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# **Executive Summary: Management of Moderate Wasting Using Local Foods**

Documentation of Approaches in Nigeria, Senegal, and Uganda



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Photo Credit: Gloria Nabaasa, consultant for USAID Advancing Nutrition

A child consumes a nutritious *kitoobero* meal made from locally available ingredients in Masaka District, Uganda. This work is supported by Caritas MADDO.

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# Acronyms

AFI	Andre Foods International
Caritas MADDO	Caritas Masaka Diocesan Development Organization
CMAM	community-based management of acute malnutrition
CRS	Catholic Relief Services
CSB	corn-soya blend
FBF	fortified blended foods
FSL	food security and livelihoods
JSI	JSI Research & Training Institute, Inc.
kg	kilogram
KII	key informant interview
MAM	moderate acute malnutrition
METU-I	Malnutrition Eradication Therapy in Uganda-I
mm	millimeter
MNP	micronutrient powder
MUAC	mid-upper arm circumference
NEC	Nutrition Education Center
NGN	Nigerian Naira
NGO	nongovernmental organization
PLW	pregnant and lactating women
PRN	Programme de Renforcement de la Nutrition (Nutrition Strengthening Program)
PUI	Premiere Urgence Internationale
RUSF	ready-to-use supplementary food
SFFs	specially formulated foods
TSFP	targeted supplementary feeding program
USAID	U.S. Agency for International Development
WFH	weight-for-height
WFL	weight-for-length
WFP	World Food Programme
WHO	World Health Organization
WHZ	weight-for-height z-score

# Executive Summary

## Introduction

Undernutrition contributes to an estimated 45 percent of deaths of children under 5 years of age. As much as 12.6 percent of those deaths are caused by wasting, an acute form of malnutrition (Black et al. 2013). In the past, much of the global attention to wasting was focused on its severe form because these children are at a higher risk of death. However, the number of children with moderate wasting is significantly higher and managing it effectively is an important way to prevent moderate wasting from turning into severe wasting and corresponding mortality. According to the 2023 Joint Child Malnutrition Estimates, globally, 45 million (6.8 percent) children under 5 experience wasting. Of this number, 31.3 million children have moderate wasting, representing 70 percent of all wasted children (UNICEF, WHO, World Bank Group 2023). Due to the economic and food security impacts caused by the ongoing COVID-19 pandemic, the number of wasted children is estimated to increase to 60 million (Osendarp et al. 2021). With the conflict in Ukraine further exacerbating economic and food security issues, more children will continue to be at risk of wasting.

## Background and Rationale

Until the release of the *World Health Organization (WHO) guideline on the prevention and management of wasting and nutritional oedema (acute malnutrition) in infants and children under 5 years* in June 2023, there was no global guidance to address moderate wasting. Prior to the release of this new guidance, countries either included moderate wasting programming in their national guidelines or referenced *Moderate Acute Malnutrition (MAM): A Decision Tool For Emergencies (MAM Decision Tool)*, which was developed in 2012 (updated in 2017) by the Global Nutrition Cluster MAM Task Force to help guide practitioners on program design, modality selection (e.g., cash/voucher, food supplement, or behavior change intervention), and targeting in emergency settings (GNC 2017).

Much of the experience addressing moderate wasting has been in food insecure or emergency settings and has, therefore, used commercially produced and typically imported specially formulated foods (SFFs) rather than local foods to manage cases. Services to address moderate wasting are one component of the community-based management of acute malnutrition (CMAM) approach in which moderately wasted children are managed through targeted supplementary feeding programs (TSFP) (WHO 2020). TSFP uses SFFs such as ready-to-use supplementary food (RUSF) and fortified blended foods (FBF). However, due to the high need for services coupled with limited capacity and funding, in many places TSFP is not available or SFF supply availability may be intermittent or unreliable.

Guidance remains limited on what to do should none of these specialized products be readily available in food insecure settings and on the use of locally available foods to address moderate wasting. In the absence of global guidance, practitioners have developed many innovative approaches to address moderate wasting using locally available foods in the permanent or temporary absence of standard TSFP programs and SFFs. However, there is a lack of minimum standards to establish parameters for non-inferiority for these approaches, and insufficient global guidance on how these approaches should be designed and implemented—and if and how they should be utilized alongside TSFP that uses commercially produced SFFs.

## Objectives and Research Questions

Practitioners and donors need to better understand the variety of local food-based approaches in use to manage moderate wasting. The objective of these case studies is to document how approaches using locally available foods to manage moderate wasting are implemented in different contexts and to understand the results of those efforts as a contribution to ongoing global efforts to develop

programmatic guidance to better address moderate wasting. These case studies examined the following questions:

1. What are the contextual factors (e.g., availability of and access to local foods) that influence the success or appropriateness of the approach in different settings?
2. How do local food-based program structures differ from TSFP that follow the generic moderate wasting management protocol in terms of core program components, admission and discharge criteria, referral and follow-up procedures, and reporting on outcomes (e.g., percent of children cured, died, defaulted)?
3. What types of locally available foods are used to manage children with moderate wasting and how does the nutritional value of the ration/recipe compare to the SFF standards set by the World Food Programme (WFP)?

## Methodology

We selected six approaches to document. The final selection of the case studies was based on ensuring geographic and contextual diversity (e.g., emergency and development contexts) and in consultation with the USAID Bureau for Humanitarian Assistance, based on anticipated future emergency nutrition needs. Table I summarizes the selected case examples.

**Table I. Selected Countries, Approaches, and Implementing Organizations**

Country	Project/Approach	Implementing Organizations
Nigeria	Tom Brown	Catholic Relief Services (CRS), Save the Children, Première Urgence Internationale (PUI)
	Porridge Mum	Action Against Hunger
Senegal	Programme de Renforcement pour la Nutrition (Strengthening Nutrition Program [PRN]), locally produced flour	USAID/Neema, Helen Keller International <sup>1</sup> Feed the Future Kawolor, National Cooperative Business Association CLUSA International and Helen Keller International
Uganda	Multi-Nutrient Dense Mix (kitoobero)	Caritas Masaka Diocesan Development Organization (Caritas MADDO)
	Malnutrition Eradication Therapy in Uganda-I (METU-I)	Andre Foods International (AFI)
	Nutrition Education Centers	Iowa State University Uganda Program

We used a mix of primary and secondary data sources to produce the case studies. We completed a desk review of available documentation provided by the selected implementing organizations, including guidance documents and/or protocols, job aids, data collection and reporting tools, reports, and evaluations. Primary data collection consisted of qualitative key informant interviews (KIIs) with staff from the implementing organizations, including, if possible, those who supported the original design of

<sup>1</sup> The USAID/Neema and Feed the Future Kawolor projects were no longer operating at the time of data collection. However, we consulted with the former implementing organizations to select past project sites to see the continuity of programming in the absence of organizational support. Support to these sites is now provided by either community-based organizations as part of the PRN program or by nongovernmental organizations (NGOs). NGO-supported sites in our sample were supported by ChildFund and Plan International.

the approach. We designed generic KII guides that were contextualized for each approach, based on the information gathered during the desk review. We also visited a convenience sample of service delivery sites for each selected approach and completed an observation checklist documenting the services provided and other program considerations, such as observance of food safety and hygiene practices and, in cases where on-site feeding was done, noting approximately how much of the provided portion was consumed by the children. We did not conduct KIIs or focus group discussions with the caregivers of enrolled children.

We used several approaches to compare the local food-based approaches with standard TSFP. We used the 2018 Training Guide for CMAM as the standard of care for moderate wasting against which we compared the selected locally based food approaches (FANTA 2018). Where appropriate, we also noted if the implementation of the selected approaches deviated from the countries' national CMAM protocols, including if the local food-based recipes and rations were included in any of the countries' national guidelines.

We assessed the nutritional adequacy of the recipes used and compared them to the 2023 WHO guidance on total daily energy requirements for anthropometric recovery from moderate wasting. We also looked at the specific daily nutrient requirements for moderately wasted children, as presented in the 2012 WHO *Technical note: Supplementary foods for the management of moderate acute malnutrition in infants and children 6–59 months of age*, which is the guidance still referenced in the updated 2023 WHO guidelines. We assessed the nutritional value of the recipes using NutVal software. For food items not included in the NutVal database, we manually entered the items using values from the food composition tables appropriate to the country, including the West Africa Food Composition Table (Vincent et al. 2020), and Kenya's Food Composition Table (Food and Agriculture Organization of the United Nations; Ministry of Health, Republic of Kenya; and Ministry of Agriculture and Irrigation, Republic of Kenya 2018). We also included the nutrition composition of the following SFFs, using published product standards from either WFP for USAID (standards used are cited next to each product): RUSF (WFP 2021), corn-soya blend plus (CSB+) with oil (USAID n.d. [a]; USAID n.d. [b]), and SuperCereal+ (WFP 2014).



Women in Borno State wash the ingredients for the Tom Brown flour before laying them out to dry. Once dry, the ingredients are ground into flour. Photo Credit: Halima Haruna, consultant for USAID Advancing Nutrition

Lastly, if program outcome information was collected by the implementing organizations, we compared data on cured, died, and defaulted rates against Sphere standards for moderate wasting management (Sphere Association 2018): cured: >75 percent; died <3 percent; defaulted: <15 percent. Information on length of stay, deterioration and referral for severe wasting treatment during enrolment, and relapse was also reviewed, if available, but not compared against a global benchmark, as these indicators can vary greatly depending on context.

## Comparing Local Food-Based Approaches with TSFP

### Program Delivery

Each of the selected local food-based approaches follow some elements of a typical TSFP model. Table 2 provides an overview of some of the basic program design features alongside the TSFP standard.



**Table 2. Program Delivery Comparison**

	TSFP*	Nigeria		Senegal	Uganda		
		Tom Brown	Porridge Mum	PRN	METU-12	Nutrient Dense Multi-Mixes (kitoobero)	Nutrition Education Centers (NEC)
Target population(s)	Children 6–59 months, pregnant and lactating women (PLW)	Children 6–59 months	PLW and their children 6–24 months	Children 6–59 months	Children 6–59 months  Children 5–10 years	Children 6–59 months  Children 6–10 years	Children 6–59 months; PLW (in special circumstances)
Admission criteria	Mid-upper arm circumference (MUAC) $\geq 115$ mm to $< 125$ mm or weight-for-height (WFH)/weight-for-length (WFL) $\geq -3$ to $< -2$ , no medical complications	MUAC $\geq 115$ mm to $< 125$ mm	Must be on food security and livelihoods (FSL) beneficiary list. Anthropometric assessment is not part of the admission criteria.	MUAC $\geq 120$ mm to $< 130$ mm	MUAC $\geq 115$ mm to $< 125$ mm; confirmed using weight-for-height z-score (WHZ) $\geq -3$ to $< -2$ , without edema  MUAC $\geq 135$ mm to $< 140$ mm	MUAC $\geq 115$ mm to $< 125$ mm  MUAC $\geq 135$ mm to $< 145$ mm	MUAC $\geq 115$ mm to $< 125$ mm

<sup>2</sup> Criteria for children 6–59 months taken from the RCT design. Criteria for older children are being used for program implementation.

	TSFP*	Nigeria		Senegal	Uganda		
		Tom Brown	Porridge Mum	PRN	METU-12	Nutrient Dense Multi-Mixes (kitoobero)	Nutrition Education Centers (NEC)
Discharge criteria	If MUAC admission: MUAC $\geq 125$ mm for two consecutive sessions; If WFH/WFL admission: WFH/WFL $\geq -2$ z-score for two consecutive sessions	MUAC $\geq 125$ mm by end of program cycle	Loss of pregnancy, death of child or mother, graduation from the FSL program, or aging out of the child. Anthropometric measurement is not part of the discharge criteria.	Not clearly defined. Assumed MUAC $\geq 130$ mm <sup>3</sup>	WHZ $\geq -2$  Considered cured when MUAC $\geq 145$ mm; but not discharged once MUAC is reached	MUAC $\geq 125$ mm  MUAC $\geq 145$ mm	Completion of caregiver training, inclusive of first harvest and child has MUAC $\geq 137$ mm
Length of stay in program	Until discharge criteria reached or defined as non-recovered (does not reach discharge criteria after 4 months -	8–10 weeks	8 months	Until discharge criteria reached or defined as non-recovered (No or little	Until discharge criteria reached; maximum of 3 months	3 months	6 months

<sup>3</sup> Discharge criteria not specified in the revised COVID-19 treatment guidelines. National IMAM guidelines state that moderately wasted children can be discharged with MUAC of  $\geq 125$ mm. In practice children continue to receive rations for 2 months, regardless of if they reach a MUAC  $\geq 130$ mm before the 2 months is completed.

	TSFP*	Nigeria		Senegal	Uganda		
		Tom Brown	Porridge Mum	PRN	METU-12	Nutrient Dense Multi-Mixes (kitoobero)	Nutrition Education Centers (NEC)
	medical investigation previously done)			weight gain after 4 weeks in the program; weight loss after 2 weeks in the program; weight loss of more than 5 percent of body weight at any one time; failure to meet discharge criteria after 3 months in the program)	(children 6-59 months)  3 months (school-based program for older children)		

	TSFP*	Nigeria		Senegal	Uganda		
		Tom Brown	Porridge Mum	PRN	METU-12	Nutrient Dense Multi-Mixes (kitoobero)	Nutrition Education Centers (NEC)
Ration type and feeding approach (e.g., take-home, on-site, recipe replication)	Take-home ration (RUSF or FBF, such as SuperCereal with oil and sugar or SuperCereal+)	Take-home ration of Tom Brown flour	There is no specific ration for children with moderate wasting. Women receive a monthly restricted electronic food voucher (NGN 5,000) to purchase ingredients to replicate Porridge Mum recipes at home.	Take-home ration of local flour mix (recipes vary; only given when RUSF or imported fortified flours are unavailable)	Take-home ration  Ration prepared and consumed on site.	Feeding at home using available household foods to replicate recipes	Either on-site feeding at the NEC or a take-home ration of pre-mixed flour to be prepared at home

## Nutritional Value of Recipes

To understand how the nutritional value of local food-based recipes compare to specialized products that are distributed through TSFP, we used NutVal software to conduct a nutrition analysis of recipes provided by key informants or outlined in the program documentation. For programs such as Porridge Mum, PRN, kitoobero, and recipes promoted by Caritas MADDO that have multiple recipes or can be varied at the household level based on available foods, we selected a subset of the recipes to illustrate some of the variation in the foods provided or promoted for moderate wasting treatment. The NutVal analyses were compared to standards published by either USAID or WFP for CSB+ with fortified vegetable oil, SuperCereal+, and RUSF.

## Global Standards for Supplement Composition

While WFP and USAID publish supplementary feeding product specifications and standards for SFFs like RUSF, CSBs, and SuperCereals, there is limited guidance on the caloric and nutritional requirements of moderately wasted children. The recently updated, *WHO Guideline on the Prevention and Management of Wasting and Nutritional Oedema (Acute Malnutrition) in Infants and Children Under 5 Years* still uses WHO guidance from 2012 on the proposed nutrient composition of supplementary foods for use in the management of moderate wasting in children (WHO 2023). The 2012 guidance is based on 1,000 kcals per day and can be consumed either through regular foods or supplementary foods. The newly revised WHO guidance estimates that moderately wasted children have a total daily energy requirement of 100–130kcal/kg/day to achieve anthropometric recovery, and it is recommended that 40–60 percent of this need is met using SFFs (WHO 2023).

## Analysis of SFF Composition

We found that the SFFs that are typically used by TSFP programs do not have standardized nutritional compositions nor do they meet the standards proposed in the globally available guidance.

To compare the specialized products more directly with the WHO-recommended nutrient values for supplementary foods, we adjusted the actual SFF ration sizes so that they were equivalent to the median value of the recommended range of kcals/kg/day as recommended in the 2023 WHO guidance, which is equal to 120kcal. We further prorated that amount to be equal to 60 percent of these daily caloric needs, in line with the upper range of a child's diet that should come from SFFs (60 percent). For comparison, we use the minimum values for each nutrient included in the 2012 WHO guidance, also proportional to 60 percent of the recommended value.

The published formulations for the selected SFFs generally comply with the WHO guidance on the proposed nutrient composition for supplementary foods. CSB+ with fortified vegetable oil meets the fewest of these requirements (14/24) followed by SuperCereal+ (22/24). However, according to the 2023 WHO guidance, lipid-based nutrient supplements, such as RUSF, are the preferred choice for the management of moderate wasting. RUSF meets all the WHO nutrient composition recommendations.

## Analysis of Local Food-Based Recipes

We applied the same analysis approach as used for the SFFs to the local food-based recipes. When we compared the local food-based recipes with the recommended WHO nutrient composition standards for supplementary foods we found that none of the recipes met the recommended standards. NutVal does not include vitamin B7 (biotin), iodine, potassium, phosphorus, or sodium in its calculations. Therefore, although WHO has recommended standards for these nutrients, they are excluded from the analysis.

### Fortification of Local Food-Based Recipes

It is unsurprising that local foods are unable to meet all recommended nutrient requirements without additional fortification. Only partners using Tom Brown flour mentioned that they encourage additional fortification of the flour as part of its preparation. To see if fortification would help the flour to meet more of the recommended nutrient requirements, we added the additional nutrient values from 1 packet of micronutrient powder (MNP) to the adjusted kcal/kg/day Tom Brown flour ration. Unfortified Tom Brown flour fails to meet 11 of the 15 nutrient values without fortification. If MNP is added, all standards are met, even without adjusting the kcal/kg/day values for a weight greater than 1 kg. Although adding MNP to local food-based recipes means that caregivers must be provided with or be able to purchase the necessary MNP to add to their home cooked foods, expanding the availability of MNP is likely more feasible and cost effective than trying to make SFFs more readily available within communities.

### Program Outcomes

Although all local food-based approaches, except for Porridge Mum, adhered to standard enrollment guidance, the tracking of program outcomes was inconsistent. Table 3 provides a summary of available program outcome data, including cured, died, defaulted, and non-respondent. Because the data are not from the same time period or geographic area, the approaches should not be directly compared against each other. For programs with outcome data available, all met Sphere standards for cured, died, and defaulted rates apart from Caritas MADDO, which exceeded the maximum death rate by one percent.



An example of a kitoobero meal made during a site visit in Masaka District. This meal was made from matooke, groundnuts, and silverfish.  
Photo Credit: Gloria Nabaasa, consultant for USAID Advancing Nutrition

**Table 3. Program Performance Compared to Sphere Standards for Moderate Wasting Treatment of Children 6–59 Months**

	Sphere Standard	Nigeria				Senegal	Uganda				
		Tom Brown			Porridge Mum	USAID/ Neema and PRN	METU-14		Multi-Nutrient Dense Mix (kitoobero) <sup>5</sup>	NECs	
		CRS <sup>6</sup>	PUI <sup>7</sup>	Save the Children <sup>8</sup>			6–59m	5–10y			
Cured	>75%	98%	95%	92%	Data collected but outcome not analyzed	Detailed site and historic project data were not available.	91.4%	94%	96%	Data collected but outcomes not analyzed.	
Died	<3%	0% <sup>9</sup>	0%	0% <sup>10</sup>			0%	0%	4% <sup>11</sup>		
Defaulted	<15%	0%	0%	0% <sup>12</sup>			15% <sup>13</sup>	Not reported <sup>14</sup>			0%
Non-respondent	Not defined	Not reported	5%	3%			Not reported	7.7%	6%		0%

<sup>4</sup> Data for children 6–59 months taken from efficacy trial results. Data for children 5–10 years are from three sites with complete data from the October–December 2022 programming cycle.

<sup>5</sup> The most recent available data are from a 2013 evaluation report, conducted during the Primary Health Care project. Program outcomes are not routinely tracked.

<sup>6</sup> Data taken from semi-annual report, April 2022.

<sup>7</sup> Performance from four different program cohorts. Data from October 2021–April 2022.

<sup>8</sup> Data from January to August 2022

<sup>9</sup> Only percentages reported. Estimated to be 1 child out of 2,417 enrolled.

<sup>10</sup> 6 children out of 2,614 enrolled died while enrolled in the program.

<sup>11</sup> Only percentages reported. Estimated to be 13 children out of 326 enrolled.

<sup>12</sup> 12 children out of 2,014 enrolled defaulted from the program.

<sup>13</sup> Based on data from two sites from August–September 2022.

<sup>14</sup> 22 children were lost to follow up during the trial. 17 moved away, Four withdrew consent. No defaulters reported for older children.

## Synthesis of Findings

### Program Design

The design of the documented approaches varied greatly. However, the duration of the overall program and feeding, the mix of complementary interventions, and the ration type, along with related feeding considerations, emerged as some of the key considerations for using local foods for the management of moderate wasting.

### Impact of Program Duration and Mix of Interventions on Outcomes

The documented approaches had a range of program durations and packages of additional interventions provided to the caregivers or households alongside support for the wasted child. A longer feeding period and more complementary interventions likely means a higher total cost per child. When determining what elements are essential to achieve and maintain a good program outcome, it is important to be able to consider tradeoffs between overall costs and outcomes.

Several of the programs had much longer enrollment periods than a typical TSFP, even when the suggested maximum length of stay of 4 months in a TSFP is considered. Of the programs with a management objective, the NECs in Uganda had the longest program and feeding duration at 6 months. This approach was also combined with a wide range of other interventions, including a training program to build skills and capacity of caregivers in good feeding, health, and hygiene practices as well as agriculture and other livelihood skills. Although not defined as a program to manage moderate wasting by its designers, Porridge Mum does seem to have an impact on reducing moderate wasting in the communities where it operates and also has the longest program duration (8–12 months) of all the documented approaches.



A NEC trainer checks a child's MUAC at the NEC site. Photo Credit: Gloria Nabaasa, consultant for USAID Advancing Nutrition

All the programs with available outcome data had high cure rates that met Sphere minimum standards. However, based on the available data, we were unable to determine how much overall cure rates improved with the increased duration of the program. Unfortunately, none of the documented programs kept detailed records on relapse rates. Had this information been available, more insight could have been gained into whether longer program durations are necessary to not only improve cure rates but also to prevent relapse, and therefore reduce moderate wasting caseloads. Additionally, information is not collected to determine if complementary activities, when provided, are having a preventative effect - for example, if fewer children within the same household become wasted after the caregiver or household has taken part in these other activities.

### Ration Types

Unlike standard TSFPs that always provide take-home rations, the approaches we documented provided a range of different types of rations, including take-home rations, on-site feeding, and, in one case, no food ration of any kind. Along with the type of ration comes considerations about how much of the food will be consumed and the risk of sharing. Table 4 summarizes the ration types provided by the various approaches.



**Table 4. Summary of Ration Types, Frequency, and Portion Size**

Approach	Ration Type	Frequency	Portion Size
Tom Brown	Take-home flour	Weekly distributions	1.5kg per week. 214g daily given in 2–3 servings, prepared at home.
Porridge Mum	On-site feeding on cooking demonstration days; voucher to purchase foods for home preparation	On-site feeding approximately twice a month, during cooking sessions  Monthly voucher transfer to replicate meals at home	One of the recipes should be prepared daily.  Portion sizes vary based on recipe.
PRN	Take-home flour	Distributions monthly or every 2 weeks	1.5kg at each distribution (some partners provide more flour over the enrolment period).  90g daily servings given in two portions prepared at home.
METU-I	On-site feeding at schools	On-site feeding twice a day on school days	Two 500ml portions.
Nutrient-dense Multi Mixes	No ration - only education sessions (previously on-site feeding during group cooking demonstrations, followed by home preparation)	N/A	Meals to be prepared daily at least four times a week and served in two portions. Portion sizes vary based on recipe and age of child.
NEC	Primarily on-site feeding, occasionally take-home flour	On-site feeding: 5 days a week  Take-home: weekly distribution	On-site feeding: one portion consumed on site. Sent home with two additional portions to consume the same day.  Take-home: 1 kg of flour to be prepared at home daily as porridge and given in three portions.

Two approaches, Tom Brown and PRN, provided only take-home rations in the form of flours. However, the total amount of flour provided and the frequency of distribution varied. With take-home rations, there is always a risk of the ration being shared. For Tom Brown, key informants mentioned that ration size had not been adjusted for sharing and that this posed a challenge. For PRN, the very small daily ration is more likely to be insufficient if sharing is occurring.

On-site feeding reduces or eliminates the potential for ration sharing. However, it places a greater burden on the caregiver as they are required to travel to the program site so their children can receive the ration. Only two programs, METU-I for school-aged children and NECs, use on-site feeding as their primary feeding method. Unfortunately, neither approach reported on default rates so we are unable to determine if or how the on-site feeding format may have impacted defaulting.

Two programs, Porridge Mum and the Caritas MADDO-supported version of the kitoobero training, provided on-site feeding following cooking demonstrations. However, outside of these sessions, the programs rely on the caregivers to procure the necessary foods and correctly prepare and feed the meals to their children at home. While Porridge Mum provides restricted vouchers to encourage caregivers to procure the necessary foods, households that are taught to prepare kitoobero are not given any additional support to procure the required foods.

Based on available data, we are unable to make any clear determinations about the ration type (or lack of any in-kind food support) and accompanying assumptions and risks related to the feeding methods.

## **Assessing and Interpreting the Nutritional Value of Recipes**

We encountered several barriers to assessing and interpreting the nutritional value of the local food-based recipes.

### **Limitations of Assessment Using NutVal**

Because NutVal is free and relatively easy to use, it is often the go-to tool for implementers trying to assess the nutritional value of rations provided as part of food assistance programs. We even received NutVal-generated nutritional information on Porridge Mum recipes from a key informant, even though the software is not designed to be used for recipe development for the management of moderately wasted children. Despite its accessibility and ease of use, we did encounter several limitations when using it to interpret the nutritional value and composition of the recipes used by our selected approaches.

NutVal does not include all the suggested micronutrients in WHO's guidance on the nutritional composition of supplementary foods. Among the various nutrients for which global standards are provided, NutVal does not calculate chromium, fatty acids, iodine, manganese, molybdenum, phosphorus, potassium, sodium, sulfur, or vitamin B7 (biotin). While NutVal does cover what can be considered essential micronutrients, if MNP composition is used as a guide, the omission of sodium, along with macronutrients including carbohydrates and fiber are important gaps. Understanding these elements, along with total protein and fat which are provided, is essential for understanding the overall composition of the supplementary diet provided. For example, it is important to know the amount of fiber in a recipe to avoid providing high amounts, as too much fiber can reduce nutrient and energy digestibility, which may cause potential harm to moderately wasted children (Golden 2009). High fiber diets may also be too filling and reduce the ability of the child to consume sufficient energy (Webb et al 2011).

Lastly, NutVal has a limited food database, which is less suited to calculating recipes that are based on local foods. Different varieties of foods can contain different nutrient compositions and some regionally specific foods, such as sorrel, ginger, turmeric, and Maggi bouillon, are not included in the NutVal database. Although regional food composition tables are available, it requires extra time and effort to add these foods manually to the NutVal database. This is particularly challenging since the food

composition tables are reported in 100g quantities but must be entered into NutVal in the quantity listed in the recipe, requiring users to self-calculate each nutrient based on the serving size. Depending on the skill level of the implementer, he or she may not necessarily know where to find or be able to access local food composition information or be able to accurately add it to the tool.

### **Inconsistent Global Guidance on Nutritional Needs of Moderately Wasted Children**

Prior to the recent update of WHO's guidance on the management of wasting, there was a great deal of inconsistency among available literature on the recommended nutrients for moderately wasted children. The 2023 guidance update references the 2012 WHO recommendations on the proposed nutrient composition of supplementary foods for use in the management of moderate wasting in children, and the recommendations are noted as being conditional due to the "very low certainty evidence" (WHO 2023). Additionally, these recommendations focus primarily on standards for SFFs, which are commercially produced and centrally fortified. Therefore, it is difficult to set standards for local food-based recipes. The earliest example of guidance from 2009 that we reviewed states that moderately wasted children need to have nutrient requirements that allow for "catch-up growth in weight and height, prevent their death from nutritional disease, strengthen their resistance to infection, allow for convalescence from prior illness, and promote normal mental, physical, and metabolic development" (Golden 2009). This guidance provides two sets of recommendations - one for local food items and one for specialized foods and notes that the proposed requirements are unlikely to be met through local foods without some level of fortification. The provided analysis is detailed and complex to ensure a balanced set of requirements that meet the multiple needs described above and that the levels of suggested nutrients do not result in negative interactions between the nutrients.

Since 2009, there have been ongoing efforts to reach further consensus on the nutritional needs of moderately wasted children. However, these efforts have largely focused on applying these requirements to specialized food products, such as the harmonization of micronutrient premixes used in RUSF and FBF (Annan, Webb, and Brown 2014). Despite the detail of these efforts, we found little additional guidance beyond what was originally developed in 2009 that was applicable to local foods and nothing in a format that would be easily accessible and user-friendly to practitioners who are trying to develop local food-based recipes for their programs.

### **Contextual Considerations**

The available data limit our ability to propose which types of local food-based approaches are generally the most effective and cost effective to manage moderate wasting. However, we present several contextual factors that should be taken into consideration when determining what type of local food-based alternative to TSFP is most appropriate for a given implementation context.

### **Food Security and Market Availability**

To implement a program to manage moderate wasting using locally available foods, an adequate and reliable supply of the necessary foods must be available either within the communities or local markets, or within a transportable distance from the implementation site. For circumstances that require transport of foods to the implementation site, tradeoffs between the cost of transportation, transportation reliability, and potential degradation of food quality due to increased transport and storage requirements should be considered.

Furthermore, the food security status of households with moderately wasted children must also be considered when determining what type of ration to provide. For example, Caritas MADDO was operating in a reasonably food secure environment in Uganda where communities could easily access or grow their own local foods to cook kitoobero recipes at home. Therefore, no in-kind food ration or cash/voucher was provided to these households. This approach would likely be inappropriate in a context such as North East Nigeria where households face significant food insecurity. In contrast, the Tom Brown and Porridge Mum programs implemented in this context provided either the local foods

required to make the rations or a voucher to support caregivers to purchase the required foods to reproduce the recipes.

### Availability and Coverage of TSFP

Although the approaches that use local foods to manage moderate wasting do so in the absence of TSFP services in the implementation area, only two approaches - the nutrient-dense multi-mixes (kitoobero) and NECs - operate in areas where there is no WFP presence.

For the other approaches, the mix of traditional WFP-supported TSFP and local food-based approaches has posed some challenges. This has been most acutely felt in North East Nigeria, where several key informants mentioned difficulties that were faced when conducting geographic targeting alongside WFP. We were told by these informants that WFP has tried to start TSFP in areas where Tom Brown services are already operating, despite there being other parts of the region that have no moderate wasting services at all. In the Karamoja region of Uganda, despite having invested in a number of trials and analyses to determine the suitability of METU-I, AFI has not been able to provide it to its original target population of children 6–59 months due to new WFP-supported TSFP that were implemented after METU-I was developed and tested. Similarly, in Senegal, support from WFP and a preference for specialized treatment products has hindered the maintenance and expansion of local flour production.

While TSFP may be appropriate for some settings, particularly those experiencing acute crises resulting in a spike in moderate wasting cases, they are ultimately much less sustainable and unable to reach all children in need of support. Therefore, there is a need for open dialogue between donors, practitioners, and WFP on when these types of local food-based approaches are considered acceptable alternatives to TSFP.

### Referrals to Treatment for Severe Wasting

Referral of severely wasted children to inpatient or outpatient treatment was a component of all the documented approaches, even if these services were not readily available close to the communities. Implementing partners often provided direct support to the provision of severe wasting treatment services or provided support to households to access these services if they were located far from treatment sites. Interestingly, informants did not mention referrals of children discharged from severe wasting treatment programs to the local food based approaches for continued recovery. We did not interview providers of severe wasting treatment services to determine if children are discharged from these programs as fully cured, referred to a TSFP, or how else their continued recovery is supported.

Ensuring that children identified as having severe wasting and children who deteriorate from moderate wasting have access to the necessary treatment services is not only an ethical imperative, but it is also essential for ensuring that communities have confidence in the guidance and services provided. Although an argument can be made that managing moderate wasting is better than nothing, all reasonable efforts should be made to provide a continuum of care that includes life-saving severe wasting treatment services as well.

### Community-Based Nature of the Program Designs

The “C” in CMAM, which stands for community-based, can often spark debate among practitioners. While there are some community-based elements, such as active case finding, screening, and referral, which are truly community-based, treatment and management components, including TSFP, are still closely linked to health centers. This means that not every community can easily access wasting management support, depending on its proximity to the closest health facility with the appropriate wasting management services. In contrast, all the local food-based approaches that we documented are very clearly embedded within or very close to the communities they are intended to serve. Even the PRN program, which follows a much more traditional TSFP model, uses community-anchored elements such as *groupements d'intérêt économique* (economic interest groups) or Debbo Galle groups (women's

groups) to support local flour production. Because these approaches are so closely linked to communities, several things should be considered when planning for their implementation.

First, these approaches require community buy-in to work effectively. Examples from Porridge Mum programs for which land for communal kitchens was “donated” and then reclaimed illustrate the need for careful sensitization prior to the start of programming. Also, for effective interventions, populations need to be somewhat stable. For example, communities should not be at risk of frequent insecurity or violence that would cause them to flee. Additionally, communities should not disappear at certain times of year due to pastoralist or nomadic lifestyles.

Additionally, we do not have enough information to know if setting up these approaches in each community may be more costly than setting up a TSFP that serves multiple communities. The population density and prevalence of moderate wasting may impact the cost efficiency of the community-based approaches when compared to TSFP and should be carefully considered when contextualizing the approach to the implementation context. However, there may also be additional benefits to these community-specific approaches, including the creation of peer support groups that benefit caregivers as well as benefitting the individual children who are being managed, which could outweigh the additional cost.

## Discussion and Way Forward

There are already a wide range of approaches that use local foods to address moderate wasting. It is likely that the existing approaches will be scaled up and new approaches will be developed given the high level of need and barriers in terms of lack of funding, capacity, and SFFs to address all moderate wasting through traditional TSFPs. Additionally, the updated 2023 WHO guidance emphasizes the use of nutrient-dense foods, inclusive of locally available foods that are typically consumed by households, to support their recovery. The guidance has highlighted a set of risk factors<sup>15</sup> that indicate when a moderately wasted child should be prioritized to be managed with SFFs rather than local foods. The decision on which risk factors to apply at a population level will be reflected in revised national guidelines in consultation with WHO and UNICEF. Moderately wasted children without one or more additional risk factors do not need to receive a specific SFF according to the WHO guideline, and, therefore, there is great potential to identify and scale up local approaches such as those outlined in this analysis to increase coverage and ensure local market promotion and caregiver empowerment in addressing moderate wasting. Our documentation of a small selection of these programs shows that they are promising, but due to gaps in available programmatic data, our ability to draw clear conclusions about their effectiveness is limited. Additionally, clear guidance and standards for how to design and monitor these programs to ensure they meet the nutritional needs of the children served and ensure they are cured are lacking. There is also a need to build the evidence base on the effectiveness and cost effectiveness of these programs in different contexts to reach consensus, including with WFP, on when local food-based approaches are considered acceptable alternatives, or components of traditional TSFP. We recommend the following actions to help strengthen existing programs and to set clearer standards for future innovation and scale-up.

### Apply More Rigorous Monitoring of Program Outcomes

All the programs we documented that had a primary objective of managing moderate wasting applied similar program admission standards as TSFP. Children were screened and often re-screened before enrollment into the programs. However, this rigor broke down significantly when it came to tracking

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<sup>15</sup> Risk factors include: MUAC 115–119mm, WAZ <-3 SD, Age <24 months, Failing to recover from moderate wasting after receiving other interventions (e.g. counselling alone), Having relapsed to moderate wasting, History of severe wasting, Co-morbidity (serious or chronic), such as HIV, TB, or a physical or mental disabilities, Illness within 12 weeks before admission into outpatient care, Severe personal circumstances, such as mother died or poor maternal health and well-being, or severe personal circumstances, such as mother died or poor maternal health and well-being (WHO 2023)

program outcomes. This is likely because many of the approaches do not discharge children from programs once they reach a healthy MUAC status. Instead, they are retained in the program for the full program period. However, if programs using local foods are designed to manage moderate wasting and support children with recovery, then it is critically important to know if children are actually achieving ‘normal’ nutritional status and if these programs are meeting Sphere minimum standards and/or country-specific performance standards. Therefore, all local food-based approaches that characterize themselves as managing moderate wasting should collect and analyze data on outcomes that align with Sphere guidance and ensure their approaches meet Sphere minimum standards. Additionally, nutrition clusters globally should include these local food-based approaches to managing moderate wasting as a part of their caseload planning for moderate wasting supplementation, and require the same reporting, coordination and referral standards of these partners as are required of TSFP partners. As national guidelines are revised to integrate updated WHO guidance on wasting management, there is an opportunity to ensure that all moderate wasting management programs, regardless of if they use SFFs or local foods, adhere to and report on the same outcome indicators.

### **Develop Clearer Guidance on the Minimum Nutrition Composition of Recipes that use Local Foods to Manage Moderate Wasting**

Current global guidance on the nutritional needs of moderately wasted children remains limited, despite the updates provided in the new 2023 WHO guidance. This is especially true when looking at standards for non-fortified local foods that can be used to support recovery from moderate wasting. The updated guidance recognizes that not all moderately wasted children need SFF to recover. Instead, the guidance emphasizes the use of local foods for recovery and prioritizes SFFs for high-risk cases. The guideline also highlights the need for more research to better understand the nutrient requirements for children with moderate wasting, including the efficacy of the use of home foods. Given the limited level of guidance on nutrient requirements for moderately wasted children and the scientific rather than operational format in which this information is currently available, it is understandable that the nutritional composition of local food-based recipes provide a wide range of different nutrients in different quantities. As recommended in the WHO guidance, the global community should invest in the necessary research and debate to strengthen the evidence base and reach consensus on this important topic. According to the available program data, children enrolled in local food-based approaches to manage moderate wasting appear to be recovering, at least anthropometrically. More detailed guidance is needed to delineate which nutrients, and at what levels, are critical for using local foods to manage moderate wasting versus what should be included in an SFF that targets high-risk children.

Additionally, user-friendly, operational guidance that includes minimum standards for local food-based recipes and guidance on their formulation needs to be developed for use by practitioners. This guidance should also emphasize the need to adjust recipe portions based on a child’s weight, as per the revised WHO guidance, and explain how to appropriately select the kcal per kg amount that is appropriate to the implementation context. At present, all portion sizes-including those for SFFs-have a single daily portion size that is not appropriate for children of all ages. Furthermore, guidance on how to adjust ration and portion sizes to account for household sharing and strategies to minimize sharing, such as providing a complementary household ration, should also be developed. This guidance should be accompanied by the tools to conduct the necessary calculations (see “Update the NutVal Tool”).

### **Undertake More Non-Inferiority Studies to Compare the Effectiveness of Local Foods with Commercially Prepared SFFs**

All of the documented approaches, with the exception of Caritas MADDO’s kitoobero recipes, conducted some kind of nutritional analysis to understand the nutrient composition of their recipes. However, only one partner (AFI) conducted a non-inferiority study to determine if the program outcomes following the provision of the product (METU-1) were non-inferior to specialized food products (Amegovu et al. 2014). Globally, there is a lack of research on the non-inferiority of local food-

based recipes. In our non-systematic literature review, we found only one other non-inferiority trial that took place in Ethiopia for a flour-type product that was mixed with oil and served as a porridge (Nane, Hatløy, and Lindtjorn 2021). We did not identify any non-inferiority trials focused on recipes prepared at home that more closely resembled family meals (e.g., the kitoobero recipes). More research needs to be done to determine if certain types of recipes made from local foods (e.g., a flour blend for a porridge or a meal based on local recipes) are more or less effective or potentially more appropriate for different contexts. Learning from this type of research may also help inform better guidance on nutrient requirements and prioritization of nutrients.

### **Study the Benefits of Complementary Activities**

The updated WHO guidance emphasizes that although dietary management is necessary for recovery from moderate wasting, it is usually not sufficient. The guidance states that children with moderate wasting should also be comprehensively assessed and treated wherever possible for medical and psychosocial problems leading to or exacerbating the episode of wasting (WHO 2023). Many of the approaches we documented, particularly those with longer durations, provide a range of complementary activities that benefit the caregiver and/or household in addition to addressing moderate wasting in a particular child. However, available data did not allow us to understand the additional benefits that these complementary activities may have for recovery, relapse, or prevention of other cases of moderate wasting in the household. Additionally, the approaches we documented focus primarily on educational aspects and do not necessarily co-locate or directly provide additional health services at their implementation sites, although referrals may be made. Only the NECs in Uganda mention hosting clinic days at the NEC sites. The only program that mentioned psychosocial benefits was Porridge Mum but these focused more on the benefits the mothers found in having a “safe space” to come together during the program and did not include professional support for the women or their children. More research is needed to understand which complementary activities may support additional benefits beyond just anthropometric recovery and the contextual factors that may influence their effectiveness.

### **Conduct Costing Studies to Better Understand Tradeoffs Between Program Duration, Outcomes, and Cost**

The long duration of some of the approaches that we documented - as long as 8–12 months - implies higher costs when compared to programs of shorter durations, particularly if those programs are also providing the food, cash, or vouchers as part of the program. However, it is important to understand if these longer programs lead to better overall outcomes for the children, not just in terms of cure rates but also looking at other indicators such as the number of relapsed cases and a possible reduction in wasting overall within supported households - especially for programs that provide additional support beyond just the management of a moderately wasted child. Depending on the mix of interventions, it may also be appropriate to consider outcomes related to the overall quality of nurturing care and social and emotional support for caregivers. If additional beneficial outcomes beyond cure rates can be identified, the longer and more costly program may actually be more cost effective. Very little research has been done on this topic and more information is needed to help practitioners determine the optimal duration and mix of interventions to include in these more expansive, community-based programs. Costing studies should be designed to consider differences in cost effectiveness in programs that also provide complementary interventions and may have multiple desired outcomes. Additionally, advocacy with implementers designing these programs to include more specific metrics around the perceived benefits of the approach would go far in promoting healthy evidence generation.

Furthermore, costing studies contribute to the documentation of these approaches by outlining the necessary components for implementation and societal costs to participation. This type of information is important for decision-makers when considering the feasibility and appropriateness of scale-up and when considering what factors may contribute to or detract from future program sustainability. Flexible financing approaches that allow for fluid implementation periods and do not have fixed implementation

sites, such as the type used by the NECs in Uganda, may also be worth investigating as part of the contextual factors that contribute to differences in cost-efficiency or effectiveness of different approaches.

### **Convene a Global Consultation on Local Food-Based Approaches for Managing Moderate Wasting**

In our discussions with implementing partners, several mentioned tensions between partners, ministries of health, and WFP about if, when, how, and where local food-based approaches should be implemented. This was particularly true in areas where WFP-supported TSFP were also present but unable to provide full coverage. Following the release of the updated 2023 WHO guidance and as a follow up to the findings of this report, a global convening of partners, governments, donors, and WFP would be a useful next step to begin to provide clearer operational guidance for both implementing partners and WFP on when local food-based approaches should be considered acceptable alternatives to TSFP for addressing moderate wasting.

### **Update the NutVal Tool**

Many practitioners are already familiar with NutVal. Rather than creating a new tool to support the development of local food-based recipes to manage moderate wasting, we recommend that the NutVal tool be updated to include a broader range of local foods and to include more nutrients. The tool is currently undergoing an update; however, more discussion and consensus on the essential nutrient requirements and composition of recipes to manage moderately wasted children is required before some of these updates can be made. At a minimum, carbohydrates, fiber, and sodium should be added to the tool now.



Women in Borno State receive counseling on infant and young child feeding practices following the packaging and distribution of the Tom Brown flour. Photo: Halima Haruna, consultant for USAID Advancing Nutrition



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