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

In June 2007, FSAU and its partners[1] conducted an inter-agency nutrition assessment in Pastoral, Agropastoral and Riverine Livelihood Zones in Middle and Lower Juba Regions (with exception of Badhadhe and Kismayo districts, which were inaccessible to the assessment teams due to insecurity) in southwest Somalia. This was in response to the need to determine the levels of acute malnutrition 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 and measuring 65 cm (length) – 109.9 cm (height), and analyze the possible factors contributing to malnutrition, dietary diversity, morbidity, care practices and mortality rates in the specific livelihood systems in the regions.

Using a two-stage cluster sampling methodology, a total of 2770 children (919 from pastoral, 915 from agropastoral and 936 from riverine livelihoods) aged 6-59 months and with height of 65-109.9 cm from 1371 households (456 from pastoral; 443 from agropastoral and 472 from riverine livelihoods) were assessed. The mean household size was 6.4±2.4; 5.5±1.9 and 5.3±1.6 persons respectively in the Pastoral; Agropastoral and Riverine assessments while the respective mean number of the under fives per household was 2.2 ±0.9; 2.1 ±0.9 and 2.0 ±0.8.

The global acute malnutrition (GAM) rate (weight for height <-2 Z score or oedema) was **13.4%** (CI 11.0 – 15.8) and severe acute malnutrition (weight for height <-3 or oedema) was **1.3%** (CI: 0.5-2.1) including two (0.2%) oedema cases among the pastoral livelihood. A GAM rate of **10.3%** (CI: 8.0 - 12.5) and SAM rate of **1.4%** (CI: 0.6 – 2.3) with three (0.3%) oedema cases was recorded among the agropastoral livelihood. Riverine livelihood recorded the highest level of acute malnutrition (point prevalence) with a GAM rate of **15.6%** (CI: 13.5 -17.7) and a SAM rate of **3.4%** (CI: 2.4 – 4.4) including six (0.6%) oedema cases. The crude and U5 mortality rates were **0.85** (0.47 - 1.23) and **2.52** (1.00 - 4.04) respectively among the pastoral populations. Similar CMR and U5MR rates of **1.10** (0.79 -1.41) and **2.47** (1.27 – 3.68) respectively were reported in the agropastoral livelihood. Among the riverine population CMR of **1.98** (1.29 – 2.67) and U5MR of **3.01** (1.72 - 4.29) were reported.

When estimated using WHO Anthro (2005) Reference standards, slightly higher GAM rates and almost double SAM rates were reported. Pastoral livelihood reported GAM rates of **13.9%** (CI: 11.6 – 16.2) and SAM of **2.4%** (CI: 1.4 – 3.4). Agropastoral livelihood assessment reported GAM and SAM of **12.2%** (CI: 10.1 – 14.4) and **2.5%** (CI: 1.4 – 3.6) respectively; while among the riverine livelihood population a GAM of **17.1%** (14.6 – 19.6)[2] and SAM of **5.5%** (CI: 3.9 – 7.0) were reported. .

The nutrition situation in Juba Riverine region remains at ***Critical*** levels (GAM of 15.0 -19.9%), but on the borderline with Agropastoral and Pastoral livelihoods, which are classified as ***Serious*** (GAM of 10.0 – 14.9%) nutrition situation according to WHO standards. The confidence interval ranges overlap through all the three studies, indicating that there is no statistically significant difference in the rates of acute malnutrition between the three livelihood zones. Since the past nutrition assessments were conducted based either on administrative boundaries or covering part of the livelihood zones, it is not feasible to do a direct comparison of the current findings with past results. Nevertheless, integrated analysis shows a significant improvement from critical or very critical levels in three previous assessments especially among the pastoral and agropastoral livelihoods. The nutrition assessments conducted in Jilib Riverine in May 2006 recorded a **GAM rate** of **16.2%** (13.8 – 18.8) and **SAM rate** of **4.2%** (3.2 – 6.0) while the Bu'aale & Sakow districts nutrition assessment carried out in April 2006 recorded a very critical nutrition situation with a **GAM rate** of **21.9%** (19.3 – 24.8) and **SAM rate of 6.6%** (5.1 – 8.4). A nutrition assessment conducted at the same time in the pastoral

[1] UNICEF, World Vision, SRCS, Muslim Aid and Mercy USA

[2] Since the CIs do not overlap this indicates a statistically significant worse situation in the riverine than agropastoral livelihood.

dominated Afmadow and Hagar districts reported a GAM rate of **22.0**% (CI: 19.4 - 24.9%) and SAM rate of **4.2%** (CI: 3.0 – 5.8).

The crude and U5 mortality rates were **0.85** (0.47 - 1.23) and **2.52** (1.00 - 4.04) respectively among the pastorals. Similar CMR and U5MR rates of **1.10** (0.79 -1.41) and **2.47** (1.27 – 3.68) respectively were reported in the agropastoral livelihood. Among the riverine population CMR of **1.98** (1.29 – 2.67) and U5MR of **3.01** (1.72 - 4.29) were reported. The under five year mortality rates for the three assessments were above the emergency threshold of indicating a serious situation. For Crude Mortality Rate only the results for the pastoral population indicated acceptable levels with the other two above the emergency threshold of levels again indicating serious situation according to WHO standards. Most of the deaths were associated with diarrhoea, not surprising given the recall period was during the peak of the Acute Watery Diarrhoea (AWD) outbreak in the region.

High incidences of reported diarrhoea in Pastoral, Agropastoral and Riverine populations (24.7%; 16.6% and 13.2% respectively) within two weeks prior to the assessment consistent with seasonal morbidity patterns recorded from the MCHs remain to be key contributing factors to acute malnutrition and mortality. Furthermore, an outbreak of acute watery diarrhoea was reported during the assessment period with a total of 3,690 AWD cases with 208 related deaths (Case Fatality rate of 5.6%) reported in Juba Valley by end of June explaining the high diarrhoea related deaths. Overall, the assessment revealed high levels of morbidity in Juba valley region where 36-47% of the assessed children had some form of illness in the two weeks prior to the assessment. Morbidity has direct relationship with acute malnutrition where illness leads 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 a strong significant association between acute malnutrition and morbidity rates. Children who had been ill within two weeks prior to the assessment were more likely to be malnourished ($p<0.05$).

The overall improvements in the nutrition situation noted in Juba valley are associated with the positive impacts of the Gu ’06 rains and increased humanitarian support in Juba valley. Dietary diversity was reportedly high with between 83 and 96% of the households consuming four or more food groups in the previous 24 hours. In addition improved milk consumption (>90%) in pastoral and agropastoral households (slightly lower in riverine households; 64%) and recent supplies of cereals, pulses and oil in addition to own sorghum production could have contributed to improved dietary diversity and by extension to improved nutrition status. Humanitarian support in the form of food assistance and health services is also likely to have contributed to increased access to food and dietary intake especially in the riverine population. Nevertheless, this community’s dependence on external assistance, poor social support networks and low resilience to shocks (especially floods and crop failure) predisposes them to nutritional vulnerability.

The food security situation among the pastoral and agropastoral livelihoods has been improving following good Gu ‘07 season and households continue to benefit from good livestock body conditions for all species, high rates of calving, kidding and lambing; increased milk production; high livestock prices and favourable terms of trade. However, the situation in the riverine areas remains precarious due to severe flooding that delayed planting (some cultivable land still had standing water by the time of the assessment) and reliance on food aid. Following an integrated analysis after the Gu ’07 reduced numbers of populations were classified in Acute Food and Livelihood Crisis in the riverine and poor pastoral population with the remaining agropastoral and middle and wealthier pastoral population indicating improvement to **Chronically Food Insecure** with ongoing expectations for continuing improvements assuming good Deyr ’07/08 rains.

Poor coverage for health programmes are important risk factors to poor nutrition situation in the Juba Regions. Measles vaccination coverage for eligible children (9-59 months old) was very low at only 26.5% as was coverage for vitamin A supplementation (21.5%) in the assessed pastoral population. Among the assessed children in agropastoral livelihood less than half had received vitamin A supplements (22.2%) and measles vaccine in the last six months. Except for polio immunization, coverage the health programmes fell below the recommended 95% level (Sphere, 2004) in all the three livelihoods.

Table 1.1 SUMMARY OF THE FINDINGS

	Pastoral		**Agropastoral**		**Riverine**	
Indicator	N	**%**	**N**	**%**	**N**	**%**
Total number of households surveyed	456	100	443	100	472	100
Mean household size	6.4	SD=2.4	5.5	SD=1.9	5.3	SD=0.8
Total number of children assessed	919	100	915	100	936	100
Child sex: Males (boys)	474	51.6	481	52.7	489	52.2
Females (girls)	445	48.4	434	47.3	447	47.8
Global Acute Malnutrition (WHZ<-2 or oedema)	123	**13.4** (11.0 - 15.8)	94	**10.3** (8.0 - 12.5)	146	**15.6** (13.5 – 17.7)
Severe Acute Malnutrition (WHZ<-3 or oedema)	12	**1.3** (0.5 - 2.1)	13	**1.4** (0.6 - 2.3)	32	**3.4** (2.4 - 4.4)
Oedema	2	**0.2** (0.0 – 0.6)	3	**0.3** (0.0 – 0.7)	6	**0.6** (0.2 – 1.1)
GAM estimates by WHO Anthro (2005) Standards:	128	**13.9** (11.6 - 16.2)	112	**12.2** (10.1- 14.4)	160	**17.1** (14.6 – 19.6)
SAM estimates by WHO Anthro (2005) Standards:	22	**2.4** (1.4 - 3.4)	23	**2.5** (1.4 - 3.6)	51	**5.5** (3.9 - 7.0)
Global Acute Malnutrition (WHM<80% or oedema)	62	**6.7** (5.0 - 8.5)	63	**6.9** (5.0 – 8.8)	109	**11.6** (9.8-13.5)
Severe Acute Malnutrition (WHM<70% or oedema)	2	**0.2** (0.0 – 0.6)	7	**0.8** (0.3 – 1.3)	13	**1.4** (0.9 – 1.9)
Proportion of stunted children (HAZ<-2)	155	**16.9** (13.1-20.6)	367	**40.1** (35.0-45.3)	331	**35.4** (32.3-38.4)
Proportion of underweight children (WAZ<-2)	233	**25.4** (21.0-29.8)	329	**36.0** (31.3-40.6)	320	**34.2** (30.8-37.6)
Proportion of acutely malnourished pregnant women (MUAC≤23.0).	47	**39.2** (N=120)	61	**50.8** (N=120)	38	**31.9** (N=119)
Proportion of severely malnourished pregnant women (MUAC≤20.7)	17	**14.2**	14	**11.7**	8	**6.7**
Proportion of children reported to have diarrhoea in 2 weeks prior to assessment	227	24.7 (18.2-31.2)	152	16.6 (10.7-22.5)	124	13.2 (9.8-16.7)
Proportion of children reported to have ARI within two weeks prior to assessment	157	17.1 (11.7-22.5)	107	11.7 (8.2-15.2)	57	6.1 (12.5-17.3)
Children with fever/ suspected malaria in 2 weeks prior to assessment	278	30.3 (24.8-35.7)	243	26.6 (18.7-34.4)	213	22.8 (16.6-28.9)
Suspected measles within one month prior to assessment	37	4.2 (1.9 – 6.5)	15	1.7 (0.6 - 2.8)	14	1.6 (0.7 - 2.6)
Children (9-59 months) immunised against measles	233	26.5 (13.3-39.8)	431	48.6 (34.3-63.0)	656	75.8 (64.7-86.8)
Children who have ever received polio vaccine	877	95.4 (93.2-97.6)	855	93.4 (89.8-97.1)	924	98.7 (98.0-99.5)
Children who received vitamin A supplementation in last 6 months	198	21.5 (9.9 – 33.2	203	22.2 (14.4-30.0)	569	60.8 (47.7-73.8)
Proportion of households who consumed ≤3 food groups	73	16.0 (7.3-24.7)	74	16.7 (8.0-25.4)	18	3.8 (1.9-5.7)
Proportion of households who consumed ≥4 food groups	383	84.0 (75.3-92.7)	369	83.3 (74.6-92.0)	454	96.2 (94.3-98.1)

Proportion of children 6-24 months who are breastfeeding	149	55.2 (46.7-63.7)	137	51.1 (43.6-58.7)	207	58.6 (52.3-65.0)
Under five Death Rate (U5DR) as deaths/10,000/ day		**2.52** (1.00-4.04)		**2.47** (1.27-3.68)		**3.01** (1.72-4.29)
Crude Death Rate (CDR) as deaths/10,000/ day		**0.85** (0.47-1.23)		**1.10** (0.79-1.41)		**1.98** (1.29-2.67)

Insecurity, unemployment, stressed livelihoods, poor child feeding and poor access to health services remain the main underlying causes of acute malnutrition in Juba valley. 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.

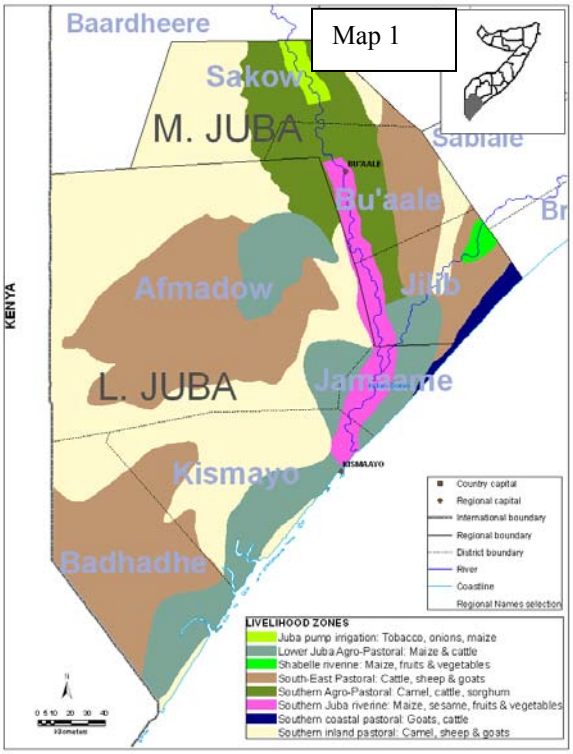
It should be emphasised that, in spite of this evidence of significant recovery in the food security and nutrition situation, the results continue to highlight that **the rates of acute malnutrition in Juba still remain at unacceptably serious and critical levels.** Intervention efforts, therefore, need 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.

1.0 INTRODUCTION

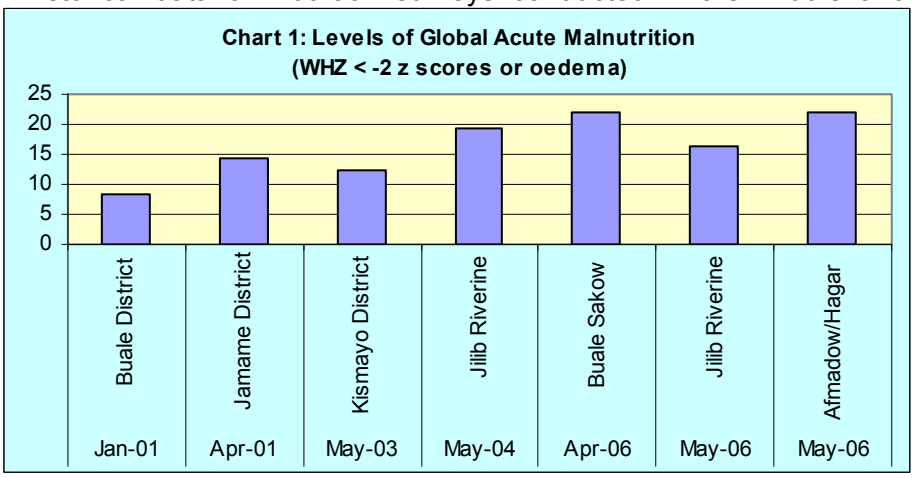
Historical Context

The Middle and Lower Juba Regions are located in the Juba Valley in Southern Somalia

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 [3]two regions is 624,667 and falls into five livelihood zones[4]: The Riverine, Pastorals, Agro-pastorals, Coastal and Urban.



Since the collapse of the Somali Central Government in 1991, South and Central Somalia including the Middle and Lower Juba Regions have faced a series of disasters, both natural (floods and droughts) and man-made (poor governance, sporadic armed conflict and widespread human rights abuses); The aftermaths of which have been limited resilience for parts of the population to recover from shocks. The FSAU Integrated Phase Classification series of Maps from 2004 highlights sustained Humanitarian Emergency (HE) or Acute Food and Livelihood Crisis (AFLC) in parts of the Middle and Lower Juba Regions. For the Riverine group, the humanitarian emergency situation has been sustained for over three years (indicated by the purple line). .

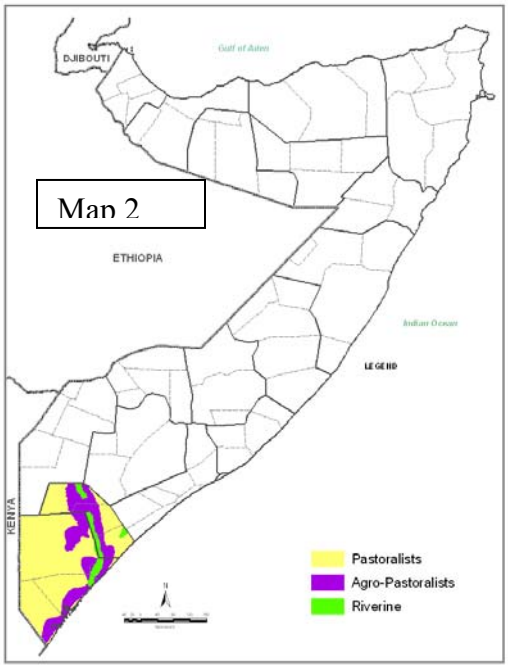


Historical data on nutrition surveys conducted in the Middle and Lower Juba Regions indicates serious-critical nutrition situation (WHO classification) with global acute malnutrition levels ranging from 10-22.0%, Weight for height z scores, WHZ, or presence of bilateral oedema from 2001 to current ( ). Whereas a direct comparison between assessments is not possible due to the varying location and timings of the assessments, with the exception of Buale District assessment (January 2001), these trends illustrate a persistent serious - critical nutrition situation with results of >10%, being reported throughout 2001 to date. However, of note is the downward trend in the prevalence of acute malnutrition in 2007.

[3] Middle Juba has a population size of 385,790 and Lower Juba of 238, 877
[4] The Baseline Profiles are currently being revised by FSAU

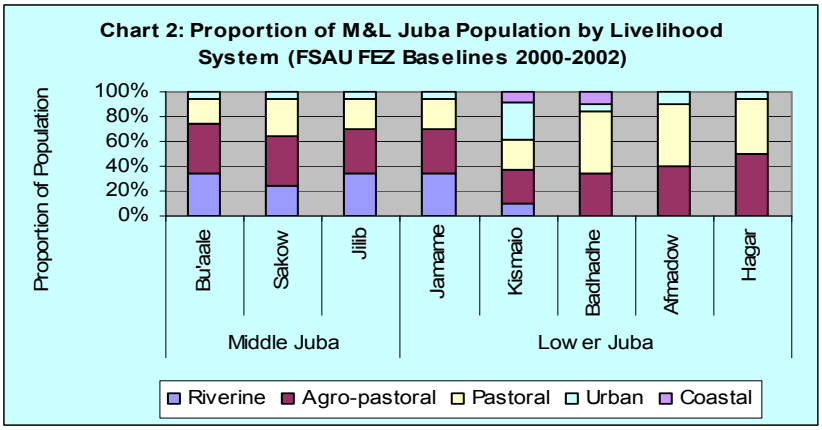
The Food Security Context

The **pastoral** livelihood system is [5]predominant 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. Livestock, especially cattle, are normally traded in Kenya, with good prices during the [6] and season as well as the beginning of the [7] (January – March). Pastoralists are most vulnerable to malnutrition and food insecurity during drought or in the dry seasons of and when there is little or no access to pasture and/or water to sustain their livestock; or when the Kenyan border is closed, restricting their access to livestock markets.



The second most important livelihood system is the Agro pastoral practiced by 29.4% of the Juba Valley population. **Agro-pastorals** combine livestock rearing (cattle, camel; shoats) with agricultural (maize and sorghum) production. The Agro-pastoral crop fields depend on rain or [8] for water. During the cultivation period (and rainy seasons), animals are moved away from the farming area resulting in reduced access to milk. In the dry season livestock are moved towards and riverine areas, with core households remaining at home. Depending on the type and size of crop establishments and livestock stocks at their disposal, Agro Pastorals may have more options for dealing with shocks that predispose them to nutrition and food insecurity.

The **Riverine** livelihood group constitutes of pure farmers who live within three kilometers 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 and 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 group of Kismayo and Badhadhe undertake fishing and collect lobsters for food and income generation as their main livelihood. They are mostly vulnerable to nutrition and food insecurity in June



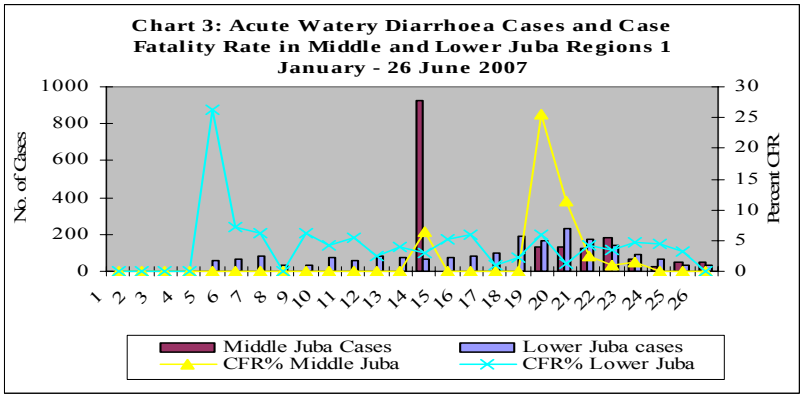
[5] FSAU Livelihoods Baseline Profile, 2000.
[6] *Gu* refers to the long rains (April – June) while *Deyr* refers to the short rains (October-December) seasons.
[7] *Jilaal* refers to the hot and dry (January - March) season; *Hagar* refers to the cool and dry (July – September) season
[8] *Dheshek* refers to water holding depressions, where recessional cropping is commonplace

– September when the sea is rough and fishing becomes dangerous. highlights the proportions of the Juba population by livelihood.

The FSAU Post Deyr '06/07 analysis[9] estimated a total of 280,000 people in the Middle and Lower Juba Regions to be in a state of Humanitarian Emergency (110,000) or Acute Food and Livelihood Crisis (170,000), and in dire need of humanitarian assistance or livelihood support. This was a slight reduction in the total number requiring some form of assistance from the **Post Gu'06** when a total of 297,000 people were identified to be in need. The improvement was also reflected in a general shift from HE to AFLC from 210,000 in HE and 87,000 in AFLC during [10]. In general, the food, livelihood and nutrition situation for pastoralists improved due to the good rainfall of and exceptionally good Deyr'06/07 rains.

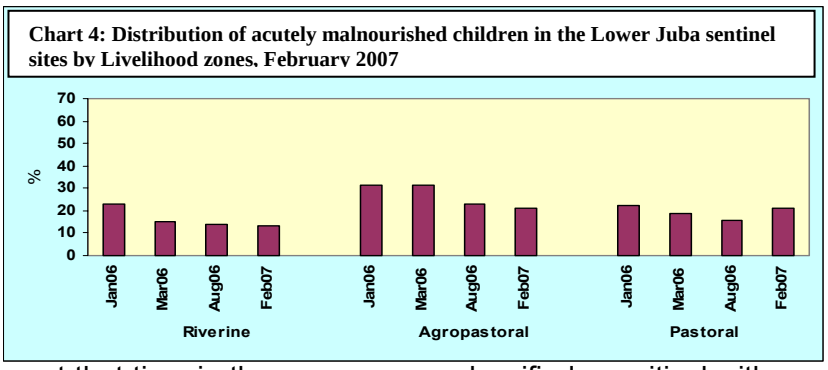
Health context

As mentioned earlier, the Juba Regions are highly susceptible to flooding and thus to water bourne disease. In 2007 there has been a wide spread epidemic of Acute Watery Diarrhoea (AWD) throughout the country with no exception in the Juba Region. provides a summary of AWD cases and CFR in Middle and Lower Juba Regions from January 1st – June 26th, 2007 (Source of Data: WHO AWD June 28th Update). 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 have been reported in the same period with a lower, yet still concerning, CFR of 4.35%. provides a summary of AWD cases and CFR in Middle and Lower Juba Regions from January 1st – June 26th, 2007 (Source of Data: WHO AWD June 28th Update). One of the biggest challenges in the Juba's is the delivery of humanitarian assistance which, when delivered in a timely manner, can greatly reduce the fatalities associated with AWD. However limited access by humanitarian actors, due to the ongoing insecurity and poor road conditions, prevent the needs of the population being met.



Nutrition Context

The overall nutrition situation in Middle and Lower Juba indicated a slight improvement for most of the areas in the period six months prior to the last post analysis possibly associated with the positive impacts of the rains and other mitigating factors such as increased humanitarian support. However localised areas of deterioration were reported with an increase in seasonal morbidity trends. In addition ongoing risks of conflict and disease in lower Juba were still of concern. Therefore the nutrition situation at that time in these areas was classified as critical with an



[9] FSAU 2006/07 Post Deyr Analysis. Technical Series V.12; March 2007
[10] FSAU 2006 Post Gu Analysis. Technical Series V.9; September 2006

uncertain trend for the following months. The most recent sentinel site surveillance data[11] indicated that the nutrition situation in these areas is consistent with the food security analysis classified as Critical in the Pastoral and Agro pastoral populations and Very Critical in the Riverine populations. Additional information from Maternal and Child Health Centres showed similar trends in acute malnutrition in the regions. Communicable diseases especially the acute watery diarrhoea outbreak aggravated the nutrition situation as highlighted above. Therefore in order to determine the current nutrition situation, FSAU and partners[12] conducted three nutrition assessments in Juba valley (Middle and Lower Juba) in June 2007 based on three main livelihood systems:- Pastoral, Agro pastoral and Riverine livelihood systems ( ). The two stage cluster sampling technique of 30 by 30 was used. Hence 915 -936 children were assessed at household level, while retrospective mortality assessment was conducted in 901-906 households (irrespective of whether or not they had an under five) in each assessment.

In general, the food, livelihood and nutrition situation for both pastoralists and agropastoralists improved due to the good rainfall of Gu'06 and exceptionally good Deyr'07/07 rains. However, the situation in the riverine populations remained critical and deteriorating due to the compounding impacts of the previous drought characterised by four consecutive seasons of low crop production and a socially marginalised population with limited access to social support, as well as severe flooding during the season leading to crop destruction and displacements.

The Historical timeline of events in the Middle and Lower Juba Regions and their potential contribution to the sustained ***Serious*** nutrition situation is provided in the table below.

[11] FSAU Nutrition Update March 2007
[12] UNICEF, WVI, SRCS and Muslim Aid

Historical Timeline of Events In Middle and Lower Juba Regions and Their Potential Contribution to The Sustained Serious Nutrition Situation

Year	Events And Potential Risk Factors for Acute Malnutrition	Nutritional Status Outcome
1991	• Collapse of the Somalia Central Government and with it, governance problems and sporadic armed conflict in the Middle and Lower Juba Regions. This led to widespread human rights abuses, interruption to normal livelihood practices and reduced access to food and health care services. • Heavy fighting and insecurity in Kismayo leads to heavy looting of crops, livestock and assets in the surrounding areas. • The Gu rains are average but the Deyr rains failed. This marks the beginning of drought conditions reported in parts of South and Central Somalia and leads to reduced availability of meat, milk and milk products for consumption, livestock deaths and crop failure. • Massive displacement of people within Somalia and across the border into refugee camps in Kenya in search of assistance • Food Economy Baseline Profile (2000): **A Poor – Medium year**	
1992	• Ongoing insecurity across the two Juba Regions limits access for humanitarian actors • Drought and famine conditions continue in the South. Total collapse of livelihoods following massive livestock deaths (limiting access to meat, milk and milk products for consumption) and crop failure. This leads to high numbers of internally displaced populations within the region and across the border to Kenya • ICRC provides relief food in region • 'Operation Restore Hope', UNITAF, commences in Somalia December 1992 • FSAU Baseline Profile: **A Bad year**	
1993	• Ongoing insecurity and fighting with populations Kismayo and Sakow badly affected • UNISOM takes over from 'Operation Restore Hope' (UNITAF) in May, enabling humanitarian food assistance to commence in South Somalia, including the Middle and Lower Juba regions. UNISOM sponsors 'Kismayo Airport Juba land reconciliation'. • End of the drought. Improved rainfall leading to increased production in both agriculture and livestock sectors • A cholera outbreak in the Juba Valley mainly in the Agro pastoral and pastoral areas which kills large numbers of people • FSAU Livelihood Profile: **A Normal-Good year**	
1994	• UNISOM's continued presence in Somalia • The Somali Aid Coordination Body established to coordinate humanitarian response in Somalia • UNHCR coordinates refugee repatriation movement from Kenya to Juba • The Absame tribe peace conference is held in Dobley • Medium rains are received, pasture becomes available and livestock conditions and production are good. Crop production is good and prices of food commodities normal across the regions.	

	• FSAU Baseline Profile: **A Good year**	
1995	• UNISOM withdraws from Somalia due to heightened insecurity. • UNHCR repatriates Middle and Lower Juba refugees from Kenyan camps • Gu & Deyr rainfall failure causing crop failure and poor livestock condition • FSAU Baseline Profile: **A Good year**	
1996	• Average crop production but very poor livestock condition • Massive livestock slaughter due to disease (suspected severe Foot and Mouth Disease) and drought. • Southern Somalia is classified as a humanitarian emergency zone by the UN Appeal for 1996/97 • Refugee movement to Kenya • FSAU Baseline Profile: **A Bad year**	
1997	• El-Nino rains, increasing water and pasture availability, resulting in good livestock production in the short term. However, with continued heavy rains, large numbers of people, shoats and camel deaths occur. An unknown camel disease leading to Carmel deaths is reported. • The persistently heavy rains cause serious floods, deaths and extensive damage to infrastructure and property. Hundreds of thousands of people are displaced and significant crops and livestock lost. Flood recession commences towards the end of the year. • Communicable disease outbreaks mainly, malaria and acute watery diarrhoea, causing high mortality are reported • FSAU Baseline Profile: **A Mixed Year**	
1998	• Rift valley fever outbreak in Juba Valley following El-Nino floods • The Saudi Arabian Government, the main importer of Somalia's livestock imposes a ban due to RVF. This leads to reduced income access options for Somalia including Middle and Lower Juba Regions • Pasture and water availability normal • High infestation of birds and rats severely attack crop causing major damage. Suspected anthrax and tick borne diseases attack livestock. • There is serious clan fighting in Sakow District from November 1998-April 1999. • FSAU Baseline Profile: **A Mixed year**	
1999	• Battle for control of Kismayo continues • Normal Gu rains and production but the Deyr is below normal • FSAU Baseline Profile: **A Normal Year**	

2000	• There is unusual live-stock migration from Kenya, M&L Juba to the Juba riverine areas for pastures and water, due to the drought • Crop and livestock production are low • The livestock ban imposed by the gulf countries in 1998 on Somali livestock due to Rift Valley Fever (RVF) still in place • FSAU Baseline Profile: **A Normal Year** •	
2001	• Continued unusual livestock migration to the Juba riverine areas for pastures and water, due to the drought • Closure of the Kenya- Somalia border due to conflict and insecurity in the Juba areas • Disrupted trade link between Juba Valley and Mogadishu due to fighting in the riverine areas • FSAU Baseline Profile: **A Bad Year** •	• FSAU/UNICEF Bu'aale District Survey **GAM rate of 8.4%** (W/H <-2z score or oedema) • FSAU/UNICEF Jamame District survey (April 2001): **GAM rate of 14.3%** (W/H <-2z score or oedema)
2002	• Poor Deyr '01/02 rains lead to significant crop failure and out-migration of livestock in search of water and pasture. There is significant loss of assets especially in the poor wealth groups and cereal prices become extremely high and inaccessible for majority of the poor • Light Gu rains lead to an improvement in water and pasture availability, and crop production. Cereal prices reduce with the Gu harvest and become accessible. • FSAU Baseline Profile: **A Very Bad Year**	• Afmadow Town (FSAU April 2002), Rapid MUAC assessment with **9.5%** identified as acutely malnourished (N=200) with MUAC (<12.5cm or oedema) • Hagar Town (FSAU April 2002), Rapid MUAC assessment with **10.5%** identified as acutely malnourished (MUAC < 12.5 cm) • Jilib District, 8 villages (FSAU October 2002), Rapid MUAC assessment with **14.6%** identified as acutely malnourished with MUAC < 12.5 cm (N=365)
2003	• Poor Deyr 02/03 performance in Afmadow and Hagar but average - normal in the riverine areas • Food insecurity situation following poor Gu 2003 rains. (• Insecurity disrupts seasonal migration of agro pastoralists and pastoralists to grazing areas, leading to food insecurity in these groups	• Kismayo District survey (May 2003): **GAM rate of 12.2%** (W/H <-2z score or oedema) • Jilib riverine villages (FSAU, July 2003): **MUAC assessment identified 28% as acutely malnourished** (MUAC<12.5 or oedema). • Jilib riverine villages (FSAU, Oct 2003**): MUAC assessment identified 14.8% as acutely malnourished** (MUAC<12.5 or oedema). • Kismayo IDP rapid assessment (FSAU, March 2003): **21%** identified as acutely malnourished (MUAC< 12.5 cm or oedema).
2004	• **The FSAU Post Gu '04** Analysis: 54,000 people in the riverine community of the Middle Juba are faced with a **Humanitarian Emergency** and 61,000 with **a Livelihood Crisis** due to chronic and on-going civil insecurity. Consecutive seasons of near crop failure, unaffordable food prices, limited income earning opportunities, and limited social	• FSAU/UNICEF: Jilib riverine survey (May 2004): GAM rate of **19.5%** (W/H <-2z score or oedema) and U5MR of **5.4**/10,000/day • FSAU Post Gu Integrated Nutrition

	support networks have pushed this fragile group into a state of humanitarian emergency. An additional 59,000 agro-pastorals and pastorals face a livelihood crisis in Afmadow and Jamame Districts. • Therapeutic and supplementary feeding programs by MSFH on-going in Marere, Jilib District	Situation Analysis indicates: **A Critical Nutrition Situation** coupled with high disease burden (
2005	• **FSAU Post Deyr '04/05** Analysis: o Juba Riverine areas are of significant concern due to the continuing and chronic state of Humanitarian Emergency, with an estimated 83,000 people in a state of **Humanitarian Emergency** with no improvement since the previous FSAU assessment in Sept '04. o Excessive rains and river floods destroyed more than half of the maize production. Civil insecurity, the main underlying cause of the areas vulnerability, continues to disrupt economic activities and undermine people's livelihoods food security and well being • **FSAU Post Gu '05** Analysis: o 116,000 people in the Middle and Lower Juba Valley are in a state of **Chronic Humanitarian Emergency**, with a further 20,000 in a state of **Acute Livelihood Crisis**. o The deteriorating situation of the Juba Riverine communities is attributed to the devastating floods during the May-June 2005 which destroyed standing crops (including fruit trees) and underground granaries or bakaars, submerged farmers and villages, destroyed feeder roads and cut-off settlements and villages from the main towns and markets. o The pastoral and agro pastoral populations in the Juba valley region in a state of **Alert.** • Therapeutic and supplementary feeding programs by MSFH on-going in Marere, Jilib District	• FSAU Post Deyr 04/05 Integrated Nutrition Situation Analysis indicates **A Critical** Nutrition Situation in M&L Juba and **Very Critical Nutrition** in the Riverine areas • FSAU's first round of sentinel sites conducted in 8 sites in **Juba** indicate levels of acute malnutrition of >15% WHZ or oedema. • Bu'aale riverine (Sukeyla village) (FSAU, July 2005): MUAC assessment identified **27.4% as acutely malnourished** (MUAC <12.5cm or oedema)
2006	• **FSAU Post Deyr'05/06** Analysis: o An estimated 235,000 people in Middle and Lower Juba face a **Humanitarian Emergency** and 110,000 face an **Acute Food and Livelihood Crisis** as a result of prolonged **drought** that has led to crop failure and loss of livestock. All livelihood systems are affected. Juba Riverine community are now faced with 'Sustained **Humanitarian Emergency'** for preceding 3 years. o The Middle and Lower Juba are also hosting a large number of people from north eastern Kenya and Gedo, who have migrated into the area and have settled around strategic boreholes and water points along the Juba River. • **FSAU Post Gu'06** Analysis: 210,000 in Middle and Lower Juba Regions are faced with a **Humanitarian Emergency** and 87,000 an **Acute Food and Livelihood Crisis** o The overall performance of the Gu rains throughout the season was poor, both in intensity and distribution over time and geographically, despite some improvement in pasture and browsing conditions in the hinterland. Water availability is critical. Many pastoralists and agro pastoralists have migrated towards the riverine and coastal areas in search of water due to water shortages and high competition for resources from in-	• FSAU Post 05/06 Integrated Nutrition Situation Analysis indicates **A Critical Nutrition Situation** coupled with high disease burden in the Middle Juba and a serious nutrition situation in the Lower Juba areas o Jilib Riverine Nutrition assessment (May 06) indicates a critical situation with **GAM rate of 16.2%** (w/h<-2 z score or oedema); o Afmadow Hagar Districts Nutrition Assessment (May 06) with **GAM rate of 22.0 %** • Bu'aale, Sakow Apr-06 Districts Nutrition Assessment with **GAM rate of 21.9%** (w/h<-2 z score or oedema) • FSAU Post Gu'06 Integrated Nutrition Situation Analysis indicates **Critical -**

	migrated livestock from the Gedo and North-eastern Kenya. o Middle and Lower Juba regions have also experienced a third consecutive season of cereal crop failure. As a result, households stocks are extremely low, leading to increased staple food prices and poor access to food for most of the poor households in these regions. • Therapeutic and supplementary feeding programs by MSFH in Marere, Jilib District on-going.	**Very critical** in Middle and Lower Juba
Jan-June 2007	• **FSAU Post Deyr '06/07** Analysis: o A total of 110, 000 people in **Humanitarian Emergency** and 170,000 in **Acute food and Livelihood Crisis.** o The humanitarian situation of the riverine populations in Juba Valley is critical and deteriorating due to the compounding impacts of the previous drought and severe flooding this season leading to total maize crop failure though some off season production is expected from March '07 onwards. Of the riverine population in the Juba Valley, 106,000 people are in a state of **Humanitarian Emergency** and 12,000 are in a state of **Acute Food and Livelihood Crisis**. Of these, in Middle Juba, 66,000 people are in Humanitarian Emergency and 5,000 in Acute Food and Livelihood Crisis and in Lower Juba, 40,000 people are in a state of Humanitarian Emergency and 7,000 in Acute Food and Livelihood Crisis. In the pastoral and agro pastoral areas, the food, livelihood and nutrition situation has improved since the Gu'06. Pastoral recovery continues due to the good rainfall of the Gu'06 and the exceptionally good rainfall of the Deyr 06/07. • Acute watery diarrhoea cases indicating a declining trend in South Central Somalia except for Middle Juba. Additionally, whereas Middle Juba reported 5% of all the cases for Jan-June 29th, 2007, the highest CFR of 7.16% was also reported here ( ) • Therapeutic and supplementary feeding programs by MSFH on-going in Marere, Jilib District	• FSAU Post Deyr 06/07 Integrated Nutrition Situation Analysis indicates a **Critical** in Middle and Lower Juba, and a **Very Critical** situation in the Riverine • FSAU led Nutrition Assessments in June 2007 o M&L Juba Riverine: **GAM rate** of **15.4% (13.4-17.4)** (WHZ < -2 or oedema) o M&L Juba Pastorals: **GAM rate** of **13.4% (CI: 11.0-15.8)** WHZ < -2 or oedema) o Juba Agro-Pastorals: **GAM rate** of **10.2%** (**CI: 8.0-12.4**) WHZ < -2 or oedema

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 acute 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 or with height/length of 65-109.9cm in the three livelihood groups of Pastoral, Agropastoral and Riverine in Juba valley.
2. To estimate the level of acute malnutrition among women aged 15-49 years in the three livelihood groups of Pastoral, Agropastoral and Riverine in Juba valley.
3. To identify factors influencing nutritional status of the children in the three livelihood groups of Pastoral, Agropastoral and Riverine in Juba valley.
4. To estimate the prevalence of some common diseases (measles, diarrhoea, febrile illnesses and ARI) in the three livelihood groups of Pastoral, Agropastoral and Riverine in Juba valley.
5. To estimate the measles and polio vaccination and Vitamin A supplementation coverage among children in the three livelihood groups of Pastoral, Agropastoral and Riverine in Juba valley.
6. To assess child feeding and care practices in the three livelihood groups of Pastoral, Agropastoral and Riverine in Juba valley.
7. To estimate the crude and under-five mortality rates in the three livelihood groups of Pastoral, Agropastoral and Riverine in Juba valley.

3.0 METHODOLOGY

Three cross-sectional assessments were conducted among the Pastoral; Agropastoral and Riverine populations of in Middle and Lower Juba Regions covering across all the districts – Afmadow/ Hagar; Buale; Sako/Salagle; Jilib and Jamame except Badhadhe and Kismayo districts, which were inaccessible to the assessment teams due to insecurity.

Two-stage cluster (30 by 30) sampling methodology was used to select 30 children aged 6-59 months and height/length of 65-109.9 cm from each of the 30 clusters in each livelihood. A list of all settlements/villages/towns within each of the three assessed livelihoods in the regions with their respective populations[13] formed a sampling frame and was used to construct cumulative population figures for the assessment area from which 30 clusters were randomly drawn for each livelihood zone . Retrospective mortality data was collected from 30 households in each cluster from each livelihood including those that did not have children aged 6-59 months.

Both qualitative and quantitative data collection techniques were used. Quantitative data was collected through a standard household questionnaire for nutrition assessment (appendix 1a) and a standard mortality questionnaire (appendix 2). Quantitative data collected included household characteristics; child anthropometry, morbidity; vitamin A supplementation, measles and polio immunization coverage; dietary diversity; and water and sanitation. Qualitative data was collected by an interagency team comprising of assessment supervisors and coordinators through focus group discussions and key informant interviews to provide further understanding of possible factors influencing nutritional status.

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), 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 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 Nutrisurvey software.

Quality checks using ENA/ Nutrisurvey software were conducted and results are included in the annexes.

[13] Due to lack of UNDP population figures at settlement level, NID polio figures (March 2007) further verified by the assessment team were used for sampling.

4.0 ASSESSMENT RESULTS

4.1 Household Characteristics of Study Population

The three livelihood-based nutrition assessments covered a total of 1371 households (456 from pastoral; 443 from agropastoral and 472 from riverine livelihoods) with mean household sizes of 6.4±2.4; 5.5±1.9 and 5.3±1.6 persons respectively in the Pastoral; Agropastoral and Riverine livelihoods. A total of 2770 children (919 from pastoral, 915 from agropastoral and 936 from riverine livelihoods) aged 6-59 months and with height of 65-109.9 cm from were assessed with respective mean number of 2.2 ±0.9; 2.1 ±0.9 and 2.0 ±0.8 under fives per household. The household characteristics by livelihood are presented in Table 4.1 below.

Table 4.1: Household Characteristics

Total Households	456	100	443	100	438	100
Household size (Mean):	6.4	SD=2.4	5.5	SD=1.9	5.3	1.6
Mean No of Under fives	2.2	SD=0.9	2.1	SD=0.9	2.0	SD=0.8
Male	387	84.9	379	85.6	405	85.8
Female	69	15.1	64	14.4	67	14.2
Yes	254	55.7	221	49.9	406	86.0
No	202	44.3	222	50.1	66	14.0
GFSOM	150	59.1	197	89.1	369	90.9
Other	95	37.4	21	9.5	32	7.9
Not seen	9	3.5	3	1.4	5	1.2
Animal and its products sales	315	69.1	65	14.7	0	0
Crop sales	0	0	289	65.2	366	77.5
Trade	36	7.9	4	0.9	26	5.5
Casual labour	79	17.3	45	10.2	66	14.0
Salaries/wages	5	1.1	9	2.0	3	0.6
Remittances	21	4.6	31	7.0	11	2.3

The results showed that at least 85% of the assessed households were male-headed. Majority (86%) of the assessed households in riverine population had mosquito nets, 91% of which were distributed by the Global Fund Somalia programme. However, only 50% and 56% of the agropastoral and pastoral households respectively had mosquito nets.

The major source of income for the assessed households in the pastoral and agropastoral livelihoods were sale of animal and animal products; and sale of crops respectively as expected. Among the riverine livelihoods also, crop sales (77.5%) was the main source of income at the time of assessment (Table 4.1). Casual labour provided supplementary income in all the livelihoods. Gu seasonal cultivation and off season cultivation (in the riverine) in the farms along the river beds and pump-irrigated farms provided casual labour to the poor households. Qualitative information showed that the riverine population had the weakest social support network and this could partly be explained by the lowest number (2.3%) of households receiving remittances.

4.2 Morbidity, immunization and Health Seeking Behaviour

High morbidity rates were reported in the three livelihoods of pastoral (46.6%); agropastoral (40.3%) and riverine (36.2%) populations of children under five years.

For the children who fell sick within the two weeks prior to the assessment, the majority of those who (>50%) sought medical assistance, were mostly from public health facilities (in agropastoral and riverine populations). Among the pastoral populations assistance was mostly sought from private drug shops or clinics (Table 4.4).

Yes	428	46.6	369	40.3	339	36.2
No	491	53.4	546	59.7	597	70.0
Public health facilities	81	18.9	99	26.8	185	54.6
Private pharmacy/clinic	228	53.3	84	22.8	50	14.7
Traditional healers	22	5.1	7	1.9	14	4.1
Own medication	28	6.5	9	2.4	26	7.7
No assistance sought	69	16.1	170	46.1	64	18.9

The incidence of reported diarrhoea in Pastoral, Agropastoral and Riverine populations (24.7%; 16.6% and 13.2% respectively) within two weeks prior to the assessment remained high. High incidences of ARI and febrile illnesses (suspected malaria) were also reported in the three livelihoods (Table 4.5). These levels were consistent with seasonal morbidity patterns recorded from the MCHs. Furthermore, an outbreak of acute watery diarrhoea was reported during the assessment period with a total of 3690 AWD cases[14] with 208 related deaths (Case Fatality rate of 5.6%) reported in Juba Valley by end of June.

	Pastoral		**Agropastoral**		**Riverine**	
	n	**%**	**n**	**%**	**n**	**%**
Proportion of children with diarrhoea in 2 weeks prior to assessment	227	24.7	152	16.6	124	13.2
Proportion of children with ARI within 2 weeks prior to assessment	157	17.1	107	11.7	57	6.1
Children with febrile illness in 2 weeks prior to assessment	278	30.3	243	26.6	213	22.8
Children who slept under bed net	477	51.9	431	47.1	806	86.1
Suspected measles within one month prior to assessment	37	4.2	15	1.7	14	1.6
Children (9-59 months) immunised against measles	233	26.5	431	48.6	656	75.8
Children who have ever received polio vaccine	877	95.4	855	93.4	924	98.7
Children who received vitamin A supplementation in last 6 months	198	21.5	203	22.2	569	60.8

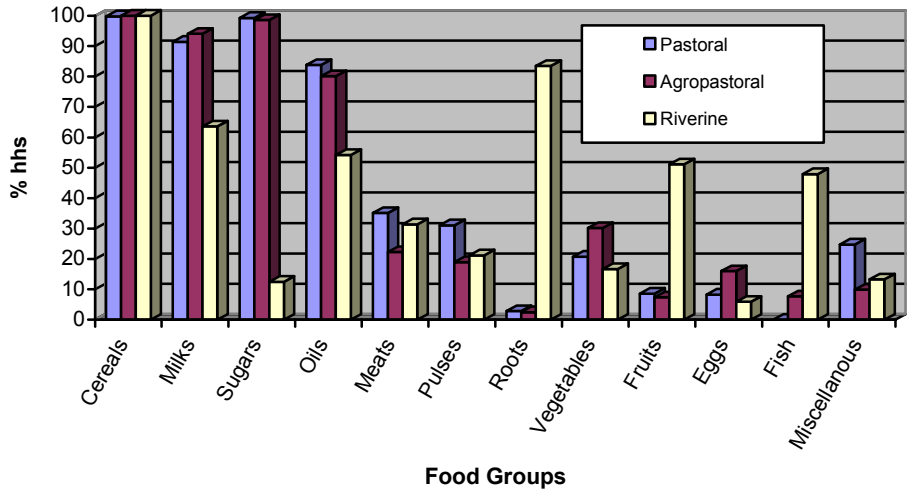
Measles vaccination coverage for eligible children (9-59 months old) was very low at only 26.5% as was coverage for vitamin A supplementation (21.5%) in the assessed pastoral population. Among the assessed children in agropastoral livelihood less than half had received vitamin A supplements (22.2%) and measles vaccine in the last six months. Except for polio immunization, coverage the health programmes fell below the recommended 95% level (Sphere, 2004) in all the three livelihoods.

[14] WHO Acute watery diarrhoea update, 30th June 2007

4.3 Household Food Security

4.3.1 Food Consumption

As shown on figure 4.3.1, cereals provided the bulk of the food in the household diet. Cereal-based diets were consumed by all the assessed households. Other food items frequently consumed were milk, sugar an oil/fat. The riverine population had a distinct consumption pattern reporting high consumption of roots/tubers (83.5%); fruits (51.1%) and fish (47.9%), but considerably lower consumption of milk (63.6%) and sugar (12.5%) than the other livelihood groups.



The riverine households grow and consume fruits (oranges, lemon, and mangoes) and vegetables (onions, tomatoes, pumpkins). Some families also fish from the river. Consumption of other food groups (fruits, vegetables, eggs, roots and fish were very low in the other livelihoods.

	Pastoral		Agropastoral		Riverine	
	n	%	n	%	n	%
Purchasing	285	62.5	87	19.6	78	16.5
Own production	46	10.1	308	69.5	234	49.6
Food aid	119	26.1	47	10.6	160	33.9
Gifts	3	0.7	1	0.2	0	0.0
Bartering	2	0.4	0	0.0	0	0.0
Gathering	1	0.2	0	0.0	0	0.0
Purchasing	250	54.9	48	10.8	47	10.0
Own production	52	11.4	351	79.2	246	52.1
Food aid	137	30.1	42	9.5	175	37.1
Gifts	7	1.5	2	0.5	2	0.4
Bartering	3	0.7	0	0.0	0	0.0
Borrowing	6	1.3	0	0.0	2	0.4
Purchasing	156	37.4	188	45.1	64	21.3
Own production	256	61.4	229	54.9	235	78.3
Gifts	5	1.2	0	0.0	1	0.3

Purchasing was the main households' source of food (mainly cereals) for the pastoralists. However, majority of agropastoral (69.5%) and riverine (49.6%) households produced their own food.

This was unlike in the previous year when most of the households surveyed obtained their food through purchasing or food aid. This is linked to improved pasture and off season harvest after the Deyr '06/07 rains. However, food aid still contributed a significant proportion (11-34%) of the

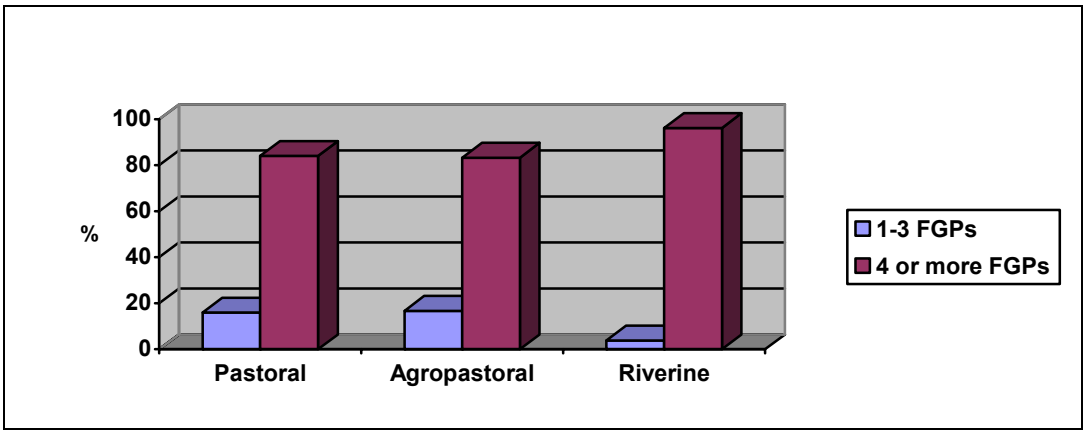
households source of food in this assessment (Table 4.7).

4.3.2 Dietary Diversity

As reflected in the food consumption pattern, the riverine households consumed a more diversified diet (96.2%) with six food groups the most frequently consumed (reported in 25.6% of the households); mean dietary diversity score of 5.9 ±1.5 within the previous 24 hours. Pastoral and agropastoral households consumed an average (HDDS) of 5 food groups with the number of food groups consumed ranging from two to nine.

	Pastoral		Agropastoral		Riverine	
	n	%	n	%	n	%
_						
2 food groups	6	1.3	10	2.3	4	0.8
3 food groups	67	14.7	64	14.4	14	3.0
4 food groups	141	30.9	121	27.3	72	15.3
5 food groups	91	20.0	104	23.5	101	21.4
6 food groups	47	10.3	80	18.1	121	25.6
7 food groups	51	11.2	47	10.6	100	21.2
8 food groups	41	9.0	16	3.6	33	7.0
9 food groups	12	2.6	1	0.2	23	4.9
10 food groups	0	0.0	0	0.0	2	0.4
11 food groups	0	0.0	0	0.0	2	0.4
1-3 food groups	73	16.0	74	16.7	18	3.8
≥ 4 food groups	383	84.0	369	83.3	454	96.2
Mean HDDS	5.1 (SD=1.7)		4.9 (SD=1.4)		5.9 (SD=1.5)	

As shown in Fig 4.3.2, overall, a large majority (83-96%) of the households consumed diversified diets[15] in the 24 hours prior to the assessment.



[15] Composed of at least four food groups based on a total of 12 FAO food groups.

4.4 Nutritional Status

4.4.1 Acute Malnutrition by Livelihoods

A total of 919 children, 51.6% boys and 48.4% girls (sex ratio = 1.1) aged 6-59 months were assessed from 456 households among the pastoral livelihoods (mean household size = 6.4 ± 2.4). In the agropastoral livelihood, 915 children (52.7% boys and 47.7% girls; sex ratio 1.1) were assessed from 443 households (mean household size = 5.5 ± 1.9) while 936 children (52.2% of them boys and 47.8% girls; sex ratio 1.1) were assessed from 472 sampled households. The results shows ***Serious*** nutrition levels according to WHO classification with GAM rates of **13.4%** (CI: 11.0 – 15.8) and **10.3%** (CI: 8.0 – 12.5); and SAM rates of **1.3%** (CI: 0.5 – 2.1) and **1.4%** (CI: 0.6 – 2.3) respectively among the assessed pastoral and agropastoral populations. However the nutrition situation in riverine livelihood remains ***Critical*** with GAM and SAM rates of **15.6%** (CI: 13.5 – 17.7) and **3.4%** (CI: 2.4 – 4.4). A summary of the findings for the acute malnutrition rates is given in table 4.10.

Global Acute Malnutrition (WHZ<-2 or oedema)	123	**13.4** (11.0 - 15.8)	94	**10.3** (8.0 - 12.5)	146	**15.6** (13.5 – 17.7)
Severe Acute Malnutrition (WHZ<-3 or oedema)	12	**1.3** (0.5 - 2.1)	13	**1.4** (0.6 - 2.3)	32	**3.4** (2.4 - 4.4)
Oedema	2	**0.2** (0.0 – 0.6)	3	**0.3** (0.0 – 0.7)	6	**0.6** (0.2 – 1.1)
GAM estimates by WHO Anthro (2005) Standards:	128	**13.9** (11.6 - 16.2)	112	**12.2** (10.1- 14.4)	160	**17.1** (14.6 – 19.6)
SAM estimates by WHO Anthro (2005) Standards:	22	**2.4** (1.4 - 3.4)	23	**2.5** (1.4 - 3.6)	51	**5.5** (3.9 - 7.0)
Global Acute Malnutrition (WHM<80% or oedema)	62	**6.7** (5.0 - 8.5)	63	**6.9** (5.0 – 8.8)	109	**11.6** (9.8-13.5)
Severe Acute Malnutrition (WHM<70% or oedema)	2	**0.2** (0.0 – 0.6)	7	**0.8** (0.3 – 1.3)	13	**1.4** (0.9 – 1.9)
Proportion of stunted children (HAZ<-2	155	**16.9** (13.1-20.6)	367	**40.1** (35.0-45.3)	331	**35.4** (32.3-38.4)
Proportion of underweight children (WAZ<-2)	233	**25.4** (21.0-29.8)	329	**36.0** (31.3-40.6)	320	**34.2** (30.8-37.6)

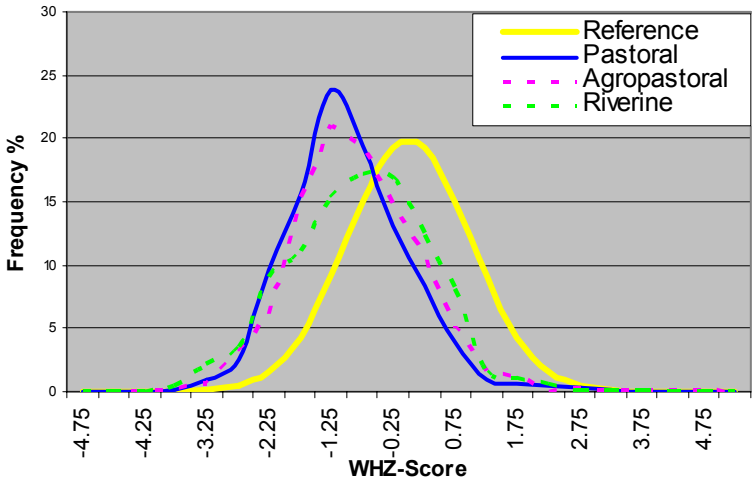
When estimated using WHO Anthro (2005) Reference standards, slightly higher GAM rates and almost double SAM rates were reported. Pastoral livelihood reported GAM rates of **13.9%** (CI: 11.6 – 16.2) from **13.4%** (CI: 11.0 – 15.8) and SAM rates of **2.4%** (CI: 1.4 – 3.4) from **1.3%** (CI: 0.5 – 2.1), an increase of 3.6% and 84.6% respectively due to the varied reference standards. Agropastoral livelihood assessment reported a GAM rate of **12.2%** (CI: 10.1 – 14.4) from **10.3%** (CI: 8.0 – 12.5) and a SAM rate of **2.5%** (CI: 1.4 – 3.6) from **1.4%** (CI: 0.6 – 2.3), an increase of 18.4% and 78.6% respectively; while among the riverine livelihood population a GAM rate of **17.1%** (14.6 – 19.6)[16] and a SAM rate of **5.5%** (CI: 3.9 – 7.0) were reported indicating 9.6% and 61.8% increase in GAM and SAM rates respectively.

[16] Since the CIs do not overlap this indicates a statistically significant situation in the riverine than agropastoral livelihood.

Generally, the distributions of the weight-for-height scores in the three Juba livelihoods 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, agropastoral and riverine livelihoods were -0.98 (SD=0.95); -0.84 (SD=1.05) and -0.79 (SD=1.13) respectively.

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

Fig. 4.4.1 WHZ Distribution Curve - Juba 07



4.4.2 Acute Malnutrition by Sex in the three Livelihoods

GAM (WHZ<-2 /oedema)	81	17.1	42	9.4	52	10.8	42	9.7	84	17.2	62	13.9
SAM (WHZ<-3 /oedema)	9	1.9	3	0.7	6	1.2	7	1.6	22	4.5	10	2.2
Oedema	1	0.2	1	0.2	1	0.2	2	0.5	3	0.6	3	0.7

For reasons that need further investigation, boys were more likely to be malnourished (RR= 1.81; CI: 1.23 – 2.65; p=0.0007) in the surveyed population using weight for height <-2 Z score or presence of oedema in the pastoral livelihood with about 17.1% of boys and 9.4% of girls acutely malnourished. However, results of acute malnutrition among the agropastoral and riverine livelihoods did not show any statistical difference between the two sexes (p>0.05) even though a higher proportion of boys (10.8% in agropastoral and 17.2% in riverine) than girls (9.7% in agropastoral and 13.9% in riverine) were acutely malnourished (Table 4.11). Furthermore, children from male-headed and female-headed households did not show any statistically significant difference in their risk to malnutrition.

4.4.3 Malnutrition by Age in the three Livelihoods

6-17	3 (1.7%)	21 (11.7%)	3 (1.8%)	22 (13.4%)	4 (2.0%)	32 (16.1%)
18-29	3 (1.4%)	26 (11.9%)	4 (2.0%)	17 (8.5%)	15 (6.5%)	44 (19.0%)
30-41	1 (0.4%)	32 (14.2%)	5 (2.4%)	24 (11.6%)	10 (4.1%)	37 (15.2%)
42-53	4 (2.2%)	23 (12.8%)	0 (0.0%)	12 (6.5%)	3 (1.7%)	25 (13.8%)
54-59	1 (0.9%)	21 (17.9%)	1 (0.6%)	19 (11.9%)	0 (0.0%)	8 (9.9%)
Total	12 (1.3%)	123 (13.4%)	13 (1.4%)	94 (10.3%)	32 (3.4%)	146 (15.6%)

Analysis of distribution of malnutrition between the different age groups showed that all the groups equally had the risk of malnutrition. The breastfeeding age group 6-24 months and the 25-59 months category showed no statistical difference in malnutrition rates among them ($p>0.05$). Equally there was no statistical difference ($p>0.05$) in malnutrition levels among the 6-29 months and 30-59 months age bands.

4.4.4 Acute Malnutrition by MUAC

	N= 820		N= 842		N=805	
GAM (MUAC< 12.5 cm or oedema)	27	**3.3** (1.6-5.0)	26	**3.1** (1.8 – 4.3)	71	**8.8** (7.0 – 10.6)
SAM (MUAC< 11.0 cm or oedema)	2	**0.2** (0.0 - 0.6)	6	**0.7** (0.1 - 1.3)	19	**2.4** (1.4 - 3.3)
	N=120		N=120		N=119	
Total malnourished (MUAC< 23.0 cm)	47	**39.2** (30.4 – 47.9)	61	**50.8** (38.9 -62.8)	38	**31.9** (23.0 - 40.9)
Severely malnourished (MUAC≤ 20.7 cm)	17	**14.2** (6.5 – 21.9)	14	**11.7** (4.8 – 18.6)	8	**6.7** (1.7 – 11.8)
	N=375		N=376		N=377	
Total malnourished (MUAC≤ 18.5 cm)	6	**1.6** (0.5 – 2.7)	3	**0.8** (0.0 – 1.7)	4	**1.1** (0.0 – 2.3)
Severely malnourished (MUAC< 16.0 cm)	2	**0.5** (0.0 – 1.3)	0	**0.0**	2	**0.5** (0.0 – 1.3)

Based on MUAC measurements, acute malnutrition rates (MUAC< 12.5 cm or oedema) of 3.3% (CI: 1.6 – 5.0); 3.1% (CI: 1.8 – 4.3) and 8.8% (CI: 7.0 – 10.6) were reported in Pastoral; Agropastoral and Riverine livelihoods respectively (Table 4.13) indicating serious malnutrition situation in pastoral and agropastoral areas and critical[17] situation in the riverine areas. The MUAC results though identifying fewer children as acutely malnourished when compared to the WFH indicators were generally consistent with weight –for-height estimates of malnutrition.

Among the assessed women; high malnutrition rates were recorded among the pregnant women (MUAC< 23.0 cm) ranging from 31.9% in Riverine to 50.8% in the agropastoral livelihood system. A high proportion of pregnant women were also severely (MUAC<20.7 cm) at risk of malnutrition as indicated in Table 4.13. Pregnancy raises physiological and nutritional demands of women making them more vulnerable to malnutrition. Low malnutrition rates were recorded among the non pregnant women. These rates appear higher than is other areas in Somalia therefore require close analysis to understand the underlying causes.

[17] According to the FSAU Nutrition Indicators and Categorization Table

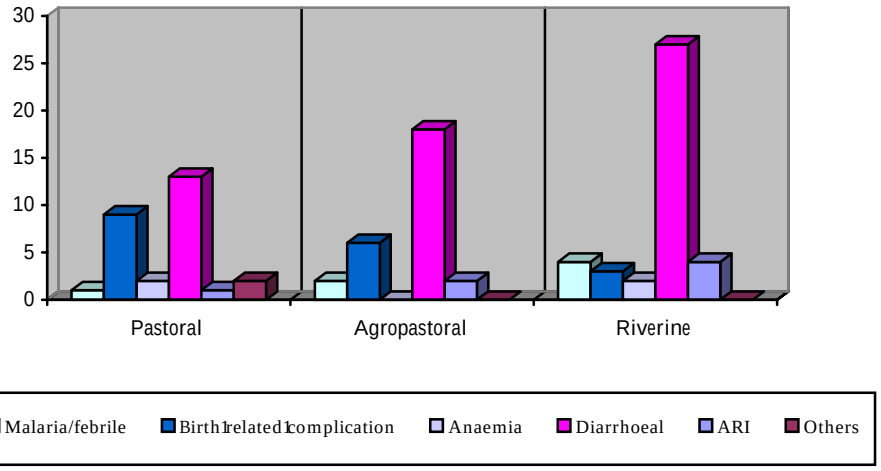
4.5 Mortality

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.

	U5	Total	U5	Total	U5	Total
Total HHs surveyed		906		901		905
Total Population assessed in HHs	1269	4995	1273	4583	1488	4575
Number who joined the HHs	22	250	4	36	8	60
Number who left the HHs	13	250	24	187	5	104
Number of births		87		79		55
Number of deaths	28	38	28	46	40	82
Mortality rate	**2.52** (1.00–4.04)	**0.85** (0.47 – 1.23)	**2.47** (1.27 – 3.68)	**1.10** (0.79 – 1.41)	**3.01** (1.72 – 4.29)	**1.98** (1.29 – 2.67)

The crude and U5 mortality rates were estimated at 0.85 (0.47-1.23) and 2.52 (1.00-4.04) respectively among the pastorals. CMR and U5MR rates of 1.10 (0.79 -1.41) and 2.47 (1.27 – 3.68) respectively were reported in the agropastoral livelihood. Among the riverine CMR of 1.98 (1.29 – 2.67) and U5MR of 3.01 (1.72-4.29) were reported (Table 4.14). Except for pastoral CMR, both CMR and U5MR were above the alert thresholds in all the livelihoods indicating a serious situation.

Fig 4.4.2 Reported Causes of Mortality in U5s in Gedo



As shown on figure 4.4.2, diarrhoeal diseases, suspected malaria, birth related complications (poor birth outcome) an 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. It should be noted that the mortality recall period covered the months of March to June that experienced the AWD outbreak with one of the highest Case Fatality Rates of 7.16% and 4.35% in Middle and Lower Juba regions respectively, explaining the high diarrhoea related deaths.

5.0 DISCUSIION

6. 0 RECOMMENDATIONS

It should be emphasised that, in spite of this evidence of significant recovery in the food security and nutrition situation, the results continue to highlight that **the rates of acute malnutrition in Juba have still remain at unacceptably serious and critical levels.** Intervention efforts, therefore, need to be strengthened and broadened to address both immediate life saving needs in addition to developing

Q15-25 Anthropometry and morbidity for children aged 6 – 59 months or (65 – 109.9cm) in the household

First Name	Q15 Child Sex	Q16 Oedema	Q17 Height (cm)	Q18 Weight (kg)	Q19 MUAC (cm)	Q20 Diarrhoea[21] in last two weeks	Q21 Serious ARI[22] in the last two weeks	Q22 Febrile illness/ suspected Malaria[23] in the last two weeks	Q23 **(If ≥9 month)** Suspected Measles[24] in last one month	Q24 Did child sleep under a mosquito net last night?	Q25 Where did you seek healthcare assistance when child was sick? **(**If yes in ***Q20 – 23)***
1											
2											
3											
4											

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

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

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

[21] Diarrhoea is defined for a child having three or more loose or watery stools per day

[22]

[23] illness: - the three signs to be looked for are periodic chills/shivering, fever, sweating and sometimes a coma

[24]

Q 27 Food Consumption & Dietary Diversity

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

Food group consumed: What foods groups did members of the household consume in the past 24 hours (from this time yesterday to now)? Include any snacks consumed.	Did a member of your household consume food from any these food groups in the last 24 hours**?**	1= Own production 2=Purchases 3=Gifts from friends/ relativeses 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)?		
2. Milk and milk products		
3. Sugar and honey?		
4. Oils/fats		
Meat, poultry, offal		
6. Pulses/legumes, nuts ?		
7. Roots and tubers		
8. Vegetables		
9. Fruits ?		
10. Eggs?		
11. Fish and sea foods		
12. Miscellaneous		

Q28 In general what is the <u>main</u> source of staple food in the household? _____

Q29 Total number of food groups consumed in the household: _____

Q30 How many meals[25] has the household had in the last 24 hours (from this time yesterday to now)? 1= One 2=Two 3= Three

Checked by supervisor *(signed)*: _____

[25] *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*

Appendix 2: Juba Valley Mortality Questionnaire, June 2007

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

No.	**1**: First Name	**2**: Sex *(1=M; 2=F)*	**3**: Age (yrs)	**4**: Born since **__ / 3/ 2007**	**5**: Arrived since **__ / 3/ 2007**	**6**: Reason for leaving	**7**: Cause of death
a) How many members are present in this household now? List them.							
b) How many members have left this household (out migrants) since **March __, 2007**? List them							
c) Do you have any member of the household who has died since **March __, 2007**? List them							

Codes

Reason for migration

1= Civil Insecurity
2= Food Insecurity
3= Employment
4=Divorce/ Married away
5=Visiting
6= Hospitalised
7= In boarding school
8= Grazing/herding
9= Other, specify

Cause of death

1= Diarrhoeal diseases
2= ARI
3= Measles
4= Malaria
5= STD/ HIV/AIDS
6= Anaemia
7= Birth complications
8= Accident/ killed/ physical injuries
9= Hunger/starvation
10= Other, specify

Summary*

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

** For Supervisor Only*

APPENDIX 3: TRADITIONAL CALENDAR

Month	Events	2002	2003	2004	2005	2006	2007
Jan.	Beginning of Jiilal		51 Siditaal	39 Siditaal	27 Siditaal Safari park retreat	15 Siditaal	3 Carafo
Feb.	Mid of Jiilaal		50 Arafo/Dul-Xaj	38 Arafo/Dul-Xaj	26 Arafo/Dulxaj	14 Arafo/Dulxaj Sheikh Indhocaadde-Baidoa attack	2 Seko
Mar.	End of Jiilaal		49 Sako	37 Sako	25 Sako	13 Sako/Safar Sheikh Ibrahim Bardera ceremony	1 Safar
Apr.	Beginning of Gu'		48 Safar	36 Safar	24 Safar	12 Safar/Mawliid	Safar/ Mowliid
May	Mid of Gu'	59 Mawlid	47 Mawlid	35 Mawlid	23 Mawlid	11 Mawlid/Jamadul-awal.	
Jun.	End of Gu'	58 Malmadoone/ Milihore	46 Malmadoone/ Milihore	34 Malmadoone/ Milihore	22 Malmadoone/ Milihore	10 Malmadoone/ Milihore/Jamadul-awal	
July	Beginning of Xagaa	57 Jamadul-Awal/	45 Jamadul-Awal/	33 Jamadul-Awal/	21 Jamadul-Awal/	9 Jamadul-Awal/	
Aug.	Mid of Xagaa	56 Jamadul-Akhir/	44 Jamadul-Akhir/	32 Jamadul-Akhir/	20 Jamadul-Akhir/	8 Jamadul-Akhir/	
Sep.	End of Xagaa	55 Rajab/Shacbaan	43 Rajab/Shacbaan	31 Rajab/Shacbaan	19 Rajab/Shacbaan	7 Rajab/Shacbaan	
Oct.	Beginning of Deyr	54 Shacbaan	42 Shacbaan	30 Shacbaan/ Ramadan	18 Shacbaan/ Ramadan Election of president Abdulahi Yusuf in Kenya.	6 Ramadan	
Nov.	Mid of Deyr	53 Soon **(Ramadhan)**	41 Soon **(Ramadhan)**	29 Soon **(Ramadhan)**	17 Soon **(Ramadhan)**	5 Soonfur	
Dec.	End of Deyr	52 Soon fur	40 Soonfur	28 Soonfur	16 Soonfur	4 Sidatal	

Appendix 4: Clusters Sampling for Gedo 2007 assessment

Juba's Pastoral Clusters

Geographical unit	Population size	Assigned cluster	District
Hassan marid	350	1	Sakow
Cashirow leysaan	485	2	Sakow
Nafsooy	200	3	Sakow
Caroogleey	640	4	Salagle
Arabow	1100	5	Bu'aale
Buulagalool	575	6	Bu'aale
Wareegta kore	650	7	Bu'aale
Afmadow	12500	8,9,10,11,12,13,14,15	Afmadow
Guri Jab	700	16	Afmadow
Go'doonka	400	17	Afmadow
Qoqani	1200	18	Afmadow
Tabta	1600	19	Afmadow
Dobley	16000	20,21,22,23,24,25,26,27,28	Afmadow
Diif	2000	29,30	Afmadow

Juba Agropastoral Clusters

Geographical unit	Population size	Assigned cluster	District
salagle	6525	1,2	Salagle
iswaroy	970	3	Salagle
sheekh daahir	410	4	Salagle
buulo yuu	485	5	Salagle
Gubakibir	540	6	Salagle
aliyow galdhow	925	7	Salagle
sakow	10500	8,9,10,11	Sakow
qeydcayuusi	705	12	Sakow
gaduudey	875	13	Sakow
cashsrow leysan	485	14	Sakow
caliyow kerow	600	15	Sakow
towsi waaf	265	16	Sakow

basra	775	17	Sakow
hagar town	3680	18,19	Hagar
ulo dabadeer	450	20	Hagar
hargeisa yarey	4000	21	Jilib
bilisa	2550	22	Jilib
gududey	5540	23,24	Jilib
kamsuuma	2000	25	Jamaame
baladul amiin	2262	26	Jamaame
bandar jadiid	1175	27	Jamaame
aqabataa	300	28	Jamaame
buulo abo	400	29	Jamaame
baarka	1300	30	Jamaame

Juba Riverine Clusters

Geographical unit	Population size	Clusters		District
Madmadobe	385			SALAGLE
Reersabo	400		1	SALAGLE
Gurmeyso	1100		2	Sakow
B/Dhatoo	235		3	Sakow
BU'AALE	7500	4,5,		Bu'aale
Duguia lantar	525		6	Bu'aale
Qardhaale	635		7	Bu'aale
Raxoole	845		8	Bu'aale
Bula sheikh	870		9	Jilib
Mareri	5650		10	Jilib
Mobleyn	400		11	Jilib
Bardere yarey	2100		12	Jilib
Kalanja	1600		13	Jilib
JILLIB	11520		14,15,	Jilib
Mubaarak	1665		16	Jilib
Fanoole + nomadic	1050		17	Jilib
Dhaydhay + IDPs	550		18	Jilib
Waagaade	1035		19	Jilib
Barakamajiido	805		20	Jilib
Bandar Salaam	480		21	Jilib
Sandaria	315		22	Jilib
Araare	1200		23	Jamaame
Lakane 1	500		24	Jamaame
Manamoofo	1950		25	Jamaame
Mogaanboo	2700		26	Jamaame
Moofi	2600		27	Jamaame

Miigwa	1700	28	Jamaame
Kamatiireey	1230	29	Jamaame
Barka dhuroo	900	30	Jamaame
	52445		
Cluster interval	**4400**		
Random number	**3776**		

Appendix 4b: Juba 2007 Assessment Team

Survey Coordination Team:
- Tom Oguta – FSAU Nutrition Project Officer
- Mohamed Borle– FSAU Nutrition Project Officer

FSAU Field Nutrition Staff
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- Sicily Matu - FSAU Senior Nutrition Project Officer
- Joseph Waweru - FSAU Nutrition Project Officer
- Mohamed Borle - FSAU Nutrition Project Officer
- World Vision Somalia
- UNICEF Somalia

APPENDIX 5: REFERRAL FORM FOR MALNOURISHED CHILDREN

Name of the village: _____ Date:_____

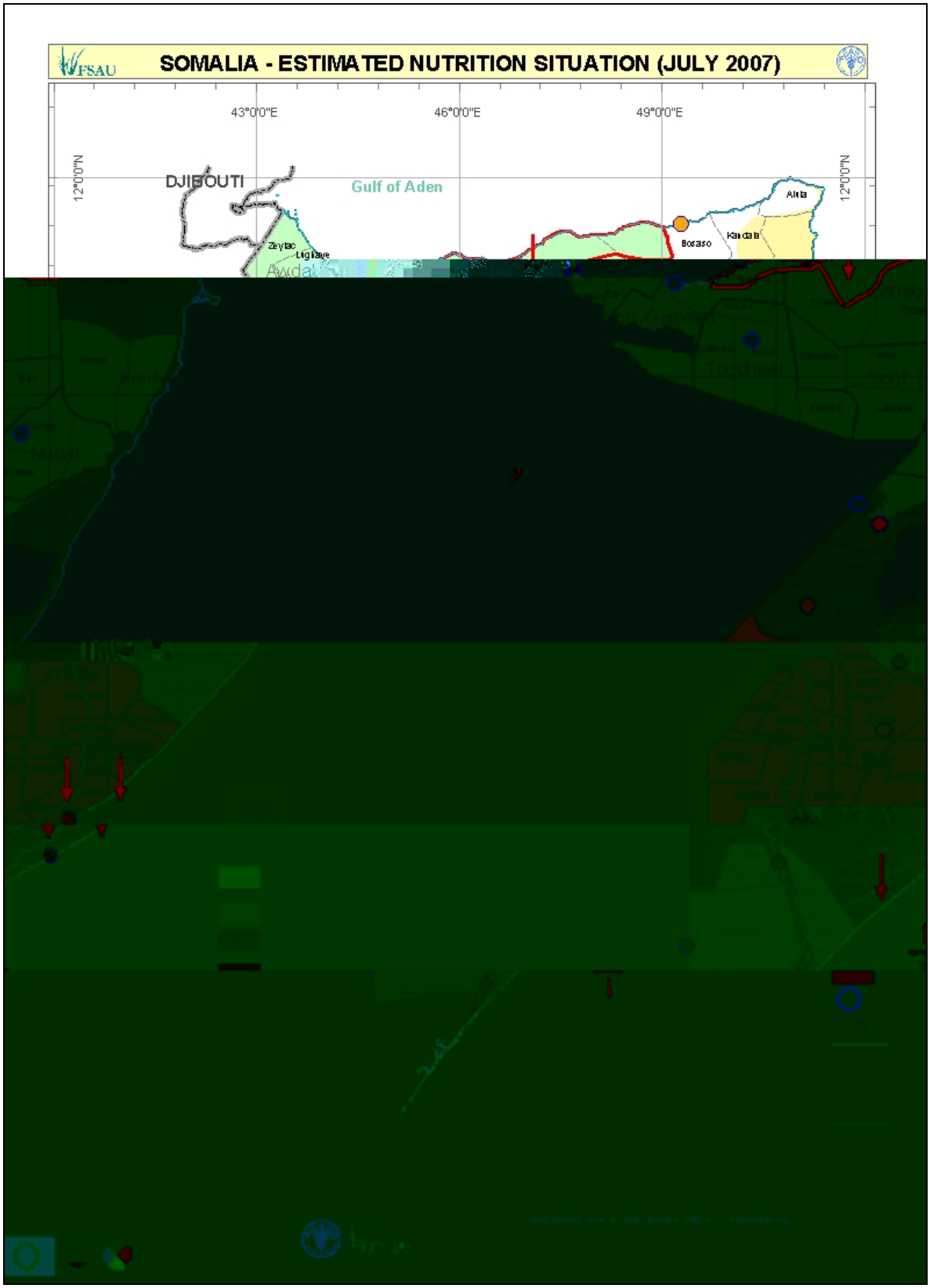
Name of the child:_____ Sex of child: _____

Age of child: _____ Name of caretaker: _____

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

Child referred to: _____

Child referred by: _____


SOMALIA - ESTIMATED NUTRITION SITUATION (JULY 2007)
FSAU
43°0'0"E
46°0'0"E
49°0'0"E
12°0'0"N
12°0'0"N
DJIBOUTI
Gulf of Aden
Zeylac
Lughaye
Bosaso
Kandala
Alula

Appendix 7. Assessments Quality checks

		Pastoral	Agropastoral	Riverine	Reference
No of flags (%)		0.4	0.9	0.4	-
Mean of WHZ		-0.98	-0.84	-0.79	
Digit preference	Weight	No	No	No	No
	Height	5	No	No	No
SD of WHZ		0.95	1.05	1.13	-0.85 to 1.1
Skewness of WHZ		0.59	0.66	0.21	-1 to 1
Kutosis of WHZ		1.06	2.22 problem	0.63	-1 to 1
Representativeness of sample	Age group	No bias	No bias	No bias	No bias
	Age clumping	36 and 48	36, 48; and 59	36 and 48	None
	Sex ratio	1.1	1.1	1.1	0.8 to 1.2

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