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Optimizing Local Diets Tool

Instruction Manual

Part of the *Optimizing Diets by Using Local Foods for Improved Nutrition for Women and Children Guide*



October 2023

About USAID Advancing Nutrition

USAID Advancing Nutrition is the Agency's flagship multi-sectoral nutrition project, led by JSI Research & Training Institute, Inc. (JSI), and a diverse group of experienced partners. Launched in September 2018, USAID Advancing Nutrition implements nutrition interventions across sectors and disciplines for USAID and its partners. The project's multi-sectoral approach draws together global nutrition experience to design, implement, and evaluate programs that address the root causes of malnutrition. Committed to using a systems approach, USAID Advancing Nutrition strives to sustain positive outcomes by building local capacity, supporting behavior change, and strengthening the enabling environment to save lives, improve health, build resilience, increase economic productivity, and advance development.

Disclaimer

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Contents

Acknowledgments	iv
Glossary	v
Introduction	1
Steps for Using the Calculator	3
Step 0: Define specific population, nutrient(s) of concern	4
Step 1: Identify which fortified foods or supplements exist in your context.....	5
Step 2: Create a key foods identification (ID) list (up to 31 foods).....	1
OPTION 1: (Step 3A)	7
OPTION 2: Nutrition calculator tool for CU2 and children 2-5 years of age (Steps 3B and Step 4).....	9
Final Remarks.....	13

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Glossary

<p>Enriched flour-based blend (EFB)</p>	<p>For the purposes of this guide, an EFB is primarily composed of locally available cereals that are blended and to which other ingredients/foods are added. This increases the nutritional value of the blend and responds to local food and flavor preferences and availability of the various ingredients that make up the blend. It does not include the use of fortificant pre-mixes.</p>
<p>Food-based recommendation (FBR)</p>	<p>A dietary recommendation to promote consumption of a particular food or food group for members of a specific group. May include the recommended frequency of consumption of the foods or food groups in a 1-day or -week period (Food and Agriculture Organization of the United Nations/World Health Organization 2001).</p>
<p>Food composition table (FCT)</p>	<p>A list of foods that have been chemically analyzed and for which, we have a verifiable understanding of their nutritional content. Not all countries have a recently produced FCT. There may be regional options that can be useful for identifying similar ingredients.</p>
<p>Food safety</p>	<p>Conditions and practices that preserve the quality of food to prevent contamination and food-borne illnesses.</p>
<p>Key foods ID list</p>	<p>For the purposes of this guide, this refers to the surfaced foods (up to 30) that can be used in either the menu of key foods or the nutrition calculator.</p>
<p>Nutrient composition</p>	<p>The unique caloric density, macronutrients (fat, protein, carbohydrates) and micronutrients (vitamins and minerals) of a food.</p>
<p>Nutrients of concern</p>	<p>The top micronutrients that are missing in the specific population, based on primary or secondary data.</p>
<p>Retention factor</p>	<p>Adjusts the level of each vitamin or mineral in an ingredient as a result of the preparation and cooking process undertaken. Each method of cooking, and the time for which the food is cooked, may affect individual nutrients to different extents.</p>

Introduction

The Excel-based Optimizing Local Diets Tool (OLDT) helps you identify locally available, nutrient-dense foods. This tool also accounts for factors that may influence the effectiveness or uptake of identified foods, including cultural acceptability, the availability of fortified foods/multiple micronutrient powders and supplements, food safety, and sustainability considerations. This tool is a part of the *Optimizing Diets by Using Local Foods for Improved Nutrition for Women and Children Guide*, which consists of a set of resources and supports Bureau for Humanitarian Assistance Resilience Food Security Activity (RFSA) implementing partners (IPs) in developing local food-based approaches. It describes two pathways to consider to optimize the use of local foods. Depending on your program context, you could opt to use a household food-based approach for

complementary foods, or a market-driven approach for the production of enriched blended complementary foods. A food-based approach is defined as including food production, dietary diversification and food fortification, which are seen as sustainable strategies for improving nutrition (FAO/CABI 2014). The household food-based approach focuses on identifying local nutrient-rich foods that can be promoted and are produced or purchased by households. A market-driven approach in this context is also a local food-based approach as it relies on local foods produced in the program area to develop enriched blended complementary foods. The OLDT is relevant for both the household pathway and market pathway and these instructions will help you use the OLDT.

The OLDT allows you to develop two things:

Option 1: A prioritized menu of key foods (Tab 3A) based on your context's specific nutrition needs. This list can be used to promote key foods and food groups, based on nutrient needs for any population at the household level. The [Food Environment Assessment Package](#) can also help with this.

Option 2: Nutrient-rich food-based recommendations (FBRs) or enriched flour-based blends (EFBs) formulations for children under two (Tabs 3B–4B) for use by RFSA IPs that work with:



- **households** to support complementary feeding and preparation and consumption of more nutritious meals. In this case, the FBRs can be considered a recipe for food preparation or key nutrient-rich local food options suitable for children under age two.



- **small and medium enterprises** to develop an enriched flour-based blend that can be made commercially available to specific consumers (e.g., sold in single serving size or 1-kilogram package, depending on consumer preferences).

As a part of the overall guide, this OLDT can be used at the beginning of a RFSA award¹ to identify the most suitable key foods menu, FBRs, or EFBs. This tool—

- Is appropriate for use by a variety of stakeholders and applications.

The Optimizing Diets Guide includes 7 components:

1. Overview
2. Optimizing Local Diets Tool (OLDT)
3. Instruction Manual for OLDT
4. Household Pathway Workbook
5. Market Pathway Workbook
6. Business Model Calculator Tool (BMCT)
7. Instruction Manual for BMCT

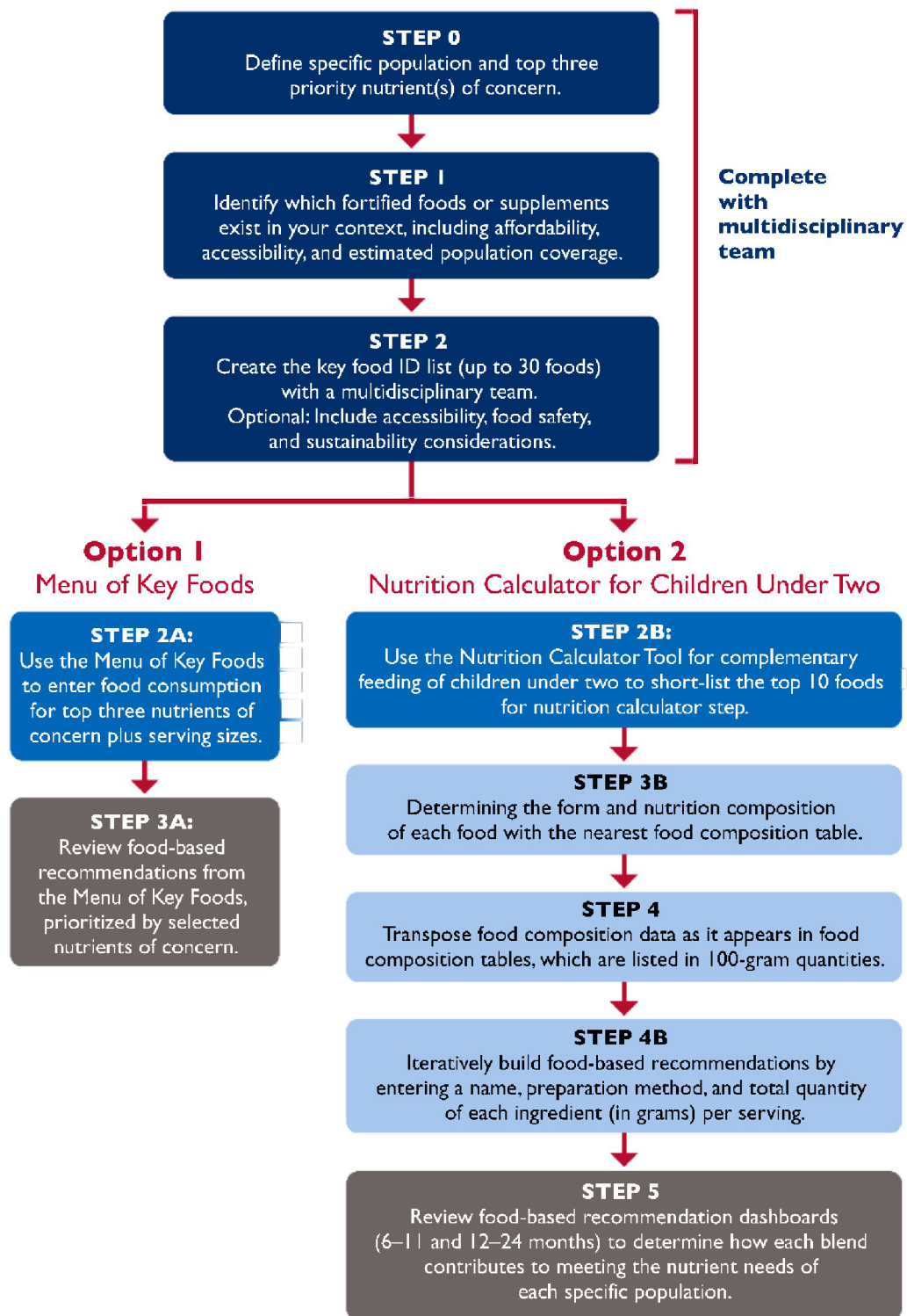
¹This tool can be applied at any stage of a RFSA, but we strongly recommended to do so during the refinement and implementing period as its results will likely require adjustments and iteration to arrive at a set of viable foods to promote or an EFB to produce.

- For example, this tool also includes a sheet for children aged two to five years of age, in the event a program would like to develop FBRs using local foods for the prevention and management of moderate acute malnutrition.
- Relies on data sourced from publicly available food composition tables (FCTs) as close to the geographic context as possible.
- Can consider available fortified ingredients and multiple micronutrient powders and supplements that the specific populations consume regularly.
- Produces outputs that take into account cultural appropriateness, food safety, seasonality, and nutrient density.

Outputs should be designed to consider various factors to ensure the appropriateness of ingredients and fortificants when incorporating local raw materials.

Note that in the case of developing FBRs and EFBs based on local foods, if multiple micronutrient powders are available and can be promoted, these should be promoted alongside local foods and blends to further support optimal diets for children 6-23 months, as nutrient gaps may remain even with the use of a mix of local foods.

Figure I. Using the OLDT to Build Food-Based Recommendations



Steps for Using the Calculator

The following (Steps 0–5) correspond with the Steps 0–5 in the OLDT.

Step 0: Define specific population, nutrient(s) of concern

Objective(s)	<ul style="list-style-type: none"> • Define the specific population (one population at a time). • Specify key nutrients of concern for the specific population. <ul style="list-style-type: none"> — Protein is always included. Select up to three top missing essential micronutrients from the drop-down list.
Information needed	<ul style="list-style-type: none"> • Specific population age range (0.1). <ul style="list-style-type: none"> — Menu of key foods (Option 1) <ul style="list-style-type: none"> ▪ Any population — Nutrition calculator (Option 2) <ul style="list-style-type: none"> ▪ Children under two only • Based on secondary data, determine the top three nutrients of concern among the following nutrients (protein is always included). <ul style="list-style-type: none"> — Leading micronutrients of concern include iron, folate, vitamins A and B12, niacin, calcium and zinc.
Resources	<ul style="list-style-type: none"> • Nutrients of concern in your local context may be available using the following resources (secondary data): <ul style="list-style-type: none"> — Food Systems Dashboard — StatCompiler, and reports of nationally representative surveys such as the Multiple Indicator Cluster Surveys (MICS), Demographic Health Surveys (DHS), micronutrient surveys, SMART surveys, and national nutrition monitoring data such as the DHIS2, (other sources can include the World Health Organization, UNICEF, and the World Bank’s country data dashboards) — FAO/WHO Global Individual Food Consumption Data Tool

To optimize consumption of a healthy diet, first define the specific population(s), identify their unique nutritional needs.

As a multidisciplinary team, answer the following questions:

- Who is the intended population(s) for this list of key foods? (Row 5; Tab 1).
 - List of key foods (Option 1): can be used with any population.
 - Nutrition calculator (Option 2): can only be used with children under 2.
- What are the unique micronutrient needs in your project’s implementation area and for your specific population(s)? (see secondary data resources above) (Row 8; Tab 1)

Example Screenshot

Identification of Fortified Foods / Supplements

Step 0: Define specific population(s) and nutrient(s) of concern for Option 1 or Option 2

		Menu of Key Foods (Option 1)							
						Management of MAM			
						IYCF Nutrition Calc (Option 2)			
		Adult - Men	Adult - Women	Adult - PLW	Teens (14-18 years)	Children (5-8 years)	Children (2-5 years)	Children (6-24 months)	Other (insert below)
0.1	Place a checkmark below the target population(s) for this FBD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0.2	In addition to protein, and in order of priority of nutrients of concern, please select the top 1-3 nutrients of concern	Protein &	Select #1 Micronutrient of Concern	Select #2 Micronutrient of Concern	Select #3 Micronutrient of Concern				
		Protein (g)	Folate (mcg)	Calcium (mg)	Iron (mg)				

Step 1: Identify which fortified foods or supplements exist in your context

Objective(s)	<ul style="list-style-type: none"> As a multidisciplinary team, identify and document available context-specific fortified foods and/or multiple micronutrient powders and/or supplements. Document the types, accessibility, and population coverage (e.g., the geographic and/or demographic reach of the fortified food or supplement) of context-specific fortified foods and/or supplements (up to 7). <ul style="list-style-type: none"> Current population coverage of fortified foods/supplements, according to project objectives (e.g., coverage for vulnerable groups of children).
Information needed	<ul style="list-style-type: none"> Identify regionally available and context-specific fortified foods and/or supplements that are available (up to 7). <ul style="list-style-type: none"> Example analysis for Mozambique. The form (e.g., powdered) of each fortified food and/or supplements. Nutrition composition of the fortified foods and/or supplements. Acceptability. Government policies and operational support for supplement/food Population coverage (select high, medium, or low) <ul style="list-style-type: none"> Add secondary data source of population coverage (Tab1; NI6)
Required Actions	<ul style="list-style-type: none"> Document these fortified foods and/or supplements, including their accessibility, coverage, and sustainability (Rows 13-33).
Resources	<ul style="list-style-type: none"> Global Fortification Data Exchange Database

Example Screenshot

														*Note: What proportion of the population has access to this fortified food? This can be a subjective assessment based on secondary data.
Step 1: Identify which fortified foods or supplements exist in your context														
#	Food Name / Brand Name	Target population	Type of fortified food / supplement	Form	Accessibility	Quarters of the Year				Sustainability Considerations		Coverage of fortified food or supplement		Additional Comments/Observations for Selecting Key Foods
						Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Desirability	Government supported / promoted?	Population Coverage ^a	Data source for coverage	
1	Multiple micronutrient powder	Adult - Women	Fortified flour	powdered	Availability	Low	Medium	Medium	Low	Yes	Yes	Medium	Analysis for Mozambique	Availability is low, and it is not affordable for this context.
					Affordability	Low	Low	Low	Low					
					Origin	Imported	Imported	Imported	Imported					
2	[insert fortified food/supplement name]		Fortified flour	powdered	Availability	High	High	High	High	Yes	Yes	Medium		
					Affordability	Low	Medium	Medium	High					
					Origin	Domestic	Domestic	Domestic	Domestic					
3	[insert fortified food/supplement name]				Availability									
					Affordability									
					Origin									

Step 2: Create a key foods identification (ID) list (up to 31 foods)

<p>Objective(s)</p>	<ul style="list-style-type: none"> • Create a key foods ID list (up to 31 of diverse, nutritious foods for use in your nutrition programming. • Determine which option (1 or 2) your team requires to achieve your goals: <ul style="list-style-type: none"> — 3A: Option 1: Menu of key foods <ul style="list-style-type: none"> ▪ Up to 31 foods can be used — 3B: Option 2: Nutrition Calculator (FBRs/blends) <ul style="list-style-type: none"> ▪ Up to 10 foods can be shortlisted
<p>Information needed</p>	<ul style="list-style-type: none"> • Build and refine a list of key foods, based on your local context, with the support of a multidisciplinary team. You will use the following criteria for each food and specify: <ul style="list-style-type: none"> — Variety of species and/or local name (what is the local name for the food selected or the variety/species selected?). This will help identify the most suitable data to use within your local FCTs, as well as provide context to potential variability among different varieties of foods. — Form of the food used (Which form will be used? (e.g., fresh/raw, baked, smoked, flour)). — Food group (identified by the MDD-W 2021 Guide). — Origin – what is the origin of the food, is it local, regionally sourced from within the country, or imported from another country? There is a preference for local foods for affordability and sustainability reasons. — Seasonality (when are these foods most and least available throughout the year?). — Sustainability considerations (consider cultural appropriateness, climate resilience, ease of production/processing, low agricultural input requirement, women’s workload, and food safety) — If choosing Option 1, complete Columns AB6–AF95. If only using Option 1, stop here. — If Option 2, select the top 10 foods for use in the nutrition calculator (Column AG).
<p>Resources</p>	<ul style="list-style-type: none"> • Food Group Classification: UN FAO MDD-W 2021 Guide • INFOODS (FAO) List of Food Composition Tables

Key Foods ID List – Instructions

Your multidisciplinary team should create a key foods ID list (Tab 2) of up to 31 foods that will be used in Option 1 or 2. Foods should be added under their appropriate food group. This step facilitates the process by requiring users to consider seasonal availability, market assessments (accessibility, availability, and affordability), and sustainability considerations by food group. Data required to populate the key

foods ID list (e.g., seasonality, sustainability considerations) can be retrieved through secondary data sources and/or primary data collection (including community-based focus group discussions, food environment assessments, market assessments, etc.). The [Food Environment Assessment Tool](#) can also be useful for this step.

Consider adding foods from each of the diverse food groups. When developing this list, you will be asked to identify the species, variety, and local name to ensure you clearly identify the food name (for reference in food composition tables), the food group it relates to, and in what form it is used (e.g., boiled, flour, paste).

The next step is to determine which FBR you want as an output (Option 1 or 2):

Example Screenshot

Key Food Identification List

Step 2: Create a diverse key food list, across food groups, with your multidisciplinary team.

Are you seeking to create a menu of key foods (simplified process), or create a food based recommendation with the nutrition calculator?	Menu of Key Foods (Option 1) <input checked="" type="checkbox"/>	Nutrition Calculator (Option 2) <input type="checkbox"/>
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- **Option 1 (up to 31 foods):** Develop a prioritized **list of key foods (Step 3A)** based on the specific population’s micronutrient needs. This option can be used for promoting key foods and food groups at the household level.
 - a. Select the checkbox in cell **I3**.
 - b. With your multidisciplinary team, list up to 31 foods, organized by food groups.
 - c. Complete the considerations for each listed food (table 1), including seasonality and sustainability considerations (optional).
 - d. Next, identify and enter the nutrition composition of your selected three nutrients of concern and protein (**Columns Y–AB**) using FCTs, which are listed per 100g quantities. Nutrition composition for common foods may be found in the ‘FCT common foods’ tab. Transpose the nutrient composition from the FCT common foods and/or FCTs based on 100g quantities. From there, the tool will calculate the average nutrients per serving of food, based on estimated portion sizes by food group.
 - e. Lastly, review **the menu of key foods** (instructions below).
- **Option 2 (up to 10 shortlisted foods):** Develop **FBRs** or **EFBs formulations for children under two (CU2)** for use by RFSA IPs. Up to 10 foods can be shortlisted for the development of FBRs or EFBs (excluding sugar and salt). This smaller number of foods is to ensure recommendations and blends are not unattainable, containing too many ingredients. This tool can be used for two groups of children, 6–11 and 12–23 mos. There are two versions of Option 2 (separate tabs) for each age range of CU2.
 - a. **Option 2 is the nutrition calculator tool** used for building FBRs or EFBs, select the checkbox in cell M3.

- Of the 31 foods in the combined list, short list the top 10 for use in the nutrition calculator (Column AD). These foods will auto populate into tab 3B, where you can add detailed nutrition composition data.
 - Follow the instructions below (Option 2).
 - **Important:** The foods you select for the composition of the FBR should have at least 1 if not more per food group, depending on the population.
- Populate the key foods ID list by providing the food name, variety/local name, food group (with a specification for minimum daily diet for women), and select form of food from the drop-down list (e.g., dried, fresh/raw, smoked, powder, paste). See instructions for populating the key foods ID list in table 1.

Table 1. Food Availability, Affordability, and Accessibility (Optional)

<p>Seasonal Availability</p> <p>Specify the quarters in which the food is available using the following drop-down options</p>
<p>Specify the quarter in which the food is available with: High = “H” (max availability during the quarter) Medium = “M” (moderate availability) Low = “L” (minimal availability) NA = "N" (not available)</p>
<p>Price per unit or level of effort. Indicate the unit (quantity to be specified) and price (monetary value) based on the previous year. This will allow the team to eventually estimate the cost of each food and review affordability considerations. Select low, medium, or high to reflect the unit price.</p>
<p>Example: One 50 kg bag of maize was \$50 (H) in May, June, July; the same quantity is \$40 (M) during the other months of the year.</p>
<p>If the collection of unit price data is not possible, consider providing an indication of the level of effort it takes to produce or gather a certain food. Indicate low, medium, or high level of effort.</p>
<p>Example: Baobab fruit is collected by the mother of the household. It may take her half-a-day to collect enough fruit for the week (high level of effort). Other wild fruits are available in greater abundance and only require half-an-hour to collect a week’s worth of fruit (low level of effort)</p>
<p>Origin. Indicate the origin of the food using the options in the drop-down menu.</p>
<p>Locally sourced (LS) = within the community or district (e.g., immediate locality). Domestically sourced (DS) = within the country, but from another region/agro-ecological zone. Imported (I) = from a neighboring country or another continent. Mixed (M) = sometimes available locally/domestically, sometimes imported.</p>

Sustainability considerations (optional)

Sustainability considerations help users understand the broader implications of selecting certain foods. This information is optional, but can help provide a more holistic picture of the foods and associated intervention. With a multidisciplinary team, determine the sustainability factors for each food by examining the following economic, social, and environmental considerations. Indicate whether each consideration provides a potential limitation by selecting high, medium, or low.

Desirability/cultural appropriateness. Example: if the food is highly desired by the intended consumer, and culturally appropriate, select **high**.

Climate resilience. Example: if the food is drought resilient or heat tolerant, select **high**.

Ease of production/processing. Example: if the food is easy [not time-consuming] to produce or gather in the local environment (fields or home gardens), select **high**.

Low agricultural input requirements. Example: if the food requires [costly] pesticides or fertilizer to grow, select **low**.

Women's workload. Example: if the food requires extra time for women [cleaning, transformation, processing, or preparation] select **high**.

Food safety. Example: if the food has high risk of aflatoxins [food safety concern], select **high**. Food safety in the context of preparing foods at the household post-harvest processing (e.g., aflatoxins), household food preparation (household level), and complementary blends.

Example Screenshot

Key Food Identification List					
Step 2: Create a diverse key food list, across food groups, with your multidisciplinary team.					
Are you seeking to create a menu of key foods (simplified process), or create a food based recommendation with the nutrition calculator?					
#	Food Name	Variety/Local Name	Food Group	Form of Food	Origin of Food
1. Grains, white roots, tubers, plantains (MDD-W)					
1	Millet	Common	<i>1. Grains, white roots, tubers, plantains (MDD-W)</i>	flour	Availability
					Price or LOE
					Origin
2	Taro	white	<i>1. Grains, white roots, tubers, plantains (MDD-W)</i>	dried	Availability
					Price or LOE
					Origin
3	Potatoes	white	<i>1. Grains, white roots, tubers, plantains (MDD-W)</i>	dried	Availability
					Price or LOE
					Origin
4	Sorghum	white	<i>1. Grains, white roots, tubers, plantains (MDD-W)</i>	dried	Availability
					Price or LOE
					Origin
2. Pulses (beans, peas, lentils) MDD-W					
5	Cowpeas	common	<i>2. Pulses (beans, peas, lentils) MDD-W</i>	flour	Availability
					Price or LOE
					Origin
6	Roundnuts	common	<i>2. Pulses (beans, peas, lentils) MDD-W</i>	dried	Availability
					Price or LOE
					Origin
7	Lentils	<i>[insert variety and/or the local]</i>	<i>2. Pulses (beans, peas, lentils) MDD-W</i>	dried	Availability
					Price or LOE

Example Screenshot

Menu of Key Foods (Option 1) <input type="checkbox"/>				Nutrition Calculator (Option 2) <input checked="" type="checkbox"/>				*Foods that meet the diverse tastes and needs of the population, based on their taste preferences and cultural identity.				*Foods that are adaptable to the changing climatic conditions (e.g. drought) within the specific context.				*Ease of turning raw food into ready to use ingredients.				*Requires few agricultural inputs, such as fertilizers, water, pesticides, etc.				*The impact that producing more of this food would have on the increased workload of women.				*Food safety in the context of preparing foods at the household post-harvest processing (e.g. aflatoxins), household food preparation (household level), and complementary blends.				NUTR CALC SELECTIONS (3B)			
Months of the Year				Sustainability Considerations *(descriptions in row 2)										Shortlist top 10 foods for Nutrition Calculator Only (Step 3B)		Additional Comments/Observation for Selecting Key Foods																			
Jan-Mar	Apr-Jun	Jul-Sept	Oct-Dec	Desirability/cultural appropriateness	Climate resilience	Ease of production/processing	Low Agriculture Input Requirement	Women's workload	Food Safety																										
Low	High	High	Low	High	High	High	High	High	Medium	No																									
Local	Local	Local	Local	High	Medium	High	Medium	High	High	No																									
Low	Low	High	NA	Medium	Medium	High	Medium	High	High	No																									
Local	Local	Local	Local	High	High	High	High	High	High	No																									
Low	Low	High	NA	Low	High	High	High	Low	Low	No																									
Local	Local	Local	Local	Low	High	High	High	Medium	Medium	No																									
Low	Low	Low	Low																																
Local	Local	Local	Local																																
Low	High	Medium	Low																																
Local	Local	Local	Local																																
Low	Medium	High	Medium																																
Local	Local	Local	Local																																

OPTION I: Menu of Key Foods (Step 3A)

Review menu of key foods

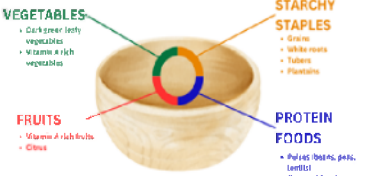
Objective(s)	<ul style="list-style-type: none">Review the priority foods, by food group, to promote in your local context based on the nutrient composition of each food. The outputs on the list of key foods will be organized by your top three nutrients of concern.
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- This is the final step if you are choosing **Option I (Step 3A)**. On this tab, you will see all listed foods, ranked by the key nutrients of concern per serving size of each food item. Below each food group, you will see the recommended serving size for CU2, children under 5, and adults.
- As a multidisciplinary team, review the list of key foods, which will display those most suitable to promote in your context. You can print this tab as a PDF and share with agriculture and market development specialists, nutrition professionals, and/or programmers to guide their decisions. For example, if vitamin A is the top nutrient of concern, use the list of key foods and select those at the top for each food group.
- This list of key foods (Tab 3A) can be used as an infographic to share with households and programs aiming to increase the consumption of diverse, nutrient-dense foods that are good sources of key essential nutrients.

Example Screenshot

Menu of Key Foods (Option 1)

Step 3A: Review the Menu of Key foods, which is organized by your top three nutrients of concern, by serving size.

Top 3 Nutrients of Concern		Folate (mcg), Calcium (mg), Iron (mg)																																																																																																																																																																																																																																																																																				
<table border="1"> <thead> <tr> <th colspan="5">Vegetables</th> </tr> <tr> <th colspan="5">Nutrients per serve</th> </tr> <tr> <th></th> <th>Protein (g)</th> <th>Folate (mcg)</th> <th>Calcium (mg)</th> <th>Iron (mg)</th> </tr> </thead> <tbody> <tr> <td>Sweet potatoes</td> <td>1</td> <td>2</td> <td>300</td> <td>95</td> </tr> <tr> <td>Tomatoes</td> <td>3</td> <td>1</td> <td>16</td> <td>4</td> </tr> <tr> <td>Butternut squash</td> <td>1</td> <td>0</td> <td>51</td> <td>9</td> </tr> <tr> <td>Potatoes</td> <td>1</td> <td>0</td> <td>48</td> <td>8</td> </tr> <tr> <td>Average serving size per meal in grams (g)</td> <td>CU2</td> <td>CU5</td> <td>Adults</td> <td>PLW</td> </tr> <tr> <td></td> <td>40</td> <td>55</td> <td>75</td> <td>100</td> </tr> </tbody> </table>		Vegetables					Nutrients per serve						Protein (g)	Folate (mcg)	Calcium (mg)	Iron (mg)	Sweet potatoes	1	2	300	95	Tomatoes	3	1	16	4	Butternut squash	1	0	51	9	Potatoes	1	0	48	8	Average serving size per meal in grams (g)	CU2	CU5	Adults	PLW		40	55	75	100	<table border="1"> <thead> <tr> <th colspan="5">Dark Green Leafy Vegetables</th> </tr> <tr> <th colspan="5">Nutrients per serve</th> </tr> <tr> <th></th> <th>Protein (g)</th> <th>Folate (mcg)</th> <th>Calcium (mg)</th> <th>Iron (mg)</th> </tr> </thead> <tbody> <tr> <td>Moringa leaves</td> <td>10</td> <td>7</td> <td>43</td> <td>43</td> </tr> <tr> <td>Chard</td> <td>1</td> <td>2</td> <td>360</td> <td>90</td> </tr> <tr> <td>Pumpkin Leaves</td> <td>0</td> <td>2</td> <td>13</td> <td>20</td> </tr> <tr> <td>Spinach</td> <td>0</td> <td>1</td> <td>120</td> <td>38</td> </tr> <tr> <td>Average serving size per meal in grams (g)</td> <td>CU2</td> <td>CU5</td> <td>Adults</td> <td>PLW</td> </tr> <tr> <td></td> <td>10</td> <td>15</td> <td>30</td> <td>50</td> </tr> </tbody> </table>		Dark Green Leafy Vegetables					Nutrients per serve						Protein (g)	Folate (mcg)	Calcium (mg)	Iron (mg)	Moringa leaves	10	7	43	43	Chard	1	2	360	90	Pumpkin Leaves	0	2	13	20	Spinach	0	1	120	38	Average serving size per meal in grams (g)	CU2	CU5	Adults	PLW		10	15	30	50	<p>Choose 3-4 food groups (e.g. vegetables, fruits, starchy staples, protein foods) per meal to improve nutrient adequacy. We suggest integrating these diverse food groups into meals regularly throughout the week (e.g. 2-4 times per week).</p>  <p>VEGETABLES</p> <ul style="list-style-type: none"> Dark green leafy vegetables Vitamin A rich vegetables <p>STARCHY STAPLES</p> <ul style="list-style-type: none"> Grains White roots Tubers Plantains <p>FRUITS</p> <ul style="list-style-type: none"> Vitamin A rich fruits Citrus <p>PROTEIN FOODS</p> <ul style="list-style-type: none"> Pulses (beans, peas, lentils) Meats and Seeds Animal sourced foods including meat/fish, dairy, eggs 		<table border="1"> <thead> <tr> <th colspan="5">Grains, white roots, tubers, plantains</th> </tr> <tr> <th colspan="5">Nutrients per serve</th> </tr> <tr> <th></th> <th>Protein (g)</th> <th>Folate (mcg)</th> <th>Calcium (mg)</th> <th>Iron (mg)</th> </tr> </thead> <tbody> <tr> <td>Millet</td> <td>10</td> <td>6</td> <td>2</td> <td>398</td> </tr> <tr> <td>Taro</td> <td>2</td> <td>3</td> <td>600</td> <td>189</td> </tr> <tr> <td>Potatoes</td> <td>2</td> <td>3</td> <td>600</td> <td>189</td> </tr> <tr> <td>Sorghum</td> <td>2</td> <td>3</td> <td>600</td> <td>189</td> </tr> <tr> <td>Average serving size per meal in grams (g)</td> <td>CU2</td> <td>CU5</td> <td>Adults</td> <td>PLW</td> </tr> <tr> <td></td> <td>60</td> <td>80</td> <td>150</td> <td>175</td> </tr> </tbody> </table>		Grains, white roots, tubers, plantains					Nutrients per serve						Protein (g)	Folate (mcg)	Calcium (mg)	Iron (mg)	Millet	10	6	2	398	Taro	2	3	600	189	Potatoes	2	3	600	189	Sorghum	2	3	600	189	Average serving size per meal in grams (g)	CU2	CU5	Adults	PLW		60	80	150	175	<table border="1"> <thead> <tr> <th colspan="5">Pulses (beans, peas, lentils)</th> </tr> <tr> <th colspan="5">Nutrients per serve</th> </tr> <tr> <th></th> <th>Protein (g)</th> <th>Folate (mcg)</th> <th>Calcium (mg)</th> <th>Iron (mg)</th> </tr> </thead> <tbody> <tr> <td>Lentils</td> <td>25</td> <td>25</td> <td>25</td> <td>25</td> </tr> <tr> <td>Beans</td> <td>25</td> <td>25</td> <td>25</td> <td>25</td> </tr> <tr> <td>Cowpeas</td> <td>28</td> <td>8</td> <td>8</td> <td>113</td> </tr> <tr> <td>Broadbeans</td> <td>22.6</td> <td>4.1</td> <td>0.0</td> <td>48.8</td> </tr> <tr> <td>Average serving size per meal in grams (g)</td> <td>CU2</td> <td>CU5</td> <td>Adults</td> <td>PLW</td> </tr> <tr> <td></td> <td>40</td> <td>70</td> <td>125</td> <td>150</td> </tr> </tbody> </table>		Pulses (beans, peas, lentils)					Nutrients per serve						Protein (g)	Folate (mcg)	Calcium (mg)	Iron (mg)	Lentils	25	25	25	25	Beans	25	25	25	25	Cowpeas	28	8	8	113	Broadbeans	22.6	4.1	0.0	48.8	Average serving size per meal in grams (g)	CU2	CU5	Adults	PLW		40	70	125	150	<table border="1"> <thead> <tr> <th colspan="5">Nuts and Seeds</th> </tr> <tr> <th colspan="5">Nutrients per serve</th> </tr> <tr> <th></th> <th>Protein (g)</th> <th>Folate (mcg)</th> <th>Calcium (mg)</th> <th>Iron (mg)</th> </tr> </thead> <tbody> <tr> <td>Almonds</td> <td>10.0</td> <td>2.0</td> <td>400</td> <td>126</td> </tr> <tr> <td>Cashews</td> <td>10.0</td> <td>1.0</td> <td>260</td> <td>80</td> </tr> <tr> <td>Sesame seeds</td> <td>8.0</td> <td>0.5</td> <td>100</td> <td>40</td> </tr> <tr> <td>Average serving size per meal in grams (g)</td> <td>CU2</td> <td>CU5</td> <td>Adults</td> <td>PLW</td> </tr> <tr> <td></td> <td>10</td> <td>15</td> <td>30</td> <td>40</td> </tr> </tbody> </table>		Nuts and Seeds					Nutrients per serve						Protein (g)	Folate (mcg)	Calcium (mg)	Iron (mg)	Almonds	10.0	2.0	400	126	Cashews	10.0	1.0	260	80	Sesame seeds	8.0	0.5	100	40	Average serving size per meal in grams (g)	CU2	CU5	Adults	PLW		10	15	30	40	<table border="1"> <thead> <tr> <th colspan="5">Animal Sourced Foods</th> </tr> <tr> <th colspan="5">Nutrients per serve</th> </tr> <tr> <th></th> <th>Protein (g)</th> <th>Folate (mcg)</th> <th>Calcium (mg)</th> <th>Iron (mg)</th> </tr> </thead> <tbody> <tr> <td colspan="5">Meat and Seafood</td> </tr> <tr> <td>Mopane worms</td> <td>149</td> <td>203</td> <td>0</td> <td>729</td> </tr> <tr> <td>Goat</td> <td>41</td> <td>56</td> <td>0</td> <td>203</td> </tr> <tr> <td>Chicken</td> <td>14</td> <td>2</td> <td>56</td> <td>10</td> </tr> <tr> <td>Average serving size per meal in grams (g)</td> <td>CU2</td> <td>CU5</td> <td>Adults</td> <td>PLW</td> </tr> <tr> <td></td> <td>30</td> <td>45</td> <td>75</td> <td>100</td> </tr> </tbody> </table>		Animal Sourced Foods					Nutrients per serve						Protein (g)	Folate (mcg)	Calcium (mg)	Iron (mg)	Meat and Seafood					Mopane worms	149	203	0	729	Goat	41	56	0	203	Chicken	14	2	56	10	Average serving size per meal in grams (g)	CU2	CU5	Adults	PLW		30	45	75	100
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Powdered condensed milk	1	0	14	36																																																																																																																																																																																																																																																																																		
Average serving size per meal in grams (g)	CU2	CU5	Adults	PLW																																																																																																																																																																																																																																																																																		
	80	120	250	250																																																																																																																																																																																																																																																																																		
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	Protein (g)	Folate (mcg)	Calcium (mg)	Iron (mg)																																																																																																																																																																																																																																																																																		
Yogurt	21.4	4.3	127.5	22.1																																																																																																																																																																																																																																																																																		
Average serving size per meal in grams (g)	CU2	CU5	Adults	PLW																																																																																																																																																																																																																																																																																		
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Eggs	11.0	3.4	3.0	45.0																																																																																																																																																																																																																																																																																		
Average serving size per meal in grams (g)	CU2	CU5	Adults	PLW																																																																																																																																																																																																																																																																																		
	25	50	50	70																																																																																																																																																																																																																																																																																		

OPTION 2: Nutrition calculator tool for CU2 and children 2–5 years of age (Steps 3B and Step 4)

Steps 3B: Identifying and entering the nutrient composition data for shortlisted foods

<p>Objective(s)</p>	<p>Step 3B:</p> <ul style="list-style-type: none"> • Determine approximate serving size for one meal (in grams) for specific population. Recommendation ranges are provided for each of the following populations: <ul style="list-style-type: none"> — 6-11 months — 12-24 months — 2-5 years of age [MAM] • Completed detailed information on shortlisted foods. • Transpose nutrition composition data exactly as it appears on your nearest FCT. <ul style="list-style-type: none"> — <i>Note: many common foods have been added to the “FCT common foods” tab. Check here first to see if your shortlisted foods are available.</i>
<p>Information needed</p>	<p>Step 3B: For the shortlisted foods, add the following information:</p> <ul style="list-style-type: none"> — Local and scientific names, nutrition composition source (e.g., FCTs), and a hyperlink to the source. — All foods must be entered in their correct form (e.g., fresh, dried). • Transpose the nutritional composition data from nearest FCTs: <ul style="list-style-type: none"> — Enter the nutrition composition for all nutrients, exactly as it appears in the selected FCTs, which are in 100-gram quantities. — Include any optional fortified foods or supplements identified in Step 1 (e.g., vitamin mixes or supplements) in Column O. This should be entered as one serving.
<p>Resources</p>	<ul style="list-style-type: none"> • INFOODS (FAO) - FCTs <ul style="list-style-type: none"> — Examples: <ul style="list-style-type: none"> ▪ FAO/INFOODS Food Composition Table for Western Africa (2019) ▪ USDA Food Central Database (2021) ▪ Kenya FCT (2018) ▪ Australia Searchable FCT (2021) ▪ ASEAN Food Composition Database (2014) ▪ LATINFOODS (compilation)

- **Step 3B:** Completed detailed information on shortlisted foods. The maximum number of foods is 10, but ideally FBRs will contain 5–7, excluding sugar and salt. Limiting the number of ingredients to 10 aims to encourage accessibility and year-round availability of FBRs for households and/or food processors. The following steps should be completed for children 6–11 months [Tabs 3B–4B) Nutrition Calculator (6–11 mos)]. All added information will be automatically copied to the tab

for children 12–23 months, and children 2-5 years old, except for the estimated serving sizes and quantity of each ingredient, which will need to be adjusted for the older children. The adjustments can be made in Tab 3B–4B Nutrition Calculator (12–24mos).

- Determine approximate serving size for one meal (in grams) for each specific population. Enter this number in grams in **Cell C4**. Recommended daily ranges (in grams) are provided for CU2 next to **Cell C4**.
- Add the local name, if different than the common name, in **Column C**.
- Add the scientific name for each ingredient in **Column D**. This can be found via a simple Google search.
- In **Column E**, indicate the form each ingredient is in before adding to recipe/formulation (fresh/raw, dried, flour, paste, baked, roasted, smoked, boiled/cooked, or powdered).
- Select the food group in **Column F**.
- Write the FCT name for each food in **Column H**.
 - Identify the most suitable (e.g., most recent and closest in proximity) FCTs to your targeted geographic area, which also contain the food in the calculator (Columns G–H).
- Add the hyperlink to the FCT source in **Column I**.
- Supplements and pre-mixes will be added during Step 4 (Column O).
- Add food composition data for each shortlisted food (Row 17). This step should be double-checked by a colleague to ensure accurate transcription.
 - Review the **Food Composition Tab** to determine if any of the shortlisted foods have food composition data already available. Copy and paste these values into Step 4. If not, then locate food in your nearest FCT.
 - Enter data EXACTLY as it appears in the selected FCTs in **cells C16–L35**. **Data in FCTs are listed in 100-gram quantities.**

- | |
|--|
| <ul style="list-style-type: none">• (g) = grams• (mg) = milligrams• (mcg or μg) = micrograms |
|--|

- *Note:* If a food does not have recorded nutrition composition data, you can:
 - Find the closest available substitute (e.g., spinach for wild greens).
 - Consult with a local laboratory to conduct nutrient analysis of the food.
- OPTIONAL FORTIFICANTS
 - If sugar and/or salt is fortified, add each fortified nutrient in **Columns M and N** (per 100 grams of salt and/or sugar).

- If a supplement (e.g., multivitamin mix) is added, add its name in cell **O18**, and the nutrition composition in **cells O19–O37**.

Step 4: Develop and iterate up to four FBRs/EFBs

Objective(s)	<ul style="list-style-type: none"> • Develop and iterate up to 4 unique FBRs, based on the included ingredients, with your team of experts:
Information needed	<ul style="list-style-type: none"> • The total quantity of each food, in grams, for each FBR/blend. This includes up to 10 unique foods, added sugar, added salt, and an optional supplement.

Instructions

1. Add name for each FBR or EFB (Row 38).
2. **IMPORTANT:** Select the preparation method for each FBR/EFB from the dropdown menu in **Row 40**.
3. Add the total quantity of each food item/ingredient (in grams) for one serving for your specific population, including sugar, salt, and optional supplements (C42–F54). Each FBR should be designed to support **1 serving** of food for your specific population.
 - a. Use the “Estimated Serving Size Key (Grey box)” to guide your serving sizes by food group. These estimated serving sizes are reflective of each specific age range.

Example Screenshot

Step 4B: Building Food Based Recommendations (FBR) or Enriched Flour Blends (EFB)
 Enter the name, select preparation method, and add total quantity of each ingredient (in grams) for up to 4 FBRs or enriched flour blends.
 Max 10 ingredients per FBR. Sugar, salt, and vitamin mix are added in addition.

FBR or EFB #	1	2	3	4	ESTIMATED SERVING SIZE KEY Average serving size per food group	
Add FBR / Enriched Flour Blend Name	FBR #1	FBR #2	FBR #3	FBR #4	FOOD GROUP	6-11
Select Preparation Method	Boiled (<10 min)	Boiled (<10 min)	Fried			grams unit
1 Sorghum	30		40			
2 Roundnuts	20	20			1. Grains, white roots, tubers, plantains (MDD-W)	40 1/4 cup
3 Sesame seeds		40			2. Pulses (beans, peas, lentils) MDD-W	20 1/3 cup
4 Powdered cows milk			30		3. Nuts and seeds (MDD-W)	10 1 tbsp
5 Yogurt	20				4.1 Milk, milk products (MDD-W)	60 1/4 cup
6 Chicken			10		4.2 Powdered milk	10 1.25 tbsp
7 Moringa leaves	50	5	10		4.2 Cheese	10 1.25 tbsp
8 0					5. Meat, poultry, fish (MDD-W)	20 2 tbsp
9 0					6. Eggs (MDD-W)	25 1/2 egg
10 0					7.1 (FRESH) Dark leafy vegetables (MDD-W)	10 1/4 cup
+ ADDED SUGAR (g)	5	5	5		7.2 (DRIED) Dark leafy vegetables	5 1 tbsp
+ ADDED SALT (g)					8. Vitamin A-rich fruits and vegetables (MDD-W)	30 2 tbsp
+ Micronutrient Powder					9. Other vegetables (MDD-W)	30 2 tbsp
TOTAL FBR WEIGHT	125 grams	70 grams	95 grams	0 grams	10. Other fruits (MDD-W)	30 2 tbsp
Serving Size for specific population	120 grams					

Step 5: Review the dashboard tab(s)

1. Review each FBR dashboard, which will appear on the same dashboard tab. The dashboard features each nutrient’s daily value in reference to your specific population (daily value [DV%]).

- a. *Prepared FBR/EFB (w/ retention factor)* shows the total nutrient quantity after preparation (e.g., the method chosen in Step 4B), which is the number each DV% is based on.
 - b. DV percentages are the recommended amounts of nutrients to consume each day, specific to each population. **Be aware that the calculation of the FBR/EFB provides the total quantity for one serving size, and children need more than one serving per day. The 30% DV reflects one-third of daily needs, assuming three meals per day.**
 - i. When the 30% mark is reached for any nutrient (for children 6–11 or 12–23 months), the calculator will automatically highlight those cells in green. Ideally the FBR/blend will reach ~30% DV of nutrients of concern for your specific population, per serving. Note: not all nutrients will be in ‘green;’ this is normal.
 - ii. Cells that have a N/A denote that a daily value is not available for this population.
2. Select the most appropriate FBR(s) or EFB(s) for your context’s nutritional needs, food availability, and sustainability considerations. Selection should be based on each FBR/blend DV% for each nutrient of concern for your specific population.
 - a. *Note: The nutrition calculator should be used as part of an iterative process to determine the best FBR/EFB for your context.*
 3. There is a comparison to the daily rations provided by commonly used Title II commodities (e.g., CSB+ with oil, SQ-LNS).
 4. The quantity of each ingredient is listed below each nutrition calculator dashboard, for ease of comparison.
 5. Move forward with the most appropriate FBR/EFB based on your context’s needs. Once you have selected the most appropriate FBRs and EFBs, you will need to test the acceptability, feasibility, and willingness to pay in the case of an EFB. Use the [household pathway](#) or [market pathway workbooks](#) to guide you through this process.

Example Screenshot

Nutrients	#1 Dashboard - FBR Sweet potato			#2 Dashboard - FBR Mopane / Pumpkin Leaves			#3 Dashboard - FBR Moringa Leaves			#4 Dashboard -			DAILY RATION (reference)			
	Prepared FBR / EFB (w/ retention factor)	Children (12-24 months) % DV	Children (6-12 months) % DV	Prepared FBR / EFB (w/ retention factor)	Children (12-24 months) % DV	Children (6-12 months) % DV	Prepared FBR / EFB (w/ retention factor)	Children (12-24 months) % DV	Children (6-12 months) % DV	Prepared FBR / EFB (w/ retention factor)	Children (12-24 months) % DV	Children (6-12 months) % DV	CSB+ with oil	CSB++	SO-LNS	Multiple Micronutrient Powder (5g sachets)
Energy (kcal. or calories)	127.4	12.7%	15.9%	312.4	31.2%	39.0%	285.4	28.5%	35.7%	0.0	0.0%	0.0%	601	563	550-620	
Protein (g)	8.5	17.3%	21.6%	18.2	48.6%	60.8%	11.3	30.2%	37.7%	0.0	0.0%	0.0%	13.3	21	12-16	
Total fat (g)	5.8	15.0%	18.7%	7.0	17.9%	22.4%	3.0	7.8%	9.7%	0.0	0.0%	0.0%	26.5	13	40-53	
Carbohydrate (g)	12.0	9.6%	12.0%	18.5	14.8%	18.5%	30.1	24.1%	30.1%	0.0	0.0%	0.0%	51		0-8	
Fiber (g)	0.5	2.9%	NA	6.8	40.2%	NA	7.6	44.8%	NA	0.0	0.0%	NA	3.7			
Sugar (g)	0.0	NA	NA	5.0	NA	NA	0.0	NA	NA	0.0	NA	NA	2		0-8	
Calcium [Ca] (mg)	133.6	33.4%	51.4%	210.5	52.6%	81.0%	155.8	39.0%	59.9%	0.0	0.0%	0.0%	381	579	1400-1960	
Iron [Fe] (mg)	4.6	65.9%	41.9%	20.4	291.0%	185.2%	3.6	51.7%	32.9%	0.0	0.0%	0.0%	7.8	15	30-42	12.5
Magnesium [Mg] (mg)	14.2	21.8%	18.9%	43.4	66.8%	57.9%	33.2	51.1%	44.3%	0.0	0.0%	0.0%	60.7	190	200-280	
Potassium [K] (mg)	77.6	8.6%	9.0%	313.2	34.8%	36.4%	266.0	29.6%	30.9%	0.0	0.0%	0.0%	457	1426	1000-1400	
Sodium [Na] (mg)	48.4	8.1%	12.1%	35.2	5.9%	8.8%	0.4	0.1%	0.1%	0.0	0.0%	0.0%	3.7			
Zinc [Zn] (mg)	0.7	29.1%	24.3%	1.8	71.6%	50.7%	2.2	89.9%	74.9%	0.0	0.0%	0.0%	4.88	11	40-56	5
Vitamin A RAE (mcg)	143.9	68.5%	28.8%	29.0	13.8%	5.8%	8.5	4.0%	1.7%	0.0	0.0%	0.0%	4074	714	2000-3390	300
Thiamine [Vitamin B1] (mg)	0.1	15.8%	21.0%	0.1	37.1%	49.5%	0.2	62.3%	83.0%	0.0	0.0%	0.0%	0.36	0.8	1.5-3.8	
Riboflavin [Vitamin B2] (mg)	0.1	26.8%	26.8%	0.4	101.1%	101.1%	0.1	25.9%	25.9%	0.0	0.0%	0.0%	1.2	1.2	2-3	
Niacin Equiv [Vitamin B3] (mg)	1.1	22.4%	28.0%	0.5	9.3%	11.6%	0.4	7.4%	9.2%	0.0	0.0%	0.0%	6.75	11	20-28.8	
Folate DFE (mcg)	4.5	3.7%	5.6%	2.7	2.3%	3.4%	0.0	0.0%	0.0%	0.0	0.0%	0.0%	156	31	667-1044	
Vitamin B12 (mcg)	0.2	22.4%	31.3%	0.0	6.2%	8.8%	0.0	0.0%	0.0%	0.0	0.0%	0.0%	1.5	3.3	2.5-4.2	
Vitamin C (mg)	1.9	14.6%	3.8%	1.7	13.2%	3.4%	0.0	0.0%	0.0%	0.0	0.0%	0.0%	68	145	75-169	50

Ingredients:	= >10% Daily Value			
	FBR #1	FBR #2	FBR #3	FBR #4
Sorghum	30	0	0	0
0	20	0	0	0
0	0	0	0	0
0	0	0	0	0
0	20	0	0	0
0	0	0	0	0
0	50	0	0	0
0	0	0	0	0
0	30	0	0	0
ADDED SUGAR (g)	0	0	0	0
ADDED SALT (g)	0	0	0	0
Micronutrient Powder	0	0	0	0
TOTAL	150	0	0	0

Final Remarks

- This is an Excel-based tool. Please save your work regularly to ensure no data entry is lost.
- If you are developing an EFB, move to the [business model tool](#) to determine the most suitable EFB for your context (e.g., detailed manufacturing cost analysis; consumer acceptability and willingness to pay; product promotion, distribution, and marketing considerations).



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USAID ADVANCING NUTRITION

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