MINISTRY OF HEALTH

NUTRITIONAL ANTHROPOMETRIC & MORTALITY SURVEY

CHILDREN 6-59 MONTHS

ERUTE, MOROTO AND OTUKE COUNTIES, LIRA DISTRICT

10th- 25th AUGUST 2009

ACKNOWLEDGEMENTS

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.I. EXECUTIVE SUMMARY

Nutrition is a key element of a child's right to health as stipulated in the Convention on the Rights of the Child (CRC, 1989). All children have a right to adequate nutrition and access to safe and nutritious food as this is fundamental for their nutrition, health, survival, growth and development. According to Uganda Demographic Health Survey (UDHS 2006), severe malnutrition rates in the northern region of Uganda stood at 1.9% for wasting, 17.3% for stunting and 6.8% for underweight. Furthermore, the last nutritional survey conducted in Lira District by ACF-USA in April 2008 revealed rates of Global Acute Malnutrition (GAM) and Severe Acute Malnutrition (SAM) of 4.4% (CI: 3.0 - 5.9%) and 0.0% (CI: 0.0% - 0.0%) respectively based on WHO references.

Following a five days training on National Nutritional Survey Guidelines based on Standardized Monitoring and Assessment of Relief and Transitions (SMART) methodology, participants needed hands on practice to appreciate and obtain skills on data collection, analysis and reporting. Furthermore, the survey was aimed at routine monitoring of the health and nutrition situation of Lira District.

Objectives

- ♦ To assess the nutritional status of children aged between 6 and 59 months,
- ♦ To estimate the levels of retrospective crude mortality rates,
- ♦ To determine the measles immunization coverage in children of age 9-59 months,
- ♦ To determine the incidence of common diseases (malaria, measles, diarrhea, and ARI) among children aged between 6 and 59 months in a period of two weeks prior to the assessment,
- ♦ To assess the factors influencing the nutrition situation of the community.

Methodology

SMART methodology was used in the implementation of the nutritional anthropometric survey and retrospective mortality assessment. Children aged 6-59 months formed the target group for the anthropometric survey because of their vulnerability while the whole population was considered for crude mortality rate. Information utilised for planning the survey was obtained from secondary sources such as ACF survey reports, Uganda Demographic Health Survey (2006), Lira District sub county offices and the Uganda National Nutrition Survey Guidelines (June, 2009). Planning data is shown in Table 1 below.

Table 1: Survey planning data

	Anthropometric survey	**Mortality survey**
Population	76,464[1]	382,321
Estimated prevalence[1]	6 %	0.82
± Desired precision %	2.5%	0.4%
Design effect	1.5	1.5
Sample sizes	518	2,648

Anthropometric survey: A final sample size of 570 children was obtained after factoring in 10% to cater for contingency. The sample (570) was then divided by 17[2] to obtain the number of clusters (34) required for the survey.

Mortality survey: The recall period was of 110 days based on a public holiday (Labour Day as the starting date). The automatically calculated sample size (2,648) was increased by 10% and the final sample was divided by the total number of clusters (34) to obtain the required number of persons present now per cluster (86).

At parish level, random selection was applied to select a particular village for the survey with help of the local leaders putting into consideration factors such as accessibility. The selected village was surveyed using the EPI method. Mortality questionnaires were then administered in every selected household using a recall period of 110 days as well as household nutrition security questionnaires whereas anthropometry was administered only to households with children 6-59 months of age. Key informant interviews and observations were also used to collect nutrition security data.

Anthropometric and mortality data was analyzed using Emergency Nutrition Assessment (ENA) for SMART (version 1 October 2007) software with both WHO and NCHS references. Excel was used to carry out analyses on MUAC and measles immunization coverage. Finally, household nutrition security data was analysed using SPSS 15.0.

Summary of findings

Nutrition and Mortality Survey Results

The final analysis was done on 601 children upon exclusion of 5 incoherent data sets. The GAM was 3.5% (2.2% - 4.8%) based on WHO 2006 reference and falls within the normal category (Less than 5%). Underweight rate of 13.3% (10.9% - 15.7%) fell within the moderate category while stunting rate of 33.9% was classified as serious. Detailed results are shown in Table 3 below.

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[1] 20% of the estimated population to cater for children under 5 years
[2] Number of children that could be measured accurately by each team per day

Table 2: Nutrition and mortality survey results

INDEX	INDICATOR		RESULTS[3] (n = 601)
WHO (2006)	Z- scores	**Global Acute Malnutrition** W/H< -2 z and/or oedema	**3.5%** (2.2%- 4.8%)
		Severe Acute Malnutrition W/H < -3 z and/or oedema	**0.2%** (0.0%- 0.5%)
		Total stunting W/H< -2 z	33.9% (29.3%-38.4%)
		Total underweight W/H< -2 z	13.3% (10.9%-15.7%)
NCHS (1977)	**Z-scores**	**Global Acute Malnutrition** W/H< -2 z and/or oedema	3.3% (2.1%- 4.5%)
		Severe Acute Malnutrition W/H < -3 z and/or oedema	0.2% (0.0%- 0.5%)
	% Median	**Global Acute Malnutrition** W/H < 80% and/or oedema	1.3 % (0.5% - 2.2%)
		Severe Acute Malnutrition W/H < 70% and/or oedema	0.2 % (0.0% - 0.5%)
MUAC	**Height>65 cm**	**Global Acute Malnutrition** (<125 mm)	3.0% (1.7-4.4%)
		Severe Acute Malnutrition (<115 mm)	0.8% (0.1-1.6%)
Total crude retrospective mortality (last 3 months) /10,000/day **Under five crude retrospective mortality** /10,000/day			0.23 (0.06 – 0.39%) 0.29 (0.0 – 0.65%)
Measles immunization coverage [N= 570 children>= 9 months old]	By card[4] According to caretaker[5] Not immunized Don't know		33.3% 54.7% 11.1% 0.9%

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[3] Results in bracket are at 95% confidence intervals.
[4] The mass measles campaign card or the Road to health card was checked to verify measles immunization status of the child
[5] When no EPI card was available for the child at the household, measles vaccination information was collected according to the caretaker

.II. INTRODUCTION

Lira District is located in Lango sub-region of Northern Uganda. It is bordered by Dokolo District to the south, Amuria District to the east, Moroto and Abim Districts to the north east, Pader District to the north, Oyam District to the northwest and Apac District to the west. It has a total area of 7,251 km² with an average altitude of 170 meters. Lira District is comprised of five counties: Erute North, Erute South, Otuke, Moroto and Lira City Council. These are further subdivided into 15 sub-counties four of which are municipal divisions (Central, Ojuuina, Railways and Adyel). The national population census of 2002 estimated the population of the district at 530,342, with an annual population growth rate of 3.5%. The estimated population of Lira as of 2009 after considering the population growth rate is about 674,744.

The northern region of Uganda witnessed a tragic insurgency for almost two decades perpetrated by the Lord's Resistance Army (LRA) led by Joseph Kony against the Government of Uganda. Lira District was affected in 2003 by the LRA insurgency that ravaged Kitgum, Gulu, Amuru and Pader Districts. The conflict resulted in massive population displacement into the district in May 2003. There was increased movement of rebels along the northern border which made Lira district a clear target of attacks, abductions, and looting. Internally Displaced People (IDP) camps were established to create settlements for the people and these were in close proximity to Uganda People's Defense Force (UPDF) units. Living conditions in the IDP camps were very difficult and precarious. The population in the IDPs regularly faced food shortages due to lack of access to farmland. The peace talk negotiations held in Juba (southern Sudan) in July 2006 between the Uganda government and the LRA made progress with a formal cessation of hostilities agreement signed on August 26, 2006 leading to the return of peace to the region. Lira District experienced a massive return of IDPs, whereby over 310,000 of the estimated 350,000 people left the camps to return to their home villages in a period of 14 months.

The continental climate of the district is modified by the swampy area surrounding the southern part of the district while the rest of land is mainly flat landscape. The rainfall is bi modal with one peak during April-May and the other in August-October. The average annual rainfall varies between 1200-1600mm decreasing northwards with average minimum and maximum temperatures of 22.5°C and 25.5°C, respectively. Lira district is also naturally endowed with fertile soils that are condusive for agriculture.

The major commercial activities in Lira include; grain and oil milling, wholesale and retail trade in general merchandise, fishing, and transport business including boda-boda cycling. Major investment opportunities in the district are; oil seed production, cotton industry, shea butter project, agro forestry and small scale industries.

To build national capacity in the detection of malnutrition, Action Against Hunger in collaboration with the Ministry of Health conducted a regional training in Lira that covered six northern districts

that is Lira, Abim, Oyam, Amuru, Moroto and Gulu. The training focused on National Guidelines for conducting nutritional surveys in Uganda and SMART methodology. In order to equip participants with practical skills, a nutritional anthropometric survey was implemented between 17th and 25th August 2009.

.III. OBJECTIVES

- ♦ To assess the nutritional status of children aged between 6 and 59 months.
- ♦ To estimate Crude Mortality Rates (CMR) through a retrospective mortality survey in Lira district.
- ♦ To determine the measles immunization coverage in children aged 9-59 months.
- ♦ To determine the incidence of common diseases (diarrhea, malaria, measles and Acute Respiratory Infections - ARI) among children aged between 6 and 59 months in a period of two weeks prior to the assessment.
- ♦ To assess the factors influencing the nutrition situation of the community.

.IV. METHODOLOGY

.IV.1. Type of Survey and Sample Size

A nutrition anthropometric survey was undertaken in Lira District using SMART methodology. Data on anthropometry, mortality and nutrition security was collected simultaneously. Key informant interviews targeting parish chiefs, caretakers and other informed persons were conducted in all of the 34 clusters. The study covered Erute, Moroto and Otuke Counties. The sub counties covered were; Aromo, Barr, Ogur, Abako, Aloi, Amugu, Apala, Omoro, Adwari, Okwang and Olilim (**See appendix X: 1 and X. 5.**). The survey focused on the above counties in which Internally Displaced Persons (IDPs) numbering 310,000 and above settled within 14 months after a peace agreement was reached in 2006 and a process to close camps was initiated. The accessible population was estimated at 382,321[6] persons and during the survey; children aged 6-59 months formed the target group.

.IV.2. Sampling Methodology

A two-stage cluster sampling method was used:

- • **Cluster selection:** The sample sizes for anthropometry and mortality were automatically calculated in ENA for SMART Software October 2007 version. ACF nutritional anthropometric survey report of April 2008 provided necessary information for planning. The number of clusters was calculated based on the capacity of the teams to measure

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[6] Population of surveyed counties based on UBOS estimates

children and logistical support available. Clusters were then selected at parish level population with use of ENA *(See appendix X: 1)*.

Anthropometric survey: The estimated total population in the surveyed area was 382,321 persons. Twenty percent (20%) of this population was calculated to obtain the number of children below 5 years (76,464). The sample size of 518 children was obtained after inputting target population (76,464), estimated malnutrition prevalence (6%), precision (2.5%) and maximum expected design effect (1.5). The final sample size of 570 children was obtained after factoring in 10% contingency allowance for unforeseen eventualities. The sample of 570 was then divided by 17 to obtain the total number of clusters required for the survey (34).

Mortality survey: The total population (382,321) estimated CMR prevalence (0.82), corresponding desired precision (0.4%), design effect of 1.5 and 110 recall days were keyed into the mortality section of the planning template. A sample of 2,913 was obtained after factoring in 10% contingency. The calculated sample size (2,913) was then divided by the total number of clusters (34) to obtain the required number of persons present now per cluster (86).

- **Selection of households and children**

Within a cluster: At parish level, random selection was applied to select a particular village for the survey with help of the local leaders putting into consideration factors such as accessibility. The selected village was surveyed using the EPI method. Mortality questionnaires were then administered in every selected household using a recall period of 110 days as well as the nutrition security questionnaires whereas anthropometry was administered only to households with children 6-59 months of age. Key informant interviews and observations were also used to collect nutrition security data.

Choosing children within the house: In every selected household, all children aged 6-59 months were assessed till a target of 17 was obtained in the cluster. Child Health Cards and a local calendar of events were used to determine the ages of children. In cases whereby the teams only needed one child to attain the target of 17, measurements were taken for all eligible children in the last household visited.

.IV.3. Data Collection

The anthropometric questionnaire *(See appendix X: 2)* was administered to all eligible children till a target of 17 children per cluster was attained.

The following information was obtained:

- ✎ **Age:** Recorded with the help of child health cards and a local calendar of events *(See appendix X: 6)*.
- ✎ **Gender:** Male or female
- ✎ **Weight:** Targeted children were weighed using UNISCALES that were calibrated using a 2kg stone.

- ✤ **Height:** Children were measured on a measuring board (precision of 0.1cm). Children less than 87m were measured lying down, while those greater than or equal to 87cm were measured standing up.
- ✤ **Mid-Upper Arm Circumference (MUAC):** MUAC was measured at the mid-point of the left upper arm (precision of 0.1cm).
- ✤ **Bilateral oedema:** Assessed by the application of normal thumb pressure for at least 3 seconds to both feet.
- ✤ **Measles vaccination:** Assessed by checking for measles vaccination on Child health cards and probing caretakers.

Households without eligible children remained a part of the "sample" that contributed zero children to the nutritional part of the survey. Children with MUAC less than 115 or W/H < -3 Z-score and or oedema were referred to the nearest Out- patient Treatment Program (OTP) sites. Operational OTPs in Lira District include: Okwongo, Aleptong, Okwang, Omoro, Olilim and Orum.

Household nutrition security data: Information was sought on the residence status, source of livelihood, dietary diversity scores, coping mechanisms, as well as Water, Sanitation and Hygiene (WASH) using a structured questionnaire.

The mortality questionnaire (*See Appendix .X.3 and .X.4)* was administered in all households irrespective of whether they had eligible children or not until a target of 86 persons present 'now' per cluster was attained.

Retrospective morbidity of children

The recall period for children's illness including malaria, diarrhea, ARI, skin disease and other diseases was 2 weeks. Caretakers were asked questions about children's illnesses.

.IV.4. Indicators, Guidelines, and Formula Used

.IV.4.1. Acute Malnutrition

➢ **Weight for Height Index**

Low weight-for-height identifies wasted children. This index is appropriate when examining short-term effects such as seasonal changes in food supply or short-term nutritional stress brought about by illness.

Acute malnutrition rates were estimated from the weight for height (W/H) index values as well as presence of bilateral oedema. Results were obtained using World Health Organization (WHO)[7]

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[7] WHO Child Growth Standards: length/height-for-age, weight-for-age, weight-for-length, weight-for-height and body mass index-for-age. Methods and development, Geneva, Switzerland: World Health Organization, 2006.

standards 2006 and National Center for Health Statistics (NCHS) [8] references. The result was then expressed in both Z-scores and percentage of the median.

Other than having a true statistical meaning, expression in z- score conveys malnutrition rates more precisely and allows for inter-study comparison. The percentage of the median on the other hand, estimates weight deficits more accurately and in the recent past was used in determining eligible children for targeted feeding programs.

The following guidelines were thus used in expression of results in Z-score and percentage of the median.

Guidelines for results expressed in Z-score:
- ✣ Severe malnutrition: - WFH < -3 SD and/or existing bilateral oedema on the child's lower limbs.
- ✣ Moderate malnutrition: - WFH < -2 SD and ≥ -3 SD and no oedema.
- ✣ Global acute malnutrition: - WFH < -2 SD and/or existing bilateral oedema.

Guidelines for results expressed in percentage of median:
- ✣ Severe malnutrition: WFH < 70 % and/or existing bilateral oedema on the child's lower limbs.
- ✣ Moderate malnutrition: WFH < 80 % and ≥ 70 % and no oedema.
- ✣ Global acute malnutrition: WFH <80% and/or existing bilateral oedema

.IV.4.2. Chronic malnutrition

➢ **Height for age Index**

The height-for-age index is an indicator of linear growth retardation and cumulative growth deficits. Children whose height-for-age Z-score is below -2 z scores are considered short for their age (stunted) and are chronically malnourished. Children who are below -3 z scores are considered severely stunted. Stunting reflects failure to receive adequate nutrition over a long period of time and is also affected by recurrent and chronic illness. Height-for-age, therefore, represents the long-term effects of malnutrition in a population and is not sensitive to recent, short-term changes in dietary intake.

.IV.4.3. Underweight

➢ **Weight for age index**

Weight-for-age is a composite index of height-for-age and weight-for-height. It takes into account both acute and chronic malnutrition. Children whose weight-for-age is below -2 z scores are classified as underweight. Children whose weight-for-age is below -3 z scores are considered severely underweight.

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[8] NCHS: National Center for Health Statistics (1977) NCHS growth curves for children birth-18 years. United States. Vital Health Statistics, 165, 11-74.

➢ **Children's Mid-Upper Arm Circumference (MUAC)**

MUAC is a good predictor of mortality. It is a malnutrition indicator in children taller than 65 cm in some protocols, and children taller than 75cm in others. As such, MUAC measurements of the assessed children were presented in various height groups of <75cm, ≥75cm - < 90cm and ≥ 90 cm.

 MUAC Guidelines

MUAC < 115mm and/or oedema   Severe malnutrition and high risk of mortality

MUAC ≥ 115 mm and <125 mm   Moderate malnutrition and risk of mortality

MUAC ≥ 125 mm and <135 mm   At risk of malnutrition

MUAC ≥ 135   Adequate nutritional status.

.IV.4.4. Mortality

Crude Mortality Rate (CMR) = 10,000/a*f/ (b+f/2-e/2+d/2-c/2), where:

a = Number of recall days (94)

b = Number of current household residents

c = Number of people who joined household

d = Number of people who left household

e = Number of births during recall

f = Number of deaths during recall period

The result is expressed per 10,000 people / day.

Thresholds are defined as follows[9]:

Total CMR:

Alert level: 1/10,000 people/day

Emergency level: 2/10,000 people/day

Under five CMR:

Alert level: 2/10,000 people/day

Emergency level: 4/10,000 people/day

.IV.5. Field Work

Training of the participants was done for 5 days facilitated by the national Training of Trainers (TOTs) team and focused on the National Survey Guidelines, SMART methodology, standardization test and pilot test. Five teams of a minimum of 4 people each (one team leader, two measurers, one enumerator for the household nutrition security component and the other for

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[9] Health and nutrition information systems among refugees and displaced persons, Workshop report on refugee's nutrition, ACC / SCN, Nov 95.

the key informant and observation questionnaire) completed the data collection. The overall supervision of the survey was done by the training facilitators and ACF staff that comprised of Nutrition Program Manager and 2 Nutrition Program Officers.

Field work was undertaken from 17th to 24th August 2009 and the data collected was entered on a daily basis by the field supervisors. Teams were debriefed each morning on errors encountered and ways to ensure quality data.

.IV.6. Data Analysis

Data entry, processing and analysis for both anthropometric and mortality data were carried out using ENA for SMART Software (October 2007 version). SPSS 15.0 and Excel 2003 were used to carry out analyses on MUAC, Measles, immunization coverage, and other nutrition security related data.

.V. RESULTS OF THE QUALITATIVE ASSESSMENT

.V.1. Socio- demographic Characteristics of the Respondents

A total of 468 households were assessed to collect nutrition security data. Female respondents were 77.6%. This could be attributed to the fact that males are the main income earners and most of the time they are not found at home. Most of the inhabitants in the surveyed areas were permanent residents as depicted in Figure 1 below. It is important to note that most of them had moved from camps a few years ago. The type of shelters in the study parishes were mostly grass thatched huts with a few permanent houses. Congestion problem was reported in Abukamola and Ogur parishes.

- Resident 81.2%
- Temporary resident 0.9%
- Returnee 17.9%
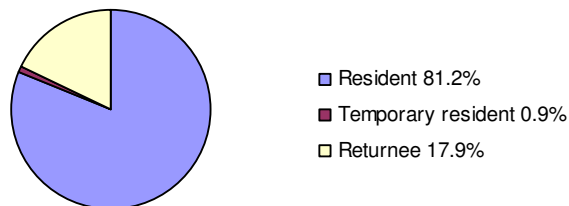
Figure 1: Residency status of surveyed households

Figure 2 shows the distribution of livelihood sources. Most households' source of livelihood was crop farming (72.5%). Others sources of livelihood included mixed farming (20.4%), petty trade (1.6%), permanent jobs (4.0%), temporary jobs (0.6%) and other (0.8%). The major crops grown were cereals such as maize, millet, sorghum and vegetables (cowpea leaves). Prior to the conflict, cultivation of millet and sorghum was of significant importance. Farmers produced large

quantities of corn, sweet potatoes, cassava, peas, beans, rice and various vegetables (ACF nutritional survey report in Lira, April 2008). The past conflict is likely to have contributed to heavy reliance on crop farming in comparison to livestock keeping. Households lost some of their assets including capacity to rear large herds of livestock during the conflict. It is important to note that crop farming / cultivation being a source of food as well as income may contribute to food insecurity problem especially in times of crop failure, unfavorable weather conditions and competing interests between food and money.
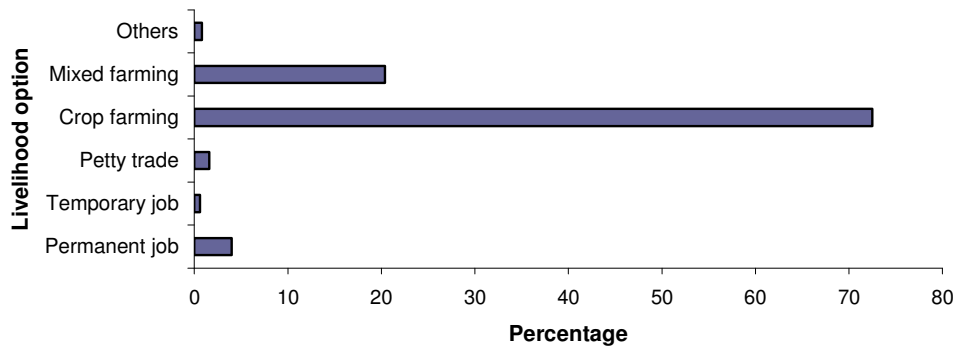
Figure 2: Livelihood source

.V.2. Food Security

For most households, the main source of food in the month of August was cultivation (87.9%). Most households were observed harvesting maize while a few were planting for the second cropping season. Those who bought food constituted 9.3% of the respondents while a very small proportion depended on livestock, food aid and kinship support.
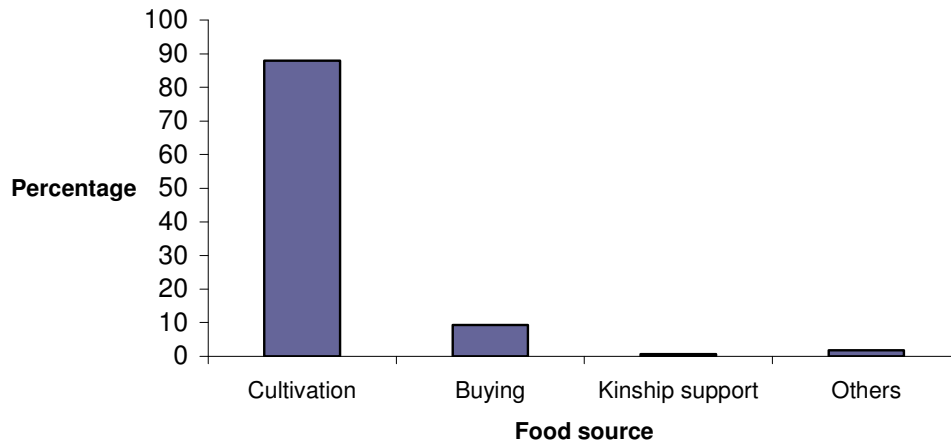
Figure 3: Household main source of food

The major food groups consumed in the last 24 hours preceding the interview were cereals, vegetables and legumes. Tubers, roots, plantains, fish, fruits and animal products were the least

consumed food groups. This is interesting to note because the ACF Nutrition survey report for Lira (April 2008) reported that most households (89%) owned livestock with every household owning an average of 3 chickens, 2 pigs, 2 goats and 3 cows. This is attributed to the fact that culturally animals are kept for prestige and as a source of income. Findings from key informants and observation revealed that most households had granaries and were observed sun drying sorghum, millet and maize. The average household dietary diversity score was 3. The score is low on a scale of 12 and indicates a poor household economic access to food.

The main coping strategies to mitigate food scarcity were reduction of food quantity consumed per meal (44%). Other coping strategies included reduction in number of meals, consumption of low quality food, borrowing of food and money. Only 0.2% of the respondents had never faced food scarcity. Figure 4 below illustrates the findings.
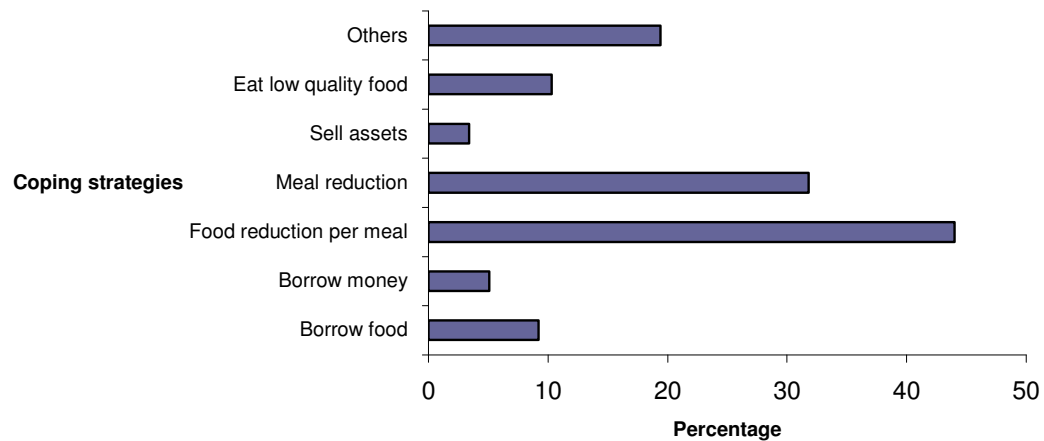
Figure 4: Coping strategies

.V.3. Health and Nutrition

Health facilities present were government health centers (I to IV), private health facilities and local pharmacies / drug shops. Key informants reported availability of at least 1 government health facility in most of the parishes except Oculokori. Respondents reported that on falling sick they mainly sought treatment from public health facilities (94.2%), private health facilities (3.6%) pharmacies or drug shops (1.9%) and others such as traditional healers (0.2%). Access to health services was determined by cost and proximity to the health facilities. Majority of the households (62.4%) required 1 - 2 hours to access the health facilities. Furthermore, 11.8% of the households required 2 hours and above to access the health facilities.

Measles immunization coverage was 88.1% of which 33.3% was confirmed by cards and 54.7% by caretakers. The coverage shows a slight improvement of 3.7% from the previous year's results. The national target for measles coverage is 100%.

The majority (81.5%) of under-five children were reported to have been ill in the two weeks preceding the survey. The most prevalent cause of morbidity was malaria (68.8%). Other common diseases were acute respiratory infections (18.5%), diarrhea (5.9%), and skin infections (3.7%). In addition there were cases of worm infestations, HIV/AIDS and sickle cell anaemia reported among (3.1%) of the children. High prevalence of malaria was attributed to bushy environment and swamps that encourage mosquito breeding.

0.23 [0.06 – 0.39] /10,000/day and 0.29 [0.00 – 0.65] /10,000/day crude and under five mortality rates were obtained respectively. Analytically, both findings fall below the mortality alert and emergency levels.

Figure 5 illustrates the trend of malnutrition results in Z score in Lira District. There was a sharp decline in malnutrition since April 2007. Households moved from camps and settled in villages once a peace agreement was signed in August 2006. This had an effect of reducing the risk to malnutrition because it may improve access to land and food production. The data from 2007 was also analyzed using WHO 2006 references.
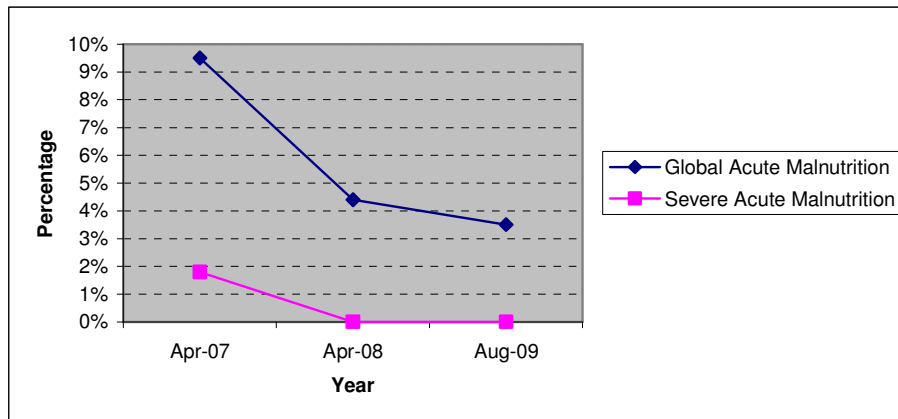
Figure 5: Trends of malnutrition in Lira District

.V.4. Water, Sanitation and Hygiene

The main water source in the surveyed locations was a borehole (45.7%). Most of the boreholes were constructed under support of Action Against Hunger (USA). Other sources included wells (22.6%), surface run off water (19.9%), rain water (3.4%) swamp water (1.3%) and unspecified other (7.1%). From key informant interviews all parishes reported 1 to 3 functioning boreholes except Ogur which had 3 non-functional boreholes and Agweng village which had no borehole. Ajwati village in Abukamola parish, Dim-dem, Acede, Aweng and Otara in Abako Sub County had no borehole at all but water was often fetched from the protected wells around or nearby villages. Boreholes were usually located near schools and along the road within a walking distance for most households.

Most households (85%) did not treat water before drinking despite the fact that more than 50% of the water sources are reported to not be safe. Only 2.4% of the households used chemicals such as water guard and aqua safe while 6.0% filtered water. Ogur parish was one of the locations in which households had limited access to safe water. The majority of the households in the surveyed area (95.5%) stored drinking water in pots. Jerricans were also used by some households (3.8%) despite the poor hygiene that was associated with them.

Poor sanitation coupled with unsafe water sources increases the risk of water-borne diseases. Among the assessed households, 81.8% had access to a latrine. Almost 70% of these households owned the latrines. Most households in Otuke County did not have any access to latrines and hence disposed off human waste in bushes.

The pit latrine was the most common type except in Ogur parish, where plastic ones were noted. These pit latrines were poorly constructed, lacked vent pipes and were small in size. However, respondents noted that the appalling state of latrines was due to limited resources and the fact that people were just settling into their homes after coming from IDP camps. Respondents who lacked latrines seemed unaware of the dangers of living without one.

.V.5. Child care practices

The current Infant and Young Child Feeding (IYCF) recommendations in Uganda include: exclusive breastfeeding up to at least 6 months, timely introduction of complementary feeds such as porridge and continued breastfeeding until 2 years of age or beyond. A child between 6 and 8 months should eat 2 – 3 meals and 1 – 2 snacks per day. A child of age 9 - 11 requires 3 – 4 meals and 1 - 2 snacks per day. The child should be able to eat most family foods and snacks by the age of 1 year. The use of locally available nutritious foods in the right consistence and nutrient density, active feeding and high standards of hygiene when handling the infant's food or water safety are also recommended. In addition, counseling and support for mothers to space births 2-3 years apart and continued growth monitoring through five years of age are components of the IYCF guidelines (Policy Guidelines on IYCF- MOH, 2009).

The results indicated that out of 53 households with infants 0-6 months, 84.9% exclusively breastfed the infants and 15.1% used breast milk and other foods such as soups and cereal porridge. No assessed household practiced complete replacement feeding. Almost half of the children (48.5%) were fed on 2 meals per day. Very few households (1.3%) fed children on more than 4 meals per day (Figure 5). According to Infant and Young Child Feeding (IYCF) recommendations of a minimum of 2 meals per day, children in the assessed communities require improved feeding. It was also observed that some children had distended stomachs and skin rashes (sign of worm infestation) and wore dirty garments.

Number of meals consumed by children 5 years and below in the last 24 hours
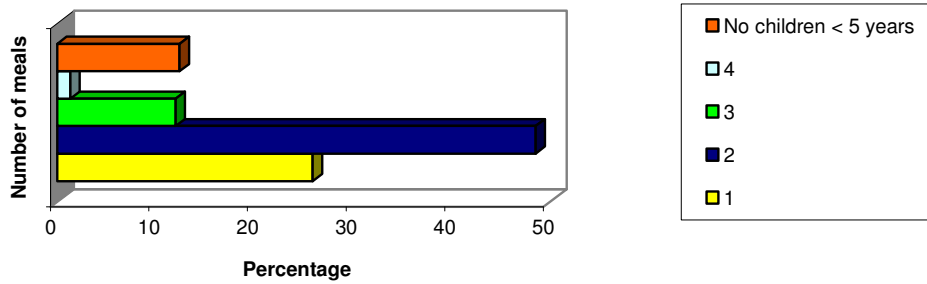
Figure 6: Number of meals consumed by children below 5 years of age in the last 24 hours

The table below lists organizations running various programs in Lira District.

Table 3: List of organizations working in Lira district and fields of activity

Sector	Organization
Agriculture and Food Security	Action Against Hunger (ACF-USA), Agricultural Cooperative Development International /Volunteers Overseas Cooperative Assistance (ACDI/VOCA), Facilitation for Integrated Community Rural Development (FICRO), World Food Programme (WFP) and Lira Community Development Association (LICODA).
Health and Nutrition	District Health Office (DHO), Action Against Hunger (ACF-USA), Marie Stopes Uganda (MSU), World Health Organization (WHO), Northern Uganda Malaria, AIDS and Tuberculosis (NUMAT), Canadian Physicians for AID and Relief (CPAR), United Nations Children's Fund (UNICEF), Medical Teams International (MTI), UNFPA, AIDS Information Center (AIC), Reproductive Health Uganda (RHU) and UNFPA.
WASH	ACF-USA, UNICEF, Catholic Relief Services (CRS), CARE, COOPI and Uganda Red Cross.
Protection and Education	Uganda Red Cross Society (URCS) and Education Development Advocacy with Principled Integrity (EDAPRI)

.VI. RESULTS OF THE ANTHROPOMETRIC SURVEY

.VI.1. Distribution by Age and Sex

Table 4: Distribution by Age and Sex

Age in months	Boys		Girls		Total		Sex ratio
	N	%	N	%	N	%	Boy: Girl
6-17	87	57.6	64	42.4	151	25.1	1.4
18-29	64	53.3	56	46.7	120	20.0	1.1
30-41	74	47.4	82	52.6	156	26.0	0.9
42-53	56	50.5	55	49.5	111	18.5	1.0
54-59	34	54.0	29	46.0	63	10.5	1.2
Total	**315**	**52.4**	**286**	**47.6**	**601**	**100.0**	**1.1**

An overall sex ratio of 1.1 falls within the acceptable range of 0.8 – 1.2. However, there were more boys than girls in the sample.

Figure 7: Distribution by Age and Sex
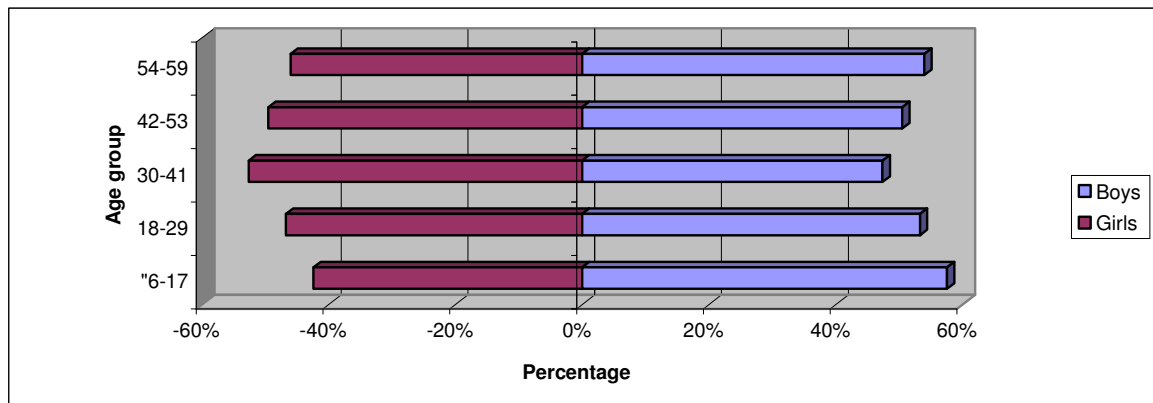
.VI.2. Anthropometrics Analysis

.VI.2.1. Acute Malnutrition defined in Weight for Height

➢ **Distribution of Acute Malnutrition in Z-Scores**

Table 5: Weight for Height distribution by Age in Z - scores and / or oedema (WHO Reference)

Age (months)	Total no.	Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	151	0	0.0	10	6.6	141	93.4	0	0.0
18-29	120	0	0.0	5	4.2	114	95.0	1	0.8
30-41	156	0	0.0	3	1.9	153	98.1	0	0.0
42-53	111	0	0.0	0	0.0	111	100.0	0	0.0
54-59	63	0	0.0	2	3.2	61	96.8	0	0.0
Total	601	0	0.0	20	3.3	580	96.5	1	0.2

Table 6: Weight for Height distribution by Age in Z - scores and / or oedema (NCHS Reference)

Age (months)	Total no.	Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	151	0	0.0	9	6.0	142	94.0	0	0.0
18-29	120	0	0.0	6	5.0	113	94.2	1	0.8
30-41	156	0	0.0	3	1.9	153	98.1	0	0.0
42-53	111	0	0.0	0	0.0	111	100.0	0	0.0
54-59	63	0	0.0	1	1.6	62	98.4	0	0.0
Total	601	0	0.0	19	3.2	581	96.7	1	0.2

Table 7: Weight for Height Vs Oedema in Z - scores (WHO and NCHS Reference)

WEIGHT FOR HEIGHT		WHO 2006		NCHS 1977	
		<-3 SD	≥ -3 SD	<-3 SD	≥ -3 SD
OEDEMA	YES	Marasmic kwashiorkor 0 (0.0 %)	Kwashiorkor 1 (0.2 %)	Marasmic kwashiorkor 0 (0.0 %)	Kwashiorkor 1 (0.2 %)
	NO	Marasmic 0 (0.0 %)	Normal 1 (99.8 %)	Marasmic 0 (0.0 %)	Normal 600 (99.8 %)

A standard deviation of 0.99 was unveiled as shown in the graph below. This fell within the acceptable range (0.8-1.2) indicating that the sample was representative.
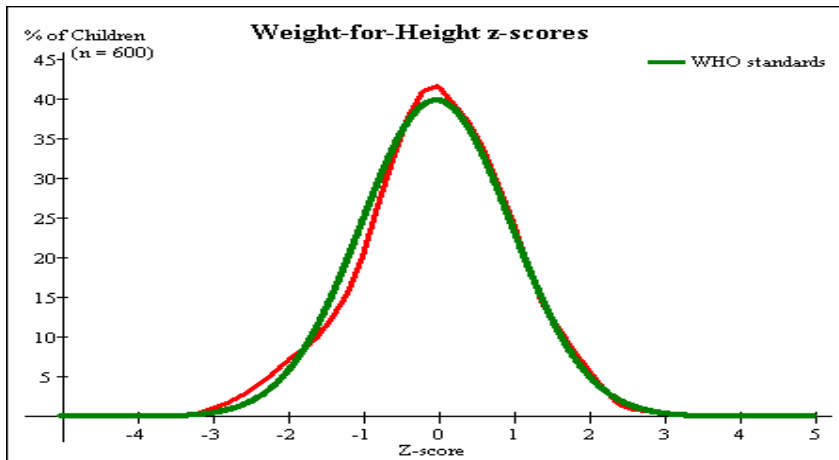
Figure 8: Weight-for-Height z-scores based on WHO standards

➢ **Distribution of Acute Malnutrition in Percentage of the Median**

Table 8: Prevalence of malnutrition by age, based on weight-for-height percentage of the median and oedema (NCHS reference)

Age (months)	Total no.	Severe wasting (<70% median)		Moderate wasting (>=70% and <80% median)		Normal (> =80% median)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	151	0	0.0	3	2.0	148	98.0	0	0.0
18-29	120	0	0.0	2	1.7	117	97.5	1	0.8
30-41	156	0	0.0	1	0.6	155	99.4	0	0.0
42-53	111	0	0.0	0	0.0	111	100.0	0	0.0
54-59	63	0	0.0	1	1.6	62	98.4	0	0.0
Total	601	0	0.0	7	1.2	593	98.7	1	0.2

Table 9: Prevalence of acute malnutrition based on the percentage of the median and/or oedema (NCHS reference)

	n = 601
Prevalence of Global Acute Malnutrition (<80% and/or oedema)	(8) 1.3 % (0.5% - 2.2%)
Prevalence of Moderate Acute Malnutrition (<80% and >= 70%, no oedema)	(7) 1.2 % (0.4% - 2.0%)
Prevalence of Severe Acute Malnutrition (<70% and/or oedema)	(1) 0.2 % (0.0% - 0.5%)

.VI.2.2. Risk of Mortality: Children's MUAC

Table 10: MUAC Distribution

MUAC (mm)	< 65 - < 75 cm height		>=75 – < 90 CM height		≥ 90 cm height		Total	
	N	%	N	%	N	%	N	%
< 115	4	3.1	1	0.4	0	0	5	0.8
≥115 and<125	8	6.3	7	2.8	0	0	15	2.5
≥125 MUAC <135	19	14.9	25	9.9	4	1.8	48	8.0
MUAC ≥ 135	96	75.6	219	86.9	218	98.2	533	88.7
TOTAL	127	21.1	252	41.9	222	36.9	601	100

According to MUAC, 2.5% and 0.8% children were moderately and severely malnourished respectively.

.VI.3. Measles Vaccination Coverage

Table 11: Measles Vaccination Coverage*

Measles vaccination	N	%
Proved by Card	190	33.3
According to the mother/caretaker	312	54.7
Not immunized	63	11.1
Don't know	5	0.9
Total	570	100.0

From the above results, 88% of the children were immunized against measles while 11.1% were not immunized at all. The national measles immunization target is 100%.

.VI.4. Composition of the households

A total of 551 households were assessed during the mortality survey and results are shown in Table 12 below.

Table 12: Household composition

Age group	N	%	Average per household
Under 5 years	634	19.9	1.2
Adults	2549	80.1	4.6
Total	**3183**	**100.0**	**5.8**

.VI.5. Stunting

Table 13: Chronic malnutrition based on Height-for-Age in z-scores

Description of Nutritional status	Height for age index Z score	Result
Moderate chronic malnutrition	≥ - 3.0 but <-2.0	23.5% (19.7%-27.4%)
Severe chronic malnutrition/Severely stunted	<-3 Z scores	10.4% (8.3%-12.4%)
Total chronic malnutrition/Total stunted (moderate + severe)	<-2 Z score	33.9% (29.3%-38.4%)

Total chronic malnutrition of 33.9% falls within the serious category (30-39.9%) of stunting.

.VI.6. Underweight

Table 14: Underweight based on Weight-for-Age in z-scores

Description of Nutritional Status	Weight for Age Index Z scores	Result
Severe Underweight	<-3	2.8% (1.7%- 3.9%)
Moderately Underweight	≥ - 3.0 but <-2.0	10.5% (8.2%-12.7%)
Total Underweight (moderate plus severe)	≥-2	13.3% (10.9%-15.7%)

The underweight rate of 13.3% lies within the medium category (10-19.9%) for weight for age.

.VII. RESULTS OF THE RETROSPECTIVE MORTALITY SURVEY

A recall period of 110 days was used during the survey. A total of 3183 people were present in the 551 sampled households and 634 of the subjects were children under five years of age. Other demographic data collected in the selected households included the following:

- ➢ A total of 17 people had joined the households during the recall period, of which none were children under five years of age.
- ➢ 104 people had left the households and 13 of them were under five year old children.
- ➢ The number of births that occurred in the assessed households was 31.
- ➢ A total of 8 people were reported to have died during the recall period, 2 of them being children under five years of age.

0.23 (0.06 – 0.39%) /10,000/day and 0.29 (0.0 – 0.65%) /10,000/day crude and under five mortality rates were unveiled respectively. Analytically, both findings fall below the mortality alert and emergency levels.

.VIII. CONCLUSION

The current GAM finding of 3.5% (2.2%-4.8%) indicates a normal situation (lower than 5 % cut off point) and is also lower than the Uganda national average for wasting of 6% (UDHS, 2006). Stunting rate of 33.9% and underweight rate of 13.3% fell in the serious and moderate classification respectively. The anthropometric results could be attributed to the following factors:

Disease prevalence and access to health facilities:
The results showed that the health seeking behavior was positive since 94.2% of the household members sought first treatment from public health facilities. This can lead to better management of diseases if the heath service system is effective. However, unconfirmed reports indicated inadequate supply of drugs and manpower in the heath facilities. Health facilities were far away and patients took more than 2 hours to access the facilities. Malaria was the leading cause of morbidity and its effects can lead to malnutrition among young children. Measles immunization coverage had improved to 88% from last years' result of 84.7%. There is room for improvement to reach the national target of 100%.

Food intake and food insecurity:
Majority of the assessed households (91.2%) relied on cultivation as a main source of food. The survey was conducted during a period of harvesting. Households were observed harvesting maize with a few households planting in the second cropping season. Due to low income and being a rural agricultural community, a small proportion of communities depended on buying as a main source of food. Coping strategies adopted by households in the event of food shortage were reduction of food quantity consumed per meal, reduction of number of meals, consumption of low

quality food and borrowing of food and money. The diet of the households was less diversified with most households consuming cereals and vegetables. Animal products, fruits, fish and tubers were the least consumed foods.

Water and sanitation situation:

The main source of water was boreholes (45.7%) that were constructed by Action Against Hunger -USA. Key informant interviews revealed that all parishes had 1 to 3 functional boreholes except Ogur which had 3 non-functional boreholes. Ajwati village in Abukamola parish, Agweng, Dim-dem, Acede, Aweng and Otara in Abako Sub County had no boreholes and households fetched water from protected wells around or nearby villages. Boreholes were usually located near schools and along the road within a walking distance for most households. Most households (85%) did not treat water before drinking despite the fact that more than 50% of the water sources might not be safe. Water was usually stored in pots and plastic containers. The plastic containers were generally dirty and mould could be spotted.

Poor sanitation coupled with unsafe water sources increases the risk of water-borne diseases. Among the assessed households (81.8%) had access to a latrine. However, most households in Otuke County did not have access to latrines and hence disposed off human waste in bushes.

Child care practices:

The use of locally available nutritious foods in the right consistency and nutrient density, active feeding and high standards of hygiene when handling the infant's food or water safety are recommended in the Uganda IYCF guidelines. In addition, counseling and support for mothers to space births 2-3 years apart and continued growth monitoring through five years of age is also recommended. Exclusive breast feeding was widely practiced (84.9%). In addition, almost half of the children were fed on 2 meals per day (48.5%). Very few households (1.3%) fed children on more than 4 meals per day. According to IYCF recommendations, slightly above 50% of the children in the assessed community received fewer than the recommended meals per day. It was also observed that some children had distended stomachs and skin rashes (sign of worm infestation) and clothed in dirty garments.

.IX. RECOMMENDATIONS

Health and Nutrition

- To collaborate with the District Health Office (DHO) in capacity building so that all health facilities have the capacity to treat Severe Acute Malnutrition. Training of nutrition and health workers on application of the new WHO standards in detection and treatment of malnutrition is required.
- To disseminate and promote use of National Nutrition Survey Guidelines. Participants in the Northern region training should take an active role in applying the guidelines.

- To introduce nutrition and health education sessions at community level, with an emphasis on breastfeeding, weaning, complementary foods, balanced diets and prevention of malaria, acute respiratory infections and diarrhoea. Target groups should include both men and women.
- To improve availability and access to drugs in the health facilities.
- To sensitize the communities on the importance of eating animal products to complement plant sources of food. Diet diversification is essential in improving the quality of diets.

Food security

- To enhance food production through increased acreage and use of technologies such as animal traction.

- To promote access to income through cash based program and marketing of local produce.

Water and sanitation

- Government and other partners are recommended to make efforts and construct boreholes in Ajwati, Dim- Dem, Acede, Aweng and Otara villages. The parishes affected include Abukamola, Along, Arwot Omito and Abunga.
- To increase emphasis on hygiene and sanitation activities such as: safe water access/treatment, proper water storage, water sources protection, human and garbage disposal. Households especially in Otuke County lacked latrines.

.X. APPENDIX

.X.1. Sample Size and Cluster Determination

Sub county	Parish	Pop	Cluster	Sub county	Parish	Pop	Cluster
AROMO	Acutcum	3231		AMUGU	Abongatin	5097	
	Apua	3179	1		Abunga	7197	21
	Apuce	3778			Ajonyi	4850	
	Arwot Omito	6016	2		Omee	7680	22
	Barpii	4397		APALA	Abia	6445	23
	Odora	3148			Abiting	6216	
	Otara	3703	3		Atinkok	6760	24
	Walela	5185			Obim	5233	
BARR	Abunga	5944	4		Okwangole	7087	25
	Alebere	5252			Otena	6804	
	Ayira	7786	5	OMORO	Abukamola	6210	26
	Ober	5750			Angetta	8418	27
	Olilo	6178	6		Alolololo	3677	
	Onywako	7785			Ocokober	3238	
	Ayamo	2262	7		Oculokori	2725	28
OGUR	Abala	5810			Omarari	5118	
	Adwoa	4288	8	ADWARI	Agweng	4334	
	Akangi	6545			Alango	7721	29
	Akano	5527	9		Okere	3024	
	Angolocom	7567			Olarokwon	3245	30
	Apoka	6986	10		Omito in Adwari	3310	
	Ogur	8445	11	OKWANG	Amoyai	3491	
	Orit	6030			Arwotngo	3305	31
ABAKO	Acede	7007	12		Barocok	1892	
	Alanyi	9483	13		Olworongu	3591	
	Amoneno	8891			Opejal	3591	
	Awapiny	7506	14	OLILIM	Amunga	2375	32
	Ojul	5167	15		Anepkide	2035	
	Olyet	4210			Angetta in Olilim	5436	
	Owalo	5652			Atira	2041	
ALOI	Akura	4376	16		Got Ojwang	2484	33
	Akwangkel	7603	17		Ogwete	1374	
	Alal	8454		ORUM	Alangi/Bar-odugu	3650	
	Alebtong	9151	18		Anepmoroto	4297	34
	Anara	4298			Anyalima	1508	
	Anyanga	4355	19		Atangwata	1852	
	Aweipek	4914			Ating/Abongorwoa	2850	
	Otweotoke	6301	20				

.X.2. Anthropometric data collection form for children 6-59 months

Anthropometric data collection form for children 6-59 months

Village/zone: _____ Date: _____ Cluster number: _____ Team number: _____

Child no.	HH. No.	Sex (F/M)	Age in months	Weight (kg) ±0.1 kg	Height/ Length[10] (cm) ±0.1cm	Oedema (Y/N)	MUAC (mm)	Measles[11] Vaccination	Illness in the last 2 weeks[12]
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									

Case definition: Diarrhea is an episode of more than three stools per day; **Bloody diarrhea** is an episode of more than three stools with blood stains per day; **ARI** is an episode with associated fever and cough and at least one of the following signs: sputum, thoracic pain, dyspnoea, wheezing; **Fever** is an elevated body temperature (confirm if test was done).

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[10] Height measurement standing when child is ≥24 months(height proxy ≥87 cm)
[11] 1 = Yes (with card); 2= Yes (without card); 3= No; 4= Not applicable for children below 9 months.
[12] 1= No illness; 2= malaria; 3= diarrhea; 4= ARI; 5= skin disease; 6=other(specify)

.X.3. Household enumeration data collection form for a death rate calculation survey (one sheet/household)

Survey district:_____ Village:_____ Cluster number:_____

HH number:_____ Date:_____ Team number:_____

ID	1	2	3	4	5	6	7
	HH member	Present now	Present at beginning of recall (include those not present now and indicate which members were not present at the start of the recall period)	Sex	Date of birth/or age in years	Born during recall period?	Died during the recall period
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

Tally (these data are entered into ENA for each household):

Current HH members – total		
Current HH members - < 5		
Current HH members who arrived during recall (exclude births)		
Current HH members who arrived during recall - <5		
Past HH members who left during recall (exclude deaths)		
Past HH members who left during recall - < 5		
Births during recall[13]		
Total deaths		
Deaths < 5		

---

[13] If the child subsequently died during the recall period tally up as death ONLY

.X.4. Enumeration data collection form for a death rate calculation survey (one sheet/cluster)

Parish:_____ Village:_____Cluster number:_____

HH number:_____ Date:_____ Team number:_____

N	Current HH member		Current HH members who arrived during recall (exclude births)		Past HH members who left during recall (exclude deaths)		Births during recall	Deaths during recall	
	Total	< 5	Total	<5	Total	< 5		Total	< 5
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
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16									
17									
18									
19									
20									
21									
22									
23									
24									
25									

.X.5. Map of surveyed rural settlements in Lira district, 2009
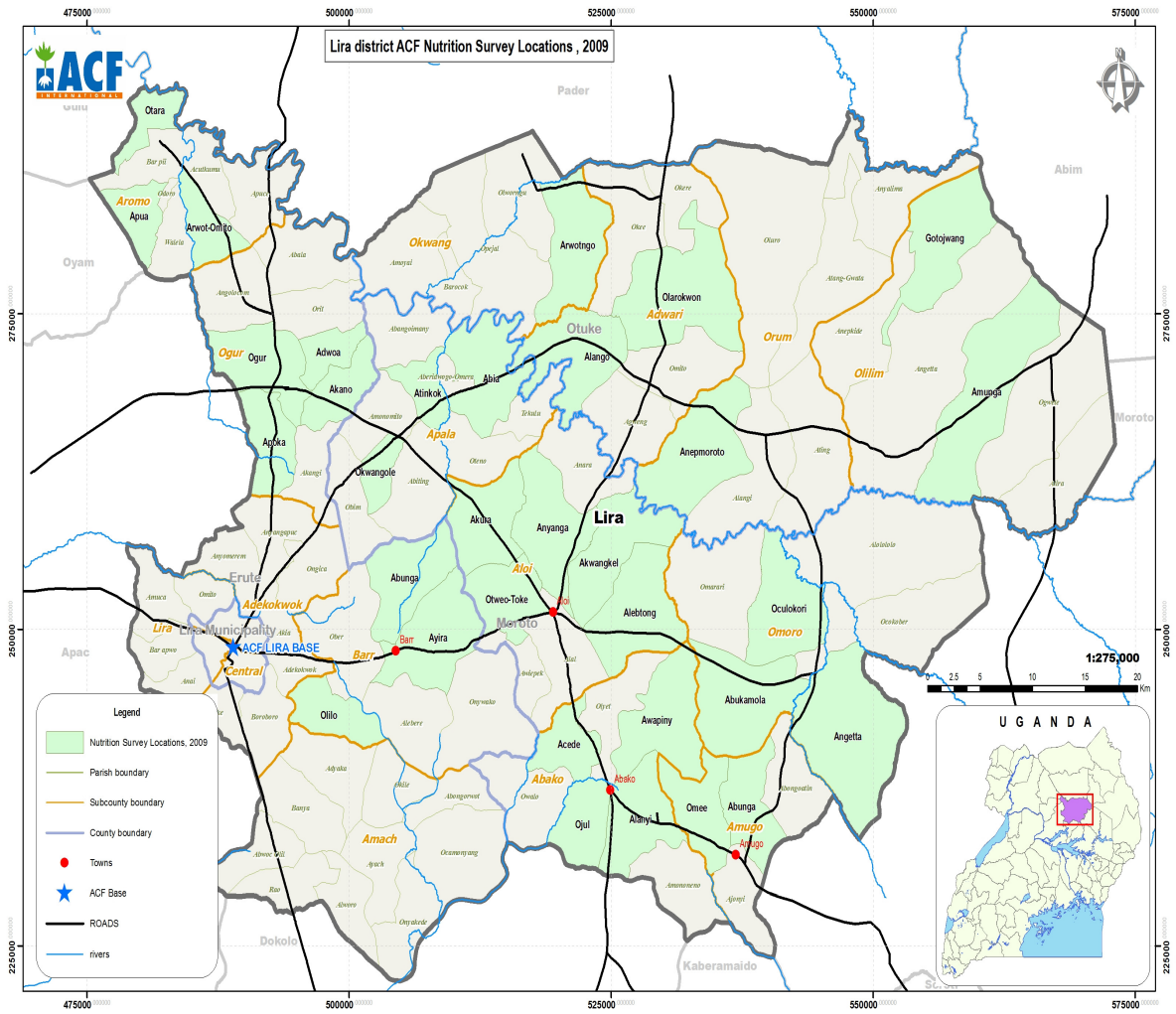
.X.6. **Calendar of events, Lira District, August 2009**

MONTH	ANNUAL EVENTS	EVENTS PER MONTH AND PER YEAR											
		2004		2005		2006		2007		2008		2009	
JANUARY	1ST new year, 26th victory day				55		43		31		19	Swearing in for President Barrack Obama, USA	7
FEBRUARY	Cleaning the field, opening school				54	23rd presidential elections (Multiparty)	42		30		18		6
MARCH	Women's day, Sea-nut season	Beginning of rainy season, Barlonyo attack 7 march 2004,		Beginning of rainy season,	53	Beginning of rainy season, National LC3 & LC5 elections	41	Beginning of rainy season	29	Beginning of rainy season	17	Beginning of rainy season	5
APRIL	Easter, White-aunt season, Fools day 1st Day				52		40		28	Fire outbreak at Buddo Junior Primary School	16		4
MAY	1st labor day, Mango season				51		39		27		15	National Child Health Days Plus (Ministry of Health/EPI)	3
JUNE	3RD martyrs day, 9th heroes day	Attack on Aboke girls 28 people killed and 7 abducted		Graduated tax scrapped	50		38		26		14		2
JULY	Harvest of millet	Harvest 1st session		Harvest 1st session	49	Harvest 1st session	37		25		13	Harvest 1st session	1
AUGUST	Ascension day			John Garang died	48	Uganda and LRA rebels signed a truce to end war in Juba, Peace talks in Juba	36	Plan crash killed 72 soldiers	24		12		0
SEPTEMBER	Weeding of 2nd session		59		47		35	Flooding washed away towns and lives in Teso region	23		11		
OCTOBER	9th independence day		58	Death of former president Milton Obote 10/10/05	46	Museveni meets LRA rebels	34	Floods	22		10		
NOVEMBER	Harvest of maize and millet	Harvest 2nd session	57	Harvest 2nd session, Dr.Kizza Besigye arrested	45	Harvest 2nd session	33	Harvest 2nd session	21	Election day for President Barrack Obama	9		
DECEMBER	25th Christmas, 26th boxing day	Peace talks failed and Museveni declared war	56		44	Sadam Hussein executed	32		20		8		