

# **NUTRITION ASSESSMENT REPORT**

## **MIDDLE AND LOWER JUBA PASTORAL, AGROPASTORAL AND RIVERINE LIVELIHOOD SYSTEMS**

### **JUBA VALLEY, SOMALIA**

**Food Security Analysis Unit (FSAU/FAO)  
United Nation Children Funds (UNICEF)  
World Vision International (WVI)**



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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 with the pastoral livelihood being predominant and accounting for 34.5% of the population. The integrated nutrition situation analysis conducted in the Post Gu'08 showed mixed results in Juba. A sustained *Serious* nutrition situation was recoded in the pastoral livelihood and an improvement from *Critical* to *Serious* nutrition situation note in the riverine zone. However, the likelihood of the nutrition situation of the riverine community deteriorating was acknowledged at the time due to worsening food security indicators and the eventual effect on food intake. In the agropastoral livelihood, the situation deteriorated from *Serious* to *Critical* levels in *Gu '08*.

In December 2008, FSAU and its partners<sup>1</sup> 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, 28, 29 and 27 clusters were selected for both anthropometric and mortality assessments from the pastoral, agro-pastoral and riverine livelihoods settlements respectively with a corresponding 20 households, 23 households and 21 households assessed. A total of 2065 children (720 from pastoral, 713 from agro pastoral and 632 from riverine livelihoods) aged 6-59 months were assessed from 359; 394 and 399 households respectively.

Results, based on NCHS 1977 reference, show ***Serious*** nutrition levels according to WHO classification with GAM rates of **14.9%** (CI: 11.2 – 19.4) and SAM rates of **2.4%** (CI: 1.3 – 4.2) including 0.2% oedema cases among the assessed pastoralist populations. Similarly, the results indicate ***Serious*** nutrition levels in the agro-pastoral population with a GAM rate of **13.9%** (8.3 – 19.4) and a SAM rate of **2.9%** (0.5 – .5.3) including 0.1% of oedema cases. Among the riverine community the results indicate a GAM rate of **10.9%** (CI: 8.8 – 13.5); that is within *Serious* levels, but due to a high severe acute malnutrition rate of **4.2%** (2.5-7.1) that included 13 (1.8%) cases of oedema, the nutrition situation is classified as ***Critical***. When compared with the past assessments conducted in Gu'08, results shows a sustained *Serious* nutrition situation in the pastoral population as was in July 2008 assessment when a GAM rate of 14.3% (CI 11.3 – 17.2) and a SAM rate of 2.6% (CI: 1.4 – 4.7) was reported. In the agro-pastoral livelihood, results show an improvement from the *critical* levels reported in July 2008 when a GAM rate of 17.8% (CI: 13.7 – 22.9) and SAM rate of 2.1% (CI: 0.9 – 4.7) were recorded. In the Riverine community, results show a deterioration from *serious* levels recorded in July 2008 assessment when a GAM rate of 14.5% (CI: 11.7 – 17.7) and SAM rate of 2.2 (CI: 1.3- 3.5) were reported. 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 July 2008.

When estimated using WHO Anthro (2006) Reference standards, slightly higher GAM rates and almost double SAM rates Reference Estimates were reported: The pastoral livelihood reported GAM rate of 15.0% (CI: 11.5 – 19.4) and SAM rate of 4% (CI: 2.6 – 6.2). Agro-pastoral livelihood assessment reported GAM rate of 14.3% (CI: 8.7 – 19.1) and SAM rate of 4.2% (CI: 1.1 – 7.3), while among the riverine livelihood population a GAM rate of 12.6% (9.1– 17.2) and SAM rate of 5.1% (CI: 3.1 – 8.2) were reported indicating. The stunting rates were higher across the three livelihoods at

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

20.3% among pastoral, 37.2% among agro-pastoral and 42.1% among riverine populations. These rates indicate alert, serious and critical stunting levels among the pastoral, agropastoral and riverine populations respectively based on WHO classification. Equally high underweight rates of 24.7%, 32.4% and 36.4% among pastoral, agro-pastoral and riverine livelihoods respectively were recorded and basing on WHO classification, these rates indicate *serious* levels among the pastoral and *critical* levels in both agropastoral and riverine livelihoods zones.

Among the assessed women, high malnutrition rates were recorded among the pregnant women (MUAC < 23.0 cm) with 23% of pastoral, 27% of agro-pastoral and 37.5% of the Riverine identified as malnourished. Pregnancy raises physiological and nutritional demands of women making them vulnerable to acute malnutrition and this may partly explain the high levels recorded in this group. Low acute malnutrition rates (<2%) were recorded among the non pregnant women.

The crude (CMR) and U5 (U5M) mortality rates among the pastorals were within the *acceptable* levels at **0.90** (0.51-1.58) and **1.82** (1.10- 3.01) /10,000/day respectively (WHO). The CMR and U5MR rates were both within the *serious* levels at **2.27** (1.50 -3.45) and **1.19** (0.83 – 1.71) respectively in the agro-pastoral livelihood. While among the riverine community the U5MR of **3.27** (1.97-5.39) and CMR of **1.08** (0.68 – 1.71) were reported, both indicating a *serious* situation. The most commonly reported causes of death included diarrhoea, suspected malaria and birth related complications.

The assessment also revealed a high morbidity level in Juba regions where at least 50% of the assessed children in each livelihood were reported to have suffered from some form of illness in the two weeks prior to the assessment. The prevalence of reported diarrhoea in pastoral, agro-pastoral and riverine populations (25.4%; 21.6% and 28% respectively) within two weeks prior to the assessment remained high. Equally, high prevalence of ARI (18.1-28.9%) and febrile illnesses/suspected malaria (21.9 - 34.9%) were reported in the three livelihoods. Rapid diagnostic test for malaria (*P. falciparum*) show that malaria is endemic in Juba valley with positive rates of 5.1%; 3.4% and 8.8% 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 a 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 ARI were more likely to be acutely malnourished ( $p < 0.05$ ). In the assessed pastoral, agropastoral and riverine livelihoods, 46%, 17.3 and 30.0% of the households respectively do not have access to safe water.

Poor coverage for health programmes are important risk factors to poor nutrition situation in Juba region. Measles vaccination status for eligible children (9-59 months old) is still very low at 44% as is coverage for vitamin A supplementation (42.9%) in the assessed pastoral population. Measles vaccination and vitamin A supplementation was equally low at 53.4% and 47.5% respectively among agro-pastoral. However, in the riverine livelihood, measles vaccination and vitamin A supplementation status were higher at 69% and 60.4% respectively. Polio immunization status in the three livelihoods was higher, between 87.1 to 91.8%. The relatively higher coverage for the three health programmes in the riverine zones is due to better access from the humanitarian agencies operating in the area. Nevertheless the status 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, particularly vitamin A supplementation, with improved immunity. High morbidity rates were reported in the three livelihoods of Juba Valley with more than half of the assessed children reportedly falling ill in two weeks and one month for measles prior to the assessment in pastoral, agro-pastoral and the riverine population with (58.4%, 50.9% and 60.2% respectively) of the assessed children were reported to have fallen. In these assessments the children from pastoral and

agro-pastoral livelihoods therefore is no significant association between the exposure and the outcome since 1.0 lies within the confidence interval, RR=1.2 (0.71- 1.86) and RR=1.3 (0.91 - 1.96) respectively.

The current FSAU Post Deyr '08/09 food security analysis indicates a mixed rainfall outcome in Juba regions, with parts recording near normal rainfall while others, particularly in Middle Juba, receiving poor rains. As a result, water availability and pasture condition is poor in both pastoral and agropastoral areas but good in riverine areas. This has led to the early migration of livestock from pastoral and agropastoral zones to riverine areas and Jorey of Badhadhe district. The livestock body condition is average while milk production is average to good in the regions. The overall cereal production is 20% and 30% of PWA in Lower and Middle Juba regions respectively. 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.

Results on dietary intake based on 24 hour recall show that 6.2% of the pastoral, 8.6% of agro-pastoral and 12.4% of the riverine population were consuming poorly diversified diets, comprising 3 or fewer food groups; indicating a risk factor that is *alert* in the pastoral & agropastoral, and *serious* in the riverine. The most commonly consumed food groups are cereals, sugar and oils/fat, while milk was mainly consumed among the pastoral and agro-pastoral livelihoods. The main sources of food across livelihoods are purchase and own production. 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.

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**

- Rehabilitation of acutely malnourished children through the existing selective feeding and outreach programs and active case finding until household food security is restored and critical public health issues are addressed. Capacity building of the existing MCH and the community to manage acutely malnourished children through locally available resources could be explored. Skills on the management of nutritional oedema are essential in the riverine community
- Intervention programmes on improving water, sanitation and hygiene practices including health education to educate the community on domestic treatment of drinking water.
- Improving status for health programmes, especially for measles vaccination and vitamin A supplementation. Vigorous campaigns targeting the bulk of rural population are required in Juba Valley regions. Care givers should also be trained on the need to let their children receive these services.
- Intensify nutrition and health education targeting children care givers with messages on the importance of exclusive breastfeeding, improved child-feeding practices appropriate health-seeking behaviour and improved hygiene & sanitation practices

### **Long term Interventions**

- Rehabilitation/protection of water systems including the well and water catchments. The community should be trained on sanitation of the water systems

- There is need for establishment or strengthening of health facilities and satellite services especially in rural villages where there are no health facilities
- 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 diet diversification, and improvements in household hygiene including health care practices.
- Provision of sanitation facilities through community participatory approaches coupled with awareness campaign on the importance of using such facilities.
- Implementation of mechanisms for regular water treatment at the source as well as at the household level.
- To initiate income generating activities to improve the socio-economic situation in Juba regions given that purchase is the main source of food.
- Canal rehabilitations, provision of irrigations pumps, fuel for irrigation and spare parts to the riverine communities in Juba Valley.
- Exploring the reasons behind high nutritional oedema in the riverine community is would help in management of this form of malnutrition.

<b>Table 1.1 SUMMARY OF THE FINDINGS</b>						
<b>Indicator</b>	<b>Pastoral</b>		<b>Agropastoral</b>		<b>Riverine</b>	
	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>
Total number of households surveyed	389	100	394	100	399	100
Mean household size	5.6	SD=2.0	5.4	SD=3.3	5.3	SD=1.8
Total number of children assessed	720	100	713	100	732	100
Child sex:						
Males (boys)	368	51.2	374	52.4	377	51.5
Females (girls)	351	48.8	339	47.8	355	48.5
Global Acute Malnutrition (WHZ<-2 or oedema)	107	<b>14.9</b> (11.2 – 19.4)	99	<b>13.9</b> (8.3 – 19.4)	79	<b>10.9</b> (7.5 – 15.4)
Severe Acute Malnutrition (WHZ<-3 or oedema)	17	<b>2.4</b> (1.3 – 4.2)	21	<b>2.9</b> (0.5 – 5.3)	30	<b>4.2</b> (2.4 – 6.0)
Oedema	2	<b>0.2</b> (0 – 0.6)	1	<b>0.1</b> (0 – 0.9)	13	<b>1.8</b> (0.8- 2.7)
GAM estimates by WHO Anthro (2006) Standards:	108	<b>15.0</b> (11.5-19.4)	102	<b>14.3</b> (8.7-19.1)	92	<b>12.6</b> (9.1 – 19.2)
SAM estimates by WHO Anthro (2006) Standards:	29	<b>4</b> (2.6 – 6.2)	30	<b>4.2</b> (1.1 – 7.3)	37	<b>5.1</b> (3.1 – 8.2)
Global Acute Malnutrition (WHM<80% or oedema)	70	<b>9.7</b> (6.8 - 13.7)	65	<b>9.1</b> (5.2 – 15.5)	56	<b>7.6</b> (4.3 – 11.0)
Severe Acute Malnutrition (WHM<70% or oedema)	6	<b>0.8</b> (0.3 – 2.6)	13	<b>1.8</b> (0.8 – 4.1)	12	<b>1.6</b> ( <b>0.1-3.2</b> )
Proportion of malnourished (MUAC<12.5 cm or oedema))	86	11.9 (6.7-17.1)	164	<b>23</b> (14.2- 31.8)	140	<b>19.1</b> (12.9 – 25.9)
Proportion of severely malnourished (MUAC<11.0 cm or oedema))	14	<b>1.9</b> (0.0 – 4.0)	12	<b>1.7</b> (0.0 – 3.4)	12	<b>1.6</b> (0.1 – 3.2)
Proportion of stunted children (HAZ<-2)	146	<b>20.3</b> (15.9-25.7)	265	<b>37.2</b> (29.7-45.3)	308	<b>42.1</b> (37.7-46.5)
Proportion of underweight children (WAZ<-2)	117	<b>24.7</b> (18.1-32.6)	231	<b>32.4</b> (25.8-39.9)	262	<b>36.4</b> (30.6-42.6)
Proportion of acutely malnourished pregnant women (MUAC≤23.0)	23	<b>28</b> (N=82)	27	<b>31.4</b> (N=86)	36	<b>37.5</b> (N=96)
Proportion of severely malnourished pregnant women (MUAC≤20.7)	4	<b>4.5</b>	6	<b>7.0</b>	4	<b>4.2</b>
Proportion of acutely malnourished pregnant women (MUAC<18.5)	4	<b>1.3</b> (N=302)	1	<b>0.3</b> (N=306)	2	<b>0.6</b> (N=311)
Proportion of children reportedly with diarrhoea in the 2 weeks prior to survey	183	25.4 (17.6-33.3)	154	21.6 (17.3-25.9)	205	28 (22.7-33.2)
Proportion of children reportedly with ARI within two weeks prior to survey	208	28.9 (19.8-38.0)	129	18.6 (11.9-24.3)	20	27 (21.2-34.7)
Children with fever/ suspected malaria in 2 weeks prior to assessment	251	34.9 (27.4-42.3)	156	21.9 (16.7-27.1)	227	31 (23.8-38.2)
Proportion confirmed with malaria <i>Plasmodium falciparum</i> (RDT positive)	72	(N=1400) 5.1(2.8 – 7.5)	51	(N=1464) 3.4 (1.6 – 5.4)	119	(N=1358) 8.8 (3.2 – 14.3)
Suspected measles within one month prior to assessment	19	2.6 (1.1 – 4.2)	9	1.3 (0.0 – 2.7)	18	2.4 (0.3 – 4.6)
Children (9-59 months) immunised against measles	317	44 (27.7 – 60.4)	381	53.4 (37.3-69.4)	505	69.0 (54.8 – 83.3)
Children who have ever received polio vaccine	627	87.1 (78.7-95.5)	655	91.8 (85.2-95.5)	669	91.5 (86.2-96.7)
Children who received vitamin A supplementation in last 6 months	309	42.9 (26.6-59.7)	339	47.5 (29.5-65.6)	442	60.4 (43.8-77.1)
Proportion of households who consumed ≤3 food groups	22	6.2 (0.0-13.8)	34	8.6 (6.1-12.0)	51	12.6 (9.6- 16.3)
Proportion of children 6-8 months who are complementary food frequency	45	n=(51) 88.2 (76.1-95.6)	24	n=(37) 64.9 (47.5-79.8)	22	n=35 62.9 (44.9-78.5)
Under five Mortality Rate (U5MR) as deaths/10,000/ day	<b>1.82</b> (1.10-3.01)		<b>2.27</b> (1.50-3.45)		<b>3.27</b> (1.97-5.39)	
Crude Mortality Rate (CMR) as deaths/10,000/ day	<b>0.90</b> (0.51-1.58)		<b>1.19</b> (0.83-1.75)		<b>1.08</b> (1.68-1.71)	



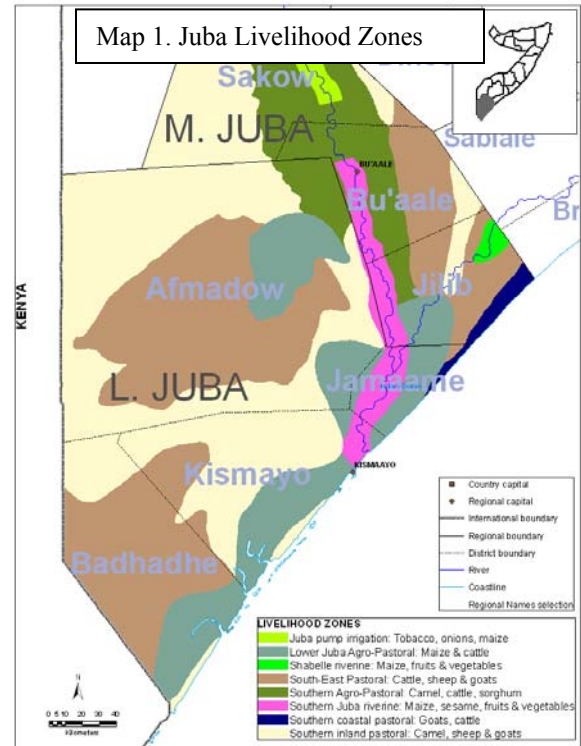
## 1.0 INTRODUCTION

### 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 <sup>2</sup>two regions is 624,667 and falls into five livelihood zones<sup>3</sup>. The riverine, pastorals, agro-pastorals, Coastal and Urban (see map 1).

The **pastoral** livelihood system is <sup>4</sup>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 through 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 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 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 food security and nutrition situations in Juba regions have varied over time, mainly linked to rainfall performances and the resultant impacts on different livelihoods. Heavy rainfall in the Juba regions or in the Ethiopian highlands often results in floods that devastate crops cultivation in the riverine areas, but later benefits the riverine communities from recession crops from the *Desheks* and fishing opportunities from flood waters. The agropastoral communities who rely on rain-fed agriculture are totally dependent on rainfall performance as do the pastoralists, whose livelihood is greatly influenced by pasture conditions and water availability for the livestock.

The FSAU Post Gu 08 analysis classified the food security and nutrition situations in Juba regions into

<sup>2</sup> Middle Juba has a population size of 385,790 and Lower Juba of 238, 877

<sup>3</sup> The Baseline Profiles are currently being revised by FSAU

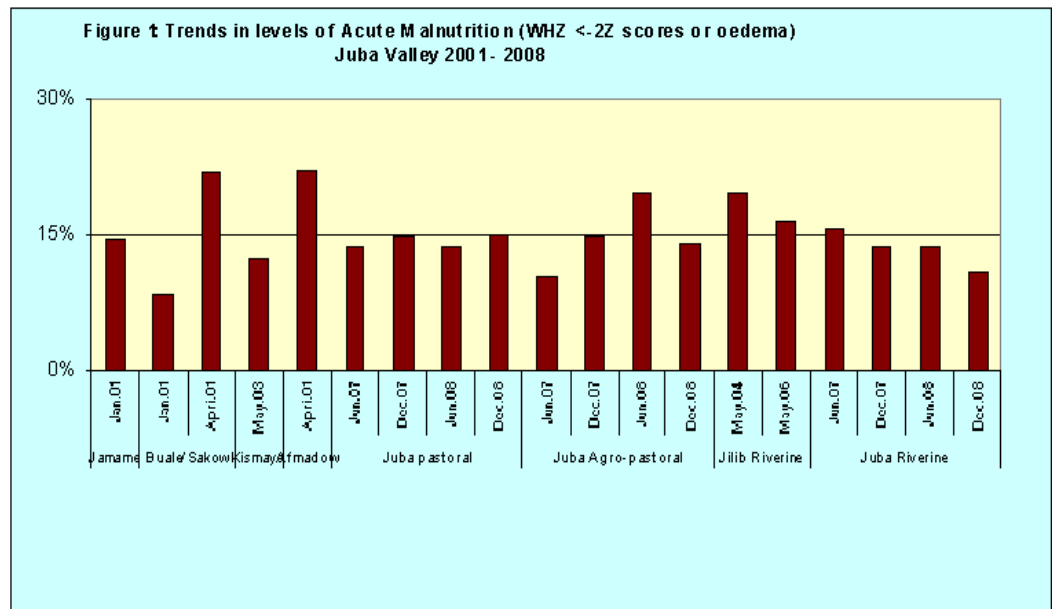
<sup>4</sup> FSAU Livelihoods Baseline Profile, 2000.

different phases. In Middle Juba, the situation showed deterioration with about 36,000 of rural and 25,000 of urban populations faced with AFLC. In addition, 7,000 people from Buale, Jilib and Sakow riverine areas who were earlier classified in AFLC in Post Deyr’07/08 had deteriorated to HE in Gu ’08. The worsening situation was a result of poor rainfall and the ensuing poor cereal (sorghum/maize) production ranging from 3% of PWA in Sakow to 21% of PWA in Buale. On the other hand, the food security situation in Lower Juba region showed some improvement with an estimated 13,000 people who were faced with HE in Post Deyr’07/08 progressing to AFLC in Gu ’08. Overall, the numbers of people who were faced with AFLC from urban and rural populations in Lower Juba were 25,000 and 45,000 respectively. The improvement was attributed to average rainfall; good cereal (maize) production with 96% of PWA in Jamame and Badhadhe and 113% of PWA in Kismayo; increased labour opportunities and improved rangeland and livestock body conditions.

### Health and Nutrition Context

The nutrition situation in Middle and Lower Juba regions varies across livelihoods and administrative units.

From January 2001 and December 2008 a total of sixteen nutrition assessments were carried out in Juba regions, with six of these assessments recording GAM rates that are 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 integrated nutrition analysis in Post Gu’ 08 was recorded a mixed results in the regions. A sustained *Serious* nutrition situation was recorded in the pastoral livelihood and an improvement from Critical to Serious nutrition situation noted in the riverine zone. However, the likelihood of the nutrition situation of the riverine community deteriorating was acknowledged at the time due to worsening food security indicators and the eventual affect on food intake. In the agropastoral livelihood, the situation deteriorated from Serious to Critical levels in Gu ’08.

## **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 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 24<sup>th</sup> December 2008 up to 5<sup>th</sup> January 2009 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 populations<sup>5</sup> formed a sampling frame and was used to construct cumulative population figures for the assessment area, from which 27 or 29 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*<sup>th</sup> 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, 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 in Buale town 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.

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<sup>5</sup> 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 1152 households (359 from pastoral; 394 from agro-pastoral and 399 from riverine livelihoods) with mean household sizes of 5.6±2.0; 5.4±3.3 and 5.3±1.8 persons in the pastoral; agro-pastoral and riverine livelihoods respectively,. A total of 2065 children (720 from pastoral, 713 from agro-pastoral and 632 from riverine livelihoods) aged 6-59 months, were assessed with respective mean number of 2.1 ±0.8; 1.8 ±0.8 and 1.8 ±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	359	100	394	100	399	100
Household size (Mean):	5.6	SD=2.0	5.4	SD=3.3	5.3	1.8
Total number of children assessed	720	100	713	100	732	100
Mean No of Under fives	2.1	SD=0.8	1.8	SD=0.8	1.8	SD=0.8
<i>Sex of Household Head:</i>						
Male	318	88.5	344	87.1	335	85.7
Female	41	11.5	50	12.9	64	14.3
<i>Has Mosquito net:</i>						
Yes	669	50.0	529	36.1	436	32.1
<i>Host IDPs</i>	14	3.9	36	9.1	28	7.5
<i>Main source of Income</i>						
Livestock and its products sales	155	43.1	28	7.1	3	0.8
Crop sales/Agriculture	41	11.4	241	61.0	236	61.5
Trade	20	5.5	12	3.0	7	1.8
Casual labour	133	37	101	25.6	129	33.6
Salaries/wages	2	0.5	8	2.0	5	1.3
Remittances/gifts/zakat	5	1.4	3	0.8	5	1.5
Others/Destitute	3	0.8	2.0	0.5	-	-

The results show that the majority, >85% 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. Over 4% of the assessed households in the three livelihoods were reportedly hosting 1-3 internally displaced persons.

In the pastoral livelihood, the major source of income for the assessed households was sale of livestock and livestock products while among the agro-pastoral and riverine livelihoods, sale of crops was the main source of income (Table 4.1). Casual labour provided supplementary income in all the livelihoods. In the seasonal 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 Health Facilities use, water Sources, access and Quality

Access to safe water for drinking and for other domestic use remains limited and is a key concern in the study area. Only 46% of pastoral, 17.3% of agro-pastoral and 30.1% of riverine households were

reportedly accessing safe water. However, a significant proportion of the assessed households consumed treated water which was either treated at the source or at the storage level. Water is mainly treated by boiling and chlorination. As indicated in table 4.2, main sources of drinking and other domestic uses across the livelihoods were surface sources (catchments) and tube well or borehole well. On a positive note, water supply from these sources was reported as reliable by 46% of pastoral, 18% of agropastoral and 30% of the Riverine households. Access to health facilities is still a challenge with only 25.3% of pastoral, 62.5% of agro-pastoral and 47.5% of riverine households reportedly accessing health facilities. Of more concern is the fact that about 10% of the households with access to health facilities are not utilizing them for varied reasons as shown on Table 4.2

	Pastoral		Agro-pastoral		Riverine	
<i>Main Source of drinking water</i>	n	%	n	%	n	%
Tap	-	-	3	0.8	9	2.3
Truck	-	-	-	-	0	0.0
Tube well	144	40.1	82	21.2	111	28.0
Spring			-	-	9	2.3
Surface sources	215	59.9	302	78	276	69.7
<i>Have access to safe water</i>						
Yes	165	46	67	17.3	119	30.1
<i>Water treated at</i>						
Source	165	46	45	11.6	84	21.2
Storage	252	70.2	60	17.7	7	2.4
<i>Method of treatment</i>						
1. Boiling	95	35.7	-	-	6	7.5
2. Chlorination	167	62.8	-	-	72	9.0
3. Filtering	-	-	-	-	0	0
4. Letting it stand and settle	4	1.5	-	-	2	2.5
Health facilities access	91	25.3 (n=359)	242	62.5 (N=387)	189	47.5 (N=396)
Health Facilities use	82	90.1 (n=91)	229	94.6 (n=242)	174	92.1 (n=189)
Why Health facilities not use	(n=9)		-	-	(15)	
1. too expensive	3	33.3	-	-	2	13.3
2. too far	5	55.6	-	-	12	80.0
3. not enough time	1	11.1	-	-	1	6.7

### 4.3 Morbidity, immunization and Health Seeking Behaviour

High morbidity rates were reported in the three livelihoods of Juba Valley with more than half of the assessed children reportedly falling ill in two weeks and one month for measles prior to the assessment.

**Table 4.3: Health seeking behaviour**

	Pastoral		Agropastoral		Riverine	
	N	%	N	%	N	%
<i>Child fell sick</i>						
Yes	421	58.4	363	50.9	441	60.2
<i>Where health service sought</i>						
No assistance sought	62	14.4	67	16.9	30	6.7
Own medication	47	10.9	42	10.6	39	8.7
Traditional healers	29	6.7	18	4.5	67	14.9
Sheikh/ prayer	50	11.6	34	8.6	37	8.2
Private pharmacy/clinic	106	24.7	73	18.4	97	21.6
Public health facilities	136	31.6	162	40.8	180	40

Medical assistance for children reported to have fallen sick within two weeks prior to the assessment was sought from different sources. In the three livelihoods, the pastoral, agropastoral and riverine health assistance for sick children was mainly sought from public health facilities

(31.6%, 40.8% and 40% respectively) and private pharmacy/clinics (24.7%, 18.4% and 21.6% respectively) It is worth to mention that 6-16.9% 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 prevalence of diarrhoea in pastoral, agro-pastoral and riverine populations (25.4%; 21.6% and 28% respectively) were high within two weeks prior to the assessment. The prevalence of suspected measles ranged between 1.3% in agro-pastoral to 2.6% in pastoral livelihoods. High prevalence of ARI (18.1-28.9%) and suspected malaria or febrile illnesses (21.9-34.9%) were also reported in the three livelihoods (Table 4.4). Malaria is endemic in Juba regions with the current results of rapid diagnostic test for *Plasmodium. falciparum* indicating rates of 5.1%; 3.4% and 8.8% recorded in the assessed Pastoral, Agro-pastoral and Riverine populations respectively. These levels were consistent with seasonal morbidity patterns reported from the health facilities. In this period of the year, unlike the beginning of last year, there was no reported outbreak of acute watery diarrhoea as of the time of the assessment.

**Table 4.4: Morbidity, measles immunisation, polio vaccination and vitamin A supplementation**

	Pastoral		Agropastoral		Riverine	
	n	%	n	%	n	%
<i>Major childhood illnesses</i>						
Proportion of children reported with diarrhoea in 2 weeks prior to assessment	183	25.4 (17.6-33.3)	154	21.6 (17.3-25.9)	205	28 (22.7-33.2)
Proportion of children reported with ARI in 2 weeks prior to assessment	208	28.9 (19.8-38)	129	18.1 (11.9-24.3)	204	27 (21.2-34.7)
Children reported with febrile illness in 2 weeks prior to assessment	251	34.9 (27.4 -42.3)	156	21.9 (16.7-27.1)	227	.31 (23.8-38.2)
Proportion of persons confirmed with malaria (RDT positive)	72	5.1 (2.8 – 7.5) (N=1400)	51	3.4 (1.6– 5.4) (N=1464)	119	8.8 (3.2 – 14.3) (N=1358)
Children who slept under bed net	681	48.6 (33.0 –64.7)	477	32.6 (19.1 – 46.0)	394	29.0 (20.4 – 37.6)
Suspected measles within one month prior to assessment	19	2.6 (1.1– 4.2)	9	1.3 (0.0 – 2.7)	18	2.4 (0.3- 4.6)
<i>Immunization status (recall and card)</i>						
Children (9-59 months) immunised against measles	317	44 (27.7-60.4)	381	53.4 (37.4-69.4)	505	69.0 (54.8-83.3)
Children who were reported to have ever received polio vaccine	627	87.1 (78.7-95.5)	655	91.8 (85.2-95.5)	669	91.5 (86.2-96.7)
Children who received vitamin A supplementation in last 6 months	309	42.9 (26.2–59.7)	339	47.5 (29.5-65.5)	442	60.4 (43.8-77.1)

Morbidity, acute respiratory infection particularly, was identified as an important risk factor to acute malnutrition with children from riverine livelihood who had ARI two weeks prior to the assessment being 1.94 times more likely to be acutely malnourished as compared to their counterparts who had no ARI (RR=1.94; CI: 1.24- 3.04; p=0.002). Measles vaccination for eligible children (9-59 months old) and vitamin A supplementation coverage were very low at between 44 to 69% across livelihoods fell below the recommended coverage of 95% level (Sphere, 2004) (table 4.4). Polio immunization was relatively high at 87.1% among pastoral, 91.8% among agro-pastoral and 91.5% among the riverine. Overall, status for the three health programmes (including polio immunization) fell slightly below the recommended coverage of 95% level (Sphere, 2004) in all the three livelihoods.

#### 4.4 Feeding practices

The majority (94%) of the assessed pastoral children aged 6-8 months, 78% of agro-pastoral and 76% of riverine population, were fed for two times or above as recommended (Source: Facts for Life, 2002; WHO, Fanta and UNICEF). While those aged 9 months and above, 73.4% of the pastoral livelihood, 74.4% of agro-pastoral and 90% of riverine population had been fed the recommended minimum 3-4 times in a day. Less than one-fifth of the assessed children in the three livelihoods were reportedly registered in a feeding programme, mainly supplementary feeding programme (table 4.5). Overall, only 16.7% of the acutely malnourished from pastoral livelihood, 27.3% from agro-pastoral and 13.3% 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.



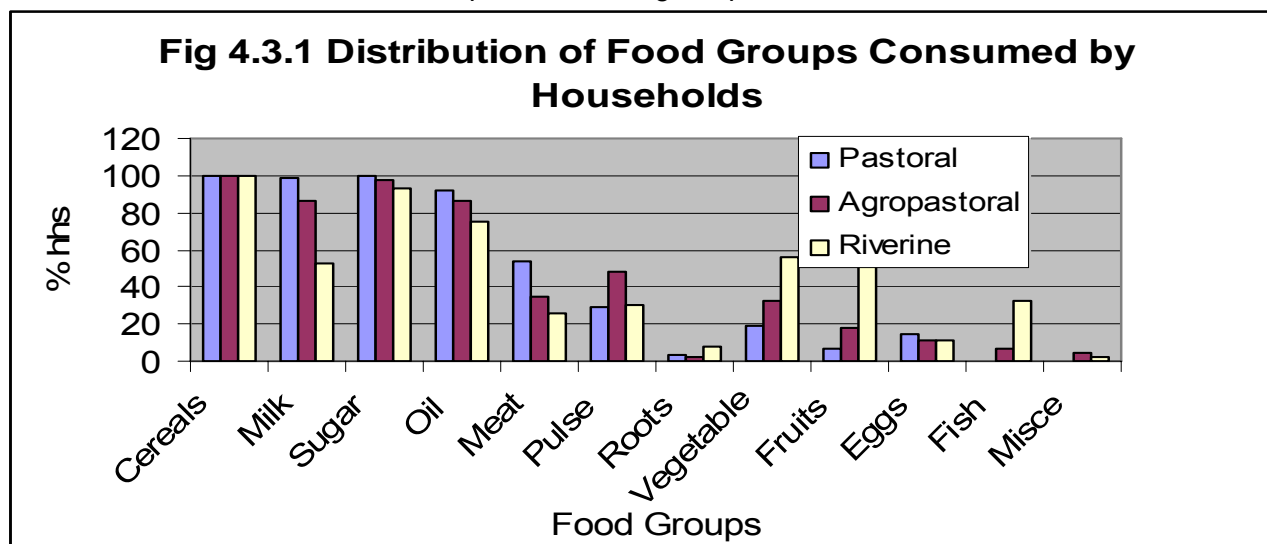
**Table 4.5: Child feeding practices**

	<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>Complementary Feeding frequency:</i>		N=670		N=257		N=697
6-8 months ≤ 1 meal	3	5.9	8	21.6	9	23.7
9 months and above ≥ 3 meals	492	73.4	503	74.4	627	90
<i>Type of feeding programme where the child is currently registered in</i>						
SFP	116	16.7	194	27.3	97	13.3
TFC	1	0.1	8	1.1	8	1.1
OTP/CTC	2	0.2	4	0.5	6	0.8
None	579	80.2	503	70.8	618	87.7

## 4.5 Household Food Security

### 4.5.1 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 (60.4%) and fish (32%) while the pastoralists had a considerably higher consumption of their staple food, milk (98.8%). This clarifies the fact that riverine households grow and consume fruit and vegetables in their farms while milk is the main staple food among the pastoral communities.



**Table 4.6. Households main source of food**

Main source of food	Pastoral		Agropastoral		Riverine	
	n	%	n	%	n	%
Own production	58	16.2	248	63.4	116	29.1
Purchasing	294	82.1	133	34.0	263	66.0
Gifts	1	0.2	1	0.2	3	0.7
Food aid	5	1.3	9	2.3	6	1.5
Bartering	-	-	-	-	-	-
Borrowing	-	-	-	-	9	2.1
<b>Main source of cereals</b>	<b>N=359</b>		<b>N=389</b>		<b>N=398</b>	
Own production	64	17.8	242	61.8	161	40.3
Purchasing	235	65.4	133	34	208	52.1
Gifts	1	0.2	2	0.5	2	0.5
Food aid	59	16.4	12	3	27	6.7
<b>Main source of milk</b>	<b>N=359</b>		<b>N=334</b>		<b>N=210</b>	
Own production	301	83.8	184	47	10	2.5
Purchasing	58	16.2	150	38.3	200	50.1

The main source of food, in the three different livelihoods was purchase, but a significant proportion also reported producing their own food (Table 4.6). As expected, own production was the main source of cereals for agropastoral and of milk for pastoral livelihood zones.

Other major sources of food included, food aid, which was reported as main source of cereals for (3-16.5%) of the assessed

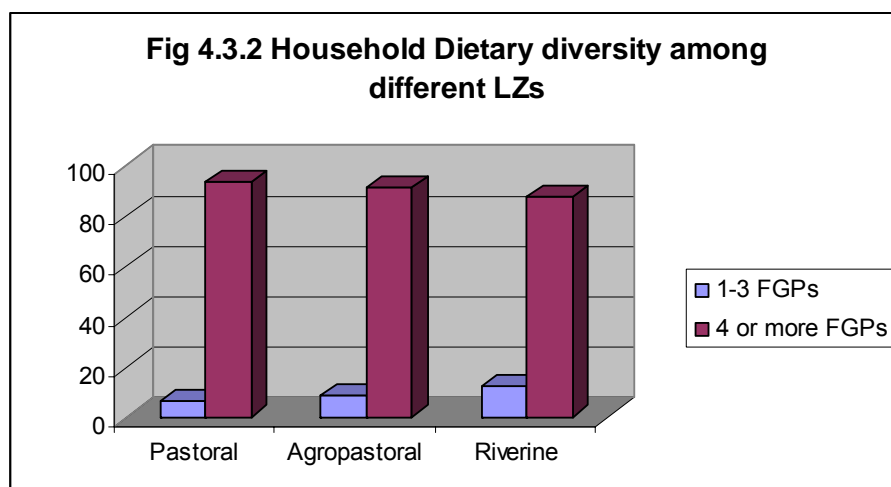
households,

### 4.5.2 Dietary Diversity

**Table 4.8. Household Food Consumption and Dietary diversity**

	Pastoral		Agropastoral		Riverine	
	n	%	n	%	n	%
<i>No of food groups consumed</i>						
1 food group	-	-	-	-	6	1.5
2 food groups	3	0.8	10	2.5	14	3.5
3 food groups	19	5.3	24	6.1	31	7.7
4 food groups	84	23	61	15.5	66	16.5
5 food groups	104	29	133	33.9	93	23.3
6 food groups	106	29.6	97	24.7	80	20
7 food groups	31	8.6	49	12.5	52	13
8 food groups	9	2.5	16	4	36	9
9 food groups	2	0.5	1	0.2	15	3.7
10 food groups	-	-	1	0.2	5	1.2
<i>No. Having Diversified Diet</i>						
1-3 food groups	22	6.1	34	8.7	49	12.3
≥ 4 food groups	335	93.9	358	91.3	350	87.7
Mean HDDS	5.2 (SD=1.2)		5.2 (SD=1.3)		5.4 (SD=1.8)	

In the three livelihoods, the majority (87.7–93.9%) of the households consumed diversified diets with four or more food groups. Overall, households consumed one to ten food groups with a mean of 5.2±1.2 among the pastoral and 5.2±1.3 and 5.4±1.8 among the agro-pastoral and riverine livelihoods respectively.



As shown in Fig 4.3.2, even though the majority of the households consumed diversified diets<sup>6</sup> in the 24 hours prior to the assessment, the concern is the significant (6.1-12.3%) of the households that consumed three or fewer food groups in the preceding 24 hours.

## 4.6 Nutrition Status

### 4.6.1 Malnutrition levels by Livelihoods

A total of 721 children, 51.2% boys and 48.8% girls aged 6-59 months were assessed from 359 households among the pastoral livelihoods. In the agro-pastoral livelihood, 713 children (52.4% boys and 47.6% girls) were assessed from 386 households while 732 children (51.5% of them boys and 48.5% girls) were assessed from 399 sampled households. Using the NCHS (1978) reference, the results show **Serious** nutrition levels in pastoral, and agropastoral according to WHO classification with respective GAM rates of **14.9%** (CI: 11.2 – 19.4), and **13.9** (8.3- 19.5) and respective SAM rates of **2.4%** (CI: 1.3 – 4.2) and **2.9%** (CI: 0.5 – 5.4). However, the results from riverine community recorded a GAM rate **10.9%** (CI: 8.8 – 13.5); that is within *Serious* levels, but due to a high severe acute malnutrition rate of **4.2%** (2.5-7.1) that included 13 (1.8%) cases of oedema, therefore the situation is classified as **Critical**. A summary of the findings for the acute malnutrition rates is given in Table 4.8.

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

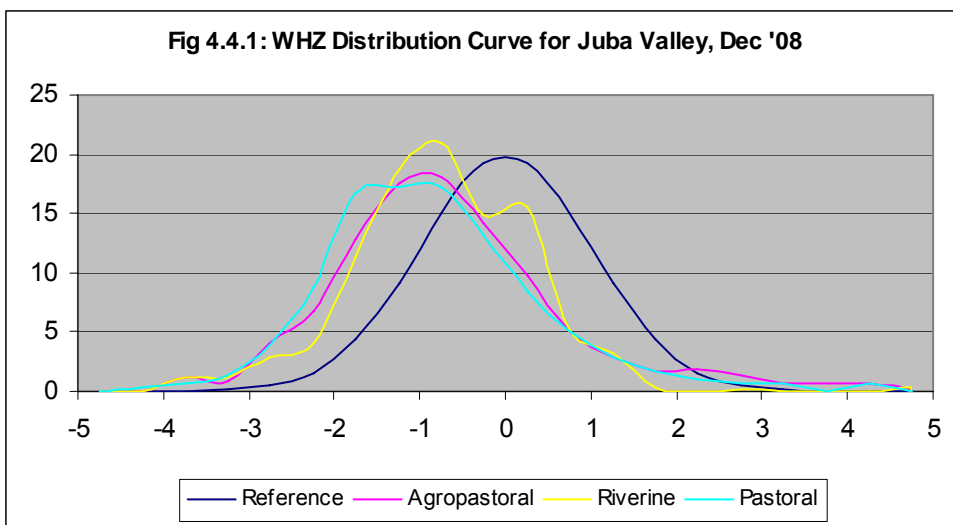
Table 4.8: Summary of Malnutrition rates by Livelihood systems

Malnutrition rates	Pastoral (N=652)		Agropastoral (N=652)		Riverine (N=645)	
	No	% (CI)	No	% (CI)	No	% (CI)
Global Acute Malnutrition (WHZ<-2 or oedema)	107	<b>14.9</b> (11.2 – 19.4)	99	<b>13.8</b> (8.3 – 19.4)	79	<b>10.8</b> (7.5 – 15.4)
Severe Acute Malnutrition (WHZ<-3 or oedema)	17	<b>2.4</b> (1.3 – 4.2)	21	<b>2.9</b> (0.5 – 5.3)	30	<b>4.1</b> (2.4 – 7.0)
Oedema	2	<b>0.2</b> (0 – 0.6)	1	<b>0.1</b> (0- 0.9)	13	<b>1.8</b> (0.8- 2.7)
GAM estimates by WHO Anthro (2006) Standards:	108	<b>15</b> (11.5 – 19.4)	104	<b>14.3</b> (9.8 – 21.1)	92	<b>12.6</b> (9.1- 17.2)
SAM estimates by WHO Anthro (2006) Standards:	29	<b>4</b> (2.6 – 6.2)	32	<b>4.2</b> (1.1 – 7.3)	37	<b>5.1</b> (3.1 – 8.2)
Global Acute Malnutrition (WHM<80% or oedema)	70	<b>9.7</b> (6.8 – 13.7)	65	<b>9.1</b> (5.2-15.5)	56	<b>7.6</b> (4.3-11)
Severe Acute Malnutrition (WHM<70% or oedema)	6	<b>0.8</b> (0.3 – 2.6)	13	<b>1.8</b> (0.8 – 4.1)	12	<b>1.6</b> (0.1 – 3.2)
Proportion of stunted children (HAZ<-2)	146	<b>20.3</b> (15.7-25.7)	265	<b>37.2</b> (29.7-45.3)	308	<b>42.1</b> (37.7-46.5)
Proportion of underweight children (WAZ<-2)	117	<b>24.7</b> (18.1-32.6)	231	<b>32.4</b> (25.8-39.9)	262	<b>36.4</b> (30.6-42.7)

When estimated using WHO Anthro (2005) Reference standards, higher GAM rates and almost double SAM rates were reported in the pastoral and agropastoral livelihood assessments. The pastoral livelihood assessment reported a GAM rate of 15.0% (CI: 11.5 – 19.4) and a SAM rate of 4% (CI: 2.6 – 6.2), while among the agropastoral livelihood population a GAM rate of 14.3% (8.7.0 – 19.1) and a SAM rate of 4.2% (CI: 1.1 – 7.3) were reported. The riverine livelihood reported a slightly higher GAM rate of 12.1% (CI: 9.1 – 17.2) and SAM rate of 5.1% (CI: 3.1 – 8.2).

Generally, the distributions of the weight-for-height scores in the three Juba regions assessments were shifted towards the left depicting a poorer nutrition situation (Fig 4.4.1). The mean WHZ for pastoral, agropastoral and riverine livelihoods were -0.84 (SD=1.25); -068 (SD=1.35) and -0.76 (SD=1.03 respectively).

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



#### 4.6.2 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)	59	16.5	48	13.1	59	15.7	40	11.7	51	13.5	28	7.9
SAM (WHZ<-3 /oedema)	8	2.1	9	2.5	11	2.9	10	2.9	20	5.5	10	3.1
Oedema	1	0.2	1	0.2	1	0.2	0	0	9	23	4	1.1

Further analysis of the results indicates that, boys were about one and a half times more likely to be acutely malnourished (RR= 1.55; CI: 0.92 – 2.63; p=0.001 in riverine livelihood) in the surveyed population using weight for height <-2 Z score or presence of oedema. Similarly, more boys (15.7%) than girls (11.8%) from agropastoral livelihood were acutely malnourished but on the contrary, results of pastoral assessment show more girls (16.2%) than boys (13.5%) were acutely malnourished,. however results in the two livelihoods did not show any statistical difference between the two sexes (p>0.05).

#### 4.6.3 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 (2.2%)	26 (14.6%)	1 (0.6%)	16 (10.3%)	11 (6.7%)	21(12.8%)
18-29	5 (2.8%)	33 (18.9%)	5 (2.8%)	23 (13%)	9 (4.2%)	29 (13.6%)
30-41	4 (2.6%)	22 (14.5%)	8 (5.1%)	24 (15.3%)	9 (5.7%)	16 (10.2%)
42-53	2 (1.4%)	19 (13.7%)	5 (3.9%)	19 (14.9%)	1 (1.4%)	7 (5.1%)
54-59	2 (2.5%)	7 (8.9%)	2 (2%)	17 (17.1%)	1 (1.5%)	6 (9.5%)
<b>Total</b>	<b>17 (2.3%)</b>	<b>107(14.8%)</b>	<b>21 (2.9%)</b>	<b>99 (13.8%)</b>	<b>30 (4.1%)</b>	<b>79 (10.8%)</b>

Analysis of distribution of acute malnutrition between the different age groups showed a variation in risk of acute malnutrition. In the pastoral and riverine livelihoods, children in the age bracket of 18-29 and 54-59 months recorded the highest and lowest proportion of acutely malnourished children respectively. Among the agropastoral children in the age brackets of 6-17 months recorded low proportion of malnourished children while those in the age bracket of 30-41 had the low number of acutely malnourished children. Further analysis showed a significance difference in distribution of acute malnutrition between complementary food frequencies with those who were fed for fewer than four times in a day being more likely to be acutely malnourished than those who had been fed for more than three times. Results in the pastoral livelihood zone particularly showed that the children who had been fed for fewer than four times were about nearly two times more likely to be acutely malnourished than their counterparts, who had been fed for more than three times in the previous 24 hours prior to the assessment (RR=1.78; CI: 0.60-5.31; p=0.03)..

#### 4.6.4 Acute Malnutrition by MUAC

Based on MUAC measurements, acute malnutrition rates (MUAC< 12.5 cm or oedema) of 11.9% (CI: 6.7 – 17.1); 23% (CI: 14.1 – 31.8) and 19.1% (CI: 12.9 – 25.2) were reported in pastoral; agropastoral and riverine livelihoods respectively (Table 4.12) The MUAC results indicated lower rates of acute malnutrition when compared to WHZ Z score cut offs particularly in pastoral livelihoods, likely linked to physiological stature.

**Table 4.11 Child and Maternal Malnutrition by MUAC**

Among the assessed women; high acute malnutrition rates (MUAC< 23.0 cm) were recorded ranging from 28% in pastoral to 37.5% in the riverine livelihood system. A high proportion of pregnant women were also severely (MUAC<20.7 cm) at risk of acute malnutrition as indicated in Table 4.11. Pregnancy raises physiological and nutritional demands of women making them vulnerable to acute

<b>Malnutrition rates</b>	<b>Pastoral</b>		<b>Agropastoral</b>		<b>Riverine</b>	
	<i>No</i>	<i>% (CI)</i>	<i>No</i>	<i>% (CI)</i>	<i>No</i>	<i>% (CI)</i>
<i>Child MUAC</i>						
GAM (MUAC< 12.5 cm or oedema)	86	<b>11.9</b> (6.7 – 17.1)	164	<b>23</b> (14.2 – 31.8)	140	<b>19.1</b> (12.9 – 25.2)
SAM (MUAC< 11.0 cm or oedema)	14	<b>1.9</b> (0 – 4.0)	12	<b>1.7</b> (0 – 3.4)	23	<b>3.1</b> (1.6 – 4.6)
<i>Pregnant Women MUAC</i>						
Total acutely malnourished (MUAC< 23.0 cm)	N=82 23	<b>28</b>	N=86 27	<b>31.4</b>	N=96 36	<b>37.5</b>
Severely malnourished (MUAC≤ 20.7 cm)	4	<b>4.5</b>	6	<b>7</b>	4	<b>4.2</b>
<i>Non pregnant women MUAC</i>						
Total acutely malnourished (MUAC≤ 18.5 cm)	N=302 4	<b>1.3</b>	N=306 1	<b>0.3</b>	N=311 2	<b>0.6</b>
Severely malnourished (MUAC< 16.0 cm)	-		-		-	

malnutrition. Low acute malnutrition rates (<2%) were recorded among the non pregnant women.

**Table 4.12 Health status of the adult women**

	<i>Pastoral</i>		<i>Agro-pastoral</i>		<i>Riverine</i>	
Total women assessed	377		301		407	
Illness in the last 14 days						
None	147	39.5	44	14.6	166	40.7
ARI	18	4.7	13	4.3	14	3.4
Diarrhoeal	6	1.5	15	4.9	9	2.2
Malaria/febrile illness	58	15.3	61	20.2	50	12.2
Joint pain	51	13.5	103	34.2	96	25.5
Urinal	20	5.3	21	6.9	24	5.8
Organ	11	2.9	9	2.9	17	4.1
Anemia	63	16.7	32	10.6	22	5.4
Reproductive	1	0.2	1	0.3	3	0.7
Others	0	0	2	0.6	6	1.4
Reported to have received tetanus vaccine						
Yes	149	38.8	188	47.9	299	74.9
No	235	61.2	204	52.1	100	25.1

The large majority of the assessed women which included 60.5% of the pastoral, 85.4% of the agropastoral and 59.3% of the riverine women were reportedly ill fourteen days prior to the assessment. As indicated in table 4.12, the most commonly reported illness was suspected malaria diarrhoea, anaemia and joint pain. Tetanus vaccination was also low especially among the pastoral (38.8%) and agro-pastoral (47.9%) whereas the riverine had a higher vaccination rate with almost three quarters (74.9%) of the assessed women reporting to have received the vaccine.

#### 4.8 Retrospective Mortality

A total of 9111 persons, 2531 of them under fives from 1793 households were assessed for mortality in the three livelihood-based assessments. Out of these, a total of 88 deaths were reported, 53 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		568		654		571
Total Population assessed in HHs	867	2964	881	3271	783	2876
Number who joined the HHs	2	44	2	91	13	45
Number who left the HHs	4	54	10	61	14	56
Number of births	42	42	24	24	28	28
Number of deaths	14	24	18	35	21	29
<b>Mortality rate</b>	<b>1.82</b> (1.10- 3.01)	<b>0.90</b> (0.51 – 1.58)	<b>2.27</b> (1.50 – 3.45)	<b>1.19</b> (0.83 – 1.71)	<b>3.27</b> (1.97 – 5.39)	<b>1.08</b> (0.68 – 1.71)

The crude and U5 mortality rates among the pastorals were within the acceptable levels at **0.90** (0.51-1.58) and **1.82** (1.10- 3.01) /10,000/day respectively (WHO). In the agro-pastoral livelihood, the U5MR and CMR rates were both within the **serious** levels at **2.27** (1.50 -3.45) and **1.19** (0.83 – 1.71) respectively as were the rates among the riverine community at respective rates of **3.27** (1.97-5.39) and **1.08** (0.68 – 1.71)

Diarrhoeal diseases, ARI febrile illness and birth related complications were the main reported factors

associated with under-five mortality according to 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**

Qualitative information was collected from observations, focus group discussions and key informant interviews. A total of 6 focus group discussions were held with mothers and with men (elders). The discussions were centred on feeding care practices, healthcare and food security and sanitation issues. The team also stopped randomly at settlements along the road for brief assessments, including observation of livestock's conditions and movements.

The average breastfeeding duration was reportedly 12-18 months of age. Milk (from cow, camel or goat) and sugared water are introduced within the first week of birth. Most children are started on sugared water before 3 months. Complementary feeding of semi solid foods, usually sorghum porridge mixed with milk, is introduced at 6 months while solid foods are introduced at the age of 12 months. The average feeding frequency is up to 3 times a day. The common foods given to infants (0-2 years) are milk with water two times per day, sorghum or caanjera with tea 1-2 times a day. This therefore goes to show that child feeding and child care practices remain largely suboptimal. The main source of water for most households is open wells whose water is not treated and neither is drinking water treated at home. Most households do not have latrines; for those who have, it is shared between more than 10 persons. Children excreta waste is not disposed properly and it can be seen littered in the open areas in the homestead. . No food storage facilities are available; food is prepared and consumed at one sitting

The current FSAU Post Deyr '08/09 food security analysis indicates a mixed rainfall outcome in Juba regions, with parts recording near normal rainfall while others, particularly in Middle Juba, receiving poor rains. As a result, water availability and pasture condition is poor in both pastoral and agropastoral areas but good in riverine areas. This has led to the early migration of livestock from pastoral and agropastoral zones to riverine areas and Jorey of Badhadhe district. The livestock body condition is average while milk production is average to good in the regions. The overall cereal production is 20% and 30% of PWA in Lower and Middle Juba regions respectively. 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. However cultural beliefs sometimes also negatively affect breastfeeding. Lack of clean water, cooking and 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.

In Juba regions, high morbidity and the chronic problem of poor child care, limited access to safe water and lack of sanitation and health facilities remain key factors aggravating the nutrition situation. The ongoing conflict in the two regions is also likely to impact negatively on the nutrition situation, especially through the disruption of humanitarian activities such as food distribution and provision of health and selective feeding services. Among the adults in the district, the most common illness reported was joint pain. For children, diarrhoea, ARI and worms were reported as the most common illnesses. Health facilities are available in the urban centres and are run by humanitarian organizations including World Vision, International Medical Corps and MSF-Belgium and in collaboration with UN bodies (WHO, UNICEF, WFP). Access to health services by rural communities is limited owing to long distance while insecurity often disrupts delivery of services at the existing facilities.



## 5.0 Discussion

The results from the assessed pastoral populations livelihoods shows a sustained **Serious** nutrition levels according to WHO classification with a GAM rate of **14.9%** (CI: 12.1 – 19.4) and a SAM rate of **2.4%** (CI: 1.3 – 4.2) including two (0.2%) oedema cases recorded. Likewise, the agro-pastoral livelihood assessment, results show a **Serious** nutrition situation with a GAM rate of **13.9%** (8.3 – 19.5) and a SAM rate of **2.9%** (0.5 – 5.4) including 0.1% of oedema cases. However, the results from riverine community recorded a GAM rate of **10.9%** (CI: 8.8 – 13.5); that is within *Serious* levels, but due to a high severe acute malnutrition rate of **4.2%** (2.5-7.1) that included 13 (1.8%) cases of oedema, therefore the situation is classified as **Critical**. When compared with the past assessments, current results show a sustained *serious* nutrition situation in the pastoral population as was in July 2008 assessment when a GAM rate of 14.3% (CI 11.3 – 17.2) and SAM rate of 2.6% (CI: 1.4-4.7) including twelve (0.2%) oedema cases were reported. In the agro-pastoral livelihood, results shows an improvement from the *Critical* levels reported in July 2008 assessment when a GAM rate of 17.8% (CI: 13.7 – 22.9) and SAM rate of 2.2% (CI: 0.9 – 4.7) with (0.3%) oedema cases were reported. In the riverine livelihood, results shows deterioration from *Serious* to **Critical** levels reported the similar assessment in July 2008, when a GAM rate of 14.5% (CI: 11.7 – 17.7) and SAM rate of 2.2% (CI: 1.3 – 3.5) (0.3%) oedema cases were reported. 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 July 2008.

When estimated using WHO Anthro (2006) Reference standards, slightly higher GAM rates and almost double SAM rates than the NCHS (1978) Reference Estimates were noted. The pastoral livelihood reported GAM rate of 15.0% (CI: 11.5 – 19.4) and SAM rate of 4% (CI: 2.6 – 6.2), Agro-pastoral livelihood assessment reported GAM rate of 14.3% (CI: 8.7 – 19.1) and SAM rate of 4.2% (CI: 1.1 – 7.3), while among the riverine livelihood population a GAM rate of 12.1% (9.1– 17.2) and SAM rate of 5.1% (CI: 3.1 – 8.2) were reported. High levels of stunting ranging from 20.3% among the pastoral and 37.7% among the riverine population were recorded. Equally high underweight rates of 24.7%, 32.4% and 36.4% among pastoral, agro-pastoral and riverine livelihoods respectively were recorded and basing on WHO classification these rates indicate *serious* levels among the pastoral and *critical* levels in both agropastoral and riverine livelihoods zones.

Among the assessed women; high acute malnutrition rates were recorded among the pregnant women (MUAC < 23.0 cm) ranging from 37.5% in the Riverine to 27% in the agro-pastoral livelihood zones. Pregnancy raises physiological and nutritional demands of women making them vulnerable to acute malnutrition and this may partly explain the higher malnutrition rates among pregnant women. However, more investigation is required to explain the high malnutrition rates among the pregnant women. On the other hand, low acute malnutrition rates (<2%) were recorded among the non pregnant women. Morbidity among the women was high across the livelihoods, with 59.3- 85.4% of the women reportedly been sick two weeks prior to the assessment. Tetanus vaccination among the pastoral and agro-pastoral women was low at 38.8% and 47.9% respectively. However, a higher vaccination rate of 74.9% was recorded among the riverine women and this could be attributed to better services provided by the humanitarian agencies in the regions.

The crude and U5 mortality rates among the pastorals were within the acceptable levels at **0.90** (0.51-1.58) and **1.82** (1.10- 3.01) /10,000/day respectively (WHO). Similarly The U5MR and CMR rates were both within the **serious** levels at 2.27 (1.50 -3.45) and **1.19** (0.83 – 1.71) respectively in the agro-pastoral livelihood. While among the riverine community the U5MR of 3.27 (1.97-5.39) and CMR of 1.08 (0.68 – 1.71) were reported and they were both at **serious** levels. The most commonly reported causes of death included diarrhoea, suspected malaria and birth related complications.

The prevalence of diarrhoea in pastoral, agro-pastoral and riverine populations (25.4%; 21.6% and 28% respectively) were high within two weeks prior to the assessment. The prevalence of suspected measles ranged between 1.3% in agro-pastoral to 2.6% in pastoral livelihoods. High prevalence of ARI (18.1-28.9%) and suspected malaria or febrile illnesses (21.9-34.9%) were also reported in the three livelihoods (Table 4.4). Malaria is endemic in Juba regions with the current results of rapid diagnostic test for *Plasmodium. falciparum* indicating rates of 5.1%; 3.4% and 8.8% reported in the assessed Pastoral, Agro-pastoral and Riverine populations respectively. 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. 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 ARI were more likely to be acutely malnourished ( $p < 0.05$ ). Among the assessed households across pastoral, agropastoral and riverine livelihoods at 46%, 17.3 and 30.0% respectively this 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 44% as was coverage for vitamin A supplementation (42.9%) in the assessed pastoral population. Measles vaccination and vitamin A supplementation was equally low at 53.4% and 47.5% respectively among agro-pastoral. However, in the riverine livelihood, measles vaccination and vitamin A supplementation status were relatively higher at 69% and 60.4% respectively. Polio immunization status in the three livelihoods was higher at 87.1% to 91.8%. 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. Status for the health programmes (including polio immunization) fell below the recommended 95% level (Sphere, 2004) in the three livelihoods. Past studies, particularly vitamin A supplementation have associated these programmes, with improved immunity

However, results from the current assessments showed that 6.2% of the pastoral, 8.6% of agro-pastoral and 12.4% of the riverine population were consuming poorly diversified diets, which comprised of 3 or fewer 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 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.

The current FSAU Post *Deyr* '08/09 food security analysis indicates a mixed rainfall outcome in Juba regions, with parts recording near normal rainfall while others, particularly in Middle Juba, receiving poor rains. As a result, water availability and pasture condition is poor in both pastoral and agropastoral areas but good in riverine areas. This has led to the early migration of livestock from pastoral and agropastoral zones to riverine areas and Jorey of Badhadhe district. The livestock body condition is average while milk production is average to good in the regions. The overall cereal production is 20% and 30% of PWA in Lower and Middle Juba regions respectively. 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.

Poor feeding practices persist in Juba livelihoods like in other parts of Somalia and have been associated with high levels of malnutrition. The majority of the assessed children aged 6-8 months, 88.2% of the pastoral livelihood, 65% of agro-pastoral and 62% of riverine population, were fed for three times or less in a day. While those aged 9 months and above, 73.4% of the pastoral livelihood, 74.4% of agro-pastoral and 90% of riverine population had been fed for at least 3-4 times in a day. High morbidity rates were reported in the three livelihoods of Juba Valley with more than half of the assessed children reportedly falling ill in two weeks and one month for measles prior to the assessment in pastoral, agro-pastoral and the riverine population with (58.4%, 50.9% and 60.2% respectively) of the assessed children were reported to have fallen.

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**

Even though some recovery in the food security and nutrition situation in Juba have been noted, current results show persistence of unacceptable serious and critical levels of malnutrition. The poor nutrition and health situation in the study areas is attributed to multiple and interrelated factors that calls for integrated intervention efforts to address both immediate life saving needs in addition to developing longer term strategies to enhance access to basic services and support and sustain livelihood systems and social protection mechanisms. Specific recommendations include:

### **Immediate Interventions**

- Rehabilitation of acutely malnourished children through the existing selective feeding and outreach programs and active case finding until household food security is restored and critical public health issues are addressed. Capacity building of the existing MCH and the community to manage acutely malnourished children through locally available resources could be explored.
- Intervention programmes on improving water, sanitation and hygiene practices including health education to educate the community on domestic treatment of drinking water.
- Improving status for health programmes, especially for measles vaccination and vitamin A supplementation. Vigorous campaigns targeting the bulk of rural population are required in Bakool region. Care givers should also be trained on the need to let their children receive these services.
- Intensify nutrition and health education targeting children care givers with messages on the importance of exclusive breastfeeding, improved child-feeding practices appropriate health-seeking behaviour and improved hygiene & sanitation practices

### **Long term Interventions**

- Rehabilitation/protection of water systems including the well and water catchments. The community should be trained on sanitation of the water systems
- There is need for establishment or strengthening of health facilities and satellite services especially in rural villages where there are no health facilities
- 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 diet diversification, and improvements in household hygiene including health care practices.
- Provision of sanitation facilities through community participatory approaches coupled with awareness campaign on the importance of using such facilities.

- Implementation of mechanisms for regular water treatment at the source as well as at the household level.
- To initiate income generating activities to improve the socio-economic situation in Juba regions given that purchase is the main source of food.
- Canal rehabilitations, provision of irrigations pumps, fuel for irrigation and spare parts to the riverine communities in Juba Valley.

**QNO:**

## JUBA NUTRITION ASSESSMENT HOUSEHOLD QUESTIONNAIRE, DECEMBER 2008

Household Number \_\_\_\_\_ Date \_\_\_\_\_ Team Number \_\_\_\_\_ Cluster Number \_\_\_\_\_ Cluster Name \_\_\_\_\_  
 District: \_\_\_\_\_

**Q1-7 Characteristics of Household**

**Q1.** Household size<sup>7</sup>? \_\_\_\_\_

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

**Q3.** Sex of household head<sup>8</sup>? 1=Male 2=Female

**Q4a.** How long has this household lived in this locality? 1= Resident 2= IDP<3 months 3=IDP March '07 4=IDP before 2007

**b.** Are you hosting any recently (in the last 6 months) internally displaced persons? 1= Yes 2= No

**c.** If yes, Number of persons \_\_\_\_\_

**d.** If yes, what is the impact of IDPs on the household? 1=Receive food aid 2=Increased income for the household 3=Less resources available 4=

**Q5.** Does household have mosquito net? \_\_\_\_\_ 1= Yes 2= No

**Q6.** If yes, ask to see the net type: \_\_\_\_\_ 1= GFSOM label 2=Other

type 3= Not seen

**Q7.** What is the household's main source of income? 1= Animal & animal product sales 2= Crop sales/farming 3= Trade 4= Casual labour

5= Salaried/wage employment 6= Remittances/gifts/zakat 7= Others, specify

\_\_\_\_\_

**Q8-11 Feeding and immunization status of children aged 6 – 59 months in the household.**

<sup>7</sup> Number of persons who live together and eat from the same pot at the time of assessment

<sup>8</sup> One who controls and makes key decisions on household resources (livestock, assets, income, and food), health and social matters for and on behalf of the household members.

First Name	Age (months)	Q8 How many times do you feed the child in a day (besides breast milk)?  1= 1 time 2=2 times 3=-3 times 4= 4 times 5= 5 times	Q 9 Has child been provided with Vitamin A in the last 6 months?  (show sample)  1=Yes 2= No	Q10 Has child been Vaccinated against measles?  1=Yes 2= No	Q11 Has the child ever been given polio vaccine orally?  1=Yes 2= No
1					
2					
3					
4					

**Q12-27** Anthropometry and morbidity for children aged 6 – 59 months in the household

First Name	Q12a Age	Q13 Sex  1=Male 2=Female	Q14 Oedema  1=yes 2= No	Q15 Height (cm)  To the nearest tenth of a cm	Q16 Weight (kg)  To the nearest tenth of a kg	Q17 MUAC (cm)  To the nearest tenth of a cm  (≥6 mo)	Q18 Diarrhea <sup>9</sup> in last two weeks  1= Yes 2= No	Q19 Serious ARI <sup>10</sup> (Oof Wareen/Wareento) in the last two weeks  1=Yes 2= No	Q20 Febrile illness/ suspected Malaria <sup>11</sup> in the last two weeks  1=Yes 2= No	Q21 Suspected Measles <sup>12</sup> (Jadeeco): in last one month  1=Yes 2= No	Q22 Did the child sleep under a mosquito net last night?  1=Yes 2= No	Q23 Where did you seek healthcare assistance when child was sick? (If yes in Q18 – 21)  1=No assistance sought 2=Own medication 3=Traditional healer 4 = Sheikh / Prayers clinic/ 5=Private Pharmacy 6= Public health facility	Q24 Is the child currently registered any of the feeding centres  1= SFP 2= TFC 3= OTP/C 4= Other 5=None
1													

<sup>9</sup> Diarrhoea is defined for a child having three or more loose or watery stools per day

<sup>10</sup> ARI asked as oof wareen or wareento. The three signs asked for are cough, rapid breathing and fever

<sup>11</sup> Suspected malaria/acute febrile illness: - the three signs to be looked for are periodic chills/shivering, fever, sweating and sometimes a coma

<sup>12</sup> Measles (Jadeeco): a child with more than three of these signs– fever and, skin rash, runny nose or red eyes, and/or mouth infection, or chest infection

2													
3													
4													

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

Sno	Name	Age (years)	Received Tetanus vaccine? 1= Yes 2= No	MUAC (cm)	Physiological status 1=Pregnant 2= Non pregnant	Illness in last 14 days? If yes, what illness?
1	Mother:					

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

**Q 26 Food Consumption & Dietary Diversity**

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

Food group consumed: What foods groups did members of the household consume in the past 24 hours (from this time yesterday to now)? Include any snacks consumed.	Did a member of your household consume food from any these food groups in the last 24 hours?  1=Yes 0= No	*Codes: 1= Own production 2=Purchases 3=Gifts from friends/ relatives 4=Food aid 5=Bartered 6=Borrowed 7=Gathering/wild 8=Others, specify____ 9=N/A
<b>Type of food</b>		<b>What is the main source of the dominant food item consumed? (Use codes above)?</b>
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)?		
<b>Q27 In general what is the <u>main</u> source of staple food in the household? (*Use codes in 26 above) _____</b>		
<b>Q28 Total number of food groups consumed in the household: _____</b>		

**Q29** How many meals<sup>13</sup> has the household had in the last 24 hours (from this time yesterday to now)? 1= One                      2=Two                      3= Three

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

**Q30** What is the household's main source of drinking water? 1 = Tap/ piped water      2= Tanker truck    3= Tube well/ borehole    4= Spring      5= Bottled water

6= rooftop rainwater      7= Surface water (river, stream, dam, pond, open well; water catchments; berkad, etc)

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

**Q31b** Is water treated at the:      **a)** source?      1= Yes                      2= No                      **b)** storage level?                      1= Yes                      2= No

**Q31c** 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

**Q 32 Access to Health Care**

**Q32a** Do you have access to a health facility?

1 = Yes      2 = No

**Q32b** If yes, do you use it?                      1 = Yes    2 = No

**Q32c** If not, why not?                      1 = Too expensive                      2 = Too far                      3 = Not enough time                      4 = Others      specify

\_\_\_\_\_

<sup>13</sup> 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



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

### Appendix 2: Data collection form for Malaria

Date

District

Cluster Number

Cluster Name

Name of medical person of the team

Household number

Team Number


North

East

GPS Coordinates

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No	Name	Age	Sex	Treated for malaria in past 2 weeks?	Fever last 2 days?	BedNet Owner	BedNet User	Slept under net last night?	RDT result
		In MONTHS if < 1 year In YEARS if ≥ 1 year	M = Male F = Female	YES or NO	Yes or NO	Yes or NO	Yes or NO	Yes or NO	POSITIVE, NEGATIVE or INVALID


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### Appendix 3: Juba Mortality Questionnaire, December 2008

Household No: \_\_\_\_\_ Date: \_\_\_\_\_ Team No: \_\_\_\_\_ Cluster No: \_\_\_\_\_ Enumerator's Name: \_\_\_\_\_

No.	1: First Name	2: Sex <small>(1=M; 2=F)</small>	3: Age <small>(yrs)</small>	4: Born since <small>___ / 10/ 2008</small>	5: Arrived since <small>___ / 10/ 2008</small>	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 ___ / 10/ 2008? List them							
c) Do you have any member of the household who has died since ___ / 10/ 2008 List them							

#### Codes

- |  |   |   |
|--|---|---|
| <i>Reason for migration</i><br>1= Civil Insecurity<br>2= Food Insecurity<br>3= Employment<br>4=Divorce/ Married away<br>5=Visiting | 6= Hospitalised<br>7= In boarding school<br>8= Grazing/herding<br>9= Other, specify | <i>Cause of death</i><br>1= Diarrhoeal diseases<br>2= ARI<br>3= Measles<br>4= Malaria<br>5= STD/ HIV/AIDS |
| 6= Anaemia<br>7= Birth complications<br>8= Accident/ killed/ physical injuries<br>9= Hunger/starvation<br>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

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#### **APPENDIX 4: TRADITIONAL CALENDAR**

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

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

### Pastoral clusters

District	Geographical unit	Population size	Cluster No.	Livelihood	No. of HH required
Salagle	Buulahar	460	1	Pastoral	20
Salagle	Wargadudo	350	2	Pastoral	20
Salagle	Audhadhexe	370	3, 4	Pastoral	20
Salagle	Yacibuulo	440	5	Pastoral	20
Buale	Arabow	1100	6, 7	Pastoral	20
Buale	Warahadhobley	650	8	Pastoral	20
Afmadow	Afmadow	12500	9, 10, 11, 12, 13	Pastoral	20
Afmadow	Aw magan	470	14	Pastoral	20
Afmadow	Arbaqarso	360	RC	Pastoral	20
Afmadow	Qoqani	1200	15	Pastoral	20
Afmadow	Tabta	1600	16	Pastoral	20
Afmadow	Dobley	16000	17, 18, 19, 20, 21	Pastoral	20
Afmadow	Godaye	490	22	Pastoral	20
Kismayo	Canjeel	1500	23, 24	Pastoral	20
Kismayo	Gurmadka	360	25	Pastoral	20
Badhadhe	Jadeecadley	650	26	Pastoral	20
Badhadhe	Kulbiyo	600	27	Pastoral	20
Badhadhe	Bulo qoqan	500	28	Pastoral	20
Badhadhe	Madiyasha	500	RC	Pastoral	20
NB: RC stands for a cluster that you can use to replace inaccessible clusters.					

### Agropastoral clusters

District	Cluster name	Population size	Cluster No.	Livelihood	No. of HH required
Salagle	Salagle	6525	31, 32	Agropastoral	23
Salagle	Nuurgabo	650	33	Agropastoral	23
Salagle	Buulakulan	560	34	Agropastoral	23
Salagle	Gubokibir	540	35	Agropastoral	23
Salagle	Raamashilimey	515	36	Agropastoral	23
Sakow	Sakow town	10500	37, 38, 39	Agropastoral	23
Sakow	B/Cabdalla	200	40	Agropastoral	23
Sakow	Bagadey	605	41	Agropastoral	23
Sakow	L/buul	125	42	Agropastoral	23
Sakow	Bar Muumin Dhoorow	1250	43	Agropastoral	23
Sakow	Buulagaduud	600	44	Agropastoral	23
Hagar	Hagar town	3680	45	Agropastoral	23

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Jilib West	Hargaisa	4000	46	Agropastoral	23
Jilib West	Bilisa	2550	47	Agropastoral	23
Jilib West	Gududei	5540	48, 49	Agropastoral	23
Jamame	Kamsuuma	2000	50	Agropastoral	23
Jamame	Bangeeni	1680	51	Agropastoral	23
Jamame	Aqabataa	300	52	Agropastoral	23
Jamame	Buulo Jeele	430	53	Agropastoral	23
Kismayu	Khamkham	850	54	Agropastoral	23
Kismayu	Bulo Haji	8422	55,56	Agropastoral	23
Kismayu	Jana Abdall	500	57	Agropastoral	23
Badhadhe	Ramato	500	58	Agropastoral	23
Badhadhe	Kaamboni	3000	59	Agropastoral	23

**Riverine clusters**

<b>District</b>	<b>Cluster name</b>	<b>Population size</b>	<b>Cluster No.</b>	<b>No. of HH required</b>
Sakow	Kooraar	150	61	21
Sakow	Hiloari	400	62	21
Bualle	BU'AALE	7500	63,64	21
Bualle	Dalxiis	170	65	21
Bualle	Hurufle	440	66	21
Bualle	Raxoole	845	67	21
Jilib West	Dadeyle	195	68	21
Jilib West	Mareri	5650	69	21
Jilib West	Libanga	725	70	21
Jilib West	Bashir Malambo	202	71	21
Jilib East	JILLIB Town	11520	72, 73	21
Jilib East	Mubaarak	1665	74	21
Jilib East	Fanoole + nomadic	1050	75	21
Jilib East	Jlija+nomadic	895	76	21
Jilib East	Helashiid	625	77	21
Jilib East	Madhooka	670	78	21
Jilib East	Kumbareere	470	79	21
Jilib East	Sabatuuni	1250	80	21
Jamaame	Araare	1200	81	21
Jamaame	Lokane 2	850	82	21
Jamaame	Buulo farxaan	400	83	21
Jamaame	Mogaanboo	2700	84	21
Jamaame	Masaagyaroo	900	85	21
Jamaame	Makalaangoo	2200	86	21
Jamaame	Barka dhuroo	900	87	21

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**Appendix 5b. Juba Assessment Team – Dec 2008**

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	Mukhtaar sheikh Ali	SRCS	Enumerator	Jilib west
2	1	Hassan Sayid	Mercy USA	Supervisor	Jilib East
	2	Abdirashid warsame Hasan	JAF	Team leder	Jilib East
	3	Suleyman Sheikh Mohamed	Mercy USA	RDT Nurse	Jilib East
	4	Mohamed omar Mohamed	Mercy USA	Enumerator	Jilib East
	5	Mohamed dhaqane Moalim	Community	Enumerator	Jilib East
3	1	Hasan Mohamed Hasan	Muslim Aid Uk	Supervisor	Jamame East/West
	2	Faduma A. Muse	Muslim Aid Uk	Team leder	Jamame East/West
	3	Salah abdikadir haydar	Muslim Aid Uk	RDT Nurse	Jamame East/West
	4	Mohamed salah Mohamud	Juba Foundation	Enumerator	Jamame East/West
	5	Mohamed Hashi Hersi	Juba foundation	Enumerator	Jamame East/West
4	1	Mohamed Abdi Narijin	Juba youth	Supervisor	Kismayu
	2	Abdiasis Haji Ali	PCDDO	Team Leader	Kismayu
	3	Abdoi Moge hassan	SRCS	RDT Nurse	Kismayu
	4	Ismail sabriyeMohamed	PCDDO	Enumerator	Kismayu
	5	Nastexo Cawil Hussien	JAF	Enumerator	Kismayu
5	1	Omar Hassan Nour	DIAL	Supervisor	Badhadhe
	2	Abdi Gedi Mohamed	DIAL	Team leder	Badhadhe
	3	Abdifatah dahir hassan	SRCS	RDT Nurse	Badhadhe
	4	Abdirashid Abdi Mohamed	DIAL	Enumerator	Badhadhe
	5	Maktal Mohamed Moalim	Authoriy	Enumerator	Badhadhe
6	1	Muxiyidin Ahmed Abdi	SAF	Supervisor	Afmado
	2	Ahmed Sheikh Mohamed	AFREC	Team leder	Afmado
	3	Ibrahim Hasn Omar	AFREC	RDT Nurse	Afmado
	4	Salah Abdulahi sanbul	APD	Enumerator	Afmado/Hagar
	5	Ubax Matan Abdi	WRRS	Enumerator	Afmado/Hagar
7	1	Mohamed Yusuf Qodow	Afrec	Supervisor	Afmadou/Dhobley
	2	Shakir Aden Muse	WRRS	Team leder	Afmadou/Dhobley
	3	Deqo Siraad ali	EIRG	RDT Nurse	Afmadou/Dhobley
	4	Sahro Abdi hasan	Afrec	Enumerator	Afmadou/Dhobley
	5	Daud Ali	Community	Enumerator	Afmadou/Dhobley



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8	1	Sheikh Bashir moahamed	WVI	Supervisor	Buale
	2	Isniino Ali Muse	WVI	Team leder	Buale
	3	Mowlid dahiye Hussein	WVI	RDT Nurse	Buale
	4	Dhubow farah Mohanmed	Community	Enumerator	Buale
	5	Mohamed mohamud cilmoge	WVI	Enumerator	Buale
9	1	Mohamed Shimoy Gure	WVI	Supervisor	Salagle/Sakow
	2	Shafi Aden Ibrahim	WVI	Team leder	Salagle/Sakow
	3	Abdi Siraad Khalif	WVI	RDT Nurse	Salagle/Sakow
	4	Hussein Abdi borle	Health broad	Enumerator	Salagle/Sakow
	5	Hassan Abdulkadir Mohamed	WVI	Enumerator	Salagle/Sakow
	6	Said Muse jamac	Community	Enumorator	Salagle/Sakow
10	1	Aweys Sheikh Mohamed	FSAU data assisstant	Supervisor	Saakow
	2	Abdi Ibrahim Mohamed	WVI	Team Leader	Saakow
	3	Hassan abdi Ali	WVI	RDT Nurse	Saakow
	4	Abdikadir Mohamed Ahmed	Authority	Enumerator	Saakow
	5	Abdulahi Diriye Ibrahim	WVI	Enumerator	Saakow
	1	Joseph Waweru	FSAU, Nairobi	Coordinator	
	2	Mohamed Borle	FSAU, Nairobi	Coordinator & report witting	
	3	Ibrahim Mohamud M	FSAU,Kismayu	Coordinator	All

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**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: \_\_\_\_\_

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### **Appendix 7. Assessments Quality checks**

	Pastoral	A gro-pastoral	Riverine
Digit Preference score-Weight			
Digit Preference score-Height			
Age preference			
SD of WHZ			
Skewness of WHZ			
Kurtosis of WHZ			
Percent of flags			
Age groups (6-29)			
Age Groups(30-59)			
Sex Ratio (M/F)			
Overall score			

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