

## MASFRIJOL: Linking Agriculture and Nutrition to Improve Health in Guatemala's Western Highlands

Although beans and maize were domesticated in the Americas and are traditional staples of the indigenous Mayan peoples in Guatemala's western highlands, undernutrition plagues the people living in this region, with more than half the children suffering from chronic malnutrition and stunting. Globally, the Mayan populations in the western highlands persist as the most undernourished population in the Americas and the sixth most undernourished in the world.

Although beans and maize provide a quality protein when eaten together, access to sufficient beans for household consumption is inadequate to meet the nutritional needs of the populations living in Guatemala's western highlands. Low bean production from limited access to farm land and low productivity from the inability of most bean varieties to grow well at elevations 2,500 meters above sea level—an altitude well exceeded in the western highlands—has made beans scarce and expensive. These high prices, along with little understanding of beans' nutritional value, have, in the past, led smallholder farmers to sell them.



Beans are intermixed with corn in farmers' fields in Guatemala, a practice called the *milpa* system.  
Photo: Kurt Stepnitz, CABS, MSU



Most of the food eaten in Guatemala's western highlands is corn-based, which leads to poor nutritional outcomes.  
Photo: Kurt Stepnitz, CABS, MSU

Additionally, limited means for safely storing beans results in their availability for consumption remaining strictly seasonal. Consequently, households don't regularly serve beans at meals; when beans are served, the quantity is small. Instead, the people predominantly consume foods made from maize, which lessens their hunger but doesn't provide sufficient nutrition for optimal health and development.

With household food choices depending on a personal family field or locally grown crops, improved nutrition cannot be achieved without sufficient increases in the availability of beans and education on eating, not selling, them. Consequently, as the first step in carrying out its goal of improving nutrition, MASFRIJOL provides



Improved bean varieties that grow well in the western highlands help farmers harvest better yields.

smallholder farmers with high quality seed of improved, disease-resistant varieties adapted to the agroecologies of the western highlands. These altitude-appropriate varieties, along with education and training on such topics as soil

preparation, seed germination, and safe bean storage, help farmers improve their integrated crop management to grow and to store greater quantities of beans. Information on how to save seed for the next season's planting and locally run community seed banks ensure that quality seeds for planting will continue to be available to farmers every year.

At the same time as MASFRIJOL's extension educators are distributing improved bean seed varieties and presenting state-of-the-art information and training to local farmers on crop management practices for



MASFRIJOL nutrition educators meet with mothers of young children in Quetzaltenango, a small village in the western highlands, to teach how a diet that includes beans can improve family health. *Photo: Kurt Stepnitz, CABS, MSU*

achieving better yields, they are also establishing educational programs throughout the western highlands to increase household understanding of the link between regularly eating beans with maize—and other local foods—for improved health.

Educational programs include dietary information designed for both the general adult population and the more vulnerable populations of women of childbearing age and young children. Educational gatherings feature videos on health topics along with discussion of the material and how to apply it, and an activity that allows attendees to practice what they've learned.

For example, a video on protein complementarity is followed by a discussion on how to proportionally integrate maize and beans into a recipe and then a chance to try recipes, which educators then distribute. Other teaching programs focus on the dietary health of children (for example, information on how to make a healthier formula for young children to replace atole, a maize-sugar beverage given to infants that provides calories but little nutrition) and include instruction and practice on how to prepare an appetizing bean-based porridge that young children enjoy.

Pairing the seed distribution and first planting of improved bean varieties with nutrition education multiplies the program's effectiveness. Because the educational programs focus on the nutritional value of beans along with how to prepare them, households that suddenly find themselves with a large bean harvest know how to use them most advantageously. Instead of educators telling the people that they should eat more beans before they even possess them, educators are preparing the local people to use the improved bean harvests to their best advantage. Cross-trained and working together, agronomists and nutritionists present integrated and improved farming and nutrition messages to maximum effect, ensuring that the improved agriculture practices and technologies that lead to improved crop yields also lead to increased bean consumption and, ultimately, improved nutrition throughout the region.



Bean-stuffed tortillas provide a complete protein. Recipes for these and other nutritious bean-based meals are taught and distributed by nutrition educators through the MASFRIJOL project in Guatemala's western highlands.