



Nutrition Surveillance
Acholi Region,
Uganda
Round 1, March/April 2011



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Summary of key findings

- Among 6- to 59-month children, the overall prevalence of **GAM** was **3.2%** (2.3% - 4.1%), and the prevalence of **SAM** was **0.7%** (0.3% - 1.1%) based on weight-for-height z-scores results (WHO standards, CI 95%).
- Across Acholi, Lamwo district recorded the highest level of GAM 6.5% (4.2% - 9.8%) and the highest level of SAM 1.8% (0.7% - 4.0%), and pocket cases of malnutrition were found in Agoro sub-county.
- Regional **Measles vaccination** coverage was 90% among 9- to 59-month children, above the national coverage target.
- Regional **Vitamin A supplementation** coverage was 77.5%, however in Gulu district only 46% of the 6- to 59-month children received Vitamin A supplementation.
- **Morbidity** among 6- to 59-month children ranged from 65% in Kitgum to 79% in Gulu; the most common illness was ARI with 47% of children affected within two weeks preceding the survey. Management of **diarrhea** was poor, especially in Gulu and Amuru districts where very few 0- to 6-month infant who had diarrhea received ORS (11% and 9% respectively).
- **Exclusive breast feeding** among 0- to 6-month infants ranged from 66% (Lamwo) to 88% (Pader).
- Own production/cultivation was the **main food source**, except in Kitgum where households relied as much on cultivation than on market products.
- In Lamwo and Kitgum districts, the households' **main drinking water source** was boreholes (99% and 89% respectively), while in other districts many households used water from unsafe sources (47% of households in Amuru used unprotected wells/springs).
- The use of pit latrines was the most common method of **human waste disposal** except in Pader where almost 60% of households used the bush.
- **Hand washing** with soap at critical junctures was poorly practiced across the region.

Introduction

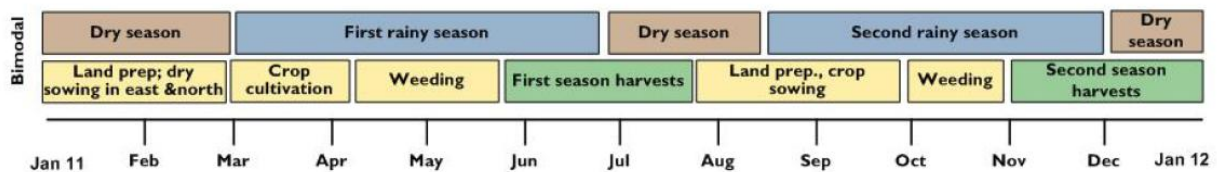
Acholi region is located in Northern Uganda, and is divided in seven districts that overlap with seven livelihood zones. The Acholi population is 1,454,300 with district populations being:

Table 1: Districts population of Acholi region

District	Tot population ¹
Gulu	374,700
Pader	481,000
Kitgum	229,000
Lamwo	158,100
Amuru	211,500
Total	1,454,300

Acholi is a bimodal production area (**Figure 1**) hence disposing two rainy and two lean seasons per year, in May-July and Oct-Dec. In 2011, the first rainy season was slightly delayed (2 to 3 weeks) and started around mid-March with lower than average rainfalls throughout April. Although this low rainfall resulted first in a predicted delay in planting of crops, since early May rains have continuously improved¹.

Figure 1: Seasonal Calendar March 2011 FEWS NET²



Although Acholi region went from an acute food and livelihood crisis (Phase 3) to a moderate/borderline food secure (Phase 2) classification in 2010, this irregular rain pattern and the current important rise in food prices continue to put the population at risk of food shortage. In May, the area assessed was described as 'stressed' by FEWS NET.²

With more than 20 years of insurgency because of the activities of the Lord's Resistance Army (LRA), the Acholi region has suffered widespread devastation. An estimated 95% of the Acholi population fled from their villages to shelter in displacement camps for more than 15 years, in some cases with devastating effects on the people. In 2006, Internally Displaced Persons (IDPs) began a long and complex process of return and/or resettlement to or near their places of origins.

As of Dec 2010, although more than 90% of the population have returned to their villages, there is a growing body of evidence that the consequences of this long humanitarian crisis continues to threaten individual lives and entire communities. Additionally, social services in the return areas continue to be more limited than in camps (including limited access to health, water, and sanitation). The lack of infrastructures makes this region with already poor health indices prone to disease out-break, for example polio³, yellow fever⁴ and continuing Hepatitis E⁵ outbreaks.

¹ Uganda Bureau of Statistics, projection 2010

² FEWS NET Uganda Food Security Outlook May 2011

³ ICRC DREF Operation No. MDRUG018 <http://www.ifrc.org/docs/appeals/10/MDRUG018dfr.pdf> last accessed 20 May 2011

⁴ ECDC, Yellow Fever Outbreak in Uganda, http://www.ecdc.europa.eu/en/activities/sciadvice/Lists/ECDC%20Reviews/ECDC_DispForm.aspx?List=512ff74f-77d4-4ad8-b6d6-bf0f23083f30&ID=994&RootFolder=%2Fen%2Factivities%2Fsciadvice%2FLists%2FECDC%20Reviews, last accessed 20 May 2011

⁵ Teshale EH, Howard CM, Grytdal SP, Handzel TR, Barry V, Kamili S, et al. Hepatitis E epidemic, Uganda. Emerg Infect Dis [serial on the Internet]. 2010 Jan [date cited]. Available from <http://www.cdc.gov/EID/content/16/1/126.htm>



In the past years, Northern Uganda reported to have higher than national averages of chronic malnutrition and underweight children at 40% and 22% respectively, with national rates for these types of malnutrition at 38% for chronic malnutrition and 16% for underweight children⁶.

These continuous indicators of poor nutritional status among the Acholi population supported the need for the region to develop a nutrition surveillance system to monitor the nutrition and health status of children under 5 year of age. District Health Officers (DHOs) of the Acholi Region together with ACF developed a small scale nutrition surveillance system starting from March 2011. This initiative is funded through the United Nations Children's Fund (UNICEF) until June 2012.

The first surveillance round in Acholi region was conducted between mid-March and early April 2011. Data collection was conducted jointly with the five DHOs (Pader, Kitgum, Lamwo, Amuru and Gulu districts). The surveillance round covered seven districts in total, including Agago and Nwoya, newly curved districts from Pader and Amuru respectively.

Nutrition Surveillance Objectives

The nutrition surveillance system was designed:

- To monitor the nutrition status of children aged between 6 and 59 months,
- To monitor health and morbidity, food security & livelihoods (FSL) and water, sanitation and hygiene (WASH) factors linked to malnutrition,
- To collect data twice a year in March/April (beginning of the lean period) and October (second lean season),
- 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 malnutrition, and contributing to the design of appropriate interventions accordingly.

Methodology

Household was the base sample unit with a sample size of 300 households per district. The samples 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 using 25 clusters of 12 households per district (Detailed methodology in Annex 3).

- > Parish population (lowest unit population available) was used for random selection of 25 clusters per district (using ENA software).
- > A simple ballot system was used to select villages, and systematic random sampling was used for households' selection (household lists provided by the village leaders were used to determine the sampling interval).

Selected households received two questionnaires:

- The first one targeting all eligible children (6- to 59 months old) in the household, capturing anthropometric measures, the incidence of common diseases (diarrhoea, measles and acute respiratory infections) two weeks prior to the assessment, information regarding measles vaccination and vitamin A supplementation, and the proportion of 6-59-month children currently enrolled in a therapeutic feeding programme at the time of the survey (Anthropometric questionnaire in Annex 4);

⁶ UNICEF Country Statistics http://www.unicef.org/infobycountry/uganda_statistics.html Accessed 29 May



- The second questionnaire aimed at assessing possible underlying factors of malnutrition by collecting information about nutrition, health, FSL, and WASH indicators (integrated surveillance questionnaire in Annex 4).

Data was entered into ENA for SMART 2010 version to determine nutritional indicators of WHZ, WAZ and HAZ using WHO 2006. EpiInfo 3.5.1 software was used to further analyse data. Design weights were added to each district to identify a more representative result for each of the five districts using Microsoft Excel 2007. CDC Probability Calculator using MS Excel 2007 was employed to identify 85% probability point estimates. NCHS 1977 standards are presented in Annex 6 in order to be able to compare earlier surveys. More details about weight calculation in Annex 3.

The analysis was run without excluding outliers to include severe malnourished children in the analysis.

Results

A total of 1498 out of the 1500 selected households were interviewed, and 1498 children (6-59 months) were screened for anthropometric indicators. **Table 2** lists the sample size obtained for each district and contains information about missing children and households' replacement (abandoned house).

Regional age (6-29 months/30-59 months) and gender (male/female) ratios are 1.01 and 1.03 respectively (Annex 5 for details about data quality obtained for each district).

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

	Lamwo	Kitgum	Pader	Amuru	Gulu	Total
Households interviewed	300	300	300	298	300	1498
Children measured	339	303	283	284	289	1498
Replaced households	4	0	0	0	0	4
Absent households	0	0	0	2	0	2
Missing children	6	0	3	2	2	13

Anthropometric Results

- The prevalence of Global Acute Malnutrition (GAM) and Severe Acute Malnutrition (SAM) results obtained for each district and for Acholi region are presented in **Table 3**.
- Acholi region had an overall prevalence of **GAM** of **3.2%** (2.3% - 4.1% CI 95%), and of **SAM** of **0.7%** (0.3% - 1.1% CI 95%) based on weight-for-height z-scores results (WHO 2006 Standards).
- The prevalence of oedema was measured at 0% for the region.
- Across Acholi, **Lamwo district** recorded the worst results (**Table 3**), i.e., the highest prevalence of GAM 6.5% (4.2% - 9.8% CI 95%), and the highest prevalence of SAM 1.8% (0.7% - 4.0% CI 95%) based on weight-for-height z-scores results; the prevalence of **underweight** was 23% and the prevalence of **stunting** was 41% (**Table 4**).
- In Lamwo district, spots of high malnutrition were located in Agoro sub-county (Poisson distribution $p < 0.05$, **Annex 5**)
- When results are based on Middle Upper Arm Circumference (MUAC) results, Kitgum had the highest prevalence of global acute malnutrition i.e., 3.3% (**Table 5**).

Table 3: Global and Severe Acute Malnutrition among children 6-59 months per District, WHO 2006 Standards

INDICATOR	Lamwo	Kitgum	Pader	Amuru	Gulu	Total
Global Acute Malnutrition WHZ < -2 z and/or oedema	6.5% (3.9% - 10.7%)	3.0% (1.4% - 6.2%)	1.8% (0.8% - 4.1%)	3.5% (1.7% - 7.0%)	3.5% (2.0% - 5.9%)	3.2% (2.3% - 4.1%)
Severe Acute Malnutrition WHZ < -3 z and/or oedema	1.8% (0.7% - 4.4%)	0.0%	0.0%	1.1% (0.3% - 3.2%)	1.0% (0.3% - 3.2%)	0.7% (0.3% - 1.1%)

Table 4: Prevalence of chronic malnutrition (stunting) and underweight per district, WHO 2006 Standards

INDICATOR	Lamwo	Kitgum	Pader	Amuru	Gulu	Total
Stunting H/A < -2 z	41.0% (35.8% - 46.5%)	29.0% (21.8% - 37.6%)	33.6% (28.1% - 40.3%)	39.1% (32.4% - 46.2%)	30.8% (24.2% - 38.2%)	33.7% (30.6%-36.9%)
Underweight W/A < -2 z	23.0% (18.0% - 28.9%)	12.9% (9.1% - 17.8%)	13.1% (9.2% - 18.3%)	13.7% (9.1% - 20.2%)	13.5% (10.0% - 18.0%)	14.4% (12.3%-16.5%)

Table 5: Prevalence of GAM and SAM based on MUAC

INDICATOR	Lamwo	Kitgum	Pader	Amuru	Gulu	Total
Global Acute Malnutrition (<125mm)	3.2% (1.5% - 6.9%)	3.3% (1.6% - 6.6%)	2.1% (1.0% - 4.4%)	1.4% (0.4% - 4.6%)	2.1% (0.9% - 4.8%)	2.5% (1.8% - 3.5%)
Severe Acute Malnutrition (<115mm)	1.2% (0.3% - 4.0%)	0.3% (0.0% - 2.5%)	0.0%	0.4% (0.0% - 2.6%)	0.7% (0.2% - 2.8%)	0.5% (0.3% - 1.1%)

Classification of malnutrition on the basis stunting, wasting and underweight was as follows:

- 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%)⁷.

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

INDICATOR	Lamwo	Kitgum	Pader	Amuru	Gulu	Total
Wasting	poor	acceptable	acceptable	acceptable	acceptable	acceptable
Stunting	critical	poor	serious	serious	serious	serious
Underweight	serious	poor	poor	poor	poor	poor

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, GAM and SAM points of estimate (WHO standards, no exclusion). Results presented in **Table 7** give GAM thresholds with 85% probability to be exceeded, e.g., in Lamwo district, there was 85% probability that GAM exceeds the 5.0% threshold.

⁷ WHO. 2000. *WHO Complementary feeding: Family foods for breastfed children*.

Table 7: Prevalence of GAM and SAM expressed with 85% probability (CDC calculator)

INDICATOR	Lamwo	Kitgum	Pader	Amuru	Gulu	Total
Global Acute Malnutrition	5.0%	2.1%	1.1%	2.8%	2.4%	2.1%
Severe Acute Malnutrition	1.1%	<0.01	<0.01%	0.8%	0.5%	0.3%

A total of 42 malnourished children were identified and referred to health centres during data collection process (7 SAM and 35 MAM referrals, **Table 8**). In addition to those identified for nutrition treatment 46 children were already enrolled in feeding programs.

Table 8: Children 6-59 months referred to targeted feeding program (OTC/SFP) during surveillance

Feeding Program	Lamwo	Kitgum	Pader	Amuru	Gulu	Total
OTP	3	0	0	1	3	7
SFP	7	8	5	8	7	35

At the time of the survey, there were 2.6% of children enrolled in a Supplementary Feeding Program (SFP) and 0.4% in Out-patient Therapeutic Program (**Table 9**).

Table 9: Children receiving treatment at time of surveillance

Feeding Program	Lamwo	Kitgum	Pader	Amuru	Gulu	Acholi
OTP	1	0	2	0	1	4
SFP	12	7	9	12	2	42

Health Indicators

Measles vaccination, Vitamin A supplementation and mosquito net coverage gives an indication for basic health prevention activities within the districts.

High levels of measles vaccination coverage for children > 9 months of age in all districts of Acholi was higher than 85% coverage standard set by the Ministry of Health with no significant difference between each of the districts. This high level of vaccination coverage improves the herd immunity to measles and therefore having a significant impact for the prevention of outbreaks which has devastating impacts on the nutrition status of children. It should be noted that on average less than **two-thirds** of respondents who said their children received measles vaccine held a vaccination card (**Table 10**).

Table 10: Measles Vaccination Coverage

Vaccination Coverage	Lamwo	Kitgum	Pader	Amuru	Gulu	Total
Eligible Children	314	277	268	262	265	1386
Vaccination Card	58.6%	65.7%	44.8%	51.5%	55.5%	55.4%
Without Card	33.8%	26.4%	45.1%	38.5%	35.1%	35.6%
Total Coverage	92.4%	92.1%	89.9%	90.1%	90.6%	91.1%

As with measles immunization, vitamin A supplementation improves the immunity of children preventing illness such as Bitot's spot on the eyes and increases children's susceptibility to diseases such as measles. Vitamin A supplementation coverage ranges are 46.7% to 92.4% in the region (**Table 11**). Pader and Kitgum showed the highest coverage with 91.8 and 92.4% respectively exceeding the Ministry of Health national target of 90% coverage. In Gulu, vitamin A supplementation is far from meeting the national target at 46.7%.

Table 11: Vitamin A Supplementation for eligible children

Vit A Supplementation	Lamwo	Kitgum	Pader	Amuru	Gulu	Total
Eligible Children	336	301	281	278	287	1483
Received with Record	48.5%	64.1%	31.3%	32.0%	16.4%	39.1%
Without Record	40.5%	28.2%	60.5%	47.5%	30.3%	41.1%
Total Coverage	89.0%	92.4%	91.8%	79.5%	46.7%	80.2%

The use of ITN bed nets has shown to reduce the burden of malaria and associated morbidity and mortality among children. ITN bed nets have also shown to improve the nutritional status of the children⁸. Thanks to a recent ITN distribution (November 2010) by the Uganda Red Cross society, ITN possession among assessed households was above 70% in all districts except in Amuru (60%, **Table 12**). In households that own an ITN, its usage among children less than five years ranged from 72% in Gulu to 88% in Lamwo and Kitgum (**Table 13**). Even with widespread distribution and use of ITN, all districts reported that of children having malaria was in excess of 50% of children reporting illness.

Table 12: ITN ownership and use

ITN ownership	Kitgum	Lamwo	Pader	Amuru	Gulu
No	27%	17%	27%	40%	26%
Yes	73%	83%	73%	60%	74%

Table 13: ITN household Usage

ITN use	Kitgum	Lamwo	Pader	Amuru	Gulu
under 5 child	88%	88%	80%	75%	72%
above 5 child	20%	47%	45%	43%	40%
mother	88%	82%	77%	80%	77%
father	37%	43%	37%	48%	44%
no one	1%	4%	6%	8%	5%

Morbidity Results

Occurrence of illness within the two weeks prior the survey was high (slightly above 70% region wise, **Table 14**).

Table 14: Occurrences of illness among 6-59 month children

	Lamwo	Kitgum	Pader	Amuru	Gulu	Total
Illness in past 2 weeks	67.3%	65.0%	67.5%	72.5%	78.9%	70.1%
No Illness	32.7%	35.0%	32.5%	27.5%	21.1%	29.9%

Gulu showed a very high rate of current or preceding illness with 78.9% of the 6-59-month children being affected by a disease within the two weeks the survey.

In all districts, Acute Respiratory Infection (ARI) was the most frequent disease followed by malaria and diarrhoea (**Table 15**). 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.

⁸ 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.

Table 15: Diagnosis for children with recorded illness in past 2 weeks

Illness	Lamwo	Kitgum	Pader	Amuru	Gulu	Total
Diarrhoea	39.9%	36.5%	35.1%	34.0%	35.1%	36.2%
Malaria	56.1%	54.8%	57.6%	47.1%	52.6%	53.6%
ARI	61.8%	57.9%	63.4%	73.8%	72.8%	66.1%

Among 6- to 59-month children affected by diarrhoea, only half received appropriate treatment (Oral Rehydration Solution ORS). This low rate of implementation of approved treatment for diarrhoea may impact on the recovery rate of children leading to preventable weight loss.

Table 16: Children with diarrhoea who received Oral Rehydration Solution (ORS)

	Lamwo	Kitgum	Pader	Amuru	Gulu	Total
Received ORS	69.2%	51.4%	32.8%	37.1%	43.8%	48.2%
Did not receive ORS	30.8%	48.6%	67.2%	62.9%	56.3%	51.8%

Food Security Indicators

Main Food Source

Own production was the main source of food throughout the region. Interestingly, households in Kitgum purchased a significant amount of food for the household, more so than Gulu which is classified as an urban context.

Other food sources including food borrowing, gift, barter, and food aid/donation remained minimal and ranged from 0% to 2% of the consumption (Figure 2).

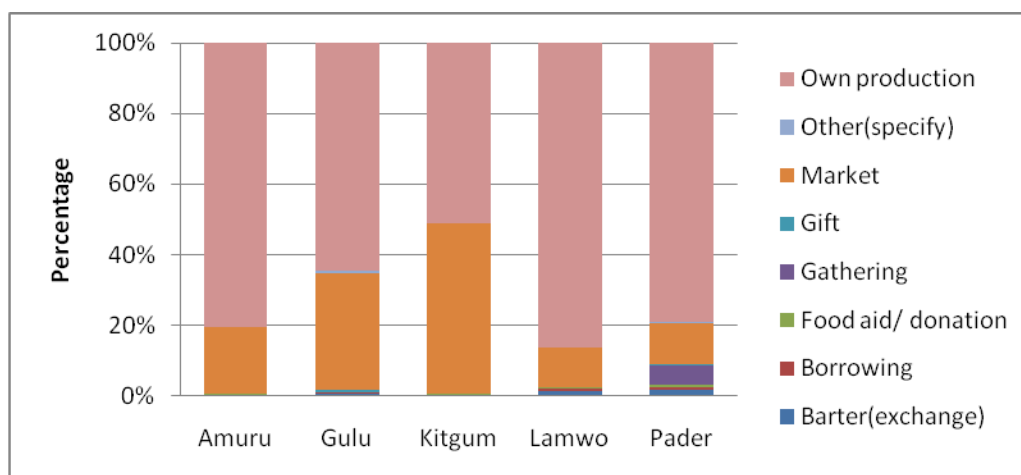


Figure 2: Household main food source

Food Consumption Score (FCS)⁹

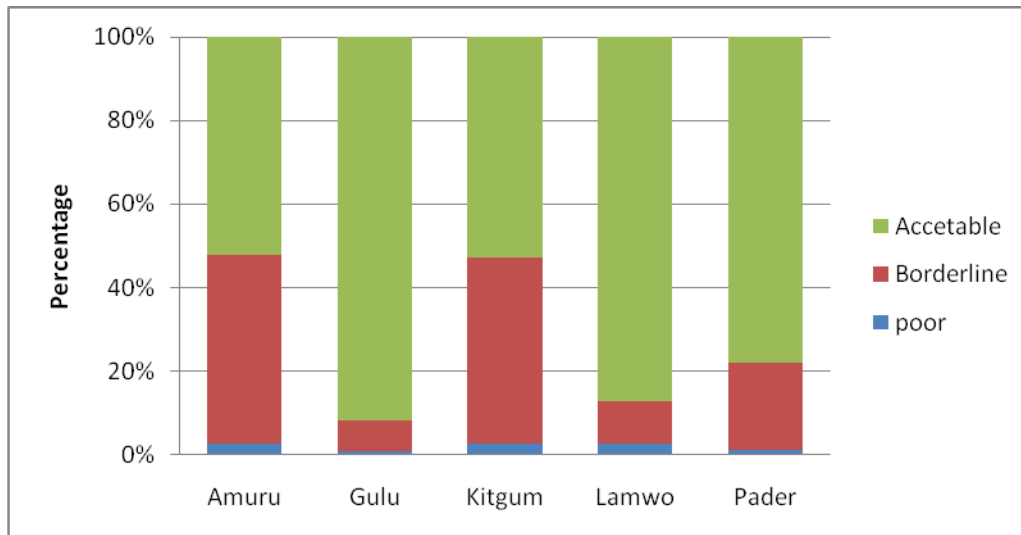
Households were asked about how frequently (in term of days) certain food groups were consumed over seven days prior the interview (see nutrition security questionnaire in Annex 4). The FCS is used as a food security proxy that captures both dietary diversity and food frequency. FCS standard thresholds categorize households into poor, borderline, and acceptable consumption and food security.

The majority of households had a FCS that is within the acceptable range. However, nearly half of the households in Amuru (45%) and Kitgum (44.6%) had a borderline FCS (Figure 3) indicating that households might be at risk of not accessing to the basic food groups in their habitual diet.

⁹Food 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 3: Households Food Consumption Score (FCS) by districts (7-day recall period)



Meal frequency among 6- to 23-month children

The number of meals eaten in the last 24 hours preceding the interview was assessed among 6- to 23-month children, and results showed that the majority of children consumed two to three meals per day (**Figure 4**).

Consumption of the recommended number of meals (three and above) was 35% in Amuru, 47% in Kitgum, 47% in Gulu, 52% in Pader, and 59% in Lamwo.

In Lamwo and Gulu districts, it was reported that 4% and 2% of 6-23-month children respectively did not receive any solid meal¹⁰ within the last 24 hours and it often referred to children between 6 and 8 months who were not yet introduced to other foods than breast milk.

However, although 92% of households in Gulu had an acceptable food consumption (see FCS results above), only 49% of 6- to 23-month children received the recommended number of meals (three and above, **Table 17**).

In Amuru, the feeding practices among 6- to 23-month children of households with a borderline FCS were similar than the ones of acceptable FCS households (**Table 17**).

These results may indicate that even though at household level, food consumption is acceptable; it might not be the case at individual child level.

¹⁰A **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

Figure 4: Meal frequency among 6-23-month children within the last 24 hrs

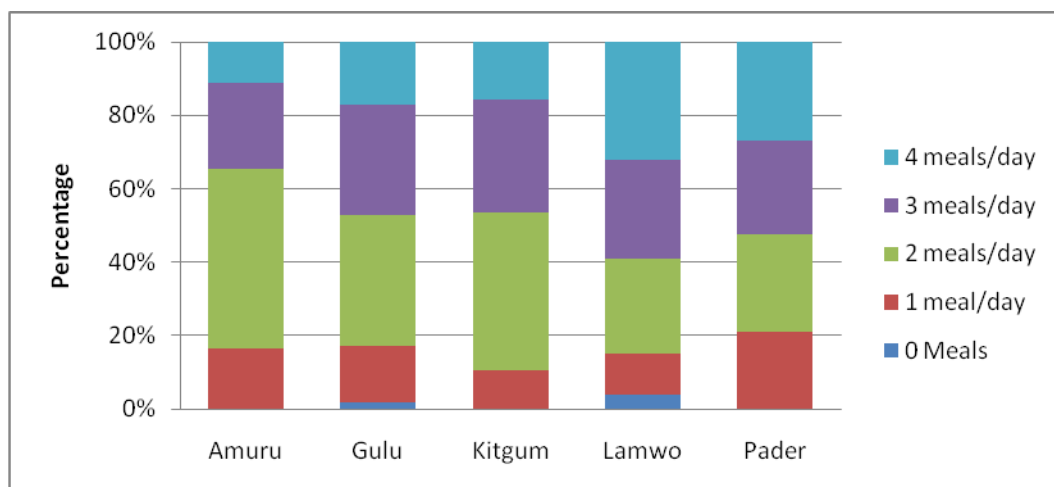


Table 17: Meal frequency among 6- to 23-month children from poor, borderline and acceptable FCS households

	FCS	Kitgum			Lamwo			Pader			Amuru			Gulu		
		poor	borderline	acceptable	poor	borderline	acceptable	poor	borderline	acceptable	poor	borderline	acceptable	poor	borderline	acceptable
		3%	45%	53%	3%	10%	87%	1%	21%	78%	3%	45%	52%	1%	7%	92%
Child meals	0	0%	2%	0%	0%	8%	6%	0%	0%	0%	0%	0%	0%	0%	0%	2%
	1	33%	14%	6%	0%	15%	9%	100%	27%	19%	0%	18%	17%	0%	33%	14%
	2	67%	51%	35%	100%	31%	22%	0%	27%	26%	0%	51%	46%	0%	44%	35%
	3	0%	18%	41%	0%	15%	28%	0%	27%	27%	0%	22%	24%	0%	11%	31%
	4	0%	14%	17%	0%	31%	34%	0%	20%	29%	100%	9%	13%	0%	11%	18%

Individual Dietary Diversity Score (IDDS) among 6- to 23-month children¹¹

Using the 24 hour recall, the IDDS of 6- to 23-month children was assessed. Among children 6-23 months of age, an indicator of 'minimum dietary diversity' has been defined as the proportion of children who received foods from at least 4 food groups the previous day.

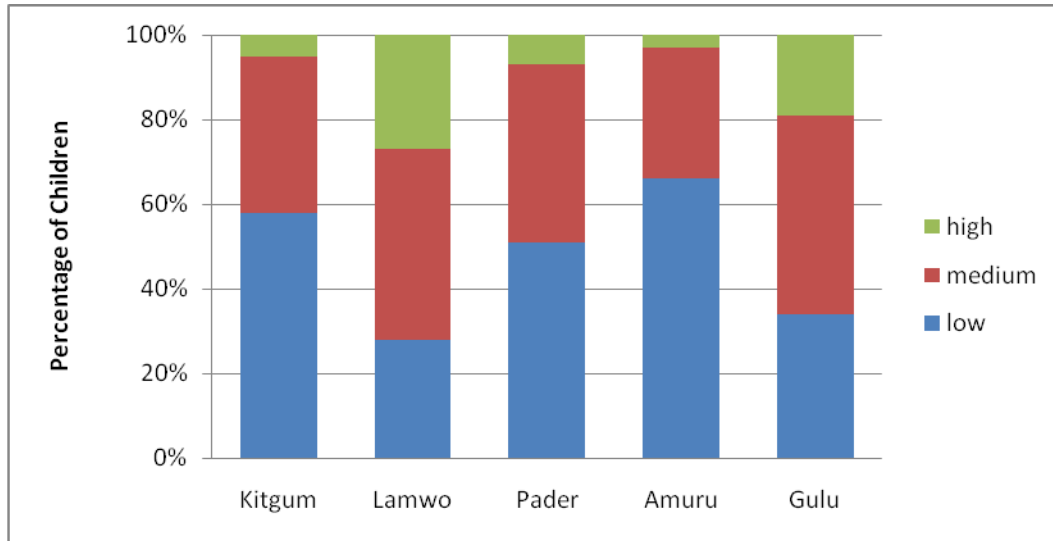
The majority of the children had a low IDDS (≤ 3) except in Gulu and Lamwo districts where majority of children's IDDS fell in the medium interpretation level ¹¹(Figure 5).

Children in Amuru district were the most affected with 66% lying within the low IDDS bracket followed by children of Kitgum and Pader at 58% and 51% respectively.

Among children having an extremely poor dietary diversity (IDDS=1), cereal was the only food consumed. For children with an IDDS equal to 2 or 3, cereals were consumed at 95% closely followed by vegetables consumed at 50% to 60%.

¹¹Low ≤ 3 ; 3 < medium ≤ 5 ; high > 5

Figure 5: IDDS among 6- to 23-month children

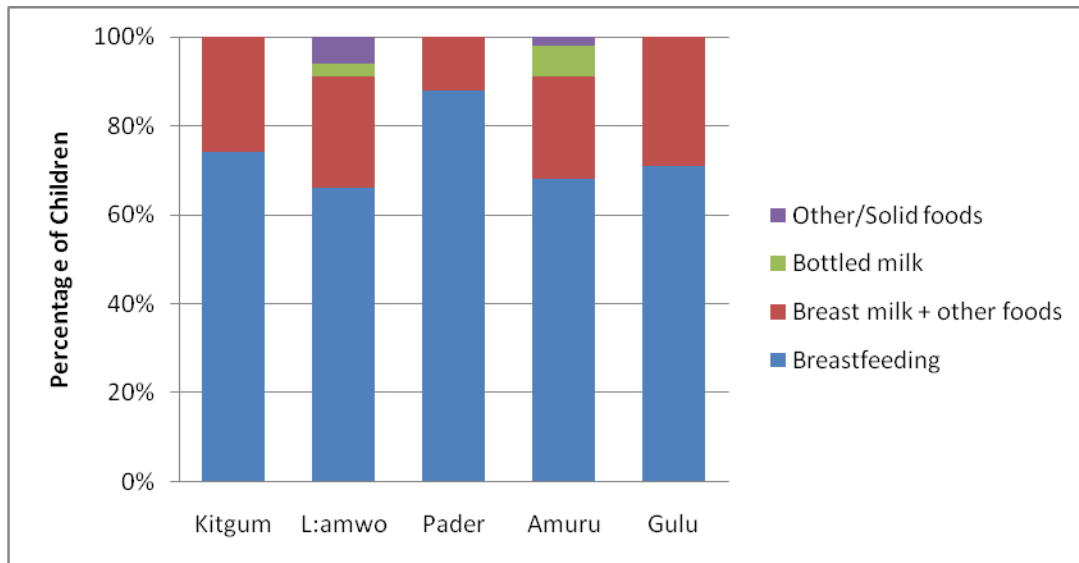


Breast feeding practices among 0- to 6-month children

The highest rate of exclusive breast feeding was obtained in Pader (88%).

In all districts, the proportion of infants exclusively breastfed was above the current national rate (60%), although in four out of five districts, one fourth of the 0-6 months were already introduced to other foods (Figure 6).

Figure 6: Breast feeding practices among 0- to 6-month children



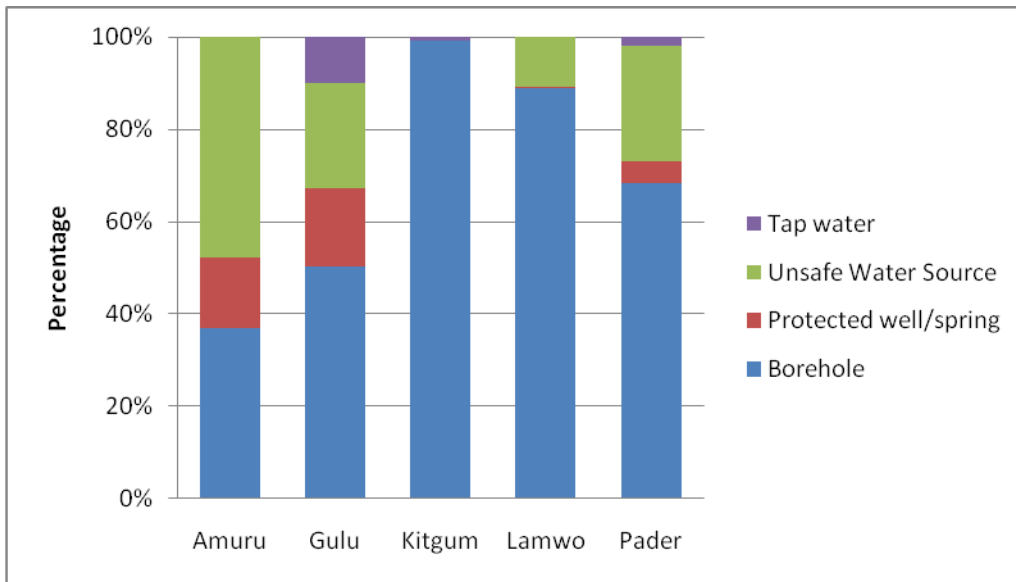
Water, Sanitation and Hygiene (WASH) Indicators

Drinking Water Sources

The main source of drinking water was a borehole in all districts except in Amuru where nearly half the population got their drinking water from unsafe sources (**Figure 7**). The low borehole usage in Amuru could be attributed to movement of the population back to their ancestral land yet most of the boreholes were drilled mainly in satellite camps.

Although the majority of water is collected from safe sources, it should be noted that more than 20% of households still access water from sources classified as unsafe. It can be presumed that these households are more susceptible to water borne and diarrhoeal disease.

Figure 7: Drinking water sources per district

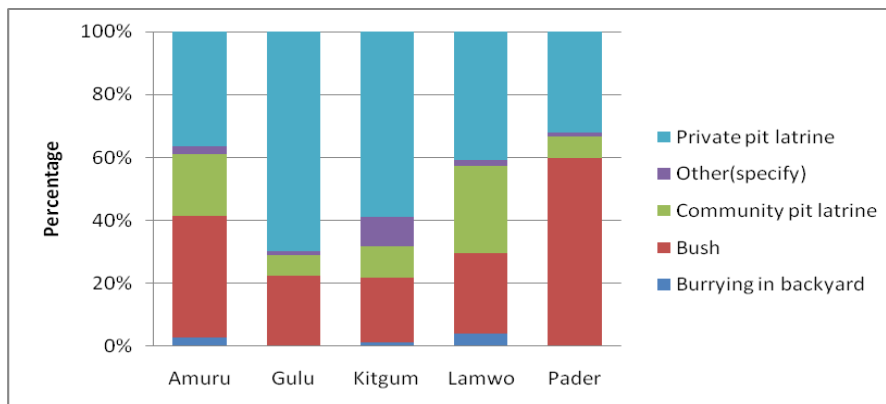


Human Waste Disposal

Pit latrines were the main means of human waste disposal in Gulu (77%), Kitgum (69%), and Lamwo (69%).

However in Pader and Amuru, 59% and 39% of households reported to use the bush for human waste disposal (**Figure 8**).

Figure 8: Human Waste Disposal per District



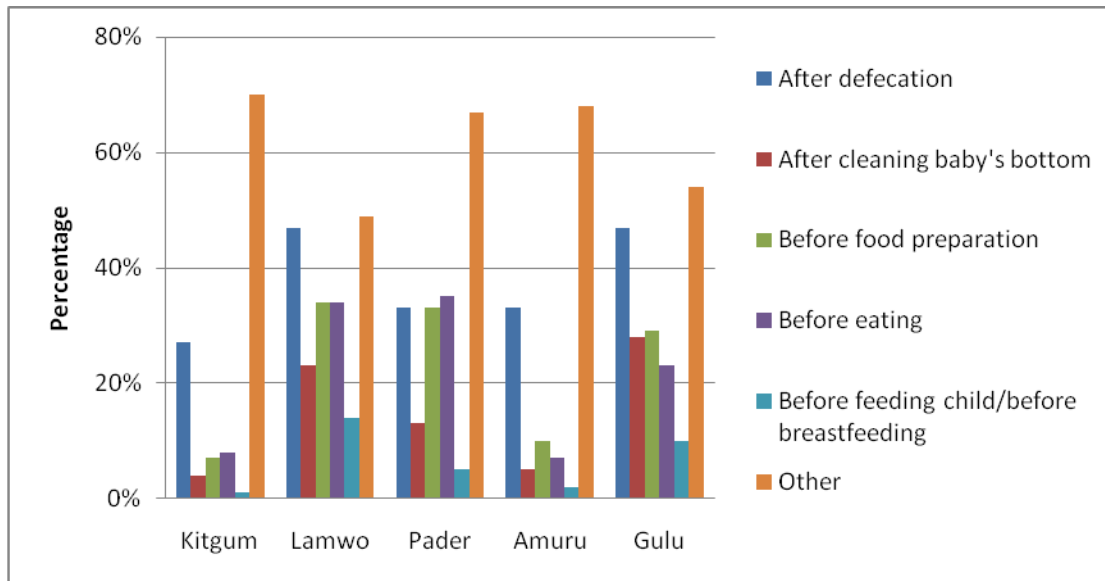
Hand washing practices

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 9**).

Majority of assessed households (from 49% in Lamwo to 70% in Kitgum) washed hands without soap. This is attributed to a low community hygiene practice sensitization within the ancestral settlements (**Figure 9**).

Figure 9: Household hand washing practices.



Conclusions

Nutrition and Health

In March/April 2011, Lamwo was the district with the highest rates of acute malnutrition. While the other districts surveyed did not show evidence of serious problems associated with acute malnutrition, overall chronic malnutrition and underweight children still exceed the national averages (Chronic 38%, Underweight 16%¹²).

Although some specific areas were found to have high malnutrition prevalence, this should be read with caution considering the sample size of each cluster.

Case load estimate: Acholi population is estimated at 1,454,300; bringing the under 5 children population to be 280,860 (20% of the total population). It can be assumed that from the surveillance data, acute malnutrition will affect around 9300 children under 5 years of age.

Measles vaccination and Vitamin A supplementation coverage in Acholi is close to or exceeding national targets (Measles 85%, Vitamin A 90%) set by the Ministry of Health national targets, except in Gulu where only 47% of children have received vitamin A supplementation.

¹²UNICEF Country Statistics http://www.unicef.org/infobycountry/uganda_statistics.html, accessed 29 May 2011



Occurrence of illness was high across the region and especially in Gulu, where almost 80% of the 6- to 59-month children were affected by a disease within the two weeks preceding the survey.

In all districts, Acute Respiratory Infection (ARI) was the most frequent disease (47%), followed by malaria (38%), and diarrhoea (25%).

Rehydration solution (ORS) to prevent complications of diarrhoea had limited use across the region.

While most households own an ITN, and its usage among under five children ranged from 72% in Gulu to 88% in Lamwo and Kitgum.

Food Security

In the month of the survey period (March/April), the households main food source was own production.

In Kitgum and Gulu 48% and 33% of households respectively relied on products purchased from markets.

The majority of households had a Food Consumption Score (FCS) in the acceptable range, although nearly half of the households in Amuru (45%) and Kitgum (44.6%) had a borderline FCS indicating that households might be at risk of not accessing to the basic food groups in their habitual diet.

In the last 24 hours preceding the interview, the consumption of the recommended number of meals (three and above) was 35% in Amuru, 47% in Kitgum and in Gulu, 52% in Pader, and 59% in Lamwo 6- to 23-month children.

The majority of 6- to 23-month children had a low IDDS in Amuru district, with 66% lying within the low IDDS bracket followed by children of Kitgum and Pader at 58% and 51% respectively; while the IDDS for the children in Gulu and Lamwo districts fell into the medium interpretation level, indicating that they received a minimum dietary diversity.

In all districts, the proportion of infants exclusively breast-fed was above the current national rate (60%), and the highest rate of exclusive breast-feeding was obtained in Pader (88%).

Water, Sanitation and Hygiene (WASH) Indicators

The main source of drinking water was a borehole in all districts except in Amuru where nearly half the population got their drinking water from unsafe sources.

Pit latrines were the main means of human waste disposal in Gulu (77%), Kitgum (69%), and Lamwo (69%); however in Pader and Amuru, 59% and 39% of households reported to use the bush for human waste disposal.

Hand washing practices with soap at critical junctures are generally low across the region.

Priority Areas

Lamwo: The highest prevalence of GAM and SAM were obtained, with pocket cases in Agoro sub-county, but Lamwo is not the district with the worst health, FS, WASH indicators except for the feeding practices of infants aged 0-6 months.

Pader: Had the lowest level of GAM within Acholi. Children aged 6-23 months had an adequate daily meal frequency. A significant proportion of households (28%) accessed drinking water from unsafe water sources. This highlighted a need for the immediate rehabilitation of boreholes; interim measures include provision of water treatment to reduce waterborne diseases. In light of the poor results relating to water access, human waste disposal identified the lack of or use of proper facilities, resulting in a large proportion of people continuing to defecate in the bush.

Kitgum: Around half of households produced/cultivated their own food. The majority of households have a borderline FCS with children consuming only 2 meals a day, in addition to a low IDDS. These FS results are concerning as they may translate into higher rates of acute malnutrition in the district. The use of borehole to access water and proper sanitation facilities was highest in this district.



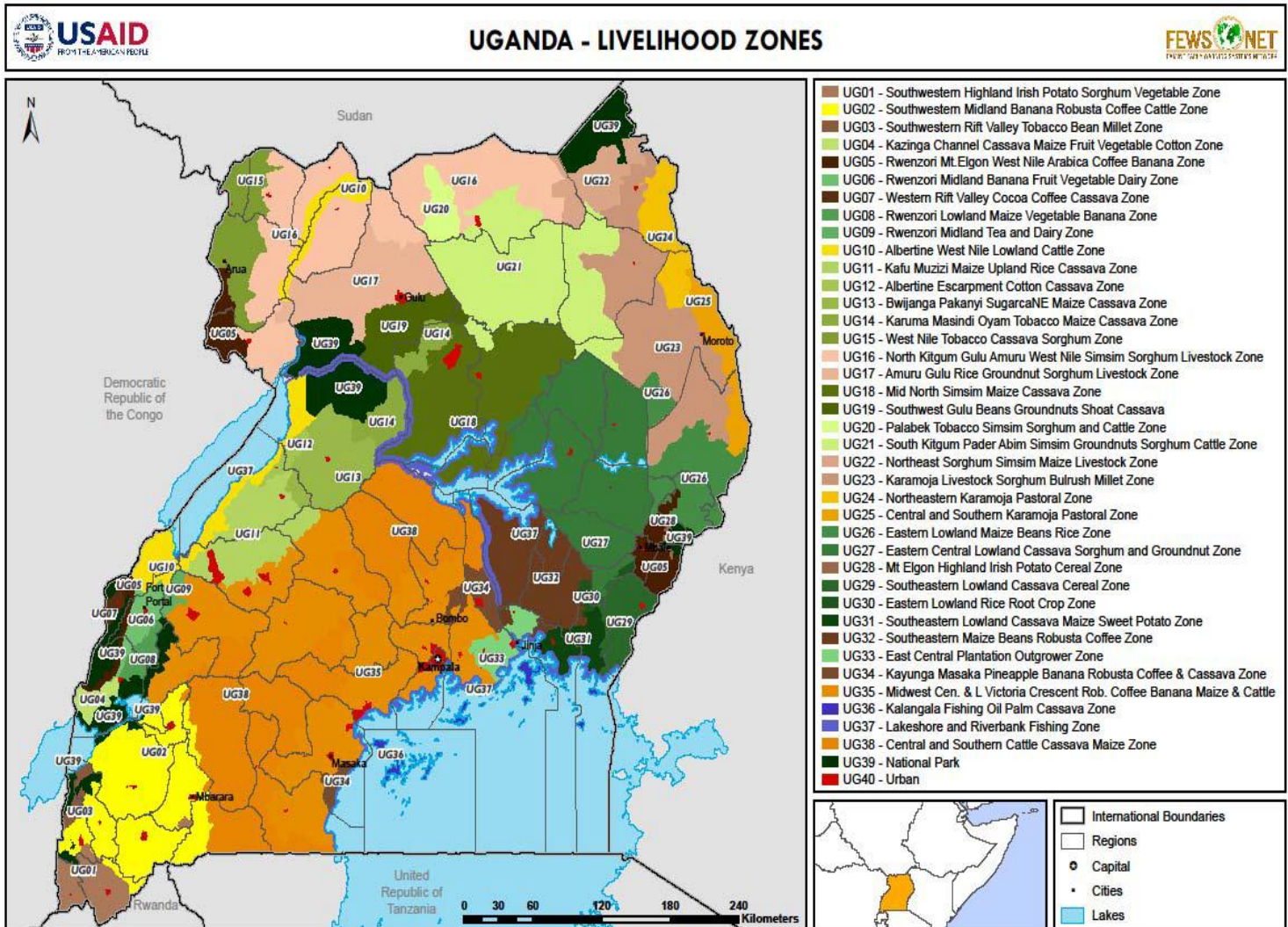
Amuru: There is the biggest proportion of households that get drinking water from unsafe sources (47%), this did not yet result in high rates of diarrhoeal disease among children. Within this district the largest proportion of children has a low IDDS.

Gulu: While Gulu is the main urban centre for the district, it showed lower than average vitamin A coverage and the highest incidence of disease that impacts on the nutrition of children. Dehydration prevention through the use of ORS was considerably lower than other districts and the enrolment of children in nutritional programs was lowest for the five districts surveyed.

Recommendations

- Greater emphasis on targeted prevention programs in Lamwo should be considered to reduce the rates of wasting in the district. While the malnutrition rates do not present a critical acute picture, efforts to reduce malnutrition through prevention is needed.
- There is a clear need to improve child care practices and health seeking behaviours of parents with infant and small children, especially in the use of ORS for diarrhoea.
- Results showed that underweight rates continue to be concerning in this region. An emphasis needs to be put on child feeding practices for an appropriate preparation and appropriate use of foods for children.
- While there is adequate ITN ownership, increased health education and prevention messages in the correct use of ITN bed nets are needed to reduce the numbers of children suffering from malaria.
- 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.
- While it has been reported that vitamin A supplementation and immunisation coverage exceeded national targets, continued efforts are needed to ensure that children are not susceptible to preventable disease.

Annex 2: Livelihood Zone Map of Uganda



Annex 3: Applied Methodology

Methodology:

- Household was the sample unit and the sample size was 300 for each of the five 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, Kitgum district comprises of LHZs called UG16, UG21, UG22 and UG40, and using PPS, these LHZs were assigned 5, 13, 1 and 6 clusters respectively.

Table 18: Population per district per LHZ

District	UG21	UG 17	UG 16	UG40	UG19	UG 20	UG 22	Total
Gulu	0	90,000	2,800	149,900	132,000	0	0	374,700
Pader	481,000	0	0	0	0	0	0	481,000
Kitgum	118,800	0	46,500	57,400	0	0	6,300	229,000
Lamwo	0	0	123,000	0	0	35,100	0	158,100
Amuru	0	175,000	25,900	0	10,600	0	0	211,500
Total	599,800	265,000	198,200	207,300	142,600	35,100	6,300	1,454,300

Table 19: Clusters per district per LHZ

District	UG21	UG 17	UG 16	UG 40	UG19	UG 20	UG 22	Total
Gulu	0	6	1	10	8	0	0	25
Pader	25	0	0	0	0	0	0	25
Kitgum	13	0	5	6	0	0	1	25
Lamwo	0	0	19	0	0	6	0	25
Amuru	0	21	3	0	1	0	0	25
Total	38	27	28	16	10	6	1	125

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

Health Staff Training:

ACF trained five district nutrition focal persons (DNFPs) from the 28th of February through the 3rd March 2011 about surveillance program objectives, methodology (sampling, indicators, etc.); data collection (anthropometric measurement, nutrition security questionnaire completion, malnutrition referral criteria); data entry and quality check (use of Epi Info/ENA software); data analysis; reporting and results dissemination.

In each district, 20 health workers received a 4-day training focusing on survey field implementation; training co-facilitated by DNFPs and ACF staff.

Field implementation:

The survey was conducted from the 14th through the 19th of March 2011 in Pader, Kitgum, and Lamwo districts (Phase 1), and was conducted in Amuru and Gulu districts from the 1st through the 6th of April (Phase 2).

Then five teams comprising of four health workers collected data through a period of five days. Training of health workers and supervision of data collection at field level was carried out by district nutrition surveillance focal persons supported by ACF staff.

Data entry/analysis:

ENA for SMART and Epi Info software were used to record 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 (13th-16th April 2011) during which DNFPs' skills in data cleaning, analysis and reporting were strengthened.

When the analysis was performed for the Acholi region (5 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 is run by livelihood zones, a weight was brought to each LHZs within a district to compensate the fact that clusters were allocated by district (and not by LHZs).

Weight calculation: design weight was calculated by dividing the total segment population by the number of total number of children measured for that segment.

Table 20: Design weights attached for anthropometric data analysis for Acholi Region Nutritional Surveillance Round 1

District	UG21		UG 17		UG 16		UG 40		UG19		UG 20		UG 22		Total	district weight
	answer	weight	answer	weight	answer	weight	answer	weight	answer	weight	answer	weight	answer	weight		
Gulu			76	1184.2	13	215.4	115	1303.5	85	1552.9					289	1296.5
Pader	283	1699.6													283	1699.6
Kitgum	151	786.8			68	683.8	72	797.2					12	525.0	303	755.8
Lamwo					266	462.4					73	480.8			339	466.4
Amuru			241	726.1	31	835.5			12	883.3					284	744.7
Total	434		317		378		187		97		73		12		1498	

Table 21: Design weights attached for nutrition security data analysis for Acholi Region Nutritional Surveillance Round 1

District	UG21		UG 17		UG 16		UG 40		UG19		UG 20		UG 22		Total	district weight
	answer	weight	answer	weight	answer	weight	answer	weight	answer	weight	answer	weight	answer	weight		
Gulu			72	1250.0	12	233.3	120	1249.2	96	1375.0					300	1249.0
Pader	300	1603.3													300	1603.3
Kitgum	156	761.5			60	13.1	72	797.2					12	57.0	300	763.3
Lamwo					228	539.5					72	487.5			300	527.0
Amuru			250	700.0	36	719.4			12	883.3					298	709.7
Total	456		322		336		192		108		72		12		1498	



Annex 4: Questionnaires

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

District: _____ Sub - County: _____ Parish _____ Village/Zone _____

Livelihood _____ Date: _____ Cluster no. _____ Cluster b _____ Team no _____

Child no.	HH no.	Sex (F/M)	Age in months	Weight (kg) ±0.1 kg	Height/Length ¹³ (cm) ±0.1cm	Oedema (Y/N)	MUAC (mm)	Measles ¹⁴ Vaccination (Y/N)	Vitamin A supplementation ¹⁵ in the last 6 months. (Child received Red or blue capsule drops)	Did this child have the following illnesses in the last 2 weeks (Y/N)				Is this child enrolled in any feeding programme? ¹⁶
										Diarrhoea	If Yes, did the child receive ORS?	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.

¹³ Height measurement standing when child is ≥24 months (height proxy ≥87 cm) and lying down when child is < 24 months (< 87 cm)

¹⁴ 1 = Yes (with card); 2= Yes (without card); 3= No; 4= Don't know 5= Not applicable for children below 9 months.

¹⁵ 1= Yes (with card); 2= Yes (without card); 3= No; 4= Don't know

¹⁶ 1 = OTC (Plumpy Nut, red sachet); 2 = ITC; 3 = SFC (Plumpy, white sachet), 4=None



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	11	12
Gender of respondent 1=Male 2=Female	Household main source of food in the current month 1=own production 2= market 3=food aid/donation 4=gathering 5=barter (exchange) 6=gift 7=borrowing 8=Other (specify)	Ask how many days in the past 7 days, the household consumed each of the following food items. C=Cereals and tubers (Maize/posho, sorghum, wheat,rice,cassava, millet, residue, matoke, potatoes) O=Oils and fats (butter, ghee, simsim, sunflower etc) S=Sugar/honey/sweets/cakes/soda M=Meat,offal and blood , fish, eggs ML=Milk and milk products eg yoghurt, cheese V=Vegetables (tomato, onion, boo, akeo,ekadolia,ekoorete, etsaboliet, ejaapo etc) Pulses(P)=Beans/Lentils/Nuts eg (beans, peas,groundnuts, simsim) FR=Fruits (mango, pawpaw, banana, ekimune, citrus, passion, etc.)	Which of the following food groups were consumed by children 6-23 months in the household in the last 24 hours? (Yes=1 and No=0). C=Cereals (Maize/posho, sorghum, wheat,rice, millet, residue) O=Oils and fats (butter, ghee, simsim, sunflower etc) M=Meat,offal and blood , fish, eggs ML= Milk and milk products eg yoghurt, cheese etc. V=Vegetables (tomato, onion, boo, akeo,ekadolia,ekoorete, etsaboliet, ejaapo etc) Pulses(P)=Beans/Lentils/Nuts eg (beans, peas,groundnuts, simsim) FR=Fruits (mango, pawpaw, banana, ekimune, citrus, passion, etc.)	How many meals did children between 6 and 23 months in your household eat during the last 24 hours? 1 = one 2 = two 3 = three 4= Four and above 5=Not applicable	What did the children aged 0-6 months feed on in your household in the last 24 hours? 1= Breast milk only 2=Breast milk and other foods() 3=Bottled milk 4= Other foods only 5=Not Applicable	Did the child 0-6 months in your household receive ORS if it had diarrhoea in the last two weeks? 1=Yes 2=No 3=child didn't have diarrhoea 4= child above 6 months.	What is the current main source of drinking water in your household? 1 = Bore - hole 2 = Protected well/spring 3=unprotected well/spring 4 = swamp water 5 = Pans 6 = Seasonal stream/pond 7 = Tap water	Do you have an insecticide-treated net in your household? 1=Yes 2=No (Go to qs 11)	If yes, who slept under the insecticide-treated net last night?(More than 1 answer allowed) 1=Children below 5 years 2= Children above 5 years 3= Mother 4=Father 5=None	Where do you dispose of human waste in your household? 1= Private Pit Latrine 2= Community pit latrine 3=Bush 4=Burying in backyard 5=Other(specify)	When are the times that you wash your hands with soap? 1=After defecation 2=After cleaning babies bottoms 3=Before food preparation 4=Before eating 5=Before feeding child (or breast feeding) 6= Other (specify)



Annex 5: Data quality (WHO 2006 Standards)

Table 22: Data Quality Standards for Acholi Region Round 1 Surveillance

Variable/tests	Acceptable Range	Amuru	Gulu	Lamwo	Kitgum	Pader
Sample size (no exclusion)	Greater than the calculated sample size (i.e., n=300)	284	289	339	303	283
Out of usual range values (Flags) Weight for Height:	Less than 3% of the sample size	1.4%	1.4%	1.8%	0.0%	0.7%
Out of usual range values (Flags) Height for Age:	Less than 5% of the sample size	0.0%	2.8%	0.6%	0.7%	2.5%
Age ratio = (6-29 months) / (30-59 months)	between 0.78 and 1.18, Ideal ratio = 0.98	1.09	1.06	0.92	1.31	0.75
Overall sex ratio	between 0.8 and 1.2	0.96	1.16	0.93	1.1	1.04
Digit Preference Score Weight Height	0-5 good, 5-10 acceptable 10-20 poor 20 unacceptable	5 5	4 8	2 10	3 4	6 9
Standard Deviation WHZ (no exclusion)	between 0.8 and 1.2 z-score	1.09	1.07	1.03	0.93	0.97
Design effect (no exclusion)	About 1 - 2	1.17	1.0	1.44	1.19	1.0
Standard Deviation HAZ (no exclusion)	1.10 and 1.30 z-score	1.16	1.34	1.22	1.16	1.26
Skewness WHZ (no exclusion)	Between ± 1	-0.44	-0.18	0.22	0.03	0.71
Kurtosis WHZ	Between ± 1	1.77	0.74	1.72	-0.25	2.17
Index of Dispersion (ID) and Poisson distribution	$p > 0.05$: Cases appear to be randomly distributed among clusters.	ID=1.05 p=0.398	ID=0.75 p=0.803	ID=1.68 p=0.020	ID=1.13 p=0.299	ID=0.83 p=0.697



Annex 6: Prevalence of acute malnutrition

Table 23: Combined Nutritional Data for Acholi Region Round 1 Surveillance

INDEX	INDICATOR	Lamwo	Kitgum	Pader	Amuru	Gulu	Total
WHO (2006)	Global Acute Malnutrition W/H < -2 z and/or oedema	6.5% (3.9% - 10.7%)	3.0% (1.4% - 6.2%)	1.8% (0.8% - 4.1%)	3.5% (1.7% - 7.0%)	3.5% (2.0% - 5.9%)	3.2% (2.3% - 4.1%)
	Severe Acute Malnutrition W/H < -3 z and/or oedema	1.8% (0.7% - 4.4%)	0.0%	0.0%	1.1% (0.3% - 3.2%)	1.0% (0.3% - 3.2%)	0.7% (0.3% - 1.1%)
	Stunting H/A < -2 z	41.0% (35.8% - 46.5%)	29.0% (21.8% - 37.6%)	33.6% (28.1% - 40.3%)	39.1% (32.4% - 46.2%)	30.8% (24.2% - 38.2%)	33.7% (30.6% - 36.9%)
	Underweight W/A < -2 z	23.0% (18.0% - 28.9%)	12.9% (9.1% - 17.8%)	13.1% (9.2% - 18.3%)	13.7% (9.1% - 20.2%)	13.5% (10.0% - 18.0%)	14.4% (12.3% - 16.5%)
NCHS (1977)	Global Acute Malnutrition W/H < -2 z and/or oedema	5.9% (3.3% - 10.3%)	2.3% (1.1% - 5.0%)	1.4% (0.4% - 4.4%)	3.9% (1.9% - 7.6%)	2.8% (1.4% - 5.4%)	2.9% (1.9% - 3.8%)
	Severe Acute Malnutrition W/H < -3 z and/or oedema	0.6% (0.1% - 2.4%)	0.0%	0.0%	0.7% (0.2% - 2.9%)	0.7% (0.2% - 2.8%)	0.4% (0.1% - 0.7%)
	Global Acute Malnutrition W/H < 80% and/or oedema	2.1% (0.9% - 4.6%)	0.3% (0.0% - 2.5%)	0.0%	1.4% (0.4% - 4.5%)	1.4% (0.5% - 3.5%)	1.6% (1.0% - 2.3%)
	Severe Acute Malnutrition W/H < 70% and/or oedema	0.0%	0.0%	0.0%	0.4% (0.0% - 2.7%)	0.0%	0.2% (0.0% - 0.4%)