

**WFP Uganda  
Emergency Food Security Assessment Of  
Karamoja Region  
March-April 2007**



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## Background on Karamoja Region

Karamoja is a region in north-eastern Uganda comprising of the districts of Abim, Kotido, Moroto, Kaabong and Nakapiripirit. It is mostly a semi-arid plain with harsh climate and low annual rainfall. The vegetation is largely savannah, covered with seasonal grasses, and small trees. The average elevation of the plain of Karamoja is 1400 meters above sea level. The district is characterized by a single cropping season, which begins in April and ends in October, with a dry spell in July<sup>1</sup> (FEWS, 2003)

Subsistence pastoralism remains the preferred way of life for most people in northeast Uganda. As Dyson-Hudson<sup>2</sup> points out, the uncertainties of rainfall and other ecological hazards make agriculture alone a high-risk strategy. The inclusion and maintenance of livestock (essentially cattle) mitigates some of the risks associated with agriculture. However, major losses of livestock regularly occur through drought, disease and raiding by armed groups creating a recurrent need to reconstitute the herds.

The people of Karamoja are from an ethnic group referred to as the 'Plains Nilotes'<sup>3</sup> most of whom follow a semi-nomadic lifestyle. Other groups in the region include the Oropom, Pokot, Ik and the Tepeth. The degree to which the ethnic groups depend on livestock varies depending on the amount of available water and grazing areas. For most households, however, there is a permanent residential settlement with food cropping, especially sorghum cultivated by women and children; the herds are moved seasonally to available grazing<sup>4</sup>.

## WFP Response

In 1999, the East Africa region was affected by a La Niña with lower than normal rains between March and June. This resulted in the loss of much of the grazing lands and complete failure (90%) of the agriculture<sup>5</sup>. In 2000 WFP launched an EMOP to respond to the resulting drought and planned to assist a total of 190,000 vulnerable people. In 2003 support to people affected by the drought was increased to assist over 586,000 people (WFP, April 2003)<sup>6</sup>. In 2004 with the recurrence of another agricultural season of poor rains, WFP launched a PRRO to assist 500,000 drought-affected agro-pastoralists in the Karamoja region. (WFP, 2005)<sup>7</sup>. Currently WFP is supporting 560,000 people in the Karamoja region due to conflict, drought and loss of grazing lands.

## Study objectives and methodology

The purpose of the study was to determine the degree of food insecurity in the Karamoja region of Uganda. The study stratified the region based on its 8 counties (Labwor, Dodoth, Jie, Bokora, Matheniko, Pian, Chekwi, and Pokot).

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<sup>1</sup> FEWS, *WFP increases food aid in Karamoja*, FEWS NET 2003

<sup>2</sup> Dyson-Hudson, *Pastoralism: Self Image and Behavioral Reality*, Johns Hopkins University, 1987

<sup>3</sup> Ruben de Koning, *People in Motion*, Occasional Paper 113, CIDIN Development Studies

<sup>4</sup> Mirzeler and Young, *Pastoral politics in the northeast periphery in Uganda: AK-47 as change agent*, *The Journal of Modern African Studies*, 38, 3 (2000), pp. 407-429

<sup>5</sup> ACT Alert - Uganda 1/99: Drought Emergency in Karamoja Region, Northern Uganda (<http://www.reliefweb.int/rw/RWB.NSF/db900SID/ACOS-64BHSN?OpenDocument>)

<sup>6</sup> Emergency Report n. 17, 25 April 2003 (<http://www.wfp.org/english/?ModuleID=78&Key=524>)

<sup>7</sup> WFP Emergency Report No. 2 of 2005 (<http://www.reliefweb.int/rw/RWB.NSF/db900SID/KKEE-6ERPJC?OpenDocument>)

## Definition, terminology and concepts

Food Security: Based on the definition from the 1996 World Food Summit food security is defined as *when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.*

## Sources of data

The results of this study are based on collected household data from the 8 counties in Karamoja region, North-eastern Uganda. The data was collected at the end of April by enumerators using a quantitative household questionnaire. The questionnaire was a closed ended tool which focused on household demographics, economic and livelihood activities, access to land and agricultural activities, consumption, expenditure, shocks and coping and mother and child MUAC (Middle Upper Arm Circumference).

## Sampling procedures

The sample for the study is based on a complex two stage sampling procedure. The first stage or cluster is the village. The second stage is the household. In order to select the village using PPS (Probability Proportion to Size), for the two levels of stratification, the following procedure was undertaken:

## Sample Universe

1. Sample universe is all villages in the region of Karamoja.
2. Population figures in the clusters were based on the Government of Uganda population figures.
3. In the counties, peri-urban areas with a population greater than 5000 people were removed as these population centres are not classified a rural by WFP-VAM

## Stratification

The study area was stratified based on eight administrative counties in the region: Karamoja Region

- |            |              |             |
|------------|--------------|-------------|
| i. Labwor  | iv. Bokora   | vii. Chekwi |
| ii. Dodoth | v. Matheniko | viii. Pokot |
| iii. Jie   | vi. Pian     |             |

## Number of Clusters

1. Based on the WFP sampling guidelines, 22 clusters per strata are needed to provide a representative sample with a 95% confidence interval with a precision of +/- 7.5%.
2. The villages were then selected by PPS, based on a systematic sampling pattern with a fixed interval combined with an initial random number. The selected sample is presented in Annex I at the end of this report

## Household Selection (Second Stage Sampling)

Households for this study were randomly selected from a village list of households using the following procedure:

1. Upon arrival in the selected camp, the enumerator teams collected the most recent population list from the community leaders
2. A simple random selection procedure was used to identify the households. The sample interval was identified by dividing the total number of households by the desired number of households (5 additional households were selected in the event that households selected refused or were not present). The first household was selected at random from 1 to the sample interval (inclusive). The second household was the number of the first + the sample interval, and so on.

3. If during the data collection a household identified was not present the enumerator would return later. If not present that day one of the spare households was selected.
4. The interview was administered to Head of Household. If the Head of the Household was not in the village or nearby, another representative of the household was interviewed, preferably the spouse.

Table below is the number of households by strata interviewed:

Strata	Number of Households	Number of clusters	Administrative District
Bokora	150	22	Moroto
Matheniko	227	22	Moroto
Dodoth	161	22	Kaabong
Jie	222	22	Kotido
Labwor	209	22	Abim
Pian	210	22	Nakapirpirit
Chekwi	195	22	Nakapirpirit
Pokot	216	22	Nakapirpirit

The image to the right is the location of the 8 strata and the current district administration boundaries in the Karamoja region.

### Data entry and statistical analysis

When the questionnaires were completed, they were forwarded to Kampala for data entry. A data entry application was created by ODK in Microsoft Access. The application was installed on a local network. A half day training was given to the clerks which outlined the process of data entry and practice with the application. Eleven data entry clerks entered all the questionnaires over a period of 7 days. As the households questionnaires were completed, they were filed in numerical sequence for checking purposes. Data supervisors, aside from clarifying queries from the clerks on the data entry, marked a random selection of questionnaires to estimate the accuracy of the clerks. After marking 3% of all the questionnaires, an error rate of 0.01% was calculated.



### Limitations to the study

While the study was conducted in the most rigorous manner possible, some limitations must be acknowledged.

- **Representativeness:** Data were collected to be representative for each of the counties and can be used for comparison across strata but not within. As always with large scale surveys, sampling error due to multi-stage sampling needs to be acknowledged in interpreting the results. One should be cautious about drawing conclusions on an individual's food security and vulnerability from aggregated data

Additionally Urban populations are not included in this sample. The specific needs of these communities are not addressed in this analysis. Inclusion of urban populations, due to the difference in their needs and situation, would have required different data collection tools and sampling.

- **Questionnaires:** The questionnaire was designed in English and then administered in local languages. Intensive training was provided to the supervisors and enumerators together and in small groups. Despite all efforts to reduce error in understanding of the concepts and questions contained in the questionnaire, misinterpretation of the questions contained in the survey tools is possible and may have affected the outcome of the analysis.
- **Data collection:** The random nature of the site selection and the large geographical areas of some of the regions surveyed meant that in some of the regions the distances between the villages sampled was large. Fatigue and human error are always factors in such studies and also contributes to the reliability of data collected.
- **Data quality:** Inaccurate recall and quantitative estimates may have affected the quality of the results. The experience of the enumerators and additional training was used to facilitate such recalls and estimates through various methods (e.g. event calendars, proportional piling and income estimation). In some cases social desirability<sup>8</sup> and expectations (e.g. food aid) may have affected the responses. During the training the enumerators were briefed on the importance of ensuring that the interviewees understood that there was no direct benefit from participation in the study nor would the interview process result in inclusion in an intervention.

Although every effort was made to collect data from the Head of Household in many cases the respondent was the spouse of the household head. This was noted to be particularly acute in the Matheniko, Pokot, and Pian counties where the head of the household was a woman but married. In most cases it is suspected that this was because, the male head of the household was away tending and protecting the livestock. The spouse would be considered the head of the household in his absence. As the secondary data suggests, there are distinct roles and responsibilities along gender lines. In the recall of expenditure and income sources a female headed household with an absent spouse would be unlikely to be fully aware of the total household expenditure (particularly on 'male responsibility' expenses) and this is likely to have affected the quality of the data.

- **Contextual:** The data was collected during the month of April. This is during the late stages of the dry season. Therefore, although the questions are designed to capture longer-term information about the household the current circumstances are likely to reflect in the data collected. Thus interpretation of the data should be considered within the seasonal context of the survey.

## Household food consumption and access profiling

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<sup>8</sup> When a respondent answers in a way that he or she thinks will please the interviewer or result in direct benefits to him or her.



Household food security profiles were developed using information on dietary diversity, the consumption frequency of staple and non-staple food, sources of foods consumed, the percentage of total household expenditure spent on food and per capita monthly expenditure.

The number of different foods from different food groups, consumed in a household reflects the dietary diversity and it provides a measure of the quality of the household diet. The variety of foods/food groups consumed by household members is a proxy indicator of household food access and research has demonstrated that dietary diversity is highly correlated with caloric and protein adequacy, percentage of protein from animal sources (high quality protein) and household income.

In order to classify households on the basis of their actual weekly food consumption, the frequency of consumption for the 19 food items was reorganized into 9 main food groups (days of consumption, 0 to 7 days per week). The organisation of these groups is defined in the annexes at the end of this report.

Each household was asked to report the main sources for each food item consumed in the past week. Possible options included: own production, hunting, fishing and gathering, exchange labour/items for food, borrowing, purchase, gift from relatives and food aid. The number of responses for each source was 'weighted' by the frequency of consumption of the foods that were accessed through that particular source. Then the proportion of consumption from each source was calculated.

### **Methodology for Analyzing Food Consumption and Access**

The analysis of multiple variables simultaneously, required the use of multivariate statistical techniques. Specifically a principal component analysis (PCA) followed by cluster analysis<sup>9</sup> was used to cluster together households that share a particular food consumption/access pattern. The advantage of running a cluster analysis on principal components and not on the original variables is that the clustering is done on relationship among variables. PCA was run on the frequency of consumption of the above mentioned food groups, sources of consumed foods, share of total household expenditure spent on food and per capita monthly expenditure.

A cluster analysis was run on 18 factors which captured 89% of the variance which produced 14 distinct classes. Such a high level of consistency with the original complexity of the dataset ensures a good reflection of the relationships among variables. It guarantees also that particular combinations of variables' values (frequencies of consumption of single food groups, particular food source and expenditure patterns) are maintained and not smoothed too much through a high data reduction approach.

Based on this analytical approach, 14 distinct profiles of households were identified being characterized by their different food consumption and access patterns. These 14 profiles could be summarized into 5 main food consumption groups and into 5 different access profiles. The combinations of those characteristics together with expenditure capacity will result into a 4-group food security classification.

### **Food Consumption**

The household diet among the administrative counties is relatively homogenous. In general, households in the Karamoja region consumed maize and other cereals 6.2 days out of seven. Pulses were consumed 2 days out of seven with contributions of proteins from meat, fish, milk and blood (2.8 day out of seven), and Oils, fats and groundnuts from (2.43 days out of seven). Vegetables were consumed on average 3.3 days out of seven.

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<sup>9</sup> The software used for multivariate analyses (PCA and Cluster Analysis) is ADDAWIN, freely available at [http://cidoc.iuav.it/~silvio/addawin\\_en.html](http://cidoc.iuav.it/~silvio/addawin_en.html)

However, of particular food items, the average number of days out of seven that were consumed by households differed significantly ( $p < 0.05$ ) from the mean. For example,

- The Labwor and Jiwe counties consumed other cereals 3.5 and 4.0 days out of seven respectively
- The country of Labwor consumed groundnuts 1.9 days out of seven and fruits 2.5 days out of seven
- The counties of Dodoth and Bokora consumed vegetables 3.9 and 4.2 days out of seven respectively
- The counties of Pokot and Chekwe consumed oils 2.7 and 2.9 days out of seven
- The county of Pokot consumed maize 5.2 and meat 2.3 days out of seven.

### **Household Food Access**

Household access to food based on the 7 day recall period, varied between the 8 counties. However, on average a third of the household's food was acquired from the market, another quarter was accessed from their own production, and the remainder was derived from hunting, fishing and gathering (16%), Food aid (10%), Borrowed (7%) and Exchange (6%). Similarly, on average 66% of household expenditure per capita was on food and the remainder on non-food (34%).

Between the counties there are significant differences. For example

- A significantly higher percentage of the households food was acquired from their own production in the Pokot (41%) and Chekwi (32%) counties
- On average 19% in Labwor, 21% in Dodoth, 15% in Jie and 18% in Bokora of the household food is acquired from Gathering which is significantly higher than the Pokot and Chekwi counties
- 10% of the households' food basket in Bokora is acquired from exchange. This is significantly higher than all the other counties.
- In the previous 7-day, food aid contributed to 37% in Pian, 26% in Matheniko, and 17% in Bokora which is significantly higher than the other counties

### **Household Food security profiling**

Household food security profiles were determined through a qualitative interpretation of the different pieces of information entered into the analysis. The final classification was based on convergence of food access, actual food consumption, food sources and expenditure on food and per capita total expenditure. Based on this convergence of indicators, four final categories were created: Food Insecure, Moderately Food Insecure, Moderately Food Secure and Food Secure.

Based on the results of the analysis, below is the proportion of households from the study by food security category and a brief description of the principal factors to describe the households. A more detailed description of the consumption and access profiles are provided in Annexes 2 and 3 at the end of this report.

#### **Food Insecure (27%)**

- Households have very poor or poor consumption patterns
- These households rely on assistance for the bulk of their food items or depend on the market but have a very low per absolute capita expenditure on food and the highest percentage of expenditure spent on food (70%)

#### **Moderately Food Insecure (47%)**

- Household consumption is classified as poor to borderline<sup>10</sup> with the food coming from either food aid or the market.
- Total household expenditure per capita is below the mean for most of the households in this class and 65% of the household's expenditure is allocated to food.

### **Moderately Food Secure (10%)**

- Household dietary diversity and consumption frequency is classified as good.
- Access to food is either from the market or a combination of the market and their own production.
- The percentage of household expenditure on food is 62% of total expenditure; and total expenditure is close the average for the sample

### **Food Secure (16%)**

- Consumption patterns for the food secure households ranges from good to very good.
- Access is predominately either from the market or a combination of the market and their own production.
- The percentage of household expenditure on food is the lowest among the group and the total per capita expenditure (food, non-food and total) is nearly 3 times the sample mean.

As mentioned in the brief description of the consumption patterns, the household diet among the food security classes differed between very poor and very good consumption. The table below illustrates the mean number of days the various food groups are consumed by each of the food security classes. It should be noted that difference between the classes are statistically significant ( $p < 0.05$ )

	Cereals and Starches	Pulses	Animal Proteins	Oils and Fats
Food Insecure	5.0	0.7	1.1	1.0
Moderately Food Insecure	6.0	2.5	2.1	1.6
Moderately Food Secure	>7 <sup>11</sup>	2.3	3.2	6.2
Food Secure	>7	3.2	>7	5.3

### **Geographic Distribution of Consumption Profiles**

Based on the description of the results above, the distribution of the food security and vulnerability profiles is presented below:

<sup>10</sup> Borderline implies a consumption pattern of households consuming staples daily; pulses between 5 days/week; and oil 1 days/week on average. For more details on the consumption patterns please refer to Annex 2

<sup>11</sup> Please note, in cases where the total number of days a food category (e.g. cereals) was consumed is greater than 7 is because the mean consumption is the sum of all the food items in that category. For example, the total number of days out of 7 cereals were consumed is a sum of the 6 different cereals/starches in the questionnaire. Resultantly, a household could have eaten maize 4 days out of 7, cassava 2 days out of 7 and rice 2 days out of seven. The total number of days out of seven there cereals/starches were consumed were 8 days out of 7.

Food Security Classes by County (Pct of households)					
	Food Insecure	Moderately Food Insecure	Moderately Food Secure	Food Secure	Total %
Labwor	20%	18%	24%	39%	100%
Dodoth	34%	48%	7%	11%	100%
Jie	33%	42%	13%	13%	100%
Bokora	31%	48%	19%	2%	100%
Matheniko	11%	70%	4%	13%	100%
Pian	21%	74%	2%	3%	100%
Chekwi	7%	60%	7%	25%	100%
Pokot	5%	30%	2%	63%	100%
Karamoja Region	27%	48%	11%	14%	100%

The table above highlights two distinct grouping of food insecure households. There is a lower prevalence of food insecure households in Chekwi, Pokot and Matheniko counties; and between a fifth to a third of the households in the counties of Pian, Labwor, Dodoth, Jie, and Bokora are food secure.

### Household Survey Results/Outcomes

As mentioned in the methodology section of this report, the study of the Karamoja counties was designed to provide representative results for each of the eight counties in the region. The following sections of the report will provide the weighted mean results for the counties and mention, as required, prevalences or averages for the any of the eight counties which differ significantly ( $p < 0.05$ ) from the other counties. The report will also present the findings for the food security classes and highlight where a significant statistical difference between the classes exists.

### Demographics

#### Age and Composition of Household

In the Karamoja region the mean age of the head of the household is 45 with a lower mean age of 40 years in Matheniko. The average number of members per household is 6.9 people with a higher average of 8.9 in Labwor.

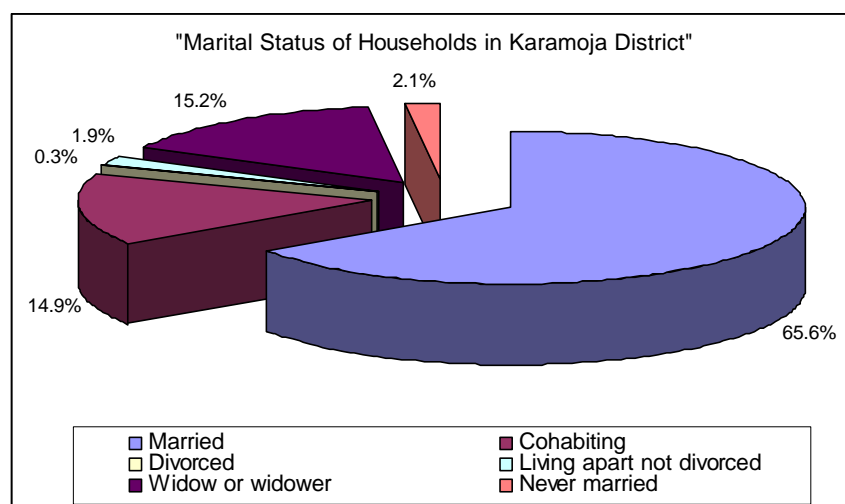
#### Sex of the head of the household

The percentage of households that are headed by a female varies across the eight counties with an average 29% of households headed by a female. A significantly higher percentage of female headed households are in Matheniko (68%), Pian (48%) and Bokora (44%).

Between the food security classes, there is little variance between the percentage of females headed households. Possible explanations for this could be that 1) if the male head of the household was away tending and protecting the livestock and the spouse would be considered the head of the household (high incidences of this were identified in the Matheniko, Pokot and Pian strata); 2) the social capital networks between households within a kraal and the clan structure in general facilitate a greater redistribution of wealth. This reduces the food security differences between the sex of the head of the households within the county

## Marital Status of the Household

According to the household responses, the graph below highlights the marital status of the households in the region. However, the percentage of married households is significantly higher in Pokot (90%) and Matheniko (78%) counties; as is the number of cohabitating households is less than 1% in Pokot and less than 7% in Matheniko.



Among the food security classes, there is little **there is a significantly higher ( $p < 0.05$ ) percentage of widowed households that are food insecure**. A possible explanation for the apparent contradiction between the lack of a relationship between the food security status female headed households and the significant relationship between widowed headed households and food security status is the number of female headed households by marital status. The table below is the percentage of female headed households and their marital status. As the table highlights, one-third of female headed households are married which could explain the lack of a relationship between the sex of the head of the household but a relationship between widows and food insecurity

Marital Status of Household	Pct of Women
Married	33%
Cohabiting	6%
Divorced	1%
Living apart not divorced	6%
Widow or widower	51%
Never married	3%
Total	100%

Excluding the households that have never married, on average, 41% of the households are polygamous. A higher percentage of polygamous households are located in Jie (53%) and Pokot (50%) counties.

## Household Literacy

In the Karamoja region, on average, 29% of the heads of the households and 12% of the head of the household's spouse can read a simple message. However, as the table

below highlights there is significant variation between the counties (the numbers in bold differ significantly ( $p < 0.05$ )).

Percentage of Households that can read and write a simple message by County		
County	Head of Household	Spouse of the Head of the Household
Labwor	<b>62%</b>	<b>31%</b>
Dodoch	35%	14%
Jie	22%	10%
Bokora	15%	2%
Matheniko	<b>12%</b>	8%
Pian	18%	6%
Chekwi	40%	15%
Pokot	23%	11%
Total	29%	12%

Similarly, among the food security classes, the percentage of head's of households and spouses of head's of households that can read and write a simple message varies. The table below highlights the mean percentage variance of head's of households and spouses of head's of households that can read a simple message.

Percentage of Households that can read and write a simple message by Food Security Class		
	Head of Household	Spouse of Head of Household
Food Insecure	22%	6%
Moderately Food Insecure	27%	12%
Moderately Food Secure	37%	21%
Food Secure	46%	19%
Total	29%	12%

**There is a significant relationship ( $p < 0.05$ ) between the ability of the head of the household and spouse of the head of the household to read a simple message and the food security status of the household.**

### Adult Education

#### Head of Household

Households responded that, 73% of the head of households did not have any formal education. The table to the right is the percentage of responses of households indicating their level of formal education

Education Status	% Responses
Did not have any education	73
Some Primary	13
Completed Primary	4
Some Secondary	7
Completed Secondary or Some/ completed Tertiary/University	3
Total	100%

In the counties of Labwor and Chekwi 20% of the households indicated that they had *some primary* education; Labwor continued to have a higher percentage of academic achievement. According to the responses, 13% *Completed Primary* 19% *Some Secondary Education*, and 8% indicated either *Completed Secondary or Some/completed Tertiary/University*.

## Spouse of the Head of Household

The percentage of spouses that indicated no schooling is 88%. The table to the right is the percentage of responses of households indicating their level of formal education

Education Status	% Responses
Did not have any education	88
Some Primary	8
Completed Primary	1
Some Secondary	2
Completed Secondary	1
Total	100%

In the counties of Labwor and Dodoth 14% and 11% of the households indicated that the spouse of the head of the household had *some primary* education. The trend continues in the Labwor country with 9% of spouses having completed primary school and the 9% having started or completed secondary education.

By food security class, there is an increasing percentage of both the head of the households and the spouse of the head of the household as the food security status of the household improves. For example **the proportion of households where the head of the household has no schooling and are food insecure is significantly ( $p < 0.05$ ) higher than households with primary or secondary education. Similarly, the proportion of households who are food secure or moderately food secure and where the spouse of the head of the household has completed primary school or some secondary school is significantly higher than the other food security classes.**

## Child Education

### Primary Schools Access

Of the households with children between the age of 6 and 15, in the region of Karamoja, 64% of households indicated they had children attending school. Although not directly comparable, the national percentage of primary enrolment/attendance calculated by UNICEF can provide context for this figure. According to UNICEF, the national enrolment/attendance rate is 87%, and Karamoja is below the mean.

Percentage of Household with school age children attending school	
Labwor	96%
Dodoth	72%
Jie	42%
Bokora	68%
Matheniko	46%
Pian	57%
Chekwi	66%
Pokot	53%
Regional Mean	64%

However, there is a significant variation between the counties. The table to the right highlights the variance between the counties of the percentage of households that have children attending school. It should be noted that there is a significant ( $p < 0.001$ ) difference between Labwor and the other counties.

Among the food security classes between 60% and 69% percent of households with school age children send their children to school. **There is no significant relationship between food security class and the percentage of children attending primary school.**

## Secondary School Access

Based on the responses of the households with children between the age of 12 and 18 in the region of Karamoja, 15% of households indicated they had children attending secondary school. However, as with the results for the primary school, there is a significant variation between the counties. The table below highlights the variance between the counties of the percentage of households that have children attending school. It should be noted that there is a significant ( $p < 0.05$ ) difference between the percentage of households in Labwor country that have children attending secondary school than the other counties.

County	Percentage
Labwor	44%
Dodoth	14%
Jie	9%
Bokora	11%
Matheniko	8%
Pian	11%
Chekwi	21%
Pokot	14%
Regional Mean	15%

Households with children of secondary school age by food security class ranged from 9% of the food insecure households to 23% of the moderately food secure and food secure households. **The proportion of food secure and moderately food secure households that have children attending secondary school is significantly higher ( $p < 0.05$ ) than moderately food insecure or food insecure households.**

## Households with Disabled or Chronically Ill Members

On average 14% of the households in the Karamoja region report the head of the household being either chronically ill or disabled. Although the mean percentage of households by region varied from 21% in Bokora and Chekwi counties to 7% in the Pokot county there is no significant difference ( $p < 0.05$ ) between the counties. Households also reported on average that in the Karamoja region 11% of households had a household member that was chronically ill or disabled.

Between the food security classes, the percentage of households reporting that the head of household either chronically ill or disabled varied between 23% for the moderately food secure and 12% for the moderately food insecure. However, there is no significant relationship ( $p < 0.05$ ) between the household's food security status and the head of the household or the household member being disabled or chronically ill.

## Water Access

In the Karamoja region, 71% of the households reported that their main source of water was a borehole; 17% of households indicated that their main source of water was a river or stream and 10% used an unprotected well or a spring.

	River/stream	Unprotected spring/well	Protected spring/well & Water Tap	Borehole	Total
Labwor	1%	8%	1%	90%	100%
Dodoth	24%	9%	2%	65%	100%
Jie	9%	7%	5%	78%	100%
Bokora	3%	18%	0%	79%	100%
Matheniko	13%	5%	1%	82%	100%
Pian	12%	5%	0%	83%	100%
Chekwi	28%	3%	0%	68%	100%



Pokot	26%	30%	0%	44%	100%
Regional Mean	17%	10%	2%	71%	100%

It is important to note that **a statistically significant ( $p < 0.05$ ) higher proportion of households in Pokot and Bokora counties drink from an unprotected spring/well**

By food security class, there is no significant variation between the different food security classes and the region mean by water source.

49% of the households indicated that it took less than 30 minutes to collect water; 40% of the sample indicated that the collection of water takes between 1-3 hours and the remainder of the respondents (15%) indicating that it takes a half day or more to collect water.

In the last 3 months, 35% of the respondents in the Karamoja region indicated that their principle water source had changed. Of the households that indicated that their water source had changed, the table below is the percentage response by source and cause of the change

Water Source	Reason why the water source has changed				
	Inaccessible due to insecurity/flood	The source has dried up	The source has broken down	Other	Total
River/ stream	13%	44%	36%	7%	100%
Unprotected spring/well	4%	62%	28%	6%	100%
Protected spring/well	0%	50%	0%	50%	100%
Borehole	3%	9%	79%	8%	100%
Water taps	0%	0%	56%	44%	100%
Regional Mean	5%	24%	61%	10%	100%

## Health

According to the households, in the past three months, on average 59% of households reported having a member suffering from diarrhoea, 15% from the measles, 9% from meningitis, 78% from malaria and 26% from whooping cough. The table below presents the average percent of household reporting a household member being affected by particular illness. However caution must be exercised when employing these figures as they are household reported illnesses and are not validated by medical tests.

	Diarrhoea	Measles	Meningitis	Malaria	Whooping cough
Labwor	70%	9%	2%	95%	47%
Dodoth	65%	20%	6%	77%	14%
Jie	63%	13%	15%	82%	20%
Bokora	31%	13%	3%	53%	21%
Matheniko	65%	8%	8%	84%	56%
Pian	33%	9%	8%	67%	41%
Chekwi	63%	7%	11%	80%	42%
Pokot	54%	19%	20%	98%	44%
Regional Total	59%	15%	9%	78%	26%

By food security class, there is little variation between the food security classes and the reported incidence of a household member suffering from a particular illness.

## Displacement

The Karamoja region although largely unaffected by the conflict between the Uganda People's Liberation Army (UPLA) and the Lord's Resistance Army (LRA); 7% of the households indicated that they had been displaced. Of the displaced households, 31% are located in Labwor county and 30% in the Dodoth county. The remaining 38% of household that indicated they had been displaced are evenly distributed between the remaining 6 counties. In terms of duration, the majority of the households reporting being displaced indicated that it had occurred in the pervious 1-5 years.

## Household Food Security and Vulnerability

### Agriculture

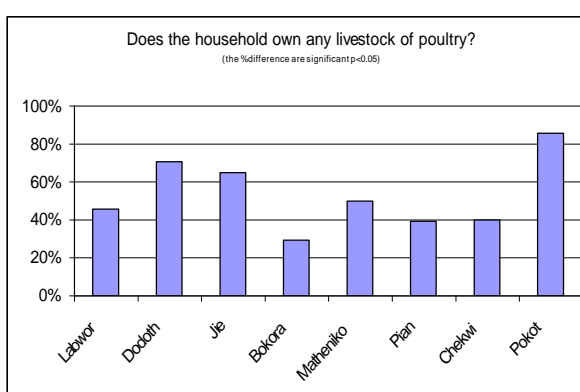
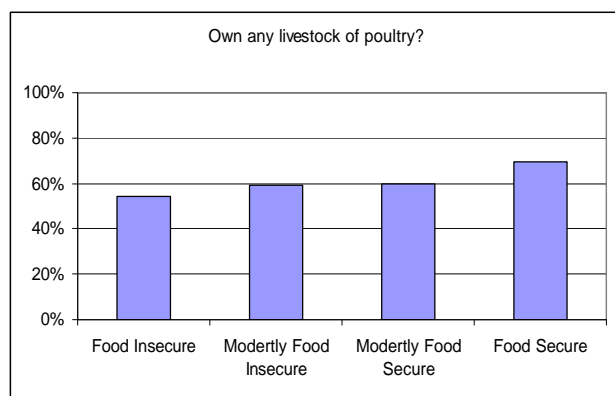
The Karamoja region is in a semi-arid zone typified by between 500 and 700 mm of rainfall a year and agricultural activities tend to be limited to dry land cereal production. According to the household responses, 2% of the households (37 households) in the Karamoja region indicated that they had undertaken any agricultural work in the past three months.

Among the 37 households that did indicate that they had engaged in agricultural activities in the previous 3 months, the predominant response was preparing land for planting. This would agree with the seasonal calendar as the period of the study was prior to the beginning of the rainy season. However, ethnographic studies have highlighted the importance of agricultural production by women for the household food basket. The questionnaire asked in the previous 3 months. However, the principal rainy season (April-June) arrived late. The delay in the rainy season and the estimation that it is to be below normal (FEWS, 2007) could explain why so few households indicated agricultural activities even though it is a key activity for household food security.

Of the households that indicated they were engaged in agricultural activities, the households were preparing their fields for maize (58%) and sorghum (66%) and kidney beans (25%). However caution should be exercised when employing this information as the actual number of households is quite small (n<17 for any of the activities)

### Livestock Holdings

Unlike agriculture 60% of the sample indicated that they owned livestock. As the graph to the right highlights, households in the Pokot county reported



the highest percentage (86%) of owning livestock. This is followed by the Dodoth (71%) and the Jie (65%) counties.

By food security classification, there is a pattern between food security class and the indication of owning animal. **As the**

graph above indicates, more food secure households indicated owning livestock or poultry than food insecure households. The mean percentage difference between the food secure and food insecure is significant ( $p < 0.05$ ).

The table below is the percentage of households that indicated owning types of livestock by county and food security class. It should be noted that **the percentage of households in the Pokot county that responded owning cattle, camels, and goats is significantly higher ( $p < 0.05$ ) than all the other counties.**

Between the food security classes, **a higher percentage of food secure households own goats, cattle, and oxen than food insecure households which is statistically significant ( $p < 0.05$ ).**

	Poultry	goats	Sheep	pigs	cattle	oxen	donkeys	Camels
<b>County</b>								
Labwor	32%	26%	3%	8%	3%	1%	0%	0%
Dodoth	48%	45%	21%	5%	31%	14%	2%	1%
Jie	43%	41%	28%	1%	41%	36%	8%	0%
Bokora	13%	14%	12%	0%	10%	8%	1%	0%
Matheniko	27%	37%	23%	0%	25%	4%	4%	1%
Pian	11%	24%	20%	0%	17%	19%	1%	0%
Chekwi	18%	25%	13%	0%	24%	15%	4%	2%
Pokot	33%	57%	33%	0%	71%	1%	17%	5%
<b>Food Security Class</b>								
Food Insecure	37%	32%	16%	1%	27%	16%	4%	1%
Moderately Food Insecure	36%	38%	25%	3%	31%	17%	2%	0%
Moderately Food Secure	36%	37%	11%	7%	16%	11%	2%	0%
Food Secure	38%	46%	22%	1%	39%	8%	8%	2%
<b>Mean Averages</b>	<b>36%</b>	<b>38%</b>	<b>21%</b>	<b>3%</b>	<b>30%</b>	<b>15%</b>	<b>4%</b>	<b>1%</b>

### Animal & Livestock Products

As mentioned in the consumption profiles, household consumption of blood and milk was an important component in the household's diet for animal proteins and fats. **Food secure households consumed a significantly higher mean number of days of milk and blood.** Similarly, the mean number of days **households in the Pokot and Jie counties consume milk and blood is significantly higher ( $p < 0.05$ ) than the other counties.**

Of the households that did not access milk or blood in the previous 3-months, the principle reasons were sick animals (61%  $n=147$  households) and a lack of pasture (59%  $n=144$  households). It should be noted that at the time the study was undertaken a highly contagious disease affecting sheep and goats, *Pest des Petits Ruminants (PPR)*, was affecting the Karamoja region. FEWS report that the PPR outbreak was reducing the size of herds, directly affecting households' food security by reducing their sources of income and food (FEWS, 2007)<sup>12</sup>.

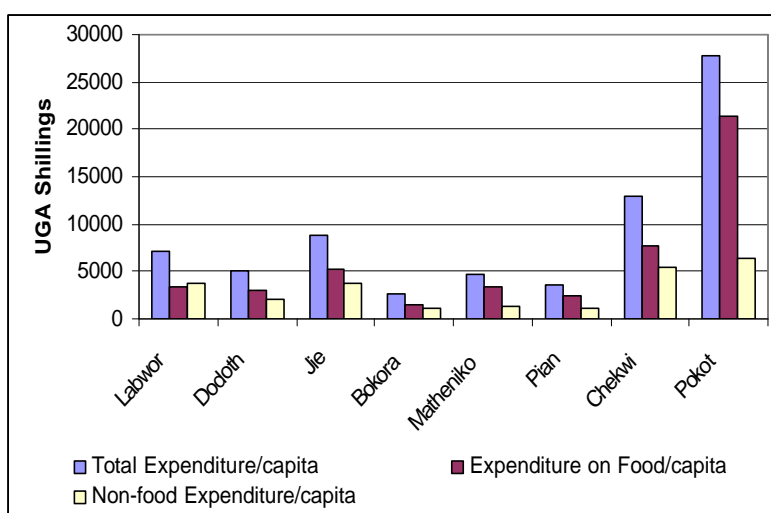
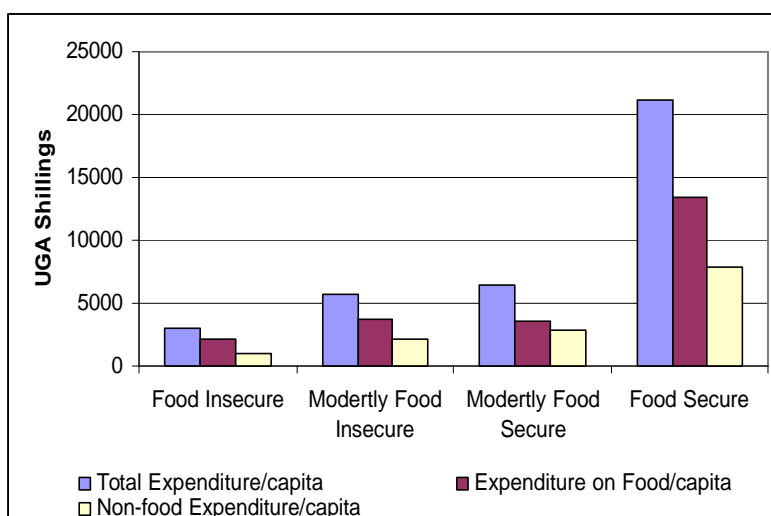
<sup>12</sup> FEWS, Report June 15, 2007

## Household expenditure

Drawing upon the households' responses for expenditure on food and non-food items, the mean expenditure by food security class is presented in the graph above and by county in the graph below.

As the graph illustrates the average expenditure per capita on food, non-food and total expenditure increases as the food security status of the household improves. The difference between mean expenditure by food security class is statistically significant ( $p < 0.01$ )

Among the 8 counties or strata in the Karamoja region, there is little variance between 7 of the 8 counties. The graph to the right illustrates the mean household expenditure by county. Except for Pokot county, there is no statistically significant difference between the per capita levels of expenditure among the counties



## Meals Consumed

By county the number of means consumed varied slightly. On average for the Karamoja region, Adults ate 1.3 meals on the previous days, Children under 6 years old 1.5 meals in the previous day and finally children 7-12 years old 1.3 meals in the previous day.

County	Adult	Children (<=6 years)	Children (7-12 years)
Labwor	1.1	1.4	1.1
Dodoth	1.4	1.7	1.3
Jie	1.4	1.4	1.4
Bokora	1.2	1.1	1.3
Matheniko	1.3	1.4	1.3
Pian	1.1	1.2	1.2
Chekwi	1.4	1.4	1.4
Pokot	1.5	1.7	1.6

The table below gives the mean number of meals consumed by the adults, children under 6 and children 7-12 years old from the previous day by food security class. It should be noted that the mean number of meals between the four food security classes is statistically significant ( $p < 0.05$ ).

Strata	Adult	Children (<=6 years)	Children (7-12 years)
Food Insecure	1.2	1.4	1.1
Moderately Food Insecure	1.2	1.4	1.3
Moderately Food Secure	1.4	1.5	1.5
Food Secure	1.8	1.9	1.8
Mean	1.3	1.5	1.3

### Main Income Activities & Economic Strategies

In the questionnaire, households were asked to identify the first, second and third economic activities and the percentage contribution each of the three activities to the household's income strategy. Based on the responses from the households, a Principal Component Analysis (PCA) and non-hierarchical clustering exercise, was conducted to identify and group households based on common activities and their relative contribution to the household's income. Employing 8 factors that captured 84% of the variance between the households, 12 classes were identified which explains 75% of the dispersion.

In summary, the 12 classes were then regrouped into 7 classes. A brief summary of the 7 classes is explained below

Livelihood Group	Number	Description	Pct of Sample
Agriculture/Gathering	502	On average, 65% of the households' annual income comes from their own production. The remainder is comprised from natural resources extraction (firewood, charcoal, bricks, wild foods, and thatch).	32
Agriculture/Casual Labour	385	85% of this livelihood group's income is derived agriculture (50%) and casual labour (35%).	25
Gathering	195	On average households indicated that 63% of their income was derived from natural resources extraction. Other contributions came from unskilled labour (16%) and agricultural production (13%)	13
Agro-pastoral	168	Unlike the other livelihood groups, over half of this group's income is derived from livestock. Small contributions to this group economic activities is contributed by agriculture and casual labour.	11
Casual Labour	117	This livelihood group depend heavily on causal labour. On average 73% of household income is derived from this activity. The remainder is derived from natural resource extraction (14%) and agriculture (10%)	8
Professional/Civil Servant	105	This group of households has been grouped based on the importance of	7

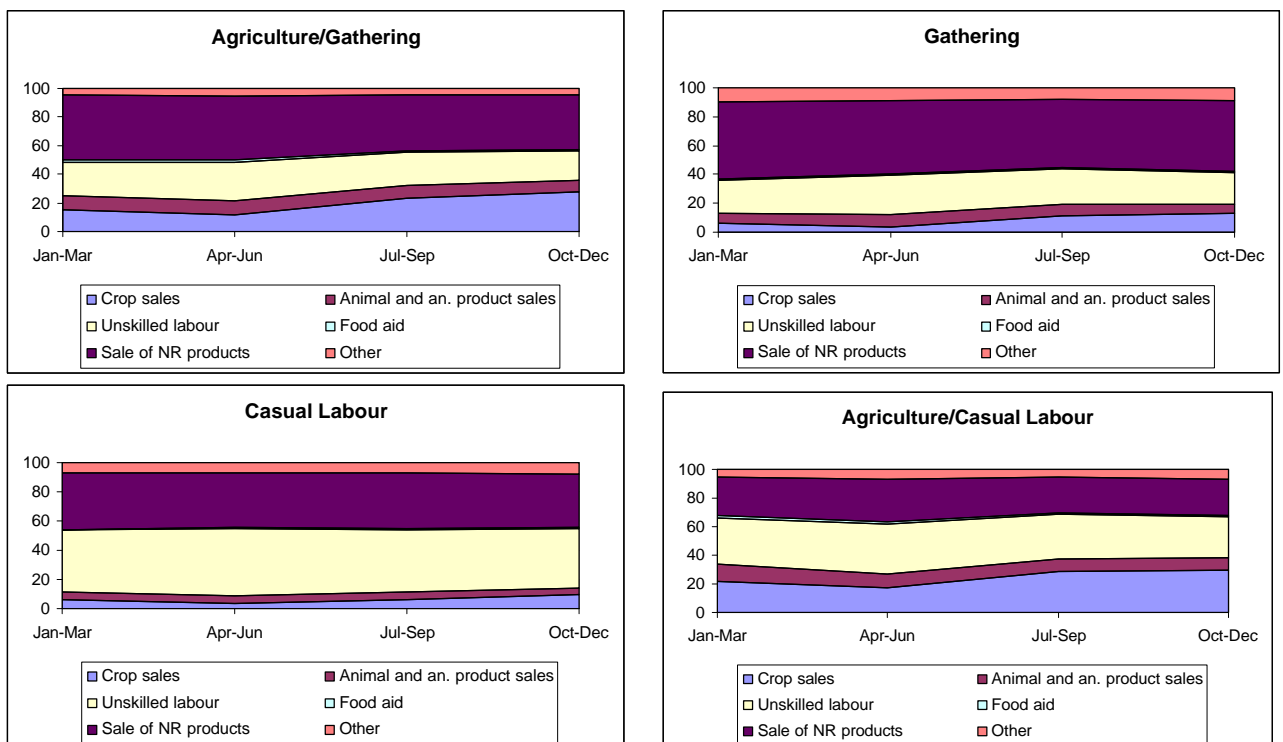
		skilled formal income activities (medical worker, teacher, international NGOs). However, agriculture also contributes between to 15% and 25% of the household income sources.	
Other	77	This is a grouping of the smaller livelihood groups. They are composed of the following livelihood typologies: <b>Skilled Labour/Agriculture:</b> This livelihood group is the only group that identifies skilled labour as an income activity. On average 42% of this group's income is earned from skilled labour. The other dominate income activities are agriculture (28%), casual labour (16%) and informal trade (6%). <b>Agriculture/Sale Food Aid/Casual Labour:</b> Over 40% of this livelihood group's income is dependent on the sale of food aid (33%) and informal trade (7%). The remainder is sought from agriculture (36%) and casual labour (20%) <b>Trading/Agriculture/Casual Labour:</b> This livelihood group focuses heavily on formal and informal trade (49%). The remaining income for this livelihood group is derived from agriculture (34%) and casual labour (9%).	5
Total	1,549		100

### Seasonal Variation of Income/Economic Activities

The construction of income groups, was based on an annual estimation of proportion of three income activities to the households overall income generation. The results from the analysis tends to agree broadly with the literature review as households in Karamoja rely on a combination of agriculture, sale of firewood and charcoal and wage labour for income.

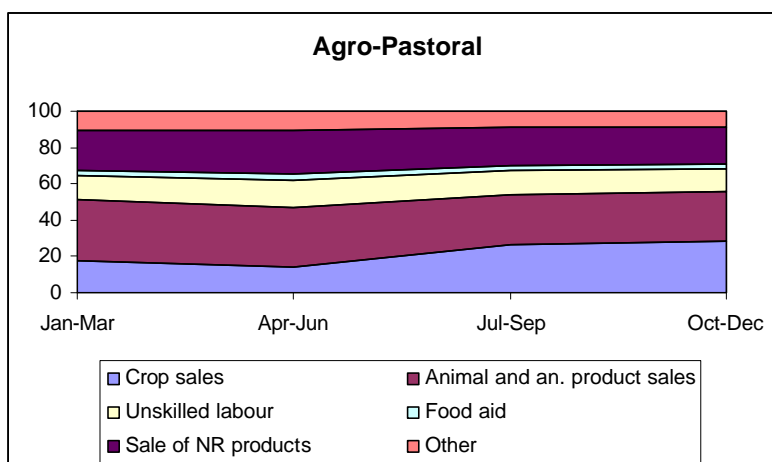
However, there are distinct seasonal variations in the activities. During the lean season, the livelihood groups that have the highest prevalence of food insecure and moderately food insecure households increase their dependence on unskilled labour and sale of natural resources.

### Income Source for Agriculture, Gathering, Casual Labour and Agriculture/Casual Labour Livelihoods/Economic Strategies



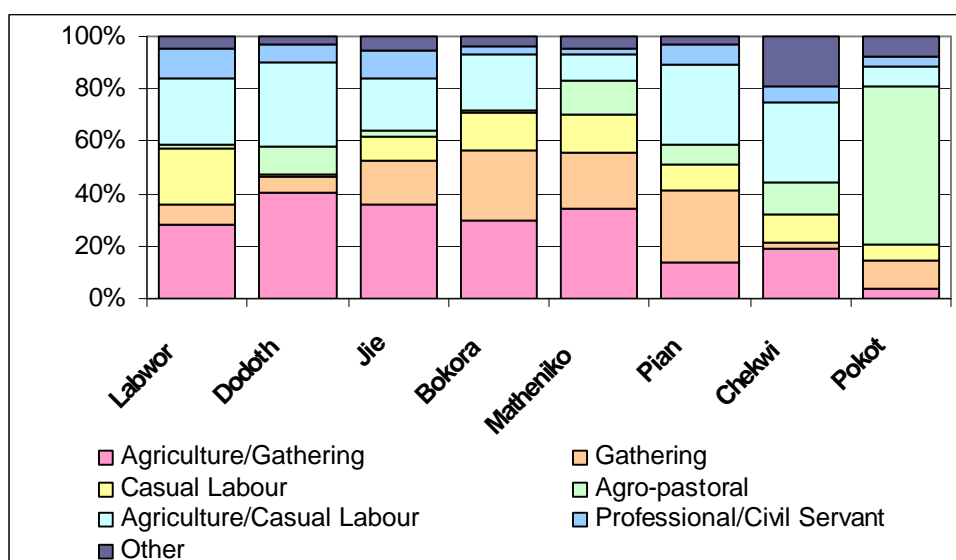
### Income Sources for Agro-Pastoral Households

In contrast, the agro-pastoral households, with one of the lowest prevalence of food insecure or moderately food insecure households, increase the sale of animals and animal products during the lean season for income to buy food. However, the percentage contribution of the other activities seems to be unaffected.



### Distribution of the Livelihood Groups by County

The distribution of the 7 livelihood groups are described above by county is as follows.

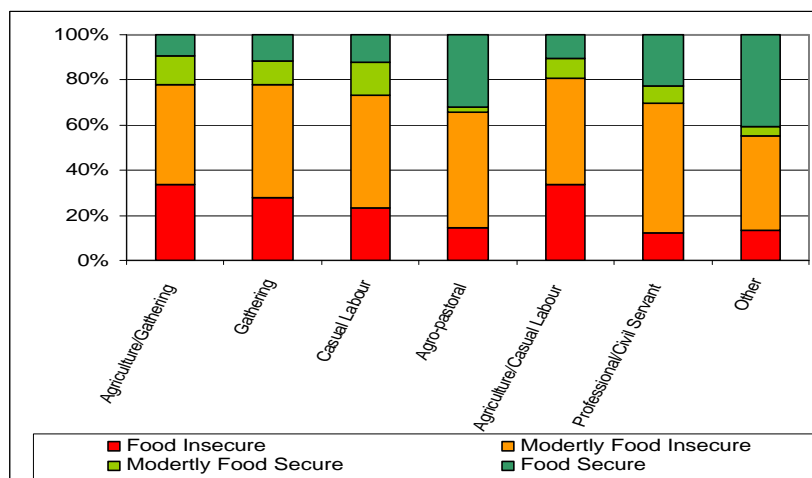


Based on this distribution, the following significant ( $p < 0.05$ ) observations can be made.

- The percentage of households in the Casual Labour livelihood group are significantly higher in the Labwor and Bokora counties
- The proportion of Agro-pastoral households is significantly higher in the Pokot county
- The 'Other' livelihood is proportionally higher in Chekwi county
- The proportion of Gathering livelihood households is significantly higher in the Bokora county

## Livelihood and Food Security

Cross-tabulating the food security classes by economic activity classes; it is possible to see the distribution of food secure households vis-à-vis the 7 principle livelihoods in the Karamoja region. The graph to the right represents the proportion of food secure/food insecure by county.



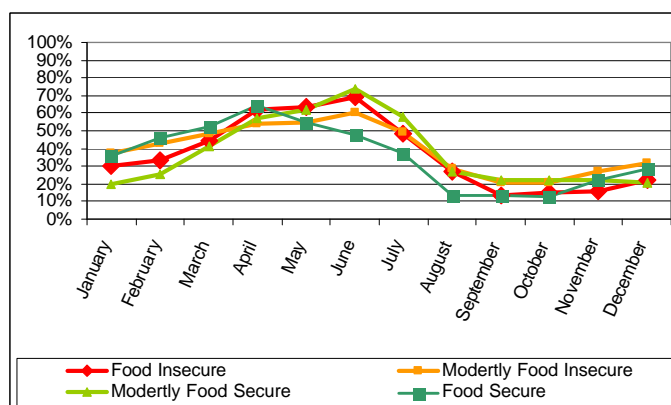
Based on the distribution of the food security classes by livelihood, the following significant ( $p < 0.05$ ) observations can be made.

- The proportion of food insecure households in the Agriculture/Gathering and Agriculture/Casual Labour households is significantly higher than the other food security categories
- The proportion of Professional/Civil Servant and 'Other' livelihoods that are food secure is significantly higher than the other food security classes

## Difficulty Feeding Household

During the household interview, respondents were requested to indicate which months they had difficulties feeding their households. The responses provided some interesting results.

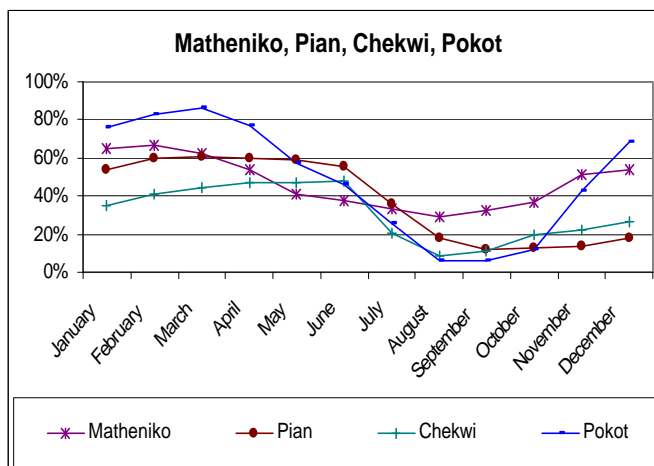
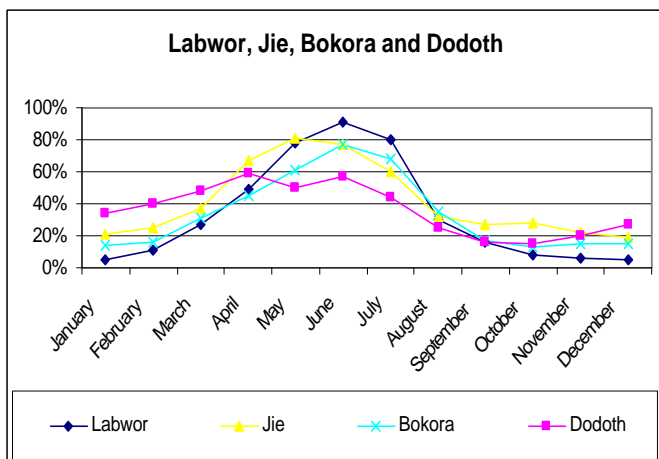
The graph to the right illustrates the months that households had difficulty acquiring food, by food security class. In general between the months of March and August between 30 and 70 percent of the household indicated difficulties feeding themselves. By



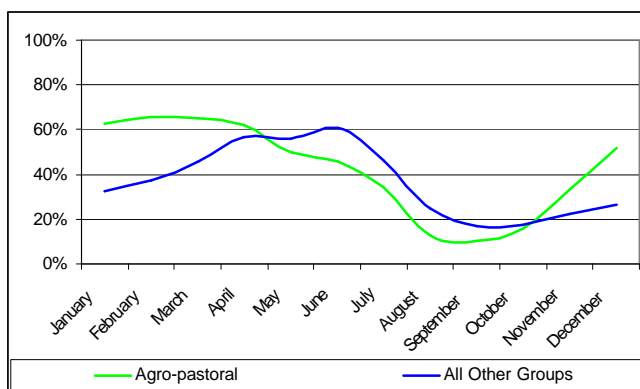
food security class, the food insecure and moderately food insecure households had a higher reported incidence and duration of difficulties feeding their households than the moderately food secure and food secure households.

By county, the two distinct patterns of difficulty with feeding their households emerge. In the Labwor, Jie and Bokora and Dodoth counties, the months with the highest incidence of difficulties is between April and August with the most acute in June. For the households in the counties of Matheniko, Pian, Chekwi and Pokot suggest a greater difficulty feeding their families between January and March.





Investigating the seasonal variations of when households have difficulty meeting their food needs, by the economic strategies classes suggests that there are two distinct groups: Agro-Pastoral and all other groups. The graph to the right is percentage of households reporting difficulty satisfying their feeding needs by month for these two groups. As the graph illustrates, the Agro-Pastoral households reported having the highest difficulty meeting their household food needs between January and April. Whereas for all the other livelihood groups the peak period when households have the most difficulty feeding their households are the months between April and July.



## External Shocks and Coping Strategies

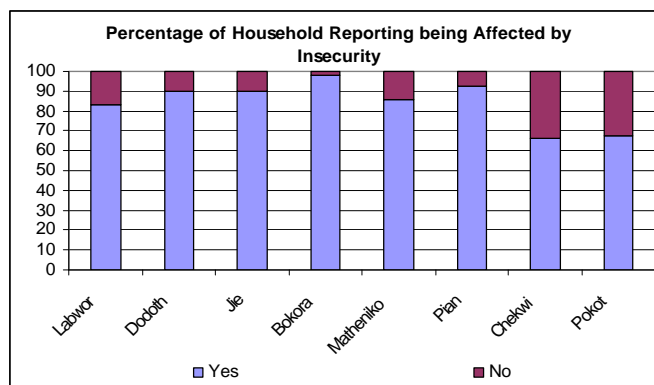
### Main Reported Shocks

In the questionnaire, households were asked to indicate if they had been negatively affected by a shock in the past 12-months. Based on the interviewee responses, 87% of households indicated being affected by a shock. On the 16 possible shocks, four shocks were identified as the more prominent: *Insecurity / conflict / raiding*, *Unusually high prices for food*, *Other*, and *Unusually high level of human disease or accident of HH member*. The table above indicates the number and percentage of households affected by one or more of the 4 key shocks over the previous 12-months.

Shock	N	Percent
Insecurity / conflict / raiding	1091	38
Unusually high prices for food	285	11
Other	264	10
Unusually high level of human disease or accident of HH member	243	9

## Insecurity

When specifically asked in the past 3 months if the village had been affected by civil insecurity, 83% of the households in the Karamoja region reported being affected by insecurity. However, as the graph to the right illustrates, a significantly lower proportion of households in the Pokot and Chekwi counties report being affected by insecurity.



The impact of the insecurity on the household varied. Of the households report being affected by insecurity, the table to the right indicates impact of the insecurity. As the table illustrates, the overwhelming impact of the insecurity was loss of cattle, and the death or injury of household/community members.

Impact of Insecurity	Percentage of Households
Some livestock was taken	63%
Some people were killed	48%
Some people were injured	36%
Crops were destroyed	7%
Some people were displaced	5%
There was sexual violence against women	2%
The whole village/camp was displaced	1%

The impact of the insecurity on household sense of security varies by county. However on average, 45% of the households in the Karamoja region indicated that their perception of the physical security in their community was *average with living sometimes in fear*. However, 31% of households indicated that the physical security of household members was *poor with households living sometimes in fear and experiencing some physical insecurity*. The table below is the percentage of household reporting their senses of physical security by county.

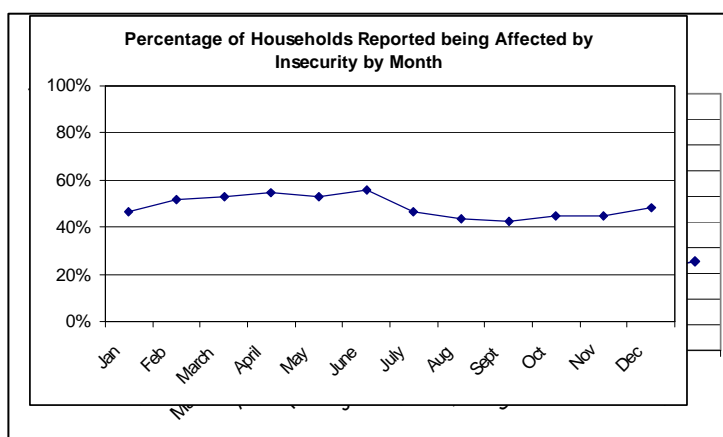
	Good	Average (sometimes in fear)	Poor (sometimes in fear and experience some PI)	Very poor (constantly in fear and experience PI)	Total
Labwor	1%	42%	48%	9%	100%
Dodoth	13%	53%	26%	6%	100%
Jie	11%	35%	30%	23%	100%
Bokora	0%	35%	38%	27%	100%
Matheniko	6%	38%	33%	20%	100%
Pian	6%	24%	50%	9%	100%
Chekwi	18%	43%	33%	7%	100%
Pokot	4%	66%	20%	7%	100%
<b>Total</b>	<b>9%</b>	<b>45%</b>	<b>31%</b>	<b>13%</b>	<b>100%</b>

Seasonally, there is little variation in reported incidence of being affected by insecurity. The graph to the right is the percentage of the households reported being affected by insecurity by month. As the graph to the right illustrates, throughout the year over half of the respondents in the Karamoja region indicated being affected by insecurity.

By food security class, there is no significant seasonal difference between the incidence of insecurity and the household food security class. This would suggest that insecurity is a covariant shock, but the perception of insecurity is much higher in the Jie, Bokora and Matheniko counties.

### High Prices

The second most reported shock by the households in the study was high prices for food. The graph to the right indicates the incidences of responses by household by month. As the graph illustrates, more household indicate high prices during the months of April, May June and July.



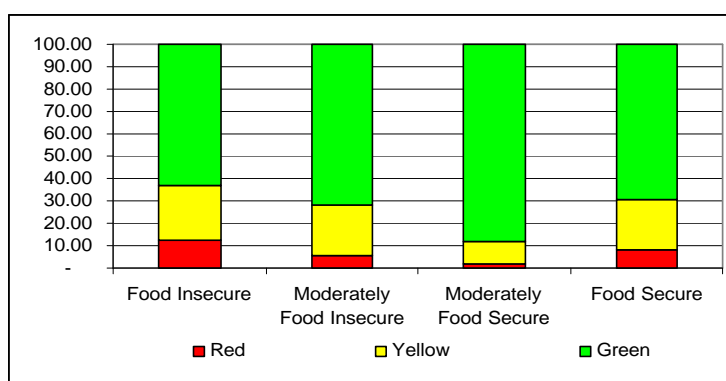
As with insecurity, the impact of high prices seems to be a covariant shock as there is no significant difference between the food security groups and counties either by the percentage of households reporting high prices as a shock or a greater proportion of household being affected by high prices throughout the year.

### Mid-Upper Arm Circumference (MUAC)

Included in the study was the measurement of women between 15 and 49 years and children between 6 and 59 months. Mid-Upper Arm Circumference had been endorsed by the World Health Organisation (WHO) as a suitable tool to diagnose severe acute undernutrition. The study was not designed to provide prevalence among the population for either age group. Moreover, the study only collected the reference colour and thus the incidences of colour status (Red, Yellow and Green) among the strata can be compared. However, some caution should be exercised when extrapolating these results to indicate the nutritional status of children in the Karamoja region or the 8 counties.

### Under 5 MUAC Results by Food Security Class

The graph to the right is the percentage of children, categorised by their household's food security status and their MUAC measure. Based on the results, the following statistically significant findings were identified.



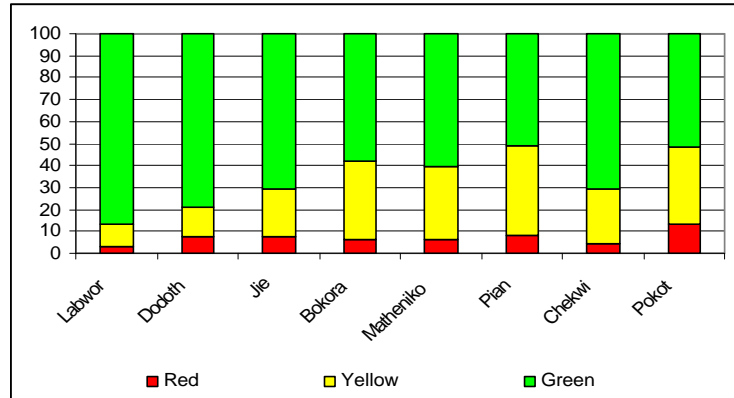
- The proportion of households with children with red MUAC scores is significantly higher in the food insecure class

- The percentage of households with yellow and green MUAC scores are significantly higher in the moderately food insecure class
- The proportion of children with green MUAC scores are significantly higher in the moderately food secure class.

### Under 5 MUAC Results by County

By county, the percentage of children by MUAC colour is presented in the graph to the right. The following statistically significant observations can be made

- The proportion of households with children with red MUAC scores is significantly higher in the Pokot county (n=417).
- The percentage of households with children with yellow MUAC scores is significantly higher in the Bokora (n=111), Matheniko (n=187), Pian (n=270) and Chekwi (n=253) counties
- The proportion of households with green MUAC scores is significantly higher in Labwor (n=269) and Dodoth (n=166) counties

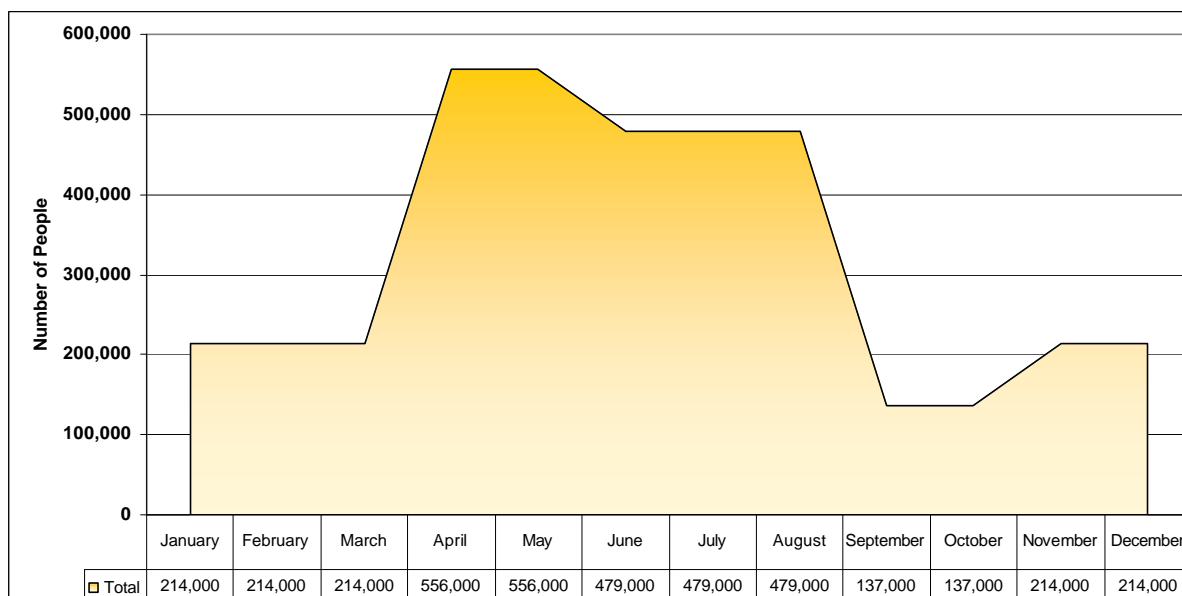


There is an apparent contradiction between either a statistically significant higher percentage of children in food secure households with red MUAC measures or Pokot county with the highest prevalence of food secure households and the highest incidence of red and yellow MUAC measures. However, as mentioned earlier in this report, 56% of the households in Pokot county indicated drinking water collected from an unsafe source as classified by UNICEF<sup>13</sup>. This would suggest that the higher incidence of red and yellow MUAC measures in Pokot county could be related more to issues of safe drinking water than food security.

### Summary of Findings

1) Based on the analysis of the dietary diversity and food frequency of the households in the Karamoja region coupled with the seasonal variation in the sources of food and the difficulties associated with the seasonal availability of food, it is estimated that at the peak of the lean season, over 555,500 individuals will be either chronically or transiently food insecure. At the end of the lean season, it is estimated that the transitory food insecure individuals will have improved their food security status to moderately food insecure. However, there are still 137,000 individuals who remain food insecure. The graph below presents the variations in the estimated number of food insecure individuals by month.

<sup>13</sup> safe drinking water is defined by households using improved drinking water sources which include: Household connection, Public standpipe, Protected dug well, Protected spring, Rainwater collection.



2) In terms of programming response, the evidence would suggest that both food and non-food assistance would be required at different points during the year to assist both the chronically and transitory food insecure individuals in the region.

3) For households where food assistance would be appropriate, a full ration is not likely to be required. Based on the consumption and food sources analysis, food insecure and moderately food insecure households have a very small gap in cereals and more pronounced gaps in pulses and oils. If food assistance was to be considered, a half ration of cereals, pluses and oils would be appropriate.

4) Food aid responses in the form of general food distribution may be the most appropriate response to address the immediate food shortages. However, the seasonal nature of the changes in household food security status suggests that any assistance should be timed to support households either during the acute period of food stress (food aid) or prior to the onset of lean period so as to provide households with means to rely on the market for assistance (cash). However, cash based programmes should be carefully monitored as previous periods of acute food stress have been accompanied by dramatic rises in prices (see FEWS, 2003 & 2005) and the increased availability of cash could compound this by causing spiralling inflation.

To reduce long term vulnerability to climatic change, livelihood asset building should become a priority. As illustrated in the economic activities perused by the households, the food insecure and moderately food insecure households rely on agriculture, resource gathering and agriculture related activities (casual labour) to acquire the resources to meet their food requirements. Food for asset programmes could consider the programming suggestions from the Horn of Africa Initiative to strengthen resilience of agriculture, and gathering related resources to drought.

Aside from assistance for agriculture, a key factor between the food security classes was the ability of households to consume animal products (milk and blood). The food insecure and moderately food insecure households indicated the lowest consumption of animal products. Returning to the household data, the principal reasons given by household for not consuming animal products were that the animals were sick and that there was not enough pasture. Improvements in veterinary services for livestock and development of sustainable pasture lands; would, through the improvement of the livestock, improve the food security status of the food insecure households.

5) Through this report, significant characteristics of the population by county, food security class were identified. If targeted food or cash interventions for the food insecure households are desired, the following guidance should be considered as these characteristics describe the moderately food insecure and food insecure households.

- Widowed households
- Households without cattle or goats and depend on agriculture, natural resource extraction or casual labour for their income

Overlaying the administrative divisions of the region (counties) with the livelihood groups and cross-tabulating these divisions by the food security status of the households allows for a geographical and livelihood targeting. **However, care needs to be taken when applying this analysis. The number of households used to calculate the prevalence of food insecure and moderately food insecure is too small to be extrapolated with any statistical confidence.** Yet, for indicative guidance and as geographical reference areas for the qualitative investigation the following results can be employed.

The results below identify the households in the 8 counties and livelihoods where the percentage of the food insecure or moderately food insecure households are greater than 10% of the total households sampled in the administrative strata (county). The distribution of the food security classes by economic activity class and county is presented in Annex 6 at the end of this report.

#### **Food Insecure**

Dodoch: Agriculture/Gathering  
Dodoch: Agriculture/Casual Labour  
Jie: Agriculture/Gathering  
Bokora: Agriculture/Casual Labour

#### **Moderately Food Insecure**

Matheniko: Gathering  
Matheniko: Agriculture/Gathering  
Matheniko: Casual Labour  
Pian: Agriculture/Casual Labour  
Pian: Agriculture/Gathering  
Dodoch: Agriculture/Gathering  
Dodoch: Agriculture/Casual Labour  
Bokora: Agriculture/Gathering  
Bokora: Gathering  
Jie: Agriculture/Gathering  
Chekwi: Agriculture/Casual Labour  
Chekwi: Other  
Chekwi: Agriculture/Gathering

6) The household data collected is extensive and further analysis could be undertaken to better understand how the different economic activities coalesce around food security, income activities and seasonal variations. To deepen the understanding on the quantitative finding a consultation with local experts in the Karamoja region would be beneficial so as to develop a stronger qualitative understanding of the context. Themes that have arisen from the analysis of the quantitative study are discussed more in the following section.

#### **Further Investigation**

Above it has been suggested that qualitative investigations should be undertaken to develop on the results of this report. The priority areas (combinations of county and livelihood described in point 5 above) could be used as geographical references for the qualitative work. Key themes to discuss are as follows

**Conflict and economic activities:** Insecurity, violence and banditry have been reported by the respondents in this study as a continuous threat. Previous ethnographies have described the use of cattle raiding as a means of re-stocking and managing the herd. Traditionally cattle raiding occurred at the end of the dry season so as to allow the clans to rebuild their herds. However, the secondary literature describes a present situation where social networks are breaking down, a proliferation of automatic weapons and ammunition, and a marked increase in inter-ethnic and intra-clan conflicts.

As indicated in the report both the household data and secondary literature suggest that households are engaged in an array of economic activities to develop a livelihood strategy. With the increase in conflict over resources scarcity and a high vulnerability to drought, how do communities anticipating coping?

**Methods to improve pasture land:** Conflict over resource competition seems to be a growing concern in the secondary literature. Livestock ownership and the consumption of animal products were significantly greater in both number and frequency for the food secure groups (i.e. as the food security of the household improves the number of animals and days animal products are consumed increases). However, there are both centrifugal and centripetal forces for households to access grazing lands. With recurring drought inevitable, what mechanisms do the households themselves see as a means to address these tensions?

**Gathering/Natural Resource Extraction & Environmental Degradation:** As indicated in the study, except for the agro-pastoral households, gathering or natural resource extraction is a key income and food source. What are the different resources that are extracted and are the seasonal periods when the gathering occurs? What is the impact of recurring drought on these resources? And what mechanisms or management systems do households in the Karamoja region see as a means of sustainability manage the exploitation of these natural resources?

### Annex 1: Sample for the Karamoja Region (8 Strata)

Sampled Parishes	No of HH	Village Name	Sub-county Name
Achangali	10	Gulopono	Lotukei
Angolebwal	10	Umlonge West	Morulem
Aremo	10	Agile	Morulem
Atunga	10	Otalabar West	Abim
Atunga	10	Oryotyene	Abim
Awach	10	Mamkai	Lotukei
Kanu	10	Geregere East	Abim
Katabok	10	Odollo West	Morulem
Katabok	10	Katabok West	Morulem
Kiru	10	Obangangeo North	Abim
Kiru	10	Oyaro Central	Abim
Loyoroit	10	Olem North	Alerek
Opopongo	10	Okwangaluk	Nyakwae
Oporoth	10	Barotuke	Lotukei
Oporoth	10	Barlyech	Lotukei
Oreta	10	Agule	Nyakwae
Orwamuge	10	Baratanga South	Lotukei
Otumpili	10	Loyoro Trading Centre	Alerek
Pupukamuya	10	Teramoth	Nyakwae
Wiawer	10	Abim west	Abim
Wiawer	10	Angwee	Abim
Wilela	10	Wilela Central	Alerek
Kaimese	10	Kailob	Lolelia
Kamacharikol	10	Kitum	Kathile
Kamion	10	Moruatap	Kalapata
Kampswahili	10	Kampswahili South	Kaabong Town Council
Kapedo	10	Loyoro	Kapedo
Kapilan Bar	10	Nakapilan-Bar West	Kaabong Town Council
Karenga	10	Kamukoi Central	Karenga
Kathile	10	Lois	Kathile
Lobongia	10	Kangios	Loyoro
Lodiko	10	Lodochia	Loyoro
Lokerui	10	Lokerui Centre	Kaabong Rural
Lokolia	10	Morulem	Kaabong Rural
Lokwakaramoe	10	Lokwakaramoe central	Kalapata
Lomeris /kabong	10	Kepak	Kaabong Rural
Losogolo	10	Nameri	Kaabong Rural
Loteteleit	10	Nakamurei	Lolelia
Loyoro Napore	10	Loyoro North	Karenga
Moroto	10	Lokicher	Kalapata
Morukori	10	Nariwogum	Kalapata
Narengepak	10	Narube	Kathile
Teuso. Lopedo	10	Teuso Lopedo	Loyoro
Kacheri	10	Morunyang	Kacheri
Kacheri	10	Namamoe	Kacheri
Kamoru	10	Kamoru North	Panyangara
Kamoru	10	Kamoru South	Panyangara
Kamoru	10	KamoruXXX	



Kanawat	10	Lokore East	Kotido TC
Kotido East	10	Acholi Quarter	Kotido TC
Lokadeli	10	Kapeelok	Rengen
Lokitelaebu	10	Nakoreto South	Kotido TC
Loletio	10	Kapadakook	Panyangara
Loletio	10	Kaputir	Panyangara
Lookorok	10	Oyapuwa	Nakapelimoru
Lopotha	10	Loputuk	Panyangara
Lopotha	10	Jimos	Panyangara
Lopuyo	10	Um-Um	Rengen
Losilang	10	Natedekitoe	Kotido TC
Losilang	10	Nariwo	Kotido TC
Nakwakwa	10	Lokodiokodoi	Rengen
Naponga	10	Nabwalin	Rengen
Narikapet	10	Police barracks	Kotido TC
Potongor /kadocha	10	Longelep	Nakapelimoru
Watakao	10	Lobongia	Nakapelimoru
Watakao	10	Nakiporet	Nakapelimoru
Akalale	10	Kalukmeri	Lokopo
Iriiri	10	IriiriXXX	
Kalokengel	10	Loroo	Lotome
Lokali	10	Logurukocho	Matany
Lokodumo	10	Napetet	Lopeei
Lokoreto	10	Nasike	Ngoleriet
Lokupoi	10	Kokorio	Matany
Lokuwas	10	Nathiloit	Matany
Lomuno	10	Nataparapalemu	Lotome
Lomuno	10	Lopuu	Lotome
Longalom	10	Longalom	Lokopo
Lorengecora	10	LorengecoraXXX	
Lorikitae	10	Lorikitae	Ngoleriet
Morulinga	10	Nathinyonoit	Matany
Moruongor	10	Naitakoswan	Lotome
Naitakwae	10	Loputuk	Ngoleriet
Nakwamoru	10	Lorunget	Lopeei
Nakwamoru	10	Loodoi	Lopeei
Nawaikorot	10	Naregae	Ngoleriet
Tepeth	10	TepethXXX	
Kakingol	10	Naro	Katikekile
Komaret	10	Arechek	Nadunget
Lia	10	Musas	Katikekile
Lobuneit	10	Lonyathan	Rupa
Loputuk	10	Lokwakwa	Nadunget
Loputuk		Looi	Nadunget
Lotirir	10	Namatwae	Nadunget
Loyaraboth	10	Katikekile	Katikekile
Loyaraboth	10	Lokiles	Katikekile
Mogoth	10	Kithop	Rupa
Mogoth	10	Natedeoi	Rupa
Nadunget	10	Nakapelimen	Nadunget
Naitakwae	10	Nagorit	Nadunget
Nakadeli	10	Kidepo	Rupa

Natumukale	10	Lopelipel	Katikekile
New Campswahili	10	Lopeduru	South Division
Old Campswahili	10	Regina mundi	South Division
Old Campswahili	10	Npayan	Nabiltuk
Rupa	10	Musupo	Rupa
Rupa	10	Losimit	Nabiltuk
Rupa	10	Kadilakeny	Rupa
Rupa	10	Lorukumo	Rupa
Tapac	10	Lonyilik	Katikekile
Tapac	10	Napak Ngakimul	Katikekile
Acegeretolim	10	Cucu	Nabilatuk
Acegeretolim	10	Arensesiep	Nabilatuk
Kalokwameri	10	Napanyan	Nabilatuk
Kalokwameri	10	Losimit	Nabilatuk
Kamaturu	10	Napong	Lorengedwat
Kosike	10	Nayona Ankelio	Nabilatuk
Kosike	10	Natengerebet	Nabilatuk
Lokaala	10	Nasinyonoit	Nabilatuk
Lorukumo	10	Domoye	Lolachat
Lotaruk	10	Lolachat Trading Centre	Lolachat
Lotaruk	10	Lokitela	Lolachat
Moruangibuin	10	Ariamaoi	Nabilatuk
Nakobekobe	10	Natapararengan	Nabilatuk
Nakobekobe	10	Nakobekobe	Nabilatuk
Nakuri	10	Lousugu	Lolachat
Narisae	10	Naoi	Lorengedwat
Nathinyonoit	10	Nawete	Lorengedwat
Natirae	10	Natirae	Lolachat
Natirae	10	Lokibui	Lolachat
Natirae	10	Nathinyonoit	Lolachat
Natirae	10	Lokirimo	Nabilatuk
Sakale	10	Lopeduru	Lolachat
Akuyam	10	Looi	Kakomongole
Kaiku	10	Naabore	Namalu
Katabok	20	KatabokXXX	
Kokuwaum	10	Namalu Trading Centre	Namalu
Kokuwaum	10	Nakayot	Namalu
Lobulio-lomuu	10	Lobuliolumuu	Namalu
Lokatapan	10	Nakiloro	Namalu
Lokatapan	10	Lowatachin	Namalu
Loperot/lokatapan	10	Lokoreto	Namalu
Lokatapan	10	Lopedot	Namalu
Loregae	10	Lomuchurus	Namalu
Loregae	10	Ajokokipi	Namalu
Loregae	10	Loreng	Namalu
Loregae	10	Nawalangor	Namalu
Moruita	10	Sukudil	Moruita
Moruita	10	Karinga	Moruita
Namorotot	10	Lorengedwat	Kakomongole
Napiananya	10	Naturum	Namalu
Napiananya	10	Nakale	Namalu
Okwapon	10	Lopeduru	Kakomongole

Tokora	10	Tokoro Trading centre	Kakomongole
Abiliep	10	Achukul	Loroo
Abiliep	10	Kapanyirit	Loroo
Achorichor	10	Babatian	Loroo
Amudat	10	Amudat Ward A	Amudat
Amudat	10	Napao	Amudat
Karita	10	Karita Centre	Karita
Karita	10	Abongai	Karita
Karita	10	Amuna	Karita
Karita	10	Namodo	Karita
Katabok	10	Dingdinga	Amudat
Katabok	10	Akurion	Amudat
Katabok	10	Motany	Amudat
Loburin	10	Lochengenge	Amudat
Lokales	20	Lwakai	Karita
Loroo	10	Loroo	Loroo
Loroo	10	Lowan	Loroo
Loroo	10	Kongorok	Loroo
Losidok	50	Cheptapoyo	Nakapiripirit

## Annex 2: Household Consumption Profiles

Consumption Class	Number of Sub-classes	Description	Pct of Sample
Very Good	4	Household consume cereals and animal products over 1.5 times a day over seven days; Oils almost each day and pulses 4 days out of seven	13%
Good	3	Household consume cereals over 1.5 times a day over seven days; Animal products every day out of seven; Oils and fats five days out of seven and pulses 3 days.	12%
Borderline	3	Household consume cereals over 1 time each of the seven previous days; animal products (2) and pulses (5) days out of seven; Oils and fats just over 1 day out of seven	15%
Poor	2	Household consume cereals five days out of seven and oils/fats (1.5 days), animal products (2.5 days) and pulses (1.7 days) out of seven	32%
Very Poor	2	Households consume cereals 5 days out of seven; pulses and proteins 2 days out of seven, and oils/fats one day out of seven	27%

### Annex 3: Household access to food

Access Class	Number of Sub-classes	Description	Pct of Sample
Dependent	3	On average over 55% of the households food basket comes based on the 7-day recalls comes from food aid, gifts and borrowing. Annually household in these classes indicated the highest percentage of food coming from food aid	29%
Mixed (Purchased/Own Production)	5	On average almost half of the household food basked came from their own production and a quarter from the market. Annually, household indicated that 50% of their food was from their own production and 25% from the market	42%
Purchased	4	In the previous 7 days, over one-third of the food came from the market and another third from their own production. Annually, 50% of the household's food came from the market.	28%
Mixed	2	For households in this class, in the previous 7 days, over 70% of the household's food came from hunting and gathering (41%) and the market (30%). Annually, the household's food comes from the market, own production and hunting and gathering.	1%

## Annex 4 : Principal Component Analysis: analyzing relationships among variables<sup>14</sup>

A domain of statistics called **factor** or **multivariate analysis** offers several techniques for multi-dimensional data analysis in order to capture the essence of the relationship among various indicators of food security<sup>15</sup>.

Principal Component Analysis (PCA) is one technique of multivariate analysis that applies to *continuous* variables. The objective of PCA is to identify and describe the underlying relationships amongst the variables by creating new indicators (called 'factors' or 'principal components') that capture the essence of the associations between variables.

Although a single PCA can be applied to food security indicators in general (covering food availability, access, utilization, and even risk/vulnerability), the objective of the WFP/VAM approach (identifying the optimal description of household food security status by examining three dimensions of food security: availability, access, and utilization) requires that each of these dimensions of food security (and even sub-categories within them, such as food consumption) are treated separately using PCA.

### Example of Principal Component Analysis (PCA)

Suppose you have several different variables relevant to food security. If you could simultaneously envision all variables, then there would be little need for **ordination methods**. However, with more than three dimensions, we usually need a little help. PCA takes the cloud of data points that depict the relationship between variables, and rotates it such that the maximum variability is visible. In this example, we take a simple set of 2-D data and apply PCA to determine the principal axes. Although the technique is used with many dimensions, 2 dimensional data makes it simpler to visualize. The Principal Component Analysis is performed on these data and the correlation matrix is calculated. The Principal Components are calculated from the correlation matrix. Principal Components Analysis chooses the first PCA axis as that line that goes through the **centroid**, but also minimizes the square of the distance of each point to that line. Graphically, the first principal component lies along the line of greatest variation and it is as close to all of the data as possible. The second PCA axis also must go through the centroid, and also goes through the maximum variation in the data, but with a certain constraint. It must be completely uncorrelated i.e. at right angles, or "**orthogonal**" to PCA axis 1

PCA is essentially a process of data reduction. A series of variables measuring a particular category of behavior (e.g. food consumption) are optimized into **principal components** capturing the essence of the relationships among initial variables of this behavior. Each principal component is thus a new indicator that represents the "best" summary of the linear relationship among the initial variables. PCA yields as many principal components as there are initial variables. However, the contribution of each principal component in explaining the total variance found amongst households will progressively decrease from the first principal component to the last. As a result, a limited set of principal components explain the majority of the matrix variability and principal components with little explanatory power can be removed from the analysis. The result is data reduction with relatively little loss of information.

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<sup>14</sup> The following information comes from the World Food Programme's VAM unit guidance on measuring food security. The entire document can be downloaded from <http://vam.wfp.org>

<sup>15</sup> 4 This type of analysis can be applied to all sorts of data (e.g. agriculture production, expenditures, nutrition, etc.) and to various aggregations or units of analysis (e.g. geographic area, households, individuals, etc.). For WFP/VAM, the primary unit of analysis used is households.

## **Annex 5: Cluster analysis: exploring the distribution of principal components among households**

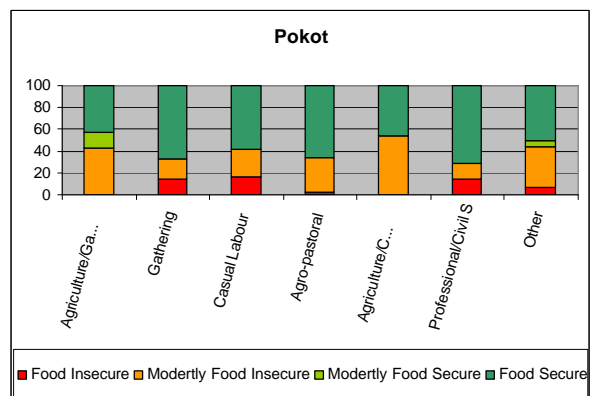
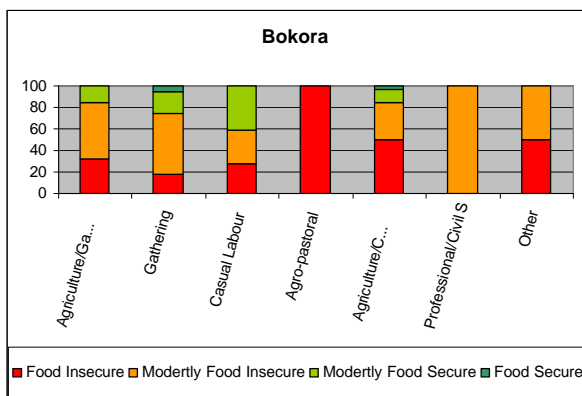
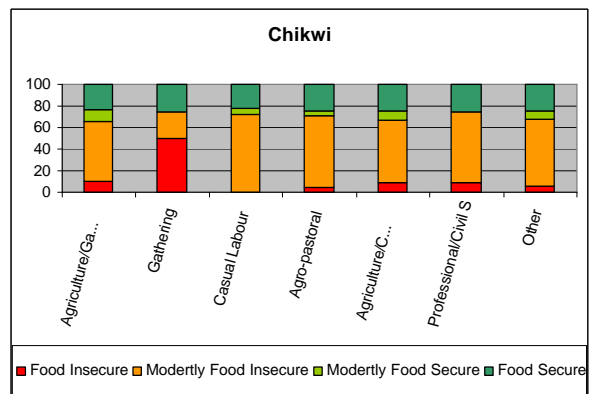
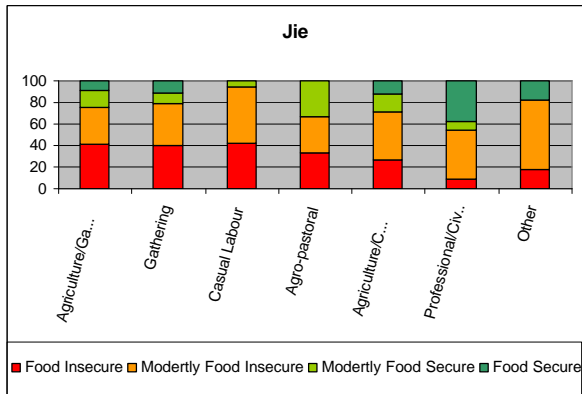
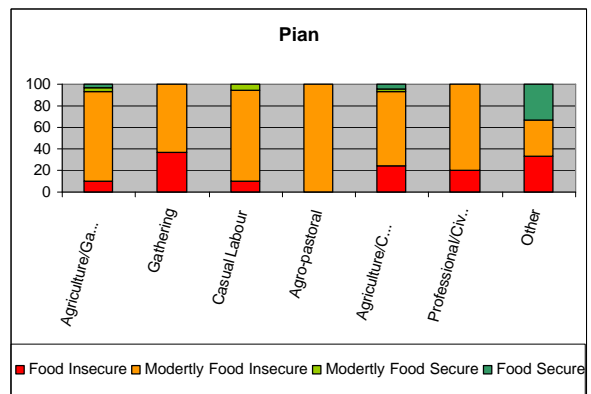
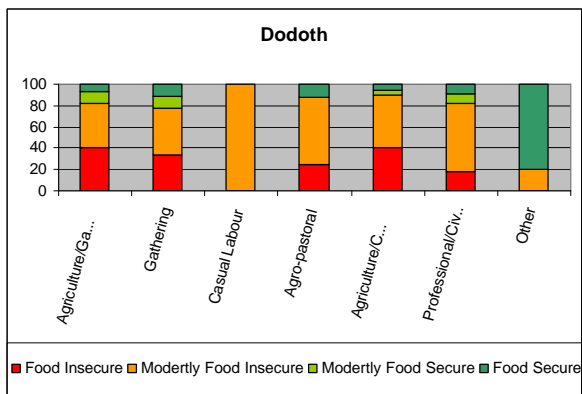
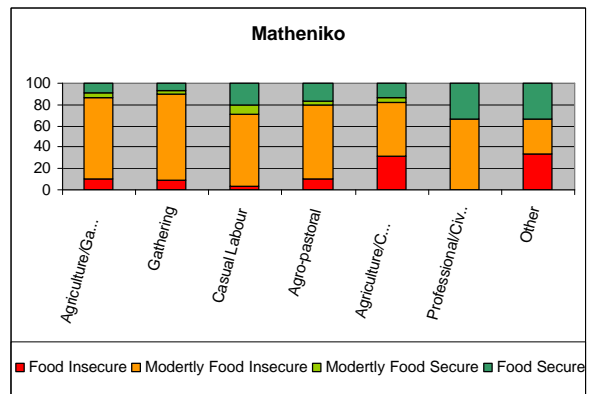
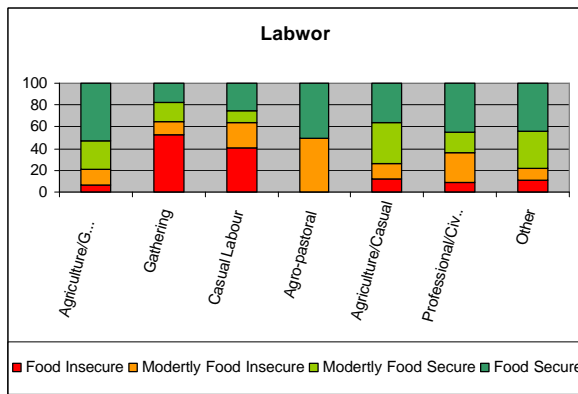
The second phase of the analysis consists of exploring the distribution of the principal components among the units of analysis. Although the units of analysis can be administrative or geographic regions, individuals, or households, for WFP/VAM the unit of analysis is usually households.

**Cluster analysis** provides a means of identifying and *clustering* households characterized by very similar patterns as described by the principal component indicators developed in the previous step. Clustering methods use the similarities or distances between objects (i.e. households) when forming the clusters. These similarities are a set of rules that serve as criteria for grouping or separating households and can be based on a single principle component or multiple principle components. Each principal component included in the cluster analysis represents a rule or condition for grouping households.

The most straightforward way of computing similarities between households in a multidimensional space (defined by principle components included in the analysis) is to compute **Euclidean distances**. If the space is two or three dimensional, the Euclidean distance is the actual geometric distance between households (as if measured with a ruler).

The highest similarity possible is *zero* distance between households (e.g. households are exactly the same). However, in practice clustering only those households that are exactly the same would result in a large number of clusters of very small size. It is much more useful to identify a limited number of clusters that contain households that are similar, but not exactly the same. To this end, cluster analyses (performed by statistical software) involve a series of iterations that creates mutually exclusive clusters by obtaining the lowest dispersion among households belonging to each cluster (e.g. grouping together households that are similar as indicated by the small geometric distance between them).

## Annex 6: Distribution of Food Security Classes by County and Livelihood





Strata		Number of Households			
Dcounty	Livelihood	Food Insecure	Moderately Food Insecure	Moderately Food Secure	Food Secure
Labwor	Agriculture/Gathering	4	8	15	30
Labwor	Gathering	9	2	3	3
Labwor	Casual Labour	18	10	5	11
Labwor	Agro-pastoral	0	1	0	1
Labwor	Agriculture/Casual Labour	6	7	19	18
Labwor	Professional/Civil Servant	2	6	4	10
Labwor	Other	1	1	3	4
Dodoch	Agriculture/Gathering	25	26	7	4
Dodoch	Gathering	3	4	1	1
Dodoch	Casual Labour	0	2	0	0
Dodoch	Agro-pastoral	4	10	0	2
Dodoch	Agriculture/Casual Labour	20	25	2	3
Dodoch	Professional/Civil Servant	2	7	1	1
Dodoch	Other	0	1	0	4
Jie	Agriculture/Gathering	32	27	12	7
Jie	Gathering	15	14	4	4
Jie	Casual Labour	8	10	1	0
Jie	Agro-pastoral	2	2	2	0
Jie	Agriculture/Casual Labour	11	19	7	5
Jie	Professional/Civil Servant	2	11	2	9
Jie	Other	2	7	0	2
Bokora	Agriculture/Gathering	14	23	7	0
Bokora	Gathering	7	23	8	2
Bokora	Casual Labour	6	7	9	0
Bokora	Agro-pastoral	1	0	0	0
Bokora	Agriculture/Casual Labour	16	11	4	1
Bokora	Professional/Civil Servant	0	4	0	0
Bokora	Other	3	3	0	0
Matheniko	Agriculture/Gathering	8	58	3	7
Matheniko	Gathering	4	38	2	3
Matheniko	Casual Labour	1	23	3	7
Matheniko	Agro-pastoral	3	20	1	5
Matheniko	Agriculture/Casual Labour	7	11	1	3
Matheniko	Professional/Civil Servant	0	4	0	2
Matheniko	Other	3	3	0	3
Pian	Agriculture/Gathering	3	24	1	1
Pian	Gathering	20	35	0	0
Pian	Casual Labour	2	16	1	0
Pian	Agro-pastoral	0	15	0	0
Pian	Agriculture/Casual Labour	15	43	1	3
Pian	Professional/Civil Servant	3	12	0	0
Pian	Other	2	2	0	2
Chekwi	Agriculture/Gathering	4	21	4	9
Chekwi	Gathering	2	1	0	1
Chekwi	Casual Labour	0	13	1	4
Chekwi	Agro-pastoral	1	16	1	6
Chekwi	Agriculture/Casual Labour	5	33	5	14
Chekwi	Professional/Civil Servant	1	8	0	3

Chekwi	Other	2	23	3	9
Pokot	Agriculture/Gathering	0	3	1	3
Pokot	Gathering	3	4	0	14
Pokot	Casual Labour	2	3	0	7
Pokot	Agro-pastoral	3	37	1	78
Pokot	Agriculture/Casual Labour	0	8	0	7
Pokot	Professional/Civil Servant	1	1	0	5
Pokot	Other	1	6	1	8