

## Validation of Food-Based Recommendations Developed using Optifood for Groups at Nutritional Risk in the Western Highlands of Guatemala

Extremely high chronic malnutrition puts Guatemalan children at an increased risk of mortality and infections, and may result in increased risk of chronic diseases in adulthood as well as long-term decreased earnings and productivity. To improve nutritional status, the World Health Organization recommends that food-based recommendations (FBRs) be used in social and behavior change communication to promote the consumption of nutrient-dense, diverse locally available foods, and promote the use of supplements only if necessary.<sup>1</sup> The report presents the results of a qualitative study undertaken in the Western Highlands of Guatemala to validate a set of FBRs for pregnant and lactating women (PLW) and children 6–23 months. The Food and Nutrition Technical Assistance III Project (FANTA) conducted this activity in partnership with the Instituto de Nutrición de Centro América y Panamá (Institute of Nutrition of Central America and Panama).

The activity began in 2012–2013, when a dietary survey of children 6–23 months of age and PLW, plus a market survey were completed in the Western Highland departments of Huehuetenango and Quiché. The most commonly consumed foods by both PLW and children 6–23 months included tortillas, potatoes, eggs, and black beans, as well as small quantities of onions and tomatoes, with generally low consumption of animal source foods, fortified-blended flour (FBF), and fruits and vegetables. Data were analyzed using the Optifood linear programming tool to identify the best combinations of local foods to optimize the diets of PLW and children under 2 years of age, within the



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*Promotion of micronutrient supplements and a feasible set of food-based recommendations can improve consumption of most nutrients that are typically lacking for pregnant and lactating women and children 6–23 months in the Western Highlands.*

observed acceptable dietary patterns and with the highest nutrient density and lowest cost.

For pregnant women, the results showed that micronutrient deficiencies persist in the diet even though the quantity of food consumed was adequate. Problem nutrients for pregnant women included iron, and in some cases, zinc and folate.<sup>2</sup> Micronutrient supplements would be needed to

<sup>1</sup> FBRs are dietary recommendations for members of a specified target group to promote consumption of specific foods or food groups. They may also 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).

<sup>2</sup> Problem nutrients, as defined in Optifood, are nutrients that are likely to remain low in diets due to the availability of and/or access to local food sources and existing dietary patterns.

achieve iron adequacy for pregnant women. For PLW, vitamin B12 adequacy could not be achieved without the consumption of liver; and zinc and folate adequacy could not be achieved without the provision of FBF. For children 6–23 months, the Optifood study found that problem nutrients included iron, zinc, and calcium. For both PLW and children 6–23 months, the findings also noted that the consumption of animal protein was low relative to the total protein consumed from plant sources.

From this analysis, a set of FBRs was selected for each of the target groups to address nutrient gaps and optimize the diets of PLW and children 6–23 months, including the quantity and frequency (per week or day) with which they should be consumed to optimize the diet, assuming regular access to FBF and micronutrient supplementation (see Table 1). To validate the FBRs, mothers of children 6–23 months and PLW were asked to practice the set of FBRs during a 3-week period and participate in a 24-hour dietary recall, food frequency questionnaire, and a set of three interviews about the FBRs covering their intentions to put them into practice, perceived difficulties or barriers, and any changes and substitutes introduced. Focus group discussions were held with mothers, PLW, and families involved in agriculture. Key informant interviews were held

with local leaders and health workers. A market survey was conducted of available products and prices. Although not generalizable due to the small sample size, findings provided insight into the feasibility and acceptability of the FBRs.

Based on the FBR trial findings, the recommended foods were considered acceptable, but putting the FBRs into practice with the recommended frequency and quantity was difficult. Challenges included financial limitations, seasonal price variation, difficulties in accessing and storing fresh foods, and the cost and time associated with transport to markets. Most interviewees said they would need to buy the recommended food for the whole family, increasing the cost. Lack of distribution of the FBF Vitacereal negatively impacted the FBRs that used the product.

Further Optifood testing was carried out to examine the impact of adjusting the FBRs to make their adoption more feasible, as well as combining the FBRs with different scenarios of micronutrient supplementation, multiple micronutrient powders (MNPs), and FBF. The new set of FBRs omitted the potato recommendation for children and PLW, omitted oranges for PLW, and limited the vegetable servings for PLW from 28 to 14 per week (see Table

**Table 1. Summary of FBRs tested for PLW and children 6–23 months in the Western Highlands**

<b>Pregnant and Lactating Women</b>	<b>Children 6–11 Months</b>	<b>Children 12–23 Months</b>
Drink a cup of thick fortified drink ( <i>atole espeso</i> ) made with Incaparina, Vitacereal, or fortified oatmeal every day.	Give your child a medium-sized potato 3 times a week.	Give your child a medium-sized potato 4 times a week.
Eat 4 servings of vegetables every day of the week.	Give your child beans 3 times a week.	Give your child beans 4 times a week.
Eat a large potato every day.	Give your child half a medium-sized egg at least 3 times a week.	Give your child a medium-sized egg at least 4 times a week.
Eat beef liver or chicken liver once a week.	Give your child Incaparina or Vitacereal as porridge 5 times a week.	Give your child green leafy vegetables 4 times a week.
Eat an orange 3 times a week.		Give your child Incaparina or Vitacereal as porridge 4 times a week.

2). The analysis showed that when micronutrient supplements or MNPs are consumed along with a feasible set of FBRs that includes fortified blended flour, these combinations are capable of supplying most problem nutrients for PLW and children 6–23 months, provided the micronutrient supplements or MNPs are consistently available and consumed with the recommended frequency.

To promote the FBRs, it will be necessary to integrate them within the government's broader strategy that is focused on reducing stunting in these regions of the Western Highlands. It will also be necessary to ensure that the approach is integrated at multiple levels including the policy, program, community, household, and individual levels. The following recommendations were developed related to the FBRs.

## Nutrition Recommendations

- Promote the FBRs alongside broader infant and young child feeding practices and improved food hygiene practices.
- Consider the FBRs as ideal practices to be promoted, recognizing challenges for ideal use.
- Prioritize the most nutrient-dense FBRs.
- Promote a simple preparation of fortified porridge.
- Identify and promote other local foods with similar nutrient profiles for seasonal accommodation.
- Target multiple decision makers within households.

**Table 2. New FBRs developed for PLW and children 6–23 months in the Western Highlands**

<b>Pregnant and Lactating Women</b>	<b>Children 6–11 Months</b>	<b>Children 12–23 Months</b>
<ol style="list-style-type: none"> <li>1. Drink a cup of thick fortified drink (<i>atole espeso</i>) made with FBF or fortified oats every day. <i>Serving size: 2 heaping tablespoons of dry FBF or fortified oats with a cup of boiled or treated water.</i></li> </ol>	<ol style="list-style-type: none"> <li>1. Continue to breastfeed on demand.</li> </ol>	<ol style="list-style-type: none"> <li>1. Continue to breastfeed on demand.</li> </ol>
<ol style="list-style-type: none"> <li>2. Eat 2 servings of vegetables every day of the week. <i>Serving size: 1 medium tomato, half a carrot, or 1 cup of chopped vegetables.</i></li> </ol>	<ol style="list-style-type: none"> <li>2. Give your child fortified porridge 5 times per week, or as often as possible. <i>Serving size: 1 tablespoon of dry FBF mixed with 1/3 cup of boiled or treated water.</i></li> </ol>	<ol style="list-style-type: none"> <li>2. Give your child fortified porridge 4 times a week. <i>Serving size: 2 tablespoons of dry FBF mixed with 1/3 cup of boiled or treated water.</i></li> </ol>
<ol style="list-style-type: none"> <li>3. Eat beef liver or chicken liver once a week. <i>Serving size: 90 grams (3 ounces) of liver (chicken livers or beef liver).</i></li> </ol>	<ol style="list-style-type: none"> <li>3. Give your child half an egg at least 3 times a week. <i>Serving size: 1/2 of a well-cooked, medium-sized egg (yolk and white).</i></li> </ol>	<ol style="list-style-type: none"> <li>3. Give your child an egg at least 4 times a week. <i>Serving size: 1 well-cooked, medium-sized whole egg (yolk and white).</i></li> </ol>
	<ol style="list-style-type: none"> <li>4. Give your child beans 3 times a week. <i>Serving size: 2 tablespoons of cooked beans. Prepare mashed, pureed, or refried.</i></li> </ol>	<ol style="list-style-type: none"> <li>4. Give your child beans 4 times a week. <i>Serving size: 2 tablespoons of cooked beans. Prepare whole, mashed, pureed, or refried.</i></li> </ol>
		<ol style="list-style-type: none"> <li>5. Give your child green leafy vegetables 4 times a week. <i>Serving size: 1/2 a cup of cooked green leafy vegetables, for example, Swiss chard, spinach, or macuy leaves.</i></li> </ol>

## Household Production Recommendations

- Prioritize nutrient-dense foods for production.
- Explore options for home processing of the recommended foods to make them more convenient to feed children.
- Support improved storage for perishable food.
- Promote technical assistance for raising egg-laying chickens.
- Provide technical assistance to select and cultivate highly nutritious vegetables.

## Economic and Market Access Recommendations

- Explore options for the government's safety net programs to expand access to the recommended foods.
- Advocate for prioritization of household expenditures for the foods promoted in the FBRs.
- Promote economic access to an FBF (e.g., Incaparina) if an FBF is not being distributed.
- Support access to local markets or mobile vendors to ease transportation cost and time burden.

## Policy and Programmatic Recommendations

- Strengthen the national program for family agriculture.
- Ensure that micronutrient supplementation is appropriately targeted to the problem nutrients.
- Ensure procurement and distribution of micronutrient supplements.
- Support strategies to improve uptake of and compliance with supplementation programs.
- Consider an improved micronutrient powder for children 6–23 months and PLW, in place of an FBF.
- Support food-based safety nets that support local production, such as vouchers for local eggs.
- Advocate for the creation of small scale private-public partnerships to increase access to the recommended foods.

**Learn more about the Guatemala Optifood study at [www.fantaproject.org/tools/optifood](http://www.fantaproject.org/tools/optifood).**

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