Food Security and Nutrition Assessment in Karamoja Region

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&

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1.0 EXECUTIVE SUMMARY

Key findings

Food Security and Livelihoods

1. Nearly half of all households (46%) in Karamoja were food insecure; with Kaabong (73%), Kotido (65.0%), Moroto (54%) and Napak (46%) above the regional average.
2. Kaabong district, in particular, depicts a marked decline across key food security & nutrition indicators for the period July to December 2015.
3. There was high reliance on food and livelihood coping strategies that were being adopted in Karamoja with only 23% of the households not adopting any coping.
4. There has been marked increase in household's dependency on borrowing – approximately 50% of the HHs reported borrowing money in the last 30 days prior to the survey. More pertinently, the primary reason for borrowing was to buy food; underlining the curtailed food access at present.
5. The increased dependency on borrowing combined with the increased reliance on food assistance is the main reason why key food security & nutrition indicators have not deteriorated to a greater extent for the period July – Dec 2015.
6. In all districts, except for Kaabong, higher proportions of female headed households have been enrolled in the Extremely Vulnerable Households (EVH) program as opposed to male headed households (20% against 10% at regional level).
7. Napak district has the highest prevalence of non-able bodied household heads.
8. In particular, on average the heads of food insecure households have 1.35 years of formal education against 2.76 of those in food secure households; emphasizing the critical impact of education on food security & nutrition.
9. Overall, the household dietary diversity has markedly worsened since June when the regional average for low HDDS was 40% against the current 50%.
10. Although the coping pattern was similar to findings in June 2015, a massive increase of rCSI was recorded in Kotido and Kaabong. The rCSI recorded in December is the highest ever recorded in the past 6 rounds, including records from FSNA conducted in the lean seasons. The reduced CSI index is a measure of the challenges faced by one household to access the minimum adequate consumption.
11. Overall, 55% of the households' expenditure is used for food purchase, with peaks in Kotido (71%) and Moroto (61%).

Nutrition and Sanitation

1. The prevalence of GAM was 12.4% for Karamoja and Napak district had the highest prevalence at critical levels (16.3%) while the rest were at serious levels (above 10%) except Abim (9.7%). The most affected age group were children 6-23 months where GAM prevalence was at critical level in all districts except Amudat (12.4%). The trend of GAM in Karamoja over the last five years depicts a worsening situation with Abim district deteriorating with over 3 percentage points.

2. Anemia prevalence was 57.2% in Karamoja. There was some small improvement in anemia prevalence among children 6-59 months from above 65% observed in previous studies. However, Nakapirpirit, Amudat, Kaabong and Napak still had anemia prevalence of 60% or above.
3. Infant and young child feeding practices were in a dire situation in all districts with only 2.7% of the children 6-23 months in Karamoja having the minimum acceptable diet, 5.6% having the minimum diet diversity and 34.3% meeting the minimum meal frequency.
4. Over 85% of the children in all districts were immunized; but only 23.6% were reported not to have suffered from any illness in the two weeks preceding the assessment with malaria and ARI being the most common; and 69.9% of the children slept under a bed net with Abim (92.3%) leading and Amudat (47.2%) at the bottom.
5. Latrine coverage has slightly improved to 30% from about 10% 5 years ago. However, Amudat, Napak, Moroto and Kotido still have over 80% of the households without any latrine.
6. Over 80% of the households in Karamoja were using water from safe sources mainly from boreholes. However, 20% of household in Amudat, 13.7% in Nakapiripirit and 11.3% in Kaabong reported to be using water from ponds, dams or rivers. The average quantity of water used was below the recommended 15 liters per person per day in all districts except Abim.
7. The factors that were independently associated with malnutrition included livestock ownership, household food security status, amount of water available for use at household level, household socio-economic status, anemia status of children, maternal underweight and a child being of male gender.

Recommendations

(For a more comprehensive list, please refer to Main Section of the FSNA)

1. Any scale up in interventions, especially those related to food access, be prioritized in the following districts, where possible – Kaabong, Kotido, Moroto & Napak.
2. Prioritize targeting to female headed households across Karamoja, particularly in Amudat, Kotido, Napak and Moroto.
3. Ensure that household size (4 or less and 7 or more) is used as a criterion for targeting of humanitarian assistance (see section 4.3). If necessary, in Napak prioritize targeting of small sized households (1-4 members), whereas in Moroto and Nakapiripirit larger-sized ones (7 or more members).
4. Continue providing assistance to EVHs.
5. Increase access to foods rich in micronutrients (fruits, meat, milk, vegetables) by:
    - Exploring opportunities for vouchers to increase access to fruits and vegetables in the markets
    - Exploring opportunities to liaise with P4P and post-harvest losses for vegetables/fruits
    - Scaling up projects leading to improved own production of vegetables and fruits (e.g. kitchen gardens)
    - Enhancing access to milk all year round through fodder cultivation

6. In order to address the poor infant and young child feeding, children 6-23 months should be specifically targeted with blanket supplementary feeding programs
7. Programs aimed at controlling anemia among children such as the micronutrient powders should be implemented to cover a wide coverage since anemia in children was associated with other nutritional outcomes
8. There should be for a restocking program in Karamoja for nutritional and livelihood purposes. Restocking should be done with adequate program for parasite and disease control for livestock.
9. Provision of safe water alone is not adequate for nutritional outcomes. Efforts should be done to increase the quantity of water for use at household level.
10. Maternal health and nutrition status correlated well with nutrition outcomes of children. Programs targeting to improve the nutrition status of mothers should be extensively implemented.
11. Programs aimed at improving household socioeconomic status and also possibly targeting social ills like alcoholism should be implemented. Anecdotal information from supervisors indicated a lot of alcoholism amongst mothers, which might hinder or even reverse all the gains made over the past decade.

2.0 METHODS

This was a population based and cross-sectional assessment across all the seven districts Karamoja, namely Abim, Amudat, Kaabong, Kotido, Moroto, Nakapiripirit and Napak. Data were collected simultaneously from all the seven districts in December 2015.

2.1 Target population

The targets were representative households in each of the seven districts regardless of who occupies them. Children between the ages of 0 and 59 months and their mothers or caregivers if they existed in the sampled households were assessed.

2.2 Sample size and sampling procedure

The target was to detect a minimum variation of 5% of Global Acute Malnutrition (GAM) with 85% precision. We aimed to sample a total of 480 representative households per district using a two-stage 30x16 cluster randomization design. As in previous assessments, district representative two-stage probability samples were obtained. At the first stage clusters were selected using parish level population from the 2014 National Population and Housing Census. At the second stage, national systematic samples were drawn from village lists of households. A total of 3360 households were therefore targeted for sampling in all the seven districts combined.

2.3 Data collection and variable measurements

Open Data Kit (ODK) electronic platform using smart phones was used to collect quantitative data. The electronic tool permitted use of data checks and skip patterns to minimize spurious entries by data collectors. Key variables that are prone to error like age were carefully assessed based on child health cards. In the absence of cards care was taken to discuss with the mother/caregiver using a calendar of local events.

Data were collected on the following variables: age; sex; weight; height; bilateral pedal oedema; infant feeding practices; morbidity for common diseases and conditions; food consumption diversity; food security and livelihood coping mechanisms; ownership of household assets, livestock and land; income sources and expenditures; education status of mother and household head; household population, fertility and polygamy status of the household; water and sanitation; immunization/supplementation and deworming; and mortality.

2.3.1 Age and sex

Exact age of the child was reported in months using information on child health cards. Where these did not exist, age (month and year of birth) was determined using a local calendar of events. An age chart (Appendix) was used to read off age in months if date of birth (month and year) was known. Sex was assessed based on mother's reports and/or observation as appropriate.

2.3.2 Weight

Any child falling within the age bracket of 0 to 59 months found in the household sampled was weighed. The weight was recorded to the nearest 0.1kg accuracy on the conventional scales. Even those with oedema were weighed and the Emergency Nutrition Assessment (ENA) for SMART software was used for data analysis and accounted for such.

2.3.3 Height

Children above the age of two years were measured standing upright whilst those below 2 years were measured lying down to nearest 0.1cm. Where age was difficult to determine, those measuring less than 85cm were generally measured lying down and those taller than 85cm measured standing upright. ***Note****: Only data of children measuring between 65cm and 110cm were used for analysis where age was not known.*

2.3.4 Bilateral oedema

Oedema was assessed by exerting medium thumb pressure on the upper side of each foot for three seconds. Oedema was recorded as present if a skin depression remained on both feet after pressure was released.

2.3.5 BMI and MUAC

Mothers/caregivers 15-49 years of age were assessed for weight and height to calculate their Body Mass Index (BMI). Children 6-59 months and mothers were also assessed for Mid-Upper Arm Circumference (MUAC) using tapes to nearing 0.1 cm.

2.3.6 Morbidity and care seeking

Morbidity from common childhood illness like acute respiratory infections (ARI), fever and diarrhea were assessed over a two-week recall period. In addition, coverage of the essential primary care services such as immunization, vitamin supplementation and deworming among infants and young children, and environmental and domestic sanitation factors such as latrine and safe water coverage were assessed. WHO definitions for diseases and conditions were used.

2.3.7 Infant feeding practices

Breastfeeding and complementary feeding practices were assessed for each child. Assessment covered exclusive breast-feeding rates (using 24-hour recall), quality and quantity of complementary feeding practices. Dietary frequency and diversity were assessed to establish adequacy of complementary feeding among children 6-23 months.

2.3.8 Household food security and livelihood mechanism

Standard and valid questions from UNICEF/UNWFP were used to assess household food security and livelihood mechanisms. The types of food and the number of times they are eaten in the past 7 days, any foods bought by the household and the income sources will be assessed. Data were also collected on household agricultural food production such as maize, millet, sorghum, potato, cassava, banana, etc. Household socioeconomic status was assessed by collecting information on household assets (bicycle, radio, hoe/axe, mobile phone, motorcycle/car, shoes, clothes, television, etc); and livestock production (cow, goat, sheep, chicken, and pig).

2.3.9 Water and sanitation

Household source of water, amount of water used, and latrine coverage were assessed.

2.3.10 Immunization/Supplementation and de-worming

Vitamin A supplementation and de-worming in the last 6 months, and DPT3 and Measles vaccination coverage was ascertained from Child health cards and/or mothers recall.

2.3.11 Assessment of anemia status

Blood samples were collected through a finger prick from a sub-sample of children and mothers/caregivers to determine the hemoglobin level. Hemocue analyzer machines 301 were used for the assessment.

2.4 Data analysis and interpretation of findings

The unit of analysis was the household for the food security data. All children in the household were assessed but only children 6-59 months were included in the nutrition analysis as per national and international guidelines. Source electronic data in excel format was exported to ENA software to transform anthropometric data into z-scores and to assess quality of assessments based on the ENA plausibility check. All the data was eventually exported to SPSS the main software that was used for data analysis. Nutrition and IYCF data were analyzed based on WHO guidelines while Food Security data were analyzed based on the WFP Food Security and Vulnerability Assessment guidelines. Where appropriate corporate syntaxes were run to derive variables and to analyze certain outcomes. As much as possible data were disaggregated by sex and age. Current findings were compared to previous surveys to establish any positive or negative changes.

2.4.1 Analysis of anthropometric data

Anthropometric indices were presented based on the WHO standard. Indices were expressed in Z-scores.

Global acute malnutrition (GAM)

Was estimated using Weight-for-Height index and oedema. Children presenting with a weight for height index less than –2 z scores with/without oedema were considered to have GAM.

Moderate Acute Malnutrition (MAM) and Severe Acute Malnutrition (SAM):

These were estimated using Weight-for-Height index. Children presenting less than –2 z-scores but greater than –3 z-scores were regarded as moderately malnourished while those with less than –3 z-scores and/or presence of bilateral oedema were regarded as severely malnourished. Likewise, underweight (weight-for-age) and stunting (height-for-age) were analysed.

MUAC and BMI

Were interpreted based on WHO criteria.

2.4.2 Anemia

Was interpreted based on the WHO classification.

2.4.3 Analysis of morbidity and other health and sanitation data

Prevalence of diseases and conditions occurring two weeks prior the survey, latrine and coverage of health indicators were reported using descriptive statistics.

2.4.4 Analysis of food security data

Food security data was systematically analyzed. First, a household wealth index was generated from ownership of household assets using principal components analysis. The assets used included: ownership of bed, table, chair, mattress, radio, cellphone, bicycle, motorcycle, water-tank, ox-plough and food store. The wealth index was derived from the first principal component, which was then ranked and categorized into quintiles. Second, household food consumption scores were generated based on 8 food groups derived from

the 16 food columns in the questionnaire using the UNWFP– weighted scores of certain food groups. Third, other facet of food security such as food sources, expenditures on food and coping mechanisms were analyzed accordingly using syntaxes provided directly from WFP.

2.5 Ethical considerations

Permission to collect data was sought from local authorities with the DHO's involvement. The purpose of the survey was clearly explained. Protocol was observed while entering any community. A written consent was sought from survey participant before any interview and confidentiality ensured.

3.0 HOUSEHOLD CHARACTERISTICS

3.1 Female headed households

Around one in five households across Karamoja were female headed, with the largest proportion observed in Kotido and Moroto districts **(Figure 1)**. As shown in the dedicated sections of this report, female-headed households are significantly more exposed to inadequate food consumption than their homologue males and have children who are more likely to be chronically or acutely malnourished. In all districts, except for Kaabong, higher proportions of female-headed households have been enrolled on the Extremely Vulnerable Households (EVH) program as opposed to male-headed households (19.7% against 9.9% at regional level). Around 75% of households with EVH cards were headed by a woman.

The highest proportion of EVH households was in Kaabong (20%) followed by Nakapiripirit (14%). Kaabong is also the region with highest proportion of households enrolled in NUSAF programmes.

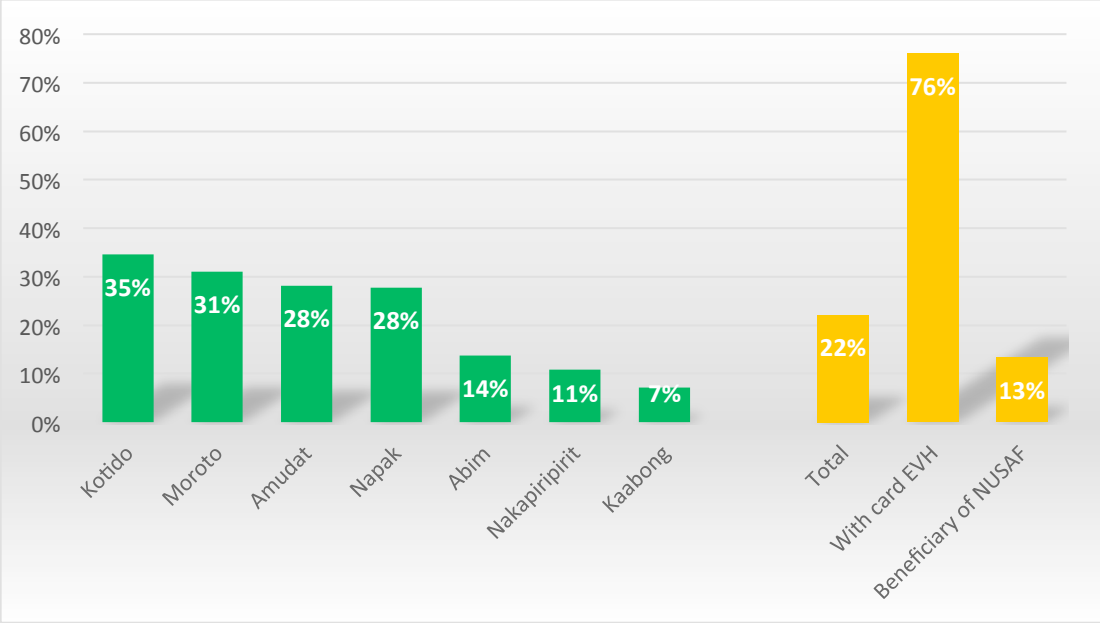


Figure 1: Female headed households by district and by support programme

3.2 Physical conditions of the household head

The wide majority of household heads in Karamoja are able bodied and therefore capable to cater for their families. However, 6% of the household heads interviewed were disabled and 3% were chronically ill.

The proportion of disabled or chronically ill female-headed households (14%) was double the rate in male-headed households (7%). This constraint has an impact on access to food (52% of households with disabled/chronically ill head against 41% of normally able). A significant correlation was also found with the other food security and malnutrition outcome indicators.

As in the previous rounds, Napak district has the highest prevalence of non-able bodied household heads. In all districts households headed by the chronically ill or the disabled were more likely to have been participating in the EVH program **(Figure 2)**. Given the implications on the household's livelihood opportunities of the head's status, more households of the disabled and chronically ill ought to be targeted in future.

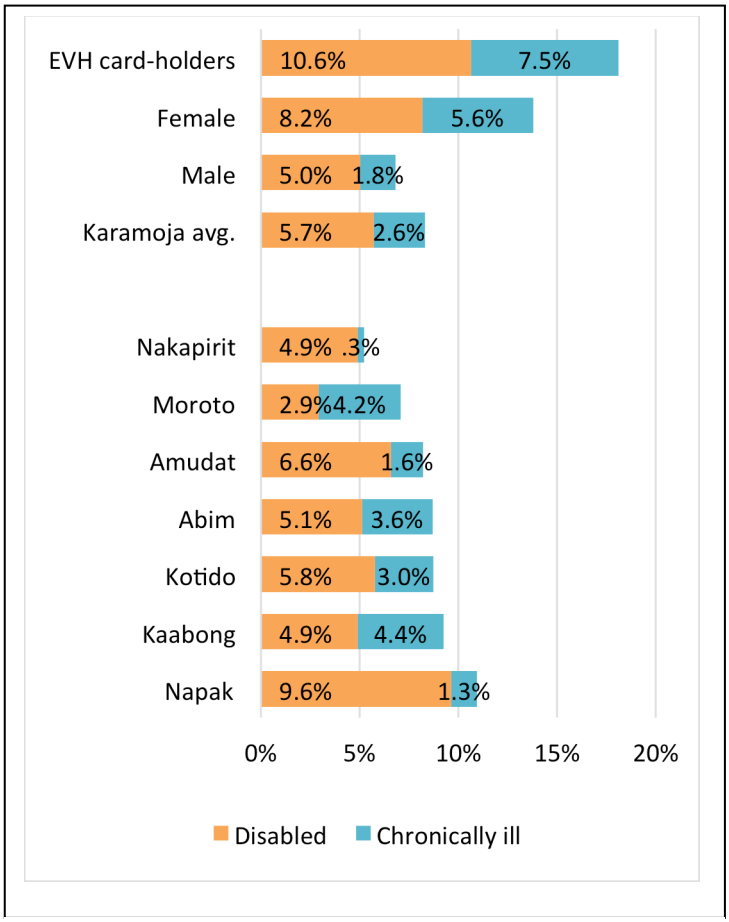


Figure 2: Status of household head by district, sex and EVH card ownership

3.3. Other demographic characteristics

Average HH size: The mean household size for Karamoja was 5.78 persons and the median was 5.0 persons. Over the past five years, the average household population has slowly increased in some districts such as Kaabong from an average of five to six persons. The highest average size was recorded in Kaabong (6.72 members), the lowest in Napak (5.09).

Age of head of household: Households interviewed had relatively young head of households (38 years).

Marital status: Almost 45% of households in Karamoja live in polygamous relationships. Nakapiripirit (60.0%) and Abim (23.8%) districts were having the largest and least proportions of polygamous households, respectively. A social set of polygamy increases vulnerability of children due to the associated poor standards of living.

Education of head of household: Over 72% of household heads across Karamoja have never attended school, with Kotido, Napak and Amudat scoring the worst records in this regard as per the previous rounds. On average, each of the interviewed household's head had completed 2.15 years of formal education. Formal education varies dramatically between

women (0.98 years) and men (2.48 years), and has a very relevant impact on all the main indicators of food security and nutrition. In particular, on average the heads of food insecure households have 1.35 years of formal education against 2.76 of those in food secure households. Similar differences are observed for indicators of malnutrition.

3.4. Participation in development programmes

Similarly to the results of June 2015, around 56% of households reported having participated in at least one development programme conducted in the region by the Government or development partners. Around 17% of households had also access to a second programme, and 4% to a third. The district with the highest proportion of households benefitting from external programmes was Kaabong (70%) in line with results from the previous round.

No significant difference between male and female-headed household was recorded when it comes to benefitting of development programmes. Overall, there was a direct correlation between the participation to development programmes and probability to have access to adequate food consumption, both in terms of frequency and dietary diversity.

As raised in the previous round, the high proportion of households participating in two or more programmes requires stronger coordination among M&E units of the various organizations to maximize the coverage of vulnerable population.

3.4.1. Participation in EVH and NUSAF programs

Approximately 12% of the households belonged to the EVH program in Karamoja, and 80% of these confirmed status with cards **(Table 1)**. The highest proportion of EVH households was in Kaabong (20%) followed by Nakapiripirit (14%).

Around 17% of households interviewed were beneficiaries of the NUSAF programmes, with the highest proportion also observed in Kaabong district (34%) followed by Napak (28%). A significant correlation was found between food enrolment in the NUSAF programmes and food insecurity (p=0.000) and to a lesser extent with chronic malnutrition (p=0.063).

Table 1: Proportion of EVH households by district and sex of household head

District	Sex household head	EVH status (With card)	
		No	Yes
Abim	Male (N=414)	93.70%	6.30%
	Female (N=66)	74.20%	25.80%
	Total	***91.00%***	***9.00%***
Amudat	Male (N=366)	93.40%	6.60%
	Female (N=144)	77.10%	22.90%
	Total	***88.80%***	***11.20%***
Kaabong	Male (N=461)	80.00%	20.00%
	Female (N=35)	80.00%	20.00%
	Total	***80.00%***	***20.00%***
Kotido	Male (N=335)	91.30%	8.70%
	Female (N=177)	87.60%	12.40%
	Total	***90.00%***	***10.00%***
Moroto	Male (N=376)	88.00%	12.00%
	Female (N=170)	83.50%	16.50%
	Total	***86.60%***	***13.40%***
Nakapirit	Male (N=445)	89.20%	10.80%
	Female (N=54)	59.30%	40.70%
	Total	***86.00%***	***14.00%***
Napak	Male (N=363)	97.80%	2.20%
	Female (N=139)	81.30%	18.70%
	Total	***93.20%***	***6.80%***
Total	Male (N=2760)	90.10%	9.90%
	Female (N=785)	80.30%	19.70%
	Karamoja	***88.00%***	***12.00%***

4.0. OVERVIEW OF FOOD INSECURITY IN KARAMOJA

4.1. The food security situation

The food security analysis was based on a combination of indicators to form the food security classification indicator *referred to as the* Consolidated Approach for Reporting Indicators of Food Security (*CARI*[1]). The CARI is a food security console that combines a suite of food security indicators into a summary indicator – called the Food Security Index (FSI) - which represents the population's *overall food security status* **(Table 2).** The console itself serves to provide a clear snapshot of the rates of the different types of a population's food insecurity at quick glance.

Table 2: Food consumption Score by district, sex of household head and EVH card

Domain		Indicators	Food secure (1)	Marginally food secure (2)	Moderately food insecure (3)	Severely food insecure (4)
Current status	Food consumption	Food consumption score	57.1%		30.3%	12.6%
Coping capacity	Economic vulnerability	Food expenditure share	43.9%	15.9%	9.9%	30.3%
	Asset depletion	Livelihood coping strategies category	23.1%	13.1%	12.5%	51.2%
			Food secure (1)	**Marginally food secure (2)**	**Moderately food insecure (3)**	**Severely food insecure (4)**
Food insecurity Index (FSI)			**13.3%**	**40.8%**	**31.8%**	**14.1%**

Almost half (46%) of the households in Karamoja were food insecure, of which 32% moderately and 14% severely food insecure. This implies that, an estimated current population of around half a million people are food insecure with 14% severely food insecure implying limited or no access to sufficient, nutritious food, and were eating less than the minimum required to live a healthy life. A strong correlation between food security and malnutrition was found (see below – Relationship between food security and malnutrition).

4.2. Where are the food insecure?

The districts of Kaabong, Kotido and Moroto had a much higher proportion of food insecure population than the rest of the region. In particular, in Kaabong almost three out of four households were food insecure and 27% were severely food insecure **(Figure 3)**.

[1] The CARI assesses two dimensions of food security:1) The current status of households (assessed based on food consumption patterns); and 2) The future coping capacity of households (assessed based on economic vulnerability and asset depletion). These two dimensions are assessed using a selection from three indicators: the food expenditure share, livelihood coping and food consumption.

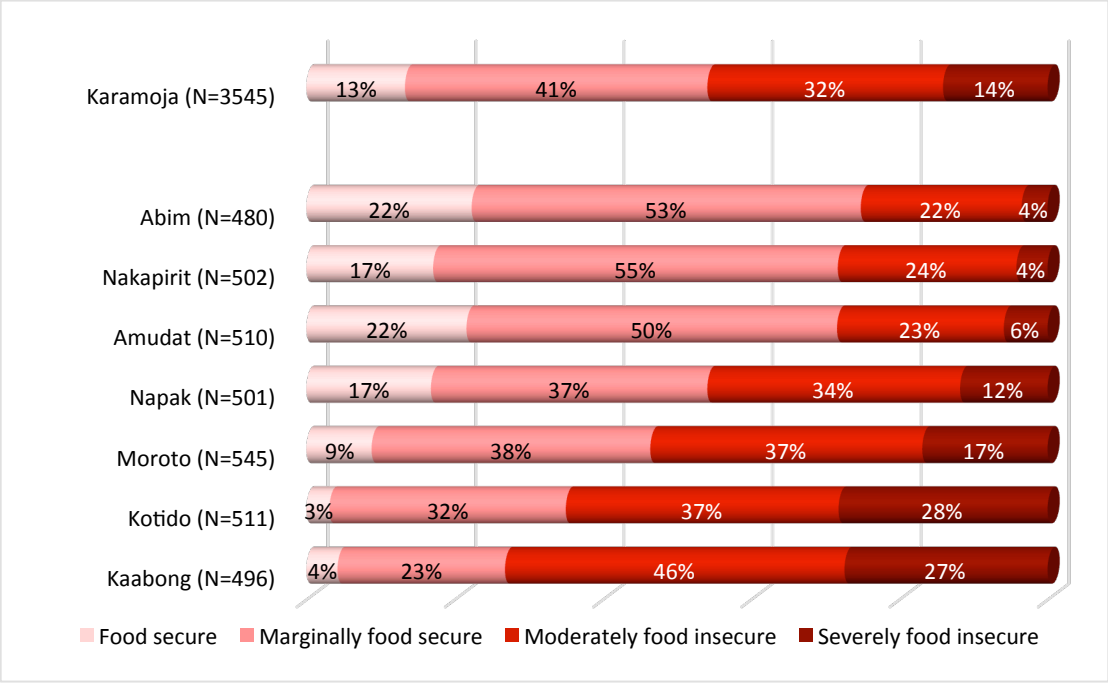


Figure 3: Summary of the food security situation in Karamoja by district

4.3. Who are the food insecure?

Female-headed households were more exposed to food insecurity (56%) than the male (43%). In particular, 23% of households led by a woman are severely food insecure against 'only' 12% of male-headed households. A more pronounced correlation was found in Amudat, Kotido and Napak.

Smaller households (1 to 4 members) or big ones (7 or more) were slightly more exposed to food insecurity than medium range households (5-6 members). In particular, a significant correlation with food insecurity was found for households with 4 or less members in Napak, and for households with 7 or more in Moroto and Nakapiripirit.

However, the most relevant demographic drivers to food insecurity alongside the sex of household head were the presence of a disabled or chronically ill head; the level of education attained by the head of household (especially in Moroto, Kotido and Napak), and the age as older heads (>65 years) were significantly more exposed to food insecurity.

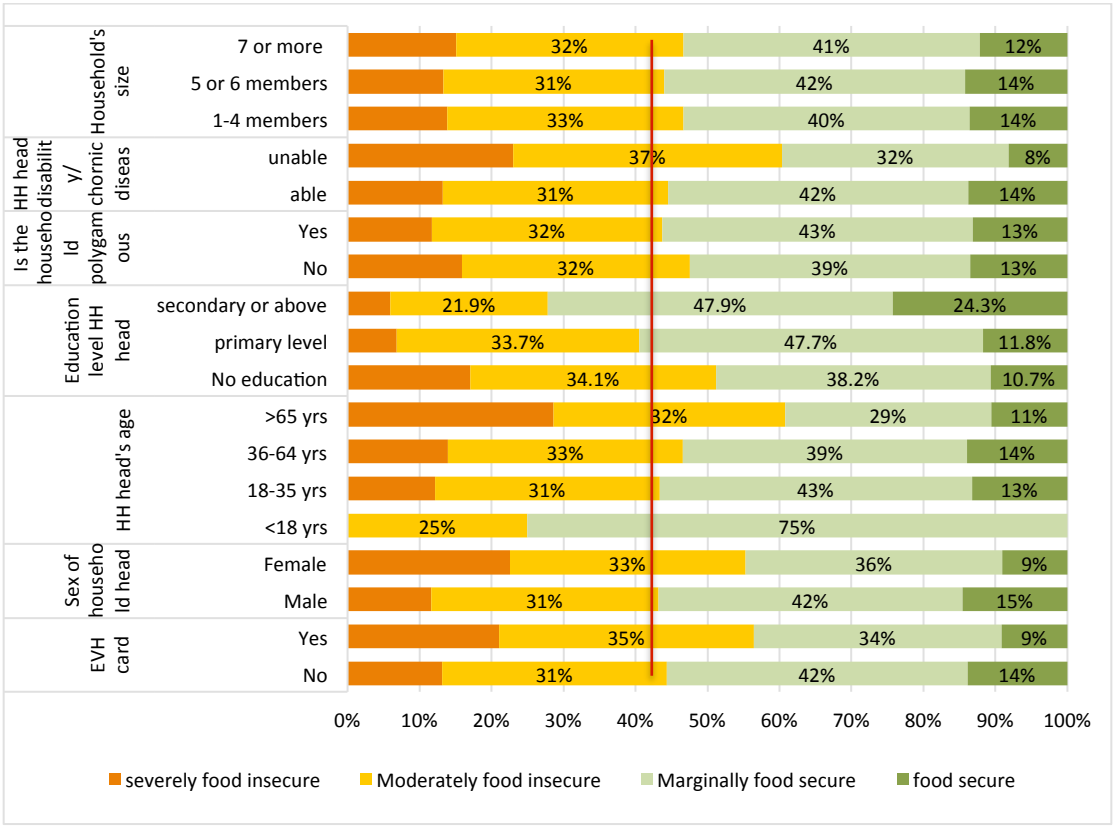


Figure 4: Food security status by characteristics of the head of household

4.4. Food Consumption Patterns

4.4.1. Household food consumption

Around 43% of the population in Karamoja did not have access to acceptable food consumption **(Table 3)**. The improvements in this post-harvest season were not remarkable (+7% household with adequate food consumption) as opposed to the lean season. Female-headed households were more likely to have inadequate consumption (50%) than males (41%). EVH card-holders were also more likely to have inadequate food consumption (52%) than other households (42%).

At district level, over 75% of the households in Kaabong were experiencing poor food consumption, followed by Kotido (58%), Napak (47%) and Moroto (45%).

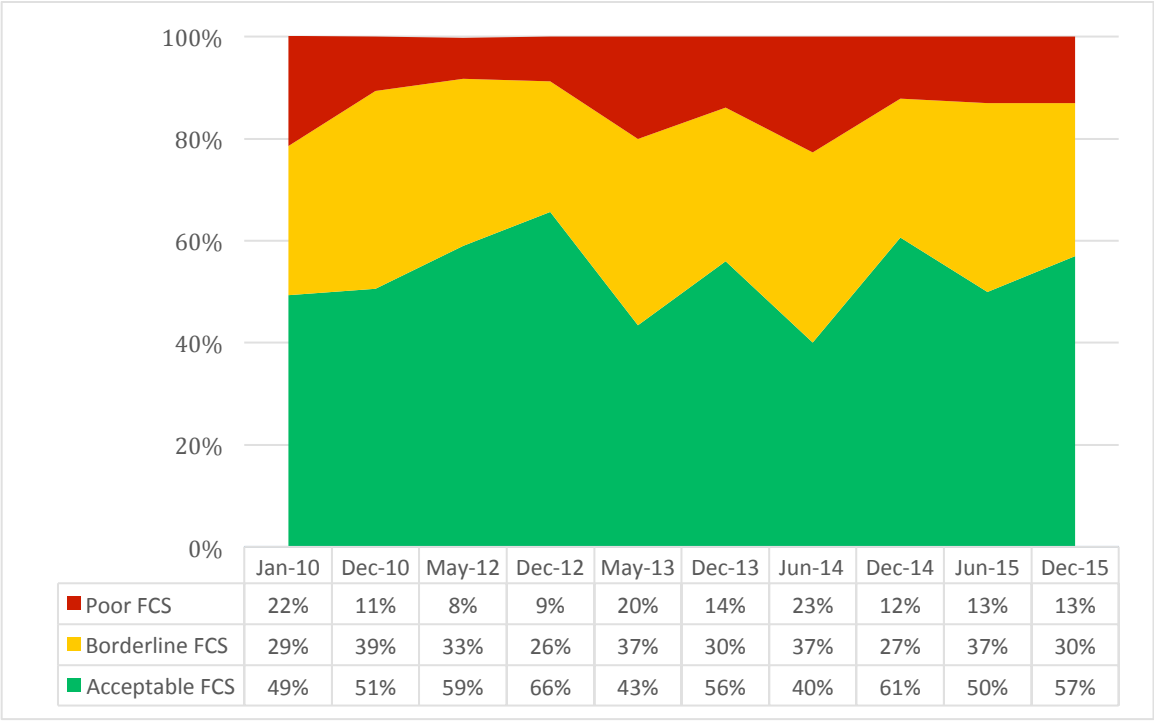
As in June 2015, Amudat remained the district with the highest proportion of population with acceptable food consumption (over 80%), which was related to the high ownership of livestock hence enhancing access to meat and dairy products.

Table 3: Food consumption Score by district, sex of household head and EVH card

		Food Consumption Score		
		Poor	*Borderline*	*Acceptable*
District	Abim	2.1%	27.3%	70.6%
	Amudat	6.3%	12.0%	81.8%
	Kaabong	28.6%	48.2%	23.2%
	Kotido	20.0%	37.8%	42.3%
	Moroto	11.4%	31.7%	56.9%
	Nakapirit	6.2%	21.3%	72.5%
	Napak	13.4%	33.9%	52.7%
Karamoja avg.		**12.6%**	**30.3%**	**57.1%**
Female headed household		17.3%	33.1%	49.6%
EVH card (confirmed)		18.5%	33.5%	48.0%

Alongside the key socio-demographic elements described on the food security session, the poor food consumption was related to a series of factors including the ownership of livestock, the adoption of livelihood coping strategies, and the wealth level of the family due to the high dependence on markets for the food supply in a regime of high food prices.

The inadequate food consumption remained steady at the levels of December 2014 and marginally decreased from the values of June 2015. A significant increase in inadequate food consumption was however observed in Kaabong since June (+30%). Kotido and Amudat remained on similar levels of inadequate food consumption as opposed to June 2015. The impact of food assistance and indeed the scale up of assistance by Government of Uganda, UN organizations and I/NGOs since September 2015 across Karamoja region was obviously a key factor here.



	Jan-10	Dec-10	May-12	Dec-12	May-13	Dec-13	Jun-14	Dec-14	Jun-15	Dec-15
Poor FCS	22%	11%	8%	9%	20%	14%	23%	12%	13%	13%
Borderline FCS	29%	39%	33%	26%	37%	30%	37%	27%	37%	30%
Acceptable FCS	49%	51%	59%	66%	43%	56%	40%	61%	50%	57%

Figure 5: Trends of the Food consumption scores (January 2010-Dec 2015)

4.4.2. Household dietary diversity

One in two households had low dietary diversity (less than 5 food group consumed in the week prior to the interview), with again peak levels in Kaabong (70%) and Kotido (68%). The population of Karamoja ate mainly cereals and tubers (six days a week) and vegetables (5 days) **(Table 4)**. As expected, the consumption of milk was really low in all districts except in Amudat (where however the dietary diversification remains low for over 46% of households). Consumption of pulses was low in pastoral districts such as Kaabong and Amudat. Fruits consumption was almost nonexistent in the whole region.

The low dietary diversity observed in Abim (55%), when compared to the relatively high food consumption score, suggests that the population has limited access to highly nutritious food, namely meat, fruits and milk.

Table 4: Weekly consumption of food groups (in average number of days)

District	Starch	Pulse	Meats	Veg.	Oil	Fruit	Sugar	Milk	Condiment
Abim	6.49	5.56	.75	3.97	3.35	.82	2.40	.45	3.00
Amudat	6.13	1.54	1.43	4.54	3.72	.26	3.86	5.08	3.01
Kaabong	5.59	2.14	.65	4.63	1.93	.16	.61	.64	3.76
Kotido	5.79	3.32	1.44	4.48	1.78	.11	.29	.30	4.02
Moroto	6.00	3.73	1.47	5.01	3.16	.35	1.09	1.41	1.24
Nakapirit	6.09	3.04	1.54	5.89	3.97	.73	1.59	2.77	2.21
Napak	6.34	3.05	1.29	5.32	2.49	.20	.52	1.22	4.99
Karamoja	***6.06***	***3.19***	***1.23***	***4.84***	***2.91***	***.37***	***1.47***	***1.71***	***3.15***

In Kaabong, the diet was based on starch and vegetables. Overall, two thirds of households in Kaabong never ate iron-rich foods. Also, one in five households never ate protein-rich foods and 22% Vit-A rich foods. Similar consumption patterns were observed in Moroto (47% of households did not eat iron rich foods) and Kotido, where the highest proportion of population never consuming fruits or vegetables (19%) was observed, alongside high levels of the one not consuming iron-rich foods (50.5%).

The diet of the population in Kaabong, Kotido and Moroto was clearly lacking in sufficient nutrition, and people in those households would be expected to suffer from micronutrient deficiencies.

As expected, female-headed households had a less diversified diet (only 42% of them eat more than four food groups in a week against 52% of male headed households) with a lower weekly average consumption of all food groups with exception of pulses. Overall, the household dietary diversity worsened since June when the regional average for low HDDS was 40% against the current 50%.

4.4.3 Sources of food

Purchase from markets was the main source of all food commodities across all districts. At least 68% of households interviewed were mainly dependent on markets, with peaks in Moroto (75%), Napak and Abim (71.5%). Own production was the most important source of food for just 14% of the population, with highest prevalence in Abim and Amudat (22% and 21% respectively). Finally, gathering wild foods was the main food source for a relatively

high proportion of households (around 8%) – especially in light of the post-harvest season – with a prevalence of 11% in Kotido, Moroto, Nakapiripirit and Napak.
All the above, underlines the extent of poor food availability through agriculture for the typical agrarian household in the region.

4.4.4. Poverty, income sources and food insecurity

Wealth

A wealth index was created based on information on ownership of assets and access to essential facilities, such as electricity, drinking water and cooking sources. Based on the results of the wealth index, households were classified into five groups that show the level of their wealth status: lowest, second, middle, fourth and highest.

Moroto, Napak and Kotido recorded the highest proportion of population in the two poorest quintiles, whereas Abim was by far the best-off district **(Figure 6)**.

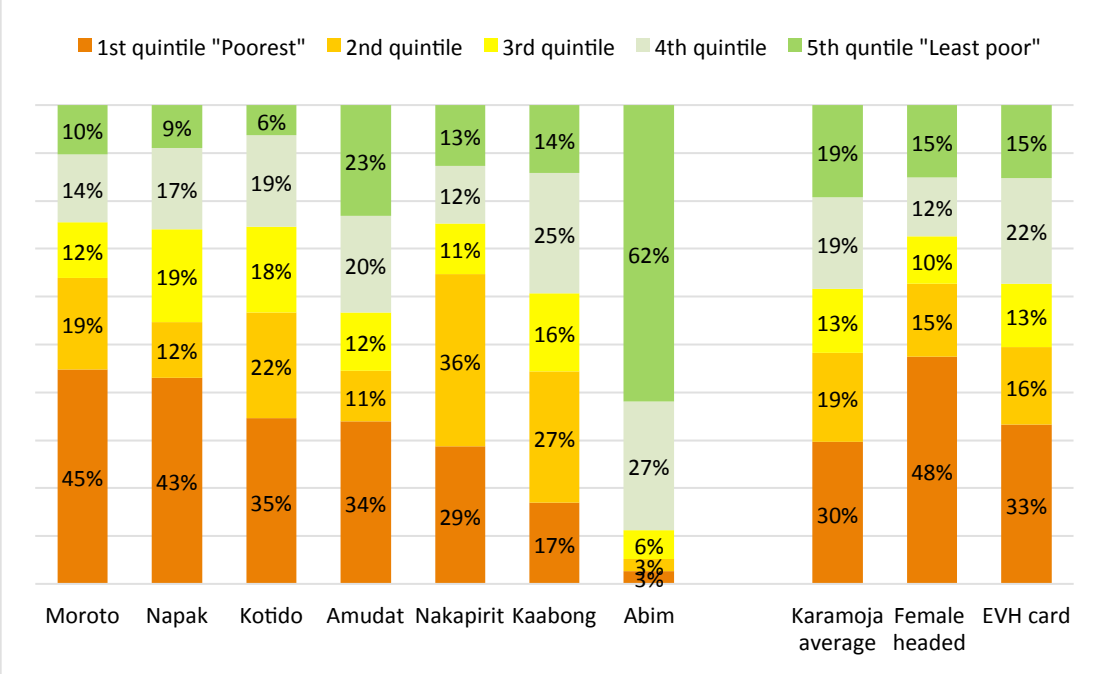


Figure 6: Poverty quintiles by district, sex of household head and EVH card

Almost 50% of female-headed households were in the poorest quintile as opposed to 25% of male-headed households. Also, around 50% of households with a head aged above 65 years were within the poorest quintile as opposed to 31% of those aged 35-64 and 27% of those aged 18-34.

In a context of high dependence on markets for food supply, poor households had a lower economic access to food compared to the wealthier, which translates into increasing levels of adoption of coping strategies, lower food consumption and overall higher food insecurity.

Income sources

Twenty four percent of the households in Karamoja only relied on one source of income and 46% had access to three or more sources. Despite the high number, very few had access to sustainable or lucrative activities, which affects access to food and food security of the population. Over a third of the households in Karamoja (38.3%) mainly depended on trade or small businesses for their income. Almost 20% of them relied on unsustainable and often

non-lucrative sources such as gifts, loans, sale of food assistance. Moroto and Kotido was the district with the highest proportion of households relying on unsustainable income sources (25% and 23% respectively) while Abim has the lowest (8%).

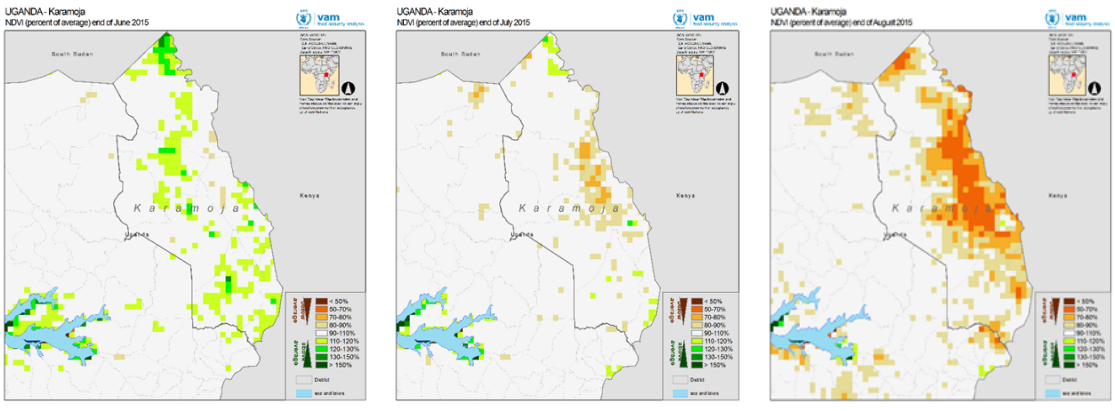
Not surprisingly, the population in Amudat rely mainly on the sale of animals and animal products (34%), whereas in the other pastoral communities in Kaabong, Kotido and Moroto only 2%, 3% and 1% of households respectively were dependent on this. The traditional approach to the sale of animals was one of the key drivers of poverty in the three districts. Finally, casual labour was a key income source for only 15% of the population. The poor socio-economic context in Moroto is not conducive to the creation of work opportunities.

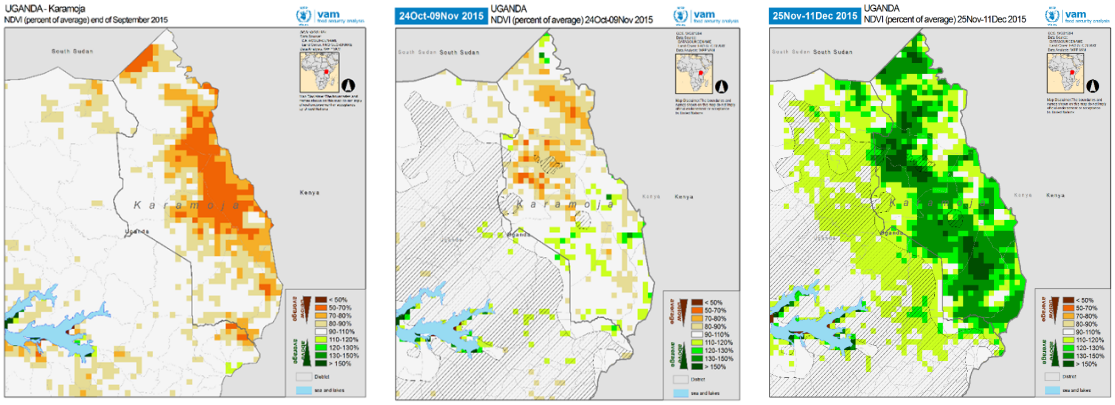
The main income sources households depend on influence the poverty level of the household. In particular, the highest proportion of the 'poorest' were found among those relying on unsustainable activities (food assistance, sale of food aid, gifts, loans, etc), as well as those relying on pensions or allowances. As expected, families mainly dependent on fixed salaries or farming/sale of agricultural products were the best off and were therefore less exposed to food insecurity.

4.4.5. Food Availability – households' crop production and availability of food stocks

The average land size cultivated for the main crops (Sorghum and Maize) was about one acre per household involved in farming. Unfortunately the number of households involved in planting these major staples was still small – in most cases much less than 50% of all sampled households.

Despite the effort, the farming season was perturbed by a dry spell in the critical July to September period, which affected mainly Moroto, Kotido, Kaabong and Napak districts. The maps below show the evolution of the monthly deviation of biomass production from the long-term average in the June to December period (Normalized Difference Vegetation Index – NDVI). A significantly below normal biomass production, whether from crops, pastures or weeds, is observed between July and early November, with peak in September.





Map 1: Evolution of biomass production (NDVI June-Dec 2015) compared to long term average through NDVI

Although the biomass creation reacted positively to the second onset of rainfall in November, including in the sorghum agro-pastoral zones, yields had been almost completely compromised, across the region. Despite a "larger" number of households planted food crops, the number that harvested was considerably much less. For instance a total of 1349 and 2059 households planted maize and sorghum, yet only 633 and 1233 harvested, respectively. This signifies hash weather or massive crop failure in 2015.

As a result, over 80% of households in Kaabong, Amudat, Kotido and Moroto have exhausted their stocks and are therefore only relying on food assistance, aid or coping mechanisms for accessing food.

In Napak, despite the high proportion of households who planted land, stock would not last for more than one week from the data collection period. Even in Abim and Nakapiripirit, where the highest harvests records were recorded, stocks would not last more than 3 weeks, which means that the vast majority of households in Karamoja had exhausted all stock before the end of the 2015. Measures to supply food or vouchers for food should be enhanced, bearing in mind that in many areas, scarce food availability might be protracted until next harvest in October 2016.

The low level of productions and stocks justifies why most households, even in post-harvest season, relied mainly on markets. In order to reduce dependency on markets and to increase own production, it is therefore important to address the key constraints faced by farmers in the productive season.

Alongside the dry spell that hit farmlands in the period July-September, a large proportion of farmers declared not having access to the right tools and seeds. Insufficient labour was also a key limiting factor to the surface cultivated **(Figure 7)**.

Figure 7: Main constraints for agricultural production in Karamoja

4.4.7. Livestock production

Up to 40% of households in Karamoja did not own any livestock, and only about one in three households owned cattle **(Figure 8)**. Not surprisingly, Amudat district had high ownership of cattle (76.5%), whereas the lowest proportion was found in Kaabong (21.2%), Moroto (18.5%) and Abim (17%). Female-headed households were less likely to own livestock, including cattle. No significant difference was found between EVH cardholders and other households.

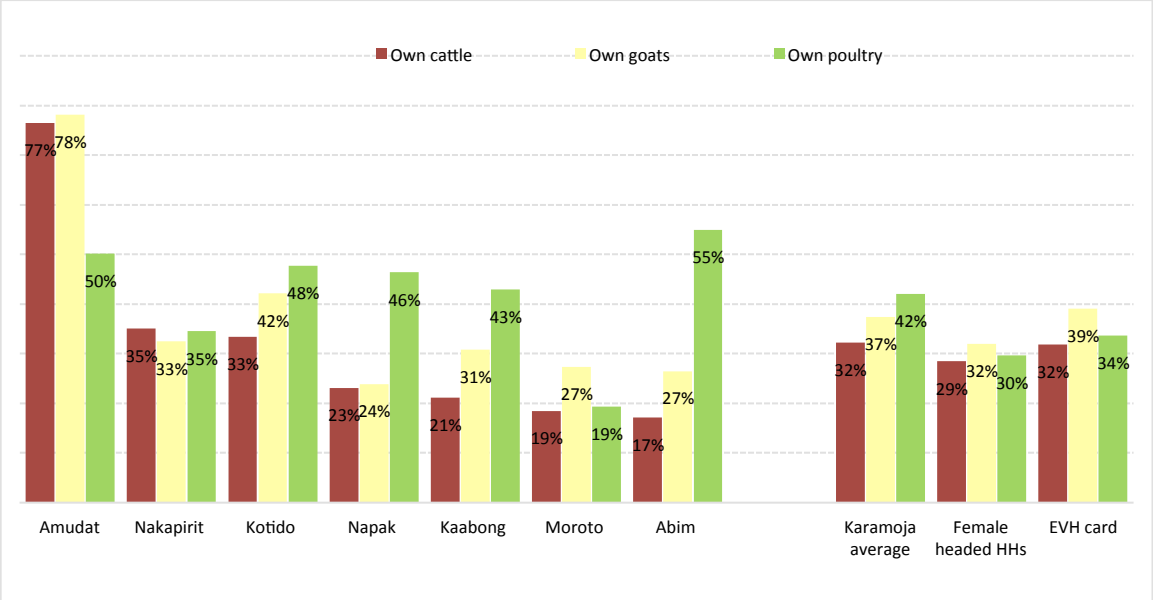


Figure 8: Ownership of cattle, goats and poultry in Karamoja

In Amudat, an increase of 10% among households owning cattle was observed since June 2015 against a 3% average increase in the region. Unsurprisingly, in Kaabong the proportion of households with cattle decreased significantly (-14%) in the same period due to the increased adoption of livelihood coping strategies to face food shortages.

Almost half of the population in Kaabong and four in ten households in Kotido did not own any livestock. This is particularly worrisome given the relevance of livestock production for the local economy.

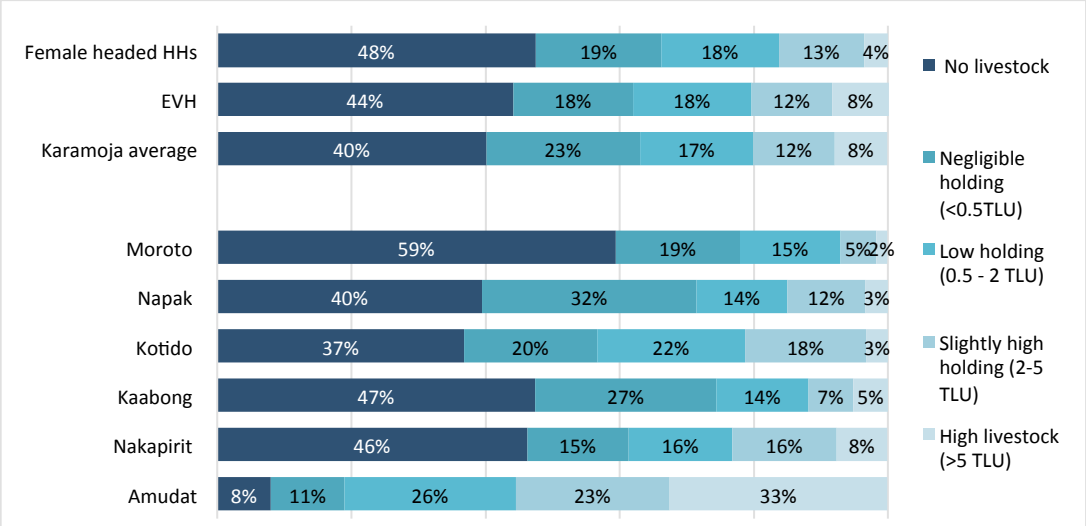


Figure 9: Livestock ownership in Karamoja based on Tropical Livestock Units (TLUs)

This sale of animals in pastoral areas follows a trend that had already been signaled in June, when over 75% of households had adopted crisis or emergency coping mechanisms including productive assets and animals. Given the significant correlation between cattle ownership and food security, the decrease in livestock ownership is a key driver of food insecurity and could justify the unseasonable increase in food insecurity levels notably in Kaabong (+31%) and Kotido (+12%).

It is important to promote projects aimed at restoring the ordinary livestock population with a specific geographical focus in Kaabong and Kotido. Female-headed households should be given priority within livestock-related projects in Karamoja.

Finally, with regards to the current animal production, the main constraints faced by pastoral households relate with the increased morbidity and the effects of parasites on livestock, and the concurrent lack of adequate veterinary services to mitigate their impact. The exposure to diseases and parasites was seen as the main constraint in Amudat (98.5%), Napak (88.3%) and Abim (87.3%) where increased rainfall and flash flooding occurred since November onwards due to the impact of El Nino. Water shortage was the main constraint for 4% of households in Kaabong and Kotido, against only 1% at the regional level. Also, the shortage of pasture was relatively high (10.5%) in Kaabong as opposed to 2% at the regional level.

Figure 10: Main constraints for livestock production in

4.4.8. Coping strategies

Main difficulties/shocks faced by household

Only 17% of the households in Karamoja never experienced any shocks or difficulties in the 30 days prior the assessment. The most frequent shocks Karamoja is exposed to are the high prices of food items and the unfavorable weather/climatic conditions.

Table 5: Main shocks by district, EVHs and sex of household head

Shocks	Abim	Amudat	Kaabong	Kotido	Moroto	Nakapirit	Napak	Karamoja average	EVH card	Female headed HHs
Loss employment/reduced salary/wages	11.4%	.1%	.9%	.3%	5.0%	3.5%	.1%	3%	3%	3%
Crop Loss due to Rodents	14.1%	6.8%	12.2%	.3%	10.0%	9.2%	.4%	8%	8%	9%
Death household member/funerals	2.0%	.6%	5.8%	1.3%	2.6%	3.8%	3.7%	3%	3%	4%
High food prices	33.9%	42.3%	33.4%	51.3%	37.6%	19.9%	26.7%	35%	35%	42%
High fuel/transportation prices	2.2%	1.8%	.4%	.8%	2.2%	1.4%	1.2%	1%	1%	1%
Debt to reimburse	4.1%	1.4%	2.5%	.5%	7.2%	1.6%	7.9%	4%	4%	4%
Floods, heavy rains, drought, etc	14.7%	30.6%	19.9%	35.2%	13.3%	9.3%	17.7%	20%	20%	14%
Sickness/disease	5.2%	4.5%	11.5%	3.7%	15.7%	4.0%	22.6%	10%	10%	11%
No difficulty mentioned	12.6%	12.1%	13.4%	6.7%	6.3%	47.4%	19.8%	17%	17%	11%

Nine in ten female-headed households had suffered at least one shock in the month prior to the survey. In particular, female-headed households were even more exposed to high food prices than male-headed ones (42% against 33%). It is required to increase efforts aimed at strengthening resilience of female-headed households and to create work opportunities for them.

High food prices affect more frequently the population relying on non-profitable and unsustainable income such as beneficiaries of food assistance, of gifts and people relying mainly on pension or allowances. Not surprisingly, climatic hazards including the dry spell in August and September, followed by sporadic flooding, hit farmers and reduced work opportunities for agricultural casual labor.

Food coping strategies

The average food consumption coping strategy index – reduced (rCSI)[2] increased to 19.1 for Karamoja compared to 16 in June 2015. The average rCSI was highest in Kaabong 29.6 and lowest in Napak 10.1.

The most frequent food coping strategies adopted in Karamoja in the week prior to the survey were:

- Reduced number of meals: 4.2 days on average per week
- Eat less preferred/less expensive foods: 4.1 days per week
- Limit portion size of meals: 3.8 per week.

Although the coping pattern was similar to findings in June 2015, a massive increase of rCSI was recorded in Kotido and Kaabong. The reduced CSI index is a measure of the challenges faced by one household to access the minimum adequate consumption. In this regard, the unseasonable and dramatic increase of rCSI in Kaabong and Kotido is an alert of a critical unfolding scenario in these pastoral areas, which might have been partially compensated by protracted rainfall in the period following the survey.

The rCSI recorded in December is the highest ever recorded in the past 6 rounds, including records from FSNA conducted in the lean seasons. It is therefore important to continue monitoring consumption patterns of households in these districts over the next rounds, while immediately scaling up measures aimed at enhancing adequate food access of the most vulnerable.

Livelihoods coping

The livelihoods-based coping strategies module was used to better understand longer-term coping capacity of households. Coping Capacity domains were aimed to measure households' resilience to potential shocks. The livelihood coping is an important component of the CARI console.

[2] Reduced coping strategy index (RCSI) measures the behaviours adopted by households when they have difficulties covering their food needs. It is calculated based on standard food consumption-based strategies (reliance on less preferred food; borrowing food or relaying on help from friends/relatives; reduction in the number of meals eaten per day; reduction in portion size of meals; and reduction in quantities of food consumed by adults/mothers for young children) and severity weighting.

Classification of severity of livelihood coping strategies

- ***Stress coping**: lead to decreasing capacity to withstand future shocks and include: sold more animals than usual; sold households goods; spent savings; borrowed money.*
- ***Crisis coping**: affect directly the future productivity of the household and include: sale of productive assets; reduce essential non-food expenditures; consume seeds stocks held for next season.*
- ***Emergency coping**: affect the future productivity of the household as well as the individual dignity of the households, and are more difficult to revert; these strategies include: selling of house/land; practicing illegal activities; begging.*

From the survey, three in four households in Karamoja adopted at least one livelihood coping strategy in the month prior to the interview. This proportion was highest in Kaabong (87%) and lowest in Abim (66%). Only 13% used stress coping, 13% crisis coping and 51% emergency coping.

Most common stress coping mechanisms: over 50% of households declared having borrowed some money and 11.5% of households declared having sold more animals than usual, with peaks in Kotido (20%) and Kaabong (15%).
Most common crisis coping mechanisms: around 37% of households interviewed declared that they consumed seed stocks held for the next season.

The most commonly adopted livelihood strategies were borrowing money, consuming seed stocks and begging **(Table 6)**. Borrowing increased significantly since June in Abim and Napak and remains at very high level in Moroto. Despite the post-harvest period in which the survey was conducted, the consumption of seed stocks increased since the lean season in Kotido and Nakapiripirit. Begging, yet another signal of difficulty of household to access food, was higher in Kaabong, Kotido and Moroto. Compared to June 2015, the adoption of begging increased more significantly in Amudat, Nakapiripirit and Moroto. Female-headed households had much higher proportion in the adoption of borrowing, begging and seed stocks consumption as opposed to male-headed ones.

Table 6: The most common livelihood coping strategies reported by households

District	Borrowed money		Consumed seed stock		Begged	
	Dec-15	*Dec vs Jun*	Dec-15	*Dec vs Jun*	Dec-15	*Dec vs Jun*
Abim	53%	▲ *24%*	25%	▲ *7%*	35%	▼ *-13%*
Amudat	35%	▼ *-13%*	3%	▼ *-20%*	51%	▲ *28%*
Kaabong	38%	▼ *-13%*	35%	▼ *-11%*	54%	▼ *-14%*
Kotido	49%	▬ *4%*	42%	▲ *10%*	56%	▲ *1%*
Moroto	56%	▲ *21%*	17%	▬ *-5%*	64%	▲ *26%*
Nakapirit	52%	▲ *24%*	19%	▲ *15%*	56%	▲ *34%*
Napak	59%	▲ *16%*	34%	▲ *12%*	25%	▼ *-10%*
Karamoja	49%	▲ *9%*	25%	▬ *1%*	49%	▲ *10%*
EVH	48%	▲ *16%*	26%	▬ *0%*	62%	▲ *14%*
Female headed	58%	▲ *24%*	28%	▲ *7%*	64%	▲ *14%*

Note: As can be seen from the above, Begging is a common coping mechanism being reported. However more information needs to be collected on this aspect per se. It is possible that a percentage of HHs might be referring to borrowing or an increased reliance on family, rather than Begging. WFP Sub offices staff are currently helping the AME unit to collect more information on this aspect.

4.4.9. Expenditures

Households in Karamoja spend most of their resources on food. The share of food expenditure is used as a proxy indicator for poverty. Overall, 55% of the households' expenditure was used for food purchase, with peaks in Kotido (71%) and Moroto (61%). In Kotido, 56% of households dedicate more than three quarter of their budget to the purchase of food.

Also, female headed households and elderly-headed households spend much more on food than the others. Over 40% of household with a head aged beyond 65 spend more than 75% on food which clearly has an impact on key non-food expenditures such as health, and education of the young members.

Overall, an average increase of 6% of households spending over 75% of their budget on food purchase was observed. This is really worrisome given that the trend is unseasonable and not really in line with the expected post-harvest food availability. The increase of household with 75% or above food expenditure share is mainly evident in Kotido (+24% since June), Kaabong (+17%) and Moroto (+14%).

4.4.10. Indebtedness of households

Higher proportion of households in Abim, Napak and Moroto reported that they borrowed money, as well as minor headed households and large sized households. On average, the debt amounted to 60,000 UGX, with peaks in Amudat (3 times as much) **(Figure 11)**.

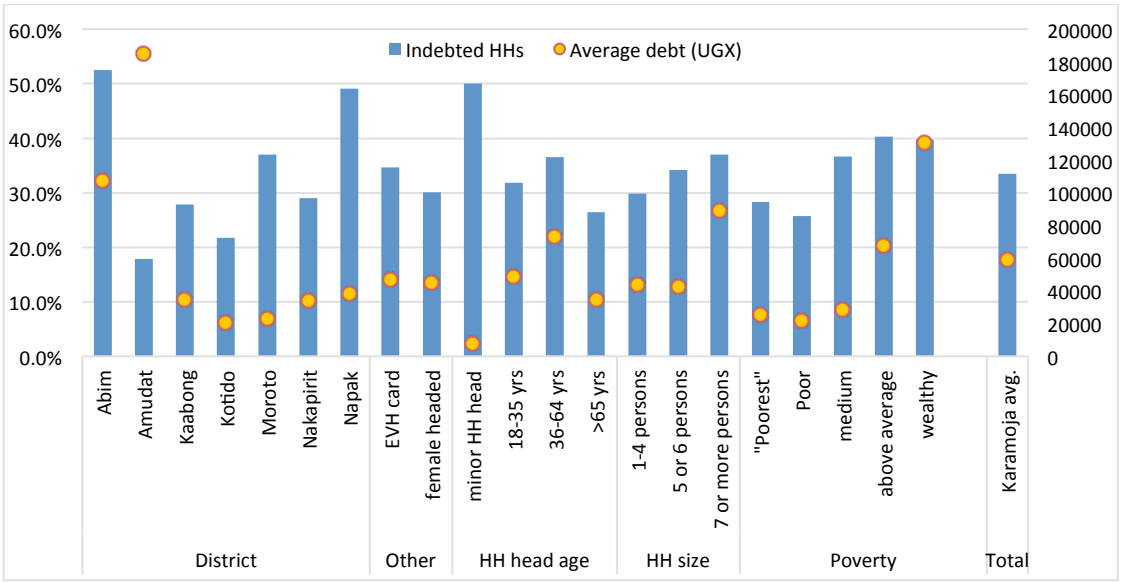


Figure 11: Proportion of indebted households and average debt by district

The vast majority of people borrowed money to buy food (54%), with peaks in Moroto (75%), Kaabong (69%), and Kotido (61%). The remainder contracted debts to meet health expenses and school fees. Female headed households and food insecure households have a higher tendency to borrow money to meet their basic food needs, thereby increasing their vulnerability in the short to long term.

5 NUTRITION STATUS OF CHILDREN 6-59 MONTHS AND WOMEN 15-49 YEARS

5.1. Age and sex distribution of sampled children

A total of 3937 children were sampled out of which 536 were below six months of age and were therefore excluded from analysis of the nutrition findings. The sex ratio of sampled children was 1.0 **(Table 7)**.

Table 7: Sex and age distribution of the sampled children according to district

District	Sex ratio of sampled			Distribution of sampled children by age					Total
	Boys	Girls	Boys:Girls	6-17	18-29	30-41	42-53	54-59	
Abim	259	284	0.9	171	146	107	79	40	543
Amudat	248	246	1.0	157	162	111	55	9	494
Kaabong	198	208	1.0	169	128	77	26	6	406
Kotido	280	263	1.1	176	160	120	72	15	543
Moroto	268	251	1.1	170	167	101	62	19	519
Nakapiripir	235	220	1.1	150	133	102	60	10	455
Napak	223	218	1.0	133	113	89	84	22	441
Total	1711	1690	1.0	1126	1009	707	438	121	3401

5.2. Prevalence of wasting, stunting and underweight

The overall **prevalence of GAM** among children 6-59 months in Karamoja region was 12.4%, 95% CI (11.3 – 13.6) **(Table 8).** According to the standard WHO malnutrition cut-off points, 'critical' GAM prevalence was observed in Napak (16.3%) whereas the other district fall under the 'serious level' (10-14%). Only Abim district (prevalence of 9.7%) is labelled as 'poor'. However, Abim marked an unseasonable increase (+0.6%) from the lean season period (June 2015) in which the previous round was conducted, alongside Amudat (+0.7%), and Napak (+0.1%). The dry spell that occurred in the critical July-August period may have affected the cropping areas in the three districts hence reducing harvest and food availability.

Overall, a seasonal decrease was observed in the region (-1.7 GAM prevalence since June 2015), mainly resulting from the declining prevalence in Moroto (-5.1%) and in Nakapiripirit (-4%). Increased access to food is the key driver to such an improvement; the two districts recorded a 27% and 14% increase respectively in the proportion of households with acceptable food consumption over the last 6 months.

Prevalence of stunting remained above the WHO 'Very high' levels (40%) in most districts, with peaks (both in terms of absolute values and trends from previous surveys) observed in Kaabong, Moroto and Nakapiripirit. Stunting was statistically correlated to food insecurity (p=0.001) and in particular to inadequate food consumption (p=0.000). This confirms how in Karamoja chronic food insecurity relates to chronic malnutrition due to poor diets lacking in essential micronutrients for children's development.

Table 8: Prevalence of GAM, SAM, Stunting and Underweight among children 6-59 months according to district, December 2015 (WHO flags)

District	N	GAM % (95% CI)	SAM (95% CI)	Stunting (95% CI)	Underweight (95% CI)
Karamoja	3397	**12.4** *(11.3 – 13.6)*	**3.8** *(3.2 – 4.5)*	**39.5** *(37.9 – 41.2)*	**31.0** *(29.4 – 32.6)*
Abim	539	**9.7** *(7.1 - 13.0)*	**3.0** *(1.7 - 5.1)*	**31.9** *(27.6 - 36.6)*	**20.8** *(16.6 - 25.8)*
Amudat	494	**10.8** *(8.1 - 14.2)*	**1.4** *(0.7 - 2.8)*	**24.2** *(20.4 - 28.6)*	**24.2** *(20.5 - 28.4)*
Kaabong	406	**13.9** *(10.8 - 17.7)*	**3.5** *(2.0 - 6.3)*	**50.4** *(45.9 - 54.9)*	**37.8** *(34.3 - 41.5)*
Kotido	543	**12.6** *(9.0 - 17.4)*	**3.8** *(2.3 - 6.3)*	**42.4** *(37.5 - 47.4)*	**32.2** *(27.7 - 37.1)*
Moroto	519	**13.2** *(9.9 - 17.3)*	**5.2** *(3.3 - 8.0)*	**46.8** *(41.5 - 52.1)*	***37.1*** *(32.4 - 42.0)*
Nakapirit	455	**11.3** *(8.5 - 14.8)*	**5.4** *(3.5 - 8.2)*	**42.5** *(37.2 - 48.0)*	**32.2** *(28.2 - 36.5)*
Napak	441	**16.3** *(12.0 - 21.8)*	**4.4** *(2.9 - 6.8)*	**41.8** *(37.4 - 46.5)*	**34.8** *(29.3 - 40.7)*

Shifting the analysis at main livelihood zones' level, the highest prevalence of GAM was observed among the pastoral communities of the central sorghum and livelihood zones (13.8%), whereas children living within communities in the main cropping areas, including in the green belt, record slightly lower GAM rates (10.3%).

The pastoral areas in the dry belt and in the 'mountain slopes maize and cattle' zone also registered the highest levels of chronic malnutrition with 42.8% and 42.4% respectively. High levels of GAM and stunting can be explained with a recent and continuous access to a poorly diversified diet. Almost 60% of households in the dry belt ('central sorghum and livestock zone') consumed only four or less food groups (mainly cereals, vegetables, pulses and oil) over the seven days prior to the interview.

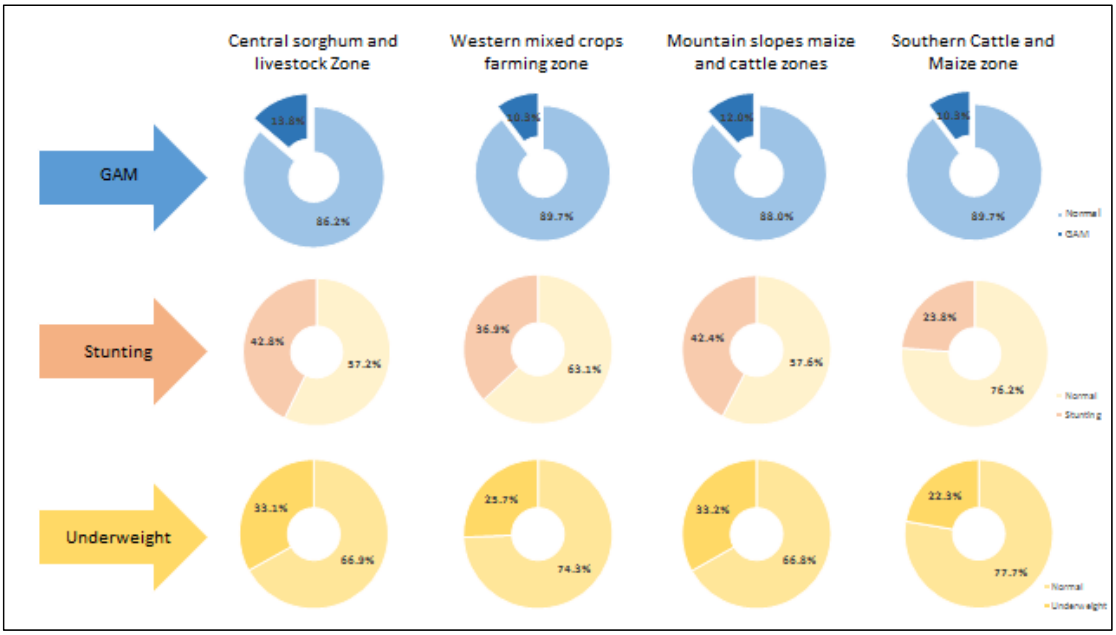


Figure 12: Prevalence of GAM, Stunting and Underweight among children 6-59 months by livelihood zones, December 2015 (WHO flags)

5.3. Distribution of wasting based on MUAC

Prevalence of GAM based on the Mid Upper Arm Circumference (MUAC) assessed in children 6-59 months was high (10.2%), with peaks observed in Moroto (14.6%), Napak (14.3%) and Kaabong (13.8%) districts. Overall, GAM prevalence based on MUAC correlated well with z-score findings except in Amudat district **(Table 9)**.

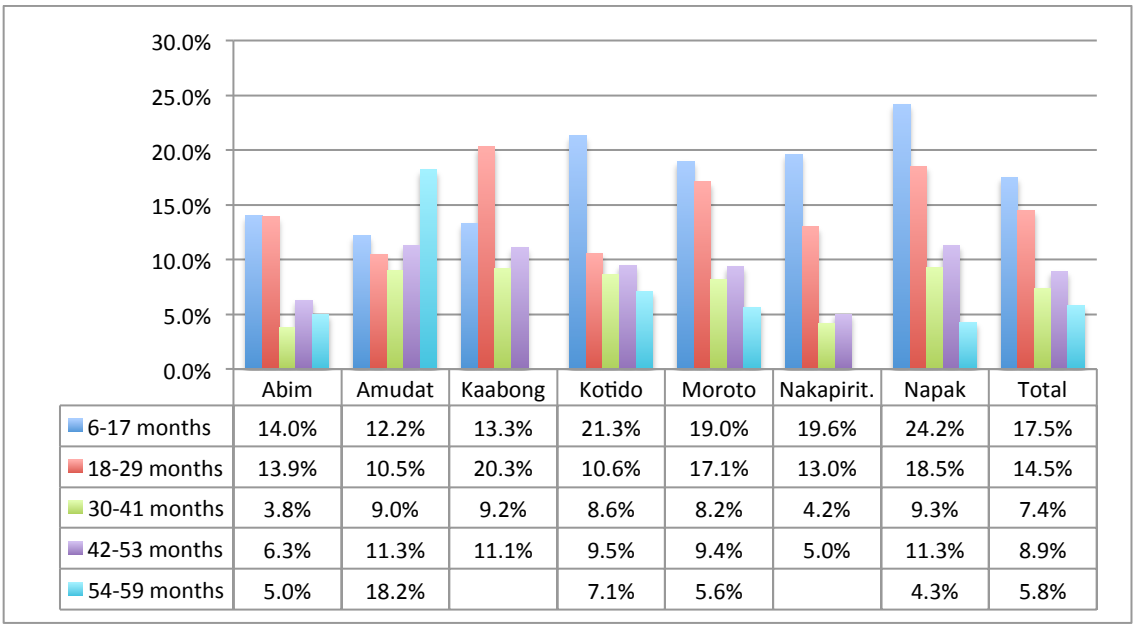
The analysis on MUAC depicted a very high proportion (25.2%) of children at risk of being under nourished (≥ 12.5 cm - < 13.5 cm). In particular, the districts of Kotido (32.1%), Moroto (30.1%) Napak (28.0%) and Kaabong (27.6%) recorded very high proportions of children at risk of developing GAM if there is no quick intervention done. The most vulnerable age group was 6-17 months (results not resented). Feeding programs should urgently address this age group.

Table 9: Wasting status assessed by MUAC in children 6-59 months by district

District (N)	GAM (< 125 mm)	Moderate (< 125 and >= 115 mm)	Severe (< 115 mm)
Abim (N=540)	7.2% (4.6 - 11.1)	4.1% (2.5 - 6.5)	3.1% (1.8 - 5.6)
Amudat (N=492)	3.5% (2.2 - 5.3)	2.8% (1.8 - 4.5)	0.6% (0.2 - 1.9)
Kaabong (N=398)	13.8% (10.6 - 17.8)	11.1% (8.4 - 14.4)	2.8% (1.4 - 5.3)
Kotido (N=547)	10.2% (8.1 - 12.9)	7.1% (5.3 - 9.5)	3.1% (1.8 - 5.3)
Moroto (N=507)	14.6% (10.5 - 19.9)	10.8% (7.8 - 15.0)	3.7% (2.1 - 6.6)
Nakapirit (N=451)	13.5% (10.5 - 17.2)	8.6% (6.6 - 11.3)	4.9% (2.8 - 8.3)
Napak (N=426)	14.3% (10.9 - 18.6)	10.3% (7.7 - 13.7)	4.0% (2.5 - 6.3)

5.4. Distribution of malnutrition by age and sex

The highest prevalence of GAM and SAM was observed among children aged 6-17 months. The findings are consistent with what was observed in previous assessments in the region.



	Abim	Amudat	Kaabong	Kotido	Moroto	Nakapirit.	Napak	Total
6-17 months	14.0%	12.2%	13.3%	21.3%	19.0%	19.6%	24.2%	17.5%
18-29 months	13.9%	10.5%	20.3%	10.6%	17.1%	13.0%	18.5%	14.5%
30-41 months	3.8%	9.0%	9.2%	8.6%	8.2%	4.2%	9.3%	7.4%
42-53 months	6.3%	11.3%	11.1%	9.5%	9.4%	5.0%	11.3%	8.9%
54-59 months	5.0%	18.2%		7.1%	5.6%		4.3%	5.8%

Figure 13: Prevalence of GAM and SAM according to age group

GAM among children 6-23 months was at critical levels (above 15%) in all districts except Amudat where it was serious (above 10%). Malnutrition in this age group is catastrophic. There is urgent need for blanket supplementary feeding program targeting all children in this age-group.

Children aged 6-23months were more likely to be wasted than those aged 24-59 months (16.7% against 8.5%) **(Figure 14)**. This was due to a series of factors, of which the low levels of children meeting the minimum acceptable diet (only 2.8%) was the most evident in an age where the diversification of food consumed is key. This was then reflected in increasing stunting rates after the second year of age, as older children (24-59 months) tend to have a higher level of stunting (43% against 38.9%). There is need to continuously address challenges of complementary feeding, alongside other interventions including sensitization campaigns and projects on WASH. Only 9.9% of households who treat drinking water before consumption have wasted children against 14.9% of those who do not treat. This difference further increases when the analysis shifts to households with wasted children aged 6-11 months.

The highest difference in prevalence of wasting between the two age groups was observed in Nakapiripirit (12.6% difference) and Napak (11.5%), the lowest in Amudat (2.7% only).

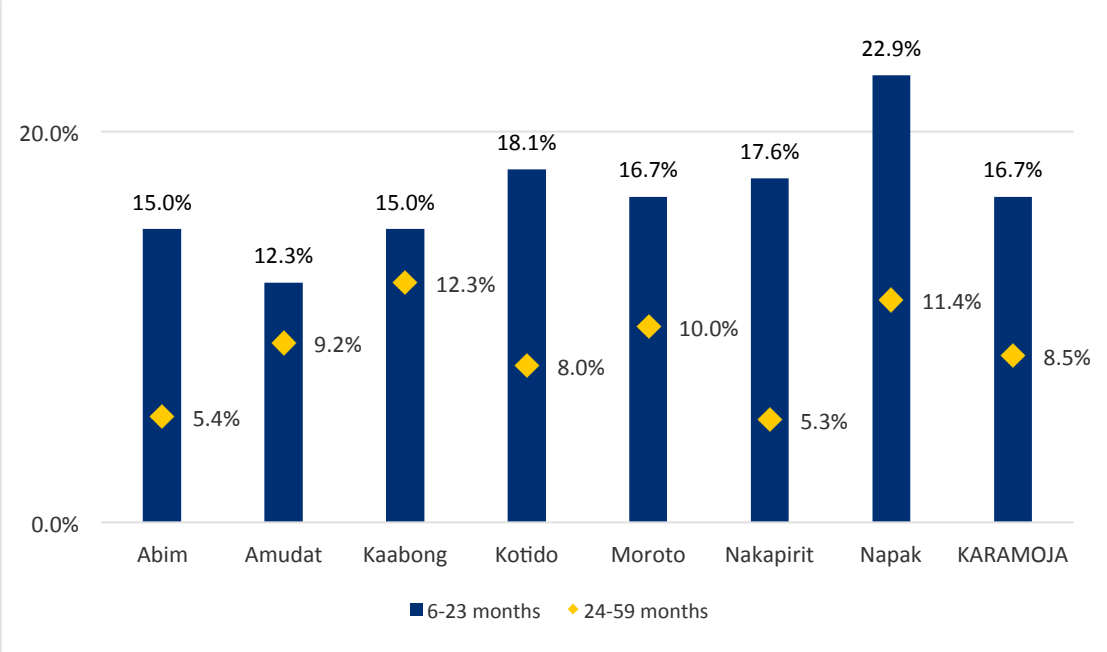


Figure 14: Prevalence of GAM according to age group 6-23 and 24-59 months by district

There were significant differences in malnutrition according to sex in all districts with the male children being more affected than girls **(Figures 15-17)**. Increased malnutrition in boys who are likely to be the future household decision makers is worrisome but might be too sensitive to address as an isolated problem.

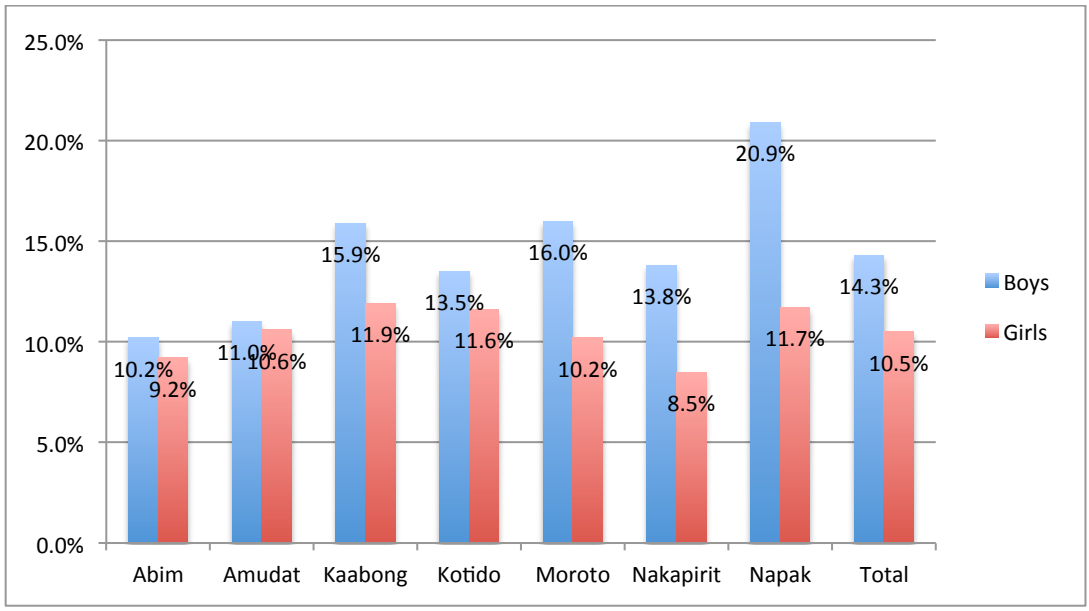


Figure 15: Wasting prevalence according to sex of children and district

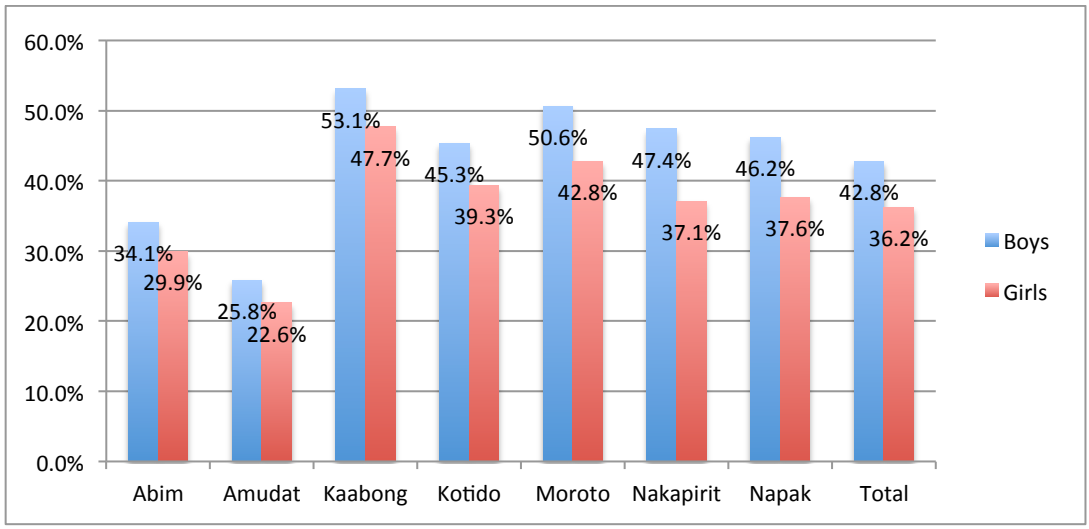


Figure 16: Stunting prevalence according to sex of children and district

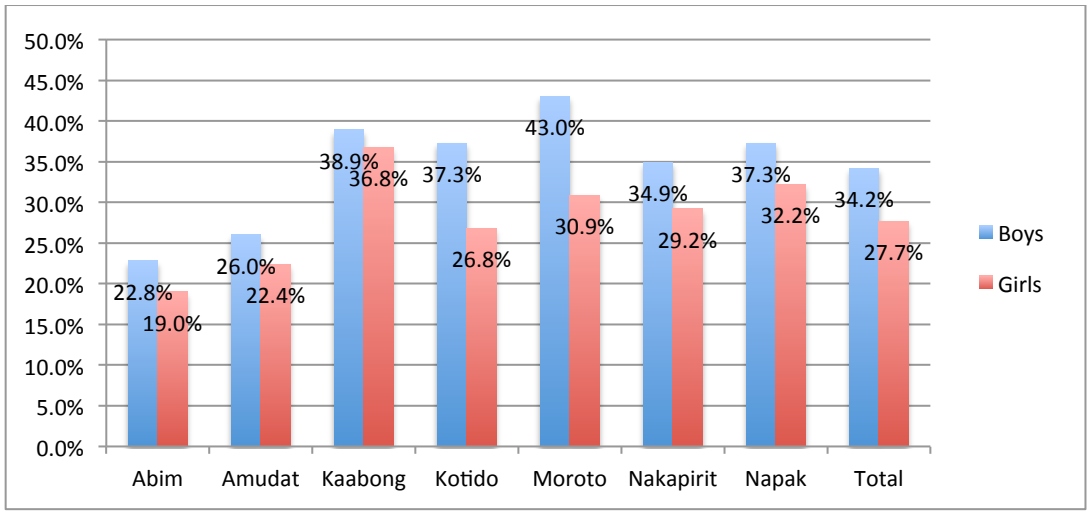


Figure 17: Underweight prevalence according to sex of children and district

These findings are extremely relevant and demand further in-depth causal analysis in the next surveys. The most plausible hypothesis is about children being deployed since their early age in livelihood activities outside the household – i.e. following daily movements of livestock in search for pastures. Although boys have a slightly higher probability to meet a minimum meal frequency than girls, the daily calorific intake is probably not sufficient to meet the needs at that age and under those conditions.

5.5. Distribution of malnutrition by sub-county

The study was powered to provide district representative findings. However, further disaggregation at sub-county levels was conducted although findings at this level will have only indicative value. Therefore caution is needed while interpreting findings at the sub-county level.

Overall, 18 sub-counties (46% of the total) recorded GAM levels above the 'critical' threshold (15%) and two out of three registered very high (>40%) prevalence of stunting. There were significant variations in prevalence of malnutrition between sub-counties within districts **(Table 10)**. Lotome sub-county in Napak district had the highest prevalence of GAM at 39.5%, followed by Kotido TC (32.3%) and Kathile (27.9) in Kaabong district. It is important for implementers on the ground to cross-validate these findings and institute the appropriate interventions.

As expected most of the sub-counties with GAM prevalence beyond the critical levels are found in the pastoral livelihood zone 'Central sorghum and livestock zone'. Stunting is also particularly high in this zone, with prevalence beyond 60% in Lolelia and Sidok sub-counties in Kaabong, Rupa sub-county in Moroto, Lorengechora TC in Napak.

Table 10: Prevalence of GAM, Stunting and Underweight according to sub-county

District	Sub-county (N)	GAM	Stunting	Underweight
Abim	Nyakwae (N=79)	19.0%	37.2%	27.8%
	Alerek (N=73)	15.1%	31.5%	24.7%
	Abim TC (N=78)	11.5%	33.3%	21.8%
	Morulem (N=109)	8.3%	28.7%	18.2%
	Lotuke (N=138)	6.5%	35.3%	19.3%
	Abim (N=62)	3.2%	33.9%	20.6%
Amudat	Loroo (N=117)	14.5%	26.5%	27.4%
	Amudat (126)	11.1%	23.2%	19.8%
	Karita (N=250)	9.2%	25.8%	24.9%
Kaabong	Kathile (N=43)	27.9%	43.2%	51.1%
	Kapedo (N=31)	25.8%	54.8%	50.0%
	Lolelia (N=24)	25.0%	66.7%	54.2%
	Sidok (N=40)	20.0%	68.3%	54.8%
	Lobalangit (N=32)	18.8%	54.5%	31.3%
	Kaabong East (N=24)	12.5%	41.7%	37.5%
	Kamion (N=9)	11.1%	22.2%	11.1%
	Kalapata (N=78)	10.3%	48.7%	34.6%

District	Sub-county (N)	GAM	Stunting	Underweight
	Kaabong West (N=27)	7.4%	44.4%	28.6%
	Karenga (N=30)	6.7%	46.7%	33.3%
	Lodiko (N=20)	5.0%	45.0%	30.0%
	Kawalakol (N=30)		50.0%	16.7%
	Loyoro (N=9)		44.4%	22.2%
Kotido	Kotido TC (N=31)	32.3%	43.3%	35.5%
	Panyangara (N=163)	19.0%	39.0%	32.1%
	Kacheri (N=92)	13.0%	50.5%	42.4%
	Rengen (N=85)	10.6%	43.5%	28.2%
	Kotido SC (N=122)	7.4%	41.3%	32.0%
	Nakapelimoru (N=58)	3.4%	45.8%	27.1%
Moroto	Rupa (N=84)	20.2%	60.7%	53.6%
	Katikekile (N=94)	18.1%	44.7%	37.2%
	Nadunget (N=205)	16.1%	46.6%	36.9%
	Tapac (N=86)	8.1%	42.5%	30.2%
	South division (N=40)	2.5%	32.5%	22.5%
Nakapiripirit	Nabilatuk (N=57)	17.5%	38.6%	29.3%
	Moruita (N=18)	16.7%	47.1%	61.1%
	Lolachat (N=81)	13.6%	48.8%	39.5%
	Kakamongole (N=44)	11.4%	56.8%	36.4%
	Nakapirit TC (N=36)	11.1%	38.9%	30.6%
	Namalu (N=93)	10.8%	43.0%	31.2%
	Loregae (N=95)	9.5%	33.3%	26.3%
	Lorengedwat (N=27)	3.7%	55.6%	26.9%
Napak	Lotome (N=43)	39.5%	50.0%	53.5%
	Lorengechora (N=11)	27.3%	45.5%	40.0%
	Lorengechora TC (N=11)	18.2%	63.6%	72.7%
	Iriiri (N=92)	16.3%	47.8%	38.0%
	Lokopo (N=121)	14.0%	38.8%	29.5%
	Matany (N=67)	14.9%	37.3%	31.3%
	Ngoleriet (N=30)	13.3%	40.0%	23.3%
	Lopeei (N=52)	3.8%	45.3%	30.2%

5.6. Analysis of trend of malnutrition

Malnutrition indicators in all districts in Karamoja are deteriorating over the past five years. A slight decrease (-0.3%) was observed on GAM prevalence since December 2015, whereas a more substantial reduction was observed since June 2015 (-1.7%). As mentioned, this is mainly due to the improvements observed in Moroto (-5.1%) and in Nakapiripirit (-4%), where a substantial increase of households with adequate food consumption (27% and 14% increase respectively) was observed over the last 6 months.

Also, given the significant correlation between water availability and GAM (p=0.014), the 2 litres increase since June 2015 on the average water quantity consumed per capita each day (from 10.6 to 12.6) can help justify the seasonal decrease of GAM. More significant correlations were found between daily water consumption and stunting (p=0.004), and underweight (p=0.000).

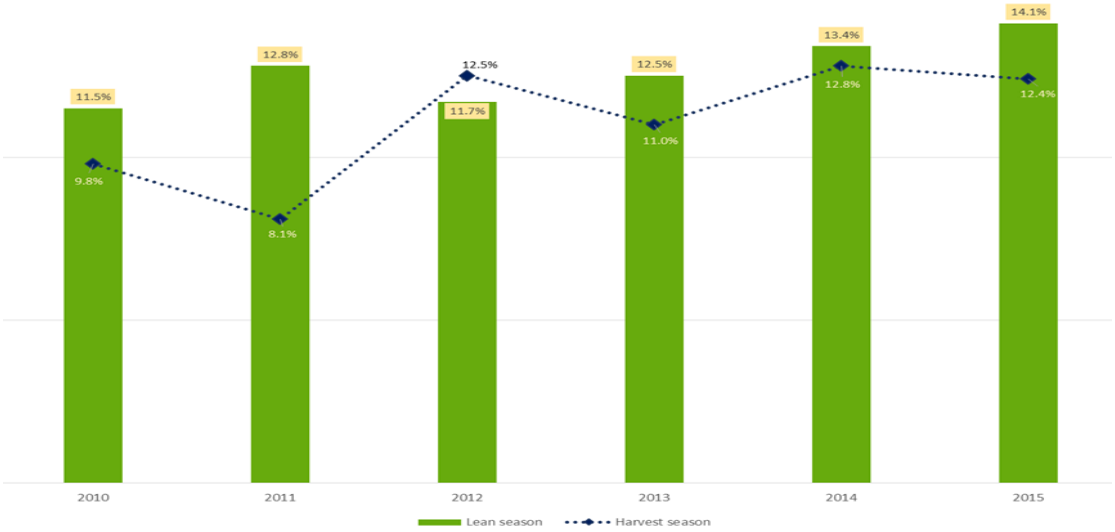


Figure 18: Trend analysis and forecast for GAM since 2010

The five year data for December Surveys suggest an urgent need or change of strategy in the interventions being implemented otherwise the regional average for GAM will soon reach the 'critical' stage beyond 14% **(Figure 18)**. Other indicators especially underweight shows similar trend.

5.7. Mean z-scores

The mean z-scores for weight-for-height (WFH), weight-for-age (WFA) and height-for-age (HFA) were all shifted to the left **(Figure 19)**. This suggests that the three anthropometric indices are deteriorating compared to the reference population of children (December 2013).

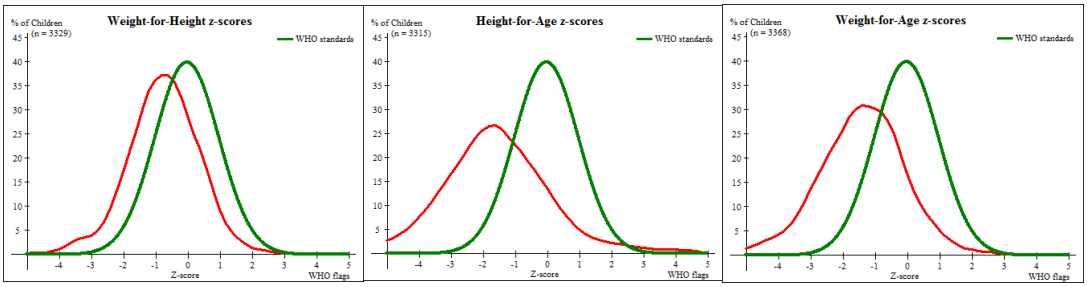


Figure 19: Distribution of malnutrition in the entire population of children in Karamoja

There was deterioration in nutrition status in the entire region compared to for example rates in December 2013. All districts showed some signs of deterioration except Moroto and Amudat. For Instance in Abim WFH was -0.17 in 2013 compared to -0.63. The median of the entire population of children in Karamoja for WFA and HFA is now -1.5 SD below the median reference, which is pathetic **(Table 11)**. This highlight the magnitude of work needed to improve nutrition in the region.

Table 11: Mean z-scores for weight-for-height, weight-for-age and height-for-age according to district

District	*Mean z-scores ± SD*		
	WFH	**WFA**	**HFA**
Abim	-0.63±1.04	-1.34±1.19	-1.27±1.46
Amudat	-0.77±1.08	-1.09±1.26	-0.96±1.82
Kaabong	-0.86±1.19	-1.62±1.42	-1.82±1.78
Kotido	-0.68±1.16	-1.43±1.32	-1.66±1.65
Moroto	-0.86±1.20	-1.52±1.47	-1.63±2.01
Nakapirit	-0.73±1.15	-1.45±1.33	-1.63±1.76
Napak	-0.86±1.09	-1.61±1.22	-1.76±1.49
Karamoja	-0.73±1.15	-1.40±1.34	-1.54±1.74

5.8. Prevalence of anemia in children and mothers

Over the past three years there has been some reduction in anemia prevalence among children 6-59 months from above 65% in 2013 to slightly less than 60% in the current assessment **(Table 12)**. A statistical correlation was found between anemia in children 6-59, stunting and underweight (p=0.000); 43.4% of anemic children were chronically malnourished against 'only' 33.8% among non-anemic children. Programmes aimed at addressing anemia shall have to be scaled up with special focus on Kotido and Nakapiripirit.

Table 12: Prevalence of anemia in children 6-59 months according to district

District	*Severely Anemia* %	*Moderately Anemic* %	*Mildly Anemic* %	*Not Anemic* %
Abim (N=280)	0.7	18.2	26.8	54.3
Amudat (N=318)	2.2	30.8	28.9	38.1
Kaabong (N=261)	1.1	29.5	31	38.3
Kotido (N=281)	5.3	29.5	25.3	39.9
Moroto (N=264)	1.5	19.3	25	54.2
Nakapirit (N=227)	1.8	37.4	27.3	33.5
Napak (N=291)	0.7	25.4	33.3	40.5
Karamoja (N=1922)	1.9	27	28.3	42.8

Likewise there was a regional decline in prevalence of anemia among women 15-49 years of age from around 45% in 2013 to the current 35% **(Table 12)**. No significant association of mothers' anemia with children's outcome indicators of malnutrition was observed.

Table 13: **Prevalence of anemia in women 15 – 49 years according to district**

District	*Severely Anemic* %	*Moderately Anemic* %	*Mildly Anemic* %	*Not Anemic* %
Abim (N=252)	0.4	2.8	17.9	79
Amudat (N=249)	0.8	7.6	26.5	65.1
Kaabong (N=286)	0.3	8	29.4	62.2
Kotido (N=243)	1.2	4.1	20.6	74.1
Moroto (N=234)	-	5.6	32.9	61.5
Nakapirit (N=219)	-	8.2	33.3	58.4
Napak (N=232)	-	3	29.7	67.2
Karamoja (N=1715)	0.4	5.7	27.1	66.9

5.9. Infant and young child feeding practices

5.9.1 Breastfeeding and complementary feeding practices

Early breastfeeding practices determine the successful establishment and duration of breastfeeding. It is recommended that children be put to the breast immediately or within one hour after birth. Early initiation of breastfeeding enables breast milk production to be stimulated.

Overall, 88% of children below five years of age were breastfed within the first hour of life. Higher prevalence of malnutrition were found among children who were not immediately breastfed (+2.6% wasting; +8.7% stunting; +4.6 underweight). A statistically significant correlation was found with stunting (p=0.022). A special focus should be given to sensitization on immediate breastfeeding, especially in Moroto where this factor contributes to the high rates of stunting.

Exclusive breastfeeding with no other liquids (including water) or food is recommended for the first 6 months of life. Exclusive breastfeeding rates among infants less than 6 months was high as equally observed in previous studies. Only Moroto district was less than 90% **(Figure 20).**

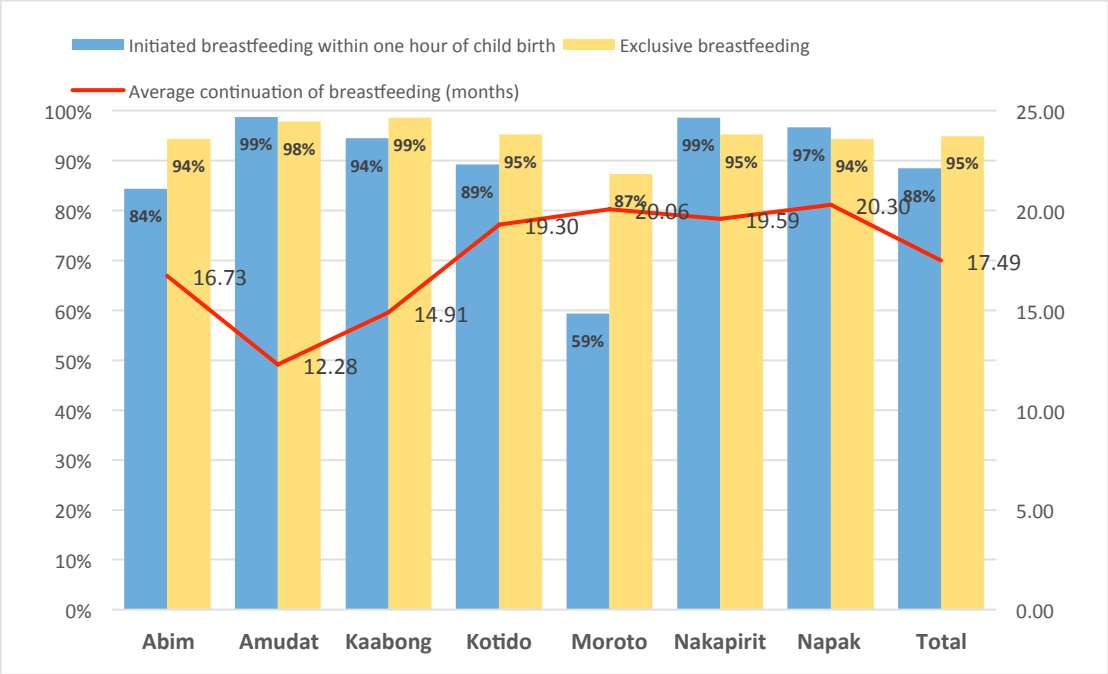


Figure 20: Exclusive breastfeeding rates among children 0-5 months according to districts

Continued breastfeeding is important for older infants and young children age 6-23 months, and contributes to the overall nutrient intake and remains the main sources of Vitamin C and A. On average, children in Karamoja are breastfed for 17.5 months, with the lowest levels observed in Amudat and Kaabong. A certain correlation (p=0.08) was found between the duration of breastfeeding and GAM. On average, wasted children were breastfed for only 15.5 months against 18.1 of non-wasted children. An even higher correlation was noticed between continued breastfeeding and underweight children (p=0.03).

Finally, it is interesting to notice that stunting had an indirect correlation with average duration of breastfeeding. Stunted children were breastfed for 18.8 months on average against 17.3 of non-stunted. Given the statistical correlation between minimum acceptable diet and stunting (p=0.047), it can be concluded that stunted children are more likely to be malnourished as the extended exclusive breastfeeding might limit the early introduction of complementary feeding. Alternatively the observations could have been a result of reverse causality bias, where mothers of stunted children continue to breastfeed them because they might intuitively look younger and shorter.

5.9.2 Quality of complementary feeding practices among children 6-23 months

Feeding practices were analyzed to ascertain whether children were able to feed according to WHO guidelines in terms of frequency of meals, diversity of nutrients and whether the minimum acceptable diets were achieved or not.

On average, the introduction of complementary food on average takes place after 6.06 months from the childbirth, with some little differences noted between extremes in Kotido (5.72) and Kaabong (6.30). No significant correlation was found between the period of introduction of complementary foods and GAM, stunting or underweight **(Figure 21)**.

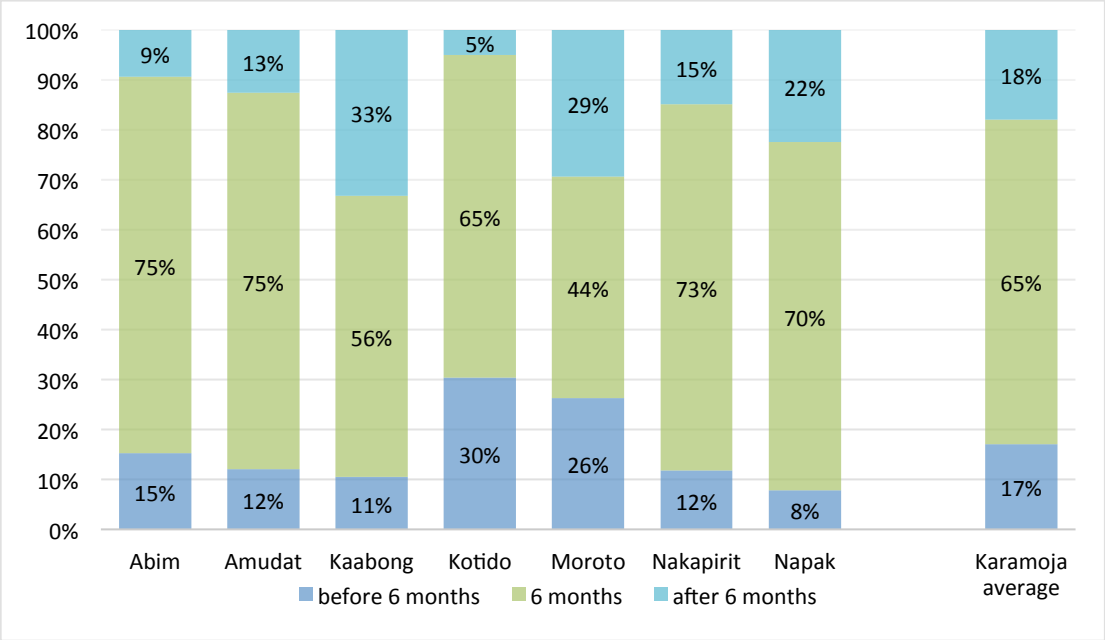


Figure 21: Introduction of complementary foods

Minimum Dietary Diversity (MDD) was assessed based on a modified WHO seven food groups categorization namely: cereals, pulses and oils, meats, eggs, milk, vitamin A rich fruits and vegetables, other fruits and vegetables, and for this survey fortified foods (WFP fortified products which were added to cereals during analysis).[3] Minimum dietary diversity was defined as the proportion of children who received at least four food groups during the previous day.

Table 14: Consumption of different food groups by children 6-23 months

	Wasting status		Stunting status		Underweight status		
	No	Yes	No	Yes	No	Yes	Total
Cereals and tubers	67.3%	67.6%	67.3%	67.1%	67.2%	66.5%	67.0%
Legumes and nuts	31.7%	31.2%	31.2%	32.8%	32.3%	30.9%	31.9%
Dairy products	28.3%	25.6%	28.4%	27.1%	26.8%	29.5%	27.7%
Meat, fish, poultry, liver, organ meats	4.7%	3.6%	4.6%	4.3%	4.2%	5.5%	4.6%
Eggs	2.8%	3.6%	3.8%	1.8%	2.4%	4.1%	2.9%
Vitamin A rich fruits	13.8%	17.6%	14.0%	14.7%	14.2%	14.3%	14.2%
Other fruits and	13.9%	12.4%	12.4%	16.6%	13.7%	14.3%	13.9%
Fortified foods	8.2%	13.6%	7.1%	12.0%	7.3%	12.3%	9.0%

No significant difference in the consumption of the various food groups was observed between malnourished and non-malnourished children. The only correlation found was the one between stunting and meat consumption (p=0.049), eggs (p=0.029), fruits and vegetables (p=0.025).

[3] WHO Indicators for assessing infant and young child feeding practices part 2: measurements.

At the regional level, the prevalence of children meeting the MDD has increased by 2.5% since December 2014 when it was 3.1% but has dramatically decreased over the last 6 months from 22% in June **(Figure 22)**.

The regional **Minimum Meal Frequency (MMF)** was relatively stable on the levels of December 2014 (34.3 in the current study against 36.5% in 2014) but had decreased significantly (-18%) since June 2015 when it was 52%. Children who met the MMF were significantly less likely to be stunted (36% not chronically malnourished against 30% of stunted) and wasted (4.5% vs 2.6%).

Overall, the **Minimum Acceptable Diet (MAD)** showed similar trends. A slight improvement was observed compared to December 2014 (from 2.2 to 2.7% in the current study) but decreased tremendously from 14% in May 2015. Kotido, Amudat, Moroto and Kaabong register the worst levels of MAD.

Finally, the daily **consumption of at least two milk feeds** among non-breastfed children – relevant source of proteins, fats and micro-nutrients – remains steadily low at 3%, with lowest records observed in Moroto (0.4%), Nakapiripirit (0.9%). The proportion of stunted children with access to 2 or more milk feeds daily was half (20.5%) the one not meeting the minimum intake (40.7%) (p=0.007). Amudat, the district with the highest concentration of livestock, had the highest proportion of children accessing at least two milk products daily. This has an impact on stunting which is lowest in Karamoja.

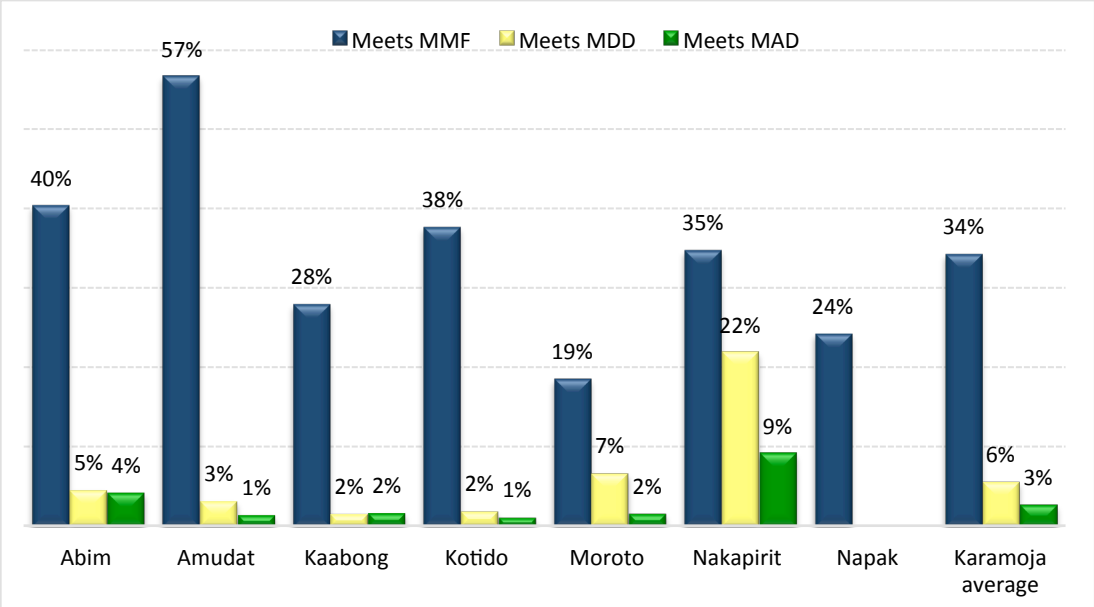


Figure 22: Children 6-23 meeting the minimum meal frequency (MMF), Minimum dietary diversity (MDD), Minimum acceptable diet (MAD)

While the MDD does not seem a key determinant of malnutrition, a strong correlation was found between MMF and stunting (p=0.018) and to a lesser extent wasting (0.063).

Compared to the national average of 5.7%, and other districts like Kabale and Kanungu where MAD was above 40%, IYCF programs in Karamoja should intensify complementary feeding promotion, encourage milk products consumption by infants and young children, and sensitize mothers on the relevance of introducing complementary feeding at the sixth month of age of their children.

5.10. Participation in MCHN program

A significant proportion of children 6-23 months were enrolled in the MCHN program and a large proportion of the enrolled children had MCHN cards present **(Figure 23)**. The lowest enrollment was observed in Moroto and Napak similar to what was observed in May 2015.

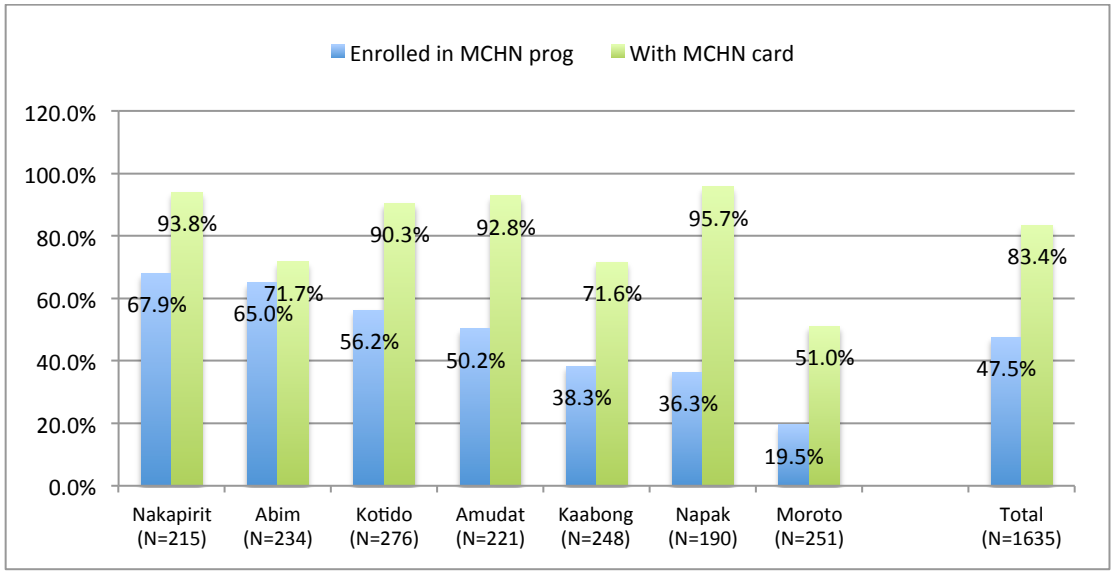


Figure 23: Proportion of children 6-23 months enrolled in the MCHN program

Children aged 6-23 holding MCHN cards had a much higher prevalence of malnutrition. In particular, 21% of wasted children were beneficiaries of MCHN programmes against 13.5% of normal ones (p=0.000). Similar trends were observed for stunting and underweight.

Given the effectiveness in the targeting of MCHN programmes, it is highly recommended to continue scaling it up, in particular in those districts with lower MCHN coverage and higher GAM prevalence (Moroto, Napak, Kaabong). In this regard, it is also important to ensure that adequate sensitization and awareness raising campaigns are regularly conducted, including through community based services and leaders.

5.11. Immunization, vitamin A supplementation and deworming coverage

Immunization, supplementation and deworming were above 85% among children in the second year of life when mothers' reports were considered **(Table 15).** Coverage and presence of child health cards has greatly improved in all districts.

Table 15: Immunization, deworming, Vitamin A supplementation

		Measles vaccination				DPT3 vaccination				Deworming				Vitamin A supplementation			
		Yes with card	Yes without card	No with card	No without card	Yes with card	Yes without card	No with card	No without card	Yes with card	Yes without card	No with card	No without card	Yes with card	Yes without card	No with card	No without card
Average Karamoja		79%	14%	6%	1%	84%	15%	1%	1%	81%	14%	4%	1%	82%	14%	3%	1%
District	Abim	79%	17%	2%	2%	82%	18%	1%	-	81%	17%	1%	1%	80%	19%	1%	1%
	Amudat	67%	17%	14%	2%	78%	21%	8%	-	76%	20%	4%	1%	79%	18%	2%	1%
	Kaabong	77%	12%	10%	1%	83%	13%	4%	-	79%	13%	9%	-	83%	14%	4%	
	Kotido	88%	10%	2%		90%	9%	1%	-	87%	11%	1%	1%	90%	10%		
	Moroto	82%	16%	1%	1%	82%	17%	1%	-	83%	17%	-	-	82%	17%	1%	1%
	Nakapirit	81%	12%	8%		87%	10%	2%	1%	86%	12%	1%	-	87%	12%	1%	
	Napak	78%	16%	5%	1%	83%	17%	-	-	74%	11%	10%	6%	68%	10%	15%	7%

No significant correlation was found between the malnutrition status of children and morbidity to the most common diseases in Karamoja **(Table 16)**.

Table 16: Morbidity and malnutrition among children 6-59 months of age

	Wasting status		Stunting status		Underweight status	
Disease	No	Yes	No	Yes	No	Yes
Fever or malaria	82.6%	17.4%	54.9%	45.1%	64.1%	35.9%
Measles	100.0%	0.0%	50.0%	50.0%	66.7%	33.3%
Diarrhea	80.9%	19.1%	51.1%	48.9%	59.6%	40.4%
ARI or cough	83.3%	16.7%	51.7%	48.3%	63.8%	36.2%
Skin disease	81.5%	18.5%	45.8%	54.2%	61.1%	38.9%
Eye disease	84.6%	15.4%	44.8%	55.2%	57.3%	42.7%
Other	75.0%	25.0%	66.7%	33.3%	66.7%	33.3%
No disease	82.7%	17.3%	55.5%	44.5%	66.7%	33.3%

5.12. Prevalence of common childhood illnesses and bed net use

The most prevalent common childhood illness was malaria (46.2%) followed by ARI (43.9%) and was similar to previous assessments. Prevalence of diarrhea was particularly high in Moroto and Kotido **(Table 17)**. Very few cases of measles were also reported, but could not be confirmed during the assessment.

Table 17: Two-week prevalence of childhood illness among children 0-59 months

District	Fever/ Malaria	Measles	Diarr hoea	ARI	Skin disease	Eye disease	Other illness	No Illness
	%	%	%	%	%	%	%	%
Abim (N=613)	56.1	0.3	37.0	46.2	4.2	1.3	1.0	20.2
Amudat (N=587)	48.7	0.0	18.7	32.4	5.1	18.2	1.5	28.4
Kaabong (N=477)	54.7	0.2	30.0	44.4	11.1	19.3	4.4	17.0
Kotido (N=619)	25.5	0.5	38.8	44.1	10.7	4.4	0.5	27.8
Moroto (N=582)	47.6	1.4	39.5	52.4	16.2	15.8	1.9	27.7
Nakapirit (N=520)	49.4	0.6	31.9	59.8	6.9	7.7	2.5	14.6
Napak (N=513)	41.5	0.2	22.4	27.7	6.8	2.9	2.9	29.6
Karamoja (N=3911)	46.2	0.5	31.2	43.9	8.7	9.9	2.1	23.6

While fever was reported to be high, use of bed net for children was high in most districts except Amudat **(Figure 24)**. Net coverage has been high in all districts over the past two years except in Amudat. However, Nakapiripirit and Moroto coverage have started to deteriorate.

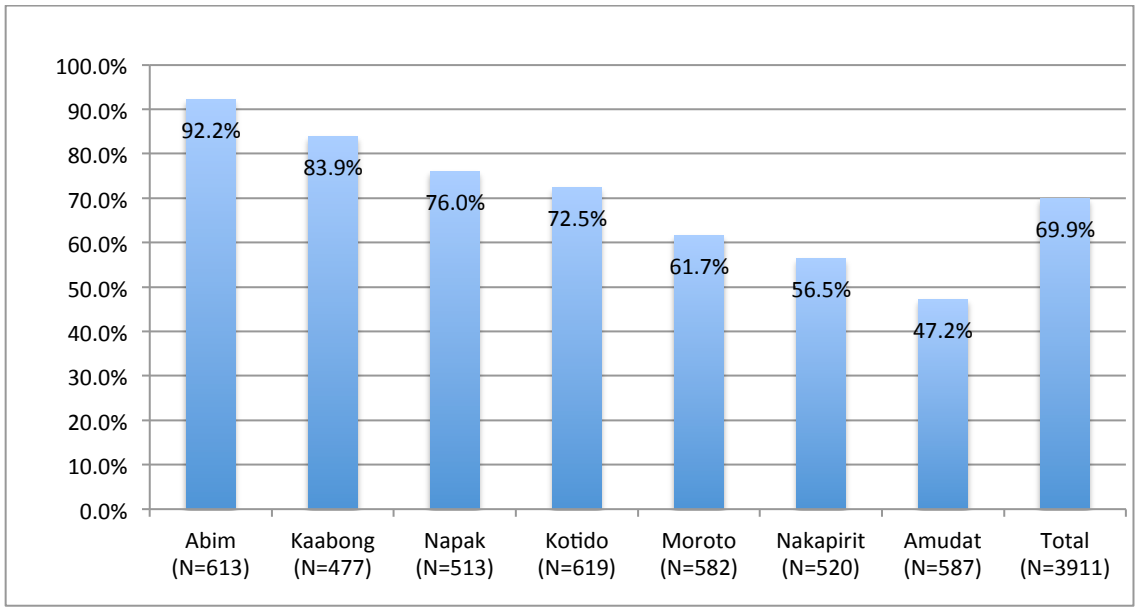


Figure 24: Proportion of children who slept under a bed net during the night preceding the survey according to district

The main source of treatment for sick children was public health facilities, mainly health centers **(Table 18)**. The care seeking practices in Karamoja are distinct from the rest of the country where a lot of care is sought from the private sector and VHTs.

Table 18: Care seeking facilities mostly used or visited by households according to district

District	Main Hospital	Health center	Private Clinic	Traditional healer	Village Health Team	Drug shop
Abim (N=480)	15.2%	81.3%	0.8%	-	2.7%	-
Amudat (N=510)	9.6%	88.4%	0.4%	-	1.2%	0.4%
Kaabong (N=496)	2.4%	95.4%	-	0.2%	2.0%	-
Kotido (N=512)		87.9%	-	3.1%	8.8%	0.2%
Moroto (N=546)	12.5%	87.2%	-	-	0.4%	-
Nakapirit (N=499)	3.8%	92.8%	2.2%	0.6%	0.6%	-
Napak (N=502)	18.5%	79.5%	1.4%	-	0.6%	-
Karamoja (N=3545)	8.9%	87.5%	0.7%	0.6%	2.3%	0.1%

5.13. Malnutrition among women in reproductive age (15-49 years)

5.13.1. Prevalence of underweight among women 15 – 49 years

Mothers' nutrition status assessed by BMI was poor as previously observed in similar assessments **(Table 19)**. The proportion of underweight mothers in Karamoja has remained constantly high. Prevalence of underweight amongst mothers was associated with wasted and underweight children and should be a matter of concern to programs. Around 17.9% of underweight mothers had at least one malnourished child against 11.7% among non-underweight mothers. Similar trends were observed for stunting and underweight.

Table 19: **BMI of mothers 15-49 years of age according to district**

District	Severely underweight %	Moderately underweight %	Normal %	Overweight %	Obese %
Abim (N=380)	0.3	15.3	78.2	3.9	2.4
Amudat (N=340)	1.8	17.6	75.6	4.1	0.9
Kaabong (N=351)	3.1	23.6	72.4	0.3	0.6
Kotido (N=355)	2.3	12.4	82.5	2.3	0.6
Moroto (N=380)	4.2	24.5	70.3	0.8	0.3
Nakapirit (N=342)	2.6	21.1	73.4	1.5	1.5
Napak (N=314)	5.4	23.9	69.1	1.3	0.3
Karamoja (N=2462)	2.8	19.7	74.6	2.0	0.9

In particular, a significant correlation was found in Kaabong (p=0.02) and Moroto (p=0.009), where wasted children had almost double the probability to live with underweight mothers **(Figure 25)**. In these two districts, measures to improve the nutrition status of mothers should be implemented.

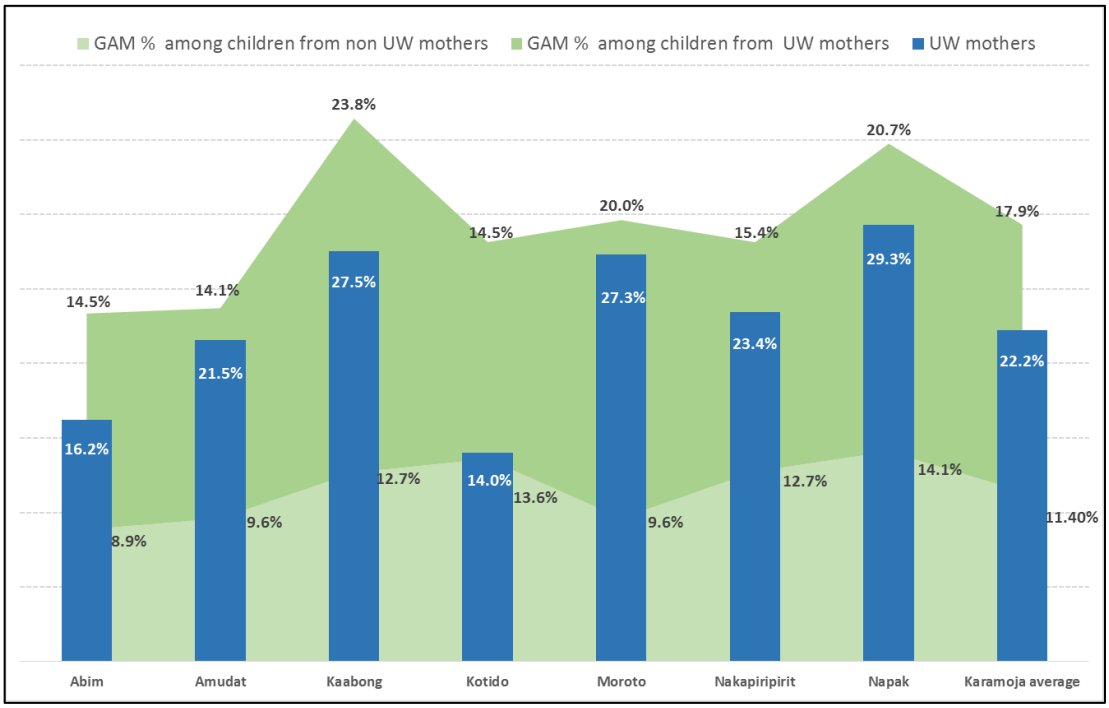


Figure 25: Prevalence of underweight mothers, GAM prevalence of children from UW mothers and from non-UW mothers

On average, each mother gave birth to 3.82 children, with the highest values in Napak (4.35), Kotido (4.12), Nakapiripirit (3.99), Amudat (3.93) and Napak (3.93). The number of children is not a key determinant of malnutrition, except for underweight. Statistically significant correlation between stunting and mothers with four or more children were found in Abim (p=0.05) and Napak (p=0.05).

Around 74% of mothers and primary caregivers interviewed were either pregnant or breastfeeding, with 1.2% breastfeeding while pregnants. Unfortunately, the limited number of records did not allow an analysis on the correlation between back-to-back pregnancies and underweight status of mothers. However, given the strong correlation between

mothers' underweight status and stunting, it is important to scale-up sensitization campaigns against back-to-back pregnancies in those districts where the prevalence of women lactating while pregnant is higher, namely Kaabong (2.0%), Kotido (1.6%) and Moroto (1.5%).

5.13.2. Education status of the mothers

As reported in previous assessments, the majority of the mothers aged 15-49 years had zero years of formal education **(Figure 26)**. The proportion of mothers with no formal education was highest in Kotido (96.6%) followed by Nakapiripirit (90.4%), Kaabong (87.9%), Amudat (87.2%), Moroto (84.6%), Napak (81.0%) and lastly Abim (29.8%).

The importance of formal education for mothers or children (both the girl and boy child) cannot be overemphasized. Education and keeping of the girl child in School is a fundamental factor for socioeconomic development and improvement of indicators in Karamoja region. All possible means including building of more boarding Schools, providing food in Schools, and directly linking Karamojong children with donor families elsewhere should be explored by relevant authorities in order to improve the education status of children in the region.

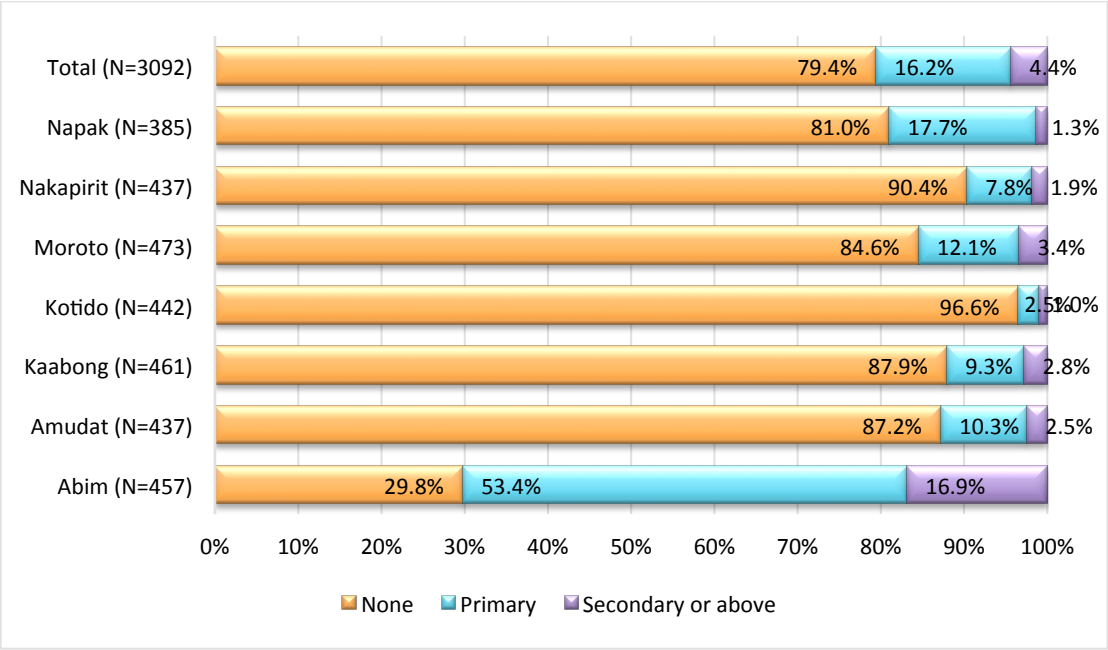


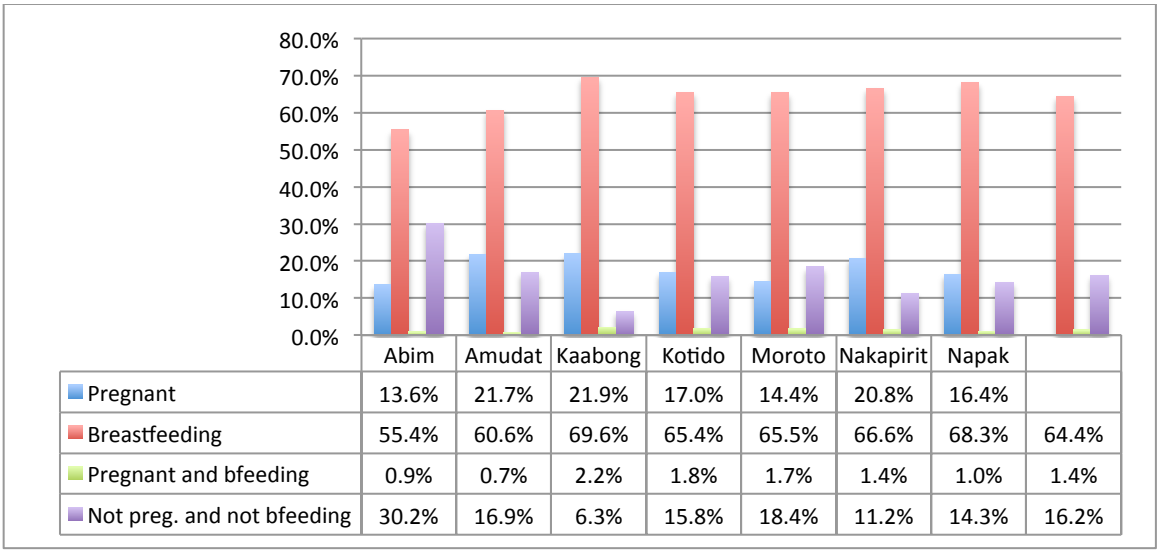
Figure 26: Education status of women aged 15-49 years according to district

Mothers with no education were significantly more likely to have malnourished children. In particular, 12.2% of uneducated mothers had wasted children against 8.3% of those who had access to any levels of education (p=0.004). Similar trends were observed for stunted children (38% vs 28%) and underweight (30% vs 20%). The correlation between mothers' education and wasting was significant in Abim, Amudat and Napoak, whereas the one with stunting was significant in Abim and Kaabong, and the one with underweight in Abim and Napak. No correlation was however found between the education level of mothers and their underweight status.

4.13.3. Reproduction and fertility of mothers

The majority of the women 15-49 years in Karamoja were either pregnant or breastfeeding **(Figure 27).** A large proportion had also given birth to four or more children **(Figure 28)**. The proportion of pregnant women around the period of the year was increasing from an

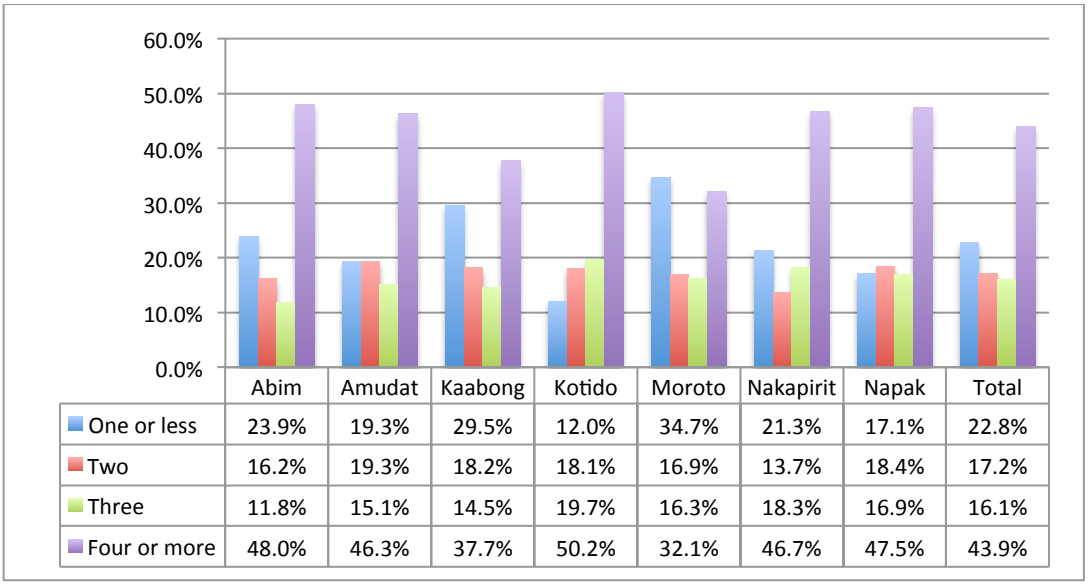
average of 12% in previous years to the current 18%. There is need to strengthen reproductive health services in the region.



	Abim	Amudat	Kaabong	Kotido	Moroto	Nakapirit	Napak	
Pregnant	13.6%	21.7%	21.9%	17.0%	14.4%	20.8%	16.4%	
Breastfeeding	55.4%	60.6%	69.6%	65.4%	65.5%	66.6%	68.3%	64.4%
Pregnant and bfeeding	0.9%	0.7%	2.2%	1.8%	1.7%	1.4%	1.0%	1.4%
Not preg. and not bfeeding	30.2%	16.9%	6.3%	15.8%	18.4%	11.2%	14.3%	16.2%

Figure 27: Reproductive health status among women 15-49 years according to district

Since our sampling was based on household regardless of presence of children, these findings are representative for districts and/or the entire region. The situation of high fertility in the region calls for partners to intensify reproductive health services.



	Abim	Amudat	Kaabong	Kotido	Moroto	Nakapirit	Napak	Total
One or less	23.9%	19.3%	29.5%	12.0%	34.7%	21.3%	17.1%	22.8%
Two	16.2%	19.3%	18.2%	18.1%	16.9%	13.7%	18.4%	17.2%
Three	11.8%	15.1%	14.5%	19.7%	16.3%	18.3%	16.9%	16.1%
Four or more	48.0%	46.3%	37.7%	50.2%	32.1%	46.7%	47.5%	43.9%

Figure 28: Number of live children by women 15-49 years according to district (N=3090)

6 WATER AND SANITATION

6.1 Latrine coverage

The situation of Latrine coverage in Karamoja is slowly improving over the past five years. However the majority of the districts for example Amudat, Napak, Moroto and Kotido still have over 80% of the households without any latrine **(Figure 21)**.

Only 13% of households in Karamoja have access to improved sanitation facilities, with the lowest levels observed in Moroto (7%) and Kotido (8%).

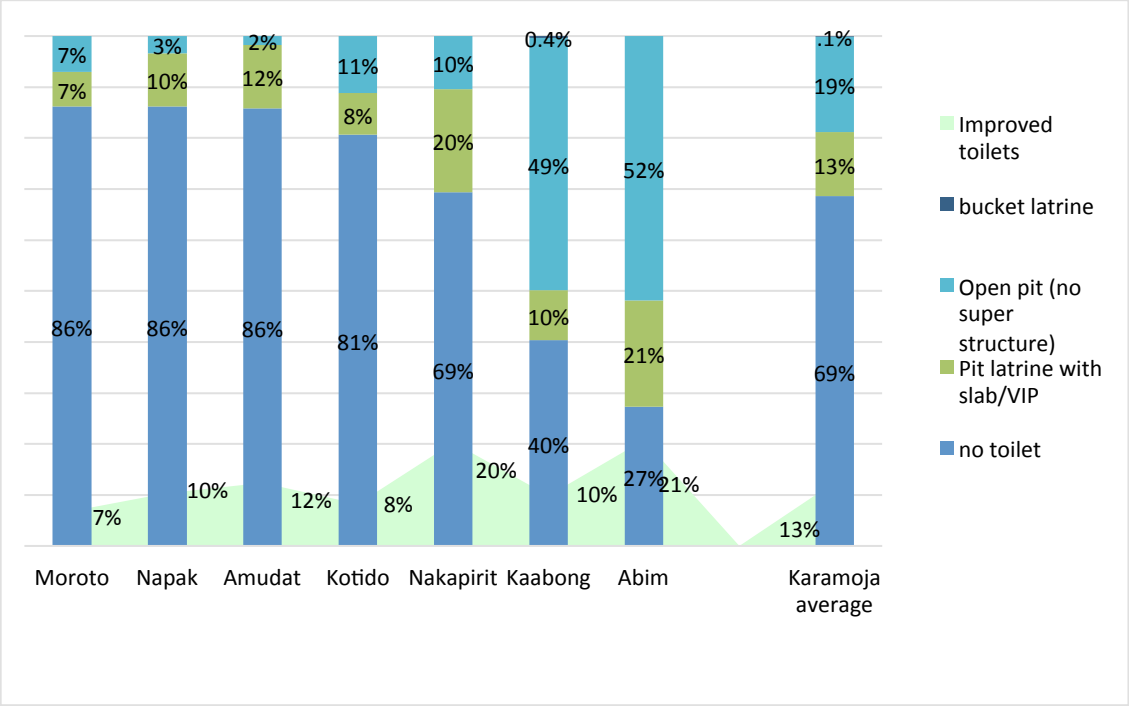


Figure 29: Kind of toilet facilities used by households according to district

Around 14% of households with toilets were sharing them with other households. Most shared toilets were in Abim, Kaabing and Nakapiripirit. Almost 50% of these households affirmed that they were sharing toilets with 3 or more other families.

The presence and use of toilets limits the risk of malnutrition among children 6-59 months. The prevalence of wasted children living in households with a toilet is 9.3% while this scales up to 13.7% within households with no facilities. Similar trends were observed for stunting and underweight children. The correlation between malnutrition and presence/absence of sanitation facilities was particularly significant in Nakapiripirit, Abim and Amudat districts.
The use of improved sanitation facilities (e.g. pit latrines with slab/VIP) is also relevant to limit malnutrition, particularly in Abim and Nakapiripirit.

6.2 Safe water coverage

While the quality of water and water sources is often acceptable in Karamoja, access and availability remain challenging. Over 88% of the households in Karamoja were using water from safe sources **(Table 6.1)**. This is mainly due dense network of boreholes dug or rehabilitated in the region over the years. This proportion varied however among the different districts, with the lowest observed in Amudat (71%). Here, almost 14% of the population reported using water from pond/dams or rivers.

Table 20: Source of drinking water according to district

District	Piped water	Open well/spring	Protected well/spring	Borehole	River/dam/ pond	Rain water	Other
Abim	1.0%	4.8%	2.9%	90.8%	0.4%		
Amudat	0.8%	8.2%	1.0%	69.2%	20.8%		
Kaabong	4.0%	1.2%	0.4%	83.1%	11.3%		
Kotido	1.2%	0.4%	4.7%	90.8%	0.6%		2.3%
Moroto	4.4%	0.2%	0.2%	87.2%	8.1%		
Nakapirit	13.1%	3.4%	2.0%	67.6%	13.7%	0.2%	
Napak	0.4%	5.2%	0.2%	89.4%	3.6%		1.2%
Karamoja	3.6%	3.3%	1.6%	82.6%	8.4%	0.0%	0.5%

Unfortunately very few households treat water **(Figure 30)**. Most of the water treatment was done by boiling (41%), chlorination (27%) and letting water to stand and settle (25%). Households who treated water had a lower proportion of wasted children (8.5% vs 12.6% of those who did not treat). Kaabong and Napak were the district in which the correlation was stronger against all the three indicators of malnutrition.

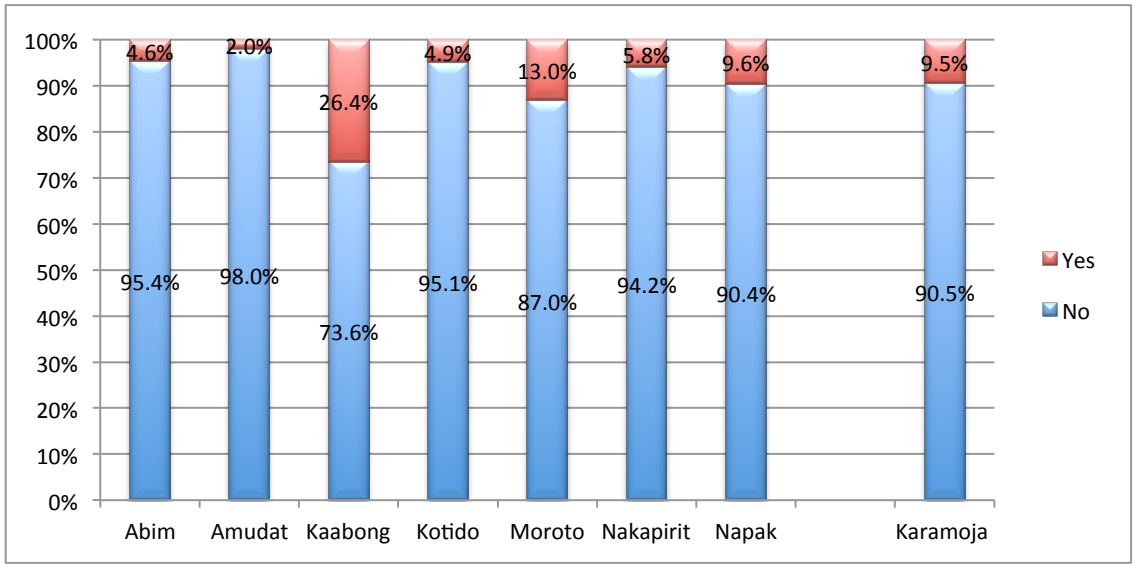


Figure 30: Prevalence of water treatment practice according to district

Water availability remain critical in Karamoja. Only one district – Abim – met the WHO guidelines on the amount of water per person per day **(Figure 31)**. The regional median was 10.2 liters falling short of the recommendation by 5 liters, whereas the mean was 12.8l.

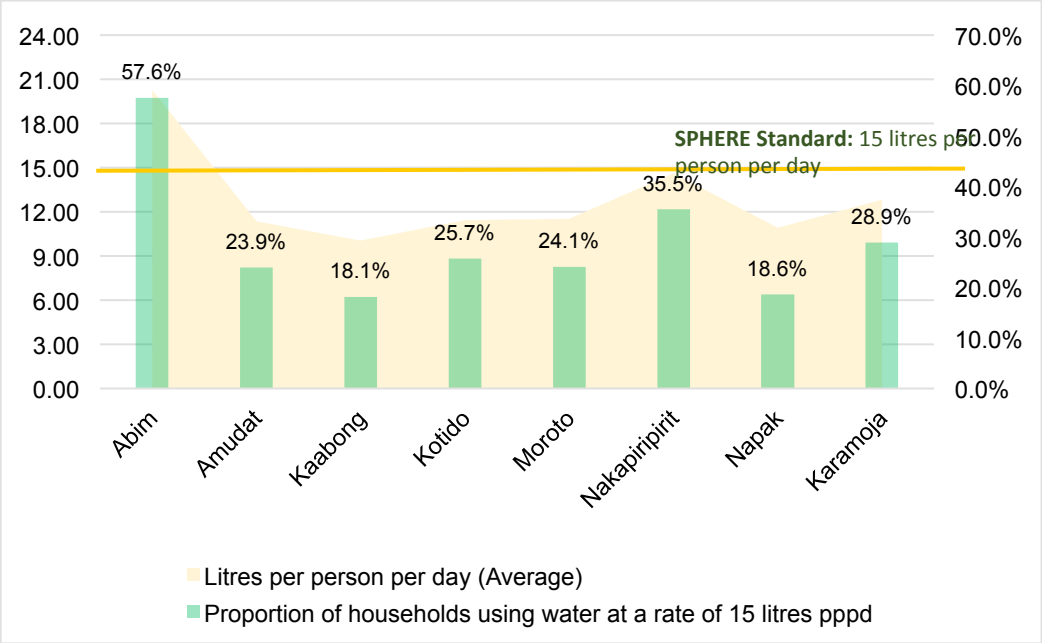


Figure 31: Percapita water use according to district

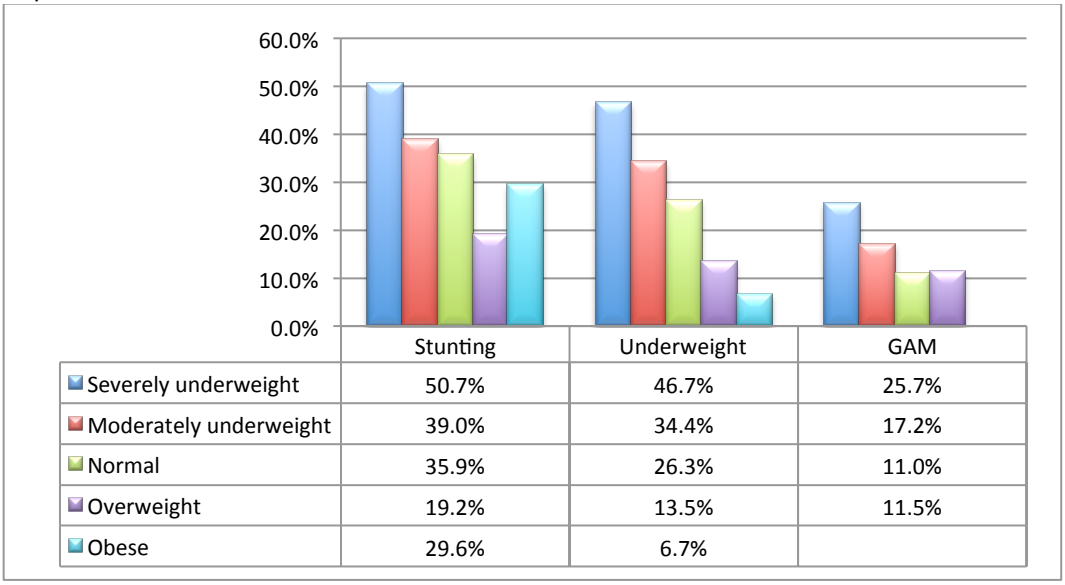
As per the other indicators of WASH, access to a minimal quantity of water is strongly related to malnutrition. Overall, the per-capita use of water in households with wasted children is 11.3 litres against 12.8 of those with no wasted children. Similar trends and correlation between water availability and stunting are observed as well as with underweight. The correlation is particularly strong in Kaabong, Abim and Nakapiripirit.

7. SUMMARY OF DRIVERS OF MALNUTRITION

A number of factors assessed were associated with malnutrition on bivariate analysis. The first seven (a. to g.) relate to individual level causality either from mothers or specific child-related determinants. The following ones relate to household level determinants. Please refer to Annex 1 and 2 for the complete list of direct and indirect determinants of malnutrition in Karamoja.

a. Mothers' malnutrition

Underweight mothers were significantly more likely to have children with malnutrition compared to normal, overweight or obese mothers **(Figure 32)**. Around 17.9% of underweight mothers had at least one malnourished child against 11.7% among non-underweight mothers. Similar trends were observed for stunting and underweight. In particular, a significant correlation was found in Kaabong (p=0.02) and Moroto (p=0.009), where wasted children had almost double the probability to live with underweight mothers. In these two districts, measures to improve the nutrition status of mothers should be implemented.

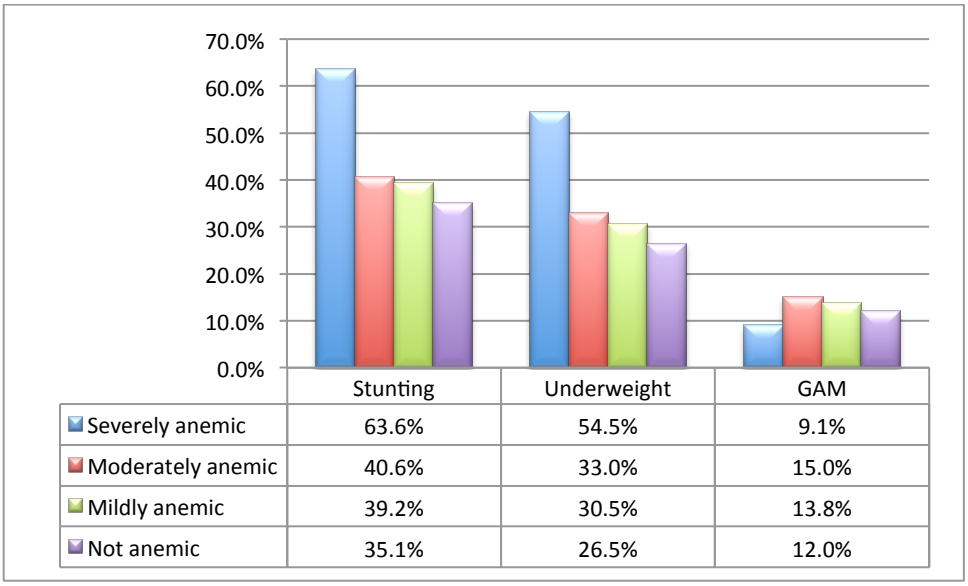


	Stunting	Underweight	GAM
Severely underweight	50.7%	46.7%	25.7%
Moderately underweight	39.0%	34.4%	17.2%
Normal	35.9%	26.3%	11.0%
Overweight	19.2%	13.5%	11.5%
Obese	29.6%	6.7%	

Figure 32: Association between GAM, Stunting and Underweight with mothers' underweight status

b. Anemia of children and mothers

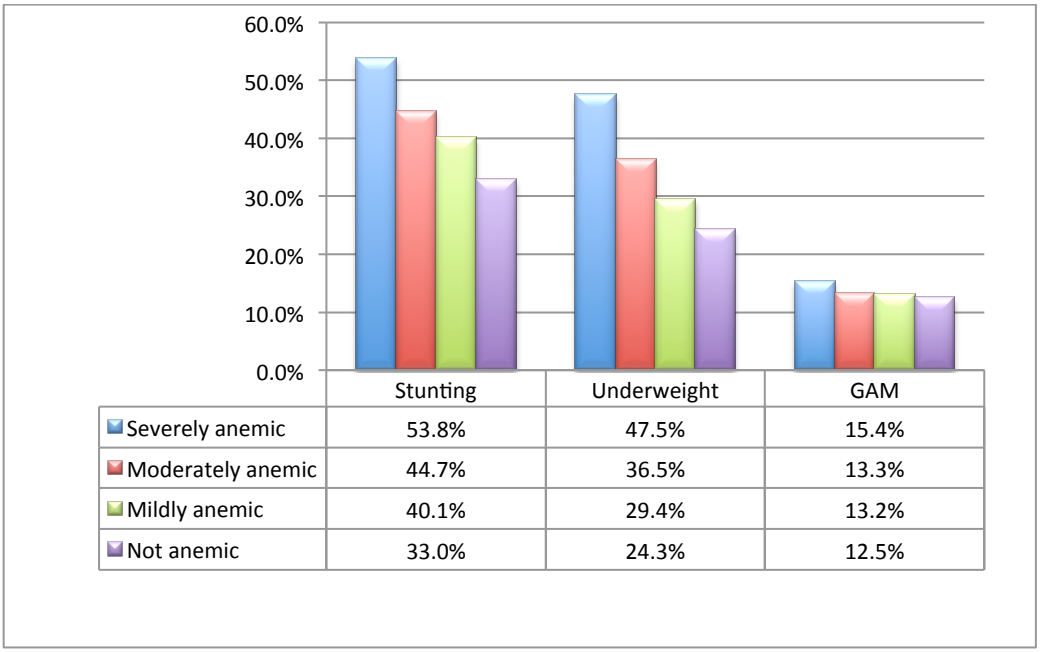
A statistical correlation was found between anemia in children 6-59, stunting and underweight (p=0.000); 43.4% of anemic children were chronically malnourished against 'only' 33.8% among non-anemic children. Programmes aimed at addressing anemia shall have to be scaled up with special focus on Kotido and Nakapiripirit. Child anemia status was significantly associated with childhood malnutrition **(Figures 33-34)**. Severely anemic mothers were also significantly more likely to have stunted and underweight children than the non-anemic ones.



	Stunting	Underweight	GAM
Severely anemic	63.6%	54.5%	9.1%
Moderately anemic	40.6%	33.0%	15.0%
Mildly anemic	39.2%	30.5%	13.8%
Not anemic	35.1%	26.5%	12.0%

Figure 33: Association of stunting, underweight and GAM with mothers' anemia status

Due to the design of the study, it was not clear whether anemia in children in Karamoja is chronic in nature since it was associated with stunting, a form of chronic malnutrition. But this finding calls for increased action to increase coverage for the micronutrient powder program.



	Stunting	Underweight	GAM
Severely anemic	53.8%	47.5%	15.4%
Moderately anemic	44.7%	36.5%	13.3%
Mildly anemic	40.1%	29.4%	13.2%
Not anemic	33.0%	24.3%	12.5%

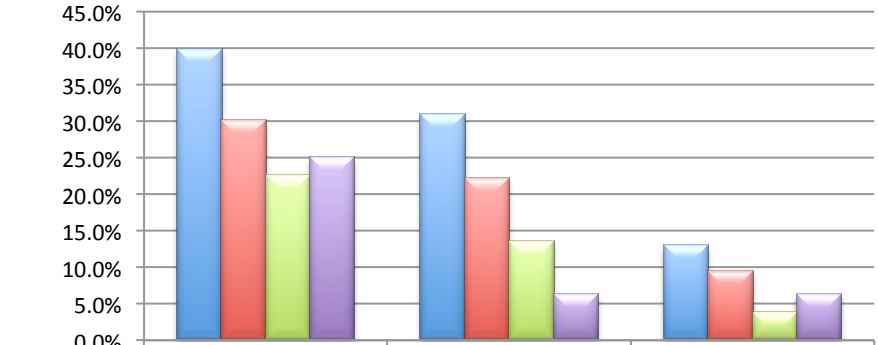
Figure 34: Association of stunting, underweight and GAM with children's anemia status

c. Number of children per mother

In particular, Mothers with 4 or more children were more likely to give birth to an underweight child. Also, a statistically significant correlation between stunting and mothers with four or more children were found in Abim (p=0.05) and Napak (p=0.05).

d. Education of mothers

Mothers with no education were significantly more likely to produce malnourished children. In particular, 12.2% of uneducated mothers had wasted children against 8.3% of those who had access to any levels of education (p=0.004). Similar trends were observed for stunted children (38% vs 28%) and underweight (30% vs 20%). The correlation between mothers' education and wasting was significant in Abim, Amudat and Napoak, whereas the one with stunting was significant in Abim and Kaabong, and the one with underweight in Abim and Napak.



	Stunting	Underweight	GAM
None	39.9%	31.0%	13.0%
Primary	30.1%	22.2%	9.5%
Secondary	22.7%	13.5%	3.8%
Tertiary	25.0%	6.3%	6.3%

Figure 35: Association of stunting, underweight and GAM with mothers' education status

e. IYCF – Early breastfeeding

A significant correlation was found between breastfeeding within one hour from the birth and stunting (p=0.022). A special focus should be given to sensitization on immediate breastfeeding, especially in Moroto where this factor highly contributes to the high rates of stunting.

f. IYCF - complementary feeding

Of the infant and young child recommended feeding practices only MMF was associated with malnutrition **(Annex 1)**. MAD had a weak negative correlation with stunting and GAM but not significant **(Annex 1)** while MDD was instead positively correlated with malnutrition. Finding such as MDD being positively correlated with malnutrition are not uncommon and could be due to reverse causality. That is, mothers improving feeding care for their children on realizing that children are malnourished. Children who meet the MMF were significantly less likely to be stunted (36% not chronically malnourished against 30% of stunted – p 0.010) and wasted (4.5% vs 2.6%, p=0.054). This should be reinforced in particular in Kotido, Moroto and Kaabong where MMF is lowest.

Finally, the proportion of stunted children with access to 2 or more milk feeds daily was half (20.5%) the one not meeting the minimum intake (40.7%) (p=0.007). Daily consumption of at least two milk feeds among non-breastfed children was particularly low in Moroto (0.4%) and Nakapiripirit (0.9%).

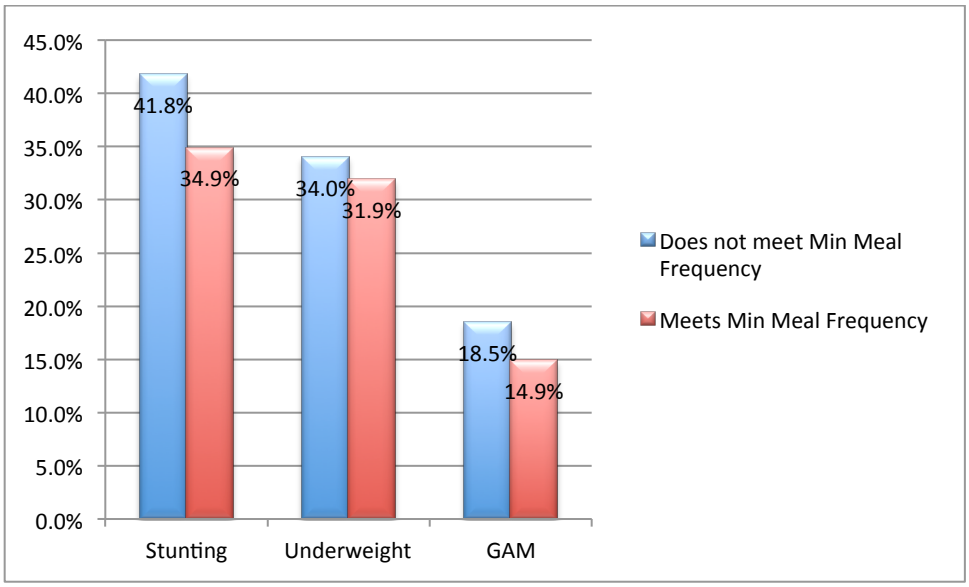


Figure 36: Association of stunting, underweight and GAM with minimum meal frequency among children 6-23 months

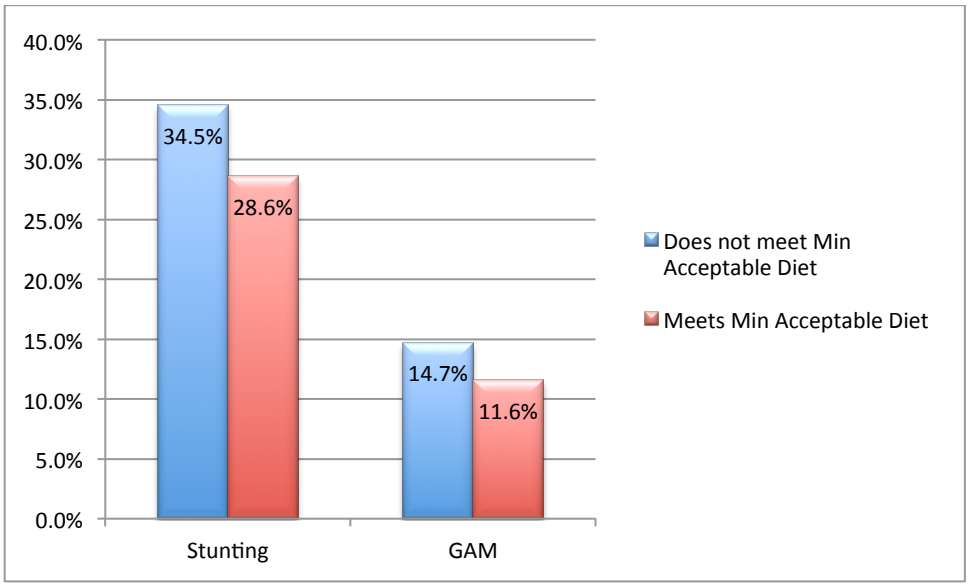


Figure 37: Association of stunting and GAM with minimum acceptable diet among children 6-23 months

g. Enrolment in MCHN programmes

Children aged 6-23 holding MCHN cards had a much higher prevalence of malnutrition. In particular, 21% of wasted children were beneficiaries of MCHN programmes against 13.5% of normal ones (p=0.000). Similar trends were observed for stunting and underweight. Given the effectiveness in the targeting of MCHN programmes, it is highly recommended to continue scaling it up, in particular in those districts with lower MCHN coverage and higher GAM prevalence (Moroto, Napak, Kaabong).

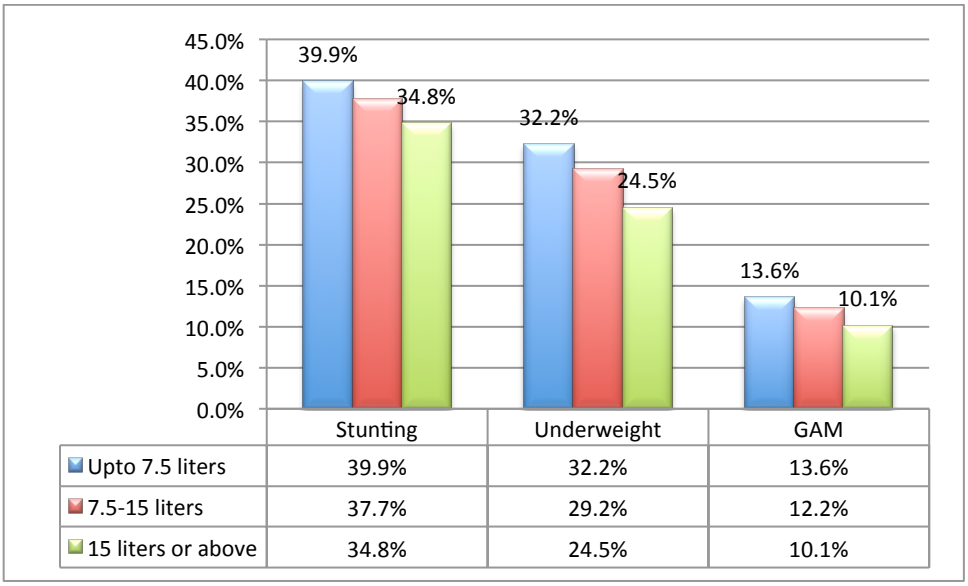
h. Demographic factors

The sex of the household head had a strong influence on wasting of children as over 16% of children from female headed households were acutely malnourished against 'only' 12% from

male headed ones. Also, the education level of the head of household is affecting significantly all malnutrition outcome indicators, especially when the vast majority of households have a head with no education at all. Finally, a much higher proportion of malnourished children (in particular with regards to wasting and underweight) and the age of the household head. Households headed by a head less than 18 or above 65 were extremely more likely to have malnourished children as opposed to those having a head aged 18 to 64 years.

i. WASH indicators

The amount of water used by household was significantly associated with all indicators of malnutrition. Children in households where the **percapita water use** was above 15 liters were less likely to be malnourished. In particular, a tight correlation was found between access to water (categorized as below minimum 15ltrs standard or above) and wasting and underweight.



	Stunting	Underweight	GAM
Upto 7.5 liters	39.9%	32.2%	13.6%
7.5-15 liters	37.7%	29.2%	12.2%
15 liters or above	34.8%	24.5%	10.1%

Figure 38: Association of stunting, underweight and GAM with percapita water use

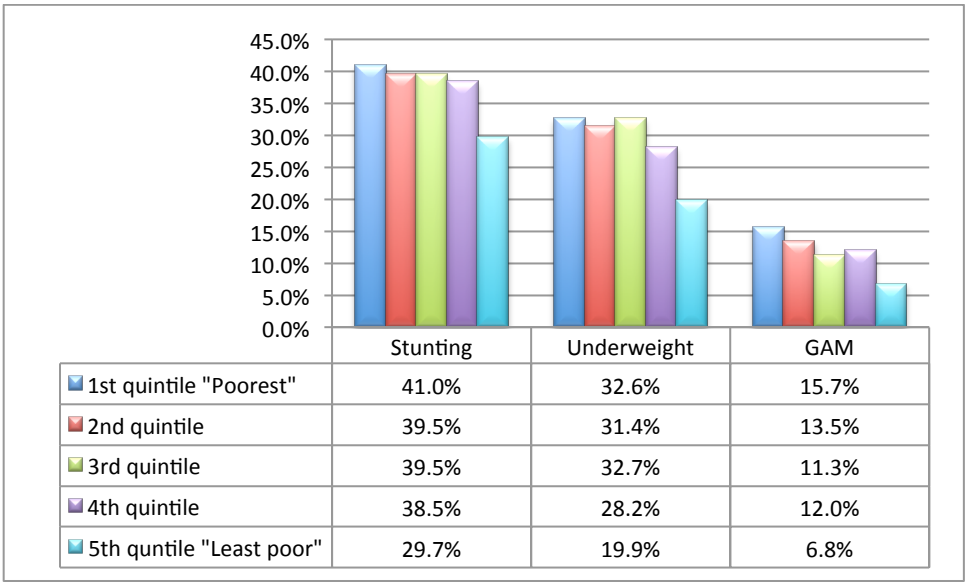
Also, the limited **treatment of water** was one of the key determinants of wasting. Only 8.8% of households who treat water had at least one wasted child against 13.2% of those who did not treat the water.

j. Household socio-economic status & livelihoods

Household socioeconomic status was significantly associated with all the three indicators of malnutrition. Children in the poorest socioeconomic quintile were more likely to be malnutrition compared to their better off peers. A stronger than average correlation between poverty and malnutrition was observed in Moroto, Napak and Abim. The relatively homogenous poverty patterns in Kaabong and Kotido could justify the scarce correlation.

Poverty status of Karamojong is strongly linked to livelihoods as the population in the poorest rely mainly on unsustainable and unprofitable income sources (food assistance, begging, gifts, pensions and allowances). Furthermore, a significant correlation was found between the number of income sources in a household and stunting ($p=0.000$) or wasting ($p=0.012$).

It is therefore important to invest in plans aimed at diversifying livelihoods opportunities in all districts of Karamoja, given that this has not only an impact on food access but also on nutrition status of children.



	Stunting	Underweight	GAM
1st quintile "Poorest"	41.0%	32.6%	15.7%
2nd quintile	39.5%	31.4%	13.5%
3rd quintile	39.5%	32.7%	11.3%
4th quintile	38.5%	28.2%	12.0%
5th quntile "Least poor"	29.7%	19.9%	6.8%

Figure 39: Association of stunting, underweight and GAM with household socioeconomic status

k. Household food security

Household level food consumption in particular were significantly associated with malnutrition. This means that no major distortion in the intra-household food distribution penalizing children was observed.

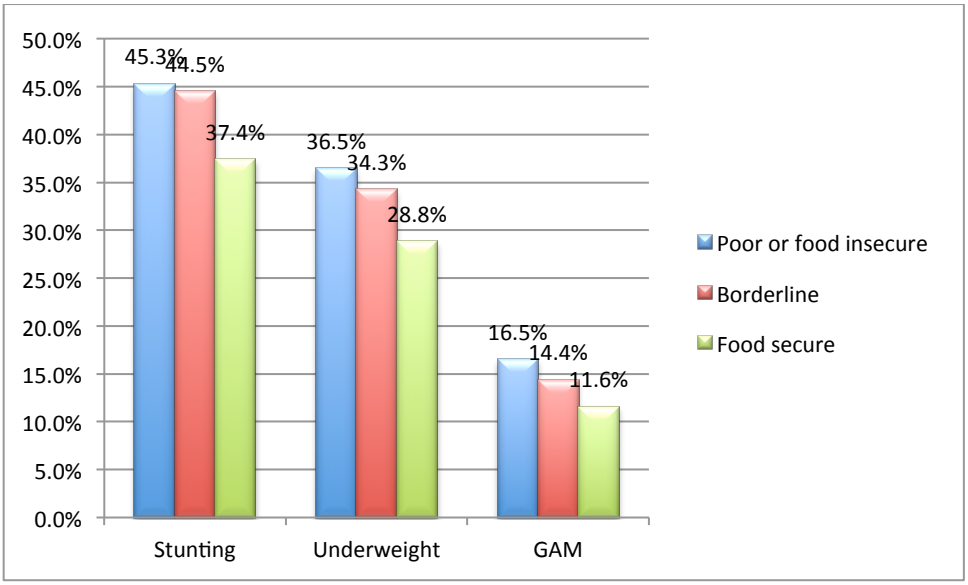


Figure 40: Association between stunting, underweight and GAM with household food consumption scores

Likewise, the consolidated household food security index, which is a summary of the household food security status, revealed that children living in severely food insecure households were at significantly higher risk of being malnourished compared to those children who were living in food secure households. This classical dose-effect relation highlights the importance of household food security but also validates the robustness of assessing food security using multiple dimensions as was done in this index.

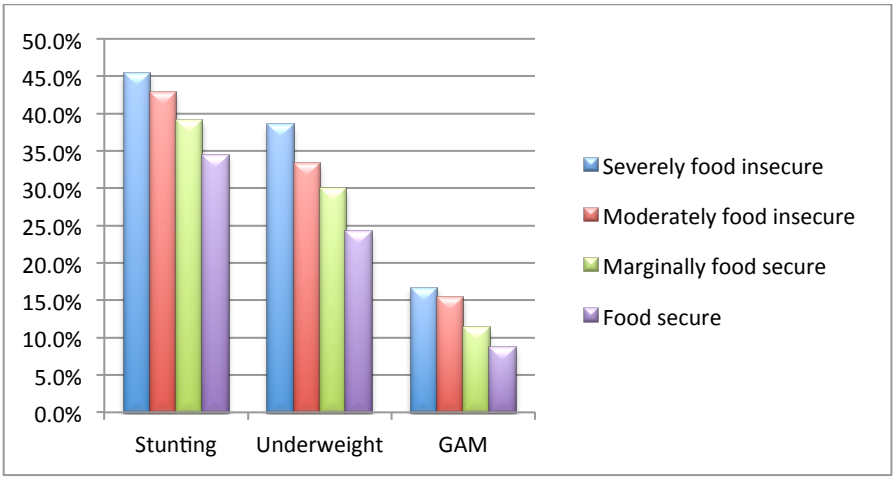


Figure 41: Association between stunting, underweight and GAM with the multi-dimensional summary of the household food security

l. Livestock ownership

Household livestock ownership had a significant association with malnutrition. The more the number of TLUs a household had the less was the risk of having a malnourished child. This correlation was particularly strong in Moroto and Abim districts.

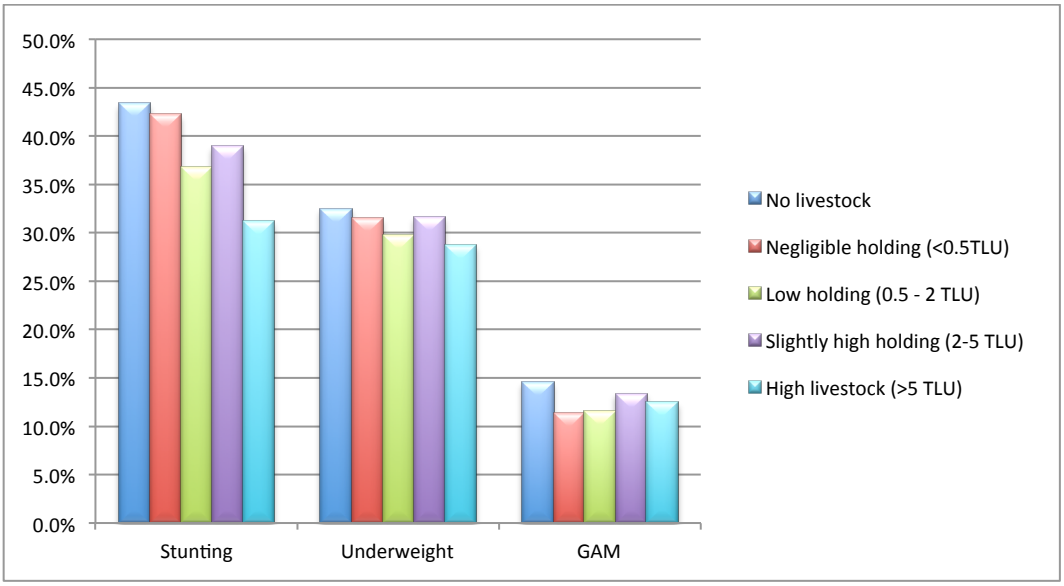


Figure 42: Association between stunting, underweight and GAM with household livestock ownership

m. Adoption of livelihood coping mechanisms

Households employing emergency livelihood coping strategies were more likely to have malnourished children compared to households that were not adopting any livelihood coping strategies.

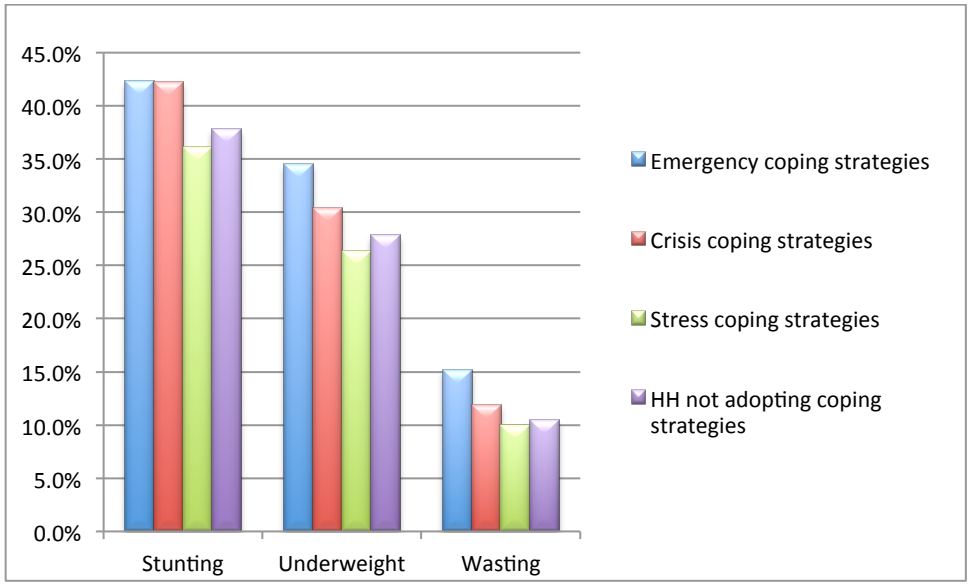


Figure 43: Association between stunting, underweight and GAM with household livelihood coping strategies

8.0 RECOMMENDATIONS AND CONCLUSIONS

8.1 Recommendations

Food Security and Livelihoods

- Prioritize targeting to female headed households in the whole region, even more so in Amudat, Kotido, Napak and Moroto.
- Ensure that household size (4 or less and 7 or more) is used as a criterion for targeting of humanitarian assistance. If necessary, in Napak prioritize targeting of small sized households (1-4 members), whereas in Moroto and Nakapiripirit big-sized ones (7 or more members).
- Continue providing assistance to EVHs.
- Increase access to foods rich in micronutrients (fruits, meat, milk, vegetables) by:
    - Exploring opportunities for vouchers to increase access to fruits and vegetables in the markets
    - Exploring opportunities to liaise with P4P and post-harvest losses for vegetables/fruits
    - Scaling up projects leading to improved own production of vegetables and fruits (e.g. kitchen gardens)
    - Enhancing access to milk all year round through fodder cultivation

- Increase livelihoods opportunities for the creation of community assets having an impact on sustainability of income in Karamoja, notably:
    - ***Pastoral areas***: Identify community assets in pastoral areas maximizing the outreach to beneficiaries in terms of population coverage and long-term benefits; these might include sand dams, sub-soil water tanks, half-moons, soil fertility enhancement measures, feeder roads to markets and veterinary services.
    - Given the high levels of gifts, begging and borrowing promote loans through VSLA or cover for collaterals of female-headed households towards SACCOs
    - Explore the opportunity to support alternative income sources such as bee keeping, wood lots, fruit tree planting for sale.
    - Geographical targeting: Moroto, Kotido, Kaabong
    - ***Agro-pastoral areas***: Liaise with FAO and relevant partners to identify key community assets aimed at increasing access to water (rehabilitation of boreholes, distribution of hand pumps, construction of sub-soil water tanks), soil fertility enhancement measures around water catchment, promote fodder and vegetable/fruit production lots, feeder roads construction to link farmers to markets.
    - Given the high levels of gifts, begging and borrowing promote loans through VSLA or cover for collaterals of female-headed households towards SACCOs
    - Geographical targeting: Napak
    - **Targeting profile**: female-headed households, HH size (1 to 4), households with disabled members/head of HH over 35 years, HHs with no or limited number of livestock.
    - Tool: CFA/FFA (When possible promote cash distribution)

- Strengthen EWS for flash floods and sudden increases in livestock morbidity and mortality (CAHWs could be the ideal focal points for KIIs), explore the opportunity to link this to mVAM
- Strengthen Community Animal health workers' network

- Extend vaccination campaigns against the most common diseases
- Promote programmes aimed at restoring livestock presence and ownership through chain of solidarity and/or granting trust funds covering for collaterals with SACCOs.
- Plant fodder to increase coverage of animal food consumption in lean season
- Replenish stocks (including sub-soil water) through:
    - Watershed management
    - build water retention infrastructures during lean season (FFA)
- Geographical targeting: Kaabong, Kotido, Moroto.
- Profile of beneficiaries: e.g. female headed
- Plan for food assistance (in-kind, CBIs) before the usual onset in March in the region to the most vulnerable:
    - Female headed households
    - HH size (1 to 4),
    - households with disabled head of HH
    - Head of HH over 65 yrs.
- Geographical targeting: prioritize districts affected Kaabong, Kotido, Moroto and Napak if necessary
- Advocate towards FAO and local authorities to enhance access to land for women and female-headed households through the following:
    - Advocacy towards local communities & leaders
    - Promote distribution of agricultural kits (seeds and tools)
    - Continue providing trainings on best practices, including association of azote-fixing tree-shrubs & herbaceous species
    - Participation to FFT or Farmers/Pastoral field schools
    - Introduce low cost micro-irrigation technologies for small scale farmers prioritizing on female headed households
    - Promote introduction of short-cycle varieties of key crops and sensitize over their use in case of rainy season condensed in a short period (e.g. Nov-Jan).
- Strengthen resilience programmes in pastoral areas targeting female headed households
- Strengthen Community Animal health workers' network
- Limit exposure to food prices fluctuations by reducing post-harvest/stocks losses
- Distribute seeds and agricultural kits to vulnerable households in Kaabong, Kotido and Napak who were obliged to consume their seed stocks due to poor harvests. As per the other.
- Increase access to cash and food by scaling up community assets conditional transfers (F-CFA, F-CFT) in Moroto, Kaabong, Kotido where most people borrow cash for food purchase.
- Explore the opportunity to negotiate with formal micro-credit financial institutions (banks, SACCOS, other cooperative of credit) for small loans at very low interest rate to reduce exposure to usury rates. This could be applied in the major urban centres with high levels of boorowing (Abim, Nakapiripirit, Moroto and Napak). If necessary consider small trust funds to cover for the collateral in case of insolvability.
- There should be for a restocking program in Karamoja for nutritional and livelihood purposes. Restocking should be done with adequate program for parasite and disease control for livestock.
- Scale-up take home rations for girls under school feeding programmes
- Increase school feeding and home grown school feeding programmes
- Scale up Food For Education and Food For Training projects for young women, associated to literacy courses and sensitization on best parental care practices.

- If necessary, prioritize the scaling up of education programmes (WFP and others) in Abim, Amudat, Kaabong and Napak. Given the higher proportion of educated mothers in Abim, a more thorough assessment to profile uneducated mothers is recommended.

Nutrition, water and sanitation

- Maternal health and nutrition status correlated well with nutrition outcomes of children. Programs targeting to improve the nutrition status of mothers should be extensively implemented.
- In order to address the poor infant and young child feeding, children 6-23 months should be specifically targeted with blanket supplementary feeding programs
- Programs aimed at controlling anemia among children such as the micronutrient powders should be implemented to cover a wide coverage since anemia in children was associated with other nutritional outcomes
- Provision of safe water alone is not adequate for nutritional outcomes. Efforts should be done to increase the quantity of water for use at household level.
- Support anti-anemia programmes for children, especially in Kotido, Amudat and Nakapiripirit.
- Stunting: sensitization on Immediate BF (especially in Moroto).
- Increase complementary feeding: BSF to children 6-24
- Increase livelihoods intervention on pastoralism enhancing milk/meat production
- Sensitize mothers to the introduction of complementary feeds at 6 months, including dairy products, meat, fruits and eggs.
- Scale up MCHN coverage, in particular in those those districts with lower MCHN coverage and higher GAM prevalence (Moroto, Napak, Kaabong).
- Raise awareness on MCHN programmes through community based initiatives and services/leaders
- Strengthen screening process for mothers at health and nutrition recuperation centres, with a specific focus in Moroto and Kaabong
- Consider targeted supplementary feeding for mothers following screening
- Increase targeting in favour of PLW and mothers in asset creation/livelihoods project
- Sensitize towards the increasing risks of stunting for mothers with more than 3 children in Abim and Napak.
- Scale up sensitization campaigns against back to back pregnancies especially in Kaabong, Moroto and kotido.
- Promote projects aimed at coverage of improved sanitation facilities in Karamoja (slab/VIP pit latrines increasing), if necessary by prioritizing in Nakapiripirit, Abim, Amudat.
- Promote sensitization campaigns to raise awareness on the relevance of use of toilets, and on the risk of malnutrition to children related to open defecation practices.
- Sensitize over the importance of treating water before drinking, prioritizing if necessary Kaabong and Napak districts.
- Procure and distribute desinfecting pills to PLWs at nutrition centres or health centres
- Promote project aimed at increasing the coverage of population from improved water sources (ie digging/rehabilitating boreholes, mountain springs, etc), preferable using solar power or hand pumps.

- Coordinate with relevant partners in the sector to identify areas with poor water coverage and increase distribution of clean water through construction of small aqueducts, fountains
- Integrate structures for facilitating livestock usage of water in the surroundings of the water point
- Increase coverage of water points within schools and health centers

Others

- Programs aimed at improving household socioeconomic status and also possibly targeting social ills like alcoholism should be implemented. Anecdotal information from supervisors indicated a lot of alcoholism amongst mothers, which might hinder or even reverse all the gains made over the past decade.
- Target: all district – prioritizing Kaabong, Kotido, Moroto and Napak.

8.2 Conclusions

The prevalence of GAM was 12.4% for Karamoja and Napak district had the highest prevalence at critical levels (16.3%) while the rest were at serious levels (above 10%) except Abim (9.7%). The most affected age group were children 6-23 months where GAM prevalence was at critical level in all districts except Amudat (12.4%). The trend of GAM in Karamoja over the last five years depicts a worsening situation with Abim district deteriorating with over 3 percentage points. Anemia prevalence was 57.2% in Karamoja. There was some small improvement in anemia prevalence among children 6-59 months from above 65% observed in previous studies. However, Nakapirpirit, Amudat, Kaabong and Napak still had anemia prevalence of 60% or above.

Infant and young child feeding practices were in a dire situation in all districts with only 2.7% of the children 6-23 months in Karamoja having the minimum acceptable diet, 5.6% having the minimum diet diversity and 34.3% meeting the minimum meal frequency.

Over 85% of the children in all districts were immunized; but only 23.6% were reported not to have suffered from any illness in the two weeks preceding the assessment with malaria and ARI being the most common; and 69.9% of the children slept under a bed net with Abim (92.3%) leading and Amudat (47.2%) at the bottom.

A high proportion of households (45.9%) in Karamoja were food insecure, with Kaabong (73.2%), Kotido (65.0%), Moroto (53.6%) and Napak (45.9%) above the regional average. There was high food and livelihood coping strategies that were being adopted in Karamoja with only 23.1% of the households not adopting any coping, 13.1% were stress coping, 12.5% crisis coping and 51.2% emergency coping.

Latrine coverage has slightly improved to 30% from about 10% 5 years ago. However, Amudat, Napak, Moroto and Kotido still have over 80% of the households without any latrine. Over 80% of the households in Karamoja were using water from safe sources mainly from boreholes. However, 20% of household in Amudat, 13.7% in Nakapiripirit and 11.3% in Kaabong reported to be using water from ponds, dams or rivers. The average quantity of water used was below the recommended 15 liters per person per day in all districts except Abim.

The factors that were independently associated with malnutrition included livestock ownership, household food security status, amount of water available for use at household level, household socio-economic status, anemia status of children, maternal underweight and a child being of male gender.

The high correlation between household level food security and malnutrition status of children aged 6 to 59 months was observed in particular in Abim, Napak and Nakapiripirit districts, whereas it was less strong in the districts with the highest prevalence of malnutrition, Kaabong, Kotido and Moroto. Here, other factors including WASH and parental care highly contribute to malnutrition of children and it is therefore important that a more comprehensive multi-stakeholders' approach to tackle these drivers is put in place.

ANNEX1 - Summary of individual direct determinants of malnutrition

Determinants of malnutrition (individual level)		Wasting status		Stunting status		Underweight status	
		No	Yes	No	Yes	No	Yes
Malnutrition of mothers	mother non-underweight	78.8%	68.7%	78.7%	76.3%	79.9%	72.2%
	mothers underweight	21.2%	31.3%	21.3%	23.7%	20.1%	27.8%
	p-value	.000*		.159		.000*	
Number of children per mother	none to 3	49.6%	46.4%	49.6%	48.3%	50.8%	46.0%
	4 or above	50.4%	53.6%	50.4%	51.7%	49.2%	54.0%
	p-value	.229		.458		.011*	
Anemia of child	No	43.1%	40.6%	47.1%	36.8%	46.3%	35.1%
	Yes	56.9%	59.4%	52.9%	63.2%	53.7%	64.9%
	p-value	.474		.000*		.000*	
Education of mothers	none	79.3%	87.5%	77.1%	85.1%	77.8%	85.9%
	primary or above	20.7%	12.5%	22.9%	14.9%	22.2%	14.1%
	p-value	.000*		.000*		.000*	
Early breastfeeding	No	11.7%	13.8%	10.6%	14.4%	11.6%	13.9%
	Yes	88.3%	86.2%	89.4%	85.6%	88.4%	86.1%
	p-value	.361		.022*		.195	
Minimum Meal Frequency (MMF)	Does not meet MMF	65.1%	71.4%	63.6%	70.0%	65.5%	67.9%
	Meets MMF	34.9%	28.6%	36.4%	30.0%	34.5%	32.1%
	p-value	.054		.010*		.344	
Minimum dietary diversity (MDD)	Does not meet MDD	97.4%	95.5%	97.3%	97.0%	97.4%	96.8%
	Meets MDD	2.6%	4.5%	2.7%	3.0%	2.6%	3.2%
	p-value	.031*		.622		.304	
Minimum Acceptable Diet (MAD)	Does not meet MAD	97.2%	98.0%	96.8%	98.4%	97.3%	97.7%
	Meets MAD	2.8%	2.0%	3.2%	1.6%	2.7%	2.3%
	p-value	.442		.051		.591	
Child 6-23 months enrolled in the MCHN Programme	No	54.3%	40.7%	54.6%	49.5%	54.4%	48.7%
	yes	45.7%	59.3%	45.4%	50.5%	45.6%	51.3%
	p-value	.000*		.052		.032*	

ANNEX 2: summary of HH level determinants/factors of malnutrition

Demographic factors		Wasting status		Stunting status		Underweight status	
		No	Yes	No	Yes	No	Yes
Sex of household head	Male	88.0%	12.0%	59.3%	40.7%	69.3%	30.7%
	Female	83.7%	16.3%	58.0%	42.0%	65.3%	34.7%
	p value	.003*		.555		.051	
HH size	1-4 members	87.6%	12.4%	61.4%	38.6%	72.2%	27.8%
	5-6 members	85.6%	14.4%	56.4%	43.6%	65.5%	34.5%
	7 or above	88.4%	11.6%	59.4%	40.6%	68.4%	31.6%
	p value	0.121		.060		.004*	
HH Head chronically ill/disabled	Yes	91.9%	8.1%	48.6%	51.4%	65.2%	34.8%
	No	86.9%	13.1%	59.8%	40.2%	68.8%	31.2%
	p value	0.031*		0.001*		0.262	
Education level head of HH	No education	85.8%	14.2%	57.4%	42.6%	66.3%	33.7%
	primary level	86.5%	13.5%	59.9%	40.1%	71.0%	29.0%
	secondary level or above	92.1%	7.9%	64.0%	36.0%	75.0%	25.0%

	p value	.000*		.007*		.000*	
HH head age	minor HH head	61.5%	38.5%	38.5%	61.5%	53.8%	46.2%
	18-35 yrs	87.4%	12.6%	59.0%	41.0%	69.3%	30.7%
	36-64 yrs	87.5%	12.5%	59.8%	40.2%	68.5%	31.5%
	>65 yrs	83.3%	16.7%	52.0%	48.0%	57.8%	42.2%
	p value	.026*		.195		.067	
NUSAF beneficiary	No education	87.5%	12.5%	59.8%	40.2%	68.9%	31.1%
	yes	85.5%	14.5%	54.8%	45.2%	66.9%	33.1%
	p value	0.202		.030*		.358	

WASH factors		Wasting status		Stunting status		Underweight status	
		No	Yes	No	Yes	No	Yes
Toilet presence within household	No	85.7%	14.3%	57.8%	42.2%	66.0%	34.0%
	Yes	90.3%	9.7%	61.4%	38.6%	73.8%	26.2%
	p value	.000*		0.051		.000*	
Improved sanitation facilities (PIT/VIP)	No	86.8%	13.2%	58.3%	41.7%	67.3%	32.7%
	Yes	90.2%	9.8%	63.6%	36.4%	77.3%	22.7%
	p value	.047*		.042*		.000*	
Water access beyond minimum (15ltrs)	No	86.4%	13.6%	58.0%	42.0%	66.9%	33.1%
	yes	89.5%	10.5%	61.9%	38.1%	73.0%	27.0%
	p value	.016*		.045*		.001*	
Household treat its drinking water	No	86.8%	13.2%	59.0%	41.0%	68.6%	31.4%
	Yes	91.2%	8.8%	59.2%	40.8%	68.2%	31.8%
	p value	.029*		0.944		0.901	

Socio-economic factors and food security		Wasting status		Stunting status		Underweight status	
		No	Yes	No	Yes	No	Yes
Number income sources	1	89.6%	10.4%	63.4%	36.6%	73.0%	27.0%
	2	85.4%	14.6%	61.5%	38.5%	67.6%	32.4%
	3 or more	87.1%	12.9%	54.8%	45.2%	66.7%	33.3%
	p value	.063[a,b]		.000[a,b,*]		.012[a,b,*]	
Cultuvated land size	none	96.2%	3.8%	69.2%	30.8%	73.1%	26.9%
	<1 acre	85.3%	14.7%	62.6%	37.4%	68.4%	31.6%
	1 acre or more	88.7%	11.3%	57.5%	42.5%	69.0%	31.0%
	p value	.019*		.027*		.859	
Livestock presence (TLU)	No livestock	86.5%	13.5%	56.2%	43.8%	67.9%	32.1%
	Negligible presence	87.3%	12.7%	57.3%	42.7%	67.6%	32.4%
	Medium to high presence	87.9%	12.1%	63.4%	36.6%	69.8%	30.2%
	p value	0.529		.000*		.481	
Household wealth quintiles	1st quintile "Poorest"	82.8%	17.2%	55.9%	44.1%	64.3%	35.7%
	2nd quintile	85.8%	14.2%	56.5%	43.5%	66.1%	33.9%
	3rd quintile	88.3%	11.7%	56.5%	43.5%	63.8%	36.2%
	4th quintile	87.5%	12.5%	58.9%	41.1%	69.6%	30.4%
	5th quntile "Least poor"	93.3%	6.7%	67.2%	32.8%	78.4%	21.6%
	p value	.000*		.000*		.000*	
Adoption of coping strategies (max severity)	No coping	89.6%	10.4%	62.0%	38.0%	71.9%	28.1%
	Stress coping	89.9%	10.1%	63.5%	36.5%	73.3%	26.7%
	Crisis coping	88.5%	11.5%	57.2%	42.8%	69.8%	30.2%
	Emergency coping	85.1%	14.9%	56.9%	43.1%	65.4%	34.6%

	p value	.003*		.018*		.001*	
Food Consumption group	Poor	83.6%	16.4%	54.2%	45.8%	63.3%	36.7%
	Borderline	85.6%	14.4%	54.6%	45.4%	65.4%	34.6%
	Acceptable	88.7%	11.3%	62.1%	37.9%	71.1%	28.9%
	p value	.005*		.000*		.000*	
Food security final classification	food secure	91.5%	8.5%	64.9%	35.1%	75.2%	24.8%
	Marginally food secure	89.0%	11.0%	60.5%	39.5%	70.1%	29.9%
	Moderately food insecure	84.5%	15.5%	56.5%	43.5%	66.4%	33.6%
	severely food insecure	83.5%	16.5%	53.9%	46.1%	61.5%	38.5%
	p value	.000*		.002*		.000*	