Food Security and Nutrition Assessment (FSNA) in Karamoja

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Report

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Demography

Approximately one-third (32%) of households in Karamoja are female headed, of which the highest percentage of 42% was found in Napak district. About 10% of household heads were either disabled or chronically ill, the highest of which was in Kotido (15%). Also, considerably more female household heads have never been to school compared to male household heads (81% of female heads as compared to 68% of male heads of household). Female headed households are therefore deemed to be highly vulnerable to food insecurity.

Food availability

Livestock production: Forty three per cent (43%) of households own no livestock, and, furthermore, the level of livestock holding is low (<1 Total livestock unit/TLU) among the 57% that own livestock. Poultry, goats, and cattle are the most commonly owned among 45%, 36%, and 32% of households respectively. Livestock parasites/diseases are the major constraints affecting livestock production.

Crop production: Approximately 80% of households have access to agricultural land. Maize, sorghum and beans are the most commonly cultivated crops. However, when asked about their perceptions on the quantity of food harvested this year compared to last year, two-thirds (67%) of the households reported having harvested less food. The lean season is therefore projected to start earlier as findings further suggest that stocks will be depleted from many households in early February and from all households by end of March. Due consideration should be given in the timing of food assistance. The single most important constraint to agriculture was noted as drought/low rainfall.

Food access

Household assets: Approximately 96% of households owned at least one asset; the most commonly owned assets are; an axe (50%), a panga (71%) and a hoe (86%). This analysis suggests reliance on traditional, non-lucrative livelihoods. Furthermore, only 44% own a food store while only 24% own a seed store. This points to limitations in agricultural production and adequate post-harvest handling.

Household income: About three-quarters (75%) of households have at least one income earner. This is a significant finding as it implies that for the majority of the households, food access is not

an obstacle. The high percentage of income earners is due to income derived from food crop production/sales following the harvest season.

Household expenditure: Food, health, clothes and shelter were the main expenditures for households. Food as a percentage of all household expenses accounts for 65%. This is an improvement as compared to data collected in June 2014 when it accounted for 70%. This is mainly due to the just concluded harvests which has resulted in an overall improvement in food access and availability. However, it should be noted that majority of the households reported education and health as their main nonfood expenditure items.

Household debt: About 40% of households reported being in debt and therefore with need to repay the loans. The highest percentage of households with debt was found in Abim (58%) and the lowest in Amudat (16%). The average amount of debt per household was UgX 71,000. Of the households that had debt, 76% borrowed primarily to buy food or cover health expenses. Most common sources of credit for households were informal e.g. through relatives and traders.

Food utilization

Food consumption: Food consumption scores are better as compared to June 2014 as a result of the harvest; about 45% of the population had acceptable Food Consumption Score (FCS), 32% borderline FCS, and 24% poor FCS. The highest percentage of food insecure households (borderline and poor FCS) was found in Moroto district (67%). The most important food sources were cited as own production and market purchases. Key factors affecting FCS at household level include gender and education level of the household head, livestock ownership, and the presence of an income earner in the household.

Stability

Shocks and Coping: Up to 80% of households suffered at least one shock in the 30 days preceding the survey. However the majority of households had a low food consumption coping strategy index (RCSI) with an average of 12.78. This is attributed to relatively higher food availability at the time of the survey, following the harvest. On the other hand, application of livelihoods coping strategies was common among households across the region. The most commonly used livelihoods coping strategies by households were borrowing of money (41%) and consumption of seed stock (26%). This is a manifestation of the chronic food insecurity that has characterized the region over time.

Safety and Security

Whereas 89% of household members that went to WFP Final Distribution Points (FDP) did not experience a safety problem, findings show that a higher percentage of households in Kaabong (32%), and among EVH households (27%) experienced safety problems. This necessitates a

comprehensive review of security threats faced by these households and implementation of measures to reduce safety and security incidents. This is especially required in Kaabong district.

Extremely Vulnerable households

On several measures, the Extremely Vulnerable Household (EVH) group was worse off compared to non EVHs, for example with a higher prevalence of disability/chronic illness, poorer harvests, and higher application of food consumption, stress and crisis coping strategies. However, EVHs were better off with regard to certain criteria such as ownership of livestock and food consumption scores (which in part could be a function of the assistance they receive). Nevertheless, the data strongly suggests that some EVH households might be better off, and calls for an urgent review of the classification criteria to ensure appropriate targeting of food assistance.

Summary on gender analysis for key food security indicators

Findings suggest that female headed households are highly vulnerable as they are worse off on several measures compared to their male counterparts (**Table 1**) with; lower access to land, fewer households with at least one income earner, and poorer food consumption scores, among others. Any interventions to address food insecurity in the region need to deliberately prioritize female headed households, the highest percentage of which are found in Napak (42%) against the region's average of 32%.

Table 1: Summary on gender analysis for key food security indicators

Parameter		Female Headed Households	Male Headed households
Household heads disabled or chronically ill	▼	16%	7%
Household heads never attended school	▼	81%	68%
Access to land	▼	76%	81%
Households that own food stores	▲	45%	44%
Households that own livestock	▼	48%	61%
Households with at least one income earner	▼	69%	78%
Households with debt	▼	41%	40%
Acceptable Food consumption scores	▼	38%	48%
Food consumption coping strategy index (RCSI)	▲	11.92	13.17
Households not adopting livelihood coping strategies	▲	28%	26%

▼ Female headed households worse off; ▲ Female headed households better off

Nutrition status

Prevalence of malnutrition in Karamoja has not improved for many years and Global Acute Malnutrition (GAM) was at serious level (12.8%) in the current assessment. Notably, Moroto and Kaabong had prevalence of GAM at critical level, a cause for real concern in the two districts.

District	*GAM % (95%CI)*	*SAM % (95%CI)*	*Stunting % (95%CI)*	*Underweight % (95%CI)*
Abim (N=559)	6.2 (4.5 - 8.6)	1.5 (0.7 - 2.9)	31.8 (28.0 - 35.8)	17.1 (14.2 - 20.4)
Nakapirit (N=399)	11.6 (8.8 - 15.1)	5.5 (3.7 - 8.2)	43.0 (38.2 - 48.0)	30.3 (26.0 - 35.1)
Napak (N=410)	11.8 (9.0 - 15.3)	2.5 (1.3 - 4.5)	36.1 (31.6 - 40.9)	27.4 (23.3 - 31.9)
Kotido (N=460)	11.4 (8.8 - 14.6)	2.9 (1.7 - 4.8)	37.1 (32.8 - 41.6)	24.8 (21.1 - 29.0)
Amudat (N=432)	12.2 (9.4 - 15.7)	3.8 (2.3 - 6.0)	27.8 (23.8 - 32.3)	21.8 (18.2 - 25.9)
Moroto (N=448)	18.5 (15.1 - 22.3)	2.7 (1.6 - 4.7)	47.4 (42.7 - 52.1)	42.0 (37.5 - 46.7)
Kaabong (N=526)	20.2 (16.9 - 23.9)	6.1 (4.3 - 8.5)	37.0 (32.9 - 41.2)	34.7 (30.8 - 38.9)
Combined (N=3234)	12.8 (11.7 - 14.0)	3.2 (2.7 - 3.9)	36.9 (35.2 - 38.6)	28.0 (26.5 - 29.6)

Analysis of trend of GAM since May 2011 depicted a decline in only two districts. That is, Abim and Nakapiripirit; a relatively constant prevalence in Kotido; and an upward trend in the rest of the districts. Maternal underweight and education status were significantly associated with all indicators of malnutrition while ownership of cows and latrines were significantly associated with reduced stunting.

Anemia prevalence in both children 6-59 months and mothers 15-49 years has persistently remained at critical/severe levels in Karamoja sub-region. Overall prevalence of anemia in children was 58.9% and was above 55% in all districts except Kaabong 42.9% and Moroto 48.4%. In districts like Amudat, Nakapiripirit and Napak, anemia levels in children were as high as 70%. Among mothers, prevalence of anemia was above 40% in most districts except Kotido 30.1%, Kaabong 36.1% and Moroto 37.5%. There is no change in the prevalence of anemia over several studies done in the region over the past few years.

Likewise, the proportion of underweight mothers in Karamoja has constantly remained high. Prevalence of underweight mothers in Karamoja was 24.7%, which was similar to findings in many other previous assessments.

Further analysis of the explanatory factors for malnutrition in children indicated that household socioeconomic status, food security, maternal nutrition, education and fertility status, household ownership of cattle and latrines were some of the factors that influenced nutrition status. Malnutrition prevalence in EVH households was also significantly lower than in non-EVH households.

Infant and young child feeding practices

A high proportion of mothers initiated breastfeeding within the first hour of birth; Abim (76.4%), Amudat (86.2%), Kaabong (83.6%), Kotido (67.6%), Moroto (75.2%), Nakapiripirit (83.7%) and Napak 75.1%). Besides the high timely initiation of breastfeeding, exclusive breastfeeding rate among children <6 months was above 80% in the majority of the districts except Amudat (69.1%) and Nakapiripirit (72.7%). Exclusive breastfeeding rates among infants <6 months were therefore above nation average of about 60%.

However, complementary feeding practices were poorly implemented. Over 45% of children 6-8 months in Kaabong, and over 20% in the rest of the districts except Moroto (5.4%) and Kotido (6.8%) had no complementary foods provided to them the day before the assessment as required. Mothers were therefore not introducing complementary foods in a timely manner.

Among children 6-23 months who had received complementary food, the meals provided were inadequate, failing to meet the Minimum Meal Frequency (MMF) requirement in 63.5% of cases. Minimum Dietary Diversity (MDD) was even worse. Only 3.1% of the children 6-23 months received MDD. In summary only 2.2% of the children in Karamoja received the Minimum Acceptable Diet (MAD) the day before the survey. That is, 4.9% for Kaabong, 3.6% for Abim, 2.3% for Amudat, 1.0% for Kotido, 0.4% for Moroto and 0% for Napak.

Morbidity and primary health care services

Immunization coverage, deworming and vitamin A supplementation was above 90% considering child health card and mothers' recall in all the districts. The coverage and presence of child health cards were particularly commendable in the districts of Kotido and Nakapiripirit where cards were available in over 95% of the cases.

The most prevalent common childhood illness was malaria/fever (37.1%) followed by ARI (29.0%). Prevalence was lower than in many previous assessments where malaria/fever often exceeded 50%. Children in Kaabong and Nakapiripirit particularly had a relatively higher burden of common childhood illnesses with diarrhea prevalence exceeding 30% in both districts.

Mosquito net use by children was high and above 90% in all districts except Amudat (78.8%). This level of coverage is good and recommended practice.

The main water source in Karamoja, as in previous assessment, was boreholes (86.4%). For the first time the proportion of piped water was observed especially in the districts of Kotido (11.1%) and Kaabong (10.9%). However use of ponds/dams or unprotected sources to fetch domestic

water was still high in Amudat (30.7%) and Nakapiripirit (14.0%). Unfortunately, the total amount of water available per household was below recommendation. Only Abim district met the WHO recommendation of 15 liters per person per day while in the rest of the districts it was 12.7, 11.8, 10.5, 9.2, 9.0 and 8.5 liters for Moroto, Nakapiripirit, Kaabong, Amudat, Kotido and Napak, respectively.

As has been previously observed, latrine coverage in Karamoja remains a persistent problem with over 75% of the households in the district of Amudat, Nakapiripirit, Moroto, Kotido and Napak having no latrines. Latrine coverage was highest in Abim (69.9%) and Kaabong (68.8%), but even in these two districts it was only Abim, which had up to 74.9% of the latrines having a slab and structure, while in Kaabong, 59.3% of the latrines had no superstructure.

Summary by district

A highlight of findings per district level is presented below and summarized in **Table 2**.

Abim

- District had a higher than average percentage of households with poor FCS (28%) while 36% had borderline FCS and 36% had acceptable FCS. This is despite the fact that a relatively high percentage of households have access to land (84%), harvested similar or more quantities compared to last year (37%), or have at least one income earner (86%).
- The highest percentage of household heads that attended school was observed. The district also had highest percentage - 11% - of households depending on salary/wages against a Karamoja average of 4%.
- However, the highest percentage of households that had incurred debt (58%), and of households that had applied stress coping mechanisms (26%), especially borrowing money, was found.
- Inadequate Food access therefore seems to be the key factor affecting food security in Abim with many households borrowing to buy food. It is therefore important to monitor food prices and wage levels in this district.
- Abim had the highest proportion of households with latrine coverage (69.9%) and was the only district meeting the WHO per capita water use.
- Abim has traditionally had the lowest proportion of children with GAM (6.2%) and SAM (1.5%) in the sub-region.

Amudat

- This district had the highest percentage of households with acceptable food consumption score (81%), while 13% have borderline FCS and 6% poor FCS. This is probably linked to the finding that the highest percentage of households owned some livestock (92%) and the second highest percentage of households have at least one income earner (86%).
- However, the average level of debt per household was high at UgX. 71,000 and all households (100%) that incurred debt in the district obtained it from informal sources, suggesting the absence of any formal financial systems.
- The main food security issue in Amudat is sustainability of the food consumption patterns observed given the threat of livestock parasites/diseases (mentioned by 88% of households), high levels of informal debt and limited crop production.
- Amudat had the lowest coverage of mosquito nets (78.8%), the highest proportion of children with anemia (70.5%) and mothers with anemia (62.8%), and the highest proportion of households using water from pond/dams (30.7%).
- The highest proportion of children who consumed milk and dairy products, and highest children that met the minimum meal frequency (57.0%).
- GAM was at serious level (12.2%) with SAM at critical level (3.8%).
- Amudat district had the lowest prevalence of stunting (27.8%) which could be due to the milk consumption reported in children in the district.

Kaabong

- Kaabong had lower than average percentage of households with acceptable FCS (39%), despite the fact that the highest percentage of households had access to agricultural land (95%) and, the second highest percentage of households harvested similar or higher quantities of food this year (39%).
- This might be attributable to the much higher percentage of female headed households (40%) in this district and relatively low percentage of households with at least one income earner (70%). Also, a high percentage of households incurred debt (55%).
- Therefore, the main food security issue in Kaabong is inadequate access to food by households. In addition, there might be a security issue in the district as more household members faced security threats while going to the WFP FDP, and 15% reported theft as a constraint to livestock production.
- Although the district reported the lowest proportion of children and mothers with anemia, 42.9% and 36.1%, respectively, the GAM (20.2%) and SAM (6.1%) were the highest observed in the sub-region.
- Although the district had the highest proportion of exclusive breastfeeding among children <6 months (94.7%), it also had 45.7% of the children 6-8 months receiving no complementary food.

- The district had the lowest proportion of children who fed on milk or dairy products (5.9%) and had the highest disease burden with a diarrhea prevalence of 32.0%.

Kotido

- Relatively high percentage of households had acceptable FCS (42%) while 27% had borderline FCS and 31% had poor FCS. This is attributable to the harvest as the district had the highest percentage of households that reported harvesting similar or more quantities than last year (47%).
- However, Kotido also had highest percentage of household heads that had never been to school (87%); or that were disabled or chronically ill (15%). These factors are believed to have a negative drag on potentially better food security outcomes.
- Nevertheless, the key factor limiting food security seems to be access to food with only 56% of households having an income earner.
- Although the district had the highest proportion of piped water (11.1%), the total water per capita use was one of the lowest in the sub-region (9.0 liters per person).
- The district had the highest number of children with child health cards (99%), and the lowest proportion of mothers who were underweight (13.8%).
- Although the district had the lowest rates of anemia in mothers (30.1%), GAM rate in children was serious (11.4%).

Moroto

- While Moroto had the highest percentage of households with at least one income earner (96%), about two-thirds (67%) of households are food insecure with 36% having borderline FCS and 31% poor FCS. This is partly explained by the finding that there is limited access to agricultural land and low livestock ownership among households (by 68% and 59% of households respectively).
- Furthermore, a relatively high percentage of households had incurred debt (55%), and the use of food consumption coping strategies was highest (RCSI = 21.11) in this district. In addition, the highest percentage of households (76%) borrowed to buy food, and food is the main expenditure for 97% of households.
- Findings therefore suggest that current income levels are insufficient to meet food and other basic needs; inadequate access to food is therefore the key limiting factor for food security.
- The highest proportion of mothers underweight (31.4%) was observed in the district. The proportion of households without latrines (88.2%) and infant and young child complementary feeding practices were the worst observed in the sub-region.
- GAM (18.5%) was at critical levels.

Nakapiripirit

- The highest percentage of households with poor FCS (31%) was observed while 23% had borderline FCS and 46% acceptable FCS. Households therefore seem to be maintaining food consumption through the use of detrimental coping strategies.
- There may be a sickness/health issue in the district as 63% of households reported health as the second most common expense
- Findings indicate that the limitations to food security are twofold: i) inadequate access to food with the lowest percentage of households having at least one income earner (58%) and; ii) low food availability given that the second highest percentage of households (77%) harvested less food this year, the highest percentage of households own no livestock (65%), and the lowest proportion of households have access to agricultural land (67%).
- The district had the highest proportion of mothers who were either pregnant or breastfeeding (78.2%) and a high proportion of anemic children (69.8%).
- The disease burden in children was high, second to Kaabong with a diarrhea prevalence of 30.8%. Latrine coverage was low with 85.1% of the households lacking latrines.
- GAM (11.6%) was serious and SAM (5.5%) was at critical level.

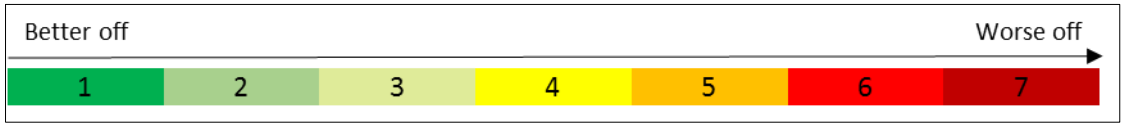
Napak

- Approximately 65% of households in Napak are food insecure with 24% having poor FCS while 41% had borderline FCS. This might be linked to the finding that the highest percentage of households (79%) harvested less food this year than the previous and a relatively high percentage (48%) of households had no livestock.
- Furthermore, the highest percentage of female headed households (42%) was observed, a high percentage of household heads never having been to school (81%) - both factors found to be positively correlated with low food consumption – was observed.
- Food availability seems to be the key limiting factor for food security in the district
- Anemia in children (69.8%) and maternal underweight (31.6%) were among the highest in the sub-region.
- Infant and young child complementary feeding practices were the worst in the region. No single child in the district had the minimum acceptable diet.
- Per capita water use was the lowest in the region (8.5 liters per person per day)
- GAM (11.8%) was at serious level

Table 2: Districts relative ranking (for selected food security indicators) and performance against WHO thresholds (for nutrition indicators) .

Variable	Abim	Amudat	Kaabong	Kotido	Moroto	Nakap -iripirit	Napak
% female headed households	27.6	17.1	39.5	33.1	31.6	31.7	41.9
% never attended school	28.7	85.3	69.8	86.7	79.0	79.8	80.7
% disabled or chronically ill	14.6	8.2	14.1	15.4	5.2	5.3	6.9
% that own no assets	2.2	3.8	1.8	2.9	4.6	14.4	1.4
% that own a seed store	7.2	6.0	34.6	54.4	20.3	17.8	28.6
% that own a food store	49.3	61.7	48.7	58.9	31.3	28.9	30.2
% that own no livestock	44.0	7.9	33.4	44.4	59.4	64.6	48.2
% with access to agricultural land	84.4	79.6	94.7	78.5	67.9	66.6	84.6
% that harvested less than last year	63.3	72.3	60.9	53.0	68.5	76.6	78.9
% with at least one income earner	86.2	86.3	69.9	55.8	95.9	58.4	73.1
% that incurred debt	57.8	16.1	55.3	25.4	55.1	29.0	38.7
% obtaining debt through informal sources	27.5	100	88.6	92.6	92.3	67.2	57.5
% acceptable food consumption score	36.1	80.7	39.2	41.6	33.3	46.2	35.2
Reduced coping strategy index (RCSI)	12.4	12.7	19.4	6.2	21.1	13.1	3.7
% not adopting coping strategies	25.5	29.4	8.1	38.9	22.1	26.8	34.8
% Stress coping	26.0	19.3	5.0	6.3	9.7	6.3	23.0
% Crisis coping	18.9	15.5	17.4	25.9	30.3	36.8	6.4
% Emergency coping	29.5	35.8	69.4	28.8	37.9	30.1	35.9
% GAM	6.2	12.2	20.2	11.4	18.5	11.6	11.8
% Stunting	31.8	27.8	37.0	37.1	47.4	43.0	36.1
% Underweight	17.1	21.8	34.7	24.8	42.0	30.3	27.4

Key:



Recommendations on food security related findings

1. Approximately 16% of female household heads are either disabled or chronically ill. These households are extremely vulnerable and need to be urgently mapped and provided appropriate support to ensure their food security.
2. While many households owned at least one of the enumerated assets, a high percentage lacked seed stores (76%) and food stores (56%). These are key limiting factors for household

food availability. It is therefore recommended to scale up household storage initiatives and improve post-harvest management in the region with the view to: i) ensure availability of good quality planting materials and thus facilitate timeliness of planting; ii) reduce post-harvest losses; iii) encourage longer periods of household food availability and; iv) reduce the need to sell produce at low prices during harvest periods so that they can store and sell when prices are slightly higher.

3. It is recommended that any such interventions be initiated first in Abim (seed stores) and Nakapiripirit (food stores).
4. The most commonly mentioned constraint to livestock production was livestock parasites/diseases. Given the importance of livestock to food security in the region, it is recommended to first, institute a study aimed at further understanding the epidemiology of livestock diseases in the region and providing appropriate courses of action and, second, implement measures to reduce the incidence of livestock diseases as per the study findings. Implementation of this recommendation should necessarily begin in Amudat district.
5. About two-thirds of the households harvested less food this year compared to last year. Household stocks are expected to run up to March at the latest. Food security situation should be monitored closely to prevent deterioration of food security/nutrition outcomes, especially among women and children. Priority should be given to Nakapiripirit and Napak districts where the highest percentage of households reported having harvested less food.
6. While about 40% of households had incurred debt, the majority received the facility through informal sources. It is recommended to further understand the credit access conditions for households from these informal sources to facilitate appropriate solutions in the event that loan conditions perpetrate a debt trap among households. Furthermore, there is a need to explore options for more formalized access to credit among stakeholders. This is especially the case for Amudat, Kotido and Moroto districts where the highest percentage of households accessed debt through informal sources.
7. There was high application of livelihoods coping strategies that are detrimental and continually diminish households' ability to with stand subsequent shocks. This was especially so in Kaabong and Moroto districts. There needs to be a combined effort to promote alternative livelihoods for the Karamoja population and also to ensure availability of social services including education and health care that were among leading expenditures for households.
8. The fact that 63% of households in Nakapiripirit report health to be their second most common expense points towards sickness/health being an issue in the district. It is recommended to further investigate this problem and to formulate appropriate responses.
9. While some households are currently categorized as Extremely Vulnerable Households (EVHs), findings show that some of these might be better off than other parts of the

population. It is recommended to urgently review classification criteria to ensure appropriate targeting of food assistance, and to phase out those that no longer meet this criteria.

10. In Kaabong district, and among EVH households, a higher percentage of household members experienced safety problems while going to the FDP. A Security review is recommended in order to identify solutions to the threats identified.

Recommendations on findings of nutrition and related key indicators

1) Livestock is a key livelihood in the region, restocking, disease control, pasture and water management are critical for Nutrition. Households with cattle were less likely to have malnourished children.
2) Education of the girl child should be emphasized since the higher the level of maternal education the better was the nutrition status of children. Need for UNICEF and the DLGs to rejuvenate the **GO back to School, stay in School campaign** for karamoja region. Where is The Girl's Education Movement (GEM)?
3) Reproductive health services to ensure good birth spacing for women should be strengthened since malnutrition correlated positively with fertility. Need for UNICEF and WFP to work closely with sister agencies such as UNFPA and DLGs on this issue. Cognizant of the challenges family planning has faced in the region.
4) Need to Strengthen the VHT referral system for active case finding, referral and follow up of children for both SAM and MAM. This is key to improve coverage and performance of the treatment.
5) The status of GAM prevalence in Kaabong and Moroto should receive special attention. Detailed investigation to better understand why these 2 districts have persistently had high GAM over the years is key.
6) Given the high rates of anemia in the under five children and women of reproductive age, there is need to explore the use and promotion of multiple micronutrient powder/sprinkles for children in the short to medium term. Emphasis on Iron and Folate supplementation or use of multiple micronutrient tablets for mothers also key while discussions continue on how to promote dietary diversity in the region
7) Promotion of optimal maternal nutrition practices is key for the region. Relatedly is need to reduce maternal/women's workload as this compromises child caring practices as well nutrition/health status of the women. Can water points be made gender sensitive? How about promotion of energy saving technologies? Can public works programs that are largely dominated by women be made nutrition sensitive?
8) The issue Of Male involvement in key for nutrition. How can stakeholders rally behind this for the region?

9) The quality of complementary feeding remains a big challenge in the region largely due to limited food varieties especially protein sources and vegetables. There is need to promote consumption milk for children, address the barriers to access to milk and ensure milk is made available during the lean season.
10) Promotion of proper sanitation and hygiene practices can't be over emphasized. There is a need to ensure that households construct and use latrines. There was a strong correlation between latrine ownership and stunting. How do players in Nutrition and WASH work together in the region to promote CLTS (community Led Total Sanitation)?
11) By comparison, Amudat district has over the years demonstrated better nutrition outcomes than the other 6 districts in the region i.e. better IYCF practices, lower stunting rates and GAM. What can the other districts learn from Amudat? Need for a more in-depth case study to document some of the good practices in Amudat.
12) While Immunization, vitamin A, deworming, mosquito net use were found not be positively related with nutrition, there is need to commend the district local governments and sustain the good coverages of these interventions

Background

Karamoja sub-region is known to suffer from recurrent food insecurity and high levels of malnutrition influenced by several factors including unpredictable climatic conditions, insecurity, crop and livestock pest, parasite and disease incidences, poor sanitation and feeding practices and poor social and economic capital among others. This has resulted into the need for frequent surveys and studies by government, UNWFP, UNICEF and other stakeholders in order to understand the situation, and make appropriate and timely interventions.

Recent Food Security and Nutrition assessments in Karamoja indicate a rather stagnant prevalence of malnutrition above alert level and high levels of food insecurity with households

employing the entire spectrum of coping strategies. Crop performance has continued to be poor and therefore unable to provide sufficient food stocks for the households. The May 2014 assessment indicated insufficient household stocks similar to other previous assessment.

In addition, morbidity levels have also remained high across the region with more than half of the children having suffered at least one illness in the two weeks prior to the assessment. Also, non-optimal Infant and Young Child Feeding Practices as well as appalling water and sanitation conditions continue to be recurrent problems in Karamoja.

These factors negatively impact the food security and nutrition situation in Karamoja. Despite the various interventions in place to counter the deteriorating food security situation and nutrition, Karamoja still remains vulnerable to food insecurity and malnutrition. With the reported high levels of malnutrition, it is critical to assess the food security and nutrition status and the possible causal factors on a regular basis.

In addition to understanding the general food security status of the entire population it was deemed necessary to incorporate a special analysis for the Extremely Vulnerable Households (EVH) in Karamoja sub-region. The food security and nutrition situation of the EVH households in Karamoja is fragile owing to their lack of productivity. EVH households have low ability to cope and lack resilience to recurrent shock and are generally worse off than the general population and thus the need to monitor them closely.

The current assessment was therefore part of the routine monitoring strategy normally done semi-annually to provide critical information on key performance indicators to enable effective planning for the sub-region.

Methods

The sampling methodology was a two-stage cluster survey that enabled independent as well as combined reporting of results for the seven districts of Karamoja (Abim, Kotido, Kaabong, Moroto, Napak, Amudat and Nakapiripirit). A highly representative sample of approximately 4,105 households were sampled.

Survey findings

Demography

Approximately one third (32%) of households in Karamoja are female headed (**Figure 1**), the highest of which are in Napak (42%) and the lowest in Amudat at (17%). This is significant given that female headed households are frequently more vulnerable to food insecurity.

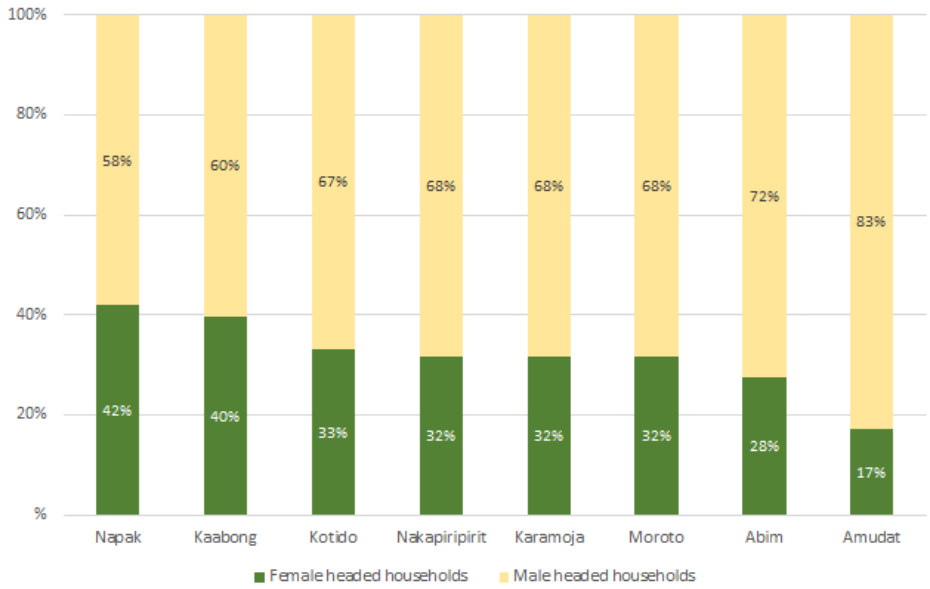


Figure 1: Proportion of female and male headed households

Majority (90%) of the household heads were reported as able bodied. Disabled household heads were mostly found in Kotido (13%), while the prevalence of chronically ill household heads was highest in Kaabong at 7%. Households whose heads are either disabled or chronically ill are deemed to be extremely vulnerable and need extra assistance to achieve and sustain optimal food security outcomes.

Expectedly, (since disability and chronic illness constitutes one of the classification criteria for EVH households), findings showed that the prevalence of household heads that were either disabled or chronically ill was more than four times higher among EVH (31%) than non EVH (7%).

Furthermore, the prevalence of disability or chronic illness among female household heads (16%) was more than twice that among male headed households (7%). This further exacerbates the vulnerability of female headed households.

Nearly three-quarters (73%) of household heads had never attended school (**Figure 2**). Primary level education had only been attained by 18% of household heads and, across the board, proportionately less had attended secondary or tertiary level education. Abim district was markedly different with 48% having attended primary school, while 20% attended secondary school against an average of 18% and 8% for Karamoja respectively.

There was no significant difference between the level of education for EVH and non EVHs

The percentage of female household heads that had never been to school was much higher than for males (81% vs. 68%), and fewer female heads had attended higher levels of education compared to their male counterparts. Being that education was found to be positively correlated

with FCS (see **Table 8**), the findings suggest greater vulnerability of female headed households to food insecurity.

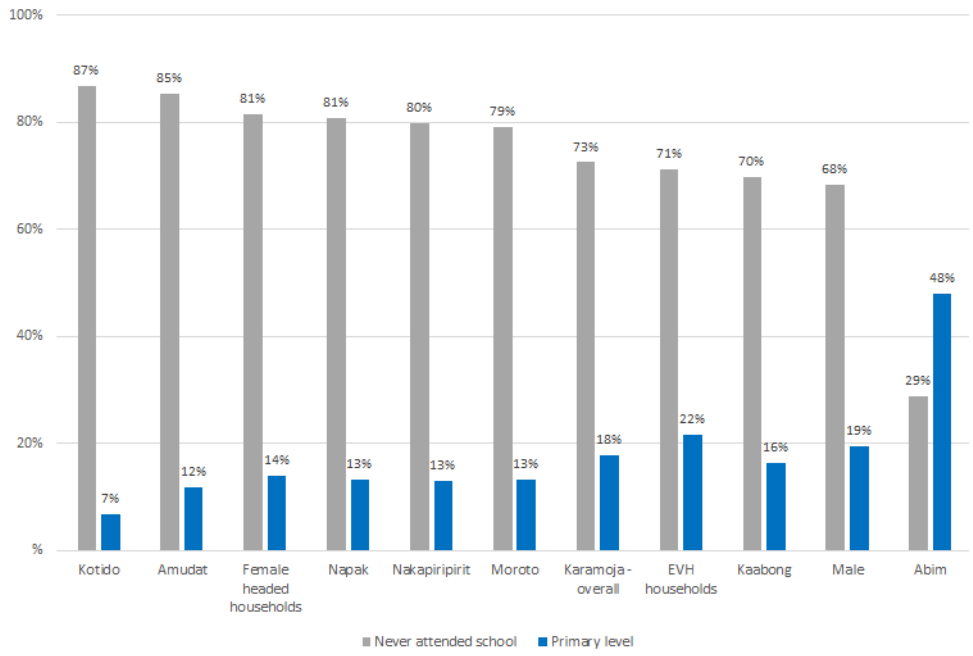


Figure 2: Education level of household heads

Food availability

Access to land

Approximately 80% of households reported access to agricultural land (**Figure 3**). The highest percentages were in Kaabong (95%) while the lowest was in Nakapiripirit (67%). Land is a critical factor of production directly affecting households' ability to produce food for own consumption. It is therefore anticipated household food availability in Nakapiripirit is relatively low due to limited access to land.

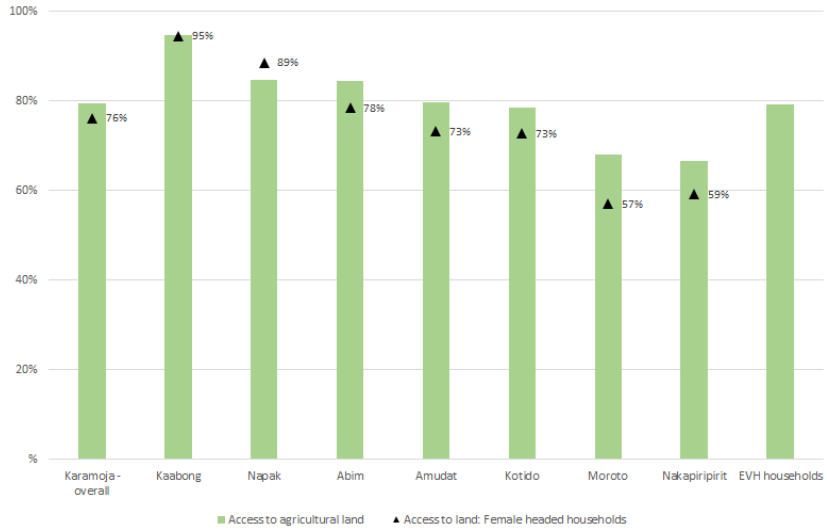


Figure 3: Access to land

Majority of households have access to either flat land for small gardens (66%) or upland for cultivation (33%) (**Figure 4**). The average size of flat land per household was 2.4 acres while upland was 2.5 acres. While this might be enough to allow surplus production for sale, poor yields and household size considerations (average household size = 6[1]) among others limit per capita food production and availability.

There were marginal differences in access to land between EVH and non-EVH households, and between male and female headed households.

[1] See Food Security and Nutrition Assessment (FSNA) for Karamoja – June 2014

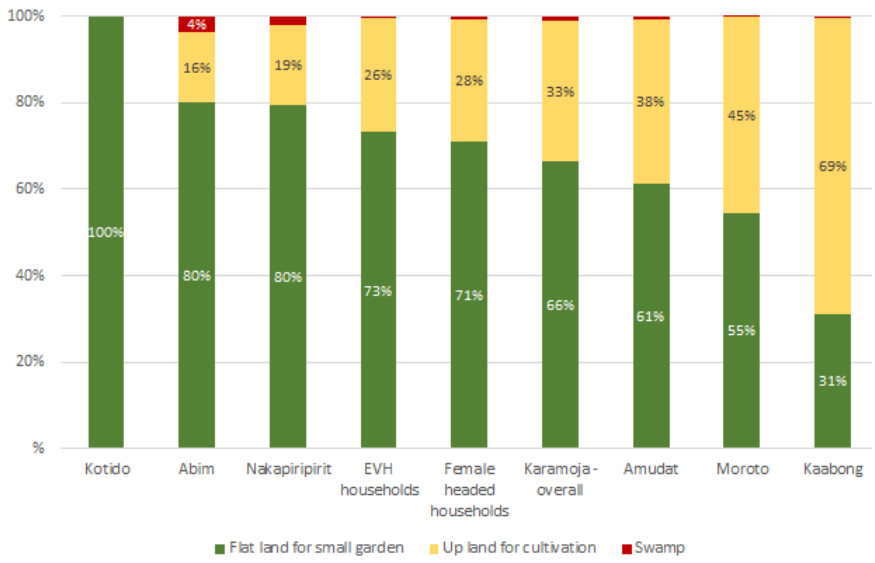


Figure 4: Type of land accessed by households

Livestock production

About 43% of households own no livestock in Karamoja; the highest percentage without livestock is in Nakapiripirit (65%) and the lowest in Amudat (8%). As shown in **Figure 5**, the most commonly owned livestock were poultry (45%), goats (36%) and cattle (32%). However, it was observed that livestock ownership[2] is generally low across Karamoja with most households that owned livestock having low holding (i.e. < 1 TLU) even in predominantly pastoral Amudat.

Slightly more EVH households owned some livestock (62%) compared to 56% for non-EVH, suggesting that that some EVHs are better off and need to be phased out. Generally more male headed households had livestock (61%) than female headed households (48.2%).

As seen in **Table 8**, households that owned livestock were found to have better food consumption scores. This is probably because they have greater access to protein-rich foods which could in turn lead to better maternal and child health/nutrition outcomes. It is therefore postulated that 43% of households, more so in Nakapiripirit, are vulnerable to food insecurity, and are susceptible to economic shocks as they lack the cushion/ protective effect conferred by livestock. Re-stocking and /or alternative livelihoods programs (e.g. cash for work, crop farming, etc.) that are nutrition-sensitive are recommended for such households.

[2] Livestock ownership was measured through a calculation of Total Livestock units (TLU) at household level. The TLU is a weighted sum of different livestock (cattle, sheep, goats etc.) available in a household. Households are then classified into groups depending on the sum.

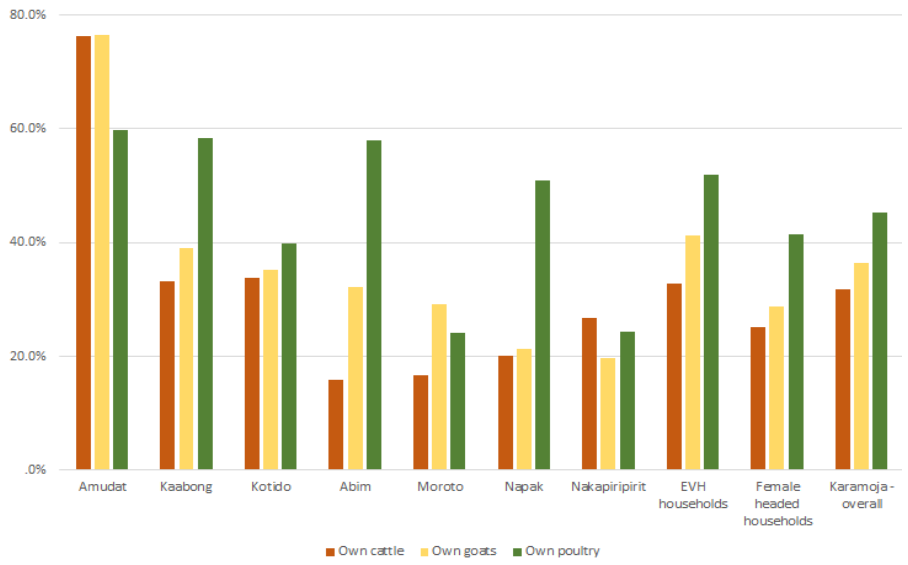


Figure 5: Livestock ownership among households

The main constraint to livestock production across Karamoja was parasites/diseases (83%). Almost all households owning livestock in Abim (91%), Amudat (88%) and Napak (90%) reported this as the only constraint. However, in Kaabong and Kotido, about 15% households identified theft as a constraint, while poor breeds were an issue for 38% of households.

This implies that any re-stocking programmes would require, as a pre-requisite, a livestock epidemiology study and/or implementation of measures to reduce incidence of livestock diseases and thus create an enabling environment for herders.

Crop production

Maize, sorghum and beans were the most commonly cultivated crops across Karamoja (by 44%, 26% and 72% of households respectively). As shown in **Table 3**, Abim had unique patterns with households growing seemingly more diverse crops, including potatoes (45%), millet (43%) and cassava (28%).

Table 3: Three most commonly cultivated crops

	Main	**second**	**Third**
Karamoja - overall	Sorghum (72%)	Maize (44%)	Beans (26%)
Abim	Sorghum (69%)	Potato (45%)	Millet (43%)
Amudat	Maize (95%)	Beans (24%)	Sorghum (3%)
Kaabong	Sorghum (94%)	Maize (65%)	Beans (23%)
Kotido	Sorghum (93%)	Maize (14%)	Beans (13%)
Moroto	Sorghum (74%)	Maize (44%)	Beans (27%)
Nakapiripirit	Sorghum (78%)	Maize (25%)	Beans (9.8%)
Napak	Sorghum (92%)	Beans (43%)	Maize (36%)

EVH households	Sorghum (75%)	Maize (42%)	Beans (32%)
Female headed households	Sorghum (77%)	Maize (41%)	Beans (29%)

When asked about their perception on the quantities of food harvested, two-thirds (67%) of the households across Karamoja indicated having harvested less compared to last year's season, while 17% harvested the same amount and only 15% harvested more (**Figure 6**).

Consequently, majority of households expected their stocks to last a short period - an average of 7 weeks. Considering that the survey was conducted mid-December, findings suggest that stocks will be depleted from many households in early February and from all households by end of March. Due consideration should thus be given in the timing of food assistance.

Given that the majority of households do not own either food or seed stores, it is recommended to implement measures that promote household food and/or seed storage with the view to: i) ensure availability of good quality planting materials and thus facilitate timeliness of planting; ii) reduce post-harvest losses; iii) encourage longer periods of household food availability and; iv) reduce the need to sell produce at low prices during harvest periods.

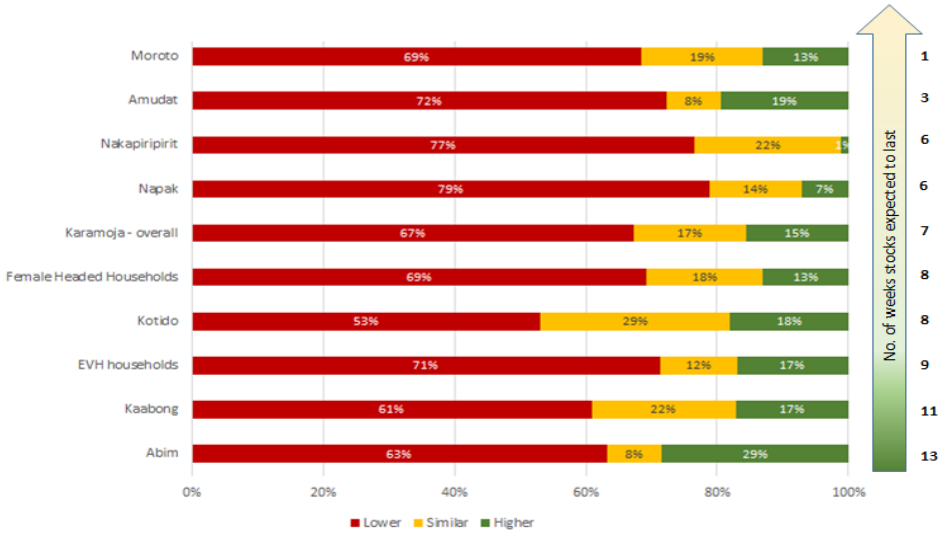


Figure 6: Comparison between this season and last year's harvest, and duration stocks expected to last in household

The single most important constraint to agriculture was noted as drought /low rainfall (69%), and highest in Amudat (95%) and Moroto (87%) but lowest in Kotido (45%). Other constraints identified, albeit to a limited extent, and especially in Kotido, were lack of adequate seeds /tools (18%) and insufficient family/household labour (17%) (**Table 4**). This trend was the same regardless of whether households were EVHs or not, and female headed or not.

Table 4: Leading constraints to agricultural production

	First constraint	Second constraint
Abim	Harsh weather (drought/low rainfall) - 45 - 95% of households	Lack of adequate seeds/tools (9%)
Amudat		Lack of adequate seeds/tools (2%)
Kaabong		Lack of adequate seeds/tools (13%)
Kotido		Lack of adequate seeds/tools (18%)
Moroto		Physical inability (4%)
Nakapiripirit		Infertile land/unproductive farming (11%)
Napak		Insufficient family/household labour (7%)
EVH households		Sickness or physical inability (14%)
Female Headed Households		Insufficient family/household labour (8%)
Karamoja		Lack of adequate seeds/tools (7%)

It is recommended to implement climate smart agricultural technologies[3] that could support increased yields for households.

Food access

Household asset ownership

Household asset ownership is used here as proxy to poverty/wealth status of households; the higher the number of assets owned, the more likely that households can afford food through markets.

The survey enumerated ownership of household assets such as bed, cellphones, axe, hoe etc. Findings were used to compute the Household Asset Score (HAS) as a composite sum of the different assets owned.

Approximately 96% of households owned at least one asset[4] across Karamoja; about 19% of households owned 2-4 assets, while fairly equal proportions were found to own 3-4 assets and more than 4 assets (38% and 39% respectively). Asset ownership was highest in Abim with 62%

[3] The Food and Agriculture Organization defines Climate Smart Agriculture as agriculture that sustainably increases productivity, resilience (adaptation), reduces/removes GHGs (mitigation), and enhances achievement of national food security and development goals.

[4] The survey enumerated a broader set of assets compared to the one used in by WFP's "A Feasibility Study of Cash Transfer Programmes in Karamoja (Kaabong, Kotido, Moroto, Napak) – November 2014". Therefore the two are not directly comparable.

of the population owning more than 4 assets. The most commonly owned assets were the axe (50%), the panga (71%) and the hoe (86%) – the most basic assets on the list – suggesting reliance on traditional, non-lucrative livelihoods. Furthermore, only 44% of households owned a food store, while only 24% owned a seed store (**Figure 7**). This points to limitations in agricultural production and adequate post-harvest handling.

More EVH households had no assets (9%) compared to non EVH (4%), but the difference at other levels of asset ownership was negligible. Asset ownership patterns suggest the lower likelihood of EVH households to engage in agricultural activities.

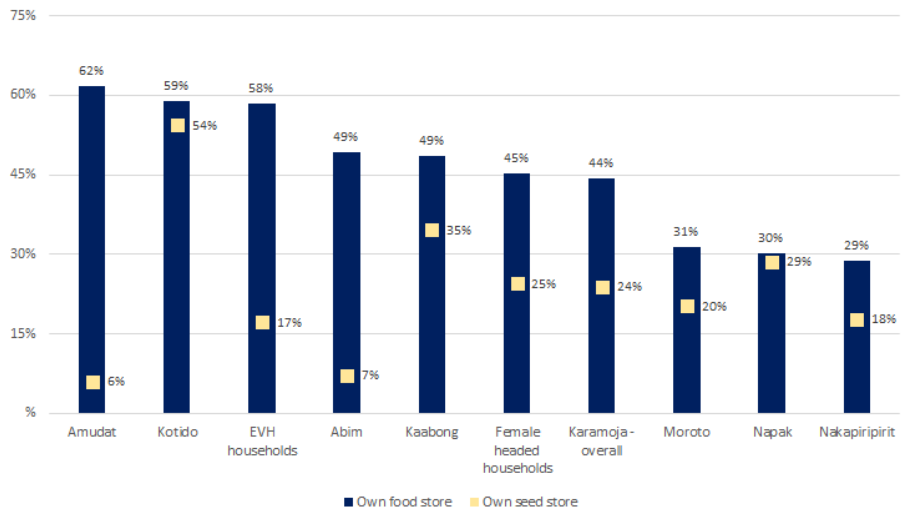


Figure 7: Ownership of food and seed stores

Household income

Three quarters (75%) of households in Karamoja have at least one income earner in the household. The highest percentage is observed in Moroto (96%) and the lowest in Kotido (56%) (**Figure 8**).

The proportion of households with at least one income earner was higher among male headed households (78%) compared to female headed households (69%), further illustration of the vulnerability of female headed households.

As shown in **Table 8**, having an income earner was found to be positively correlated with food consumption scores. Thus for 75% of households, access to food is expectedly good.

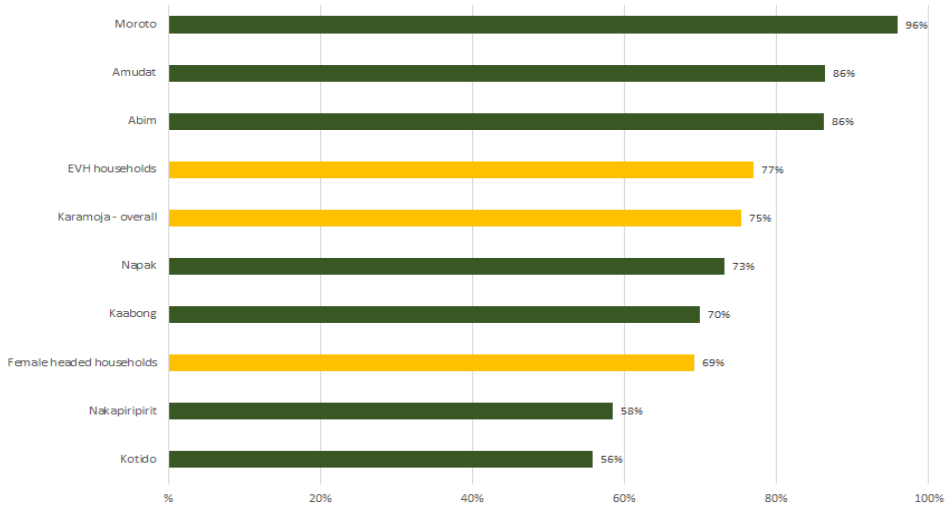


Figure 8: Proportion of households with at least one income earner

The most important income sources in the region were food crop production/sales (31%) and petty trade (25%) with limited variations in some districts as per **Table 5**. These sources accounted for nearly 75% of total household income. The relatively high number of income earners is expected because the survey was conducted during the harvest season.

Table 5: Most important income sources for households

	Most important income sources		
	First	**Second**	**Third**
Karamoja	*Food crop production/sales*	*Petty trade*	*Non-agricultural wage labour*
Abim	*Food crop production/sales*	*Petty trade*	*Agricultural wage labour*
Amudat	*Sale of animals or animal products*	*Petty trade*	*Food crop production/sales*
Kaabong	*Food crop production/sales*	*Petty trade*	*Small business/self-employed*
Kotido	*Food crop production/sales*	*Petty trade*	*Borrowing*
Moroto	*Petty trade*	*Food crop production/sales*	*Borrowing*
Nakapiripirit	*Food crop production/sales*	*Petty trade*	*Non-agricultural wage labour*
Napak	*Food crop production/sales*	*Petty trade*	*Non-agricultural wage labour*
EVH households	*Food crop production/sales*	*Petty trade*	*Borrowing*

Female headed households	*Food crop production/sales*	*Petty trade*	*Borrowing*

Besides the fact that majority of households were found to have harvested less food this year, field reports indicate that some households sold their food at very low prices at the peak of the harvest season to raise money for other household necessities and presumably due to insufficient household storage facilities. The implication is twofold;

I. Household stocks will run out very fast exposing these households to hunger during the leans season
II. It will become increasingly difficult to buy food as household income is low, while food prices are expected to increase.

Close monitoring of markets and the overall food security situation is recommended.

Household expenditure

As expected, the main expenditure for 91% of households was on food, highest in Moroto (97%) and lowest in Abim (79%) (**Table 6**); the second main expense was health mentioned by 45% of households, highest in Nakapiripirit (63%) and lowest in Abim (21%). Findings showed that the main expenditure accounts for an average of 65% of total expenditure for households. However in Napak, this was higher (81%) and lower in Nakapiripirit (51%). The fact that 63% of households in Nakapiripirit report health to be their second most common expense points towards sickness/health being an issue in the district with potential impact on other food security/nutrition outcomes. It is therefore recommended to further study this issue and design appropriate health interventions.

There were no significant differences in expenditure patterns between;

- EVH and non EVH,
- Female and male headed households.

The top three expenditures among households reflect prevalent deprivation of basic needs and services that seem to crowd out expenditures that would otherwise be empowering such as on education. Effective public service delivery remains a prerequisite for broader development in Karamoja.

Table 6: Main household expenditures

	Main household expenditures			
	1st	**2nd**	**3rd**	**4th**
Karamoja	Food	Health	Clothes/shelter	Utilities

Abim		Clothes/shelter	Utilities	Farm input/investment
Amudat		Health	Clothes/shelter	Transport
Kaabong		Clothes/shelter	Health	Education
Kotido		Health	Clothes/shelter	Utilities
Moroto		Health	Clothes/shelter	Utilities
Nakapiripirit		Health	Clothes/shelter	Utilities
Napak		Health	Clothes/shelter	Transport
EVH households		Health	Clothes/shelter	Utilities
Female headed households		Health	Clothes/shelter	Utilities

Household debt

About 40% percent of households reported being in debt with need to repay their loans. The highest percentage of households with debt was found in Abim (58%) and Kaabong (55%) while the lowest was in Amudat (16%) (**Table 7**). The average amount of debt per household was UgX 71,000, but highest was observed in Abim (UgX. 153,000) and lowest in Moroto (UgX. 35,000).

Amount of debt owed was classified into four groups based on consideration of how long it would take one to clear a debt with a week (7 days) of labour[5] at the prevailing wage rate[6] of UgX 3,600 per day (**Table 7**). It is seen that:

- Half of the households (50%) that had incurred debt owed less than UgX 25,000 – thus had low debt;
- Approximately 22% owed between UgX. 25,000 and 50,000 and;
- Another 22% owed more than UgX. 75,000.

Abim had the highest percentage of households with debt > UgX. 75,000 (46%) while Moroto had the highest percentage of households with debt < UgX. 25,000 (73%).

Table 7: Prevalence and level of debt

	Level of debt (% households)

[5] With a week (7 days) of labour, a person could clear a debt of UgX. 25,000. Similarly, 2 weeks are equivalent to UgX 50,000; and 3 weeks of labour equivalent to UgX 75,000.

[6] See WFP Uganda's monthly market monitor available at http://www.wfp.org/content/uganda-monthly-market-monitor-2014

	% households with debt	Amount of current debt*	< UgX 25,000	UgX 25,000 - 50,000	UgX 50,000 - 75,000	> UgX 75,000
Abim	58%	153,000	18%	28%	8%	46%
Kaabong	55%	56,000	54%	23%	5%	17%
Moroto	55%	35,000	73%	13%	3%	11%
EVH households	43%	106,000	39%	26%	5%	30%
Female headed households	41%	64,000	52%	23%	6%	19%
Karamoja - overall	40%	71,000	50%	22%	5%	22%
Napak	39%	45,000	60%	26%	4%	11%
Nakapiripirit	29%	45,000	47%	29%	5%	19%
Kotido	25%	55,000	58%	18%	4%	20%
Amudat	16%	71,000	46%	21%	12%	22%

*Figures rounded-off to the nearest '000.

The main reasons for debt, advanced by 75% of the households were to buy food and cover health expenses. To a negligible extent (7%), households borrowed to pay school fees. Findings showed that majority of households that borrowed money primarily to buy food borrowed small amounts – 65% had borrowed less than UgX 25,000. Approximately half of households that borrowed to cover health expenses also borrowed less than UgX 25,000.

More EVH had incurred debt (43%) than non EVH (40%). The average amount of debt for EVH was much higher (UgX. 106,000) compared to non-EVH (UgX. 66,000).

Male headed households had slightly higher debt (74,000) compared to female headed households (64,000). Also Female headed households borrowed more to buy food (63%) than their male counterparts (54%).

The main sources of credit for households were mainly informal (i.e. from relatives, traders etc.) especially in Amudat, but less so in Abim where banks were widely used (73%) (**Figure 9**).

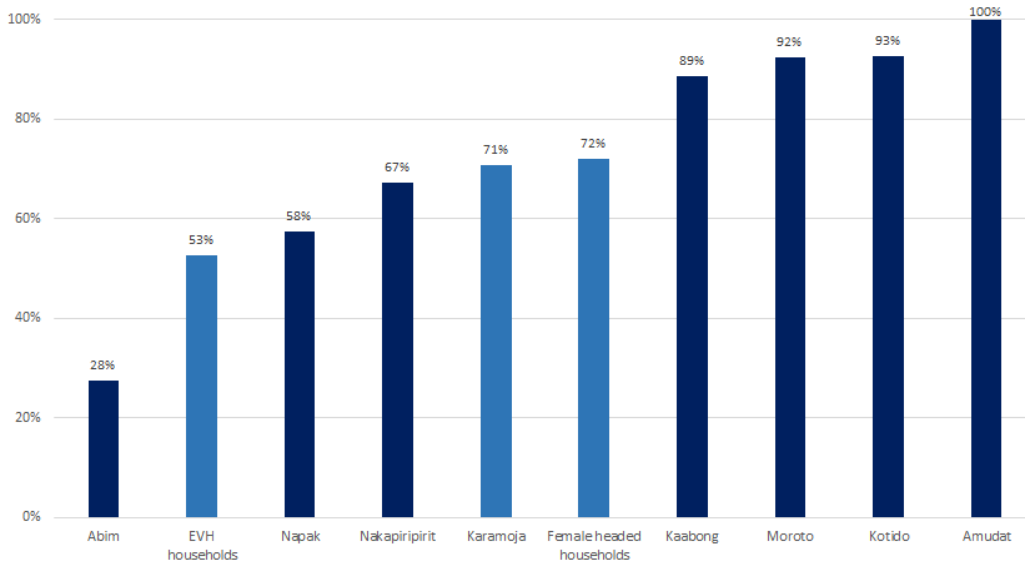


Figure 9: Percentage of households that accessed debt through informal sources

Clearly, such informal sources of credit are not sustainable and may carry high interest rates that effectively reduce net incomes for households. Broader, systemic interventions that stimulate markets and formal banking systems should be explored.

Food utilization

Food consumption

Information was collected on the dietary diversity of households with respondents being asked to list the number of days a particular food item was consumed by the household in the seven days prior to the interview. A '0' for fruits would indicate that a household did not consume any fruit in the previous seven days while a '4' would indicate consumption four days out of seven etc. The mean Food Consumption Score (FCS) for a seven day period for the sample was then calculated and three Food Consumption Groups (Acceptable, Borderline, and Poor) were formulated.

At least 45% of the population had acceptable FCS while 32% had borderline FCS, and 24% had poor FCS (**Figure 10**). Hence, more than half (56%) of households in the sample had inadequate food consumption. The highest percentage of households with inadequate food consumption was observed in Moroto (67%) and the lowest in Amudat (19%) (See **Annex 1** for detail).

- There was no significant difference in FCS between EVH and non-EVH
- Male headed households had better FCS than female headed households

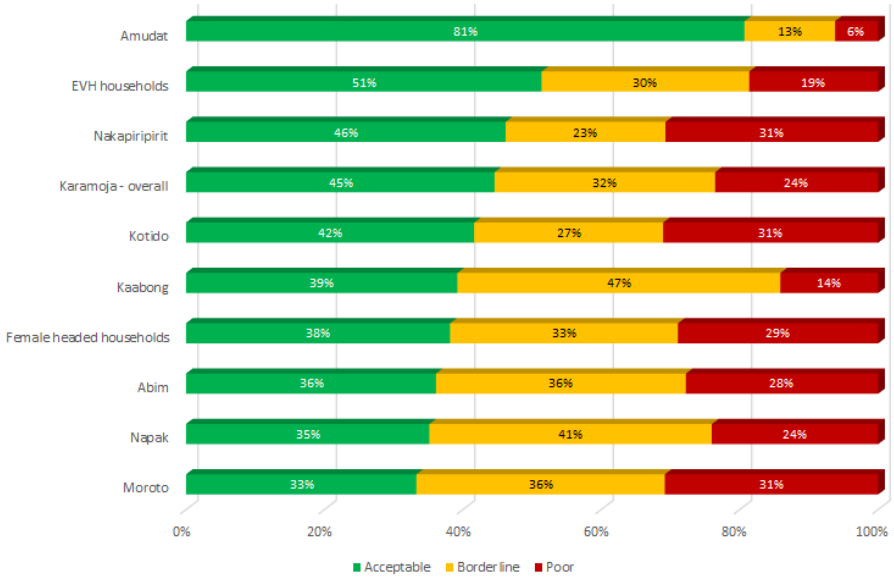


Figure 10: Food Consumption among households

Note that while Amudat had the best Food Consumption Scores, it had a relatively high GAM rate (12%) but the lowest stunting rate (28%). This suggests that while the diets in Amudat might be rich in protein, they are likely deficient of carbohydrate/energy sources and that the quantities consumed per serving might be lower than the recommended daily allowance (RDA).

The most important food sources across the board were market purchases and own production for each of the commodity groups.

Summary of factors affecting food consumption

Analyses showed that food consumption patterns among households were influenced by the following factors as summarized in **Table 8:**

- **Gender of the household head:** Except in Abim, male headed households had better food consumption scores compared to female headed households
- **Education level of the household head:** Across Karamoja, food consumption scores increase with the level of education (years of schooling).
- **Access to land:** Households with access to land generally had better Food Consumption Scores. This was true in all districts except Kaabong and Moroto.
- **Asset ownership:** Food consumption score was found to increase with the number of assets at household level – as measured by the Household Asset Score. This relationship was true in all districts except Kotido.
- **Livestock ownership:** Food consumption score increases with the level of livestock holding – as measured by the Total Livestock Units (TLU). Expectedly therefore, Amudat had the highest food consumption scores. This relationship was however not true for Kotido.
- **Debt:** Higher debt, while improving FCS, masks underlying problems and such improvements will be temporary.

- **Income earners in household:** Having at least one income earner in a household significantly improves food consumption scores. However, this relationship did not hold in Moroto and Napak.

Table 8: Factors influencing household food consumption

	Karamoja – overall	Abim	Amudat	Kaabong	Kotido	Moroto	Nakapiripirit	Napak
Gender of the household head	√	--	√	√	√	√	√	√
Level of education	√	√	√	√	√	√	√	√
Access to land	√	√	√	--	√	--	√	√
Asset ownership	√	√	√	√	--	√	√	√
Livestock ownership	√	√	√	√	--	√	√	√
Debt**	√	√	√	√	√	--	√	√
Income earners in household	√	√	√	√	√	--	√	--

√ FCS improves with the presence of these factors; **--** no relationship found. Increases in FCS due to debt are unsustainable and therefore temporary since higher debt masks underlying problems.

Shocks & coping

Approximately 88% of households had experienced at least one shock in the 30 days preceding the survey. The most common difficulties/shocks mentioned by at least 65% of households were high food prices (37%), crop loss due to rodents (11%), and adverse weather - floods/heavy rains/drought/ landslides (15%) (**Table 9**). High food prices were particularly felt in Abim (48%) and Amudat (59%); crop loss in Kaabong (27%) and Nakapiripirit (30%); and floods/drought in Amudat (24%) and Napak (31%).

Table 9: Main difficulties/shocks faced by households

	Main difficulties faced by households	
	1st	**2nd**
Karamoja	*High food prices*	*Floods, heavy rains, drought, landslides*
Abim	*High food prices*	*Debt to reimburse*

Amudat	*High food prices*	*Floods, heavy rains, drought, landslides*
Kaabong	*Crop loss due to rodents*	*High food prices*
Kotido	*High food prices*	*Crop loss due to rodents*
Moroto	*High food prices*	*Floods, heavy rains, drought, landslides*
Nakapiripirit	*High food prices*	*Crop loss due to rodents*
Napak	*Floods, heavy rains, drought, landslides*	*High food prices*
EVH households	*High food prices*	*Crop loss due to rodents*
Female headed households	*High food prices*	*Floods, heavy rains, drought, landslides*

The reduced coping strategy index (RCSI)[7] was highest in Moroto (21.11) and Kaabong (19.38) against an average of 12.78. The lowest RCSI was found in Napak and Kotido (3.74 and 6.18 respectively) (**Figure 11**). Majority of households were therefore characterized as having low RCSI (74%) especially in Kotido (90%) and Napak (99.6%).

RCSI value was higher among EVH households (14.41) compared to non EVH households (12.57).

RCSI value was higher among male headed households (13.17) compared to female headed households.

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

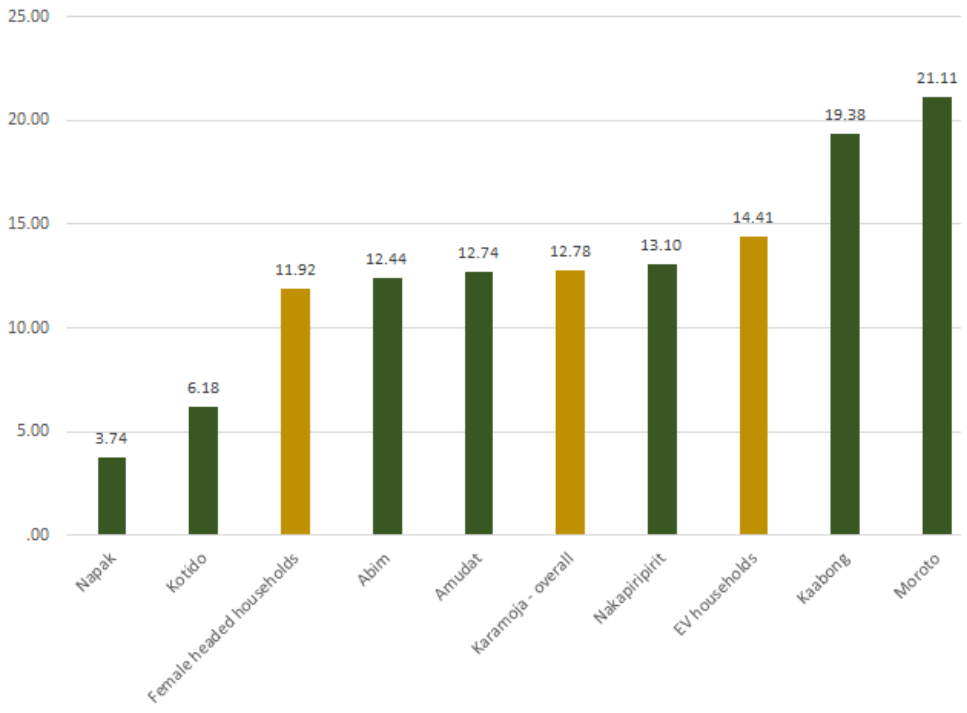


Figure 11: Food consumption coping strategy index (RCSI)

Given that the survey was conducted during harvest period, it is expected that households had easier access to food with little necessity to adopt food consumption coping strategies, hence low RCSI values

With regard to livelihoods coping strategies,[8] up to 74% of households had used stress[9], crisis[10] or emergency[11] coping strategies. As shown in **Figure 12**, the percentage of households in livelihoods coping was highest in Kaabong (91%) and lowest in Kotido (61%).

Across the board, the most commonly applied stress coping strategies were borrowing of money (41%) and spending of savings (21%). There was some variation in Amudat where the most common stress strategies consisted of selling more animals than usual (30%) (**Table 10**).

[8] Livelihoods-based coping strategies reflect longer term coping capacity of households. The various strategies applied households can be categorized as stress, crisis or emergency coping strategies depending on the severity weights.

[9] Stress coping strategies indicate reduced ability to deal with future shocks due to a current reduction in increase in debts. They include borrowing money, spending savings, selling household goods or animals.

[10] Crisis coping strategies, such as selling productive assets, reduction of essential non-food expenditure, and consumption of seed stock directly reduce future productivity, including human capital formation

[11] Emergency coping strategies, such as selling one's house or land, engaging in illegal income activities, and begging also affect future productivity, but are more difficult to reverse or more dramatic in nature.

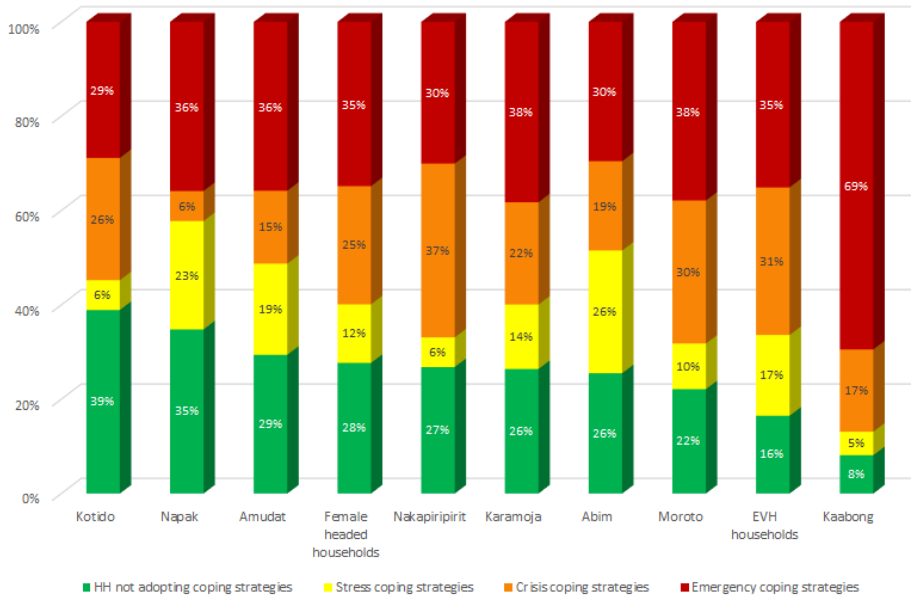


Figure 12: Application of livelihood coping strategies

The pattern of application of stress coping strategies was the same between EVH and non EVH households, as well as between male and female headed households

Among households that used crisis coping strategies, consumption of seed stock was the most common form of application by 26% of households, highest in Kaabong (55%). However, the common crisis strategy in Amudat was selling of productive assets (32%) while in Moroto was reduction of essential non-food expenditure (20%).

Table 10: Most common stress, crisis and emergency coping strategies

	Livelihoods coping strategies	
	Stress	**Crisis**
Karamoja	Borrowed money (41%)	Consumed seed stock (26%)
Abim	Borrowed money (50%)	Consumed seed stock (24%)
Amudat	Sold more animals than usual (30%)	Sold productive assets (24%)
Kaabong	Borrowed money (70%)	Consumed seed stock (55%)
Kotido	Borrowed money (30%)	Consumed seed stock (24%)
Moroto	Borrowed money (44%)	Reduced essential non-food expenditure (20%)
Nakapiripirit	Borrowed money (32%)	Consumed seed stock (22%)
Napak	Borrowed money (42%)	Consumed seed stock (29%)

EVH households	Borrowed money (52%)	Consumed seed stock (20%)
Female headed households	Borrowed money (41%)	Consumed seed stock (25%)

Whereas RCSI was low, the extent of application of livelihoods coping strategies is a manifestation of chronic food insecurity that has characterized the region. It suggests increasing asset depletion, high levels of vulnerability, and inability to withstand future shocks. Comprehensive solutions are required to systematically address food insecurity in the region.

WFP assistance

Overall, the sample of the survey comprised of only 22% of WFP beneficiaries – higher in Nakapiripirit at 38%. In majority of cases, the decision on what to do with the food assistance received is made by women alone (62%) even higher in Kotido (71%), Nakapiripirit (77%) and Napak (80%). The trend was the same among EVH and non EVH households.

In 92% of households visited, it was reported that at least one member of the household had gone to the FDP in the last two months. Of those that went to the FDP, 89% did not experience safety problems, highest In Napak & Moroto (96%) but low in Kaabong (68%) (**Figure 13**). For 66% of those that experienced safety problems, it was while going to the WFP programme site.

A less percentage of EVH households did not experience safety problems (73%) compared to non EVH (92%)

Findings therefore suggest that a higher percentage of households in Kaabong (32%), and among EVH households (27%) experienced safety problems. This necessitates a comprehensive review of security threats faced by these households and implementation of measures to reduce safety incidents.

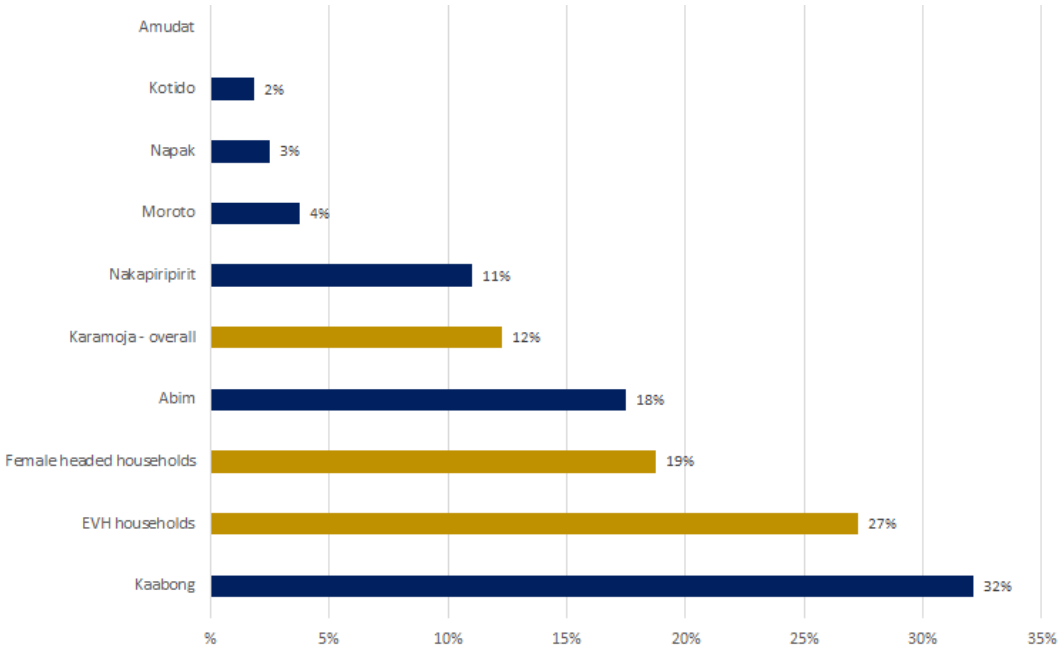


Figure 13: Percentage of households whose members experienced safety problems while going to the FDP

Vulnerability to food insecurity

Extremely Vulnerable Households (EVH)

A summary comparison of the EVH[12] and non EVH groups is presented in **Table 11**. It is seen that on several measures, EVH group was worse off for example with higher prevalence of disability/chronic illness, poorer harvests, and higher application of food consumption, stress and crisis coping strategies.

However, EVHs were better off with regard to certain criteria such as ownership of livestock and food consumption scores (which in part could be a function of the assistance they receive). Nevertheless, the data strongly suggests that some EVH households might be better off, and calls for an urgent review of the classification criteria to ensure appropriate targeting of food assistance.

Table 11: Comparison of key findings between EVH and Non EVH groups

Parameter	EVH	Non EVH
Household heads disabled or chronically ill	31%	7%

[12] Up to 473 EVH households were visited in the survey, representing 11% of the total sample

Household heads never attended school	▲	71%	73%
Households without assets	▲	8%	4%
Access to land	▼	79%	80%
Households that own seed stores	▼	17%	25%
Households that own food stores	▲	58%	42%
Households that own livestock	▲	62%	56%
Households that harvested less this year compared to last year	▼	71%	67%
Households with at least one income earner	▲	77%	75%
Households with debt	▼	43%	40%
Acceptable Food consumption scores	▲	51%	44%
Food consumption coping strategy index (RCSI)	▼	14.41	12.57
Households not adopting livelihood coping strategies	▼	17%	28%
Households stress coping	▼	17%	13%
Households crisis coping	▼	31%	21%
Households emergency coping	▲	35%	39%

▼ EVH worse off; ▲ EVH better off

Female headed households

Findings suggest that female headed households[13] are highly vulnerable as they are worse off on several measures compared to their male counterparts. Female headed households were worse off on key indicators such as access to land, the presence of income earners in the household, food consumption scores, and others (**Table 12**).

It is however interesting to note that there was rather limited use of food consumption, stress and emergency coping strategies despite not being well resourced in comparison to male headed households. Further investigation on coping mechanisms among female headed households may be useful; to further understand this behavior.

[13] Up to 1324 female headed households were reached, comprising approximately 32% of the total sample

Table 12: Comparison of key findings between male and female headed households

Parameter		Female Headed Households	Male Headed households
Household heads disabled or chronically ill	▼	16%	7%
Household heads never attended school	▼	81%	68%
Households without assets	▼	7%	3%
Access to land	▼	76%	81%
Households that own seed stores	▲	25%	24%
Households that own food stores	▲	45%	44%
Households that own livestock	▼	48%	61%
Households that harvested less this year compared to last year	▼	69%	66%
Households with at least one income earner	▼	69%	78%
Households with debt	▼	41%	40%
Acceptable Food consumption scores	▼	38%	48%
Food consumption coping strategy index (RCSI)	▲	11.92	13.17
Households not adopting livelihood coping strategies	▲	28%	26%
Households stress coping	▲	12%	14%
Households crisis coping	▼	25%	20%
Households emergency coping	▲	35%	40%

▼ Female headed households worse off; ▲ Female headed households better off

Nutrition

Education status of mothers/caregivers

As observed in previous surveys in Karamoja, the majority of the mothers 15-49 years still have zero years of formal education **(Figure 14)**. The edge in maternal education Abim district has had over other districts is constant in surveys, and correlates with the relatively better nutrition status of children in the district compared to other districts in the region. Any level of maternal formal education is therefore important. Both girl and boy children should be kept in School.

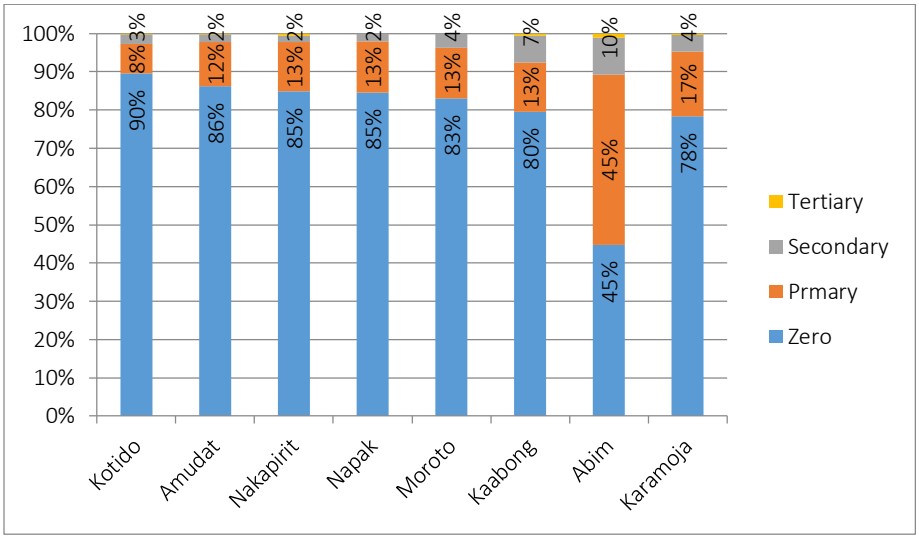


Figure 14: Education status of women aged 15-49 years according to district (N=3998)

Reproductive health status of mothers

The mean age of mothers was 34.1 years and mean number of birth was 4.1 **(Table 13)**. There was no significant variation between districts.

Table 13: Mothers age and parity

District	*Mean age of mothers*	*Mean number of live birth*
Abim	33.0	4.4
Amudat	34.8	4.1
Kaabong	32.5	4.0
Kotido	37.9	4.6
Moroto	28.9	3.4
Nakapiripirit	33.5	3.9
Napak	38.5	4.1
Total	34.1	4.1

The majority of the mothers 15-49 years were either pregnant or breastfeeding **(Figure 15)**. Fertility in Karamoja region is still high and partners should intensify reproductive health services.

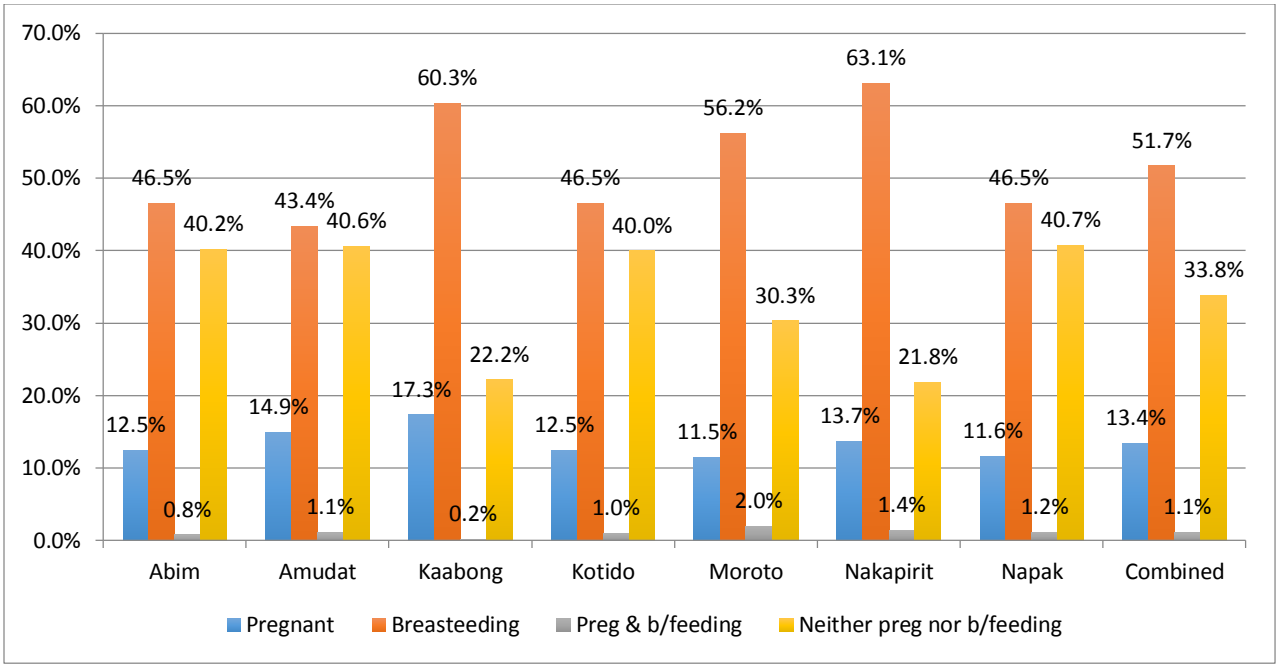


Figure 15: Reproductive health status among women 15-45 years according to district (N=4002)

Age and sex distribution of sampled children

Up to 3234 children 6-59 months were sampled across districts of Karamoja **(Table 14).** Overall the sex ratio of the sampled children was 1.0 although sampling in Nakapiripirit was skewed toward boys depicting possible challenges of sampling in the district.

Table 14: Sex distribution of sampled children according to district

District	Sex ratio of sampled children			Distribution of sampled children					Total
	Boys	Girls	Boys:Girls	6-17	18-	30-	42-	54-	
Abim	264	295	0.9	180	152	114	80	33	559
Amudat	216	216	1.0	150	122	83	57	20	432
Kaabong	276	250	1.1	194	156	96	60	20	526
Kotido	211	249	0.8	152	123	106	60	19	460
Moroto	214	234	0.9	175	138	86	38	11	448
Nakapiripirit	223	176	1.3	163	134	65	33	4	399
Napak	192	218	0.9	150	125	76	43	16	410
Total	1596	1638	1.0	1164	950	626	371	123	3234

Prevalence of wasting, stunting and underweight

The overall prevalence of GAM among children 6-59 months in Karamoja region was 12.8%, 95% CI (11.7 – 14.0) **(Table 15)**. This was similar to the May 2014 survey where prevalence of GAM was 13.4%, 95% CI (12.1 – 14.7). Kaabong district however, had a marked increase of GAM from

13.5% in May 2014 to current 20.2% (although not statistically significant). This increase should be investigated further.

Table 15: Prevalence of GAM, SAM, Stunting and Underweight according to district, December 2014

District	*GAM % (95% CI)*	*SAM % (95% CI)*	*Stunting % (95% CI)*	*Underweight % (95% CI)*
Abim (N=559)	6.2 (4.5 - 8.6)	1.5 (0.7 - 2.9)	31.8 (28.0 - 35.8)	17.1 (14.2 - 20.4)
Nakapiripirit	11.6 (8.8 - 15.1)	5.5 (3.7 - 8.2)	43.0 (38.2 - 48.0)	30.3 (26.0 - 35.1)
Napak (N=410)	11.8 (9.0 - 15.3)	2.5 (1.3 - 4.5)	36.1 (31.6 - 40.9)	27.4 (23.3 - 31.9)
Kotido (N=460)	11.4 (8.8 - 14.6)	2.9 (1.7 - 4.8)	37.1 (32.8 - 41.6)	24.8 (21.1 - 29.0)
Amudat (N=432)	12.2 (9.4 - 15.7)	3.8 (2.3 - 6.0)	27.8 (23.8 - 32.3)	21.8 (18.2 - 25.9)
Moroto (N=448)	18.5 (15.1 - 22.3)	2.7 (1.6 - 4.7)	47.4 (42.7 - 52.1)	42.0 (37.5 - 46.7)
Kaabong (N=526)	20.2 (16.9 - 23.9)	6.1 (4.3 - 8.5)	37.0 (32.9 - 41.2)	34.7 (30.8 - 38.9)
Combined (N=3234)	12.8 (11.7 - 14.0)	3.2 (2.7 - 3.9)	36.9 (35.2 - 38.6)	28.0 (26.5 - 29.6)

Based on WHO classification for trigger points based on prevalence of malnutrition, that is:

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

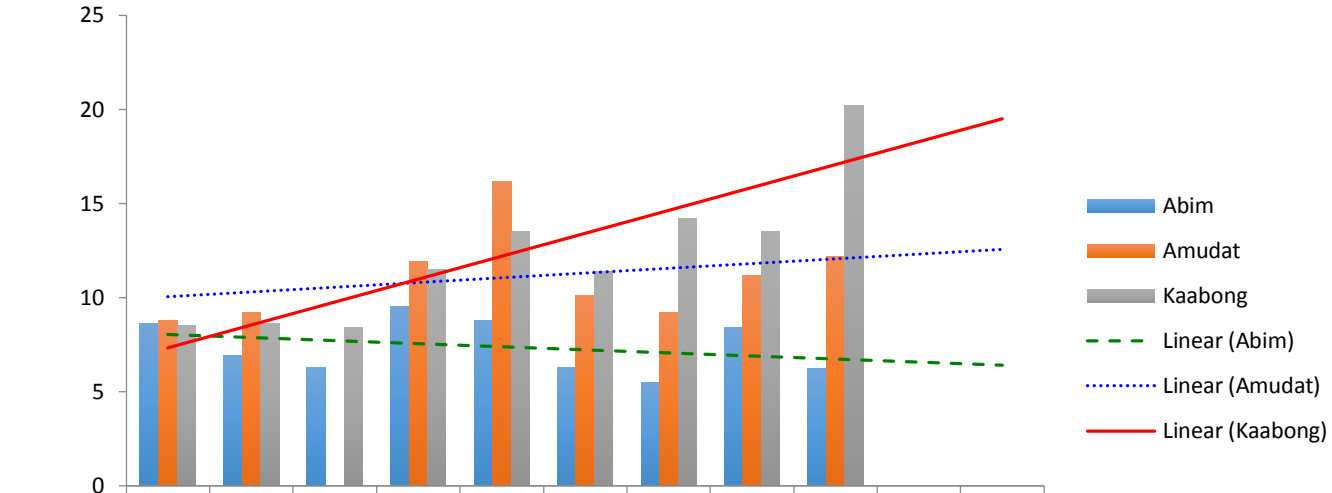
GAM was at critical level in Moroto and Kaabong, serious in the rest of the districts except Abim where it was poor **(Table 16)**.

Table 16: A diagrammatic view of malnutrition expressed according to the WHO classification of prevalence of malnutrition, by district

District	***GAM***	***Stunting***	***Underweight***
Abim	Poor	Serious	Poor
Nakapiripirit	Serious	Critical	Critical
Napak	Serious	Serious	Serious
Kotido	Serious	Serious	Serious
Amudat	Serious	Poor	Serious
Moroto	Critical	Critical	Critical
Kaabong	Critical	Serious	Serious
Combined	Serious	Serious	Serious

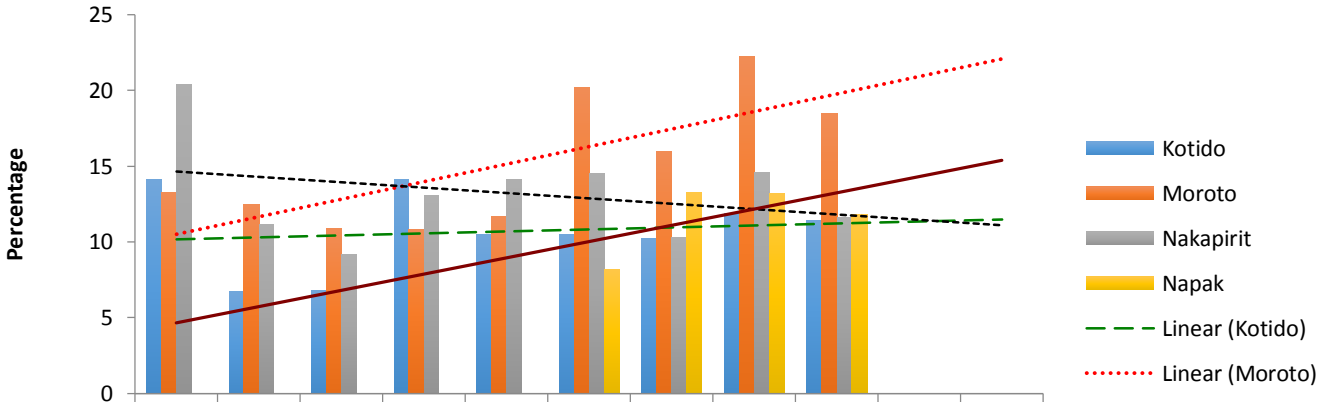
Trend of GAM and projections since May 2011

According to trends and projections of GAM, only Abim and Nakapiripirit districts have experienced declining GAM and are thus projected to continue improving if the status quo is sustained **(Figures 16 and 17)**.



	May 11	Sept 11	Dec 11	May 12	Dec 12	May 13	Dec 13	Jun 14	Dec 14		
Abim	8.6	6.9	6.3	9.5	8.8	6.3	5.5	8.4	6.2		
Amudat	8.8	9.2		11.9	16.2	10.1	9.2	11.2	12.2		
Kaabong	8.5	8.6	8.4	11.5	13.5	11.4	14.2	13.5	20.2		

Figure 16: Trend and linear projections of GAM for Abim, Amudat and Kaabong districts



	May 11	Sept 11	Dec 11	May 12	Dec 12	May 13	Dec 13	Jun 14	Dec 14		
Kotido	14.1	6.7	6.8	14.1	10.5	10.5	10.2	11.9	11.4		
Moroto	13.3	12.5	10.9	10.8	11.7	20.2	16	22.2	18.5		
Nakapirit	20.4	11.2	9.2	13.1	14.1	14.5	10.3	14.6	11.6		
Napak						8.2	13.3	13.2	11.8		

Figure 17: Trend and linear projections of GAM for Kotido, Moroto, Nakapiripirit and Napak districts

Prevalence of stunting according to sex in children 6-59 months

For all indicators of malnutrition, prevalence was higher in boys than in girls. This was exemplified by stunting **(Figure 18)** where both stunting and severe stunting was higher in boys than in girls except in Amudat where severe stunting was higher in girls. In Moroto one it two boys was stunted.

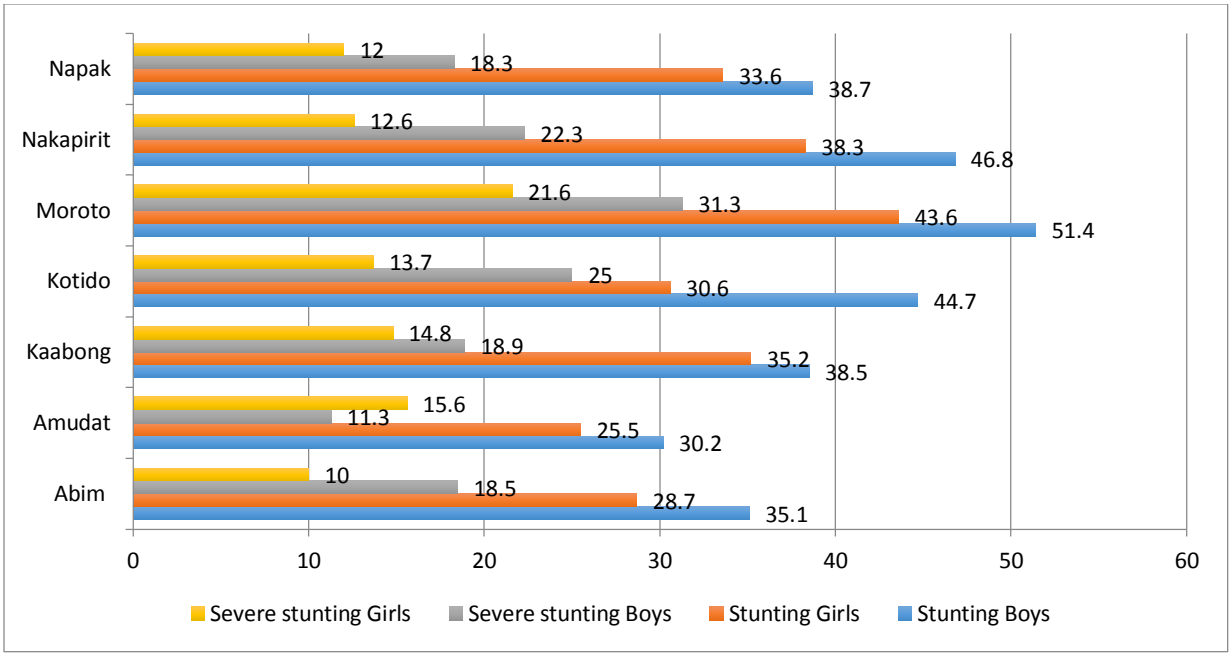


Figure 18: Prevalence of stunting according to sex and district

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. The population of children in districts of Karamoja was generally over -1 SD below the median reference for underweight and stunting, which is pathetic **(Table 17)**. This highlight the magnitude of work needed to improve nutrition in the region.

Table 17: Mean z-scores for weight-for-height, weight-for-age and height-for-age according to district

	Mean z-scores ± SD		
	WFH	WFA	HFA
Abim	-0.17±1.23	-0.92±1.27	-1.34±1.70
Amudat	-0.70±1.21	-1.16±1.24	-1.13±1.75
Kaabong	-1.01±1.33	-1.44±1.39	-1.31±1.92
Kotido	-0.55±1.25	-1.29±1.26	-1.56±1.66
Moroto	-0.87±1.23	-1.64±1.47	-1.74±1.99
Nakapirit	-0.58±1.15	-1.37±1.30	-1.76±1.54
Napak	-0.70±1.12	-1.39±1.20	-1.58±1.47

Prevalence of anemia in children and mothers

Anemia in Karamoja is not reducing. Overall prevalence in the current survey was 58.9% **(Table 18)** similar to about 60% reported in December 2013. In some districts like Amudat, Nakapiripirit and Napak, anemia levels in children 6-59 months were as high as 70%, suggesting a need for blanket supplementation with micronutrient powder.

Table 18: Prevalence of anemia in children 6-59 months according to district

District	Severely Anemic	Moderately Anemic	Mildly Anemic	Total Anemic	Not Anemic
	%	%	%	%	%
Abim (N=522)	2.3	31.4	25.1	58.8	41.2
Amudat (N=430)	3.5	37.7	29.3	70.5	29.5
Kaabong (N=524)	2.1	20.8	20.0	42.9	57.1
Kotido (N=458)	3.5	27.3	26.6	57.4	42.6
Moroto (N=442)	2.3	22.6	23.5	48.4	51.6
Nakapiripirit (N=384)	2.3	33.6	33.9	69.8	30.2
Napak (N=401)	3.0	41.9	24.9	69.8	30.2
Total (N=3161)	2.7	30.3	25.9	58.9	41.2

Likewise as in previous surveys more than 40% of the women 15 -49 years in all districts were anemic **(Table 19).**

Table 19: Prevalence of anemia in women 15 – 49 years according to district

District	Severely Anemic	Moderately Anemic	Mildly Anemic	Total Anemic	Not Anemic
	%	%	%	%	%
Abim (N=470)	0.6	15.3	23.2	39.1	60.9
Amudat (N=407)	3.9	34.2	24.8	62.9	37.1
Kaabong (N=513)	0.8	14.2	21.1	36.1	63.9
Kotido (N=395)	1.8	13.9	14.4	30.1	69.9
Moroto (N=546)	0.5	14.3	22.7	37.5	62.5
Nakapiripirit (N=424)	2.4	18.9	23.8	45.1	55.0
Napak (N=391)	1.0	23.0	22.8	46.8	53.2
Total (N=3146)	1.5	18.7	21.9	42.1	57.9

Prevalence of underweight among women 15 – 49 years

Mothers' nutrition status assessed by BMI was poor. The proportion of underweight mothers in Karamoja has remained constantly high. Prevalence of underweight mothers was in Karamoja has been about 25% for the past few years; it was 28% in May 2014; and was 24.7% in the current survey **(Table 20).** This level of adult malnutrition is not observed elsewhere in Uganda even among refugee populations.

Table 20: BMI of non-pregnant mothers 15-49 years of age according to district

District	Severely underweight %	Moderately underweight %	Normal %	Overweight %	Obese %

Abim (N=412)	2.7	15.8	75.0	4.9	1.7
Amudat (N=328)	3.4	24.4	65.9	4.3	2.1
Kaabong (N=401)	3.2	22.4	70.1	2.7	1.5
Kotido (N=342)	0.6	13.2	82.2	4.1	0.0
Moroto (N=471)	4.9	26.5	65.2	2.5	0.8
Nakapiripirit (N=362)	2.5	21.3	74.3	1.4	0.6
Napak (N=320)	4.7	26.9	67.5	0.9	0.0
Total (N=2636)	3.2	21.5	71.3	3.0	1.0

Infant and young child feeding practices

Breastfeeding practices

A high proportion of mothers initiated breastfeeding within the first hour of birth, Abim (76.4%), Amudat (86.2%), Kaabong (83.6%), Kotido (67.6%), Moroto (75.2%), Nakapiripirit (83.7%) and Napak 75.1%). Exclusive breastfeeding rates among infants less than 6 months were high **(Figure 19)** above nation average of about 60%.

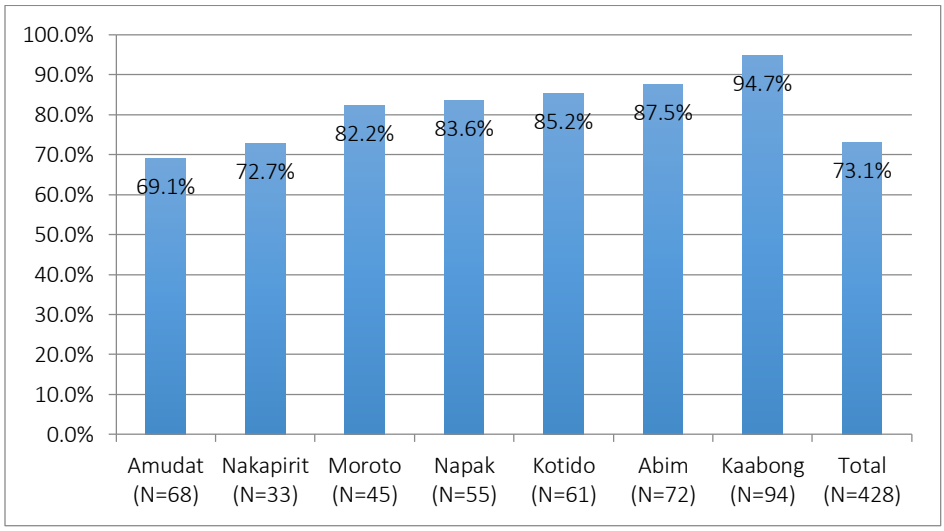


Figure 19: Exclusive breastfeeding rates among children 0-5 months according to districts

Timing of introduction of complementary feeding

Introduction of complementary feeding was not timely in 22.6% of the children 6-8 months overall. Some districts like Kaabong (45.7%), Nakapiripirit (23.7%), Napak (22.0%) and Amudat (20.5%) had high proportions of children 6-8 months exclusively breastfed when they should have been given complementary food the day before the survey **(Figure 20)**. The situation in Kaabong warrants urgent investigation.

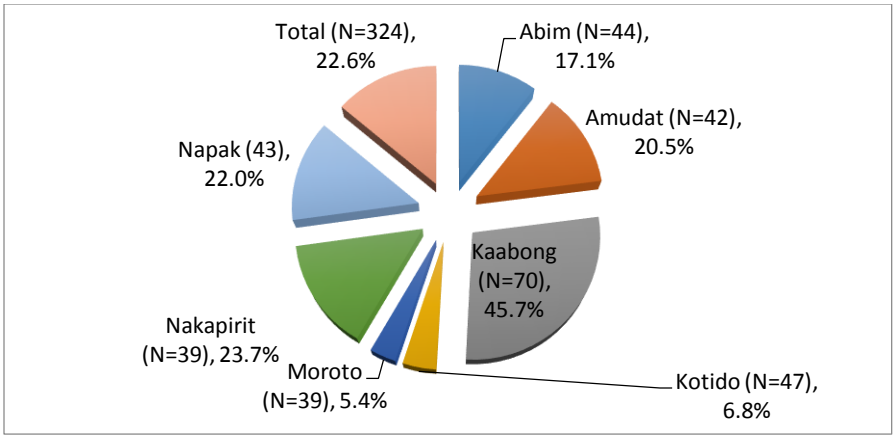


Figure 20: Proportion of children 6-8 months who did receive complementary the day before the survey, according to district

Minimum meal frequency of complementary food

Among children 6-23 months there were many who had receive zero meals or had only been exclusively breastfed in the 24-hour preceding the assessment **(Figure 21)**. On average up to 63.5% of the children received less than the minimum meal frequency (three meals), which was worse than 58% reported in May 2014 and that of the UDHS 2011 (44%).

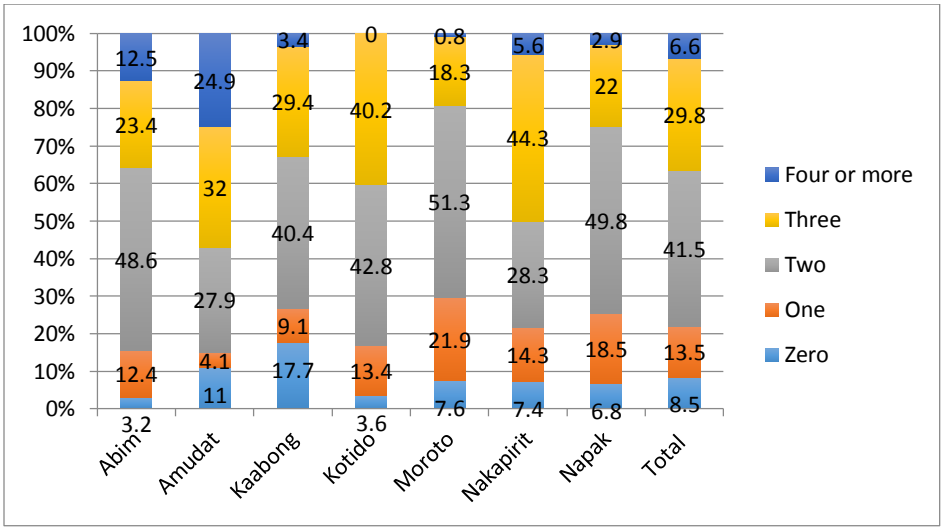


Figure 21: Meal frequency among children 9-23 according to district

Minimum dietary diversity

Minimum dietary diversity (MDD), i.e. diversity of food groups contained in the diet consumed by children 6-23 months was low (not acceptable). 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).[14] Minimum dietary diversity was defined as the proportion of children who received at least four food groups the previous day[15].

In the current assessment only 3.1% of the children were having acceptable MDD **(refer to Figure 21 below)**. Children in Karamoja were below national average of 11% and were much worse off than the refugee children in Uganda where 74.1% had acceptable MDD in the November 2014. Nutrient diversity consumed by children at household level is key for sustainability of good nutrition status of children.

However, it is unfortunate to note that even milk, supposed to be traditional food in Karamoja was no longer widely available to children. In many districts including Abim, Napak, Moroto and Kaabong less than 30% of children 6-23 months accessed milk **(Figure 22)**. Of surprise however, was the high use of infant formula observed in certain districts.

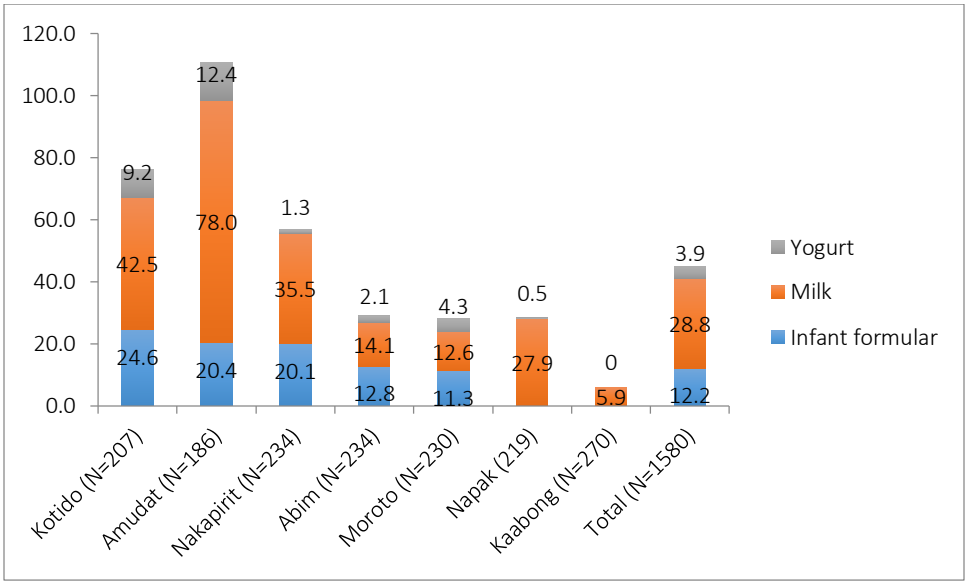


Figure 22: Milk consumption and use of infant formula among children 6-23 months according to district

Minimum acceptable diet

Minimum Acceptable Diet (MAD), the combination of children who had minimum/ acceptable diet diversity and those who had minimum meal frequency were only 2.2% among children 6-23 months **(Figure 23)**. This was lower than nation average of 5.7% (UDHS 2011) but better than findings in May 2014 (0.7%). Some districts such as Moroto and Napak had almost no child receiving the minimum acceptable diet. The situation of complementary feeding in Karamoja is

[14] WHO Indicators for assessing infant and young child feeding practices part 2: measurements.
[15] Low $\leq$ 3; acceptable $\geq$ 4

unacceptable and calls for institution of blanket supplementary feeding programs and nutrition education for mothers.

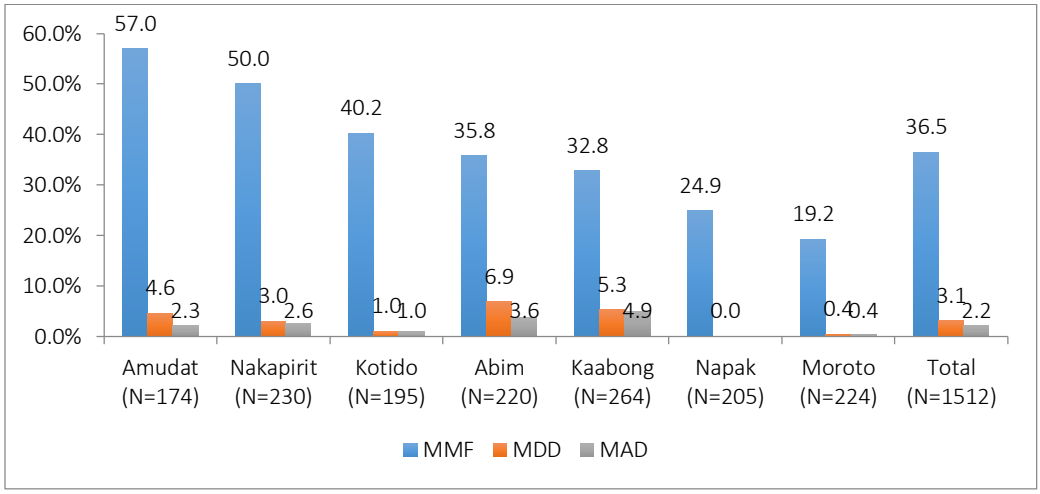


Figure 23: Proportion of children 6-23 months who had minimum meal frequency (MMF), minimum dietary diversity (MDD) and minimum acceptable diet (MAD)

Enrollment in MCHN program

Overall 37.5% of the children 6-23 months were enrolled in the MCHN program **(Figure 24)**. Like in the May 2014 survey, the highest proportion of enrolled children was in Amudat and Nakapiripirit districts.

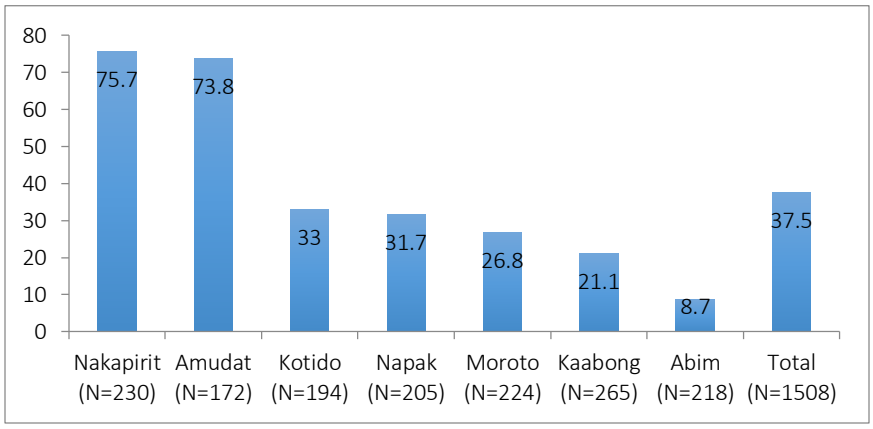


Figure 24: Proportion of children enrolled in MCHN program

Of the enrolled children, a small proportion (6.7%) did not have cards and sighted reasons of not having cards as: lost card, and did not received card.

Morbidity and primary health care services

Immunization, vitamin A supplementation and deworming coverage

Immunization, supplementation and deworming were above 90% among children in the second year of life when mothers' reports were considered **(Tables 21-24)**. The coverage and presence of child health cards were particularly commendable in the districts of Kotido and Nakapiripirit. Immunization, deworming and vitamin A supplementation in Karamoja has been above national target in recent surveys. This achievement should be sustained.

Table 21: Measles immunization coverage among children 12-23 months according to district

District	*Yes with card*	*Yes without card*	*No with card*	*No without card*
	%	%	%	%
Abim (N=161)	60.9	34.2	1.9	3.1
Amudat (N=103)	54.4	36.9	6.8	1.9
Kaabong (N=160)	73.8	18.8	6.3	1.3
Kotido (N=124)	98.4	0.8	0.0	0.8
Moroto (N=166)	64.5	33.1	1.2	1.2
Nakapiripirit (N=163)	94.5	3.1	2.5	0.0
Napak (151)	71.5	21.2	7.3	0.0
Total (N=1028)	74.2	21.0	3.6	1.2

DPT 3 and measles coverage were similar in almost all districts.

Table 22: DPT3 immunization coverage among children 12-23 months according to district

District	*Yes with card*	*Yes without card*	*No with card*	*No without card*
	%	%	%	%
Abim (N=161)	62.1	34.8	1.9	1.2
Amudat (N=103)	59.2	39.8	1.0	0.0
Kaabong (N=160)	75.6	20.0	4.4	0.0
Kotido (N=124)	99.2	0.8	0.0	0.0
Moroto (N=166)	64.5	33.1	1.2	1.2
Nakapiripirit (N=163)	96.3	3.7	0.0	0.0
Napak (151)	74.2	21.9	4.0	0.0
Total (N=1028)	76.0	21.8	1.8	0.4

Table 23: Deworming coverage in children 12-23 months according to district

District	*Yes with card*	*Yes without card*	*No with card*	*No without card*

	%	%	%	%
Abim (N=152)	60.5	34.9	2.6	2.0
Amudat (N=103)	56.3	37.9	3.9	1.9
Kaabong (N=152)	75.0	21.1	3.3	0.7
Kotido (N=124)	99.2	0.8	0.0	0.0
Moroto (N=164)	65.2	33.5	0.6	0.6
Nakapiripirit (N=155)	96.1	3.9	0.0	0.0
Napak (150)	65.3	13.3	15.3	6.0
Total (N=1000)	74.1	20.6	3.7	1.6

Table 24: Vitamin A supplementation coverage among children 12-23 months

District	*Yes with card*	*Yes without card*	*No with card*	*No without card*
	%	%	%	%
Abim (N=161)	62.3	35.2	1.3	1.3
Amudat (N=103)	56.3	38.8	4.9	0.0
Kaabong (N=160)	76.1	20.8	2.5	0.6
Kotido (N=124)	99.2	0.8	0.0	0.0
Moroto (N=166)	64.8	33.9	0.6	0.6
Nakapiripirit (N=163)	96.9	3.1	0.0	0.0
Napak (151)	66.2	13.2	14.6	6.0
Total (N=1028)	74.8	20.6	3.3	1.3

Prevalence of common childhood illnesses and bed net use

The most prevalent common childhood illness was malaria/fever (37.1%) followed by ARI (29.0%). Prevalence was lower than in many previous assessments where malaria/fever often exceeds 50%. Children in Kaabong and Nakapiripirit had the highest burden of common childhood illnesses **(Figure 25)**. The burden of common childhood illnesses correlates well with prevalence of GAM in districts such as Kaabong and Moroto.

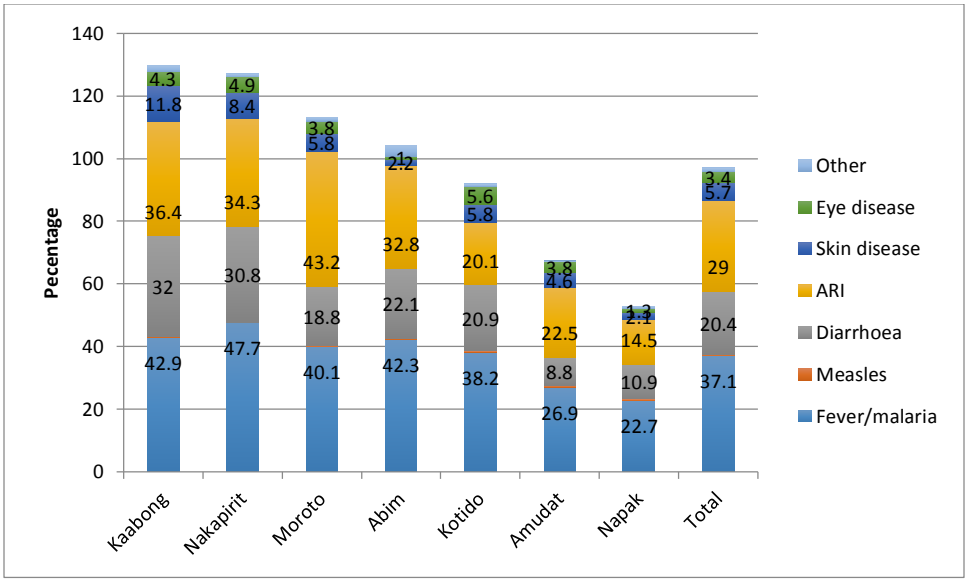


Figure 25: Two-week prevalence of common childhood illness according to district

Mosquito net coverage

Mosquito net use by children was high and above national target in many districts except Amudat **(Figure 26)**. Overall 93.1% of the children slept under a bed net the night preceding the assessment, which is good and recommended practice.

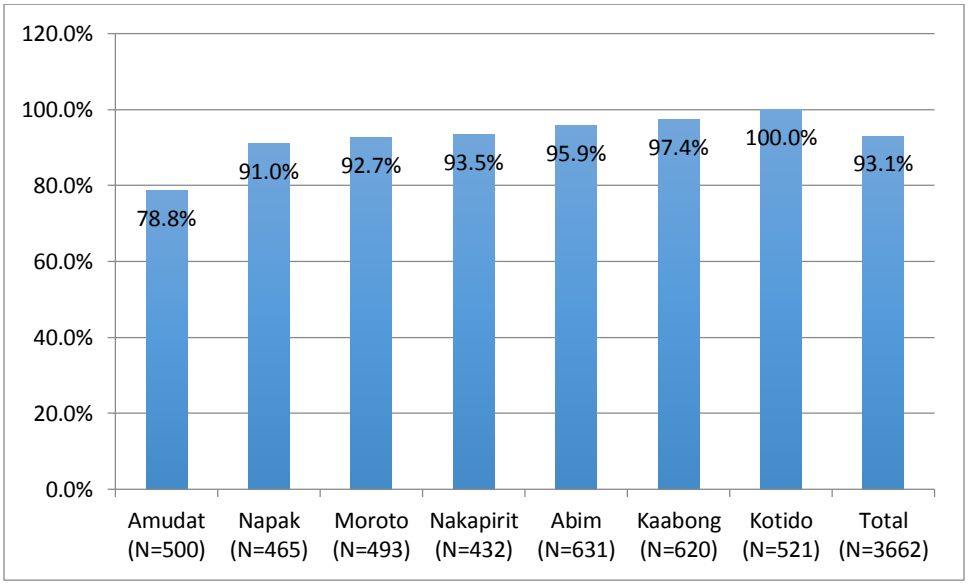


Figure 26: Proportion of children who slept under a bed net during the night preceding the survey according to district

Water and Sanitation

Water sources

The main water sources in Karamoja remain as boreholes (86.4%). However for the first time the proportion of piped water has increased especially in the districts of Kotido and Kaabong **(Table 25)**.

Table 25: Household water sources according to district

District	*Piped*	*Protected well*	*Borehole*	*Open well*	*Pond/dam*	*Rain water*
Abim (N=617)	1.1%	1.9%	96.1%	0.8%	0.0%	0.0%
Amudat (N=553)	0.2%	0.0%	68.9%	0.2%	30.7%	0.0%
Kaabong (N=596)	10.9%	0.3%	82.4%	0.5%	5.4%	0.5%
Kotido (N=585)	11.1%	0.0%	88.9%	0.0%	0.0%	0.0%
Moroto (N=601)	0.0%	0.2%	90.3%	2.7%	6.8%	0.0%
Nakapiripirit (N=568)	2.7%	0.2%	83.0%	2.4%	11.6%	0.0%
Napak (N=568)	0.2%	0.0%	93.8%	1.6%	4.4%	0.0%
Total (N=4104)	3.8%	0.4%	86.4%	1.2%	8.2%	0.1%

However the total amount of water available per household was still below recommendation. Only Abim district met the WHO recommendation of 15 liters per person per day while the rest of the districts were far below standard **(Table 26)**.

Table 26: Per capita water use according to district

District (N)	*Average household population size*	*Average household water (liters)*	*Per capita water (liters)*
Abim (N=617)	5.9	89.0	15.0
Amudat (N=553)	5.9	53.8	9.2
Kaabong (N=596)	6.2	64.7	10.5
Kotido (N=585)	5.9	53.2	9.0
Moroto (N=601)	5.0	63.6	12.7
Nakapiripirit (N=584)	5.7	67.1	11.8
Napak (N=568)	5.8	48.7	8.5
Total (N=4104)	5.8	63.1	10.9

Latrine coverage

The challenge of latrine coverage in Karamoja is persistent with the majority of the household living without any **(Figure 27)**. In the two districts with high latrine coverage, its only Abim, which

had up to 74.9% of the latrines having a slab and structure, but Kaabong has 59.3% of the latrines with no superstructure. Despite the challenges, the two districts of Abim and Kaabong could be used as case studies to try and improve the situation in the rest of the districts.

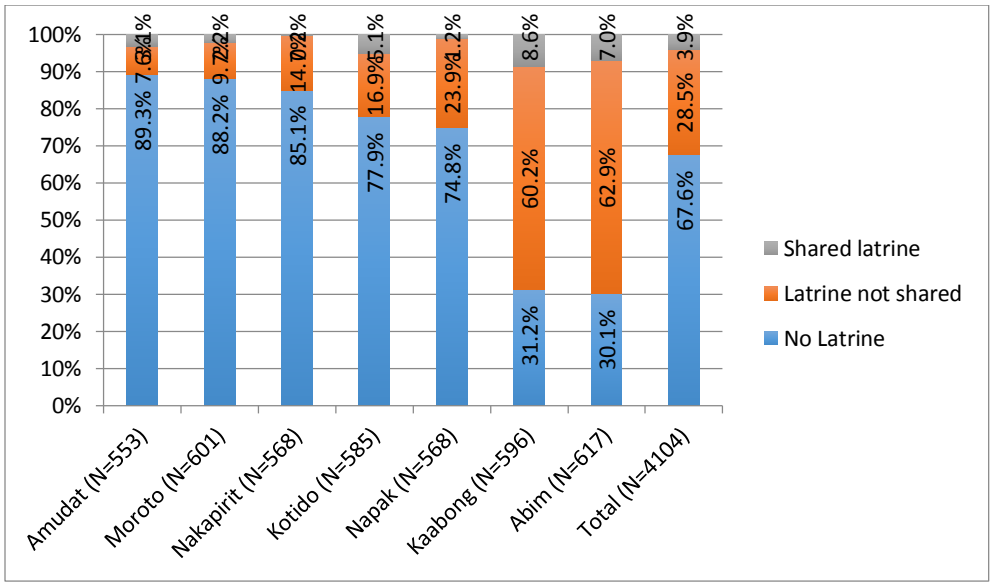


Figure 27: Latrine coverage according to district

Analysis of factors associated with malnutrition

Association of malnutrition with household socioeconomic status

A household socioeconomic index that was developed through principal components analysis using fifteen variables namely household ownership of bed, table, chairs, mattress, radio, cellphone, bicycle, motor cycle, car, television, cattle, sheep, goat, pig, poultry and donkey; and was categorized into quintiles with categories ranging from poorest to richest.

Abim (50%) and Amudat (19.8%) had the highest households in the wealthiest socioeconomic quintile while Nakapiripirit (42.3%), Moroto (35.1%) and Napak (26.8%) had the highest proportion of households in the poorest wealth quintile **(Figure 28)**. This might explain the relatively better nutrition indicators observed in Abim and Amudat districts especially with stunting which co-varies with socioeconomic status.

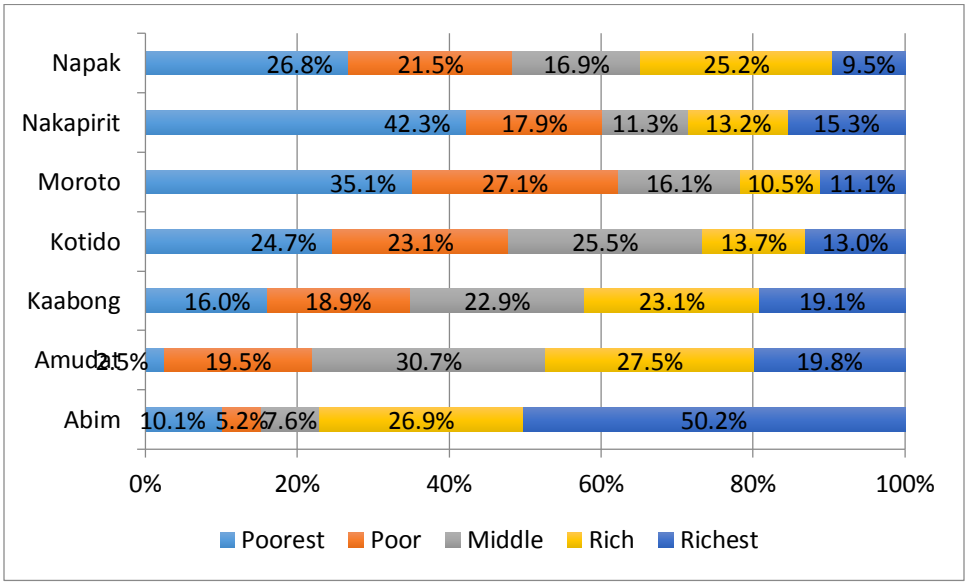


Figure 28: Household socioeconomic status according district

Household socioeconomic status had a clear dose-effect relationship with all indicators of malnutrition and the relationship were statistically significant **(Figure 29)**. Households in the poorest socioeconomic quintile were disproportionately more affected with malnutrition compared to those in the wealthiest quintile.

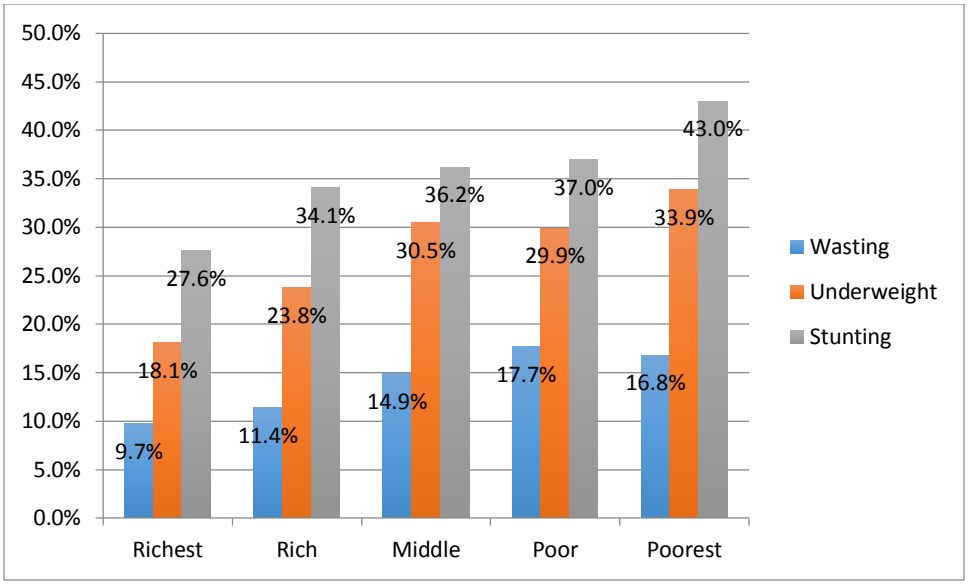


Figure 29: Association between household socioeconomic status and malnutrition

Likewise, food insecurity was more prevalent in the socioeconomically poorer households **(Figure 30)**, compared to wealthy households. Nearly 80% of the households in the richest socioeconomic quintile were having acceptable food consumption scores as compared to 30% in the poorest quintile.

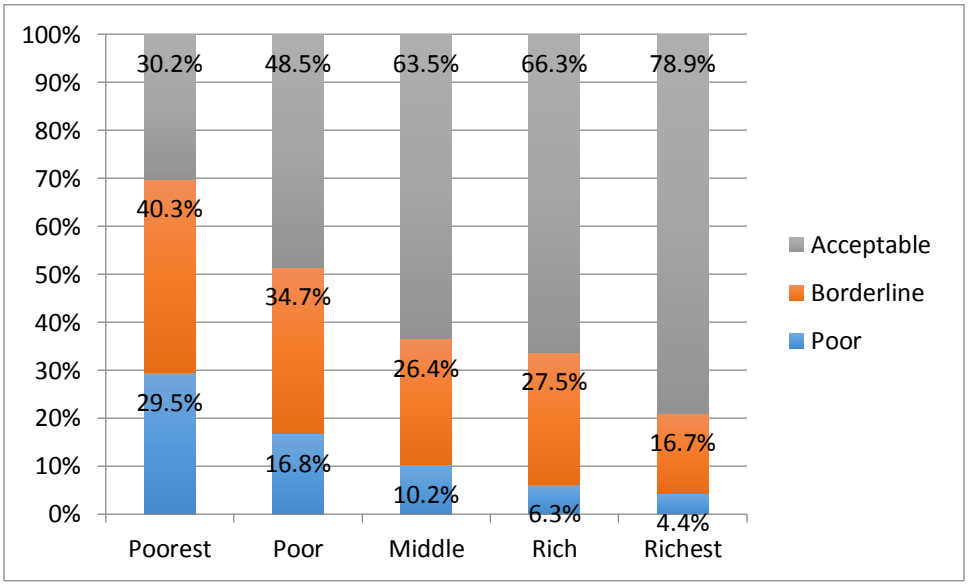


Figure 30: Association between household socioeconomic status and household food security status

Household socioeconomic status also had a statistically significant relationship between quality of infant and young child feeding (IYCF) practices. The socioeconomically poorer the household was the less likely it was to have children with minimum dietary diversity (MDD), minimum meal

frequency (MMF) and minimum acceptable diet (MAD), **(Figure 31).** However, even among the richest households only 4.3% of their children 6-23 months could afford having the minimum acceptable diet.

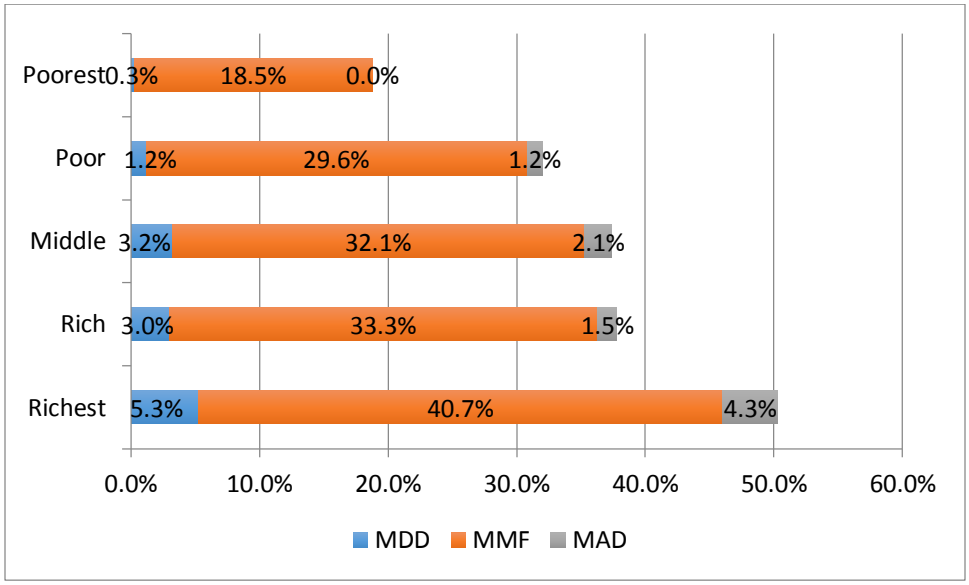


Figure 31: Association of household socioeconomic status with IYCF practices

Association of malnutrition with household EVH status

There were significant associations between stunting and underweight, and whether the household was EVH or not. EVH households were having significantly lower prevalence of stunted and underweight children compared to non-EVH households **(Figure 32).** It was not possible to establish why EVH households were performing better than non-EVH households. However, it is possible that children in EVH households are being effectively accessed with services and have therefore significantly improved. Another possibility would be to establish if the criteria for selection of EVH households was being adequately adhered to. It is well known that public interventions are oftentimes accessed first by populations not in dire need of the particular service. Although analysis of findings of this survey based on household socioeconomic status seemed to suggest the latter challenge when using regional data **(Figure 33),** stratified analysis by districts depicted that EVH households were actually socioeconomically poorer than non-EVH households in the majority of the districts except Abim (data not presented). These findings therefore are more biased by Abim district, which could review effectiveness of adherence to EHV selection criteria.

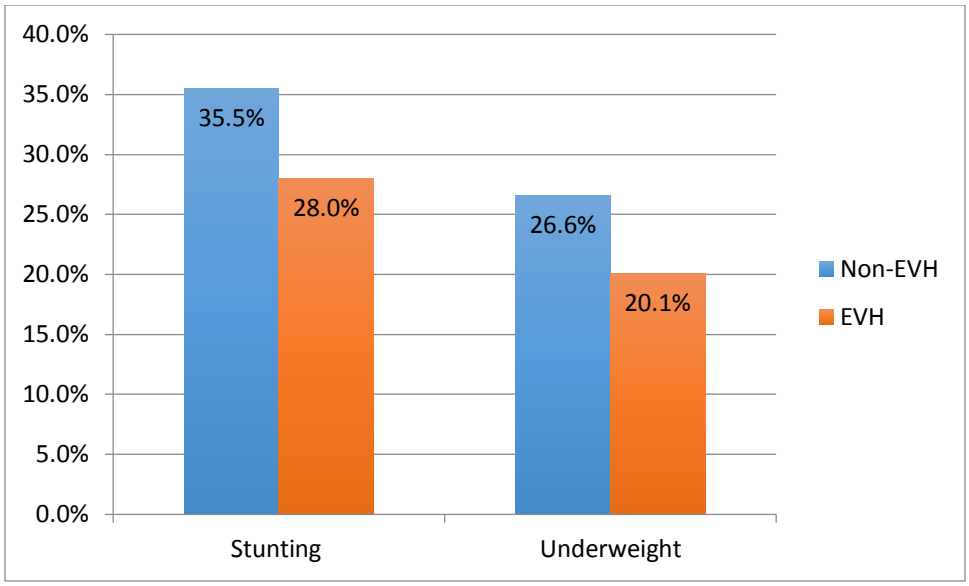


Figure 32: Association of malnutrition with EVH status

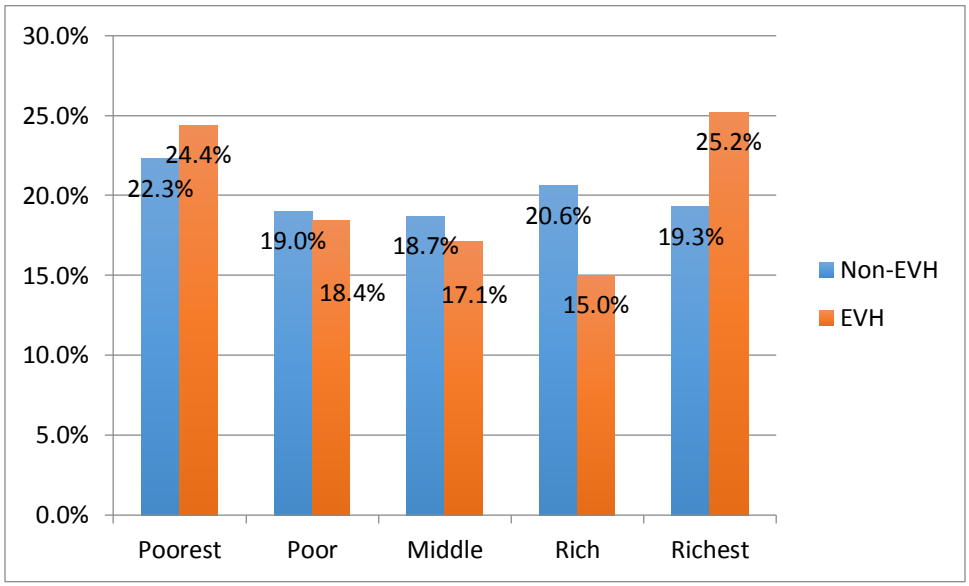


Figure 33: Association between household socioeconomic status and EVH status

Association of IYCF indicators with household food security status

There was a statistically significant relationship between quality of IYCF practices and household food security status. Food insecure and borderline households were less likely to have children with minimum dietary diversity (MDD), minimum meal frequency (MMF) and minimum acceptable diet (MAD), **(Figure 34)**.

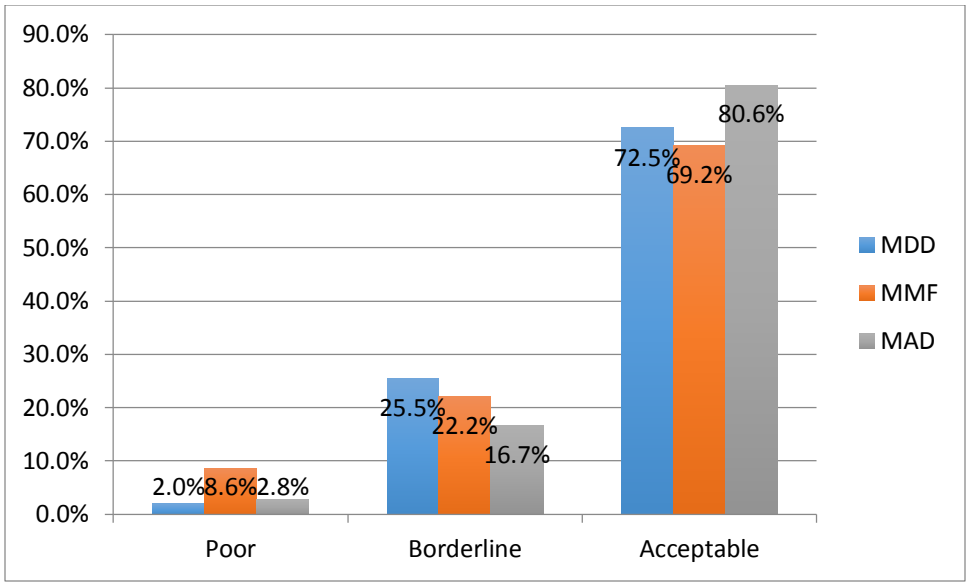


Figure 34: Association of IYCF practices with household food security status

Association of malnutrition with IYCF indicators

Infant and young child feeding practices – were all not significantly associated with malnutrition but GAM rate among those who did not meet the minimum meal frequency (16.7%) was higher than those who had had the minimum meal frequency (13.7%), (p-value =0.077).

Association of malnutrition with mothers' nutrition status

BMI status of mothers – were significantly associated with GAM **(Figure 35)**, stunting and underweight. Mothers' who were wasted were more likely to have wasted children.

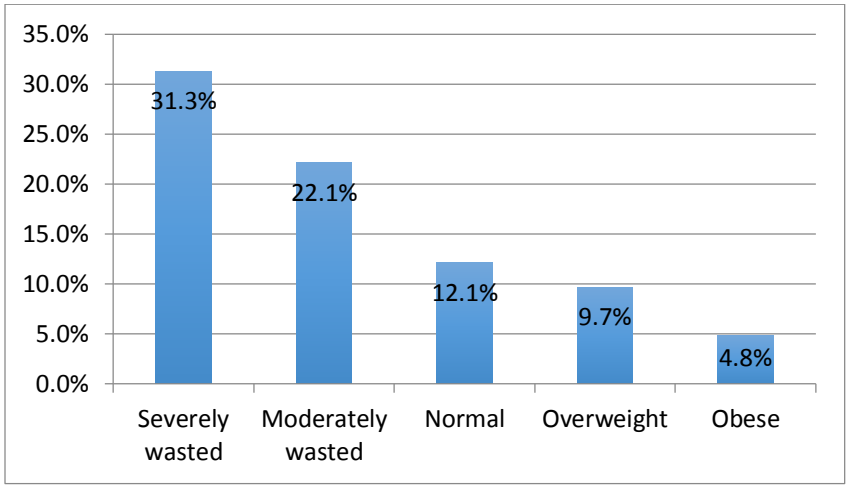


Figure 35: Association of GAM with BMI status of mothers

Association of malnutrition with mothers' education status

Mothers' education – exhibited a significant dose-effect relationship with all indicators of malnutrition **(Figure 36).** Education of the girl child has previously been emphasized and more effort is needed to implement the girl child education strategy.

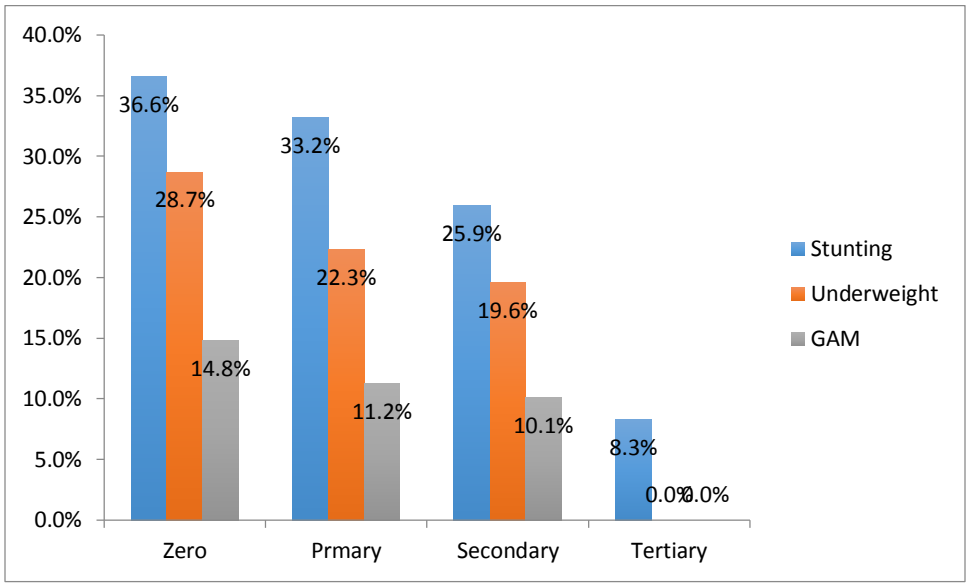


Figure 36: Association between mothers' education and indicators of malnutrition

Association of malnutrition with mothers' reproductive status

There was a statistically significant trend of malnutrition with the number of live birth a mother had had **(Figure 37)**.

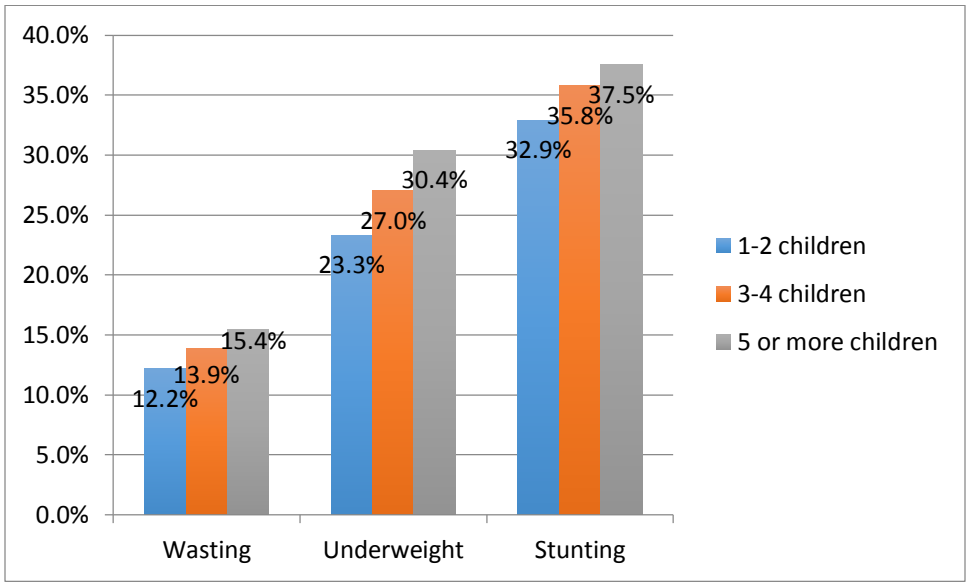


Figure 37: Association of malnutrition with maternal fertility status

Mothers with one or two children were less likely to have malnourished children than those with two or three children, who were also less likely to have malnourished children than those who had had five or more children. Reproductive health programs geared toward promoting family planning should be supported.

Likewise, mothers who were neither pregnant nor breastfeeding were more likely to have wasted children than those who were pregnant or breastfeeding **(Figure 38)**. However children of mothers who were not pregnant and not breastfeeding were more likely to have been stunted, although not statistically significant, compared to children of pregnant or breastfeeding mothers. That could have been due to the fact that mothers who were not pregnant and not breastfeeding could have had older children who were more likely to have been stunted since stunting prevalence increases with age.

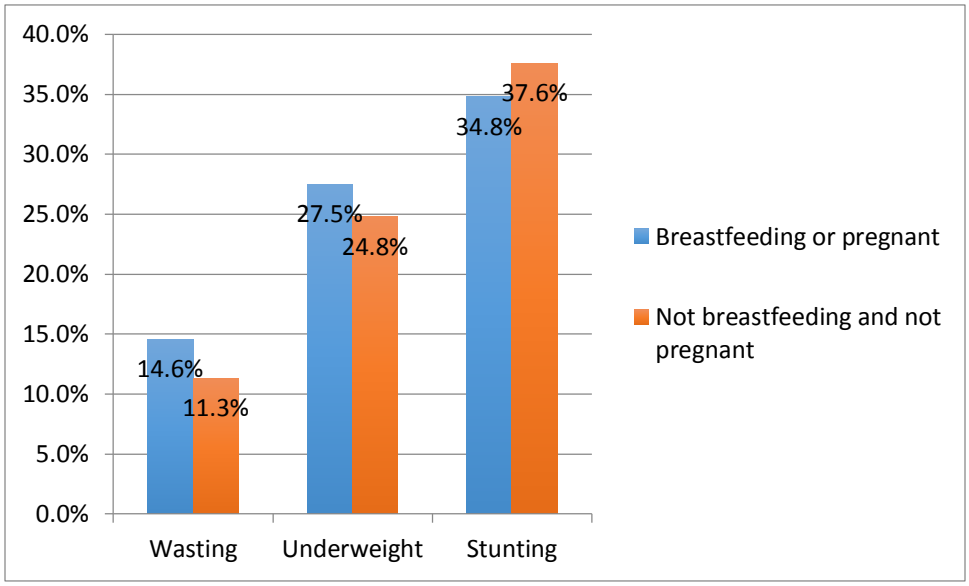


Figure 38: Association between malnutrition and pregnant or breastfeeding status

Association of malnutrition with household latrine ownership

Ownership of latrine was significantly associated with stunting but not GAM. Household without latrines (37.5%) were more likely to have stunted children compared to those with latrines (31.0%), (p-value <0.001).

Other factors that were or were not associated with malnutrition

- Ownership of cattle – was significantly associated with less stunting (p-value=0.009), but was neither associated with GAM nor underweight.

- Measles, DPT 3 immunization, deworming and vitamin supplementation were all not significantly associated with indicators of malnutrition.
- Bed net use was not associated with any indicator of malnutrition.
- Food crop production had mixed findings. Households that reported to have produced sorghum or maize had a significantly higher prevalence of malnutrition. However, having or not having any arable land did not provide any advantage as far as the prevalence of malnutrition was concerned.

Conclusions

Food availability

Livestock production: Forty three per cent (43%) of households owned no livestock. The level of livestock holding was low (<1 TLU) among the 57% that owned livestock. Poultry, goats, and cattle were the most commonly owned among 45%, 36%, and 32% of households respectively. Livestock parasites/diseases are the major constraints affecting livestock production.

Crop production: Approximately 80% of households had access to agricultural land. Maize, sorghum and beans were the most commonly cultivated crops. Two-thirds (67%) of the households reported having harvested less food compared to the previous season. The lean season is therefore projected to start early as findings suggest that stocks will be depleted from many households in early February 2015 and from all households by end of March 2015.

Food access

Household assets: Approximately 96% of households owned at least one asset; the most commonly owned assets were the axe (50%), the panga (71%) and the hoe (86%). This suggests reliance on traditional, non-lucrative livelihoods. Furthermore, only 44% owned a food store while 24% owned a seed store. This points to limitations in agricultural production and adequate post-harvest handling.

Household income: About three-quarters (75%) of households had at least one income earner. This was a significant finding as it implied that for the majority of the households, food access could not have been an obstacle. However, the high percentage of income earners was due to income derived from food crop production/sales owing to the harvest season.

Household expenditure: Food, health and clothes/shelter were the main expenditures for households. Food as a percentage of all household expenses accounted for 65%. This was an improvement as compared to data collected in June 2014 when it accounted for 70%.

Household debt: About 40% of households reported being in debt and therefore with need to repay the loans. The highest percentage of households with debt was found in Abim (58%) and

the lowest in Amudat (16%). The average amount of debt per household was UgX 71,000. Of the households that had debt, 76% borrowed primarily to buy food or cover health expenses. Most common sources of credit for households were informal e.g. through relatives and traders.

Food utilization

Food consumption: Food consumption scores were better as compared to June 2014. About 45% of the population had acceptable Food Consumption Score (FCS), 32% borderline FCS, and 24% poor FCS. The highest percentage of food insecure households (borderline and poor FCS) was found in Moroto district (67%). The most important food sources were cited as own production and market purchases.

Stability

Shocks and Coping: Up to 80% of households suffered at least one shock in the 30 days preceding the survey. However, majority of households had a low food consumption coping strategy index (RCSI) with an average of 12.8. This was attributed to relatively higher food availability at the time of the survey, following the harvest. On the other hand, application of livelihoods coping strategies was common among households across the region. The most commonly used livelihoods coping strategies by households were borrowing of money (41%) and consumption of seed stock (26%). This was a manifestation of the chronic food insecurity that has characterized the region over time.

Safety and Security: Whereas 89% of household members that went to WFP Final Distribution Points (FDP) did not experience a safety problem, findings show that a higher percentage of households in Kaabong (32%), and among EVH households (27%) experienced safety problems.

Nutrition status

Prevalence of malnutrition in Karamoja has not improved for many years and was at serious level (12.8%) in the current assessment. Maternal underweight and education status were significantly associated with all indicators of malnutrition while ownership of cows and latrine were significantly associated with stunting status.

Overall prevalence of anemia in children was 58.9% and was above 55% in all districts except Kaabong 42.9% and Moroto 48.4%. In districts like Amudat, Nakapiripirit and Napak, anemia levels in children were as high as 70%. Among mothers, prevalence of anemia was above 40% in most districts except Kotido 30.1%, Kaabong 36.1% and Moroto 37.5%. Underweight among mothers in Karamoja was also high (24.7%).

Infant and young child feeding practices

A high proportion of mothers initiated breastfeeding within the first hour of birth, Abim (76.4%), Amudat (86.2%), Kaabong (83.6%), Kotido (67.6%), Moroto (75.2%), Nakapiripirit (83.7%) and Napak 75.1%). Besides the high timely initiation of breastfeeding, exclusive breastfeeding rate

among children 0-5 months was above 80% in the majority of the districts except Amudat (69.1%) and Nakapiripirit (72.7%). Exclusive breastfeeding rates among infants less than 6 months were therefore above nation average of about 60%.

Over 45% of children 6-8 months in Kaabong, and over 20% in the rest of the districts except Moroto (5.4%) and Kotido (6.8%) had no complementary foods provided to them the day before the assessment, when they should have got it, suggesting bad timing for introduction of complementary foods.

Among children 6-23 months who had received complementary food, meals provided to them were inadequate, failing to meet the minimum frequency requirement in 63.5% of cases. Additionally, only 3.1% of the children 6-23 months received minimum dietary diversity. In summary only 2.2% of the children in Karamoja did receive the minimum acceptable diet the day before the survey. That is, 4.9% for Kaabong, 3.6% for Abim, 2.3% for Amudat, 1.0% for Kotido, 0.4% for Moroto and 0% for Napak.

Morbidity and primary health care services

Immunization coverage, deworming and vitamin A supplementation was above 90% when child health card and mothers' recall were considered in all the districts. The coverage and presence of child health cards were particularly commendable in the districts of Kotido and Nakapiripirit where cards were available in over 95% of the cases.

The most prevalent common childhood illness was malaria/fever (37.1%) followed by ARI (29.0%). Prevalence was lower than in many previous assessments where malaria/fever often exceeded 50%. Children in Kaabong and Nakapiripirit particularly had a relatively higher burden of common childhood illnesses with diarrhea prevalence exceeding 30% in both districts.

Mosquito net use by children was high and above 90% in all districts except Amudat (78.8%); the main water source was boreholes (86.4%); however only Abim district met the WHO recommendation of 15 liters per person per day while the rest of the districts it was 12.7, 11.8, 10.5, 9.2, 9.0 and 8.5 for Moroto, Nakapiripirit, Kaabong, Amudat, Kotido and Napak, respectively; latrine coverage was low with over 75% of the households in the district of Amudat, Nakapiripirit, Moroto, Kotido and Napak having no latrines.

Factors associated with malnutrition

Further analysis of the explanatory factors for malnutrition indicated that household socioeconomic status, food security, maternal nutrition, education and fertility status, household ownership of cattle and latrines were some of the factors that influenced nutrition status. Malnutrition prevalence in EVH households was also significantly lower than in non-EVH households.

Recommendations

Food security

- Approximately 16% of female household heads are either disabled or chronically ill. These households are extremely vulnerable and need to be urgently mapped and provided appropriate support to ensure their food security.
- While many households owned at least one of the enumerated assets, a high percentage lacked seed stores (76%) and food stores (56%). These are key limiting factors for household food availability. It is therefore recommended to scale up household storage initiatives such as WFP's pilot special operation on post-harvest management in the region with the view to: i) ensure availability of good quality planting materials and thus facilitate timeliness of planting; ii) reduce post-harvest losses; iii) encourage longer periods of household food availability and; iv) reduce the need to sell produce at low prices during harvest periods. It is recommended that any such interventions be initiated first in Abim (seed stores) and Nakapiripirit (food stores).
- The most commonly mentioned constraint to livestock production was livestock parasites/diseases. Given the importance of livestock to food security in the region, it is recommended to first, institute a study aimed at further understanding the epidemiology of livestock diseases in the region and providing appropriate courses of action and, second, implement measures to reduce the incidence of livestock diseases as per the study findings. Implementation of this recommendation should necessarily begin in Amudat district.
- About two-thirds of the households harvested less food this year compared to last year. Household stocks are expected to run up to March at the latest. Food security situation should be monitored closely to prevent deterioration of food security/nutrition outcomes, especially among women and children. Priority should be given to Nakapiripirit and Napak districts where the highest percentage of households reported having harvested less food.
- While about 40% of households had incurred debt, majority got the facility through informal sources. It is recommended to further understand the credit access conditions for households from these informal sources to facilitate appropriate solutions in the event that loan conditions perpetrate a debt trap among households. Furthermore, there is need to explore options for more formalized access to credit among stakeholders. This is especially the case for Amudat, Kotido and Moroto districts where the highest percentage of households accessed debt through informal sources.
- There was high application of livelihoods coping strategies that are detrimental and continually diminish households' ability to with stand subsequent shocks. This was especially so in Kaabong and Moroto districts. There needs to be a combined effort to promote alternative livelihoods for the Karamoja population and also to ensure availability of social

services including education and health care that were among leading expenditures for households.

- The fact that 63% of households in Nakapiripirit report health to be their second most common expense points towards sickness/health being an issue in the district. It is recommended to further investigate this problem and to formulate appropriate responses.
- While some households are currently categorized as Extremely Vulnerable Households (EVHs), findings show that some of these might be better off. It is recommended to urgently review the classification criteria to ensure appropriate targeting of food assistance, and to phase out those that no longer meet the criteria.
- In Kaabong district, and among EVH households, a higher percentage of household members experienced safety problems while going to the FDP. A Security review is recommended in order to identify solutions to the threats identified.
- Income generating strategies to improve household socioeconomic status are key if improvements in child malnutrition are to be seen in the region.

Nutrition

- Livestock is a key livelihood in the region, restocking, disease control, pasture and water management are critical for Nutrition. Households with cattle were less likely to have malnourished children.
- Education of the girl child should be emphasized since the higher the level of maternal education the better was the nutrition status of children. Need for UNICEF and the DLGs to rejuvenate the **GO back to School, stay in School campaign** for karamoja region. Where is The Girl's Education Movement (GEM)?
- Reproductive health services to ensure good birth spacing for women should be strengthened since malnutrition correlated positively with fertility. Need for UNICEF and WFP to work closely with sister agencies such as UNFPA and DLGs on this issue. Cognizant of the challenges family planning has faced in the region.
- Need to Strengthen the VHT referral system for active case finding, referral and follow up of children for both SAM and MAM. This is key to improve coverage and performance of the treatment.
- The status of GAM prevalence in Kaabong and Moroto should receive special attention. Detailed investigation to better understand why these 2 districts have persistently had high GAM over the years is key.
- Given the high rates of anemia in the under five children and women of reproductive age, there is need to explore the use and promotion of multiple micronutrient powder/sprinkles for children in the short to medium term. Emphasis on Iron and Folate supplementation or use of multiple micronutrient tablets for mothers also key while discussions continue on how to promote dietary diversity in the region

- Promotion of optimal maternal nutrition practices is key for the region. Relatedly is need to reduce maternal/women's workload as this compromises child caring practices as well nutrition/health status of the women. Can water points be made gender sensitive? How about promotion of energy saving technologies? Can public works programs that are largely dominated by women be made nutrition sensitive?
- The issue Of Male involvement in key for nutrition. How can stakeholders rally behind this for the region?
- The quality of complementary feeding remains a big challenge in the region largely due to limited food varieties especially protein sources and vegetables. There is need to promote consumption milk for children, address the barriers to access to milk and ensure milk is made available during the lean season.
- Promotion of proper sanitation and hygiene practices can't be over emphasized. There is a need to ensure that households construct and use latrines. There was a strong correlation between latrine ownership and stunting. How do players in Nutrition and WASH work together in the region to promote CLTS (community Led Total Sanitation)?
- By comparison, Amudat district has over the years demonstrated better nutrition outcomes than the other 6 districts in the region i.e. better IYCF practices, lower stunting rates and GAM. What can the other districts learn from Amudat? Need for a more in-depth case study to document some of the good practices in Amudat.
- While Immunization, vitamin A, deworming, mosquito net use were found not be positively related with nutrition, there is need to commend the district local governments and sustain the good coverages of these interventions

Annex

Annex 1: FCS by sub-county

District	Sub county	Average FCS	Acceptable	Borderline	Poor
Abim	Lotuke	33.24	43.2%	36.2%	20.5%
	Abim TC	32.39	39.1%	30.8%	30.2%
	Alerek	28.82	28.9%	47.0%	24.1%
	Nyakwae	27.68	29.3%	32.9%	37.8%
	Morulem	27.58	29.8%	38.5%	31.7%
Amudat	Karita	52.92	80.5%	13.6%	5.9%
	Amudat	52.44	85.2%	11.6%	3.2%
	Loroo	48.82	75.7%	14.2%	10.1%
Kaabong	Kaabong TC	47.17	66.7%	33.3%	.0%
	Karenga	43.69	57.5%	35.0%	7.5%
	Kaabong	37.33	45.3%	44.4%	10.3%
	Loyoro	37.05	60.0%	40.0%	.0%
	Kathile	36.45	45.6%	40.4%	14.0%
	Kamion	36.41	48.8%	46.3%	4.9%
	Lolelia	36.40	52.4%	38.1%	9.5%
	Lodiko	35.09	27.3%	50.0%	22.7%
	Kalapata	31.76	29.6%	55.6%	14.8%
	Kawalakol	31.49	35.0%	46.7%	18.3%
	Kapedo	30.43	31.7%	46.3%	22.0%
	Lobalangit	29.69	25.0%	57.5%	17.5%
	Sidok	29.33	25.4%	50.8%	23.7%
Kotido	Rengen	34.79	46.7%	25.3%	28.0%
	Panyangara	34.17	42.5%	32.9%	24.7%
	Kotido	33.74	44.7%	26.1%	29.2%
	Nakapelimoru	28.07	35.0%	16.3%	48.8%
	Kacheri	26.14	18.2%	40.9%	40.9%
Moroto	North Division	46.88	81.3%	18.8%	.0%
	South Division	42.97	81.0%	6.3%	12.7%
	Tapec	28.37	35.3%	21.6%	43.1%
	Katikekile	28.03	26.7%	43.3%	30.0%
	Rupa	27.72	24.5%	46.9%	28.7%
	Nadunget	27.33	22.3%	43.3%	34.4%
Nakapiripirit	Loregae	39.44	58.2%	11.9%	29.9%
	Namalu	39.08	48.0%	30.6%	21.4%
	Nabilatuk	38.39	55.7%	17.5%	26.8%
	Moruita	37.39	46.3%	16.7%	37.0%
	Nakapiripirit TC	35.83	45.0%	40.0%	15.0%
	Kakomongole	33.76	35.6%	35.6%	28.8%
	Lorengedwat	29.27	39.0%	22.0%	39.0%
	Lolachat	26.08	24.3%	28.6%	47.1%
Napak	Ngoleriet	37.98	53.8%	33.8%	12.5%
	Matany	34.66	45.8%	33.9%	20.3%
	Lokopo	32.49	33.3%	42.7%	24.0%
	Lotome	32.37	31.7%	43.3%	25.0%
	Iriiri	30.99	30.8%	39.0%	30.2%
	Lorengecora	30.35	25.0%	51.7%	23.3%
	Lopei	30.65	28.3%	46.7%	25.0%

Annex 2: Questionnaire

World Food Programme

unicef

Household ID: |__|__|__|__|__|__|

Food Security and Nutrition Assessment in Karamoja, December 2014

0.1 Date |__|__|/|__|__|/2014

0.2 Interviewer Name: _____ Signature: _____

0.3 Supervisor Name:_____ Signature:_____

0.4 District: ……..1-Abim 2–Amudat 3–Kaabong 4–Kotido 5–Moroto 6–Nakapiripirit 7–Napak

0.5 Sub-county…… 0.6 Parish…….. 0.7 Village……..

0.8 Cluster ID |__|__| **0.9 HH No:** |__|__|

0.10. Is this household on the Extremely Vulnerable Households' (EVH) Programme? *(Circle one)*
1= Yes 0=No *(If No, skip to 0.11)*

0.10b. If Yes, do you have a card for the EVH Programme 1= Yes 0=No

0.11 Is any member of the household currently receiving assistance from the NUSAF programme?
(Circle one) 1 = Yes 0=No

SECTION 1 – HOUSEHOLD AND MOTHER/CAREGIVER INFORMATION

A1. What is the sex of the household head? Male = 1 Female = 2

A2. What is the age of the household head? |__|__| Years

A3. Is the head of household disabled, chronically ill or able bodied?

1 = Disabled 2 = Chronically ill 3 = Able bodied

A4. Household head number of completed years of formal education |__|__|

A5. Does your household have toilet facilities?

1= Yes 2= Yes but shared with other households 0= No ***(If NO go to A16)***

A6. What kind of toilet facilities do you use or, rather, have within the household and use?

1= Flush toilet 2= Pit Latrine with slab/VIP 3= Open pit (no super structure) 4= bucket latrine

A7. How many households share this toilet?

1= Not shared 2= Two HH 3= 3 HH or more 4 = Public Toilet

A8. Where do you usually get the water which people drink?

1=Piped water 2= Protected Well or Spring 3= Bore hole 4= Open Spring or well

5= Surface water (pond, stream, river, lake, dam, swamp) 6= Rain water

A9. Before drinking this water do you do anything to make it safer to drink?

1= Yes 2= No ***(If No go to A19)***

A10. What do you commonly do to make your water safer to drink?

1= Boil 2= Add bleach or chlorine 3= Straining through a cloth

4= Use water filter (ceramic/sand/composite, etc) 5= Let it stand and settle

6= Other (Specify) _____

No	OBSERVATION / QUESTION	ANSWER			
A11.	CALCULATE THE TOTAL AMOUNT OF WATER USED BY THE HOUSEHOLD PER DAY THIS RELATES TO ALL SOURCES OF WATER (DRINKING WATER AND NON-DRINKING WATER SOURCES)	Please show me the containers you used yesterday for collecting water ASSIGN A NUMBER TO EACH CONTAINER	Capacity in litres	Number of journeys made with each container	Total litres **SUPERVISOR TO COMPLETE** **HAND CALCULATION**
		1 E.g. jerry can	20 L		
		2 E.g. jerry can	10 L		
		3 E.g. jerry can	5 L		
		4 E.g. bucket	20 L		
		5 E.g. bucket	10 L		
		6			
		7			
		Total litres used by household			

SECTION 2 – HOUSEHOLD ASSET AND LIVESTOCK OWNERSHIP							
B1.	Does anyone in your household **own** any of the following assets? **1 – Yes, 0 - No** **WHILE ASKING, ALSO OBSERVE** *(Enter '1' for yes, '0' for no)*	1.	Bed	|__|	11.	Television	|__|
		2.	Table	|__|	12	Axe	|__|
		3	Chairs	|__|	13.	Panga/Machete	|__|
		4.	Mattress	|__|	14.	Hoe	|__|
		5.	Radio/Tape	|__|	15.	Ox-plough	|__|
		6.	Cell Phone	|__|	16.	Water tank	|__|
		7.	Sewing Machine	|__|	17.	Seed store	|__|
		8.	Bicycle	|__|	18.	Food store	|__|
		9.	Automobile	|__|			
		10.	Motorcycle	|__|			

				1=Yes 0=No	Number of livestock
B2.	Does your household own any of the following livestock? If *'No'* skip to section 4. If '*Yes'*, how many of the following livestock does your household currently own?	1.	Cattle	|__|	|__|__|__|
		2.	Sheep	|__|	|__|__|__|
		3	Goat	|__|	|__|__|__|
		4.	Pig	|__|	|__|__|__|
		5.	Poultry	|__|	|__|__|__|
		6.	Donkey	|__|	|__|__|__|
		8.	Other: Specify		|__|__|__|
B3.	What are the main constraints for livestock and livestock production for your household?	**Main constraints**			
		1=Poor breed		6=Lack of veterinary services	
		2=Parasites/diseases		7=Insecurity	
		3=Inadequate labour		8=Theft	

	Circle all that apply	4=Shortage of pasture/feed	9=Lack of market for livestock
		5=Shortage of water	10=Other *(specify)*:

SECTION 3 – FOOD AVAILABILITY			
C1.	Do you have access to agricultural land (arable land for cultivation)?		1=Yes 0= No *(Go to section 4)*
C2.	What type and how big is the land do you have access to?	1= Flatland for small garden	acres
		2= Up land for cultivation	acres
		3= Swamp	acres
		4= Other (specify):	acres
C3.	What type of crops did you cultivate last season and how much land each occupy?	Maize	acres
		Bean	acres
		Cassava	acres
		Millet	acres
		Sorghum	acres
		Potato	acres
		Banana	acres
		Rice	acres
		Other (specify)	

C4.	If household cultivated food in last season, fill in the table below**. For harvested crops, ask the quantity of output; Leave a blank space if crop was not planted**			
	Crop Harvested	**Number of Units**	**Name of Unit**	**Kilogram per one Unit**
	1. Maize	| | | | | |		| | | |
	2. Millet	| | | | | |		| | | |
	3. Sorghum	| | | | | |		| | | |
	4. Potato	| | | | | |		| | | |
	5. Rice	| | | | | |		| | | |
	6. Beans	| | | | | |		| | | |
	7. Cassava	| | | | | |		| | | |
C5.	How much crop is in your current stock? |__|__||__| kg			

C6.	How long will your food stock last? |__|__|.|__| months	
C7.	How does this years (last season) harvest compare with the last year's harvest? (circle) 1 = lower 2 = similar 3 = higher	
C8.	What was the **BIGGEST** constraint to agriculture in the past six months? **(Circle one response)**	1=Insecurity 2=I have been prohibited by the clan/my husband 3=The land is infertile/farming is unproductive 4=I have been prohibited by the government 5=Sickness or physical inability 6=I did not have adequate seeds and tools 7=I do not have sufficient family/household labour 8= Land conflicts 9= Drought/Low rainfall 10= Lack of household storage facility 11=Other (Specify)

SECTION 4 – MAIN INCOME SOURCE

D1. - How many members of the household earn an income?			**|____|**
Please complete the table, one activity at a time *(use income source codes, up to 3 activities)*		During the past 30 days, what were your household's most important livelihood sources? *(use income source codes, up to 3 activities)*	Using proportional piling or 'divide the pie' methods, please estimate the relative contribution to total income of each source **(%)**
D2.	**Most important**	**|__|__|**	**|__|__|__|**
D3.	**Second** *(leave blank if none)*	**|__|__|**	**|__|__|**
D4.	**Third** *(leave blank if none)*	**|__|__|**	**|__|__|**

Income source codes:	*7 = Small business/self-employed*	*14 = Borrowing*
1 = Food crop production/sales	*8 = Petty trade (firewood sales, etc.)*	*15 = Food assistance*
2 = Cash crop production/sale (e.g. coffee)	*9 = Pension, allowances*	*16 = Skilled Trade*
3 = Sale of animals or animal products	*10 = Salary/wages*	*17 = Sale of food assistance*
4 = Livestock production (Animal Husbandry)	*11 = Fishing*	*19=Government allowance*

5 = Agricultural wage labor	*12 = Handicrafts*	*20=Remittances*
6 = Non-agricultural wage labor	*13 = Gifts/begging*	*18 = Other*

SECTION 5 – CREDIT/DEBT			
	What were your household's main expenses in the past 30 days? *(Rank up to 4 expenditures.Use expenses codes)*	Using proportional piling method, estimate the relative contribution to total expenditure of each activity (%)	
E1.	Main **|____|____|**	**E1.1. |____|____|____|%**	
E2.	Second **|____|____|**	**E2.1. |____|____|%**	
E3.	Third **|____|____|**	**E3.1. |____|____|%**	
E4.	Fourth **|____|____|**	**E4.1 |____|____|%**	
Expenses codes	*1 = Food* *2 = Education* *3 = Health* *4 = Clothes/ Shelter*	*5 = Farm input/investment* *6 = Utilities* *7= Transport* *8= Others*	
E5.	Do you have any debt or credit to repay at the moment?	1= YES 0= N	|___| ***If 'No', go to section 6***
E6.	If yes, approximate the amount of current debt in Uganda shillings		**……..UGX**
E7.			**Main reason**

	What was the **MAIN** reason for new debts or credit? (**CHOOSE ONLY ONE)** **1**= To buy food **2**= To cover health expenses **3**= To pay school, education costs **4**= To buy agricultural inputs (seed, tools...) **5**= To buy animal feed, fodder, veterinary **6**= To buy or rent land **7**= To buy or rent animals **8**= To buy or rent or renovate a flat/ house **9**= To pay for social events / ceremonies **10**= To invest for other business **11**= Other reason(specify)_____	|____|
E8.	Who is the **MAIN** source of credit for all debts and loans? (**CHOOSE ONLY ONE)** 1= Relatives 2= Traders/shop-keeper 3= Bank/ Credit institution/Micro-credit project 4= Money lender 5= Other (specify)	**Main source** |____|

SECTION 6– FOOD SOURCES AND CONSUMPTION

Read: I would now like to ask you a few questions about food consumption in your household (**Ask all the three questions for each row)**				
	Food Item	***a.*** *Number of days food item was eaten during last 7 days* *(0-7 Days)*	***b.*** *Main Source* *(use codes at bottom of table)*	***c.*** *Was food item eaten in last 24 hours?* *1= Yes 0= No*

F1.	**Cereals and grain:** Rice, bread / cake and / or donuts, sorghum, millet, maize, chapatti.	|__|	|__|	
F2.	**Roots and tubers:** potato, yam, cassava, sweet potato, and / or other tubers	|__|	|__|	
F3.	**Pulses:** beans, cowpeas, lentils, soy, pigeon pea	|__|	|__|	
F4.	**Nuts:** ground nuts, peanuts, sim sim, coconuts or other nuts	|__|	|__|	
F5.	**Orange vegetables (vegetables rich in Vitamin A):** carrot, red pepper, pumpkin, orange sweet potatoes,	|__|	|__|	
F6.	**Green leafy vegetables:**, spinach, broccoli, amaranth and / or other dark green leaves, cassava leaves, bean leaves, pea leaves.	|__|	|__|	
F7.	**Other vegetables:** onion, tomatoes, cucumber, radishes, green beans, peas, lettuce, cabbage, etc.	|__|	|__|	
F8.	**Orange fruits (Fruits rich in Vitamin A):** mango, papaya, apricot, peach	|__|	|__|	
F9.	**Other Fruits (Fruits rich in Vitamin A) :** banana, apple, lemon, tangerine	|__|	|__|	
F10.	**Meat:** goat, beef, chicken, pork *(report only meat consumed in large quantities and not as a condiment)*	|__|	|__|	
F11.	**Liver, kidney, heart and / or other organ meats and blood**	|__|	|__|	
F12.	**Fish / Shellfish:** fish, including canned tuna, and/or other seafood *(report only fish consumed in large quantities and not as a condiment)*	|__|	|__|	
F13.	**Eggs**	|__|	|__|	

F14.	**Milk and other dairy products**: fresh milk / sour, yogurt, cheese, other dairy products *(Exclude margarine / butter or small amounts of milk for tea / coffee)*	|__|	|__|	
F15.	**Oil / fat / butter:** vegetable oil, palm oil, shea butter, margarine, other fats / oil	|__|	|__|	
F16.	**Sugar, or sweet:** sugar, honey, jam, cakes, candy, cookies, pastries, cakes and other sweet (sugary drinks)	|__|	|__|	
F17.	**Condiments / Spices:** tea, coffee / cocoa, salt, garlic, spices, yeast / baking powder, lanwin, tomato / sauce, meat or fish as a condiment, condiments including small amount of milk / tea coffee.	|__|	|__|	
Food source codes *0 = Not eaten food group* *1 = Own production (crops, animal)* *2 = Fishing / Hunting* *3 = Gathering* *4 = Borrowed*		*5 = Market (purchase with cash)* *6 = Market (purchase on credit)* *7 = Beg for food* *8 = Exchange labor or items for food*	*9 = Gift (food) from family relatives or friends* *10 = Food aid from civil society, NGOs, government, WFP etc*	

SECTION 7– SHOCKS AND COPING

*WHAT HAVE BEEN YOUR MAIN **DIFFICULTIES OR SHOCKS** IN THE PAST 30 DAYS* **DO NOT LIST, LEAVE THE HOUSEHOLD ANSWER SPONTANEOUSLY** ONCE DONE, ASK THE HOUSEHOLD TO RANK THE 3 MOST IMPORTANT ONES	*1ST DIFFICULTY*		2nd Difficulty	
1 = Loss employment/reduced salary/wages 2 = Crop Loss due to Rodents 3 = Death household member/funerals 4 = High food prices	***G1.***	|___ |	***G2.***	|___|

5 = High fuel/transportation prices 6= Debt to reimburse 7 = Floods, heavy rains, drought, land slides 8= Other shock (Specify) 99= No difficulty mentioned				

Reduced Coping Strategies Index During the last 7 days, how many times (in days) did your household have to employ one of the following strategies to cope with a lack of food or money to buy it? **READ OUT STRATEGIES**		**Frequency (number of days from 0 to 7)**
G3.	Relied on less preferred, less expensive food	| __ |
G4.	Borrowed food or relied on help from friends or relatives	| __ |
G5.	Reduced the number of meals eaten per day	| __ |
G6.	Reduced portion size of meals	| __ |
G7.	Reduction in the quantities consumed by adults/mothers for young children	| __ |

Livelihood Coping Strategies Index During the last 30 days, did anyone in your household have to engage in any of the following activities because there was not enough food or money to buy food		1. **Yes,** 2. **No, because it wasn't necessary;** 3. **No, because I already sold those assets or did this activity and cannot continue and;** 4. **No, because I never had the possibility to do so.**
G8.	Sold more animals (non-productive) than usual	| __ |
G9.	Sold household goods (radio, furniture, refrigerator, television, jewelry etc..)	| __ |
G10.	Spent savings	| __ |
G11.	Borrowed money	| __ |

STRESS

G12.	EMERGENCIES	Sold productive assets or means of transport (sewing machine, wheelbarrow, bicycle, car, goats, cows, etc.)	| __ |
G13.		Reduced essential non-food expenditures such as education, health, etc.	| __ |
G14.		Consume seed stock held for next season	| __ |
G15.	CRISIS	Sold house or land	| __ |
G16.		Illegal income activities (theft, smuggling, prostitution)	| __ |
G17.		Begged	| __ |

SECTION 8 A: MOTHER / CAREGIVER 1 (WITH CHILDREN 0-59 MONTHS OLD)

8a.1	Respondent relationship to children *Circle one*		1=Mother 2= Care giver
8a.2	Age of mother/caregiver		|__|__| years
8a.3	Educational level of mother/caregiver ***CIRCLE***		1. No formal education 2. Primary 3. Secondary 4. Tertiary
8a.4	Number of live births by this mother/Care giver		|__|__|
8a.5	Is mother/caretaker pregnant or breast feeding?		1. Pregnant 2. Breastfeeding (lactating) 3. Pregnant and breastfeeding 4. None of the above
8a.6	Weight (kg)	|__|__|__|.|__|kg	(Only for non-pregnant women with children 0 to 59 months)
8a.7	Height (cm)	|__|__|__|.|__|cm	(Only for non-pregnant women with children 0 to 59 months)
8a.8	MUAC (cm)	|__|__|__|.|__|cm	(For ALL women with children 0 to 59 months)
8a.9	Hemocue test	|__|__|.|__|g/dl	(For ALL women with children 0 to 59 months)

SECTION 8 A: CHILD HEALTH AND NUTRITION (CHILDREN 0-59 MONTHS OLD): MOTHER / CAREGIVER 1

Please ask Mother/Caregiver 1 all questions about Child 1 and write the answers before moving to Child 2, 3, etc.													
		Child 1				**Child 2**				**Child 3**			
8a.9	Sex of the child? *Circle one*	1=Male 2=Female				1=Male 2=Female				1=Male 2=Female			
8a.10	Date of birth *(Day/month/ year)*	|__|__|/|__|__|/|__|__|				|__|__|/|__|__|/|__|__|				|__|__|/|__|__|/|__|__|			
8a.11	Age of the child? (*in months*)	|__|__|				|__|__|				|__|__|			
8a.12	Has(mention child's name) been taken for immunization,de-worming or supplementation? Use the following codes **1**= Yes with card **2**= Yes without card **3**= No with card **4**= No without card	**Measles**	DPT3	De-worming (>12 months)	Vitamin A (6 months)	**Measles**	DPT3	De-worming (>12 months)	Vitamin A (6 months)	**Measles**	DPT3	De-worming (>12 months)	Vitamin A (6 months)
8a.13	What did the child aged 0-6 months feed on in your household in the last 24 hours? *(Circle all that apply)*	1= Breast milk only 2= Breast milk and other foods or fluids 3= Bottled or milk in cup (cow or formula) 4= Other foods only 5= No children aged below 6 months											
8a.14	How long after birth	1. Within first 1 hour 2. After 1 hour 3. Did not breast fed at all				1. Within first 1 hour 2. After 1 hour 3. Did not breast fed at all				1. Within first 1 hour 2. After 1 hour 3. Did not breast fed at all			

	did you put the baby to the breast? *(Circle one)*	4. Don't know	4. Don't know	4. Don't know
8a. 15	Since birth, for how long (in months) was your child continuously breast-fed? *(if still breastfeeding, tick box)*	|__|__| months |__| still breastfeeding	|__|__| months |__| still breastfeeding	|__|__| months |__| still breastfeeding
9a. 16	Mention the diseases your child has suffered in the last 2 weeks *Circle all that apply*	1 = Fever/malaria 2 = measles 3 = diarrhea 4 = ARI/cough 5 = skin diseases 6 = Eye disease 7 = other 8 = No Illness	1 = Fever/malaria 2 = measles 3 = diarrhea 4 = ARI/cough 5 = skin diseases 6 = Eye disease 7 = other 8 = No Illness	1 = Fever/malaria 2 = measles 3 = diarrhea 4 = ARI/cough 5 = skin diseases 6 = Eye disease 7 = other 8 = No Illness
8a.17	Did the child sleep under a mosquito net last night? CIRCLE	1= YES 0= NO	1= YES 0= NO	1= YES 0= NO
Questions 8a.18 to 8a.23iv apply only to children 6 to 23 months				
8a.18	At what age of your child did you introduce Liquid/ solid foods	|__|__| months	|__|__| months	|__|__| months
8a.19	Was your child 6-23 months breastfed yesterday during the day or night	1 = Yes 2 = No 3 = Don't know	1 = Yes 2 = No 3 = Don't know	1 = Yes 2 = No 3 = Don't know
8a.20	How many times during the day or	1 = Infant formula |__| times	1 = Infant formula |__| times	1 = Infant formula |__| times

	night did your child 6-23 months consume any of….	2 = Milk such as tinned, powdered, or fresh animal milk |__|.times 3 = Yogurt |__| times 4=Thin porridge |__|times	2 = Milk such as tinned, powdered, or fresh animal milk |__|.times 3 = Yogurt |__| times 4=Thin porridge |__|times	2 = Milk such as tinned, powdered, or fresh animal milk |__|.times 3 = Yogurt |__| times 4=Thin porridge |__|times
8a.21	What foods did your child 6-23 months eat in the last 24 hours? Circle all that apply	1 = Grains, roots, and tubers *eg porridge, bread, rice, posho, potatoes, cassava, etc* 2 = Legumes and nuts *eg beans, peas, ground nuts. etc* 3 = Dairy products *eg milk yoghurt, cheese* 4 = Flesh foods *eg meat, fish, poultry, liver, organ meats* 5 = Eggs 6 = Vitamin A rich fruits and vegetables *eg carrots, ripe mangoes, papaya, etc* 7 = Other fruits and vegetables 8 = Fortified foods (WFP fortified products)	1 = Grains, roots, and tubers *eg porridge, bread, rice, posho, potatoes, cassava, etc* 2 = Legumes and nuts *eg beans, peas, ground nuts. etc* 3 = Dairy products *eg milk yoghurt, cheese* 4 = Flesh foods *eg meat, fish, poultry, liver, organ meats* 5 = Eggs 6 = Vitamin A rich fruits and vegetables *eg carrots, ripe mangoes, papaya, etc* 7 = Other fruits and vegetables 8 = Fortified foods (WFP fortified products)	1 = Grains, roots, and tubers *eg porridge, bread, rice, posho, potatoes, cassava, etc* 2 = Legumes and nuts *eg beans, peas, ground nuts. etc* 3 = Dairy products *eg milk yoghurt, cheese* 4 = Flesh foods *eg meat, fish, poultry, liver, organ meats* 5 = Eggs 6 = Vitamin A rich fruits and vegetables *eg carrots, ripe mangoes, papaya, etc* 7 = Other fruits and vegetables 8 = Fortified foods (WFP fortified products)
8a.22	How many times did your child 6-23 months eat solid, semi-solid or soft foods during the previous day?	|__| times	|__| times	|__| times
8a.23i	Is this child 6-23 months enrolled in the MCHN *Programme (Note: MCHN beneficiaries receive*	1= YES 0= NO (Skip to 9a.20iv)	1= YES 0= NO(Skip to 9a.20iv)	1= YES 0= NO(Skip to 9a.20iv)

	Premix of CSB, Oil and Sugar at health facilities)			
8a.23ii	May I see your programme participation card ? *Tick the response provided*	1 = Card present 2 = Card absent	1 = Card present 2 = Card absent	1 = Card present 2 = Card absent
8a.23iii	Why do you not have a programme participation card?	1 = I was not given one 2= Did not know I needed one 3 = I lost/misplaced my card 4 = Other	1 = I was not given one 2= Did not know I needed one 3 = I lost/misplaced my card 4 = Other	1 = I was not given one 2= Did not know I needed one 3 = I lost/misplaced my card 4 = Other
8a.23iv	If child 6-23 months is not enrolled, what is the main reason for not enrolling the child?	1 = I don't know about the programme 2 = Too much time required to participate= The distribution site was too far 4 = No transportation to reach the distribution site 5 = I had other commitments that prevented enrolling the child 6 = Other – Specify…… ……	1 = I don't know about the programme 2 = Too much time required to participate= The distribution site was too far 4 = No transportation to reach the distribution site 5 = I had other commitments that prevented enrolling the child 6 = Other – Specify…… ……	1 = I don't know about the programme 2 = Too much time required to participate= The distribution site was too far 4 = No transportation to reach the distribution site 5 = I had other commitments that prevented enrolling the child 6 = Other – Specify…… ……
Questions 8a.24 to 8a.27 apply only to all children 6 to 59 months				
8a.24	Does the child have oedema? *(If yes, skip 9a.25-9a.27)*	1 = YES 0 = NO	1 = YES 0 = NO	1 = YES 0 = NO

8a.25	Weight (Kg) of the child	|__|__|.|__|kg	|__|__|.|__|kg	|__|__|.|__|kg
8a.26	Height (cm) of the child	|__|__|__|.|__|cm	|__|__|__|.|__|cm	|__|__|__|.|__|cm
8a.27	MUAC (cm) of the child	|__|__|__|.|__|cm	|__|__|__|.|__|cm	|__|__|__|.|__|cm
8a.28	Hemocue test	|__|__|.|__|g/dl	|__|__|.|__|g/dl	|__|__|.|__|g/dl

SECTION 8 B: MOTHER / CAREGIVER 2 (WITH CHILDREN 0-59 MONTHS OLD)			
8b.1	Respondent relationship to children *Circle one*		1=Mother 2= Care giver
8b.2	Age of mother/caregiver		|__|__| years
8b.3	Educational level of mother/caregiver ***CIRCLE***		5. No formal education 6. Primary 7. Secondary 8. Tertiary
8b.4	Number of live births by this mother/Care giver		|__|__|
8b.5	Is mother/caretaker pregnant or breast feeding?		5. Pregnant 6. Breastfeeding (lactating) 7. Pregnant and breastfeeding 8. None of the above
8b.6	Weight (kg)	|__|__|__|.|__|kg	(Only for non-pregnant women with children 0 to 59 months)
8b.7	Height (cm)	|__|__|__|.|__|cm	(Only for non-pregnant women with children 0 to 59 months)
8b.8	MUAC (cm)	|__|__|__|.|__|cm	(For ALL women with children 0 to 59 months)
8b.9	Hemocue test	|__|__|.|__|g/dl	(For ALL women with children 0 to 59 months)

SECTION 8 B: CHILD HEALTH AND NUTRITION (CHILDREN 0-59 MONTHS OLD): MOTHER / CAREGIVER 2				
Please ask Mother/Caregiver 1 all questions about Child 1 and write the answers before moving to Child 2, 3, etc.				
		Child 1	**Child 2**	**Child 3**

8b.9	Sex of the child? *Circle one*	1=Male 2=Female				1=Male 2=Female				1=Male 2=Female					
8b.10	Date of birth *(Day/month/ year)*	|__|__|/|__|__|/|__|__|				|__|__|/|__|__|/|__|__|				|__|__|/|__|__|/|__|__|			
8b.11	Age of the child? (*in months*)	|__|__|				|__|__|				|__|__|			
8b.12	Has (mention child's name) been taken for immunization ,de-worming or supplementation? Use the following codes **1**= Yes with card **2**= Yes without card **3**= No with card **4**= No without card	**Measles**	DPT3	De-worming (>12 months)	Vitamin A (6 months)	**Measles**	DPT3	De-worming (>12 months)	Vitamin A (6 months)	**Measles**	DPT3	De-worming (>12 months)	Vitamin A (6 months)		
8b.13	What did the child aged 0-6 months feed on in your household in the last 24 hours? *(Circle all that apply)*	1= Breast milk only 2= Breast milk and other foods or fluids 3= Bottled or milk in cup (cow or formula) 4= Other foods only 5= No children aged below 6 months													
8b.14	How long after birth did you put the baby to the breast? *(Circle one)*	5. Within first 1 hour 6. After 1 hour 7. Did not breast fed at all 8. Don't know				5. Within first 1 hour 6. After 1 hour 7. Did not breast fed at all 8. Don't know				5. Within first 1 hour 6. After 1 hour 7. Did not breast fed at all 8. Don't know					

8b. 15	Since birth, for how long (in months) was your child continuously breast-fed? *(if still breastfeeding , tick box)*	|__|__| months |__| still breastfeeding	|__|__| months |__| still breastfeeding	|__|__| months |__| still breastfeeding
8b. 16	Mention the diseases your child has suffered in the last 2 weeks *Circle all that apply*	1 = Fever/malaria 2 = measles 3 = diarrhea 4 = ARI/cough 5 = skin diseases 6 = Eye disease 7 = other 8 = No Illness	1 = Fever/malaria 2 = measles 3 = diarrhea 4 = ARI/cough 5 = skin diseases 6 = Eye disease 7 = other 8 = No Illness	1 = Fever/malaria 2 = measles 3 = diarrhea 4 = ARI/cough 5 = skin diseases 6 = Eye disease 7 = other 8 = No Illness
8b.17	Did the child sleep under a mosquito net last night? CIRCLE	1= YES 0= NO	1= YES 0= NO	1= YES 0= NO
Questions 8b.18 to 8b.23iv apply only to children 6 to 23 months				
8b.18	At what age of your child did you introduce Liquid/ solid foods	|__|__| months	|__|__| months	|__|__| months
8b.19	Was your child 6-23 months breastfed yesterday during the day or night	1 = Yes 2 = No 3 = Don't know	1 = Yes 2 = No 3 = Don't know	1 = Yes 2 = No 3 = Don't know
8b.20	How many times during the day or night did your child 6-23 months	1 = Infant formula |__| times 2 = Milk such as tinned, powdered, or fresh animal	1 = Infant formula |__| times 2 = Milk such as tinned, powdered, or fresh animal	1 = Infant formula |__| times 2 = Milk such as tinned, powdered, or fresh animal

	consume any of….	milk |__|.times 3 = Yogurt |__| times 4=Thin porridge |__|times	milk |__|.times 3 = Yogurt |__| times 4=Thin porridge |__|times	milk |__|.times 3 = Yogurt |__| times 4=Thin porridge |__|times
8b.21	What foods did your child 6-23 months eat in the last 24 hours? Circle all that apply	1 = Grains, roots, and tubers *eg porridge, bread, rice, posho, potatoes, cassava, etc* 2 = Legumes and nuts *eg beans, peas, ground nuts. etc* 3 = Dairy products *eg milk yoghurt, cheese* 4 = Flesh foods *eg meat, fish, poultry, liver, organ meats* 5 = Eggs 6 = Vitamin A rich fruits and vegetables *eg carrots, ripe mangoes, papaya, etc* 7 = Other fruits and vegetables 8 = Fortified foods (WFP fortified products)	1 = Grains, roots, and tubers *eg porridge, bread, rice, posho, potatoes, cassava, etc* 2 = Legumes and nuts *eg beans, peas, ground nuts. etc* 3 = Dairy products *eg milk yoghurt, cheese* 4 = Flesh foods *eg meat, fish, poultry, liver, organ meats* 5 = Eggs 6 = Vitamin A rich fruits and vegetables *eg carrots, ripe mangoes, papaya, etc* 7 = Other fruits and vegetables 8 = Fortified foods (WFP fortified products)	1 = Grains, roots, and tubers *eg porridge, bread, rice, posho, potatoes, cassava, etc* 2 = Legumes and nuts *eg beans, peas, ground nuts. etc* 3 = Dairy products *eg milk yoghurt, cheese* 4 = Flesh foods *eg meat, fish, poultry, liver, organ meats* 5 = Eggs 6 = Vitamin A rich fruits and vegetables *eg carrots, ripe mangoes, papaya, etc* 7 = Other fruits and vegetables 8 = Fortified foods (WFP fortified products)
8b.22	How many times did your child 6-23 months eat solid, semi-solid or soft foods during the previous day?	|__| times	|__| times	|__| times
8b.23 i	Is this child 6-23 months enrolled in the MCHN *Programme (Note: MCHN beneficiaries receive Premix of CSB, Oil and Sugar at health facilities)*	1= YES 0= NO (Skip to 9b.20iv)	1= YES 0= NO(Skip to 9b.20iv)	1= YES 0= NO(Skip to 9b.20iv)

8b.23 ii	May I see your programme participation card ? *Tick the response provided*	1 = Card present 2 = Card absent	1 = Card present 2 = Card absent	1 = Card present 2 = Card absent
8b.23 iii	Why do you not have a programme participation card?	1 = I was not given one 2= Did not know I needed one 3 = I lost/misplaced my card 4 = Other	1 = I was not given one 2= Did not know I needed one 3 = I lost/misplaced my card 4 = Other	1 = I was not given one 2= Did not know I needed one 3 = I lost/misplaced my card 4 = Other
8b.23 iv	If child 6-23 months is not enrolled, what is the main reason for not enrolling the child?	1 = I don't know about the programme 2 = Too much time required to participate= The distribution site was too far 4 = No transportation to reach the distribution site 5 = I had other commitments that prevented enrolling the child 6 = Other – Specify…… ……	1 = I don't know about the programme 2 = Too much time required to participate= The distribution site was too far 4 = No transportation to reach the distribution site 5 = I had other commitments that prevented enrolling the child 6 = Other – Specify…… ……	1 = I don't know about the programme 2 = Too much time required to participate= The distribution site was too far 4 = No transportation to reach the distribution site 5 = I had other commitments that prevented enrolling the child 6 = Other – Specify…… …… ……
Questions 8b.24 to 8b.27 apply only to all children 6 to 59 months				
8b.24	Does the child have oedema? *(If yes, skip 9b.25-9b.27)*	1 = YES 0 = NO	1 = YES 0 = NO	1 = YES 0 = NO
8b.25	Weight (Kg) of the child	|__|__|.|__|kg	|__|__|.|__|kg	|__|__|.|__|kg
8b.26	Height (cm) of the child	|__|__|__|.|__|cm	|__|__|__|.|__|cm	|__|__|__|.|__|cm
8b.27	MUAC (cm) of the child	|__|__|__|.|__|cm	|__|__|__|.|__|cm	|__|__|__|.|__|cm

8b.28	Hemocue test	|__|__|.|__|g/dl	|__|__|.|__|g/dl	|__|__|.|__|g/dl

SECTION 9 : CROSS CUTTING INDICATORS		
9.1	In the last 6 months, did this household receive the following from WFP – circle all that apply	1. Food aid 2. Cash 3. No assistance from WFP (If "No Assistance", STOP here)
9.2	Regarding the last WFP distribution, Who (men, women or both) decides what to do with the cash/voucher given by WFP, such as when, where and what to buy?	1. Women 2. Men 3. Women and Men Together
9.3	Regarding the last WFP distribution, Who (men, women or both) decides what to do with the food given by WFP, such as whether to sell, trade, lend or share a portion of it?	1. Women 2. Men 3. Women and Men Together
9.4	How many HH members went (or tried to go) to the WFP programme site during the last 2 months?	|__|
9.5	Have any of these HH member(s) experienced safety problems 1) going to WFP programme sites, 2) at WFP programme sites, and/or 3) going from WFP programme sites during the last 2 months?	1=Yes 0= No (If no, skip question 10.6)
9.6	If yes, could you let me know where the problem occurred (select all that are relevant):	a) Going to the WFP programme site |__| b) At the WFP programme site |__| c) Going from the WFP programme site |__|

SECTION 10: MORTALITY ASSESSMENT IN THE PAST 90 DAYS

L1. Current HH members – total		
L2. Current HH members - < 5		
L3. Current HH members who arrived during recall (exclude births)		
L4. Current HH members who arrived during recall - <5		
L5. Past HH members who left during recall (exclude deaths)		
L6. Past HH members who left during recall - < 5		
L7. Births during recall		
L8. Total deaths		
L9. Deaths < 5		
L10. Assumed cause of death for under five 1		
L11. Assumed caused of death for under five 2		
L12. Assumed cause of death for adult		

1= Diarrhea, 2= Bloody diarrhea, 3= Measles, 4= Malaria (fever of 2-3days standing),

5= Lower respiratory tract infection, 6= Gun shot, 7= Accident, 8= Other (specify),

9= Unknown

Annex 3: ENA Reports and plausibility checks

Abim

Model nutrition assessment report - Abim

(based on the Save the Children Fund emergency nutrition assessment handbook)

Executive summary (one to two pages only)

GAM: 6.2 % (4.5 - 8.6 95% C.I.)
SAM : 1.5 % (0.7 - 2.9 95% C.I.)

3. Results

3.1 Anthropometric results (based on WHO standards 2006):

Definitions of acute malnutrition should be given (for example, global acute malnutrition is defined as <-2 z scores weight-for-height and/or oedema, severe acute malnutrition is defined as <-3z scores weight-for-height and/or oedema)

Exclusion of z-scores from Zero (reference mean) WHO flags: WHZ -5 to 5; HAZ -6 to 6; WAZ -6 to 5

Table 3.1: Distribution of age and sex of sample

	Boys		Girls		Total		Ratio
AGE (mo)	**no.**	**%**	**no.**	**%**	**no.**	**%**	**Boy:girl**
6-17	90	50.0	90	50.0	180	32.2	1.0
18-29	73	48.0	79	52.0	152	27.2	0.9
30-41	54	47.4	60	52.6	114	20.4	0.9
42-53	35	43.8	45	56.3	80	14.3	0.8
54-59	12	36.4	21	63.6	33	5.9	0.6
Total	264	47.2	295	52.8	559	100.0	0.9

Table 3.2: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All n = 547	**Boys** n **=** 257	**Girls** n **=** 290
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(34) 6.2 % (4.5 - 8.6 95% C.I.)	(17) 6.6 % (4.2 - 10.3 95% C.I.)	(17) 5.9 % (3.7 - 9.2 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(26) 4.8 % (3.3 - 6.9 95% C.I.)	(14) 5.4 % (3.3 - 8.9 95% C.I.)	(12) 4.1 % (2.4 - 7.1 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(8) 1.5 % (0.7 - 2.9 95% C.I.)	(3) 1.2 % (0.4 - 3.4 95% C.I.)	(5) 1.7 % (0.7 - 4.0 95% C.I.)

The prevalence of oedema is 0.2 %

Table 3.3: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema

		Severe wasting (<-3 z-score)		**Moderate wasting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	176	3	1.7	16	9.1	157	89.2	0	0.0

18-29	148	0	0.0	4	2.7	144	97.3	0	0.0
30-41	114	0	0.0	4	3.5	110	96.5	0	0.0
42-53	76	3	3.9	1	1.3	71	93.4	1	1.3
54-59	33	1	3.0	1	3.0	31	93.9	0	0.0
Total	547	7	1.3	26	4.8	513	93.8	1	0.2

Table 3.4: Distribution of acute malnutrition and oedema based on weight-for-height z-scores

	<-3 z-score	**>=-3 z-score**
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 1 (0.2 %)
Oedema absent	Marasmic No. 11 (2.0 %)	Not severely malnourished No. 544 (97.8 %)

Table 3.7: Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 556	**Boys** n **=** 263	**Girls** n **=** 293
Prevalence of underweight **(<-2 z-score)**	(95) 17.1 % (14.2 - 20.4 95% C.I.)	(54) 20.5 % (16.1 - 25.8 95% C.I.)	(41) 14.0 % (10.5 - 18.4 95% C.I.)
Prevalence of moderate underweight **(<-2 z-score and >=-3 z-score)**	(68) 12.2 % (9.8 - 15.2 95% C.I.)	(35) 13.3 % (9.7 - 17.9 95% C.I.)	(33) 11.3 % (8.1 - 15.4 95% C.I.)
Prevalence of severe underweight **(<-3 z-score)**	(27) 4.9 % (3.4 - 7.0 95% C.I.)	(19) 7.2 % (4.7 - 11.0 95% C.I.)	(8) 2.7 % (1.4 - 5.3 95% C.I.)

Table 3.8: Prevalence of underweight by age, based on weight-for-age z-scores

	Severe underweight (<-3 z-score)	**Moderate underweight (>= -3 and <-2 z-score)**	**Normal (> = -2 z score)**	**Oedema**

Age (mo)	Total no.	No.	%	No.	%	No.	%	No.	%
6-17	180	7	3.9	23	12.8	150	83.3	0	0.0
18-29	151	7	4.6	19	12.6	125	82.8	0	0.0
30-41	114	8	7.0	11	9.6	95	83.3	0	0.0
42-53	78	3	3.8	9	11.5	66	84.6	1	1.3
54-59	33	2	6.1	6	18.2	25	75.8	0	0.0
Total	556	27	4.9	68	12.2	461	82.9	1	0.2

Table 3.9: Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 548	**Boys** n **=** 259	**Girls** n **=** 289
Prevalence of stunting (<-2 z-score)	(174) 31.8 % (28.0 - 35.8 95% C.I.)	(91) 35.1 % (29.6 - 41.1 95% C.I.)	(83) 28.7 % (23.8 - 34.2 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(97) 17.7 % (14.7 - 21.1 95% C.I.)	(43) 16.6 % (12.6 - 21.6 95% C.I.)	(54) 18.7 % (14.6 - 23.6 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(77) 14.1 % (11.4 - 17.2 95% C.I.)	(48) 18.5 % (14.3 - 23.7 95% C.I.)	(29) 10.0 % (7.1 - 14.0 95% C.I.)

Table 3.10: Prevalence of stunting by age based on height-for-age z-scores

		Severe stunting (<-3 z-score)		**Moderate stunting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	177	16	9.0	25	14.1	136	76.8
18-29	150	21	14.0	32	21.3	97	64.7
30-41	112	17	15.2	17	15.2	78	69.6
42-53	76	13	17.1	16	21.1	47	61.8
54-59	33	10	30.3	7	21.2	16	48.5
Total	548	77	14.1	97	17.7	374	68.2

Table 3.11: Prevalence of overweight based on weight for height cut off's and by sex (no oedema)

	All n = 547	**Boys** n **=** 257	**Girls** n **=** 290
Prevalence of overweight (WHZ > 2)	(23) 4.2 % (2.8 - 6.2 95% C.I.)	(10) 3.9 % (2.1 - 7.0 95% C.I.)	(13) 4.5 % (2.6 - 7.5 95% C.I.)
Prevalence of severe overweight (WHZ > 3)	(9) 1.6 % (0.9 - 3.1 95% C.I.)	(1) 0.4 % (0.1 - 2.2 95% C.I.)	(8) 2.8 % (1.4 - 5.3 95% C.I.)

Table 3.12: Prevalence of overweight by age, based on weight for height (no oedema)

		Overweight (WHZ > 2)		**Severe Overweight (WHZ > 3)**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**
6-17	176	7	4.0	1	0.6
18-29	148	6	4.1	2	1.4
30-41	114	5	4.4	2	1.8
42-53	76	2	2.6	2	2.6
54-59	33	3	9.1	2	6.1
Total	547	23	4.2	9	1.6

Table 3.13: Mean z-scores, Design Effects and excluded subjects

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	546	-0.17±1.23	1.00	4	9
Weight-for-Age	556	-0.92±1.27	1.00	1	2
Height-for-Age	548	-1.34±1.70	1.00	0	11

* contains for WHZ and WAZ the children with edema.

Appendix 4

Result Tables for NCHS growth reference 1977

Table 3.2: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All	**Boys**	**Girls**

	n = 550	n = 259	n = 291
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(28) 5.1 % (3.5 - 7.3 95% C.I.)	(13) 5.0 % (3.0 - 8.4 95% C.I.)	(15) 5.2 % (3.1 - 8.3 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(21) 3.8 % (2.5 - 5.8 95% C.I.)	(11) 4.2 % (2.4 - 7.4 95% C.I.)	(10) 3.4 % (1.9 - 6.2 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(7) 1.3 % (0.6 - 2.6 95% C.I.)	(2) 0.8 % (0.2 - 2.8 95% C.I.)	(5) 1.7 % (0.7 - 4.0 95% C.I.)

The prevalence of oedema is 0.2 %

Table 3.3: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema

		Severe wasting (<-3 z-score)		**Moderate wasting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	177	3	1.7	13	7.3	161	91.0	0	0.0
18-29	148	1	0.7	4	2.7	143	96.6	0	0.0
30-41	114	0	0.0	1	0.9	113	99.1	0	0.0
42-53	78	1	1.3	3	3.8	73	93.6	1	1.3
54-59	33	1	3.0	0	0.0	32	97.0	0	0.0
Total	550	6	1.1	21	3.8	522	94.9	1	0.2

Table 3.4: Distribution of acute malnutrition and oedema based on weight-for-height z-scores

	<-3 z-score	**>=-3 z-score**
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 1 (0.2 %)
Oedema absent	Marasmic No. 9	Not severely malnourished No. 546

	(1.6 %)	(98.2 %)

Table 3.5: Prevalence of acute malnutrition based on MUAC cut off's (and/or oedema) and by sex

	All n = 1	**Boys** n = 0	**Girls** n = 1
Prevalence of global malnutrition **(< 125 mm and/or oedema)**	(1) 100.0 % (20.7 - 100.0 95% C.I.)	(0) % (- 95% C.I.)	(1) 100.0 % (20.7 - 100.0 95% C.I.)
Prevalence of moderate malnutrition **(< 125 mm and >= 115 mm, no oedema)**	(0) 0.0 % (0.0 - 79.3 95% C.I.)	(0) % (- 95% C.I.)	(0) 0.0 % (0.0 - 79.3 95% C.I.)
Prevalence of severe malnutrition **(< 115 mm and/or oedema)**	(1) 100.0 % (20.7 - 100.0 95% C.I.)	(0) % (- 95% C.I.)	(1) 100.0 % (20.7 - 100.0 95% C.I.)

Table 3.5: Prevalence of acute malnutrition based on the percentage of the median and/or oedema

	n = 550
Prevalence of global acute malnutrition **(<80% and/or oedema)**	(17) 3.1 % (1.9 - 4.9 95% C.I.)
Prevalence of moderate acute malnutrition **(<80% and >= 70%, no oedema)**	(15) 2.7 % (1.7 - 4.5 95% C.I.)
Prevalence of severe acute malnutrition **(<70% and/or oedema)**	(2) 0.4 % (0.1 - 1.3 95% C.I.)

Table 3.6: Prevalence of malnutrition by age, based on weight-for-height percentage of the median and oedema

	Severe wasting **(<70% median)**	**Moderate wasting**	**Normal** **(> =80% median)**	**Oedema**

				(>=70% and <80% median)					
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	177	1	0.6	9	5.1	167	94.4	0	0.0
18-29	148	0	0.0	2	1.4	146	98.6	0	0.0
30-41	114	0	0.0	0	0.0	114	100.0	0	0.0
42-53	78	0	0.0	3	3.8	74	94.9	1	1.3
54-59	33	0	0.0	1	3.0	32	97.0	0	0.0
Total	550	1	0.2	15	2.7	533	96.9	1	0.2

Table 3.7: Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 555	**Boys** n **=** 263	**Girls** n **=** 292
Prevalence of underweight (<-2 z-score)	(121) 21.8 % (18.6 - 25.4 95% C.I.)	(62) 23.6 % (18.8 - 29.1 95% C.I.)	(59) 20.2 % (16.0 - 25.2 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(91) 16.4 % (13.5 - 19.7 95% C.I.)	(41) 15.6 % (11.7 - 20.5 95% C.I.)	(50) 17.1 % (13.2 - 21.9 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(30) 5.4 % (3.8 - 7.6 95% C.I.)	(21) 8.0 % (5.3 - 11.9 95% C.I.)	(9) 3.1 % (1.6 - 5.8 95% C.I.)

Table 3.8: Prevalence of underweight by age, based on weight-for-age z-scores

		Severe underweight (<-3 z-score)		**Moderate underweight (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	180	9	5.0	29	16.1	142	78.9	0	0.0
18-29	150	8	5.3	29	19.3	113	75.3	0	0.0
30-41	114	8	7.0	17	14.9	89	78.1	0	0.0
42-53	78	3	3.8	10	12.8	65	83.3	1	1.3
54-59	33	2	6.1	6	18.2	25	75.8	0	0.0
Total	555	30	5.4	91	16.4	434	78.2	1	0.2

Table 3.9: Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 550	**Boys** n = 261	**Girls** n = 289
Prevalence of stunting (<-2 z-score)	(148) 26.9 % (23.4 - 30.8 95% C.I.)	(79) 30.3 % (25.0 - 36.1 95% C.I.)	(69) 23.9 % (19.3 - 29.1 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(86) 15.6 % (12.8 - 18.9 95% C.I.)	(42) 16.1 % (12.1 - 21.0 95% C.I.)	(44) 15.2 % (11.5 - 19.8 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(62) 11.3 % (8.9 - 14.2 95% C.I.)	(37) 14.2 % (10.5 - 18.9 95% C.I.)	(25) 8.7 % (5.9 - 12.5 95% C.I.)

Table 3.10: Prevalence of stunting by age based on height-for-age z-scores

		Severe stunting (<-3 z-score)		**Moderate stunting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	178	9	5.1	27	15.2	142	79.8
18-29	150	14	9.3	29	19.3	107	71.3
30-41	112	15	13.4	12	10.7	85	75.9
42-53	77	14	18.2	12	15.6	51	66.2
54-59	33	10	30.3	6	18.2	17	51.5
Total	550	62	11.3	86	15.6	402	73.1

Table 3.11: Prevalence of overweight based on weight for height cut off's and by sex (no oedema)

	All n = 550	**Boys** n = 259	**Girls** n = 291
Prevalence of overweight (WHZ > 2)	(17) 3.1 % (1.9 - 4.9 95% C.I.)	(4) 1.5 % (0.6 - 3.9 95% C.I.)	(13) 4.5 % (2.6 - 7.5 95% C.I.)

Prevalence of severe overweight (WHZ > 3)	(8) 1.5 % (0.7 - 2.8 95% C.I.)	(2) 0.8 % (0.2 - 2.8 95% C.I.)	(6) 2.1 % (0.9 - 4.4 95% C.I.)

Table 3.12: Prevalence of overweight by age, based on weight for height (no oedema)

		Overweight (WHZ > 2)		**Severe Overweight (WHZ > 3)**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**
6-17	177	6	3.4	2	1.1
18-29	148	2	1.4	2	1.4
30-41	114	3	2.6	1	0.9
42-53	78	4	5.1	3	3.8
54-59	33	2	6.1	0	0.0
Total	550	17	3.1	8	1.5

Table 3.13: Mean z-scores, Design Effects and excluded subjects

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	549	-0.42±1.15	1.00	4	6
Weight-for-Age	555	-1.14±1.22	1.00	1	3
Height-for-Age	550	-1.17±1.64	1.00	0	9

* contains for WHZ and WAZ the children with edema.

Plausibility check for: Abim14_above6.as

Standard/Reference used for z-score calculation: WHO standards 2006

(If it is not mentioned, flagged data is included in the evaluation. Some parts of this plausibility report are more for advanced users and can be skipped for a standard evaluation)

Overall data quality

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	**Score**
Flagged data	Incl	%	0-2.5	>2.5-5.0	>5.0-7.5	>7.5	
(% of in-range subjects)			0	5	10	20	**5** (4.4 %)

Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**0** (p=0.190)
Overall Age distrib	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**10** (p=0.000)
Dig pref score - weight	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (3)
Dig pref score - height	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**2** (10)
Dig pref score - MUAC	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (0)
Standard Dev WHZ	Excl	SD	<1.1	<1.15	<1.20	>=1.20	
.			and	and	and	or	
.	Excl	SD	>0.9	>0.85	>0.80	<=0.80	
			0	2	6	20	**2** (1.10)
Skewness WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (0.06)
Kurtosis WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (-0.19)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<=0.001	
			0	1	3	5	**0** (p=)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	**19** %

The overall score of this survey is 19 %, this is acceptable.

There were no duplicate entries detected.

Percentage of children with no exact birthday: 100 %

Age/Height out of range for WHZ:

HEIGHT:

Line=518/ID=10316: 36.00 cm

Anthropometric Indices likely to be in error (-3 to 3 for WHZ, -3 to 3 for HAZ, -3 to 3 for WAZ, from observed mean - chosen in Options panel - these values will be flagged and should be excluded from analysis for a nutrition survey in emergencies. For other surveys this might not be the best procedure e.g. when the percentage of overweight children has to be calculated):

Line=4/ID=12018: HAZ (1.918), Height may be incorrect

Line=10/ID=12313: HAZ (2.404), Age may be incorrect

Line=13/ID=12405: HAZ (4.651), WAZ (2.416), Age may be incorrect

Line=19/ID=10317: HAZ (3.203), Age may be incorrect

Line=31/ID=12404: HAZ (2.987), Age may be incorrect

Line=36/ID=12620: HAZ (2.483), Age may be incorrect

Line=45/ID=10321: **WHZ (-5.759)**, HAZ (5.808), Height may be incorrect

Line=49/ID=10609: **WHZ (-5.142)**, HAZ (6.967), Height may be incorrect

Line=52/ID=10417: HAZ (1.930), Age may be incorrect

Line=55/ID=12812: **WHZ (9.262)**, HAZ (-8.256), Height may be incorrect

Line=56/ID=10617: HAZ (1.719), Height may be incorrect

Line=64/ID=12216: **WHZ (2.912)**, Weight may be incorrect

Line=86/ID=10511: **WHZ (-3.450)**, Height may be incorrect

Line=92/ID=10301: HAZ (18.630), Height may be incorrect

Line=95/ID=12203: **WHZ (3.471)**, HAZ (-5.151), Height may be incorrect

Line=102/ID=12205: HAZ (3.645), Height may be incorrect

Line=103/ID=10404: HAZ (2.846), Age may be incorrect

Line=106/ID=11112: HAZ (1.776), Age may be incorrect

Line=114/ID=11620: HAZ (4.109), Height may be incorrect

Line=115/ID=11216: HAZ (2.802), WAZ (2.377), Age may be incorrect

Line=119/ID=12719: HAZ (4.705), Age may be incorrect

Line=128/ID=11604: HAZ (4.517), WAZ (3.119), Age may be incorrect

Line=135/ID=12707: HAZ (2.108), Age may be incorrect

Line=138/ID=12512: HAZ (2.702), WAZ (2.183), Age may be incorrect

Line=158/ID=11418: HAZ (1.608), Age may be incorrect

Line=166/ID=11613: HAZ (-5.035), Age may be incorrect

Line=178/ID=12807: **WHZ (-3.660)**, WAZ (-3.974), Weight may be incorrect

Line=194/ID=11320: **WHZ (8.890)**, WAZ (7.240), Weight may be incorrect

Line=198/ID=11314: **WHZ (4.483)**, HAZ (-7.643), Height may be incorrect

Line=213/ID=11404: HAZ (-5.120), Age may be incorrect

Line=215/ID=11404: HAZ (-4.693), Age may be incorrect

Line=220/ID=10402: **WHZ (-5.804)**, WAZ (-3.952), Weight may be incorrect

Line=227/ID=12406: HAZ (-7.702), WAZ (-5.784), Age may be incorrect

Line=230/ID=12903: **WHZ (-5.615)**, HAZ (3.177), Height may be incorrect

Line=247/ID=11310: HAZ (2.767), Age may be incorrect

Line=259/ID=10208: HAZ (-5.604), Height may be incorrect

Line=262/ID=10203: HAZ (1.726), Age may be incorrect

Line=264/ID=12103: HAZ (2.005), Age may be incorrect

Line=275/ID=12116: HAZ (1.833), Age may be incorrect

Line=278/ID=10906: HAZ (1.838), Age may be incorrect

Line=292/ID=11319: **WHZ (3.644)**, WAZ (2.282), Weight may be incorrect

Line=300/ID=10212: **WHZ (6.691)**, WAZ (4.029), Weight may be incorrect

Line=313/ID=10818: HAZ (-4.953), Age may be incorrect

Line=317/ID=12415: HAZ (1.608), Age may be incorrect

Line=327/ID=12005: HAZ (-5.459), WAZ (-4.012), Age may be incorrect

Line=333/ID=10717: HAZ (1.905), Height may be incorrect

Line=343/ID=11702: HAZ (1.791), Age may be incorrect

Line=347/ID=10215: HAZ (-6.498), WAZ (-5.200), Age may be incorrect

Line=352/ID=12506: HAZ (-4.989), WAZ (-4.017), Age may be incorrect

Line=355/ID=10215: HAZ (-6.861), WAZ (-5.200), Age may be incorrect

Line=371/ID=12303: **WHZ (3.135)**, Height may be incorrect

Line=380/ID=12901: HAZ (3.916), Age may be incorrect

Line=396/ID=12313: HAZ (-5.095), WAZ (-4.044), Age may be incorrect

Line=405/ID=11211: HAZ (1.902), WAZ (2.682), Age may be incorrect

Line=408/ID=11604: HAZ (-5.631), Age may be incorrect

Line=410/ID=11020: **WHZ (3.633)**, Weight may be incorrect

Line=423/ID=12108: HAZ (-4.421), Age may be incorrect

Line=457/ID=10617: **WHZ (3.427)**, Weight may be incorrect

Line=461/ID=12811: HAZ (-5.425), Age may be incorrect

Line=466/ID=12919: HAZ (-4.930), Age may be incorrect

Line=469/ID=11816: **WHZ (-3.264)**, Weight may be incorrect

Line=473/ID=12809: HAZ (-4.416), WAZ (-3.934), Age may be incorrect

Line=486/ID=12310: **WHZ (3.631)**, HAZ (-5.680), Height may be incorrect

Line=492/ID=10913: HAZ (-11.580), WAZ (-7.502), Age may be incorrect

Line=503/ID=12617: **WHZ (5.142)**, HAZ (-6.524), Height may be incorrect

Line=509/ID=11017: **WHZ (5.082)**, HAZ (-6.039), Height may be incorrect

Line=518/ID=10316: HAZ (-16.010), Height may be incorrect

Line=520/ID=11717: **WHZ (-3.557)**, Weight may be incorrect

Line=527/ID=10616: **WHZ (-3.691)**, Weight may be incorrect

Line=549/ID=12420: HAZ (-5.115), Age may be incorrect

Line=550/ID=12420: HAZ (-5.795), WAZ (-4.520), Age may be incorrect

Line=551/ID=12616: **WHZ (3.160)**, Height may be incorrect

Line=557/ID=11713: **WHZ (3.109)**, Height may be incorrect

Percentage of values flagged with SMART flags:WHZ: 4.4 %, HAZ: 10.4 %, WAZ: 3.4 %

Age distribution:

Month 6 : ####################

Month 7 : ############

Month 8 : ############

Month 9 : ###############

Month 10 : ################

Month 11 : #############

Month 12 : ###############

Month 13 : ############

Month 14 : ###############

Month 15 : ##########################

Month 16 : ##########

Month 17 : ##############

Month 18 : ############

Month 19 : ##############

Month 20 : #############

Month 21 : #############

Month 22 : #######

Month 23 : ##########

Month 24 : ######################

Month 25 : #########

Month 26 : ####################

Month 27 : ############

Month 28 : #########

Month 29 : ###########

Month 30 : ##############

Month 31 : ##########

Month 32 : ##############

Month 33 : #########

Month 34 : ########

Month 35 : #########

Month 36 : ##########

Month 37 : ##########

Month 38 : ##########

Month 39 : #######

Month 40 : #######

Month 41 : #######

Month 42 : ########

Month 43 : #####

Month 44 : ####

Month 45 : #########

Month 46 : ######

Month 47 : ########

Month 48 : #####

Month 49 : ######

Month 50 : ########

Month 51 : ########

Month 52 : ###

Month 53 : ##########

Month 54 : ###########

Month 55 : ######

Month 56 : ######

Month 57 : #

Month 58 : ##

Month 59 : #######

Age ratio of 6-29 months to 30-59 months: 1.46 (The value should be around 0.85).

Statistical evaluation of sex and age ratios (using Chi squared statistic):

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	90/61.3 (1.5)	90/68.4 (1.3)	180/129.7 (1.4)	1.00
18 to 29	12	73/59.7 (1.2)	79/66.7 (1.2)	152/126.5 (1.2)	0.92
30 to 41	12	54/57.9 (0.9)	60/64.7 (0.9)	114/122.6 (0.9)	0.90
42 to 53	12	35/57.0 (0.6)	45/63.7 (0.7)	80/120.6 (0.7)	0.78
54 to 59	6	12/28.2 (0.4)	21/31.5 (0.7)	33/59.7 (0.6)	0.57
6 to 59	54	264/279.5 (0.9)	295/279.5 (1.1)		0.89

The data are expressed as observed number/expected number (ratio of obs/expect)

Overall sex ratio: p-value = 0.190 (boys and girls equally represented)

Overall age distribution: p-value = 0.000 (significant difference)

Overall age distribution for boys: p-value = 0.000 (significant difference)

Overall age distribution for girls: p-value = 0.001 (significant difference)

Overall sex/age distribution: p-value = 0.000 (significant difference)

Digit preference Weight:

Digit .0 : ##################################

Digit .1 : ########################

Digit .2 : ##########################

Digit .3 : ########################

Digit .4 : ########################

Digit .5 : ##########################

Digit .6 : ############################

Digit .7 : ##########################

Digit .8 : ##########################

Digit .9 : ##########################

Digit preference score: **3** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

p-value for chi2: 0.737

Digit preference Height:

Digit .0 : ##

Digit .1 : ######################

Digit .2 : ####################################

Digit .3 : ############################

Digit .4 : ########################

Digit .5 : ##########################

Digit .6 : ##########################

Digit .7 : ########################

Digit .8 : ####################

Digit .9 : ##################

Digit preference score: **10** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

p-value for chi2: 0.000 (significant difference)

Evaluation of Standard deviation, Normal distribution, Skewness and Kurtosis using the 3 exclusion (Flag) procedures

.	no exclusion	exclusion from reference mean	exclusion from observed mean
.			

.		(WHO flags)	(SMART flags)
WHZ			
Standard Deviation SD:	1.49	1.23	1.10
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	6.7%	6.1%	5.3%
calculated with current SD:	10.7%	7.0%	5.2%
calculated with a SD of 1:	3.2%	3.4%	3.7%
HAZ			
Standard Deviation SD:	2.16	1.70	1.25
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	32.7%	31.8%	31.3%
calculated with current SD:	39.1%	34.9%	33.2%
calculated with a SD of 1:	27.6%	25.4%	29.3%
WAZ			
Standard Deviation SD:	1.35	1.27	1.12
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	17.4%	17.3%	15.9%
calculated with current SD:	21.2%	19.9%	16.4%
calculated with a SD of 1:	14.1%	14.1%	13.7%
Results for Shapiro-Wilk test for normally (Gaussian) distributed data:			
WHZ	p= 0.000	p= 0.001	p= 0.374
HAZ	p= 0.000	p= 0.000	p= 0.009
WAZ	p= 0.000	p= 0.002	p= 0.202
(If p < 0.05 then the data are not normally distributed. If p > 0.05 you can consider the data normally distributed)			
Skewness			
WHZ	0.98	0.28	0.06
HAZ	0.83	0.46	-0.07
WAZ	0.08	-0.12	-0.08

If the value is:

-below minus 0.4 there is a relative excess of wasted/stunted/underweight subjects in the sample

-between minus 0.4 and minus 0.2, there may be a relative excess of wasted/stunted/underweight subjects in the sample.

-between minus 0.2 and plus 0.2, the distribution can be considered as symmetrical.

-between 0.2 and 0.4, there may be an excess of obese/tall/overweight subjects in the sample.

-above 0.4, there is an excess of obese/tall/overweight subjects in the sample

Kurtosis

WHZ	6.93	0.74	-0.19
HAZ	17.90	1.41	-0.38
WAZ	3.71	1.01	-0.17

Kurtosis characterizes the relative size of the body versus the tails of the distribution. Positive kurtosis indicates relatively large tails and small body. Negative kurtosis indicates relatively large body and small tails.

If the absolute value is:

-above 0.4 it indicates a problem. There might have been a problem with data collection or sampling.

-between 0.2 and 0.4, the data may be affected with a problem.

-less than an absolute value of 0.2 the distribution can be considered as normal.

Are the data of the same quality at the beginning and the end of the clusters?

Evaluation of the SD for WHZ depending upon the order the cases are measured within each cluster (if one cluster per day is measured then this will be related to the time of the day the measurement is made).

Time	SD for WHZ
point	0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3

(when n is much less than the average number of subjects per cluster different symbols are used: 0 for n < 80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags found in the different time points)

Analysis by Team

Team	**1**	**999**
n =	1	558

Percentage of values flagged with SMART flags:

WHZ:	0.0	6.2
HAZ:	0.0	10.4
WAZ:	0.0	4.7

Age ratio of 6-29 months to 30-59 months:

1.46

Sex ratio (male/female):

0.89

Digit preference Weight (%):

.0 :	0	13
.1 :	0	9
.2 :	0	10
.3 :	0	9
.4 :	0	9
.5 :	0	10
.6 :	0	11
.7 :	100	10
.8 :	0	10
.9 :	0	10
DPS:	100	3

Digit preference score (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

Digit preference Height (%):

.0 :	0	17
.1 :	0	8
.2 :	0	14
.3 :	0	11
.4 :	0	8
.5 :	0	10
.6 :	0	10
.7 :	100	8
.8 :	0	8
.9 :	0	7
DPS:	100	10

Digit preference score (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

Standard deviation of WHZ:

SD 0.00

Prevalence (< -2) observed: %

Prevalence (< -2) calculated with current SD: %

Prevalence (< -2) calculated with a SD of 1: %

Standard deviation of HAZ:

SD 0.00

observed: %

calculated with current SD: %

calculated with a SD of 1: %

Statistical evaluation of sex and age ratios (using Chi squared statistic) for:

Team 1:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	1/0.2 (4.3)	0/0.0	1/0.2	
18 to 29	12	0/0.2 (0.0)	0/0.0	0/0.2	
30 to 41	12	0/0.2 (0.0)	0/0.0	0/0.2	
42 to 53	12	0/0.2 (0.0)	0/0.0	0/0.2	
54 to 59	6	0/0.1 (0.0)	0/0.0	0/0.1	
6 to 59	54	1/0.5 (2.0)	0/0.5 (0.0)		

The data are expressed as observed number/expected number (ratio of obs/expect)

Overall sex ratio: p-value = 0.317 (boys and girls equally represented)

Overall age distribution: p-value = 0.507 (as expected)

Overall age distribution for boys: p-value = 0.507 (as expected)

Overall sex/age distribution: p-value = 0.107 (as expected)

Team 2:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	0/0.0	0/0.0	0/0.0	
18 to 29	12	0/0.0	0/0.0	0/0.0	
30 to 41	12	0/0.0	0/0.0	0/0.0	
42 to 53	12	0/0.0	0/0.0	0/0.0	
54 to 59	6	0/0.0	0/0.0	0/0.0	

```
6  to 59     54        0/0.0    0/0.0
```

The data are expressed as observed number/expected number (ratio of obs/expect)

Evaluation of the SD for WHZ depending upon the order the cases are measured within each cluster (if one cluster per day is measured then this will be related to the time of the day the measurement is made).

Team: 1

```
Time                                                SD for WHZ

point                0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
```

```
(when n is much less than the average number of subjects per cluster different symbols are used:
0 for n < 80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags found in
the different time points)
```

Team: 2

(for better comparison it can be helpful to copy/paste part of this report into Excel)

Amudat

Model nutrition assessment report - Amudat

(based on the Save the Children Fund emergency nutrition assessment handbook)

Executive summary (one to two pages only)

GAM: 12.2 % (9.4 - 15.7 95% C.I.)

SAM : 3.8 % (2.3 - 6.0 95% C.I.)

3. Results

3.1 Anthropometric results (based on WHO standards 2006):

Definitions of acute malnutrition should be given (for example, global acute malnutrition is defined as <-2 z scores weight-for-height and/or oedema, severe acute malnutrition is defined as <-3z scores weight-for-height and/or oedema)

Exclusion of z-scores from Zero (reference mean) WHO flags: WHZ -5 to 5; HAZ -6 to 6; WAZ -6 to 5

Table 3.1: Distribution of age and sex of sample

	Boys		Girls		Total		Ratio

AGE (mo)	no.	%	no.	%	no.	%	Boy:girl
6-17	73	48.7	77	51.3	150	34.7	0.9
18-29	63	51.6	59	48.4	122	28.2	1.1
30-41	41	49.4	42	50.6	83	19.2	1.0
42-53	30	52.6	27	47.4	57	13.2	1.1
54-59	9	45.0	11	55.0	20	4.6	0.8
Total	216	50.0	216	50.0	432	100.0	1.0

Table 3.2: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All n = 426	**Boys** n **=** 213	**Girls** n **=** 213
Prevalence of global malnutrition **(<-2 z-score and/or oedema)**	(52) 12.2 % (9.4 - 15.7 95% C.I.)	(35) 16.4 % (12.1 - 22.0 95% C.I.)	(17) 8.0 % (5.0 - 12.4 95% C.I.)
Prevalence of moderate malnutrition **(<-2 z-score and >=-3 z-score, no oedema)**	(36) 8.5 % (6.2 - 11.5 95% C.I.)	(24) 11.3 % (7.7 - 16.2 95% C.I.)	(12) 5.6 % (3.3 - 9.6 95% C.I.)
Prevalence of severe malnutrition **(<-3 z-score and/or oedema)**	(16) 3.8 % (2.3 - 6.0 95% C.I.)	(11) 5.2 % (2.9 - 9.0 95% C.I.)	(5) 2.3 % (1.0 - 5.4 95% C.I.)

The prevalence of oedema is 0.2 %

Table 3.3: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema

		Severe wasting (<-3 z-score)		**Moderate wasting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	150	7	4.7	14	9.3	129	86.0	0	0.0
18-29	119	3	2.5	5	4.2	110	92.4	1	0.8
30-41	82	3	3.7	11	13.4	68	82.9	0	0.0
42-53	55	1	1.8	4	7.3	50	90.9	0	0.0
54-59	20	1	5.0	2	10.0	17	85.0	0	0.0
Total	426	15	3.5	36	8.5	374	87.8	1	0.2

Table 3.4: Distribution of acute malnutrition and oedema based on weight-for-height z-scores

	<-3 z-score	**>=-3 z-score**
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 1 (0.2 %)
Oedema absent	Marasmic No. 17 (4.0 %)	Not severely malnourished No. 412 (95.8 %)

Table 3.7: Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 431	**Boys** n **=** 216	**Girls** n **=** 215
Prevalence of underweight **(<-2 z-score)**	(94) 21.8 % (18.2 - 25.9 95% C.I.)	(50) 23.1 % (18.0 - 29.2 95% C.I.)	(44) 20.5 % (15.6 - 26.4 95% C.I.)
Prevalence of moderate underweight **(<-2 z-score and >=-3 z-score)**	(56) 13.0 % (10.1 - 16.5 95% C.I.)	(27) 12.5 % (8.7 - 17.6 95% C.I.)	(29) 13.5 % (9.6 - 18.7 95% C.I.)
Prevalence of severe underweight **(<-3 z-score)**	(38) 8.8 % (6.5 - 11.9 95% C.I.)	(23) 10.6 % (7.2 - 15.5 95% C.I.)	(15) 7.0 % (4.3 - 11.2 95% C.I.)

Table 3.8: Prevalence of underweight by age, based on weight-for-age z-scores

		Severe underweight (<-3 z-score)		**Moderate underweight (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	150	11	7.3	12	8.0	127	84.7	0	0.0
18-29	121	7	5.8	18	14.9	96	79.3	1	0.8
30-41	83	10	12.0	12	14.5	61	73.5	0	0.0
42-53	57	5	8.8	10	17.5	42	73.7	0	0.0
54-59	20	5	25.0	4	20.0	11	55.0	0	0.0

Total	431	38	8.8	56	13.0	337	78.2	1	0.2

Table 3.9: Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 424	**Boys** n = 212	**Girls** n = 212
Prevalence of stunting (<-2 z-score)	(118) 27.8 % (23.8 - 32.3 95% C.I.)	(64) 30.2 % (24.4 - 36.7 95% C.I.)	(54) 25.5 % (20.1 - 31.7 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(61) 14.4 % (11.4 - 18.0 95% C.I.)	(40) 18.9 % (14.2 - 24.7 95% C.I.)	(21) 9.9 % (6.6 - 14.7 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(57) 13.4 % (10.5 - 17.0 95% C.I.)	(24) 11.3 % (7.7 - 16.3 95% C.I.)	(33) 15.6 % (11.3 - 21.1 95% C.I.)

Table 3.10: Prevalence of stunting by age based on height-for-age z-scores

		Severe stunting (<-3 z-score)		**Moderate stunting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	147	15	10.2	11	7.5	121	82.3
18-29	121	17	14.0	26	21.5	78	64.5
30-41	80	12	15.0	10	12.5	58	72.5
42-53	56	8	14.3	9	16.1	39	69.6
54-59	20	5	25.0	5	25.0	10	50.0
Total	424	57	13.4	61	14.4	306	72.2

Table 3.11: Prevalence of overweight based on weight for height cut off's and by sex (no oedema)

	All n = 426	**Boys** n = 213	**Girls** n = 213
Prevalence of overweight (WHZ > 2)	(8) 1.9 %	(3) 1.4 %	(5) 2.3 %

	(1.0 - 3.7 95% C.I.)	(0.5 - 4.1 95% C.I.)	(1.0 - 5.4 95% C.I.)
Prevalence of severe overweight (WHZ > 3)	(4) 0.9 % (0.4 - 2.4 95% C.I.)	(0) 0.0 % (0.0 - 1.8 95% C.I.)	(4) 1.9 % (0.7 - 4.7 95% C.I.)

Table 3.12: Prevalence of overweight by age, based on weight for height (no oedema)

		Overweight (WHZ > 2)		**Severe Overweight (WHZ > 3)**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**
6-17	150	2	1.3	1	0.7
18-29	119	3	2.5	2	1.7
30-41	82	2	2.4	1	1.2
42-53	55	1	1.8	0	0.0
54-59	20	0	0.0	0	0.0
Total	426	8	1.9	4	0.9

Table 3.13: Mean z-scores, Design Effects and excluded subjects

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	425	-0.70±1.21	1.00	3	4
Weight-for-Age	431	-1.16±1.24	1.00	1	0
Height-for-Age	424	-1.13±1.75	1.00	2	6

* contains for WHZ and WAZ the children with edema.

Appendix 4

Result Tables for NCHS growth reference 1977

Table 3.2: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All n = 427	**Boys** n **=** 214	**Girls** n **=** 213

Prevalence of global malnutrition (<-2 z-score and/or oedema)	(55) 12.9 % (10.0 - 16.4 95% C.I.)	(37) 17.3 % (12.8 - 22.9 95% C.I.)	(18) 8.5 % (5.4 - 13.0 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(48) 11.2 % (8.6 - 14.6 95% C.I.)	(32) 15.0 % (10.8 - 20.3 95% C.I.)	(16) 7.5 % (4.7 - 11.9 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(7) 1.6 % (0.8 - 3.3 95% C.I.)	(5) 2.3 % (1.0 - 5.4 95% C.I.)	(2) 0.9 % (0.3 - 3.4 95% C.I.)

The prevalence of oedema is 0.2 %

Table 3.3: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema

		Severe wasting (<-3 z-score)		**Moderate wasting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	149	3	2.0	18	12.1	128	85.9	0	0.0
18-29	120	1	0.8	11	9.2	107	89.2	1	0.8
30-41	83	1	1.2	12	14.5	70	84.3	0	0.0
42-53	55	0	0.0	5	9.1	50	90.9	0	0.0
54-59	20	1	5.0	2	10.0	17	85.0	0	0.0
Total	427	6	1.4	48	11.2	372	87.1	1	0.2

Table 3.4: Distribution of acute malnutrition and oedema based on weight-for-height z-scores

	<-3 z-score	**>=-3 z-score**
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 1 (0.2 %)
Oedema absent	Marasmic No. 7	Not severely malnourished No. 422

	(1.6 %)	(98.1 %)

Table 3.5: Prevalence of acute malnutrition based on the percentage of the median and/or oedema

	n = 427
Prevalence of global acute malnutrition (<80% and/or oedema)	(30) 7.0 % (5.0 - 9.9 95% C.I.)
Prevalence of moderate acute malnutrition (<80% and >= 70%, no oedema)	(26) 6.1 % (4.2 - 8.8 95% C.I.)
Prevalence of severe acute malnutrition (<70% and/or oedema)	(4) 0.9 % (0.4 - 2.4 95% C.I.)

Table 3.6: Prevalence of malnutrition by age, based on weight-for-height percentage of the median and oedema

		Severe wasting (<70% median)		**Moderate wasting (>=70% and <80% median)**		**Normal (> =80% median)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	149	0	0.0	10	6.7	139	93.3	0	0.0
18-29	120	1	0.8	5	4.2	113	94.2	1	0.8
30-41	83	1	1.2	8	9.6	74	89.2	0	0.0
42-53	55	0	0.0	2	3.6	53	96.4	0	0.0
54-59	20	1	5.0	1	5.0	18	90.0	0	0.0
Total	427	3	0.7	26	6.1	397	93.0	1	0.2

Table 3.7: Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 431	**Boys** n **=** 216	**Girls** n **=** 215

Prevalence of underweight **(<-2 z-score)**	(124) 28.8 % (24.7 - 33.2 95% C.I.)	(64) 29.6 % (23.9 - 36.0 95% C.I.)	(60) 27.9 % (22.3 - 34.3 95% C.I.)
Prevalence of moderate underweight **(<-2 z-score and >=-3 z-score)**	(89) 20.6 % (17.1 - 24.7 95% C.I.)	(46) 21.3 % (16.4 - 27.2 95% C.I.)	(43) 20.0 % (15.2 - 25.9 95% C.I.)
Prevalence of severe underweight **(<-3 z-score)**	(35) 8.1 % (5.9 - 11.1 95% C.I.)	(18) 8.3 % (5.3 - 12.8 95% C.I.)	(17) 7.9 % (5.0 - 12.3 95% C.I.)

Table 3.8: Prevalence of underweight by age, based on weight-for-age z-scores

		Severe underweight (<-3 z-score)		**Moderate underweight (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	150	8	5.3	30	20.0	112	74.7	0	0.0
18-29	121	9	7.4	24	19.8	88	72.7	1	0.8
30-41	83	9	10.8	15	18.1	59	71.1	0	0.0
42-53	57	4	7.0	15	26.3	38	66.7	0	0.0
54-59	20	5	25.0	5	25.0	10	50.0	0	0.0
Total	431	35	8.1	89	20.6	307	71.2	1	0.2

Table 3.9: Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 427	**Boys** n **=** 215	**Girls** n **=** 212
Prevalence of stunting **(<-2 z-score)**	(100) 23.4 % (19.7 - 27.7 95% C.I.)	(54) 25.1 % (19.8 - 31.3 95% C.I.)	(46) 21.7 % (16.7 - 27.7 95% C.I.)
Prevalence of moderate stunting **(<-2 z-score and >=-3 z-score)**	(56) 13.1 % (10.2 - 16.6 95% C.I.)	(36) 16.7 % (12.3 - 22.3 95% C.I.)	(20) 9.4 % (6.2 - 14.1 95% C.I.)

Prevalence of severe stunting (<-3 z-score)	(44) 10.3 % (7.8 - 13.6 95% C.I.)	(18) 8.4 % (5.4 - 12.8 95% C.I.)	(26) 12.3 % (8.5 - 17.4 95% C.I.)

Table 3.10: Prevalence of stunting by age based on height-for-age z-scores

		Severe stunting (<-3 z-score)		**Moderate stunting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	150	11	7.3	14	9.3	125	83.3
18-29	121	9	7.4	23	19.0	89	73.6
30-41	81	13	16.0	6	7.4	62	76.5
42-53	55	6	10.9	8	14.5	41	74.5
54-59	20	5	25.0	5	25.0	10	50.0
Total	427	44	10.3	56	13.1	327	76.6

Table 3.11: Prevalence of overweight based on weight for height cut off's and by sex (no oedema)

	All n = 427	**Boys** n = 214	**Girls** n = 213
Prevalence of overweight (WHZ > 2)	(5) 1.2 % (0.5 - 2.7 95% C.I.)	(1) 0.5 % (0.1 - 2.6 95% C.I.)	(4) 1.9 % (0.7 - 4.7 95% C.I.)
Prevalence of severe overweight (WHZ > 3)	(1) 0.2 % (0.0 - 1.3 95% C.I.)	(0) 0.0 % (0.0 - 1.8 95% C.I.)	(1) 0.5 % (0.1 - 2.6 95% C.I.)

Table 3.12: Prevalence of overweight by age, based on weight for height (no oedema)

	Overweight (WHZ > 2)	**Severe Overweight (WHZ > 3)**

Age (mo)	Total no.	No.	%	No.	%
6-17	149	1	0.7	0	0.0
18-29	120	2	1.7	0	0.0
30-41	83	2	2.4	1	1.2
42-53	55	0	0.0	0	0.0
54-59	20	0	0.0	0	0.0
Total	427	5	1.2	1	0.2

Table 3.13: Mean z-scores, Design Effects and excluded subjects

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	426	-0.89±1.04	1.00	3	3
Weight-for-Age	431	-1.37±1.16	1.00	1	0
Height-for-Age	427	-0.97±1.73	1.00	2	3

* contains for WHZ and WAZ the children with edema.

Plausibility check for: noname.as

Standard/Reference used for z-score calculation: WHO standards 2006

(If it is not mentioned, flagged data is included in the evaluation. Some parts of this plausibility report are more for advanced users and can be skipped for a standard evaluation)

Overall data quality

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	**Score**
Flagged data	Incl	%	0-2.5	>2.5-5.0	>5.0-7.5	>7.5	
(% of in-range subjects)			0	5	10	20	**5** (3.1 %)
Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**0** (p=1.000)
Overall Age distrib	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**10** (p=0.000)
Dig pref score - weight	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (6)

Dig pref score - height	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**2** (9)
Dig pref score - MUAC	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (0)
Standard Dev WHZ	Excl	SD	<1.1	<1.15	<1.20	>=1.20	
.			and	and	and	or	
.	Excl	SD	>0.9	>0.85	>0.80	<=0.80	
			0	2	6	20	**0** (1.07)
Skewness WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (-0.10)
Kurtosis WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (-0.09)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<=0.001	
			0	1	3	5	**0** (p=)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	**17** %

The overall score of this survey is 17 %, this is acceptable.

Duplicate Entries in the database:

Line=316/ID=999 with Line=312/ID=999

Missing data:

HEIGHT: Line=119/ID=20314, Line=411/ID=22405

Percentage of children with no exact birthday: 100 %

Anthropometric Indices likely to be in error (-3 to 3 for WHZ, -3 to 3 for HAZ, -3 to 3 for WAZ, from observed mean - chosen in Options panel - these values will be flagged and should be excluded from analysis for a nutrition survey in emergencies. For other surveys this might not be the best procedure e.g. when the percentage of overweight children has to be calculated):

Line=9/ID=20517: HAZ (-4.476), Height may be incorrect

Line=11/ID=20705: HAZ (2.781), Height may be incorrect

Line=12/ID=22812: **WHZ (5.454)**, Height may be incorrect

Line=23/ID=21601: HAZ (-6.058), Age may be incorrect

Line=27/ID=21611: **WHZ (3.533)**, HAZ (-6.414), Height may be incorrect

Line=34/ID=22807: HAZ (-6.789), WAZ (-4.852), Age may be incorrect

Line=45/ID=20814: **WHZ (-4.970)**, Height may be incorrect

Line=54/ID=22421: HAZ (2.053), Height may be incorrect

Line=61/ID=21713: HAZ (5.143), Height may be incorrect

Line=62/ID=22625: HAZ (3.663), Age may be incorrect

Line=71/ID=22524: **WHZ (-5.304)**, Weight may be incorrect

Line=78/ID=23007: HAZ (4.570), Age may be incorrect

Line=81/ID=23012: HAZ (3.121), Age may be incorrect

Line=86/ID=21410: HAZ (3.611), Age may be incorrect

Line=94/ID=22717: HAZ (2.210), Age may be incorrect

Line=97/ID=22605: **WHZ (3.647)**, Weight may be incorrect

Line=114/ID=21409: **WHZ (2.675)**, HAZ (-4.581), Height may be incorrect

Line=125/ID=21618: HAZ (-5.393), Age may be incorrect

Line=130/ID=23012: HAZ (-5.416), WAZ (-4.167), Age may be incorrect

Line=141/ID=22616: **WHZ (-4.077)**, HAZ (-5.166), WAZ (-5.220)

Line=143/ID=20218: HAZ (-5.465), Age may be incorrect

Line=149/ID=20217: HAZ (-4.653), Age may be incorrect

Line=156/ID=22812: **WHZ (7.286)**, HAZ (-5.872), Height may be incorrect

Line=166/ID=21024: HAZ (2.200), Height may be incorrect

Line=170/ID=22018: HAZ (-4.183), Age may be incorrect

Line=172/ID=21910: **WHZ (2.429)**, HAZ (-4.726), Height may be incorrect

Line=175/ID=20808: HAZ (-4.388), Age may be incorrect

Line=186/ID=20712: HAZ (-4.474), Age may be incorrect

Line=188/ID=22010: HAZ (-4.811), Height may be incorrect

Line=192/ID=20318: HAZ (-4.275), Age may be incorrect

Line=204/ID=20210: HAZ (1.913), Age may be incorrect

Line=207/ID=22802: HAZ (-5.695), WAZ (-4.881), Age may be incorrect

Line=243/ID=21008: HAZ (2.547), Height may be incorrect

Line=250/ID=20203: HAZ (3.222), Age may be incorrect

Line=266/ID=21001: HAZ (2.088), Age may be incorrect

Line=267/ID=21619: HAZ (-4.520), WAZ (-4.505), Age may be incorrect

Line=288/ID=20811: HAZ (-4.271), Age may be incorrect

Line=292/ID=21816: HAZ (-4.504), Age may be incorrect

Line=302/ID=22112: HAZ (6.387), Height may be incorrect

Line=309/ID=21707: **WHZ (4.959)**, HAZ (-4.614), Height may be incorrect

Line=317/ID=20813: HAZ (-6.220), WAZ (-4.890), Age may be incorrect

Line=344/ID=22624: HAZ (-4.326), Age may be incorrect

Line=360/ID=20712: HAZ (2.149), Height may be incorrect

Line=374/ID=21112: **WHZ (3.985)**, Height may be incorrect

Line=383/ID=22718: HAZ (5.057), WAZ (2.091), Age may be incorrect

Line=384/ID=20411: HAZ (3.779), Age may be incorrect

Line=386/ID=21402: **WHZ (-4.033)**, HAZ (2.426), Height may be incorrect

Line=400/ID=21014: HAZ (1.842), Age may be incorrect

Line=402/ID=22419: HAZ (2.612), Age may be incorrect

Line=410/ID=20715: HAZ (-4.472), Age may be incorrect

Line=413/ID=22810: **WHZ (-5.875)**, Weight may be incorrect

Line=427/ID=22714: HAZ (-6.093), WAZ (-5.047), Age may be incorrect

Percentage of values flagged with SMART flags:WHZ: 3.1 %, HAZ: 10.7 %, WAZ: 1.9 %

Age distribution:

Month 6 : ###############

Month 7 : ############

Month 8 : ###############

Month 9 : ##########

Month 10 : ##################

Month 11 : ################

Month 12 : ##########################

Month 13 : ##########

Month 14 : ######

Month 15 : ######

Month 16 : #######

Month 17 : ######

Month 18 : #######

Month 19 : ###

Month 20 : #####

Month 21 : ######

Month 22 : ########

Month 23 : ###########

Month 24 : ##

Month 25 : #############

Month 26 : #####

Month 27 : ########

Month 28 : ######

Month 29 : #######

Month 30 : #######

Month 31 : ##

Month 32 : #####

Month 33 : #####

Month 34 : ###

Month 35 : #########

Month 36 : ##############################

Month 37 : #####

Month 38 : #########

Month 39 : #

Month 40 : ###

Month 41 : #####

Month 42 : ###

Month 43 : ######

Month 44 : #

Month 45 : ###

Month 46 : ##

Month 47 : #########

Month 48 : ###############

Month 49 : ########

Month 50 : ##

Month 51 : ###

Month 52 : #

Month 53 : #####

Month 54 : ##

Month 55 : #

Month 56 : ###

Month 57 : #

Month 58 : ######

Month 59 : #######

Age ratio of 6-29 months to 30-59 months: 1.70 (The value should be around 0.85).

Statistical evaluation of sex and age ratios (using Chi squared statistic):

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	73/50.1 (1.5)	77/50.1 (1.5)	150/100.2 (1.5)	0.95
18 to 29	12	63/48.9 (1.3)	59/48.9 (1.2)	122/97.7 (1.2)	1.07
30 to 41	12	41/47.4 (0.9)	42/47.4 (0.9)	83/94.7 (0.9)	0.98
42 to 53	12	30/46.6 (0.6)	27/46.6 (0.6)	57/93.2 (0.6)	1.11
54 to 59	6	9/23.1 (0.4)	11/23.1 (0.5)	20/46.1 (0.4)	0.82
6 to 59	54	216/216.0 (1.0)	216/216.0 (1.0)		1.00

The data are expressed as observed number/expected number (ratio of obs/expect)

Overall sex ratio: p-value = 1.000 (boys and girls equally represented)

Overall age distribution: p-value = 0.000 (significant difference)

Overall age distribution for boys: p-value = 0.000 (significant difference)

Overall age distribution for girls: p-value = 0.000 (significant difference)

Overall sex/age distribution: p-value = 0.000 (significant difference)

Digit preference Weight:

Digit .0 : ##

Digit .1 : ##

Digit .2 : ######################################

Digit .3 : ##############################

Digit .4 : ##

Digit .5 : ##

Digit .6 : ##

Digit .7 : ##################################

Digit .8 : ##################################

Digit .9 : ####################################

Digit preference score: **6** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

p-value for chi2: 0.204

Digit preference Height:

Digit .0 : ############################

Digit .1 : ######################

Digit .2 : ####################

Digit .3 : ################

Digit .4 : ################

Digit .5 : ##################################

Digit .6 : ####################

Digit .7 : ################

Digit .8 : ##############

Digit .9 : ################

Digit preference score: **9** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

p-value for chi2: 0.000 (significant difference)

Evaluation of Standard deviation, Normal distribution, Skewness and Kurtosis using the 3 exclusion (Flag) procedures

.	no exclusion	exclusion from reference mean	exclusion from observed mean
.			

.		(WHO flags)	(SMART flags)
WHZ			
Standard Deviation SD:	1.35	1.22	1.07
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	12.3%	11.9%	11.5%
calculated with current SD:	16.5%	14.1%	11.7%
calculated with a SD of 1:	9.4%	9.6%	10.2%
HAZ			
Standard Deviation SD:	1.86	1.75	1.31
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	28.6%	27.8%	25.3%
calculated with current SD:	32.9%	31.0%	25.6%
calculated with a SD of 1:	20.5%	19.3%	19.5%
WAZ			
Standard Deviation SD:	1.24	1.24	1.15
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	21.6%	21.6%	20.4%
calculated with current SD:	25.0%	25.0%	21.9%
calculated with a SD of 1:	20.1%	20.1%	18.6%
Results for Shapiro-Wilk test for normally (Gaussian) distributed data:			
WHZ	p= 0.000	p= 0.000	p= 0.256
HAZ	p= 0.000	p= 0.003	p= 0.031
WAZ	p= 0.000	p= 0.000	p= 0.013
(If p < 0.05 then the data are not normally distributed. If p > 0.05 you can consider the data normally distributed)			
Skewness			
WHZ	0.71	0.34	-0.10
HAZ	0.16	0.23	0.00
WAZ	-0.44	-0.44	-0.22

If the value is:

-below minus 0.4 there is a relative excess of wasted/stunted/underweight subjects in the sample

-between minus 0.4 and minus 0.2, there may be a relative excess of wasted/stunted/underweight

subjects in the sample.

-between minus 0.2 and plus 0.2, the distribution can be considered as symmetrical.

-between 0.2 and 0.4, there may be an excess of obese/tall/overweight subjects in the sample.

-above 0.4, there is an excess of obese/tall/overweight subjects in the sample

Kurtosis

WHZ	5.08	2.00	-0.09
HAZ	1.32	0.83	-0.48
WAZ	0.33	0.33	-0.27

Kurtosis characterizes the relative size of the body versus the tails of the distribution. Positive kurtosis indicates relatively large tails and small body. Negative kurtosis indicates relatively large body and small tails.

If the absolute value is:

-above 0.4 it indicates a problem. There might have been a problem with data collection or sampling.

-between 0.2 and 0.4, the data may be affected with a problem.

-less than an absolute value of 0.2 the distribution can be considered as normal.

Are the data of the same quality at the beginning and the end of the clusters?

Evaluation of the SD for WHZ depending upon the order the cases are measured within each cluster (if one cluster per day is measured then this will be related to the time of the day the measurement is made).

Time	SD for WHZ															
point	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3

(when n is much less than the average number of subjects per cluster different symbols are used: 0 for n < 80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags found in the different time points)

Analysis by Team

Team	**1**	**999**
n =	1	431

Percentage of values flagged with SMART flags:

WHZ:	0.0	5.2
HAZ:	0.0	11.2
WAZ:	0.0	3.5

Age ratio of 6-29 months to 30-59 months:

1.69

Sex ratio (male/female):

0.00 1.00

Digit preference Weight (%):

.0 :	0	13
.1 :	0	11
.2 :	0	9
.3 :	0	7
.4 :	100	12
.5 :	0	11
.6 :	0	11
.7 :	0	8
.8 :	0	9
.9 :	0	9
DPS:	100	6

Digit preference score (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

Digit preference Height (%):

.0 :	0	14
.1 :	0	11
.2 :	0	10
.3 :	100	7
.4 :	0	7
.5 :	0	16
.6 :	0	10
.7 :	0	9
.8 :	0	7
.9 :	0	8
DPS:	100	10

Digit preference score (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

Standard deviation of WHZ:

SD 0.00

Prevalence (< -2) observed: %

Prevalence (< -2) calculated with current SD: %

Prevalence (< -2) calculated with a SD of 1: %

Standard deviation of HAZ:

SD 0.00

observed: %

calculated with current SD: %

calculated with a SD of 1: %

Statistical evaluation of sex and age ratios (using Chi squared statistic) for:

Team 1:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	0/0.0	1/0.2 (4.3)	1/0.2 (4.3)	0.00
18 to 29	12	0/0.0	0/0.2 (0.0)	0/0.2 (0.0)	
30 to 41	12	0/0.0	0/0.2 (0.0)	0/0.2 (0.0)	
42 to 53	12	0/0.0	0/0.2 (0.0)	0/0.2 (0.0)	
54 to 59	6	0/0.0	0/0.1 (0.0)	0/0.1 (0.0)	
6 to 59	54	0/0.5 (0.0)	1/0.5 (2.0)		0.00

The data are expressed as observed number/expected number (ratio of obs/expect)

Overall sex ratio: p-value = 0.317 (boys and girls equally represented)

Overall age distribution: p-value = 0.507 (as expected)

Overall age distribution for girls: p-value = 0.507 (as expected)

Overall sex/age distribution: p-value = 0.107 (as expected)

Team 2:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	0/0.0	0/0.0	0/0.0	
18 to 29	12	0/0.0	0/0.0	0/0.0	

```
30 to 41     12        0/0.0    0/0.0    0/0.0
42 to 53     12        0/0.0    0/0.0    0/0.0
54 to 59      6        0/0.0    0/0.0    0/0.0
-------------------------------------------------------------------------------
6  to 59     54        0/0.0    0/0.0
```

The data are expressed as observed number/expected number (ratio of obs/expect)

Evaluation of the SD for WHZ depending upon the order the cases are measured within each cluster (if one cluster per day is measured then this will be related to the time of the day the measurement is made).

Team: 1

```
Time                                          SD for WHZ
point              0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
```

```
(when n is much less than the average number of subjects per cluster different symbols are used:
0 for n < 80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags found in
the different time points)
```

Team: 2

(for better comparison it can be helpful to copy/paste part of this report into Excel)

Kaabong

Model nutrition assessment report - Kaabong

(based on the Save the Children Fund emergency nutrition assessment handbook)

GAM: 20.2 % (16.9 - 23.9 95% C.I.)
SAM : 6.1 % (4.3 - 8.5 95% C.I.)

3. Results

3.1 Anthropometric results (based on WHO standards 2006):

Definitions of acute malnutrition should be given (for example, global acute malnutrition is defined as <-2 z scores weight-for-height and/or oedema, severe acute malnutrition is defined as <-3z scores weight-for-height and/or oedema)

Exclusion of z-scores from Zero (reference mean) WHO flags: WHZ -5 to 5; HAZ -6 to 6; WAZ -6 to 5

Table 3.1: Distribution of age and sex of sample

	Boys		Girls		Total		Ratio

AGE (mo)	no.	%	no.	%	no.	%	Boy:girl
6-17	101	52.1	93	47.9	194	36.9	1.1
18-29	78	50.0	78	50.0	156	29.7	1.0
30-41	54	56.3	42	43.8	96	18.3	1.3
42-53	32	53.3	28	46.7	60	11.4	1.1
54-59	11	55.0	9	45.0	20	3.8	1.2
Total	276	52.5	250	47.5	526	100.0	1.1

Table 3.2: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All n = 511	**Boys** n **=** 268	**Girls** n **=** 243
Prevalence of global malnutrition **(<-2 z-score and/or oedema)**	(103) 20.2 % (16.9 - 23.9 95% C.I.)	(49) 18.3 % (14.1 - 23.3 95% C.I.)	(54) 22.2 % (17.5 - 27.9 95% C.I.)
Prevalence of moderate malnutrition **(<-2 z-score and >=-3 z-score, no oedema)**	(72) 14.1 % (11.3 - 17.4 95% C.I.)	(35) 13.1 % (9.5 - 17.6 95% C.I.)	(37) 15.2 % (11.3 - 20.3 95% C.I.)
Prevalence of severe malnutrition **(<-3 z-score and/or oedema)**	(31) 6.1 % (4.3 - 8.5 95% C.I.)	(14) 5.2 % (3.1 - 8.6 95% C.I.)	(17) 7.0 % (4.4 - 10.9 95% C.I.)

The prevalence of oedema is 0.0 %

Table 3.3: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema

		Severe wasting (<-3 z-score)		**Moderate wasting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	189	18	9.5	38	20.1	133	70.4	0	0.0
18-29	152	6	3.9	19	12.5	127	83.6	0	0.0
30-41	92	1	1.1	8	8.7	83	90.2	0	0.0
42-53	59	2	3.4	7	11.9	50	84.7	0	0.0
54-59	19	4	21.1	0	0.0	15	78.9	0	0.0

Total	511	31	6.1	72	14.1	408	79.8	0	0.0

Table 3.4: Distribution of acute malnutrition and oedema based on weight-for-height z-scores

	<-3 z-score	**>=-3 z-score**
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 36 (6.9 %)	Not severely malnourished No. 485 (93.1 %)

Table 3.7: Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 524	**Boys** n **=** 276	**Girls** n **=** 248
Prevalence of underweight **(<-2 z-score)**	(182) 34.7 % (30.8 - 38.9 95% C.I.)	(100) 36.2 % (30.8 - 42.1 95% C.I.)	(82) 33.1 % (27.5 - 39.1 95% C.I.)
Prevalence of moderate underweight **(<-2 z-score and >=-3 z-score)**	(116) 22.1 % (18.8 - 25.9 95% C.I.)	(66) 23.9 % (19.3 - 29.3 95% C.I.)	(50) 20.2 % (15.6 - 25.6 95% C.I.)
Prevalence of severe underweight **(<-3 z-score)**	(66) 12.6 % (10.0 - 15.7 95% C.I.)	(34) 12.3 % (9.0 - 16.7 95% C.I.)	(32) 12.9 % (9.3 - 17.6 95% C.I.)

Table 3.8: Prevalence of underweight by age, based on weight-for-age z-scores

		Severe underweight (<-3 z-score)		**Moderate underweight (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**

6-17	193	25	13.0	41	21.2	127	65.8	0	0.0
18-29	155	20	12.9	35	22.6	100	64.5	0	0.0
30-41	96	13	13.5	18	18.8	65	67.7	0	0.0
42-53	60	5	8.3	16	26.7	39	65.0	0	0.0
54-59	20	3	15.0	6	30.0	11	55.0	0	0.0
Total	524	66	12.6	116	22.1	342	65.3	0	0.0

Table 3.9: Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 514	**Boys** n = 270	**Girls** n = 244
Prevalence of stunting **(<-2 z-score)**	(190) 37.0 % (32.9 - 41.2 95% C.I.)	(104) 38.5 % (32.9 - 44.4 95% C.I.)	(86) 35.2 % (29.5 - 41.4 95% C.I.)
Prevalence of moderate stunting **(<-2 z-score and >=-3 z-score)**	(103) 20.0 % (16.8 - 23.7 95% C.I.)	(53) 19.6 % (15.3 - 24.8 95% C.I.)	(50) 20.5 % (15.9 - 26.0 95% C.I.)
Prevalence of severe stunting **(<-3 z-score)**	(87) 16.9 % (13.9 - 20.4 95% C.I.)	(51) 18.9 % (14.7 - 24.0 95% C.I.)	(36) 14.8 % (10.9 - 19.7 95% C.I.)

Table 3.10: Prevalence of stunting by age based on height-for-age z-scores

		Severe stunting (<-3 z-score)		**Moderate stunting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	191	28	14.7	23	12.0	140	73.3
18-29	155	21	13.5	48	31.0	86	55.5
30-41	92	26	28.3	22	23.9	44	47.8
42-53	58	8	13.8	8	13.8	42	72.4
54-59	18	4	22.2	2	11.1	12	66.7
Total	514	87	16.9	103	20.0	324	63.0

Table 3.11: Prevalence of overweight based on weight for height cut off's and by sex (no oedema)

	All	**Boys**	**Girls**

	n = 511	n = 268	n = 243
Prevalence of overweight (WHZ > 2)	(9) 1.8 % (0.9 - 3.3 95% C.I.)	(2) 0.7 % (0.2 - 2.7 95% C.I.)	(7) 2.9 % (1.4 - 5.8 95% C.I.)
Prevalence of severe overweight (WHZ > 3)	(5) 1.0 % (0.4 - 2.3 95% C.I.)	(2) 0.7 % (0.2 - 2.7 95% C.I.)	(3) 1.2 % (0.4 - 3.6 95% C.I.)

Table 3.12: Prevalence of overweight by age, based on weight for height (no oedema)

		Overweight (WHZ > 2)		**Severe Overweight (WHZ > 3)**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**
6-17	189	4	2.1	2	1.1
18-29	152	2	1.3	2	1.3
30-41	92	3	3.3	1	1.1
42-53	59	0	0.0	0	0.0
54-59	19	0	0.0	0	0.0
Total	511	9	1.8	5	1.0

Table 3.13: Mean z-scores, Design Effects and excluded subjects

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	511	-1.01±1.33	1.00	5	10
Weight-for-Age	524	-1.44±1.39	1.00	0	2
Height-for-Age	514	-1.31±1.92	1.00	3	9

* contains for WHZ and WAZ the children with edema.

Appendix 4

Result Tables for NCHS growth reference 1977

Table 3.2: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All	**Boys**	**Girls**

	n = 518	n = 272	n = 246
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(109) 21.0 % (17.8 - 24.8 95% C.I.)	(49) 18.0 % (13.9 - 23.0 95% C.I.)	(60) 24.4 % (19.4 - 30.1 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(84) 16.2 % (13.3 - 19.6 95% C.I.)	(39) 14.3 % (10.7 - 19.0 95% C.I.)	(45) 18.3 % (14.0 - 23.6 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(25) 4.8 % (3.3 - 7.0 95% C.I.)	(10) 3.7 % (2.0 - 6.6 95% C.I.)	(15) 6.1 % (3.7 - 9.8 95% C.I.)

The prevalence of oedema is 0.0 %

Table 3.3: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema

		Severe wasting (<-3 z-score)		**Moderate wasting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	192	15	7.8	36	18.8	141	73.4	0	0.0
18-29	154	8	5.2	28	18.2	118	76.6	0	0.0
30-41	94	0	0.0	10	10.6	84	89.4	0	0.0
42-53	59	2	3.4	6	10.2	51	86.4	0	0.0
54-59	19	0	0.0	4	21.1	15	78.9	0	0.0
Total	518	25	4.8	84	16.2	409	79.0	0	0.0

Table 3.4: Distribution of acute malnutrition and oedema based on weight-for-height z-scores

	<-3 z-score	**>=-3 z-score**
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 25	Not severely malnourished No. 497

	(4.8 %)	(95.2 %)

Table 3.5: Prevalence of acute malnutrition based on the percentage of the median and/or oedema

	n = 518
Prevalence of global acute malnutrition (<80% and/or oedema)	(78) 15.1 % (12.2 - 18.4 95% C.I.)
Prevalence of moderate acute malnutrition (<80% and >= 70%, no oedema)	(63) 12.2 % (9.6 - 15.3 95% C.I.)
Prevalence of severe acute malnutrition (<70% and/or oedema)	(15) 2.9 % (1.8 - 4.7 95% C.I.)

Table 3.6: Prevalence of malnutrition by age, based on weight-for-height percentage of the median and oedema

		Severe wasting (<70% median)		**Moderate wasting (>=70% and <80% median)**		**Normal (> =80% median)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	192	10	5.2	29	15.1	153	79.7	0	0.0
18-29	154	4	2.6	18	11.7	132	85.7	0	0.0
30-41	94	0	0.0	6	6.4	88	93.6	0	0.0
42-53	59	1	1.7	6	10.2	52	88.1	0	0.0
54-59	19	0	0.0	4	21.1	15	78.9	0	0.0
Total	518	15	2.9	63	12.2	440	84.9	0	0.0

Table 3.7: Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 525	**Boys** n **=** 276	**Girls** n **=** 249
Prevalence of underweight (<-2 z-score)	(211) 40.2 % (36.1 - 44.4 95% C.I.)	(112) 40.6 % (35.0 - 46.5 95% C.I.)	(99) 39.8 % (33.9 - 45.9 95% C.I.)

Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(144) 27.4 % (23.8 - 31.4 95% C.I.)	(77) 27.9 % (22.9 - 33.5 95% C.I.)	(67) 26.9 % (21.8 - 32.7 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(67) 12.8 % (10.2 - 15.9 95% C.I.)	(35) 12.7 % (9.3 - 17.1 95% C.I.)	(32) 12.9 % (9.3 - 17.6 95% C.I.)

Table 3.8: Prevalence of underweight by age, based on weight-for-age z-scores

		Severe underweight (<-3 z-score)		**Moderate underweight (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	193	25	13.0	48	24.9	120	62.2	0	0.0
18-29	156	22	14.1	48	30.8	86	55.1	0	0.0
30-41	96	13	13.5	22	22.9	61	63.5	0	0.0
42-53	60	4	6.7	20	33.3	36	60.0	0	0.0
54-59	20	3	15.0	6	30.0	11	55.0	0	0.0
Total	525	67	12.8	144	27.4	314	59.8	0	0.0

Table 3.9: Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 516	**Boys** n = 271	**Girls** n = 245
Prevalence of stunting (<-2 z-score)	(162) 31.4 % (27.5 - 35.5 95% C.I.)	(87) 32.1 % (26.8 - 37.9 95% C.I.)	(75) 30.6 % (25.2 - 36.6 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(95) 18.4 % (15.3 - 22.0 95% C.I.)	(52) 19.2 % (14.9 - 24.3 95% C.I.)	(43) 17.6 % (13.3 - 22.8 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(67) 13.0 % (10.4 - 16.2 95% C.I.)	(35) 12.9 % (9.4 - 17.4 95% C.I.)	(32) 13.1 % (9.4 - 17.9 95% C.I.)

Table 3.10: Prevalence of stunting by age based on height-for-age z-scores

		Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	192	19	9.9	31	16.1	142	74.0
18-29	155	13	8.4	45	29.0	97	62.6
30-41	94	25	26.6	11	11.7	58	61.7
42-53	58	7	12.1	6	10.3	45	77.6
54-59	17	3	17.6	2	11.8	12	70.6
Total	516	67	13.0	95	18.4	354	68.6

Table 3.11: Prevalence of overweight based on weight for height cut off's and by sex (no oedema)

	All n = 518	**Boys** n **=** 272	**Girls** n **=** 246
Prevalence of overweight (WHZ > 2)	(9) 1.7 % (0.9 - 3.3 95% C.I.)	(4) 1.5 % (0.6 - 3.7 95% C.I.)	(5) 2.0 % (0.9 - 4.7 95% C.I.)
Prevalence of severe overweight (WHZ > 3)	(5) 1.0 % (0.4 - 2.2 95% C.I.)	(3) 1.1 % (0.4 - 3.2 95% C.I.)	(2) 0.8 % (0.2 - 2.9 95% C.I.)

Table 3.12: Prevalence of overweight by age, based on weight for height (no oedema)

		Overweight (WHZ > 2)		Severe Overweight (WHZ > 3)	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**
6-17	192	4	2.1	2	1.0
18-29	154	2	1.3	1	0.6
30-41	94	3	3.2	2	2.1
42-53	59	0	0.0	0	0.0
54-59	19	0	0.0	0	0.0
Total	518	9	1.7	5	1.0

Table 3.13: Mean z-scores, Design Effects and excluded subjects

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	518	-1.13±1.22	1.00	4	4
Weight-for-Age	525	-1.63±1.31	1.00	0	1
Height-for-Age	516	-1.15±1.82	1.00	3	7

* contains for WHZ and WAZ the children with edema.

Plausibility check for: Kaabong_above6.as

Standard/Reference used for z-score calculation: WHO standards 2006

(If it is not mentioned, flagged data is included in the evaluation. Some parts of this plausibility report are more for advanced users and can be skipped for a standard evaluation)

Overall data quality

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	**Score**
Flagged data	Incl	%	0-2.5	>2.5-5.0	>5.0-7.5	>7.5	
(% of in-range subjects)			0	5	10	20	**10** (5.6 %)
Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**0** (p=0.257)
Overall Age distrib	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**10** (p=0.000)
Dig pref score - weight	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (3)
Dig pref score - height	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**2** (11)

Dig pref score - MUAC	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (0)
Standard Dev WHZ	Excl	SD	<1.1	<1.15	<1.20	>=1.20	
.			and	and	and	or	
.	Excl	SD	>0.9	>0.85	>0.80	<=0.80	
			0	2	6	20	**2** (1.15)
Skewness WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (-0.02)
Kurtosis WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**1** (-0.23)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<=0.001	
			0	1	3	5	**0** (p=)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	**25** %

The overall score of this survey is 25 %, this is problematic.

Duplicate Entries in the database:

Line=499/ID=999 with Line=498/ID=999

Missing data:

HEIGHT: Line=5/ID=31417, Line=71/ID=32611, Line=289/ID=30503

Percentage of children with no exact birthday: 100 %

Age/Height out of range for WHZ:

HEIGHT:

Line=515/ID=32109: 31.20 cm

Anthropometric Indices likely to be in error (-3 to 3 for WHZ, -3 to 3 for HAZ, -3 to 3 for WAZ, from observed mean - chosen in Options panel - these values will be flagged and should be excluded from analysis for a nutrition survey in emergencies. For other surveys this might not be the best procedure e.g. when the percentage of overweight children has to be calculated):

Line=11/ID=31515: **WHZ (-4.968)**, Height may be incorrect

Line=19/ID=30908: **WHZ (2.783)**, Height may be incorrect

Line=21/ID=30724: HAZ (1.918), Age may be incorrect

Line=31/ID=30412: **WHZ (-4.537)**, Weight may be incorrect

Line=43/ID=32016: HAZ (2.459), Height may be incorrect

Line=52/ID=30305: **WHZ (-5.095)**, HAZ (-4.442), WAZ (-6.197)

Line=54/ID=32215: **WHZ (-5.377)**, WAZ (-4.481), Weight may be incorrect

Line=55/ID=32304: **WHZ (-4.206)**, Weight may be incorrect

Line=57/ID=31808: HAZ (2.083), Height may be incorrect

Line=61/ID=30503: HAZ (2.632), Height may be incorrect

Line=62/ID=31512: **WHZ (-4.304)**, HAZ (2.981), Height may be incorrect

Line=68/ID=31514: **WHZ (-4.278)**, Weight may be incorrect

Line=73/ID=31918: **WHZ (-4.354)**, HAZ (3.133), Height may be incorrect

Line=74/ID=31210: **WHZ (3.060)**, HAZ (-5.114), Height may be incorrect

Line=78/ID=31108: **WHZ (-5.046)**, HAZ (3.292), Height may be incorrect

Line=80/ID=30413: WAZ (-4.488), Age may be incorrect

Line=82/ID=32910: **WHZ (-4.753)**, WAZ (-4.769), Weight may be incorrect

Line=101/ID=32014: HAZ (2.446), Height may be incorrect

Line=103/ID=30802: HAZ (5.045), WAZ (1.930), Age may be incorrect

Line=107/ID=30811: **WHZ (-3.969)**, Weight may be incorrect

Line=111/ID=30420: HAZ (2.384), Age may be incorrect

Line=114/ID=31106: HAZ (2.944), Age may be incorrect

Line=116/ID=32211: HAZ (-5.656), WAZ (-5.241), Age may be incorrect

Line=124/ID=30707: HAZ (6.297), WAZ (2.900), Age may be incorrect

Line=125/ID=32015: HAZ (3.098), Height may be incorrect

Line=136/ID=33004: HAZ (2.042), Age may be incorrect

Line=139/ID=32903: HAZ (4.742), Age may be incorrect

Line=151/ID=31012: HAZ (5.426), WAZ (1.797), Age may be incorrect

Line=153/ID=31102: **WHZ (3.829)**, HAZ (3.623), WAZ (4.523)

Line=158/ID=31710: HAZ (2.687), Age may be incorrect

Line=165/ID=32411: HAZ (4.947), Age may be incorrect

Line=175/ID=31814: **WHZ (2.128)**, Height may be incorrect

Line=176/ID=30809: HAZ (2.074), WAZ (1.723), Age may be incorrect

Line=182/ID=31707: HAZ (1.969), Age may be incorrect

Line=200/ID=30901: **WHZ (-3.965)**, Weight may be incorrect

Line=201/ID=30315: WAZ (-4.491), Weight may be incorrect

Line=206/ID=31215: HAZ (3.061), Age may be incorrect

Line=208/ID=32718: **WHZ (3.578)**, WAZ (1.552), Weight may be incorrect

Line=209/ID=31107: **WHZ (-5.283)**, HAZ (3.400), Height may be incorrect

Line=211/ID=32815: **WHZ (9.893)**, HAZ (-5.783), WAZ (3.269)

Line=220/ID=33010: HAZ (1.622), Age may be incorrect

Line=242/ID=31518: HAZ (1.695), Height may be incorrect

Line=248/ID=30409: HAZ (4.103), Age may be incorrect

Line=260/ID=30105: HAZ (1.853), Age may be incorrect

Line=265/ID=31803: HAZ (3.711), Age may be incorrect

Line=283/ID=32408: HAZ (3.033), Age may be incorrect

Line=287/ID=30401: HAZ (1.850), Age may be incorrect

Line=295/ID=30905: HAZ (-5.549), Age may be incorrect

Line=310/ID=32505: HAZ (5.245), Age may be incorrect

Line=322/ID=30319: HAZ (2.310), WAZ (1.848), Age may be incorrect

Line=324/ID=31816: HAZ (2.754), WAZ (1.565), Age may be incorrect

Line=329/ID=31805: **WHZ (3.260)**, Weight may be incorrect

Line=330/ID=30614: HAZ (-4.709), Age may be incorrect

Line=341/ID=31303: HAZ (2.411), WAZ (1.889), Age may be incorrect

Line=343/ID=30318: **WHZ (-5.605)**, HAZ (-4.684), WAZ (-6.165)

Line=347/ID=30404: HAZ (2.212), Age may be incorrect

Line=350/ID=31708: HAZ (2.037), Age may be incorrect

Line=364/ID=30303: HAZ (-6.084), WAZ (-4.564), Age may be incorrect

Line=372/ID=33002: HAZ (-5.520), Age may be incorrect

Line=385/ID=33001: **WHZ (2.403)**, Height may be incorrect

Line=386/ID=31010: HAZ (-8.215), Height may be incorrect

Line=388/ID=30516: HAZ (-5.941), Age may be incorrect

Line=395/ID=32813: **WHZ (9.400)**, WAZ (3.673), Weight may be incorrect

Line=396/ID=31107: **WHZ (6.124)**, HAZ (-6.826), Height may be incorrect

Line=397/ID=30602: HAZ (-4.750), Age may be incorrect

Line=400/ID=31406: HAZ (-6.177), WAZ (-4.614), Age may be incorrect

Line=401/ID=31113: **WHZ (2.391)**, HAZ (-5.273), Height may be incorrect

Line=405/ID=30112: **WHZ (3.130)**, Weight may be incorrect

Line=438/ID=31610: **WHZ (7.660)**, WAZ (2.415), Weight may be incorrect

Line=441/ID=32909: HAZ (-5.567), Age may be incorrect

Line=448/ID=30414: HAZ (2.254), Age may be incorrect

Line=455/ID=30301: HAZ (-4.757), Age may be incorrect

Line=457/ID=32903: HAZ (-6.848), WAZ (-5.120), Age may be incorrect

Line=458/ID=32707: HAZ (3.380), Height may be incorrect

Line=465/ID=31007: **WHZ (9.423)**, HAZ (-8.459), Height may be incorrect

Line=469/ID=32915: HAZ (-4.975), Age may be incorrect

Line=475/ID=30910: HAZ (-5.237), Height may be incorrect

Line=481/ID=31803: HAZ (-5.867), Age may be incorrect

Line=489/ID=31102: **WHZ (-4.349)**, Weight may be incorrect

Line=491/ID=30305: HAZ (-5.526), Height may be incorrect

Line=507/ID=30106: HAZ (1.613), Height may be incorrect

Line=509/ID=32717: HAZ (-7.015), WAZ (-5.092), Age may be incorrect

Line=515/ID=32109: HAZ (-16.530), Height may be incorrect

Line=518/ID=30902: HAZ (-5.542), Age may be incorrect

Line=522/ID=31902: HAZ (2.082), Height may be incorrect

Line=525/ID=32018: HAZ (-5.901), Age may be incorrect

Percentage of values flagged with SMART flags:WHZ: 5.6 %, HAZ: 12.8 %, WAZ: 4.4 %

Age distribution:

Month 6 : ############################

Month 7 : ########################

Month 8 : ################

Month 9 : ##################

Month 10 : ##########

Month 11 : ############

Month 12 : ################

Month 13 : ##################

Month 14 : ###############

Month 15 : ######

Month 16 : ##########

Month 17 : ###########

Month 18 : ############

Month 19 : ################

Month 20 : ############

Month 21 : #########

Month 22 : ##################

Month 23 : ##########

Month 24 : ################

Month 25 : ##############

Month 26 : ###########

Month 27 : ##########

Month 28 : ##########

Month 29 : ###########

Month 30 : ###############

Month 31 : ########

Month 32 : ######

Month 33 : ###########

Month 34 : ######

Month 35 : ####

Month 36 : ############

Month 37 : #########

Month 38 : ####

Month 39 : #####

Month 40 : #######

Month 41 : #######

Month 42 : #####

Month 43 : ###

Month 44 : #####

Month 45 : ######

Month 46 : #####

Month 47 : ###########

Month 48 : ######

Month 49 : #####

Month 50 : ###

Month 51 : ####

Month 52 : #####

Month 53 : ##

Month 54 : #########

Month 55 : ##

Month 56 : ###

Month 57 : ######

Age ratio of 6-29 months to 30-59 months: 1.99 (The value should be around 0.85).

Statistical evaluation of sex and age ratios (using Chi squared statistic):

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	101/64.0 (1.6)	93/58.0 (1.6)	194/122.0 (1.6)	1.09
18 to 29	12	78/62.4 (1.2)	78/56.6 (1.4)	156/119.0 (1.3)	1.00
30 to 41	12	54/60.5 (0.9)	42/54.8 (0.8)	96/115.3 (0.8)	1.29
42 to 53	12	32/59.6 (0.5)	28/53.9 (0.5)	60/113.5 (0.5)	1.14
54 to 59	6	11/29.5 (0.4)	9/26.7 (0.3)	20/56.1 (0.4)	1.22
6 to 59	54	276/263.0 (1.0)	250/263.0 (1.0)		1.10

The data are expressed as observed number/expected number (ratio of obs/expect)

Overall sex ratio: p-value = 0.257 (boys and girls equally represented)

Overall age distribution: p-value = 0.000 (significant difference)

Overall age distribution for boys: p-value = 0.000 (significant difference)

Overall age distribution for girls: p-value = 0.000 (significant difference)

Overall sex/age distribution: p-value = 0.000 (significant difference)

Digit preference Weight:

Digit .0 : ##

Digit .1 : ##

Digit .2 : ##

Digit .3 : ##

Digit .4 : ##

Digit .5 : ##

Digit .6 : ##

Digit .7 : ##

Digit .8 : ##

Digit .9 : ##

Digit preference score: **3** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

p-value for chi2: 0.794

Digit preference Height:

Digit .0 : ##

Digit .1 : ################################

Digit .2 : ####################################

Digit .3 : ####################

Digit .4 : ########################

Digit .5 : ##################################

Digit .6 : ####################

Digit .7 : ######################

Digit .8 : ##################

Digit .9 : #############

Digit preference score: **11** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

p-value for chi2: 0.000 (significant difference)

Evaluation of Standard deviation, Normal distribution, Skewness and Kurtosis using the 3 exclusion (Flag) procedures

.	no exclusion	exclusion from reference mean (WHO flags)	exclusion from observed mean (SMART flags)
WHZ			
Standard Deviation SD:	1.68	1.33	1.15
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	20.8%	20.2%	18.9%
calculated with current SD:	26.8%	22.9%	19.5%
calculated with a SD of 1:	14.9%	16.1%	16.2%
HAZ			
Standard Deviation SD:	2.15	1.92	1.35
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	37.9%	37.0%	37.5%
calculated with current SD:	39.0%	35.9%	35.5%
calculated with a SD of 1:	27.4%	24.4%	30.8%
WAZ			
Standard Deviation SD:	1.42	1.39	1.20
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	35.0%	34.7%	34.4%
calculated with current SD:	35.1%	34.3%	33.0%
calculated with a SD of 1:	29.3%	28.7%	29.8%
Results for Shapiro-Wilk test for normally (Gaussian) distributed data:			
WHZ	p= 0.000	p= 0.001	p= 0.183
HAZ	p= 0.000	p= 0.000	p= 0.001
WAZ	p= 0.004	p= 0.003	p= 0.090
(If p < 0.05 then the data are not normally distributed. If p > 0.05 you can consider the data normally distributed)			
Skewness			
WHZ	1.71	0.15	-0.02

HAZ	-0.42	0.48	0.01
WAZ	0.15	0.28	-0.03

If the value is:

-below minus 0.4 there is a relative excess of wasted/stunted/underweight subjects in the sample

-between minus 0.4 and minus 0.2, there may be a relative excess of wasted/stunted/underweight subjects in the sample.

-between minus 0.2 and plus 0.2, the distribution can be considered as symmetrical.

-between 0.2 and 0.4, there may be an excess of obese/tall/overweight subjects in the sample.

-above 0.4, there is an excess of obese/tall/overweight subjects in the sample

Kurtosis

WHZ	10.08	0.87	-0.23
HAZ	5.30	0.82	-0.70
WAZ	1.05	0.87	-0.47

Kurtosis characterizes the relative size of the body versus the tails of the distribution. Positive kurtosis indicates relatively large tails and small body. Negative kurtosis indicates relatively large body and small tails.

If the absolute value is:

-above 0.4 it indicates a problem. There might have been a problem with data collection or sampling.

-between 0.2 and 0.4, the data may be affected with a problem.

-less than an absolute value of 0.2 the distribution can be considered as normal.

Are the data of the same quality at the beginning and the end of the clusters?

Evaluation of the SD for WHZ depending upon the order the cases are measured within each cluster (if one cluster per day is measured then this will be related to the time of the day the measurement is made).

Time	SD for WHZ															
point	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3

(when n is much less than the average number of subjects per cluster different symbols are used: 0 for n < 80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags found in the different time points)

Analysis by Team

Team	**1**	**999**
n =	1	525

Percentage of values flagged with SMART flags:

WHZ:	0.0	7.8
HAZ:	0.0	13.4

WAZ: 0.0 5.6

Age ratio of 6-29 months to 30-59 months:

1.98

Sex ratio (male/female):

1.10

Digit preference Weight (%):

.0 : 0 9

.1 : 0 8

.2 : 0 11

.3 : 100 9

.4 : 0 10

.5 : 0 11

.6 : 0 11

.7 : 0 9

.8 : 0 11

.9 : 0 10

DPS: 100 3

Digit preference score (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

Digit preference Height (%):

.0 : 0 15

.1 : 0 12

.2 : 0 14

.3 : 0 8

.4 : 0 10

.5 : 0 13

.6 : 0 8

.7 : 0 8

.8 : 0 7

.9 : 100 5

DPS: 100 11

Digit preference score (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

Standard deviation of WHZ:

SD 0.00

Prevalence (< -2) observed: %

Prevalence (< -2) calculated with current SD: %

Prevalence (< -2) calculated with a SD of 1: %

Standard deviation of HAZ:

SD 0.00

observed: %

calculated with current SD: %

calculated with a SD of 1: %

Statistical evaluation of sex and age ratios (using Chi squared statistic) for:

Team 1:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	1/0.2 (4.3)	0/0.0	1/0.2	
18 to 29	12	0/0.2 (0.0)	0/0.0	0/0.2	
30 to 41	12	0/0.2 (0.0)	0/0.0	0/0.2	
42 to 53	12	0/0.2 (0.0)	0/0.0	0/0.2	
54 to 59	6	0/0.1 (0.0)	0/0.0	0/0.1	
6 to 59	54	1/0.5 (2.0)	0/0.5 (0.0)		

The data are expressed as observed number/expected number (ratio of obs/expect)

Overall sex ratio: p-value = 0.317 (boys and girls equally represented)

Overall age distribution: p-value = 0.507 (as expected)

Overall age distribution for boys: p-value = 0.507 (as expected)

Overall sex/age distribution: p-value = 0.107 (as expected)

Team 2:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	0/0.0	0/0.0	0/0.0	
18 to 29	12	0/0.0	0/0.0	0/0.0	

```
30 to 41     12        0/0.0    0/0.0    0/0.0

42 to 53     12        0/0.0    0/0.0    0/0.0

54 to 59      6        0/0.0    0/0.0    0/0.0

-------------------------------------------------------------------------------

6  to 59     54        0/0.0    0/0.0
```

The data are expressed as observed number/expected number (ratio of obs/expect)

Evaluation of the SD for WHZ depending upon the order the cases are measured within each cluster (if one cluster per day is measured then this will be related to the time of the day the measurement is made).

Team: 1

```
Time                                              SD for WHZ

point                0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3


(when n is much less than the average number of subjects per cluster different symbols are used:
0 for n < 80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags found in
the different time points)
```

Team: 2

(for better comparison it can be helpful to copy/paste part of this report into Excel)

Kotido

Model nutrition assessment report - Kotido

(based on the Save the Children Fund emergency nutrition assessment handbook)

Executive summary (one to two pages only)

GAM: 11.4 % (8.8 - 14.6 95% C.I.)
SAM : 2.9 % (1.7 - 4.8 95% C.I.)

3. Results

3.1 Anthropometric results (based on WHO standards 2006):

Definitions of acute malnutrition should be given (for example, global acute malnutrition is defined as <-2 z scores weight-for-height and/or oedema, severe acute malnutrition is defined as <-3z scores weight-for-height and/or oedema)

Exclusion of z-scores from Zero (reference mean) WHO flags: WHZ -5 to 5; HAZ -6 to 6; WAZ -6 to 5

Table 3.1: Distribution of age and sex of sample

	Boys		Girls		Total		Ratio
AGE (mo)	**no.**	**%**	**no.**	**%**	**no.**	**%**	**Boy:girl**
6-17	63	41.4	89	58.6	152	33.0	0.7
18-29	56	45.5	67	54.5	123	26.7	0.8
30-41	47	44.3	59	55.7	106	23.0	0.8
42-53	34	56.7	26	43.3	60	13.0	1.3
54-59	11	57.9	8	42.1	19	4.1	1.4
Total	211	45.9	249	54.1	460	100.0	0.8

Table 3.2: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All n = 456	**Boys** n **=** 210	**Girls** n **=** 246
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(52) 11.4 % (8.8 - 14.6 95% C.I.)	(26) 12.4 % (8.6 - 17.5 95% C.I.)	(26) 10.6 % (7.3 - 15.0 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(39) 8.6 % (6.3 - 11.5 95% C.I.)	(17) 8.1 % (5.1 - 12.6 95% C.I.)	(22) 8.9 % (6.0 - 13.2 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(13) 2.9 % (1.7 - 4.8 95% C.I.)	(9) 4.3 % (2.3 - 7.9 95% C.I.)	(4) 1.6 % (0.6 - 4.1 95% C.I.)

The prevalence of oedema is 0.0 %

Table 3.3: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema

	Severe wasting (<-3 z-score)	**Moderate wasting**	**Normal (> = -2 z score)**	**Oedema**

				(>= -3 and <-2 z-score)					
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	152	2	1.3	19	12.5	131	86.2	0	0.0
18-29	122	5	4.1	12	9.8	105	86.1	0	0.0
30-41	103	3	2.9	6	5.8	94	91.3	0	0.0
42-53	60	2	3.3	2	3.3	56	93.3	0	0.0
54-59	19	1	5.3	0	0.0	18	94.7	0	0.0
Total	456	13	2.9	39	8.6	404	88.6	0	0.0

Table 3.4: Distribution of acute malnutrition and oedema based on weight-for-height z-scores

	<-3 z-score	**>=-3 z-score**
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 16 (3.5 %)	Not severely malnourished No. 443 (96.5 %)

Table 3.7: Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 459	**Boys** n **=** 211	**Girls** n **=** 248
Prevalence of underweight **(<-2 z-score)**	(114) 24.8 % (21.1 - 29.0 95% C.I.)	(68) 32.2 % (26.3 - 38.8 95% C.I.)	(46) 18.5 % (14.2 - 23.9 95% C.I.)
Prevalence of moderate underweight **(<-2 z-score and >=-3 z-score)**	(73) 15.9 % (12.8 - 19.5 95% C.I.)	(43) 20.4 % (15.5 - 26.3 95% C.I.)	(30) 12.1 % (8.6 - 16.7 95% C.I.)
Prevalence of severe underweight	(41) 8.9 %	(25) 11.8 %	(16) 6.5 %

(<-3 z-score)	(6.7 - 11.9 95% C.I.)	(8.2 - 16.9 95% C.I.)	(4.0 - 10.2 95% C.I.)

Table 3.8: Prevalence of underweight by age, based on weight-for-age z-scores

		Severe underweight (<-3 z-score)		**Moderate underweight (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	152	11	7.2	23	15.1	118	77.6	0	0.0
18-29	123	10	8.1	20	16.3	93	75.6	0	0.0
30-41	105	13	12.4	17	16.2	75	71.4	0	0.0
42-53	60	6	10.0	10	16.7	44	73.3	0	0.0
54-59	19	1	5.3	3	15.8	15	78.9	0	0.0
Total	459	41	8.9	73	15.9	345	75.2	0	0.0

Table 3.9: Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 456	**Boys** n **=** 208	**Girls** n **=** 248
Prevalence of stunting (<-2 z-score)	(169) 37.1 % (32.8 - 41.6 95% C.I.)	(93) 44.7 % (38.1 - 51.5 95% C.I.)	(76) 30.6 % (25.2 - 36.6 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(83) 18.2 % (14.9 - 22.0 95% C.I.)	(41) 19.7 % (14.9 - 25.6 95% C.I.)	(42) 16.9 % (12.8 - 22.1 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(86) 18.9 % (15.5 - 22.7 95% C.I.)	(52) 25.0 % (19.6 - 31.3 95% C.I.)	(34) 13.7 % (10.0 - 18.5 95% C.I.)

Table 3.10: Prevalence of stunting by age based on height-for-age z-scores

	Severe stunting (<-3 z-score)	**Moderate stunting (>= -3 and <-2 z-score)**	**Normal (> = -2 z score)**

Age (mo)	Total no.	No.	%	No.	%	No.	%
6-17	151	14	9.3	25	16.6	112	74.2
18-29	122	31	25.4	23	18.9	68	55.7
30-41	105	27	25.7	25	23.8	53	50.5
42-53	59	10	16.9	7	11.9	42	71.2
54-59	19	4	21.1	3	15.8	12	63.2
Total	456	86	18.9	83	18.2	287	62.9

Table 3.11: Prevalence of overweight based on weight for height cut off's and by sex (no oedema)

	All n = 456	**Boys** n **=** 210	**Girls** n **=** 246
Prevalence of overweight (WHZ > 2)	(7) 1.5 % (0.7 - 3.1 95% C.I.)	(5) 2.4 % (1.0 - 5.5 95% C.I.)	(2) 0.8 % (0.2 - 2.9 95% C.I.)
Prevalence of severe overweight (WHZ > 3)	(1) 0.2 % (0.0 - 1.2 95% C.I.)	(0) 0.0 % (0.0 - 1.8 95% C.I.)	(1) 0.4 % (0.1 - 2.3 95% C.I.)

Table 3.12: Prevalence of overweight by age, based on weight for height (no oedema)

		Overweight (WHZ > 2)		**Severe Overweight (WHZ > 3)**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**
6-17	152	3	2.0	1	0.7
18-29	122	3	2.5	0	0.0
30-41	103	1	1.0	0	0.0
42-53	60	0	0.0	0	0.0
54-59	19	0	0.0	0	0.0
Total	456	7	1.5	1	0.2

Table 3.13: Mean z-scores, Design Effects and excluded subjects

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range

Weight-for-Height	456	-0.55±1.25	1.00	1	3
Weight-for-Age	459	-1.29±1.26	1.00	1	0
Height-for-Age	456	-1.56±1.66	1.00	0	4

* contains for WHZ and WAZ the children with edema.

Appendix 4

Result Tables for NCHS growth reference 1977

Table 3.2: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All n = 458	**Boys** n **=** 210	**Girls** n **=** 248
Prevalence of global malnutrition **(<-2 z-score and/or oedema)**	(46) 10.0 % (7.6 - 13.1 95% C.I.)	(20) 9.5 % (6.2 - 14.3 95% C.I.)	(26) 10.5 % (7.3 - 14.9 95% C.I.)
Prevalence of moderate malnutrition **(<-2 z-score and >=-3 z-score, no oedema)**	(33) 7.2 % (5.2 - 9.9 95% C.I.)	(13) 6.2 % (3.7 - 10.3 95% C.I.)	(20) 8.1 % (5.3 - 12.1 95% C.I.)
Prevalence of severe malnutrition **(<-3 z-score and/or oedema)**	(13) 2.8 % (1.7 - 4.8 95% C.I.)	(7) 3.3 % (1.6 - 6.7 95% C.I.)	(6) 2.4 % (1.1 - 5.2 95% C.I.)

The prevalence of oedema is 0.0 %

Table 3.3: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema

		Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	152	2	1.3	14	9.2	136	89.5	0	0.0
18-29	123	5	4.1	11	8.9	107	87.0	0	0.0
30-41	104	4	3.8	5	4.8	95	91.3	0	0.0
42-53	60	2	3.3	2	3.3	56	93.3	0	0.0
54-59	19	0	0.0	1	5.3	18	94.7	0	0.0
Total	458	13	2.8	33	7.2	412	90.0	0	0.0

Table 3.4: Distribution of acute malnutrition and oedema based on weight-for-height z-scores

	<-3 z-score	**>=-3 z-score**
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 14 (3.1 %)	Not severely malnourished No. 445 (96.9 %)

Table 3.5: Prevalence of acute malnutrition based on the percentage of the median and/or oedema

	n = 458
Prevalence of global acute malnutrition (<80% and/or oedema)	(38) 8.3 % (6.1 - 11.2 95% C.I.)
Prevalence of moderate acute malnutrition (<80% and >= 70%, no oedema)	(32) 7.0 % (5.0 - 9.7 95% C.I.)
Prevalence of severe acute malnutrition	(6) 1.3 %

(<70% and/or oedema)	(0.6 - 2.8 95% C.I.)

Table 3.6: Prevalence of malnutrition by age, based on weight-for-height percentage of the median and oedema

		Severe wasting (<70% median)		**Moderate wasting (>=70% and <80% median)**		**Normal (> =80% median)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	152	1	0.7	9	5.9	142	93.4	0	0.0
18-29	123	2	1.6	13	10.6	108	87.8	0	0.0
30-41	104	3	2.9	5	4.8	96	92.3	0	0.0
42-53	60	0	0.0	4	6.7	56	93.3	0	0.0
54-59	19	0	0.0	1	5.3	18	94.7	0	0.0
Total	458	6	1.3	32	7.0	420	91.7	0	0.0

Table 3.7: Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 459	**Boys** n **=** 211	**Girls** n **=** 248
Prevalence of underweight (<-2 z-score)	(156) 34.0 % (29.8 - 38.4 95% C.I.)	(83) 39.3 % (33.0 - 46.1 95% C.I.)	(73) 29.4 % (24.1 - 35.4 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(118) 25.7 % (21.9 - 29.9 95% C.I.)	(60) 28.4 % (22.8 - 34.9 95% C.I.)	(58) 23.4 % (18.5 - 29.0 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(38) 8.3 % (6.1 - 11.2 95% C.I.)	(23) 10.9 % (7.4 - 15.8 95% C.I.)	(15) 6.0 % (3.7 - 9.7 95% C.I.)

Table 3.8: Prevalence of underweight by age, based on weight-for-age z-scores

	Severe underweight (<-3 z-score)	**Moderate underweight (>= -3 and <-2 z-score)**	**Normal (> = -2 z score)**	**Oedema**

Age (mo)	Total no.	No.	%	No.	%	No.	%	No.	%
6-17	152	8	5.3	38	25.0	106	69.7	0	0.0
18-29	123	12	9.8	42	34.1	69	56.1	0	0.0
30-41	105	12	11.4	22	21.0	71	67.6	0	0.0
42-53	60	5	8.3	13	21.7	42	70.0	0	0.0
54-59	19	1	5.3	3	15.8	15	78.9	0	0.0
Total	459	38	8.3	118	25.7	303	66.0	0	0.0

Table 3.9: Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 457	**Boys** n **=** 209	**Girls** n **=** 248
Prevalence of stunting (<-2 z-score)	(149) 32.6 % (28.5 - 37.0 95% C.I.)	(81) 38.8 % (32.4 - 45.5 95% C.I.)	(68) 27.4 % (22.2 - 33.3 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(89) 19.5 % (16.1 - 23.4 95% C.I.)	(45) 21.5 % (16.5 - 27.6 95% C.I.)	(44) 17.7 % (13.5 - 23.0 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(60) 13.1 % (10.3 - 16.5 95% C.I.)	(36) 17.2 % (12.7 - 22.9 95% C.I.)	(24) 9.7 % (6.6 - 14.0 95% C.I.)

Table 3.10: Prevalence of stunting by age based on height-for-age z-scores

		Severe stunting (<-3 z-score)		**Moderate stunting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	152	8	5.3	29	19.1	115	75.7
18-29	122	22	18.0	24	19.7	76	62.3
30-41	105	18	17.1	26	24.8	61	58.1
42-53	59	8	13.6	7	11.9	44	74.6
54-59	19	4	21.1	3	15.8	12	63.2
Total	457	60	13.1	89	19.5	308	67.4

Table 3.11: Prevalence of overweight based on weight for height cut off's and by sex (no oedema)

	All n = 458	**Boys** n = 210	**Girls** n = 248
Prevalence of overweight (WHZ > 2)	(2) 0.4 % (0.1 - 1.6 95% C.I.)	(0) 0.0 % (0.0 - 1.8 95% C.I.)	(2) 0.8 % (0.2 - 2.9 95% C.I.)
Prevalence of severe overweight (WHZ > 3)	(1) 0.2 % (0.0 - 1.2 95% C.I.)	(0) 0.0 % (0.0 - 1.8 95% C.I.)	(1) 0.4 % (0.1 - 2.2 95% C.I.)

Table 3.12: Prevalence of overweight by age, based on weight for height (no oedema)

		Overweight (WHZ > 2)		**Severe Overweight (WHZ > 3)**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**
6-17	152	2	1.3	1	0.7
18-29	123	0	0.0	0	0.0
30-41	104	0	0.0	0	0.0
42-53	60	0	0.0	0	0.0
54-59	19	0	0.0	0	0.0
Total	458	2	0.4	1	0.2

Table 3.13: Mean z-scores, Design Effects and excluded subjects

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	458	-0.76±1.08	1.00	1	1
Weight-for-Age	459	-1.48±1.19	1.00	1	0
Height-for-Age	457	-1.36±1.60	1.00	0	3

* contains for WHZ and WAZ the children with edema.

Plausibility check for: Kotido_above6.as

Standard/Reference used for z-score calculation: WHO standards 2006

(If it is not mentioned, flagged data is included in the evaluation. Some parts of this plausibility report are more for advanced users and can be skipped for a standard evaluation)

Overall data quality

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	**Score**
Flagged data	Incl	%	0-2.5	>2.5-5.0	>5.0-7.5	>7.5	
(% of in-range subjects)			0	5	10	20	**5** (3.3 %)
Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**2** (p=0.076)
Overall Age distrib	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**10** (p=0.000)
Dig pref score - weight	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (6)
Dig pref score - height	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**10** (27)
Dig pref score - MUAC	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (0)
Standard Dev WHZ	Excl	SD	<1.1	<1.15	<1.20	>=1.20	
.			and	and	and	or	
.	Excl	SD	>0.9	>0.85	>0.80	<=0.80	
			0	2	6	20	**2** (1.12)
Skewness WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (-0.08)
Kurtosis WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**1** (-0.20)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<=0.001	
			0	1	3	5	**0** (p=)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	**30** %

The overall score of this survey is 30 %, this is problematic.

There were no duplicate entries detected.

Missing data:

WEIGHT: Line=174/ID=4251

Percentage of children with no exact birthday: 100 %

Anthropometric Indices likely to be in error (-3 to 3 for WHZ, -3 to 3 for HAZ, -3 to 3 for WAZ, from observed mean - chosen in Options panel - these values will be flagged and should be excluded from analysis for a nutrition survey in emergencies. For other surveys this might not be the best procedure e.g. when the percentage of overweight children has to be calculated):

Line=12/ID=40404: HAZ (-7.112), WAZ (-4.669), Age may be incorrect

Line=15/ID=40602: HAZ (-5.995), Height may be incorrect

Line=17/ID=41205: HAZ (-5.282), WAZ (-4.516), Age may be incorrect

Line=34/ID=40517: HAZ (2.299), Age may be incorrect

Line=35/ID=43005: **WHZ (-6.477)**, HAZ (3.165), Height may be incorrect

Line=42/ID=42310: **WHZ (-5.321)**, Height may be incorrect

Line=46/ID=41108: HAZ (4.027), WAZ (1.983), Age may be incorrect

Line=57/ID=42611: **WHZ (-3.911)**, Weight may be incorrect

Line=61/ID=41017: HAZ (3.316), Age may be incorrect

Line=69/ID=40103: HAZ (1.459), Age may be incorrect

Line=85/ID=41508: **WHZ (2.610)**, Weight may be incorrect

Line=88/ID=41905: HAZ (-4.951), Age may be incorrect

Line=93/ID=42810: **WHZ (-4.788)**, Weight may be incorrect

Line=101/ID=42713: **WHZ (-4.512)**, HAZ (2.160), Height may be incorrect

Line=116/ID=41915: HAZ (-5.101), Age may be incorrect

Line=132/ID=41609: **WHZ (-3.928)**, Weight may be incorrect

Line=180/ID=42920: **WHZ (-4.823)**, WAZ (-4.528), Weight may be incorrect

Line=183/ID=42206: HAZ (-5.924), Age may be incorrect

Line=191/ID=41315: HAZ (1.790), Age may be incorrect

Line=200/ID=42706: HAZ (-5.339), WAZ (-4.316), Age may be incorrect

Line=217/ID=41009: **WHZ (2.723)**, Height may be incorrect

Line=226/ID=42508: HAZ (-5.511), Age may be incorrect

Line=227/ID=40107: HAZ (-5.486), Age may be incorrect

Line=228/ID=40120: **WHZ (-3.767)**, Weight may be incorrect

Line=230/ID=42107: HAZ (-6.394), WAZ (-4.712), Age may be incorrect

Line=242/ID=41911: HAZ (1.516), Age may be incorrect

Line=254/ID=41006: HAZ (2.527), Height may be incorrect

Line=302/ID=40312: **WHZ (3.802)**, Height may be incorrect

Line=311/ID=43018: HAZ (2.502), Age may be incorrect

Line=322/ID=40404: HAZ (6.743), WAZ (3.599), Age may be incorrect

Line=331/ID=42105: HAZ (-5.404), WAZ (-4.344), Age may be incorrect

Line=338/ID=42804: HAZ (-5.145), WAZ (-4.395), Age may be incorrect

Line=339/ID=42804: HAZ (-5.103), WAZ (-4.973), Age may be incorrect

Line=344/ID=42020: WAZ (1.772), Age may be incorrect

Line=376/ID=41511: HAZ (3.493), WAZ (2.075), Age may be incorrect

Line=377/ID=43008: **WHZ (-5.175)**, HAZ (6.282), Height may be incorrect

Line=379/ID=40718: WAZ (1.838), Weight may be incorrect

Line=398/ID=41406: HAZ (3.555), Height may be incorrect

Line=399/ID=42009: **WHZ (2.887)**, HAZ (-5.604), Height may be incorrect

Line=400/ID=42103: HAZ (3.901), WAZ (2.017), Age may be incorrect

Line=416/ID=41118: **WHZ (-4.045)**, Weight may be incorrect

Line=418/ID=42319: HAZ (2.110), WAZ (2.459), Age may be incorrect

Line=426/ID=42519: HAZ (4.948), WAZ (1.922), Age may be incorrect

Line=429/ID=42703: HAZ (1.644), Age may be incorrect

Line=441/ID=41608: HAZ (2.330), Height may be incorrect

Line=444/ID=40303: HAZ (-4.984), Age may be incorrect

Line=456/ID=42805: HAZ (-4.954), Age may be incorrect

Line=457/ID=40716: **WHZ (-3.814)**, HAZ (-5.028), WAZ (-4.972)

Percentage of values flagged with SMART flags:WHZ: 3.3 %, HAZ: 7.8 %, WAZ: 3.8 %

Age distribution:

Month 6 : ##################

Month 7 : ###############

Month 8 : ##################

Month 9 : ###############

Month 10 : ##########

Month 11 : ##########

Month 12 : ##########

Month 13 : #########

Month 14 : #########

Month 15 : #####

Month 16 : ########

Month 17 : ####################

Month 18 : ###############

Month 19 : ##########

Month 20 : #######

Month 21 : #########

Month 22 : ########

Month 23 : ##########

Month 24 : ##########

Month 25 : ######

Month 26 : ##############

Month 27 : #########

Month 28 : ##########

Month 29 : ##########

Month 30 : ################

Month 31 : #########

Month 32 : ##########

Month 33 : #####

Month 34 : ##########

Month 35 : ##########

Month 36 : ####

Month 37 : ######

Month 38 : #####

Month 39 : #######

Month 40 : #########

Month 41 : ############

Month 42 : ##########

Month 43 : ###

Month 44 : ####

Month 45 : ########

Month 46 : ###

Month 47 : ########

Month 48 : ###

Month 49 : #####

Month 50 : ###

Month 51 : #######

Month 52 : ##

Month 53 : ####

Month 54 : ####

Month 55 : ####

Month 56 : ###

Month 57 : ####

Month 58 : ##

Month 59 : ##

Age ratio of 6-29 months to 30-59 months: 1.49 (The value should be around 0.85).

Statistical evaluation of sex and age ratios (using Chi squared statistic):

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	63/49.0 (1.3)	89/57.8 (1.5)	152/106.7 (1.4)	0.71
18 to 29	12	56/47.7 (1.2)	67/56.3 (1.2)	123/104.1 (1.2)	0.84
30 to 41	12	47/46.3 (1.0)	59/54.6 (1.1)	106/100.9 (1.1)	0.80
42 to 53	12	34/45.5 (0.7)	26/53.7 (0.5)	60/99.3 (0.6)	1.31
54 to 59	6	11/22.5 (0.5)	8/26.6 (0.3)	19/49.1 (0.4)	1.38
6 to 59	54	211/230.0 (0.9)	249/230.0 (1.1)		0.85

The data are expressed as observed number/expected number (ratio of obs/expect)

Overall sex ratio: p-value = 0.076 (boys and girls equally represented)

Overall age distribution: p-value = 0.000 (significant difference)

Overall age distribution for boys: p-value = 0.006 (significant difference)

Overall age distribution for girls: p-value = 0.000 (significant difference)

Overall sex/age distribution: p-value = 0.000 (significant difference)

Digit preference Weight:

Digit .0 : ##

Digit .1 : ##

Digit .2 : ##

Digit .3 : ##

Digit .4 : ################################

Digit .5 : ##

Digit .6 : ##

Digit .7 : ##

Digit .8 : ####################################

Digit .9 : ##

Digit preference score: **6** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

p-value for chi2: 0.116

Digit preference Height:

Digit .0 : ##

Digit .1 : ##############

Digit .2 : ##############

Digit .3 : #############

Digit .4 : ########

Digit .5 : ############################

Digit .6 : ##########

Digit .7 : ######

Digit .8 : ######

Digit .9 : #######

Digit preference score: **27** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

p-value for chi2: 0.000 (significant difference)

Evaluation of Standard deviation, Normal distribution, Skewness and Kurtosis using the 3 exclusion (Flag) procedures

.	no exclusion	exclusion from reference mean (WHO flags)	exclusion from observed mean (SMART flags)
WHZ			
Standard Deviation SD:	1.32	1.25	1.12
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	12.1%	11.6%	10.0%
calculated with current SD:	14.3%	12.5%	9.4%
calculated with a SD of 1:	8.0%	7.5%	7.0%
HAZ			
Standard Deviation SD:	1.77	1.66	1.29
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	37.2%	37.1%	36.3%
calculated with current SD:	40.0%	39.6%	37.9%
calculated with a SD of 1:	32.6%	33.1%	34.5%
WAZ			
Standard Deviation SD:	1.27	1.27	1.10
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	25.2%	25.2%	24.1%
calculated with current SD:	28.9%	28.9%	25.9%
calculated with a SD of 1:	24.0%	24.0%	23.8%

Results for Shapiro-Wilk test for normally (Gaussian) distributed data:

WHZ	p= 0.000	p= 0.007	p= 0.240
HAZ	p= 0.000	p= 0.000	p= 0.007

WAZ	p= 0.010	p= 0.010	p= 0.176

(If p < 0.05 then the data are not normally distributed. If p > 0.05 you can consider the data normally distributed)

Skewness

WHZ	-0.52	-0.23	-0.08
HAZ	0.56	0.34	0.03
WAZ	-0.06	-0.06	-0.18

If the value is:

-below minus 0.4 there is a relative excess of wasted/stunted/underweight subjects in the sample

-between minus 0.4 and minus 0.2, there may be a relative excess of wasted/stunted/underweight subjects in the sample.

-between minus 0.2 and plus 0.2, the distribution can be considered as symmetrical.

-between 0.2 and 0.4, there may be an excess of obese/tall/overweight subjects in the sample.

-above 0.4, there is an excess of obese/tall/overweight subjects in the sample

Kurtosis

WHZ	1.64	0.76	-0.20
HAZ	2.34	1.05	-0.57
WAZ	0.72	0.72	-0.20

Kurtosis characterizes the relative size of the body versus the tails of the distribution. Positive kurtosis indicates relatively large tails and small body. Negative kurtosis indicates relatively large body and small tails.

If the absolute value is:

-above 0.4 it indicates a problem. There might have been a problem with data collection or sampling.

-between 0.2 and 0.4, the data may be affected with a problem.

-less than an absolute value of 0.2 the distribution can be considered as normal.

Are the data of the same quality at the beginning and the end of the clusters?

Evaluation of the SD for WHZ depending upon the order the cases are measured within each cluster (if one cluster per day is measured then this will be related to the time of the day the measurement is made).

Time	SD for WHZ															
point	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3

(when n is much less than the average number of subjects per cluster different symbols are used: 0 for n < 80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags found in the different time points)

Analysis by Team

Team	**1**	**999**
n =	1	459

Percentage of values flagged with SMART flags:

WHZ:	0.0	4.9
HAZ:	0.0	7.8
WAZ:	0.0	5.3

Age ratio of 6-29 months to 30-59 months:

1.48

Sex ratio (male/female):

0.84

Digit preference Weight (%):

.0 :	0	14
.1 :	0	10
.2 :	0	10
.3 :	0	9
.4 :	0	7
.5 :	0	10
.6 :	0	10
.7 :	0	12
.8 :	0	8
.9 :	100	10
DPS:	100	6

Digit preference score (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

Digit preference Height (%):

.0 :	0	31
.1 :	0	9
.2 :	0	9
.3 :	100	8
.4 :	0	5
.5 :	0	18

.6 : 0 6

.7 : 0 4

.8 : 0 4

.9 : 0 5

DPS: 100 27

Digit preference score (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

Standard deviation of WHZ:

SD 0.00

Prevalence (< -2) observed: %

Prevalence (< -2) calculated with current SD: %

Prevalence (< -2) calculated with a SD of 1: %

Standard deviation of HAZ:

SD 0.00

observed: %

calculated with current SD: %

calculated with a SD of 1: %

Statistical evaluation of sex and age ratios (using Chi squared statistic) for:

Team 1:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	1/0.2 (4.3)	0/0.0	1/0.2	
18 to 29	12	0/0.2 (0.0)	0/0.0	0/0.2	
30 to 41	12	0/0.2 (0.0)	0/0.0	0/0.2	
42 to 53	12	0/0.2 (0.0)	0/0.0	0/0.2	
54 to 59	6	0/0.1 (0.0)	0/0.0	0/0.1	
6 to 59	54	1/0.5 (2.0)	0/0.5 (0.0)		

The data are expressed as observed number/expected number (ratio of obs/expect)

Overall sex ratio: p-value = 0.317 (boys and girls equally represented)

Overall age distribution: p-value = 0.507 (as expected)

Overall age distribution for boys: p-value = 0.507 (as expected)

Overall sex/age distribution: p-value = 0.107 (as expected)

Team 2:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	0/0.0	0/0.0	0/0.0	
18 to 29	12	0/0.0	0/0.0	0/0.0	
30 to 41	12	0/0.0	0/0.0	0/0.0	
42 to 53	12	0/0.0	0/0.0	0/0.0	
54 to 59	6	0/0.0	0/0.0	0/0.0	
6 to 59	54	0/0.0	0/0.0		

The data are expressed as observed number/expected number (ratio of obs/expect)

Evaluation of the SD for WHZ depending upon the order the cases are measured within each cluster (if one cluster per day is measured then this will be related to the time of the day the measurement is made).

Team: 1

Time point	SD for WHZ															
	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3

(when n is much less than the average number of subjects per cluster different symbols are used: 0 for n < 80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags found in the different time points)

Team: 2

(for better comparison it can be helpful to copy/paste part of this report into Excel)

Model nutrition assessment report - Moroto

(based on the Save the Children Fund emergency nutrition assessment handbook)

Executive summary (one to two pages only)

GAM: 18.5 % (15.1 - 22.3 95% C.I.)

SAM : 2.7 % (1.6 - 4.7 95% C.I.)

3. Results

3.1 Anthropometric results (based on WHO standards 2006):

Definitions of acute malnutrition should be given (for example, global acute malnutrition is defined as <-2 z scores weight-for-height and/or oedema, severe acute malnutrition is defined as <-3z scores weight-for-height and/or oedema)

Exclusion of z-scores from Zero (reference mean) WHO flags: WHZ -5 to 5; HAZ -6 to 6; WAZ -6 to 5

Table 3.1: Distribution of age and sex of sample

	Boys		Girls		Total		Ratio
AGE (mo)	**no.**	**%**	**no.**	**%**	**no.**	**%**	**Boy:girl**
6-17	93	53.1	82	46.9	175	39.1	1.1
18-29	65	47.1	73	52.9	138	30.8	0.9
30-41	35	40.7	51	59.3	86	19.2	0.7
42-53	15	39.5	23	60.5	38	8.5	0.7
54-59	6	54.5	5	45.5	11	2.5	1.2
Total	214	47.8	234	52.2	448	100.0	0.9

Table 3.2: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All n = 439	**Boys** n = 210	**Girls** n = 229
Prevalence of global malnutrition **(<-2 z-score and/or oedema)**	(81) 18.5 % (15.1 - 22.3 95% C.I.)	(44) 21.0 % (16.0 - 27.0 95% C.I.)	(37) 16.2 % (12.0 - 21.5 95% C.I.)

Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(69) 15.7 % (12.6 - 19.4 95% C.I.)	(36) 17.1 % (12.6 - 22.8 95% C.I.)	(33) 14.4 % (10.4 - 19.5 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(12) 2.7 % (1.6 - 4.7 95% C.I.)	(8) 3.8 % (1.9 - 7.3 95% C.I.)	(4) 1.7 % (0.7 - 4.4 95% C.I.)

The prevalence of oedema is 0.0 %

Table 3.3: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema

		Severe wasting (<-3 z-score)		**Moderate wasting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	174	5	2.9	33	19.0	136	78.2	0	0.0
18-29	135	4	3.0	21	15.6	110	81.5	0	0.0
30-41	82	2	2.4	10	12.2	70	85.4	0	0.0
42-53	37	1	2.7	4	10.8	32	86.5	0	0.0
54-59	11	0	0.0	1	9.1	10	90.9	0	0.0
Total	439	12	2.7	69	15.7	358	81.5	0	0.0

Table 3.4: Distribution of acute malnutrition and oedema based on weight-for-height z-scores

	<-3 z-score	**>=-3 z-score**
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 18 (4.0 %)	Not severely malnourished No. 428 (96.0 %)

Table 3.7: Prevalence of underweight based on weight-for-age z-scores by sex

	All	**Boys**	**Girls**

	n = 445	n = 212	n = 233
Prevalence of underweight (<-2 z-score)	(187) 42.0 % (37.5 - 46.7 95% C.I.)	(97) 45.8 % (39.2 - 52.5 95% C.I.)	(90) 38.6 % (32.6 - 45.0 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(109) 24.5 % (20.7 - 28.7 95% C.I.)	(53) 25.0 % (19.7 - 31.2 95% C.I.)	(56) 24.0 % (19.0 - 29.9 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(78) 17.5 % (14.3 - 21.3 95% C.I.)	(44) 20.8 % (15.8 - 26.7 95% C.I.)	(34) 14.6 % (10.6 - 19.7 95% C.I.)

Table 3.8: Prevalence of underweight by age, based on weight-for-age z-scores

		Severe underweight (<-3 z-score)		**Moderate underweight (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	174	23	13.2	35	20.1	116	66.7	0	0.0
18-29	137	23	16.8	39	28.5	75	54.7	0	0.0
30-41	85	22	25.9	23	27.1	40	47.1	0	0.0
42-53	38	7	18.4	9	23.7	22	57.9	0	0.0
54-59	11	3	27.3	3	27.3	5	45.5	0	0.0
Total	445	78	17.5	109	24.5	258	58.0	0	0.0

Table 3.9: Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 435	**Boys** n = 208	**Girls** n = 227
Prevalence of stunting (<-2 z-score)	(206) 47.4 % (42.7 - 52.1 95% C.I.)	(107) 51.4 % (44.7 - 58.1 95% C.I.)	(99) 43.6 % (37.3 - 50.1 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(92) 21.1 % (17.6 - 25.2 95% C.I.)	(42) 20.2 % (15.3 - 26.2 95% C.I.)	(50) 22.0 % (17.1 - 27.9 95% C.I.)
Prevalence of severe stunting	(114) 26.2 %	(65) 31.3 %	(49) 21.6 %

(<-3 z-score)	(22.3 - 30.5 95% C.I.)	(25.3 - 37.8 95% C.I.)	(16.7 - 27.4 95% C.I.)

Table 3.10: Prevalence of stunting by age based on height-for-age z-scores

		Severe stunting (<-3 z-score)		**Moderate stunting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	173	26	15.0	30	17.3	117	67.6
18-29	131	38	29.0	31	23.7	62	47.3
30-41	83	33	39.8	19	22.9	31	37.3
42-53	38	13	34.2	10	26.3	15	39.5
54-59	10	4	40.0	2	20.0	4	40.0
Total	435	114	26.2	92	21.1	229	52.6

Table 3.11: Prevalence of overweight based on weight for height cut off's and by sex (no oedema)

	All n = 439	**Boys** n **=** 210	**Girls** n **=** 229
Prevalence of overweight (WHZ > 2)	(10) 2.3 % (1.2 - 4.1 95% C.I.)	(5) 2.4 % (1.0 - 5.5 95% C.I.)	(5) 2.2 % (0.9 - 5.0 95% C.I.)
Prevalence of severe overweight (WHZ > 3)	(3) 0.7 % (0.2 - 2.0 95% C.I.)	(1) 0.5 % (0.1 - 2.6 95% C.I.)	(2) 0.9 % (0.2 - 3.1 95% C.I.)

Table 3.12: Prevalence of overweight by age, based on weight for height (no oedema)

		Overweight (WHZ > 2)		**Severe Overweight (WHZ > 3)**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**
6-17	174	3	1.7	0	0.0

18-29	135	4	3.0	1	0.7
30-41	82	2	2.4	1	1.2
42-53	37	1	2.7	1	2.7
54-59	11	0	0.0	0	0.0
Total	439	10	2.3	3	0.7

Table 3.13: Mean z-scores, Design Effects and excluded subjects

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	439	-0.87±1.23	1.00	2	7
Weight-for-Age	445	-1.64±1.47	1.00	0	3
Height-for-Age	435	-1.74±1.99	1.00	0	13

* contains for WHZ and WAZ the children with edema.

Appendix 4

Result Tables for NCHS growth reference 1977

Table 3.2: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All n = 445	**Boys** n **=** 213	**Girls** n **=** 232
Prevalence of global malnutrition **(<-2 z-score and/or oedema)**	(77) 17.3 % (14.1 - 21.1 95% C.I.)	(40) 18.8 % (14.1 - 24.6 95% C.I.)	(37) 15.9 % (11.8 - 21.2 95% C.I.)
Prevalence of moderate malnutrition **(<-2 z-score and >=-3 z-score, no oedema)**	(65) 14.6 % (11.6 - 18.2 95% C.I.)	(32) 15.0 % (10.8 - 20.4 95% C.I.)	(33) 14.2 % (10.3 - 19.3 95% C.I.)
Prevalence of severe malnutrition **(<-3 z-score and/or oedema)**	(12) 2.7 % (1.5 - 4.7 95% C.I.)	(8) 3.8 % (1.9 - 7.2 95% C.I.)	(4) 1.7 % (0.7 - 4.3 95% C.I.)

The prevalence of oedema is 0.0 %

Table 3.3: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema

		Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	174	3	1.7	31	17.8	140	80.5	0	0.0
18-29	137	5	3.6	20	14.6	112	81.8	0	0.0
30-41	85	2	2.4	11	12.9	72	84.7	0	0.0
42-53	38	2	5.3	3	7.9	33	86.8	0	0.0
54-59	11	0	0.0	0	0.0	11	100.0	0	0.0
Total	445	12	2.7	65	14.6	368	82.7	0	0.0

Table 3.4: Distribution of acute malnutrition and oedema based on weight-for-height z-scores

	<-3 z-score	**>=-3 z-score**
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 14 (3.1 %)	Not severely malnourished No. 434 (96.9 %)

Table 3.5: Prevalence of acute malnutrition based on the percentage of the median and/or oedema

	n = 445
Prevalence of global acute malnutrition (<80% and/or oedema)	(51) 11.5 % (8.8 - 14.8 95% C.I.)
Prevalence of moderate acute malnutrition (<80% and >= 70%, no oedema)	(44) 9.9 % (7.4 - 13.0 95% C.I.)
Prevalence of severe acute malnutrition	(7) 1.6 %

(<70% and/or oedema)	(0.8 - 3.2 95% C.I.)

Table 3.6: Prevalence of malnutrition by age, based on weight-for-height percentage of the median and oedema

		Severe wasting (<70% median)		**Moderate wasting (>=70% and <80% median)**		**Normal (> =80% median)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	174	1	0.6	17	9.8	156	89.7	0	0.0
18-29	137	3	2.2	16	11.7	118	86.1	0	0.0
30-41	85	2	2.4	8	9.4	75	88.2	0	0.0
42-53	38	1	2.6	3	7.9	34	89.5	0	0.0
54-59	11	0	0.0	0	0.0	11	100.0	0	0.0
Total	445	7	1.6	44	9.9	394	88.5	0	0.0

Table 3.7: Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 448	**Boys** n **=** 214	**Girls** n **=** 234
Prevalence of underweight (<-2 z-score)	(218) 48.7 % (44.1 - 53.3 95% C.I.)	(114) 53.3 % (46.6 - 59.8 95% C.I.)	(104) 44.4 % (38.2 - 50.8 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(136) 30.4 % (26.3 - 34.8 95% C.I.)	(69) 32.2 % (26.3 - 38.8 95% C.I.)	(67) 28.6 % (23.2 - 34.7 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(82) 18.3 % (15.0 - 22.1 95% C.I.)	(45) 21.0 % (16.1 - 27.0 95% C.I.)	(37) 15.8 % (11.7 - 21.0 95% C.I.)

Table 3.8: Prevalence of underweight by age, based on weight-for-age z-scores

	Severe underweight (<-3 z-score)	**Moderate underweight (>= -3 and <-2 z-score)**	**Normal (> = -2 z score)**	**Oedema**

Age (mo)	Total no.	No.	%	No.	%	No.	%	No.	%
6-17	175	23	13.1	48	27.4	104	59.4	0	0.0
18-29	138	28	20.3	44	31.9	66	47.8	0	0.0
30-41	86	23	26.7	26	30.2	37	43.0	0	0.0
42-53	38	5	13.2	14	36.8	19	50.0	0	0.0
54-59	11	3	27.3	4	36.4	4	36.4	0	0.0
Total	448	82	18.3	136	30.4	230	51.3	0	0.0

Table 3.9: Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 438	**Boys** n **=** 208	**Girls** n **=** 230
Prevalence of stunting **(<-2 z-score)**	(186) 42.5 % (37.9 - 47.1 95% C.I.)	(97) 46.6 % (40.0 - 53.4 95% C.I.)	(89) 38.7 % (32.6 - 45.1 95% C.I.)
Prevalence of moderate stunting **(<-2 z-score and >=-3 z-score)**	(91) 20.8 % (17.2 - 24.8 95% C.I.)	(47) 22.6 % (17.4 - 28.7 95% C.I.)	(44) 19.1 % (14.6 - 24.7 95% C.I.)
Prevalence of severe stunting **(<-3 z-score)**	(95) 21.7 % (18.1 - 25.8 95% C.I.)	(50) 24.0 % (18.7 - 30.3 95% C.I.)	(45) 19.6 % (15.0 - 25.2 95% C.I.)

Table 3.10: Prevalence of stunting by age based on height-for-age z-scores

		Severe stunting (<-3 z-score)		**Moderate stunting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	173	21	12.1	27	15.6	125	72.3
18-29	133	31	23.3	32	24.1	70	52.6
30-41	84	27	32.1	20	23.8	37	44.0
42-53	38	12	31.6	10	26.3	16	42.1
54-59	10	4	40.0	2	20.0	4	40.0
Total	438	95	21.7	91	20.8	252	57.5

Table 3.11: Prevalence of overweight based on weight for height cut off's and by sex (no oedema)

	All n = 445	**Boys** n **=** 213	**Girls** n **=** 232
Prevalence of overweight (WHZ > 2)	(7) 1.6 % (0.8 - 3.2 95% C.I.)	(3) 1.4 % (0.5 - 4.1 95% C.I.)	(4) 1.7 % (0.7 - 4.3 95% C.I.)
Prevalence of severe overweight (WHZ > 3)	(3) 0.7 % (0.2 - 2.0 95% C.I.)	(1) 0.5 % (0.1 - 2.6 95% C.I.)	(2) 0.9 % (0.2 - 3.1 95% C.I.)

Table 3.12: Prevalence of overweight by age, based on weight for height (no oedema)

		Overweight (WHZ > 2)		**Severe Overweight (WHZ > 3)**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**
6-17	174	3	1.7	0	0.0
18-29	137	2	1.5	1	0.7
30-41	85	1	1.2	1	1.2
42-53	38	1	2.6	1	2.6
54-59	11	0	0.0	0	0.0
Total	445	7	1.6	3	0.7

Table 3.13: Mean z-scores, Design Effects and excluded subjects

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	445	-1.03±1.13	1.00	0	3
Weight-for-Age	448	-1.84±1.41	1.00	0	0
Height-for-Age	438	-1.59±1.88	1.00	0	10

* contains for WHZ and WAZ the children with edema.

Plausibility check for: Moroto14_above6.as

Standard/Reference used for z-score calculation: WHO standards 2006

(If it is not mentioned, flagged data is included in the evaluation. Some parts of this plausibility report are more for advanced users and can be skipped for a standard evaluation)

Overall data quality

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	**Score**
Flagged data	Incl	%	0-2.5	>2.5-5.0	>5.0-7.5	>7.5	
(% of in-range subjects)			0	5	10	20	**5** (4.6 %)
Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**0** (p=0.345)
Overall Age distrib	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**10** (p=0.000)
Dig pref score - weight	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (4)
Dig pref score - height	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**2** (11)
Dig pref score - MUAC	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (0)
Standard Dev WHZ	Excl	SD	<1.1	<1.15	<1.20	>=1.20	
.			and	and	and	or	
.	Excl	SD	>0.9	>0.85	>0.80	<=0.80	
			0	2	6	20	**0** (1.07)
Skewness WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (-0.04)
Kurtosis WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**1** (-0.32)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<=0.001	
			0	1	3	5	**0** (p=)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	**18** %

The overall score of this survey is 18 %, this is acceptable.

There were no duplicate entries detected.

Percentage of children with no exact birthday: 100 %

Anthropometric Indices likely to be in error (-3 to 3 for WHZ, -3 to 3 for HAZ, -3 to 3 for WAZ, from observed mean - chosen in Options panel - these values will be flagged and should be excluded from analysis for a nutrition survey in emergencies. For other surveys this might not be the best procedure e.g. when the percentage of overweight children has to be calculated):

Line=2/ID=50514: **WHZ (-5.033)**, Height may be incorrect

Line=3/ID=50819: HAZ (2.519), Age may be incorrect

Line=6/ID=52401: HAZ (1.721), Height may be incorrect

Line=8/ID=52911: HAZ (1.734), Age may be incorrect

Line=11/ID=52804: **WHZ (2.685)**, Weight may be incorrect

Line=15/ID=51805: HAZ (6.777), WAZ (1.852), Age may be incorrect

Line=18/ID=51805: HAZ (6.457), Age may be incorrect

Line=19/ID=52811: HAZ (1.196), Age may be incorrect

Line=27/ID=52016: HAZ (-4.817), Age may be incorrect

Line=28/ID=51405: **WHZ (-6.440)**, HAZ (6.143), Height may be incorrect

Line=32/ID=53010: HAZ (-4.964), Age may be incorrect

Line=35/ID=51104: **WHZ (2.776)**, Weight may be incorrect

Line=41/ID=50111: HAZ (-8.823), WAZ (-5.899), Age may be incorrect

Line=43/ID=50104: HAZ (-5.029), Age may be incorrect

Line=48/ID=50501: HAZ (-8.355), WAZ (-6.035), Age may be incorrect

Line=55/ID=51903: HAZ (-4.854), Age may be incorrect

Line=57/ID=51116: HAZ (-6.024), Age may be incorrect

Line=58/ID=53006: WAZ (1.366), Age may be incorrect

Line=61/ID=52205: HAZ (-5.923), Age may be incorrect

Line=62/ID=50508: **WHZ (2.152)**, WAZ (1.646), Weight may be incorrect

Line=88/ID=50202: HAZ (1.406), Age may be incorrect

Line=96/ID=52307: HAZ (5.249), WAZ (2.899), Age may be incorrect

Line=97/ID=52805: **WHZ (2.339)**, Weight may be incorrect

Line=101/ID=51812: HAZ (3.926), WAZ (1.975), Age may be incorrect

Line=104/ID=52511: HAZ (-5.277), Age may be incorrect

Line=118/ID=51406: HAZ (-4.858), Age may be incorrect

Line=142/ID=52105: HAZ (-6.588), Age may be incorrect

Line=160/ID=51905: **WHZ (3.504)**, Weight may be incorrect

Line=163/ID=52605: HAZ (3.252), Height may be incorrect

Line=167/ID=50805: **WHZ (-5.345)**, HAZ (1.309), Height may be incorrect

Line=169/ID=51516: **WHZ (6.783)**, WAZ (2.510), Weight may be incorrect

Line=175/ID=53003: HAZ (-6.090), WAZ (-4.800), Age may be incorrect

Line=189/ID=52312: **WHZ (4.369)**, WAZ (1.950), Weight may be incorrect

Line=209/ID=52905: HAZ (2.290), WAZ (1.602), Age may be incorrect

Line=210/ID=50215: HAZ (-7.588), WAZ (-6.148), Age may be incorrect

Line=211/ID=52413: HAZ (-5.824), WAZ (-5.390), Age may be incorrect

Line=221/ID=52912: **WHZ (-5.116)**, Weight may be incorrect

Line=222/ID=50109: **WHZ (-5.643)**, WAZ (-5.283), Weight may be incorrect

Line=223/ID=50617: HAZ (-4.863), Height may be incorrect

Line=231/ID=52212: HAZ (2.041), Age may be incorrect

Line=250/ID=52519: HAZ (1.311), Height may be incorrect

Line=251/ID=52810: **WHZ (2.442)**, Weight may be incorrect

Line=262/ID=50810: HAZ (1.396), Age may be incorrect

Line=264/ID=52613: HAZ (1.624), Height may be incorrect

Line=266/ID=50513: **WHZ (2.661)**, HAZ (3.098), WAZ (3.411)

Line=268/ID=51701: HAZ (1.280), Age may be incorrect

Line=272/ID=50113: HAZ (1.552), Age may be incorrect

Line=273/ID=51803: HAZ (1.785), Age may be incorrect

Line=274/ID=50817: HAZ (1.330), Age may be incorrect

Line=282/ID=50611: HAZ (-5.522), Age may be incorrect

Line=286/ID=52406: HAZ (1.768), Age may be incorrect

Line=297/ID=52803: HAZ (-5.272), Age may be incorrect

Line=298/ID=50412: HAZ (5.071), Age may be incorrect

Line=305/ID=52921: HAZ (3.197), Age may be incorrect

Line=349/ID=51818: **WHZ (-4.645)**, HAZ (5.179), Height may be incorrect

Line=364/ID=52604: **WHZ (-4.227)**, HAZ (5.880), Height may be incorrect

Line=367/ID=52522: HAZ (-5.440), Age may be incorrect

Line=377/ID=51318: HAZ (4.288), WAZ (2.108), Age may be incorrect

Line=378/ID=52618: HAZ (2.217), Age may be incorrect

Line=381/ID=51218: HAZ (-6.044), Age may be incorrect

Line=387/ID=50317: **WHZ (3.510)**, HAZ (-8.677), Height may be incorrect

Line=391/ID=51009: HAZ (-5.048), Age may be incorrect

Line=393/ID=50801: HAZ (3.927), Age may be incorrect

Line=398/ID=50703: **WHZ (2.298)**, HAZ (-7.216), Height may be incorrect

Line=401/ID=52605: HAZ (2.436), Height may be incorrect

Line=418/ID=52516: HAZ (4.554), Age may be incorrect

Line=419/ID=52013: HAZ (1.637), Age may be incorrect

Line=421/ID=51012: **WHZ (-4.114)**, HAZ (-5.267), WAZ (-5.296)

Line=426/ID=51602: HAZ (-5.763), Age may be incorrect

Line=427/ID=50118: HAZ (-5.204), Age may be incorrect

Line=431/ID=50318: HAZ (-8.614), WAZ (-6.508), Age may be incorrect

Line=432/ID=50713: HAZ (2.564), Age may be incorrect

Line=437/ID=50509: HAZ (-5.808), Age may be incorrect

Line=439/ID=52106: **WHZ (-6.416)**, WAZ (-5.251), Weight may be incorrect

Line=440/ID=52612: HAZ (-5.596), WAZ (-4.833), Age may be incorrect

Line=441/ID=50911: HAZ (3.207), WAZ (2.599), Age may be incorrect

Line=442/ID=50606: HAZ (-5.549), Age may be incorrect

Percentage of values flagged with SMART flags:WHZ: 4.6 %, HAZ: 14.3 %, WAZ: 4.8 %

Age distribution:

Month 6 : ############

Month 7 : ##############

Month 8 : #############

Month 9 : ################

Month 10 : ############

Month 11 : #############

Month 12 : ####################

Month 13 : ############

Month 14 : ##############

Month 15 : ################

Month 16 : ################

Month 17 : ##############

Month 18 : ##############

Month 19 : ############

Month 20 : #######

Month 21 : ############

Month 22 : ##########

Month 23 : ################

Month 24 : ####################

Month 25 : ################

Month 26 : #######

Month 27 : #######

Month 28 : ########

Month 29 : ##########

Month 30 : #######

Month 31 : #########

Month 32 : #########

Month 33 : #######

Month 34 : ########

Month 35 : #########

Month 36 : #########

Month 37 : ####

Month 38 : ######

Month 39 : #########

Month 40 : #######

Month 41 : ##

Month 42 : ########

Month 43 : ########

Month 44 : ##

Month 45 : ###

Month 46 :

Month 47 : ######

Month 48 : ##

Month 49 : ###

Month 50 : #

Month 51 : ###

Month 52 : #

Month 53 : #

Month 54 : ###

Month 55 : #

Month 56 : ###

Month 57 : #

Month 58 : #

Month 59 : ##

Age ratio of 6-29 months to 30-59 months: 2.32 (The value should be around 0.85).

Statistical evaluation of sex and age ratios (using Chi squared statistic):

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	93/49.7 (1.9)	82/54.3 (1.5)	175/103.9 (1.7)	1.13
18 to 29	12	65/48.4 (1.3)	73/52.9 (1.4)	138/101.3 (1.4)	0.89
30 to 41	12	35/46.9 (0.7)	51/51.3 (1.0)	86/98.2 (0.9)	0.69
42 to 53	12	15/46.2 (0.3)	23/50.5 (0.5)	38/96.7 (0.4)	0.65
54 to 59	6	6/22.8 (0.3)	5/25.0 (0.2)	11/47.8 (0.2)	1.20
6 to 59	54	214/224.0 (1.0)	234/224.0 (1.0)		0.91

The data are expressed as observed number/expected number (ratio of obs/expect)

Overall sex ratio: p-value = 0.345 (boys and girls equally represented)

Overall age distribution: p-value = 0.000 (significant difference)

Overall age distribution for boys: p-value = 0.000 (significant difference)

Overall age distribution for girls: p-value = 0.000 (significant difference)

Overall sex/age distribution: p-value = 0.000 (significant difference)

Digit preference Weight:

Digit .0 : ##

Digit .1 : ####################################

Digit .2 : ##

Digit .3 : ##

Digit .4 : ##

Digit .5 : ##

Digit .6 : ##

Digit .7 : ##################################

Digit .8 : ##

Digit .9 : ##

Digit preference score: **4** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

p-value for chi2: 0.563

Digit preference Height:

Digit .0 : ####################################

Digit .1 : ################

Digit .2 : ##########################

Digit .3 : ##################

Digit .4 : ###############

Digit .5 : ##############################

Digit .6 : ##################

Digit .7 : ###############

Digit .8 : ##################

Digit .9 : ################

Digit preference score: **11** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

p-value for chi2: 0.000 (significant difference)

Evaluation of Standard deviation, Normal distribution, Skewness and Kurtosis using the 3 exclusion (Flag) procedures

.	no exclusion	exclusion from reference mean (WHO flags)	exclusion from observed mean (SMART flags)
WHZ			
Standard Deviation SD:	1.40	1.24	1.07
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	19.5%	18.4%	18.3%
calculated with current SD:	21.8%	17.9%	15.7%
calculated with a SD of 1:	13.8%	12.8%	14.2%
HAZ			
Standard Deviation SD:	2.24	1.99	1.42
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	48.2%	47.4%	48.7%
calculated with current SD:	46.6%	44.7%	48.0%
calculated with a SD of 1:	42.4%	39.6%	47.2%
WAZ			
Standard Deviation SD:	1.52	1.48	1.29
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	42.2%	41.8%	42.0%
calculated with current SD:	41.3%	40.2%	40.0%
calculated with a SD of 1:	36.9%	35.7%	37.2%
Results for Shapiro-Wilk test for normally (Gaussian) distributed data:			
WHZ	p= 0.000	p= 0.000	p= 0.261
HAZ	p= 0.000	p= 0.000	p= 0.001
WAZ	p= 0.388	p= 0.511	p= 0.007
(If p < 0.05 then the data are not normally distributed. If p > 0.05 you can consider the data normally distributed)			
Skewness			
WHZ	0.18	0.42	-0.04
HAZ	0.49	0.70	0.06
WAZ	0.00	0.14	-0.03
If the value is:			

-below minus 0.4 there is a relative excess of wasted/stunted/underweight subjects in the sample

-between minus 0.4 and minus 0.2, there may be a relative excess of wasted/stunted/underweight subjects in the sample.

-between minus 0.2 and plus 0.2, the distribution can be considered as symmetrical.

-between 0.2 and 0.4, there may be an excess of obese/tall/overweight subjects in the sample.

-above 0.4, there is an excess of obese/tall/overweight subjects in the sample

Kurtosis

WHZ	3.79	1.32	-0.32
HAZ	1.87	1.11	-0.74
WAZ	0.44	0.22	-0.66

Kurtosis characterizes the relative size of the body versus the tails of the distribution. Positive kurtosis indicates relatively large tails and small body. Negative kurtosis indicates relatively large body and small tails.

If the absolute value is:

-above 0.4 it indicates a problem. There might have been a problem with data collection or sampling.

-between 0.2 and 0.4, the data may be affected with a problem.

-less than an absolute value of 0.2 the distribution can be considered as normal.

Are the data of the same quality at the beginning and the end of the clusters?

Evaluation of the SD for WHZ depending upon the order the cases are measured within each cluster (if one cluster per day is measured then this will be related to the time of the day the measurement is made).

Time	SD for WHZ														
point	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3

(when n is much less than the average number of subjects per cluster different symbols are used: 0 for n < 80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags found in the different time points)

Analysis by Team

Team	**1**	**999**
n =	1	447

Percentage of values flagged with SMART flags:

WHZ:		7.1
HAZ:	0.0	14.3
WAZ:		6.8

Age ratio of 6-29 months to 30-59 months:

2.31

Sex ratio (male/female):

0.00 0.92

Digit preference Weight (%):

.0 :	100	10
.1 :	0	9
.2 :	0	12
.3 :	0	10
.4 :	0	12
.5 :	0	9
.6 :	0	11
.7 :	0	8
.8 :	0	10
.9 :	0	10
DPS:	100	4

Digit preference score (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

Digit preference Height (%):

.0 :	0	17
.1 :	0	8
.2 :	0	12
.3 :	0	9
.4 :	0	7
.5 :	0	15
.6 :	100	8
.7 :	0	7
.8 :	0	9
.9 :	0	8
DPS:	100	11

Digit preference score (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

Standard deviation of WHZ:

SD

Prevalence (< -2) observed: %

Prevalence (< -2) calculated with current SD: %

Prevalence (< -2) calculated with a SD of 1: %

Standard deviation of HAZ:

SD 0.00

observed: %

calculated with current SD: %

calculated with a SD of 1: %

Statistical evaluation of sex and age ratios (using Chi squared statistic) for:

Team 1:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	0/0.0	0/0.2 (0.0)	0/0.2 (0.0)	
18 to 29	12	0/0.0	1/0.2 (4.4)	1/0.2 (4.4)	0.00
30 to 41	12	0/0.0	0/0.2 (0.0)	0/0.2 (0.0)	
42 to 53	12	0/0.0	0/0.2 (0.0)	0/0.2 (0.0)	
54 to 59	6	0/0.0	0/0.1 (0.0)	0/0.1 (0.0)	
6 to 59	54	0/0.5 (0.0)	1/0.5 (2.0)		0.00

The data are expressed as observed number/expected number (ratio of obs/expect)

Overall sex ratio: p-value = 0.317 (boys and girls equally represented)

Overall age distribution: p-value = 0.490 (as expected)

Overall age distribution for girls: p-value = 0.490 (as expected)

Overall sex/age distribution: p-value = 0.098 (as expected)

Team 2:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	0/0.0	0/0.0	0/0.0	
18 to 29	12	0/0.0	0/0.0	0/0.0	
30 to 41	12	0/0.0	0/0.0	0/0.0	
42 to 53	12	0/0.0	0/0.0	0/0.0	
54 to 59	6	0/0.0	0/0.0	0/0.0	

```
--------------------------------------------------------------------------------
6  to 59     54        0/0.0    0/0.0
```

The data are expressed as observed number/expected number (ratio of obs/expect)

Nakapiripirit

Model nutrition assessment report - Nakapiripirit

(based on the Save the Children Fund emergency nutrition assessment handbook)

Executive summary (one to two pages only)

GAM: 11.6 % (8.8 - 15.1 95% C.I.)
SAM : 5.5 % (3.7 - 8.2 95% C.I.)

3. Results

3.1 Anthropometric results (based on WHO standards 2006):

Definitions of acute malnutrition should be given (for example, global acute malnutrition is defined as <-2 z scores weight-for-height and/or oedema, severe acute malnutrition is defined as <-3z scores weight-for-height and/or oedema)

Exclusion of z-scores from Zero (reference mean) WHO flags: WHZ -5 to 5; HAZ -6 to 6; WAZ -6 to 5

Table 3.1: Distribution of age and sex of sample

	Boys		Girls		Total		Ratio
AGE (mo)	**no.**	**%**	**no.**	**%**	**no.**	**%**	**Boy:girl**
6-17	94	57.7	69	42.3	163	40.9	1.4
18-29	73	54.5	61	45.5	134	33.6	1.2
30-41	39	60.0	26	40.0	65	16.3	1.5
42-53	16	48.5	17	51.5	33	8.3	0.9
54-59	1	25.0	3	75.0	4	1.0	0.3
Total	223	55.9	176	44.1	399	100.0	1.3

Table 3.2: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All n = 398	**Boys** n = 222	**Girls** n = 176
Prevalence of global malnutrition **(<-2 z-score and/or oedema)**	(46) 11.6 % (8.8 - 15.1 95% C.I.)	(32) 14.4 % (10.4 - 19.6 95% C.I.)	(14) 8.0 % (4.8 - 12.9 95% C.I.)

Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(24) 6.0 % (4.1 - 8.8 95% C.I.)	(20) 9.0 % (5.9 - 13.5 95% C.I.)	(4) 2.3 % (0.9 - 5.7 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(22) 5.5 % (3.7 - 8.2 95% C.I.)	(12) 5.4 % (3.1 - 9.2 95% C.I.)	(10) 5.7 % (3.1 - 10.1 95% C.I.)

The prevalence of oedema is 2.5 %

Table 3.3: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema

		Severe wasting (<-3 z-score)		**Moderate wasting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	163	6	3.7	14	8.6	137	84.0	6	3.7
18-29	134	5	3.7	10	7.5	117	87.3	2	1.5
30-41	65	1	1.5	0	0.0	62	95.4	2	3.1
42-53	32	0	0.0	0	0.0	32	100.0	0	0.0
54-59	4	0	0.0	0	0.0	4	100.0	0	0.0
Total	398	12	3.0	24	6.0	352	88.4	10	2.5

Table 3.4: Distribution of acute malnutrition and oedema based on weight-for-height z-scores

	<-3 z-score	**>=-3 z-score**
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 10 (2.5 %)
Oedema absent	Marasmic No. 12 (3.0 %)	Not severely malnourished No. 377 (94.5 %)

Table 3.7: Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 389	Boys n = 219	Girls n = 170
Prevalence of underweight **(<-2 z-score)**	(118) 30.3 % (26.0 - 35.1 95% C.I.)	(80) 36.5 % (30.4 - 43.1 95% C.I.)	(38) 22.4 % (16.7 - 29.2 95% C.I.)
Prevalence of moderate underweight **(<-2 z-score and >=-3 z-score)**	(82) 21.1 % (17.3 - 25.4 95% C.I.)	(52) 23.7 % (18.6 - 29.8 95% C.I.)	(30) 17.6 % (12.7 - 24.1 95% C.I.)
Prevalence of severe underweight **(<-3 z-score)**	(36) 9.3 % (6.8 - 12.5 95% C.I.)	(28) 12.8 % (9.0 - 17.9 95% C.I.)	(8) 4.7 % (2.4 - 9.0 95% C.I.)

Table 3.8: Prevalence of underweight by age, based on weight-for-age z-scores

		Severe underweight (<-3 z-score)		Moderate underweight (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	157	14	8.9	26	16.6	117	74.5	6	3.8
18-29	132	17	12.9	32	24.2	83	62.9	2	1.5
30-41	63	3	4.8	18	28.6	42	66.7	2	3.2
42-53	33	2	6.1	5	15.2	26	78.8	0	0.0
54-59	4	0	0.0	1	25.0	3	75.0	0	0.0
Total	389	36	9.3	82	21.1	271	69.7	10	2.6

Table 3.9: Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 395	Boys n = 220	Girls n = 175
Prevalence of stunting **(<-2 z-score)**	(170) 43.0 % (38.2 - 48.0 95% C.I.)	(103) 46.8 % (40.3 - 53.4 95% C.I.)	(67) 38.3 % (31.4 - 45.7 95% C.I.)
Prevalence of moderate stunting	(99) 25.1 %	(54) 24.5 %	(45) 25.7 %

(<-2 z-score and >=-3 z-score)	(21.0 - 29.6 95% C.I.)	(19.3 - 30.6 95% C.I.)	(19.8 - 32.7 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(71) 18.0 % (14.5 - 22.1 95% C.I.)	(49) 22.3 % (17.3 - 28.2 95% C.I.)	(22) 12.6 % (8.5 - 18.3 95% C.I.)

Table 3.10: Prevalence of stunting by age based on height-for-age z-scores

		Severe stunting (<-3 z-score)		**Moderate stunting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	162	19	11.7	35	21.6	108	66.7
18-29	133	29	21.8	40	30.1	64	48.1
30-41	64	16	25.0	16	25.0	32	50.0
42-53	32	6	18.8	8	25.0	18	56.3
54-59	4	1	25.0	0	0.0	3	75.0
Total	395	71	18.0	99	25.1	225	57.0

Table 3.11: Prevalence of overweight based on weight for height cut off's and by sex (no oedema)

	All n = 398	**Boys** n **=** 222	**Girls** n **=** 176
Prevalence of overweight (WHZ > 2)	(5) 1.3 % (0.5 - 2.9 95% C.I.)	(3) 1.4 % (0.5 - 3.9 95% C.I.)	(2) 1.1 % (0.3 - 4.0 95% C.I.)
Prevalence of severe overweight (WHZ > 3)	(0) 0.0 % (0.0 - 1.0 95% C.I.)	(0) 0.0 % (0.0 - 1.7 95% C.I.)	(0) 0.0 % (0.0 - 2.1 95% C.I.)

Table 3.12: Prevalence of overweight by age, based on weight for height (no oedema)

	Overweight (WHZ > 2)	**Severe Overweight (WHZ > 3)**

Age (mo)	Total no.	No.	%	No.	%
6-17	163	4	2.5	0	0.0
18-29	134	0	0.0	0	0.0
30-41	65	1	1.5	0	0.0
42-53	32	0	0.0	0	0.0
54-59	4	0	0.0	0	0.0
Total	398	5	1.3	0	0.0

Table 3.13: Mean z-scores, Design Effects and excluded subjects

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	388	-0.58±1.15	1.00	10	1
Weight-for-Age	389	-1.37±1.30	1.00	10	0
Height-for-Age	395	-1.76±1.54	1.00	0	4

* contains for WHZ and WAZ the children with edema.

Appendix 4

Result Tables for NCHS growth reference 1977

Table 3.2: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All n = 398	**Boys** n **=** 222	**Girls** n **=** 176
Prevalence of global malnutrition **(<-2 z-score and/or oedema)**	(44) 11.1 % (8.3 - 14.5 95% C.I.)	(27) 12.2 % (8.5 - 17.1 95% C.I.)	(17) 9.7 % (6.1 - 14.9 95% C.I.)
Prevalence of moderate malnutrition **(<-2 z-score and >=-3 z-score, no oedema)**	(26) 6.5 % (4.5 - 9.4 95% C.I.)	(17) 7.7 % (4.8 - 11.9 95% C.I.)	(9) 5.1 % (2.7 - 9.4 95% C.I.)

Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(18) 4.5 % (2.9 - 7.0 95% C.I.)	(10) 4.5 % (2.5 - 8.1 95% C.I.)	(8) 4.5 % (2.3 - 8.7 95% C.I.)

The prevalence of oedema is 2.5 %

Table 3.3: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema

		Severe wasting (<-3 z-score)		**Moderate wasting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	163	4	2.5	12	7.4	141	86.5	6	3.7
18-29	134	4	3.0	13	9.7	115	85.8	2	1.5
30-41	65	0	0.0	1	1.5	62	95.4	2	3.1
42-53	32	0	0.0	0	0.0	32	100.0	0	0.0
54-59	4	0	0.0	0	0.0	4	100.0	0	0.0
Total	398	8	2.0	26	6.5	354	88.9	10	2.5

Table 3.4: Distribution of acute malnutrition and oedema based on weight-for-height z-scores

	<-3 z-score	**>=-3 z-score**
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 10 (2.5 %)
Oedema absent	Marasmic No. 8 (2.0 %)	Not severely malnourished No. 381 (95.5 %)

Table 3.5: Prevalence of acute malnutrition based on the percentage of the median and/or oedema

	n = 398

Prevalence of global acute malnutrition **(<80% and/or oedema)**	(32) 8.0 % (5.8 - 11.1 95% C.I.)
Prevalence of moderate acute malnutrition **(<80% and >= 70%, no oedema)**	(20) 5.0 % (3.3 - 7.6 95% C.I.)
Prevalence of severe acute malnutrition **(<70% and/or oedema)**	(12) 3.0 % (1.7 - 5.2 95% C.I.)

Table 3.6: Prevalence of malnutrition by age, based on weight-for-height percentage of the median and oedema

		Severe wasting (<70% median)		**Moderate wasting (>=70% and <80% median)**		**Normal (> =80% median)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	163	1	0.6	11	6.7	145	89.0	6	3.7
18-29	134	1	0.7	8	6.0	123	91.8	2	1.5
30-41	65	0	0.0	1	1.5	62	95.4	2	3.1
42-53	32	0	0.0	0	0.0	32	100.0	0	0.0
54-59	4	0	0.0	0	0.0	4	100.0	0	0.0
Total	398	2	0.5	20	5.0	366	92.0	10	2.5

Table 3.7: Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 389	**Boys** n **=** 219	**Girls** n **=** 170
Prevalence of underweight **(<-2 z-score)**	(154) 39.6 % (34.9 - 44.5 95% C.I.)	(90) 41.1 % (34.8 - 47.7 95% C.I.)	(64) 37.6 % (30.7 - 45.1 95% C.I.)
Prevalence of moderate underweight **(<-2 z-score and >=-3 z-score)**	(109) 28.0 % (23.8 - 32.7 95% C.I.)	(59) 26.9 % (21.5 - 33.2 95% C.I.)	(50) 29.4 % (23.1 - 36.7 95% C.I.)

Prevalence of severe underweight (<-3 z-score)	(45) 11.6 % (8.8 - 15.1 95% C.I.)	(31) 14.2 % (10.2 - 19.4 95% C.I.)	(14) 8.2 % (5.0 - 13.3 95% C.I.)

Table 3.8: Prevalence of underweight by age, based on weight-for-age z-scores

		Severe underweight (<-3 z-score)		**Moderate underweight (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	157	17	10.8	40	25.5	100	63.7	6	3.8
18-29	132	21	15.9	43	32.6	68	51.5	2	1.5
30-41	63	5	7.9	19	30.2	39	61.9	2	3.2
42-53	33	2	6.1	6	18.2	25	75.8	0	0.0
54-59	4	0	0.0	1	25.0	3	75.0	0	0.0
Total	389	45	11.6	109	28.0	235	60.4	10	2.6

Table 3.9: Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 395	**Boys** n **=** 220	**Girls** n **=** 175
Prevalence of stunting (<-2 z-score)	(145) 36.7 % (32.1 - 41.6 95% C.I.)	(87) 39.5 % (33.3 - 46.1 95% C.I.)	(58) 33.1 % (26.6 - 40.4 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(90) 22.8 % (18.9 - 27.2 95% C.I.)	(51) 23.2 % (18.1 - 29.2 95% C.I.)	(39) 22.3 % (16.8 - 29.0 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(55) 13.9 % (10.9 - 17.7 95% C.I.)	(36) 16.4 % (12.1 - 21.8 95% C.I.)	(19) 10.9 % (7.1 - 16.3 95% C.I.)

Table 3.10: Prevalence of stunting by age based on height-for-age z-scores

	Severe stunting	**Moderate stunting**	**Normal**

		(<-3 z-score)		(>= -3 and <-2 z-score)		(> = -2 z score)	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	162	15	9.3	32	19.8	115	71.0
18-29	133	24	18.0	31	23.3	78	58.6
30-41	64	9	14.1	21	32.8	34	53.1
42-53	32	6	18.8	6	18.8	20	62.5
54-59	4	1	25.0	0	0.0	3	75.0
Total	395	55	13.9	90	22.8	250	63.3

Table 3.11: Prevalence of overweight based on weight for height cut off's and by sex (no oedema)

	All n = 398	**Boys** n **=** 222	**Girls** n **=** 176
Prevalence of overweight (WHZ > 2)	(3) 0.8 % (0.3 - 2.2 95% C.I.)	(1) 0.5 % (0.1 - 2.5 95% C.I.)	(2) 1.1 % (0.3 - 4.0 95% C.I.)
Prevalence of severe overweight (WHZ > 3)	(0) 0.0 % (0.0 - 1.0 95% C.I.)	(0) 0.0 % (0.0 - 1.7 95% C.I.)	(0) 0.0 % (0.0 - 2.1 95% C.I.)

Table 3.12: Prevalence of overweight by age, based on weight for height (no oedema)

		Overweight (WHZ > 2)		**Severe Overweight (WHZ > 3)**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**
6-17	163	3	1.8	0	0.0
18-29	134	0	0.0	0	0.0
30-41	65	0	0.0	0	0.0
42-53	32	0	0.0	0	0.0
54-59	4	0	0.0	0	0.0
Total	398	3	0.8	0	0.0

Table 3.13: Mean z-scores, Design Effects and excluded subjects

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	388	-0.76±1.00	1.00	10	1
Weight-for-Age	389	-1.58±1.24	1.00	10	0
Height-for-Age	395	-1.57±1.40	1.00	0	4

* contains for WHZ and WAZ the children with edema.

Plausibility check for: Napirit14_above6.as

Standard/Reference used for z-score calculation: WHO standards 2006

(If it is not mentioned, flagged data is included in the evaluation. Some parts of this plausibility report are more for advanced users and can be skipped for a standard evaluation)

Overall data quality

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	**Score**
Flagged data	Incl	%	0-2.5	>2.5-5.0	>5.0-7.5	>7.5	
(% of in-range subjects)			0	5	10	20	**0** (1.5 %)
Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**4** (p=0.019)
Overall Age distrib	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**10** (p=0.000)
Dig pref score - weight	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (4)
Dig pref score - height	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (7)
Dig pref score - MUAC	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (0)
Standard Dev WHZ	Excl	SD	<1.1	<1.15	<1.20	>=1.20	
.			and	and	and	or	
.	Excl	SD	>0.9	>0.85	>0.80	<=0.80	
			0	2	6	20	**0** (1.09)
Skewness WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (-0.05)
Kurtosis WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (-0.11)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<=0.001	
			0	1	3	5	**0** (p=)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	**14** %

The overall score of this survey is 14 %, this is good.

There were no duplicate entries detected.

Percentage of children with no exact birthday: 100 %

Anthropometric Indices likely to be in error (-3 to 3 for WHZ, -3 to 3 for HAZ, -3 to 3 for WAZ, from observed mean - chosen in Options panel - these values will be flagged and should be excluded from analysis for a nutrition survey in emergencies. For other surveys this might not be the best procedure e.g. when the percentage of overweight children has to be calculated):

Line=1/ID=60304: HAZ (-4.880), Age may be incorrect

Line=15/ID=60519: HAZ (-5.415), Age may be incorrect

Line=50/ID=61715: HAZ (-5.670), Age may be incorrect

Line=60/ID=60709: HAZ (-7.108), WAZ (-5.466), Age may be incorrect

Line=68/ID=60402: **WHZ (-4.002)**, WAZ (-4.652), Weight may be incorrect

Line=76/ID=62516: HAZ (1.381), Age may be incorrect

Line=95/ID=61701: HAZ (2.357), Age may be incorrect

Line=109/ID=61712: HAZ (-5.258), Age may be incorrect

Line=131/ID=60414: **WHZ (8.975)**, HAZ (-8.107), Height may be incorrect

Line=155/ID=61415: HAZ (-8.231), Height may be incorrect

Line=164/ID=61507: HAZ (-5.324), Age may be incorrect

Line=199/ID=60915: HAZ (-5.178), Age may be incorrect

Line=208/ID=62203: HAZ (1.397), Age may be incorrect

Line=222/ID=60810: HAZ (8.756), WAZ (3.496), Age may be incorrect

Line=224/ID=61217: HAZ (2.073), Age may be incorrect

Line=235/ID=60405: HAZ (-5.082), WAZ (-4.427), Age may be incorrect

Line=241/ID=63009: HAZ (3.261), Age may be incorrect

Line=245/ID=61508: HAZ (4.824), WAZ (2.013), Age may be incorrect

Line=246/ID=61705: HAZ (1.962), Age may be incorrect

Line=256/ID=62801: HAZ (3.196), Height may be incorrect

Line=270/ID=62312: HAZ (3.436), Height may be incorrect

Line=282/ID=60511: HAZ (2.687), Age may be incorrect

Line=300/ID=62318: **WHZ (-3.592)**, WAZ (-4.433), Weight may be incorrect

Line=317/ID=61017: **WHZ (-3.896)**, Weight may be incorrect

Line=321/ID=62404: HAZ (-4.841), Age may be incorrect

Line=354/ID=60418: HAZ (5.523), WAZ (2.837), Age may be incorrect

Line=355/ID=61907: HAZ (2.840), Age may be incorrect

Line=365/ID=62214: **WHZ (2.498)**, HAZ (2.194), WAZ (2.735)

Line=375/ID=61708: HAZ (-5.675), WAZ (-5.177), Age may be incorrect

Line=383/ID=61514: **WHZ (-4.133)**, WAZ (-4.788), Weight may be incorrect

Percentage of values flagged with SMART flags:WHZ: 1.5 %, HAZ: 6.5 %, WAZ: 2.6 %

Age distribution:

Month 6 : ##############

Month 7 : #############

Month 8 : ############

Month 9 : ####################

Month 10 : ##########

Month 11 : #########

Month 12 : ##############

Month 13 : ###############

Month 14 : ##################

Month 15 : ##################

Month 16 : ############

Month 17 : #######

Month 18 : ####################

Month 19 : ############

Month 20 : #######

Month 21 : ##########

Month 22 : ##############

Month 23 : ##########

Month 24 : ##########

Month 25 : ######

Month 26 : ############

Month 27 : ##########

Month 28 : ############

Month 29 : ######

Month 30 : ############

Month 31 : ##########

Month 32 : #######

Month 33 : ######

Month 34 : #####

Month 35 : #

Month 36 : #######

Month 37 : #####

Month 38 : ####

Month 39 : #####

Month 40 : ##

Month 41 : #

Month 42 : #######

Month 43 : #####

Month 44 : ###

Month 45 : #

Month 46 : ##

Month 47 : ##

Month 48 : ###

Month 49 : ##

Month 50 : ##

Month 51 : #

Month 52 : ###

Month 53 : ##

Month 54 :

Month 55 :

Month 56 : #

Month 57 : ##

Month 58 : #

Age ratio of 6-29 months to 30-59 months: 2.91 (The value should be around 0.85).

Statistical evaluation of sex and age ratios (using Chi squared statistic):

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	94/51.7 (1.8)	69/40.8 (1.7)	163/92.6 (1.8)	1.36
18 to 29	12	73/50.4 (1.4)	61/39.8 (1.5)	134/90.3 (1.5)	1.20
30 to 41	12	39/48.9 (0.8)	26/38.6 (0.7)	65/87.5 (0.7)	1.50
42 to 53	12	16/48.1 (0.3)	17/38.0 (0.4)	33/86.1 (0.4)	0.94
54 to 59	6	1/23.8 (0.0)	3/18.8 (0.2)	4/42.6 (0.1)	0.33
6 to 59	54	223/199.5 (1.1)	176/199.5 (0.9)		1.27

The data are expressed as observed number/expected number (ratio of obs/expect)

Overall sex ratio: p-value = 0.019 (significant excess of boys)

Overall age distribution: p-value = 0.000 (significant difference)

Overall age distribution for boys: p-value = 0.000 (significant difference)

Overall age distribution for girls: p-value = 0.000 (significant difference)

Overall sex/age distribution: p-value = 0.000 (significant difference)

Digit preference Weight:

Digit .0 : ##

Digit .1 : ##

Digit .2 : ######################################

Digit .3 : ################################

Digit .4 : ################################

Digit .5 : ###################################

Digit .6 : ##

Digit .7 : ###################################

Digit .8 : ##

Digit .9 : ##

Digit preference score: **4** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

p-value for chi2: 0.623

Digit preference Height:

Digit .0 : ##

Digit .1 : ################################

Digit .2 : ##

Digit .3 : ##############################

Digit .4 : ####################################

Digit .5 : ##

Digit .6 : ####################################

Digit .7 : ##

Digit .8 : ####################################

Digit .9 : ##############################

Digit preference score: **7** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

p-value for chi2: 0.030 (significant difference)

Evaluation of Standard deviation, Normal distribution, Skewness and Kurtosis using the 3 exclusion (Flag) procedures

.	no exclusion	exclusion from reference mean (WHO flags)	exclusion from observed mean (SMART flags)

WHZ

Standard Deviation SD:	1.24	1.15	1.09
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	9.3%	9.3%	8.4%
calculated with current SD:	12.4%	10.9%	9.3%
calculated with a SD of 1:	7.5%	7.8%	7.5%

HAZ

Standard Deviation SD:	1.70	1.54	1.18
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	43.4%	43.0%	43.2%
calculated with current SD:	45.0%	43.9%	44.7%
calculated with a SD of 1:	41.5%	40.7%	43.7%

WAZ

Standard Deviation SD:	1.30	1.30	1.17
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	30.3%	30.3%	29.6%
calculated with current SD:	31.4%	31.4%	29.1%
calculated with a SD of 1:	26.4%	26.4%	26.0%

Results for Shapiro-Wilk test for normally (Gaussian) distributed data:

WHZ	p= 0.000	p= 0.214	p= 0.483
HAZ	p= 0.000	p= 0.000	p= 0.229
WAZ	p= 0.077	p= 0.077	p= 0.099

(If p < 0.05 then the data are not normally distributed. If p > 0.05 you can consider the data normally distributed)

Skewness

WHZ	0.97	-0.19	-0.05
HAZ	0.81	0.72	-0.04
WAZ	-0.01	-0.01	-0.11

If the value is:

-below minus 0.4 there is a relative excess of wasted/stunted/underweight subjects in the sample

-between minus 0.4 and minus 0.2, there may be a relative excess of wasted/stunted/underweight subjects in the sample.

-between minus 0.2 and plus 0.2, the distribution can be considered as symmetrical.

-between 0.2 and 0.4, there may be an excess of obese/tall/overweight subjects in the sample.

-above 0.4, there is an excess of obese/tall/overweight subjects in the sample

Kurtosis

WHZ	8.35	0.23	-0.11
HAZ	5.68	2.54	-0.32
WAZ	0.62	0.62	-0.43

Kurtosis characterizes the relative size of the body versus the tails of the distribution. Positive kurtosis indicates relatively large tails and small body. Negative kurtosis indicates relatively large body and small tails.

If the absolute value is:

-above 0.4 it indicates a problem. There might have been a problem with data collection or sampling.

-between 0.2 and 0.4, the data may be affected with a problem.

-less than an absolute value of 0.2 the distribution can be considered as normal.

Are the data of the same quality at the beginning and the end of the clusters?

Evaluation of the SD for WHZ depending upon the order the cases are measured within each cluster (if one cluster per day is measured then this will be related to the time of the day the measurement is made).

Time	SD for WHZ															
point	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3

(when n is much less than the average number of subjects per cluster different symbols are used: 0 for n < 80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags found in the different time points)

Analysis by Team

Team	**1**	**999**
n =	1	398

Percentage of values flagged with SMART flags:

WHZ:	0.0	4.1
HAZ:	0.0	6.5
WAZ:	0.0	5.2

Age ratio of 6-29 months to 30-59 months:

2.90

Sex ratio (male/female):

1.26

Digit preference Weight (%):

.0 :	0	12

.1 : 0 12

.2 : 0 10

.3 : 0 8

.4 : 100 8

.5 : 0 9

.6 : 0 11

.7 : 0 9

.8 : 0 10

.9 : 0 11

DPS: 100 5

Digit preference score (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

Digit preference Height (%):

.0 : 100 15

.1 : 0 8

.2 : 0 11

.3 : 0 8

.4 : 0 10

.5 : 0 10

.6 : 0 10

.7 : 0 12

.8 : 0 10

.9 : 0 8

DPS: 100 7

Digit preference score (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

Standard deviation of WHZ:

SD 0.00

Prevalence (< -2) observed: %

Prevalence (< -2) calculated with current SD:

%

Prevalence (< -2) calculated with a SD of 1: %

Standard deviation of HAZ:

SD 0.00

observed: %

calculated with current SD: %

calculated with a SD of 1: %

Statistical evaluation of sex and age ratios (using Chi squared statistic) for:

Team 1:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	1/0.2 (4.3)	0/0.0	1/0.2	
18 to 29	12	0/0.2 (0.0)	0/0.0	0/0.2	
30 to 41	12	0/0.2 (0.0)	0/0.0	0/0.2	
42 to 53	12	0/0.2 (0.0)	0/0.0	0/0.2	
54 to 59	6	0/0.1 (0.0)	0/0.0	0/0.1	
6 to 59	54	1/0.5 (2.0)	0/0.5 (0.0)		

The data are expressed as observed number/expected number (ratio of obs/expect)

Overall sex ratio: p-value = 0.317 (boys and girls equally represented)

Overall age distribution: p-value = 0.507 (as expected)

Overall age distribution for boys: p-value = 0.507 (as expected)

Overall sex/age distribution: p-value = 0.107 (as expected)

Team 2:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	0/0.0	0/0.0	0/0.0	
18 to 29	12	0/0.0	0/0.0	0/0.0	
30 to 41	12	0/0.0	0/0.0	0/0.0	
42 to 53	12	0/0.0	0/0.0	0/0.0	
54 to 59	6	0/0.0	0/0.0	0/0.0	
6 to 59	54	0/0.0	0/0.0		

The data are expressed as observed number/expected number (ratio of obs/expect)

Evaluation of the SD for WHZ depending upon the order the cases are measured within each cluster (if one cluster per day is measured then this will be related to the time of the day the measurement is made).

Napak

Model nutrition assessment report - Napak

(based on the Save the Children Fund emergency nutrition assessment handbook)

Executive summary (one to two pages only)

GAM: 11.8 % (9.0 - 15.3 95% C.I.)
SAM : 2.5 % (1.3 - 4.5 95% C.I.)

3. Results

3.1 Anthropometric results (based on WHO standards 2006):

Definitions of acute malnutrition should be given (for example, global acute malnutrition is defined as <-2 z scores weight-for-height and/or oedema, severe acute malnutrition is defined as <-3z scores weight-for-height and/or oedema)

Exclusion of z-scores from Zero (reference mean) WHO flags: WHZ -5 to 5; HAZ -6 to 6; WAZ -6 to 5

Table 3.1: Distribution of age and sex of sample

	Boys		Girls		Total		Ratio
AGE (mo)	**no.**	**%**	**no.**	**%**	**no.**	**%**	**Boy:girl**
6-17	69	46.0	81	54.0	150	36.6	0.9
18-29	55	44.0	70	56.0	125	30.5	0.8
30-41	31	40.8	45	59.2	76	18.5	0.7
42-53	27	62.8	16	37.2	43	10.5	1.7
54-59	10	62.5	6	37.5	16	3.9	1.7
Total	192	46.8	218	53.2	410	100.0	0.9

Table 3.2: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All n = 406	**Boys** n **=** 191	**Girls** n **=** 215
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(48) 11.8 % (9.0 - 15.3 95% C.I.)	(28) 14.7 % (10.3 - 20.4 95% C.I.)	(20) 9.3 % (6.1 - 13.9 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(38) 9.4 % (6.9 - 12.6 95% C.I.)	(22) 11.5 % (7.7 - 16.8 95% C.I.)	(16) 7.4 % (4.6 - 11.7 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(10) 2.5 % (1.3 - 4.5 95% C.I.)	(6) 3.1 % (1.4 - 6.7 95% C.I.)	(4) 1.9 % (0.7 - 4.7 95% C.I.)

The prevalence of oedema is 0.0 %

Table 3.3: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema

		Severe wasting (<-3 z-score)		**Moderate wasting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	148	7	4.7	23	15.5	118	79.7	0	0.0
18-29	124	3	2.4	9	7.3	112	90.3	0	0.0
30-41	76	0	0.0	1	1.3	75	98.7	0	0.0
42-53	42	0	0.0	5	11.9	37	88.1	0	0.0
54-59	16	0	0.0	0	0.0	16	100.0	0	0.0
Total	406	10	2.5	38	9.4	358	88.2	0	0.0

Table 3.4: Distribution of acute malnutrition and oedema based on weight-for-height z-scores

	<-3 z-score	**>=-3 z-score**

Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 13 (3.2 %)	Not severely malnourished No. 397 (96.8 %)

Table 3.7: Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 409	**Boys** n = 191	**Girls** n = 218
Prevalence of underweight **(<-2 z-score)**	(112) 27.4 % (23.3 - 31.9 95% C.I.)	(60) 31.4 % (25.3 - 38.3 95% C.I.)	(52) 23.9 % (18.7 - 29.9 95% C.I.)
Prevalence of moderate underweight **(<-2 z-score and >=-3 z-score)**	(71) 17.4 % (14.0 - 21.3 95% C.I.)	(37) 19.4 % (14.4 - 25.6 95% C.I.)	(34) 15.6 % (11.4 - 21.0 95% C.I.)
Prevalence of severe underweight **(<-3 z-score)**	(41) 10.0 % (7.5 - 13.3 95% C.I.)	(23) 12.0 % (8.2 - 17.4 95% C.I.)	(18) 8.3 % (5.3 - 12.7 95% C.I.)

Table 3.8: Prevalence of underweight by age, based on weight-for-age z-scores

		Severe underweight (<-3 z-score)		**Moderate underweight (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	150	15	10.0	28	18.7	107	71.3	0	0.0
18-29	124	13	10.5	21	16.9	90	72.6	0	0.0
30-41	76	8	10.5	10	13.2	58	76.3	0	0.0
42-53	43	3	7.0	11	25.6	29	67.4	0	0.0
54-59	16	2	12.5	1	6.3	13	81.3	0	0.0
Total	409	41	10.0	71	17.4	297	72.6	0	0.0

Table 3.9: Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 408	**Boys** n **=** 191	**Girls** n **=** 217
Prevalence of stunting (<-2 z-score)	(147) 36.0 % (31.5 - 40.8 95% C.I.)	(74) 38.7 % (32.1 - 45.8 95% C.I.)	(73) 33.6 % (27.7 - 40.2 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(86) 21.1 % (17.4 - 25.3 95% C.I.)	(39) 20.4 % (15.3 - 26.7 95% C.I.)	(47) 21.7 % (16.7 - 27.6 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(61) 15.0 % (11.8 - 18.7 95% C.I.)	(35) 18.3 % (13.5 - 24.4 95% C.I.)	(26) 12.0 % (8.3 - 17.0 95% C.I.)

Table 3.10: Prevalence of stunting by age based on height-for-age z-scores

		Severe stunting (<-3 z-score)		**Moderate stunting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	150	16	10.7	20	13.3	114	76.0
18-29	124	19	15.3	39	31.5	66	53.2
30-41	76	18	23.7	14	18.4	44	57.9
42-53	43	6	14.0	9	20.9	28	65.1
54-59	15	2	13.3	4	26.7	9	60.0
Total	408	61	15.0	86	21.1	261	64.0

Table 3.11: Prevalence of overweight based on weight for height cut off's and by sex (no oedema)

	All n = 406	**Boys** n **=** 191	**Girls** n **=** 215

Prevalence of overweight (WHZ > 2)	(4) 1.0 % (0.4 - 2.5 95% C.I.)	(3) 1.6 % (0.5 - 4.5 95% C.I.)	(1) 0.5 % (0.1 - 2.6 95% C.I.)
Prevalence of severe overweight (WHZ > 3)	(1) 0.2 % (0.0 - 1.4 95% C.I.)	(0) 0.0 % (0.0 - 2.0 95% C.I.)	(1) 0.5 % (0.1 - 2.6 95% C.I.)

Table 3.12: Prevalence of overweight by age, based on weight for height (no oedema)

		Overweight (WHZ > 2)		**Severe Overweight (WHZ > 3)**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**
6-17	148	1	0.7	1	0.7
18-29	124	1	0.8	0	0.0
30-41	76	0	0.0	0	0.0
42-53	42	1	2.4	0	0.0
54-59	16	1	6.3	0	0.0
Total	406	4	1.0	1	0.2

Table 3.13: Mean z-scores, Design Effects and excluded subjects

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	406	-0.70±1.12	1.00	0	4
Weight-for-Age	409	-1.39±1.20	1.00	0	1
Height-for-Age	408	-1.58±1.47	1.00	0	2

* contains for WHZ and WAZ the children with edema.

Appendix 4

Result Tables for NCHS growth reference 1977

Table 3.2: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All	**Boys**	**Girls**
	n = 407	n **=** 191	n **=** 216

Prevalence of global malnutrition (<-2 z-score and/or oedema)	(45) 11.1 % (8.4 - 14.5 95% C.I.)	(24) 12.6 % (8.6 - 18.0 95% C.I.)	(21) 9.7 % (6.4 - 14.4 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(37) 9.1 % (6.7 - 12.3 95% C.I.)	(21) 11.0 % (7.3 - 16.2 95% C.I.)	(16) 7.4 % (4.6 - 11.7 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(8) 2.0 % (1.0 - 3.8 95% C.I.)	(3) 1.6 % (0.5 - 4.5 95% C.I.)	(5) 2.3 % (1.0 - 5.3 95% C.I.)

The prevalence of oedema is 0.0 %

Table 3.3: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema

		Severe wasting (<-3 z-score)		**Moderate wasting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	149	5	3.4	19	12.8	125	83.9	0	0.0
18-29	124	3	2.4	13	10.5	108	87.1	0	0.0
30-41	76	0	0.0	1	1.3	75	98.7	0	0.0
42-53	42	0	0.0	4	9.5	38	90.5	0	0.0
54-59	16	0	0.0	0	0.0	16	100.0	0	0.0
Total	407	8	2.0	37	9.1	362	88.9	0	0.0

Table 3.4: Distribution of acute malnutrition and oedema based on weight-for-height z-scores

	<-3 z-score	**>=-3 z-score**
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 10 (2.4 %)	Not severely malnourished No. 400 (97.6 %)

Table 3.5: Prevalence of acute malnutrition based on the percentage of the median and/or oedema

	n = 407
Prevalence of global acute malnutrition (<80% and/or oedema)	(29) 7.1 % (5.0 - 10.0 95% C.I.)
Prevalence of moderate acute malnutrition (<80% and >= 70%, no oedema)	(27) 6.6 % (4.6 - 9.5 95% C.I.)
Prevalence of severe acute malnutrition (<70% and/or oedema)	(2) 0.5 % (0.1 - 1.8 95% C.I.)

Table 3.6: Prevalence of malnutrition by age, based on weight-for-height percentage of the median and oedema

		Severe wasting (<70% median)		**Moderate wasting (>=70% and <80% median)**		**Normal (> =80% median)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	149	1	0.7	15	10.1	133	89.3	0	0.0
18-29	124	1	0.8	9	7.3	114	91.9	0	0.0
30-41	76	0	0.0	1	1.3	75	98.7	0	0.0
42-53	42	0	0.0	2	4.8	40	95.2	0	0.0
54-59	16	0	0.0	0	0.0	16	100.0	0	0.0
Total	407	2	0.5	27	6.6	378	92.9	0	0.0

Table 3.7: Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 410	**Boys** n **=** 192	**Girls** n **=** 218
Prevalence of underweight (<-2 z-score)	(152) 37.1 % (32.5 - 41.8 95% C.I.)	(78) 40.6 % (33.9 - 47.7 95% C.I.)	(74) 33.9 % (28.0 - 40.5 95% C.I.)

Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(106) 25.9 % (21.9 - 30.3 95% C.I.)	(55) 28.6 % (22.7 - 35.4 95% C.I.)	(51) 23.4 % (18.3 - 29.4 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(46) 11.2 % (8.5 - 14.6 95% C.I.)	(23) 12.0 % (8.1 - 17.3 95% C.I.)	(23) 10.6 % (7.1 - 15.3 95% C.I.)

Table 3.8: Prevalence of underweight by age, based on weight-for-age z-scores

		Severe underweight (<-3 z-score)		**Moderate underweight (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	150	17	11.3	39	26.0	94	62.7	0	0.0
18-29	125	16	12.8	31	24.8	78	62.4	0	0.0
30-41	76	8	10.5	16	21.1	52	68.4	0	0.0
42-53	43	3	7.0	16	37.2	24	55.8	0	0.0
54-59	16	2	12.5	4	25.0	10	62.5	0	0.0
Total	410	46	11.2	106	25.9	258	62.9	0	0.0

Table 3.9: Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 408	**Boys** n **=** 191	**Girls** n **=** 217
Prevalence of stunting (<-2 z-score)	(122) 29.9 % (25.7 - 34.5 95% C.I.)	(58) 30.4 % (24.3 - 37.2 95% C.I.)	(64) 29.5 % (23.8 - 35.9 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(74) 18.1 % (14.7 - 22.2 95% C.I.)	(30) 15.7 % (11.2 - 21.5 95% C.I.)	(44) 20.3 % (15.5 - 26.1 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(48) 11.8 % (9.0 - 15.3 95% C.I.)	(28) 14.7 % (10.3 - 20.4 95% C.I.)	(20) 9.2 % (6.0 - 13.8 95% C.I.)

Table 3.10: Prevalence of stunting by age based on height-for-age z-scores

		Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	150	10	6.7	21	14.0	119	79.3
18-29	124	15	12.1	34	27.4	75	60.5
30-41	76	16	21.1	8	10.5	52	68.4
42-53	43	5	11.6	7	16.3	31	72.1
54-59	15	2	13.3	4	26.7	9	60.0
Total	408	48	11.8	74	18.1	286	70.1

Table 3.11: Prevalence of overweight based on weight for height cut off's and by sex (no oedema)

	All n = 407	**Boys** n **=** 191	**Girls** n **=** 216
Prevalence of overweight (WHZ > 2)	(1) 0.2 % (0.0 - 1.4 95% C.I.)	(0) 0.0 % (0.0 - 2.0 95% C.I.)	(1) 0.5 % (0.1 - 2.6 95% C.I.)
Prevalence of severe overweight (WHZ > 3)	(1) 0.2 % (0.0 - 1.4 95% C.I.)	(0) 0.0 % (0.0 - 2.0 95% C.I.)	(1) 0.5 % (0.1 - 2.6 95% C.I.)

Table 3.12: Prevalence of overweight by age, based on weight for height (no oedema)

		Overweight (WHZ > 2)		Severe Overweight (WHZ > 3)	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**
6-17	149	1	0.7	1	0.7
18-29	124	0	0.0	0	0.0
30-41	76	0	0.0	0	0.0
42-53	42	0	0.0	0	0.0
54-59	16	0	0.0	0	0.0
Total	407	1	0.2	1	0.2

Table 3.13: Mean z-scores, Design Effects and excluded subjects

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	407	-0.90±0.96	1.00	0	3
Weight-for-Age	410	-1.61±1.13	1.00	0	0
Height-for-Age	408	-1.42±1.37	1.00	0	2

* contains for WHZ and WAZ the children with edema.

Plausibility check for: noname.as

Standard/Reference used for z-score calculation: WHO standards 2006

(If it is not mentioned, flagged data is included in the evaluation. Some parts of this plausibility report are more for advanced users and can be skipped for a standard evaluation)

Overall data quality

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	**Score**
Flagged data	Incl	%	0-2.5	>2.5-5.0	>5.0-7.5	>7.5	
(% of in-range subjects)			0	5	10	20	**0** (2.5 %)
Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**0** (p=0.199)
Overall Age distrib	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**10** (p=0.000)
Dig pref score - weight	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (4)
Dig pref score - height	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (7)
Dig pref score - MUAC	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (0)
Standard Dev WHZ	Excl	SD	<1.1	<1.15	<1.20	>=1.20	
.			and	and	and	or	
.	Excl	SD	>0.9	>0.85	>0.80	<=0.80	
			0	2	6	20	**0** (1.04)
Skewness WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**1** (-0.23)
Kurtosis WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (0.00)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<=0.001	

	0	1	3	5	**0** (p=)
OVERALL SCORE WHZ =	0-9	10-14	15-24	>25	**11** %

The overall score of this survey is 11 %, this is good.

Duplicate Entries in the database:

Line=374/ID=999 with Line=372/ID=999

Percentage of children with no exact birthday: 100 %

Age/Height out of range for WHZ:

HEIGHT:

Line=403/ID=72211: 43.20 cm

Anthropometric Indices likely to be in error (-3 to 3 for WHZ, -3 to 3 for HAZ, -3 to 3 for WAZ, from observed mean - chosen in Options panel - these values will be flagged and should be excluded from analysis for a nutrition survey in emergencies. For other surveys this might not be the best procedure e.g. when the percentage of overweight children has to be calculated):

Line=1/ID=72714: HAZ (-5.370), WAZ (-4.540), Age may be incorrect

Line=59/ID=73007: HAZ (-4.885), Age may be incorrect

Line=64/ID=70115: **WHZ (-6.490)**, HAZ (3.901), Height may be incorrect

Line=72/ID=71217: HAZ (-5.489), Age may be incorrect

Line=102/ID=71802: **WHZ (2.926)**, Weight may be incorrect

Line=112/ID=71103: HAZ (-5.002), Age may be incorrect

Line=114/ID=70205: **WHZ (2.409)**, Weight may be incorrect

Line=146/ID=70610: **WHZ (-6.206)**, HAZ (1.511), Height may be incorrect

Line=151/ID=71918: HAZ (-6.940), WAZ (-4.773), Age may be incorrect

Line=179/ID=72419: HAZ (-4.906), Age may be incorrect

Line=194/ID=72905: HAZ (-5.151), Age may be incorrect

Line=235/ID=72107: HAZ (-5.867), Height may be incorrect

Line=243/ID=70313: HAZ (-5.589), Age may be incorrect

Line=247/ID=70804: HAZ (1.510), Height may be incorrect

Line=265/ID=70305: HAZ (4.499), Age may be incorrect

Line=297/ID=70809: HAZ (4.296), Age may be incorrect

Line=304/ID=70408: HAZ (2.970), WAZ (1.609), Age may be incorrect

Line=305/ID=72207: **WHZ (-3.899)**, Weight may be incorrect

Line=308/ID=71611: HAZ (2.420), Age may be incorrect

Line=322/ID=71314: **WHZ (-4.020)**, Weight may be incorrect

Line=329/ID=70716: HAZ (-5.747), Age may be incorrect

Line=338/ID=70909: **WHZ (-4.904)**, HAZ (-7.145), WAZ (-6.497)

Line=364/ID=70418: HAZ (2.546), Age may be incorrect

Line=379/ID=70711: HAZ (2.386), Age may be incorrect

Line=381/ID=70620: HAZ (3.888), WAZ (1.680), Age may be incorrect

Line=386/ID=71906: **WHZ (3.411)**, Weight may be incorrect

Line=390/ID=71815: **WHZ (-5.749)**, WAZ (-5.282), Weight may be incorrect

Line=401/ID=73003: **WHZ (5.211)**, WAZ (2.974), Weight may be incorrect

Line=403/ID=72211: HAZ (-12.670), Height may be incorrect

Line=404/ID=71317: HAZ (-5.227), WAZ (-4.549), Age may be incorrect

Percentage of values flagged with SMART flags:WHZ: 2.5 %, HAZ: 5.6 %, WAZ: 2.0 %

Age distribution:

Month 6 : ###############

Month 7 : ############

Month 8 : ################

Month 9 : ######

Month 10 : #########

Month 11 : ############

Month 12 : ##########

Month 13 : ###########

Month 14 : #################

Month 15 : ###############

Month 16 : #################

Month 17 : #########

Month 18 : ###############

Month 19 : ############

Month 20 : #########

Month 21 : ##############

Month 22 : ################

Month 23 : #######

Month 24 : ##########

Month 25 : ###########

Month 26 : ######

Month 27 : #######

Month 28 : ########

Month 29 : ###########

Month 30 : ###########

Month 31 : #####

Month 32 : ####

Month 33 : #####

Month 34 : ########

Month 35 : #######

Month 36 : ########

Month 37 : ####

Month 38 : ######

Month 39 : ########

Month 40 : ##

Month 41 : ########

Month 42 : #####

Month 43 : #

Month 44 : ###

Month 45 : ####

Month 46 : ####

Month 47 : ######

Month 48 : ###

Month 49 : ###

Month 50 : #########

Month 51 : ##

Month 52 :

Month 53 : ###

Month 54 : ###

Month 55 : ###

Month 56 : #

Month 57 : ##

Month 58 : #####

Month 59 : ##

Age ratio of 6-29 months to 30-59 months: 2.04 (The value should be around 0.85).

Statistical evaluation of sex and age ratios (using Chi squared statistic):

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	69/44.5 (1.5)	81/50.6 (1.6)	150/95.1 (1.6)	0.85
18 to 29	12	55/43.4 (1.3)	70/49.3 (1.4)	125/92.7 (1.3)	0.79
30 to 41	12	31/42.1 (0.7)	45/47.8 (0.9)	76/89.9 (0.8)	0.69
42 to 53	12	27/41.4 (0.7)	16/47.0 (0.3)	43/88.5 (0.5)	1.69
54 to 59	6	10/20.5 (0.5)	6/23.3 (0.3)	16/43.8 (0.4)	1.67
6 to 59	54	192/205.0 (0.9)	218/205.0 (1.1)		0.88

The data are expressed as observed number/expected number (ratio of obs/expect)

Overall sex ratio: p-value = 0.199 (boys and girls equally represented)

Overall age distribution: p-value = 0.000 (significant difference)

Overall age distribution for boys: p-value = 0.000 (significant difference)

Overall age distribution for girls: p-value = 0.000 (significant difference)

Overall sex/age distribution: p-value = 0.000 (significant difference)

Digit preference Weight:

Digit .0 : ##

Digit .1 : ##

Digit .2 : ###################################

Digit .3 : ##

Digit .4 : ###################################

Digit .5 : ##

Digit .6 : ##

Digit .7 : ##

Digit .8 : ##

Digit .9 : ###################################

Digit preference score: **4** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

p-value for chi2: 0.806

Digit preference Height:

Digit .0 : ##

Digit .1 : ##

Digit .2 : ##

Digit .3 : ###################################

Digit .4 : ############################

Digit .5 : ##

Digit .6 : ###############################

Digit .7 : ##

Digit .8 : ##

Digit .9 : ###############################

Digit preference score: **7** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

p-value for chi2: 0.019 (significant difference)

Evaluation of Standard deviation, Normal distribution, Skewness and Kurtosis using the 3 exclusion (Flag) procedures

.	no exclusion	exclusion from reference mean (WHO flags)	exclusion from observed mean (SMART flags)
WHZ			
Standard Deviation SD:	1.25	1.13	1.04
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	12.6%	11.9%	11.4%
calculated with current SD:	15.5%	12.6%	10.8%
calculated with a SD of 1:	10.3%	9.8%	9.8%
HAZ			
Standard Deviation SD:	1.61	1.47	1.15
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	36.6%	36.1%	35.4%
calculated with current SD:	41.2%	39.0%	36.8%
calculated with a SD of 1:	36.1%	34.1%	34.9%
WAZ			
Standard Deviation SD:	1.22	1.20	1.12
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	27.8%	27.6%	27.1%
calculated with current SD:	31.3%	30.6%	29.1%
calculated with a SD of 1:	27.6%	27.1%	26.9%
Results for Shapiro-Wilk test for normally (Gaussian) distributed data:			
WHZ	p= 0.000	p= 0.012	p= 0.137
HAZ	p= 0.000	p= 0.000	p= 0.190
WAZ	p= 0.006	p= 0.073	p= 0.020
(If p < 0.05 then the data are not normally distributed. If p > 0.05 you can consider the data normally distributed)			
Skewness			
WHZ	-0.42	-0.17	-0.23
HAZ	-0.61	0.38	-0.11
WAZ	-0.27	-0.13	-0.15

If the value is:

-below minus 0.4 there is a relative excess of wasted/stunted/underweight subjects in the sample

-between minus 0.4 and minus 0.2, there may be a relative excess of wasted/stunted/underweight subjects in the sample.

-between minus 0.2 and plus 0.2, the distribution can be considered as symmetrical.

-between 0.2 and 0.4, there may be an excess of obese/tall/overweight subjects in the sample.

-above 0.4, there is an excess of obese/tall/overweight subjects in the sample

Kurtosis

WHZ	3.51	0.89	0.00
HAZ	6.79	2.20	-0.28
WAZ	0.84	0.37	-0.24

Kurtosis characterizes the relative size of the body versus the tails of the distribution. Positive kurtosis indicates relatively large tails and small body. Negative kurtosis indicates relatively large body and small tails.

If the absolute value is:

-above 0.4 it indicates a problem. There might have been a problem with data collection or sampling.

-between 0.2 and 0.4, the data may be affected with a problem.

-less than an absolute value of 0.2 the distribution can be considered as normal.

Are the data of the same quality at the beginning and the end of the clusters?

Evaluation of the SD for WHZ depending upon the order the cases are measured within each cluster (if one cluster per day is measured then this will be related to the time of the day the measurement is made).

Time	SD for WHZ															
point	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3

(when n is much less than the average number of subjects per cluster different symbols are used: 0 for n < 80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags found in the different time points)

Analysis by Team

Team	**1**	**999**
n =	1	409

Percentage of values flagged with SMART flags:

WHZ:	0.0	3.5
HAZ:	0.0	5.6
WAZ:	0.0	2.7

Age ratio of 6-29 months to 30-59 months:

2.03

Sex ratio (male/female):

0.88

Digit preference Weight (%):

.0 :	0	11
.1 :	0	10
.2 :	0	9
.3 :	0	11
.4 :	0	9
.5 :	0	10
.6 :	0	10
.7 :	0	11
.8 :	100	11
.9 :	0	8
DPS:	100	4

Digit preference score (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

Digit preference Height (%):

.0 :	0	14
.1 :	0	12
.2 :	0	12
.3 :	0	8
.4 :	0	7
.5 :	0	11
.6 :	0	8
.7 :	0	10
.8 :	0	11
.9 :	100	8
DPS:	100	7

Digit preference score (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

Standard deviation of WHZ:

SD 0.00

Prevalence (< -2) observed: %

Prevalence (< -2) calculated with current SD: %

Prevalence (< -2) calculated with a SD of 1: %

Standard deviation of HAZ:

SD 0.00

observed: %

calculated with current SD: %

calculated with a SD of 1: %

Statistical evaluation of sex and age ratios (using Chi squared statistic) for:

Team 1:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	1/0.2 (4.3)	0/0.0	1/0.2	
18 to 29	12	0/0.2 (0.0)	0/0.0	0/0.2	
30 to 41	12	0/0.2 (0.0)	0/0.0	0/0.2	
42 to 53	12	0/0.2 (0.0)	0/0.0	0/0.2	
54 to 59	6	0/0.1 (0.0)	0/0.0	0/0.1	
6 to 59	54	1/0.5 (2.0)	0/0.5 (0.0)		

The data are expressed as observed number/expected number (ratio of obs/expect)

Overall sex ratio: p-value = 0.317 (boys and girls equally represented)

Overall age distribution: p-value = 0.507 (as expected)

Overall age distribution for boys: p-value = 0.507 (as expected)

Overall sex/age distribution: p-value = 0.107 (as expected)

Team 2:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	0/0.0	0/0.0	0/0.0	
18 to 29	12	0/0.0	0/0.0	0/0.0	
30 to 41	12	0/0.0	0/0.0	0/0.0	
42 to 53	12	0/0.0	0/0.0	0/0.0	

```
54 to 59      6        0/0.0    0/0.0    0/0.0
-------------------------------------------------------------------------------
6  to 59     54        0/0.0    0/0.0
```

The data are expressed as observed number/expected number (ratio of obs/expect)

Evaluation of the SD for WHZ depending upon the order the cases are measured within each cluster (if one cluster per day is measured then this will be related to the time of the day the measurement is made).