



Food-Based Approaches to Improve the Quality and Diversity of Diets in the Western Highlands of Guatemala

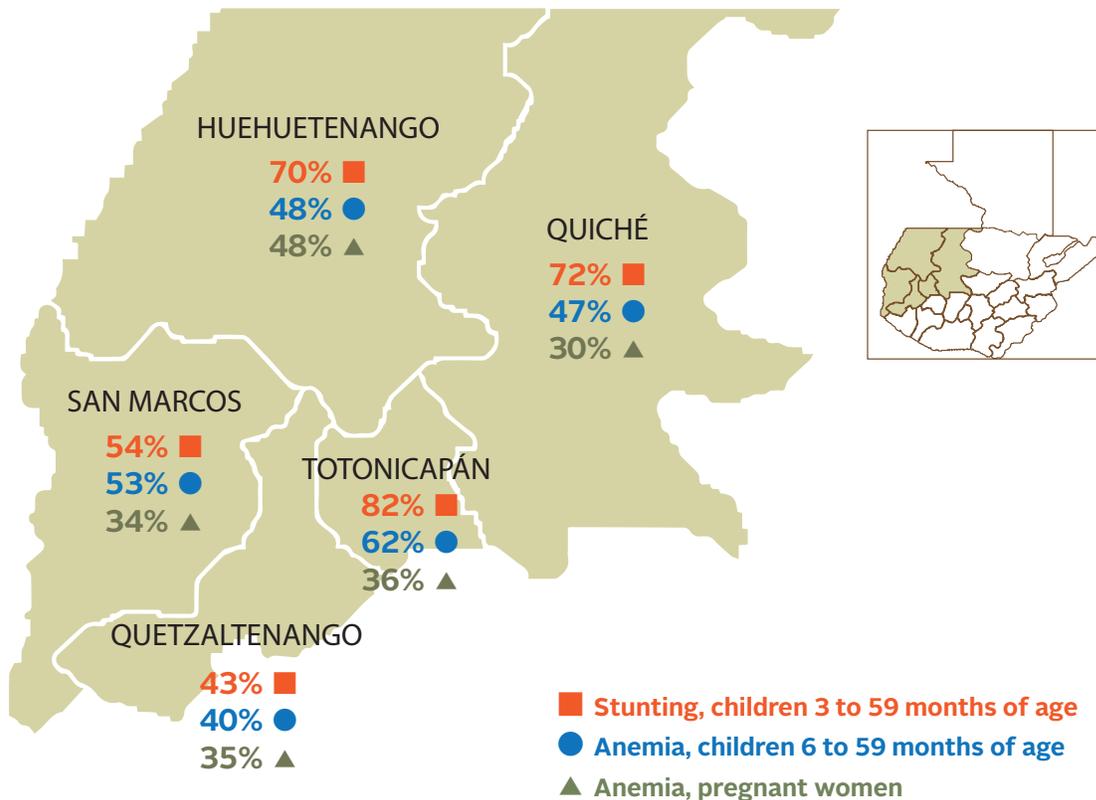
FEBRUARY 2015



Nutritional Status of Women and Children in Guatemala

Nearly half of Guatemalan children under 5 years of age are stunted, indicating a high level of chronic malnutrition with severe consequences for the physical and cognitive development of affected children, their communities, and the country overall. Anemia is also of critical importance, as nationally, nearly half of children under 5 are anemic, and anemia affects 29% of pregnant women. Iron deficiency anemia contributes substantially to maternal deaths, perinatal mortality, and low birth weight and is related to decreased cognitive development and lower future earnings. In areas of the Western Highlands, stunting and other indicators of poor nutrition are even more pronounced (see Figure 1). The high prevalence of stunting and anemia in Guatemala has been attributed to suboptimal infant and young child feeding practices, low dietary diversity, food insecurity, and poor access to health services. In response, the U.S. Agency for International Development (USAID) is supporting the Guatemalan Government efforts outlined in the Zero Hunger Pact Plan, to reduce the prevalence of stunting in the country through integrated health, nutrition, agriculture, and local governance projects in the Western Highlands.

Figure 1. Prevalence of Chronic Malnutrition and Anemia in Five Departments of the Western Highlands



Data source: Encuesta Nacional de Salud Materno Infantil 2008-2009

Given the pervasiveness of stunting and anemia in Guatemala, it is important to question whether current dietary practices and locally available foods are capable of meeting dietary needs, particularly during the 1,000-day window of opportunity from a woman's pregnancy to when her child reaches 2 years of age, which is when rapid physical growth occurs and cognitive development is critical. Along with optimal breastfeeding practices, adequate nutrition during pregnancy and complementary feeding through 2 years of age are recognized as key interventions to reduce chronic malnutrition.

To improve the nutritional quality of diets for women and children in the Western Highlands, the USAID-funded Food and Nutrition Technical Assistance III Project (FANTA) partnered with the Institute of Nutrition of Central America and Panama (INCAP) to use Optifood, a linear programming software package, to identify a set of evidence-based and population-specific dietary messages known as food-based recommendations specifically targeted for children 6–23 months of age and pregnant and lactating women. Optifood analyzes the actual dietary patterns of the target group and the costs of local foods that will meet or come as close as possible to meeting the nutrient needs of specific groups—typically children under 2 years of age, pregnant women, and lactating mothers. Optifood also indicates when local foods are unlikely to provide adequate nutrient intake and additional products are needed, such as fortified-blended food, micronutrient supplements, animal-source food, biofortified crops, etc., which could be added to the local diet to meet nutritional needs. Lastly, Optifood identifies the lowest-cost combination of local foods that will meet or come as close as possible to meeting the nutrient needs of specific target groups. This information helps to flag circumstances in which a nutritionally adequate diet is inaccessible due to cost and additional support is needed through safety nets or other programs.

Determining the Diets of Women and Children

A first step in developing food-based recommendations is to collect data on existing diets and cost of food for the population being targeted. In 2012, with support from FANTA, INCAP carried out a cross-sectional survey in Quiché and Huehuetenango in the Western Highlands to collect information on diets, nutritional status, food security, household socio-economic conditions, and costs of locally available food. The main findings include the following.

- Women and children lived in predominantly rural, indigenous households characterized by high prevalence of stunting and anemia.
- Many families (more than a third) produced food in a home garden and most (82%) kept livestock.
- The largest problems identified in the diets of women and children were related to diet quality, not to the quantity of food consumed in terms of energy and calories.



- Diets were largely similar across both departments; foods most commonly consumed included tortillas and other maize products, potatoes, black beans, sugar, tomatoes, onions, eggs, and coffee.
- The dietary diversity of children in the study was low—only 36% of children 6–8 months, 49% of children 9–11 months, and 37% of children 12–23 months met the minimum standards for dietary diversity, defined as consuming food from at least four food groups on the day before a 24-hour dietary recall.
- Foods of animal origin, with the exception of eggs, were almost completely absent from observed diets.
- Although the average protein density of food consumed by children in the study was considered adequate, most protein was obtained from plant-based food as opposed to animal-source food. As such, the quality of protein consumed by the population may be inadequate. Protein consumption was not adequate to meet the requirements for pregnant and lactating women. Similar to children’s diets, protein consumed by women came mainly from plant sources (such as maize and beans), rather than from animal-source food.
- Complementary food consumed by children was low in iron and zinc.
- There was significant consumption of food low in nutritional value. Dehydrated soups and bouillon cubes were among the 10 most reported foods for some of the target groups.

Results of the Optifood Analysis

The Optifood analysis revealed “problem nutrients” (nutritional requirements that are likely to remain low in diets due to low availability in local food sources and/or to existing dietary patterns among target groups) (see Figure 2). Optifood results show that breastfed children under 2 years of age are unlikely to consume adequate amounts of iron, zinc, and niacin, and non-breastfed children under 2 years of age are unlikely to consume adequate amounts of iron, vitamin B12, and niacin. Pregnant women are unlikely to consume adequate amounts of iron, zinc, and folate, while lactating mothers may lack zinc, vitamin B12, and vitamin C.

Data from the analysis was then used to establish a set of food-based recommendations, which take into account dietary preferences and patterns, nutritional requirements of the target population, accessibility and nutritional content of locally available food, and the cost of those foods. As well as recommending the quantity and frequency of consumption of available food, if the diet is still insufficient using local food, Optifood can test the contribution of additional products to enhance nutrient intake. As shown in Figure 2, the analysis found that for all target groups, it is critical to combine food-based recommendations with fortified-blended food to meet nutrient needs. For the youngest children, 6–8 months of age, micronutrient gaps were always present in the diet, requiring extra nutritional support to reach dietary adequacy, such as from a multiple

Figure 2. Problem Nutrients

	Breastfed children			Non-breastfed children	Women	
	6–8 months	9–11 months	12–23 months	12–23 months	Pregnant	Lactating
Iron	▲	●	●	●	▲	
Zinc	▲	●	●		●	●
Vitamin B12				●	◆	◆
Folate					●	●
Vitamin C						■
Niacin	●	●	●	●		

- ▲ Not possible to meet nutrient requirements
- Not possible to meet nutrient requirements without fortified-blended food
- ◆ Not possible to meet nutrient requirements without liver
- Not possible to meet nutrient requirements without oranges

micronutrient supplement like Chispitas. The analysis also identified local food sources that would improve intake of particular nutrients for the targeted groups. However, there may be constraints to meeting dietary needs with these foods due to their cost, seasonal availability, dietary preferences, or a range of other factors.

Initial Recommendations Based on Optifood Results

Food-Based Recommendations for Children 6–11 Months of Age

In addition to continued breastfeeding, appropriate complementary food needs to be introduced into the diet starting at 6 months of age. Recommendations for children 6–11 months include consumption three times per week of a fortified-blended food (such as Vitacereal or Incaparina), egg, beans, and potatoes; consumption of maize products seven times a week; and consumption of breast milk and micronutrient supplements (for example, the micronutrient powder Chispitas, as per Ministry of Health guidelines for this age group).

Food-Based Recommendations for Children 12–23 Months of Age

In combination with breastfeeding and micronutrient supplementation (in accordance with Ministry of Health guidelines), children 12–23 months should consume a fortified-blended food four to five times a week, depending on if the child is breastfed; eggs, beans, green leafy vegetables (including chayote squash), and potatoes four times per week; and maize products seven times a week. For children 12–23 months who are not breastfed, dietary requirements are greater and include additional requirements for animal milk.

Food-Based Recommendations for Pregnant and Lactating Women

In combination with other food and supplementation with iron and folic acid (according to Ministry of Health guidelines), pregnant and lactating women should consume fortified-blended food, green leafy vegetables (including chayote squash), and potatoes seven times a week; liver once a week; and oranges (for lactating women) three times a week.

Lowest Cost of Diets That Come as Close as Possible to Meeting Nutrient Needs

Table 2 presents the lowest-cost diet (in U.S. dollars) that meets or comes as close as possible to meeting nutrient needs, and the foods that contribute at least 10% of the cost. These lowest-cost diets ranged from about \$0.23/day for children 6–8 months to about \$2.41/day for lactating women. Considering that average household size among the study

population was seven people, with 51% of the population living on less than \$3.13/day (15% earn less than \$1.50/day), it appears that a nutritionally adequate diet for young children and pregnant and lactating women is not affordable for many households in the Western Highlands.

Table 2. Lowest-Cost Diets for Target Populations

Target group	Cost (US\$ equivalent/day)	Foods that contribute $\geq 10\%$ of cost*
Breastfed children 6–8 months	0.23	Tortilla or other maize product (24%) Egg (11%) Incaparina (10%)
Breastfed children 9–11 months	0.33	Egg (21%) Tortilla or other maize product (10%)
Breastfed children 12–23 months	0.54	Egg (35%)
Non-breastfed children 12–23 months	0.72	Eggs (17%) Tortilla or other maize product (16%) Bread (13%)
Pregnant women	1.97	Tortilla or other maize product (28%) Chicken (12%)
Lactating women	2.41	Tortilla or other maize product (39%)

* Value in parentheses is the percentage of the total cost spent on that food.

How the Results are Being Used

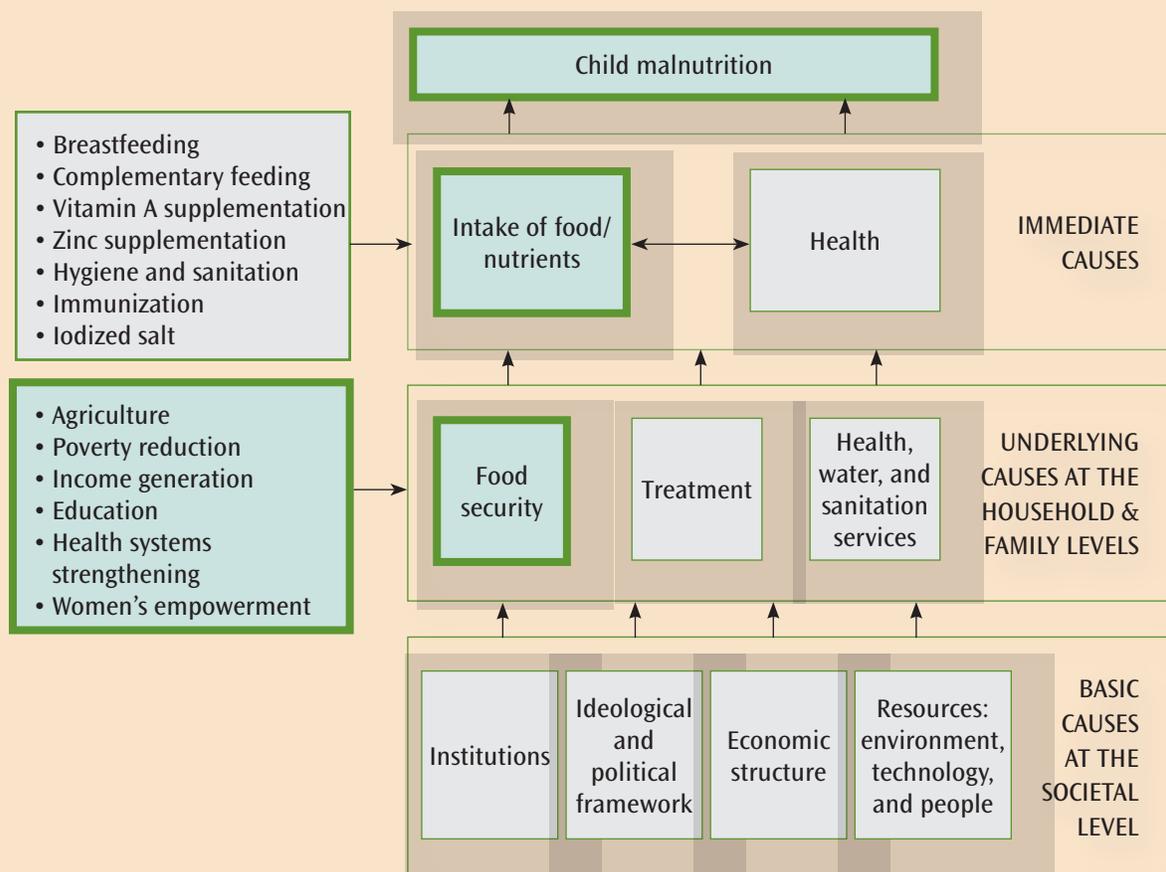
To date, the results of the survey and the subsequent Optifood analysis have been used to:

- Identify nutrient gaps in the dietary patterns of the target populations. These findings are facilitating discussion among private sector stakeholders, government, and donors to review options for food fortification, especially fortified-blended food and sugar.
- Raise awareness among government agencies, USAID and its partners, and other stakeholders of the importance of physical and economic access to the recommended foods.
- Identify agricultural actions to support local production of the recommended foods.
- Encourage training for agricultural extension workers to support production of high-nutrient foods, especially those working in the Family Agriculture Program.
- Support and contribute to a national project to update dietary guidelines for children under 2 years, a process that is being led by the Ministry of Health.

The Link between Agriculture and Nutrition

In the Western Highlands, many families depend on agricultural production for survival by producing their own food for consumption and sale and/or generating income from participation in seasonal agricultural work. As such, the quality and diversity of local food production, along with access and availability of food, are important factors in improving health and nutritional status. Support for local agricultural production is a key action of the government's Zero Hunger Plan. Figure 3 shows that agriculture is one of the key interventions that can affect household food security and thus intake of food and nutrients at the household level. In turn, agricultural production is affected by the basic causes of malnutrition, especially those related to resources, social capital, and financial capital.

Figure 3. Child Nutrition Status Determinants and Interventions to Address Them



Adapted from UNICEF. 1990. *Strategy for Improved Nutrition of Children and Women in Developing Countries*; and Black et al. 2013. "Maternal and child undernutrition and overweight in low-income and middle-income countries." *The Lancet*. Vol. 382, Issue 9890, pp. 427–451.



Next Steps

- In close coordination with the Ministry of Health, FANTA, INCAP, and Nutri-Salud, will test the acceptability and feasibility of implementing the food-based recommendations by asking families in Huehuetenango and Quiché to try the food-based recommendations in their households. These trials examine factors such as availability and access to food, seasonality, agricultural practices, time available for women to engage in the recommended actions, and long-term willingness to adopt the recommendations. The result will be a modified set of recommendations for each target group, as well as additional considerations regarding support for: agriculture and/or livestock production, the use of fortified-blended food or micronutrient supplements, safety-net programs, and nutrition education.
- USAID and its partners will develop a social and behavioral change communication strategy for promoting the food-based recommendations.
- An interagency group that includes USAID partners, research centers, and universities will help strengthen national capacity to use and understand the results from Optifood.

For more information see the full report: [Development of Evidence-Based Dietary Recommendations for Children, Pregnant Women, and Lactating Women Living in the Western Highlands of Guatemala](http://www.fantaproject.org/countries/guatemala) at www.fantaproject.org/countries/guatemala.



This brief is made possible by the generous support of the American people through the support of the Office of Health, Infectious Diseases, and Nutrition, Bureau for Global Health, U.S. Agency for International Development (USAID), and USAID/Guatemala under terms of Cooperative Agreement No.AID-OAA-A-12-00005, through the Food and Nutrition Technical Assistance III Project (FANTA), managed by FHI 360. The contents are the responsibility of FHI 360 and do not necessarily reflect the views of USAID or the United States Government.

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