0 cm) with 25.8% of the Riverine, 52.3% of agro-pastoral and 32% of pastoral identified as malnourished. Pregnancy raises physiological and nutritional demands of women making them vulnerable to acute malnutrition. Low acute malnutrition rates (<1.5%) were recorded among the non pregnant women

The under five and crude mortality rates among the pastorals were within the **acceptable** levels at **0.72** (0.33-1.54) and **0.74** (0.54-1.01)/10,000/day respectively (WHO). Similarly U5MR and CMR rates were both within the **acceptable** levels at **1.79** (1.17 -2.73) and **0.98** (0.66 – 1.43) respectively in the agro-pastoral livelihood. Among the riverine a CMR of 1.55 (1.08 – 2.22) and U5MR of 2.69 (1.54-4.68) were reported and they were both at **alert** levels. The most commonly reported causes of death included diarrhoea, suspected malaria and birth related complications.

Child feeding and care practices remain poor in Juba valley. Exclusive breastfeeding is never practiced while breastfeeding stops before the recommended 24 months and beyond. Complementary food is introduced early in life for the majority (47-63%) of the children. The assessment also revealed a high level of morbidity in Juba regions where at least 51% of the assessed children had some form of illness in the two weeks prior to the assessment. The incidence of reported diarrhoea in pastoral, agro-pastoral and riverine populations (24.9%; 24.6% and 24.5% respectively) within two weeks prior to the assessment remained high. Equally, high incidences of ARI (17- 37%) and febrile illnesses/suspected malaria (31- 48%) were also reported in the three livelihoods. Rapid diagnostic test for *P. falciparum* show that malaria is endemic in Juba valley with positive rates of 9.1%; 16.4% and 7.2% reported in the assessed pastoral, agro-pastoral and riverine populations. These levels were consistent with seasonal morbidity patterns recorded from the health facilities. Morbidity has direct relationship with malnutrition where illness lead to increased nutritional demands to repair worn out tissues and at the same time interfering with the intake, digestion, absorption and utilization of the nutrients in the body. In these assessments children who had been ill within two weeks prior to the assessment, especially from diarrhoea were more likely to be acutely malnourished ($p < 0.05$). Poor sanitation and lack of safe drinking water could explain the high prevalence of diarrhoeal diseases. Among the assessed households across the livelihoods, more than half of the population do not have sanitation facilities such as latrines while 49-70% does not have access to safe water.

Poor coverage for health programmes are important risk factors to the poor nutrition situation in Juba region. Measles vaccination coverage for eligible children (9-59 months old) was still very low at only 43.4% as was coverage for vitamin A supplementation (44%) in the assessed pastoral population. Measles vaccination and vitamin A supplementation was equally low at 49.4% and 54.9% respectively among agro-pastoral populations. However, in the riverine livelihood, measles vaccination and vitamin A supplementation status were relatively higher at 73.4% and 74.6% respectively. Polio immunization status in the three livelihoods was higher at 78-85%. The relatively higher coverage for the three health programmes in the riverine zone is due to better access to these services from the humanitarian agencies operating in the area. Coverage for the health programmes (including polio immunization) fell below the recommended 95% level (Sphere, 2004) in the three livelihoods. Past studies have associated these programmes, with improved immunity against childhood diseases. In these assessments the children from agro-pastoral and riverine livelihoods who had not received measles vaccination were more likely to be acutely malnourished as compared to those who had received the vaccination ($p < 0.0$, therefore vaccination status could also be used a proxy for access to health services.

An analysis of the post *Gu'08* food security situation indicate Juba regions as having had good rainfall performance with the exception of parts of Middle Juba region such as Sakow District, which experienced rain failure. The good rainfall performance had a positive impact, including increased water and pasture, improved livestock body conditions, increased access to milk from both the in-migrating livestock and those from within the regions. Households reported that milk consumption has improved after the rains due to an increase in livestock productivity among the pastoral group. Middle Juba region experienced crop failure with overall cereal production in the region being 28% of PWA (1995-2007) while Lower Juba had good cereal production amounting to 88% of PWA. Overall, both Middle and Lower regions produced an estimated total of 7540 MT of cereals (mainly maize) in *Gu'08* period.

However, results from the current assessment showed that 27.7% of the pastoral, 37.6% of agro-pastoral and 45.2% of the riverine population were consuming poorly diversified diets, which comprised of 3 or less food groups. The most commonly consumed food groups were cereals, sugar and oils/fat, while milk was mainly consumed among the pastoral and agro-pastoral livelihoods. The main sources of food across livelihoods were purchase and own production. Food aid was the main source of food especially cereals to about 2% of the assessed households. Even though this study and past assessments do not show a significant association between acute malnutrition and dietary diversity in Somalia, reduced food intake is an immediate cause of acute malnutrition, and so acute malnutrition may be attributed to a combination of other intervening factors such as high morbidity, poor child feeding, and poor sanitation that negatively influences nutrition status.

Poor child feeding and poor access to health services remain the main underlying causes of acute malnutrition in Juba regions. Juba has experienced sporadic armed conflict for over 10 years with devastating effects on education, labour, food security and economic development in the region. Feeding practices for children are persistently poor, preventable diseases are prevalent and access to maternal and child care is suboptimal in the region. Exclusive breastfeeding for the first six months of life, introduction of appropriate complimentary food at six month of age and persistence in breastfeeding for up to 24 months and beyond is associated with proper growth and development and reduced risks of morbidity.

Intervention efforts that address both immediate life saving needs especially for the acute malnutrition cases in addition to developing longer term strategies to enhance the provision of basic services, sustainable strategies for livelihood support and social protection mechanisms are recommended. Specific recommendations include:

Immediate Interventions

- Improving coverage for health programmes, especially for measles vaccination, vitamin A supplementation and de-worming. Vigorous campaigns are required in Juba regions especially among the pastoral and agro-pastoral communities. Strategies used to achieve higher coverage in riverine livelihood could be borrowed.
- Rehabilitation of acutely malnourished children through selective feeding programs until household food security is restored and critical public health issues are addressed. All options to address this through effective and non-damaging measures need to be considered. Capacity building of the existing Health Facilities staff and the community to manage acutely malnourished children at community level could be explored.
- There is need to focus on programmes that improve and sustain dietary diversity and promote the consumption of micronutrient rich foods.
- Intervention programmes on water, sanitation and hygiene practices including health education should be encouraged

- Intervention programmes tailored to address the high rates of malnutrition among pregnant and lactating women are needed across livelihoods.

Long term Interventions

- There is a need for rehabilitation/protection of water systems including the well and water catchments (such as capping of wells) in anticipation of seasonal flooding. The community should be trained on sanitation of the water systems.
- Implementation of mechanisms for regular water treatment at the source as well as at the household level.
- Provision of large water containers for fetching and storage of water would contribute in easing water problems where people have to cover long distance to get water and yet they are unable to carry large volume of water.
- To initiate income generating activities to improve the socio-economic situation in Juba regions given that purchase is the main source of food.
- There is need for establishment or strengthening of health facilities and satellite services especially in rural villages where there are no health facilities to increase access for all
- Intensifying 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 practices.
- Canal rehabilitations, provision of irrigations pumps, fuel for irrigation and spare parts to the riverine communities in Juba Valley.
- Provision of sanitation facilities through community participatory approaches coupled with awareness campaign on the importance of using such facilities.

Table 1.1 SUMMARY OF THE FINDINGS						
Indicator	Pastoral		Agropastoral		Riverine	
	N	%	N	%	N	%
Total number of households surveyed	308	100	364	100	332	100
Mean household size	6.1	SD=2.2	5.6	SD=2.0	5.6	SD=2.0
Total number of children assessed	652	100	763	100	645	100
Child sex:						
Males (boys)	329	50.5	387	50.7	320	49.6
Females (girls)	323	49.5	376	49.3	325	50.4
Global Acute Malnutrition (WHZ<-2 or oedema)	93	14.3 (11.3 – 17.2)	136	17.8 (13.7 – 22.9)	93	14.5 (11.7 – 17.7)
Severe Acute Malnutrition (WHZ<-3 or oedema)	17	2.6 (1.4 – 4.7)	16	2.1 (0.9 – 4.7)	14	2.2 (1.3 – 3.5)
Oedema	1	0.2 (0 – 0.5)	2	0.3 (0 – 0.6)	2	0.3 (0- 1.6)
GAM estimates by WHO Anthro (2005) Standards:	91	14.0 (11.4- 17.0)	160	21.0 (16.6- 26.2)	105	16.3 (13.0 – 22.9)
SAM estimates by WHO Anthro (2005) Standards:	21	3.2 (1.9 – 5.3)	40	5.2 (3.6 – 7.5)	25	3.9 (2.9 - 5.6)
Global Acute Malnutrition (WHM<80% or oedema)	60	9.2 (7.3 - 11.6)	107	14.0 (10.7 – 18.2)	97	10.8 (7.4-14.1)
Severe Acute Malnutrition (WHM<70% or oedema)	1	0.2 (0 – 1.2)	9	1.2 (0.5 – 2.6)	27	3.0 (1.4 – 4.6)
Proportion of malnourished (MUAC<12.5 cm or oedema))	41	6.3 (4.0 - 8.6)	127	16.7 (10.8- 22.5)	104	16.1 (13.1 – 19.1)
Proportion of severely malnourished (MUAC<11.0 cm or oedema))	3	0.5 (0 – 1.0)	9	1.2 (0.3 – 2.1)	7	1.1 (0.2 - 2.0)
Proportion of stunted children (HAZ<-2)	129	19.8 (16.3-23.8)	249	32.6 (25.9-40.1)	262	40.6 (33.9-47.8)
Proportion of underweight children (WAZ<-2)	166	25.5 (20.3-31.5)	306	40.2 (32.7-48.2)	260	40.4 (34.9-46.3)
Proportion of acutely malnourished pregnant women (MUAC≤23.0)	16	32.0 (N=50)	46	52.3 (N=88)	24	25.8 (N=93)
Proportion of severely malnourished pregnant women (MUAC≤20.7)	5	10.0	11	12.5	2	2.2
Proportion of acutely malnourished pregnant women (MUAC<18.5)	0	0	4	1.4 (N=284)	1	0.4 (N=263)
Proportion of children reportedly with diarrhoea in the 2 weeks prior to survey	162	24.9 (18.1-31.6)	188	24.6 (18-31.5)	158	24.5 (18.0-31.0)
Proportion of children reportedly with ARI within two weeks prior to survey	241	37.0 (25.5-48.5)	162	21.3 (11.5-21.0)	113	17.5 (10.1-24.9)
Children with fever/ suspected malaria in 2 weeks prior to assessment	312	47.9 (39.4-56.3)	241	31.6 (19.4-43.8)	157	24.3 (15.8-32.9)
Proportion confirmed with malaria <i>Plasmodium falciparum</i> (RDT positive)	118	(N=1303) 9.1(7.6 – 10.8)	220	(N=1344) 16.4 (14.5 – 18.5)	94	(N=1305) 7.2 (5.9 – 8.8)
Suspected measles within one month prior to assessment	58	9.5(4.9 – 14.3)	11	1.5(0.3 – 2.7)	14	2.3 (0.8 – 3.8)
Children (9-59 months) immunised against measles	264	43.4 (30.7 – 56.1)	355	49.4 (34.3-64.5)	452	73.4 (62.2 – 84.5)
Children who have ever received polio vaccine	554	85.0 (79.7-90.2)	596	78.1 (68.3- 87.9)	543	84.2 (76.6-91.7)
Children who received vitamin A supplementation in last 6 months	287	44.0 (29.9-58.1)	419	54.9 (40.6-69.3)	481	74.6 (63.8-85.3)
Proportion of households who consumed ≤3 food groups	76	24.7 (11.5-37.9)	137	37.6 (26.2-49.1)	87	18.4 (15.0-22.2)
Proportion of children 6-24 months who are breastfeeding	138	58.7 (51.5-66.0)	157	60.6 (53.4-67.7)	133	58.3 (49.7-66.9)
Under five Mortality Rate (U5MR) as deaths/10,000/ day	0.72 (0.33-1.54)		1.79 (1.1721.73)		2.69 (1.54-4.68)	
Crude Mortality Rate (CMR) as deaths/10,000/ day	0.74 (0.54-1.01)		0.98 (0.66-1.43)		1.55 (1.08-2.22)	

1.0 INTRODUCTION

Historical Context

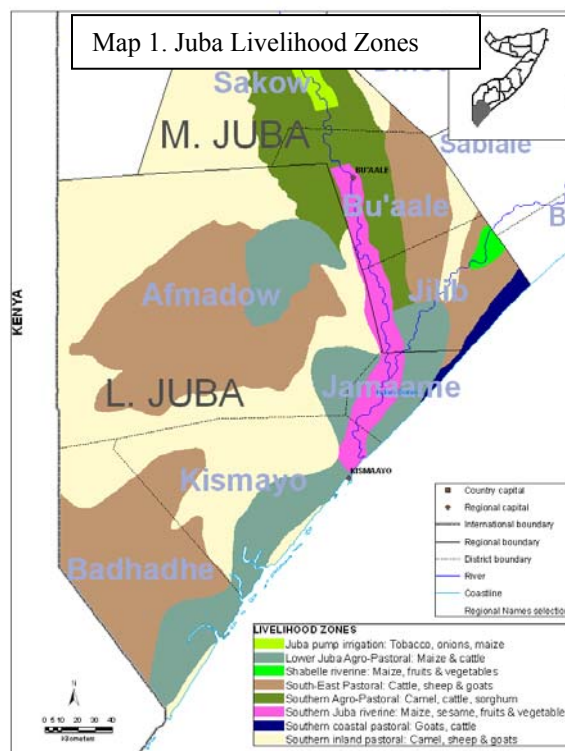
The Middle and Lower Juba Regions are located in the Juba Regions in Southern Somalia (See Map 1). The regions border Kenya to the west, the Indian Ocean and the Lower Shabelle to the southeast, Gedo to the north and Bay to the East. The Middle Juba Region comprises three districts (Bu'aale, Sakow/Salagle and Jilib) and the Lower Juba, five districts (Badhadhe, Hagar, Afmadow, Kismayo and Jamame). The total population of the ²two regions is 624,667 and falls into five livelihood zones³: The riverine, pastorals, agro-pastorals, Coastal and Urban (see map 1).

The **pastoral** livelihood system is ⁴predominant with about 34.5% of the Middle and Lower Juba population engaged in cattle, camel, goat and/or sheep rearing. Their main source of income is sale of livestock products (milk, ghee; meat) as well as live animals. The second most important livelihood system is the Agro pastoral practiced by 29.4% of the Juba regions population. **Agro-pastorals** combine livestock rearing (cattle, camel; shoats) with agricultural (maize and sorghum) production.

The **Riverine** livelihood group constitutes of pure farmers who live within three kilometres of the Juba River. They mainly access food and income through production and sale of crop. They are sedentary, keep negligible stocks of livestock, and are highly vulnerable to nutrition and food insecurity in the event of shocks such as floods and crop failure in the *Gu* and *Deyr* seasons. The **Urban** group's main source of livelihood constitutes of employment, trade and casual labour. Food is mainly accessed through purchase; therefore a secure environment that enables access to income and essential basic services is critical for sustained nutrition and food security. The coastal communities of Kismayo and Badhadhe undertake fishing and collect lobsters for food and income generation as their main livelihood.

The Food Security Context

The overall food and livelihood security conditions of Juba regions have shown continuous and significant improvement since the historic drought and floods in '05/06. This is attributed to continuous positive rainy seasons, including the exceptionally good rainfall in the *Deyr* '07/08, which improved cereal production in southern agro-pastoral areas. The *Deyr* '07/08 analysis illustrates the continued positive impact of the *Gu* '07, and the *Deyr* '07/08 rains complimented by significant humanitarian interventions in the region, which led to a significant improvement in the food security and a stable nutrition situation in Middle and Lower Juba regions for the agropastoral and riverine groups. The pastoral population in Juba has also experienced recovery of pasture and herd sizes from the earlier drought in '05/06, improving availability of milk and milk products, high livestock prices, high and improved terms of trade. Juba received above average *Deyr* '07/08 rains, which



² Middle Juba has a population size of 385,790 and Lower Juba of 238, 877

³ The Baseline Profiles are currently being revised by FSAU

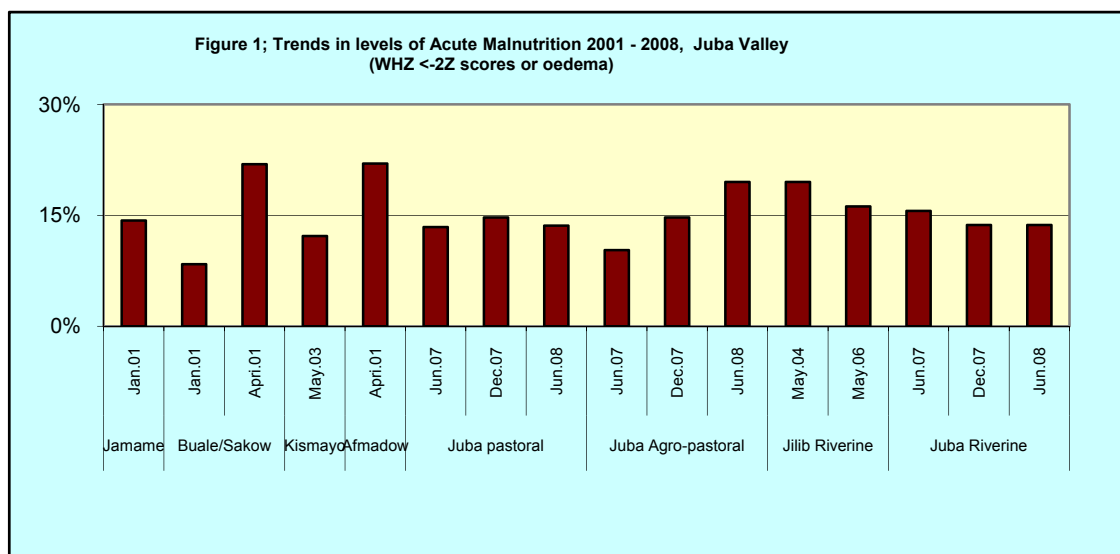
⁴ FSAU Livelihoods Baseline Profile, 2000.

resulted in good harvests among the agropastoral and riverine populations. Middle Juba for instance recorded the second best cereal production in *Deyr* '07/08 season (173%) after Gedo (291%) followed by Bakool (165%) compared to the Post War Average (PWA). In addition to improved cereal production, the riverine population also benefit from the availability of job opportunities in riverine areas, including fishing in the *Desheks*. Nevertheless, the riverine population in Lower Juba are still faced with **Humanitarian Emergency**. This is due to areas of Kismayo and Jamame of Lower Juba that experienced poor rainfall causing crop failure (L Juba had only 35% of PWA cereal production) in both riverine and agropastoral livelihoods. As of the time of post *Deyr* '07/08 analysis, **15,000** people in Jamame and Kismayo riverine were identified as facing **Humanitarian Emergency (HE) conditions**, while **80,000** people in Lower Juba agro-pastoral, Juba riverine and southeast pastoral livelihood zones were faced with **Acute Food and Livelihood Crises (AFLC) conditions**. Before the start of these assessments, qualitative data from the two regions indicated poor *Gu*'08 rainfall performance particularly in Middle Juba. This and overall *Gu*'08 outcome is discussed later under results section.

Health and Nutrition Context

The nutrition situation in Middle and Lower Juba regions varies across livelihoods and administrative units. From January 2001 and December 2007 a total of thirteen nutrition assessments were carried out in Juba regions, with five of these assessments recording GAM rates that were above emergency threshold of 15% while the remaining recorded GAM rates below 15% (see figure 1). It is important to note that prior to June 2007, most of the assessments conducted in the regions were district-based, while FSAU adapted livelihood-based assessments in 2007. The three most recent livelihood based assessments

conducted in the Juba regions in December 2007, recorded nutrition levels that were below emergency thresholds, with GAM rates of 14.1% (11.3-16.9) among the pastorals,



14.7% (10.9 – 18.5) and 13.7%(10.0-17.3) among the Agro-pastoral and riverine populations respectively, all indicating a serious nutrition situation. However, the integrated analysis of various nutrition data from in January 2008 during the post *Deyr* '07/08 indicated that the nutrition situation in the riverine population was critical due to high oedema cases and increased admission of severely malnourished children in the targeted feeding centres in the riverine areas. The main factors aggravating the nutrition situation in Juba regions include, poor childcare and feeding practices and morbidity particularly diarrhoea.

Juba Regions are highly susceptible to flooding and thus to water borne diseases such as diarrhoea. Particularly in 2007 there was a wide spread epidemic of Acute Watery Diarrhoea (AWD) throughout the country with no exception in the Juba Region. In total from Jan 1st to 29th June, 1,690 cases of AWD were reported in Middle Juba with a Case Fatality Rate of 7.16%. In Lower Juba, 2000 cases

were reported in the same period with a lower, yet still concerning, CFR of 4.35%. (Source of Data: WHO AWD June 28th Update). From January to May'08, a total of 404 cases of AWD were reported in Lower and Middle Juba regions, mainly from Jilib riverine where 34% of the cases were reported. The AWD has since been contained through initiatives from the local and international NGOs who in addition to treatment of the AWD cases also carried out health education and hygiene promotion. One of the biggest challenges in the Juba regions as in the other areas in South Somalia is poor access to basic services including health and sanitation. The larger population rely on humanitarian assistance to get these essential services, however limited access by humanitarian actors, due to the ongoing insecurity and poor infrastructure, prevent the needs of the population being met.

2.0 ASSESSMENT OBJECTIVES

The overall objective of the three 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 malnutrition in Middle and Lower Juba regions.

Specific Objectives were:

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

3.0 METHODOLOGY

Three cross-sectional assessments were conducted concurrently between 20th June and 4th July 2008, among the Agropastoral, Pastoral and Riverine populations of in Middle and Lower Juba Regions

Respective sample sizes (number of households and number of children) were calculated using the Epiinfo/Ena 2008 software after considering the population size, estimated prevalence and desired precision. A list of all villages within each of the assessed livelihoods in the regions with their respective populations⁵ formed a sampling frame and was used to construct cumulative population figures for the assessment area, from which 26 or 27 clusters were randomly drawn for each livelihood zone (*Appendix 4*). Selection of respondents within the village was done randomly, preferably from a list of eligible names or a map of households. Where these were not available, the number of households in the village was estimated from the population figures (the total population divided by the mean household size). This is the interval, *n*. Starting from a random household, every *n*th household was selected and all eligible children (aged 6-59) in that household measured. Retrospective mortality data was collected from all the households in each cluster from each livelihood, including even those that did not have children aged 6-59 months.

Quantitative data was collected through a standard household questionnaire for nutrition assessments in Somalia (see appendix 1). Retrospective mortality data for 90 days prior to the assessments and Rapid Diagnostic Test for malaria was also collected among the study households using the standard questionnaires (see appendix 2 and 3 respectively). Qualitative data was collected 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 procedure, inclusion and exclusion criteria, sources and reduction of errors, taking of measurements (height, weight and MUAC), undertaking malaria RDTs, standardisation of questions in the questionnaire, levels of precision required in measurements, diagnosis of oedema and measles, verification of deaths within households, handling of equipment, and the general courtesy during the assessment.

Standardisation of measurement and pre-testing of the questionnaire and equipment were carried out in a village in Buale town not selected as a cluster for the actual assessment. Quality of data was also ensured through (i) monitoring of fieldwork by 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 analysed using EPI6 software. Mortality data was entered and crude and under five mortality rates generated in ENA software.

⁵ UNDP population estimates, 2005

4.0 ASSESSMENT RESULTS

4.1 Household Characteristics of Study Population

The three livelihood-based nutrition assessments covered a total of 1004 households (308 from pastoral; 364 from agro-pastoral and 332 from riverine livelihoods) with mean household sizes of 6.1±2.2; 5.6±2.0 and 5.6±2.0 persons respectively, in the pastoral; agro-pastoral and riverine livelihoods. A total of 2060 children (652 from pastoral, 763 from agro-pastoral and 645 from riverine livelihoods) aged 6-59 months, were assessed with respective mean number of 2.2 ±0.8; 2.2 ±0.8 and 2.1 ±0.8 under fives per household. The household characteristics by livelihood are presented in Table 4.1 below.

Table 4.1: Household Characteristics

Characteristics	Pastoral		Agropastoral		Riverine	
	N	%	N	%	N	%
Total Households	308	100	364	100	332	100
Household size (Mean):	6.1	SD=2.2	5.6	SD=2.0	5.6	2.0
Mean No of Under fives	2.2	SD=0.8	2.2	SD=0.8	2.1	SD=0.8
<i>Sex of Household Head:</i>						
Male	255	82.8	279	76.7	259	72.0
Female	53	17.2	85	23.4	73	22.0
<i>Has Mosquito net:</i>						
Yes	160	52.0	122	33.5	125	37.7
<i>Type of Net:</i>						
GFSOM	105	65.6	99	81.1	106	84.8
Other	50	31.3	23	18.9	12	9.6
Not seen	5	3.1	-	-	7	5.6
<i>Host IDPs</i>	34	11.0	37	10.2	35	10.7
<i>Main source of Income</i>						
Animal and its products sales	106	34.4	40	11.0	-	-
Crop sales/Agriculture	64	20.8	233	64.0	230	69.3
Trade	33	10.7	3	0.8	9	2.7
Casual labour	90	29.2	78	21.4	69	20.8
Salaries/wages	3	1.0	6	1.7	19	5.7
Remittances/gifts/zakat	11	3.6	4	1.1	5	1.5
Others/Destitute	1	0.3	-	-	-	-

The results showed that the majority, >72% of the assessed households were male-headed. Slightly over half of the assessed households in pastoral and about a third of agro-pastoral and riverine populations had mosquito nets. Most of these nets were distributed by the Global Fund Somalia programme. About 10% of the assessed households in the three livelihoods were reportedly hosting 1-3 internally displaced persons.

As it may be expected, the major source of income for the assessed households in the pastoral livelihood was sale of animals and animal products while among the agro-pastoral and riverine livelihoods, sale of crops/agriculture was the main source of income (Table 4.1). Casual labour provided supplementary income in all the livelihoods. *Deyr/Gu* seasonal cultivation and off season cultivation (in the riverine) in the farms along the river beds and pump-irrigated farms, especially in Middle Juba provided casual labour to the poor households.

4.2 Water Sources, access and Quality

	Pastoral		Agro-pastoral		Riverine	
<i>Main Source of drinking water</i>	n	%	n	%	n	%
Tap	-	-	21	5.8	38	11.5
Truck	-	-	-	-	0	0.0
Tube well	160	51.9	42	11.5	50	15.0
Surface sources	148	48.1	288	79.1	244	73.5
<i>Source of water for other domestic uses</i>						
Tap			17	4.7	33	9.9
Truck	4	1.3	1	0.3	18	5.4
Tube well	-	-	37	10.2	26	7.8
Spring	153	49.7	-	-	1	0.3
Surface sources	151	49.0	309	84.9	254	76.5
<i>Have access to safe water</i>						
Yes	156	50.6	59	16.6	100	30.1
<i>Reason for water inaccessibility</i>						
Not available	203	65.9	201	65.9	166	71.6
Distance too far	69	22.4	25	8.2	34	14.7
Security concerns	-	-	3	1.0	4	1.7
Can't afford	36	11.7	76	24.9	28	13.7
<i>Reliability of water Source:</i>						
Reliable supply	147	47.7	145	39.8	196	59.0
Seasonal supply	129	41.9	148	40.7	50	15.1
Occasional problems	19	6.2	49	13.5	45	13.6
Frequent problems	13	4.2	22	6.0	41	12.4
<i>Time to and from water point</i>						
< 30 min	65	21.1	167	45.9	150	45.2
30-60 min	132	42.9	119	32.7	124	37.4
1-2 hours	104	33.8	64	17.6	45	13.9
> 2 hours	7	2.3	14	3.8	13	3.9
<i>Water treated at</i>						
Source	48	15.6	50	13.7	40	12.1
Storage	-	-	12	3.8	83	25.0
<i>No of Water Containers</i>						
1-2 containers	62	20.1	235	64.6	158	47.6
3-4 containers	142	46.1	94	25.8	133	40.1
5-6 containers	86	27.9	26	7.1	29	8.8
> 6 containers	18	5.8	9	2.5	12	3.6
<i>Type of water storage containers</i>						
Clean container with cover	77	25.0	49	13.5	34	10.2
Closed plastic containers	203	65.9	207	56.9	179	53.9
Open buckets	24	7.8	67	17.9	27	8.1
Ashun (constricted)	4	1.3	43	11.8	92	27.7

Access to safe water for drinking and for other domestic use remains limited and is a key concern in the study area. Only 50.6% of pastoral, 16.6% of agro-pastoral and 30.1% of riverine households were reportedly accessing safe water yet very few household (12-25%) reported that the water they consumed was treated at the source or storage level. The main reason given by >65% of the households for lack of safe water was the fact that safe water is not available in their areas. Other reasons given for lack of safe water included long distance to the sources of safe water and security concerns. As indicated in table 4.2, main sources of drinking and other domestic uses across the livelihoods were surface sources (catchments) and tube well. On a positive note, most households 47.7% of pastoral, 59% of riverine and 39.8% of agro-pastoral households indicated that they accessed reliable water supply from these sources, however the quality is of concern. There was still significant proportion (32-42%) of

the households that reported the reliability of water sources as of seasonal supply while others had frequent or occasional problems of water supply.

Majority of the agro-pastoral (45.9%) and riverine (45.2%) populations, spent less than 30 minutes to and from the water sources. On the other hand, most (42.9%) of the pastoral households spent between thirty minutes to one hour to go to the water sources, fetch water and come back. Other households spent more than one hour to get water. Most of the assessed agro-pastoral (64.6%) and riverine 47.6% households had between one and two containers for storing water while majority (46.1%) of pastoral households owned 3-4 water containers. Sphere (2004) recommends that each household has at least 2 clean water collecting containers of 10-20L, and depending on the household size, plus enough clean water storage containers to ensure there is always water in the household for an average usage of 15L/person/day. Across livelihoods water was mainly stored in closed plastic containers.

4.3 Sanitation and Hygiene

	Pastoral		Agro-pastoral		Riverine	
	n	%	n	%	n	%
<i>Have access to latrines</i>						
Yes	147	47.7	123	33.8	105	31.6
<i>Type of sanitation facility</i>						
Bush	147	47.7	141	66.2	227	68.4
Traditional pit	161	52.3	122	33.5	105	31.6
VIP latrine	-	-	1	0.3	-	-
<i>Reason for latrine inaccessibility</i>						
Pastoral	78	53.1	16	6.6	1	0.5
Lack of resources	41	27.9	172	71.4	180	91.4
Doesn't see need	28	19.0	53	22.0	16	8.1
<i>Maintain hygienic hand washing</i>						
<i>Practice Hygiene</i>						
	303	98.4	355	97.5	221	66.6
<i>Washing agent</i>						
Soap/ shampoo	361	89.6	293	65.8	325	82.5
Sand	19	4.7	53	11.9	30	7.6
Ash	2	0.5	46	10.3	27	6.9
Plant extracts	0	0.0	2	0.4	0	0.0
None	21	5.2	51	11.5	12	3.0

Poor sanitation has remained of concern in Lower and Middle Juba regions for a long time. Access to sanitation facilities remains limited with only 47.7%, 37.8% and 31.6% of pastoral, agro-pastoral and riverine households respectively accessing sanitation facilities in the form of traditional pit latrines. The large majority of the populations have no access to sanitation facilities, which predisposes them

to related diseases. The main reason reported by the both agro-pastoral and riverine households for inaccessibility is lack of resources to construct the latrines while the pastoral households cited their pastoral lifestyle as their main impediment to sanitation facilities access (Table 4.3). Others did not see any need of using sanitation facilities. 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.

As indicated in the Table 4.3, a large number (66-98%) of the assessed households practiced basic hygienic hand washing practices while soap was reportedly the main washing agents used across livelihoods. In order to prevent the spread of disease through contamination, SPHERE (2004) recommends hand washing always after defecation and before eating and food preparation and the

users should have the means to wash their hands after defecation with soap or alternative.

4.4 Morbidity, immunization and Health Seeking Behaviour

High morbidity rates (from common child illnesses) were reported in the three livelihoods with more than half of the assessed children reportedly falling ill in two weeks (one month for measles) prior to the assessment in pastoral (69.2%) and agro-pastoral (50.9%) populations. While among the riverine population, 49% of the assessed children were reported to have fallen sick.

Table 4.4: Health seeking behaviour

	Pastoral		Agropastoral		Riverine	
	N	%	N	%	N	%
<i>Child fell sick</i>						
Yes	451	69.2	388	50.9	316	49.0
<i>Where health service sought</i>						
Own medication	130	24.4	36	9.3	37	11.7
Traditional healers	91	17.1	22	5.7	30	9.5
Private pharmacy/clinic	117	22.0	112	28.9	68	21.5
Public health facilities	87	16.4	136	35.1	103	32.6
No assistance sought	107	20.1	82	21.1	78	24.9

Children reported to have fallen sick within two weeks prior to the assessment sought medical assistance from varied sources. In the pastoral livelihood carere of sick children sought assistance mainly from private pharmacy/clinics (22%) or used own

medication (24.4%) and among the agro-pastoral and riverine livelihoods medical assistance was mainly sought from public health facilities (32- 35%) and private pharmacy/clinics (21-29%), see table 4.4. A significant proportion also sought the services of traditional doctors especially in pastoral (17.1%) population. It is worth noting that about a quarter of the children who were reported to have fallen sick did not seek any medical assistance and this could lead to further deterioration of the health status.

The incidence of reported diarrhoea in pastoral, agro-pastoral and riverine populations (24.9%; 24.6% and 24.5% respectively) within two weeks prior to the assessment remained high. The reported incidences of suspected measles ranged between 1.5% in agro-pastoral to 9.1% in pastoral livelihoods. High incidences of ARI (17-37%) and suspected malaria or febrile illnesses (24-48%) were also reported in the three livelihoods (Table 4.5). Malaria is endemic in Juba regions with the current results of rapid diagnostic test for *Plasmodium. falciparum* indicating rates of 9.1%; 16.4% and 7.2% reported in the assessed Pastoral, Agro-pastoral and Riverine populations. These levels were consistent with seasonal morbidity patterns recorded from the health facilities. In this period of the year, unlike the beginning of last year, there was no outbreak of acute watery diarrhoea outbreak as of the time of the assessment.

Table 4.5: Morbidity, measles immunisation, polio vaccination and vitamin A supplementation

	Pastoral		Agropastoral		Riverine	
	n	%	n	%	n	%
<i>Incidence of major childhood illnesses</i>						
Proportion of children reported with diarrhoea in 2 weeks prior to assessment	241	24.9 (18.1-31.6)	188	24.6 (18.0-31.5)	158	24.5 (18.0-31.0)
Proportion of children reported with ARI in 2 weeks prior to assessment	241	37.0 (25.5-48.5)	162	21.3 (11.5-21.0)	113	17.4 (10.1-24.9)
Children reported with febrile illness in 2 weeks prior to assessment	312	47.9 (39.4-56.3)	241	31.6 (19.4-43.8)	157	24.3 (15.8-32.9)
Proportion of persons confirmed with malaria (RDT positive)	118	9.1 (7.6 – 10.8) (N=1303)	220	16.4 (14.5– 18.5) (N=1344)	94	7.2 (5.9 – 8.8) (N=1305)
Children who slept under bed net	357	54.8 (42.2 – 67.3)	228	29.89 (19.4 – 40.3)	201 6	31.2 (21.6 – 40.7)
Suspected measles within one month prior to assessment	58	9.5 (4.9– 14.3)	11	1.5 (0.3 – 2.7)	14	2.3 (0.8– 3.8)
<i>Immunization status (recall and card)</i>						
Children (9-59 months) immunised against measles	264	43.4 (30.7-56.1)	355	49.4 (34.3-64.5)	452	73.4 (62.2-84.5)
Children who were reported to have ever received polio vaccine	554	85.0 (79.7-90.2)	596	78.1 (68.3-87.9)	543	84.2 (76.6-91.7)
Children who received vitamin A supplementation in last 6 months	287	44.0 (29.9–58.1)	419	54.9 (40.6-69.3)	481	74.6 (63.8-85.3)

Morbidity, diarrhoea in particular, was identified as an important risk factor to acute malnutrition with children from riverine livelihood who had diarrhoea two weeks prior to the assessment being 1.78 times more likely to be acutely malnourished as compared to their counterparts who had no diarrhoea (RR=1.78; CI: 1.22- 2.62; p=0.003). Measles vaccination for eligible children (9-59 months old) and vitamin A supplementation coverage were very low at between 43 to 75% across livelihoods (table 4.5). Polio immunization was relatively high at 85% among pastoral, 78.1% among agro-pastoral and 84.2% among the riverine. Overall, status for the three health programmes (including polio immunization) fell well below the recommended coverage of 95% level (Sphere, 2004) in all the three livelihoods.

4.5 Feeding practices

None of the assessed children were exclusively breastfed for the recommended first six months and more than a third of the children aged 6-24 months had stopped breastfeeding at the time of the assessment. The majority (>68%) of the 58-60% of the children who were breastfeeding at the time of the assessment were breastfed on demand as recommended SPHERE (2004). Complimentary food was introduction too early in life with the majority (47-64%) of the assessed children aged 6-24 months reportedly introduced to complimentary food at the age of 0-3 months. This is contrary to the international recommendation for exclusive breastfeeding for the first six months of life and introduction of appropriate complimentary feeding at the age of six months. The majority of the assessed children aged 6-24 months, including 43% of the pastoral livelihood, 62% of agro-pastoral and 70.2% of riverine population, were fed for two times in a day (FANTA, 2003, WHO, 2003). Children aged 6-8 months should be fed for at least 2-3 times in a day while those aged 9 months and above should be fed for at least 3-4 times in a day. Less than a quarter of the assessed children

in the three livelihoods were reportedly registered in a feeding programme, mainly supplementary feeding programme (table 4.6).Overall,, only 15.5% of the acutely malnourished from pastoral livelihood, 25.2% from agro-pastoral and 20.3% from riverine livelihoods were identified to have been registered in a feeding programme. Other acutely malnourished identified in these assessments children were not registered in any feeding programme.

Analysis of distribution of acute malnutrition between the different age groups showed higher risks and levels of association with acute malnutrition for the younger children. Among the pastoral, the breastfeeding age group 6-24 months were about one and a half times more likely to be acutely malnourished than the 25-59 months category (RR=1.45; CI: 1.02 – 2.17; p=0.004). Similarly, children aged 6-24 months from riverine livelihood were 1.58 times more likely to be acutely malnourished than their 25-59 months aged counterparts (RR=1.58; CI: 1.07 – 2.33; p=0.003). Further, children aged 6-24 months from pastoral livelihood who were breastfeeding at the time of the assessment were about 52% less likely to be acutely malnourished as compared to their counterparts in the same age groups who were not breastfeeding (RR=0.52; CI:0.30 – 0.91; p=0.022). This all underscores the importance of child feeding particularly breastfeeding for the children aged less than two years.

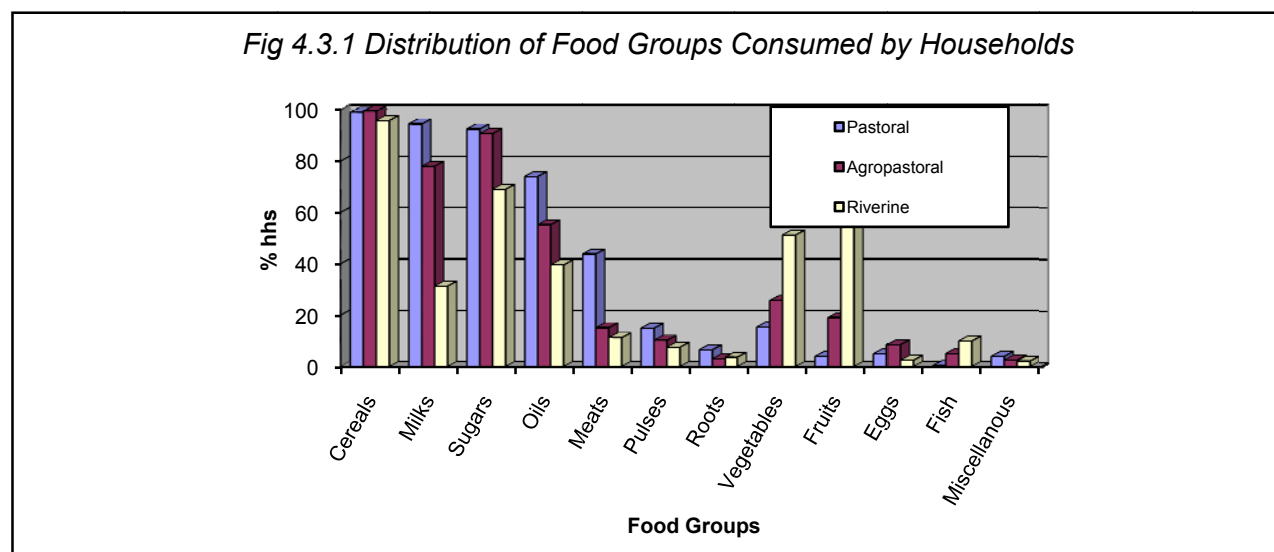
Table 4.6: Child feeding practices

<i>Malnutrition rates</i>	<i>Pastoral</i>		<i>Agro-pastoral</i>		<i>Riverine</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
<i>Is child (6-24 mo) breastfeeding?</i>						
Yes	138	N=235 58.7	157	N=257 60.6	133	N=228 58.3
<i>Breastfeeding frequency</i>		N=138		N=157		N=228
1-2 times	2	1.4	4	2.6	3	2.3
3-6 times	30	21.7	45	28.7	22	16.5
On demand	106	76.8	108	68.8	108	81.2
<i>Age stopped breastfeeding</i>		N=163		N=102		N=95
<6 months	37	22.7	13	12.8	16	16.8
6 - 11 months	89	54.6	37	36.3	40	42.1
12 – 18 months	34	20.9	44	43.0	24	25.3
More than 18 months	2	1.2	6	5.9	15	15.8
Never breastfed	1	0.6	2	2.0	-	-
<i>Introduction of Complementary feeding</i>		N=235		N=257		N=228
0 - 3 months	150	63.8	122	47.0	111	48.7
4 – 5 months	53	22.6	71	27.4	59	25.9
6 months	28	11.9	63	24.3	48	21.1
7 or more months	4	1.7	3	1.2	10	4.4
<i>Complementary Feeding frequency:</i>		N=235		N=257		N=228
Once	14	6.0	24	9.3	28	20.3
2-3 times	101	43.0	160	62.0	160	70.2
4 times	49	20.9	53	20.5	34	14.9
5 or more times	71	30.2	21	8.1	6	2.6
<i>Type of feeding programme where the child is currently registered in</i>						
SFP	120	18.4	138	18.1	69	10.7
TFC	6	0.9	30	3.9	33	5.1
OTP/CTC	3	0.5	3	0.4	1	0.2
None	523	80.2	591	77.6	542	84.0

4.6 Household Food Security

4.6.1 Food Consumption

As shown in figure 4.3.1, cereals provided the bulk of the food in the household diet. Cereal-based diets were consumed by almost all the assessed households. Other food items frequently consumed were milk, sugar and oil/fat. The riverine population had a higher consumption of fruits (56.9%) and vegetables (51.2%) while the pastoralists had a considerably higher consumption of their staple food, milk (94.5%) and meat 43.8% as expected. This is explained by the fact that riverine households grow and consume fruits (oranges, lemon, and mangoes) and vegetables (onions, tomatoes, pumpkins) in their farms while milk/meat is staple food among the pastoral communities. Consumption of other food groups (fruits, vegetables, eggs, roots and fish) were very low in the other livelihoods.



Main source of food	Pastoral		Agropastoral		Riverine	
	n	%	n	%	n	%
Own production	63	20.5	150	41.3	106	31.9
Purchasing	239	77.6	211	58.1	216	65.1
Gifts	3	1.0	2	0.6	7	2.1
Food aid	1	0.3	-	-	3	0.9
Bartering	1	0.3	-	-	-	-
Borrowing	1	0.3	-	-	-	-
Main source of cereals	N=305		N=362		N=318	
Own production	48	15.7	173	47.8	86	27.0
Purchasing	251	82.3	185	51.1	222	69.8
Gifts	-	-	1	0.3	4	1.3
Food aid	4	2.0	3	0.8	6	1.9
Main source of milk	N=291		N=284		N=104	
Own production	141	48.5	114	40.1	24	23.1
Purchasing	150	51.5	170	59.9	80	76.9

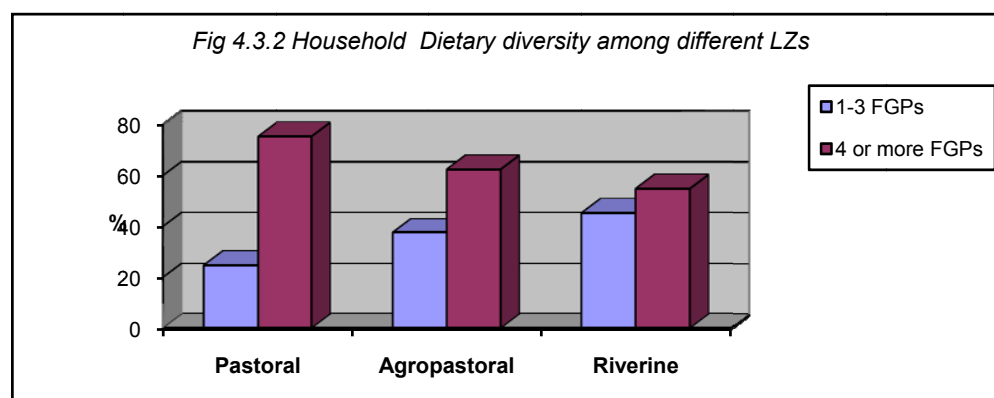
Purchase was the main households' source of food, mainly cereals, but a significant proportion also reported producing their own food (Table 4.7). Similarly, the main source for both cereals and milk was through purchase.

Other major sources of food included, food aid, which was reported as main source of cereals for about 2% of the assessed households, gifts, bartering and borrowing.

4.6.2 Dietary Diversity

	Pastoral		Agropastoral		Riverine	
	n	%	n	%	n	%
No of food groups consumed						
1 food group	2	0.7	2	0.6	9	2.7
2 food groups	16	5.2	19	5.2	35	10.5
3 food groups	58	18.8	116	31.9	106	31.9
4 food groups	77	25.0	106	29.1	86	25.9
5 food groups	90	29.2	70	19.2	64	19.3
6 food groups	37	12.1	30	8.2	24	7.2
7 food groups	18	5.8	11	3.0	2	1.8
8 food groups	9	2.9	9	2.5	2	0.6
9 food groups	-	-	1	0.3	-	-
10 food groups	1	0.3	-	-	-	-
No. Having Diversified Diet						
1-3 food groups	76	24.7	137	37.6	150	45.2
≥ 4 food groups	232	75.3	227	62.4	182	54.8
Mean HDDS	4.5 (SD=1.4)		4.1 (SD=1.4)		3.8 (SD=1.3)	

Across livelihoods, the majority (54 – 75%) of the households consumed diversified diets with four or more food groups. Overall, households consumed one to ten food groups with a mean of 4.5±1.4 among the pastoral and 4.1±1.4 and 3.8±1.3 among the agro-pastoral and riverine livelihoods respectively.



As shown in Fig 4.3.2, the although majority of the households consumed diversified diets⁶ in the 24 hours prior to the assessment of concern, though is the significant (24-45%) of the households that consumed three or less food groups in the preceding 24 hours.

4.7 Nutrition Status

4.7.1 Malnutrition levels by Livelihoods

A total of 652 children, 50.5% boys and 49.5% girls aged 6-59 months were assessed from 308 households among the pastoral livelihoods. In the agro-pastoral livelihood, 763 children (50.7% boys and 49.3% girls) were assessed from 364 households while 645 children (49.6% of them boys and 50.4% girls) were assessed from 332 sampled households. Using the NCHS (1977) reference, the results show **Serious** nutrition levels in pastoral and riverine population according to WHO classification with respective GAM rates of **14.3%** (CI: 11.3 – 17.2) and **14.5%** (CI: 11.7 – 17.7); and respective SAM rates of **2.6%** (CI: 1.4 – 4.7) and **2.2%** (CI: 1.3 – 3.5). However, the results from agro-pastoral livelihood indicated a **Critical** nutrition situation with a GAM rate of **17.8%** (CI: 13.7 – 22.9) and a SAM rate of **2.1%** (CI: 0.9 – 4.7). A summary of the findings for the acute malnutrition rates is given in table 4.10.

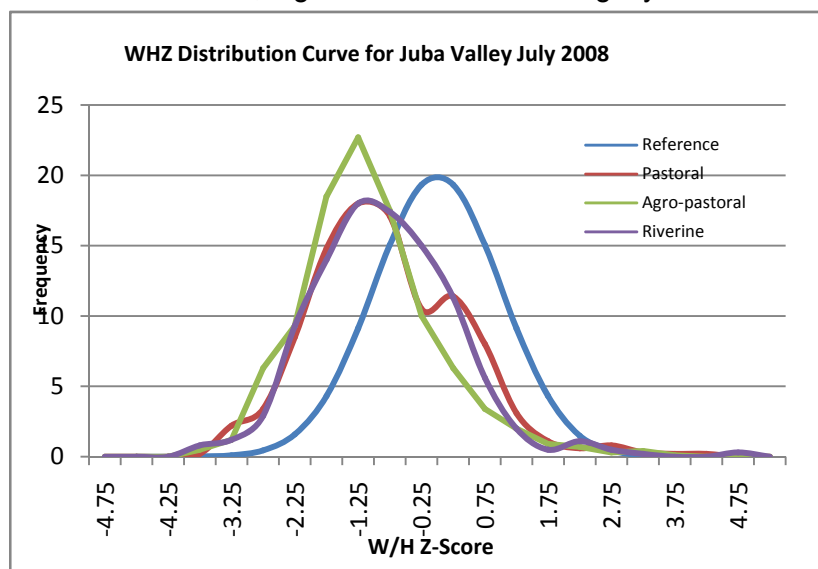
⁶ Diversified diet is composed of at least four food groups based on a total of 12 FAO food groups.

Table 4.8: Summary of Malnutrition rates by Livelihood systems

Malnutrition rates	Pastoral (N=652)		Agropastoral (N=652)		Riverine (N=645)	
	No	% (CI)	No	% (CI)	No	% (CI)
Global Acute Malnutrition (WHZ<-2 or oedema)	93	14.3 (11.3 – 17.2)	136	17.8 (13.7 – 22.9)	93	14.4 (11.7– 17.7)
Severe Acute Malnutrition (WHZ<-3 or oedema)	17	2.6 (1.4 – 4.7)	16	2.1 (1.4 - 3.9)	14	2.2 (1.3 – 3.5)
Oedema	1	0.2 (0 – 0.5)	2	0.3 (0 – 0.6)	2	0.3 (0- 1.6)
GAM estimates by WHO Anthro (2005) Standards:	91	14.0 (11.4 - 17.0)	160	21.0 (16.6- 26.2)	105	16.3 (13.0 – 22.9)
SAM estimates by WHO Anthro (2005) Standards:	21	3.2 (1.9 – 5.3)	40	5.2 (3.6 – 7.5)	25	3.9 (2.9 – 5.6)
Global Acute Malnutrition (WHM<80% or oedema)	60	9.2 (7.3 - 11.6)	107	14.0 (10.7 – 18.2)	97	10.8 (7.4-14.1)
Severe Acute Malnutrition (WHM<70% or oedema)	1	0.2 (0 – 1.2)	9	1.2 (0.5 – 2.6)	27	3.0 (1.4 – 4.6)
Proportion of stunted children (HAZ<-2)	129	19.8 (16.3-23.8)	249	32.6 (25.9-40.1)	262	40.6 (33.9-47.8)
Proportion of underweight children (WAZ<-2)	166	25.5 (20.3-31.5)	306	40.2 (32.7-48.2)	260	40.4 (34.9-46.3)

When estimated using WHO Anthro (2005) Reference standards, higher GAM rates and slightly more than double SAM rates were reported in the Agro-pastoral and riverine livelihood assessments. The agro-pastoral livelihood assessment reported a GAM rate of **21.0%** (CI: 16.6 – 26.2) and a SAM rate of **5.2%** (CI: 3.6 – 7.5), while among the riverine livelihood population a GAM rate of **16.3%** (13.0 – 22.9) and a SAM rate of **3.9%** (CI: 2.9 – 5.6) were reported. The pastoral livelihood reported a slightly lower GAM rate of **14.0%** (CI: 11.4 – 17.0) and a higher SAM rate of **3.2%** (CI: 1.9 – 3.2).

Generally, the distributions of the weight-for-height scores in the three Juba regions assessments were skewed towards the left depicting a poorer nutrition situation according to international (WHO) standards (Fig 4.4.1).



The mean WHZ for pastoral, agro-pastoral and riverine livelihoods were -0.80 (SD=1.19); -1.09 (SD=1.09) and -0.84 (SD=1.14) respectively.

A summary of the Nutrisurvey quality checks for the assessments is given in appendix 7.

4.7.2 Malnutrition by Sex in the three Livelihoods

Table 4.9 Distribution of children by nutritional status (WHZ-score or oedema) and child sex

Nutrition status	Pastoral				Agropastoral				Riverine			
	Males		Females		Males		Females		Males		Females	
	n	%	n	%	n	%	n	%	n	%	n	%
GAM (WHZ<-2 /oedema)	42	12.8	51	15.7	81	20.9	55	14.6	57	17.8	36	11.1
SAM (WHZ<-3 /oedema)	11	3.3	6	1.9	6	1.6	10	2.7	6	1.9	8	2.5
Oedema	1	0.3	0	0	0	0	2	0.5	1	0.3	1	0.3

For reasons that need further investigation, boys were about one and a half times more likely to be acutely malnourished (RR= 1.58; CI: 1.07 – 2.33; p=0.02 in riverine and RR= 1.46; CI: 1.06 – 1.99; p=0.02 in agro-pastoral livelihoods) in the surveyed population using weight for height <-2 Z score or presence of oedema. On the contrary, results of acute malnutrition among the pastoral livelihood showed more girls (15.7%) than boys (12.8%) were acutely malnourished, however results did not show any statistical difference between the two sexes (p>0.05). Furthermore, children from male-headed and female-headed households did not show any statistically significant difference in their risk to acute malnutrition (p>0.05).

4.7.3 Malnutrition by Age in the three Livelihoods

Table 4.10 Distribution of Acute Malnutrition (WHZ Scores) by Age

Age (months)	Pastoral		Agropastoral		Riverine	
	SAM	GAM	SAM	GAM	SAM	GAM
6-17	4 (2.5%)	23 (14.4%)	5(3.2%)	29(18.4%)	4(2.8%)	23(16.3%)
18-29	5(3.3%)	24(16%)	5(2.9%)	38(22.2%)	3(2%)	24(15.9%)
30-41	0	17(11.5%)	1(0.6%)	18(10.7%)	5 (3.3%)	21(13.7%)
42-53	5(3.7%)	20(14.8%)	3(2%)	25(16.9%)	2(1.5%)	14(10.5%)
54-59	1 (1.7%)	8(13.6%)	2(1.7%)	25(21.4%)	0	5(14.9%)
Total	15(2.3%)	92(14.3%)	16(2.1%)	136(17.87%)	14(2.2%)	92(14.5%)

Analysis of distribution of acute malnutrition between the different age groups showed a variation in risk of acute malnutrition. In the pastoral and agro-pastoral livelihoods, children in the age bracket of 18-29 and 30-41 months recorded the highest and lowest proportion of acutely malnourished children respectively. Among the riverine children in the age brackets of 6-17 months recorded the proportion of malnourished children while those in the age bracket of 42-53 had the least number of acutely malnourished children. Further analysis showed a significance difference in distribution of acute malnutrition between the breastfeeding age group 6-24 months and the 25-59 months category. In the pastoral livelihood zone results showed that the children of breastfeeding age were about one and half times more likely to be acutely malnourished than their counterparts aged 25-59 month (RR=1.45; CI: 1.02-2.17; p=0.04). Similarly the children of breastfeeding age from riverine population were one and three quarter times more likely to be acutely malnourished than their elder counter (RR=1.75; CI: 1.20-2.55; p=0.003). There was no statistical difference in acute malnutrition rates between children in the two age brackets from agro-pastoral livelihood. Equally there was no statistical difference (p>0.05) in acute malnutrition levels among the 6-29 months and 30-59 months

age bands in the three livelihoods. Previous qualitative studies and the recent KAPS⁷ study have reported poor child care including infant and young feeding practices in Somalia possibly explaining the high risk of acute malnutrition among the breastfeeding group.

4.7.4 Acute Malnutrition by MUAC

Based on MUAC measurements, acute malnutrition rates (MUAC < 12.5 cm or oedema) of 6.2% (CI: 3.6 – 8.8); 16.7% (CI: 10.8 – 22.5) and 16.1% (CI: 13.1 – 19.1) were reported in pastoral; agro-pastoral and riverine livelihoods respectively (Table 4.13) The MUAC results indicated lower rates of acute malnutrition when compared to WHZ < -2 in pastoral livelihoods, likely linked to physiological stature however the rates using WHZ and MUAC were similar between the agro-pastoral and riverine groups.

Table 4.12 Child and Maternal Malnutrition by MUAC

Malnutrition rates	Pastoral		Agropastoral		Riverine	
	No	% (CI)	No	% (CI)	No	% (CI)
Child MUAC						
GAM (MUAC < 12.5 cm or oedema)	30	6.2 (3.6 – 8.8)	127	16.7 (10.8 - 22.5)	104	16.1 (13.1 – 19.1)
SAM (MUAC < 11.0 cm or oedema)	2	0.4 (0 – 1.0)	9	1.2 (0.3 – 2.1)	7	1.1 (0.2 - 2.0)
Pregnant Women MUAC						
Total acutely malnourished (MUAC < 23.0 cm)	N=50 15	30.0	N=88 46	52.3	N=93 24	25.8
Severely malnourished (MUAC ≤ 20.7 cm)	2	10.0	11	12.5	2	2.2
Non pregnant women MUAC						
Total acutely malnourished (MUAC ≤ 18.5 cm)	N=268 1	0.4	N=284 4	1.4 (0.1 – 2.7)	N=263 1	0.4
Severely malnourished (MUAC < 16.0 cm)	-		-		1	0.4

Among the assessed women; high acute malnutrition rates were recorded among the pregnant women (MUAC < 23.0 cm) ranging from 25.8% in Riverine to 52.3% in the agro-pastoral livelihood system. A high proportion of pregnant women were also severely (MUAC < 20.7 cm) at risk of acute malnutrition as indicated in Table 4.13. Pregnancy raises physiological and nutritional demands of women making them vulnerable to acute malnutrition. Low acute malnutrition rates (<1.5%) were recorded among the non pregnant women.

⁷ Somali Knowledge, Attitude and Practices Study, FSAU December 2007.

Table 4.12 Health status of the adult women

	<i>Pastoral</i>		<i>Agro-pastoral</i>		<i>Riverine</i>	
Total women assessed	308		366		349	
Illness in the last 14 days						
None	9	2.9	92	24.7	45	12.6
ARI	12	3.9	14	3.8	10	2.8
Diarrhoeal	66	21.4	19	5.1	46	12.9
Malaria/febrile illness	67	21.8	82	22.0	31	8.7
Joint pain	40	13.0	64	17.2	97	27.2
Urinal	28	9.1	13	3.5	34	9.6
Organ	12	3.9	12	3.2	25	7.0
Anemia	63	20.5	62	16.7	57	16.0
Reproductive	6	1.9	8	2.2	5	1.4
Others	5	1.6	6	1.6	6	1.7
Reported to have received tetanus vaccine						
Yes	95	30.8	140	38.3	255	73.1
No	213	69.2	226	61.7	94	26.9

The majority of the assessed women were reportedly ill fourteen days prior to the assessment, including 97.1% of pastoral, 75.3% of agro-pastoral and 87.4% of the riverine women. As indicated in table 4.12, the most commonly reported illness were diarrhoea, suspected malaria, joint pain and anaemia. Tetanus vaccination was also low especially among the pastoral (30.8%) and agro-pastoral (38.3%) whereas the riverine had a higher vaccination rate with almost three quarters (73.1%) of the assessed women reported to have received the vaccine.

4.8 Retrospective Mortality

A total of 14,153 persons, 4,030 of them under fives from 2,712 households were assessed for mortality in the three livelihood-based assessments. Out of these, a total of 166 deaths were reported, 96 of them children under five years of age.

Table 4.14 Mortality among the Pastoral, Agro-pastoral and riverine Lzs in Gedo

	<i>Pastoral</i>		<i>Agropastoral</i>		<i>Riverine</i>	
	U5	Total	U5	Total	U5	Total
Total HHs surveyed		648		711		641
Total Population assessed in HHs	1094	3436	1119	3479	1013	3217
Number who joined the HHs	4	60	5	101	25	102
Number who left the HHs	3	141	14	206	9	140
Number of births	29	29	53	33		53
Number of deaths	7	23	18	31	24	45
Mortality rate	0.72 (0.33- 1.54)	0.74 (0.54 – 1.01)	1.79 (1.17 – 2.73)	0.98 (0.66 – 1.43)	2.69 (1.54 – 4.68)	1.55 (1.08 – 2.22)

The U5 and crude mortality rates among the pastorals were within the acceptable levels at **0.72** (0.33-1.54) and **1.74** (0.54-1.01)/10,000/day respectively (WHO). Similarly U5MR and CMR rates were both within the **acceptable** levels at 1.79 (1.17 -2.73) and **0.98** (0.66 – 1.43) respectively in the agro-pastoral livelihood. Among the riverine CMR of 1.55 (1.08 – 2.22) and U5MR of 2.69 (1.54-4.68) were reported and they were both at **alert** levels (Table 4.14).

Diarrhoeal diseases, febrile illness, birth related complications (poor birth outcome) and ARI were the main reported factors associated with under-five mortality according respondents' recall. Diarrhoea; malaria and birth related complications were also reported as the main causes of death among adults and children aged 5 years and above.

4.9 Qualitative Information

Information on food security, water & sanitation and childcare practices was collected through qualitative approaches. Semi-structured interviews with key informants and community focus groups were used for collecting the information.

An analysis of the post *Gu'08* food security situation indicate Juba regions as having had good rainfall performance with the exception of parts of Middle Juba region such as Sakow District, which experienced rain failure. The good rainfall performance had a positive impact, including increased water and pasture, improved livestock body conditions, increased access to milk from both the in-migrating livestock and those from within the regions. Overall, pasture and water availability in Juba is average as is the livestock body conditions for all species (camel, cattle). During the rainy season of *Gu' 08*, conception and calving/kidding for all livestock species was low while milk production from cattle and camel was average. Overall household milk consumption was reportedly high owing to high livestock production among the pastoral group. Access is however constrained by poor infrastructure especially among the riverine population.

Middle Juba region experienced crop failure with overall cereal production in the region being 28% of PWA (1995-2007) while Lower Juba had good cereal production amounting to 88% of PWA. Overall, both Middle and Lower regions produced an estimated total of 7540 MT of cereals in *Gu'08* period which included 5000 MT of maize and 40 MT of sorghum from Lower juba and 2400 MT of maize and 100 MT of sorghum from Lower Juba and . The negative impact of inflation and ever increasing fuel prices was identified as a major limitation to cereal access in the regions. In the riverine livelihoods, poor households are reportedly consuming unripe mangoes and wild foods and migrating to Kenya refugees' camps. Poor rainfall in Middle Juba has contributed to drying of *Dhesheks* in the riverine areas and has resulted to reduced milk consumption and loss of income from farm related labour.

Child feeding and child care practices remain largely suboptimal. Breastfeeding duration for children is usually 12 -18 months from birth. Water is often given to the newborn at birth. A sugary solution is given to the baby within the first week of birth while most children are given complementary food (animal milk – mostly goat milk) before they are one month old. 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 (1 – 12 years) are goat milk 3 to 4 times a day in most cases 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 constraints to breastfeeding of young children below two years. However cultural beliefs sometimes also negatively affect breastfeeding. 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 (during 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 show a continuing **Serious** nutrition levels according to WHO classification with a GAM rate of **14.3%** (CI: 11.3 – 17.2) and a SAM rate of **2.6%** (CI: 1.4 – 4.7) including twelve (0.2%) oedema cases among the assessed pastoral populations. Similarly, the results indicate **Serious** nutrition levels in the riverine population with a GAM rate of **14.5%** (11.7 – 17.7) and a SAM rate of **2.2%** (1.3 – 3.5) including 0.3% of oedema cases. Among the agro-pastoral population, results show a **Critical** nutrition situation with a GAM rate of **17.8%** (13.7 – 22.9) and a SAM rate of **2.1%** (0.9 – 4.7) including 0.3% of oedema cases. When compared with the most recent assessments, results show a sustained serious nutrition situation in the pastoral population as was in December 2007 when a GAM rate of **14.1%** (CI 11.3 – 16.9) and severe acute malnutrition (weight for height <-3 or oedema) was **2.2%** (CI: 1.3-3.2) including twelve (1.2%) oedema cases was reported. In the agro-pastoral livelihood, results shows a deterioration from the serious levels reported in December 2007 when a GAM rate of **14.7%** (CI: 10.9 - 18.5) and SAM rate of **2.6%** (CI: 1.4 – 3.9) with twelve (1.3%) oedema cases was were reported. In the riverine, although the GAM rate of 13.7% (CI: 10.0 – 17.3) recorded in December 2007 assessment was within the range of 10-14.9%, which therefore could have been categorized as serious, a very high SAM rate of **4.4%** (CI: 2.5 – 6.4) including twenty three (2.6%) oedema cases led to the nutrition situation of the population categorized as Critical. Hence current assessment results show some improvement in nutrition situation from Critical to Serious owing to low SAM rates and reduced oedema cases in the riverine. The somewhat improvement could be attributed to continued support of the riverine community by humanitarian actors in the area. However, given that confidence interval ranges overlap in all the three studies, there is no statistically significant difference in the rates of acute malnutrition between the three livelihood zones and from previous assessments conducted in December 2007.

When estimated using WHO Anthro (2005) Reference standards, slightly higher GAM rates and almost double SAM rates than the NCHS (1977) Reference Estimates were reported. The pastoral livelihood reported GAM rate of **14.0%** (CI: 11.4 – 17.0) and SAM rate of **3.2%** (CI: 1.9 – 3.2), a relative decrease of 2.1% and an increase of 45.5% respectively. Agro-pastoral livelihood assessment reported GAM rate of **21.0%** (CI: 16.6 – 26.2 SAM rate of **5.2%** (CI: 3.6 – 7.5), a relative increase of 18% and 147.6% respectively; while among the riverine livelihood population a GAM rate of **16.3%** (13.0– 22.9) and SAM rate of **3.9%** (CI: 2.9 – 5.6) were reported indicating a 12.4% and 77.3% relative increase respectively. High levels of stunting ranging from 19.8% among the pastoral and 40.6% among the riverine population were recorded. Similar high levels of underweight were recorded at 25.5% among the pastoral, 40.2% and 40.4% among the agro-pastoral and riverine livelihoods respectively.

Among the assessed women; high acute malnutrition rates were recorded among the pregnant women (MUAC< 23.0 cm) ranging from 25.8% in the Riverine livelihood to 52.3% in the agro-pastoral livelihood system. Pregnancy raises physiological and nutritional demands of women making them vulnerable to acute malnutrition. However, more investigation is required to explain the high malnutrition rates among the pregnant women. Low acute malnutrition rates (<1.5%) were recorded among the non pregnant women. Morbidity among the women was high across the livelihoods, with 73-93% of the women reportedly been sick two weeks prior to the assessment. Tetanus vaccination among the pastoral and agro-pastoral women was low at 30.8% and 38.3% respectively. However, a higher vaccination rate of 73.1% was recorded among the riverine women and this could be attributed to better services provided by the humanitarian agencies in the regions.

The underfive and crude mortality rates among the pastorals were within the **acceptable** levels at **0.72** (0.33-1.54) and **0.74** (0.54-1.01)/10,000/day respectively (WHO). Similarly U5MR and CMR rates were both within the **acceptable** levels at **1.79** (1.17 -2.73) and **0.98** (0.66 – 1.43) respectively in the agro-pastoral livelihood. Among the riverine CMR of 1.55 (1.08 – 2.22) and U5MR of 2.69

(1.54-4.68) were reported and they were both at **alert** levels. The most commonly reported causes of death included diarrhoea, suspected malaria and birth related complications.

Child feeding and care practices remain poor in the Juba regions. Exclusive breastfeeding is never practiced, while breastfeeding stops before the recommended 24 months and above. Overall, the assessment revealed a high level of morbidity in Juba regions where at least 51% of the assessed children had some form of illness in the two weeks prior to the assessment. The incidence of reported diarrhoea in pastoral, agro-pastoral and riverine populations (24.9%; 24.6% and 24.5% respectively) within two weeks prior to the assessment remained high. Equally, high incidences of ARI (17- 37%) and febrile illnesses/suspected malaria (31- 48%) were also reported in the three livelihoods. Rapid diagnostic test for *P. falciparum* show that malaria is endemic in juba valley with rates of 9.1%; 16.4% and 7.2% reported in the assessed pastoral, agro-pastoral and riverine populations. These levels were consistent with seasonal morbidity patterns recorded from the health facilities. Morbidity has direct relationship with malnutrition where illness lead to increased nutritional demands to repair worn out tissues and at the same time interfering with the intake, digestion, absorption and utilization of the nutrients in the body. Analysis continues to show strong significant association between acute malnutrition and morbidity rates. Children who had been ill within two weeks prior to the assessment, especially from diarrhoea were more likely to be acutely malnourished ($p < 0.05$).

Poor sanitation and lack of safe drinking water could explain the high prevalence of diarrhoeal diseases. Among the assessed households across the livelihoods more than half of the population does not have sanitation facilities such as latrines, while 49-70% does not have access to safe water.

Poor coverage for health programmes are important risk factors to poor nutrition situation in Juba region. Measles vaccination coverage for eligible children (9-59 months old) was still very low at only 43.4% as was coverage for vitamin A supplementation (44%) in the assessed pastoral population. Measles vaccination and vitamin A supplementation was equally low at 49.4% and 54.9% respectively among agro-pastoral. However, in the riverine livelihood, measles vaccination and vitamin A supplementation status were relatively higher at 73.4% and 74.6% respectively. Polio immunization status in the three livelihoods was higher at 78-85%. The relatively higher coverage for the three health programmes in the riverine zones is due to better access to these services from the humanitarian agencies operating in the area. Coverage for the health programmes (including polio immunization) fell below the recommended 95% level (Sphere, 2004) in the three livelihoods. Past studies have associated these programmes, with improved immunity. In this assessment the children from agro-pastoral and riverine livelihoods who had not received measles vaccination were more likely to be acutely malnourished as compared to those who had received the vaccination ($p < 0.05$).

An analysis of the post *Gu'08* food security situation indicate Juba regions as having had good rainfall performance with the exception of parts of Middle Juba region such as Sakow District, which experienced rain failure. The good rainfall performance had a positive impact, including increased water and pasture, improved livestock body conditions, increased access to milk from both the in-migrating livestock and those from within the regions. Households reported that milk consumption has improved after the rains, due to an increase in livestock productivity among the pastoral group. Middle Juba region experienced crop failure with overall cereal production in the region being 28% of PWA (1995-2007) while Lower Juba had good cereal production amounting to 88% of PWA. Overall, both Middle and Lower regions produced an estimated total of 7540 MT of cereals in *Gu'08* period.

However, results from the current assessments showed that 27.7% of the pastoral, 37.6% of agro-pastoral and 45.2% of the riverine population were consuming poorly diversified diets, which comprised of 3 or less food groups. The most commonly consumed food groups were cereals, sugar and oils/fat, while milk was mainly consumed among the pastoral and agro-pastoral livelihoods. The

main sources of food across livelihoods were purchase and own production. Food aid was the main source of food, especially cereals, to about 2% of the assessed households. Even though this study and past assessments do not show a significant association between acute malnutrition and dietary diversity in Somalia, reduced food intake is an immediate cause of acute malnutrition, and so acute malnutrition may be attributed to a combination of other intervening factors such as high morbidity, poor child feeding, and poor sanitation that negatively influences nutrition status.

Poor child feeding and poor access to health services remain the main underlying causes of acute malnutrition in Juba regions. Juba has experienced sporadic armed conflict for over 10 years with devastating effects on education, labour, food security and economic development in the region. Feeding practices for children are persistently poor, preventable diseases are prevalent and access to maternal and child care is suboptimal in the region. Exclusive breastfeeding for the first six months of life, introduction of appropriate complimentary food at six month of age and persistence in breastfeeding for up to 24 months and beyond is associated with proper growth and development and reduced risks of morbidity. These factors explain the serious to critical nutrition situation that has persistently been recorded in Juba regions .

Intervention efforts that address both immediate life saving needs especially for the acute malnutrition cases in addition to developing longer term strategies to enhance the provision of basic services, sustainable strategies for livelihood support and social protection mechanisms are recommended.

6.0 Recommendations

In spite of evidence of some recovery in the food security and nutrition situation in Juba, current results show persistence of unacceptable serious and critical levels of malnutrition. Intervention efforts, therefore, need to be strengthened and broadened to address both immediate life saving needs, in addition to developing longer term strategies to enhance the provision of basic services, sustainable strategies for livelihood support and social protection mechanisms. Specific recommendations include:

Immediate Interventions

- Improving coverage for health programmes, especially for measles vaccination, vitamin A supplementation and de-worming. Vigorous campaigns are required in Juba regions especially among the pastoral and agro-pastoral communities. Strategies used to achieve higher coverage in riverine livelihood could be borrowed.
- Rehabilitation of acutely malnourished children through selective feeding programs until household food security is restored and critical public health issues are addressed. All options to address this through effective and non-damaging measures need to be considered. Capacity building of the existing Health Facilities staff and the community to manage acutely malnourished children at community level could be explored.
- There is need to focus on programmes that improve and sustain dietary diversity and promote the consumption of micronutrient rich foods.
- Intervention programmes on water, sanitation and hygiene practices including health education should be encouraged
- Intervention programmes tailored to address the high rates of malnutrition among pregnant and lactating women are needed across livelihoods.

Long term Interventions

- There is a need for rehabilitation/protection of water systems including the well and water catchments (such as capping of wells) in anticipation of seasonal flooding. The community should be trained on sanitation of the water systems.

- Implementation of mechanisms for regular water treatment at the source as well as at the household level.
- Provision of large water containers for fetching and storage of water would contribute in easing water problems where people have to cover long distance to get water and yet they are unable to carry large volume of water.
- To initiate income generating activities to improve the socio-economic situation in Juba regions given that purchase is the main source of food.
- There is need for establishment or strengthening of health facilities and satellite services especially in rural villages where there are no health facilities to increase access for all
- Intensifying 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 practices.
- Canal rehabilitations, provision of irrigations pumps, fuel for irrigation and spare parts to the riverine communities in Juba Valley.
- Provision of sanitation facilities through community participatory approaches coupled with awareness campaign on the importance of using such facilities.

2									
3									
4									

Q16-27 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)	Q16 Sex 1=Male 2=Female	Q17 Oedema 1=yes 2= No	Q18 Height (cm) <i>To the nearest one tenth)</i>	Q19 Weight (kg) <i>To the nearest one tenth)</i>	Q20 MUAC (cm) <i>(Only if >11 months)</i> <i>To the nearest one tenth)</i>	Q21 Diarrhoea ¹¹ in last two weeks 1= Yes 2= No	Q22 Serious ARI ¹² in the last two weeks 1=Yes 2= No	Q23 Febrile illness/ suspected Malaria ¹³ in the last two weeks 1=Yes 2= No	Q24 (If ≥9 month) Suspected Measles ¹⁴ in last one month 1=Yes 2= No	Q25 Did child sleep under a mosquito net last night? 1=Yes 2= No	Q26 Where did you seek healthcare assistance when child was sick? (If yes in Q21 – 24) 1=No assistance sought 2=Own medication 3=Traditional healer 4=Private clinic/ Pharmacy 5= Public health facility	Q27 Which of the following programs has the child benefited from? 1= SFP 2= TFC 3= OTP/C 4= Other 5= None
1													
2													
3													
4													

28: 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:					

Codes for adult illnesses

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

Q 29 Food Consumption & Dietary Diversity

¹¹ Diarrhoea is defined for a child having three or more loose or watery stools per day

¹² ARI asked as oof wareen or wareento. The three signs asked for are cough, rapid breathing and fever

¹³ Suspected malaria/acute febrile illness: - the three signs to be looked for are periodic chills/shivering, fever, sweating and sometimes a coma

¹⁴ 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

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

Food group consumed: What foods groups did members of the household consume in the past 24 hours (from this time yesterday to now)? Include any snacks consumed.	Did a member of your household consume food from any these food groups in the last 24 hours? 1=Yes 2= No	*Codes: 1= Own production 2=Purchases 3=Gifts from friends/ relatives 4=Food aid 5=Bartered 6=Borrowed 7=Gathering/wild 8=Others, specify____ 9=N/A
Type of food		What is the main source of the dominant food item consumed? (Use codes above)?
1. Cereals and cereal products (e.g. maize, spaghetti, rice, caanjera, bread)?		
2. Milk and milk products (e.g. goat/camel/ fermented milk, milk powder)?		
3. Sugar and honey?		
4. Oils/fats (e.g. cooking fat or oil, butter, ghee, margarine)?		
5. Meat, poultry, offal (e.g. goat/camel meat, beef; chicken or their products)?		
6. Pulses/legumes, nuts (e.g. beans, lentils, green grams, cowpeas; peanut)?		
7. Roots and tubers (e.g. potatoes, arrowroot)?		
8. Vegetables (e.g. green or leafy vegetables, tomatoes, carrots, onions)?		
9. Fruits (e.g. water melons, mangoes, grapes, bananas, lemon)?		
10. Eggs?		
11. Fish and sea foods (e.g. fried/boiled/roasted fish, lobsters)?		
12. Miscellaneous (e.g. spices, chocolates, sweets, beverages, etc)?		
Q30 In general what is the <u>main</u> source of staple food in the household? (*Use codes in 29 above) _____		
Q31 Total number of food groups consumed in the household: _____		

Q32 How many meals¹⁵ has the household had in the last 24 hours (from this time yesterday to now)? 1= One 2=Two 3= Three

Q33-38 Access to water (quality and quantity)

¹⁵ 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

Q33a 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)

Q33b What is the household's main source of water for other domestic uses? _____ (Use codes in **Q33a** above)

Q34a Is drinking water drawn from a protected/safe source? 1= Yes 2= No

Q34b 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

Q34c Do you get a reliable supply of drinking water from this source? 1= Reliable supply 2= Seasonal supply 3= Occasional problems
4= Frequent problems

Q35 Is water treated at the: a) source? 1= Yes 2= No b) storage level? 1= Yes 2= No

Q35c 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

Q36 Average time taken to and from the nearest water point (including waiting and collecting time) 1= <30 min 2=30 – 60 min 3= 1-2 hrs 4= more than 2 hrs

Q37 Number of water collecting and storage containers of 10-20 litres in the household: 1=1-2 containers 2= 3-4 containers 3=4-5 containers
4= more than 5

Q38 How is water stored in the household? 1= Clean containers with cover 2= Closed plastic containers 3= open buckets/ pans 4= *Ashuun* (with constricted neck/end)

Q39-43 Sanitation and Hygiene (access and quality)

Q39a Type of toilet used by most members of the household 1= Bush/open ground 2= Traditional pit latrine/ Open pit 3= Ventilated Improved pit latrine (VIP) 4= Flush toilets

Q39b 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

Q40 Distance between latrine and water source (if underground or surface source) 1=1- 30 metres 2=30 metres or more

Q41 How many households share/use the same facility? 1= One 2= 2- 9 3= 10 or more

Q42 What key times do you maintain hygienic hand washing practices 1= before eating 2= before preparing food 3= before feeding the baby 4= after cleaning the baby's bottom 5= after defecation 6 = None /Not applicable

Q43 What substance do you use in your household for washing utensils, hands; body and clothes? 1= Soap/Shampoo 2= Sand 3= Ash 4= Plant extracts 5= None

Checked by supervisor (signed): _____

APPENDIX 4: TRADITIONAL CALENDAR

	SEASONS	2003	2004	2005	2006	2007	2008
January	Beginning of Jiilal		53 Carafo	41 Carafo	29 Carafo	17 Carafo	5 Carafo
February	Mid of Jiilaal		52 Sakow	40 Sakow Sakow market burnt	28 Sakow	16 Sakow	4 Sakow
March	End of Jiilaal		51 Safar	39 Safar	27 Safar	15 Safar	3 Safar
April	Beginning of Gu'		50 Mawlid Rabicol Awal	38 Mawlid Rabicol Awal	26 Riverine floods - Mawlid Rabicol Awal	14 Mawlid Rabicol Awal	2 Mawlid Rabicol Awal
May	Mid of Gu'		49 Iraq War Malmodone Rabicol Akhir	37 Malmo=done Rabicol Akhir	25 Rabicol Awal Malmodone	13 Rabicol Awal Malmodone	1 Rabicol Awal Malmodone
June	End of Gu'		48 Jamadul Awal	36 Jamadul Awal	24 Jamadul Awal	12 Jamaul Awal	
July	Beginning of Xagaa	59 Jamadul Akhir	47 jamadul Akhir Death of General Gabyoo	35 Jamadul Akhir	23 Jamadul Akhir	11 Jamadul Akhir	
August	Mid of Xagaa	58 Rajab	46 Rajab	34 Rajab	22 Rajab	10 Rajaba	
September	End of Xagaa	57 Shacbaan	45 Shacban	33 Shacban -World Vision moved from Buale reconciliation	21 Shacban	9 Shacban	
October	Beginning of Deyr	56 Soon	44 Soon Death of former Buale DC	32 Election of Somali President Abdulahi Yusuf	20 1 st food distribution by WV	8 Soon	
November	Mid of Deyr	55 Soonfur	43 Soonfur	31 Good deyr rain Soonfur	19 Soonfur	7 Soonfur	
December	End of Deyr	54 sidatal	42 Sidataal	30 Sidataal	18 Sidataal	6 Sidataal	

Appendix 5: Clusters Sampled for L & M Juba December 2007 Assessment

District	Name of the village	Clusters	Livelihood zone
Salagle	Hoogbalanqo	1	Riverine
Sakow	Buulafuur	2	Riverine
Sakow	Geedful+IDPs	3	Riverine
Bualle	BU'AALE	4	Riverine
Bualle	Naxariis	5	Riverine
Bualle	Shangaani	6	Riverine
Bualle	Raxoole	7	Riverine
Jilib West	Mareri	8,9	Riverine
Jilib West	Bardere yarey	10	Riverine
Jilib West	Kalanja	11	Riverine
Jilib East	JILLIB Town	12,13	Riverine
Jilib East	Mashaani	14	Riverine
Jilib East	Malenda +nomadic	15	Riverine
Jilib East	Cusmaan Mooto	16	Riverine
Jilib East	Bodboode	17	Riverine
Jilib East	Gumeeni	18	Riverine
Jilib East	Bandarjadiid 2	19	Riverine
Jamaame	Malaayleey	20	Riverine
Jamaame	Kawan	21	Riverine
Jamaame	Manamoofa	22	Riverine
Jamaame	Booriini xaaji muya	23	Riverine
Jamaame	Moofi	24	Riverine
Jamaame	Shongole	25	Riverine
Jamaame	Mashaqo	26	Riverine
Salagle	Buulahar	27	Pastoral
Salagle	Labiraaxo (Nomads)	28	Pastoral
Sakow	Towsi	29	Pastoral
Buale	Arabow	30	Pastoral
Buale	Waregta Kore	31	Pastoral
Afmadow	Afmadow	32,33,34,35,36,37	Pastoral
Afmadow	Bula fulay	38	Pastoral
Afmadow	Dhujumo	39	Pastoral
Afmadow	Tabta	40	Pastoral
Afmadow	Dobley	41,42,43,44,45,46,47	Pastoral
Afmadow	Diif	48	Pastoral
Kismayo	Kamjaron	49	Pastoral
Kismayo	Biroole	50	Pastoral
Badhadhe	Gora	51	Pastoral
Badhadhe	Didaadiy	52	Pastoral
Salagle	Salagle	53,54	Agropastoral
Salagle	Sargadudo	55	Agropastoral
Salagle	Hilfato	56	Agropastoral

Salagle	Shiitley	57	Agropastoral
Sakow	Sakow town	58,59,60	Agropastoral
Sakow	Uuroof/Waney	61	Agropastoral
Sakow	C/lebiley	62	Agropastoral
Sakow	Caleyow Kerrow	63	Agropastoral
Sakow	Bar Muumin Dhoorow	64	Agropastoral
Sakow	Buulagaduud	65	Agropastoral
Jilib West	Hargaisa	67	Agropastoral
Jilib West	Bilisa	68	Agropastoral
Jilib West	Gududei	69	Agropastoral
Jilib West	Baladul Kariim	70	Agropastoral
Jamame	Belet amiin	71	Agropastoral
Jamame	Turdho	72	Agropastoral
Jamame	warmareerta	73	Agropastoral
Jamame	Baarka	74	Agropastoral
Kismayu	Berhani	75	Agropastoral
Kismayu	Bulo Haji	76,77	Agropastoral
Badhadhe	Ramato	78	Agropastoral
Badhadhe	Kaamboni	79	Agropastoral
Hagar	Hagar town	66	Agropastoral

Appendix 5b. Juba Assessment Team – Dec 2007

Team	Names	Agency	Responsibility	Area Surveyed	
1	1	Najmo Ali Hussein	SRCS/FSAU data Ass.	Supervisor	Jilib west
	2	Ahmed Wacdi Mohamed	SRCS	Team leder	Jilib west
	3	Ibrahim Waraaq Ibrahim	SRCS	RDT Nurse	Jilib west
	4	Nasro Ahmed Mohamed	SRCS	Enumerator	Jilib west
	5	Abdirahman H. Mohamed	APD	Enumerator	Jilib west
2	1	Abdirashid warsame Hasan	JAF	Supervisor	Jilib East
	2	Hussien Abdi Borle	Community	Team leder	Jilib East
	3	Osman yarrow Hassn	SRCS	RDT Nurse	Jilib East
	4	Isse Munya Muganga	SRCS	Enumerator	Jilib East
	5	Marian Siraad yarow	SRCS	Enumerator	Jilib East
3	1	Hasan Mohamed Hasan	Muslim Aid Uk	Supervisor	Jamame East/West
	2	Abdirashid Sharif Abdirahman	Muslim Aid Uk	Team leder	Jamame East/West
	3	Faduma A. Muse	Muslim Aid Uk	RDT Nurse	Jamame East/West
	4	Mohamed salah Mohamud	Juba Foundation	Enumerator	Jamame East/West
	5	Mohamed Hashi Hersi	Muslim Aid Uk	Enumerator	Jamame East/West
4	1	Salaha Hussien Munye	AFREC	Supervisor	Kismayu
	2	Mohamed Abdi Narijin	Juba youth	Team Leader	Kismayu
	3	Rahmo Yusuf Dhaqane	AFREC	RDT Nurse	Kismayu
	4	Abdiasis Haji Ali	JAF	Enumerator	Kismayu
	5	Nastexo Cawil Hussien	JAF	Enumerator	Kismayu
5	1	Mohamed Dhaqane Moalim	Local health staff	Supervisor	Badhadhe
	2	Abdi Gedi Mohamed	DIAL	Team leder	Badhadhe
	3	Abdi Moge Hussien	SAF	RDT Nurse	Badhadhe
	4	Abdi Ahmed Hasan	DIAL	Enumerator	Badhadhe
	5	Ahmed Dirir Hasan	DIAL	Enumerator	Badhadhe
6	1	Aweys Sheikh Muxumed	FSAU data assisstant	Supervisor	Dhoble/Afmado
	2	Mohamed Yusuf Qodow	EIRG	Team leder	Dhoble/Afmado
	3	Deqo Sirad Ali	AFREC	RDT Nurse	Dhoble/Afmado
	4	Sahro Abdi Husein	EIRG	Enumerator	Dhoble/Afmado
	5	Ahmed Bashir Hagi	AFREC	Enumerator	Dhoble/Afmado
7	1	Muxiyidin Ahmed Abdi	SAF	Supervisor	Afmadou
	2	Ahmed Sheikh Mohamed	AFREC	Team leder	Afmadou
	3	Ibrahim Hasn Omar	AFREC	RDT Nurse	Afmadou
	4	Shakir Aden Muse	WRRS	Enumerator	Afmadou
	5	Salah Abdulahi Sanbul	APD	Enumerator	Afmadou
8	1	Mohamed Ibrahim Mohamed	WVI	Supervisor	Buale

	2	Mohamed Hasan Ali	WVI	Team leder	Buale
	3	Liban Abdi Sokar	WVI	RDT Nurse	Buale
	4	Moalin Ugaas Sagar	WVI	Enumerator	Buale
	5	Abdulahi Ahmed Hussien	Juba Youth	Enumerator	Buale
9	1	IbrahimAhmed Ibrahim	WVI	Supervisor	Saakow
	2	Abdulkadir Hasan Dhaqane	WVI	Team leder	Saakow
	3	Hassan Abdi Ali	WVI	RDT Nurse	Saakow
	4	Iman Hagi Shafat	WRRS	Enumerator	Saakow
	5	Sahro Abdirahman Ahmed	WVI	Enumerator	Saakow
10	1	Mohamed Shimoy Gure	WVI	Supervisor	Salagle/Sakow
	2	Siraji Ibrahim Ahmed	WVI	Team Leader	Salagle/Sakow
	3	Abdi Siraad Khalif	WVI	RDT Nurse	Salagle/Sakow
	4	Ahmednur Sheikh Mohamed	APD	Enumerator	Salagle/Sakow
	5	Abdi Ali Salad	WVI	Enumerator	Salagle/Sakow
	1	Joseph Waweru	FSAU, Nairobi	Coordinator/Data analysis & report writing	All
	2	Mohamed Borle	FSAU, Nairobi	Coordinator	All
	3	Ibrahim M. Mohamed	FSAU, Kismayu	Coordinator	All
	4	Fuad Hassan	FSAU, Buroa	Coordinator	All
	5	Mohamed Gani	FSAU, Galkacyo	Coordinator	All

APPENDIX 6: 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

	Pastoral	A gro-pastoral	Riverine
Digit Preference score-Weight	7(Acceptable)	5 (good)	6 (Acceptable)
Digit Preference score-Height	18 (poor)	11(poor)	11(acceptable)
Age preference	36,13	59,36	24, 36,48
SD of WHZ	1.21	1.11	1.08
Skewness of WHZ	0.64 (<1: normal)	071. (<1: normal)	0.34 (<1: normal)
Kurtosis of WHZ	1.14	1.56	0.44
Percent of flags	0	0	0
Age groups (6-29)	No bias	No bias	No bias
Age Groups(30-59)	No bias	No bias	No bias
Sex Ratio (M/F)	1.01	1.02	0.98
Overall score	7 (Acceptable)	8 (Acceptable)	6 (Acceptable)

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