REPORT OF SEVEN NUTRITION SURVEYS CONDUCTED IN FLOOD AND DROUGHT AFFECTED LIVELIHOOD ZONES OF MALAWI

SURVEY AREAS:

Rift Valley Escarpment Livelihood Zone

Lake Chilwa Phalombe Plains Livelihood Zone

Lower Shire Livelihood Zone

Thyolo-Mulanje Tea Estates Livelihood Zone

Shire Highlands Livelihood Zone

Kasungu Lilongwe Plain Livelihood Zone

Chitipa Karonga Rumphi Mzimba Livelihood Zone

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LIST OF ACRONYMS

ARI	Acute Respiratory Infections
CSI	Coping Strategy Index
EAs	Enumeration Areas
ENA	Emergency Nutrition Assessment
EPI	Expanded Program on Immunization
FCS	Food Consumption Score
FEWS	Feminine Early Warning System
GAM	Global Acute Malnutrition
HFCS	Household Food Consumption Score
HHS	Household Hunger Score
HIV/AIDS	Human immunodeficiency virus infection and acquired immune deficiency syndrome
IFPRI	International Food Policy Research Institute
MAM	Moderate Acute Malnutrition
MDHS	Malawi Demographic and Health Surveys
MHDDS	Minimum Household Dietary Diversity Score
MUAC	Mid-Upper Arm Circumference
MVAC	Malawi Vulnerability Assessment Committee
NSO	National Statistical Office
rCSI	Reduced Coping Strategy Index
SAM	Severe Acute Malnutrition
SMART	Standardized Monitoring and assessment of Relief and Transitions
UNICEF	United Nations Children's Fund
WHO	World Health Organization
DNHA	Department of Nutrition HIV/AIDS
GMP	Growth Monitoring Promotion
BMI	Body Mass Index

EXECUTIVE SUMMARY

Following heavy flooding and drought during the 2014/15 agricultural calendar that resulted in many households experiencing food insecurity, the nutrition cluster, through the leadership of the Department of Nutrition and HIV/AIDS (DNHA), has since been commissioning nutrition surveys using the SMART Methodology. The first survey was conducted in June 2015 covering 15 districts, and several survey rounds have since been conducted to date to assess and keep track of the nutrition situation for informed nutrition response and programming. This report presents findings of the fifth round of nutrition survey conducted in January-February 2018 in seven livelihood zones covering 25 districts. The survey, which used the SMART methodology, targeted children 6 to 59 months of age, and, for the first time, adolescents aged 10-19 years and adults aged 20-49 years. The broad objective was to provide updated information on the nutritional situation of these population groups in the flood and drought affected areas of Malawi, and collected additional indicators on mortality, morbidity and selected food security indicators.

The surveys adopted a two-stage cluster sampling and used the sampling frame from the 2015 Malawi Demographic Health Survey (MDHS) provided by the National Statistics Office (NSO). Sample size calculation for nutrition assessments in children aged 6 to 59 months was based on the expected prevalence of GAM based on results from the May 2016 SMART surveys. Sample size estimation in adolescents was based on the expected prevalence of BMI-for-age. Since no prior data was available in relation to this indicator, a proxy indicator of prevalence of thinness based on BMI less than 18.5 for adolescent girls aged between 10 and 15 years was used, based on the MDHS Survey for 2015/16. In adults, calculation was based on the expected prevalence of BMI of less than 18.5 (prevalence of thinness) using a proxy indicator for prevalence of thinness among women aged 15 – 49 years for the same reason as adolescents. Sample size calculation for crude and under-five mortality was based on the expected death rate per 10,000/day and based on a recall period of 90 days.

In each livelihood zone, the number of clusters were determined by dividing the total estimated number of households (sample size) to be included in the survey for each livelihood zone by the estimated number of households per cluster (22 households). The same number of clusters was used for the adolescent and adult surveys.Data collection began after a 7-day training from 19thJanuary to 13thFebruary, 2018 by 14 teams. Data entry was done in the field by 14 trained data clerksusing 2 packages, CSPro version 6.0.3 and ENA SMART (9th July, 2015 Version) as a data quality control measure. All survey processes were conducted in a way that ensured quality.

Overall, the survey was able to achieve the minimum required sample size (80%) for all the livelihood zones, both at the household level and the individual (children, adolescents, and adults) for anthropometric measurements. The overall quality of seven livelihood zones based on the under five children surveys was ***excellen****t* as per the SMART thresholds.

The overall nutritional situation among the under-five children was acceptable based on WHO global standards (prevalence <5%) and very good compared to results of the last two assessments. Overall weighted GAM prevalence was 1.3% (0.9-1.9), down from 4.1% in the lean period of December 2016, and lower than the post- harvest period of May 2017 (2.2%). Prevalence of GAM ranged from 0.6% in the Karonga/Chitipa/Rumphi/Mzimba (KCRM) livelihood zone to 2.4% in the Thyolo-Mulanje Tea Estates (TMTE) livelihood zone. The greatest change was observed in the Lower Shire livelihood zone (2.2%) from 6.6% in May 2016; 6.2% December 2016; and 4.3 in May 2017 surveys which continues to register a downward trend at every assessment period. Overall SAM prevalence was very low (0.1%) and within normal acceptable ranges across all zones, with no SAM cases reported in 5 out of the 7 livelihood zones. An additional indicator (overweight) for nutritional status was computed and the overall weighted prevalence of overweight was 2.5%, higher than that for GAM (1.3%) revealing an emerging problem to watch out for.

Among adolescents, the overall weighted prevalence of underweight was 4.0% and similar between boys (4.0%) and girls (3.9%). Severe underweight was at 0.3% (ranging from 0% to 0.7%), and, did not differ across the two sexes. Data on overweight and obesity revealed that overweight is a problem among girls (6.6%) than boys (2.2%) with an overall weighted prevalence of 4.4%. Results for obesity showed similar trends (0.8% in girls and 0.3% in boys) with an overall weighted value of 0.5%. These results suggest that among adolescent girls and boys, over-nutrition (4.4%) is as big a problem as under-nutrition (4%), and that girls are at a higher risk of being overweight than boys, necessitating interventions that address both problems among the adolescent group.

The prevalence of underweight among adults aged 20 to 49 years was at 5.3%, indicating that adults were more likely to be underweight than adolescents (4%). Comparison by sex showed a slightly higher prevalence in adult men (5.7%) than

women (5.1%). Severe undernutrition was uncommon (0.4%) across all zones, with no cases observed in Lake-Chilwa-Phalombe Plain and Karonga-Chitipa-Rumphi-Mzimba. However, among the adults presenting with severe under-nutrition were all females. Cases of over-nutrition were more prevalent (16.3%) than those of under-nutrition, with overweight prevalence ranging from 10.3% to 17.7%. There was a marked difference in the prevalence of overweight by sex with more overweight cases among female adults (21.3%) than male adults (8.6%). Obesity prevalence followed a similar trend (1.3% in males and 8.2% in females) with an overall weighted prevalence of 5.5%.

The overall coverage for vitamin A supplementation was at 82.7% slightly above the WHO thresholds of 80% and was higher than the coverage recorded in the December 2016 survey (73.5%). All zones recorded coverage above 80% except for the Karonga-Chitipa-Rumphi-Mzimba zone and the Kasungu-Lilongwe-Plain zones suggesting the need for extra efforts to ensure that a WHO minimum target of 80% is been achieved. The highest coverage was recorded in the Thyolo-Mulanje-Tea-Estates (87.2%). Compared within a livelihood zone, the current survey shows a remarkable increase in vitamin A supplementation across all zones.

Morbidity rate remained high in all the livelihood zones and ranged from 49.7% in Karonga-Chitipa-Rumphi-Mzimba livelihood zone to 59.9% in Kasungu-Lilongwe Plain zone with a mean of 55.7% among children aged 6-59 months up from 50.5% in the December 2016 survey**.** The current survey showed a decline in diarrhoea episodes (35.3%) as compared to the December 2016 survey (39.7%). Diarrhoea episodes were lowest in Karonga-Chitipa-Rumphi-Mzimba livelihood zone (28.9%) while the highest was recorded in the Lower Shire zone (39.5%). Overall, there was an increase in health seeking behaviour in the current survey (75.3%) compared with the December 2017 (67.3%).

Comparatively, the results show that both the crude and the under-five deaths were within the acceptable thresholds. Nevertheless Thyolo-Mulanje-Tea Estates livelihood zone recorded the highest crude deaths (0.68/10,000) followed by Lower Shire zone (0.43/10,000) while the lowest rates were recorded in Rift Valley Escarpment (0.11/10,000). On the other hand the highest underfive mortaliy rate was recorded in Kasungu/Lilongwe Plain zone (0.31/10,000) while Shire Highlands and Lake Chilwa Phalombe Plain recorded no deaths.

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The minimum acceptable diet is currently estimated at 10.7% which is higher than 6% recorded in December 2016, the shift could be attributed to differences in period of data collection, towards the end of lean period and the beginning of the lean season. Lower Shire continue to be the most affected livelihood zone as only 3.8% of the 6 to 23 month old children were able to meet MAD. The highest rate was registered in RVA zone (14.5%).

The main stay of the diet for the 6-23.9 months children was the staple comprising mainly of cereals and to a minor extent roots and tubers (68.6% overall) but this varied between livelihood zones. It was high (over 85%) in SH, TMTE, LCPP AND RVE zones while in KLP and KCRM zones it was less than 60%. These were supplemented with vitamin A rich fruits and vegetables (35.8% overall) and other vegetable (36.6% overall). However consumption of animal source foods such as eggs, milk and flesh products were all quite low (less than 15%) in all livelihood zones which explain the low MAD estimates.

Household food security situation has worsened during the current surveys. Overall the proportion of households that had a poor food consumption score increased (10.9%) when compared with 4.2% in May 2017 but similar to 10.5% registered in December 2016. The increase was experienced by all the livelihood zones. In fact, the proportion that had "Acceptable Food Consumption" was significantly lower than the results obtained in the December 2016 survey in six livelihood zones. The only exception is LCPP zone (46.5% current versus 25.6% in December 2016. In addition, the mean household dietary diversity score (MHDDS) for all the zones was 4.5 indicating medium diversity, and ranged from 4.2 in Lower Shire to 5.0 in KCRM livelihood zone. All zones registered the lowest scores in comparison with the surveys conducted in May 2017 and December 2016.

Conclusion

Under-nutrition prevalence among children under five is at its lowest compared to the previous assessments attributable to impacts of targeted programming. However, a slightly higher proportion of the under-five population are overweight indicating an emerging problem. Among adolescents and adults, over-nutrition seems to be the bigger problem compared to undernutrition. Compared to children, nutrition situation among the older groups is poor indicating a greater burden and need for targeting.

The results of the January 2018 survey have demonstrated that overall, the prevalence of morbidity has slightly decreased in most livelihood zones except for the Lower Shire and the Thyolo-Mulanje Tea Estates Zones when compared with the May 2017 survey. Similarly, when compared with the May 2017 results, the prevalence of diarrhoea decreased in all the livelihood zones except the Lower Shire. Health seeking behaviour was lowest in the Lake Chilwa Phalombe Plain.

There is a tremendous increase in vitamin A supplementation as 80% of the under-five children met the WHO guidelines except for two livelihood zones of the Kasungu Lilongwe Plain and the Karonga, Chitipa, Rumphi, Mzimba zone.

The minimum acceptable diet is currently estimated at 10.7% down from 19% in May 2017 but slightly higher than 6% achieved December 2016 is problematic for the children to meet their nutrient requirements.

The mortality situation was within the recommended thresholds for both under-five death rate and crude death rate, with no significant differences across the livelihood zones.However there was an increase in crude deaths in the LS, TMTE, LCPP and the KLP zones compared with the May 2017 and December 2016 survey results. The results also show an increase in under-five mortality rates in TMTE and the RVE when compared to the May, 2017 survey.

The results have shown that households were experiencing food insecurity as all the food security indicators had worsened when compared with the May 2017 and December 2016 survey findings. Lower Shire zone continue to be the worst hit livelihood zone.

Recommendations

Current responses and approaches by various stakeholders need to be continued and strengthened to maintain the low levels of under-nutrition in children. However, for all population groups especially the adolescents and adults, there is need for programming to shift focus to addressing problems of over nutrition while managing existing cases of under-nutrition. Interventions to improve diets will be more critical as indicators remain poor.

Although the nutritional status of the underfive children continue to improve, the delivery of the nutrition interventions that have been put in place should continue to be delivered to ensure that malnourished cases for early diagnosis and management.

It is of concern that food insecurity is increasing and this agriculture, the assessments seem to suggest more serious food deficit than 2016/17 season. Hence Government should strengthen strategies to intensify food availability interventions to prevent extreme hunger in all the districts. Such intervention include: irrigation farming, homestead farming, integrated farming that include rearing of small stock and aquaculture for improved dietary quality.

The continued decrease in proportion of 6-23.9 month old children that meet minimum acceptable diet is of grave concern to the country, as such it is again strongly recommended that any nutrition interventions implemented should include cooking demonstrations of nutritious complementary foods. In addition, simple ways of increasing dietary diversity to child's porridge such as adding from family pot, pureed vegetables, mashed beans and peas or running cooked meat through a sieve into baby's porridge significantly increase dietary diversity.

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Without the combined efforts of the above, and feedback from the nutrition community in Malawi, this work would not have been accomplished with excellence as was attained.

1.0 INTRODUCTION

1.1 Background

Since 2014/15, most districts in Malawi have continued to experience both heavy flooding and drought which has resulted in various shocks on livelihoods among households. As a result of the disasters, a national multi-sectorial response had been on-going till 31st March, 2017, while the Nutrition Cluster response is still on-going. These were put in place to mitigate the negative impacts of these natural disasters. Initially, 15 districts were affected by the erratic climatic conditions but by mid-2016, twenty-five out of the twenty-eight districts (89%) were affected. Additionally, according to the Malawi Vulnerability Assessment Committee (MVAC), the number of people who were affected by food insecurity in the country increased from about 2.8 million in mid-2015 to about 6.5 million towards the end of 2016. Due to the prevailing food insecurity and other shocks in the country, the nutrition cluster, through the leadership of the Department of Nutrition and HIV/AIDS (DNHA),started conducting nutrition surveys using the SMART Methodology to keep track of the nutrition situation, and to inform nutrition response and programming.

The first nutrition survey was conducted in June 2015 covering 15 affected districts in five livelihood zones and showed low levels of Global Acute Malnutrition (GAM) attributable to coordinated support provided by stakeholders to the affected population, and the survey timing (post-harvest). The second round of surveys was conducted during the post-harvest season of 2016, covering 25 districts from seven livelihood zones. Results showed higher GAM rates compared to the 2015 surveys and this was mainly attributed to a worsening food security situation in the country. A third round of nutrition assessments was conducted during the lean season of November-December 2016 in the same areas (25 districts across seven livelihood zones) and the results showed *poor* nutrition status in 4 livelihoods from the south and *normal* nutrition situation in the other three livelihood zones from the central and northern regions of Malawi. Finally, the fourth round of nutrition assessments was conducted during the post-harvest season in May/June 2017 and the results showed improved nutrition situation compared to the previous surveys although the malnutrition prevalence was high in Lower Shire followed by Thyolo-Mulanje Tea Estates and Lake Chilwa Phalombe Livelihood zones.

In order to continue monitoring the nutrition situation in the country, a fifth round of nutrition survey was conducted using the SMART methodology in January-February 2018 in all the seven livelihood zones covering 25 districts. These surveys targeted children 6 to 59 months of age since these are most sensitive to nutrient deprivation. However, the 5th round of nutrition assessments included the assessment of nutrition situation among adolescents aged 10-19 years and adults aged 20-49 years. The phenomenal growth that occurs in adolescence is second only to that in the first year of life and creates increased demands for energy and nutrients, thus, calls for their inclusion in the assessment.

The livelihood zones covered in the current assessment were similar to those in the fourth roundand included: 1) Lake Chilwa Phalombe Plains Livelihood Zone (Phalombe, Zomba and Machinga), 2) Lower Shire Livelihood Zone (Chikhwawa and Nsanje), 3) Thyolo-Mulanje Tea Estates Livelihood Zone (Thyolo and Mulanje), 4) Rift Valley Escarpment Livelihood Zone (Balaka, Ntcheu, Mwanza, Neno, Salima and Nkhotakota), 5) Shire Highlands Livelihood zones (Blantyre Rural, Chiradzulu and Mangochi), 6) Kasungu-Lilongwe Plain Livelihood zone (Lilongwe Rural, Dedza, Mchinji, Dowa, and Kasungu), 7) Chitipa-Karonga/Mzimba Livelihood Zone (Chitipa, Mzimba, Rumphi, and Karonga).

1.2 Objectives

The broad objective of the survey was to provide updated information on the nutritional situation of children aged 6-59 months, adolescents aged 10-19 years and adults aged 20-49 years in the flood and drought affected areas of Malawi. Specific objectives were;

i. To estimate the prevalence of acute malnutrition among children aged 6-59 months in flood and drought affected areas in Malawi
ii. To estimate the prevalence of underweight among children aged 6-59 months in flood and drought affected areas in Malawi

iii. To determine the crude and the under-five mortality rates in flood and drought affected areas in Malawi
iv. To estimate morbidity rates (ARI, Fever and Diarrhoea) among children 6-59 months two weeks prior to the survey in flood and drought affected areas in Malawi
v. To determine the proportion of children 6-59 months that had received Vitamin A in the flood and drought affected areas in Malawi
vi. To estimate the proportion of children aged between 6 and 23.9 months who were meeting the minimum acceptable diet in the drought and affected areas in Malawi
vii. To establish various food security indicators that included: Household Dietary Diversity Score (HDDS), Food Consumption Score (FCS), Coping Strategy Index (CSI), and Household Hunger Scale (HHS) in flood and drought affected areas in Malawi
viii. To assess nutritional status of adolescent boys and girls based on BMI for age in the flood and drought affected areas in Malawi
ix. To assess nutritional status of women and men aged 20 to 49 years based on BMI and MUAC in the flood and drought affected areas in Malawi

2.0 METHODOLOGY

2.1 Survey Area

In total, seven nutrition surveys were conducted, targeting seven livelihood zones in the flood and drought affected districts of Malawi. The following were the livelihood zones covered and the districts in each zone:

i. Lake Chilwa Phalombe Plains Livelihood Zone (Phalombe, Zomba and Machinga),
ii. Lower Shire Livelihood Zone (Chikhwawa and Nsanje),
iii. Thyolo-Mulanje Tea Estates Livelihood Zone (Thyolo and Mulanje),
iv. Rift Valley Escarpment Livelihood Zone (Balaka, Ntcheu, Mwanza, Neno, Salima and Nkhotakota),
v. Shire Highlands Livelihood zones (Blantyre Rural, Chiradzulu and Mangochi),
vi. Kasungu-Lilongwe Plain Livelihood zone (Lilongwe Rural, Dedza, Mchinji, Dowa, and Kasungu),
vii. Chitipa-Karonga/Mzimba Livelihood Zone (Chitipa, Mzimba, Rumphi, and Karonga)

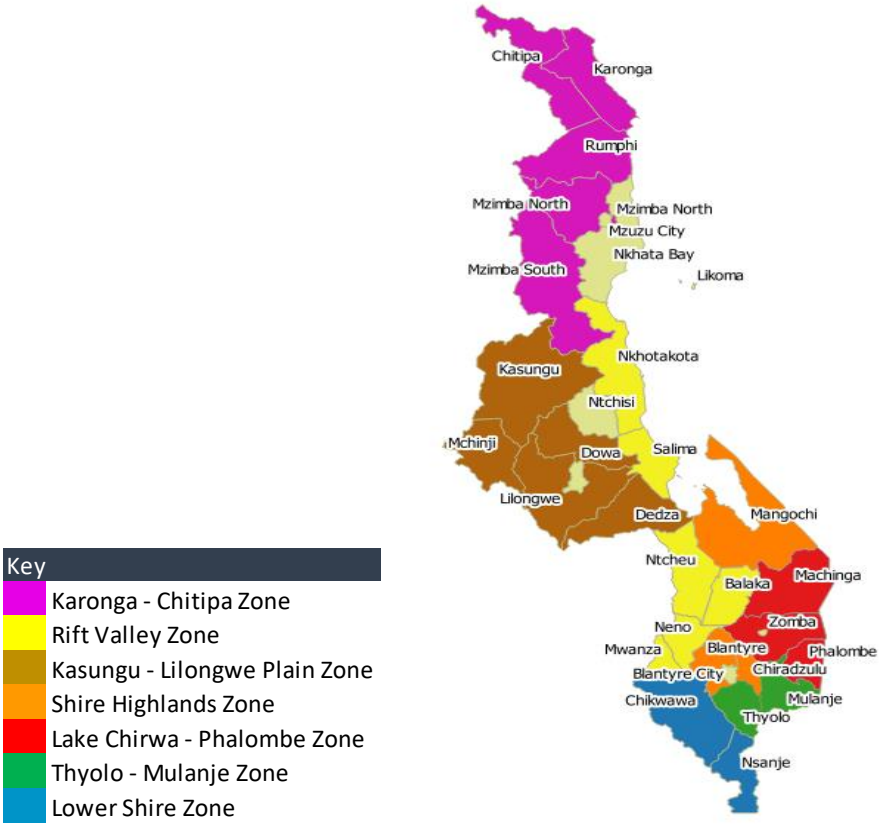

Figure 1: The seven livelihood zones for the nutrition SMART surveys

2.2 Survey Design

The surveys adopted a two-stage cluster sampling approach to collect information on child anthropometry, morbidity, mortality, vitamin A supplementation, household dietary diversity score (HDDS), food consumption score (FCS), coping strategy index (CSI), household hunger scale (HHS), crude and under five mortality as well as anthropometry of adolescents and adults using the Standardized Monitoring and Assessment of Relief and Transitions (SMART) Methodology. The sampling frame for this survey was the updated list of households from the 2015 Malawi Demographic Health Survey (MDHS) provided by the National Statistics Office (NSO).

2.3 Sample Size Estimation

2.3.1 Sample size estimation in children aged 6 to 59 months

Sample size calculation for nutrition assessments in children aged 6 to 59 months in the 7 livelihood zones was based on the expected prevalence of GAM, desired precision, and, design effect in the specific livelihood zones drawn for the May 2016 SMART surveys. The required number of households to be visited was then estimated based on the average household size, percentage of children who were under 5 and a 10% non-response rate in each of the livelihood zones. Sample sizes were estimated following SMART methodology using the ENA for SMART software version 2011 (July 9, 2015). In each livelihood zone, the number of clusters were determined by dividing the total estimated number of households (sample size) to be included in the survey for each livelihood zone by the estimated number of households per cluster (22 households). The same number of clusters was used for the adolescent and adult surveys.

2.3.2 Sample Size estimation for Adolescents

Sample size estimation in adolescents was based on the expected prevalence of BMI-for-age. Since no prior data was available in relation to this indicator, a proxy indicator of prevalence of thinness based on BMI less than 18.5 for adolescent girls aged between 10 and 15 years was used, based on the MDHS Survey for 2015/16. The other parameters considered in the sample size calculation were; the design effect set at 1.5, average household size of 4.5, and non response of 10%.

2.3.3 Sample Size estimation for Adults

Sample size calculation in adults was based on the expected prevalence of BMI of less than 18.5 (prevalence of thinness). However, due to lack of data on both sexes, a proxy indicator for prevalence of thinness among women aged 15 – 49 years was used, based on the 2015/16 MDHS Report..

2.3.4 Sample Size estimation for crude and under-five mortality

Sample size calculation for crude and under-five mortality was based on the expected death rate per 10,000/day, desired precision of 0.3 per 10,000/day, Design effect of 1.5 and over a recall period of 90 days. Table 1 summarises the sample sizes for the various groups.

Table 1: Number of Children 6-59 Months, Adolescents 10-19 years, Adults 20-49 years, Clusters and Households per Livelihood Zone

Livelihood Zone	Number of Clusters	No of Children (6-59 months)	No of Adolescents (10-19years)	No of Adults (20-49years)	Number of Households (6-59 months)	Number of Households (Adolescents, Adults, Mortality)
Rift Valley Escarpment	45	583	575	513	983	15
Lower Shire	44	516	575	513	874	14
Thyolo - Mulanje Tea Estates	44	467	575	513	877	15
Lake Chilwa Phalombe Plain	40	467	575	513	802	13
Shire Highlands	45	547	575	513	943	14
Kasungu Lilongwe Plain	43	503	575	430	853	16
Chitipa Karonga/Mzimba	46	515	575	387	1007	18
TOTAL	307	3598	4,028	3,382	6339	105

2.4 Sampling Procedure: Selection of Clusters

A two-stage cluster sampling design was used to randomly sample the study clusters and households. In the first stage, clusters were sampled using probability proportional to size (PPS). The sampling frame for the clusters was based on NSO updated Malawi Demographic and Health Survey Sampling Frame (2015-2016). The list of enumeration areas (EAs) for each of the livelihood zones were entered into ENA for SMART software version 2011 (9 July 2015) and required number of clusters were selected using the PPS approach.

To obtain the number of clusters required per livelihood zone, several factors were considered which included (1) total time to be spent in the field (2) average time in each household (3) total time to be spent for breaks. Using the above parameters, it was estimated that in every cluster, 22 households would be sampled and as a result, the number of clusters per livelihood zone was calculated (Table 1). In each of the livelihood zones, an additional 10% of the number of clusters was selected as reserve clusters to be used in case the required 80% of the children were not reached. In Karonga-Chitipa livelihood, these reserve clusters were used because the teams failed to reach the required 80% of the required sample size for children 6-59 months.

2.5 Sampling Procedure: Selection of Households, Children, Adolescents and Adults

The updated list of households from the 2015 - 2016 Malawi Demographic Health Survey was used to select households from the sampled clusters. The required 22 households per cluster for the 6-59 months children were selected using simple random sampling. In addition, from the 22 sampled households, a set number of households per livelihood zone were sampled for mortality, adolescent and adult survey as indicated in Table 1.

In the selected households, all eligible children (aged 6-59 months) were measured and the household questionnaire administered. In households selected for mortality, adolescent and adult survey, the eligible adolescents and adults were measured and mortality questionnaires were administered. Empty households and households with absent children, adolescents or adults were re-visited, and information of the outcome recorded on the cluster control form. Mothers or caregivers were chosen as primary survey respondents.

2.6 Case Definition and Inclusion Criteria

Household: was defined as a group of people who eat daily or at least frequently from the same pot and live in the same compound (or physical location).

Age: The anthropometric survey targeted children aged 6-59 months, adolescents 10-19 years and adults 20-49 years. The ages were ascertained using a health passport book, 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.

Height: A well calibrated UNICEF wooden height board was utilized to take length and height. Length was taken for children aged less than two years while height was measured for children aged 2 years (24 months) and above. In adults and adolescents, a well calibrated WFP height boards were used to measure heights in cm.

Bilateral Oedema: was assessed by exerting pressure for three seconds on both 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 confirmed by the supervisors.

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

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

Underweight and severe underweight in adults: Underweight was classified as body mass index (BMI) < 18.5 (prevalence of thinness) and severe underweight as BMI < 16.

Overweight and Obesity in adults: Overweight was classified as body mass index (BMI) of 25.0 to 29.9 and obesity as BMI ≥ 30.0.

Underweight and severe underweight in adolescents: Underweight was classified BMI-for-age less than -2 SD and severe underweight as BMI-for-age less than -3 SD.

Overweight and obesity in adolescents: Overweight was classified BMI-for-age > +2 SD and obesity as BMI-for-age > + 3 SD.

Crude death rate (CDR): In this survey, the CDR is the incidence of death that occurred in the surveyed population in the 3 months preceding the survey.

Under-five death rate: The incidence of death among children under five in the surveyed population in the 3 months preceding the survey.

The survey also gathered the following additional indicators: child morbidity, Vitamin A supplementation, Household Food Consumption Score (HFCS), Coping Strategy Index (CSI), and Household Hunger Scale (HHS). Information on these indicators was collected from the primary caregiver through a household questionnaire.

2.7 Questionnaire, Training, Data collection and Supervision

2.7.1 Questionnaire development

The survey adopted the questionnaire used in the May 2017 surveys which was updated to take care of the additional indicators (Appendix X). The questionnaire was developed to meet international standards, with the modules being extracted from various sources such as the Global SMART Project (Anthropometric and Mortality Module), World Health Organization (Minimum Dietary Diversity Module) and FANTA II (Food Security Indicators Module). The questionnaires were translated into Chichewa.

2.7.2 Training

Training for the SMART Survey Enumerators was conducted between 11th and 18thJanuary 2018 in Dedza. A total of 98 survey personnel (14 team leaders, 14 enumerators/interviewers, 28 anthropometric measurers for children 6-59 moths, 28 adult and adolescent measurers, and 14 data entry clerks) were trained. The training covered various components of the survey including: survey overview and objectives, anthropometric procedures for children and adults/adolescents, sampling

procedures, data collection and interview skills, and other field procedures. The team of trainees included 3 additional personnel to ensure that trained personnel would be available on reserve to step in when necessary.

Standardization tests for measurement of children 6-59 months as well as adolescents or adults were conducted before field testing of the survey tools on day 4 and 5 of the training. During standardisation, the enumerators for the anthropometry in children were split into three major groups and placed in separate rooms. The enumerators for adults and adolescents were split into two major groups, one comprising females, and, the other males. The splitting of the enumerators in groups helped to ensure efficiency in conducting the standardization exercise. The enumerators in each training session worked in pairs and each member measured 10 children twice in the case of child anthropometry and 10 adolescents/adults in case of adult and adolescent anthropometry as recommended by SMART. Those with good scores were assigned to take anthropometric measurements during data collection.

Piloting of the survey procedures and tools was conducted on the seventh day of the training in nearby villages not sampled in the main survey. All survey procedures that included village mapping, household identification, administration of questionnaires in the selected households, and measurement of eligible children, adolescents and adults were practiced.

During the first three days of the training, the data entry team was combined with the enumerators, in-order to have a basic understanding of the SMART Survey methodology and get familiar with the survey tools. From the fourth day, the data entry team was trained independently by the Data Manager from LUANAR.

2.7.3 Survey Teams

A total of 14 teams implemented the surveys. Each team comprised of 6 members (1 Team Leader, 2 Measurers of children 6-59 months, 2 Measurers of adolescents and adults, and 1 Interviewer). In addition, there were 14 data clerks bringing the total number of survey personnel to98 (14 team leaders, 14 enumerators, 28 anthropometric measurers for under five, 28 adult measurers, and 14 data entry clerks). In the field, every team included 1 local guide selected from the clusters by the Village Head to assist in household identification.

2.7.4 Data Collection and Supervision:

Data collection began immediately after training on 19thJanuary, 2018 and ended on 13thFebruary, 2018. Data collection in the 1st livelihood zone (Lake Chilwa Phalombe Plain) was done by all the 14 teams, and thereafter, teams split into 2 groups, each comprising 7 Survey Teams, 3 Supervisors and 7 Data Entry Clerks. The first group collected data in the 3 Livelihood Zones of Lower Shire, Shire Highlands and Thyolo-Mulanje Tea Estates in the Southern Region, while the second group collected data in the 3 livelihood zones of Rift Valley Escarpment, Kasungu Lilongwe Plain and Karonga, Chitipa, Rumphi and Mzimba in the Central and Northern Regions.

Survey managers were assigned to any of the 2 groups. The survey supervision was led by 4 Survey Managers (all trained at the SMART Managers Level) and 7 Survey Supervisors who have recently been trained as Survey Managers. Officers from UNICEF and WFP also supported in the field work supervision during data collection.

2.8 Data Analysis, entry and cleaning

Data was entered by 14trained data clerks. Data was concurrently double entered in the field using 2 packages, CSPro version 6.0.3 and ENA SMART (9th July, 2015 Version) as a data quality control measure. For the anthropometric data, plausibility checks were run daily to assess quality of the data collected using the WHO 2006 growth standards, and to identify any call back issues for immediate addressing by teams before moving to the next area. The cleaned data sets were exported to SPSS version 17 for further analysis, while the anthropometric data was further exported to ENA for SMART for analysis accordingly. Mortality data were entered and analysed in ENA software, while the other datasets for household, morbidity, minimum acceptable diets, adolescents and adult measurements were processed and analysed using SPSS version 17.

2.9 Data Quality Control

All survey processes were conducted in a way that ensured quality. Training included a standardization test which helped in the selection of measurers for anthropometry, and a pilot survey was done to equip participants with a general understanding of methods for data collection. To ensure accuracy of the data collected in the field, interviewers were

required to check all questionnaires before handing them over to their team leader, who reviewed them before submission to the supervisor for further checking and feedback before data entry.

At all levels, errors were corrected where necessary. Double data entry was done for anthropometric indices to check for any mismatches and accuracy. Data entry was done every evening after data collection to help run the plausibility analysis, and hence monitor the quality of the data on a daily basis. In case of any outliers from the plausibility analysis, supervisors were required to revisit the household and re-take the measurements for confirmation purposes. Also, Survey Managers were holding debriefing sessions with the teams to highlight areas of improvement dependent on the plausibility outputs.

2.10 Indicators and Guidelines

Nutritional status indicators:

The following indicators were used to assess nutritional status: Acute malnutrition-weight for height (WHZ) and/or oedema, and weight for age (WAZ). Given below are the cut-off points that were used for determination of the nutritional status.

Indicator	Cut off points	Interpretation
Children 6-59 months		
Weight for height Z-scores or oedema	<–2 SD score or oedema	Global Acute Malnutrition (GAM)
	<–3 SD-scores or oedema	Severe acute Malnutrition (SAM)
	>+2 SD scores	Overweight
	>+3 SD-scores	Obese
Weight for age Z-scores	<–2 SD scores	Global under-nutrition
	<–3 SD-scores	Severe under-nutrition
Adolescents 10-19 years		
BMI for-age z-score	<–2 SD scores	Underweight
	<–3 SD-scores	Severe underweight
	>+2 SD scores	Overweight
	>+3 SD-scores	Obese
Adults 20-49 years		
Body Mass Index	BMI: < 18.5	Underweight
	BMI: < 16.0	Severe underweight
	BMI: 25.0 to 29.9	Overweight
	BMI: ≥ 30.0	Obese

Other indicators

The following additional indicators were also determined as highlighted in previous sections:

1. Prevalence of morbidity in the 2 weeks prior to the survey (ARI, Fever and Diarrhoea)
2. The proportion of children 6-59 months who have been supplemented with Vitamin A
3. The Household Food Consumption Score (FCS)
4. Coping Strategy Index (CSI)
5. Household Hunger Scale (HHS)
6. Crude and under-five mortality rates

2.10 Ethical Consideration:

The nutrition surveys are regarded as part of programme monitoring to assess the nutrition situation in the affected areas and therefore official ethical review was not necessary. However, DNHA informed the District Commissioners in all the 25 districts of the SMART surveys so that the respective TAs could also be informed before household data collection commenced. In addition, consent was sought from the Village Head, village leaders and households' heads or caretakers upon arrival in any sampled cluster.

3.0 RESULTS AND DISCUSSION

3.1 Response Rate

The household and individual response rates for the seven SMART Surveys are shown in Table 2. Overall, the survey was able to achieve the minimum required sample size (80%) for all the livelihood zones, both at the household level and the individual (children, adolescents, and adults) for anthropometric measurements.

Table 2: Response Rate for Household and Individual Children (6-59 Months), adolescents (10-19 years and adults (20-49 years) per Livelihood Zone

Livelihood Zone	Achieved Sample (Households)		Achieved Sample (6-59 months)		Achieved Sample (Adolescents 10-19yrs)		Achieved Sample (Adults 20-49yrs)	
	n	%	n	%	n	%	n	%
Lower Shire	841	96	521	101	616	107	660	129
Shire Highlands	838	89	469	86	560	97	609	119
Thyolo - Mulanje Tea Estates	845	96	459	98	564	98	608	119
Lake Chilwa Phalombe Plain	733	91	427	91	380	66	493	96
Rift Valley Escarpment	835	85	521	89	524	91	665	130
Kasungu Lilongwe Plain	828	97	410	82	440	77	674	157
Chitipa-Karonga-Rumphi-Mzimba*	852	85	470	91	551	96	777	201
** The Reserve clusters were utilized since the number of children from the initial clusters was below 80%*								

3.2 Quality Check (Plausibility Analysis)

The overall quality of seven livelihood zones based on the under five children surveys was ***excellent*** as per the SMART thresholds**.** Table 3 presents the plausibility values for each of the seven surveys comparing the current surveys and the December 2016 and May 2017 survey rounds. Results indicate sustained quality of the surveys. The high data quality could be attributed to in-depth training, optimal supervision, and daily data entry and plausibility checks with feedback to teams.

Table 3: Overall Quality Value of Anthropometry Data by Zone

Livelihood Zone	December 2016		May 2017		January/February 2018	
	Overall Quality Value	Interpretation (SMART Thresholds)	Overall Quality Value	Interpretation (SMART Thresholds)	Overall Quality Value	Interpretation (SMART Thresholds)
Lower Shire	0%	Excellent	1%	Excellent	1%	Excellent
Shire Highlands	10%	Good	0%	Excellent	2%	Excellent
Thyolo - Mulanje Tea Estates	1%	Excellent	0%	Excellent	2%	Excellent
Lake Chilwa Phalombe Plain	2%	Excellent	1%	Excellent	0%	Excellent
Rift Valley Escarpment	1%	Excellent	5%	Excellent	3%	Excellent

Kasungu Lilongwe Plain	6%	Excellent	4%	Excellent	2%	Excellent
Chitipa-Karonga Zone	3%	Excellent	2%	Excellent	5%	Excellent

3.3Under-five nutritional status

A total of 3,240 children aged 6-59 months were measured to derive the nutritional status of the surveyed population using SMART anthropometric procedures to derive indices for assessing two key indicators namely Global Acute Malnutrition (GAM) and Severe Acute Malnutrition (SAM). Results on age and sex distribution (Table 4) show equal representation of boys and girls in the surveys in all the livelihood zones although in the age categories of18 to 29 month old children and the 54 to 59 month old children, there were slightly more girls (ratio=0.9) and boys (ratio=0.8) respectively.

Table 4: Age and sex distribution and sex ratio of sampled children

Age (months)	Boys		Girls		Total		Ratio
	n	%	N	%	no.	%	Boys:girls
6-17	326	50.9	314	49.1	640	19.8	1.0
18-29	365	48.2	392	51.8	757	23.4	0.9
30-41	378	49.0	393	51.0	771	23.8	1.0
42-53	378	51.4	358	48.6	736	22.7	1.1
54-59	152	45.2	184	54.8	336	10.4	0.8
Total	1599	49.4	1641	50.6	3240	100.0	1.0

3.3.1 Prevalence of acute malnutrition

The overall nutrition situation among the under-five children was acceptable based on WHO global standards (prevalence <5%) and very good compared when results are compared to the last two previous assessments. The results are presented in Table 5. Findings reveal very low prevalence of both GAM and SAM across all livelihood hoods including the Lower Shire (LS) which usually register the highest prevalence of acute malnutrition. Prevalence of GAM ranged from 0.6% in the Karonga/Chitipa/Rumphi/Mzimba (KCRM) livelihood zone to 2.4% in the Thyolo-Mulanje Tea Estates (TMTE) livelihood zone. Statistics point to sustained improvements in traditionally worse off zones like the Lower Shire, and an emerging problem in the Thyolo-Mulanje Tea Estates. Overall weighted GAM prevalence was 1.3% (0.9-1.9), down from 4.1% and 2.2% in December 2016 and May 2017 respectively.SAM prevalence was also very low (0.1%) across all zones with no SAM cases reported in 5 out of the 7 livelihood zones, mostly in the Central and Northern Malawi zones, but within normal acceptable ranges in all zones.

Table 5: Prevalence of Acute Malnutrition (GAM and SAM) by Livelihood Zone

Indicator	Livelihood Zones							Overall Weighted
	LS	SH	TMTE	LCPP	RVE	KLP	KCRM	
GAM (Jan/Feb 2018)	2.1 % (1.2 - 3.8)	1.3 % (0.5 - 3.2)	2.4 % (1.3 - 4.3)	1.4 % (0.7 - 3.0)	1.5 % (0.7 - 2.9)	1.0 % (0.4 - 2.5)	0.6 % (0.2 - 2.0)	1.3% (0.9 - 1.9)
SAM (Jan/Feb 2018)	0.4 % (0.1 - 1.6)	0.0 % (0.0 - 0.0)	0.0 % (0.0 - 0.0)	0.2 % (0.0 - 1.7)	0.0 % (0.0 - 0.0)	0.0 % (0.0 - 0.0)	0.0 % (0.0 - 0.0)	0.1% (0.0 - 0.2)

Figure 1 presents trends in GAM among under-five children in the 7 livelihood zones since December 2016. Although Lower Shire remains the zone with highest GAM prevalence, data shows a gradual and significant decline in prevalence of GAM over the three survey periods, irrespective of season of assessment. There are variations in the GAM prevalence for all the other zones with December 2016 showing highest rates across all assessment periods. Figures from the current assessment (Jan/Feb 2018) are the lowest ever recorded.

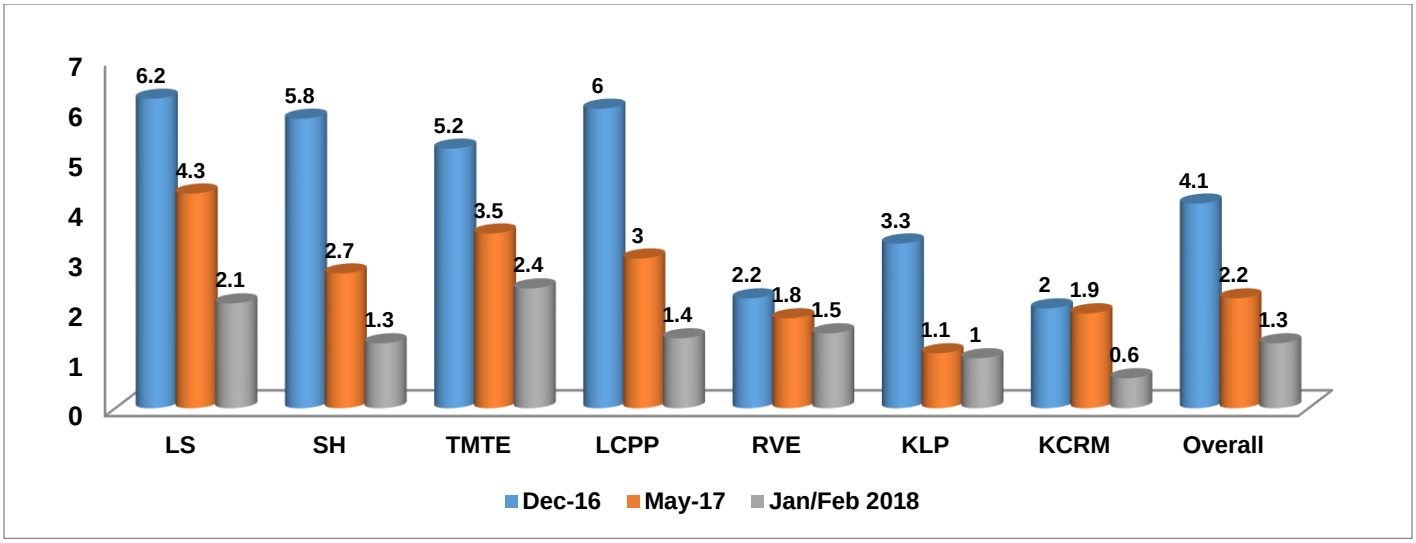

Figure 1: Trends in acute malnutrition (GAM) during December 2016, May 2017 and January/February 2018

Results of the present surveys were even comparable, and in some cases, much lower than those obtained in the assessment conducted during the post-harvest period of May 2017, suggesting an improved situation, considering that the current assessment was in the lean period (Table 6). The greatest change was observed in the Lower Shire zone (2.2%), which continues to register a significant downward trend with each assessment period, while the list change was in Rift Valley Escarpment at 0.3% difference in prevalence of GAM between the current and the previous assessment. Statistics reveal sustained improvements in traditionally worse off zones like the Lower Shire, and an emerging problem in the Thyolo-Mulanje Tea Estates. Across the zones, KCRM, KLP and RVE are slightly better-off when compared to the zones in the southern region.

SAM prevalence rates were lower than those obtained during a similar time period in 2016 (December) although data collection in the current season took place between the months of January and February 2018 due to security threats over blood sucking in some districts of Malawi. SAM cases were also lower in the current assessment when compared to results in the post-harvest period of May 2017. The highest prevalence recorded was in Lower Shire with 0.4%, while Lake Chilwa Phalombe Plains had a SAM prevalence of 0.2%. Details about the key anthropometric indicators assessed are indicated in Table 6.

Table 6: Prevalence of GAM and SAM from December 2016 by livelihood zone

Indicator	Livelihood Zones							Overall Weighted
	LS	SH	TMTE	LCPP	RVE	KLP	KCRM	
GAM (Dec 2016)	6.2% (4.2- 9.0)	5.8% (3.9- 8.6)	5.2% (3.6- 7.5)	6.0% (4.2- 8.4)	2.2% (1.2- 3.9)	3.3% (2.0- 5.4)	2.0% (1.2- 3.6)	4.1% (3.5 - 4.9)
GAM (May 2017)	4.3% (2.8- 6.6)	2.7% (1.7- 4.2)	3.5% (2.2- 5.6)	3.0% (1.6- 5.6)	1.8% (1.0- 3.2)	1.1% (0.5- 2.6)	1.9% (1.1- 3.4)	2.2% (1.7 – 2.8)
GAM (Jan/Feb 2018)	2.1 % (1.2 - 3.8)	1.3 % (0.5 - 3.2)	2.4 % (1.3 - 4.3)	1.4 % (0.7 - 3.0)	1.5 % (0.7 - 2.9)	1.0 % (0.4 - 2.5)	0.6 % (0.2 - 2.0)	1.3% (0.9 - 1.9)
SAM (Dec 2016)	0.8% (0.4- 2.0)	0.9% (0.4- 2.1)	1.0% (0.3- 2.9)	1.5% (0.7- 3.2)	0.8% (0.3- 2.1)	0.7% (0.2- 2.0)	0.4% (0.1- 1.7)	0.8% (0.6 - 1.2)

SAM (May 2017)	0.4% (0.1- 1.4)	0.2% (0.0- 1.4)	0.8% (0.3- 2.2)	0.6 % (0.1 - 2.9)	0.2% (0.0- 1.5)	0.2% (0.0- 1.6)	0.0% (0.0- 0.0)	0.3% (0.2 – 0.6)
SAM (Jan/Feb 2018)	0.4 % (0.1 - 1.6)	0.0 % (0.0 - 0.0)	0.0 % (0.0 - 0.0)	0.2 % (0.0 - 1.7)	0.0 % (0.0 - 0.0)	0.0 % (0.0 - 0.0)	0.0 % (0.0 - 0.0)	0.1% (0.0 - 0.2)

An additional indicator (overweight) for nutritional status was computed for the surveyed children and results are presented in Table 7. The overall weighted prevalence of overweight was 2.5%, higher than that for GAM (1.3%) in this population. These findings, thus, suggest that although the population would largely be within normal range, overnutrition is an emerging problem to watch out for. Comparison by livelihood zone shows a lower prevalence in Lower shire (1%) and higher prevalence rates in Lake Chilwa Phalombe Plains (3.5%) and the Rift Valley Escarpment (3.3%). It is worth noting that previous survey rounds did not include overweight thus difficult to compare. Subsequent rounds would thus need to monitor changes to inform programming decisions.

Table 7: Prevalence of overweight based on weight for height Z-scores by livelihood zone January/February 2018

Indicator	**Livelihood Zones**							**Overall Weighted**
	LS	**SH**	**TMTE**	**LCPP**	**RVE**	**KLP**	**KCRM**	
Prevalence of overweight (WHZ > 2)	1.0 % (0.4 - 2.3)	2.6 % (1.5 - 4.3)	1.7 % (0.8 - 3.6)	3.5 % (2.2 - 5.6)	3.3 % (1.9 - 5.7)	2.2 % (1.1 - 4.3	2.1 % (1.0 - 4.3	2.5% (1.9-3.4)
Prevalence of severe overweight (WHZ > 3)	0.0 % (0.0 - 0.0)	0.0 % (0.0 - 0.0)	0.0 % (0.0 - 0.0)	0.0 % (0.0 - 0.0)	0.4 % (0.1 - 1.7)	0.0 % (0.0 - 0.0)	0.0 % (0.0 - 0.0)	0.1% (0.0 - 0.5)

3.3.2 Prevalence of underweight by livelihood zone

Table 8 presents prevalence of underweight (weight-for-age <-2Zscore) among children aged 6-59 months and comparison with the previous two sets of SMART surveys. The overall underweight prevalence was 11.8% with 2.2% being severely underweight. The prevalence was highest in Lower Shire livelihood zone (14.4%) followed by Kasungu-Lilongwe Plain livelihood zone (13.7%) while Karonga-Chitipa-Rumphi-Mzimba continue to register the lowest prevalence of 8.1%. With the exception of LS and KLP livelihood zones, there was a steady reduction in underweight prevalence when compared with findings of May 2017 the pre-harvest season. Prevalence of severe underweight presents a different picture in that the highest rate was registered in Kasungu-Lilongwe Plain (3.4%) while Karonga-Chitipa-Rumphi-Mzimba zone did not register any cases.

Table 8: Prevalence of Underweight by Livelihood Zone

Indicator	**Livelihood Zones**	

	Lower Shire	Shire Highland	Thyolo-Mulanje Tea Estates	Lake ChilwaPhalombe Plain	Rift Valley Escarpment	Kasungu – Lilongwe Plain	Karonga-Chitipa – Mzimba	Overall-Weighted
Underweight *(Dec 2016)*	16.8% (14.3-19.6)	13.4% (10.3-17.4)	17.4% (14.7-20.5)	19.7% (16.4-23.5)	14.5% (11.2-18.4)	14.4% (11.1-18.5)	9.9% (6.9-13.9)	14.4% (12.8 - 16.2)
Underweight (May 2017)	12.3% (9.4-15.9)	13.1% (10.6-16.2)	14.7% (11.8-18.3)	14.1% (11.1-17.9)	12.0% (9.3-15.4)	12.3% (9.6-15.7)	10.5% (8.2-13.4)	11.2% (10.0–12.6)
Underweight (Jan/Feb 2018)	14.4 % (11.8 - 17.5)	9.8 % (7.4 - 12.9)	13.5 % (10.3 - 17.5)	10.5 % (7.7 - 14.3)	10.8 % (7.8 - 14.7)	13.7 % (9.8 - 18.7)	8.1 % (6.1 - 10.6)	11.80% (10.2 - 13.6)
Severe Underweight *(Dec 2016)*	2.7% (1.7- 4.3)	2.4% (1.2- 4.4)	3.4% (2.2- 5.2)	2.3% (1.3- 4.0)	2.4% (1.2- 4.5)	3.3% (1.8- 5.8)	0.4% (0.1- 1.7)	2.7% (2.0 - 3.8)
Severe Underweight (May 2017)	1.6% (0.7- 3.5)	2.7% (1.7-4.1)	2.5% (1.5- 4.1)	1.3% (0.5- 3.1)	1.4% (0.7- 2.8)	1.1% (0.5- 2.5)	1.5% (0.7- 3.2)	1.4% (1.0-2.1)
Severe Underweight (Jan/Feb 2018)	2.3 % (1.4 - 3.8)	1.1 % (0.4 - 3.0)	3.1 % (1.7 - 5.5)	2.6 % (1.4 - 4.6)	1.2 % (0.5 - 3.4)	3.4 % (1.6 - 7.2)	0.0 % (0.0 - 0.0)	2.20% (1.5 - 3.4)

3.4 Adolescent and adult nutritional status

Included in the current assessment was an adolescent/adult nutrition survey to determine the nutritional status of adolescent girls and boys aged 10 to 19 years, and adult men and women aged 20 to 49 years within the sampled clusters. Weights and heights were taken to derive Body Mass Index (BMI) values for interpretation of their nutritional status. BMI is calculated by dividing weight in kilograms by height in meters squared (kg/m2). A BMI less than 18.5 indicates that one is underweight or has chronic energy deficiency. Individuals are considered overweight if their BMI falls between 25.0 and 29.9, and are obese if their BMI is greater than or equal to 30.0. Results showed a slightly higher prevalence of under-nutrition among the adult men and women (5.3%) when compared to adolescent girls and boys (4.0%) with the probability of being underweight increasing when one is male than female in many of the zones. These levels of undernutrition are higher than those of children under-five and could be attributable to the fact that very few interventions exist to directly address nutritional status in the adolescent or adult years when compared to child nutrition. Overweight and obesity is of greater concern in this population group as especially among adults (16.3% and 5.5% respectively).Females are more likely to be overweight and obese at any given time across all livelihood zones.

3.4.1 Adolescent nutritional status

Prevalence of underweight ranged from 3% in Rift Valley Escarpment to 7.8% in the Lowe Shire livelihood zone. The two zones also registered the lowest (0% for RVE) and highest cases of severe underweight (0.7% for LS) although Karonga Chitipa also had no case of severe underweight. The proportion of underweight by sex was almost the same with 3 zones registering more cases of underweight girls than boys (Lower Shire, Thyolo-Mulanje Teas Estates and Kasungu-Lilongwe Plains).There were more underweight boys than girls in Shire Highlands, Lake Chilwa Phalombe Plains, and Rift Valley Escarpment while the prevalence was similar across the 2 sexes in Karonga-Chitipa-Rumphi-Mzimba zone. The overall weighted prevalence of underweight was 4.0% and similar between boys (4.0%) and girls (3.9%). Severe underweight was at 0.3% (ranging from 0% to 0.7%), and, did not differ across the two sexes (Table 9).

Table 9: Prevalence of under-nutrition in adolescents 10-19 years based on body mass index (BMI) for age z-scores by Livelihood Zone

Indicator	Sex	Livelihood Zones	

BMI Classification		LS	SH	TMTE	LCPP	RVE	KLP	KCRM	Overall Weighted
BMI for age SD <-2	*Total*	7.8%	3.3%	3.9%	5.2%	3.0%	3.6%	3.2%	4.0%
	Male	7.3%	4.2%	3.0%	5.7%	4.2%	3.0%	3.2%	4.0%
	Female	8.4%	2.4%	4.7%	4.7%	1.7%	4.1%	3.2%	3.9%
BMI for age SD <-3	*Total*	0.7%	0.2%	0.6%	0.5%	0.0%	0.2%	0.0%	0.3%
	Male	0.6%	0.3%	0.7%	0.6%	0.0%	0.0%	0.0%	0.3%
	Female	0.7%	0.0%	0.4%	0.5%	0.0%	0.5%	0.0%	0.3%

Data on overweight and obesity was also computed from the survey and results are presented in Table 10. Results show that overweight is a problem among girls (6.6%) than boys (2.2%) with an overall weighted prevalence of 4.4%. Results for obesity show similar trends (0.8% in girls and 0.3% in boys) with an overall weighted value of 0.5%. Across zones, there were more cases of overweight in Shire Highlands (5.5%) and Thyolo-Mulanje Tea Estates (5.3%) and the fewest cases in Lake Chilwa Phalombe Plains.. These results suggest that among adolescent girls and boys, over-nutrition (4.4%) is as big a problem as under-nutrition (4%), and that girls are at a higher risk of being overweight or than boys, necessitating interventions that address both problems among the adolescent group.

Table 11: Prevalence of overweight and obesity in adolescents 10-19 years based body mass index (BMI) for age z-scores by Livelihood Zone

Indicator	Sex	Livelihood Zones							
BMI Classification		LS	SH	TMTE	LCPP	RVE	KLP	KCRM	Overall Weighted
BMI for age SD > +1	*Total*	3.5%	5.5%	5.3%	2.7%	4.4%	4.3%	4.5%	4.4%
	Male	1.9%	2.1%	3.3%	1.1%	1.9%	2.5%	2.5%	2.2%
	Female	5.2%	9.5%	7.3%	4.2%	7.2%	6.5%	6.3%	6.6%
BMI for age SD > +2	*Total*	0.3%	1.3%	0.4%	0.3%	0.6%	0.5%	0.4%	0.5%
	Male	0.3%	0.3%	0.4%	0.0%	0.0%	0.5%	0.0%	0.3%
	Female	0.3%	2.4%	0.4%	0.5%	1.3%	0.5%	0.8%	0.8%
BMI for age SD > +3	*Total*	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%
	Male	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%
	Female	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%	0.1%

3.4.2 Adult nutritional status

The surveys revealed a 5.3% prevalence of underweight among adults aged 20 to 49 years, indicating that adults were more likely to be underweight than adolescents (4%). Comparison by sex showed a slightly higher prevalence in adult men (5.7%) than women (5.1%). except in two zones (Lake-Chilwa-Phalombe and Karonga-Chitipa-Mzimba) where the women were more underweight than their male counterparts. The highest prevalence of underweight adults was found in the Lower Shire livelihood zone (5.6% to 10%) followed Thyolo-Mulanje Tea Estates (5.1% to 9.3%). Kasungu-Lilongwe Plains and Karonga-Chitipa-Rumphi-Mzimba zones recorded lower prevalence estimates of 4.4% and 4.5% respectively. Severe undernutrition was uncommon (0.4%) across all zones, with no cases observed in Lake-Chilwa-Phalombe and KarongaChitipa-Rumphi-Mzimba. Among the adults presenting with severe undernutrition were in the southern region zones and all were females (Table 12).

Table 12: Prevalence of malnutrition in adults 20-49 years based body mass index (BMI) by Livelihood Zone

Indicator	Sex	Livelihood Zones							
BMI Classification		LS	SH	TMTE	LCPP	RVE	KLP	KCRM	Overall Weighted
Underweight	*Total*	7.8% (5.6-10.0)	4.8% (3.0-6.6)	7.2% (5.1-9.3)	5.8% (3.6-8.0)	6.9% (4.9-8.8)	4.4% (2.8-6.0)	4.5% (3.0-6.0)	5.3% (4.7-6.0)
	Male	8.4% (5.0-11.8)	5.2% (2.0-8.3)	7.5% (4.0-10.9)	4.3% (1.2-7.5)	9.0% (5.3-12.7)	5.0% (2.3-7.6)	3.9% (1.7-6.0)	5.7% (4.6-6.9)
	Female	7.3% (4.6-10.1)	4.6% (2.5-6.7)	7.0% (4.3-9.7)	6.6% (3.7-9.5)	5.6% (3.3-7.9)	4.0% (2.0-6.0)	5.0% (2.9-7.07)	5.1% (4.2-5.9)
Severe Underweight	*Total*	0.3% (-0.1-0.81)	0.5% (-0.1-1.1)	0.2% (-0.2-0.5)	0.0%	0.6% (0.0-1.3)	0.5% (0.1-1.0)	0.0%	0.4% (0.2-0.5)
	Male	0.0%	0.0%	0.0%	0.0%	1.7% (0.0-3.4)	0.8% (-0.3-1.8)	0.0%	0.5% (0.2-0.9)
	Female	0.6% (-0.2-1.4)	0.8% (-0.1-1.7)	0.3% (-0.3-0.9)	0.0%	0.0%	0.3% (-0.3-0.8)	0.0%	0.3% (0.0-0.5)

Cases of over-nutrition were more prevalent (16.3%) than those of undernutrition (5.3%) with overweight prevalence ranging from 10.3% (7.9-12.7) in Lower Shire to 17.7% (14.5-20.8) in TMTE (Table 13). There was a marked difference in the prevalence of overweight by sex with more overweight cases among female adults (21.3%) compared to their male counterparts (8.6%) and this difference was observed in all zones. Overweight in adult women ranged from 13.8% to 23%, while among adult men, prevalence ranged from 5.7% to 10%. Obesity prevalence followed a similar trend (1.3% in males and 8.2% in females) with an overall weighted prevalence of 5.5%. LCPP zone had the least cases of obese adults (4%) while Shire Highlands zone had the highest proportion of cases (7.1%) irrespective of gender. However, among females, the highest number of obese adults was reported in KCRM livelihood zone (10.1%). Although the current survey included 10 to 14 year olds, the results for overweight women in the present survey (21.3%) are comparable to national level findings. In the most recent MDHS, one in five (21%) of women age 15-49 are overweight or obese, 7% are thin, and 72% have a BMI in the normal range. While information for adult nutritional status are yet to be published from the 2015/2016 MNS, information on adolescents/adult nutritional status at national level remains scanty despite this growing problem.

Table 13: Prevalence of overweight and obesity in adults 20-49 years based body mass index (BMI) by Livelihood Zone

Indicator	**Sex**	**Livelihood Zones**							
		LS	**SH**	**TMTE**	**LCPP**	**RVE**	**KLP**	**KCRM**	**Overall Weighted**
Overweight (BMI 25 – 29.9	*Total*	10.3% (7.9-12.7)	16.0% (12.9-19.0)	17.7% (14.5-20.8)	16.3% (12.9-19.8)	16.8% (13.8-19.7)	16.3% (13.4-19.2)	17.4% (14.7-20.2)	16.3% (15.2-17.4)
	Male	5.7% (2.9-8.6)	9.8% (5.6-14.0)	9.6% (5.8-13.5)	8.1% (3.8-12.3)	7.7% (4.3-11.2)	8.4% (5.0-11.8)	10.0% (6.6-13.3)	8.6% (7.2-10.0)

	Female	13.8% (10.1-17.5)	19.2% (15.2-23.2)	23.0% (18.6-27.5)	21.0% (16.2-25.7)	22.1% (18.0-26.3)	21.8% (17.6-26.0)	22.9% (18.9-27.0)	21.3% (19.7-22.9)
Obesity BMI >30	*Total*	4.6% (3.0-6.3)	7.1% (5.0-9.2)	4.7% (3.0-6.5)	4.0% (2.2-5.8)	4.5% (2.8-6.1)	5.6% (3.8-7.4)	6.5% (4.7-8.3)	5.5% (4.8-6.2)
	Male	0.8% (-0.3-1.8)	3.1% (0.6-5.6)	0.9% (-0.3-2.1)	0.6% (-0.6-1.8)	1.3% (-0.2-2.7)	1.1% (-0.2-2.4)	1.6% (0.2-3.0)	1.3% (0.8-1.9)
	Female	7.6% (4.8-10.5)	9.2% (6.2-12.1)	7.3% (4.5-10.1)	5.9% (3.2-8.7)	6.3% (3.9-8.8)	8.8% (5.9-11.6)	10.1% (7.3-13.0)	8.2% (7.1-9.2)

Among pregnant women, undernutrition was assessed using the mid upper arm circumference (MUAC) measurement cut off point of less than 22cm. Very few of the surveyed women were underweight (1.8%) with no cases of severe wasting. Prevalence of underweight ranged from 0% in Shire Highlands to 3.6% in Thyolo-Mulanje Tea Estates (Table 14).

Table 14: Prevalence of underweight in pregnant and lactating women based MUAC measurements by Livelihood Zone

	Livelihood Zone							**Overall Weighted**
	LS	**SH**	**TMTE**	**LCPP**	**RVE**	**KLP**	**KCRM**	
MUAC <22.0cm	2.9% (n=2)	0.0%	3.6% (n=2)	2.0% (n=1)	1.8% (n=1)	1.8% (n=1)	1.6% (n=1)	1.8% (n=7)
MUAC <19.0cm	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

3.5 Morbidity and Vitamin A Supplementation

3.5.1 Morbidity among children (6-59 months)

Data on morbidity among the under five children in the previous two weeks prior to the survey were collected in all the seven livelihood zones and results are presented in Table 15. Overall, 55.7% of all children had some illness within the recall period. This indicates a decrease of 3.4 percentage points compared to the May 2017 survey. However, the prevalence is slightly higher than that of December 2016 (50.5%) representing an increase of 5.2 percentage points. The lowest prevalence of morbidity was recorded in the Karonga/Chitipa/Rumphi/Mzimba (KCRM) livelihood zone (49.7%) with the highest being the Kasungu/Lilongwe Plain (59.9%).

A similar trend of decreasing morbidity rates in comparison with the May 2017 surveys was observed for the individual livelihood zones with the exception of LS and TMTE zones, the prevalence of morbidity had decreased as compared to the May 2017 survey. However, all livelihood zones showed an increase in morbidity rates when compared with the December 2016 survey which could be attributed to the rainy season in which childhood illnesses is common. In December 2016, the surveys were completed before rains had intensified while the current surveys were conducted at the middle of the rainy season.

The current surveys showed a decline in overall diarrhoea episodes (19.6%) as compared to the immediate last two surveys (26.5%; 39.7% respectively). Diarrhoea episodes were lowest in KCRM livelihood zone (14.4%) while the highest was recorded in the Lower Shire zone (38.0%). The episodes of diarrhoea had increased from 32.8% to 38.0% and 19.6 to 20.9% in LS Zone and the KLP Zone respectively from May 2017 to the current survey. Except for these two zones, intra-zonal comparison between surveys revealed declining trend and the largest decline was a 25.7 percentage points registered for TMTE livelihood zone.

Respondents were asked to state the actions they took after recognising that their children had diarrhoea. Overall, 75.3% took their children to hospital suggesting an increase of 4.0 percentage points from May 2017 surveys. TMTE zone registered the highest appropriate health seeking behaviour for diarrhoea (87.3%) followed by the Rift Valley Escarpments (82.2%) with the Lake Chilwa Phalombe Plain being the lowest (63.0%). These results indicate the need to strengthen messages that promote prompt and appropriate health seeking behaviour to caregivers to ensure quick recovery. LCPP and LS livelihood zones showed decline trend in appropriate health seeking behaviour from 69.1% in May, 2017 to 63.0% in the current survey and 83.9% to 80.6% respectively.

Table 15: Morbidity, Health Seeking Behavior for Diarrhea and Vitamin A by Livelihood Zone

Indicator	Livelihood zone								Overall Weighted
	Period	LS	SH	TMTE	LCPP	RVE	KLP	KCRM	
Prevalence of Morbidity	Dec 2016	48.9% (n=291)	44.8% (n=245)	50.1% (n=253)	48.5% (n=251)	49.6% (n=239)	56.9% (n=260)	44.1% (n=213)	50.5% (n=1810)
	May 2017	49.3% (n=265)	57.8% (n=298)	54.1% (n=256)	57.8% (n=253)	61.5% (n=305)	63.2% (n=285)	56.1% (n=289)	59.1% (n=2,031)
	Jan/Feb 2018	55.5% (n=284)	52.9% (n=248)	57.0% (n=256)	57.6% (n=242)	50.4% (n=237)	59.9% (n=240)	49.7% (n=228)	55.7% (n=1771)
Prevalence of Diarrhoea	Dec 2016	45.7% (n=133)	43.7% (n=107)	45.1% (n=114)	45.8% (n=115)	35.6% (n=85)	34.6% (n=90)	40.4% (n=86)	39.7% (n=719)
	May 2017	32.8% (n=87)	30.9% (n=92)	48.4% (n=124)	26.9% (n=68)	25.9% (n=79)	19.6% (n=56)	21.5% (n=62)	26.5% (n=538)
	Jan/Feb 2018	38.0% (n=108)	19.8% (n=93)	22.7% (n=102)	22.1% (n=93)	15.5% (n=73)	20.9% (n=83)	14.4% (n=66)	19.6% (n=625)
Health Seeking – Diarrhoea	Dec 2016	78.2% (n=104)	65.4% (n=70)	65.8% (n=75)	64.3% (n=74)	71.8% (n=61)	62.2% (n=56)	80.2% (n=69)	67.3% (n=484)
	May 2017	83.9% (n=73)	70.7% (n=65)	71.8% (n=89)	69.1% (n=47)	65.8% (n=52)	69.6% (n=39)	82.3% (n=51)	71.3% (n=383)
	Jan/Feb 2018	80.6% (n=87)	74.2% (n=69)	87.3% (n=89)	63% (n=58)	82.2% (n=60)	72.3% (n=60)	81.8% (n=54)	75.3% (n=470)
Vitamin A Supplementation	Dec 2016	81.2% (n=487)	70.0% (n=386)	71.1% (n=354)	73.5% (n=383)	74.7% (n=378)	71.7% (n=329)	70.4% (n=344)	73.5% (n=2661)
	May 2017	56.8% (n=315)	53.6% (n=282)	48.3% (n=234)	54.3% (n=251)	55.1% (n=276)	56.2% (n=255)	57.3% (n=299)	54.8% (n=1,920)
	Jan/Feb 2018	85.8% (n=447)	87.0% (n=408)	87.2% (n=400)	86.7% (n=370)	86.2% (n=417)	74.2% (n=304)	77.7% (n=365)	82.7% (n=2711)

3.5.1.1 Vitamin A Supplementation

Data on vitamin A supplementation among under-five children, six months prior to the survey were collected from the respondents and verified either by a health passport card or caregivers' recall. Overall, the coverage for vitamin A supplementation was at 82.7% slightly above the WHO recommendations (Table 15). Except for KCRM zone and the KLP zone, the rest of the zones recorded a coverage of above 80% and TMTE registered the highest coverage (87.2%). The current coverage is above the 54.8% recorded in May 2017 suggesting an increase of 27.9 percentage points. Compared within a livelihood zone, the current survey shows a remarkable increase in vitamin A supplementation. This could be attributed to the timing of the survey as phase two of the 2017 child health days had already been conducted.

Despite the high coverage of vitamin A supplementation, it should be noted that in some cases, the data was collected through recall of the respondent suggesting that the results may compromised. This is because either the under-five had no health passport card or the information was not recorded. Efforts should be made to encourage caregivers to take with them

the health passport card whenever they are receiving health services. In addition, health workers should be advised to always remind caregivers to bring the health passport card with them and record the services offered especially during the child health days where vitamin A supplementation is done. Although some zones have recorded high vitamin A supplementation, the other two have not and may suggest the need for extra efforts to ensure that a WHO minimum target of 80% has been achieved.

3.5.2 Adolescent and adult morbidity prevalence

Data on morbidity for the adolescents and adults two weeks prior to survey and participation of adolescents and adults in nutrition programmes were collected during the current surveys and the results are presented in Table 16. The proportion of adolescents and adults who were sick the previous two weeks prior to the survey was similar at 26.1% and 27.1% respectively. The highest prevalence among adolescents were recorded in the LCPP (29.1%) followed by TMTE (27.1%) while the lowest rate was recorded for KCRM zone (19.7%).

Overall, very few adolescents were on any nutrition program (0.6%), and the highest proportions was recorded in SH livelihood zone (2.2%) while none were reported in KLP zone. The findings seem to suggest that very few adolescents are being reached with nutrition support. Efforts should be made to ensure that all adolescents who require nutritional support are reached in order to break the intergenerational cycle of malnutrition.

Among the adults, the highest morbidity prevalence was recorded in LCPP zone (32.3%) followed by the LS zone (30.7%). As was the case with the adolescents, the lowest morbidity prevalence was recorded in KCRM (23.1%). Few adults were on nutrition support and SH recorded the highest proportion (3.6%) followed by LS (2.0%) while it was lowest in KLP livelihood zone (0.1%) followed by KCRM zone (0.3%). These findings suggest that most of the nutrition programs do not reach adolescents and adults increasing their vulnerability to nutritional stress.

Table 56: Percentage of adults sick in the previous two weeks and percentage who currently under any nutrition programme by Livelihood Zone

Livelihood Zone								**Overall Weighted**
	LS	**SH**	**TMTE**	**LCPP**	**RVE**	**KLP**	**KCRM**	
Adolescents 10-19 years								
% sick in the last 2 weeks prior the survey	23.7% (n=145)	23.2% (n=129)	27.1% (n=16.8)	29.1% (n=109)	28.8% (n=147)	26.7% (n=114)	19.7% (n=106)	26.1% (n=931)
% of currently under any nutrition programme	0.2% (n=1)	2.2% (n=12)	0.4% (n=2)	1.1% (n=4)	0.8% (n=4)	0.0%	0.2% (n=1)	0.6% (n=22)
Adults 20-49 years								
% sick in the last 2 weeks prior the survey	30.7% (n=203)	26.6% (n=162)	26.3% (n=162)	32.3% (n=158)	28.4% (n=191)	26.6% (n=182)	23.1% (n=182)	27.1% (n=1315)
% of currently under any nutrition programme	2.0% (n=13)	3.6% (n=22)	1.0% (n=6)	0.8% (n=4)	1.3% (n=9)	0.1% (n=1)	0.3% (n=2)	1.0% (n=46)

3.5.3 Infant and Young Child Feeding Practices

Three IYCF practices were assessed during the current SMART surveys. Based on 24-hourdietary recall, information on

the types of foods consumed by the children the day preceding the survey and feeding frequency was also collected in all the livelihood zones. The information was then used to estimate the proportion of children who received minimum acceptable diet (MAD), achieved minimum dietary diversity and fed with acceptable minimum feeding frequency. The results are presented in Figures 2, 3, 4 and 5.

The minimum acceptable diet is a composite indicator generated from minimum meal frequency and dietary diversity indicators. Overall, only 10.7% of the children achieved the MAD. These are children that consumed at least 4 out of the 7 food groups the day before the surveys (Figure 2). Lower Shire livelihood zone registered the lowest (3.8%) prevalence while highest was registered in RVE livelihood zone (14.5%).

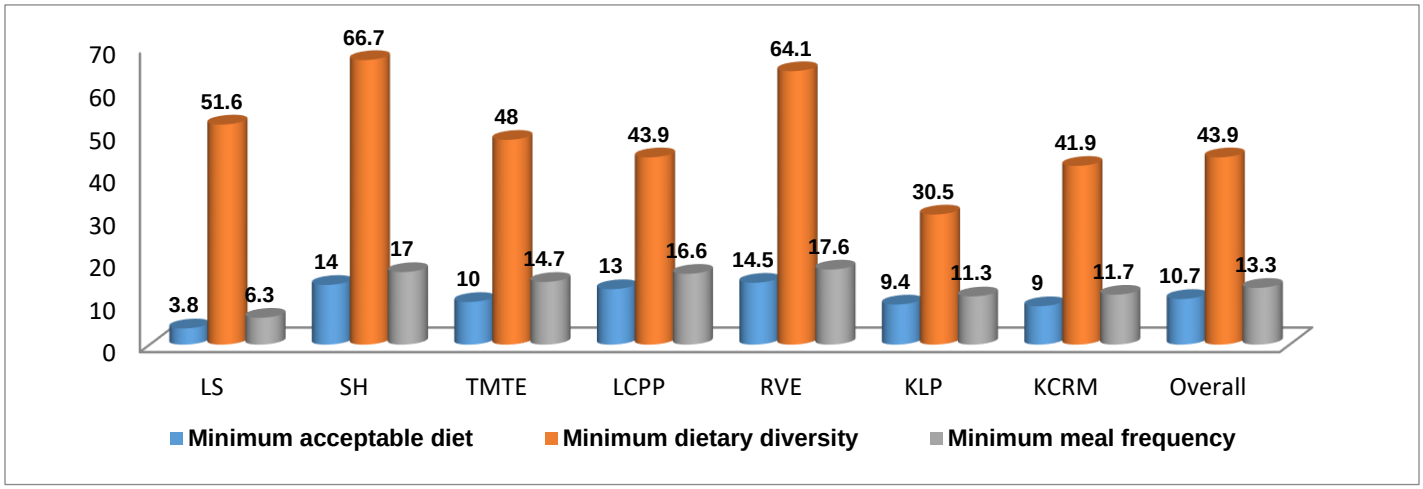

Figure 1: Proportion of children 6-23.9 months who achieved Minimum Acceptable Diet, dietary diversity and meal frequency by livelihood zone

In all the livelihood zones, the proportion of children who achieved MAD declined significantly compared with the post-harvest surveys of May 2017 (Figure 3). In addition the decline is also observed when compared with the December 2016 surveys. The current surveys were conducted at the peak of the lean period and this is the likely reason for the significant decline in the proportion that achieved MAD.

The results also indicate that 43.9% of the children met the minimum meal frequency[1] within the 24 hour recall period (Figure 2). The highest proportion was recorded in SH (66.7%) while the lowest proportion was recorded in Kasungu/Lilongwe Plain zone (30.5%).

[1]Minimum Meal Frequency: 2 Meals for children 6-8.9 Months and Breastfeeding or 3 Meals for children 9-23.9 Months and Breastfeeding, or 4 Meals for children 6-23.9 Months and Not Breastfeeding

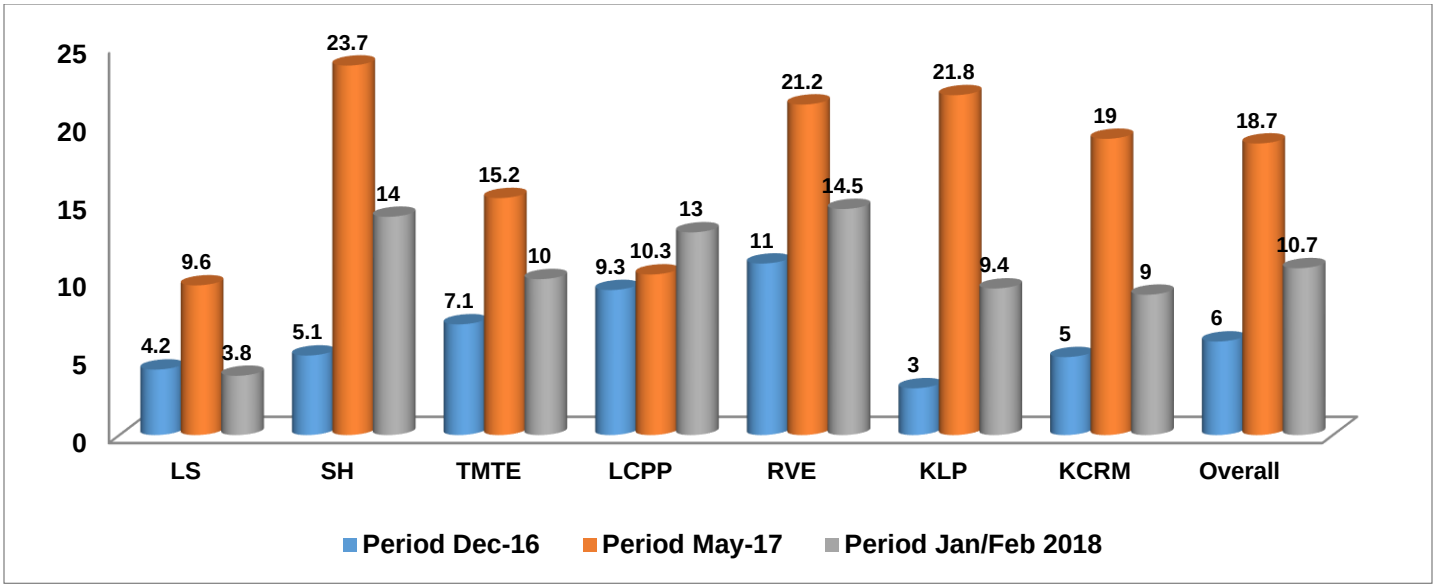

Figure 2: Proportion of children 6-23.9 months who achieved minimum acceptable diet by zone and survey period

Comparing the findings of the current survey conducted during the peak of the *lean* period with the *post-harvest* surveys of May 2017 and the lean period surveys in December 2017, the results indicate overall decline in the proportion of children fed with minimum meal frequency (Figure 4). At livelihood zone level, there were hardly any differences between the current findings with those registered in December 2016 for KCRM livelihood zone and declined in KLP zone by almost 25 percentage points.

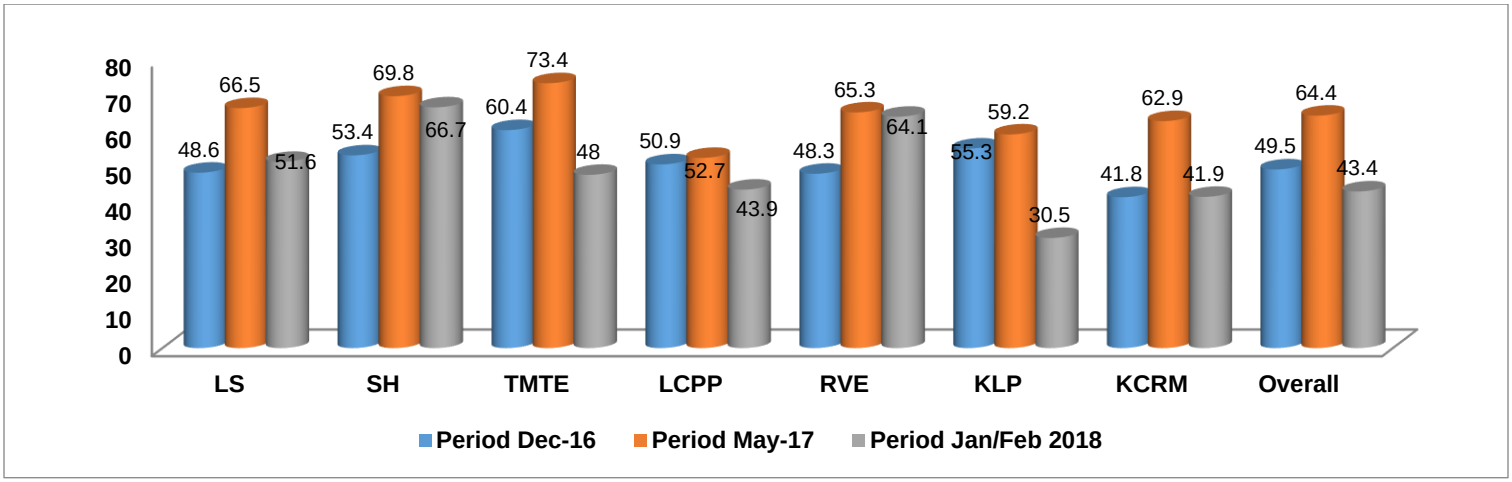

Figure 3: Proportion of children 6-23.9 months fed with minimum meal frequency by zone and survey period

Figure 5 presents the proportion of children who were fed diversified diets. Overall only 13.3 % of the children were fed diversified diets which are almost double the rate in the December 2016 surveys. The rate for the current surveys ranged from 6.3% to 17.6% in LS and RVE livelihood zones. However, all the livelihood zones showed a decline from the May 2017 post-harvest surveys. On the other hand, the proportion that were fed with diversified diet were higher than those recorded the lean period surveys in December 2017.

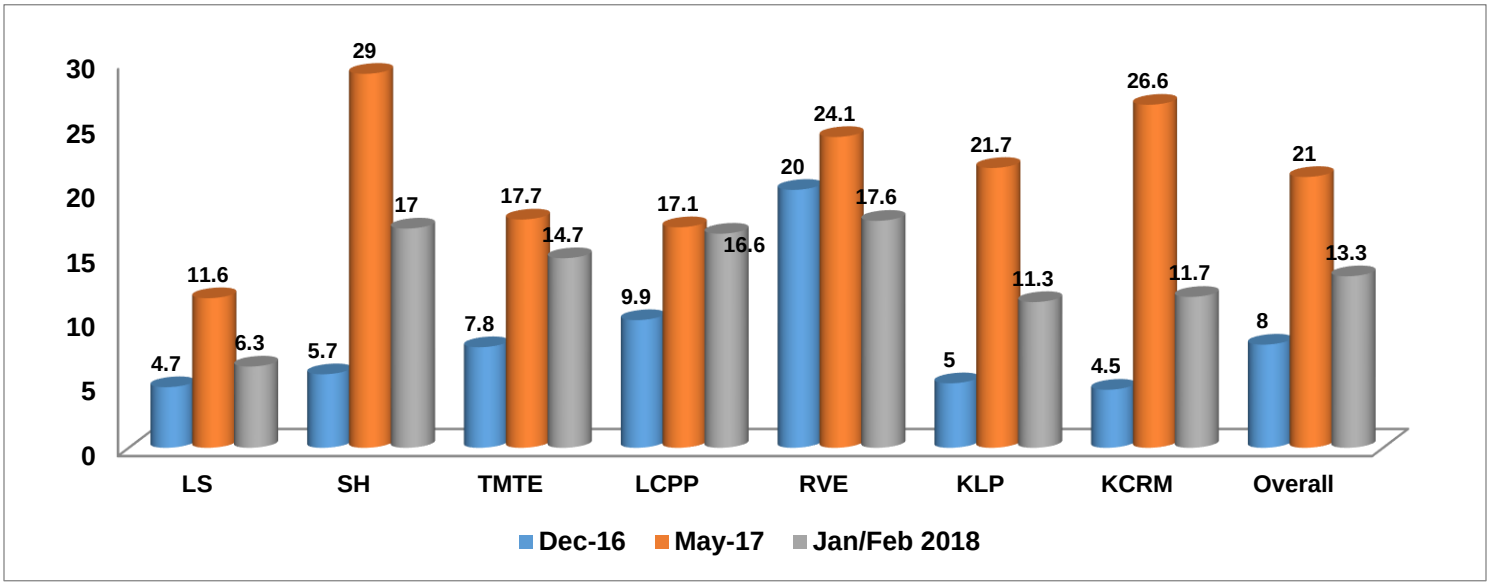

Figure 4: Proportion of children 6-23.9 months who achieved minimum dietary diversity by zone and survey period

3.5.3.1 Type food consumed by children 6-23.9 months

As expected the mainstay of the diet for the 6-23.9 months children was the staple comprising mainly of cereals and to a minor extent roots and tubers (68.6% overall) but this varied between livelihood zones. It was high (over 85%) in SH, TMTE, LCPP AND RVE zones while in KLP and KCRM zones it was less than 60%. Staple food consumption was supplemented with vitamin A rich fruits and vegetables; other fruits and vegetable and to a less extent legumes (Table 17).

Table 67: Food groups eaten by 6- 23 months aged children by livelihood zone

Food type	LS	SH	TMTE	LCPP	RVE	KLP	KCRM	Overall weighted
	n=169	n=159	n=172	n=150	n=131	n=222	n=223	n=1346
Cereals, roots and tubers	69.2	89.9	89.5	88.0	85.5	56.3	55.6	68.6
Legumes, nuts and seeds	21.9	37.7	39.0	29.3	35.9	19.8	15.7	23.8
Milk and milk products	5.3	2.5	5.8	4.0	5.3	4.1	3.6	4.3
Flesh products	8.9	10.1	22.1	10.7	17.6	8.6	5.8	10.2
Eggs	6.5	0.6	1.2	1.3	6.9	6.3	4.0	4.2
Vitamin A rich fruits and vegetables	39.6	30.2	48.8	54.0	37.4	24.8	30.5	35.8
Other fruits and vegetables	33.7	17.6	48.0	37.3	56.5	32.0	31.8	36.2

Consumption of milk, eggs and flesh foods remain low at4.3%, 4.2% and 10.2% respectively which were more scarce than during the May surveys. These findings help to explain the extremely low proportion of the children who had achieved Minimum Dietary Diversity and Minimum Acceptable Diet.

3.6 Mortality Indicators

Data on crude and under-five death rate three months prior to the survey were collected. Table 18 presents the death rates in all the seven zones. Both the crude[2] and under-five[3] death rates were within the acceptable thresholds of less than 2 deaths per 10,000 per day for under-five death rate and less than 1 death per 10,000 per dayfor crude death ratein all the zones. Thyolo-Mulanje Tea Estates recorded the highest crude deaths followed by the Lower Shire Zone and then the Lake Chilwa Phalombe Plain. The lowest was recorded for the Rift Valley Escarpments and the Shire Highlands. Likewise, the highest under-five deaths was recorded in the Thyolo-Mulanje Tea Estates followed by the Karonga-Chitipa-Rumphi-Mzimba zone with no death recorded in the Shire Highlands and the Lake Chilwa Phalombe Plain. This is a remarkable improvement as the two livelihood zones had registered the highest under-five deaths in the May 2017 survey.

The within zone comparison shows that there was an increase in crude deaths in the Lower Shire, Thyolo-Mulanje Tea Estates, Lake Chilwa Phalombe Plain and the Kasungu Lilongwe Plain zones from the May 2017 to the current. On the contrary, Shire Highlands zone recorded no death at all. The results also show an increase in under-five deaths in Thyolo-Mulanje Tea Estates and the Rift Valley Escarpments when compared with the May, 2017 survey findings.

Table 78: Crude and Under-Five Death Rate by Livelihood Zone

Indicator	Livelihood Zone						
	Lower Shire	**Shire Highland**	**Thyolo-Mulanje Tea Estates**	**Lake Chilwa-Phalombe Plain**	**Rift Valley Escarpment**	**Kasungu – Lilongwe Plain**	**Karonga-Chitipa - RumphiMzimba**
Crude Death Rate – Nov/Dec 2016	0.03 (0.00-0.26)	0.40 (0.20-0.80)	0.25 (0.12-0.52)	0.11 (0.04-0.35)	0.08 (0.02-0.34)	0.08 (0.02-0.31)	0.07 (0.02-0.31)
Crude Death Rate – May 2017	0.15 (0.05–0.43)	0.30 (0.16-0.56)	0.21 (0.10-0.43)	0.32 (0.15-0.68)	0.18 (0.08 – 0.40)	0.21 (0.10-0.45)	0.29 (0.14-0.57)
Crude Death Rate –Jan/Feb 2018	0.43 (0.23-0.78)	0.17 (0.02-1.52)	0.68 (0.39-1.19)	0.41 (0.21-0.81)	0.11 (0.04-0.35)	0.26 (0.13-0.53)	0.22 (0.11-0.44)
Male	0.31 (0.12-0.83)	0.00 (0.00-0.00)	0.72 (0.28-1.89)	0.61 (0.27-1.36)	0.15 (0.04-0.61)	0.22 (0.07-0.68)	0.38 (0.18-0.83)
Female	0.54 (0.26-1.11)	0.30 (0.03-2.77)	0.64 (0.30-1.34)	0.16 (0.04-0.64)	0.07 (0.01-0.55)	0.30 (0.11-0.78)	0.06 (0.01-0.45)
Under-Five Death Rate – Nov/Dec 2016	0.24 (0.03-1.77)	0.74 (0.17-3.26)	0.29 (0.04-2.04)	0.26 (0.03-1.93)	0.30 (0.04-2.21)	0.29 (0.04-2.12)	0.00 (0.00-0.00)
Under-Five Death Rate – May 2017	0.22 (0.03-1.65)	0.50 (0.12-2.01)	0.26 (0.03-1.94)	0.54 (0.13-2.22)	0.00 (0.00 – 0.00)	0.28 (0.04-2.11)	0.51 (0.13-2.01)
Under-Five Death Rate – Jan/Feb 2018	0.29 (0.04-2.13)	0.00 (0.00-0.00)	0.70 (0.17-2.89)	0.00 (0.00-0.00)	0.30 (0.04-2.24)	0.31 (0.04-2.34)	0.24 (0.03-1.79)

3.7 Household Food Security

The food security situation was assessed using selected indicators that is: the food consumption score (FCS), household dietary diversity score (HDDS), household hunger scale (HHS) and the coping strategy index (CSI).

[2] Thresholds for Crude Death Rate: <1/10,000/day=Acceptable; > 1/10,000/day=Very Serious, > 2/10,000/day=Out of Control, >5/10,000/day=Major Catastrophe *(adapted from Checchi and Roberts, 2005)*

[3] Thresholds for Under-Five Death Rate: <2/10,000/day=Acceptable, >2/10,000/day=Very Serious, >4/10,000/day=Out of Control, >10/10,000/day= Major Catastrophe*(adapted from Checchi and Roberts, 2005)*

3.7.1 Food Consumption Score

Overall the results show an increase in the proportion of households (10.9%) that had a poor food consumption score compared with 4.2% in May 2017 and 10.5% in December 2016 (Table 19). In fact all the livelihood zones registered higher proportions of households with poor food consumption scores than in the other 3 previous surveys in 2016 and 2017.Thus household food security situation had worsened during the current surveys.

Table 19: Food Consumption Score by Livelihood Zone

Indicator	Livelihood Zone								Overall Weighted
	Period	LS	SH	TMTE	LCPP	RVE	KLP	KCRM	
Poor Food Consumption	*Dec 2016*	7.0% (n=62)	4.8% (n=41)	7.5% (n=66)	36.4% (n=294)	4.0% (n=33)	10.3% (n=88)	3.2% (n=26)	10.5% (n=622)
	Jan/Feb 2018	16.5% (n=139)	10.3% (n=86)	9.6% (n=81)	11.1% (n=81)	7.4% (n=62)	12.7% (n=105)	8.9% (n=76)	10.9% (n632)
Borderline Food Consumption	*Dec 2016*	34.5% (n=305)	23.3% (n=198)	29.8% (n=261)	38.0% (n=307)	25.9% (n=214)	45.2% (n=385)	30.5% (n=248)	34.5% (n=2038)
	Jan/Feb 2018	43.2% (n=363)	40.8% (n=340)	40.1% (n=339)	42.4% (n=310)	39.3% (n=328)	49.4% (n=409)	34.9% (n=297)	43.0% (n=2484)
Acceptable Food Consumption	*Dec 2016*	58.4% (n=516)	71.9% (n=612)	62.7% (n=549)	25.6% (n=207)	70.1% (n=578)	44.0% (n=378)	66.3% (n=540)	55.0% (n=3249)
	Jan/Feb 2018	40.3% (n=339)	48.9% (n=408)	50.3% (n=425)	46.5% (n=340)	53.3% (n=445)	37.9% (n=314)	56.2% (n=479)	45.9% (n=2651)

3.7.2 Other Food Security Indicators

The January/February SMART surveys also collected dietary data for generation ***household dietary diversity score*** and ***copying strategy index.*** The findings are similar to those for food consumption score in that the mean household dietary diversity score (MHDDS) of 4.5 indicating medium diversity, and scores ranged from 4.2 in Lower Shire to 5.0in KCRM livelihood zone. All zones showed the lowest scores in comparison with the surveys conducted in May 2017 and December 2016 (Table 20).

Lower Shire is the only zone that registered low dietary diversity with a score of less than 4.5 (was at 5 during the lean period). However, it is of concern that no zone registered high dietary diversity during the post-harvest season even at the minimum of 6+ based on the IFPRI thresholds (<4.5 = low dietary diversity; 4.5-6 = medium dietary diversity >6 = high dietary diversity).

When livelihoods are negatively affected by a shock/crisis and as access to food declines, households may adopt undesirable coping strategies. Coping Strategy Index (CSI), a proxy indicator of household food insecurity was therefore estimated. The results presented in Table 17, show that negative coping mechanisms are utilized among some households in all livelihood zones. The overall rCSI was at 16.7ranging from 15.1 in KCRM to 17.8 in LS and LCPP. The results showed that overall rCSI increased to 16.7 from12 in the postharvest period but was lower than the December 2016 surveys.

Table 20:Household Dietary Diversity and Copying Strategy Index by Livelihood Zone

Indicator	**Livelihood Zone**	

	LS	SH	TMTE	LCPP	RVE	KLP	KCRM	Overall - Weighted
Household Dietary Diversity Score Dec 2016	5.0 (±1.7)	5.1 (±1.7)	5.0 (±1.6)	4.8 (±1.8)	5.3 (±1.6)	4.5 (±1.7)	5.3 (±1.6)	4.9 (±1.7)
Household Dietary Diversity Score May 2017	4.4 (±1.5)	4.9 (±1.6)	5.0 (±1.6)	4.8 (±1.7)	5.1 (±1.7)	5.1 (±1.7)	5.3 (±1.7)	5.0 (±1.7)
Household Dietary Diversity Score Jan/Feb 2018	4.2 (±1.4)	4.4 (±1.6)	4.4 (±1.6)	4.4 (±1.6)	4.7 (±1.6)	4.4 (±1.7)	5.0 (±1.8)	4.5 (±1.6)
Median Reduced Coping Strategy Index Dec 2016	19.0	19.0	21.0	22.0	18.0	18.0	16.0	19.0
Median Reduced Coping Strategy Index May 2017	17.0	15.0	13.0	14.0	10.0	9.0	9.0	12.0
Median Reduced Coping Strategy Index Jan/Feb 2018	17.0	17.0	15.0	17.0	14.0	14.0	13.0	15.0

3.7.3 Household Hunger Scale

Household hunger scale was also estimated during the current surveys based on households' responses to having experienced no food to eat or going a whole day or night without eating. The findings were compared with the findings of May 2017 and December 2016 survey and the results are presented in Table 21. The proportion experiencing severe hunger was 5.2% of the total households surveyed, and ranged from a low of 1.2% in RVE to 11.9% in TMTE. Nonetheless, a significant proportion (40.3%) was experiencing moderate hunger and the worst hit was lower Shire livelihood zone with 61.4% and the better off zone was KCRM (1.5% experiencing severe hunger and 26.3% experiencing moderate hunger.

Overall the improvements observed across all zones during the post-harvest period are short term hence households go through the cycle of better access after harvest that is followed with food insecurity as the season progresses. There is need for strategies that must break such a cycle at household level.

Table 21: Household Hunger Scale by Livelihood Zone

Indicator	Livelihood Zone							Overall - Weighted
	Lower Shire	Shire Highland	Thyolo-Mulanje Tea Estates	Lake Chilwa Phalombe Plain	Rift Valley Escarpment	Kasungu Lilongwe Plain	Karonga-Chitipa – Rumphi Mzimba	
Little or No Hunger Dec 2016	38.8% (n=338)	54.4% (n=463)	38.9% (n=341)	32.4% (n=262)	56.7% (n=468)	51.9% (n=442)	57.8% (n=469)	48.9% (n=2886)
Little or No Hunger May2017	46.6% (n=414)	58.5% (n=508)	65.8% (n=637)	66.5% (n=560)	79.7% (n=700)	85.0% (n=765)	80.7% (n=781)	73.4% (n=4634)
Little or No Hunger Jan/Feb 2018	30.0% (n=252)	44.7% (n=375)	44.9% (n=379)	49.2% (n=361)	62.4% (n=521)	62.7% (n=519)	71.9% (n=613)	55.4% (n=3200)
Moderate Hunger Dec 2016	52.8% (n=466)	40.8% (n=347)	49.2% (n=431)	57.5% (n=465)	42.1% (n=347)	44.5% (n=379)	40.9% (n=333)	45.9% (n=2713)
Moderate Hunger May 2017	46.7% (n=415)	38.5% (n=334)	31.6% (n=306)	30.0% (n=253)	19.1% (n=168)	14.2% (n=128)	18.3% (n=177)	24.5% (n=1548)
Moderate Hunger Jan/Feb 2018	61.4% (n=516)	48.3% (n=405)	48.8% (n=412)	44.2% (n=324)	35.4% (n=296)	34.9% (n=289)	26.3% (n=224)	40.3% (n=2325)
Severe Hunger in HHDec 2016	8.9% (n=79)	4.8% (n=41)	11.9% (n=104)	10.0% (n=81)	1.2% (n=10)	3.5% (n=30)	1.5% (n=12)	5.2% (n=309)
Severe Hunger in HHMay 2017	6.6% (n=59)	3.0% (n=26)	2.6% (n=25)	3.4% (n=29)	1.1% (n=10)	0.8% (n=7)	1.0% (n=10%)	2.1% (n=130)
Severe Hunger in HHJan/Feb 2018	8.7% (n=73)	6.9% (n=58)	6.4% (n=54)	6.5% (n=48)	2.2% (n=18)	2.4% (n=20)	1.8% (n=15)	4.3% (n=247)

3.7.4 Consumption of Iron, Vitamin A and Protein Rich Foods

Table 22presents the selected foods essential for nutritional health and well-being; these include: protein, iron and vitamin A. As was observed for infants and young children, consumption of haem iron and protein rich foods remains low and overall only 3.3% indicated consumption of at least once per day ranging from 1.7% in KLP zone to 6% in SH livelihood zone. For Vitamin A rich foods, 73.2% indicated daily consumption of such foods (38.7% in LS to a high of 86% in KCRM zone). In many of the livelihood zones the main foods consumed were dark green leafy vegetables which were in season.

Table 22: Consumption of Iron, Vitamin A and Protein Rich Foods

Food Group	Lower Shire	Shire Highlands N=833	Thyolo/ Mulanje N=844	Lake Chilwa N=729	Rift Valley	Kasungu-Lilongwe	Karonga-Chitipa	Overall - Weighted
Haem Iron (Flesh Meat, Organ Meat and Fish):								
Never Consumed	45.4%	27.4%	27.8%	31.4%	28.1%	43.1%	32.0%	34.8%
Sometimes	52.6%	66.6%	69.5%	66.1%	67.4%	55.2%	62.2%	61.9%
At least ONCE/day	2.0%	6.0%	2.6%	2.5%	4.4%	1.7%	5.8%	3.3%
Vitamin A (Dairy products, Organ Meat, Eggs, Green Veg. Orange Veg. and Orange Fruits):								
Never Consumed	2.4%	0.4%	0.4%	0.7%	0.4%	0.4%	0.4%	0.5%
Sometimes	58.9%	35.7%	27.4%	32.4%	24.7%	18.1%	13.6%	26.3%
At least ONCE/day	38.7%	63.9%	72.3%	66.9%	75.0%	81.5%	86.0%	73.2%
Protein Rich (Pulses, Dairy products, Meat, Organ Meat, Eggs, Fish):								
Never Consumed	13.2%	7.8%	8.5%	9.2%	9.0%	18.6%	13.4%	12.7%
Sometimes	69.1%	70.6%	71.4%	75.6%	69.6%	65.3%	58.3%	68.2%
At least ONCE/day	17.6%	21.6%	20.0%	15.2%	21.4%	16.1%	28.3%	19.2%

4.0 CONCLUSION

Undernutrition prevalence among children under five is at its lowest compared to the previous assessments (1.3% GAM and 0.1% SAM) and within WHO acceptable range. A slightly higher proportion of the under-five population are overweight (2.5) indicating emerging problems as effortts to reduce undernutrition are shaping up. While diarrhoea prevalence and health seeking around diarrhoea was higher compared to previous assessments, other indicators such as Minimum Acceptable Diet and other Household Food Security Indicators still suggest challenges in food availability in the survey areas. The declining statistics could thus be attributed to the sustained emergency response post assessment, among many other interventions. The declining trend observed in GAM prevalence in Lower Shire, a zone typically characterised by high prevalence, for example, suggests the impacts of targeted programming in this area. Multi-sectoral efforts are therefore critical for optimal nutritional wellbeing.

Among adolescents and adults, over-nutrition seems to be the bigger problem compared to undernutrition with the Shire Highlands zone reporting very high overweight and obesity prevalence. The overweight problem is more pronounced in adult women (21.3%) than men (8.6%) and so is obesity (1.3% in men and 8.2% in women). An opposite trend was observed for adult undernutrition with a slightly higher prevalence of underweight in men than women. Adolescent prevalence of overweight and obesity was 4.4% and 0.5% respectively, while prevalence in adults was 16.3% and 5.5% respectively. Adults also had a slightly higher prevalence of undernutrition (5.3%) than adolescents (4%). Severe undernutrition was uncommon in both adolescents and adults. Compared to children, nutrition situation among the older groups is poor.

The results of the January 2018 survey have demonstrated that overall, the prevalence of morbidity has slightly decreased in most livelihood zones except for the Lower Shire and the Thyolo-Mulanje Tea Estates Zones when compared with the May 2017 survey. Similarly, when compared with the May 2017 results, the prevalence of diarrhoea decreased in all the livelihood zones except the Lower Shire. Health seeking behaviour was low in the Lake Chilwa Phalombe Plain.

The results of the survey also show that there is a tremendous increase in vitamin A supplementation as compared to the May 2017 survey. The results show that WHO guidelines of reaching to 80% of the under-five children was met except for two livelihood zones of the Kasungu Lilongwe Plain and the Karonga, Chitipa, Rumphi, Mzimba zone.

The minimum acceptable diet is currently estimated at 10.7% down from 19% in May 2017 but slightly higher than 6% achieved December 2016 is problematic for the children to meet their nutrient requirements.

The mortality situation was within the recommended thresholds for both under-five death rate and crude death rate, with no significant differences across the livelihood zones.However there was an increase in crude deaths in the LS, TMTE, LCPP and the KLP zones compared with the May 2017 and December 2016 survey results. The results also show an increase in under-five mortality rates in TMTE and the RVE when compared to the May, 2017 survey.

The results have shown that households were experiencing food insecurity as all the food security indicators had worsened when compared with the May 2017 and December 2016 survey findings. Lower Shire zone continue to be the worsen hit.

5.0 RECOMMENDATIONS

Current responses and approaches by various stakeholders need to be continued to sustain the levels achieved or improve the nutrition indicators even further. Community systems for managing acute malnutrition need to be strengthened and enough capacity built to ensure sustained success in the nutrition situation of children.

As short term response is maintained in emergencies, focus must be shifted to other nutrition sensitive interventions with goals to improve food security, and, subsequently improve diets of children aged 6 to 59 months to address the poor IYCF and food security indicators. However, a detailed analysis of existing approaches and methodologies needs to be undertaken. Some qualitative research should be included as efforts to improve diets are promoted and strengthened.

Due to the vulnerability of the various population groups in the survey areas and the continued impacts of climate change, resilience programmes are needed to prevent alarming statistics that continue to be registered. For all population groups especially the adolescents and adults, there is need for programming to shift focus to addressing problems of over nutrition while managing cases of under-nutrition. In addition, further research is required to map out other nutritional problems faced by these groups and to understand the determinants of their nutritional status for more targeted and informed programming.

6.0 REFERENCES

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7.0 ANNEXES

MVAC_2018_Tools.zip

Appendix :Prevalence of under-nutrition in adolescents 10-19 years based on body mass index for age (BMI-for age)by Livelihood Zone*

Indicator	Sex	Livelihood Zones							Overall Weighted
BMI Classification		LS	SH	TMTE	LCPP	RVE	KLP	KCUM	
Underweight	*Total*	7.8% (5.7-10.0)	3.3% (1.8-4.9)	3.9% (2.2-5.5)	6.0% (3.6-8.5)	3.2% (1.7-4.8)	3.8% (2.0-5.7)	3.4% (1.9-5.0)	4.2% (3.6-4.9)
	Male	7.3% (4.4-10.2)	4.5% (2.1-6.9)	3.0% (0.9-4.5.0)	7.3% (3.5-11.2)	4.5% (2.0-7.1)	3.5% (0.9-6.0)	4.0% (1.7-6.3)	4.6% (3.6-5.5)
	Female	8.4% (5.2-11.6)	2.0% (0.3-3.7)	4.7% (2.2-7.3)	4.8% (1.7-7.8)	1.7% (0.0-3.4)	4.1% (1.5-6.8)	2.8% (0.7-4.8)	3.9% (3.0-4.8)
Severe Underweight	*Total*	0.8% (0.1-1.6)	0.2% (-0.2-0.5)	0.6% (-0.1-1.2)	1.1% (0.0-2.2)	0.0%	0.2% (-0.2-0.7)	0.2% (-0.2-0.6)	0.4% (0.2-0.6)
	Male	1.0% (-0.1-2.0)	0.3% (-0.3-1.0)	0.7% (-0.2-1.8)	1.7% (-0.2-3.6)	0.0%	0.0%	0.0%	0.4% (0.1-0.7)
	Female	0.7% (-0.3-1.7)	0.0%	0.4% (-0.4-1.1)	0.5% (-0.5-1.6)	0.0%	0.5% (-0.4)	0.4% (-0.4-1.2)	0.4% (0.1-0.6)
*BMI calculated based on age and sex of the adolescent and not necessary based on z scores									

Appendix xx: Prevalence of overweight and obesity in adolescents 10-19 years based body mass index (BMI) by Livelihood Zone*

Indicator	Sex	Livelihood Zones	

BMI Classification		LS	SH	TMTE	LCPP	RVE	KLP	KCRM	**Overall Weighted**
Overweight	*Total*	3.2% (1.8-4.6)	4.8% (3.0-6.6)	4.8% (3.0-6.6)	2.5% (0.9-4.1)	3.8% (2.1-5.5)	4.1% (2.2-6.0)	4.2% (2.5-5.9)	3.9% (3.3-4.6)
	Male	1.6% (0.2-3.0)	2.1% (0.4-3.7)	3.0% (0.9-5.0)	1.1% (-0.4-2.7)	1.9% (0.2-3.5)	2.0% (0.0-3.9)	2.5% (0.7-4.4)	2.0% (1.3-2.6)
	Female	4.9% (2.4-7.4)	7.9% (4.6-11.3)	6.6% (3.6-9.6)	3.7% (1.0-6.4)	6.0% (2.9-9.0)	6.0% (2.8-9.2)	6.0% (3.0-8.9)	5.9% (4.7-7.0)
Obesity	*Total*	0.3% (-0.1-0.8)	1.3% (0.3-2.2)	0.4% (-0.0-0.9)	0.3% (-0.2-0.8)	0.6% (-0.0-1.3)	0.5% (-0.2-1.1)	0.4% (-0.1-0.9)	0.5% (0.3-0.8)
	Male	0.3% (-0.3-0.9)	0.3% (-0.3-1.0)	0.4% (-0.3-1.1)	0.0%	0.0%	0.5% (-0.4-1.4)	0.0%	0.3% (0.0-0.5)
	Female	0.3% (-0.3-1.0)	2.4% (0.5-4.3)	0.4% (-0.3-1.1)	0.5% (-0.5-1.6)	1.3% (-0.2-2.7)	0.5% (-0.4-1.4)	0.8% (-0.3-1.9)	0.8% (0.4-1.2)

*BMI calculated based on age and sex of the adolescent and not necessary based on z scores