Cost of the Diet Assessment

in livelihood zones:

LR02 North Central Rice with Cassava and Market Gardens

LR04 Coastal Plain Cassava with Rice and Inland Fishing

LR08 Rubber and Charcoal with Food Crops

for

The Liberia WASH Consortium Project

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Contents

Acronyms

AEL – Association of Evangelicals of Liberia

CoD – Cost of the Diet

CHO – Carbohydrate

EO – Energy only diet

FDA – Forest Development Authority

FGD – Focus group discussion

FHAB – Food habits nutritious diet

FRC – Farmers Research Centre

HEA – Household Economy Analysis

HH - Household

IEC – Information, education, communication

IYCF – Infant and young child feeding

KII – Key informant interview

LWC – Liberia WASH Consortium

MN – Macronutrient

MoH – Ministry of Health

NFE – Non-food expenditure

NGO – Non-governmental organisation

NUT – Micronutrient 'nutritious' diet

PRO – Protein

RNI – Recommended nutrient intake

WHH - Welthungerhilfe

WHO – World Health Organization

Executive summary

Developed by Save the Children, the Cost of the Diet (CoD) methodology and software estimates the combination and amount of locally available foods needed to provide either individuals or a household with enough food to meet their average energy needs and recommended intakes of protein, fat and micronutrients (Deptford et al., 2017). The software estimates the hypothetical minimum amount a typical household would need to spend to meet all nutrient requirements using foods available in local markets. Three of the four standard CoD diets were analyzed for the Liberian assessment:

- Energy-only (EO) diet – lowest cost diet that meets energy (calorie) needs only for the household
- Micronutrient 'nutritious' (NUT) diet – lowest cost diet that meets minimum requirements for energy, fat, protein and 13 vitamins and minerals, but does not account for typical dietary habits
- Food habits nutritious (FHAB) diet – lowest cost diet that meets minimum requirements for energy, fat, protein, 13 vitamins and minerals and does account for typical dietary habits

Assessment purpose

The purpose of the assessment was to understand the causes determining sub optimal feeding and to explore the acceptability and economic feasibility of identified options to improve household consumption of nutritiously diverse foods in the livelihood zones studied. The CoD assessment results identify nutrients hardest to obtain from locally available foods and those that are the least expensive sources of energy and nutrients. This information will be used to promote low cost, highly nutritious foods and that the saved cost from the designed diets can be used for other household needs.

Specific objectives:

1. To estimate the combination and amounts of local foods needed to provide an average household of 5 (for each of the 3 target livelihood zones) with a quality diet meeting their average needs for energy and recommended intakes of carbohydrates, protein, fat, and the main micronutrients.
2. To estimate costs, affordability, and provide an economic appraisal of the options including value for money.
3. To explore the acceptability of options and compare them according to potential impact, likelihood of success and risk.
4. To recommend what foods should be considered when developing recipes for complementary feeding and pregnant mothers.
5. To understand the correlation between the market price and seasonal availability of various foods with consumption pattern.

Key findings and recommendations:

Key findings

The annual costs of a food habits nutritious diet, which accounts for local dietary habits and food consumption patterns, for an average household of 5 is 118,973.80 LRD in LR02, 120,516.01 LRD in LR04 and 134,478.04 LRD in LR08. Average daily costs and USD conversions are outlined in the table below. The annual costs are reflective of the relative distance from urban centres – with markets LR08 (Margibi, Montserrado) being the most expensive and closest to the capital city, Monrovia, and LR02 being the most rural and difficult to access.

Liberian livelihood zones	Avg daily cost RAINY (LRD)	Avg daily cost DRY (LRD)	Avg daily cost (LRD)	Annual cost (LRD)
LR02 North/Central Rice with Cassava and Market Gardening	380.78 (1.97 USD)	228.03 (1.18 USD)	325.96 (1.69 USD)	118,973.80 (616.76 USD)
LR04 Coastal Plain Cassava with Rice and Inland Fishing	382.33 (1.98 USD)	237.02 (1.23 USD)	330.18 (1.71 USD)	120,516.01 (624.75 USD)
LR08 Rubber and Charcoal with Food Crops	411.93 (2.14 USD)	290.74 (1.51 USD)	368.43 (1.91 USD)	134,478.04 (697.13 USD)

Cost of the Diet in LR02 Rice with Cassava & Market Gardening, LR04 Central Plain Cassava with Rice and Inland Fishing and LR08 Rubber and Charcoal with Food Crops, Liberia

Very poor and poor households all three livelihood zones cannot afford a food habits nutritious (FHAB) diet. An average household of 5 in LR02 cannot afford a NUT diet. Though households in LR04 and LR08 can afford the cost of a nutritious diet, the NUT diet provides a minimum number of foods in unrealistic quantities to be able to keep the cost low and does not account for local food consumption patterns and dietary habits.

The cost of the diet is 1.7, 1.6, 1.4 times more during the rainy season than the dry season in livelihood zones LR02, LR04 and LR08, respectively. LR02 is the most food insecure zone with half of visited markets offering less than 40 items for purchase. This zone was also the most difficult to access, with road conditions making almost impossible in some instances not to get stuck in the mud.

Sixty-seven percent (67%) of traders and key informants in all livelihood zones felt that the primary reason for the high cost of food was due to the high LRD to USD exchange rate. In LR02 and LR04, 64% of key informants felt that poor road conditions significantly affect the change of price. Finally, high transportation/gas costs (49% of informants) high wholesale costs (19% of informants) and lack of price controls (18% of informants) were also reasons given for changes in price.

The main food taboos were goat, dog, snake and snail (in LR02 and LR04). Taboos were individual and not community wide. The main reasons for avoiding these foods are 1) health reasons, such as fear of death, skin rashes and sores, itchiness, earache or tooth loss, 2) myth, including either bad luck, good deeds going unnoticed or positive actions turning negative, 3) family law and/or family tradition, and 4) religion. While there are a variety of other food taboos from most food groups, reasons were not always given for their avoidance.

Meal frequency varies across the three zones. Communities in LR08 claimed to only consume one meal per day. Seven of 9 communities in LR04 claimed to consume two meals per day, while the most variation was reported in LR02 – from 1 meal to 3 meals, depending upon the community. Two communities each in LR02 and LR04 had very mixed responses, ranging from one to three meals within the community, reflective of wealth diversity.

Complementary feeding practices are by individual or household, and not observed across whole communities. Whilst select households reported giving children special foods (e.g. pumpkin, boney fish dust, banana, greens), it is not common practice. Most women claimed to exclusively breastfeed to five months. However, many women reported exclusive breastfeeding, or providing only water in addition to breast milk, much longer than recommended (up to 2 years). Most communities reported that pregnant and lactating women do not consume special foods, making this vulnerable group high risk for iron deficiency anaemia. Alternatively, most reported giving sick and convalescent individuals pepper soup. Though, soup ingredients are dependent on the household wealth – the richer the household, the more ingredients - especially inclusion of meat and protein sources.

Bush meat and beans were the most frequently reported “missing” foods. Bush meat is still available and being consumed by those who can pay for it. However, bush meat is illegal and its consumption puts humans at risk of contracting diseases, such as Ebola. Beans are no longer as readily available for two reported reasons: production challenges (problems with soil and cultivation) and import challenges (trucks no longer deliver beans – presumably NGO vehicles). As meat and beans are two very important sources of nutrients (protein, iron, vitamin B12), this must be considered seriously when intervention and programme planning.

The main limiting nutrients – those that are hardest to meet using locally available food sources, which are driving up the cost of the diet - are the same across the three livelihood zones: fat, vitamin B12, niacin, iron and zinc. The cheapest foods sources, as identified in the FHAB diets, are:

- **Vitamin B12:** Boney fish, canned sardines, catfish, cow meat, dried baby fish, snail
- **Fat:** Agro (vegetable) oil, coconut, boney fish, kernel oil, red oil (palm oil)
- **Niacin:** Boney fish, breadnut, cassava, cassava leaf, fever leaf, kpakutuweh beans, sweet potato leaf
- **Iron:** Boney fish, breadnut, cassava, cassava and fever leaf, cow meat, kpakutuweh beans, palava sauce/plato leaf, sweet potato leaf, snail
- **Zinc:** Benny (sesame) seeds, breadnut, cassava, cassava leaf, coconut, fever leaf, kpakutuweh beans, snail

Recommendations

Short-term:

Promote consumption of all available free and wild foods. Foods grown in the wild require no maintenance. Encourage consumption of all foods that have no associated cost (not bush meat).

Find ways to make nutrient dense foods more affordable. Boney fish, breadnut, catfish, coconut, cassava, dried baby fish, kpakutuweh beans, palm oils, and local greens are highly nutritious and available sources of fat, vitamin B12, fat, niacin, iron and zinc, but also increase cost. Livelihood opportunities to grow and/or rear these foods will contribute to lowering the cost of the diet significantly.

Promote consumption of other low-cost nutritious local foods. All foods identified in FHAB diets are the lowest cost, locally appropriate, nutrient dense options. For example: cabbage, corn, country rice, grapefruit, orange, peanuts, sardines, split peas, sweet potato, chicken…

Improve feeding practices for pregnant and lactating women. The lactating woman's diet accounts for the greatest proportion of the FHAB diet cost for a household of 5, due to increased energy and nutrient needs. Promote consumption of proteins high in vitamin B12 and iron (boney fish, snail) to prevent iron deficiency anaemia, breadnut, vegetables (okra) and green leaves that are high in vitamin A, folic acid and calcium.

Improve complementary feeding practices for children 6-23 months. Most children are fed the same foods as adults and are not provided any special foods. Advocate for improved IYCF practices, including fruits, meats and fish and greens.

Conditional cash transfer to very poor and poor households. Whilst not sustainable in the long-term, cash transfers provide a short-term solution for households unable to afford a nutritious and locally appropriate diet. A two-year transfer could bridge the affordability gap during the inception period of other planned project activities and associated 'conditions' could be tied to participation in said activities. An amount slightly higher than the monthly 4,500 LRD trialled in this report is recommended for very poor households.

Long-term:

Nutrition-sensitive community farming. Community farming, including gardening, crop, vegetable and fruit production (e.g. breadnut and coconut). The very poor and poor groups in LR02, and many parts of LR04, must produce their own food. If road conditions do not improve, it is critical that communities in these zones protect themselves during the rainy season, when roads are inaccessible and the cost of food almost doubles. Further investigation into land accessibility required.

Nutrition-sensitive aquaculture and snail-rearing. These interventions have the potential to significantly lower the cost of the diet, whilst providing income generating opportunities. Fish and snails provide the best sources of iron and vitamin B12, two of the main limiting nutrients. Further investigation into existing fishpond and aquaculture activities within the livelihood zones required.

Improved road network and market accessibility. Most of the road in Liberia are dirt, which turns to mud during the rainy season. This will continue to prevent vehicles from accessing remote areas and the cost of transportation and gas will continue to rise.

Alternative livelihood strategies for hunters. Liberian hunters hold valuable knowledge about the forest (bush) and are more familiar with the ecosystem than anyone else. They are currently "in hiding" and sell hunted animals to highest bidders. Hunters must be offered alternative livelihood strategies if they are to stop doing work that has been passed down to them over generations, which threatens both the health of Liberians and the diversity of wildlife found within the country. Investigation into opportunities that might exist for this isolated group and how to harness their knowledge and expertise.

Investigation into the true cost of diet during the dry season. Conduct a CoD assessment between January – March in the same markets and zones, when it is clearly the middle of the dry season. This will provide a more realistic analysis of the dry season cost and seasonal variations.

1. Introduction

1.1 Background

This Cost of the Diet assessment, commissioned by the Liberia WASH Consortium (LWC) and funded by Irish Aid, is part of a three-part research initiative aimed at understanding the underlying causes of, and main contributing factors to, undernutrition - and most specifically stunting - in Liberia.

The LWC was launched in 2008 and quickly established itself as one of the two leaders, along with UNICEF, for addressing Liberian WASH challenges. The Consortium effectively engaged donor representatives, government officials and other NGOs in policy discussions, strategic planning, and learning events, apart from delivering improved WASH services in a complex environment. The LWC remains a key actor in the sector, as evidenced by its recent success promoting policy reform (2015 – 2018). The LWC, in the frame of the current project funded by Irish Aid, is conducting in-depth research to identify and understand the different factors, including WASH aspects, that interact and have an impact on the nutritional status of children under 5 in different counties of Liberia.

1.2 Need for the Cost of the Diet assessment

Suboptimal feeding and poor hygiene and sanitation practices are two main contributors to child stunting. According to the World Health Organization (WHO), stunting in the first 1,000 days of life can have adverse consequences later in life, such as poor cognition and educational performance, low adult wages, lost productivity and increased risk of nutrition-related chronic diseases as adults when accompanied by excessive weight gain in later childhood (2019). Action Against Hunger, Concern Worldwide and WaterAid, three LWC members, have taken up the task of researching the immediate and underlying causes of the high rates of child stunting in Liberia (35.5% national level), with peaks of 41% in Grand Bassa and 38% in Rivercess. This research, along with the results of the Nutrition Causal Analysis and Barrier Analysis, will inform the development of a social behavior change communication (SBCC) framework and strategy to address the identified causes and promote its adoption across current and future programs.

1.3 Aim and objectives of the assessments

The purpose of the cost of the diet assessment was to understand the causes determining sub optimal feeding and to explore the acceptability and economic feasibility of identified options to improve household consumption of nutritiously diverse foods in the communities studied. The CoD assessment results identify nutrients hardest to obtain from locally available foods and those that are the least expensive sources of energy and nutrients. The aim is that this information will be used to promote low cost, highly nutritious foods and that the saved cost from the designed diets can be used for other household needs.

Specific objectives:

6. To estimate the combination and amounts of local foods needed to provide a typical family (for each of the 3 target livelihood zones) with a quality diet meeting their average needs for energy and recommended intakes of carbohydrates, protein, fat, and the main micronutrients.
7. To estimate costs, affordability, and provide an economic appraisal of the options including value for money.
8. To explore the acceptability of options and compare them according to potential impact, likelihood of success and risk.
9. To recommend what foods should be considered when developing recipes for complementary feeding and pregnant mothers.
10. To understand the correlation between the market price and seasonal availability of various foods with consumption pattern.

2. Methods

2.1 Cost of the Diet method and software[1]

Developed by Save the Children, the CoD methodology and software estimates the combination and amount of locally available foods needed to provide either individuals or a household with enough food to meet their average energy and recommended intakes of protein, fat and micronutrients (Deptford et al., 2017). The analysis can estimate the hypothetical minimum amount a typical household would need to spend on recommended intakes of energy, protein, fat and micronutrients using foods available in local markets. The menu driven CoD software allows linear optimization programming to select locally available foods that meet WHO-recommended nutrient requirements at the lowest cost possible.

The table below outlines the three standard diets that were analyzed by the Cost of the Diet software for the Liberian assessment: energy-only (EO) diet, micronutrient 'nutritious' (NUT) diet and food habits nutritious (FHAB) diet. The NUT and FHAB diets attempt to meet recommended intakes of energy, fat, protein, nine vitamins (vitamin A, C, B1, B2, B6, B12, niacin, pantothenic acid, folic acid) and four minerals (calcium, iron, magnesium, zinc) (Cost of the Diet, 2014). Greatest emphasis will be placed on the food habits nutritious diet (FHAB), as it is the most informative and useful from a programmatic perspective. Particular attention will be paid to the contribution and significance of animal food sources, fruits and vegetables, with a focus on seasonality.

Table 1: Summary of diets calculated in the standard analysis a Cost of the Diet assessment

Diet name	Definition	Energy needs met	PRO needs met	FAT needs met	MN needs met	Reflects typical diet
Energy-only diet (EO)	A lowest cost diet that meets only the average energy specifications of the members of the household	X				
Micronutrient 'nutritious' diet (NUT)	The lowest cost diet that meets specifications for energy, protein, fat and micronutrients, but does not consider typical dietary habits	X	X	X	X	
Food habits nutritious diet (FHAB)	A lowest cost diet that meets specifications for energy, protein, fat, micronutrients and accounts for typical dietary habits	X	X	X	X	X

Energy-only diet (EO)

The energy-only diet meets recommended intake for energy for the household, but does not account for required protein, fat and micronutrients. This diet is useful for illustrating the potential for micronutrient deficiencies when only energy is provided in a diet and the extra cost required to meet all recommended nutrient needs.

Micronutrient nutritious diet (NUT)

The micronutrient nutritious (NUT) diet, which is also referred to as the 'nutritious' diet, meets recommended intakes for energy, protein and fat and all micronutrients for a specific individual or family at the lowest cost. This diet does not consider typical dietary habits, but may be useful when considering the additional cost of meeting micronutrient needs. This diet chooses local foods that provide a nutritious diet, but often in unrealistic quantities.

Food habits nutritious diet (FHAB)

The food habits nutritious diet (FHAB) applies a minimum and maximum number of times a food is consumed per week, also known as "constraints", using data collected from key informant interviews (KII) and focus group discussions (FGD). This diet most closely reflects the typical dietary habits of the examined population and is helpful for highlighting the additional cost of meeting average energy and recommended nutrient intakes (RNI) by considering normal dietary habits, such as typically consumed staple foods, food frequency and food taboos.

[1] Additional information can be found on the HEA- COD website (https://www.heacod.org)

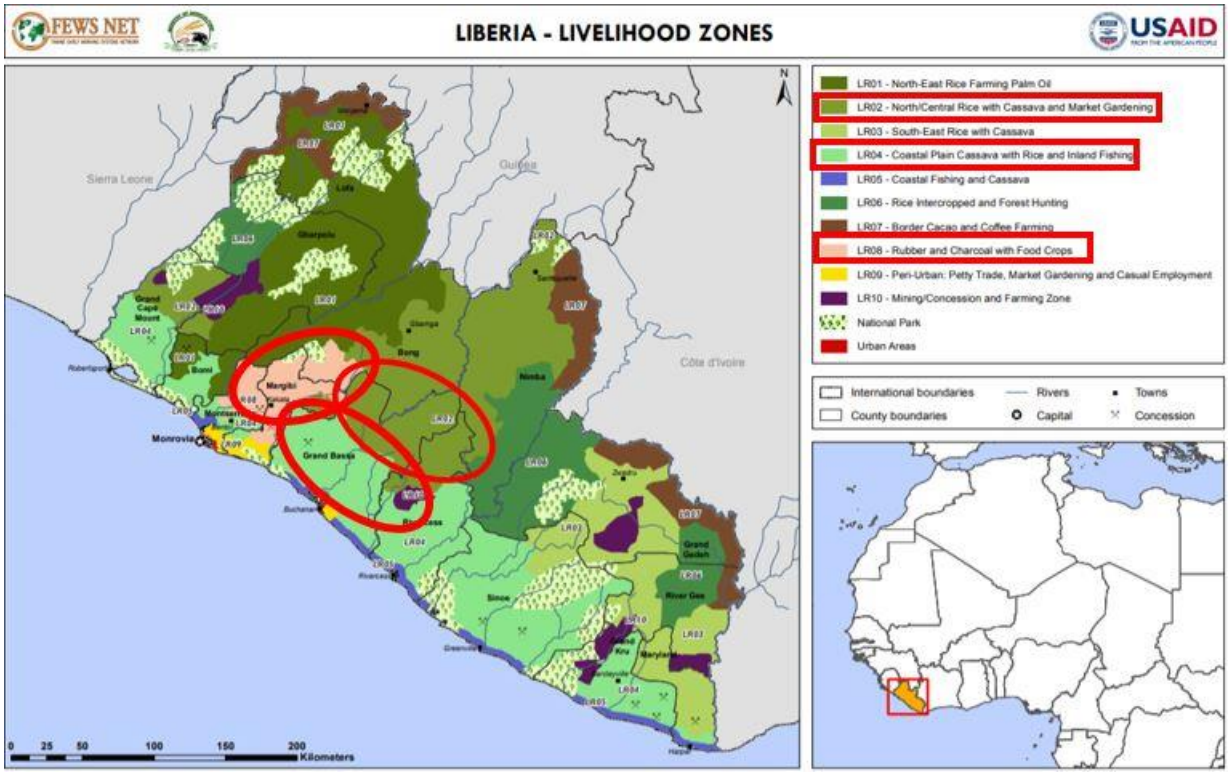
2.2 Data Collection

Data collection took place over 18 working days between the 29th October and the 19th November, 2019. Ten local enumerators, two Tearfund partner staff from the Association of Evangelicals of Liberia (AEL), the Ministry of Health's (MoH) Director of Nutrition and three MoH Nutrition Managers (Grand Bassa, Margibi, Sinoe) participated in the CoD training on the 25th, 26th and 28th of October, 2019. Eight local enumerators were selected as the final data collection team upon completing a short test on local foods following a market pilot on the final training day. The sections below provide details on the location selection, seasonality, processes for collecting quantitative market data (price and weight) and qualitative dietary habits data.

Locations

Market surveys were conducted in three livelihood zones (LR2 North/Central Rice with Cassava and Market Gardening, LR4 Coastal Plains Cassava with Rice and Inland Fishing and LR8 Rubber and Charcoal with Food Crops), across four counties (Grand Bassa, Margibi, Montserrado and Rivercess) within the selected zones (Figure 1). A livelihood zone refers to an area in which people share roughly the same livelihood activities and patterns, access to food and markets. The final zones were selected by Concern's Program Director and ANSARM Program Coordinator in consultation with the Consultant and with final approval from the donor, Irish Aid.

Figure 1: Livelihood zones selected for CoD assessments in Liberia (FEWSNET, 2019)



Market surveys

Market surveys were conducted in 23 markets across the three livelihood zones: six markets in LR02 (one in Margibi, three in Grand Bassa, two in Rivercess), eleven markets in LR04 (7 Grand Bassa, 4 Rivercess) and six markets in LR08 (4 Margibi, 2 Montserrado) (see Annex 1). Markets and villages were purposefully selected based on market days and road accessibility with guidance from Concern Worldwide staff, partner staff and key informants. A decision was made during the second week of data collection to divide the relatively large team of 8 enumerators into two groups in order to tackle more markets, as those found in Grand Bassa were particularly small and, in some cases, only one set of market data was collected. See Annex 2 for the complete list of visited markets and villages.

The initial list of available food items was created using secondary data sources and a market survey provided by Concern. The food list was reviewed on the second day of training by all CoD trainees. Missing and local food names were added and incorrect foods removed. The list was tested in a pilot market on the third day of training in

Montserrado. New food items were added to the data collection sheets during testing, later added to the software and further refined on the first data collection day. During the pilot, enumerators were able to test the equipment (scales, food list) and practice interviewing market traders. The comprehensive food list was used to collect data on the weight and price of food during the market surveys and continuously updated as new foods were discovered. Certain items, such as confectionary, flavoured powders (orange), local unidentified spices (woloh, country spice) and items used for medicinal purposes (potter for pregnant women) were excluded, as they were considered to have limited (or no) nutritional bearing on the diet.

Photos: Local enumerators collecting market data in Monrovia (pilot), Montserrado and Grand Bassa

All foods on the list were entered into the CoD software by selecting individual items from food composition tables embedded within the database. When possible, food items from the West Africa (first choice) or Senegal (second choice) databases were selected. Certain food items were allocated to the food closest in composition, including groundhog (muskrat), kittily (eggplant), land snail (sea snail) and plantain chips (cassava chips). The nutritional content of breadnuts, fufu and kiss-me were added using information attained through online searches.

The price of each food item was recorded for the current season (rainy) and retrospectively for the dry season, in order to estimate the total annual cost of the diet. It should be noted that the assessment took place at the very end of the rainy season. Seasons were identified through discussions with the local staff, enumerators and market traders. Historically, the rainy season ends around mid-October. However, for both 2018 and 2019, the rainy season extended well into November. Due to the continued presence of heavy rainfall during the assessment period, difficulty accessing markets (continued poor road conditions), and feedback from traders, it was agreed that the reference period would be the end of the rainy season and retrospective season would be the dry season.

Three samples of each item on the food list were selected and weighed on Tanita KD-400 electronic kitchen scales (+/-1g). Traders were asked for the smallest units of each food item, as it is assumed that poor households purchase small amounts, rather than bulk food that requires more money at the time of purchase. Salter hanging scales were used for items weighing more than 5kg or those too big to fit on the kitchen scales. Data collection sheets were collected at the end of each day and data entered in the CoD software on the same day.

Once all market survey data was collected, enumerators carried out a short questionnaire with Traders and Key Market Informants, which in most cases were the Market Superintendents. This information was used to understand market functionality, seasonality and supply/demand changes.

Key informant interviews and focus group discussions

Information on staple foods, free and wild foods, taboo foods, meal frequency, feeding practices for infant and young children, pregnant and lactating women, and sick individuals was collected through key informant interviews (KIIs) and focus group discussions (FGDs) to accompany collected market data to estimate a nutritious and realistic diet. In each selected community, eight women (primary household food preparers) were asked to participate in both KIIs and a subsequent FGD. Participants from very poor and poor wealth groups were selected with the help of village Leaders, Chiefs and partner staff.

A food frequency questionnaire, containing all foods in the market survey, was administered in each KII to assess the frequency of food consumption. The aim of the interviews was to collect quantitative data on the number of days each food on the list was consumed per week in a household. Participants were allowed a choice of four response options: never, rarely (once a month or on special occasions), often (1-4 days each week) or usually (5 days a week or more). Enumerators selected the appropriate response on the interview sheet and noted any comments, such as whether the food was free or a taboo if mentioned by the interviewee.

Photos: During (left) and after (right) FGDs with women who prepare the household meals in Montserrado and Rivercess

Following each individual KII, enumerators reviewed the completed questionnaires to identify gaps, free and wild foods, taboos and patterns that needed to be explored further. The same participants attended a group discussion to validate interview responses. A semi-structured questionnaire was used in each FGD to collect qualitative data on food staples, consumption patterns, complimentary feeding practices, taboos and changes in food availability.

Collected data was entered into the CoD software following each market visit and data quality was checked at that time to identify inconsistencies, irregularities, gaps, large price differences, and conflicting seasonal availability of food data. Data collection errors were addressed during a morning briefing the following day before additional data was collected.

2.3 Average family size and composition

The CoD estimates the cost of specifications for energy and nutrients based on the information provided for the typical number of people in a household, which is generally regarded as those who eat from the same cooking pot (Cost of the Diet, 2014). According to the 2013 Demographic Health Survey (DHS), the average household size in Liberia was 5.0, including an almost even female (22,725) to male (22,317) distribution, with 37% of households caring for orphaned or foster children. The CoD has been estimated based on a standard household of five individuals, comprised of a man, woman and three children:

- *Child (either sex), 12-23 months*
- *Child (either sex) 9-10 years*
- *Child (either sex) 11-12 years*
- *Man, 30-59 years, 50 kg, moderately active*
- *Woman, 30-59 years, 45 kg, moderately active (1 x lactation, 7-12 months)*

2.4 Estimating affordability of the diet

Annual household income (Liberian LDR) was calculated using figures found in a 2007 Household Economy Analysis (HEA) report from Bomi county (Save the Children), which lies between Grand Cape Mount and Montserrado, with an adjustment for inflation (261.3%) using the WorldData.info inflation calculator (2019). Two livelihood zones are found within Bomi county: LR01 Northeast Rice Farming Palm Oil and LR04 Coastal Plain Cassava with Rice and Inland Fishing. As LR04 was one of the three livelihood zone being assessed and provided the most appropriate wealth group analysis (very poor, poor, middle, better off), this was deemed to be the closest and most appropriate data to use for this CoD assessment. However, it should be noted income figures were estimated, as income information was in graph form (no absolute figures). Table 2 outlines the 2007 annual household income figures by wealth group, 2019 inflation-adjusted and non-food expenditure figures used to calculate diet affordability.

Table 2: 2006 Annual household income, 2019-adjusted annual household income and non-food expenditure as a percentage of income

	October 2005 - September 2006			
Annual Household Income (HEA, 2007)	**Very Poor**	**Poor**	**Middle**	**Better off**
2006 Annual household income (LRD)	17,000	25,000	58,000	80,000
Rate of inflation 261.3%	261.30%	261.30%	261.30%	261.30%
2019 Adjusted annual household income (LRD)	61,416	90,318	209,538	289,018
% NFE Average Grand Bassa & Rivercess (26.35%)	16,183	23,799	55,213	76,156
% NFE Average Margibi & Montserrado (36.55%)	22,448	33,011	76,586	105,636

Non-food expenditures (NFE) are the essential expenses incurred by a household that are not food. Examples of essential NFEs include costs associated with education, health, transportation, water, electricity, fuel, rent, communication and clothing. The percentage of household NFE was calculated by taking an average of the *Comprehensive Food Security and Nutrition Survey* (2016)-reported percentages for Grand Bassa (28.3%) and Rivercess (24.4%) for LR02 and LR04, and an average of Montserrado (41.4%) and Margibi (32%) for LR08.

2.5 Cost of the diet limitations

Both software and data limitations must be understood when interpreting the results of the Liberia assessment.

Software limitations

- The software can produce a 'diet' that includes recommended amounts of energy and micronutrients using a somewhat small number of foods. The selected foods would need to be consumed at every meal, every day, which is unrealistic. Therefore, it is not recommended to use the software for this purpose.
- RNIs are set to two standard deviations above the average to avoid the risk of micronutrient deficiency, as actual requirements for specific individuals are unknown. Thus, the nutritional needs of 97% of individuals will be surpassed when RNIs for a household are 100% met by the combination of software-selected foods.
- The software determines the energy and RNIs for an average household. The software is unable to account for intra-household food distribution. Although this is briefly explored in the FGDs, there is no way to account for how food will be distributed between individuals within the household.
- Iodine, vitamin D and essential amino acids and fatty acids are not accounted by the software and therefore not included in the food tables. It is assumed that iodine will come from the soil in which plants are grown in or on which animals are reared. It is assumed that vitamin D requirements will predominantly be met by ultra-violet light from the sun. Amino acids and fatty acids are not provided by most food tables.

Data limitations

A cost of the diet assessment frequently follows a Household Economy Analysis (HEA)[2] from the same assessment area, defining key demographic characteristics, income and expenditure amounts and wealth groups. Although five HEAs were conducted between 2000 and 2007 in Liberia, each disaggregated income, expenditure and wealth

[2] For more on the Household Economy Analysis, go to: (https://www.heacod.org/en-gb/Pages/WhatIsHEA.aspx)

group criteria differently, with no absolute figures provided (only graphs). An in-depth search was performed to attain county- and/or national-level annual household income data for Liberia, including government, World Bank and internationally recognized economic and food security reports and web sites. However, no absolute figures were found online for annual household income, only rates, such as percentage of income spent on food.

The 2016 Household Income and Expenditure Survey (HEIS) provided salary ranges and percentage of population that fell within the poorest, third and richest quintiles. These figures could also be adjusted for inflation (51.2% since 2016) and the median figure for the largest percentage of each group representing the associated quintile. During the Liberia CoD preliminary results dissemination on the 25th of November, 2019, attendees were presented with the 2007 HEA-adjusted figures and wealth group criteria, and the 2016 HEIS-adjusted figures. It was agreed that the HEA figures would be used for the final assessment, as they include the fourth (very poor) wealth group.

3. Results

The results in this report are presented by livelihood zone, including discussion on the availability of foods in local markets, food consumption patterns, cost and affordability of the three standard diets (EO, NUT, FHAB). All costs are calculated in Liberian dollars (LRD). A conversion rate of 192.90 LRD to 1 USD[3] was used for the analysis.

The three food lists (Annexes 3, 6, 9) contain food items that were not found in the markets. However, KII results found that many items are consumed at least occasionally, so, for this reason, they have been left in the lists to acknowledge that these foods are being consumed. Groundhog, for example, was mentioned in almost every FGD and seems to be the most consumed bush meat. The minimum and maximum constraints guide the software when selecting foods that make up the FHAB diet. For example, if a food item has a minimum and maximum constraint of 0 and 7, it could be included in the diet up to 7 times per week (once daily) for each individual household member. If the maximum constraint is 14 it can be included up to twice daily for each household member. The food frequency was determined for each food found in the market and on the food frequency questionnaire.

When exploring food consumption patterns, staple foods were referred to as those which are consumed “every day”. Fufu (cassava product) is mentioned separately from cassava, as fufu was specifically reported as being consumed every day. Other cassava products, such as boiled cassava, roasted cassava, gari, dipper and dumboy might not necessarily be consumed daily, though would fall under the “cassava” staple.

Free and wild foods include those that do not have to be purchased for money, including those that are home grown, found in the wild or foraged, hunted and provided as gifts.

Food taboos were found to be very individual and/or personal and generally categorized into four thematic areas: myths, health, family law and/or tradition, religion.

When reviewing the affordability results, it is important to keep in mind that most households in Liberia are not solely reliant on cash for income. According to the 2007 HEA, food comes from multiple sources, including household’s own crop production, payment in kind (very poor and poor groups only), market purchases, wild foods and through school feeding programmes. A household’s wealth was determined by labour availability, with very poor households often elderly or female-headed caring for young dependents, and, as such, having limited labour availability (HEA, 2007). When intervention planning, the very poor group must be considered carefully, as these households may not be able to participate in the same planned activities as those with available able-bodied adults.

[3] Exchange rate as of 22 November 2019 found on: https://www.xe.com/currencyconverter/convert/?Amount=1&From=USD&To=LRD

3.1 LR02 North/Central Rice with Cassava and Market Gardening

Availability of foods in the local market

The data collection team collected price and weight data for 89 foods in six markets within Grand Bassa (3 markets), Margibi (1 market) and Rivercess (2 markets) counties across the LR02 North/Central Rice with Cassava and Market Gardening zone. Figure 2 presents the number of foods found by food group across the zone: 7 grains and grain-based products, 8 roots and tubers, 11 legumes, nuts and seeds, 10 meat and offal, 7 fish, seafood, amphibians and invertebrates, 1 egg and egg product, 3 milk and milk products, 17 vegetables and vegetable products, 9 fruit and fruit products, 3 oils and fats, 3 sugars and confectionary, and 12 herbs, spices and condiments. A detailed food list, including the price per 100g for each season (rainy and dry), seasonal average, and minimum and maximum constraints uncovered through key informant interviews can be found in Annex 3.

Figure 2: The number of food items from each food group found in LR02 markets

Four of six markets visited in LR02 were considered small, "village" markets. It took more than three hours to reach two of the markets, Bodewhea and Boegeezaye, in Rivercess, and community members reported that they had not seen non-governmental organisation (NGO) vehicles in a long-time, indicating both problems with vehicle accessibility and lack of NGO presence in the area. The number of foods found in each of the LR02 markets can be found in Annex 4, by food group. Less than 40 food items were found in Peter's Town (38), Bodowhea (35), Boewin (19) and Boegeezaye (36) markets, highlighting low food availability and potential for low dietary diversity. It is important to note:

- No fresh eggs were found an any of the LR02 markets
- Only boiled eggs were found in Peter's Town, St. John's and Boegeezaye
- No fresh milk was found in any of the markets in all three livelihood zones
- No milk and milk products were found in Leuwin
- Only one milk or milk product was found in Peter's Town, Bodowhea, St. John and Boegeezaye
- No meat and offal were found in Bodowhea and Boewin
- No roots and tubers were found in Boewin
- Only one fruit (orange) was found in Boewin

Market changes

Seventeen (17) traders and key market informants were interviewed in LR02 markets. All 17 reported a recent noticeable increase in the cost of foods, specifically rice (12), pepper (10), oil (8), cassava/fufu (7), onion (4), bitter ball/eggplant (3) and vita (bouillon cubes) (3). Price changes were thought to be caused by the high LRD to USD exchange rate (13), poor road conditions (13), gas and transportation costs (10), wholesale cost of goods (7) and lack of price controls (2). Informants had noticed a lower demand for food (7), a low food supply (5) and higher supply of food (when compared with demand) (1). Seven of 17 interviewees felt that people cannot afford to buy

food. When asked whether seasonal price changes were normal, more or less than previous years, 10 people felt that prices were higher than previous years, five felt that prices were normal and always higher in the rainy season and six felt that price changes were not normal.

Local food consumption

Individual key informant interview (41) and focus group discussion (6) results verified that cassava, fufu, rice and plantain are the staple foods, which are consumed "every day". Cassava is more widely consumed in the rainy season, while rice consumption increases during the dry season, when cassava intake decreases. Other mentioned staple foods included eddoes (4), sweet potato (5), yam (3), breadnut (3). Although plantains were found in the markets, they were only being sold wholesale (large quantities) in LR02 and, thus, prices were not recorded.

Free and wild foods varied across the communities, though breadnut (3), cassava (2), okra (3), sweet potato (2), sweet potato leaf (2) and yam (2) were most frequently mentioned. Country rice was mentioned as being a free food during the dry season by three communities (Boewin, St. John, Boegeezaye). Other reported free foods included banana, bitter ball, cucumber, eddoes, grapefruit, lime, orange, plantain, plum, pumpkin and sugar cane.

Food taboos generally fell into three thematic areas within LR02: myth, health reasons and family law/tradition. Foods associated with myths, meaning general bad luck or good deeds going unnoticed, were chicken, dog, goat and turtle. Foods associated with negative health outcomes, such as death, skin rash, sores, itchiness, earache and tooth loss, included chicken, dog, eddoes, goat, monkey, palm cabbage, sheep, snail, turtle, worms and yam. Taboos connected to family law or family tradition were catfish, deer, dog, goat, snake, tiger and turtle. Only one person mentioned pig as being taboo for religious reasons (Muslim). Finally, bamboo, deer and snake were also mentioned, but no reasons were provided for them being considered a taboo.

Five of six interviewed communities felt that typical dietary habits differed across the community and by wealth groups. Participants claimed that habits were determined by the household's financial status and that poor people eat less. Better off households eat meat and have more ingredients in their soup (meat, fish, greens), while poor people "add only mushroom". In this community, mushroom was used as an example presumably because it's mostly free (wild). It should be noted that no mushrooms were found in LR02 markets.

The number of meals consumed per day varied from one to three times depending on the community. Participants in Peter's Town and Leuwin claimed to only eat one meal per day. The other four communities had mixed responses, with some people eating two times per day and others eating three times. Participants in Bodowhea claimed that the number of meals consumed per day goes up to two (from one) during the dry season due to improved road access. Interestingly, participants in Boewin, the market with the least number of food items (19) found, reported that *everyone* in the community consumes three meals per day. The same community also claimed to produce their own bitter ball, cassava, cucumber, chili pepper, eddoes, lime, pumpkin, plantain, rice and sweet potato.

Children aged 6 to 23 months

Four of six communities claimed that children aged 6 to 23 months are not specifically given any special foods. In Leuwin, where the community claimed only one meal is eaten per day, participants reported that children are provided two meals per day. In St. John, where two meals are eaten per day, three of eight people interviewed claimed to give children boney dust, eddoes, red oil and wheat.

Pregnant and lactating women

Three of six communities claimed that pregnant women are not specifically given any special foods. Individual responses were given in three communities, who claimed that some special foods are given to pregnant women. Participants in Bodowhea claimed that pregnant women are provided with dipper and rice. Participants in St. John reported that pregnant women consume eddoes and corn meal. Finally, individual participants in Boewin claimed to consume 1) fufu with palm butter soup and groundnut, 2) fufu soup with pepper and 3) more rice and fufu.

Four of six communities claimed that lactating women are not given any specific foods: "breastfeeding mothers consume the same foods as everyone else in the household". Only one community claimed that the quantity of food increases. Boewin community claimed to provide women with the water from boiled rice, soft rice, pepper soup and very hot bitter ball soup.

Sick and convalescent individuals

All LR02 communities reported giving special foods to sick and convalescent individuals. The most common meal is pepper soup. As mentioned previously, ingredients in pepper soup vary depending on the level of household income. Other foods mentioned were soft rice, fufu (with soup), eddoes and coconut water, sweet potato green soup with pepper (possibly a version of pepper soup), plantain soup with dried boney fish, eddoes soup with oil and chilli pepper, pork, chicken, fresh or frozen fish.

Change in food availability

Three communities reported that bush meat is no longer available. Groundhog and deer meat were specifically mentioned as missing. According to participants, bush meat is still available, however, it is taken to the city to sell at a higher price and goes to the highest bidder.

Three communities reported that beans are no longer available, including butter beans, canned kidney beans, yellow beans (split peas), and "all varieties". The reason given for the lack of bean availability was bad road conditions and high transportation fees. Other foods reported as being no longer available include basket fish, bulgur wheat, canned tomatoes ("only seen during the holidays"), chicken, country tomatoes, cow tongue, crystal oil, peanuts, pig feet, pineapple and shark fish.

The cost of the diets

Table 3 provides a summary of the cost of the three diets (EO, NUT, FHAB) calculated by the CoD software for LR02. Nutritional requirement for each diet can be met by locally available foods, which reflects well on the quality of available food items in a food insecure zone. The analysis found a nutritious (NUT) to be almost three times the cost of an energy-only diet, which illustrates the high cost of meeting fat, protein and micronutrient requirements when compared to only meeting energy needs for an average household. The cost of a food habits nutritious (FHAB) diet is only slightly higher than the NUT diet (5,436.46 LRD more annually). For the FHAB diet, the software uses minimum and maximum weekly food constraints to reflect realistic dietary habits using data collected during KIIs. Therefore, for LR02, creating a diet that is more culturally appropriate is not that much more costly.

Table 3: Summary of the daily diet cost for rainy and dry seasons, average daily cost and annual cost (LRD and USD) of each diet for an average household of 5 in LR02

Diet type	Family size	Requirements met?	Daily diet cost RAINY (LRD)	Daily diet cost DRY (LRD)	Average daily diet cost (LRD)	Annual diet cost (LRD)
Energy only (EO)	5	Yes	133.30 (0.69 USD)	77.80 (0.40 USD)	113.38 (0.69 USD)	41,384.43 (214.53 USD)
Nutritious (NUT)	5	Yes	366.40 (1.90 USD)	212.21 (1.10 USD)	311.06 (1.63 USD)	113,537.34 (588.58 USD)
Food habits nutritious (FHAB)	5	Yes	380.78 (1.97 USD)	228.03 (2.45 USD)	325.96 (1.69 USD)	118,973.80 (616.76 USD)

LR02 Energy-only (EO) diet

The lowest cost of an energy-only diet for an average household of 5 within zone LR02 in Grand Bassa, Margibi and Rivercess was 113.38 LRD per day and 41,384.43 LRD annually. The daily cost during the rainy and dry seasons were 133.30 LRD and 77.80 LRD, respectively. Table 9 in Annex 5 shows that only four (4) foods, including breast milk for infants, are needed to meet the energy requirements for an average household of 5 people. However, the EO diet does not meet RNIs for protein (53%), fat (11%), vitamin A (11%), vitamin B1 (19%), vitamin B2 (24%), niacin (25%), vitamin B6 (41%), folic acid (36%), calcium (26%), iron (12%) and zinc (29%).

LR02 Micronutrient nutritious diet (NUT)

The lowest cost of a nutritious diet for an average household of 5 within zone LR02 is 311.06 LRD per day and 113,537.34 LRD annually. The daily cost during the rainy season of 366.40 LRD was 1.7 times higher than that of the

dry season, at 212.21 LRD per day. Though the NUT diet produced a hypothetical diet that meets all nutrient needs, it is not reflective of typical dietary habits and consumption patterns. Thus, it has included substantially more raw cassava (757kg or 14.6kg/week for a household of 5) than other locally preferred items, such as fufu (84kg) and country rice (13kg). Table 10 in Annex 5 illustrates that, although RNIs are met through this diet, vitamin B12, fat and niacin are only just meeting the 100% target, indicating that these nutrients are the limiting nutrients.

The majority of vitamin B12 in this diet is provided by boney fish (78.2%), whilst the remaining 21.8% is provided by canned sardines (16.2%) and breast milk (5%). Most of the fat in the NUT diet is provided by coconut (72.2%), while the remaining 27.8% is provided by breast milk (7.7%), boney fish (6.3%) and other food items selected for the diet (all < 4%). The niacin nutrient target is only slightly higher, at 108%, which is mostly provided by boney fish (24.7%), sweet potato leaf (20.2%), cassava (19.5%) and fever leaf (15.1%). The NUT diet included gblafee leaf and pork sausage, however, these foods were only found in one market each and excluded from the FHAB analysis.

LR02 Food habits nutritious (FHAB) diet

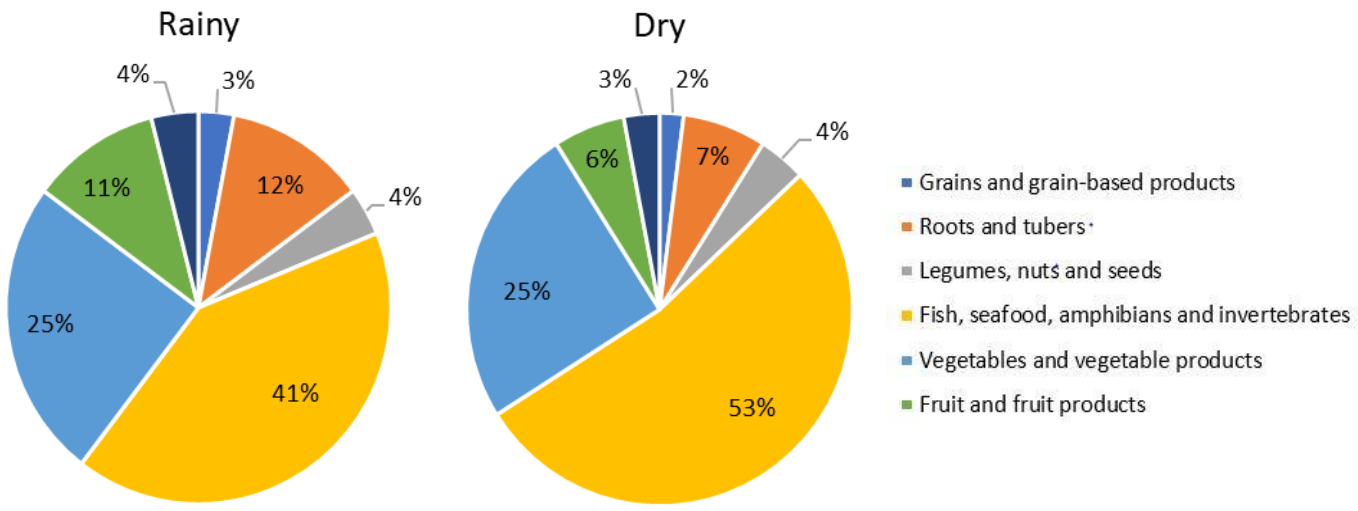
The food habits nutritious diet is different from the NUT diet in that it accounts for local habits and realistic food consumption patterns using the data collected through KIIs. The LR02 FHAB diet contains 17 of the 89 foods found in the visited markets. The cost of the FHAB diet for an average household of 5 within zone LR02 is 325.96 LRD per day and 118,973.80 LRD annually. The daily cost during the rainy season is 380.78 LRD, which is 1.7 times more expensive than the dry season (228.03 LRD), reflecting the very high cost of food during the rainy season.

Table 11 in Annex 5 presents the foods included in the FHAB diet, gblafee leaf and pork sausage were replaced with more commonly consumed foods: agro (vegetable) oil, benny seeds, catfish, kpakutuweh (adzuki) beans, palm kernel oil and pink peanuts. The FHAB diet has also adjusted the quantity of foods to account for more typical consumption patterns. For example, whereas 757kg raw cassava, 84kg fufu and 13kg country rice were included in the NUT diet, the FHAB diet has included 505kg raw cassava, 126kg fufu and 31kg country rice annually.

Vitamin B12 (100%), fat (100%), niacin (106%) and iron (111%) are the limiting nutrients in the FHAB diet, which are driving up the cost. Again, vitamin B12 is being provided by boney fish (80.3%), canned sardines (13.5%) and breast milk (5%). Most of the fat in this diet comes from coconut (49.4%), palm kernel oil (17%), boney fish (6.5%) and breadnut (5.1%). Niacin is being provided by boney fish (25.7%), sweet potato leaf (16.5%), cassava (13.2%), fever leaf (13.1%), breadnut (8.4%) and palava sauce (7.9%). Finally, iron is provided by sweet potato leaf (25.8%), fever leaf (19.6%), breadnut (17.7%), palava sauce (12.2%) and boney fish (8.6%).

Figure 3 compares the percentage of weekly food cost by food group for the FHAB diet in both seasons. The FHAB weekly food cost is 2,665.46 LRD in the rainy and 1,596.21 LRD in the dry season. Most of the cost goes to fish, seafood, amphibians and invertebrates during both seasons (41% rainy, 53% dry). The percentage allocated towards vegetables and vegetable products (25%) and legumes, nuts and seeds (41%) remains the same across the seasons. A greater part of diet cost allocation is towards fruits and fruit products (11% from 6%), oils and fats (4% from 3%), grains and grain-based products (3% from 2%) and roots and tubers (12% to 7%) during the rainy season.

Figure 3: The percentage of total weekly food cost by food group for the FHAB diet during rainy and dry seasons



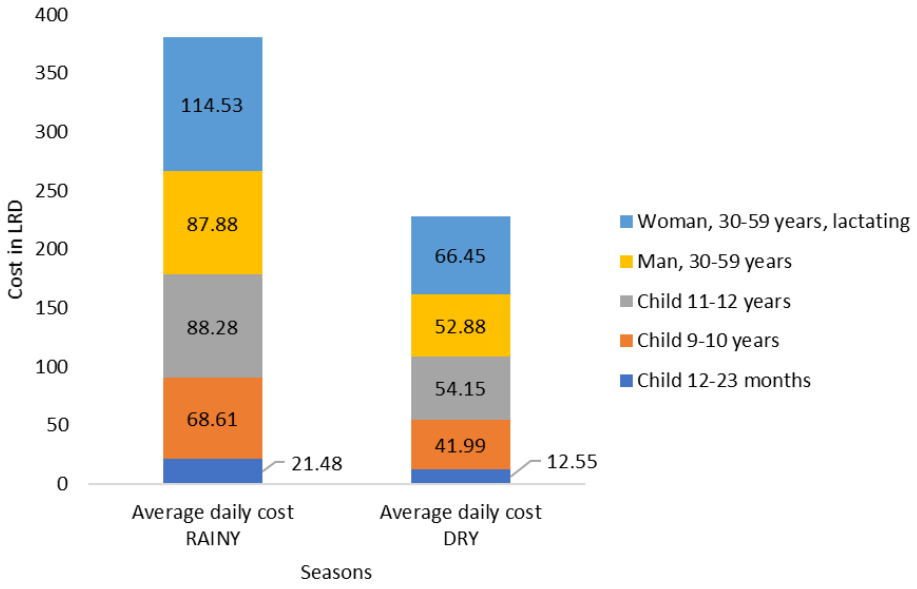
The affordability of the diets

Figure 4 illustrates the results of an affordability analysis for LR02, using inflation-adjusted income figures found in the 2007 HEA. The graph shows the cost of each diet conveyed as a percentage of annual household income for each of the four wealth groups. The minimum cost of FHAB diet represents 194%, 132%, 57% and 41% of total income for the very poor, poor, middle and better off wealth groups, respectively. The numbers rise to 220%, 158%, 83% and 68% for the same wealth groups when non-food expenditures (NFE), such as medical expenses, school uniform fees and housing costs, are added. Both the very poor and poor groups cannot afford the NUT and FHAB diets. When NFE is added to the cost of the NUT and FHAB diets for very poor, the costs are more than double income. Both the middle and better off groups can easily afford a NUT and FHAB diet, including essential NFE.

Figure 4: The affordability of the diet for the four wealth groups in LR02, as a percentage of household income

Figure 5 illustrates the average daily cost of the FHAB diet during rainy and dry seasons, broken down the amount each member of the household contributes to the total cost. In both rainy and dry seasons, the lactating woman accounts for the biggest portion at 30% and 29%, respectively. This is not surprising, as lactating women require increased energy, protein, vitamin A, calcium, iron and all other nutrients (see Annex 12) to stay healthy and provide nourishment for their infants. Children 11-12 years, who are just starting puberty (27% rainy, 24% dry), account for the next biggest portion, which is only slightly more than the moderately active adult male (27% rainy, 23% dry). Finally, children 9-10 years (21% rainy, 18% dry) and young children 12-23 months (7% rainy, 6% dry) make up the smallest portion of daily food cost.

Figure 5: The average daily cost of the FHAB diet by household members in the dry and rainy season in LR02

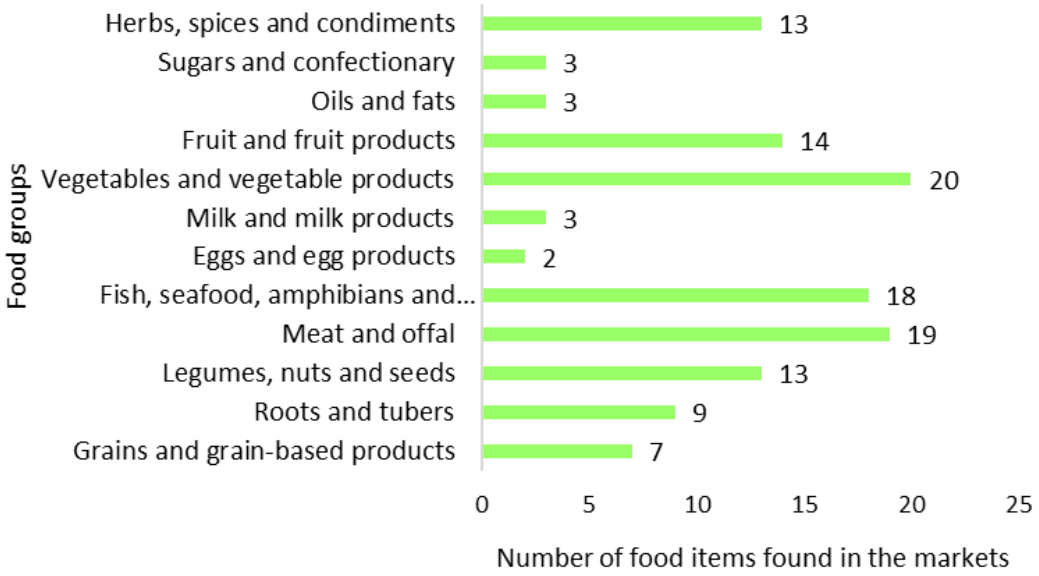


3.2 LR04 Coastal Plain Cassava with Rice and Inland Fishing

Availability of foods in the local market

The data collection team collected price and weight data for 124 foods in eleven markets within Grand Bassa (7 markets) and Rivercess (4 markets) counties across the LR04 Coastal Plain Cassava with Rice and Inland Fishing zone. Figure 6 illustrates the number of items from each food group found in the markets: 7 grains and grain-based products, 9 roots and tubers, 13 legumes, nuts and seeds, 19 meats and offal, 18 fish, seafood, amphibians and invertebrates, 2 egg and egg product, 3 milk and milk products, 20 vegetables and vegetable products, 14 fruit and fruit products, 3 oils and fats, 3 sugars and confectionary, and 13 herbs, spices and condiments. A detailed food list, including the price per 100g for each season (rainy and dry), seasonal average, and minimum and maximum constraints uncovered through KIIs can be found in Annex 6.

Figure 6: The number of food items from each food group found in LR04 markets (Grand Bassa & Rivercess)



Of the 11 visited markets in LR04, Compound 3 and Bokay markets were larger and considered to be "wholesale markets", which was reflected in the greater number of items found in the markets (96 and 70, respectively). The graph in Annex 7 illustrates the number of foods found in each LR04 market. Less than 40 food items were found in Little Kola (22), FDA market (26), Yarpleah (35), Gbozohn (30) and Sayah (20) markets. It is important to note:

- No eggs or egg products were found in Little Kola, FDA, Yarpah, Yarpleah, Gbozohn and Sayah
- Only boiled eggs (no fresh eggs) were found in Bokay, Nyonben and Little Liberia
- No milk or milk products were found in Little Kola, FDA and Sayah
- Only one milk or milk product (no fresh milk) was found in SOS, Nyonben and Gbozohn
- No oils and fats were found in FDA, Yarpleah and Sayah
- No fruits and fruit products were found in FDA and Sayah
- Only one root and/or tuber was found in Yarpleah and Gbozohn

As the assessment was conducted towards the very end of the rainy season, a time when accessibility was said to have improved, there is an assumption that food availability would be worse at the height of the rainy season (April – September).

Market changes

Twenty-eight (28) traders and key market informants were interviewed in LR04 markets. Twenty-six interviewees reported a noticeable increase in the cost of foods, specifically rice (20), pepper (12), oil (12), onion (11), vita (11), cassava/fufu (4), bitter ball/eggplant (2) and gari (2). High LRD to USD exchange rate (18), poor road conditions (16), the gas and transportation costs (15), lack of price controls (6) and the high wholesale cost of goods (3) were the main reasons given for the increased food costs. Informants had noticed a lower demand for food (14), a lower supply of food (5) and higher supply of food (when compared with demand) (3). Seven of 28 informants specifically reported that people cannot afford to buy food. When asked whether seasonal price changes were normal, more

or less than previous years, 17 people felt that prices were higher than previous years. Eleven felt that prices were normal and, of those, seven felt that prices are always higher in the rainy season. Seven interviewees felt that recent changes in price were not normal.

Local food consumption

Individual key informant interview and focus group discussion (9) results found that, like LR02, cassava, fufu, rice and plantain are the main staple foods, which are consumed daily in LR04. Rice and cassava are consumed in both rainy and dry season. However, country rice is more available during the dry season. White rice is consumed more during the rainy season, by those who can afford it. Other mentioned staple foods, which are eaten every day, included eddoes (6), sweet potato (5), yam (4), breadnut (3), cassava leaf (6) and sweet potato leaf (5).

The most commonly reported free and wild foods in LR04 included bitter ball (4), breadnut (3), cassava (4), cassava leaf (6), eddoes (4), okra (3), orange (4), palm nut (3), pepper (4), sweet potato (5), sweet potato leaf (4) and yam (4). Other mentioned free foods were benny seeds, breadfruit, careless green, coconut, corn, cucumber, golden plum, kittily, monkey nut, pumpkin and pawpaw (papaya).

Food taboos fell into four thematic areas within LR04: myth, health reasons, family law/tradition and religion. Foods associated with myths, which were connected to negative reactions experienced by the person or good deeds/behaviour going unnoticed, were bird, goat, cola nut, opossum and snail. Foods associated with poor health outcomes, such as itchiness (mouth or body), such as skin rashes or sores, and tooth loss, included bitter ball, breadnut, cat, dipper, dog, goat, leopard, monkey, sausage, snail, snake, turtle. Taboos connected to family law or family tradition were goat, dog, deer, leopard, snake and snail. Raccoon and monkey were mentioned as religious taboos (religion not specified). Finally, catfish, chicken, crab, crayfish, crocodile, cassava leaf, deer, duck and sheep were mentioned as taboos, with no explanation of why.

Seven communities felt that dietary habits were not the same across the community, while eight communities reported that the habits differed by wealth group. Everyone reported eating fufu and rice, however those with more money eat bush meat (deer), while those with less money only eat boney fish. Again, more ingredients in pepper soup was reported for those who have greater financial strength.

Most communities (7) reported eating two times per day. Two communities had mixed participant responses: one, two and three times per day in both Yarpah and Yarpleah Towns. Participants in Little Kola claimed that the number of meals consumed per day goes up to three (from two) during the dry season. Three communities specifically mentioned that they eat less during the rainy season.

Children aged 6 to 23 months

Seven communities reported that children aged 6 to 23 months are not provided any special foods. In Little Kola, participants claimed that “children eat more than adults”. In Giahbah, participants reported that children eat three meals rather than two (adults).

Individuals in a handful of communities reported feeding children special foods. One participant in Yarpleah Town claimed to give children plantain dust, rice dust, boney dust, benny seeds and kernel oil. One participant in Yarpah town claimed to give children pumpkin and banana from 6 months, while another in the same community reported giving children rice and banana dust from 6 months. One participant in Gbozohn claimed to provide her child with rice, potato greens and red oil. Women claimed to exclusively breastfeed anywhere from 6 to 23 months. Nyonben community claimed to only give children breast milk and water for up to 2 years.

Pregnant and lactating women

All nine communities reported that pregnant women eat the same foods as the rest of the household. Seven of the nine communities stated that lactating women are not given any special foods. Little Kola community claimed to give breastfeeding mothers palm butter and cassava. In Little Liberia, participants reported that “the normal diet continues, like fufu, soup, benny seed, boney fish and chicken feet”.

Sick and convalescent individuals

Eight communities reported giving pepper soup (with or without fufu) to sick and convalescent individuals. Ingredients in pepper soup included boney fish, bitter ball, pepper, kittily, mushrooms, okra, salt, vita. Additionally,

participants in Sayah, Yarpah, Little Liberia, Little Kola and Giahgbah communities claimed that sick people are provided soft rice and/or the liquid from burnt rice. Other mentioned sick and convalescent foods include river crab and fish (Yarpah), chicken, catfish and tilapia (Giahgbah), and corn meal (Gbozohn).

Change in food availability

Five communities reported that bush meat is no longer available. Groundhog, red deer and gazelle were specifically mentioned. According to participants, hunters have gone "to the deeper forest" and "are no longer killing". Yarpah community mentioned that bush meat is not eaten because of FDA (Forest Development Authority) restrictions. The same community reported "ritual killings" (people turning up dead with body parts removed), which have prevented them from going alone to catch river foods, such as crab, crayfish and catfish.

Six communities reported the absence of beans, including butter, country, kidney and kpakutuweh (adzuki). In Little Liberia, participants claimed that country beans no longer grow in the soil. In Gbozohn community, participants mentioned that NGOs no longer distribute butter beans. Other foods that are no longer available in LR04 included bulgur wheat, cabbage, corn meal, cow tongue, crayfish, eddoes, sorghum, watermelon, yams and zipper fish.

The cost of the diets

Table 4 presents the cost of the three diets in LR04. The analysis found the NUT diet to be 1.6 times the cost of an energy-only diet, highlighting the extra cost of meeting fat, protein and micronutrient requirements as compared to only meeting energy needs for the household. The FHAB diet is almost double the cost of the NUT diet. In this case, the higher cost of the FHAB diet reflects extra cost of accounting for local food consumption patterns.

Table 4: Summary of the daily diet cost in the rainy and dry seasons, average daily cost and annual cost (LRD and USD) of each diet for an average household of 5 in LR04 Coast Plain Cassava with Rice and Inland Fishing

Diet type	Family size	Requirements met?	Daily diet cost RAINY (LRD)	Daily diet cost DRY (LRD)	Average daily diet cost (LRD)	Annual diet cost (LRD)
Energy only (EO)	5	Yes	128.16 (0.66 USD)	90.06 (0.47 USD)	114.49 (0.59 USD)	41,788.45 (216.63 USD)
Nutritious (NUT)	5	Yes	199.56 (1.03 USD)	145.17 (0.75 USD)	180.04 (0.93 USD)	65,713.27 (340.66 USD)
Food habits nutritious (FHAB)	5	Yes	382.33 (1.98 USD)	237.02 (1.23 USD)	330.18 (1.71 USD)	120,516.01 (624.75 USD)

LR04 Energy-only (EO) diet

The lowest cost of an energy-only diet for an average household of 5 within zone LR04 in Grand Bassa and Rivercess was 114.49 LRD per day and 41,788.45 LRD annually. The daily cost during the rainy and dry seasons were 128.16 LRD and 90.06 LRD, respectively. Table 12 in Annex 8 illustrates that, like the EO diet for LR02, only four (4) foods, including breast milk, cassava leaf, whole coconut and fufu, are needed to meet the energy requirements for an average household of 5 individuals. However, the EO diet does not meet RNIs for fat (28%), niacin (82%), vitamin B12 (5%) and zinc (76%).

LR04 Micronutrient nutritious (NUT) diet

The micronutrient nutritious diet includes 11 of the 124 food items found in local markets. The lowest cost of a NUT diet for an average household of 5 within zone LR04 is 180.04 LRD per day and 65,713.27 LRD annually. The daily cost during the rainy season of 199.56 LRD is 1.4 times that of the dry season, at 145.17 LRD per day. Very similar to the LR02 NUT diet, Table 13 in Annex 8 illustrates that, vitamin B12 and fat have only just met the 100% target, while niacin (108%) is only slightly over. This indicates that fat, B12 and niacin are hardest RNIs to meet using locally available foods for the NUT diet in LR04 and significantly increase the cost.

The majority of vitamin B12 in this diet is provided by land snail (88.1%), while the remaining amount comes from dried baby fish (6.9%) and breast milk (5%). Most of the fat in the NUT diet is provided by coconut (77.8%), cassava leaf (9.6%) and breast milk (7.7%). The niacin target is only slightly higher, at 108%, which is mostly provided by cassava leaf (64.5%) at a very unrealistic quantity (1048kg). Although the NUT diet meets minimum nutrient requirements, it does not necessarily select rational quantities of food items chosen, which must be considered when interpreting the results. Finally, the NUT diet included gblafee leaf (only found at one LR04 market) and

cabbage, which was not found in any of the markets. Cabbage and various other foods that were identified as being consumed at least occasionally, but not found in the markets, were left in the final food list. However, foods with no cost associated are excluded from the FHAB analysis.

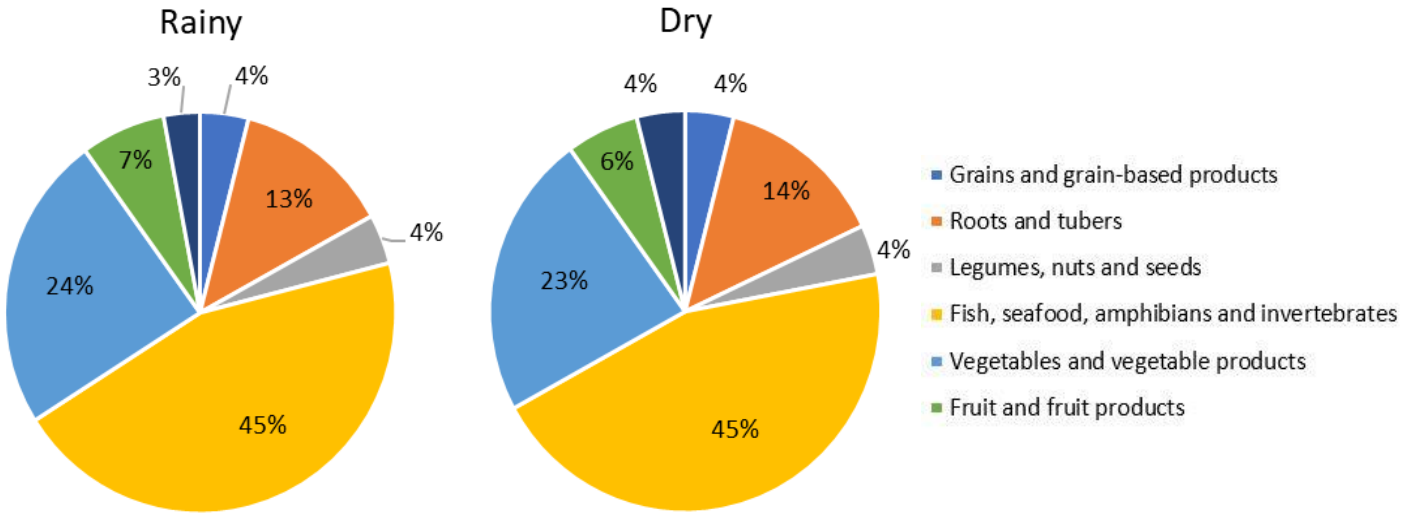
LR04 Food habits nutritious (FHAB) diet

The food habits nutritious diet contains 16 of the 124 foods found in the visited LR04 markets. The average cost of the LR04 FHAB diet for an average household of 5 is 330.18 LRD per day and 120,516.01 LRD annually. The FHAB diet is 1.8 and 2.9 times the cost of the NUT and EO diets, respectively, reflecting the high cost of meeting cultural dietary habits in addition to nutrient needs. Table 14 in Annex 8 presents foods included in the FHAB diet. Gblafee leaf and cabbage were replaced with agro (vegetable) oil, boney fish, chicken neck, fever leaf, kpakutuweh beans, split peas, red oil, white rice and sweet potato leaf. The average daily cost of the FHAB diet during the rainy season is 382.33 LRD, which is 1.6 times the cost during the dry season (237.02 LRD).

The food habits diet has, again, adjusted the quantity of foods to account for more realistic consumption patterns. For example, whereas 232kg of fufu and 206kg of whole coconut were included in the NUT diet, the FHAB diet now includes 167kg of fufu and 138kg of coconut annually. That said, the software maximises on single food sources to secure the lowest cost and this must be considered when interpreting the results. For example, it is probably not realistic for a household of 5 individuals to consume 272kg of breadnuts (11% of diet) in one year. However, this is acceptable for a hypothetical diet to highlight nutrient dense foods that should be considered when diet planning. Again, vitamin B12 (100%) and fat (102%), are the limiting nutrients in the FHAB diet, which are making the diet more expensive. Vitamin B12 is being provided by boney fish (95%) and breast milk (5%). Fat in the FHAB diet comes from coconut (51%), agro oil (17.8%), cassava leaf (7.6%), breast milk (7.6%), boney fish (7.5%) and red oil (6.1%).

Figure 7 compares the percentage of weekly food cost by food group for the LR04 FHAB diet during the rainy and dry seasons. The FHAB weekly food cost for an average household of 5 is 2,676.31 LRD during the rainy season and 1,659.14 LRD during the dry season. Interestingly, there is little variation in proportion spent on each food group, meaning the cost of the diet during the rainy season is 1.6 times more expensive than the dry season for the same foods. Almost half of diet cost goes towards fish, seafood, amphibians and invertebrates at 45% during both the rainy and dry seasons. Once again, confirming the high cost of meeting vitamin B12 and fat needs.

Figure 7: The percentage of total weekly food cost by food group for the FHAB during rainy and dry seasons



The Affordability of the diets

Figure 8 shows the results of an affordability analysis for LR04, using inflation-adjusted income figures found in the 2007 HEA analysis for Bomi county. The graph illustrates the cost of each diet conveyed as a percentage of annual household income for each of the four wealth groups. The minimum cost of FHAB diet represents 199%, 133%, 57% and 42% of total income for the very poor, poor, middle and better off wealth groups, respectively. The amounts increase to 225%, 159%, 83% and 68% for the same wealth groups when NFE is added. Therefore, for the very poor group, both the NUT and FHAB diets are not affordable. For the poor group, the NUT diet is affordable, but when

local food consumption patterns are considered in the FHAB, the more locally appropriate diet is too expensive. Both the middle and better off wealth groups can afford all three diets, including non-food expenditure.

Figure 8: The affordability of the diets for the four wealth groups in LR04, as a percentage of household income

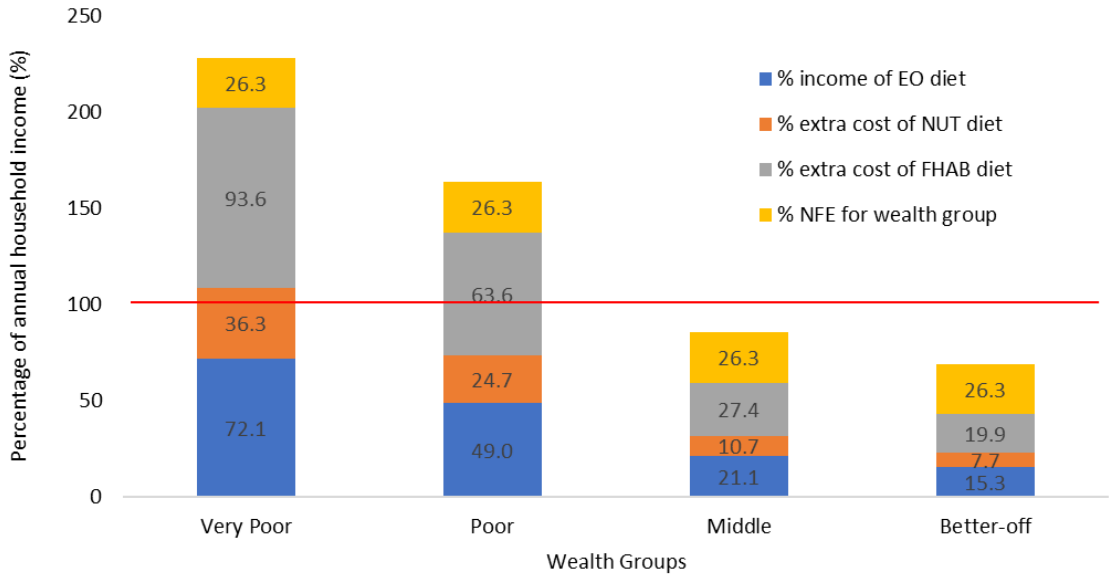
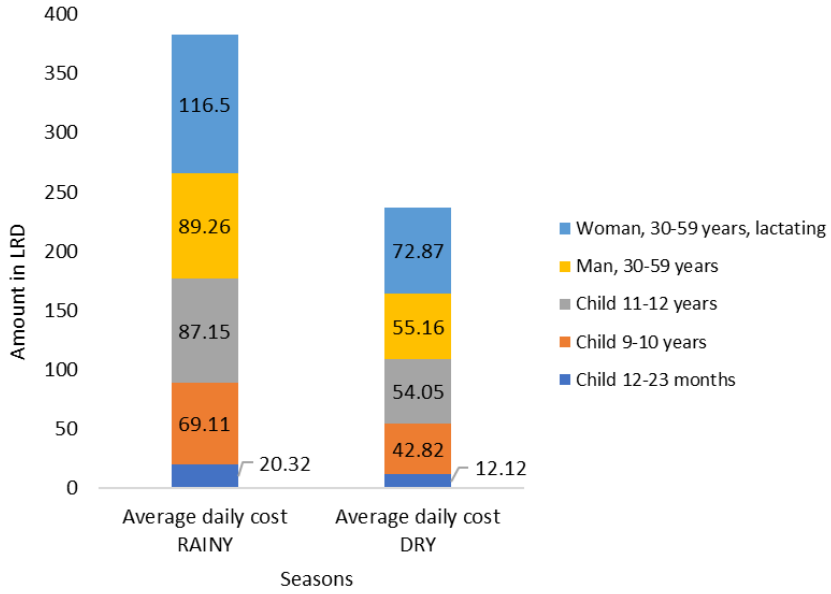


Figure 9 shows the average daily cost of the FHAB diet during the rainy and dry seasons, divided by the amount each household member contributes to the total cost. Like the LR02 diet, the lactating woman accounts for the greatest proportion of the diet, 30% and 31% in rainy and dry seasons, respectively. The adult male and children 11-12 years contribute almost equally (23% each) to the cost of the diet in both rainy and dry seasons. Children 9-10 years (18% rainy & dry) and young children 12-23 months (5% rainy & dry) account for the smallest portion of the diet cost across both seasons.

Figure 9: The average daily cost of the FHAB diet by household members in the dry and rainy season in LR04



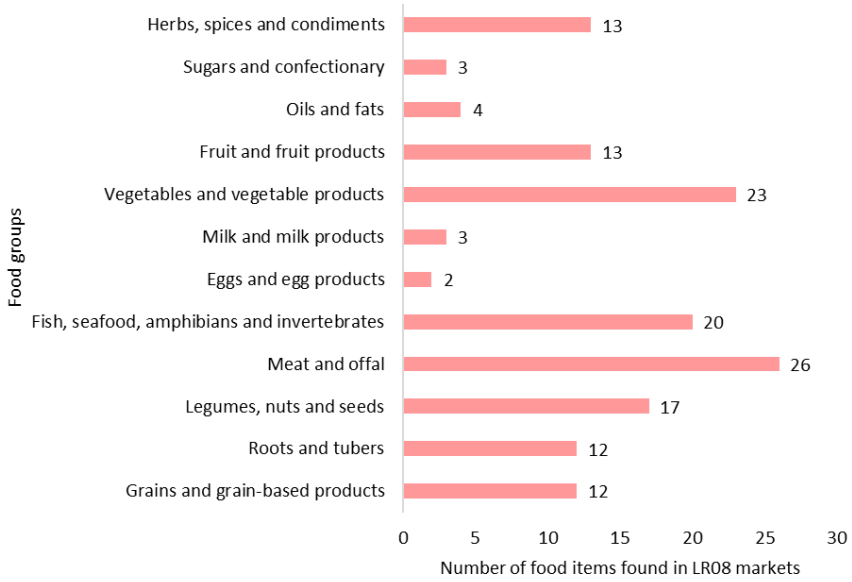
3.3 LR08 Rubber and Charcoal with Food Crops

Availability of foods in the local market

The data collection team collected price and weight data for 148 foods in six markets within Margibi (4 markets) and Montserrado (2 markets) counties across the LR08 Rubber and Charcoal with Food Crops zone. Figure 10 presents the number of food items found within the 12 food groups: 12 grains and grain-based products, 12 roots and tubers, 17 legumes, nuts and seeds, 26 meats and offal, 20 fish, seafood, amphibians and invertebrates, 2 egg and egg product, 3 milk and milk products, 23 vegetables and vegetable products, 13 fruit and fruit products, 4 oils

and fats, 3 sugars and confectionary, and 13 herbs, spices and condiments. See Annex 9 for a detailed food list, including price per 100g (rainy and dry), seasonal average, and minimum and maximum constraints.

Figure 10: The number of food items from each food group found in LR08 markets (Margibi & Montserrado)



Three of the six visited markets in LR08 - Kakata City, Cotton Tree and Kingsville #7 - were large, and considered city or wholesale markets. The graph in Annex 10 illustrates the number of foods found in each of the LR08 markets. More than 80 food items were found in Kakata General (114), Cotton Tree (94) and Kingsville #7 (85) markets. Kataka General market operates daily in central Kakata and had the greatest number of food items available of all assessed markets. Nyehn market, rural Montserrado, had the fewest number of foods, with no egg and egg products, no milk and milk products found and only one available fish product (raw boney fish).

Market changes

Twenty-eight (28) traders and key market informants were interviewed in LR08 markets. Twenty-seven reported a noticeable change in the cost of foods, specifically a rise in the cost of rice (19), oil (12), pepper (10), cassava/fufu (11), onion (7), bitter ball/eggplant (6), gari (6) and vita (6). Price changes were thought to be caused by the high LRD to USD exchange rate (18), high gas and transportation costs (11), poor road conditions (6), lack of price controls (5) and the high wholesale cost of goods (4). Informants had noticed a lower demand for food (11) and lower supply of food (5). Three informants claimed that people cannot afford to buy food. When asked whether seasonal price changes were normal, more or less than previous years, 15 people felt that prices were higher than years previous. Four felt that prices changes are normal, while two of those mentioned prices always being higher in the rainy season. Eight interviewees felt that they price changes were not normal.

Local food consumption patterns

Individual key informant interview and focus group discussion (4) results found cassava, fufu and rice to be the main staple foods, which are consumed daily. Rice is the primary staple in both seasons, with fufu consumed more during the rainy season. Additional reported staple foods were breadnut (1), corn (1), eddoes (2), plantain (2), sweet potato (2) and yam (2).

Free and wild foods were not common in LR08, unlike LR02 and LR04. Two communities mentioned cassava leaf and sweet potato greens being free. One person in Nyehn - the most rural community visited in LR08 - mentioned banana, cassava, country beans, eggplant, okra, orange, rice and sausau (sour sop) as being free. However, this was not unanimous amongst the group.

Food taboos were only associated with poor health outcomes. Dog, goat and snail were taboos for “health reasons”, while goat and turtle were linked to skin rashes and sores. One person mentioned not consuming catfish as it caused a “runny stomach and bloody stool”. Other foods that were mentioned, but no reason given were cat, crayfish, crocodile, dog, snake, dumboy (soup) and turtle.

All four communities felt that typical dietary habits were not the same due to differing tastes/appetite, diverse backgrounds and financial status. They also reported that habits differed by wealth group. One community claimed that those with more money eat fish and pig feet, while the poor eat rice with red oil. Another community reported that "the rich eat a lot of meat, but the low group, some even eat rice and fufu without fish or meat".

All four communities reported eating only one meal per day during the rainy season. Palm Bush community mentioned keeping food from the evening meal for morning consumption in the dry season, indicating that meal frequency increases to two meals. Yankollie participants reported "…rainy season hard. We sometimes don't eat".

Children aged 6 to 23 months

There were no community-wide reports of children aged 6 to 23 months being provided any special foods. Only one breastfeeding mother in Nyehn claimed to provide her child with dry plantain dust and powdered milk in addition to breast milk. Participants in Palm Bush and Yankollie communities stated that children consume two meals per day, rather than one meal like the adults. In Weala and Nyehn, children consume the same food as adults and only one meal per day. One participant in Palm Bush claimed to exclusively breastfeed up to 2 years.

Pregnant and lactating women

Three of four communities reported that women do not eat any special foods during pregnancy or lactation. Only participants in Palm Bush reported consumption of sour oranges and pepper soup during pregnancy. One participant in Nyehn, who was still breastfeeding her youngest child, stated: "…the clinic advises pregnant women consume palm butter, (sweet) potato greens, chicken, eggs", however she "…only eats rice because of economics". The same woman claimed that she ate palm butter, potato greens and cassava leaf when breastfeeding. The other Nyehn participants, who were mostly elderly women, had no other comments.

Sick and convalescent individuals

Two communities claimed that sick and convalescent individuals are not given any special foods, while the other two communities reported giving pepper soup with bitter ball, dried boney fish, eggplant, kittily and pepper. Participants in Nyehn reported adding peanut butter and benny seeds to pepper soup.

Change in food availability

All communities reported that bush meat is no longer available. Palm Bush community stated that "… the government or environmental protection agency is stopping hunters from hunting in the bush". Wayela community reported that "hunters are no longer killing animals", while Nyehn claimed that "hunters knock on the door of the rich late at night" (to sell them the meat).

Yankollie and Nyehn reported the absence of beans (country and black-eyed) and country rice. Both communities claimed that they were no longer growing beans due to challenges with planting and cultivation. Other foods reported as no longer being available in LR08 included cabbage, crayfish, lentils and palm cabbage.

The cost of the diets

Table 5 presents the costs of each of the diets in LR08. The analysis found a nutritious (NUT) to be 1.6 times the cost of an energy-only diet, which, again, highlights the great household cost of meeting RNIs for fat, protein and micronutrients when compared to an energy-only diet. The cost of a food habits nutritious (FHAB) diet in 2.8 times higher than the EO and 1.7 times higher than the NUT diet, underscoring the even higher cost of taking local habits and customs into consideration.

Table 5: Summary of the daily diet cost in the rainy and dry seasons, average daily cost and annual cost (LRD and USD) of each diet for an average household of 5 in LR08 Rubber and Charcoal with Food Crops

Diet type	Family size	Requirements met?	Daily diet cost RAINY (LRD)	Daily diet cost DRY (LRD)	Average daily diet cost (LRD)	Annual diet cost (LRD)
Energy only (EO)	5	Yes	158.68 (0.82 USD)	80.31 (0.42 USD)	130.55 (0.68 USD)	47,652.07 (247.03 USD)
Nutritious (NUT)	5	Yes	254.61 (1.32 USD)	143.38 (0.74 USD)	214.69 (1.13 USD)	78,361.61 (406,22 USD)
Food habits nutritious (FHAB)	5	Yes	411.93 (2.14 USD)	290.74 (1.51 USD)	368.43 (1.91 USD)	134,478.04 (697.13 USD)

LR08 Energy-only (EO) diet

The lowest cost of an energy-only diet for an average household of 5 within zone LR08 in Margibi and Montserrado was 130.55 LRD per day and 47,652.07 LRD annually. The daily cost during the rainy season was 158.68 LRD and 80.31 LRD during the dry season. Table 15 in Annex 11 shows that only five foods, including breast milk for infants, are needed to meet the energy requirements for an average household of 5 people. However, the EO diet does not meet RNIs for protein (58%), vitamin A (43%), vitamin C (48%), vitamin B1 (65%), vitamin B2 (52%), niacin (53%), vitamin B6 (74%), vitamin B12 (5%), calcium (70%), iron (37%) and zinc (88%).

LR08 Micronutrient nutritious (NUT) diet

The CoD-generated nutritious diet includes 11 of the 148 identified LR08 foods from seven food groups. The lowest cost of a NUT diet for an average household of 5 within LR08 is 214.69 LRD per day and 78,361.61 LRD annually. The daily cost during the rainy season of 254.61 LRD was 1.8 times higher than that of the dry season, at 143.38 LRD per day. Table 16 in Annex 11 shows that, though all nutrient requirements are met through the NUT diet, fat and iron are only just meeting the 100% target, identifying these as the limiting nutrients and contributing the most to the diet cost. The three greatest contributors to NUT diet cost are cassava leaf (14 891 LRD), snail (11,995 LRD) and coconut (11, 292 LRD), which are also the main suppliers of niacin, vitamin B12 and fat, respectively.

Most of the fat in the NUT diet is provided by coconut oil (80.4%) - not the first fat that comes to mind when considering the Liberian diet. Iron in the NUT diet is found in cassava leaf (56.2%), cassava flour (15.8%), white beans (14.9%) and cow liver (5.9%). The quantity of cassava leaf (582kg) and mushroom (182kg) is highly unrealistic. Based on these figures, a 5 person household would need to consume 11.2kg of cassava leaf and 3.5kg of mushrooms a week to meet RNIs for this diet. Finally, mushrooms and white beans were only found in one market each and, therefore, excluded from the FHAB analysis.

LR08 Food habits nutritious (FHAB) diet

The LR08 food habits nutritious diet contains 20 of the 148 foods found in the visited markets. The cost of the FHAB diet for an average household of 5 within zone LR08 is 368.43 LRD per day and 134,478.04 LRD annually. The FHAB diet is 1.7 and 2.8 times the cost of the NUT and EO diets, respectively, again illustrating the high cost of meeting both minimum RNIs and accounting for local food habits. The daily cost during the rainy season is 411.93 LRD, which is 1.4 times more expensive than the dry season (290.74 LRD), reflecting the much higher daily cost of food during the rainy season. The LR08 FHAB is the most expensive of the three zones.

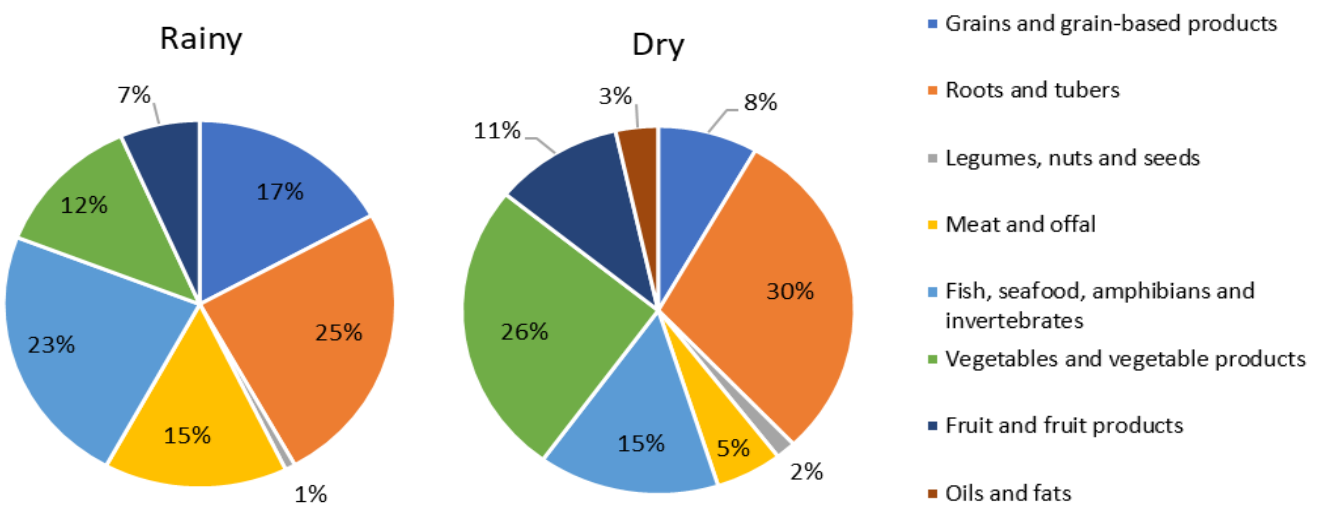
Table 17 in Annex 11 presents the foods included in the FHAB diet. Mushroom and white beans, along with cow liver and coconut oil - not found in most markets - were replaced by more regularly consumed foods that were found in most markets: agro oil, corn, breadnut, brown cowpeas, chicken leg, coconut, country rice, boneless cow meat, dried baby fish, fufu, grapefruit, kpakutuweh beans, cooked purple sweet potato, white rice, snail and sweet potato leaf. The FHAB has adjusted the staple food, from cassava flour (not consumed very often) to fufu (consumed every day), and increased the quantity of red oil, from <1kg to 18kg, to reflect more realistic consumption.

Vitamin B12 (100%), fat (101%), niacin (107%) and iron (110%) are the limiting nutrients that are driving up the cost of the diet FHAB diet in LR08. Here, vitamin B12 is being provided by snail (60.9%), dried baby fish (29.5%), breast milk (5%) and boneless cow meat (4.5%). Most of the diet's fat comes from coconut (44.9%), red oil (18%), agro oil (13.2%), breast milk (7.7%) and cassava leaf (5.5%). Niacin is provided by cassava leaf (37.3%), cassava (14.3%), boiled/roasted corn (13.2%), dried baby fish (7.9%), and trace amounts from all other foods. Finally, iron is provided by cassava leaf (57.1%), snail (7.5%), cassava (6.7%), sweet potato leaf (6.7%), boneless cow meat (3.2%) and trace amounts from the other foods.

Figure 11 compares the percentage of weekly food cost by food group for the LR08 FHAB diet during the rainy and dry seasons. The FHAB weekly food cost for an average household of 5 is 2,883.51 LRD during the rainy season and 2,035.18 LRD during the dry season. The cost of the diet during the rainy season is 1.4 times more than the dry season for the same foods. The proportion spent on meat and offal and grains and grain-based products increases from 5% to 15% and 8% to 17%, respectively, from dry to rainy season. The increase in the proportion of grain and grain-based products in indicative of the increased cost of rice during the rainy season and habit to continue with rice consumption. During the dry season, the proportion spent on vegetable and vegetable products, roots and

tubers increases from 12% to 26% and 25% to 30%, respectively. Oil and fat are not included in the rainy season FHAB diet, but account for 3% of the weekly food cost during the dry season.

Figure 11: The percentage of total weekly food cost by food group for the FHAB during rainy and dry seasons



The affordability of the diets

Figure 12 shows the results of an affordability analysis for LR08, using inflation-adjusted income figures found in the 2007 HEA analysis for Bomi county. The graph illustrates the cost of each diet conveyed as a percentage of annual household income for each of the four wealth groups. The minimum cost of FHAB diet represents 219%, 150%, 64% and 47% of total income for the very poor, poor, middle and better off wealth groups, respectively. The amounts rise to 256%, 185%, 101% and 83% for the same wealth groups when non-food expenditure (NFE) is added. The FHAB diet is not affordable for the very poor and poor groups, while the NUT group is also not affordable for the very poor. The poor group can just afford the NUT diet, but not the additional NFE amount. The middle and better off groups can afford all diets and NFE.

Figure 12: The affordability of the diet for the four wealth groups in LR08, as a percentage of household income

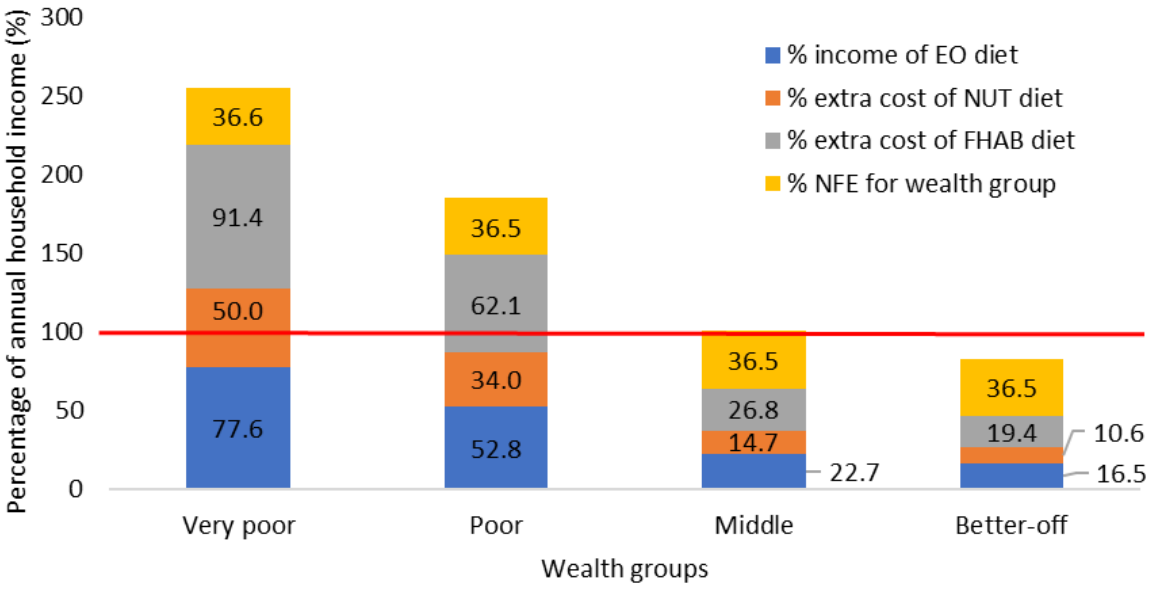
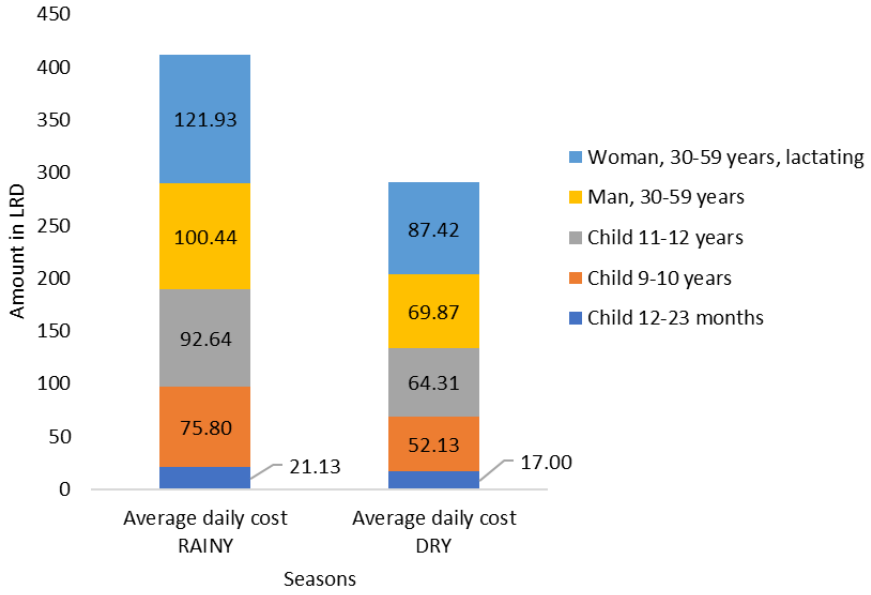


Figure 13 presents the average daily cost of the food habits nutritious diet in rainy and dry seasons, by amount that each family member contributes to the overall cost. Like LR02 and LR04, the lactating woman makes up the biggest proportion (30%) in both seasons. The 30-59 years man (24% both seasons) makes up the second biggest proportion, followed by the child 11-12 years (22% both seasons), child 9-10 years (18% both seasons) and finally child 12-23 months (5% rainy, 6% dry).

Figure 13: The average daily cost of the FHAB diet by household members in the dry and rainy season in LR08



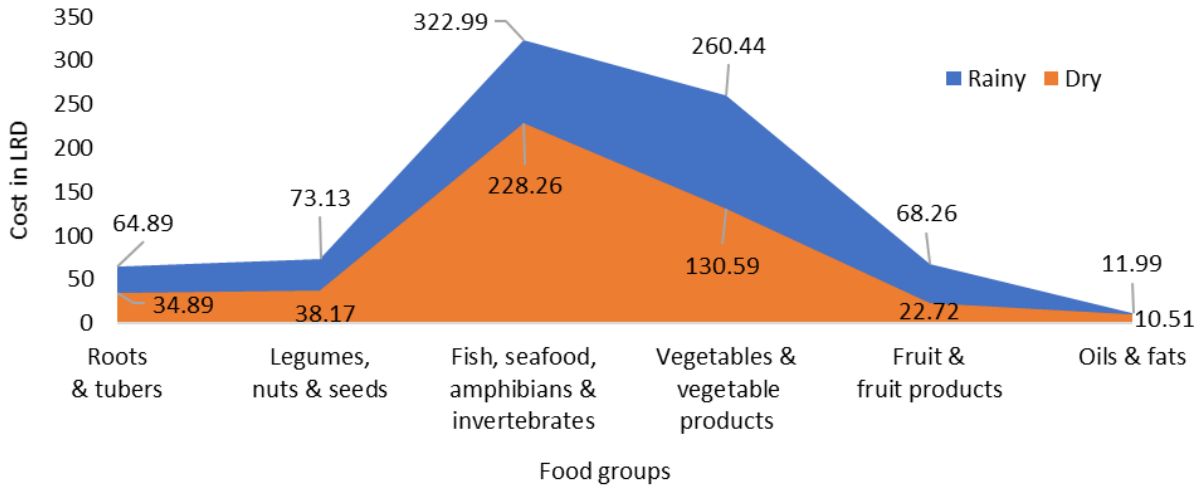
3.4 Cost of the diet for women 30-59 years, lactating

In all three livelihood zones, the woman 30-59 years (7-12 months lactation) accounts for the biggest proportion of the diet. Annex 12 outlines the extra nutrient intakes required during lactation. An analysis of the average weekly cost of the food habits nutritious diet for a lactating woman was carried out for both seasons to understand which food groups are contributing the most to the cost of the woman's diet. In LR02 and LR04, fish, seafood, amphibians and invertebrates contribute the most to the weekly food cost of the diet for lactating woman. In LR08, the vegetables and vegetable products contribute the most to the woman's diet cost.

Average weekly cost of the FHAB diet for lactating women 30-59 years in LR02

Figure 14 presents the average weekly cost of the FHAB diet for lactating women 30-59 years in LR02 by food group during the rainy and dry seasons. This graph illustrates how significantly two food groups - fish, seafood, amphibians and invertebrates, and vegetables and vegetable products - contribute to the cost of the woman's diet. Of the 801.70 LRD weekly rainy season cost , 73% comes from just the two groups, while the remaining four food groups make up the additional 27% combined. In dry season, 77% of the FHAB cost for lactating women comes from the fish and vegetable food groups, while the remaining 23% comes from roots and tubers (8%), legumes, nuts and seeds (8%), fruit and fruit products (5%), and oils and fats (2%). Remarkably, in both seasons, the hypothetical FHAB diet for a lactating woman includes only six of 12 food groups identified during data collection.

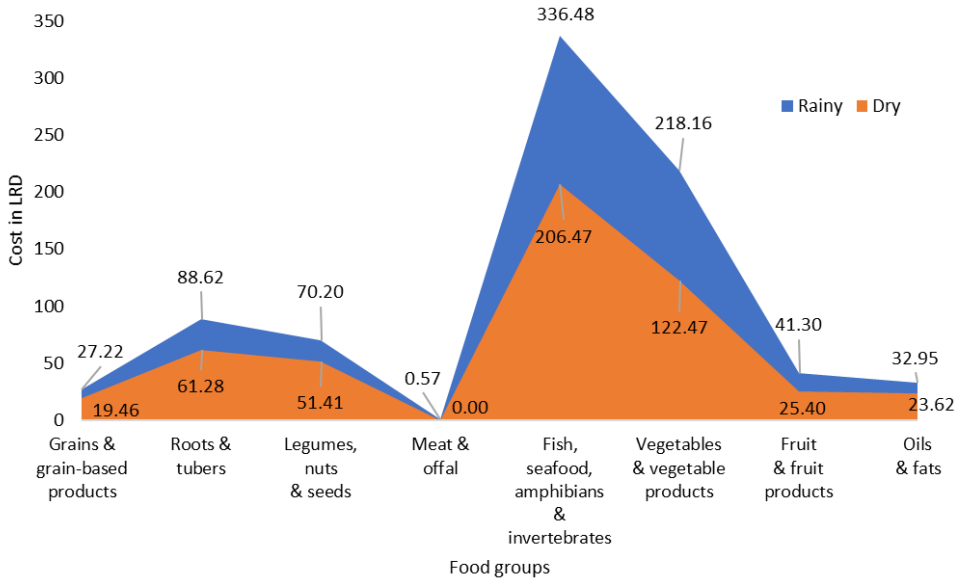
Figure 14: Average weekly cost of FHAB diet for lactating woman in LR02 by food group in rainy and dry seasons



Average weekly cost of the FHAB diet for lactating women 30-59 years in LR04

Figure 15 shows the average weekly cost of the FHAB diet for lactating women 30-59 years in LR04 by food group during the rainy and dry seasons. Again, fish, seafood, amphibians and invertebrates, and vegetables and vegetable products, like LR02, contribute the most significantly to the cost of the diet for a lactating woman. Of the average weekly cost of 815.50 LRD for the FHAB diet, 68% is allocated to fish and vegetable groups, while the remaining 32% comes from other six food groups during the rainy season. In the dry season, of the average weekly cost of 510.11 LRD for the FHAB diet for lactating women, 64% is allocated to fish and vegetable groups, while the remaining 36% comes from the other five categories (meat and offal not included, 0.00 LRD).

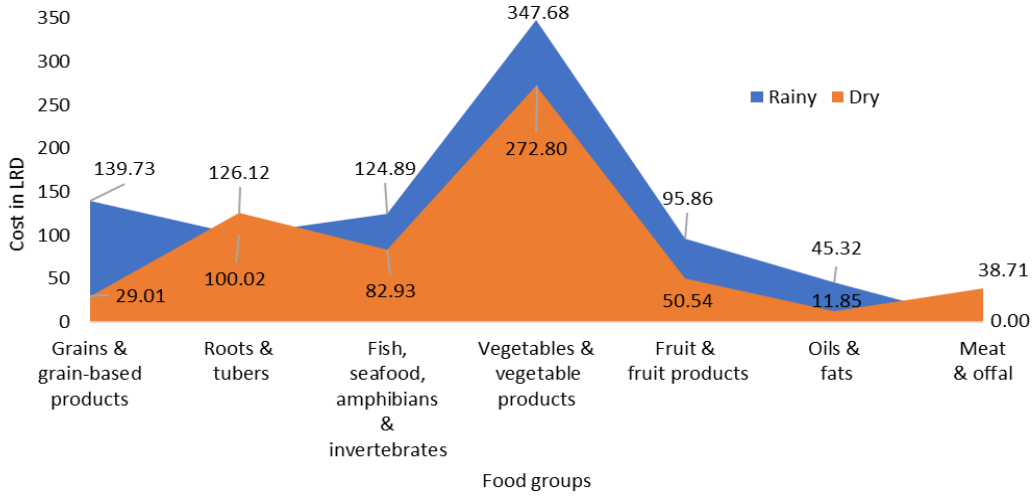
Figure 15: Average weekly cost of FHAB diet for lactating woman in LR04 by food group in rainy and dry seasons



Average weekly cost of the FHAB diet for lactating women 30-59 years in LR08

Figure 16 illustrates the average weekly cost of the FHAB diet for a 30-59 years lactating woman in LR08 across the seasons, by food group. The weekly cost of the FHAB diet is 853.50 LRD in the rainy season and 611.95 LRD during the dry season. Unlike the LR02 and LR04 FHAB diets that had most of the cost allocated to the same two food groups (fish, seafood, amphibians and invertebrates, and vegetable and vegetable products) for both seasons, the cost is more spread out across the food groups in LR08, likely due to increased food availability. The biggest proportion of cost goes towards vegetables and vegetable products in both the rainy (41%) and dry (45%) seasons. However, the second biggest portion of food cost for in the rainy season goes to grain and grain-based products (16%), followed by fish, seafood, amphibians and invertebrates (15%), roots and tubers (12%), fruit and fruit products (12%) and oils and fats (5%). In the dry season, the second biggest proportion of cost goes towards roots and tubers (21%), followed by fish, seafood, amphibians and invertebrates (13%), fruit and fruit products (8%), meat and offal (6%) and grains and grain-based products (5%). Meat and offal are not present in the rainy season FHAB.

Figure 16: Average weekly cost of FHAB diet for lactating woman in LR08 by food group in rainy and dry seasons

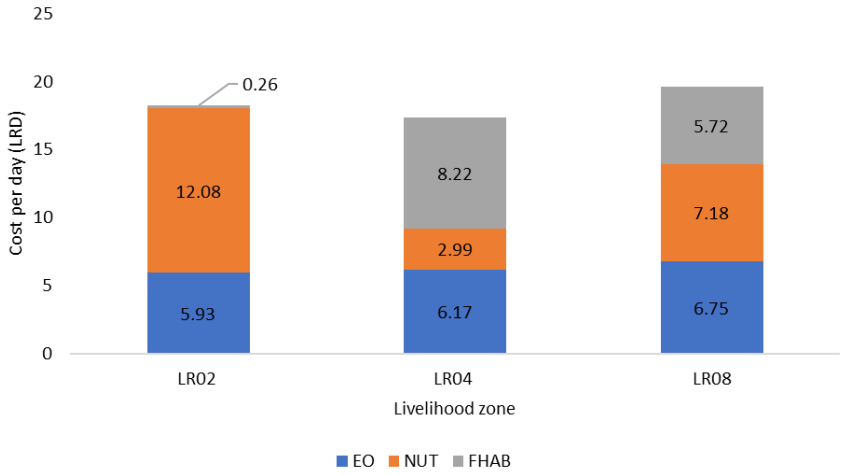


The 16% allocation of weekly cost towards grain and grain-based products during the rainy season is in line with the results from focus group discussions, where women reported consuming rice as an “every day” staple, not only in the dry season, when country rice is more readily available, but also in the rainy season. The 139.73 LRD rainy season weekly grain expenditure reflects the much higher cost of rice during this season.

3.5 Cost of the diet for children 12-23 months

The child 12-23 months contributes the least to the cost of the diet for an average household of 5 in Liberia. Figure 17 illustrates the difference in the cost of the energy-only, nutritious and food habits diet across the three zones.

Figure 17: Average daily cost of the FHAB diet for a Child 12-23 month in livelihood zones LR02, LR04, LR08



The cost of a food habits nutritious diet is almost the same for a child 12-23 months across the three livelihood zones. The FHAB diet is the most expensive in LR08 at 19.65 LRD per day and least expensive in LR04 at 17.38 LRD per day. The daily cost of the FHAB diet in LR02 is 18.27 LRD for a child 12-23 months.

The cost of the energy-only diet in all three zones is approximately 30% of the FHAB diet. The extra cost of the nutritious diet is highest in LR02 at 12.08 LRD, making the NUT diet three times that of the energy-only. Alternatively, in LR04, the extra cost of the nutritious diet is only 1.5 times that of the EO diet. The NUT diet in LR08 is double the cost of the EO diet. Interestingly, the extra of the FHAB diet is the smallest in LR02 at only 1% more than the NUT diet and largest in LR04 at double the cost. The FHAB diet is 1.4 times the cost of the NUT diet in LR08.

Tables 18, 19 and 20 in Annex 13 present the annual FHAB diet summaries for a child 12-23 months in LR02, LR04 and LR08, respectively. Fat, niacin, vitamin 12 and zinc are the limiting nutrients in LR02, while vitamin B12 and zinc are the limiting nutrients in LR04 and LR08.

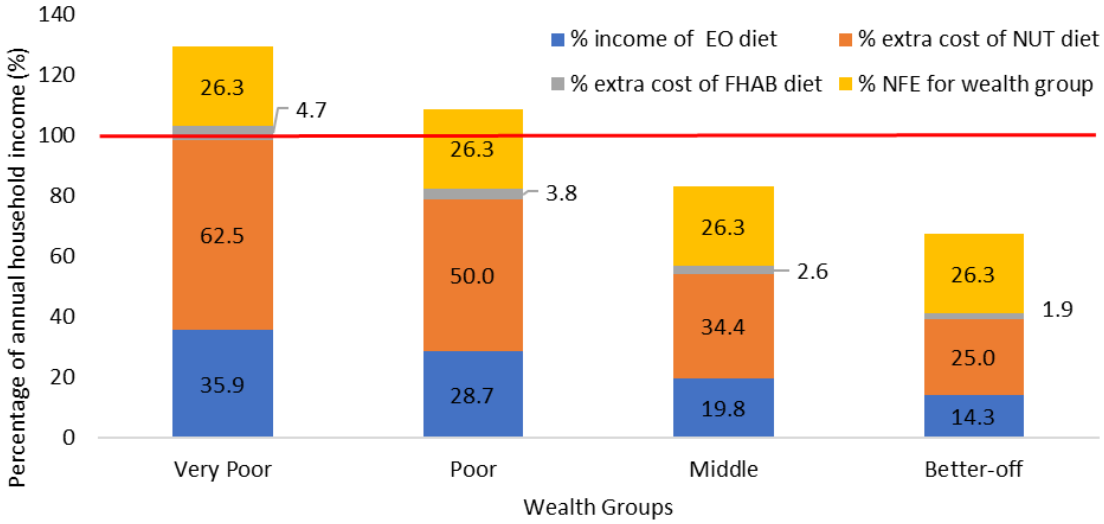
4. What if? Models

Five interventions were modelled to analyse their potential impact on the cost of the diet. Conditional cash transfer and micronutrient powder (sprinkles) interventions were modelled in LR02 North/Central Rice with Cassava and Market Gardening, the most food insecure zone with severe food availability and access issues. A nutrition-sensitive community gardening intervention was modelled in LR04 Coastal Plain Cassava with Rice and Inland Fishing, where many foods were identified as being free or wild already. An additional aquaculture intervention was modelled in LR04, where inland fishing is already a key livelihood activity. Finally, a nutrition-sensitive snail rearing intervention was modelled in LR08 Rubber and Charcoal with Food Crops, where snails were more readily found in markets.

4.1 Nutrition-sensitive conditional cash transfer intervention in LR02

Figure 18 presents the potential results of a conditional cash transfer intervention, providing a transfer of 4,500 LRD monthly to poor and very poor households for 24 months. The transfer is modelled by adding the annual transfer cost of 54,000 LRD (4,500 LRD x 12 months) to the annual income for very poor (61,416 LRD) and poor (90,318 LRD) households, totalling 115,416 LRD and 144,318 LRD, respectively.

Figure 18: Results of an affordability analysis of impact of a conditional cash transfer of 54,000 LRD monthly for 24 months on four wealth groups in LR02



The results illustrate that a nutrition-sensitive conditional cash transfer would fully cover the cost of the NUT diet, and almost cover the cost of an FHAB diet for the very poor group, but not the NFE. The transfer would fully cover the cost of the NUT and FHAB diets for the poor group, but not all the NFE. The middle and better off groups would not be affected, as they would not be part of this intervention.

Key considerations:

- Mode of distribution. Cash or mobile money would work best. Though food vouchers could be provided, the rural and undeveloped nature of the existing market system would make it difficult to target specific traders. There is an assumption that beneficiaries will spend the cash at the local market.
- Conditions attached to the transfers:
    - Children's regular, maintained school attendance (where they might also receive a nutritious meal)
    - Enrolment and participation in programmatic activities (subsistence community gardening intervention, seed saving; food produced for household food consumption *before* livelihood income). Surplus later sold for income generation.
    - Attendance at regular information, education and communication (IEC) meetings, where infant and young child feeding (IYCF) messages will be delivered and local food recipes promoted

Likelihood of success: **MEDIUM**

In the Liberian context, a conditional cash transfer is a short-term solution to help very poor and poor households achieve a nutritious diet, whilst more sustainable activities, such as community subsistence farming, are in their infancy. Beneficiary targeting could prove difficult due to the varied sources of household income. Additional risks include potentially fostering dependency over time and beneficiary resentment of imposed conditions.

4.2 Nutrition-specific micronutrient powder intervention in LR02

The second CoD What if? model in LR02 is for a nutrition-specific micronutrient powder (sprinkles) supplement for children 12-23 months. Although the software can produce a NUT and FHAB diet that meets all RNIs, fat, niacin, vitamin B12, iron and zinc are limiting nutrients, which are hardest to attain from the diet and contributing the most to the cost. To test the intervention, micronutrient sprinkles containing 12.5 mg iron, 300 µg vitamin A, 5 mg zinc, 30 mg vitamin C, 160 µg folic acid per 1 gram (sachet) were added to the software at zero cost (UNICEF, 2017).

Table 6 compares the cost of the FHAB diet for a child 12-23 months before and after a potential micronutrient powder intervention. The result is almost no difference in the annual cost of the FHAB diet, from 6,670.24 LRD (18.27 LRD average daily) to 6,576.50 LRD (18.02 LRD average daily). This would mean a savings of less than 100 LRD for the entire year for a household of 5.

Table 6: Summary of the daily diet cost for rainy and dry seasons, average daily cost and annual cost (LRD and USD) of the FHAB diet for a child 12-23 months in LR02 before and after a micronutrient powder intervention

Diet type	Family size	Requirements met?	Daily diet cost RAINY (LRD)	Daily diet cost DRY (LRD)	Average daily diet cost (LRD)	Annual diet cost (LRD)
LR02 FHAB no intervention	5	Yes	21.48 (0.11 USD)	12.55 (0.07 USD)	18.27 (0.09 USD)	6,670.24 (35.58 USD)
LR02 FHAB with intervention	5	Yes	21.17 (0.11 USD)	12.39 (0.06 USD)	18.02 (0.09 USD)	6,576.50 (34.09 USD)

Table 21 in Annex 14 shows the foods selected for the FHAB diet, including micronutrient powder (sprinkles), by the software for this intervention. With this intervention, sprinkles provided 17.6% of the annual iron contribution. Sweet potato leaf (27.4%), breadnut (21.7%) and fever leaf (21.2%) all provide more iron than the sprinkles, however the relatively large quantities of these foods must also be considered.

Key considerations:

- Other micronutrient powders (sprinkles) may provide a higher content of iron and other nutrients and, therefore, contribute a more significantly to meeting RNIs and potentially lower the cost even further
- A recent Coverage Assessment (UNICEF, 2019) reported that at end-line parents were not providing their children with the micronutrient supplement because they felt that they did not need it.
- Available local foods can provide all limiting nutrients, including iron.

Likelihood of success: **LOW**

Given the recent coverage assessment results, where parents reported that they felt their children did not need the micronutrient supplement, this intervention is unlikely to be successful. As providing free micronutrient sprinkles has almost no effect on lowering the cost of the diet, it is better to focus on promoting iron-rich foods that are available in markets.

4.3 Nutrition-sensitive community gardening intervention in LR04

The third CoD What if? model is for a nutrition-sensitive community gardening intervention. The foods selected for this intervention were those identified in the LR04 FGDs as being free or wild already. To test the intervention, the following foods were set to zero (0) cost for the FHAB diet within the software: bitter ball, breadnut, cassava (tuber), cassava leaf, fufu, okra, palm fruit, plantain (all varieties), sweet potato (purple), sweet potato (yellow), sweet potato leaf and yam. Table 22 in Annex 14 shows the foods selected by the software for this intervention.

Table 7 compares the cost of the FHAB before and after a potential community garden intervention. The result is a 45% reduction in the annual cost of the FHAB diet, from 120, 516.01 LRD (330.18 LRD average daily) to 66,709.54 LRD (182.77 LRD average daily). The average daily cost during the rainy season, when communities are most food insecure, would result in a 55% reduction in average daily food cost, from 382.33 LRD to 211.99 LRD.

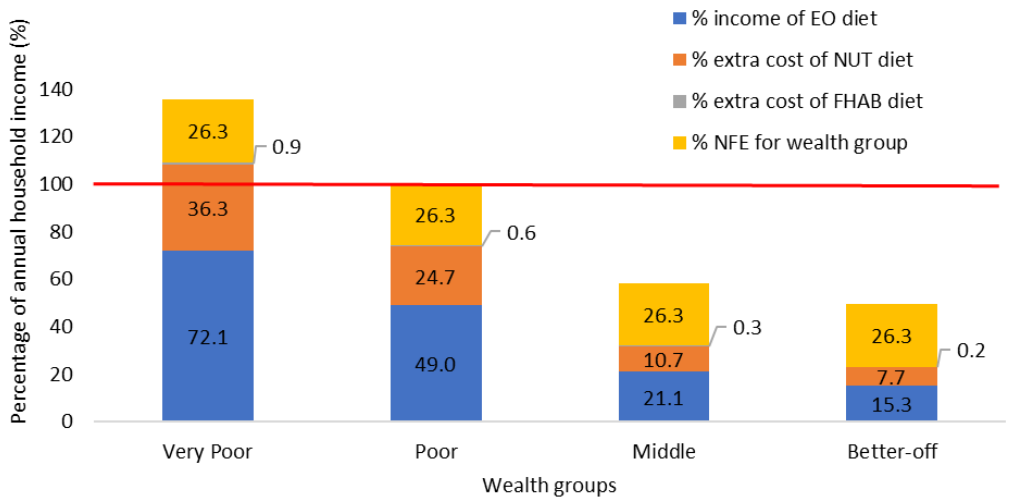
Table 7: Summary of the daily diet cost for rainy and dry seasons, average daily cost and annual cost (LRD and USD) of the FHAB diet for an average household of 5 in LR04 before and after a community gardening intervention

Diet type	Family size	Requirements met?	Daily diet cost RAINY (LRD)	Daily diet cost DRY (LRD)	Average daily diet cost (LRD)	Annual diet cost (LRD)
LR04 FHAB no intervention	5	Yes	382.33 (1.98 USD)	237.02 (1.23 USD)	330.18 (1.71 USD)	120,516.01 (624.75 USD)
LR04 FHAB with intervention	5	Yes	211.99 (1.10 USD)	130.57 (0.68 USD)	182.77 (0.95 USD)	66,709.54 (345.82 USD)

Figure 19 presents the results of an affordability analysis for the community subsistence farming intervention. The NUT and FHAB diets, including NFE, would be affordable for the poor group, whose annual income of 90,318.14

LRD would fully cover all costs. The FHAB diet would still be unaffordable for the very poor group, whose annual income of 61,416.34 LRD is just under the 66,709.54 LRD required annually to achieve this diet.

Figure 19: Results of an affordability analysis on the potential impact of a community subsistence farming intervention in LR04



Key considerations:

- An in-depth community needs-assessment to identify priorities and whether there is interest and motivation to implement such a participatory intervention.
- Community agreement on how the intervention will be implemented (who will do the work) and how the products will be distributed (who will benefit), with guidance from the implementing organisation – this is critical, as very poor households will likely not have the human capacity (healthy adults) to participate in farming activities. However, these individuals could participate in another capacity, such as minding very small children when adults from poor households are farming.
- Identification of individuals, households and communities who are already successfully growing their own food, either fully (see Boewin for traditional methods) or partially (see Sayah Town for Concern-led intervention: market gardens, banana, plantain, pineapple) to consider for practical cross-community trainings. Providing those who are sceptical the opportunity to witness what can be achieved and speak to those people who have achieved success already, will hopefully foster interest, and motivation to participate in the initiative. Also see Send a Cow's Peer Farmer Trainer programme.
- The implementing organisation should provide an initial intensive training, coordinate community-exchange visits, monitor activities and act as mentors only. Providing free inputs, such as seeds and tools, creates heavy dependency on the organisation, which is unsustainable. Some seeds could potentially be provided at only the very beginning. However, the community should be encouraged to save seeds and use a variety of agricultural techniques and methods to ensure the health and long-term sustainability of the farming system. If the community agrees to purchase their own tools and inputs, it will confirm their desire and motivation for a successful subsistence farm.

Likelihood of success: **HIGH**

All foods included in this intervention were reported as being free and/or wild by a proportion of participants in LR02 and parts of LR04 already. All foods selected are local and highly nutritious. This intervention has the potential to cut the cost of the FHAB diet almost in half and, if traditional agricultural techniques are used, should be the least disruptive for communities.

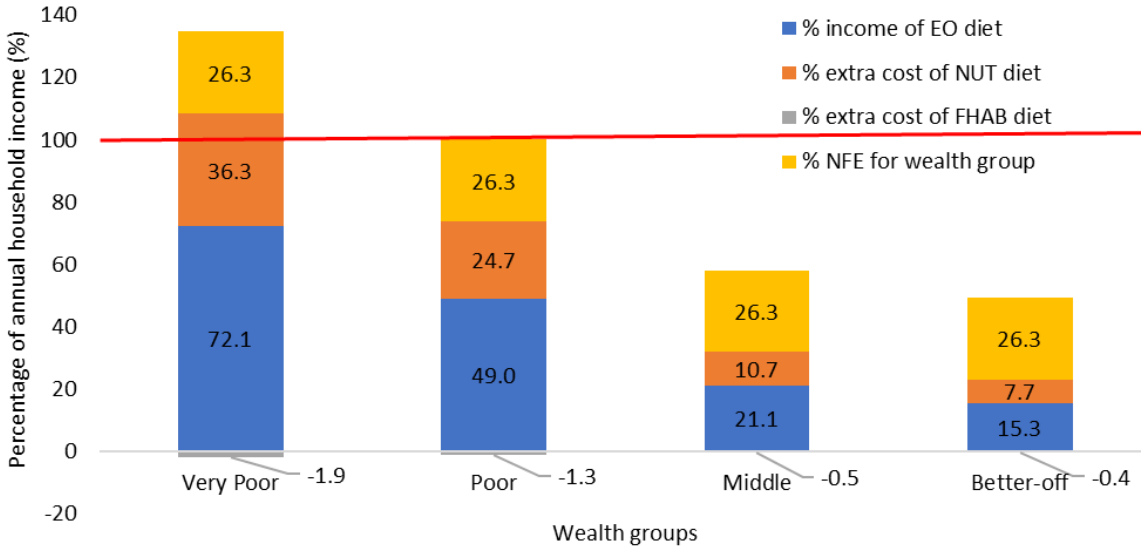
4.4 Nutrition-sensitive aquaculture intervention in LR04

A nutrition-sensitive aquaculture intervention was modelled in the LR04 Coastal Plain Cassava with Rice and Inland Fishing zone. A United Nations University final project report outlined the potential for aquaculture in Liberia, specifically using catfish and Nile tilapia (Kpadeh, 2011). To test the intervention, catfish and gbuka fish (tilapia) were set to zero (0) cost for the FHAB diet within the software.

Table 23 in Annex 14 shows the foods selected by the software for the FHAB diet for this intervention, with each fish supplying 115kg annually towards the diet. Catfish and tilapia would provide 12.7% and 14.5% of protein 55.9% and 39.6% of vitamin B12, respectively. Tilapia would also supply the diet with 13.5% niacin and 10% iron.

Figure 20 presents the results of an affordability analysis for the aquaculture intervention on the cost of the diets, including essential NFE. The NUT and FHAB diets, including NFE, would be affordable for the poor group. However, the FHAB diet would be still be unaffordable for the very poor group. The very poor's income of 61,416.34 LRD is just shy of the annual 65,425.57 LRD needed to achieve this diet, not including NFE.

Figure 20: Results of an affordability analysis on the potential impact of an aquaculture intervention in LR04



Many of the key considerations for the aquaculture intervention are the same as those listed in the community gardening intervention. However, a few more considerations must be considered for this intervention.

Additional key considerations:

- Land accessibility and soil quality.
- Participants' level of literacy, as success may be dependent on their ability to adapt to changing technology (Kpadeh, 2011).
- Potential for income generation after community needs met.
- Initial start-up costs may be expensive and how much of these would be covered by the community or by the implementing organisation.

Likelihood of success: **MEDIUM**

More research is needed on current aquaculture practices in Liberia, including successes and failures. This intervention has the potential to provide the majority of vitamin B12 and 27% protein to the diet at no cost, meeting the needs of two very limiting and expensive nutrients.

4.5 Nutrition-sensitive snail rearing intervention in LR08

The last CoD What if? model is for a nutrition-sensitive snail-rearing intervention. Snails have been identified as one of the most nutritious and least expensive sources of protein and vitamin B12 available in LR08. To test the intervention, the snail was set to zero (0) cost for the FHAB diet within the software. Table 19 in Annex 11 shows the FHAB diet food summary with snail rearing intervention, of which snails would provide 99.1% vitamin B12, 72.1% zinc, 48.6% iron, 23.3% niacin and 17.2% protein.

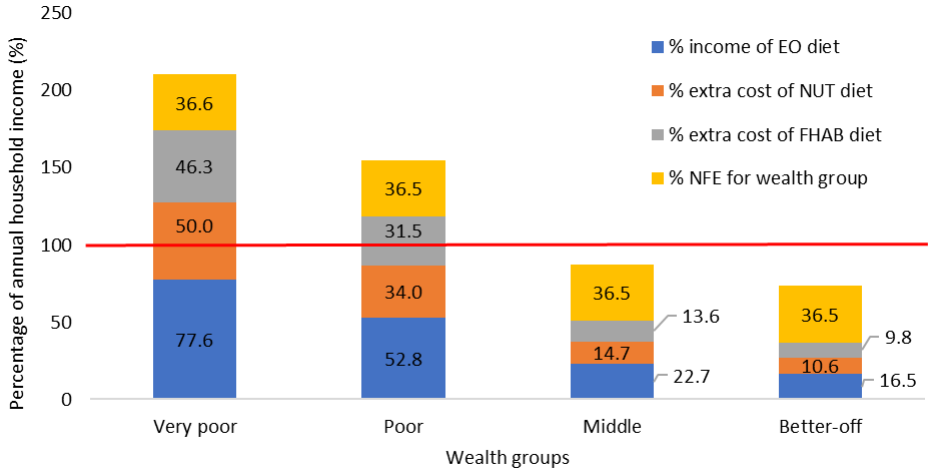
Table 8 compares the cost of the FHAB before and after a potential snail-rearing intervention. The result is a roughly 20% reduction in the annual cost of the FHAB diet, from 134,478.04 LRD (368.43 LRD average daily) to 106,802.84 LRD (292.61 LRD average daily).

Table 8: Summary of the daily diet cost for rainy and dry seasons, average daily cost and annual cost (LRD and USD) of the FHAB diet for an average household of 5 in LR08 before and after a snail-rearing intervention

Diet type	Family size	Requirements met?	Daily diet cost RAINY (LRD)	Daily diet cost DRY (LRD)	Average daily diet cost (LRD)	Annual diet cost (LRD)
LR08 FHAB no intervention	5	Yes	411.93 (2.14 USD)	290.74 (1.51 USD)	368.43 (1.91 USD)	134,478.04 (697.13 USD)
LR08 FHAB with intervention	5	Yes	325.40 (1.69 USD)	234.03 (1.21 USD)	292.61 (1.52 USD)	106,802.84 (553.66 USD)

Figure 21 presents the results of an affordability analysis for the snail-rearing intervention on the cost of the diets, including essential NFE. The FHAB diet is still be unaffordable for the very poor (173.9%) and poor (118.3%) groups before considering the NFE. The NUT diet is affordable for the poor group at 86.8% of income, but still unaffordable for the very poor group at 127.6% of income.

Figure 21: Results of an affordability analysis on the potential impact of a snail-rearing intervention in LR08



This intervention was trialled previously by Concern Worldwide, along with other activities at a Farmers Research Centre (FRC) in District 2, and by Welthungerhilfe (WHH). The Concern FRC was handed over to the community around 2006-2007 and collapsed shortly after – the reason for the collapse is unknown. Despite both theoretical and practical training, Welthungerhilfe's 2015-16 intervention experienced problems with sustainable community ownership and leadership, with snails being sold secretly before being able to reproduce and against agreed management schedules. Two of WHH's six snail projects are still functioning in Zwedru, Grand Gedeh and Bilibokree, Sinoe, communities and snails were found in LR04 and LR08 markets.

Key considerations:

- Initial start-up period (unknown) and slow rate of snail growth.
- Given the challenges with community-level leadership and ownership during the WHH intervention, an expert at WHH has suggested that a household-level approach might be more appropriate.
- A strong IEC strategy outlining the importance of waiting until the snails have had time to reproduce before either being sold or consumed.
- Potential for income generation after household and/or community needs met.

Likelihood of success: **MEDIUM**

This intervention has been trialled by Concern and Welthungerhilfe with slightly disappointing results. However, snails are highly nutritious and the Liberian environment offers the perfect living and breeding conditions. Learnings from previous trials must be considered and future trials adjusted to prevent similar results. The fact that snails are one of the main taboos in LR02 and LR04 should not affect LR08, however this should be considered.

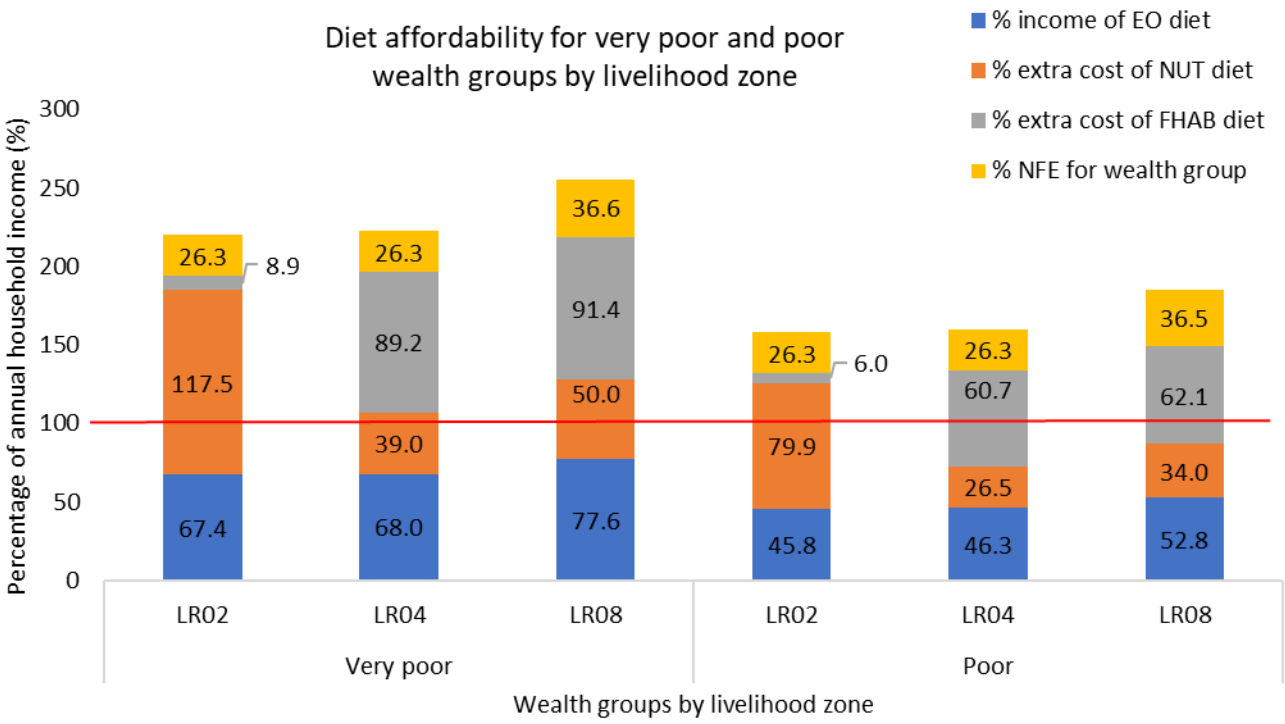
5. Key findings & recommendations

Key findings

The annual costs of a food habits nutritious diet, which accounts for local dietary habits and food consumption patterns, for an average household of 5 is 118,973.80 LRD in LR02, 120,516.01 LRD in LR04 and 134,478.04 LRD in LR08. Average daily costs and USD conversions are outlined in the table below. The annual costs are reflective of the relative distance from urban centres – with markets LR08 (Margibi, Montserrado) being the most expensive and closest to the capital city, Monrovia, and LR02 being the most rural and difficult to access.

Liberian livelihood zones	Avg daily cost RAINY (LRD)	Avg daily cost DRY (LRD)	Avg daily cost (LRD)	Annual cost (LRD)
LR02 North/Central Rice with Cassava and Market Gardening	380.78 (1.97 USD)	228.03 (1.18 USD)	325.96 (1.69 USD)	118,973.80 (616.76 USD)
LR04 Coastal Plain Cassava with Rice and Inland Fishing	382.33 (1.98 USD)	237.02 (1.23 USD)	330.18 (1.71 USD)	120,516.01 (624.75 USD)
LR08 Rubber and Charcoal with Food Crops	411.93 (2.14 USD)	290.74 (1.51 USD)	368.43 (1.91 USD)	134,478.04 (697.13 USD)

Very poor and poor households all three livelihood zones cannot afford a food habits nutritious (FHAB) diet. An average household of 5 in LR02 cannot afford a nutritious diet. Though households in LR04 and LR08 can afford the cost of a nutritious diet, the NUT diet provides a minimum number of foods in unrealistic quantities to keep the cost low and does not consider local food consumption patterns and dietary habits. In both zones, when the non-food expenditure is added to the NUT diet, it becomes unaffordable.



The cost of the diet is 1.7, 1.6, 1.4 times more during the rainy season than the dry season in livelihood zones LR02, LR04 and LR08, respectively. LR02 is the most food insecure zone with half of visited markets offering less than 40 items for purchase. This zone was also the most difficult to access, with road conditions making almost impossible in some instances not to get stuck in the mud.

Sixty-seven percent (67%) of traders and key informants in all livelihood zones felt that the primary reason for the high cost of food was due to the high LRD to USD exchange rate. In LR02 and LR04, 64% of key informants felt that poor road conditions significantly affect the change of price. Finally, high transportation/gas costs (49% of

informants) high wholesale costs (19% of informants) and lack of price controls (18% of informants) were also reasons given for changes in price.

The main food taboos were goat, dog, snake and snail (in LR02 and LR04). Taboos were individual and not community wide. The main reasons for avoiding these foods are 1) health reasons, such as fear of death, skin rashes and sores, itchiness, earache or tooth loss, 2) myth, including either bad luck, good deeds going unnoticed or positive actions turning negative, 3) family law and/or family tradition, and 4) religion. While there are a variety of other food taboos from most food groups, reasons were not always given for their avoidance.

Meal frequency varies across the three zones. Communities in LR08 claimed to only consume one meal per day. Seven of 9 communities in LR04 claimed to consume two meals per day, while the most variation was reported in LR02 – from 1 meal to 3 meals, depending upon the community. Two communities each in LR02 and LR04 had very mixed responses, ranging from one to three meals within the community, reflective of wealth diversity.

Complementary feeding practices are by individual or household, and not observed across whole communities. Whilst select households reported giving children special foods (e.g. pumpkin, boney fish dust, banana, greens), it is not common practice. Most women claimed to exclusively breastfeed to five months. However, many women reported exclusive breastfeeding, or providing only water in addition to breast milk, much longer than recommended (up to 2 years). Most communities reported that pregnant and lactating women do not consume special foods, making this vulnerable group high risk for iron deficiency anaemia. Alternatively, most reported giving sick and convalescent individuals pepper soup. Though, soup ingredients are dependent on the household wealth – the richer the household, the more ingredients - especially inclusion of meat and protein sources.

Bush meat and beans were the most frequently reported "missing" foods. Bush meat is still available and being consumed by those who can pay for it. However, bush meat is illegal and its consumption puts humans at risk of contracting diseases, such as Ebola. Beans are no longer as readily available for two reported reasons: production challenges (problems with soil and cultivation) and import challenges (trucks no longer deliver beans – presumably NGO vehicles). As meat and beans are two very important sources of nutrients (protein, iron, vitamin B12), this must be considered seriously when intervention and programme planning.

The main limiting nutrients – those that are hardest to meet using locally available food sources, which are driving up the cost of the diet - are the same across the three livelihood zones: fat, vitamin B12, niacin, iron and zinc. The cheapest foods sources, as identified in the FHAB diets, are:

- **Vitamin B12:** Boney fish, canned sardines, catfish, cow meat, dried baby fish, snail
- **Fat:** Agro (vegetable) oil, coconut, boney fish, kernel oil, red oil (palm oil)
- **Niacin:** Boney fish, breadnut, cassava, cassava leaf, fever leaf, kpakutuweh beans, sweet potato leaf
- **Iron:** Boney fish, breadnut, cassava, cassava and fever leaf, cow meat, kpakutuweh beans, palava sauce/plato leaf, sweet potato leaf, snail
- **Zinc:** Benny (sesame) seeds, breadnut, cassava, cassava leaf, coconut, fever leaf, kpakutuweh beans, snail

Recommendations

Short-term:

Promote consumption of all available free and wild foods. Foods grown in the wild require no maintenance. Encourage consumption of all foods that have no associated cost (not bush meat).

Find ways to make nutrient dense foods more affordable. Boney fish, breadnut, catfish, coconut, cassava, dried baby fish, kpakutuweh beans, palm oils, and local greens (cassava, fever, palava sauce/plahto, sweet potato leaves) are the most nutritious and available sources of fat, vitamin B12, fat, niacin, iron and zinc, but also increase cost and are still too expensive for most poor and very poor households. Livelihood opportunities to grow and/or rear these foods will contribute to lowering the cost of the diet significantly.

Promote consumption of other low-cost nutritious local foods. All foods identified in the FHAB diets are locally appropriate and nutrient dense for the lowest cost. Cabbage, corn, country rice (over white rice), grapefruit, orange, peanuts, sardines, split peas, sweet potato (all colours), and chicken to name a few.

Improve feeding practices for pregnant and lactating women. The lactating woman's diet accounts for the greatest proportion of the FHAB diet cost for a household of 5, due to her increased energy and nutrient needs. Promote consumption of proteins high in vitamin B12 and iron (boney fish, snail) to prevent iron deficiency anaemia, breadnut, vegetables (okra) and green leaves (cassava and sweet potato) that are high in vitamin A, folic acid and calcium.

Improve complementary feeding practices for children 6-23 months. Most children are fed the same foods as adults within the household and are not provided any special foods. Advocate for improved infant and young child feeding practices, including fruits, meats and fish and greens. Annex 15 lists commonly found foods and portion size per household member for guidance when developing recipes.

Conditional cash transfer to very poor and poor households. Whilst not sustainable in the long-term, cash transfers provide a short-term solution for households unable to afford a nutritious and locally appropriate diet. A two-year transfer could bridge the affordability gap during the inception period of other planned project activities and associated 'conditions' could be tied to participation in said activities. An amount slightly higher than the monthly 4,500 LRD trialled in this report is recommended for very poor households.

Long-term:

Nutrition-sensitive community farming. Community farming, including gardening, crop, vegetable and fruit production (e.g. breadnut and coconut). The very poor and poor groups in LR02, and many parts of LR04, must produce their own food. If road conditions do not improve, it is critical that communities in these zones protect themselves during the rainy season, when roads are inaccessible and the cost of food almost doubles. Further investigation into land accessibility required.

Nutrition-sensitive aquaculture and snail-rearing. These interventions have the potential to significantly lower the cost of the diet, whilst providing income generating opportunities. Fish and snails provide the best sources of iron and vitamin B12, two of the main limiting nutrients. Further investigation into existing fishpond and aquaculture activities within the livelihood zones required.

Improved road network and market accessibility. Most of the road in Liberia are dirt, which turns to mud during the rainy season. This will continue to prevent vehicles from accessing remote areas and the cost of transportation and gas will continue to rise.

Alternative livelihood strategies for hunters. Liberian hunters hold valuable knowledge about the forest (bush) and are more familiar with the ecosystem than anyone else. They are currently "in hiding" and sell hunted animals to highest bidders. Hunters must be offered alternative livelihood strategies if they are to stop doing work that has been passed down to them over generations, which threatens both the health of Liberians and the diversity of wildlife found within the country. Investigation into opportunities that might exist for this isolated group and how to harness their knowledge and expertise.

Investigation into the true cost of diet during the dry season. Conduct a CoD assessment between January – March in the same markets and zones, when it is clearly the middle of the dry season. This will provide a more realistic analysis of the dry season cost and seasonal variations.

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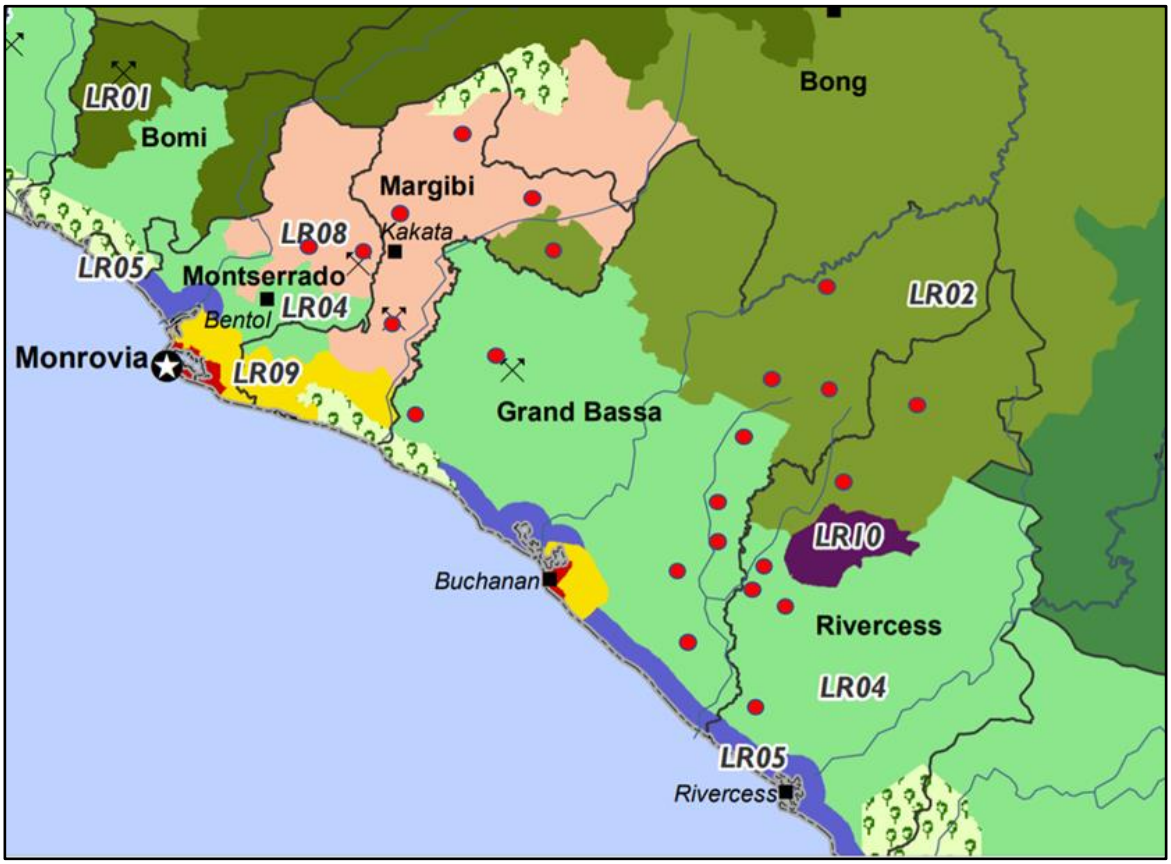
7. Annexes

Annex 1: LR02, LR04, LR08 Visited markets



Map of visited markets within each livelihood zone in Liberia

Visited market

Annex 2: Market and village schedule

Day	Date	Market name	Village	Market day	County	District	Livelihood zone
1	29-Oct-19	Kakata General	No FGD	Tuesday	Margibi	Kakata City	LR08
2	30-Oct-19	Peter's Town	Peter's Town	Wednesday	Margibi	Gibi	LR02
3	31-Oct-19	Cotton Tree	Palm Bush Community	Thursday	Margibi	Firestone	LR08
4	01-Nov-19	Yarnwollie	Yarnwollie Town	Friday	Margibi	Gibi	LR08
5	02-Nov-19	Weala	Weala Town	Saturday	Margibi	Kakata	LR08
6	04-Nov-19	Little Kola	Gbieh Town	Monday	Grand Bassa	District 4	LR04
7	05-Nov-19	FDA Market	Giagba Town	Tuesday	Grand Bassa	District 3	LR04
8	06-Nov-19	Bodowhea	Bodowhea Town	Wednesday	Rivercess	Jo River	LR02
9	07-Nov-19	Luewin	Luewin Town	Thursday	Grand Bassa	District 3	LR02
9	07-Nov-19	Boewin	Boewin Town	Thursday	Grand Bassa	District 4	LR02
10	08-Nov-19	Compound 3	No FGD	Friday	Grand Bassa	District 3	LR04
11	09-Nov-19	Frank Digg's	St. John	Saturday	Grand Bassa	District 3	LR02
12	11-Nov-19	SOS Market	Juah Town	Monday	Grand Bassa	District 2	LR04
12	11-Nov-19	Yarpah	Yarpah Town	Monday	Rivercess	Nyorwein	LR04
13	12-Nov-19	Bokay	No FGD	Tuesday	Grand Bassa	Owensgrove	LR04
13	12-Nov-19	Yarpleah	Yarpleah Town	Tuesday	Rivercess	Nyorwein	LR04
14	13-Nov-19	Nyonbehn	Nyonbehn Town	Wednesday	Grand Bassa	District 4	LR04
14	13-Nov-19	Gbozahn	Gbozahn Town	Wednesday	Grand Bassa	District 4	LR04
15	14-Nov-19	Boegeezaye	Boegeezaye Town	Thursday	Rivercess	Doedain	LR02
16	15-Nov-19	Little Liberia	Little Liberia	Friday	Rivercess	Fen River	LR04
16	15-Nov-19	Sayah	Sayah Town	Friday	Rivercess	Nyorwein	LR04
17	18-Nov-19	Nyehn	Nyehn Town	Monday	Montserrado	Todee	LR08
18	19-Nov-19	Kingsville #7	No FGD	Tuesday	Montserrado	Todee	LR08

Detailed schedule of visited markets and villages by date

Annex 3: LR02 Food List

LR02 Food list with local name, English food list name (CoD software), average price per 100g in the rainy and dry seasons, annual average, and minimum and maximum constraints.

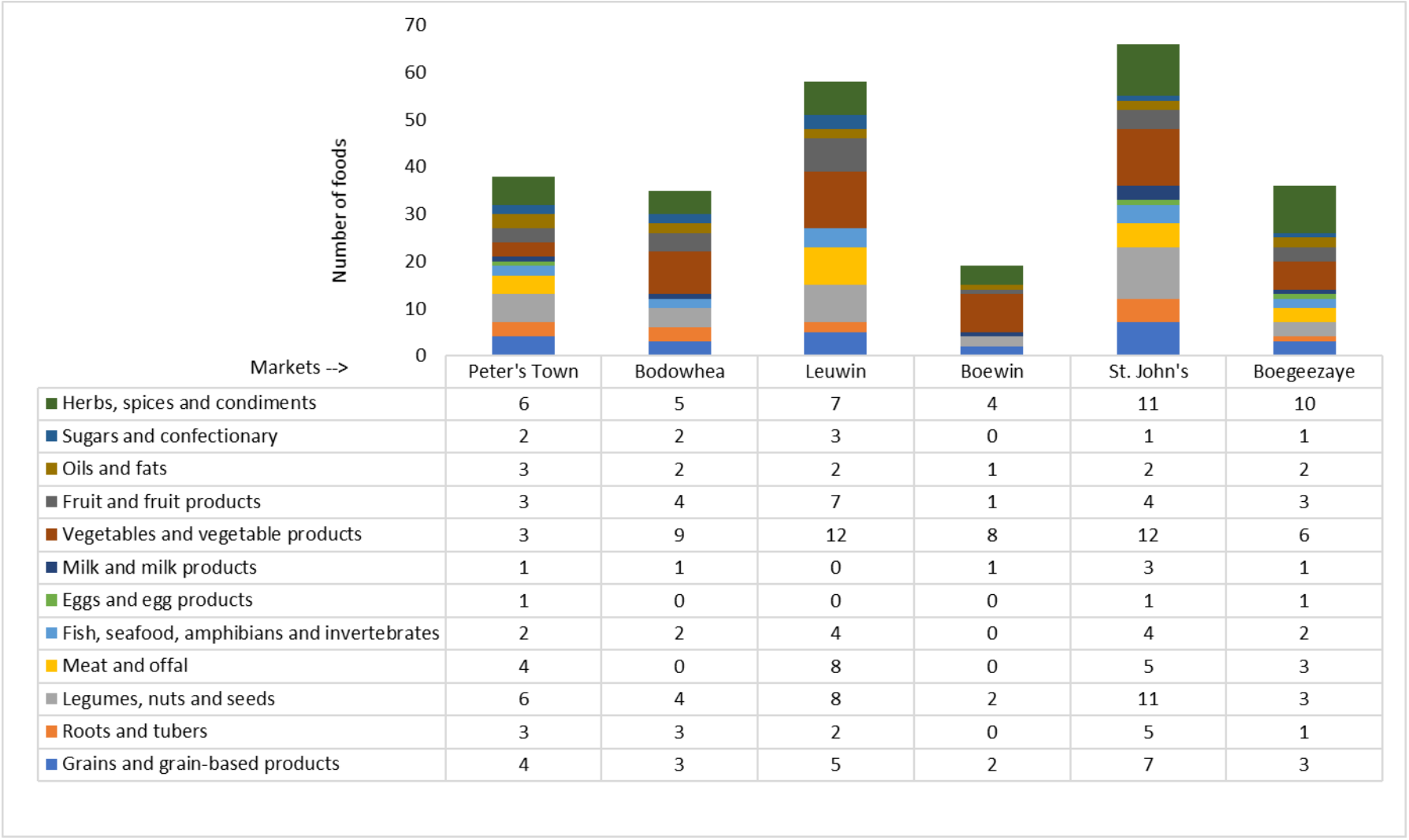
North/Central Rice with Cassava and Market Gardening **Market Food List**	Average Price Per 100g			Constraints	
	Rainy season	Dry season	Annual Average	Min	Max
Grains and grain-based products					
Baking flour (Wheat, flour, 72% extraction)	18.82	14.41	16.62	0	7
Boiled/roasted corn (Maize, cooked, CotD)				0	7
Corn flour (Maize, flour, dry)	24.70	22.24	23.47	0	0
Corn meal (Corn flour, 96% extraction)	21.61	10.81	16.21	0	7
Corn seed (Maize, dried, raw)	21.82	11.26	16.54	0	7
Country rice (Rice, brown, raw)	11.14	8.30	9.72	0	14
Rice, white, raw (Rice, white, raw)	14.93	9.69	12.31	0	14
Spaghetti (Pasta)	41.84	31.85	36.85	0	7
Roots and tubers					
Cassava, raw (Cassava, tuber, raw)	1.74	0.74	1.24	0	14
Cassava, roasted/boiled (Cassava, tuber, cooked)				0	14
Eddoes (Cocoyam, tuber, raw)	9.50	8.69	9.10	0	7
Fufu (Cassava, bread, fermented)	3.36	2.28	2.82	0	14
Gari (Cassava, root, dried meal)	14.68	10.00	12.55	0	14
Purple sweet potato, raw (Sweet potato, purple skin, pale yellow flesh, raw)				0	7
Yam, raw (Yam, tuber, raw)	5.64	3.61	4.63	0	7
Yellow sweet potato, raw (Sweet potato, yellow, raw)	4.39	3.51	3.95	0	7
Legumes, nuts and seeds					
Benny seeds, dried, raw (Sesame, seeds, whole, dried, raw)	50.20	27.98	39.09	0	14
Bitter cola, dried (Colanut, dried, raw)	99.99	87.03	93.51	0	14
Bitter cola, raw (Colanut, raw)	16.57	10.89	13.73	0	14
Black-eyed beans, raw (Cowpea, blackeyes, immature, raw)	23.51	17.23	20.37	0	7
Butter beans (Bean, lima, dried)	46.44	30.96	38.70	0	7
Country beans (Bean, pinto, immature, raw)				0	7
Kpakutuweh (Bean, adzuki, mature, raw)	25.21	16.13	20.67	0	7
Peanut paste (Groundnut paste)	55.98	46.26	51.12	0	7
Peanuts with shell (Peanut, with shell)	62.73	31.37	47.05	0	7
Peas, (yellow or green split peas), dried, raw	17.83	10.50	14.17	0	7
Pink peanuts, no shell, raw (Groundnut, rose, shelled, dried, raw)	51.51	25.76	38.64	0	7
Red peanuts, no shell, raw (Groundnut, red, shelled, dried, raw)	41.36	27.57	34.46	0	7
Meat and offal					
Chicken breast dry (Chicken, breast, without skin, raw)	60.15	40.35	50.25	0	7
Chicken feet (Chicken, feet, boiled)	43.97	21.48	32.72	0	14
Chicken meat, light meat, no skin, raw	35.24	27.81	31.53	0	7
Chicken neck, with skin, raw	65.97	32.98	49.48	0	7
Chicken thigh meat, with skin, cooked	62.24	31.12	46.68	0	7
Chicken wing meat, with skin, raw	53.29	38.90	46.10	0	7
Cow tongue, raw (Beef, tongue, raw)				0	7
Gazelle, dried (Water buck or gazelle, dried)				0	7
Gazelle, raw (Gazelle, raw)				0	7
Groundhog (Muskrat, raw)				0	7

Pig feet (Pork, feet)	42.25	27.74	35.00	0	7
Pig meat, bone, raw (Pork, with bone)	41.16	21.43	31.29	0	7
Pork sausage (Pork, sausage)	73.53	29.41	51.47	0	7
Spareribs, raw (Pork, back ribs, raw)	41.70	31.25	36.47	0	7
Fish, seafood, amphibians and invertebrates					
Boney fish, fresh, raw (Fish, mackerel, raw)	28.08	21.91	25.00	0	14
Boney fish, smoked, dried (Fish, smoked, dried)	74.39	47.95	61.17	0	14
Bumble worms (Mopanie worm, canned)				0	7
Catfish, dried (Fish, catfish, dried)	62.50	62.50	62.50	0	7
Catfish, raw (Fish, catfish, channel, wild, raw)	25.19	25.19	25.19	0	14
Crab, river (Crab, fresh water)	103.09	103.09	103.09	0	7
Crayfish (Crayfish, wild, raw)				0	7
Dried baby crayfish (Shrimp, very small, dried)				0	7
Gbuka fish, raw (Fish, tilapia, raw)	90.76	48.40	69.58	0	7
Lobster (Lobster, spiny, raw)				0	7
Sardines, canned in oil (Fish, sardines in oil, canned)	149.45	103.65	126.55	0	7
Small dried fish (Fish, dried, CoD)				0	7
Snail (Snail, sea)				0	7
Spring boe, whole (Frog)				0	7
Zipper fish (Fish, African carp, raw)				0	7
Eggs and egg products					
Boiled egg (Egg, chicken, cooked)	45.62	52.13	48.87	0	7
Raw egg (Egg, chicken, raw)				0	7
Milk and milk products					
Milk, condensed, sweet (Milk, cow, canned, condensed, sweet	82.07	59.91	70.99	0	7
Milk, evaporated, canned (liquid) (Milk, cow, canned, evaporated)	61.03	33.59	47.31	0	7
Milk, powdered (Milk, cow, powdered, whole)	85.71	57.14	71.42	0	7
Vegetables and vegetable products					
Bitter ball, white eggplant (Eggplant, white, raw)	5.90	4.77	5.34	0	14
Breadnut, raw or cooked (Breadnut, raw)	3.85	1.93	2.89	0	14
Careless green (Leaf, collards, raw)	7.77	4.66	6.22	0	7
Cassava leaf, Gbueevah (Leaf, cassava, raw)				0	14
Cucumber (Cucumber, raw)	2.27	1.60	1.94	0	14
Eggplant leaf (Leaf, eggplant, raw)				0	14
Eggplant (Eggplant, raw)	4.15	4.05	4.10	0	7
Fever leaf, raw (Leaf, fever, raw)	3.40	1.70	2.55	0	7
Gblafee leaf (Leaf, okra, raw)	1.55	1.55	1.55	0	0
Kittily (Kittily, eggplant seeds, raw)	7.76	4.29	6.03	0	14
Okra, dried (Okra, dried)	108.06	54.03	81.04	0	14
Okra (Okra, raw)	6.41	4.35	5.38	0	14
Onion (Onion, raw)	35.86	20.17	28.01	0	14
Palava sauce, plahto (Leaf, jute, raw)	2.48	1.24	1.86	0	7
Palm cabbage (African fan palm shoots)				0	7
Plantain, cooked (Plantain, cooked)				0	7
Plantain, raw (Plantain, all varieties)	7.59	3.79	5.69	0	14
Plantain, ripe, raw (Plantain, ripe, raw)				0	14
Pumpkin, cooked (Pumpkin, squash, cooked)	2.32	3.10	2.71	0	7
Pumpkin, raw (Pumpkin, squash, raw)	2.66	1.76	2.21	0	7
Spring onion (Onion, spring or scallion, raw)				0	0

Sweet potato leaf (Leaf, sweet potato, raw)	0.76	0.38	0.57	0	14
Water greens (Malabar spinach, cooked)	3.58	1.75	2.73	0	14
Worrh, mushroom (Mushroom, average)				0	7
Fruit and fruit products					
Banana, green, Booe (Banana, white flesh)				0	7
Banana, ripe or French banana (Banana, yellow flesh)	4.25	4.44	4.35	0	14
Butter pear (Avocado)				0	7
Coconut (Coconut, mature kernel)	7.90	2.63	5.27	0	7
Common plum (Mango, deep orange flesh)				0	7
Golden plum (Mango, green)	2.28	2.15	2.21	0	7
Grapefruit (Grapefruit)				0	7
Guava (Guava, fruit)				0	7
Lemon, Gargouee (Tangerine)	7.50	7.50	7.50	0	7
Monkey nut (Rambutan, average or from aceh)				0	7
Orange (Orange)	5.03	5.38	5.21	0	14
Palm fruit (African fan palm fruit)	1.00	1.00	1.00	0	14
Pawpaw (Papaya, fruit, ripe)	1.03	0.78	0.91	0	14
Pineapple pulp, Kweekpor (Pineapple, pulp)				0	7
Pineapple, Kweekpor (Pineapple)				0	7
Plum juice (Mango, juice)				0	7
Queesuck (Cashew fruit)				0	7
Ripe plum (Mango, ripe)				0	7
Sausau, sour sauce (Sour sop)				0	7
Tomato, Ceedoe (Tomato, red, ripe, raw)	12.73	7.73	10.23	0	7
Watermelon (Watermelon, fruit)				0	7
Oils and fats					
Agro oil (Oil, vegetable)	36.33	21.63	28.98	0	14
Palm kernel oil (Oil, palm, local)	24.97	12.48	18.73	0	7
Red oil (from fruit) (Oil, palm, red)	21.55	13.34	17.45	0	14
Sugars and confectionary					
Brown sugar (Sugar, brown)	244.44	122.22	183.33	0	7
Plantain chips (Crisp or chip, cassava, dried)	36.12	21.86	28.99	0	7
Sugar cane (Sugar, cane, refined)	25.41	25.03	25.22	0	7
Herbs, spices and condiments					
Dried chilli pepper (Chilli pepper, dried)	181.23	130.34	155.79	0	14
Garlic dust (Garlic, powdered)	400.00	200.00	300.00	0	0
Garlic, fresh (Garlic, raw)	218.81	173.12	195.96	0	7
Ginger root (Ginger, root, raw)				0	7
Green pepper (Chilli, green, raw)	42.31	49.09	45.70	0	14
Lime (Lime)	8.22	5.64	6.93	0	7
Onion dust (Onion, powdered)	179.05	104.79	141.92	0	7
Pepper, storage pepper (Pepper, red, hot)	32.15	22.06	27.10	0	14
Salt, iodized (Salt, iodized)	11.25	8.75	10.00	0	14
Tomato dust (Tomato, powder)	58.22	41.60	49.91	0	7
Tomato paste (Tomato paste, concentrated)	67.50	43.75	55.63	0	7
Vita (Cube, beef, dry)	100.00	100.00	100.00	0	14

Annex 4: LR02 Food availability

The number of available foods in each market surveyed in LR02 North/Central Rice with Cassava and Market Gardening by food group.



Markets -->	Peter's Town	Bodowhea	Leuwin	Boewin	St. John's	Boegeezaye
Herbs, spices and condiments	6	5	7	4	11	10
Sugars and confectionary	2	2	3	0	1	1
Oils and fats	3	2	2	1	2	2
Fruit and fruit products	3	4	7	1	4	3
Vegetables and vegetable products	3	9	12	8	12	6
Milk and milk products	1	1	0	1	3	1
Eggs and egg products	1	0	0	0	1	1
Fish, seafood, amphibians and invertebrates	2	2	4	0	4	2
Meat and offal	4	0	8	0	5	3
Legumes, nuts and seeds	6	4	8	2	11	3
Roots and tubers	3	3	2	0	5	1
Grains and grain-based products	4	3	5	2	7	3

Annex 5: LR02 Annual diet summaries

The edible weight and cost of the foods selected for an **average household of 5** for the whole year for **energy-only (EO), nutritious (NUT) and food habits nutritious (FHAB) diets** with the percentage contributed by each food in terms of weight, cost, energy, protein and fat, the percentage contribution of each food for eight vitamins and four minerals and the percentage of the total target met for each nutrient, averaged across the seasons in the **LR02 North/Central Rice with Cassava & Market Gardening livelihood zone**.

Table 9: LR02 Energy-only (EO) diet summary

Energy-Only (EO) Food List	Quantity (Kg)	% quantity	Cost (LRD)	% cost	% energy	% protein	% fat	% vit A	% vit C	% vit B1	% vit B2	% niacin	% vit B6	% folic acid	% vit B12	% calcium	% iron	% zinc
Breadnut, raw or cooked (Breadnut, raw)	59	3.1	**1,878**	4.5	3.3	10.9	5.4	6.8	6.7	8.9	7.0	4.3	26.5	16.9	0.0	13.6	19.4	19.7
Breast milk	194	10.1	**0**	0.0	3.3	6.2	68.8	85.2	3.2	11.1	14.5	13.8	2.0	7.1	100.0	12.7	0.0	6.8
Cassava, raw (Cassava, tuber, raw)	735	38.3	**11,669**	28.2	29.1	25.9	17.4	8.1	90.2	80.0	78.5	81.8	71.5	76.0	0.0	73.7	80.6	73.4
Fufu (Cassava, bread, fermented)	929	48.5	**27,838**	67.3	64.3	57.0	8.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	1,918	100	**41,384**	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
% target met					100	53	11	11	305	19	24	25	41	36	5	26	12	29

Table 10: LR02 Micronutrient nutritious (NUT) diet summary

Nutritious (NUT) Food List	Quantity (Kg)	% quantity	Cost (LRD)	% cost	% energy	% protein	% fat	% vit A	% vit C	% vit B1	% vit B2	% niacin	% vit B6	% folic acid	% vit B12	% calcium	% iron	% zinc
Boney fish, fresh, raw (Fish, mackerel, raw)	122	4.6	**46,067**	40.8	3.9	21.1	6.3	1.3	0.0	7.3	4.0	24.7	9.9	0.1	78.2	1.6	8.3	4.4
Breadnut, raw or cooked (Breadnut, raw)	367	13.9	**10,747**	9.5	20.6	19.2	3.8	1.3	17.7	8.6	4.7	6.1	29.8	17.7	0.0	16.7	13.0	30.3
Breast milk	194	7.3	**0**	0.0	3.3	1.8	7.7	2.6	1.4	1.7	1.6	3.2	0.4	1.2	5.0	2.5	0.0	1.7
Cassava, raw (Cassava, tuber, raw)	757	28.7	**12,453**	11.0	30.0	7.6	2.0	0.3	39.9	12.8	8.9	19.5	13.4	13.3	0.0	15.1	9.0	18.8
Coconut (Coconut, mature kernel)	192	7.3	**16,371**	14.5	19.3	6.0	72.2	0.0	0.7	3.3	1.0	3.5	1.9	3.8	0.0	1.5	7.9	11.8
Country rice (Rice, brown, raw)	13	0.5	**1,465**	1.3	1.2	0.9	0.3	0.0	0.0	2.1	0.2	2.6	1.4	0.4	0.0	0.1	0.4	2.0
Fever leaf, raw (Leaf, fever, raw)	244	9.2	**7,543**	6.7	6.1	16.1	2.2	18.4	16.7	25.8	26.3	15.1	14.7	21.0	0.0	31.3	22.7	12.3
Fufu (Cassava, bread, fermented)	84	3.2	**2,813**	2.5	5.8	1.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gblafee leaf (Leaf, okra, raw)	77	2.9	**1,499**	1.3	0.8	1.8	0.2	1.1	4.9	5.2	7.4	0.6	4.7	6.7	0.0	10.7	0.8	5.0
Palava sauce, plato (Leaf, jute, raw)	61	2.3	**1,852**	1.6	0.9	2.1	0.2	4.2	8.6	3.9	7.6	2.8	3.7	5.3	0.0	10.3	4.4	2.0
Pork sausage (Pork, sausage)	1	0.1	**435**	0.4	0.1	0.3	0.5	0.0	0.0	0.5	0.1	0.4	0.1	0.0	0.7	0.0	0.2	0.3
Red oil (from fruit) (Oil, palm, red)	2	0.1	**525**	0.5	0.6	0.0	2.5	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sardines, canned in oil (Fish, sardines in oil, canned)	7	0.3	**7,075**	6.3	0.4	1.5	0.9	0.1	0.0	0.2	0.4	1.3	0.2	0.0	16.2	1.2	1.7	0.7
Sweet potato leaf (Leaf, sweet potato, raw)	520	19.7	**4,006**	3.6	6.9	20.0	1.1	67.2	10.0	28.6	37.8	20.2	19.9	30.4	0.0	8.9	31.7	11.0
Total	2,643	100	**112,853**	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
% target met					100	186	100	351	708	123	214	108	225	214	100	131	112	118

Table 11: LR02 Food habits nutritious (FHAB) diet summary

Food Habits Nutritious (FHAB) Food List	Quantity (Kg)	% quantity	Cost (LRD)	% cost	% energy	% protein	% fat	% vit A	% vit C	% vit B1	% vit B2	% niacin	% vit B6	% folic acid	% vit B12	% calcium	% iron	% zinc
Agro oil (Oil, vegetable)	2	0.1	**598**	0.5	0.5	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Benny seeds, dried, raw (Sesame, seeds, whole, dried, raw)	9	0.4	**3,643**	3.1	1.3	1.3	4.3	0.0	0.0	2.6	0.4	1.1	1.3	0.6	0.0	3.7	1.7	4.7
Boney fish, fresh, raw (Fish, mackerel, raw)	126	5.1	**46,913**	39.4	4.0	21.1	6.5	1.3	0.0	7.7	4.4	25.7	9.6	0.1	80.3	1.5	8.6	4.3
Breadnut, raw or cooked (Breadnut, raw)	496	20.3	**14,956**	12.6	27.9	25.3	5.1	1.7	24.2	12.0	6.8	8.4	38.3	24.6	0.0	21.4	17.7	39.1
Breast milk	194	7.9	**0**	0.0	3.3	1.7	7.7	2.6	1.4	1.8	1.7	3.2	0.3	1.2	5.0	2.4	0.0	1.6
Cassava, raw (Cassava, tuber, raw)	505	20.6	**8,302**	7.0	20.0	5.0	1.3	0.2	27.0	8.9	6.3	13.2	8.5	9.1	0.0	9.5	6.0	12.0
Catfish, raw (Fish, catfish, channel, wild, raw)	2	0.1	**747**	0.6	0.1	0.3	0.1	0.0	0.0	0.2	0.0	0.2	0.0	0.0	1.2	0.0	0.1	0.1
Coconut (Coconut, mature kernel)	131	5.4	**11,274**	9.5	13.2	4.0	49.4	0.0	0.5	2.3	0.7	2.5	1.3	2.7	0.0	1.0	5.4	7.7
Country rice (Rice, brown, raw)	31	1.3	**3,325**	2.8	2.9	2.1	0.7	0.0	0.0	5.2	0.5	6.1	3.1	0.9	0.0	0.3	1.0	4.4
Fever leaf, raw (Leaf, fever, raw)	208	8.5	**6,392**	5.4	5.2	13.4	1.9	15.7	14.5	22.8	23.8	13.1	12.0	18.4	0.0	25.3	19.6	10.0
Fufu (Cassava, bread, fermented)	126	5.1	**4,000**	3.4	8.7	2.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Kpakutuweh (Bean, adzuki, mature, raw)	4	0.2	**1,012**	0.9	0.4	0.7	0.0	0.0	0.0	0.9	0.2	0.4	0.3	2.0	0.0	0.1	0.4	1.5
Palava sauce, plato (Leaf, jute, raw)	170	6.9	**4,715**	4.0	2.6	5.7	0.5	11.7	24.2	11.2	22.4	7.9	9.8	15.0	0.0	26.9	12.2	5.3
Palm kernel oil (Oil, palm, local)	17	0.7	**3,447**	2.9	3.7	0.0	17.0	11.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pink peanuts, no shell, raw (Groundnut, rose, shelled, dried, raw)	1	0.0	**278**	0.2	0.2	0.2	0.5	0.0	0.0	0.4	0.0	0.6	0.1	0.1	0.0	0.0	0.1	0.3
Red oil (from fruit) (Oil, palm, red)	1	0.0	**232**	0.2	0.3	0.0	1.1	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sardines, canned in oil (Fish, sardines in oil, canned)	6	0.2	**5,906**	5.0	0.3	1.2	0.8	0.0	0.0	0.2	0.3	1.1	0.2	0.0	13.5	1.0	1.4	0.5
Sweet potato leaf (Leaf, sweet potato, raw)	419	17.1	**3,235**	2.7	5.5	15.7	0.9	54.1	8.2	23.9	32.3	16.5	15.2	25.1	0.0	6.8	25.8	8.5
Total	2,448	100	**118,974**	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
% target met					100	191	100	351	699	119	202	106	237	209	100	138	111	123

Annex 6: LR04 Food List

LR04 Food list with local name, English food list name (CoD software), average price per 100g in the rainy and dry seasons, annual average, and minimum and maximum constraints.

Coastal Plain Cassava with Rice and Inland Fishing **Market Food List**	Average Price Per 100g			Constraints	
	Rainy season	Dry season	Annual Average	Min	Max
Grains and grain-based products					
Baking flour (Wheat, flour, 72% extraction)	17.56	11.47	14.52	0	7
Brown bread (Bread, wheat, wholemeal)	18.73	9.37	14.05	0	7
Corn meal (Corn flour, 96% extraction)	35.32	24.16	29.74	0	7
Corn seed (Maize, dried, raw)	30.71	21.91	26.31	0	7
Country rice (Rice, brown, raw)	12.22	10.54	11.38	0	14
Rice, white, raw (Rice, white, raw)	14.17	8.77	11.47	0	14
Spaghetti (Pasta)	41.43	31.09	36.26	0	7
Roots and tubers					
Boiled potato, cooked (Potato, cooked)	61.57	30.79	46.18	0	7
Cassava flour (Cassava, flour)	29.61	19.74	24.67	0	0
Cassava, raw (Cassava, tuber, raw)	2.46	1.69	2.08	0	14
Cassava, roasted, boiled (Cassava, tuber, cooked)				0	14
Eddoes (Cocoyam, tuber, raw)	15.61	13.35	14.48	0	7
Fufu (Cassava, bread, fermented)	3.31	2.42	2.86	0	14
Gari (Cassava, root, dried meal)	12.92	9.06	10.99	0	14
Purple sweet potato, raw (Sweet potato, purple skin, pale yellow flesh, raw)	5.51	3.82	4.67	0	7
Yam, raw (Yam, tuber, raw)	6.71	5.43	6.07	0	7
Yellow sweet potato, raw (Sweet potato, yellow, raw)	6.39	3.76	5.07	0	7
Legumes, nuts and seeds					
Benny seeds, dried, raw (Sesame, seeds, whole, dried, raw)	57.59	34.41	46.00	0	14
Bitter cola, dried (Colanut, dried, raw)	215.49	139.06	177.28	0	14
Bitter cola, raw (Colanut, raw)	29.22	16.75	22.98	0	14
Black beans (Bean, black)	41.37	27.58	34.47	0	7
Black-eyed beans, raw (Cowpea, blackeyes, immature, raw)	22.35	14.16	18.25	0	7
Butter beans (Bean, lima, dried)	35.90	25.72	30.81	0	7
Kpakutuweh (Bean, adzuki, mature, raw)	21.86	14.24	18.05	0	7
Lentils (Lentil, dried, raw)	55.05	41.29	48.17	0	0
Peanut paste (Groundnut paste)	60.22	38.52	49.37	0	7
Peanuts with shell (Peanut, with shell)	43.42	21.71	32.57	0	7
Peas, (yellow or green split peas), dried (Peas, split, mature, raw)	17.41	12.75	15.08	0	7
Pink peanuts, no shell, raw (Groundnut, rose, shelled, dried, raw)	40.05	28.64	34.34	0	7
Red peanuts, no shell, raw (Groundnut, red, shelled, dried, raw)	51.43	28.79	40.11	0	7
Meat and offal					
Chicken breast dry (Chicken, breast, without skin, raw)	51.38	41.46	46.42	0	7
Chicken feet (Chicken, feet, boiled)	56.90	36.68	46.79	0	14
Chicken leg (Chicken, leg)	54.29	24.45	39.37	0	7
Chicken meat, light meat, no skin, raw	43.53	21.77	32.65	0	7
Chicken meat, light meat, with skin, cooked	37.66	28.25	32.96	0	7
Chicken meat, light meat, with skin, raw	33.80	33.80	33.80	0	7
Chicken neck, with skin, raw (Chicken, neck, with skin, raw)	32.78	32.78	32.78	0	7

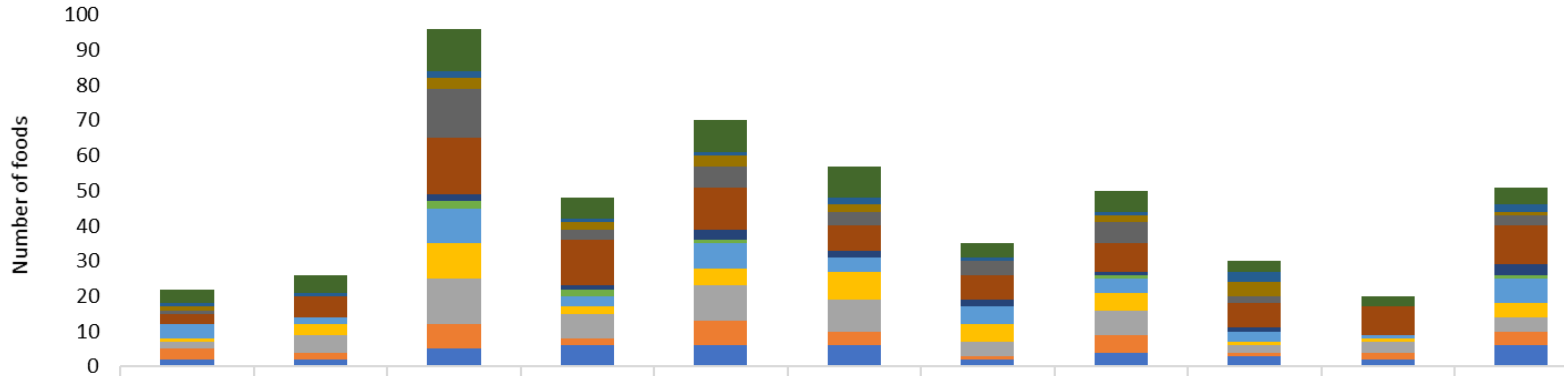
Chicken sausage (Frankfurter)	58.82	29.27	39.12	0	0
Chicken thigh meat, no skin, raw	35.37	35.37	35.37	0	7
Chicken thigh meat, with skin, raw	23.27	23.27	23.27	0	7
Chicken thigh meat, with skin, cooked	45.48	45.48	45.48	0	7
Chicken wing meat, no skin, raw	33.49	33.49	33.49	0	7
Chicken wing meat, with skin raw	53.17	33.81	43.49	0	7
Cow meat, boneless, raw (Beef, meat, with fat, boneless, raw)	35.47	17.73	26.60	0	0
Gazelle, dried (Water buck or gazelle, dried)	130.20	57.87	94.03	0	7
Gazelle, raw (Gazelle, raw)				0	7
Groundhog (Muskrat, raw)				0	7
Pig feet (Pork, feet)	40.07	24.08	32.07	0	7
Pig meat, bone, raw (Pork, with bone)	36.82	35.53	36.17	0	7
Spareribs, raw (Pork, back ribs, raw)	33.71	16.85	25.28	0	7
Turkey (Turkey)	75.04	37.52	56.28	0	7
Fish, seafood, amphibians and invertebrates					
Boney fish, fresh, raw (Fish, mackerel, raw)	29.26	17.95	23.61	0	14
Boney fish, smoked, dried (Fish, smoked, dried)	71.95	44.14	58.05	0	14
Bumble worms, grubs (Mopanie worm, canned)				0	7
Cassava fish (Fish, croaker, Atlantic, raw)	91.33	79.31	85.32	0	7
Catfish, dried (Fish, catfish, dried)	73.96	73.96	73.96	0	7
Catfish, raw (Fish, catfish, channel, wild, raw)	41.96	20.98	31.47	0	7
Clam (Clam, raw)	54.86	21.94	38.40	0	0
Crayfish (Crayfish, wild, raw)				0	7
Dried baby fish (Fish, cichlids, dried)	76.93	42.84	59.88	0	7
Dried small crayfish (Shrimp, small, dried)	203.68	101.84	152.76	0	7
Gbuka fish, raw (Fish, tilapia, raw)	159.07	103.62	131.34	0	7
Kiss-me (Periwinkle)	4.22	5.18	4.70	0	7
Red snapper fish, raw (Fish, red snapper)	31.24	62.48	46.86	0	7
River crab (Crab, fresh water)	47.34	25.40	36.37	0	7
Sardina raw (Fish, sardine, raw)	30.42	30.42	30.42	0	7
Sardines, canned in oil (Fish, sardines in oil, canned)	180.16	131.75	155.95	0	7
Shark meat, raw (Fish, shark)	96.76	60.44	78.60	0	7
Small dried fish (Fish, dried, CoD)	71.29	56.64	63.97	0	7
Snail (Snail, sea)	18.24	10.84	14.54	0	7
Zipper fish (Fish, African carp, raw)	58.43	49.19	53.81	0	7
Eggs and egg products					
Boiled egg (Egg, chicken, cooked)	48.6	40.16	44.38	0	7
Raw egg (Egg, chicken, raw)	51.53	29.02	40.28	0	7
Milk and milk products					
Condensed milk, sweetened (Milk, condensed, sweetened)	75.47	49.58	65.11	0	7
Milk, evaporated, canned (liquid) (Milk, cow, canned, evaporated)	59.31	54.83	56.91	0	7
Milk, powdered (Milk, cow, powdered, whole)	141.37	87.55	117.24	0	7
Vegetables and vegetable products					
Bitter ball, white eggplant (Eggplant, white, raw)	9.32	5.35	7.34	0	14
Breadnut, raw or cooked (Breadnut, raw)	6.48	3.82	5.15	0	7
Cabbage (Cabbage, raw)	13.09	5.24	9.17	0	7
Careless green (Leaf, collards, raw)	6.80	5.49	6.14	0	7

Cassava leaf, Gbueevah (Leaf, cassava, raw)	1.33	0.67	1.00	0	14
Cucumber (Cucumber, raw)	5.87	3.24	4.55	0	14
Eggplant leaf (Leaf, eggplant, raw)	15.03	15.03	15.03	0	14
Eggplant (Eggplant, raw)	6.76	4.45	5.60	0	7
Fever leaf, raw (Leaf, fever, raw)	7.97	4.97	6.47	0	14
Gblafee leaf (Leaf, okra, raw)	1.79	0.89	1.34	0	0
Kittily (Kittily, eggplant seeds, raw)	27.80	13.66	20.73	0	14
Okra, dried (Okra, dried)	177.78	88.89	133.33	0	14
Okra (Okra, raw)	15.03	8.73	11.88	0	14
Onion (Onion, raw)	30.62	20.04	25.33	0	14
Palava sauce, plato (Leaf, jute, raw)	8.30	3.77	6.04	0	7
Palm cabbage (African fan palm shoots)				0	0
Plantain, raw (Plantain, all varieties)	10.63	5.31	7.97	0	14
Plantain, ripe, raw (Plantain, ripe, raw)	9.42	6.71	8.06	0	14
Pumpkin, cooked (Pumpkin, squash, cooked)				0	7
Pumpkin, raw (Pumpkin, squash, raw)	3.20	2.84	3.02	0	7
Sweet potato leaf (Leaf, sweet potato, raw)	2.41	1.34	1.87	0	14
Water greens (Malabar spinach, cooked)	6.85	3.49	5.17	0	7
Worrh, mushroom (Mushroom, average)				0	7
Fruit and fruit products					
Apple, bush (Rose apple)	6.52	5.06	5.79	0	0
Banana, ripe, French banana (Banana, yellow flesh)	4.86	3.17	3.96	0	14
Banana, green, booe (Banana, white flesh)	5.60	2.19	4.14	0	14
Butter pear (Avocado)				0	7
Cherry, bush (Currant, red and white)	2.27	1.28	1.87	0	0
Coconut, whole (Coconut, mature kernel)	4.78	2.94	4.04	0	7
Common plum (Mango, deep orange flesh)				0	7
Golden plum (Mango, green)	2.54	2.41	2.48	0	7
Grapefruit (Grapefruit)	3.50	2.26	2.88	0	7
Lemon, Gargouee (Tangerine)	12.79	6.39	9.59	0	7
Monkey nut (Rambutan, average or from aceh)				0	7
Orange (Orange)	5.31	4.27	4.79	0	14
Palm fruit (African fan palm fruit)	3.07	2.38	2.73	0	14
Pawpaw (Papaya, fruit, ripe)	3.40	4.31	3.85	0	7
Pineapple juice, Kweekpor juice (Pineapple, juice)				0	7
Pineapple pulp, Kweekpor pulp (Pineapple, pulp)				0	7
Pineapple, Kweekpor (Pineapple)	8.99	4.50	6.75	0	7
Queesuck (Cashew fruit)				0	7
Ripe plum (Mango, ripe)				0	7
Sausau, sour sauce (Sour sop)				0	7
Tomato, ceedoe (Tomato, red, ripe, raw)	20.64	10.32	15.48	0	7
Watermelon (Watermelon, fruit)				0	7
Oils and fats					
Agro oil (Oil, vegetable)	34.37	23.71	29.04	0	14
Coconut oil (Oil, coconut)				0	7
Palm kernel oil (Oil, palm, local)	40.98	31.25	36.11	0	7
Red oil (from fruit) (Oil, palm, red)	23.36	15.42	19.39	0	14
Sugars and confectionary					

Brown sugar (Sugar, brown)	33.24	20.56	26.90	0	7
Plantain chips (Crisp or chip, cassava, dried)	39.38	19.69	29.53	0	7
Sugar cane (Sugar, cane, refined)	26.31	13.79	20.05	0	7
Herbs, spices and condiments					
Dried chilli pepper (Chilli pepper, dried)	265.05	136.33	200.69	0	14
Garlic dust (Garlic, powdered)	600.00	500.00	550.00	0	0
Garlic, fresh (Garlic, raw)	237.50	150.65	194.08	0	7
Ginger root (Ginger, root, raw)	24.42	11.47	17.94	0	7
Green pepper (Chilli, green, raw)	59.51	29.76	44.63	0	14
Lime (Lime)	15.52	13.21	14.36	0	7
Onion dust (Onion, powdered)	219.84	109.92	164.88	0	0
Pepper, storage pepper (Pepper, red, hot)	55.69	32.45	44.07	0	14
Salt, iodized (Salt, iodized)	11.25	15.68	13.47	0	14
Salt (Salt)	35.36	17.68	26.52	0	7
Tomato dust (Tomato, powder)	37.18	26.43	31.81	0	7
Tomato paste (Tomato paste, concentrated)	74.10	54.10	64.10	0	7
Vita (Cube, beef, dry)	84.14	62.82	73.48	0	14

Annex 7: LR04 Food availability

The number of available foods in each market surveyed in LR04 Coastal Plain Cassava with Rice and Inland Fishing by food group.



Markets -->	Little Kola	FDA	Compound 3	SOS	Bokay	Yarpah	Yarpleah	Nyonben	Gbozohn	Sayah	Little Liberia
Herbs, spices and condiments	4	5	12	6	9	9	4	6	3	3	5
Sugars and confectionary	1	1	2	1	1	2	1	1	3	0	2
Oils and fats	1	0	3	2	3	2	0	2	4	0	1
Fruit and fruit products	1	0	14	3	6	4	4	6	2	0	3
Vegetables and vegetable products	3	6	16	13	12	7	7	8	7	8	11
Milk and milk products	0	0	2	1	3	2	2	1	1	0	3
Eggs and egg products	0	0	2	2	1	0	0	1	0	0	1
Fish, seafood, amphibians and invertebrates	4	2	10	3	7	4	5	4	3	1	7
Meat and offal	1	3	10	2	5	8	5	5	1	1	4
Legumes, nuts and seeds	2	5	13	7	10	9	4	7	2	3	4
Roots and tubers	3	2	7	2	7	4	1	5	1	2	4
Grains and grain-based products	2	2	5	6	6	6	2	4	3	2	6

Annex 8: LR04 Annual diet summaries

The edible weight and cost of the foods selected for an **average household of 5** for the whole year for **energy only (EO), nutritious (NUT) and food habits nutritious (FHAB)** diets with the percentage contributed by each food in terms of weight, cost, energy, protein and fat, the percentage contribution of each food for eight vitamins and four minerals and the percentage of the total target met for each nutrient, averaged across the seasons in the **LR04 Coastal Plain Cassava with Rice & Inland Fishing livelihood zone**

Table 12: LR04 Energy-only (EO) diet summary

Energy-only (EO) Food List	Quantity (Kg)	% quantity	Cost (LRD)	% cost	% energy	% protein	% fat	% vit A	% vit C	% vit B1	% vit B2	% niacin	% vit B6	folic acid	% vit B12	% calcium	% iron	% zinc
Breast milk	194	7.0	**0**	0.0	3.3	1.9	27.9	3.1	1.1	1.4	1.3	4.2	0.5	1.1	100.0	1.7	0.0	2.6
Cabbage (Cabbage, raw)	578	20.9	**0**	0.0	4.2	8.3	2.1	1.5	42.8	9.2	4.2	9.7	15.4	18.2	0.0	7.4	5.2	13.1
Cassava leaf, Gbueevah (Leaf, cassava, raw)	1048	37.9	**12,725**	30.4	26.3	72.2	34.8	95.4	56.1	89.1	94.4	85.6	83.8	80.3	0.0	90.7	93.9	82.0
Coconut, whole (Coconut, mature kernel)	23	0.8	**1,288**	3.1	2.4	0.8	31.8	0.0	0.1	0.3	0.1	0.6	0.3	0.4	0.0	0.1	0.9	2.2
Fufu (Cassava, bread, fermented)	923	33.4	**27,776**	66.5	63.9	16.9	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	2,767	100	**41,788**	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
% target met					100	179	28	291	908	153	255	82	170	241	5	194	117	76

Table 13 : LR04 Micronutrient nutritious (NUT) diet summary

Nutritious (NUT) Food List	Quantity (Kg)	% quantity	Cost (LRD)	% cost	% energy	% protein	% fat	% vit A	% vit C	% vit B1	% vit B2	% niacin	% vit B6	% folic acid	% vit B12	% calcium	% iron	% zinc
Breadnut, raw or cooked (Breadnut, raw)	164	5.6	**6,843**	10.4	9.2	8.0	1.7	0.7	4.8	2.7	1.6	2.7	13.0	5.8	0.0	4.3	4.3	9.8
Breast milk	194	6.6	**0**	0.0	3.3	1.7	7.7	3.0	0.8	1.2	1.2	3.2	0.4	0.9	5.0	1.5	0.0	1.2
Cabbage (Cabbage, raw)	578	19.5	**0**	0.0	4.2	7.4	0.6	1.5	33.5	7.9	3.7	7.3	11.4	15.0	0.0	6.3	4.0	6.1
Cassava leaf, Gbueevah (Leaf, cassava, raw)	1048	35.4	**13,463**	20.5	26.3	64.4	9.6	93.8	43.8	77.2	84.5	64.5	61.9	66.5	0.0	77.5	72.6	38.3
Cassava, raw (Cassava, tuber, raw)	465	15.7	**12,490**	19.0	18.4	4.4	1.2	0.2	15.0	5.5	4.1	11.9	8.1	6.0	0.0	5.3	4.1	8.4
Coconut, whole (Coconut, mature kernel)	206	7.0	**12,190**	18.6	20.8	6.1	77.8	0.0	0.5	2.4	0.8	3.8	2.0	3.0	0.0	0.9	6.3	9.2
Country rice (Rice, brown, raw)	6	0.2	**687**	1.0	0.5	0.4	0.1	0.0	0.0	0.6	0.1	1.1	0.6	0.1	0.0	0.0	0.1	0.6
Dried baby fish (Fish, cichlids, dried)	2	0.1	**920**	1.4	0.2	1.0	0.2	0.0	0.0	0.1	0.1	1.6	0.2	0.0	6.9	1.0	0.3	0.6
Fufu (Cassava, bread, fermented)	232	7.9	**7,120**	10.8	16.1	3.8	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gblafee leaf (Leaf, okra, raw)	39	1.3	**669**	1.0	0.4	0.9	0.1	0.7	1.5	1.8	2.8	0.3	2.3	2.5	0.0	3.1	0.3	1.8
Snail (Snail, sea)	23	0.8	**11,330**	17.2	0.6	2.1	0.6	0.1	0.1	0.5	1.0	3.7	0.2	0.2	88.1	0.1	7.9	23.9
Total	2,958	100	**65,713**	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
% target met					100	200	100	296	1,161	177	285	108	230	291	100	227	151	163

Table 14: LR04 Food habits nutritious (FHAB) diet summary

Food Habits Nutritious (FHAB) Food List	Quantity (Kg)	% quantity	Cost (LRD)	% cost	% energy	% protein	% fat	% vit A	% vit C	% vit B1	% vit B2	% niacin	% vit B6	% folic acid	% vit B12	% calcium	% iron	% zinc
Agro oil (Oil, vegetable)	18	0.7	**5,419**	4.5	4.1	0.0	17.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Boney fish, fresh, raw (Fish, mackerel, raw)	149	6.1	**52,812**	43.8	4.8	21.1	7.5	1.7	0.0	6.6	4.1	26.0	11.6	0.1	95.0	1.4	8.4	5.1
Breadnut, raw or cooked (Breadnut, raw)	272	11.1	**14,824**	12.3	15.3	11.7	2.7	1.0	13.0	4.7	3.0	3.9	21.5	11.5	0.0	8.9	8.0	21.4
Breast milk	194	8.0	**0**	0.0	3.3	1.5	7.6	2.8	1.4	1.3	1.4	2.8	0.4	1.1	5.0	1.8	0.0	1.6
Cassava leaf, Gbueevah (Leaf, cassava, raw)	844	34.6	**10,838**	9.0	21.2	45.9	7.6	70.2	57.3	66.8	76.8	45.3	49.5	63.9	0.0	77.9	65.4	40.6
Cassava, raw (Cassava, tuber, raw)	483	19.8	**12,782**	10.6	19.2	4.0	1.3	0.2	25.3	6.1	4.8	10.8	8.3	7.4	0.0	6.9	4.8	11.5
Chicken neck, with skin, raw	< 1	0.0	**19**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Coconut, whole (Coconut, mature kernel)	138	5.7	**8,144**	6.8	13.9	3.6	51.0	0.0	0.5	1.8	0.6	2.2	1.4	2.4	0.0	0.8	4.7	8.1
Country rice (Rice, brown, raw)	12	0.5	**1,412**	1.2	1.1	0.6	0.3	0.0	0.0	1.4	0.2	1.9	1.2	0.3	0.0	0.1	0.3	1.6
Fever leaf, raw (Leaf, fever, raw)	< 1	0.0	**37**	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Fufu (Cassava, bread, fermented)	167	6.8	**4,946**	4.1	11.5	2.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Kpakutuweh (Bean, adzuki, mature, raw)	7	0.3	**1,459**	1.2	0.6	1.1	0.0	0.0	0.0	1.1	0.3	0.6	0.5	3.0	0.0	0.2	0.5	2.6
Peas, (yellow or green split peas), dried	21	0.9	**3,309**	2.7	1.9	3.7	0.2	0.0	0.1	4.8	0.9	2.0	0.7	3.7	0.0	0.4	1.3	4.4
Red oil (from fruit) (Oil, palm, red)	4	0.1	**757**	0.6	0.8	0.0	3.6	6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rice, white, raw (Rice, white, raw)	6	0.3	**566**	0.5	0.6	0.3	0.0	0.0	0.0	0.1	0.1	0.3	0.3	0.1	0.0	0.0	0.1	0.5
Sweet potato leaf (Leaf, sweet potato, raw)	126	5.2	**3,193**	2.6	1.7	4.0	0.3	17.9	2.4	5.2	7.8	4.2	4.7	6.5	0.0	1.6	6.4	2.5
Total	2,442	100	**120,516**	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
% target met					100	227	102	319	715	165	253	124	232	244	100	182	135	124

Annex 9: LR08 Food List

LR08 Food list with local name, English food list name (CoD software), average price per 100g in the rainy and dry seasons, annual average, and minimum and maximum constraints.

Rubber and Charcoal with Food Crops **Market Food List**	Average Price Per 100g			Constraints	
	Rainy season	Dry season	Annual Average	Min	Max
Grains and grain-based products					
Baking flour (Wheat, flour, 72% extraction)	18.54	14.12	16.33	0	7
Boiled/roasted corn (Maize, cooked, CoD)	13.98	14.05	14.00	0	7
Brown bread (Bread, wheat, wholemeal)	22.88	18.31	20.60	0	7
Corn bread (Bread, corn)	29.18	13.08	21.13	0	7
Corn flour (Maize, flour, dry)	15.15	11.03	13.09	0	0
Corn meal (Corn flour, 96% extraction)	31.45	23.94	27.69	0	7
Corn seed (Maize, dried, raw)	25.67	18.08	21.98	0	7
Country rice (Rice, brown, raw)	18.30	12.02	15.16	0	7
Fanti bread, Fule bread (Bread)	45.40	39.28	42.34	0	7
Lebanese bread, sliced bread (Bread, wheat, white for toasting)	17.44	12.67	15.06	0	7
Oats (Oats)				0	7
Rice, white, raw (Rice, white, raw)	13.24	10.06	11.65	0	14
Spaghetti (Pasta)	39.62	35.18	37.40	0	7
Roots and tubers					
Cassava flour (Cassava, flour)	5.45	2.73	4.09	0	0
Cassava, raw (Cassava, tuber, raw)	3.17	2.20	2.69	0	14
Cassava, roasted, boiled (Cassava, tuber, cooked)	16.56	49.87	35.59	0	7
Dipper (Cassava, sweet, tuber, dried)	14.5	9.52	12.02	0	7
Eddoes (Cocoyam, tuber, raw)	16.16	12.41	14.29	0	7
Fufu (Cassava, bread, fermented)	6.65	4.22	5.43	0	14
Gari (Cassava, root, dried meal)	13.99	10.92	12.45	0	14
Irish potato, raw (Potato, raw)	27.81	18.67	23.24	0	0
Purple sweet potato, cooked (Sweet potato, purple skin, pale yellow flesh, cooked)	4.90	2.86	3.88	0	7
Purple sweet potato, raw (Sweet potato, purple skin, pale yellow flesh, raw)	6.67	7.09	6.88	0	7
Yam, raw (Yam, tuber, raw)	6.52	8.96	7.74	0	7
Yellow sweet potato, raw (Sweet potato, yellow, raw)	6.77	3.41	5.09	0	7
Legumes, nuts and seeds					
Benny seeds, dried (Sesame, seeds, whole, dried, raw)	54.40	42.73	48.56	0	14
Bitter cola, dried (Colanut, dried, raw)	180.23	110.67	145.45	0	14
Bitter cola, raw (Colanut, raw)	30.48	26.73	28.61	0	7
Black beans (Bean, black, mature, raw)	20.90	16.86	19.28	0	7
Black-eyed beans (Cowpea, blackeyes, immature, raw)	20.73	17.15	18.94	0	7
Brown cowpeas (Cowpea, brown, dried, raw)	22.98	17.97	20.48	0	7
Butter beans (Bean, lima, dried)	41.69	30.25	35.97	0	7
Country bean (Bean, fava, immature, raw)	23.37	22.11	22.74	0	7
Kidney beans (Bean, kidney, red, mature, raw)	50.34	46.48	48.41	0	0
Kpakutuweh (Bean, adzuki, mature, raw)	20.56	16.94	18.75	0	7
Lentils (Lentil, dried, raw)	55.16	15.76	35.46	0	0
Peanut paste (Groundnut paste)	49.01	32.12	40.57	0	7

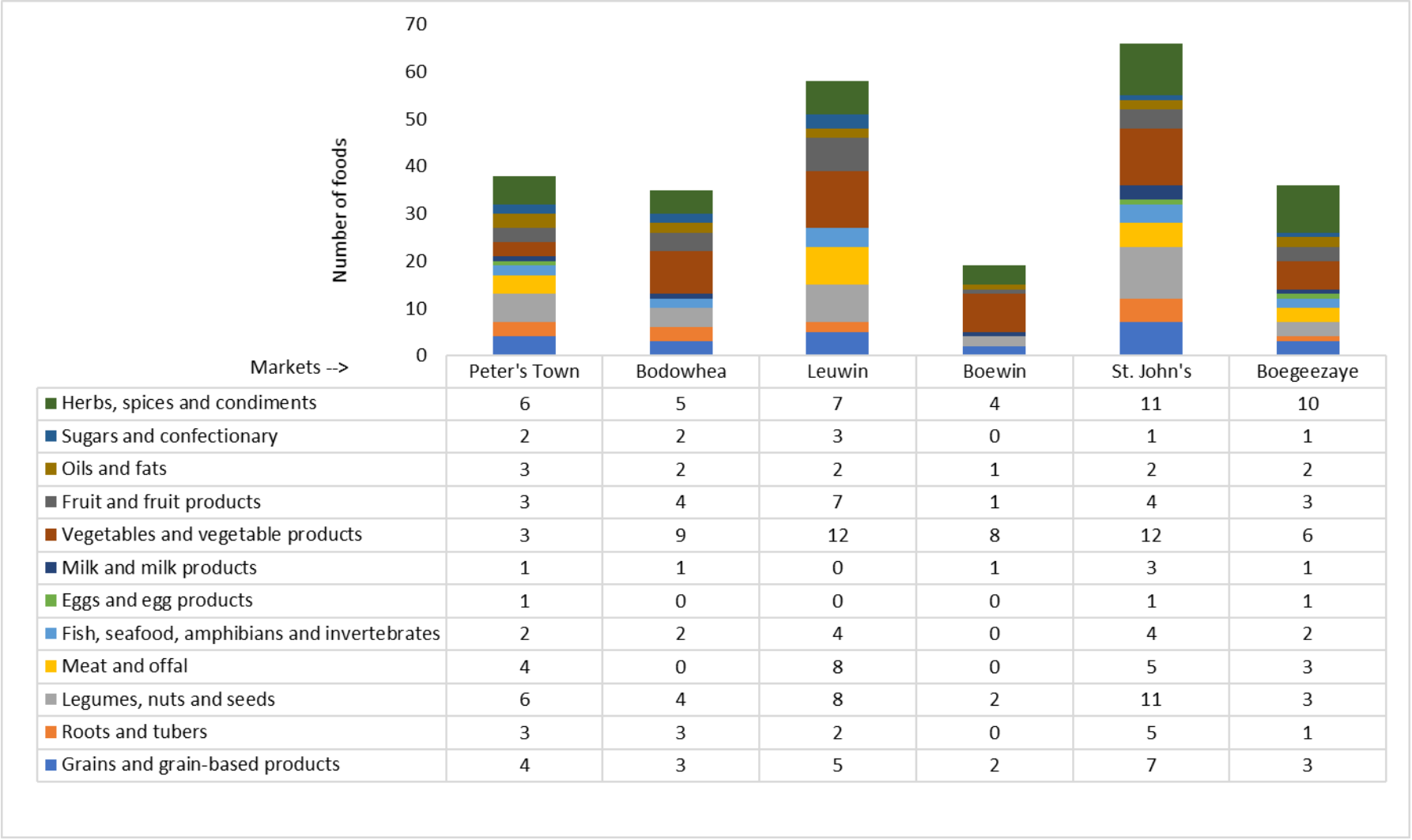
Peanuts, pink, no shell (Groundnut, rose, shelled, dried, raw)	39.94	31.32	35.63	0	7
Peanuts, red, no shell (Groundnut, red, shelled, dried, raw)	39.80	27.13	33.46	0	7
Peanuts, with shell (Peanut, with shell)	29.56	16.40	22.98	0	7
Split peas, yellow or green (Peas, split, mature, raw)	30.19	21.53	25.86	0	7
White beans (Cowpea, white, dried, raw)	30.68	1.84	16.26	0	7
Meat and offal					
Chicken breast dry (Chicken, breast, without skin, raw)	44.39	36.21	40.30	0	7
Chicken feet (Chicken, feet, boiled)	36.62	25.14	30.88	0	7
Chicken leg (Chicken, leg)	16.01	6.40	11.21	0	7
Chicken meat, light meat, no skin, cooked (Chicken, light meat, flesh, cooked)	55.37	55.37	55.37	0	0
Chicken meat, light meat, no skin, raw	38.01	25.95	31.98	0	7
Chicken meat, light meat, with skin, raw	37.44	25.76	31.60	0	7
Chicken neck, with skin, raw (Chicken, neck, with skin, raw)	25.96	25.96	25.96	0	7
Chicken thigh meat, with skin, cooked / dried (Chicken, thigh, with skin, cooked)	48.29	24.14	36.22	0	7
Chicken thigh meat, with skin, raw	43.50	29.56	36.53	0	7
Chicken wing meat, no skin, raw	38.99	21.80	30.40	0	7
Chicken wing meat, with skin, raw	44.91	16.45	33.53	0	7
Chicken wing meat, with skin, cooked / dried	77.65	38.83	58.24	0	7
Cow meat, boneless, raw (Beef, meat, with fat, boneless, raw)	51.20	12.80	32.00	0	7
Cow meat, boneless (Beef, boneless)	57.82	28.91	43.37	0	7
Cow meat, liver, raw (Beef, liver, raw)	26.64	26.64	26.64	0	0
Cow meat, tripe, raw (Beef, tripe, raw)	28.59	28.59	28.59	0	0
Cow skin (Beef, dried, boneless)	88.24	63.78	76.01	0	7
Cow tongue, raw (Beef, tongue, raw)	68.92	27.57	48.24	0	7
Gazelle, dried (Water buck or gazelle, dried)	183.49	91.75	137.62	0	0
Goat meat, raw, with bones (Goat, raw, with bone)	259.58	210.91	235.24	0	0
Groundhog (Muskrat, raw)				0	7
Pig feet (Pork, feet)	29.25	21.81	25.53	0	7
Pig meat, bone, raw (Pork, with bone)	31.41	28.52	29.97	0	7
Pig meat, no bones, raw (Pork, meat, with fat, boneless, raw)	32.14	25.71	28.93	0	7
Pork sausage (Pork, sausage)	67.75	37.59	52.67	0	7
Spareribs, raw (Pork, back ribs, raw)	29.64	20.56	25.10	0	7
Turkey neck (Turkey)	49.46	39.82	44.64	0	7
Fish, seafood, amphibians and invertebrates					
Boney fish, fresh, raw (Fish, mackerel, raw)	38.57	27.55	33.30	0	14
Boney fish, smoked, dried (Fish, smoked, dried)	75.13	53.99	64.56	0	14
Cassava fish (Fish, croaker, Atlantic, raw)	182.93		182.93	0	0
Catfish, dried (Fish, catfish, dried)	164.27	103.94	134.11	0	7
Catfish, raw (Fish, catfish, channel, wild, raw)	190.70	190.70	190.70	0	7
Crayfish, dried baby (Shrimp, very small, dried)	248.77	124.38	186.58	0	7
Crayfish, dried small (Shrimp, small, dried)	306.35	131.85	219.10	0	7
Crayfish (Crayfish, wild, raw)	101.35	40.54	70.95	0	7
Crayfish (Lobster, spiny, raw)				0	7
Dried baby fish (Fish, cichlids, dried)	148.13	61.49	104.81	0	7
Gbuka fish, raw (Fish, tilapia, raw)	79.30	76.27	77.79	0	7
Kiss-me (Periwinkle)	23.24	19.46	20.72	0	7
Red snapper fish, raw (Fish, red snapper)	44.26	40.10	42.51	0	7

River crab (Crab, fresh water)	54.52	22.50	38.51	0	7
Sardina raw (Fish, sardine, raw)	62.26	62.26	62.26	0	7
Sardines, canned in oil (Fish, sardines in oil, canned)	122.87	62.62	92.75	0	7
Small dried fish (Fish, dried, CotD)	155.26	155.26	155.26	0	7
Snail (Snail, sea)	29.73	56.20	38.56	0	7
Snake fish (Eel, mixed species, raw)	100.29	42.98	71.64	0	0
Sole fish, dried (Fish, turbot, cooked)	147.40	73.70	110.55	0	0
Zipper fish (Fish, African carp, raw)	48.25	36.89	42.57	0	7
Eggs and egg products					
Boiled egg (Egg, chicken, cooked)	45.03	33.60	39.32	0	7
Raw egg (Egg, chicken, raw)	43.36	34.61	38.99	0	7
Milk and milk products					
Milk, condensed, sweet (Milk, condensed, sweetened)	40.04	39.45	39.78	0	7
Milk, evaporated, canned (liquid) (Milk, cow, canned, evaporated)	59.80	33.67	46.73	0	7
Milk, powdered (Milk, cow, powdered, whole)	122.02	62.84	92.43	0	7
Vegetables and vegetable products					
Bitter ball, white eggplant (Eggplant, white, raw)	14.76	11.74	13.21	0	14
Breadnut, raw or cooked (Breadnut, raw)	10.46	7.81	9.13	0	7
Cabbage (Cabbage, raw)	21.24	16.19	18.71	0	7
Careless green (Leaf, collards, raw)	11.99	11.99	11.99	0	7
Cassava leaf, Gbueevah (Leaf, cassava, raw)	2.90	2.85	2.88	0	14
Cocoyam leaf, Gbueemee (Leaf, cocoyam, raw)				0	0
Cucumber (Cucumber, raw)	7.63	5.73	6.68	0	7
Eggplant leaf (Leaf, eggplant, raw)	4.29	8.59	6.44	0	7
Eggplant (Eggplant, raw)	8.78	6.22	7.50	0	7
Fever leaf (Leaf, fever, raw)	7.46	5.30	6.38	0	14
Kittily (Kittily, eggplant seeds, raw)	36.82	20.69	28.76	0	14
Mushroom (Mushroom, average)	8.88	4.44	6.66	0	7
Okra, dried (Okra, dried)	63.17	52.56	57.87	0	14
Okra (Okra, raw)	17.03	13.89	15.46	0	7
Onion (Onion, raw)	22.33	19.25	20.79	0	14
Palava sauce, Plahto (Leaf, jute, raw)	9.58	6.49	8.04	0	7
Palm cabbage (African fan palm shoots)				0	7
Plantain, cooked (Plantain, cooked)	16.14	16.14	16.14	0	7
Plantain, raw (Plantain, all varieties)	9.07	7.91	8.49	0	7
Plantain, ripe, raw (Plantain, ripe, raw)	10.03	4.19	7.11	0	7
Pumpkin, raw (Pumpkin, squash, raw)	6.20	5.26	5.73	0	7
Round peas, green peas (Peas, cooked or canned)	20.68	13.79	17.23	0	0
Spring onion (Onion, spring or scallion, raw)	54.36	27.18	40.77	0	0
Sweet potato leaf (Leaf, sweet potato, raw)	2.65	2.29	2.47	0	14
Water greens (Malabar spinach, cooked)	10.36	6.85	8.61	0	7
Fruit and fruit products					
Apple (bush) (Rose apple)				0	7
Banana, green (Banana, white flesh)	6.02	6.02	6.02	0	7
Banana, ripe, French Booe (Banana, yellow flesh)	11.76	10.57	11.17	0	7
Breadfruit (Breadfruit)				0	7
Butter pear (Avocado)				0	7

Cherry, bush (Currant, red and white)	5.84	4.78	5.31	0	7
Coconut, meat (Coconut, meat)	30.72	22.48	27.06	0	7
Coconut, whole (Coconut, mature kernel)	9.56	4.75	7.16	0	7
Common plum (Mango, deep orange flesh)				0	7
Golden plum (Mango, green)	2.24	1.12	1.68	0	7
Grapefruit (Grapefruit)	1.31	0.66	0.98	0	7
Lemon, Gargouee (Tangerine)	24.10	22.98	23.54	0	7
Monkey nut (Rambutan, average or from aceh)				0	7
Orange (Orange)	6.80	5.51	6.16	0	14
Palm fruit (African fan palm fruit)	3.52	2.67	3.10	0	7
Pawpaw (Papaya, fruit, ripe)	3.40	2.40	2.90	0	7
Pineapple pulp, Kweekpor pulp (Pineapple, pulp)				0	7
Pineapple, Kweekpor (Pineapple)	9.93	4.67	7.30	0	7
Plum (Mango, bush)				0	7
Queesuck (Cashew fruit)				0	7
Ripe plum (Mango, ripe)				0	7
Sausau, sour sauce (Sour sop)				0	7
Tomato, Ceedoe (Tomato, red, ripe, raw)	14.66	7.33	11.00	0	7
Watermelon (Watermelon, fruit)				0	7
Oils and fats					
Agro oil (Oil, vegetable)	33.29	23.91	28.60	0	14
Coconut oil (Oil, coconut)	12.08	12.08	12.08	0	0
Palm kernel oil (Oil, palm, local)	45.33	25.41	35.37	0	7
Red oil (from fruit) (Oil, palm, red)	21.77	15.84	18.80	0	14
Sugars and confectionary					
Brown sugar (Sugar, brown)	35.39	20.74	28.06	0	7
Plantain chips (Crisp or chip, cassava, dried)	40.94	25.79	33.36	0	7
Sugar cane (Sugar, cane, refined)	30.83	25.84	28.33	0	7
Herbs, spices and condiments					
Dried chilli pepper (Chilli pepper, dried)	216.12	136.54	176.33	0	14
Garlic dust (Garlic, powdered)	500.00	466.67	483.33	0	7
Garlic, fresh (Garlic, raw)	176.42	138.51	157.46	0	7
Ginger dust (Ginger, ground)				0	7
Ginger root (Ginger, root, raw)	32.13	22.39	27.26	0	7
Green pepper (Chilli, green, raw)	48.49	27.77	38.13	0	14
Lime (Lime)	22.65	20.29	21.47	0	7
Onion dust (Onion, powdered)	117.95	66.24	92.10	0	0
Pepper, storage pepper (Pepper, red, hot)	48.23	34.55	41.39	0	14
Salt, iodized (Salt, iodized)	8.75	7.08	7.92	0	14
Salt (Salt)	17.79	17.79	17.79	0	14
Tomato dust (Tomato, powder)	56.42	49.49	52.96	0	7
Tomato paste (Tomato paste, concentrated)	57.74	42.21	49.98	0	7
Vita (Cube, beef, dry)	90.28	68.06	79.17	0	14

Annex 10: LR08 Food availability

The number of available foods in each market surveyed in LR08 Rubber and Charcoal with Food Crops by food group.



Markets -->	Peter's Town	Bodowhea	Leuwin	Boewin	St. John's	Boegeezaye
Herbs, spices and condiments	6	5	7	4	11	10
Sugars and confectionary	2	2	3	0	1	1
Oils and fats	3	2	2	1	2	2
Fruit and fruit products	3	4	7	1	4	3
Vegetables and vegetable products	3	9	12	8	12	6
Milk and milk products	1	1	0	1	3	1
Eggs and egg products	1	0	0	0	1	1
Fish, seafood, amphibians and invertebrates	2	2	4	0	4	2
Meat and offal	4	0	8	0	5	3
Legumes, nuts and seeds	6	4	8	2	11	3
Roots and tubers	3	3	2	0	5	1
Grains and grain-based products	4	3	5	2	7	3

Annex 11: LR08 Annual diet summaries

The edible weight and cost of the foods selected for the average **household of 5** for the whole year for **energy only (EO), nutritious (NUT) and food habits nutritious (FHAB)** diets with the percentage contributed by each food in terms of weight, cost, energy, protein and fat, the percentage contribution of each food for eight vitamins and four minerals and the percentage of the total target met for each nutrient, averaged across the seasons in the **LR08 Rubber & Charcoal with Food Crops livelihood zone**

Table 15: LR08 Energy-only (EO) diet summary

Energy-Only (EO) Food List	Quantity (Kg)	% quantity	Cost (LRD)	% cost	% energy	% protein	% fat	% vit A	% vit C	% vit B1	% vit B2	% niacin	% vit B6	% folic acid	% vit B12	% calcium	% iron	% zinc
Breast milk	194	17.0	**0**	0.0	3.3	5.8	6.6	20.9	20.3	3.3	6.6	6.4	1.1	2.1	100.0	4.7	0.0	2.3
Cassava flour (Cassava, flour)	744	65.2	**32,787**	68.8	64.6	40.0	3.1	0.0	77.7	41.6	79.2	70.3	77.4	45.2	0.0	89.3	56.7	53.3
Coconut oil (Oil, coconut)	96	8.4	**11,637**	24.4	22.5	0.0	83.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
Red oil (from fruit) (Oil, palm, red)	6	0.6	**1,397**	2.9	1.5	0.0	5.6	79.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
White beans (Cowpea, white, dried, raw)	100	8.7	**1,832**	3.8	8.2	54.2	1.3	0.0	2.0	55.2	14.2	23.2	21.5	52.7	0.0	6.0	43.1	44.4
Total	1,140	100	**47,652**	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
% target met					100	58	118	43	48	65	52	53	74	121	5	70	37	88

Table 16: LR08 Micronutrient nutritious (NUT) diet summary

Nutritious (NUT) Food List	Quantity (Kg)	% quantity	Cost (LRD)	% cost	% energy	% protein	% fat	% vit A	% vit C	% vit B1	% vit B2	% niacin	% vit B6	% folic acid	% vit B12	% calcium	% iron	% zinc
Breast milk	194	11.0	**0**	0.0	3.3	2.4	7.7	4.5	2.9	1.4	1.6	2.6	0.5	1.1	4.0	2.1	0.0	1.4
Cassava flour (Cassava, flour)	602	34.1	**27,926**	35.6	52.2	13.3	3.0	0.0	9.0	14.8	15.6	23.2	29.5	18.0	0.0	32.1	15.8	27.5
Cassava leaf, Gbueevah (Leaf, cassava, raw)	582	33.0	**19,766**	25.2	14.6	51.2	5.3	76.4	85.0	51.3	62.7	29.6	50.3	43.8	0.0	62.3	56.2	24.9
Coconut oil (Oil, coconut)	79	4.5	**9,510**	12.1	18.4	0.0	80.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Cow meat, liver, raw (Beef, liver, raw)	8	0.4	**2,035**	2.6	0.3	1.7	0.3	17.5	0.0	0.5	2.8	3.1	2.4	1.4	96.0	0.0	5.9	1.7
Kpakutuweh (Bean, adzuki, mature, raw)	19	1.1	**3,943**	5.0	1.6	4.4	0.1	0.0	0.0	3.1	1.0	1.6	1.9	7.6	0.0	0.5	1.7	6.0
Mushroom (Mushroom, average)	182	10.3	**13,252**	16.9	1.3	4.7	0.9	0.0	2.7	4.5	12.9	30.4	5.3	2.1	0.0	0.4	5.4	10.2
Red oil (from fruit) (Oil, palm, red)	< 1	0.0	**98**	0.1	0.1	0.0	0.6	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
White beans (Cowpea, white, dried, raw)	100	5.6	**1,832**	2.3	8.2	22.3	1.5	0.0	0.3	24.4	3.5	9.5	10.1	26.0	0.0	2.6	14.9	28.3
Total	1,766	100	**78,362**	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
% target met					100	140	100	202	332	148	214	131	157	246	126	157	108	139

Table 17: LR08 Food habits nutritious (FHAB) diet summary

Food Habits Nutritious (FHAB) Food List	Quantity (Kg)	% quantity	Cost (LRD)	% cost	% energy	% protein	% fat	% vit A	% vit C	% vit B1	% vit B2	% niacin	% vit B6	% folic acid	% vit B12	% calcium	% iron	% zinc
Agro oil (Oil, vegetable)	13	0.5	**4,210**	3.1	3.0	0.0	13.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Boiled/roasted corn (Maize, cooked, CotD)	84	3.4	**11,689**	8.7	4.9	6.0	2.3	0.0	1.9	14.2	3.1	13.2	3.0	6.6	0.0	0.2	1.9	5.7
Breadnut, raw or cooked (Breadnut, raw)	90	3.6	**8,163**	6.1	5.0	5.5	0.9	0.3	4.3	1.8	1.3	1.5	9.9	4.9	0.0	3.7	3.2	6.5
Breast milk	194	7.9	**0**	0.0	3.3	2.1	7.7	2.8	1.4	1.5	1.7	3.2	0.5	1.4	5.0	2.3	0.0	1.5
Brown cowpeas (Cowpea, brown, dried, raw)	< 1	0.0	**125**	0.1	0.1	0.2	0.0	0.0	0.0	0.2	0.0	0.1	0.1	0.2	0.0	0.0	0.1	0.2
Cassava leaf, Gbueevah (Leaf, cassava, raw)	601	24.4	**20,393**	15.2	15.1	46.8	5.5	49.2	41.4	55.6	70.5	37.3	49.6	58.3	0.0	70.7	57.1	26.8
Cassava, raw (Cassava, tuber, raw)	555	22.5	**18,633**	13.9	22.0	6.6	1.5	0.2	29.4	8.2	7.1	14.3	13.4	10.9	0.0	10.1	6.7	12.2
Chicken leg (Chicken, leg)	2	0.1	**176**	0.1	0.1	0.2	0.3	0.0	0.0	0.1	0.1	0.4	0.1	0.0	0.1	0.0	0.2	0.1
Coconut, whole (Coconut, mature kernel)	120	4.9	**13,022**	9.7	12.1	4.5	44.9	0.0	0.5	1.8	0.7	2.2	1.7	2.7	0.0	0.9	5.0	6.5
Country rice (Rice, brown, raw)	15	0.6	**1,853**	1.4	1.4	1.2	0.3	0.0	0.0	2.1	0.3	2.9	2.2	0.5	0.0	0.1	0.5	2.0
Cow meat, boneless, raw (Beef, meat, with fat, boneless, raw)	15	0.6	**1,918**	1.4	0.9	2.9	2.7	0.1	0.0	0.3	1.1	3.2	1.3	0.1	4.5	0.1	3.8	3.3
Dried baby fish (Fish, cichlids, dried)	9	0.4	**5,684**	4.2	0.8	5.6	0.9	0.0	0.0	0.3	0.6	6.7	1.0	0.2	29.5	6.7	2.0	3.1
Fufu (Cassava, bread, fermented)	218	8.9	**12,988**	9.7	15.1	4.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grapefruit (Grapefruit)	220	9.0	**3,049**	2.3	1.8	1.4	0.2	2.9	13.4	2.9	1.1	2.1	2.5	1.8	0.0	1.1	0.3	1.0
Kpakutuweh (Bean, adzuki, mature, raw)	7	0.3	**1,329**	1.0	0.6	1.4	0.0	0.0	0.0	1.2	0.4	0.7	0.7	3.6	0.0	0.2	0.6	2.3
Purple sweet potato, cooked (Sweet potato, purple skin, pale yellow flesh, cooked)	127	5.2	**3,749**	2.8	3.5	0.8	0.3	0.1	5.6	2.7	1.8	2.9	5.5	0.7	0.0	1.8	3.2	3.0
Red oil (from fruit) (Oil, palm, red)	18	0.7	**3,489**	2.6	4.2	0.0	18.0	29.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rice, white, raw (Rice, white, raw)	48	2.0	**5,955**	4.4	4.3	3.4	0.3	0.0	0.0	1.2	0.5	2.4	2.6	0.8	0.0	0.2	1.2	3.6
Snail (Snail, sea)	16	0.6	**14,589**	10.8	0.4	1.8	0.4	0.0	0.1	0.5	1.0	2.6	0.2	0.2	60.9	0.1	7.5	20.2
Sweet potato leaf (Leaf, sweet potato, raw)	108	4.4	**3,464**	2.6	1.4	4.9	0.2	15.2	2.1	5.2	8.6	4.2	5.7	7.1	0.0	1.7	6.7	2.0
Total	2,460	100	**134,478**	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
% target met					100	158	101	324	705	141	196	107	165	190	100	143	110	133

Annex 12: Extra nutrient allowance for lactation

The table[4] below outlines the daily RNIs for an average woman (non-pregnant, non-lactating women) and lactating woman, including the recommended increases. Iron is recommended through supplementation.

Nutrient	Non-pregnant, non-lactating	Lactating	Increase
Energy (kcal)	2100	2600	500
Protein (g)	44	64	20
Retinol (µg)	800	1200	400
Vitamin D (µg)	7.5	12.5	5
Vitamin E (mg)	8	11	3
Vitamin C (mg)	60	100	40
Riboflavin (mg)	1.3	1.8	0.5
Nicotinic acid (mg)	14	19	5
Vitamin B_6 (mg)	2	2.5	0.5
Folate (µg)	400	500	100
Thiamin (mg)	1.1	1.6	0.5
Calcium (mg)	800	1200	400
Iron (mg)	18	S	S
Zinc (mg)	15	25	10

[4] NRC (1980). Recommended dietary allowances. 9th revised edition. National Academy of Sciences, National Research Council: Washington, D.C. Viewed the 7th of December 2019 (http://www.fao.org/3/M2998E/M2998E00.htm#noteS1)

Annex 13: FHAB annual diet summaries for a child 12-23 months

Table 18: LR02 FHAB diet summary for a child 12-23 months

The edible weight and cost of the foods selected for the **1 x Child (either sex) 12-23 months** for the whole year for a **food habits nutritious (FHAB) diet** with the percentage contributed by each food in terms of weight, cost, energy, protein and fat, the percentage contribution of each food for eight vitamins and four minerals and the percentage of the total target met for each nutrient, averaged across the seasons in the **LR02 North/Central Rice with Cassava & Market Gardening livelihood zone**

Food List	Quantity (Kg)	% quantity	Cost (LRD)	% cost	% energy	% protein	% fat	% vit A	% vit C	% vit B1	% vit B2	% niacin	% vit B6	% folic acid	% vit B12	% calcium	% iron	% zinc
Benny seeds, dried, raw (Sesame, seeds, whole, dried, raw)	1	0.4	**484**	7.3	2.1	2.1	5.4	0.0	0.0	3.8	0.7	1.9	2.3	0.8	0.0	5.9	3.2	6.3
Boney fish, fresh, raw (Fish, mackerel, raw)	2	0.6	**707**	10.6	0.7	3.3	0.8	0.2	0.0	1.2	0.7	4.3	1.7	0.0	13.1	0.2	1.6	0.6
Breadnut, raw or cooked (Breadnut, raw)	54	16.6	**1,703**	25.5	35.3	29.8	4.9	2.0	41.1	13.7	8.7	10.8	52.3	25.4	0.0	25.8	25.4	40.7
Breast milk	194	59.9	**0**	0.0	38.1	18.9	68.7	27.2	21.6	18.9	19.9	38.4	4.3	11.8	57.3	26.6	0.0	15.6
Catfish, raw (Fish, catfish, channel, wild, raw)	2	0.6	**747**	11.2	0.6	3.2	0.5	0.1	0.0	2.1	0.4	1.8	0.6	0.2	14.3	0.1	0.7	0.7
Coconut (Coconut, mature kernel)	5	1.5	**434**	6.5	5.7	1.6	16.2	0.0	0.3	0.9	0.3	1.1	0.6	0.9	0.0	0.4	2.6	2.7
Fever leaf, raw (Leaf, fever, raw)	23	7.2	**694**	10.4	6.9	16.4	1.9	18.8	25.5	27.2	31.7	17.5	17.0	19.8	0.0	31.7	29.1	10.8
Kpakutuweh (Bean, adzuki, mature, raw)	4	1.4	**1,012**	15.2	4.4	8.1	0.2	0.0	0.0	9.3	2.8	5.3	3.7	19.5	0.0	1.4	4.9	14.8
Sardines, canned in oil (Fish, sardines in oil, canned)	< 1	0.2	**586**	8.8	0.4	1.3	0.7	0.1	0.0	0.2	0.4	1.3	0.2	0.0	15.3	1.1	1.8	0.5
Sweet potato leaf (Leaf, sweet potato, raw)	38	11.6	**304**	4.6	5.8	15.4	0.7	51.7	11.5	22.7	34.3	17.5	17.2	21.5	0.0	6.8	30.6	7.3
Total	324	100	**6,670**	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
% target met					100	218	100	244	328	118	187	100	227	256	100	112	105	100

Table 19: LR04 FHAB diet summary for a child 12-23 months

The edible weight and cost of the foods selected for the **1 x Child (either sex) 12-23 months** for the whole year for a **food habits nutritious (FHAB) diet** with the percentage contributed by each food in terms of weight, cost, energy, protein and fat, the percentage contribution of each food for eight vitamins and four minerals and the percentage of the total target met for each nutrient, averaged across the seasons in the **LR04 Coastal Plain Cassava with Rice & Inland Fishing livelihood zone**

Food List	Quantity (Kg)	% quantity	Cost (LRD)	% cost	% energy	% protein	% fat	% vit A	% vit C	% vit B1	% vit B2	% niacin	% vit B6	% folic acid	% vit B12	% calcium	% iron	% zinc
Boney fish, fresh, raw (Fish, mackerel, raw)	6	1.8	**2,073**	32.7	2.2	9.5	2.2	0.7	0.0	2.8	1.7	11.0	6.1	0.0	42.7	0.5	4.1	1.9
Breadnut, raw or cooked (Breadnut, raw)	16	5.1	**811**	12.8	10.8	8.1	1.2	0.7	9.8	3.0	1.9	2.6	17.3	6.3	0.0	5.4	6.1	12.4
Breast milk	194	59.9	**0**	0.0	38.1	16.8	57.3	29.7	16.9	13.7	14.5	29.8	4.7	9.6	57.3	18.1	0.0	15.6
Cassava leaf, Gbueevah (Leaf, cassava, raw)	79	24.3	**1,012**	16.0	23.1	49.0	5.4	68.8	66.6	66.2	76.8	45.4	61.5	54.0	0.0	72.3	76.9	36.3
Cassava, raw (Cassava, tuber, raw)	9	2.9	**277**	4.4	4.4	0.9	0.2	0.0	6.2	1.3	1.0	2.3	2.2	1.3	0.0	1.3	1.2	2.2
Coconut, whole (Coconut, mature kernel)	12	3.7	**712**	11.2	14.1	3.6	33.4	0.0	0.6	1.6	0.6	2.1	1.6	1.9	0.0	0.7	5.2	6.7
Kpakutuweh (Bean, adzuki, mature, raw)	7	2.3	**1,459**	23.0	7.4	12.1	0.3	0.0	0.0	11.3	3.5	6.9	6.8	26.8	0.0	1.6	6.5	24.9
Total	324	100	**6,343**	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
% target met					100	245	120	224	421	163	257	129	210	314	100	165	133	100

Table 20: LR08 FHAB diet summary for a child 12-23 months

The edible weight and cost of the foods selected for the **1 x Child (either sex) 12-23 months** for the whole year for a **food habits nutritious (FHAB) diet** with the percentage contributed by each food in terms of weight, cost, energy, protein and fat, the percentage contribution of each food for eight vitamins and four minerals and the percentage of the total target met for each nutrient, averaged across the seasons in the **LR08 Rubber & Charcoal with Food Crops livelihood zone**

Food List	Quantity (Kg)	% quantity	Cost (LRD)	% cost	% energy	% protein	% fat	% vit A	% vit C	% vit B1	% vit B2	% niacin	% vit B6	% folic acid	% vit B12	% calcium	% iron	% zinc
Breast milk	194	59.3	**0**	0.0	38.1	20.7	64.0	32.1	16.2	15.6	16.5	31.7	6.2	10.8	57.3	20.7	0.0	15.6
Brown cowpeas (Cowpea, brown, dried, raw)	< 1	0.2	**125**	1.7	0.7	1.5	0.1	0.0	0.0	1.9	0.3	0.8	0.8	1.9	0.0	0.2	1.2	2.0
Cassava leaf, Gbueevah (Leaf, cassava, raw)	64	19.5	**2,174**	30.3	18.7	48.9	4.9	60.4	52.2	61.0	71.0	39.3	65.6	49.5	0.0	67.3	70.8	29.5
Cassava, raw (Cassava, tuber, raw)	50	15.2	**1,670**	23.3	23.0	5.8	1.1	0.2	31.2	7.6	6.0	12.7	15.0	7.8	0.0	8.1	7.0	11.3
Coconut, whole (Coconut, mature kernel)	7	2.2	**729**	10.2	8.6	2.7	22.7	0.0	0.3	1.1	0.4	1.3	1.2	1.3	0.0	0.5	3.6	4.1
Cow meat, boneless, raw (Beef, meat, with fat, boneless, raw)	2	0.7	**285**	4.0	1.6	4.2	3.4	0.1	0.0	0.5	1.5	4.7	2.4	0.1	7.7	0.1	6.5	5.1
Dried baby fish (Fish, cichlids, dried)	< 1	0.1	**129**	1.8	0.2	1.2	0.2	0.0	0.0	0.1	0.1	1.5	0.3	0.0	7.7	1.4	0.5	0.7
Fufu (Cassava, bread, fermented)	1	0.3	**75**	1.0	0.9	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Kpakutuweh (Bean, adzuki, mature, raw)	7	2.1	**1,329**	18.5	6.9	14.1	0.3	0.0	0.0	12.1	3.7	6.9	8.4	28.5	0.0	1.8	7.0	23.5
Red oil (from fruit) (Oil, palm, red)	< 1	0.1	**83**	1.2	1.0	0.0	3.2	7.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Snail (Snail, sea)	< 1	0.2	**573**	8.0	0.2	0.7	0.1	0.0	0.1	0.2	0.4	1.0	0.1	0.1	27.4	0.0	3.4	8.2
Total	327	100	**7,171**	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
% target met					100	199	107	207	437	144	226	121	160	278	100	144	117	100

Annex 14: What if? Modelled Interventions

Table 21: FHAB diet summary for nutrition-specific micronutrient powder intervention

The edible weight and cost of the foods selected for the **1 x Child (either sex) 12-23 months** for the whole year for a **food habits nutritious (FHAB) diet** with the percentage contributed by each food in terms of weight, cost, energy, protein and fat, the percentage contribution of each food for eight vitamins and four minerals and the percentage of the total target met for each nutrient, averaged across the seasons in the **LR02 North/Central Rice with Cassava & Market Gardening livelihood zone** including a micronutrient sprinkles intervention.

Food List		Quantity (Kg)	% quantity	Cost (LRD)	% cost	% energy	% protein	% fat	% vit A	% vit C	% vit B1	% vit B2	% niacin	% vit B6	% folic acid	% vit B12	% calcium	% iron	% zinc
Benny seeds, dried, raw (Sesame, seeds, whole, dried, raw)		2	0.6	904	13.8	3.5	3.5	8.9	0.0	0.0	6.3	1.2	3.1	3.8	1.5	0.0	9.8	4.6	10.4
Breadnut, raw or cooked (Breadnut, raw)		54	16.7	1,703	25.9	35.3	30.7	4.9	2.0	42.3	13.7	9.0	10.8	52.3	28.1	0.0	26.1	21.7	40.7
Breast milk		194	60.1	0	0.0	38.1	19.5	68.7	27.2	22.2	18.9	20.7	38.4	4.4	13.0	57.3	26.9	0.0	15.6
Catfish, raw (Fish, catfish, channel, wild, raw)		4	1.2	1,429	21.7	1.2	6.3	1.0	0.2	0.1	3.9	0.9	3.5	1.1	0.3	27.4	0.3	1.2	1.4
Coconut (Coconut, mature kernel)		4	1.2	312	4.7	4.5	1.3	12.8	0.0	0.2	0.7	0.3	0.9	0.5	0.8	0.0	0.3	1.8	2.2
Country rice (Rice, brown, raw)		3	0.8	285	4.3	2.7	1.9	0.5	0.0	0.0	4.4	0.5	5.8	3.1	0.8	0.0	0.3	0.9	3.5
Fever leaf, raw (Leaf, fever, raw)		20	6.2	548	8.3	5.9	14.4	1.6	16.1	22.4	23.2	28.1	14.9	14.5	18.7	0.0	27.3	21.2	9.2
Kpakutuweh (Bean, adzuki, mature, raw)		2	0.7	486	7.4	2.3	4.3	0.1	0.0	0.0	4.8	1.5	2.7	1.9	11.2	0.0	0.7	2.2	7.7
Micronutrient powder (sprinkles) 1g sachet	**<**	**1**	**0.1**	**0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.3**	**0.3**	**0.0**	**0.0**	**0.0**	**0.0**	**0.5**	**0.0**	**0.0**	**17.6**	**1.2**
Sardines, canned in oil (Fish, sardines in oil, canned)	<	1	0.2	586	8.9	0.4	1.3	0.7	0.1	0.0	0.2	0.4	1.3	0.2	0.0	15.3	1.1	1.6	0.5
Sweet potato leaf (Leaf, sweet potato, raw)		40	12.2	323	4.9	6.1	16.6	0.7	54.2	12.5	23.8	37.4	18.4	18.1	25.0	0.0	7.2	27.4	7.7
Total		323	100	6,577	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
% target met						100	212	100	244	319	118	180	100	227	231	100	111	123	100

The weight (kg), cost (LRD) and nutritional content of food selected by the CoD software for the FHAB diet for a child 12-23 months after micronutrient powder was added to the software at zero (0) cost for livelihood zone LR02 North/Central Rice with Cassava & Market Gardening.

Table 22: FHAB diet summary for nutrition-sensitive gardening intervention

The edible weight and cost of the foods selected for **an average household of 5** for the whole year for a **food habits nutritious (FHAB)** diet with the percentage contributed by each food in terms of weight, cost, energy, protein and fat, the percentage contribution of each food for eight vitamins and four minerals and the percentage of the total target met for each nutrient, averaged across the seasons in the **LR04 Coastal Plain Cassava with Rice & Inland Fishing livelihood zone**

Food List	Quantity (Kg)	% quantity	Cost (LRD)	% cost	% energy	% protein	% fat	% vit A	% vit C	% vit B1	% vit B2	% niacin	% vit B6	% folic acid	% vit B12	% calcium	% iron	% zinc
Agro oil (Oil, vegetable)	2	0.0	**611**	0.9	0.5	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bitter ball, white eggplant (Eggplant, white, raw)	599	13.5	**0**	0.0	4.4	3.2	1.3	0.4	0.6	10.8	2.0	10.9	6.6	3.7	0.0	1.0	2.9	6.1
Boney fish, fresh, raw (Fish, mackerel, raw)	158	3.6	**56,053**	84.0	5.1	20.8	8.5	1.4	0.0	5.0	3.7	20.8	7.7	0.1	95.3	1.3	7.7	4.0
Breadnut, raw or cooked (Breadnut, raw)	293	6.6	**0**	0.0	16.5	11.7	3.1	0.8	8.0	3.6	2.7	3.2	14.4	8.6	0.0	8.2	7.5	17.0
Breast milk	194	4.4	**0**	0.0	3.3	1.4	8.1	2.1	0.8	0.9	1.1	2.1	0.2	0.7	4.7	1.5	0.0	1.2
Cassava leaf, Gbueevah (Leaf, cassava, raw)	765	17.3	**0**	0.0	19.3	38.5	7.4	48.2	29.5	42.9	59.0	31.0	27.9	40.1	0.0	60.0	51.2	27.0
Cassava, raw (Cassava, tuber, raw)	139	3.2	**0**	0.0	5.5	1.1	0.4	0.0	4.1	1.3	1.2	2.3	1.5	1.5	0.0	1.7	1.2	2.4
Coconut, whole (Coconut, mature kernel)	131	3.0	**7,701**	11.5	13.2	3.1	51.7	0.0	0.3	1.2	0.5	1.6	0.8	1.6	0.0	0.6	3.9	5.6
Okra (Okra, raw)	599	13.5	**0**	0.0	5.1	6.8	1.5	3.4	16.5	5.4	8.1	10.4	15.7	23.4	0.0	14.2	5.9	18.4
Orange (Orange)	507	11.5	**0**	0.0	5.9	2.5	1.5	0.8	23.5	4.4	2.8	2.9	4.1	7.5	0.0	4.4	1.0	2.5
Palm fruit (African fan palm fruit)	276	6.2	**0**	0.0	0.9	0.0	0.3	0.0	0.3	0.0	0.0	0.0	0.3	0.1	0.0	0.1	0.0	0.0
Purple sweet potato, raw (Sweet potato, purple skin, pale yellow flesh, raw)	335	7.6	**0**	0.0	9.1	1.4	0.9	0.2	11.7	5.9	3.5	6.7	8.5	1.6	0.0	3.1	5.9	6.9
Red oil (from fruit) (Oil, palm, red)	11	0.3	**2,344**	3.5	2.7	0.0	12.2	14.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweet potato leaf (Leaf, sweet potato, raw)	259	5.9	**0**	0.0	3.4	7.6	0.6	28.0	2.8	7.6	13.6	6.6	6.0	9.2	0.0	2.7	11.4	3.9
Yam, raw (Yam, tuber, raw)	154	3.5	**0**	0.0	5.1	2.0	0.4	0.1	2.0	11.2	1.8	1.6	6.3	1.8	0.0	1.1	1.5	5.0
Total	4,424	100	**66,710**	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
% target met					100	234	100	407	1,203	224	287	160	344	333	100	189	151	172

The weight (kg), cost (LRD) and nutritional content of food selected by the CoD software for the FHAB diet after bitter ball, breadnut, cassava (tuber, raw), cassava leaf, okra, orange, palm fruit, purple sweet potato, sweet potato leaf and yam were set to zero (0) cost for livelihood zone LR04 Coastal Plain Cassava with Rice and Inland Fishing.

Table 23: FHAB diet summary for nutrition-sensitive aquaculture intervention

The edible weight and cost of the foods selected for an **average household of 5** for the whole year for a **food habits nutritious (FHAB) diet** with the percentage contributed by each food in terms of weight, cost, energy, protein and fat, the percentage contribution of each food for eight vitamins and four minerals and the percentage of the total target met for each nutrient, averaged across the seasons in the **LR04 Coastal Plain Cassava with Rice & Inland Fishing livelihood zone**

Food List	Quantity (Kg)	% quantity	Cost (LRD)	% cost	% energy	% protein	% fat	% vit A	% vit C	% vit B1	% vit B2	% niacin	% vit B6	% folic acid	% vit B12	% calcium	% iron	% zinc
Agro oil (Oil, vegetable)	12	0.5	**3,558**	5.4	2.7	0.0	12.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Boney fish, fresh, raw (Fish, mackerel, raw)	< 1	0.0	**307**	0.5	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.5	0.0	0.0	0.0
Breadnut, raw or cooked (Breadnut, raw)	250	9.9	**13,377**	20.4	14.1	10.0	2.6	0.9	11.9	4.2	2.7	3.7	20.1	10.4	0.0	8.1	7.0	18.7
Breast milk	194	7.7	**0**	0.0	3.3	1.4	7.9	2.7	1.3	1.2	1.3	2.8	0.4	1.0	4.1	1.8	0.0	1.5
Cassava leaf, Gbueevah (Leaf, cassava, raw)	875	34.8	**11,258**	17.2	22.1	44.3	8.2	68.5	59.3	66.7	79.0	47.8	52.5	65.4	0.0	79.6	64.1	40.1
Cassava, raw (Cassava, tuber, raw)	467	18.6	**12,490**	19.1	18.6	3.6	1.3	0.2	24.4	5.7	4.6	10.6	8.2	7.1	0.0	6.6	4.4	10.5
Catfish, raw (Fish, catfish, channel, wild, raw)	115	4.6	**0**	0.0	2.8	**12.7**	3.4	0.5	0.1	7.4	1.6	7.4	2.7	0.7	**55.9**	0.5	2.3	3.9
Coconut, whole (Coconut, mature kernel)	137	5.4	**8,091**	12.4	13.9	3.3	52.9	0.0	0.5	1.7	0.6	2.2	1.4	2.3	0.0	0.8	4.4	7.7
Country rice (Rice, brown, raw)	34	1.4	**4,156**	6.4	3.1	1.8	0.8	0.0	0.0	3.9	0.5	5.7	3.5	0.9	0.0	0.2	0.8	4.6
Fufu (Cassava, bread, fermented)	168	6.7	**4,900**	7.5	11.7	2.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gbuka fish, raw (Fish, tilapia, raw)	115	4.6	**0**	0.0	3.0	**14.5**	3.3	0.8	0.0	1.4	1.4	**13.5**	5.5	1.8	**39.6**	0.6	**10.0**	6.3
Kpakutuweh (Bean, adzuki, mature, raw)	7	0.3	**1,318**	2.0	0.6	0.9	0.0	0.0	0.0	0.9	0.3	0.6	0.5	2.6	0.0	0.1	0.4	2.2
Peas, (yellow or green split peas), dried (Peas, split, mature, raw)	8	0.3	**1,037**	1.6	0.7	1.3	0.1	0.0	0.0	1.8	0.3	0.8	0.3	1.4	0.0	0.1	0.5	1.6
Red oil (from fruit) (Oil, palm, red)	6	0.2	**1,273**	1.9	1.5	0.0	6.6	9.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red peanuts, no shell, raw (Groundnut, red, shelled, dried, raw)	< 1	0.0	**154**	0.2	0.1	0.1	0.3	0.0	0.0	0.1	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.1
Rice, white, raw (Rice, white, raw)	4	0.1	**319**	0.5	0.3	0.2	0.0	0.0	0.0	0.1	0.0	0.2	0.1	0.0	0.0	0.0	0.1	0.3
Sweet potato leaf (Leaf, sweet potato, raw)	125	5.0	**3,185**	4.9	1.7	3.7	0.3	16.7	2.4	4.9	7.6	4.3	4.7	6.3	0.0	1.5	6.0	2.4
Total	2,519	100	**65,426**	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
% target met					100	233	102	328	686	165	246	118	209	234	**116**	163	138	133

The weight (kg), cost (LRD) and nutritional content of food selected by the CoD software for the FHAB diet after catfish and gbuka fish (tilapia) were set to zero (0) cost for livelihood zone LR04 Coastal Plain Cassava with Rice and Inland Fishing.

Table 24: FHAB diet summary for nutrition-sensitive snail-rearing intervention

The edible weight and cost of the foods selected for an **average household of 5** for the whole year for a **food habits nutritious (FHAB)** diet with the percentage contributed by each food in terms of weight, cost, energy, protein and fat, the percentage contribution of each food for eight vitamins and four minerals and the percentage of the total target met for each nutrient, averaged across the seasons in the **LR08 Rubber & Charcoal with Food Crops livelihood zone**

Food List	Quantity (Kg)	% quantity	Cost (LRD)	% cost	% energy	% protein	% fat	% vit A	% vit C	% vit B1	% vit B2	% niacin	% vit B6	% folic acid	% vit B12	% calcium	% iron	% zinc
Agro oil (Oil, vegetable)	9	0.4	**2,772**	2.6	2.1	0.0	9.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Boiled/roasted corn (Maize, cooked, CotD)	39	1.7	**5,434**	5.1	2.3	3.0	1.1	0.0	1.0	8.1	1.7	6.3	1.6	4.0	0.0	0.1	0.6	1.1
Breadnut, raw or cooked (Breadnut, raw)	57	2.4	**4,595**	4.3	3.2	3.7	0.6	0.2	3.0	1.4	0.9	1.0	7.2	4.0	0.0	3.0	1.5	1.7
Breast milk	194	8.3	**0**	0.0	3.3	2.2	7.7	2.9	1.5	1.8	2.1	3.3	0.6	1.8	0.9	2.9	0.0	0.6
Cassava leaf, Gbueevah (Leaf, cassava, raw)	494	21.1	**16,755**	15.7	12.4	41.0	4.5	41.7	37.5	55.7	68.8	31.3	46.8	62.4	0.0	74.0	34.6	8.9
Cassava, raw (Cassava, tuber, raw)	555	23.7	**18,633**	17.4	22.0	7.0	1.5	0.2	32.4	10.0	8.4	14.6	15.4	14.3	0.0	12.9	4.9	4.9
Coconut, whole (Coconut, mature kernel)	102	4.3	**10,588**	9.9	10.2	4.0	38.3	0.0	0.4	1.8	0.7	1.9	1.6	2.9	0.0	0.9	3.1	2.2
Country rice (Rice, brown, raw)	14	0.6	**1,697**	1.6	1.3	1.2	0.3	0.0	0.0	2.4	0.3	2.7	2.3	0.6	0.0	0.2	0.3	0.7
Fufu (Cassava, bread, fermented)	130	5.6	**7,460**	7.0	9.0	2.9	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grapefruit (Grapefruit)	254	10.9	**3,555**	3.3	2.1	1.8	0.3	3.5	17.0	4.1	1.5	2.5	3.4	2.7	0.0	1.7	0.3	0.5
Purple sweet potato, cooked (Sweet potato, purple skin, pale yellow flesh, cooked)	125	5.3	**3,578**	3.4	3.4	0.9	0.3	0.1	6.1	3.3	2.1	3.0	6.3	0.9	0.0	2.3	2.3	1.2
Red oil (from fruit) (Oil, palm, red)	30	1.3	**6,127**	5.7	7.0	0.0	30.7	50.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rice, white, raw (Rice, white, raw)	201	8.6	**25,608**	24.0	18.1	15.1	1.2	0.0	0.0	6.3	2.4	10.2	12.7	4.3	0.0	1.3	3.6	6.1
Snail (Snail, sea)	139	5.9	**0**	0.0	3.5	17.2	4.0	0.5	1.1	5.0	11.0	23.3	2.2	2.1	99.1	0.8	48.6	72.1
Total	2,342	100	**106,803**	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
% target met					100	149	100	314	640	116	165	105	143	146	543	112	149	330

The weight (kg), cost (LRD) and nutritional content of food selected by the CoD software for the FHAB diet after snail was set to zero (0) cost for livelihood zone LR08 Rubber and Charcoal with Food Crops.

Annex 15: Liberian food and portion sizes for recipe development

Liberian foods and portion sizes per household member for guidance when developing recipes.

		Portion size per household member				
Food group	**Food**	**Child 12-23 months**	**Child 9-10 years**	**Child 11-12 years**	**Man, 30-59 years**	**Woman 30-59 yrs lactating**
Grains & grain-based products	Corn (boiled/roasted)	74g	156g	183g	172g	144g
	Country rice	68g	144g	169g	207g	173g
	White rice	68g	144g	169g	207g	173g
Roots & tubers	Cassava	68g	144g	169g	207g	173g
	Eddoes (cocoyam)	68g	144g	169g	207g	173g
	Fufu	79g	168g	197g	241g	202g
	Gari	102g	216g	253g	310g	259g
	Yam	91g	192g	225g	275g	230g
	Sweet potato	91g	192g	225g	275g	230g
Legumes, nuts & seeds	Benny (sesame) seeds	11g	24g	28g	34g	29g
	Bitter cola	5.7g	12g	14g	17g	14g
	Kpakutuweh beans	23g	48g	56g	69g	58g
	Peanut paste	5.7g	12g	14g	17g	14g
	Split peas	23g	48g	56g	69g	58g
	Peanuts (no shell)	5.7g	12g	14g	17g	14g
Meat and offal	Chicken meat	17g	36g	42g	52g	43g
	Cow meat	28g	60g	70g	86g	72g
	Pig meat	17g	36g	42g	52g	43g
Fish, seafood, amphibians, and invertebrates	Boney fish	28g	60g	70g	86g	72g
	Catfish	28g	60g	70g	86g	72g
	Crayfish	34g	72g	84g	103g	86g
	Gbuka fish (tilapia)	28g	60g	70g	86g	72g
	Sardines (canned in oil)	28g	60g	70g	86g	72g
	Snail	34g	72g	84g	103g	86g
Milk and milk products	Milk (canned, evaporated)	11g	24g	28g	34g	29g
	Milk (powdered)	15g	31g	37g	45g	37g
Eggs & egg products	Boiled egg	45g	96g	112g	138g	115g
	Raw egg	45g	96g	112g	138g	115g
Vegetables & vegetable products	Bitter ball	74g	156g	183g	45g	37g
	Breadnut	74g	156g	183g	45g	37g
	Eggplant	74g	156g	183g	45g	37g
	Kittily	74g	156g	183g	45g	37g
	Okra	74g	156g	183g	45g	37g
	Plantain	74g	156g	183g	45g	37g
	Pumpkin	114g	240g	281g	344g	388g
	Mushroom	74g	156g	183g	45g	37g
	Careless greens	108g	228g	267g	327g	274g
	Cassava leaf	108g	228g	267g	327g	274g
	Eggplant leaf	108g	228g	267g	327g	274g
	Palava sauce / plahto	108g	228g	267g	327g	274g
	Sweet potato leaf	108g	228g	267g	327g	274g
	Water greens	74g	156g	183g	224g	187g
	Banana	62g	132g	155g	189g	158g
	Coconut	34g	72g	84g	103g	86g
	Grapefruit	62g	132g	155g	189g	158g

Fruits & fruit products	Lemon (tangerine)	62g	132g	155g	189g	158g
	Monkey nut (rambutan)	34g	72g	84g	103g	86g
	Orange	62g	132g	155g	189g	158g
	Palm fruit	34g	72g	84g	103g	86g
	Pawpaw (papaya)	62g	132g	155g	189g	158g
	Pineapple	62g	132g	155g	189g	158g
	Plum (common/ripe) (mango)	62g	132g	155g	189g	158g
	Plum (golden) (green mango)	34g	72g	84g	103g	86g
	Sausau (sour sop)	34g	72g	84g	103g	86g
	Tomato	34g	72g	84g	103g	86g
Oils & fats	Argro oil (vegetable)	11g	24g	28g	34g	29g
	Palm kernel oil	11g	24g	28g	34g	29g
	Red oil (palm)	11g	24g	28g	34g	29g
Herbs, spices & condiments	Chilli pepper, dried	1.10g	2.4g	2.8g	3.4g	2.9g
	Garlic, fresh	1.10g	2.4g	2.8g	3.4g	2.9g
	Green pepper (green chilli)	1.10g	2.4g	2.8g	3.4g	2.9g
	Ginger root	1.10g	2.4g	2.8g	3.4g	2.9g
	Lime	1.10g	2.4g	2.8g	3.4g	2.9g
	Onion dust	1.10g	2.4g	2.8g	3.4g	2.9g
	Storage pepper (red, hot)	1.10g	2.4g	2.8g	3.4g	2.9g
	Salt (iodized)	0.6g	1.2g	1.4g	1.7g	1.4g
	Tomato dust	1.10g	2.4g	2.8g	3.4g	2.9g
	Vita cube	1.10g	2.4g	2.8g	3.4g	2.9g
Breast milk	Breast Milk	532g	-	-	-	-