



**Nutrition Surveillance**  
**Karamoja Region,**  
**Uganda**  
**Round 5, May 2011**



## Acknowledgments

Action Against Hunger (ACF-USA) acknowledges the support provided by the District Health Offices of Kaabong, Abim, Kotido, Moroto/Napak, Amudat and Nakapiripirit, in the collection and analysis of data.

ACF would like to thank the United Nations Children's Fund (UNICEF) for providing the funding to implement the Nutrition Surveillance System in Karamoja Region.

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# 1 Introduction

## 1.1 Background information

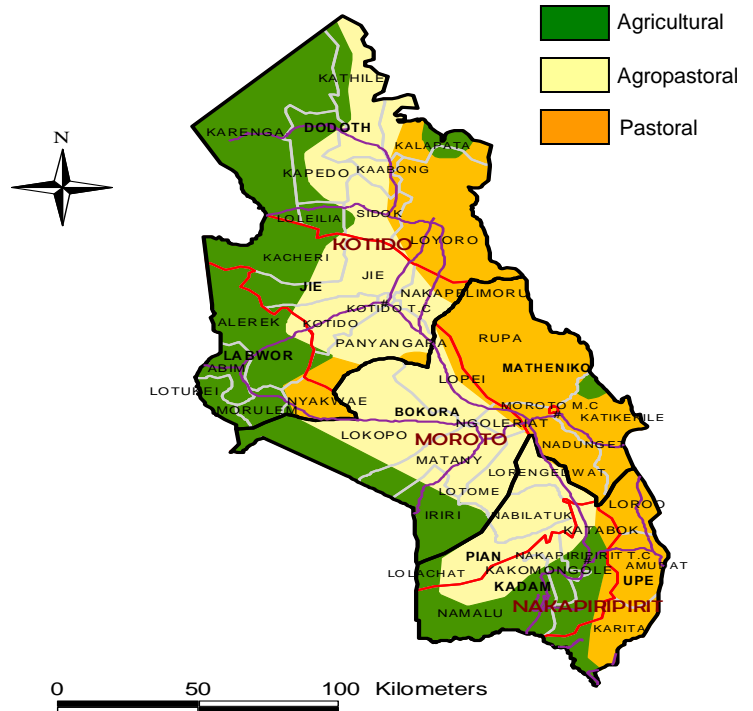
Located in North Eastern Uganda, the Karamoja region is divided in seven administrative units (districts) that overlap with three main livelihood zones (agricultural, agro-pastoral and pastoral, **Figure 1**). The Karamoja population is 1,152,464 with district population estimate being:

**Table 1: Karamoja Population Figures**

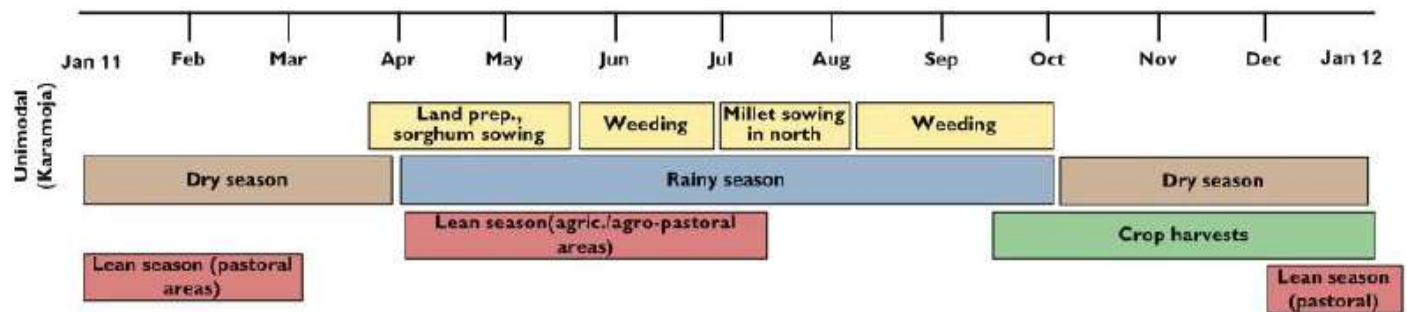
District	Total population
Kaabong	266,707 <sup>1</sup>
Abim	111,989 <sup>4</sup>
Kotido	170,738 <sup>2</sup>
Moroto/Napak	322,057 <sup>3</sup>
Nakapiripirit	176,114 <sup>4</sup>
Amudat	104,859 <sup>1</sup>
<b>Total</b>	<b>1,152,464</b>

Karamoja is a uni-modal region having one rainy season between April and October (**Figure 2**).

Despite instances of heavy rains in June, the overall rainfall remained below average throughout the beginning of the rainy season. This rain pattern caused an initial delay in planting and now that rains have averaged, some farmers have been able to replant their fields. Crop harvests in September will depend on the performance of the rains through August<sup>5</sup>.



**Figure 1: Karamoja region livelihood zones mapping<sup>5</sup>**



**Figure 2: Seasonal Calendar Karamoja 2011 FEWS NET<sup>6</sup>**

<sup>1</sup> World Vision 2009 village population data  
<sup>2</sup> Kotido district 2009 village population data  
<sup>3</sup> Samaritan Purse 2009 village population data  
<sup>4</sup> WFP 2009 village population data  
<sup>5</sup> www.fewsnat.org  
<sup>6</sup> FEWS NET, May 2011: Uganda food security outlook update



The expected lifting of the Foot and Mouth Disease quarantine in the “cattle corridor”<sup>7</sup> at the end of June is likely to alleviate the impact of low crop production on pastoral and agro-pastoral households, as the resumption of cattle sales will enable these sectors to purchase food.

Overall, households in the pastoral and agro-pastoral areas of Amudat, Kaabong, Kotido, Moroto, Nakapiripirit and Napak are likely to remain ‘stressed’ (IPC Phase 2) through to September<sup>6</sup>.

Increases in food prices have been observed since January 2011 impacting negatively on the household purchasing power in the region<sup>6</sup>.

A Hepatitis E outbreak has been confirmed in Kaabong, Moroto and Kotido on 7<sup>th</sup> June 2011 by the Ministry of Health. At the time of this report, 908 cases had been reported in the affected districts<sup>8</sup>. The mode of transmission is faecal-oral, usually through faecally contaminated water, poor food preparation and hygiene practices. Pregnant women in their final trimester are most at risk of complications, there is no vaccine for Hepatitis E.

The fifth round of surveillance in Karamoja region was conducted throughout May 2011 jointly with six District Health Offices (DHOs). Data were collected the first week of May in North Karamoja (Kaabong, Abim, and Kotido) and the third week of May in South Karamoja (Nakapiripirit, Amudat, Moroto/Napak), immediately after the National Polio Campaign.

## 1.2 Nutrition Surveillance Objectives

The nutrition surveillance system was designed:

- to monitor the overall nutritional status of children aged between 6 and 59 months,
- to identify rates of acute malnutrition among children 6 to 59 months of age,
- to monitor health and morbidity, food security (FS), and water, sanitation and hygiene (WASH) factors linked to acute malnutrition,
- to collect data three times a year in May, August/September and December,
- to build the capacity of district nutrition focal persons (DNFP) and health workers on implementing and running a nutrition surveillance system, and
- to strengthen DHOs skills to identify acute malnutrition trends, through the monitoring of aggravating factors of acute malnutrition, and contributing to the design of appropriate interventions accordingly.

## 1.3 Nutrition Surveillance Methodology

Household was the sampling unit with a sample size of 300 households per district. The sample size of 300 was calculated for ensuring that variations of acute malnutrition of minimum 4% would be detected between two rounds of data collection, using the CDC “2 surveys” calculator.

A multi-stage cluster sampling method was used to select the 300 households per district with a 25 clusters of 12 households design (more details in **Annex 3**).

For each given district, village populations were entered in ENA software for random selection of clusters.

For each selected village, a ballot system was used to randomly select one manyatta, and then to randomly select one section of the manyatta.

A ballot system was used to randomly select 12 households (households list of the manyatta’s section provided by the village leader).

Data were entered into ENA for SMART (May 4<sup>th</sup>, 2011 version) to determine nutritional indicators of WHZ, WAZ and HAZ using WHO 2006 Growth Standards. Design weights were added to each district (total

<sup>7</sup> The ‘cattle corridor’ ranges from the south-western areas of Mbarara, Sembabule and Rakai Districts through the mid-central Districts of Soroti, Kumi and Nakasongola, to the north-east, in the Karamoja region.

<sup>8</sup> 908 hepatitis cases admitted at Kaabong hospital reported the Kaabong District Health Office.



population divided by number of respondents, **Annex 3**) to perform a regional weighted analysis (with ENA for SMART).

CDC Calculators using MS Excel 2007 were employed to identify threshold estimates, and to perform two surveys t-test to compare May 2011 results with results obtained from former rounds. NCHS 1977 Reference are presented in Annex 6 in order to be able to compare earlier surveys.

Data on children identified with flagged reference values for WHZ were checked and confirmed to be correct prior to inclusion into analysis. Any data that could not be confirmed would not be included into analysis so as not to skew results. In May 2011, all outliers were confirmed and included into analysis.

## 2 Results

A total of 1795 out of the 1800 selected households were interviewed (questionnaires in **Annex 4**), and 1890 children (6 to 59 months) were screened. **Table 2** lists the sample size obtained for each district and contains information about missing children, absent households, and households' replacement (abandoned house). The results show that there is a child:household ratio of 1.05:1.

**Table 2: Information related to sample size, replaced/absent households and missing children.**

	Kaabong	Kotido	Abim	Moroto/Napak	Amudat	Nakapiripirit	Karamoja
Households interviewed	300	300	300	295	300	300	1795
Children measured	306	341	303	354	302	284	1890
Replaced households	0	0	0	0	0	0	0
Absent households	0	0	0	5	0	0	0
Missing children	0	4	0	1	2	2	9

Regional gender ratio was 0.97:1, male to female respectively. Age ratio (6-29 months/30-59 months) was 1.46:1. At district level, Kotido with an age ratio equal to 2.2 (significantly above an expected value of 1.0) contributed to the high age ratio across the region. (**Annex 5**). A high age ratio indicates an over representation of children below 30 months. In Karamoja, age estimation is more difficult with children closer to 59 months because of an often poor parental recall of birthdays and lack of documented birthdates such as immunization cards. Therefore, over concerns of including children older than 59 months, larger/taller children are presumed to exceed 59 months and are excluded from screening which may lead to the high age ratio.

### 2.1 Anthropometric Indicators

- The prevalence of Global Acute Malnutrition (GAM) and Severe Acute Malnutrition (SAM) obtained for each district and for Karamoja region are presented in **Table 3**. Karamoja region had an overall prevalence of **GAM** of **12.8%** (11.0% - 14.9%), and of **SAM** of **2.8%** (2.1 % - 3.9%) based on weight-for-height z-scores results (WHO standards, CI 95%).
- Across Karamoja, **Nakapiripirit district** recorded the worst indices, i.e., the highest prevalence of GAM 20.4% (16.0% - 25.6%), and the highest prevalence of SAM 5.6% (3.5% - 6.9%) based on weight-for-height z-scores results (**Table 3**); the prevalence of **underweight** was 32.0% while that of **stunting** was 38.7% (**Table 4**).
- Kotido district recorded the second highest prevalence of GAM 14.1% (10.5% -18.8%) and Abim the second highest prevalence of SAM 3.0% (1.5% - 5.7%).

**Table 3: Acute Malnutrition (wasting) among 6- to 59-month children per district, WHO 2006 Standards**

Indicator	Kaabong	Kotido	Abim	Moroto/Napak	Amudat	Nakapiripirit	Karamoja
<b>GAM</b> W/H < -2 z and/or	<b>8.5%</b> (5.8% - 12.3%)	<b>14.1%</b> (10.5% - 18.6%)	<b>8.6%</b> (5.7% - 12.7%)	<b>13.3%</b> (8.9% - 19.3%)	<b>11.9%</b> (7.9% - 17.7%)	<b>20.4%</b> (16.0% - 25.6%)	<b>12.8%</b> (11.0% - 14.9%)
<b>SAM</b> W/H < -3 z and/or oedema	<b>2.3%</b> (1.0% - 5.0%)	<b>2.3%</b> (1.3% - 4.3%)	<b>3.0%</b> (1.5% - 5.7%)	<b>2.3%</b> (0.8% - 5.9%)	<b>1.0%</b> (0.2% - 4.4%)	<b>5.6%</b> (3.5% - 6.9%)	<b>2.8%</b> (2.1% - 3.9%)

**Table 4: Chronic (stunting) and Underweight among 6- to 59-month children per district, WHO 2006 Standards**

Indicator	Kaabong	Kotido	Abim	Moroto/Napak	Amudat	Nakapiripirit	Karamoja
<b>Stunting</b> H/A < -2 z	35.0% (26.0% - 45.2%)	48.1% (43.0% - 53.2%)	38.3% (30.0% - 47.3%)	52.3% (46.0% - 58.5%)	8.6% (4.5% - 15.9%)	38.7% (30.9% - 47.2%)	40.3% (36.7% - 44.1%)
<b>Underweight</b> W/A < -2 z	25.8% (18.4% - 34.9%)	37.2% (31.0% - 43.9%)	24.8% (19.3% - 31.2%)	34.7% (28.8% - 41.3%)	9.3% (5.7% - 14.6%)	32.0% (24.5% - 40.6%)	29.4% (26.3% - 32.6%)

**Table 5: MUAC Results of Children >65cm per district**

Indicator	Kaabong	Kotido	Abim	Moroto/Napak	Amudat	Nakapiripirit
<b>GAM</b> (<125 mm)	<b>6.9%</b> (4.1% - 11.2%)	<b>13.2%</b> (9.6% - 17.9%)	<b>9.6%</b> (6.4% - 14.1%)	<b>11%</b> (6.8% - 17.4%)	<b>4.3%</b> (2.2% - 8.2%)	<b>18.3%</b> (12.9% - 25.4%)
<b>SAM</b> (<115 mm)	<b>1.0%</b> (0.3% - 3.1%)	<b>4.1%</b> (2.4% - 7.0%)	<b>1.3%</b> (0.5% - 3.4%)	<b>2.5%</b> (1.1% - 5.5%)	<b>0.3%</b> (0.0% - 2.6%)	<b>6.3%</b> (4.0% - 9.8%)

Classification of malnutrition categorized by interpretation levels shown in **Table 6** are based on the following<sup>9</sup>:

- Wasting: acceptable (0-5%) / poor (5%-10%) / serious (10%-15%) / critical (greater than 15%);
- Stunting: acceptable (less than 20%) / poor (20%-30%) / serious (30%-40%) / critical (greater than 40%);
- Underweight: acceptable (less than 10%) / poor (10%-20%) / serious (20%-30%) / critical (greater than 30%).

**Table 6: GAM expressed according to the WHO classification of malnutrition prevalence**

Indicator	Kaabong	Kotido	Abim	Moroto/Napak	Amudat	Nakapiripirit	Karamoja
<b>Wasting</b>	poor	serious	poor	serious	serious	critical	serious
<b>Stunting</b>	serious	critical	serious	critical	acceptable	serious	critical
<b>Underweight</b>	serious	critical	serious	critical	acceptable	critical	serious

Out of the children included into the surveillance results a total of 145 malnourished children were identified and referred to health centres during data collection process (55 SAM and 90 MAM referrals, **Table 7**).

**Table 7: Children (6 to 59 months) referred to feeding program during surveillance**

	Kaabong	Kotido	Abim	Moroto/Napak	Amudat	Nakapiripirit	Karamoja
OTP	4	16	5	11	4	15	55
SFP	11	17	9	17	9	27	90
Total	15	33	14	28	13	42	145

<sup>9</sup> WHO. 2000. *WHO Complementary feeding: Family foods for breastfed children*.

At the time of the survey, there were 142 children (7.5%) currently enrolled in a Supplementary Feeding Program (SFP) and 37 children (2.0%) currently admitted in an Out-patient Therapeutic Program (OTP, Table 8).

**Table 8: Children (6 to 59 months) currently enrolled in a feeding program at the time of the survey**

	Abim	Amudat	Kaabong	Kotido	Moroto/Napak	Nakapiripirit	Karamoja
OTP	5	1	5	15	5	6	37
SFP	27	4	12	58	23	18	142
Total TFP	32	5	17	73	28	24	179

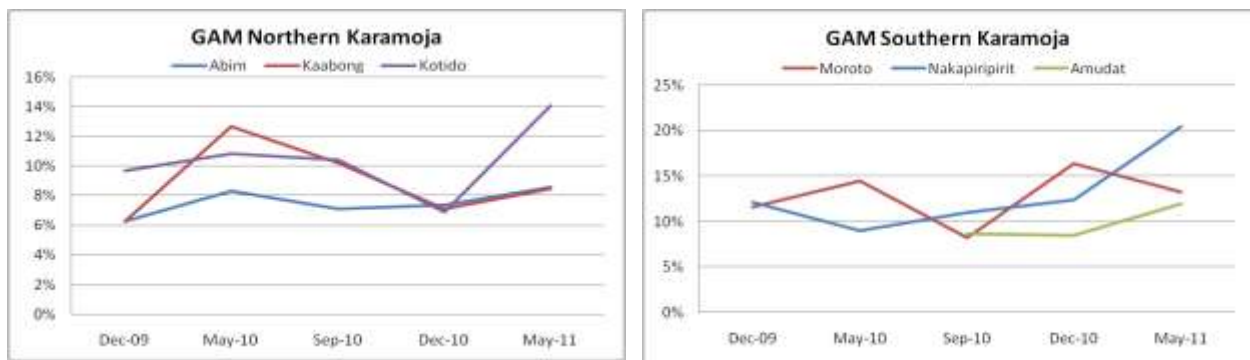
### 2.1.1 Nutrition Indicators December 2009 – May 2011

In order to compare data with former rounds of nutritional surveillance, all previous anthropometric data was re-analysed using the current version of ENA for SMART.

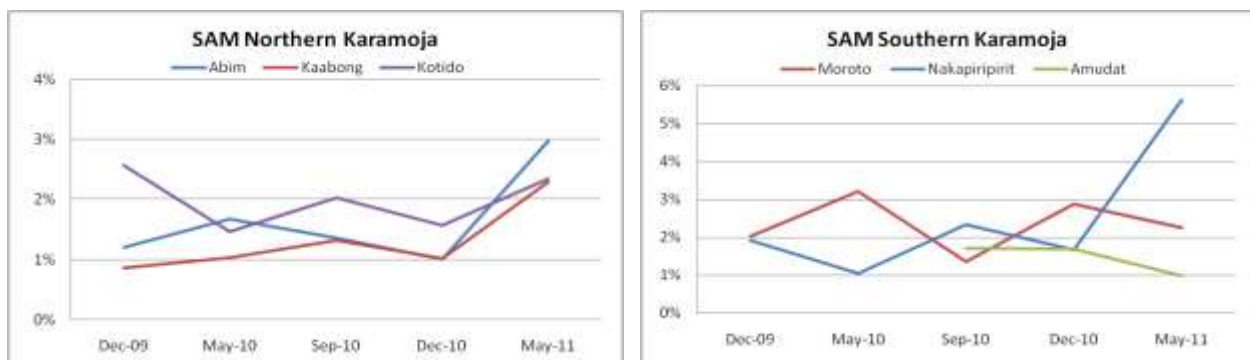
Compared to the last round of Surveillance (December 2010), the prevalence of **GAM** has not significantly changed with the exceptions of:

- **Nakapiripirit** district, where prevalence of GAM significantly increased from **12.4%** (8.5% - 17.8%) to **20.4%** (16.0% - 25.6%), ( $p < 0.05$ ); and increase of the prevalence of SAM from **1.7%** (0.7% - 3.8%) to **5.7%** (3.5% - 6.9%), ( $p < 0.05$ ).
- **Kotido** district, where prevalence of GAM significantly increased from **6.9%** (4.3% - 10.8%) to **14.1%** (10.5% - 18.6%), ( $p < 0.05$ )
- May 2010 and May 2011 identified as the hunger gap periods of the year and this can be seen
- Through the trend analysis from the past rounds (**Figures 3 and 4**).

**Figure 3: Rates of GAM in Karamoja from December 2009 to May 2011**



**Figure 4: Rates of SAM in Karamoja from December 2009 to May 2011**



## 2.1.2 Nutrition Indicators by Livelihood Zones

Prevalence of GAM and SAM obtained for each Livelihood Zone (LHZ) of Karamoja region are presented in **Table 9**. Although there was no significant difference between LHZs, the agricultural area recorded the worst indices with prevalence of GAM equal to 13.8% and of SAM equal to 3.5%.

**Table 9: Acute Malnutrition (wasting) by Livelihood Zones, WHO 2006 Standards**

INDICATOR	AGRICULTURAL	AGROSPASTORAL	PASTORAL
<b>GAM</b> W/H < -2 z and/or oedema	<b>13.8%</b> (10.5% - 17.9%)	<b>13.1%</b> (9.3% - 18.3%)	<b>12.0%</b> (9.5% - 15.1%)
<b>SAM</b> W/H < -3 z and/or oedema	<b>3.5%</b> (2.3% - 5.5%)	<b>2.3%</b> (1.1% - 5.0%)	<b>2.3%</b> (1.4% - 3.8%)

**Table 10: Chronic (stunting) and Underweight per Livelihood Zone, WHO 2006 Standards**

INDICATOR	AGRICULTURAL	AGROPASTORAL	PASTORAL
<b>Stunting</b> H/A < -2 z	38.5% (32.4% - 45.0%)	42.4% (36.1% - 49.0%)	38.1% (31.4% - 45.3%)
<b>Underweight</b> W/A < -2 z	28.0% (22.8% - 33.9%)	28.7% (23.0% - 35.1%)	30.0% (24.7% - 35.8%)

## 2.1.3 CDC Calculator

The CDC calculator was used to further analyse the prevalence of GAM and SAM for each district, and results were calculated taking into account the number of clusters, the design effect, and GAM and SAM point estimates (WHO standards, no exclusion). Results presented in **Table 11** give GAM thresholds with 85% probability to be exceeded, e.g., in Nakapiripirit district, there was 85% probability that GAM exceeds 18.0% and that SAM exceeds 4.3% (**Table 12**). One may note that there was 99% probability that GAM exceeds the emergency threshold of 15% GAM in that district.

**Table 11: Prevalence of GAM Probability thresholds as per the CDC Probability Calculator**

Threshold Value	KAABONG	KOTIDO	ABIM	MOROTO NAPAK	AMUDAT	NAKAPIRIPIT
5.0%	100%	100%	100%	100%	100%	100%
7.0%	84%	100%	85%	100%	99%	100%
7.5%	74%	100%	76%	100%	98%	100%
10.0%	20%	99%	22%	93%	80%	100%
11.0%	9%	95%	10%	84%	65%	100%
12.0%	4%	87%	4%	71%	48%	100%
12.5%	2%	80%	0%	63%	40%	100%
15.0%	0%	33%	0%	26%	12%	99%
17.5%	0%	6%	0%	7%	3%	89%
18.0%	0%	4%	0%	5%	2%	85%
20.0%	0%	1%	0%	2%	1%	57%
22.5%	0%	0%	0%	0%	0%	20%
25.0%	0%	0%	0%	0%	0%	4%

**Table 12: Prevalence of SAM Probability thresholds as per the CDC Probability Calculator**

Threshold Value	KAABONG	KOTIDO	ABIM	MOROTO NAPAK	AMUDAT	NAKAPIRIPIT
0.25%	100%	100%	100%	100%	98%	100%
0.47%	100%	100%	100%	100%	85%	100%
0.5%	100%	100%	100%	100%	83%	100%
1.0%	98%	99%	100%	96%	50%	100%
1.5%	87%	87%	98%	81%	29%	100%
1.6%	85%	85%	97%	77%	26%	100%
2.0%	64%	65%	88%	61%	17%	100%
2.5%	41%	41%	70%	43%	10%	100%
3.0%	24%	24%	50%	29%	6%	99%
4.0%	7%	7%	20%	12%	2%	91%
4.3%	5%	5%	10%	7%	1%	85%
5.0%	2%	2%	7%	5%	1%	68%
7.5%	0%	0%	0%	0%	0%	12%

Legend:

Impossible
Improbable
Probable
Very probable

## 2.2 Health Indicators

### 2.2.1 Morbidity Results

Acute infections are intrinsically linked to acute malnutrition. Malnutrition lowers the immunity of the child making them more susceptible to infections and illness, while infections and illness use the child's already limited nutritional resources causing malnutrition. The combination of both malnutrition and illness creates a downward spiral. Acute malnutrition also increases the risk of death from infections for up to 8 times for a severely malnourished child as compared to a normally nourished child with infections.

What was identified through surveillance is that infections are having a significant impact on the nutritional status of children in Karamoja.

Occurrence of illness within the two weeks prior the survey was high especially in North Karamoja (above 70% in Kaabong, and close to 80% in Abim and Kotido). Amudat had the least 6- to 59-month children being affected by a disease within the two weeks the survey (55%, **Table 13**).

**Table 13: Occurrences of illness among 6- to 59-month children (in the past 2 weeks prior the survey)**

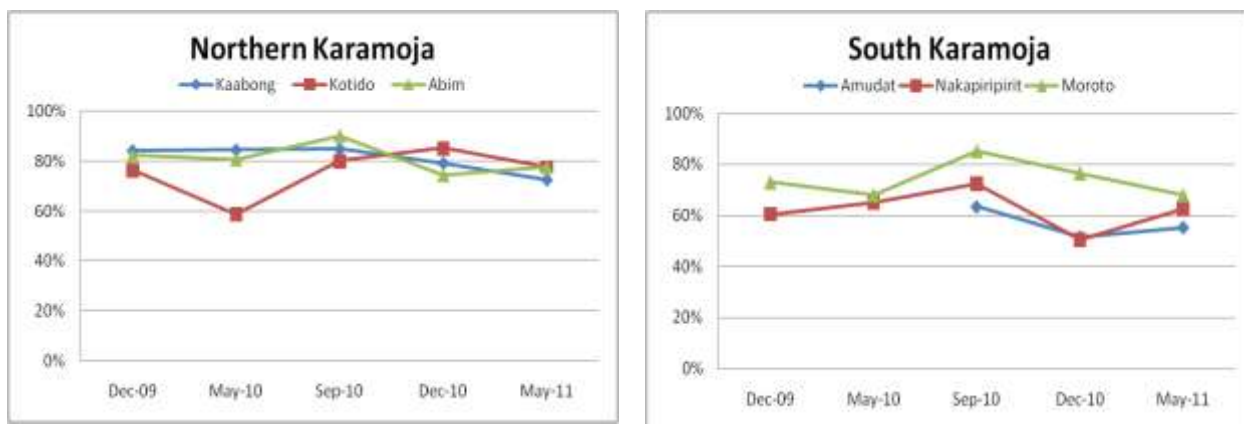
	Kaabong	Kotido	Abim	Moroto/Napak	Amudat	Nakapiripirit
illness	72.5%	77.7%	77.6%	68.1%	55.3%	62.3%

Malaria was the most frequent disease (**Table 14**) followed by diarrhoea and Acute Respiratory Infection (ARI). It should be noted that significant numbers of children had co-morbidities or more than one illness recorded in the previous 2 weeks to the surveillance.

**Table 14: Diagnosis for children with recorded illness in past 2 weeks**

	Kaabong	Kotido	Abim	Moroto/Napak	Amudat	Nakapiripirit
<b>Malaria</b>	66.7%	55.5%	77.4%	45.2%	58.7%	63.3%
<b>Diarrhoea</b>	51.4%	65.3%	44.7%	62.2%	38.3%	51.4%
<b>ARI</b>	43.7%	65.3%	46.8%	58.5%	44.3%	53.1%

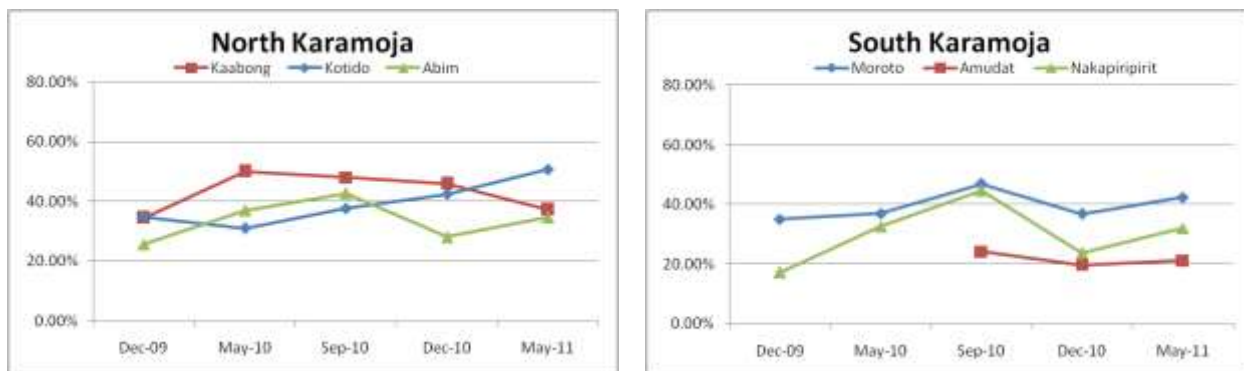
Compared to former rounds, there was no significant difference in childhood illnesses except for Kotido district where occurrence of illness increased from 58.7% in May 2010 to 77.7% in May 2011 (**Figure 5**).



**Figure 5: Morbidity trends from December 2009 through May 2011 in North (left panel) and South (right panel) Karamoja**

Malaria incidence had not significantly varied throughout the rounds except for an increase in Kaabong and Abim, from 56.7% and 58.1% in December 2010 to 66.4% and 77.4% respectively in May 2011 (data not shown).

Diarrhoea showed to be on a continuous rise since December 2009 Karamoja wise, e.g. from 17.5% to 51.4% in Nakapiripirit between December 2009 and May 2011; and increased importantly especially in Kotido and in Moroto/Napak since December 2010 (**Figure 6**).



**Figure 6: Trends of occurrence of diarrhoea from December 2009 through May 2011 in North (left panel) and South (right panel) Karamoja**

Acute Respiratory Infection (ARI) decreased significantly in Abim and Kaabong districts in May 2011 (43.5% and 46.8% respectively) compared to December 2010 (65.3% and 58.8% respectively); and increased in Moroto/Napak from 33.0% (December 2010) to 58.1% (May 2011, data not shown).

While malaria showed to be the most common illness, rates of malaria between malnourished and normal children did not vary greatly with 41.5% for normal children and 46.1% for acutely malnourished children.

Acute respiratory infection has a 12% variation between normal children and those with acute malnutrition. Normal children recorded rates of 34.9%, while acutely malnourished children recorded a higher incidence of respiratory infections of 46.9%.

Diarrhoea showed to have the greatest correlation to rates of malnutrition in each of the districts, with a regional wide difference of 53.1% and 34.5% for malnourished children and children classified as normal respectively.

The difference between normal and acutely malnourished children and rates of diarrhoea has shown to be consistent over the five rounds of surveillance ranging from 11.8% to 18.6%.

## 2.2.2 ITN Possession and use results

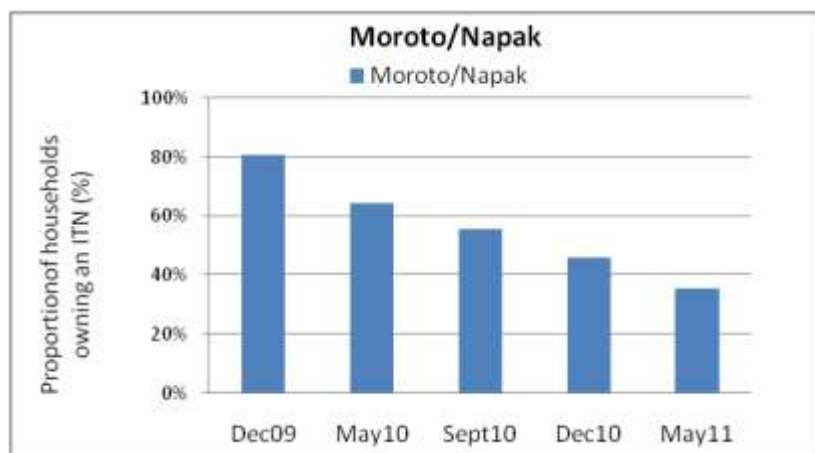
The use of Insecticide Treated bed Nets (ITNs) has shown to reduce the burden of malaria and associated morbidity and mortality among children. ITNs have also shown to improve the nutritional status of the children<sup>10</sup>. ITN possession among assessed households was above 70% in Abim, Kaabong, Kotido, and Nakapiripirit (**Table 15**), but in Moroto/Napak only 35.6% of households reported to own an ITN.

A massive ITN distribution was implemented in December 2010 throughout Karamoja with the exception of Moroto/Napak district. It's therefore not surprising to see that in that district the proportion of households owning an ITN is on a continuous decline (from 80% in December 2009 to 35.6% in May 2011). More dramatically, in Moroto/Napak, only 19% of under five children were sleeping under an ITN, increasing their risk to disease and associated malnutrition. (**Table 15 and Figure 7**)

**Table 15: Insecticide Treated Net ownership**

	Abim	Amudat	Kaabong	Kotido	Moroto/Napak	Nakapiripirit
ITN ownership	91.0%	64.3%	72.3%	80.3%	35.6%	83.7%
child less than five	94.1%	82.4%	88.5%	92.1%	19.0%	80.5%
child above five	51.3%	3.6%	57.1%	58.9%	89.5%	24.3%
mother	93.0%	82.4%	87.6%	83.4%	87.6%	92.4%
father	75.8%	25.4%	57.1%	28.6%	34.3%	55.4%
none	1.5%	7.3%	10.6%	4.1%	4.8%	3.6%

**Figure 7: Trends of ITN ownership in Moroto/Napak district since December 2009**



<sup>10</sup> Friedman, J. F., P. A. Phillips-Howard, et al. (2003). "Impact of permethrin-treated bed nets on growth, nutritional status, and body composition of primary school children in western Kenya." *Am J Trop Med Hyg* **68**(4 Suppl): 78-85.

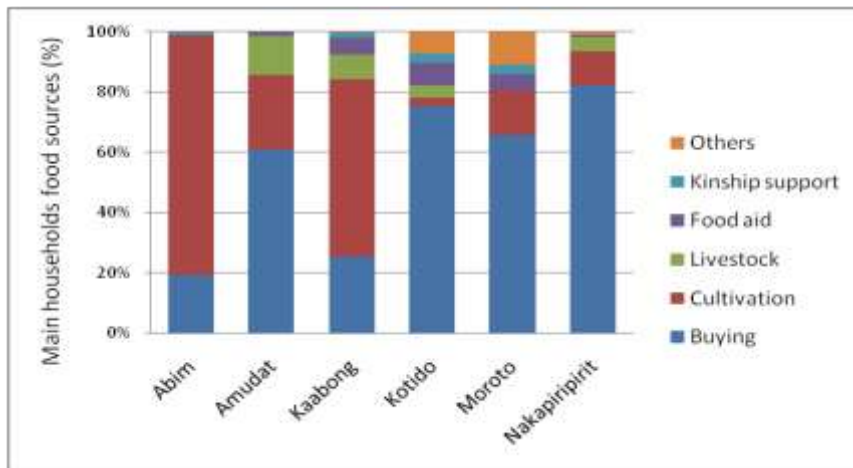
## 2.3 Food Security Indicators

### 2.3.1 Main Food Source

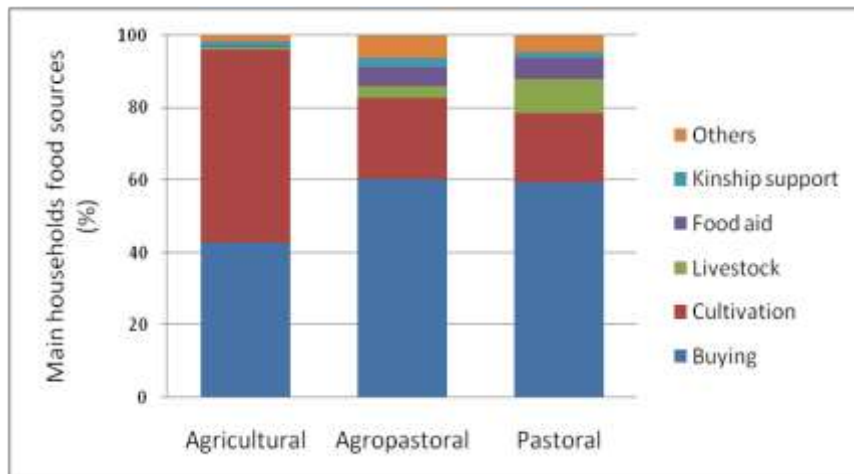
In May 2011, which coincides with the lean season (**Figure 2**), the main food source was the market for Nakapiripit (82.3%), Kotido (75.3%), Moroto/Napak (65.8%), and Amudat (61.0%, **Figure 8**). This high dependency on markets for food correlated with high rates of GAM except in Amudat, likely because households also relied on cultivation (25%) and on livestock (13%), the latest leading to a higher consumption of milk products.

In May 2011, in all districts except Moroto/Napak<sup>11</sup>, the proportion of households relying on cultivation to get food decreased, and the proportion of households relying on purchase of food increased since December 2010 (and in all districts except Kaabong were comparable to market and cultivation dependency levels recorded in May 2010). For those households which depend on markets, the current high and rising food prices is an additional source of vulnerability.

**Figure 8: Household main food sources per district**



**Figure 9: Household main food sources and per livelihood zones**



<sup>11</sup> In May 2011 in Moroto/Napak, 11% of households reported to get food from “others” sources than the ones listed in the questionnaire, other food sources being in most cases food obtained in exchange of labour, charcoal or grass, or simply gathered.

Across LHZs, purchase was the main food source in agro-pastoral (60.3%) and pastoral (59.5%) areas in May 2011 (**Figure 9**). Market dependency was on the rise compared to December 2010. For instance, in the agricultural zone, the proportion of households depending on cultivation decreased from 74.2% in December 2010 to 53.3% in May 2011, and the proportion of households relying on purchase increased from 23% in December 2010 to 43% in May 2011.

In Nakapiripirit, Moroto/Napak and Kotido this high market dependency was similar to the one observed in May 2010, i.e., the beginning of lean season. In Abim district, the majority of households (80%, average of 5 rounds) relied on cultivation and remained constant throughout the year. The main food sources in Amudat also remained constant since the surveillance system started collection data in that district (since September 2010).

### 2.3.2 Household Food Consumption Score (FCS)

Households were asked about how frequently (7-day recall period) certain food groups were consumed prior the interview (see questionnaire in Annex 4). The FCS is used as a food security indicator that captures dietary diversity and food quality and frequency. FCS standard thresholds categorize households into poor, borderline, and acceptable consumption and food security<sup>12</sup>.

Moroto/Napak and Kotido districts had both a significant increase of households with a poor FCS (compared to December 2010) reaching in May 2011 55% and 45% of households (Moroto/Napak and Kotido respectively) being at risk of food insecurity in terms of food quantity and quality (**Figure 10**).

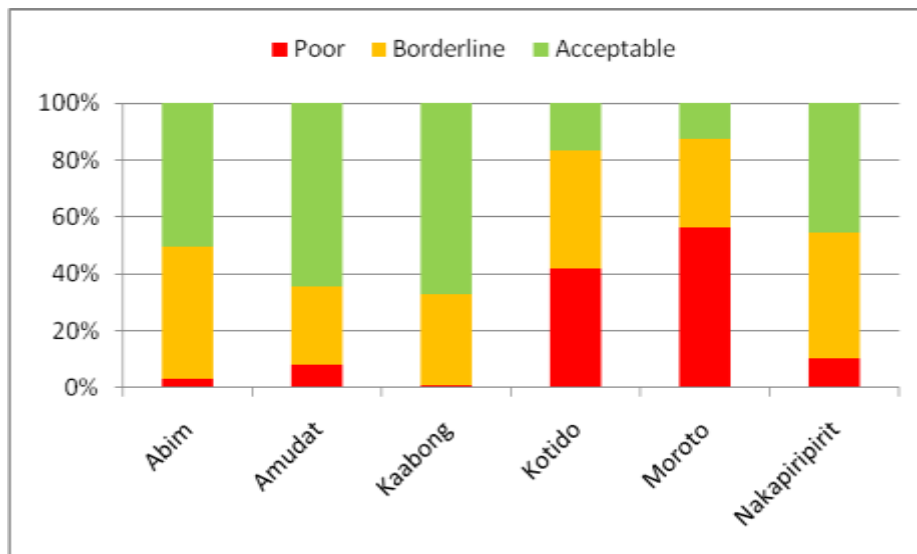
Kaabong registered a significant increase of households with an acceptable FCS (from 18.0% in December 2010 to 65.7% in May 2011).

In Amudat, there were still 65% of households with an acceptable FCS, although there was a continuous increase of the proportion of households with a borderline FCS (and a continuous decrease of households with an acceptable FCS) since September 2010.

In Nakapiripirit, although prevalences of GAM and SAM among under five children were above critical/emergency thresholds, only 11% of households were reported with a poor FCS, and 45% of households FCS fell in the acceptable interpretation level.

Across LHZs, in pastoralist areas 29.6% of households had a poor FCS (9.4% in agricultural zones) while 49.3% of households had an acceptable FCS in agricultural zones (38.1% in pastoral zones, **Figure 11**).

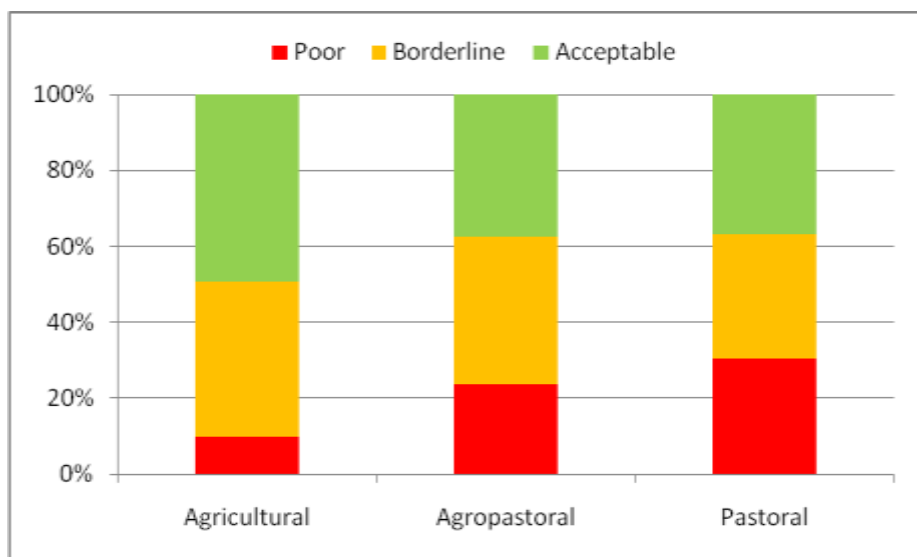
**Figure 10: Food Consumption Score (FCS) per District**



<sup>12</sup>Food Consumption Score interpretation levels are:

Poor (FCS below 21.5) / borderline (FCS greater or equal to 21.5 and less or equal to 35) / acceptable (FCS greater than 35).

**Figure 11: Food Consumption Score (FCS) per Livelihood Zone**



### 2.3.3 Household Dietary Diversity Score (HDDS)

Using a 24-hour recall period, the dietary diversity score of households was assessed. HDDS results can be analyzed by looking at:

1. the HDDS mean obtained for each district/LHZ;
2. the proportion of households falling in low/medium/high HDDS interpretation level;
3. the food groups that were eaten by households of each category mentioned above.

#### a) HDDS mean results <sup>13</sup>

The well known low economic access to food of Karamoja region was reflected by a low HDDS mean in Kotido and Moroto/Napak, and a medium HDDS mean all other districts.

Similarly to what was found in December 2010, Amudat had the highest HDDS mean (5.1) of the region (**Table 16, bottom row**), and Amudat is the only district of Karamoja where households had a high HDDS. In Nakapiripirit, Moroto/Napak and Kotido, HDDS means observed in May 2011 were similar to those of May 2010.

Region wise, the HDDS mean decreased from 4.3 in December to 3.9 in May 2011 (and was 3.6 in May 2010).

Across LHZs, in May 2011, the HDDS mean ranged from 3.6 in agro-pastoral to 4.0 in agricultural areas (**Table 17, bottom row**).

**Table 16: Household Diet Diversity Score per district**

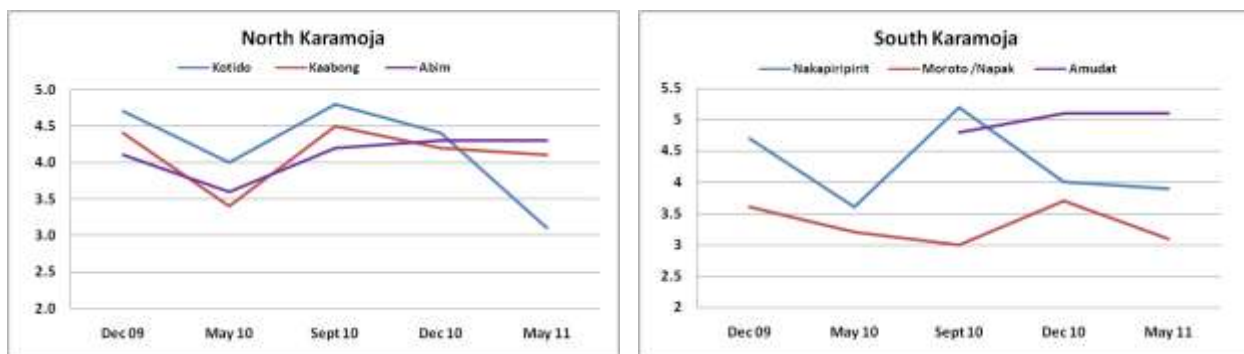
HDDS/District	Abim	Amudat	Kaabong	Kotido	Moroto/Napak	Nakapiripirit
Low ( $\leq 3$ )	25.3%	15.0%	24.0%	63.3%	69.8%	48.0%
Medium	63.3%	45.0%	63.7%	35.3%	25.4%	33.0%
High ( $\geq 6$ )	11.3%	40.0%	12.3%	1.3%	4.7%	19.0%
HDDS mean	4.26	5.07	4.1	3.11	3.13	3.89

<sup>13</sup> The HDDS categories are as follows: Low  $\leq 3$ ; 3 < medium  $\leq 5$ ; high  $> 5$

**Table 17: Household Diet Diversity Score per Livelihood Zone**

HDDS/LHZ	Agricultural	Agropastoral	Pastoral
Low ( $\leq 3$ )	32.5%	44.0%	46.1%
medium	52.8%	38.8%	40.7%
High ( $\geq 6$ )	14.7%	17.3%	13.2%
HDDS mean	4.03	3.58	3.81

**Figure 12: Trends of HDDS mean for each districts**



### b) HDDS categories results

In Nakapiripirit, Moroto/Napak and Kotido districts where the worst prevalence of GAM were recorded, the majority of households had a low HDDS ( $\leq 3$ , **Table 16**).

In agricultural zone, 52.8% of households had a medium HDDS, while in agropastoral and pastoral zones, the majority of households (44% and 46% respectively) had a low HDDS in May 2011 (**Table 17**).

### c) Most consumed foods according to HDDS results

Households with a low HDDS: In Nakapiripirit these households consumed cereals (78%), vegetables (93%), and spices (53.5%); while in Amudat, households with a low HDDS consumed cereals (95.6%), vegetables (64.4%), spices (55.6%) and 40% also consumed milk (against 4% in Nakapiripirit).

Households with a high HDDS: these households added to the food groups cited above, sugar, oil and pulses mainly and to a lower extent meat and fruits.

## 2.3.4 Meal frequency among 6- to 23-month children

The number of meals<sup>14</sup> eaten in the last 24 hours preceding the interview was assessed among 6 to 23 months children, and results showed that across the region children mainly consumed two meals per day, with exception of Amudat where 42.2% of 6 to 23 months children consumed three meals per day, and of Moroto/Napak where children had only one meal per day (43.9%, **Table 18**).

**Table 18: Meal frequency among 6- to 23-month children (past 24hrs) per District**

Child meal/District	Abim	Amudat	Kaabong	Kotido	Moroto/Napak	Nakapiripirit
1	22.9%	0.0%	4.0%	14.1%	43.9%	23.6%
2	36.1%	16.3%	60.0%	68.9%	43.1%	60.6%
3	29.2%	42.2%	35.2%	15.8%	13.0%	11.5%
4 and above	11.8%	41.5%	0.8%	1.1%	0.0%	4.2%

Consumption of the recommended number of meals (three and above) was only 13% in Moroto/Napak, 17% in Kotido, 15.7% in Nakapiripirit; was 36% in Kaabong, 41% in Abim; and was 83.7% in Amudat.

<sup>14</sup> A **meal** is an instance of eating, specifically one that takes place at a specific time and includes specifically prepared food (determined by home, culture, time or place), e.g., breakfast/lunch/supper. A meal is a mixture of foods, e.g., carbohydrates, proteins, fats and micronutrients. A snack is one or two food groups, e.g., fruit, boiled egg, milk etc.

Across livelihood zones, the majority of 6- to 23-month children received two meals per day (**Table 19**).

**Table 19: Meal Frequency among 6- to 23-month old children (24 Hrs recall) per Livelihood Zone**

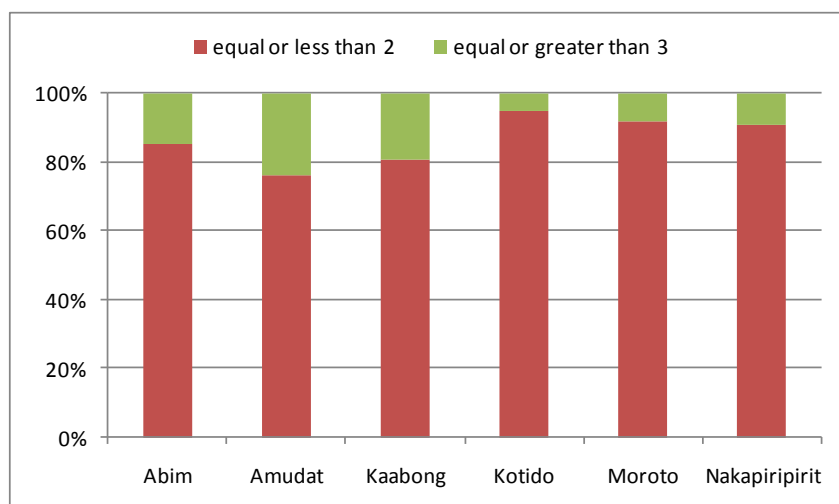
child meal/LHZ	Agricultural	Agropastoral	Pastoral
1	20.2%	25.1%	11.6%
2	46.8%	43.8%	53.5%
3	25.6%	18.3%	25.5%
4 and above	7.4%	12.8%	9.3%

### 2.3.5 Meal frequency among adults

In Abim, Kotido, Moroto/Napak, and Nakapiripirit, the majority of adults consumed only one meal (**Figure 13**). In Kaabong and Amudat districts, the majority of adults (69% and 71% respectively) consumed two meals within the 24 hours prior to the interview.

In all district except Kaabong and Amudat, the proportion of adults consuming only one meal per day was on the rise compared to previous rounds.

**Figure 13: Total number of meals consumed by adults in May 2011**



## 2.4 Water, Sanitation and Hygiene (WASH) Indicators

### 2.4.1 Primary Water Sources

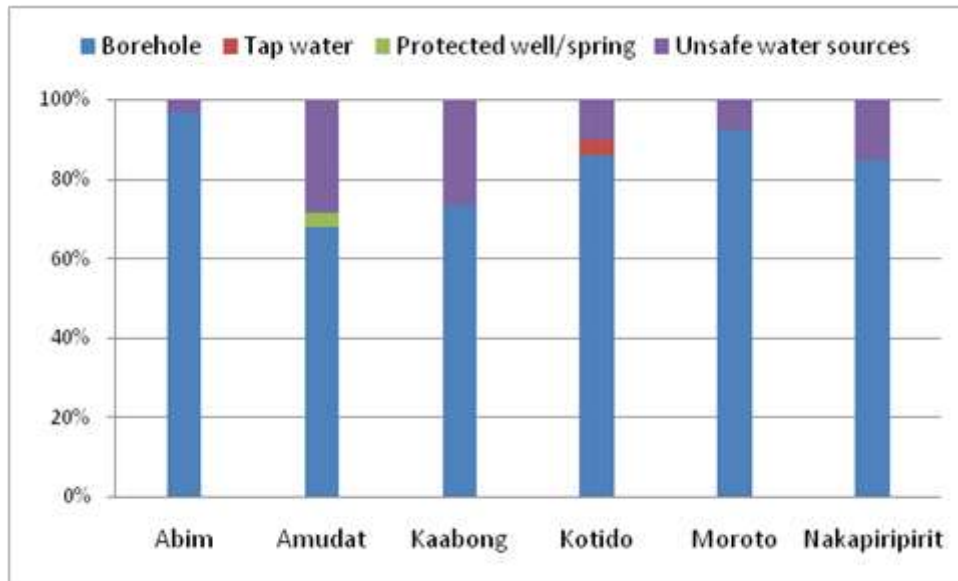
The main source of water across the region was a borehole ranging from 68% in Amudat to 99.4% in Moroto/Napak.

According to the Uganda Water Supply Atlas 2010, water access by boreholes ranges from 21% in Kaabong to 86% in Abim. In relation to the impact on the household means that a majority of households in all districts other than Abim are required to walk further than 1km to access their household water needs.

The utilization of unsafe water sources reported was 28.3% in Amudat, 28.3% in Kaabong, 15% in Nakapiripirit, 10% in Kotido, 7.5% in Moroto, and 3% in Abim (**Figure 14**).

In comparing previous rounds Nakapiripirit and Moroto Districts having increased the use of boreholes and reduced accessing water from unsafe water sources. The rationale for this increase in borehole use needs to be investigated further, to identify whether the change in practice is due to a greater understanding of unsafe water sources or whether this is being imposed on households due to lack of replenishment of usual household water sources. Comparatively, other districts have remained somewhat consistent in their use of boreholes since September 2010.

**Figure 14: Primary Water Sources in Karamoja May 2011**



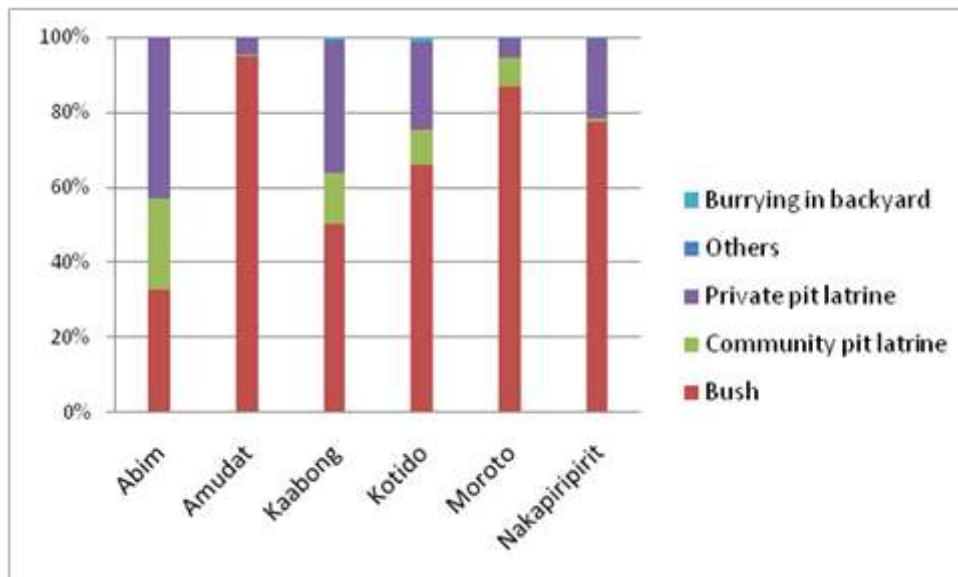
### 2.4.2 Human Waste Disposal

Except in Abim where the main mean of human waste disposal was a private pit latrine (43%), elsewhere, majority of households reported to use the bush (ranging from 50.3% in Kaabong to 95% in Amudat, **Figure 15**).

Compared to former rounds, the use of pit latrines (communal and private) was on the rise in all districts except in Amudat and in Abim where there was no variation and the proportion of households remained at 67% and 5% respectively.

The continued use of the bush as a means for human waste disposal can be seen as unsafe and a possible cause of disease and childhood infections.

**Figure 15: Human Waste Disposal per district**



### 2.4.3 Hand Washing Practices

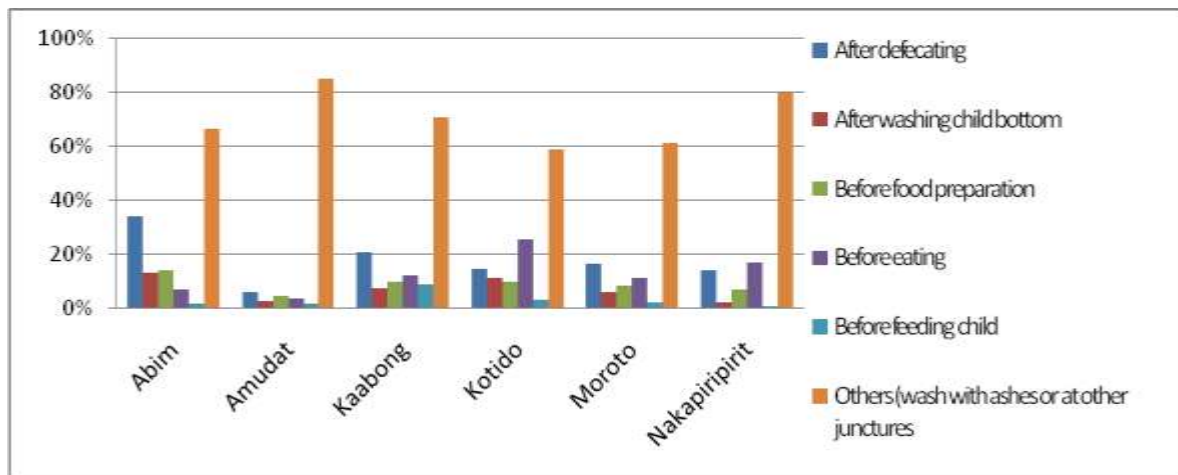
To assess the proportion of households washing their hands with soap, the question was asked as followed: “when do you wash your hands?” And then it was asked “when your wash your hands, do you use soap?”

Results showed that hand washing practices with soap at critical junctures are generally low across the region (**Figure 16**).

Majority of households (from 59% in Moroto to 84.3% in Amudat) washed hands without soap and instead used cows' urine, ash, and residue to substitute the use of soap. Abim registered the highest utilization of soap after defecation (34%), and Amudat recorded the least (6.0%).

Hand washing practices with soap after defecation in May 2011 slightly improved compared to December 2010 in Moroto (11.0% to 16.6%), Abim (17.3% to 34%) and Amudat (2.7% to 6.0%). A decline was noted in Nakapiripirit from 24.3% in December 2010 to 14% in May 2011. There was no significant change in Kotido and Kaabong in hand washing with soap after defecation.

**Figure 16: Household hand washing practices.**



### 3 Conclusions

#### 3.1 Nutrition and Health

Overall in Karamoja Region, Global Acute Malnutrition (GAM) rates have continued to increase from 9.3% (7.9-10.9% CI 95%) in September 2010 to 12.8% (11.0 -14.9% CI 95%) in May 2011. While this is seen as a worsening of the rates in this time period, the May 2011 rates are comparable with those from the same time in May 2010 with only a slight increase from 11.1% (9.6-12.8% CI 95%) in May 2010 to 12.8% (11.0-14.9% CI 95%) in May 2011.

Four out of the 6 districts included in the surveillance witnessed rates of GAM greater than 10% of children under 5 years, this with contributing factors calls for target nutrition programs address the situation<sup>15</sup>. Targeted nutrition programs (Outpatient Therapeutic Programs) are currently being rolled out through District Health Office Health Centres in Karamoja. What remains unclear at the time of this report is the coverage of these programs.

In May 2011, Nakapiripirit district recorded rates of acute malnutrition above the emergency thresholds (GAM=20.4% and SAM=5.6%). Across the region, evidences of serious to critical problems associated with acute malnutrition were sustained as overall chronic malnutrition and underweight children still exceeded the national averages.

While a follow-up assessment was proposed to conduct a deeper investigation into the rates of malnutrition as witnessed in the surveillance round, but while food security and other indicators put forward did not correlate to a worsening of the household situation in Nakapiripirit, a systems assessment into programs being implemented was finally agreed on by the major stakeholders. What was identified in this follow-up assessment was the need to strengthen programs providing therapeutic and supplementary feeding including areas of key areas of training and community linkages.

<sup>15</sup> MSF Nutrition Guidelines 1986



The next round of surveillance will be conducted in early August to identify to see whether rates as witnessed in May have changed in the preceding 2 months or if the situation continues to be at crisis level.

In considering caseload estimate for Karamoja based on May 2011 surveillance, with an overall population estimated at 1,152,464; bringing the under five children population to be 230,493 (20% of the total population). It can be assumed that from the surveillance data, acute malnutrition currently affects as many as 29,523 under five children. Among those, there is an estimate of 6,348 current severe cases.

Illness was high across the region and ranged from 55% in Amudat to 77% in Abim and Kotido. **Malaria** was most commonly reported in four out six districts and diarrhoea was on the rise since December 2009. Although when comparing malnourished children and children within normal ranges of weight for height we see that malaria is fairly consistent between the two groups. What have been identified are the rates of **diarrhoea** between malnourished and normal children with 53.1% and 34.5% respectively.

In Moroto/Napak, only 35.6% of households owned an ITN, and only 19% of under five children were reported to use it.

## 3.2 Food Security

Within the current month of the survey period, which coincides with the lean season, the households' main food source was purchase in Nakapiripirit (82.3%), in Kotido (75.3%), in Moroto/Napak (65.8%), and in Amudat (61.0%); in Abim and Kaabong 80% and 59% of households respectively relied on products purchased from markets. In Nakapiripirit, Moroto/Napak and Kotido this high market dependency was similar to the one observe in May 2010, i.e., the beginning of lean season, and in 2011, the current high and rising food prices is definitely an additional source of vulnerability compared to last year.

The majority of households had a Food Consumption Score (FCS) falling in the acceptable range except in Kotido and Moroto/Napak where 45% and 55% of households respectively had a poor FCS.

In the last 24 hours preceding the interview, among 6- to 23-month children, the consumption of the recommended number of meals (three and above) was 13% in Moroto/Napak, 15.8% in Nakapiripirit, 17% in Kotido, 36% in Kaabong, 41% in Abim, and 83.7% in Amudat.

Region wise, the **HDDS mean decreased** from 4.3 in December 2010 to 3.9 in May 2011.

In Kotido, Moroto/Napak and Nakapiripirit districts where the worst prevalence's of GAM were recorded, the majority of households had a low HDDS (63%, 70% and 48% respectively).

In Amudat, households with a low HDDS consumed cereals (95.6%), vegetables (64.4%), spices (55.6%) and 40% also consumed milk (against 4% in Nakapiripirit). The Amudat community seem to have different traditions than elsewhere, there the priority is given to children even when the food is scarce, so that in addition to consume milk, the vast majority of children received the recommended number of meals per day. These better child care practices in Amudat are reflected in the prevalences of stunting and underweight both in the acceptable range in that district.

Having limited dietary diversity directly influences the amount and type of micro-nutrients that children are receiving. While the majority households have cereal inputs, food containing proteins and essential vitamins and minerals are limited. This in turn directly impacts on the health and nutrition of children.



### 3.3 Water, Sanitation and Hygiene (WASH)

The main source of drinking water was a borehole in all districts. In Amudat and Kaabong more than one fourth of the population got their drinking water from unsafe sources.

While on average over 80% of the population in Karamoja access water from boreholes, access as defined by a borehole with 1 km distance varies from 21% in Kaabong, 33% in Kotido and Nakapiripirit, 42% in Moroto and 86% in Amudat. This range of access means that the population is walking considerable distance to access potable water for consumption and household needs. This time to fetch water includes waiting at water points to collect water, if these boreholes are centralised with several manyattas or villages accessing the one point then time away from child caring activities could be considerable.

Unsanitary human waste disposal increases the risk of cross infection and disease. Majority of households reported to use the bush (ranging from 50.3% in Kaabong to 95% in Amudat) as the main mean of human waste disposal except in Abim where 43% used a private pit latrine.

Hand washing practices with soap at critical junctures are generally low across the region. This also may contribute to the high rates of diarrhoeal disease in Karamoja.

## 4 Priority Areas

**Nakapiripirit:** The prevalence of GAM and SAM were above emergency thresholds and therefore active case finding among children should be urgently strengthened. Very high dependency on markets as food source (82.3%) was correlated with these high rates of acute malnutrition. Although there were few households having a poor FCS (11%), other food security indicators showed that the situation is worrisome, and is likely to last throughout the lean season. More importantly, more than 80% of 6- to 23-month children consumed two or less meals per day, regardless the cropping seasonality.

**Kotido:** The prevalence of GAM increased significantly compared to December 2010 and the prevalences of underweight and stunting were both above critical thresholds (37% and 48% respectively). The occurrence of illnesses among under five children was very high (77.7%) with malaria and ARI being the most prevalent ones (both at 65%). Food security indicators showed that households were food insecure with a low HDDS, and a poor FCS, a high dependency on markets, and only 17% of 6- to 23-month children received the recommended number of meals per day ( $\geq 3$ ).

**Moroto/Napak:** That district recorded very poor nutritional, food security and wash indicators. In addition, only 35.6% of households owned an ITN and more dramatically only 19% of under five children used an ITN. Surprisingly, diarrhoea was the most prevalent illness among under five children. Only 13% of 6- to 23-month children received the recommended number of meals per day ( $\geq 3$ ). Long term poor nutritional status is contributing to the worst prevalence of stunting (52%) in Karamoja region.

**Abim:** There was the second worst prevalence of SAM (after Nakapiripirit) and a very high occurrence of illness among under five children (77.6%) with malaria affecting 77.4% of them. There was the biggest proportion of households that relied on own cultivation (80%) compared to other districts. There was a majority of households with a medium HDDS, very few households with a poor FCS, and yet 59% of 6- to 23-month children did not receive the recommended number of meals per day ( $\geq 3$ ).

**Kaabong:** That district had 59% of households relying on own cultivation, 65% of households with an acceptable FCS and yet 64% of 6- to 23-month children did not receive the recommended number of meals per day as outlined by UNICEF ( $\geq 3$ ).

**Amudat:** There were the lowest prevalences of SAM (1%), stunting and underweight (both below 10%). Although there were 61% of households relying on markets for food, 25% of households also relied on cultivation, and there was the biggest proportion of households of the region that was relying on livestock (13%). Indeed Amudat was the district with the highest consumption of milk. Even among households with a low HDDS, 40% of them consumed milk. Amudat recorded the highest proportion of 6- to 23-month receiving the recommended number of meals per day (84%). Amudat was therefore the district across Karamoja with the less worrisome indicators results except for the WASH ones i.e., one fourth of households got their drinking water from unsafe water sources.



## 5 Recommendations

In Nakapiripirit, strengthening of management of curative and preventive programmes for malnutrition needs to be proactively done in order to reduce the rate of wasting in the district. Active case finding of malnourished children needs to be instigated to reduce the burden within this district.

In Kotido district, a greater emphasis on the management of malnutrition needs to be put on strengthening nutrition programmes to prevent the prevalence of GAM to rise.

There is a clear need to improve child care practices and health seeking behaviours of parents with infant and small children, to reduce the high burden of illnesses.

Stunting and underweight rates continue to be critical in Karamoja. Food security indicators identified that the use and preparation of foods for children may be inadequate, which likely impacts on these high rates.

Programs targeting the food diversification should be reinforced to ensure that under five children have an adequate diet diversity hence are not at risk of micronutrient deficiency.

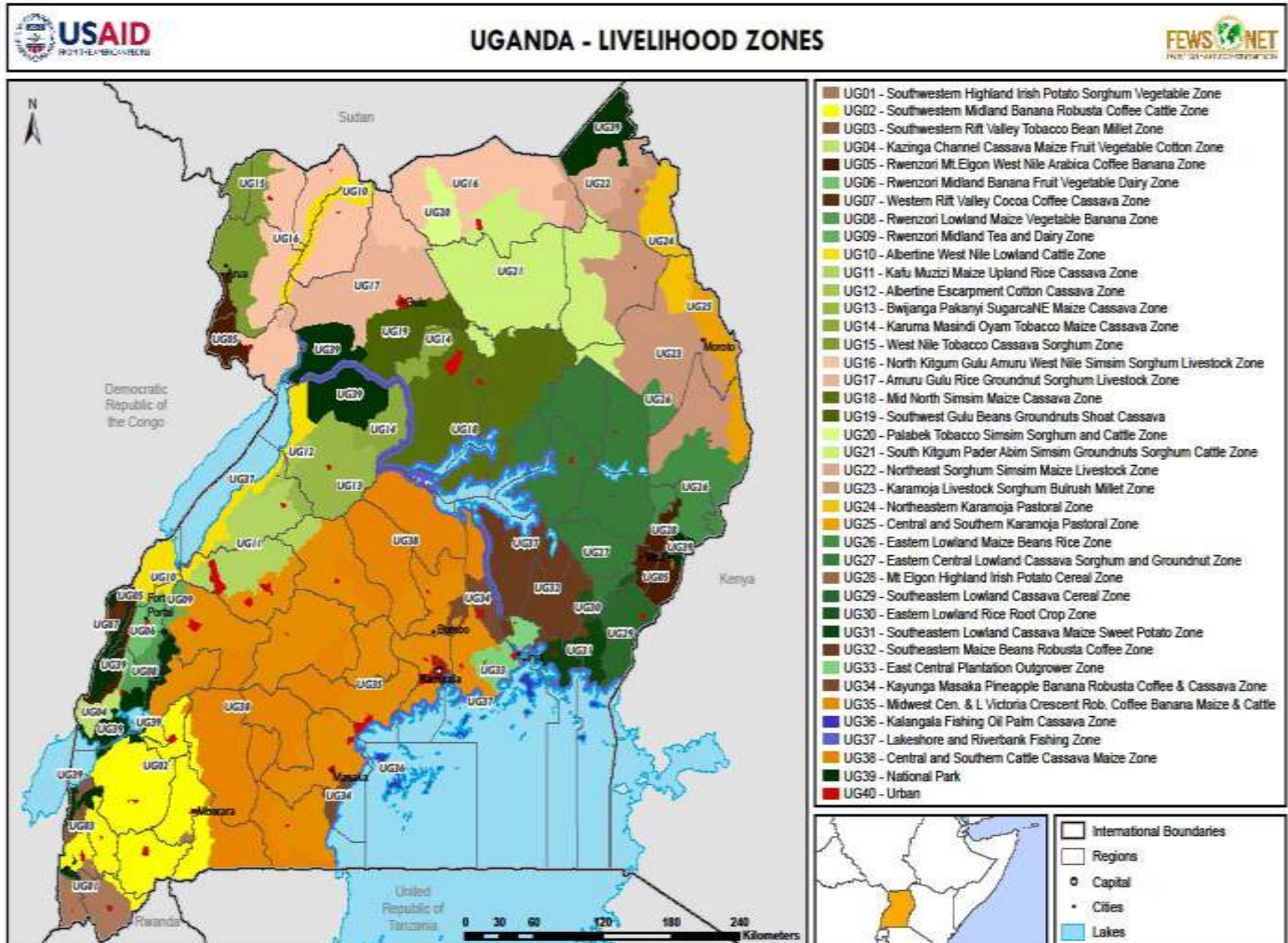
The ITN ownership is inadequate in Moroto/Napak, increased health education and prevention messages in the correct use of ITN especially among households with under five children and pregnant women are needed.

WASH initiatives intended to increase the understanding of appropriate hygiene and its linkages between ill health and malnutrition need to be reinforced. The importance of hand washing to break the cycle of transmission and improved health indicators, especially related to diarrhoeal disease should be disseminated and strengthened at the household, community and district levels.

Programs that prevent production problems and mitigate a rapid deterioration of the food security situation should have a seasonal safety net approach in order to prevent seasonal fluctuations of malnutrition. Moreover, during the lean season, in districts where markets are the biggest source of foods, programs should focus on income generation and income diversification to ensure that households sustain food access all year round.



## 6.2 Annex 2: Livelihood Zone Map of Uganda



## 6.3 Annex 3: Detailed methodology implemented

### Methodology:

Household was the sampling unit and the sample size was 300 for each of the 6 districts.

A multi-stage cluster sampling method was used to select 300 households per district (25 clusters x 12 households design).

The 25 clusters per district were distributed proportionally to the population size (PPS) of each livelihood zone (LHZ) that the district contains. For example, Kaabong district comprises of 3 LHZs and using PPS, these LHZs were assigned 8, 6, and 11 clusters respectively.

**Table 20: Population per district per LHZ**

	Population figures			
	Agricultural	Agropastoral	Pastoral	Total
Kaabong	82,843	48,187	135,677	266,707
Kotido	0	45,041	125,697	170,738
Abim	111,989	0	0	111,989
Moroto	57,312	224,341	40,404	322,057
Amudat	0	45,602	59,257	104,859
Nakapiripirit	101,127	35,774	39,213	176,114
<b>Total</b>	<b>353,271</b>	<b>398,945</b>	<b>400,248</b>	<b>1,152,464</b>

**Table 21: Clusters per district per LHZ**

	Clusters per district/LHZ PPS			
	Agricultural	Agropastoral	Pastoral	Total
Kaabong	8	6	11	25
Kotido	0	8	17	25
Abim	25	0	0	25
Moroto	7	11	7	25
Amudat	0	12	13	25
Nakapiripirit	13	5	7	25
<b>Total</b>	<b>53</b>	<b>42</b>	<b>44</b>	<b>150</b>

Then, for each LHZ of a given district, villages' populations were entered in ENA software for random selection of the clusters. A simple ballot system was used to select manyattas, and for selection of households (The list of households provided by the village leader was used to determine the sampling interval).

### Health Staff Training:

ACF organized a 1-day refresher training of 20 enumerators, in each district (except Moroto/Napak where the system was run with 16 enumerators). In each district, this training was co-facilitated by DNFPs (except in Moroto/Napak).

### Field implementation:

The survey was conducted from the 3<sup>rd</sup> through the 7<sup>th</sup> of May 2011 in North Karamoja (Phase 1), and was conducted in South Karamoja from the 19<sup>th</sup> through the 24<sup>th</sup> of May (Phase 2), after the national polio campaign took place.

Five teams comprising of 4 enumerators collected data through a period of 5 days. Training of enumerators and supervision of data collection at field level was carried out by DNFPs supported by ACF staff.

### Data entry/analysis:

ENA for SMART and Epi Info software were used to computerize data and run analysis. Data entry was conducted alongside with data collection in order to run plausibility checks to detect field errors early in the process and make necessary adjustment timely.

In addition to co-supervising the field implementation and participating in data entry, district nutrition focal persons attended a 4-day meeting (30<sup>th</sup> of May -2<sup>nd</sup> of June 2011) during which DNFPs' skills in data entry, analysis and reporting were strengthened.

When the analysis was performed for the Karamoja region (6 districts combined), a weight was brought to each district to compensate the fact that a sample size of 300 households had been used regardless district population size. When the analysis in run by livelihood zones, a weight was brought to each LHZ within a district to compensate the fact that clusters were allocated by district (and not by LHZs).

Weight calculation: weight was calculated by dividing the total segment population by the number of total answers obtained for that segment.

**Table 22: Design weights attached for anthropometric data analysis for Karamoja Region Nutritional Surveillance Round 5**

	LHZ weight_b						Total	District weight_a
	AGRIC		AGRO-PASTO		PASTO			
	answer	weight	answer	weight	answer	weight		
Kaabong	103	<b>804.3</b>	71	<b>678.7</b>	132	<b>1027.9</b>	306	<b>871.59</b>
Kotido			109	<b>413.2</b>	232	<b>541.8</b>	341	<b>500.70</b>
Abim	303	<b>369.6</b>					303	<b>369.60</b>
Moroto	100	<b>573.1</b>	155	<b>1447.4</b>	99	<b>408.1</b>	354	<b>909.77</b>
Amudat			144	<b>316.7</b>	158	<b>375.0</b>	302	<b>347.22</b>
Nakapiripirit	150	<b>674.2</b>	53	<b>675.0</b>	81	<b>484.1</b>	284	<b>620.12</b>

**Table 23: Design weights attached for nutrition security data analysis for Karamoja Region Nutritional Surveillance Round 5**

	LHZ weight_b						Total	district weight_a
	AGRIC		AGRO-PASTO		PASTO			
	answer	weight	answer	weight	answer	weight		
Kaabong	96	<b>862.9</b>	72	<b>669.3</b>	132	<b>1027.9</b>	300	<b>889.02</b>
Kotido			72	<b>625.6</b>	228	<b>551.3</b>	300	<b>569.13</b>
Abim	300	<b>373.3</b>					300	<b>373.30</b>
Moroto	67	<b>855.4</b>	132	<b>1699.6</b>	96	<b>420.9</b>	295	<b>1091.72</b>
Amudat			144	<b>316.7</b>	156	<b>379.9</b>	300	<b>349.53</b>
Nakapiripirit	156	<b>648.3</b>	60	<b>596.2</b>	84	<b>466.8</b>	300	<b>587.05</b>



## 6.4 Annex 4: Questionnaires

### Anthropometric data form and questionnaire for 6- to 59-month children:

District: \_\_\_\_\_ Sub - County: \_\_\_\_\_ Parish \_\_\_\_\_ Village/Zone \_\_\_\_\_

Livelihood \_\_\_\_\_ Date: \_\_\_\_\_ Cluster no. \_\_\_\_\_ Cluster b \_\_\_\_\_ Team no. \_\_\_\_\_

HH no.	Child no.	Sex (F/M)	Age in months	Weight (kg) ±0.1 kg	Height/ (cm) ±0.1cm	Length <sup>16</sup>	Oedema (Y/N)	MUAC (mm)	Which illness if any was this child suffering from in the last 2 weeks? (Y/N)			Is this child enrolled in a feeding program? <sup>17</sup>  1-4( one answer)
									Diarrhoea	Malaria	ARI	

**Case definition:**

- Diarrhea= any episode of more than three loose stools per day; bloody diarrhea: any episode of more than three stools per day in which there is presence of blood in stools
- ARI= any episode associated with fever and cough and at least one of the following signs: running nose, wheezing, difficult breathing, sputum, chest pain
- Malaria verified by fever= elevated body temperature (confirm if test was done), fever, chills, headache, muscular aching and vomiting.

<sup>16</sup> Height measurement standing when child is ≥24 months (height proxy ≥87 cm) and lying down when child is < 24 months (< 87 cm)

<sup>17</sup> 1 = OTC(Plumpy Nut=Emodok/Odii); 2 = ITC; 3 = SFC/HOTMAM 4=Not in feeding program



**Integrated nutrition security questionnaire administered to selected households:**

Date \_\_\_\_\_ Team no. \_\_\_\_\_ Cluster no \_\_\_\_\_ HH no \_\_\_\_\_

District \_\_\_\_\_ Sub - County \_\_\_\_\_ Parish \_\_\_\_\_ Village \_\_\_\_\_

- **Household definition** = a group of people who live and eat their meals together for at least 6 of the 12 months preceding the interview.” Take note of other inclusions (Uganda Nutrition Survey Guidelines, June 2009).
- A **meal** is an instance of eating, specifically one that takes place at a specific time and includes specifically prepared food (determined by home, culture, time or place), e.g., breakfast/lunch/supper. A meal is a mixture of foods, e.g., carbohydrates, proteins, fats and micronutrients. A snack is one or two food groups, e.g., fruit, boiled egg, milk etc.
- **Food Consumption Score (FCS)**= number of days food group was eaten in last 7 days x Weight of food group. The weights are: Cereals and tubers (2); pulses (3); vegetables (1); fruits (1); meat, fish, eggs (4); milk and milk products (4); oil (0.5); and sugar (0.5). The total FCS is obtained by summing up FCS obtained for each food group.

1	2	3	4	5	6	7	8	9	10
<b>Gender of respondent</b> 1=Male 2=Female	<b>Household main source of food in the current month</b> 1=Cultivation 2=Livestock 3=Buying 4=Food aid 5=Kinship support 6=Other(specify)	<b>Which of the following food groups were consumed in the household in the last 24 hours? (Yes=1 and No=0).</b> <b>C=Cereals</b> (Maize/posho, sorghum, wheat, rice, millet, residue) <b>O=Oils and fats</b> S = Sugar/honey/sweets/cakes/soda <b>M=Meat, offal and blood</b> <b>ML= Milk and milk products</b> eg yoghurt, cheese etc. <b>T=Tubers, roots and plantains</b> eg potatoes, yams, cassava <b>V=Vegetables</b> ( onion, boo, akeo, ekadolia, ekoorete, etsaboliet, ejaapo, yellow pumpkin etc) <b>E=Eggs</b> <b>SCB=Spices</b> ( salt, pepper), condiments(sauces) and beverages(tea, coffee, alcohol) <b>Pulses(P)=Beans/Lentils/Nuts</b> eg (beans, peas, groundnuts, simsim) <b>FR=Fruits</b> (mango, pawpaw, ripe banana, ekimune, citrus, passion, tomato etc.) <b>F=Fish</b> (dried, smoked, fresh)	<b>Ask how many days in the past 7 days, the household consumed each of the following food items.</b> <b>C=Cereals</b> and tubers( Maize/posho, sorghum, wheat, rice, cassava, millet, residue, matooke, potatoes) <b>O=Oils and fats</b> (butter, ghee, simsim, sunflower etc) <b>S=Sugar/honey/sweets/cakes/soda</b> <b>M=Meat, offal and blood</b> , fish, eggs <b>ML=Milk and milk products</b> eg yoghurt, cheese <b>V=Vegetables</b> ( onion, boo, akeo, ekadolia, ekoorete, etsaboliet, ejaapo, yellow pumpkin etc) <b>Pulses(P)=Beans/Lentils/Nuts</b> eg (beans, peas, groundnuts, simsim) <b>FR=Fruits</b> (mango, pawpaw, ripe banana, ekimune, citrus, passion, tomato etc.)	<b>How many meals did children between 6 and 23 months in your household eat during the last 24 hours?</b> 1 = one 2 = two 3 = three 4 = Four and above 5 = Not applicable	<b>How many meals did adults eat in your household during the last 24 hours?</b> 1 = one 2 = two 3 = three 4 = Four and above 5 = Zero meal	<b>What is the current main source of drinking water in your household?</b> 1 = Bore - hole 2 = Protected well/spring 3 = unprotected well/spring 4 = swamp water 5 = Pans (Akuja) 6 = Seasonal stream/pond(angol) 7 = Tap water	<b>Do you have an insecticide-treated net in your household?</b> 1=Yes 2=No (Go to qs 10)	<b>If yes, who slept under the insecticide-treated net last night?( More than 1 answer allowed)</b> 1=Children below 5 years 2= Children above 5 years 3= Mother 4=Father 5=None	<b>Where do you dispose off human waste in your household?</b> 1= Private Pit Latrine 2= Community pit latrine 3=Bush 4=Burying in backyard 5=Other(specify)
		C= O= S= M= ML= T= V= E= SCB= P= FR= F= <b>Total score=</b>	C-----*2= O-----*0.5= S-----*0.5= M-----*4= ML-----*4= V-----*1= P-----*3= FR-----*1= <b>Total Food Consumption Score (FCS) =</b>						



## 6.5 Annex 5: Data quality (WHO 2006 Standards)

**Table 22: Data Quality Standards for Karamoja Region Round 5 Surveillance**

Variable/tests	Acceptable Range	Abim	Kaabong	Kotido	Moroto/Napak	Amudat	Nakapiripir it
Sample size (no exclusion)	Greater than the calculated sample size (i.e., n=300)	303	306	341	354	302	284
Out of usual range values (Flags) Weight for Height:	Less than 3% of the sample size	0.3%	0.7%	0.9%	0.8%	0.0%	1.8%
Out of usual range values (Flags) Height for Age:	Less than 5% of the sample size	1.7%	1.3%	1.5%	1.1%	1.3%	3.2%
Age ratio = (6-29 months) / (30-59 months)	between 0.78 and 1.18, Ideal ratio = 0.98	1.39	1.20	2.19	1.16	1.4	1.68
Overall sex ratio	between 0.8 and 1.2	0.99	0.94	0.88	0.93	1.0	1.14
Digit Preference Score	0-5 good,	6	7	4	7	7	9
Weight	5-10 acceptable	7	7	5	11	8	9
Height	10-20 poor	6	9	7	8	7	7
MUAC	20 unacceptable						
Standard Deviation WHZ (no exclusion)	between 0.8 and 1.2 z-score	1.06	0.97	1.12	1.05	1.01	1.21
Design effect (no exclusion)	About 1 - 2	1.05	1.0	1.08	1.89	1.59	1.0
Standard Deviation HAZ (no exclusion)	1.10 and 1.30 z-score	1.25	1.28	1.23	1.24	1.05	1.40
Skewness WHZ (no exclusion)	Between $\pm 1$	-0.27	-0.42	-0.06	-0.53	0.09	-0.33
Kurtosis WHZ	Between $\pm 1$	0.19	0.78	0.07	1.91	-0.03	0.30
Index of Dispersion (ID) and Poisson distribution	$p > 0.05$ : Cases appear to be randomly distributed among clusters.	ID=0.92 $p=0.57$ 9	ID=0.91 $p=0.589$	ID=1.07 $p=0.367$	ID=1.53 $p=0.047$	ID=1.51 $p=0.052$	ID=1.11 $p=0.318$



## 6.6 Annex 6: Prevalence of acute malnutrition (NCHS 1977 standards)

**Table 23: Combined Nutritional Data for Karamoja Region Round 5 Surveillance**

	Kaabong	Kotido	Abim	Moroto/Napak	Amudat	Nakapiripirit
<b>Global Acute Malnutrition</b> W/H < -2 z and/or <b>Severe Acute Malnutrition</b> W/H < -3 z and/or	10.1% (6.6% - 15.3%)	12.3% (8.7% - 17.2%)	9.8% (6.2% - 12.7%)	12.7% (8.9% - 17.9%)	10.6% (7.4% - 14.9%)	20.1% (15.8% - 25.2%)
<b>Global Acute Malnutrition</b> W/H < 80% and/or <b>Severe Acute Malnutrition</b> W/H < 70% and/or	1.3% (0.5% - 3.4%)	0.9% (0.3% - 2.8%)	0.7% (0.3% - 2.7%)	1.1% (0.4% - 3.0%)	0.0% (0.0% - 0.2%)	2.8% (1.5% - 5.1%)
	5.2% (3.5% - 5.8%)	7.6% (4.9% - 11.8%)	6.3% (4.2% - 9.3%)	9.3% (5.7% - 14.8%)	5.0% (2.9% - 8.5%)	12.0% (8.2% - 17.2%)
	0.3% (0.0% - 2.6%)	0.0% (0.0% - 0.2%)	0.0% (0.0% - 0.2%)	0.8% (0.3% - 2.6%)	0.0% (0.0% - 0.2%)	1.4% (0.5% - 3.6%)