FINAL DRAFT
REPORT OF FIVE NUTRITION SURVEYS CONDUCTED IN FLOOD AFFECTED LIVELIHOOD ZONES OF MALAWI.

SURVEY AREAS:
Rift Valley Escarpment Livelihood Zone
Lake Chirwa Phalombe Plains Livelihood Zone
Lower Shire Livelihood Zone
Thyolo-Mulanje Tea Estates Livelihood Zone
Shire Highlands Livelihood Zone

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Executive summary

In January 2015, Malawi was affected by heavy flooding affecting 16 districts which were mostly in the southern region of Malawi. The flooding caused considerable havoc affecting 1,101,364 people, displacing 230,000, killing 106 killed and 172 reported missing. Given the gravity of the destruction and presumed increased vulnerability of the affected populations, nutrition surveys were undertaken between June and July 2015 in the affected areas. The 16 districts were categorised in five different livelihood zones. The overall objective of the nutrition surveys was to provide an updated situation among the flood affected areas in terms of nutrition, infant and young child feeding practices, household food security, child morbidity, vitamin A supplementation, measles vaccinations, household water and sanitation.

A cluster sampling methodology using Standardized Monitoring and Assessment of Relief and Transitions (SMART) was used in conducting the nutrition surveys in each of the livelihood zones. Sample size calculation for the surveys was determined using the ENA for SMART software June 2015 version. Number of clusters per livelihood zone was determined based on the number of households a team could comfortably undertake which was estimated to be 16 households per cluster. The total number of clusters in all the livelihood zones was 160.

A two-stage cluster sampling design was used to randomly sample study clusters and households. The clusters were sampled using probability proportional to size (PPS) and the selected clusters were further segmented into reasonably small segments if the number of households were more than 250. One segment was then randomly selected from the segments using the PPS approach. The required 16 households per cluster were randomly selected from the updated list constructed in consultations with the village leaders. All eligible children (those aged 6-59 months) in selected households were measured and the household questionnaire applied.

Results

In total, 2,388 households were visited with 1,574 children aged 6-59 months measured for anthropometry. Respondents in all the 5 surveys were mostly female caregivers with either primary education or no education at all. Most of these participants lived in households headed by males (over 60%). Within each zone, households were largely monogamous (over 50%) with an average of 5 members of which 12 to 16% were children aged below the age of 5 years. The table below provides a summary of the key findings for the survey followed by a conclusion and programmatic recommendations.

Indicator	Rift Valley Escarpment	Lower Shire	Thyolo - Mulanje Tea Estates	Shire Highlands	Lake Chilwa Phalombe Plain
Acute Malnutrition (Based on WHO 2006 Growth Standards)					
Global Acute Malnutrition (GAM)*	1.4 % (0.4 - 4.5)	2.8 % (1.2 - 6.3)	1.4 % (0.5 - 3.5)	0.6 % (0.1 - 2.6)	1.0 % (0.3 - 2.9)

Moderate Acute Malnutrition (MAM)	1.4 % (0.4 - 4.5)	2.8 % (1.2 - 6.3)	1.4 % (0.5 - 3.5)	0.6 % (0.1 - 2.6)	1.0 % (0.3 - 2.9)
Underweight (Based on WHO 2006 Growth Standards)					
Total Underweight	11.6 % (8.3 - 15.8.)	13.4 % (10.9 - 16.4)	13.7 % (9.6 - 19.2)	13.1 % (9.3 - 18.2)	17.7 % (13.4 - 23.0)
Moderate Underweight	8.5 % (5.7 - 12.6)	10.8 % (8.6 - 13.5)	11.3 % (7.7 - 16.4)	10.3 % (7.2 - 14.6)	15.1 % (11.0 - 20.4)
Severe Underweight	3.1 % (1.6 - 5.8)	2.6 % (1.2 - 5.4)	2.4 % (1.2 - 4.7)	2.8 % (1.2 - 6.6)	2.6 % (0.9 - 7.2.)
Stunting (Based on WHO 2006 Growth Standards)					
Total Stunting	38.1 % (31.2 - 45.5)	47.0 % (39.3 - 54.8)	47.9 % (42.2 - 53.8)	41.7 % (36.3 - 47.3)	50.5 % (43.9 - 57.1)
Moderate Stunting	27.0 % (20.8 - 34.2)	32.7 % (26.7 - 39.3.)	32.8 % (27.1 - 38.9)	29.9 % (24.3 - 36.1)	35.6 % (29.3 - 42.5)
Severe Stunting	11.1 % (7.7 - 15.6)	14.3 % (11.0 - 18.4.)	15.2 % (11.3 - 20.1)	11.8 % (9.1 - 15.1)	14.9 % (10.1 - 21.2)
Infant and young child feeding					
Percent children 6-59 months breastfed within the first hour after birth	71.2%	67.4%	77.8%	73.8%	74.8%
Percent children 6-59 months given pre-lacteal feeding	9.4%	6.0%	5.2%	11.4%	9.8%
Percent children 6-59 months exclusively breastfed	87.3%	85.7%	82.8%	83.6%	85.7%
Percent of breastfed children 6-23 months with acceptable feeding frequency (4+ in last 24 hours)	62.2%	57.4%	68.9%	67.2%	61.6%
Percent of non-breastfed children 6-23 months with acceptable feeding frequency (4+ meals)	14.3%	14.3%	0.0%	0.0%	20.0%
Percent of breastfed children 6-23 months with acceptable diet (4-7 food groups)	3.0%	0.0%	5.6%	1.1%	1.1%
Percent of non-breastfed children 6-23 months with acceptable diet (4-7 food groups)	0.0%	0.0%	0.0%	0.0%	20.0%
Percent of breastfed children 6-23 months with high dietary diversity (4-6 food groups)	4.0%	3.3%	12.7%	3.3%	7.6%
Percent of non-breastfed children 6-23 months with high dietary diversity (4-6 food groups)	14.3%	0.0%	0.0%	8.3%	20.0%
Measles vaccination and vitamin A supplementation					
Percent of children 9-59 months vaccinated for measles based on both card and mother's recall	82.0%	94.6%	93.7%	92.9%	93.6%
Percent of children 6-59 months given vitamin A supplementation based on both card and mother's recall	36.2%	68.6%	81.4%	76.8%	35.3%

Household food security					
Percent of household who are food secure	2.0%	0.6%	2.2%	1.8%	2.4%
Percent of households with high dietary diversity t (4-6 food groups)	27.7%	20.6%	21.9%	28.2%	27.2%
Water and sanitation					
Percent f households using improved water sources	89.0%	82.1%	84.7%	88.0%	89.6%
Percent of households whose toilet is in the dwelling compound	70.4%	58.7%	71.4%	70.5%	69.6%

* based on WHO flags GAM are 1.7% (0.6-4.6%), 3.1% (1.4-6.6%); 0.9% (0.3-2.9%) and SAM are 0.3% (0.0-2.5%), 0.3% (0.0-2.2%); 0.3% (0.0-2.4%) for Rift Valley, Lower Shire and Shire Highlands

Conclusions

Despite the effects of the flooding, the acute malnutrition rates in all the livelihood zones are within the acceptable levels. This result could be explained by a number of factors including for r example the food and non food response by the Malawi Government and all the other partners during the flooding helped in cushioning the households hence their situation did not worsen. The rates of stunting in the livelihood zones remained high and comparable to national estimates of 42% recently reported in the Endline survey (NSO, 2015).

The coverage rates for measles vaccination based on both card documentation and mother's recall were high but below the internationally recommended 95%. Coverage rates for vitamin A supplementation based on card and mother's recall were very low and were below the 90% coverage levels recommended internationally.

The infant and young child feeding indicators especially related to breastfeeding practices were high such as timely initiation of breastfeeding, and exclusive breastfeeding. Dietary diversity and consumption of acceptable meal frequency among children 6-23 months were in general very low in all livelihood zones. The household dietary diversity among the surveyed population was low. There was limited consumption of fruits, animal food, legumes and fats.

Households in all the zones are experiencing anxiety over food shortage and making modifications in dietary quality and they have begun cutting down on the quantity of food. There is low household dietary diversity across all the livelihood zones.

Recommendations

The Malawi Government and her collaborating partners should continue providing the support to the affected families in order to sustain the low levels of acute malnutrition and reduce chronic malnutrition. Given that dietary diversity is closely linked to household food security and livelihood status, implementing focused food security and livelihood interventions would be necessary to improve food diversity among the affected population.

There is need to implement specific strategies with a set of interventions targeting underfive year old children to reduce high levels of chronic malnutrition. This may include strengthening IYCF programmes to improve diet of children <2 years and enhancing the general dietary diversity at household level by implementing food security and livelihood interventions such as encouraging back yard gardens. This would help in improving access to a wider variety of foods especially those

foods rich in micronutrients that would help to reduce stunting rates.

Despite the acceptable prevalence of GAM found in this study, it is strongly recommended that there should be continous monitoring of the nutrition situation because of the flooding and severe dry spell experienced this year..

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Survey Management Team

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1.0 INTRODUCTION

1.1 Background

Malawi is a landlocked country situated between Mozambique, Zambia and Tanzania. It is composed of three distinct regions namely Northern, Southern and Central regions, which are further divided into a total of 29 districts.

In January 2015, the country was hit by heavy rains that caused unprecedented heavy flooding and considerable havoc in recent times. While 15 districts were directly affected, the whole country suffered from the effects. Water and electricity were interrupted. Damages on roads and bridges disrupted business. An estimated 1,101,364 people were affected, 230,000 displaced, 106 killed and 172 reported missing[1]. Following the flooding, multi-sectoral responses were instituted in the flood affected areas to mitigate its negative impacts on affected populations. The response package included provision of shelter, food, non-food items and other services such as education and medical care.

Prior to the flooding, the rate of global acute malnutrition (GAM) was approximated to be at an average of 4% (4% EFSA 2013, 3.8% MICS 2010, 4% 2010 MDHS) [2]. As such, given the gravity of the destruction and presumed increased vulnerability of the affected populations, it was therefore crucial and necessary for the nutrition sector to conduct a nutrition survey in the flood affected livelihood zones to inform and guide implementation of relevant nutrition programmes.

A nutrition survey was thus undertaken in the months of June/July 2015 targetting the 15 flood affected areas categorised into five (5) livelihood zones namely: 1.) Lake ChirwaPhalombe Plains Livelihood Zone *(Phalombe, Zomba and Machinga distrcits*); 2.) Lower Shire Livelihood Zone *(Chikhwawa and Nsanje districts);* 3.) Thyolo-Mulanje Tea Estates Livelihood Zone (*Thyolo and Mulanje districts)*; 4.) Rift Valley Escarpment Livelihood Zone (*Balaka, Ntcheu, Dedza, Salima, Rumphi and Karonga districts*) and; 5.) Shire Highlands Livelihood zones (*Blantyre, Chiradzulu and Mangochi districts)*.Districts of Karonga and Rumphi were included in the Rift Valley Escarpment for planning and survey implementation purposes (Appendix 6.1).

1.2 Survey Objectives

The overall objective of each of the five nutrition surveys undertaken in June/July 2015 was to provide updated information on the nutritional situation of children aged 6-59 months in the flood affected areas of Malawi.

[1] Malawi 2015 Floods Post Disaster Needs Assessment Report (PDNA); The World Bank Group
[2] No confidence intervals were reported in either of the surveys

Specific survey objectives in each of the 5 surveys.

- To estimate the prevalence of acute malnutrition in children aged 6-59 months in the 15 flood affected districts of Malawi.
- To measure the prevalence of stunting in children aged 6-59 months in the 15 flood affected districts of Malawi.
- To determine the household food security and infant and young child feeding practices for children aged 6 – 59 months in the 15 flood affected districts of Malawi.
- To estimate morbidity rates for children aged 6-59 months two weeks prior to the survey in the 15 flood affected districts of Malawi.
- Vitamin A supplementation and measles vaccination in the 15 flood affected districts of Malawi.
- To determine households' access to safe water and sanitation facilities and hygiene practices in the 15 flood affected districts of Malawi.

2. METHODOLOGY

2.1 Sample size

Cluster sampling methodology using Standardized Monitoring and Assessment of Relief and Transitions (SMART) was used in conducting the nutrition surveys due to the vastness of the area.

In addition to anthropometric data, the survey also collected data on infant and young child feeding practices, household food security, child morbidity, vitamin A supplementation, measles vaccinations, household water and sanitation. Sample size for the survey was calculated using the ENA for SMART software June 2015 version

Table 1 provides a summary of key anthropometric parameters that were used in the calculation of the sample size and the resultant sample size for each livelihood zone.

Table 1: Sample size and sample size calculation by livelihood zone

	Rift Valley Escarpment	Lower Shire	Thyolo - Mulanje Tea Estates	Shire Highlands	Lake Chilwa Phalombe Plain
Parameters for Anthropometry	**Value**	**Value**	**Value**	**Value**	**Value**
Estimated Prevalence of GAM (%)	5.0	6.0	6.0	4.5	5.0
± Desired precision	3.0	3.0	3.0	3.0	3.0
Design Effect	1.3	1.3	1.3	1.3	1.3
Children to be included	287	341	341	260	287
Average HH Size	4.6	4.6	4.5	4.5	4.6
% Children under-5	15.0	15.0	15.0	15.0	15.0
% Non-response Households	3.0	3.0	3.0	3.0	3.0
Households to be included	476	566	578	441	476

Number of clusters	30	30	37	28	30

See appendices 2, 3, 4, 5 and 6 for details of the rationale of the planning figures used by livelihood zone.

2.1.1 Number of households per cluster

Following the final sample of households to be included in the survey from the ENA planning template, the number of clusters was determined based on the number of households a team could comfortably undertake. The calculations below show the process obtaining a total of *16 households per cluster.*

a. Departure from lodge at 7am and return at 6pm: 22h, 1320 min (2 days)
b. Travel time to reach the cluster and return at night: 4h, 240min (2days)
c. Duration for initial introduction and selection of households: 4h, 240 min (completed 1 time)
d. Time spent to move from one household to the next: 5 min
e. Average time in each household: 40 min
f. Breaks: 2 breaks of 15min each and 1 break of 30 min: 2 h, 120 min (2 days)

Based on the above information, the survey teams could comfortably visit 16 HH/cluster

2.1.2 Number of clusters per livelihood

The number of clusters per livelihood zone was determined by dividing the estimated number of households to be included in the survey from each zone by the estimated number of households per cluster. Table 2 provides a summary of total number of clusters for each livelihood zone.

Table 2: Number of clusters per livelihood zone

LIVELIHOOD ZONE	Number of households	Number of households per cluster	Number of clusters
Rift Valley Escarpment	476	16	30
Lower Shire	566	16	36
Thyolo - Mulanje Tea Estates	578	16	37
Lake Chilwa Phalombe Plain	476	16	30
Shire Highlands	431	16	27

2.2 Sampling procedure: selection of clusters

A two-stage cluster sampling design was used to randomly sample study clusters and households. In the first stage, clusters were assigned using probability proportional to size (PPS). Using the Enumeration Area (EA) population estimates from the 2008 Housing and Population Census (NSO, 2010), a sampling frame of all EAs in each of the 16 flood affected areas was obtained and reviewed. Follow up was also done with the district commissioners to determine accessibility of the EAs . All inaccesible areas were then removed from the sampling frame. The two EAs were from RVE and LS livelihood zones.

The final and updated list of each of the livelihood zone was then entered into ENA for SMART software June 2015 version and clusters assigned using probability proportional to size (PPS) as per calculation on *Table 2: Number of clusters per livelihood zone.* The selected clusters were further segmented into reasonably small segments if the number of households were more than 250 and one segment was randomly selected using the PPS approach. During the data collection process, two clusters were not accessible in Rift Valley Escarpment (1) and Lower Shire (1) due to damaged roads and water. Owing to the fact that this was less than 10% of the total number of sampled clusters for the affected zones, no replacement clusters were assessed.

2.3 Sampling procedure: selection of households and children

An updated list of households was compiled with the help of village elders in each of the selected clusters while showing the distribution of the households on a sketch map. All abandoned households were excluded in the updated household listing. The 16 required number of households per cluster were randomly selected from the updated list using a Random Number Table (RNT).

In selected households, all eligible children (those aged 6-59 months) were measured and the household questionnaire applied. Empty households and households with absent children were re-visited and information of the outcome recorded on the cluster control form. This form was also used to record information on empty and non-responding households. Where a household had both father/husband and mother/wife, the mother/wife was chosen as a survey respondent. Where there was no mother/wife, a household head/caretaker was the survey respondent.

2.4 Case definitions and inclusion criteria

Household: A group of people who ate daily or at least frequently from the same pot and lived in the same compound (or physical location).

Age: The anthropometric survey targeted children aged 6-59 months. The ages were ascertained using a health passport book, baptismal card, birth certificate as well as other related documents. In the event of lack of these, a local calendar of events was used to estimate the ages in months.

Height: A well calibrated UNICEF wooden height board was utilised to take length and height. Length was taken for children less than two years while height was measured for children aged 2 years (24 months) and above.

Bilateral oedema: Measured by exerting pressure for three seconds on the feet. Presence of pitting of both feet was recorded as (Y) and (N) recorded in the absence of bilateral pitting. Cases of bilateral oedema were to be confirmed by the supervisors. No cases of bilateral oedema were found in the survey.

Global Acute Malnutrition (GAM): Classified as weight for height z-score less than -2 SD and/or oedema

Severe Acute Malnutrition (GAM): Classified as less than -3 SD weight-for-height and/or oedema

Principle anthropometry results will be reported using the WHO standards, in tandem with the government guidelines.

The survey also gathered other indicators Infant and young child feeding practices, Household food security and dietary diversity, Water and sanitation, and child morbidity. Information on these indicators was collected from the primary caregiver through a household questionnaire. For dietary diversity and food security, the Household/Individual Dietary Diversity Score (HDDS/IDDS) and the Household Food Insecurity Access Scale (HFIAS) were used as per standard methodology. Case definitions can be obtained in the results section while a description of the tools is contained in the questionnaire (Appendix 6. 7).

2.5 Questionnaire, training and supervision

Questionnaire

The questionnaire was translated from English into Chichewa (Appendix 6. 7) the main language used to undertake the interviews. Translation and back translation of the tool was done by Bunda. Pre-testing of the survey tools were conducted on the sixth day of the training with each team of 5 enumerators interviewing a minimum of 5 households. All survey procedures such as village mapping, household listing and household selection and interviewing were done during the pre-testing exercise.

Survey teams and supervision

The survey team comprised 4 survey managers (2 from LUANAR, 1 from Ministry of Health and 1 from UNICEF), 2 supervisors from DNHA[3] and World Vision, 30 enumerators and 2 data entry clerks. These enumerators were grouped into 6 teams of 5 members each *(2 measurers, 2 interviewers and 1 team leader).* Recruitment of the enumerators was based on prior experience in surveys with at least a Malawi School Certificate of Education (MSCE).

Supervision of the data collection process was done on daily basis by team leaders attached to the team. This was further augmented by the 2 supervisors and 4 survey managers who would cut across the teams on daily basis to ensure adherance to the set protocols.

Training

Prior to the survey, a survey manager level training on SMART methodology was undertaken by the SMART Specialists to 15 persons drawn from various organizations namely; LUANAR (Bunda) College, UNICEF, Ministry of Agriculture, Department of Nutrition HIV, and AIDS (DNHA) as well as partners from NGO's like World Vision and Concern Worldwide.

The manager level training provided the need skill by the team to further undertake the survey. As such, five trained survey managers from this group trained the enumerators from 20th to 26th May 2015 at SUN village lodge in Liwonde. The training covered general survey objectives, overview of survey design, household selection procedures, anthropometric measurements, data collection and

[3] Department of Nutrition, HIV and AIDS

interview skills. As part of the training, a standardisation test was undertaken by all the enumerators each taking anthropometric measurements in 10 children. Even though the survey team comprised of 30 enumerators, the training was undertaken for 33 enumerators and 2 data entry clerks. Additional enumerators were trained as a back up plan in case of any fall outs during the survey. Those with good standardization test scores were assigned to taking anthropometric measurements during the main survey data collection. Pre-testing of the survey methodology and tools were conducted on the sixth day of the training and each team of 5 enumerators interviewing a minimum of 5 households. All survey procedures such as village mapping, household listing and household selection and interviewing were done during the pre-testing exercise.

Upon completion of the pre-test, a review of the entire process was done where the identified problems and quality issues were discussed and resolved. Enumerators who had some problems during pre-test were asked to conduct mock interviews and role plays in the presence of the entire team and facilitators. Further assistance was continuously provided by the facilitators. Necessary changes to the household questionnaire were made in light of the comments and observations made during the pre-test.

2.6 Data analysis

Data was concurrently double entered by two data personnel using Epi6 version 6.04d for household questionnaire data and ENA for SMART for nutrition anthropometric data. The plausibility check was run on the nutrition data to assess quality of the data collected using the WHO 2006 growth standards. In the final analysis, all flagged records based on SMART flags (WHZ -3 SD to 3 SD; HAZ -3 SD to 3 SD; WAZ -3 SD to 3 SD) were automatically excluded from the analysis. To compare with previous surveys held in Malawi, we also used WHO flagging system only for height for weight z-scores (WHZ -5 SD to 5 SD) and the results for WHO flags were indicated where there were different estimates obtained between the two flagging systems.

3. RESULTS AND DISCUSSIONS

This section presents key survey findings of each of the five surveys undertaken in the five livelihood zones.

3.1. Socio-demographic Characteristics of Study Participants

Table 3 presents the socio-demographic characteristics of the survey participants in the 5 livelihood zones. Participants in all surveys were mostly female caregivers with either primary education or no education at all. In lower shire livelihood zone, however, about 47% of the caregivers did not have any education representing the majority of sampled population. Most of these participants lived in households headed by males (over 60%) who had attained education up to primary level or were also not educated. However a good number had attained some secondary education. Within each zone, households were largely monogamous (over 50%) with an average of 5 members of which 12 to 16% were children aged below the age of 5 years. The findings (larger proportion of households

in the different zones being headed by males and very few numbers attained and tertiary education) are consistent with results reported in the Malawi Demographic and Health Survey report of 2010.

For the nutrition survey, data was collected from children aged between 6 to 59 months using anthropometric measurements of weight, height, mid upper arm circumference (MUAC) and oedema. The subjects were, on average, aged between 31 to 35 months with heights ranging from 84.9 to 86.3 cm and weight of 11.6 to 12.2 kg.

Table 3: Socio-demographics factors for the sample households by Zone

Household Characteristics	LSH	MTE	PHA	RVE	SH
	n=505	n=563	n=464	n=437	n=419
Mean HH size	5.218	4.744	4.869	5.037	5.057
% of children 0-59 months	13.9	12.1	15.6	15.4	16.2
Sex of household head	n=505	n=563	n=464	n=437	n=418
Male	75.2	66.3	68.3	72.8	62.2
Female	24.8	33.7	31.7	27.2	37.8
Marital Status of household head	n=504	n=560	n=461	n=437	n=417
Currently Married-monogamous	65.5	62.1	61.0	60.9	55.2
Currently Married-polygamous	9.7	3.0	8.2	11.2	8.9
Widowed	12.1	15.2	13.9	11.7	16.5
Divorced	9.5	17.1	13.9	10.8	17.5
Single	3.0	2.3	3.0	5.5	1.9
Orphan (If under 18 years of age)	0.2	0.2	0.0	0.0	0.0
Education level of household head.	n=503	n=563	n=464	n=437	n=419
Adult literacy	0.8	0.4	0.0	2.7	1.0
Primary	53.1	59.1	61.9	57.9	57.3
Secondary	16.1	13.5	14.0	18.8	10.5
Tertiary	2.2	0.5	0.2	0.2	0.0
University	0.4	0.2	0.0	0.2	0.0h
Never attended school	27.4	26.3	23.9	20.1	31.3
Education level of caregiver	505	563	464	437	419
Adult literacy	1.0	1.8	0.6	3.4	1.0
Primary	42.4	56.0	57.8	58.1	55.4
Secondary	8.1	8.5	6.9	9.6	6.0

Tertiary	1.2	0.2	0.2	0.0	0.2
University	0.0	0.0	0.0	0.0	0.0
Never attended school	47.3	33.6	34.5	28.8	37.5
Nutrition survey participant characteristics	N=355	N=284	N=314	N=298	N=323
Mean age in months for children 6-59 months	31.5	35.0	33.0	32.6	33.5
Mean height of children 6-59 months	84.9	86.3	85.2	86.1	85.7
Mean weight of children 6-59 months	11.6	12.2	11.7	12.0	12.0

3.2 Anthropometric results (based on WHO standards 2006)

Based on case definitions, Global Acute Malnutrition is defined as <-2 z scores weight-for-height and/or oedema while Severe acute malnutrition referring to <-3z scores weight-for-height and/or oedema. The results are based on exclusion of z-scores from Observed mean SMART flags: WHZ -3 to 3; HAZ -3 to 3; WAZ -3 to 3. For comparison basis with previous surveys, the GAM results were also excluded based on WHO flags: WHZ -5 SD to 5 SD.

3.2.1 Distribution of age and sex of the sample

The overall sex ration in all study areas falls within acceptable levels of 0.8-1.2. Slight over and under representation in age categories were noticed as indicated in the table below.
There were more boys than girls reported in the age group 18-29 months in Rift Valley Escarpment. Lower sex ratios were reported in age group 54-59. However, the ooverall sex ratio (P-value = 0.202) indicates that boys and girls were equally represented. Equal representation of girls and boys was also observed across all livelihood zones with overall sex ratios (P-values) of 0.289 for Lower Shire, 0.446 for Thyolo Mulanje Tea Estates, 0.289 for Shire Highlands and 0.910 for Lake Chilwa Phalombe Plain. Detailed distribution tables for each zone are available in Appendix 6.8.

3.2.2 Prevalence of Global acute malnutrition based on weight for height Z-scores

Acute malnutrition levels in all the five surveys undertaken in the 15 flood affected districts fell within acceptable levels based on weight-for-height z scores. The wasting levels in Lower Shire however have a 95% chance of lying as low as 1.2% and as high as 6.3%, Figure 1. There were no cases of severe acute malnutrition (WHZ score>3 and/or oedema) in any of the five livelihood zones. No cases of Kwashiorkor or marasmic- Kwashiorkor were reported based on oedema in all survey sites. There were a total of three cases identified as oedematous representing 0.3% cases in Rift Valley Escarpment, Lower Shire and Shire Highland livelihood zones which were excluded based on the SMART flags. Thus, based on the WHO flags, GAM were 1.7% (0.6-4.6%), 3.1% (1.4-6.6%); 0.9% (0.3-2.9%) and SAM were 0.3% (0.0-2.5%), 0.3% (0.0-2.2%); 0.3% (0.0-2.4%) for Rift Valley, Lower Shire and Shire Highlands. On the whole, the survey findings from the 5 surveys are comparable to other national surveys undertaken in the Malawi such as EFSA 2013, MICS 2010 and MDHS 2010 that unveiled an average of 4% GAM levels. Furthermore, using health facility-based data for outpatient therapeutic programme (OTP) from all facilities implementing CMAM interventions, January to August 2015, showed declined trends in both total OTP admissions and cases admitted based on z-scores of <-3 SD. Total admissions declined from 56.2% in January 2015 to 19.9% in June 2015, the time when the survey was conducted. Severe acute malnutrition

based z-scores of <-3SD, the rates of SAM was 10.2% in January 2015 which declined to 3.6% in May 2015 suggesting the observed low rates of SAM in the five livelihood zones could be a result of the general downward trends nationally (Figure 2). It is worth noting that these surveys indicated no confidence intervals. Distribution curves for WHZ did not deviate greatly from WHO reference population z-scores (Appendix 6.9).

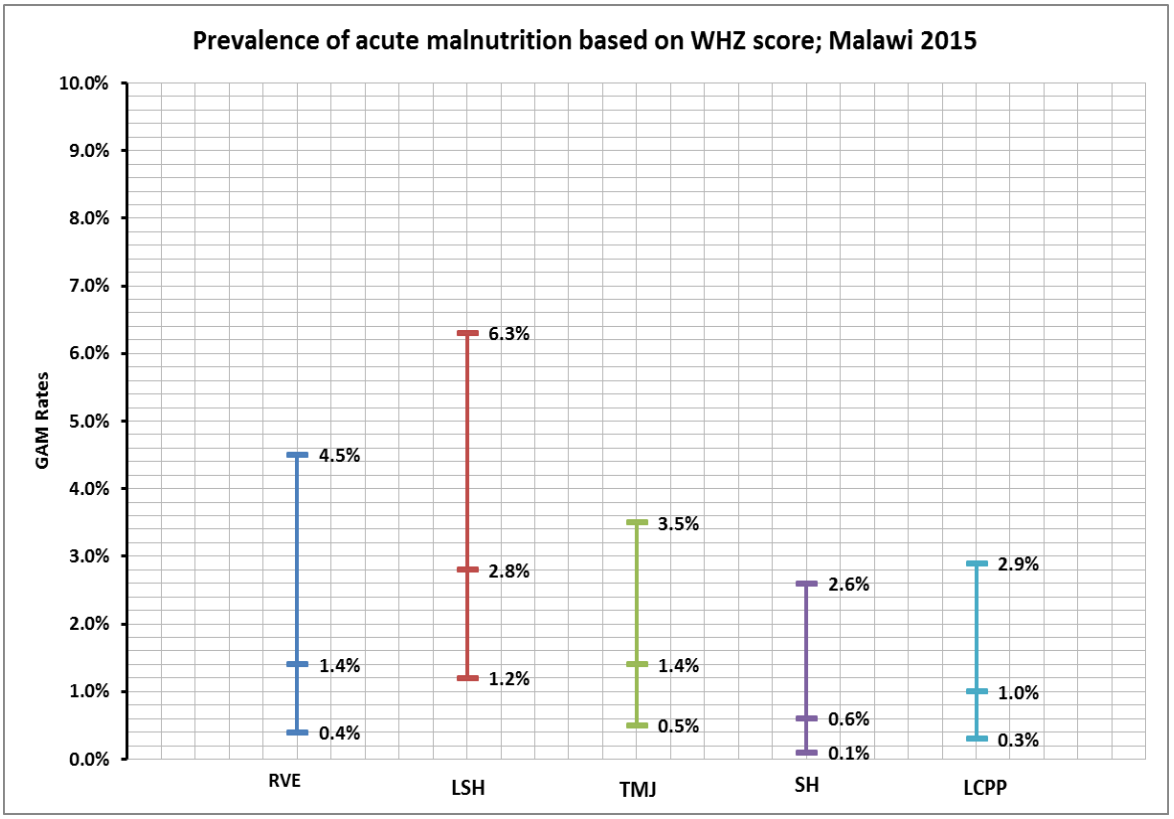


Figure 1: Prevalence of Global acute malnutrition in the five livelihood zones

*Results are expressed at 95% confidence interval

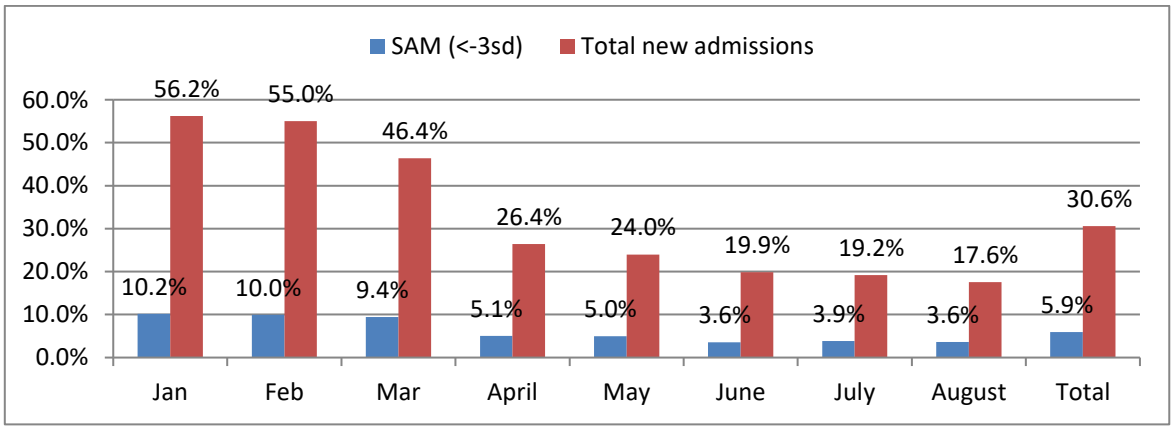


Figure 2: Trends in OTP SAM admissions and total admissions, January -August, 2015

Except for Thyolo Mulanje Tea Estates and Lake Chilwa Phalombe Plain where more girls than boys were malnourished, the trend in the prevalence of GAM by sex in the survey areas showed that boys were more likely to be malnourished than girls, Table 4. Differences, however, were minimal except for Lower Shire and Thyolo Mulanje. Never the less, the rates are still within the

acceptable ranges as earlier discussed.

Table 4: Prevalence of Global Acute malnutrition in survey areas by sex

Livelihood Zone	**Prevalence of global malnutrition (<-2 z-score and/or oedema)**	
	BOYS	GIRLS
Rift Valley Escarpment **Boys;** n=137 **Girls;** n = 157	*(2)* ***1.5 %*** *(0.4 - 5.7 95% C.I.)*	*(2)* ***1.3 %*** *(0.3 - 5.1 95% C.I.)*
Lower Shire Highlands **Boys;** n=167 **Girls;** n = 187	*(7)* ***4.2 %*** *(1.6 - 10.3 95% C.I.)*	*(3)* ***1.6 %*** *(0.5 - 4.8 95% C.I.)*
Thyolo - Mulanje Tea Estates **Boys;** n=138 **Girls;** n = 152	*(2)* ***1.4 %*** *(0.4 - 5.8 95% C.I.)*	*(4)* ***2.6 %*** *(0.8 - 8.2 95% C.I.)*
Shire Highlands **Boys;** n=149 **Girls;** n = 171	*(1)* ***0.7 %*** *(0.1 - 4.9 95% C.I.)*	*(1)* ***0.6 %*** *(0.1 - 4.5 95% C.I.)*
Lake Chilwa Phalombe Plain **Boys;** n **=** 157 **Girls;** n **=** 155	*(1)* ***0.6 %*** *(0.1 - 4.7 95% C.I.)*	*(2)* ***1.3 %*** *(0.3 - 5.2 95% C.I.)*

Prevalence of GAM by age revealed differences across zones with no clear pattern. In Rift Valley Escarpment and Lake Chilwa Phalombe Plain, the prevalence of GAM was highest among older age categories particularly those aged 54 to 59 months. In Lower Shire and the Shire Highlands, prevalence of GAM was higher among younger children aged from 6 to 41 months. For Mulanje Thyolo Tea Estates, the middle age categories (30 to 53 months) were the most likely to be malnourished (Appendix 6.10).

3.2.3 Prevalence of acute malnutrition based on MUAC cut offs (and/or oedema)

Compared to WHZ, prevalence of acute malnutrition was lower using. Severe cases were reported in Lake Chilwa Phalombe Plain and Lower Shire although prevalence was very low, Table 5. These two zones also have the highest total prevalence of GAM (3.2 % for Lake Chilwa Phalombe and 3.1% for Lower Shire) while RVE had the lowest GAM prevalence of 0.7% followed by Shire Highlands with 1.9%. The results for prevalence using MUAC are inconsistent with those obtained using the weight for height z scores which revealed prevalences of 2.8% for LS, 1.4% for RVE, 1.4% for Thyolo- Mulanje, 0.6 for SH and 1% for Lake Chilwa. Despite these inconsistencies, the point estimates for GAM for three livelihood zones (RVE, LS, Thyolo – Mulanje) using either MUAC and or WHZ fall within the same confidence interval ranges implying that the results are not significantly different.

Table 5: Prevalence of acute malnutrition based on MUAC cut off's (and/or oedema)

	Rift Valley Escarpment	**Lower Shire**	**Thyolo - Mulanje Tea Estates**	**Shire Highlands**	**Lake Chilwa Phalombe Plain**

	All n = 298	All n = 356	All n = 290	All n = 323	All n = 314
Prevalence of global malnutrition (< 125 mm and/or oedema)	*(2)* ***0.7 %*** *(0.2 - 2.7)*	*(11)* ***3.1*** *% (1.5 - 6.2)*	*(6)* ***2.1 %*** *(0.8 - 5.5)*	*(6)* ***1.9 %*** *(0.9 - 3.8)*	*(10)* ***3.2 %*** *(1.5 - 6.7)*
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(2) **0.7 %** (0.2 - 2.7)	(10) **2.8 %** (1.3 - 5.9)	(6) **2.1 %** (0.8 - 5.5)	(6) **1.9 %** (0.9 - 3.8)	(8) **2.5 %** (1.1 - 5.9)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	0.0 %	(1) 0.3 % (0.0 - 2.2)	0.0 %	0.0%	(2) **0.6 %** (0.2 - 2.6)

*Results are expressed at 95% confidence interval

Results for prevalence of GAM by sex using MUAC are comparable with WHZ prevalence for Thyolo Mulanje Tea Estates and Shire Highlands livelihood zones. In Rift Valley Escarpment, the prevalence of GAM for boys (0.7%) and for girls (0.6%) was slightly below that obtained using WHZ scores (1.5% boys and 1.3% girls) but both within the same confidence intervals . The results for Lowershire were similar with more boys than girls having GAM also below those obtained using WHZ scores (4.2% boys and 1.6%). However, the prevalence for Lake Chilwa Phalombe Plains using MUAC is very high (1.9% boys and 4.5% girls), Table 6, compared to that using WHZ (0.6% boys and 1.3% girls).

Table 6: Prevalence of acute malnutrition based on MUAC cut off's (and/or oedema) by sex

	Prevalence of global malnutrition (< 125 mm and/or oedema)	
	BOYS	GIRLS
Rift Valley Escarpment **Boys;** n=138 **Girls;** n = 160	*(1)* ***0.7 %*** *(0.1 - 5.4 95% C.I.)*	*(1)* ***0.6 %*** *(0.1 - 4.8 95% C.I.)*
Lower Shire Highlands **Boys;** n=168 **Girls;** n = 188	*(5)* ***3.0 %*** *(1.1 - 7.8 95% C.I.)*	*(6)* ***3.2 %*** *(1.4 - 7.1 95% C.I.)*
Thyolo - Mulanje Tea Estates **Boys;** n=138 **Girls;** n = 152	*(2)* ***1.4 %*** *(0.4 - 5.8 95% C.I.)*	*(4)* ***2.6 %*** *(0.8 - 8.2 95% C.I.)*
Shire Highlands **Boys;** n=149 **Girls;** n = 171	*(1)* ***0.7 %*** *(0.1 - 4.9 95% C.I.)*	*(1)* ***0.6 %*** *(0.1 - 4.5 95% C.I.)*
Lake Chilwa Phalombe Plain **Boys;** n **=** 158 **Girls;** n **=** 156	*(3)* ***1.9 %*** *(0.6 - 5.9 95% C.I.)*	*(7)* ***4.5 %*** *(1.9 - 10.3 95% C.I.)*

*Results are expressed at 95% confidence interval

Prevalence of acute malnutrition by age based on MUAC showed that acute malnutrition was likely to occur in the young children (6-17 months in Rift Valley Escarpment, 6-29 months in Shire Highlands and Lake Chilwa Phalombe Plains, and 6 to 41 months in Thyolo Mulanje Estates). The prevalence in LS was more spread across the ages as cases were reported from 6 to up to 53 months (Annex 6.10: MUAC based GAM).

3.2.4 Prevalence of underweight based on weight for age z scores.

Underweight was highest in Lake Chilwa Phalombe Plains followed by Mulanje Thyolo Tea Estates, Lower shire and Shire Highlands. RVE had the lowest prevalence of 11.6%, Figure 3. There were no significant differences in prevalence by sex in all the zones except for Shire Highlands which had a prevalence of 18.5% for boys and 8.3% for girls, Table 7. All age groups seemed to be vulnerable to underweight (Appendix 6.11).

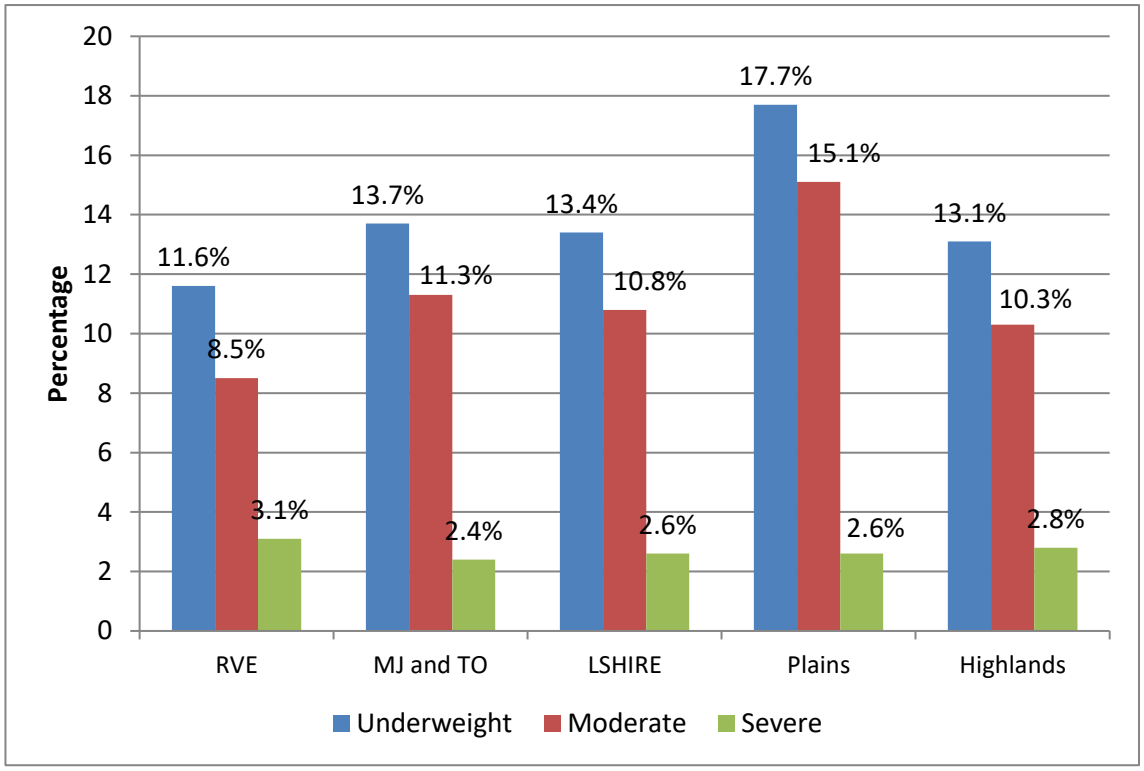


Figure 3: Prevalence of underweight in the five livelihood zones

Table 7: Prevalence of underweight based on stunting; height-for-age z-scores by sex

	Prevalence of stunting (<-2 z-score)	
	BOYS	**GIRLS**
Rift Valley Escarpment **Boys;** n=134 **Girls;** n = 155	*(60)* ***44.8 %*** *(34.6 - 55.4 95% C.I.)*	*(50)* ***32.3 %*** *(24.5 - 41.2 95% C.I.)*
Lower Shire Highlands **Boys;** n=163 **Girls;** n = 185	*(74)* ***45.4 %*** *(38.0 - 53.0 95% C.I.)*	*(71)* ***38.4 %*** *(32.0 - 45.2 95% C.I.)*

Thyolo - Mulanje Tea Estates **Boys;** n=139 **Girls;** n = 152	*(73)* ***52.9 %*** *(44.2 - 61.5 95% C.I.)*	*(66)* ***43.4 %*** *(36.1 - 51.0 95% C.I.)*
Shire Highlands **Boys;** n=146 **Girls;** n = 169	*(75)* ***51.4 %*** *(41.3 - 61.4 95% C.I.)*	*(73)* ***43.2 %*** *(35.3 - 51.4 95% C.I.)*
Lake Chilwa Phalombe Plain **Boys;** n = 151 **Girls;** n = 152	*(79)* ***52.3 %*** *(43.9 - 60.6 95% C.I.)*	*(74)* ***48.7 %*** *(40.6 - 56.8 95% C.I.)*

3.2.5 Prevalence of stunting based on height for age z scores

Consistent with the prevalence of underweight, the prevalence of stunting was highest in Lake Chilwa Phalombe Plains followed by Mulanje Thyolo Tea Estates, Lower Shire and Shire Highlands, and Rift Valley Escarpment in that order, Figure 4. Results for prevalence of stunting by sex consistently show high levels among boys than girls across all the livelihood zones, Table 8. The distribution by age categories across the zones is universal. All children are affected and the trend is the same in all the five zones (Appendix 6.12).

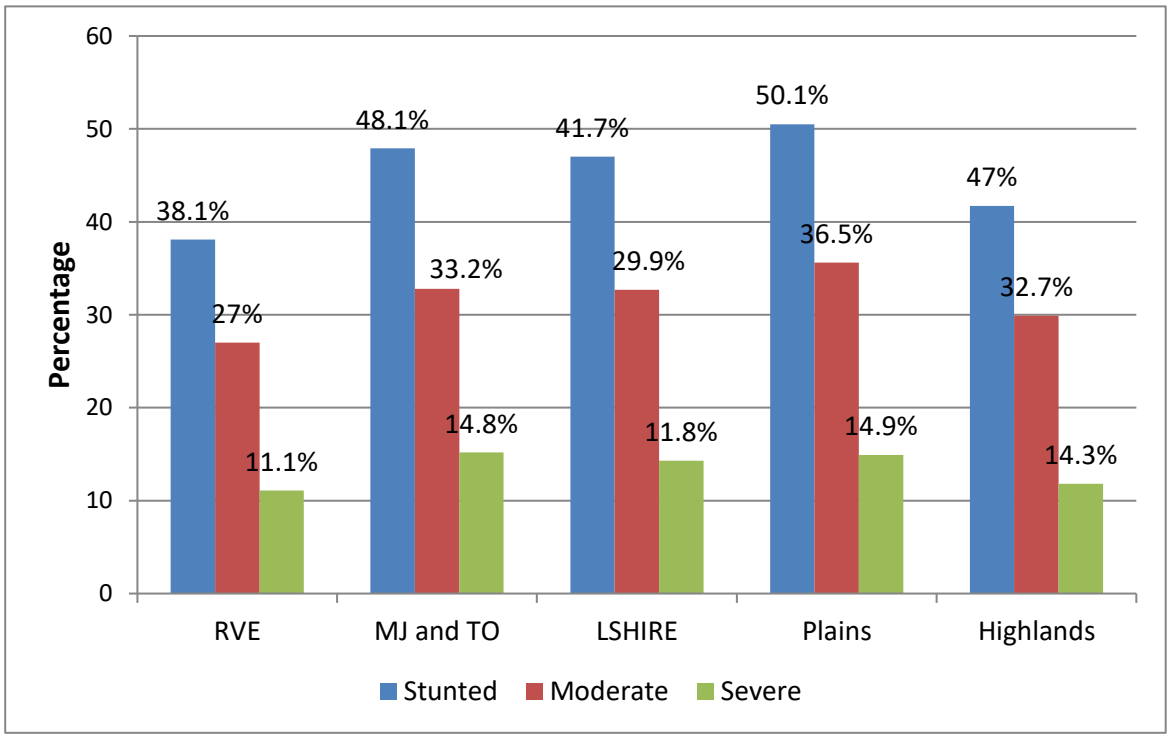


Figure 4: Prevalence of stunting in the five livelihood zones

Table 8: Prevalence of underweight based on stunting; height-for-age z-scores by sex

	Prevalence of stunting (<-2 z-score)	
	BOYS	**GIRLS**

Rift Valley Escarpment **Boys;** n=134 **Girls;** n = 155	*(60)* ***44.8 %*** *(34.6 - 55.4 95% C.I.)*	*(50)* ***32.3 %*** *(24.5 - 41.2 95% C.I.)*
Lower Shire Highlands **Boys;** n=163 **Girls;** n = 185	*(74)* ***45.4 %*** *(38.0 - 53.0 95% C.I.)*	*(71)* ***38.4 %*** *(32.0 - 45.2 95% C.I.)*
Thyolo - Mulanje Tea Estates **Boys;** n=139 **Girls;** n = 152	*(73)* ***52.9 %*** *(44.2 - 61.5 95% C.I.)*	*(66)* ***43.4 %*** *(36.1 - 51.0 95% C.I.)*
Shire Highlands **Boys;** n=146 **Girls;** n = 169	*(75)* ***51.4 %*** *(41.3 - 61.4 95% C.I.)*	*(73)* ***43.2 %*** *(35.3 - 51.4 95% C.I.)*
Lake Chilwa Phalombe Plain **Boys;** n = 151 **Girls;** n = 152	*(79)* ***52.3 %*** *(43.9 - 60.6 95% C.I.)*	*(74)* ***48.7 %*** *(40.6- 56.8 95% C.I.)*

3.2.6 Mean z scores, Design effects and excluded subjects

Table 9: Mean z-scores, Design Effects and excluded subjects by livelihood zone

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Rift Valley Escarpment					
Weight-for-Height	294	0.05±0.89	1.41	0	4
Weight-for-Age	294	-0.87±0.99	1.00	0	4
Height-for-Age	289	-1.62±1.12	1.51	0	9
Lower Shire					
Weight-for-Height	320	0.15±0.94	1.00	1	2
Weight-for-Age	320	-0.94±1.00	1.29	0	3
Height-for-Age	315	-1.90±1.05	1.82	1	7
Thyolo - Mulanje Tea Estates					
Weight-for-Height	291	0.15±0.94	1.00	0	0
Weight-for-Age	291	-1.00±0.95	1.35	0	0
Height-for-Age	290	-1.96±1.04	1.00	0	1
Shire Highlands					
Weight-for-Height	354	-0.06±0.88	1.67	1	1
Weight-for-Age	351	-1.02±0.94	1.00	0	5
Height-for-Age	348	1.76±1.07	1.05	1	7
Lake Chilwa Phalombe Plain					
Weight-for-Height	312	-0.03±0.90	1.00	2	0
Weight-for-Age	311	-1.12±1.00	1.17	0	3
Height-for-Age	303	-1.90±1.08	1.28	2	9

3.3 Infant and Young Child Feeding

Feeding practices are the underlying determinants of child's nutritional status hence growth and development. Poor nutritional status exposes a child to illness which can lead to death. In the

surveys, information on infant and young child feeding practices from birth was solicited from the respondents and the results are presented in Table 10 and Figures 5 to 8. The results indicate that nearly all children (98 to 100%) under-five years were breastfed.

Among the children under-five years, most mothers (about 70%) indicated that breastfeeding was initiated within the first half hour after birth. Over 97% of the mothers indicated that their children had received colostrum. In addition, about 85% of the respondents in all the livelihood zones indicated that they had exclusively breastfed their babies for the first six months of life. These findings may be a reflection of mothers' knowledge of appropriate child feeding practices and not necessarily that they put the knowledge into practice.

It is of concern that a significant proportion of children (6 to 11.4 %) had been given pre-lacteals and this proportion is over double the proportion of 3% reported in 2010 MDHS report (NSO and ICF Macro, 2011). This practice should strongly be discouraged because it limits the frequency of breastfeeding and exposes the baby to the risk of infection early in life.

Table 10: Child breast feeding practices of children under-five years of age by Livelihood Zone

Parameter	Rift Valley Escarpment (RVE)	Lower Shire	Thyolo - Mulanje Tea Estates	Shire Highlands	Lake Chilwa Phalombe Plain
	n=244	n=267	n=252	n=237	n=255
Child ever been breastfed	97.5	99.3	100.0	100.0	99.2
Percent children breastfed within the first hour after birth	71.2	67.4	77.8	73.8	74.8
Percent children received colostrum	97.1	97.8	98.0	97.9	98.4
Percent children given pre-lacteal feeding	9.4	6.0	5.2	11.4	9.8
Percent children exclusively breastfed	87.3	85.7	82.8	83.6	85.7
Percent children still breast feeding	47.1	44.6	31.3	39.2	39.2
Percent children ever bottle fed	11.2	4.9	7.2	8.1	10.2

According to the results, nearly all children (99%) born in the two years preceding the survey had been breastfed and findings are similar to those reported for MDHS (NSO and ICF Macro, 2011. In RVE zone only 67.1% of the children were still breastfeeding and yet the national guideline recommends continued breastfeeding up to 24 months and beyond. Practically all non-breastfed children had been fed solid/semi solid food a day before data collection. In comparison, more than 80 % of breastfed children had also received solid/semi solid food as well.

With the exception of RVE livelihood zone, about 95% of the breastfed children had received breast milk 7 times or more the previous 24 hours. The results confirm that breastfeeding in Malawi is universal and this should continue to be promoted.

3.3.1 Infant and young child minimum acceptable diet: prevalence

Information on the types of foods given to the youngest children under 2 years of age during day and night (24 hour recall) preceding the survey and feeding frequency was collected in all the five surveys. From this information, proportion of children aged 6-23months who received minimum acceptable diet, defined as consumption of at least four out of seven food groups in the previous 24 hours, by their breastfeeding status were generated. The results are presented in Figure 5. Overall, 2% of the breastfed children had received a minimum acceptable diet. Among the non-breastfed children, 2.7 percent had received a minimum acceptable diet and the highest proportion was in Lake Chilwa Phalombe Plains livelihood zone (20%). By implication therefore, these children are at high risk of malnutrition and may explain the high chronic malnutrition prevalence recorded in all the livelihood zones.

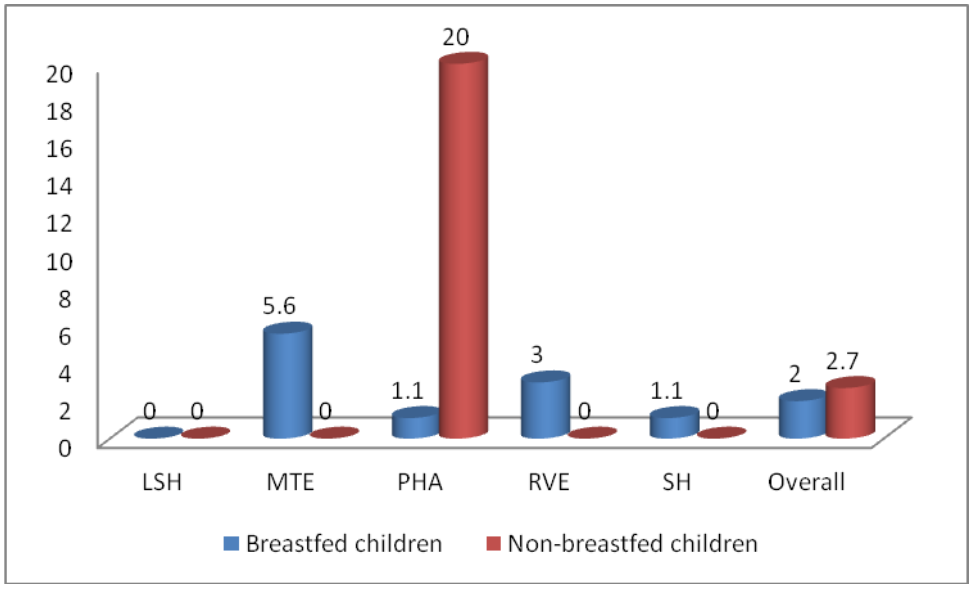


Figure 5: Proportion of breastfeed and non-breastfed children who received minimum acceptable diet by livelihood zone

3.3.2 Infant and Young child minimum acceptable meal frequency

Information on the number of times breastfed and non-breastfed children under 2 years of age were fed during day and night (24 hour recall) preceding the survey and feeding frequency was collected. From this information the proportion of children aged 6-23months who received minimum feeding frequency, that is, receiving solid or semi-solid foods at least four times per day were generated. The results are presented in Figure 6. Overall, only 8.1%t of breastfed children aged 6-23 months received a minimum acceptable diet

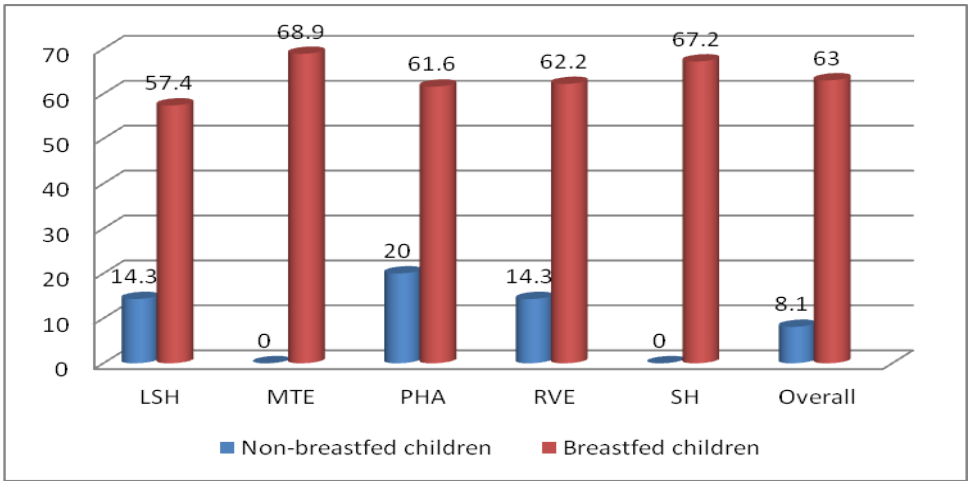


Figure 6: Minimum meal frequency for breastfed and non-breastfed children aged 6-23 months

3.3.3 Child dietary diversity

Presented in Figure 7 is dietary diversity for the breastfed and non-breastfed children respectively. Overall, 72.3% of breastfed children aged 6 -23 months had received diets with low dietary diversity in all the surveyed districts based on the Malawi six food group concepts. Only a small proportion of

the children (about 6%) had highly diversified diets the day before interview. LSH zone had the highest (76.8%) proportion consuming low diversified diets.

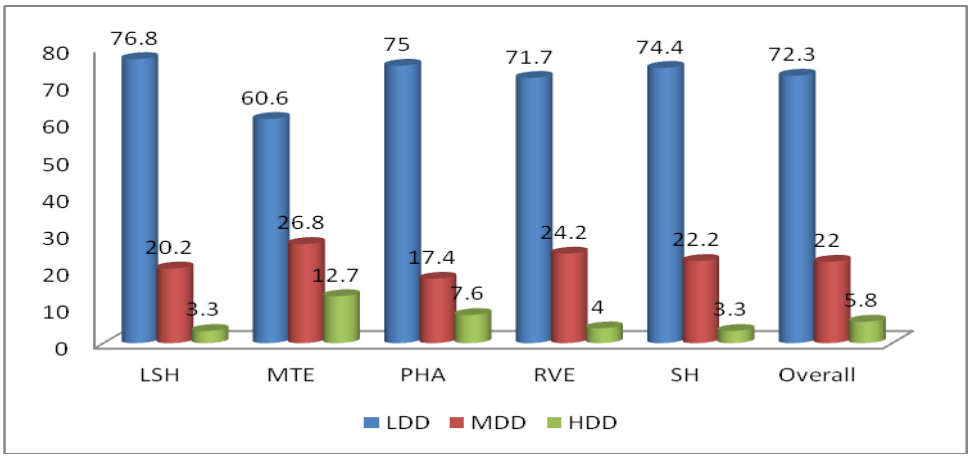


Figure 7: Dietary diversity for breastfed children aged 6-23 months by livelihood zone

It is of grave concern that almost all non-breastfed children in MTE and SH livelihood zones had diets with low dietary diversity, Figure 8. These children are no longer being breastfed hence solely dependent on the non-nutritious bulky porridge which was the main food given to children. Based on the results, only a small proportion of the children (5.8% of breastfed and 8.1% of non-breastfed children) had received highly diversified diets. These results suggest that a high proportion of the children in all the zones are not receiving adequate nourishment and are at high risk of malnutrition if no interventions are not put in place.

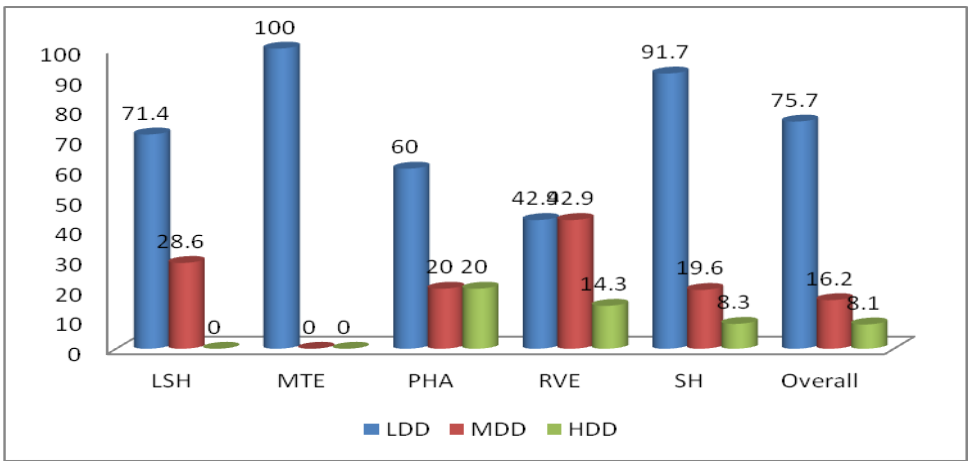


Figure 8: Dietary diversity for non-breastfeed children by livelihood zone

3.4 Household Food Security and Dietary Diversity

The survey also collected information on household food security and dietary diversity. Food security was assessed using the Household Food Insecurity Access Scale (HFIAS). The HFIAS is a tool to assess whether households have experienced problems in food access in the preceding 30 days. It poses nine questions of increasing severity on food security domains, such as anxiety over food, insufficient dietary quality, and the quantity of food. The questions in the tool ask about modifications households made in their diet or food consumption patterns due to limited resources

to acquire food to give an indication of the severity of food insecurity in the past 30 days, as reported by the households themselves. Dietary diversity was assessed using the Household Dietary Diversity Score (HDDS). While the individual dietary diversity score (IDDS) is used as a proxy measure of the nutritional quality of an individual's diet, the HDDS is used as a proxy measure of the socio-economic level of the household. A more diversified diet is highly correlated with such factors as caloric and protein adequacy, percentage of protein from animal sources (high quality protein), and household income.

3.4.1 Food Security

Results in Table 11 show the proportion of households reporting ever experiencing any of the conditions from the 9 questions of the HFIAS. In general, the study results indicate that over 90% of households in all the zones are experiencing anxiety over food shortage and making modifications in dietary quality. The high anxiety levels could reflect worry over the lack of food reserves for the majority of the households as a result of the impacts of the floods on agricultural production. About 80 to 90% have begun cutting down on the quantity of food as evidenced by the proportions that reduced the amount of meals and amount taken per meal. Although some reported experiencing the most severe conditions on a rare basis, taken together, about 35 to 60% of the surveyed population has already begun to go a day or night with nothing to eat. These results are of great concern considering that the data was collected during the post-harvest period when households had just harvested the little that was served inspite of the floods. Based on the responses recorded, Lowershire livelihood zone appears to be the most affected with the largest proportion of households experiencing each of the food insecurity conditions while the Mulanje Thyolo Tea Estates is the least. However, the situation across all zones is worrisome and may worsen as the food harvested gets depleted over time.

Table 11: Proportion of households experiencing different dietary modification patterns

Parameter	LSH n =505	MTE n=563	PHA n=464	RVE n=437	SH n=419
% of households worried due to not having enough food	96.4	90.4	93.8	92.5	94.2
% of households not eating preferred food due to not having enough food	95.5	92.3	93.3	91.3	93.3
% of households not eating different kinds of food due to not having enough food	96.2	92.7	94.4	95.2	95.7
% of households ate food did want to eat due to not having enough food	95.5	90.8	91.0	91.8	92.6
% of households reduced the quantity of meals due to not having enough food	91.1	84.6	86.6	87.0	87.1
% of households ate fewer meals due to not having enough food	90.1	81.7	87.5	89.2	87.8
% of households did not eat all day due to lack	59.6	41.7	56.3	56.8	48.5

of sources to buy food					
% of households slept hungry due to not having enough food	69.7	51.1	60.0	64.1	59.4
% of households not eaten whole day due to not having enough food	59.2	35.0	42.5	43.7	40.8

Data from the surveys were used to generate an average HFIAS score and findings revealed scores ranging from 13 to 15 with the highest score recorded for Shire-Highlands livelihood zone and the lowest for Rift Valley Escarpment zone. Lower Shire and Mulanje Thyolo Tea Estates and Lake Chilwa Phalombe Plains had a mean score of about 14. The HFIAS score is a continuous measure of the degree of food insecurity (access) in the household in the past four weeks (30 days). The maximum score for a household is 27 (the household response to all nine frequency-of-occurrence questions was "often", coded with response code of 3) and the minimum score is 0. The higher the score, the more food insecurity (access) the household experienced. The lower the score, the less food insecurity (access) a household experienced. In terms of prevalence, the proportion of households with food insecurity is very high in all zones as only less than 2.5% can be categorized as being food secure. The proportion is even lower in Lowershire with only 0.6% food secure households. There is an increasing prevalence of food insecurity as the severity increases with over 60% of households in all zones facing severe food insecurity (Table 12).

Table 12: Household Food Insecurity Access Prevalence by zone

	LSH n=505	**MTE** n =563	**PHA** n =464	**RVE** n =437	**SH** n =419
Food secure	0.6	2.2	2.4	2.0	1.8
Mild food insecure	4.3	6.5	6.6	3.7	4.3
Moderate food insecure	18.6	30.6	22.8	23.0	22.1
Severe food insecure	76.5	60.7	68.3	71.3	71.8

3.4.2 Household Dietary Diversity

The HDDS tool used had 12 food groups. The foods included cereals; white tubers and root; Vitamin A rich vegetable and tubers; Vitamin A rich fruits; organ meats; eggs; fish; legumes, nuts and seeds; milk and milk products; oils and fats; sweets; and spices, condiments, beverages. Results showed that over 96% of the population in all livelihood zones consumed staples 24 hours preceding the survey. A high consumption of vitamin A rich vegetables and tubers (over 87%) was also reported followed by legumes, nuts and seeds cereals (over 35%). Although fish consumption was reported by a few households, animal source foods were the least consumed with minimal consumption of

eggs, milk and milk products across all zones (less than 2.5%) indicating poor quality of diets. Variations occurred within food groups across the zones but followed a similar trend within each zone. When groups were compressed into the six food groups based on the Malawi food guide, staples were the most widely consumed followed by vegetables, legumes, oils and fats and animal source foods, in that order. Fruits were the least food group consumed although people from Shire Highlands ate more fruits than those from the other livelihood zones, Table 13.

Table 13: Consumption of the six food groups by zone

Food group	LSH n=505	MTE n=563	PHA n=464	RVE n=437	SH n=419
Staples (Percentage)	99.2	99.3	99.8	97.7	99.8
Vegetables (Percentage)	86.1	87.7	85.6	88.6	85.9
Fruits (Percentage)	6.7	3.7	7.3	9.2	16.2
Legumes (Percentage)	35.6	49.2	45.7	42.8	38.4
Food from animals (Percentage)	19.2	21.1	21.1	21.7	20.5
Oils and fats (Percentage)	21.2	22.9	27.8	30.0	33.4

Table 14 shows the proportion of households consuming a specified number of foods from food groups. Overall, there is low dietary diversity with over 60% of households in each zone consuming food from only 0 to 4 food groups the day preceding the survey. The remaining proportion consumed foods from 5 to 8 food groups and almost none exceeded 9 food groups. The survey tool used had 12 food groups. Comparatively, Lake Chilwa Phalombe Plains, Riftvalley Escarpment and Shire Highlands diversified their diets more than Lower Shire. On the other hand, Mulanje Thyolo Tea Estate, despite reporting few incidences of food insecurity modifications, did not have the largest proportion of households diversifying their diets. When compressed into 6 food groups, results revealed low dietary diversity in all zones followed by medium diversity. Only about 21% to 28% could be classified as having highly diversified diets (Table 14). The mean dietary diversity score averaged around 4 using the 9 food groups and 2 using the 6 food groups. Lower Shire had the lowest score.

Table 14: Dietary diversity categorisation by zone

Dietary diversity	LSH n=505	MTE n=563	PHA n=464	RVE n=437	SH n=419
DD based on 12 food groups:					
0-4 food groups	74.7	70.7	66.0	60.9	67.5

5-8 food groups	25.2	29.1	33.6	39.1	32.2
9-12 food groups	0.2	0.2	0.4	0.0	0.2
DD based on 6 food groups:					
0-2 food groups (LDD)	49.5	41.9	43.3	41.2	39.6
3 food groups (MDD)	29.9	36.2	29.5	31.1	32.2
4-6 food groups (HDD)	20.6	21.9	27.2	27.7	28.2

3.5 Child Morbidity

Children's morbidity interferes with child growth and development and it exacerbates child mortality. Morbidity among children in the previous two weeks prior to the survey was assessed in all the livelihoods zones. Results on childhood morbidities for all the livelihood zones are presented in Figure 9. Fever with chills was the highest reported illness across the zones with Lowershire zone having the highest prevalence (53.7%). Diarrhoea was the second highest reported illness and the prevalences are quite comparable across the zones. However, Lake Chilwa Phalombe Plain reported higher cases of diarrhoea among the five livelihood zones.

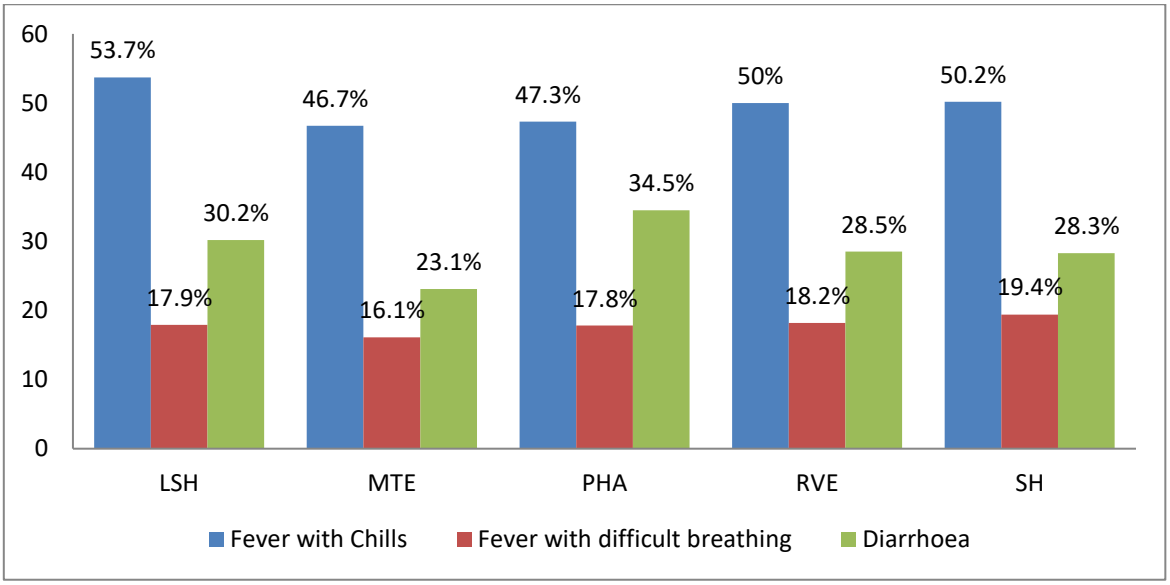


Figure 9: Prevalence of reported illness and symptoms two weeks prior to interview by zone

Where diarrhoea was reported, survey respondents were asked on what actions were taken to stop the diarrhoea. Table 15 presents results on actions that were taken across the five zones. On average, about 75% of the respondents in all the zones took their children to a health facility indicating that health seeking behaviour was high. Across the zones, decisions on what action to take when a child had dirrhoea were made by the caretakers themselves followed by husbands.

Table 15: Actions taken by the caregivers on children with diarrhoea by Zone

% of children with diarrhoea in last 2 weeks who:	LSH	MTE	PHA	RVE	SH
	n=81	n=59	n=89	n=70	n=67
Continued to breastfeed	4.9	6.8	9.0	32.9	14.9
Increased food intake	1.2	0.0	6.7	7.1	6.0
Gave salt for diarrhoea at home	12.3	5.1	11.2	11.4	23.9
went to Church/preacher	0.0	0.0	0.0	1.4	0.0
Went to traditional healer	0.0	0.0	3.4	0.0	1.5
Went to health centre-post/hospital	72.8	84.7	74.2	77.1	65.7
Did nothing	6.2	5.1	9.0	2.9	7.5
Decision maker for seeking care for diarrhoeal episode	**n=80**	**n=58**	**n=89**	**n=69**	**n=67**
Self	78.8	93.1	70.8	71.0	74.6
Grandmother	6.3	1.7	11.2	5.8	7.5
Husband	13.8	10.3	22.5	18.8	16.4

3.6 Water and Sanitation

Access to safe and clean drinking water and proper disposal of wastes have significant effects on health through reduction in incidence of waterborne diseases which in turn affect the nutritional status of children. Water and sanitation improvements affect health primarily by reducing transmission of waterborne diseases such as diarrhoea, cholera and dysentery.

3.6.1 Sources of Drinking Water

In the assessment of the availability, adequacy and access by households to clean and safe water and sanitation, the survey results indicate that over 86 percent of households are using improved water sources across all the five zones, a result which is consistent with MGD Endline survey of 2014 (National Statistics Office, 2015). Improved and safe water sources include piped water, public or community tap, borehole and protected well, Table 16 However, Lowershire zone had a slightly higher percentage (18) of households who were obtained drinking water from unsafe sources.

Table 16: Main source of drinking water by Zone

Source of drinking water	SH	MTE	LCPP	RVE	SH
	n=502	n=562	n=463	n=437	n=415
% HH using improved water sources	82.1	84.7	89.6	89.0	88.0
% HH using unimproved water sources	17.9	15.3	10.4	11.0	12.0
Piped water in dwelling	1.8	1.1	0.6	0.0	0.0
Piped into yard or plot	1.6	2.3	0.4	0.9	0.5
Public tap	4.2	15.1	19.7	6.6	1.7

Borehole with pump	73.1	64.2	64.8	78.3	84.8
Protected dug well	1.2	1.8	1.9	3.2	1.0
Protected spring	0.2	0.2	2.2	0.0	0.0
Rain water collection	0.0	0.0	0.0	0.0	0.0
Unprotected dug well	6.0	7.7	9.1	4.8	3.4
Unprotected spring	0.4	1.6	0.2	0.0	1.2
Pond, river or stream	11.6	6.0	1.1	3.4	7.5
Tanker-truck, vendor	0.0	0.0	0.0	0.0	0.0

3.6.2 Ownership and use of Sanitation Facilities

Proper disposal of wastes may result in better health due to reduction in disease conditions such as diarrhoea and parasitic infections which in turn can reduce mortality. In addition, ownership of sanitation facilities such as latrines gives dignity to household members. Over 87% of the households in all the zones had and were using a traditional pit latrine, Table 17.
Despite this finding, about 13% of households in Lowershire zone had no sanitary facilities and hence were practising open defecation (open fields or bush).

Table 17: Household Toilet Facility by Zone

Sanitation/toilet facility (%)	**LSH**	**MTE**	**PHA**	**RVE**	**SH**
	n=505	n=562	n=463	n=431	n=417
Proportion of household whose toilet is in the dwelling compound	58.7	71.4	69.6	70.4	70.5
Flush to sewage system or septic tank	1.2	0.4	0.0	0.0	0.2
Pour flush latrine (water seal type)	0.4	0.2	0.0	0.0	0.2
Improved pit latrine (eg VIP)	1.2	4.4	1.1	3.2	1.0
Traditional pit latrine	81.4	89.7	88.6	87.9	90.2
Open pit	2.8	1.6	3.7	2.3	4.1
No facilities or Bush or field	13.1	3.7	6.7	6.5	4.3

Table 18 shows results on households' practices on management of stools from children under the age of 5 years. Majority of the respondents (over 67%) were disposing off stools from children under the age of 5 in toilets an indication of an increase in the adoption of appropriate child waste disposal practices. On the other hand, about 12% of the households in Lowershire were just burring child stool within their household yard or compound.

Table 18: Household practices for managing stools from under 5 children (Percent)

Household Practices	**LSH**	**MTE**	**PHA**	**RVE**	**SH**
	n=278	**n=250**	**n=266**	**n=255**	**n=236**
Children always use toilet or latrine	14.4	34.0	28.9	22.4	22.5
Thrown into toilet or latrine	68.7	64.4	62.4	71.0	72.5
Thrown outside the yard	4.3	1.2	4.1	3.5	2.1
Buried in the yard	11.9	0.0	4.1	3.1	3.0
Not disposed off or left on	0.7	0.4	0.4	0.0	0.0

ground					

3.6.3 Measles Vaccination and Vitamin A Supplementation

Due to high levels of vitamin A deficiencies in Malawi, supplementation of vitamin A is done on a routine basis and biannually to children aged 6 to 59 months. Similarly, it was also imperative to assess coverage of measles vaccination for children aged 9 to 59 months. Results are presented in Table 19.

Table 19: Measles and vitamin A supplementation coverage

	LSH	**MTE**	**PHA**	**RVE**	**SH**
Measles vaccination	n=334	n=271	n=295	n=284	=308
Card based (Percent)	47.3	52.0	60.0	46.1	44.5
Mother's recall (Percent)	47.3	41.7	33.6	35.9	48.4
Vitamin A supplementation	n=356	N=284	N=314	N=298	N=323
Card based (Percent)	0.6	1.1	0.3	0.3	0.3
Mother's recall (Percent)	68.0	80.3	35.0	35.9	76.5

Overall, measles vaccination coverage appears to be low across the five livelihood zones irrespective of whether information was based on card or mothers recall. The measles coverage rates were below the internationally recommended 95%. On the other hand, vitamin A supplementation was only highest in Mulanje Thyolo and Shire highlands livelihood zones. The results also show that there is literally no recording of vitamin A in child's card when it is administered. The results show that Lake Chilwa Phalombe Plain, Rift Valley Escarpment and Lowershire livelihood zones had much lower coverages of vitamin A supplementation. Coverage rates for vitamin A supplementation were below the 90% coverage levels recommended internationally.

4 CONCLUSIONS AND RECOMMENDATIONS

Conclusion

The overall sex ratio in all study areas falls within acceptable levels of 0.8-1.2. Slight over and under representation in some survey areas were noticed. This was attributable to estimation of ages in some areas by use of the local calendar of events.

Acute malnutrition levels in all the five surveys undertaken in the 15 flood affected districts fell within acceptable levels. These findings are in line with other surveys undertaken in the Malawi such as EFSA 2013, MICS 2014 and MDHS 2010 that unveiled an average of 4% GAM levels.

Despite the effects of the flooding, the acute malnutrition rates in all the livelihood zones are within the acceptable levels. This result could be explained by a number of factors for example; 1) the food and non food response by the Malawi Government and all the other partners during the flooding helped in cushioning the households hence their situation did not worsen. The rates of stunting in the livelihood zones remained high and comparable to national estimates of 42% recently reported in the Endline survey (NSO, 2015).

The coverage rates for measles vaccination based on both card documentation and mother's recall were high but below the internationally recommended 95%. Coverage rates for vitamin A supplementation based on card and mother's recall were very low and were below the 90% coverage levels recommended internationally.

The infant and young child feeding indicators especially related to breastfeeding practices were high such as timely initiation of breastfeeding, and exclusive breastfeeding. Dietary diversity and consumption of acceptable meal frequency among children 6-23 months were in general very low in all the livelihood zones. The household dietary diversity among the surveyed population was low. There was limited consumption of fruits, animal food, legumes and fats.

Recommendations

The Malawi Government and her collaborating partners should continue providing the support to the affected families in order to sustain the low levels of acute malnutrition and reduce chronic malnutrition. Given that dietary diversity is closely linked to household food security and livelihood status, implementing focused food security and livelihood interventions would be necessary to improve food diversity among the affected population.

There is need to implement specific strategies with a set of interventions targeting underfive year old children to reduce high levels of chronic malnutrition. This may include strengthening IYCF programmes to improve diet of children <2 years and enhancing the general dietary diversity at household level by implementing food security and livelihood interventions such as encouraging back yard gardens. This would help in improving access to a wider variety of foods especially those foods rich in micronutrients that would help to reduce stunting rates.

Despite the acceptable prevalence of GAM found in this study, it is strongly recommended that there should be continous monitoring of the nutrition situation because of the flooding and severe dry spell experienced this year.

There is need for Government and partners to fully plan for adequate food supplies and production

inputs to promote irrigation farming so that households can eventually become self reliant.

5 REFERENCES

Caotes, J., Swindale,A., and Bilinsky, P.(2006). *Household Food Insecurity Access Scale (HFIAS) for Measurement of Household Food Access:* Indicator Guide (v.2) Washington DC.: Food and Nutrition Techincal Project, Academy for educational Development, pp 5-22.

Malawi 2015 Floods Post Disaster Needs Assessment Report (PDNA); The World Bank Group SMART Methodology. 2015. Sample Size Calculation Recommendations

Malawi Vulnerability Assessment Commmittee (2013), Emergency Food Security Assessment (EFSA) Malawi, Lilongwe, Malawi.

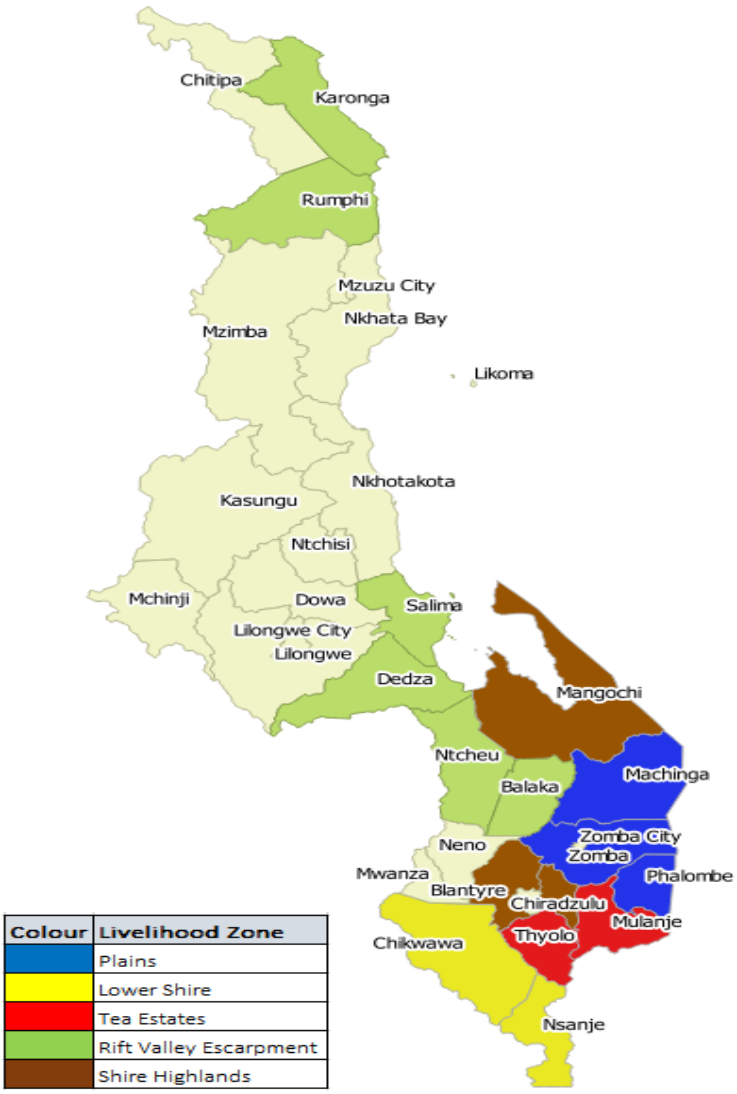
National Statistical Office. 2015. Malawi MDG Endline Survey 2014. Zomba, Malawi: National Statistical Office

National Statistical Office (NSO) and ICF Macro. 2011. *Malawi Demographic and Health Survey 2010*. Zomba, Malawi, and Calverton, Maryland, USA: NSO and ICF Macro.

Swindale,Anee and Paula Bilinsky (2006). *Household Dietary Diversity Score (HDDS) for Measurement of Household Food Access:* Indicator Guide (v.2) Washington D.C.: FHI 360/FANTA.

6 APPENDICES

Appendix 6.1: Livelihood map of Malawi



Appendix 6.2: Sample size calculation Rift Valley Escarpment

Parameters for Anthropometry	Value	Assumptions based on context
Estimated Prevalence of GAM (%)	5	EFSA 2014[4], (ranged from 0.9% for RU and NU to 4.1% for KA (Specific district GAM are RU/NU 0.9%, BK 2.5%, DZ1.6%, SA 3.5%, KA 4.1%). A value of 5% was chosen because the prevalence of GAM may have increased due to the flooding.
± Desired precision	3.0	SMART recommendation based on estimated prevalence of 5-10% GAM[5].
Design Effect	1.3	MDHS 2010, (North 1.141%, Central 1.223, South, 1.278%). DEFF may have slightly increased as a result of flooding.
Children to be included	287	
Average HH Size	4.6	EFSA 2014. Ranged from 4.6 to 5.3; MICS 2015. 4.5%. The lower average HH size was used to ensure that the sample size of children is achieved.
% Children under-5	15.0	MDHS 2010 (17.2%) and MICS 2015 (16%). A lower % children under 5 was selected to ensure that the sample size of children is achieved
% Non-response Households	3	The likelihood of non-response for this non-invasive SMART survey will be low.
Households to be included	476	
Number of clusters	30	# Clusters =476/16=29.75 clusters rounded to 30 clusters to ensure that the sample size of 287 children is achieved

Appendix 6.3: Sample size calculation Lower Shire

Parameters for Anthropometry	Value	Assumptions based on context
Estimated Prevalence of GAM (%)	6	EFSA 2014[6], (ranged from 2.9% to 5.4 A value of 6% was chosen because the prevalence of GAM may have increased due to the flooding.
± Desired precision	3.0	SMART recommendation based on estimated prevalence of 5-10% GAM[7].
Design Effect	1.3	MDHS 2010, (North 1.141%, Central 1.223, South, 1.278%). DEFF may have slightly increased as a result of flooding.
Children to be included	341	
Average HH Size	4.6	EFSA 2014. Ranged from 4.6 to 5.3. MICS 2015. 4.5% The lower average HH size was used to ensure that the sample size of children is achieved.
% Children under-5	15.0	MDHS 2010. 17.2%. MICS 2015. 16% A lower % children under 5 was selected to ensure that the sample size of children is achieved

[4]Malawi Emergency Food Security Assessment. 2014. MVAC, LUANAR, WFP, UNICEF.

[5]SMART Methodology. 2015. Sample Size Calculation Recommendations.

[6]Malawi Emergency Food Security Assessment. 2014. MVAC, LUANAR, WFP, UNICEF.

[7]SMART Methodology. 2015. Sample Size Calculation Recommendations.

% Non-response Households	3	The likelihood of non-response for this non-invasive SMART survey will be low.
Households to be included	566	
Number of clusters	36	# Clusters =566/16=35.375 clusters rounded to 36 clusters to ensure that the sample size of 341 children is achieved

Appendix 6. 4: Sample size calculation Thyolo - Mulanje Tea Estates

Parameters for Anthropometry	Value	Assumptions based on context
Estimated Prevalence of GAM (%)	6	EFSA 2014[8], (ranged from 2.9% to 8.2%. A value of 6% was chosen because the prevalence of GAM may not have increased to 8% but should have been closer to 8% due to the flooding.
± Desired precision	3.0	SMART recommendation based on estimated prevalence of 5-10% GAM[9].
Design Effect	1.3	MDHS 2010, (North 1.141%, Central 1.223, South, 1.278%). DEFF may have slightly increased as a result of flooding.
Children to be included	341	
Average HH Size	4.5	EFSA 2014. Ranged from 4.5 to 5.3. MICS 2015. 4.5% The lower average HH size was used to ensure that the sample size of children is achieved.
% Children under-5	15.0	MDHS 2010. 17.2%. MICS 2015. 16% A lower % children under 5 was selected to ensure that the sample size of children is achieved
%Non-response Households	3	The likelihood of non-response for this non-invasive SMART survey will be low.
Households to be included	578	
Number of clusters	37	# Clusters =578/16=36.125 clusters rounded to 37 clusters to ensure that the sample size of 341 children is achieved

Appendix 6.5: Sample size calculation Shire Highlands

Parameters for Anthropometry	Value	Assumptions based on context
Estimated Prevalence of GAM (%)	4.5	EFSA 2014[10], (ranged from 0.9% to 2.0%. A value of 4.5% was chosen because the prevalence of GAM may have increased due to the flooding and also to ensure that a minimum of 25 clusters is reached.
± Desired precision	3.0	SMART recommendation based on estimated prevalence of 5-10% GAM[11].
Design Effect	1.3	MDHS 2010, (North 1.141%, Central 1.223, South, 1.278%).

[8]Malawi Emergency Food Security Assessment. 2014. MVAC, LUANAR, WFP, UNICEF.

[9]SMART Methodology. 2015. Sample Size Calculation Recommendations.

[10]Malawi Emergency Food Security Assessment. 2014. MVAC, LUANAR, WFP, UNICEF.

[11]SMART Methodology. 2015. Sample Size Calculation Recommendations.

		DEFF may have slightly increased as a result of flooding.
Children to be included	260	
Average HH Size	4.5	EFSA 2014. Ranged from 4.5 to 5.4. MICS 2015. 4.5% The lower average HH size was used to ensure that the sample size of children is achieved.
% Children under-5	15.0	MDHS 2010 (17.2%) and MICS 2015 (16%). A lower % children under 5 was selected to ensure that the sample size of children is achieved
% Non-response Households	3	The likelihood of non-response for this non-invasive SMART survey will be low.
Households to be included	441	
Number of clusters	28	# Clusters =441/16=27.563 clusters rounded to 28 clusters to ensure that the sample size of 260 children is achieved

Appendix 6.6: Sample size calculation Lake Chilwa Phalombe Plain

Parameters for Anthropometry	Value	Assumptions based on context
Estimated Prevalence of GAM (%)	5	EFSA 2014[12], (ranged from 0.4% to 2.8%. A value of 5% was chosen because the area was heavily affected by flooding and prevalence of GAM may have increased beyond its normal ranges found in previous surveys.
± Desired precision	3.0	SMART recommendation based on estimated prevalence of 5-10% GAM[13].
Design Effect	1.3	MDHS 2010, (North 1.141%, Central 1.223, South, 1.278%). DEFF may have slightly increased as a result of flooding.
Children to be included	287	
Average HH Size	4.6	EFSA 2014. Ranged from 4.6 to 5.5. MICS 2015. 4.5% The lower average HH size was used to ensure that the sample size of children is achieved.
% Children under-5	15.0	MDHS 2010 (17.2%) and MICS 2015 (16%). A lower % children under 5 was selected to ensure that the sample size of children is achieved
% Non-response Households	3	The likelihood of non-response for this non-invasive SMART survey will be low.
Households to be included	476	
Number of clusters	30	# Clusters =476/16=29.75 clusters rounded to 30 clusters to ensure that the sample size of 287 children is achieved

[12]Malawi Emergency Food Security Assessment. 2014. MVAC, LUANAR, WFP, UNICEF.

[13]SMART Methodology. 2015. Sample Size Calculation Recommendations.

Appendix 6.7: Questionnaires: Anthropometric Questionnaire

HOUSEHOLD QUESTIONNAIRE FOR NUTRITION SURVEY; JUNE 2015

MODULE A : IDENTIFICATION			
A1	Day/Month/Year of Interview /____ /____ / 2015	A10	Village / City Name ……..
A2	Livelihood Zone Name ……..	A11	Measurer Name ……ID……Sign……
A3	EA code ……	A12	Assistant Name……..ID……Sign……
A4	EPA Name……..	A13	Team leader Name ……..ID……..Sign……..
A5	District Name…….	A14	Supervisor Name……ID……Sign……
A6	TA Name ……..	A15	Data entry clerk ……ID……Sign……
A7	Cluster No. /___/___/		
A8	Household No. /___/___/___/		
A9	Urban/Rural (Urban=1, Rural=2) /___/		

MODULE B: 6-59 MONTHS CHILDREN ANTHROPOMETRY, VITAMIN A, FEEDING PROGRAMME												
Child No	**Sex** 1=Male 2=Female	**Date of Birth (dd/mm/yy)**	**Age in months**	**Weight (Kg)** (00.0)	**Length/Height (cm)** (000.0)	**Measure** **L**= if child measured lying down instead of height **H =** vice versa.	**MUAC (mm) left arm** (000.0)	**Bilateral pitting Oedema** Yes=1; No=2;	**Measles*** 1: By card 2: Recall 3: No 4: Not applicable (<9 months)	**Vit A***	**** Child in feeding prog. last 6 mos If yes specify. No=0**	****Child in feeding program now. If yes specify. No=0**
1												
2												
3												

Key:

*Measles &Vitamin A: 1=Yes with health passport confirmation; 2=Yes without health confirmation; 3=No; 4=Not applicable.

Feeding program: 1=NRU; 2=SFP; 3=CTC/OTP; 99=Other specify_____*The exact birth date should only be taken from an age documentation showing day, month and year of birth. It is only recorded if official age documentation is available. **Leave blank if no official age documentation is available.

**If no age documentation is available, estimate age using local event calendar. If an official age documentation is available, record the age in months from the date of birth

Appendix 6.7: NUTRITION SURVEY HOUSEHOLD QUESTIONNAIRE JUNE 2015.

INFORMED CONSENT PAGE (KUPEMPHA CHILOLEZO)

(Onetsetsani kuti mwatenga chilorezo kuchokera kwa anthu omwe mukufuna kucheza nawo).

Zikomo chifukwa chondilandira pakhomo panu. Dzina langa ndi_____. Ndachokera ku sukulu ya ukachenjede ya Lilongwe University of Agriculture and Natural Resources (LUANAR) imene inkatchedwa kuti Bunda. Tikugwira ntchito ya kafukufuku mogwirizana ndi boma ndichithandizo chochokera ku UNICEF. Mu kafukufukuyu, tikufuna tidziwe momwe nkhani za umoyo, chakudya ndi kadyedwe koyenera zikuyendera kumadera komwe kunakhudzidwa ndi kusefukila kwa madzi. Dera lanu/khomo lanu lasankhidwa mwamayere kutenga nawo mbali mukafukufukuyi mukuimira mabanja ena onse omwe ali kudera kuno. Ngati mukusamalira mwana osapitilira zaka zisanu, tikupemphani kuti mwana wanu timukweze pa sikelo ndi kumuyesa kutalika kwake ndi zina zokhudza sikelo. Ngati musankhe kutenga nawo mbali, kucheza kwathu sikupitilira ola limodzi.

Ndinu omasuka kutenga nawo mbali pa kafukufuku ameneyu komanso simukukakamizidwa kutero. Ngati mwavomera kucheza nafe, ndinu omasuka kuyankha mafunso komaso mukhoza kusiya mafunso omwe simungathe kuyankha. Mayankho anu adzagwiritsidwa ntchito mukafukufuku yekhayu. Tidzawasunga mwa chisinsi, komaso sitidzapereka dzina lanu kwa munthu wina aliyese. Zokambirana zonse zidzasungidwa mmalo otetezedwa bwino ndipo anthu okhawo akafukufuku ochokera ku LUANAR kapena a boma adzaloledwa kugwiritsa ntchito zotsatira zakafukuyi. ***Kodi muli ndi funso pa zomwe ndafotokozazi?***

Kodi mukuvomera kutenga nawo mbali mukafukufukuyi? Inde = 1 Ayi= 2

Ngati mungakhale ndi mafuso ena kapena ndemanga pa zokambirana zathu, muli omasuka kuyimba foni ku LUANAR pogwiritsa ntchito nambala izi: **0888 851 870** kapena **0997 499 385**

MODULE A : IDENTIFICATION			
A1	Day/Month/Year of Interview /____ /____ / 2015	**A8**	Household No. /___/___/___/
A2	Livelihood Zone Name …….....	**A9**	Urban/Rural (Urban=1, Rural=2) /___/
A3	EA code …….....	**A10**	Village / City Name ……..
A4	EPA name.....	**A11**	Enumerator name..... ID.....Sign: .....
A5	District Name…….....	**A12**	Team leader name …… ID.....Sign…… …..
A6	TA name……..	**A13**	Supervisor name..... ID.....Sign: .....

A7	Cluster No. /___/___/	**A14**	Data entry clerk..... ID.....Sign: .....

NOTE: TARGET RESPONDENT IS MOTHER/CARETAKER BUT OTHER ADULT HH MEMBER (PARTICULARLY HOUSEHOLD HEAD) CAN BE INTERVIEWED IF MOTHER IS ABSENT

MODULE B : HOUSEHOLD SOCIO-ECONOMIC CHARACTERISTICS		
Household Composition		
B1	Dzina la oyankha/ respondent	……..
B2	Wammuna/wamkazi /sex	Male ……..1 Female ……..2
B3	Zaka zawo/ age *(**in completed years**)*	/___/___/ years
B4	Ubale wa oyankha ndi mwana/ Relationship of respondent to the Youngest Eligible Child ***(To be administered where household has child under 5)***	Mother……...1 Father……,…….2 Grandmother……...3 Aunt/Uncle……..4 Sibling……5 Other(specify)…….....99
B5	Muli pa banja? (**Ngati inde, funsani ngati ali pa mitala kapena ayi**)	Currently Married – monogamous…….....1 Currently Married – polygamous…….....2 Widowed……3 Divorced…….. ……..4 Single……...5 Orphan (if under 18 years of age)…….....6
B6	Dzina la mutu wa banja lino ndi ndani? *(**ask for key decision maker**)*	……..
B7	Ndi amuna kapena akazi?	Male ……..1 Female ……..2
B8	Ali ndi zaka zingati? *(**in completed years**)*	/___/___/ years
B9	Ali pa banja? **(Ngati inde, funsani ngati ali pamitala)**	Currently Married – monogamous…….....1 Currently Married – polygamous…….....2 Widowed……...3 Divorced…….. ……..4 Single……..5 Orphan if under 18 years of age)…….....6
B10	Kodi pakhomo pano mumakhalapo anthu angati? (**osawerengela alendo**)	_____
B11	Kodi ana osaposela zaka zisanu alipo angati? **(If none aged 0 to 59 months, indicate 0 in the response)**	_____
B12	Mwa ana mwatchulawa, ndi angati amene anakwanitsa miyezi isanu ndi umodzi (6 months) koma sanakwanitse zaka zisanu? **(if none aged 6-59 months, indicate 0 in**	_____

	the response)	
Education		
B13	Kodi mumatha kulemba kapena kuwerenga?	Yes ……..…1 No….. ……...…..…2
B14	Nanga mutu wa banja lino amalemba kapena kuwerenga?	Yes ……..…1 No….. ……...…..…2
B15	Maphunziro munapita nawo patali bwanji? **(ask the highest level completed)**	Adult literacy……...1 Tertiary……..…..4 Primary ……...2 University ……...…5 Secondary……3 Never attended school…..6 Other (Specify)_____99
B16	Nanga mutu wa banja anapita nawo patali bwanji? **(ask the highest level completed)**	Adult literacy……1 Tertiary…….....…4 Primary ……..…2 University ……...…5 Secondary…….....3 Never attended school.....…6 Other (Specify)_____99

Household Occupation, Assets and Food Security				
B17	Kodi mumagwira ntchito yanji kuti muzipeza ndalama? **(Ngati atchula zinthu zinngapo, fufuzani njira yomwe amayidalira kwambiri)**	Farmer……....1 Carpentry ……....2 Tailor……3 Charcoal maker…….....4 Brick maker……...5	Formal employment…….……6 Casual labour…….....…7 Business…….....…8 None…….....…9 Other(specify)_____9 9	
B18	Nanga mutu wa banja lino amagwira ntchito yanji kuti apeze ndalama?**(Ngati atchula zinthu zinngapo, fufuzani njira yomwe amayidalira kwambiri)**	Farmer……...1 Carpentry ……...2 Tailor……3 Charcoal maker…….....4 Brick maker……...5	Formal employment…….……6 Casual labour…….....7 Business…….....…8 None…….....9 Other(specify)_____9 9	
B19	Kodi alipo pa banja pano amene anafunsirako ganyu ulimi wangopitawu? **(funsani za chaka chatha - 2013/2014)**	Yes ……..…1 No….. ……...…..…2		
B20	Kodi pabanja pano munalembapo anthu ena ganyu ulimi wangopitawu?**(funsani za chaka chatha – 2013/2014)**	Yes ……..…1 No….. ……...…..…2		**2⇒ B22**
B21	Ngati inde, munalembapo anthu ganyu maulendo angati?	/_____/___/ times		

B22	Pakadali pano, chakudya chimene mukudya, mukuchipeza bwanji?	Own Food Production……..…1 Purchased Food……..2 Borrowed Food……3 Food Gift……4 Food Aid……5 Ganyu ……6 Food for work……7 Other (specify)_____99	

MODULE C: WATER AND SANITATION		
C1	Kodi madzi akumwa apakhomo pano mumatunga kuti **nthawi zambiri**?	Piped water in dwelling…….....1 Piped into yard or plot…….....2 Public tap…….3 Borehole with pump…….4 Protected dug well…….....5 Protected spring…….....6 Rainwater collection…….7 Unprotected dug well……..8 Unprotected spring…….....9 Pond, river or stream…….....10 Tanker-truck, vendor…….....11 Other specify_____99
C2	Zimakutengerani nthawi yayitali bwanji kuti mupite, kutunga madzi ndi kubwerako?	No. Minutes…….__ __ __ minutes Water on premises…….88
C3	Kodi banja lanu limagwiritsa ntchito chimbudzi chamtundu wanji?	Flush to sewage system or septic tank……...1 Pour flush latrine (water seal type)……2 Improved pit latrine (e.g VIP)…….....3 Traditional pit latrine…….4 Open pit…….5 Bucket…….6 No facilities or bush or field…….....7 Other specify _____99
C5	Malowa/kapena chimbudzichi chili kuti? (**funsani ngati chilli pakhomo pomwepo kapena ayi**)	Yes, in dwelling/yard/compound ……1 No, outside dwelling/yard/compound……..2
C6	Kodi chimbudzi cha ana ang'ono osaposa zaka zisanu (omwe sangathe kupita okha kuchimbudzi) mumasamala bwanji?? (**To be administered if household has child under 5)**	Children always use toilet or latrine……....1 Thrown into toilet or latrine…….2 Thrown outside the yard……..3 Buried in the yard……....4 Not disposed off or left on ground …….....5 Other specify…….99

MODULE D :
HOUSEHOLD FOOD SECURITY AND DIETARY DIVERSITY

D1. FOOD SECURITY

Instructions for Use

Ask the questions A - I in the column below. If respondent indicates incident occurred, you will then ask about the frequency of occurrence in past 4 weeks, whether **rarely** (1 - 2 times), **sometimes** (3 - 10 times) or **often** (more than 10). Depending on the response, mark the corresponding number/code (0-3) in the boxes below.

Question: Kodi pamasabata anayi apitawa,.....	**0 = Never**	**1= Rarely** (once or twice in the past 4 weeks)	**2 = Sometimes** (3 to 10 times in the past 4 weeks)	**3 = Often** (>10 times in the past 4 weeks)
A) Munakhalako ndi **nkhawa** kuti mukhala ndi chakudya chosakwanira pakhomo panu?				
B) Inu kapena wina pakhomo pano **analephera kudya zakudya zimene akanakonda kudya chifukwa chochepekedwa**?				
C) Inu kapena wina pakhomo pano **analephera kudya zakudya zamitundu yosiyanasiyana** (kudya mwakasinthasintha) **chifukwa chochepekedwa**?				
D) Inu kapena wina pakhomo pano anadyapo **zakudya zoti samafuna kudya** chifukwa cha kusowa kuthekera kopezera zakudya zina?				
E) Inu kapena wina pakhomo pano **anadyapo chakudya chochepa chifukwa kunalibe chakudya chokwanira**?				
F) Inu kapena wina pakhomo pano **anadya mopereweza pa tsiku chifukwa kunalibe chakudya chokwanira**?				
G) Pali tsiku lina lirilonse lomwe khomo lanu **linakhalilatu opanda chakudya cha mtundu uliwonse** chifukwa chochepekedwa?				
H) Inu kapena wina pakhomo **pano anagonapo ndi njala chifukwa chakudya chinali chosakwanira**?				
I) Inu kapena wina pakhomo pano anaswera kapena **anaswera/kuchoma ndi njala tsiku lonse chifukwa chakudya chinali chosakwanira**?				
Total for Each Column:				
Total for Whole Table:				

D2. HOUSEHOLD ***DIETARY DIVERSITY QUESTIONNAIRE***

Please describe the foods (meals and snacks) that <u>you or any household member</u> ate yesterday during the day and night, <u>excluding foods eaten outside the home.</u> As foods are being mentioned, indicate by circling/underlining the examples given. If anyone food is mentioned in a food group, indicate yes in the column to the right. For foods not whose food groups you are unsure of, indicate then under other foods.

Question number	Food group	Examples	YES=1 NO=0
D2.1	CEREALS	Bread, noodles, biscuits, cookies or any other foods made from millet, sorghum, maize, rice, wheat + *insert local foods e.g. nsima, porridge or pastes or other locally available grains*	
D2.2	VITAMIN A RICH VEGETABLES AND TUBERS	Pumpkin, carrots, squash, or sweet potatoes that are orange inside + *other locally available vitamin-A rich vegetables(e.g. sweet pepper)*	
D2.3	WHITE TUBERS AND ROOTS	White potatoes, white yams, cassava, or foods made from	
D2.4	DARK GREEN LEAFY VEGETABLES	Dark green/leafy vegetables, including wild ones + *locally available vitamin-A rich leaves such as cassava leaves etc.*	
D2.5	OTHER VEGETABLES	Other vegetables (e.g. tomato, onion, eggplant) , including wild vegetables	
D2.6	VITAMIN A RICH FRUITS	ripe mangoes, cantaloupe, dried apricots, dried peaches + *other locally available vitamin A-rich fruits*	
D2.7	OTHER FRUITS	other fruits, including wild fruits	
D2.8	ORGAN MEAT (IRON-RICH)	liver, kidney, heart or other organ meats or blood-based foods	
D2.9	FLESH MEATS	beef, pork, lamb, goat, rabbit, wild game, chicken, duck, or other birds	
D2.10	EGGS		
D2.11	FISH	fresh or dried fish or shellfish	
D2.12	LEGUMES, NUTS AND SEEDS	beans, peas, lentils, nuts, seeds or foods made from these	
D2.13	INSECTS	insect larvae, lake fly, ants, bwannoni	
D2.14	MILK AND MILK PRODUCTS	milk, cheese, yogurt or other milk products	
D2.15	OILS AND FATS	oil, fats or butter added to food or used for cooking	
D2.16	SWEETS	sugar, honey, sweetened soda or sugary foods such as chocolates, sweets or candies	
D2.17	SPICES, CONDIMENTS, BEVERAGES	Spices (black pepper, salt), condiments (soy sauce, hot sauce), coffee, tea, thobwa, mahewu, soft drinks, freezes, etc...	
D2.18	ALCOHOLIC BEVERAGES	Masese, Kachasu, Chikokeyani, Kabanga, Carlsberg, Gin,etc...	
D2.19	OTHER FOODS (Specify)		

MODULE E: INFANT AND CHILD FEEDING

#	Questions	Code
E1		CHILD Name:_____ ID |___|____|
E2	Child sex	Male ……1 Female…….2
E3	Tsiku lobadwa (DD/MM/YYYY)	____/_____/_____
E4	Zaka za mwana, < Name >?	|___|____| months 1= Verified in health document 2=Reported by mother
E5	Kodi (dzina) anayamwitsidwapo?	Yes…….1 No……
E6	Panadutsa nthawi yayitali bwanji mwanayu atangobadwa kuti ayikidwe kubere koyamba?	Within the 1 hour ..... 1 After the first hour..... 2 Not Put To The Breast At All……3
E7	Alipo wina amene anamudyetsako <NAME> chakudya /chakumwa chilichonse kupatulapo mkaka wa mmawere atangobadwa	Yes…… 1 No…….. 2
E8	Anampatsa chiyani mwanayu atangobadwa <IMMEDIATELY>? **Probe to ask everything that was given to the baby, even if someone else gave it to the baby**.	Breast milk…. ..... 1 Waterly porriadge (Mzuwa/Dawale) …….....2 Plain Water..... 3 Infant Formula…….…….....4 Herbal Infusion……..5 Fruit Juice..... 6 Soft Drinks..... 7 Tea ..... 8 Milk (Other Than Breast Milk)..... 9 Other (Specify)_____ ... 99
E9	Kodi anapereka zimenezo ndindani? (IMMEDIATELY after birth) (Multiple response possible)	Health Professional……1 TBA ……..2 Mother/Mother in law..... 3 Other Family members..... 4 Neighbors/ Friends..... 5 Other (Specify) __ 99

#	Questions	Code
E10	Kodi munamupatsa <NAME> mkaka woyamba kutuluka? (*first yellow milk)*?	Yes …….....01>>215 No …….....02
E11	Ngati AYI, chifukwa chani sanapatsidwe? PROBE AND NOTE ALL THE RESPONSES	Not Good For The Baby……..……1 Baby Was Thirsty……..2 It is Yellow therefore sour…..……3 It is our Tradition……..4 Told to do so…….5 Others (Specify)……..……99
E12	Anapanga choganizo kuti asapatsidwe mkaka oyambilira ndi ndani?	Health Professional……1 TBA ……..2 Mother/Mother in law..... 3 Other Family members..... 4 Neighbors/ Friends..... 5 Self……6 Other (Specify) __ 99
E13	Kodi munayamba liti kumpatsa zakudya zina kupatula mkaka wa mmawere?	_____months
E14	Kodi anapanga chiganizo choti muyambe kumupatsa zakudya zina ndi ndani?	Health Professional……1 TBA ……..2 Mother/Mother in law..... 3 Other Family members..... 4 Neighbors/ Friends..... 5 Self……6 Other (Specify) __ 99
E15	Kodi mwanayu munayamba mwapatsako mkaka wa m'botolo?	Yes……..1 No……2
E16	Kodi mwanayu akuyamwabe?	Yes……1 No……2
E16b	Anapanga chiganizo chomusiyitsa kuyamwa ndi ndani?	Self……1 Health worker…… 2 Grandmother……3 Other(specify)……..99

Complementary feeding				
E17	Did "Child Name" receive food yesterday?		Yes ……..1 No….. ……..2	**2 ⇒**
E18	How many times "Child Name" receive food yesterday?	Once……1 Twice……..2 Three times...3	Four times…….4 Five times……5 More than Five times…6	
E19	Did you prepare special meals for "Child Name" yesterday?		Yes ……..1 No….. ……..2	**2 ⇒E21**

E20	Specify composition of special meal for "Child Name"?	Staples ……../___/ Vegetables……/___/ Fruits……/___/ Legumes……../___/ Food from animals./___/ Fats/sugar ……/___/	
E21	What prevented you to prepare "Child Name" special meals yesterday?	Don't know how to do…….1 Lack of time……..2 Lack of food……3 Other (specify) _____99	
Minimum Acceptable Diet (to be administered to the youngest child aged 6 to 24months)			
E22	Did you ever breastfeed (NAME)? **(*Do not ask question , refer to response given in E5)***	YES……..1 NO……2	
E23	Is he/she still being breastfed? ***(Do not ask question , refer to previous response given in E16)***	YES……..1 NO……..2	If 1,➔E26
E21	NON BREASTFED CHILD: Did (NAME) eat any solid or semi-solid food in the last 24 hours?	YES……..1 NO…… …….2	➔ END
E22	NON BREASTFED CHILD: How many times did you feed (NAME) solid or semi-solid food in the last 24 hours? PROBE: ANY MORE?	☐ NUMBER OF TIMES	
E23	BREASTFED CHILD: How many times did you breastfeed (NAME) in the last 24 hours? PROBE: ANY MORE?	☐ NUMBER OF TIMES	
E24	BREASTFED CHILD: Did (NAME) eat any solid or semi-solid food in the last 24 hours?	YES……1 NO……..2 DON'T KNOW……..77	

F. CHILD DIETARY DIVERSITY: youngest child aged 6 to 59 months
This section is determining the dietary diversity of the child. The questions are asked about THE CHILD'S DIET during the past 24 hours.

Now I would like to ask you some questions about (NAME's) diet.
Please tell me everything that **(NAME)** ate yesterday during the day or night, whether at home or outside the home, either separately or combined with other foods. (Tsopano ndikufunsani za kasinthasintha wa chakudya cha mwanayu. Ndifotokozereni chakudya chilichonse chimene mwanayu anadya dzulo kapena usiku (pankhomo pano kapena kwina)

INSTRUCTIONS FOR DATA COLLECTORS:
AS THE RESPONDENT RECALLS FOODS, ASK THE NUMBER OF TIMES THE CHILD ATE THAT PARTICULAR FOOD. MARK THE NUMBER IN THE COLUMN TO THE RIGHT OF THE FOOD GROUP CALLED "NUMBER OF TIMES". LEAVE BLANK THE COLUMN MARKED "TABULATION ONLY".
IF THE FOOD IS NOT LISTED IN ANY OF THE FOOD GROUPS BELOW, WRITE THE FOOD IN THE BOX LABELED "OTHER FOODS". IF FOODS ARE USED IN SMALL AMOUNTS FOR SEASONING OR AS A CONDIMENT, INCLUDE THEM UNDER THE CONDIMENTS FOOD GROUP.

PROMPTS:

- *Think about when (NAME) woke up in the morning, did (NAME) eat anything at that time? Please tell me everything (NAME) ate? Anything else? Mwanayu anadya chakudya chilichonse atangodzuka m'mawa. Ndifotokozereni chakudya chimene anadya*
- *What did (NAME) do after that? Did (NAME) eat anything at that time? Please tell me everything (NAME) ate? Anything else? Ngati anadyaso chakudya china funsani kuti anadyaso chiyani?*
- *Repeat the above questioning until the respondent states that (NAME) went to sleep for the night*

IF RESPONDENT MENTIONS MIXED DISHES LIKE A SAUCE OR STEW, PROBE: Funsani mobwereza ngati mwana anadya zakudya zophatiki
*What ingredients were in that **(MIXED DISH)**? PROBE: Anything else? Until the respondent says, 'nothing else'*

No.	Food Groups	NUMBER OF TIMES	TABULATION ONLY
D25			
A.	**INFANT FORMULA, MILK OTHER THAN BREAST MILK, CHEESE OR YOGHURT OR OTHER MILK PRODUCTS**		
	A.1 **Commercial produced infant formula** *IF YES: How many times did (NAME) drink infant formula? NUMBER OF TIMES DRANK (Kodi ndi kangati mwanayu anamwa mkaka wa m'chitini?*		
	A.2 **Milk such as tinned, powdered, or fresh animal milk** *IF YES: How many times did (NAME) drink milk? NUMBER OF TIMES DRANK? Ndikangati mwanayu anamwa mkawa wa madzimadzi*		
	A.3 Yogurt IF YES: How many times did (NAME) drink/eat yogurt? NUMBER OF TIMES DRANK/ATE? Kodi mwanayu anamwako yogati? Ndikangati?		
B.	**FOOD FROM GRAINS, ROOTS, AND TUBER INCLUDING PORRIDGE AND FORTIFIED BABY FOOD FROM GRAINS**		

	B.1 **Baby cereals/foods** Any Cerelac (Likuni Phala, Nestum, Purity, Sibusiso)?		
	B.2 **Porridge, cereals/grains, noodles and bread** Ex: porridge, bread, biscuits, kala, rice, bulghur wheat, cornmeal, quaker oats, cream of wheat, fufu, dumboy, farina, GB, eddoes, potatoes Buledi, bisiketi, mchewere, Mapira, Chimanga, mpunga, tirigu, nsima, phala, thobwa, mawere ndi chikondamoyo, mikate, sikono, chitumbuwa, mandasi, cake, Tondido/mbanjiwa		
	B.3 **White tubers and roots** Mbatata yoyera, koko, chinangwa, kachewere/mbatatesi, zilazi Nyika		
C. VITAMIN A- RICH FRUITS AND VEGETABLES (and red palm oil)			
	C.1 **Vitamin A rich vegetables and tubers** Maungu, kaloti, mbatata yachikasu, phonda zachikasu		
	C.2 **Dark green leafy vegetables** Masamba obiliwira monga: Bonongwe, chisoso/kazota, luni, mwamuna aligone, chigwada, kholowa, nkhwani, khwanya, chitambe, kamuganje, mpiru, lepu, Chinizi, kamwamba/sagowa, kadzulo, denje, nsendeka, mnadzi		
	C.3 **Vitamin A rich fruits** Mango akupsa, mavwembe, mapapaya,		
D. Other fruits and vegetables;			
	D.1 **Other Fruits** Zipatso zolimidwa kapena zopezeka mtchire: masuku, madimu, maorenji, mandalane/nachesi, bwemba, malambe, manyumwa, chitimbe		
	D.2 **Other vegetables** Matimati, anyezi, mabiligano/mabilunjala, kabichi,therere lobala/chithanda, kadzinje/kalire, bowa, nkhaka, kayimbi, zipwete, zikanyanga, kwasakwasa/zikhupule		
	E.1 **Eggs** Mazira a bakha, nkhuku, nkhanga, nkhwali, mazira ang'ona		
F. Meat, poultry, fish, and shellfish (and organ meats)			
	F.1 **Organ meat (Iron rich)** Ziwindi, Impso, mtima, kapamba/sathamagazi, utchazo/uwende, mthubwana, mapapo		
	F.2 **Flesh Meats** Nyama ya: Ng'ombe, nkhumba, nkhosa, mbuzi, kalulu, nyama za nthengo, nkhuku, bakha, nkhanga, khuku ndembo, nkhunda, mbira, mbewa ndi mbalame zina monga: nsanasana Msuzi wa nyama		
	F.3 **Fish** Nsomba zaziwisi kapena zowuma (chambo, matemba, usipa,, ndi zina) Msuzi wa nsomba		

	F.4 **Insects and Larva** Mphalabungu, inswa, mafulufute, nkhululu, bwanoni, matondo, mabwabwa, malasa nkhuli, sesenya, dzombe, ziboli, nkhungu, bobo/numkhadala, nkhunguni Msuzi		
G. Legumes and nuts			
	G.1 Nyemba/mbwanda, nandolo, khobwe, nseula, nzama, mtedza, khungudzu, chitowe, kapena chakudya chopangidwa kuzimenezi, soya, mphodza, ntchana, nsawawa, kamumpanda, kalongonda		
H. Oils and Fats			
	H.1 Mafuta anyama, Majarini, butter, mafuta ophikira		
I. CONDIMENTS			
	SPICES E.G. ROYCO, CURRY,PEPPER		
<u>OTHER FOODS</u>: PLEASE WRITE DOWN OTHER FOODS IN THIS BOX THAT RESPONDENT MENTIONED BUT ARE NOT IN THE LIST ABOVE:			

MODULE G : CHILDREN MORBIDITY			
Children Recent Morbidity and Caring ***(To be administered to households with child/ren under 5)***			
G1	Pamasabata awiri apitawa alipo mwana/wana osakwanitsa zaka zisanu anadwalapo matenda awa?	Fever with Chills ……..1-Yes ; 2- No Fever with difficult breathing……..….1-Yes ; 2- No Diarrhea……..……1-Yes ; 2- No	**If diarrhoea⇒ G 3**
G2	Ngati anatsegulapo m'mimba, inu munachitapo chiyani zitatero?	Continue to breastfed ……...1 Increase food intake……..2 Cease breastfeeding ……...3 Cease giving food……...4 Give salt for diarrhea at home……...5 Go to church / preacher	

		……6 Go to traditional healer……..7 Go to health center-post / hospital……8 Nothing…….....9 Other (specify) _____ 99	
G2.1	Anapanga chiganizo pazomwe munachita pa nthawi yomwe mwanayo amatsekula mmimba ndi ndani?	Self.....…… 1 Grandmother……...2 Husband……3 Other(specify)……99	
G3	Kodi munapitako kusikelo ndi mwana/ana anu osaposa zaka zisanu?	Yes ……1 No….. ……2	
G3.1	Anakulangizani ndani zopita nawo ana kusikelo?	Self…..…… 1 Grandmother……...2 Husband……3 Other(specify)……99	
G4	Pakali pano, mukupitabe naye/nawo kusikelo mwana/ana osaposa zaka zisanu?	Yes ……..…1 No….. ……...…2	

Appendix 6. 8: Summary Plausibility Report of survey areas.

CRITERIA	**Rift Valley Escarpment**	**Lower Shire**	**Thyolo - Mulanje Tea Estates**	**Shire Highland**	**Lake Chilwa Phalombe Plain**
	SCORE	**SCORE**	**SCORE**	**SCORE**	**SCORE**
Flagged data(% of data out of range)	0	0	0	0	0
Overall sex ratio (significant chi square)	0	0	0	0	0
Age ratio(6-29 vs 30-59) (Significant chi square)	0	0	4	0	0
Digit preference score – WEIGHT	0	2	0	2	0
Digit preference score – HEIGHT	0	0	0	0	0
Digit preference score - MUAC	0	2	2	2	0
Standard Dev WHZ	5	5	0	5	5
Skewness WHZ	0	0	0	0	1
Kurtosis WHZ	0	1	0	1	0
Poisson distribution WHZ-2	0	1	0	1	0
OVERALL SCORE WHZ	**5**	**11**	**6**	**11**	**6**

Below are the plausibility checks for each of the five livelihood zones surveyed with cut off points.

Plausibility check for: Rift Valley Escarpment

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 (% of in-range subjects)	Incl	%	0-2.5 0	>2.5-5.0 5	>5.0-7.5 10	>7.5 20	0 (1.3 %)
Overall Sex ratio (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<=0.001 10	0 (p=0.202)
Age ratio(6-29 vs 30-59) (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<=0.001 10	0 (p=0.649)
Dig pref score - weight	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	0 (6)
Dig pref score - height	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	0 (7)
Dig pref score - MUAC	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	0 (3)
Standard Dev WHZ .	Excl	SD	<1.1 and	<1.15 and	<1.20 and	>=1.20 or	
.	Excl	SD	>0.9 0	>0.85 5	>0.80 10	<=0.80 20	5 (0.89)
Skewness WHZ	Excl	#	<±0.2 0	<±0.4 1	<±0.6 3	>=±0.6 5	0 (0.08)
Kurtosis WHZ	Excl	#	<±0.2 0	<±0.4 1	<±0.6 3	>=±0.6 5	0 (0.13)
Poisson dist WHZ-2	Excl	p	>0.05 0	>0.01 1	>0.001 3	<=0.001 5	0 (p=0.073)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	5 %

The overall score of this survey is 5 %, this is excellent.

Plausibility check for: Shire Highland Livelihood zone

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 (% of in-range subjects)	Incl	%	0-2.5 0	>2.5-5.0 5	>5.0-7.5 10	>7.5 20	0	(0.6 %)
Overall Sex ratio (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<=0.001 10	0	(p=0.290)
Age ratio(6-29 vs 30-59) (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<=0.001 10	2	(p=0.085)
Dig pref score - weight	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	0	(4)
Dig pref score - height	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	0	(5)
Dig pref score - MUAC	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	0	(4)
Standard Dev WHZ .	Excl	SD	<1.1 and	<1.15 and	<1.20 and	>=1.20 or		
.	Excl	SD	>0.9 0	>0.85 5	>0.80 10	<=0.80 20	0	(0.94)
Skewness WHZ	Excl	#	<±0.2 0	<±0.4 1	<±0.6 3	>=±0.6 5	0	(0.01)
Kurtosis WHZ	Excl	#	<±0.2 0	<±0.4 1	<±0.6 3	>=±0.6 5	1	(-0.20)
Poisson dist WHZ-2	Excl	p	>0.05 0	>0.01 1	>0.001 3	<=0.001 5	0	(p=0.519)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	3	%

The overall score of this survey is 3 %, this is excellent.

Plausibility check for: Mulanje Tea Estates Livelihood zone

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 (% of in-range subjects)	Incl	%	0-2.5 0	>2.5-5.0 5	>5.0-7.5 10	>7.5 20	0 (0.0 %)
Overall Sex ratio (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<=0.001 10	0 (p=0.446)
Age ratio(6-29 vs 30-59) (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<=0.001 10	4 (p=0.008)
Dig pref score - weight	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	0 (6)
Dig pref score - height	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	0 (7)
Dig pref score - MUAC	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	2 (9)
Standard Dev WHZ	Excl	SD	<1.1 and	<1.15 and	<1.20 and	>=1.20 or	
.	Excl	SD	>0.9 0	>0.85 5	>0.80 10	<=0.80 20	0 (0.94)
Skewness WHZ	Excl	#	<±0.2 0	<±0.4 1	<±0.6 3	>=±0.6 5	0 (-0.07)
Kurtosis WHZ	Excl	#	<±0.2 0	<±0.4 1	<±0.6 3	>=±0.6 5	0 (0.00)
Poisson dist WHZ-2	Excl	p	>0.05 0	>0.01 1	>0.001 3	<=0.001 5	0 (p=0.612)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	6 %

The overall score of this survey is 6 %, this is excellent.

Plausibility check for: Lower Shire Livelihood Zone

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 (% of in-range subjects)	Incl	%	0-2.5 0	>2.5-5.0 5	>5.0-7.5 10	>7.5 20	0 (0.3 %)
Overall Sex ratio (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<=0.001 10	0 (p=0.289)
Age ratio(6-29 vs 30-59) (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<=0.001 10	0 (p=0.796)
Dig pref score - weight	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	2 (8)
Dig pref score - height	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	0 (6)
Dig pref score - MUAC	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	2 (8)
Standard Dev WHZ	Excl	SD	<1.1 and	<1.15 and	<1.20 and	>=1.20 or	
.	Excl	SD	>0.9 0	>0.85 5	>0.80 10	<=0.80 20	5 (0.88)
Skewness WHZ	Excl	#	<±0.2 0	<±0.4 1	<±0.6 3	>=±0.6 5	0 (-0.17)
Kurtosis WHZ	Excl	#	<±0.2 0	<±0.4 1	<±0.6 3	>=±0.6 5	1 (0.23)
Poisson dist WHZ-2	Excl	p	>0.05 0	>0.01 1	>0.001 3	<=0.001 5	1 (p=0.023)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	11 %

The overall score of this survey is 11 %, this is good.

Plausibility check for: Lake Chilwa Phalombe Plain Livelihood Zone

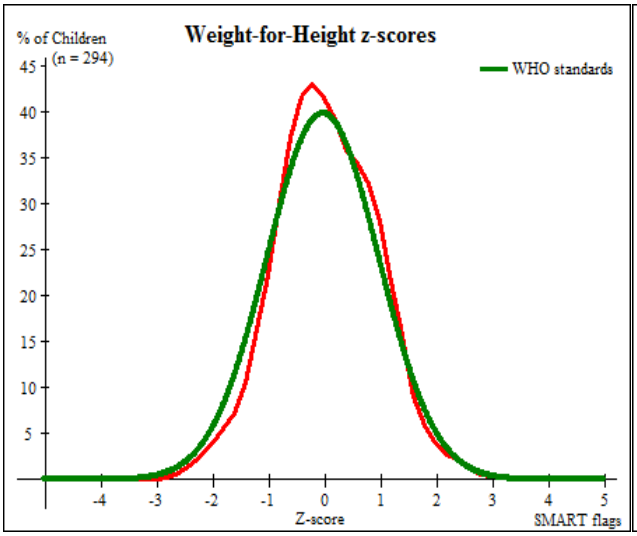
Standard/Reference used for z-score calculation: WHO standards 2006
(If it is not mentioned, flagged data is included in the evaluation. Some parts of this plausibility report are more for advanced users and can be skipped for a standard evaluation)

Overall data quality

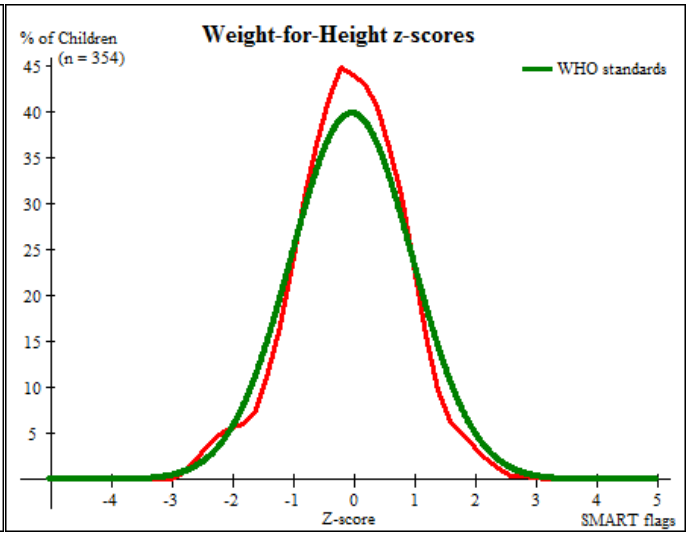
Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	Score	
Flagged data (% of in-range subjects)	Incl	%	0-2.5 0	>2.5-5.0 5	>5.0-7.5 10	>7.5 20	0	(0.0 %)
Overall Sex ratio (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<=0.001 10	0	(p=0.910)
Age ratio(6-29 vs 30-59) (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<=0.001 10	0	(p=0.165)
Dig pref score - weight	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	0	(6)
Dig pref score - height	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	0	(7)
Dig pref score - MUAC	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	0	(6)
Standard Dev WHZ .	Excl	SD	<1.1 and	<1.15 and	<1.20 and	>=1.20 or		
.	Excl	SD	>0.9 0	>0.85 5	>0.80 10	<=0.80 20	5	(0.90)
Skewness WHZ	Excl	#	<±0.2 0	<±0.4 1	<±0.6 3	>=±0.6 5	1	(0.28)
Kurtosis WHZ	Excl	#	<±0.2 0	<±0.4 1	<±0.6 3	>=±0.6 5	0	(0.10)
Poisson dist WHZ-2	Excl	p	>0.05 0	>0.01 1	>0.001 3	<=0.001 5	0	(p=0.572)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	6	%

The overall score of this survey is 6 %, this is excellent.

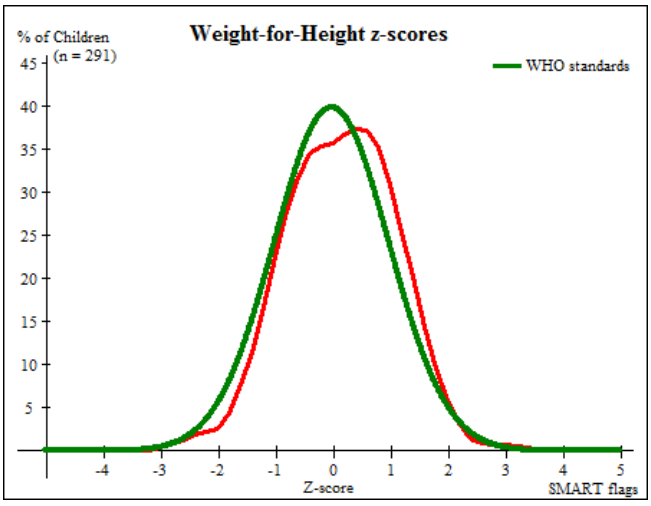
Appendix 6.9: Survey malnutrition distribution curves compared to WHO distribution curves



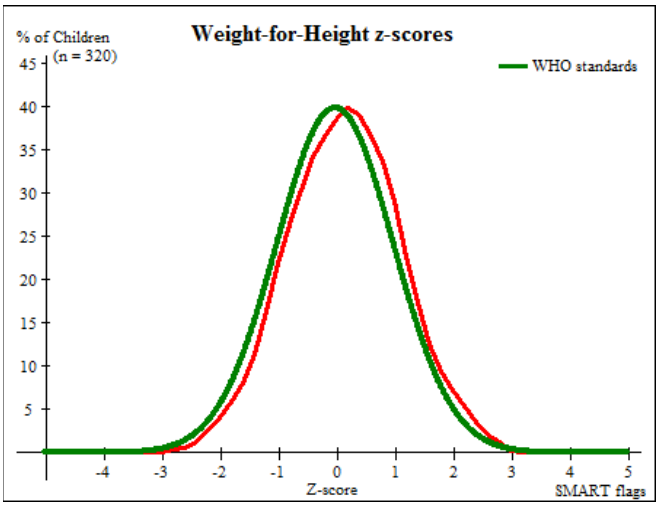
WHZ distribution curve; Rift Valley Escarpment Shire



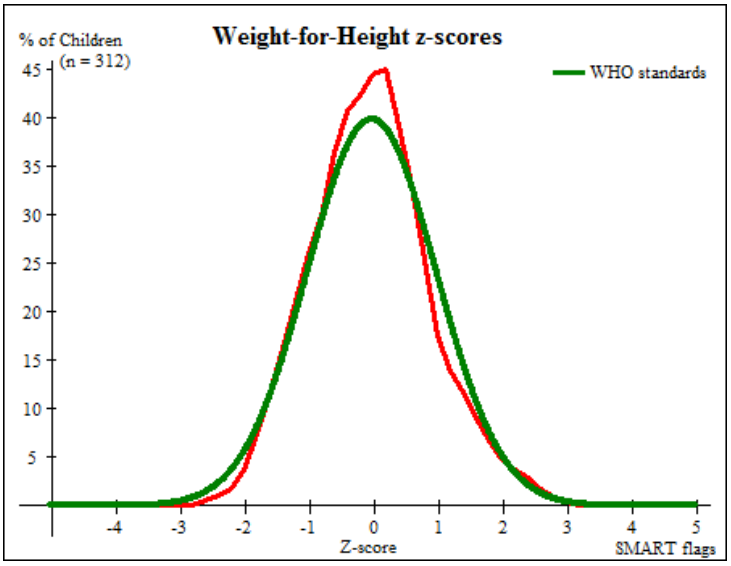
WHZ distribution curve; Lower



WHZ distribution curve; ThyoloMulanje



WHZ distribution curve; Shire Highland



Weight- for-height z-score distribution curve; Lake Chilwa Phalombe Plain

Appendix 6.10: Prevalence of global acute malnutrition by age in the livelihood zones

Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema in Rift Valley Escarpment -June 2015

Age Group		**Severe wasting (<-3 z-score)**		**Moderate wasting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Months	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	71	0	0.0	2	2.8	69	97.2	0	0.0
18-29	60	0	0.0	0	0.0	60	100.0	0	0.0
30-41	63	0	0.0	0	0.0	63	100.0	0	0.0
42-53	70	0	0.0	0	0.0	70	100.0	0	0.0
54-59	30	0	0.0	2	6.7	28	93.3	0	0.0
Total	294	0	0.0	4	1.4	290	98.6	0	0.0

Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema in Lower Shire -July 2015

Age Group		**Severe wasting (<-3 z-score)**		**Moderate wasting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Months	Total no.	No.	%	No.	%	No.	%	No.	%
6-17	77	0	0.0	3	3.9	74	96.1	0	0.0
18-29	87	0	0.0	3	3.4	84	96.6	0	0.0
30-41	96	0	0.0	3	3.1	93	96.9	0	0.0
42-53	70	0	0.0	1	1.4	69	98.6	0	0.0
54-59	24	0	0.0	0	0.0	24	100.0	0	0.0
Total	354	0	0.0	10	2.8	344	97.2	0	0.0

Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema in Thyolo - Mulanje Tea Estates –June/July 2015

Age Group		**Severe wasting (<-3 z-score)**		**Moderate wasting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Months	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	52	0	0.0	0	0.0	52	100.0	0	0.0
18-29	59	0	0.0	0	0.0	59	100.0	0	0.0
30-41	68	0	0.0	3	4.4	65	95.6	0	0.0
42-53	80	0	0.0	1	1.3	79	98.8	0	0.0
54-59	32	0	0.0	0	0.0	32	100.0	0	0.0
Total	291	0	0.0	4	1.4	287	98.6	0	0.0

Prevalence of global acute malnutrition by age, based on weight-for-height z-scores and/or oedema in Lake Chilwa Phalombe Plain - June2015

Age Group		Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Months	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	64	0	0.0	0	0.0	64	100.0	0	0.0
18-29	68	0	0.0	1	1.5	67	98.5	0	0.0
30-41	74	0	0.0	0	0.0	74	100.0	0	0.0
42-53	85	0	0.0	1	1.2	84	98.8	0	0.0
54-59	21	0	0.0	1	4.8	20	95.2	0	0.0
Total	312	0	0.0	3	1.0	309	99.0	0	0.0

Prevalence of global acute malnutrition by age, based on weight-for-height z-scores and/or oedema in Shire Highlands June 2015

Age Group		Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Months	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	58	0	0.0	1	1.7	57	98.3	0	0.0
18-29	73	0	0.0	1	1.4	72	98.6	0	0.0
30-41	78	0	0.0	0	0.0	78	100.0	0	0.0
42-53	84	0	0.0	0	0.0	84	100.0	0	0.0
54-59	27	0	0.0	0	0.0	27	100.0	0	0.0
Total	320	0	0.0	2	0.6	318	99.4	0	0.0

Prevalence of acute malnutrition by age, based on MUAC cut off's and/or oedema in Rift Valley Escarpment -June 2015

Age Group		*Severe wasting (< 115 mm)*		*Moderate wasting (>= 115 mm and < 125 mm)*		*Normal (> = 125 mm)*		*Oedema*	
Months	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	73	0	0.0	2	2.7	71	97.3	0	0.0
18-29	60	0	0.0	0	0.0	60	100.0	0	0.0
30-41	64	0	0.0	0	0.0	64	100.0	0	0.0
42-53	71	0	0.0	0	0.0	71	100.0	0	0.0
54-59	30	0	0.0	0	0.0	30	100.0	0	0.0
Total	298	0	0.0	2	0.7	296	99.3	0	0.0

Prevalence of acute malnutrition by age, based on MUAC cut off's and/or oedema in Lower Shire July 2015

Age Group		**Severe wasting (< 115 mm)**		**Moderate wasting (>= 115 mm and < 125 mm)**		**Normal (> = 125 mm)**		**Oedema**	
Months	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	78	0	0.0	5	6.4	73	93.6	0	0.0
18-29	88	0	0.0	2	2.3	86	97.7	0	0.0
30-41	96	1	1.0	1	1.0	94	97.9	0	0.0
42-53	70	0	0.0	2	2.9	68	97.1	0	0.0
54-59	24	0	0.0	0	0.0	24	100.0	0	0.0
Total	356	1	0.3	10	2.8	345	96.9	0	0.0

Prevalence of acute malnutrition by age, based on MUAC cut off's and/or oedema in Thyolo - Mulanje Tea Estates –June/July 2015

Age Group		**Severe wasting (< 115 mm)**		**Moderate wasting (>= 115 mm and < 125 mm)**		**Normal (> = 125 mm)**		**Oedema**	
Months	Total no.	No.	%	No.	%	No.	%	No.	%
6-17	52	0	0.0	2	3.8	50	96.2	0	0.0
18-29	59	0	0.0	0	0.0	59	100.0	0	0.0
30-41	67	0	0.0	4	6.0	63	94.0	0	0.0
42-53	80	0	0.0	0	0.0	80	100.0	0	0.0
54-59	32	0	0.0	0	0.0	32	100.0	0	0.0
Total	290	0	0.0	6	2.1	284	97.9	0	0.0

Prevalence of acute malnutrition by age, based on MUAC cut off's and/or oedema in Lake Chilwa Phalombe Plain - June2015

Age Group		***Severe wasting (< 115 mm)***		***Moderate wasting (>= 115 mm and < 125 mm)***		***Normal (> = 125 mm)***		***Oedema***	
Months	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	64	1	1.6	4	6.3	59	92.2	0	0.0
18-29	68	0	0.0	4	5.9	64	94.1	0	0.0
30-41	75	1	1.3	0	0.0	74	98.7	0	0.0
42-53	86	0	0.0	0	0.0	86	100.0	0	0.0
54-59	21	0	0.0	0	0.0	21	100.0	0	0.0
Total	314	2	0.6	8	2.5	304	96.8	0	0.0

Prevalence of acute malnutrition by age, based on MUAC cut off's and/or oedema in Shire

Highlands - June2015

Age Group		Severe wasting (< 115 mm)		Moderate wasting (>= 115 mm and < 125 mm)		Normal (> = 125 mm)		Oedema	
Months	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	59	0	0.0	4	6.8	55	93.2	0	0.0
18-29	74	0	0.0	2	2.7	72	97.3	0	0.0
30-41	78	0	0.0	0	0.0	78	100.0	0	0.0
42-53	85	0	0.0	0	0.0	85	100.0	0	0.0
54-59	27	0	0.0	0	0.0	27	100.0	0	0.0
Total	323	0	0.0	6	1.9	317	98.1	0	0.0

Appendix 6.11: Prevalence of Underweight by age in the livelihood zones

Prevalence of underweight by age, based on weight-for-age z-scores in Rift Valley Escarpments

Age Group		Severe underweight (<-3 z-score)		Moderate underweight (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Months	Total number	No.	%	No.	%	No.	%	No.	%
6-17	69	2	2.9	8	11.6	59	85.5	0	0.0
18-29	60	2	3.3	7	11.7	51	85.0	0	0.0
30-41	64	1	1.6	1	1.6	62	96.9	0	0.0
42-53	71	3	4.2	6	8.5	62	87.3	0	0.0
54-59	30	1	3.3	3	10.0	26	86.7	0	0.0
Total	294	9	3.1	25	8.5	260	88.4	0	0.0

Prevalence of underweight by age, based on weight-for-age z-scores in Lower Shire

Age Group		Severe underweight (<-3 z-score)		Moderate underweight (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Months	Total number	No.	%	No.	%	No.	%	No.	%
6-17	59	1	1.7	7	11.9	51	86.4	0	0.0
18-29	72	3	4.2	7	9.7	62	86.1	0	0.0
30-41	78	2	2.6	7	9.0	69	88.5	0	0.0
42-53	84	3	3.6	10	11.9	71	84.5	0	0.0
54-59	27	0	0.0	2	7.4	25	92.6	0	0.0
Total	320	9	2.8	33	10.3	278	86.9	0	0.0

Prevalence of underweight by age, based on weight-for-age z-scores in Thyolo Mulanje Tea Estates

Age Group		Severe underweight (<-3 z-score)		Moderate underweight (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Months	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	52	1	1.9	2	3.8	49	94.2	0	0.0
18-29	59	0	0.0	5	8.5	54	91.5	0	0.0
30-41	68	3	4.4	12	17.6	53	77.9	0	0.0
42-53	80	3	3.8	9	11.3	68	85.0	0	0.0
54-59	32	0	0.0	5	15.6	27	84.4	0	0.0
Total	291	7	2.4	33	11.3	251	86.3	0	0.0

Prevalence of underweight by age, based on weight-for-age z-scores in Shire Highlands

Age Group		Severe underweight (<-3 z-score)		Moderate underweight (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Months	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	76	3	3.9	3	3.9	70	92.1	0	0.0
18-29	87	1	1.1	8	9.2	78	89.7	0	0.0
30-41	95	4	4.2	12	12.6	79	83.2	0	0.0
42-53	69	1	1.4	8	11.6	60	87.0	0	0.0
54-59	24	0	0.0	7	29.2	17	70.8	0	0.0
Total	351	9	2.6	38	10.8	304	86.6	0	0.0

Prevalence of underweight by age, based on weight-for-age z-scores in Lake Chilwa Phalombe Plain

Age Group		Severe underweight (<-3 z-score)		Moderate underweight (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Months	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	63	1	1.6	6	9.5	56	88.9	0	0.0
18-29	67	2	3.0	11	16.4	54	80.6	0	0.0
30-41	75	2	2.7	14	18.7	59	78.7	0	0.0
42-53	85	3	3.5	11	12.9	71	83.5	0	0.0
54-59	21	0	0.0	5	23.8	16	76.2	0	0.0
Total	311	8	2.6	47	15.1	256	82.3	0	0.0

Appendix 6.12: Prevalence of stunting by age in the livelihood zones

Prevalence of stunting by age based on height-for-age z-scores in Rift Valley Escarpments

Age Group		Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
Months	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	69	10	14.5	17	24.6	42	60.9
18-29	60	7	11.7	16	26.7	37	61.7
30-41	63	6	9.5	20	31.7	37	58.7
42-53	68	7	10.3	20	29.4	41	60.3
54-59	29	2	6.9	5	17.2	22	75.9
Total	289	32	11.1	78	27.0	179	61.9

Prevalence of stunting by age based on height-for-age z-scores in Lower Shire

Age Group		Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
Months	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	57	9	15.8	21	36.8	27	47.4
18-29	73	13	17.8	18	24.7	42	57.5
30-41	77	13	16.9	35	45.5	29	37.7
42-53	81	7	8.6	20	24.7	54	66.7
54-59	27	3	11.1	9	33.3	15	55.6
Total	315	45	14.3	103	32.7	167	53.0

Prevalence of stunting by age based on height-for-age z-scores inn Thyolo Mulanje Tea Estates

Age Group		Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
Months	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	52	5	9.6	13	25.0	34	65.4
18-29	58	7	12.1	18	31.0	33	56.9
30-41	68	15	22.1	25	36.8	28	41.2
42-53	80	11	13.8	28	35.0	41	51.3
54-59	32	6	18.8	11	34.4	15	46.9
Total	290	44	15.2	95	32.8	151	52.1

Prevalence of stunting by age based on height-for-age z-scores in Shire highlands

Age Group		Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
Months	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	76	6	7.9	17	22.4	53	69.7
18-29	86	11	12.8	24	27.9	51	59.3
30-41	93	15	16.1	37	39.8	41	44.1
42-53	70	7	10.0	19	27.1	44	62.9

54-59	23	2	8.7	7	30.4	14	60.9
Total	348	41	11.8	104	29.9	203	58.3

Prevalence of stunting by age based on height-for-age z-scores in Lake Chilwa Phalombe Plain

Age Group		Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
Age (months)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	64	5	7.8	18	28.1	41	64.1
18-29	66	11	16.7	23	34.8	32	48.5
30-41	71	16	22.5	30	42.3	25	35.2
42-53	81	11	13.6	32	39.5	38	46.9
54-59	21	2	9.5	5	23.8	14	66.7
Total	303	45	14.9	108	35.6	150	49.5