FORUM

Not Just More . . . But More Nutritious Food

Agricultural science has provided the leadership required to meet the demand for an increasing world food supply. Around the globe, farmers produce enough calories to feed every person in the world, yet it is widely accepted that over 800 million people are starving or severely malnourished. Adequate supplies of nutritious food are not yet available to all. ARS and its scientists are working with their partners worldwide to meet these challenges now and for the future.

Supplements and food fortification may help to allay nutritional deficiencies for the short term. The long-term solution, however, must come from developing crops that are more nutritious and that thrive under stressful conditions in poorer soils.

At our U.S. Plant, Soil, and Nutrition Laboratory in Ithaca, New York, ARS scientists have worked with Cornell University colleagues and with international agricultural research centers in Asia, Latin America, and Africa to screen beans, rice, wheat, and, currently, corn. They look for genotypes that are high in iron, zinc, and provitamin A—the three micronutrients most lacking in diets worldwide. These same scientists are also assessing levels of compounds known to interfere with our ability to absorb these nutrients from foods.

Across the country at the Small Grains and Potato Research Unit in Aberdeen, Idaho, an ARS scientist has developed corn genotypes having low levels of phytic acid, a compound that inhibits absorption of some nutrients. This low-phytate trait has been bred into commercial seed. Now our scientist is ensuring that his collaborators in Guatemala get enough of the low-phytate seed to conduct a 5-year study of zinc absorption involving 700 poor families.

In Houston, Texas, at the Children's Nutrition Research Center, an ARS scientist collaborates with other agency scientists and international researchers to profile genotypes of peas, green beans, broccoli, and other vegetables for one or more vitamins and minerals important to children's health.

In Madison, Wisconsin, at the Vegetable Crops Research Unit, an ARS scientist breeds carrot lines high in beta carotene, which the body converts to vitamin A. The lines also have traits that will enable them to grow in developing countries. In Maryland, California, Washington, and Oklahoma, scientists are breeding crops like tomato, potato, and watermelon for higher content of antioxidants (see related story on page 6). The efforts of these and many other ARS scientists and their colleagues eventually will lead to crops and processed foods that could alleviate nutritional deficiencies, or "hidden hunger," and its accompanying diseases.

If agricultural research is going to improve the nutritional status of nearly 1 billion malnourished people, it will only happen through worldwide collaboration. ARS' primary contribution will be in the areas of plant germplasm, genetics, and breeding. These efforts are being augmented by new and exciting developments in molecular biology, biotechnology, and genomics. By understanding the available diversity and genetic basis for variation in phytonutrient levels, we can exploit those traits to modify the nutritional components of plants.

While the agency focuses on national needs and priorities, we freely share our information, our scientific expertise, and our germplasm internationally. For instance, ARS supports 23 repositories for seeds and cuttings for a wide variety of fruits, vegetables, beans, nuts, and grains, plus forage and natural fiber crops. These repositories annually send an average of 120,000 seed samples or cuttings to plant scientists and collections, with 30,000 to 40,000 going to foreign countries.

With help from our Office of International Research Programs (OIRP), ARS scientists collaborate in hands-on research with scientists in some 70 countries and interact at international conferences, some of which they help organize. This year, an OIRP staffer is helping to coordinate three workshops in sub-Saharan Africa that will help bring biotechnology to Africa to deal with food shortages and other nutrition problems.

Improving the nutritional quality of the U.S. food supply will also help alleviate hidden hunger in other parts of the world. Like it or not, we are role models for people in many parts of the world—people who are trying to adopt our lifestyle and diet.

Though Americans have not always been keenly aware of the nutritional value of the food they consume, that is changing. U.S. consumers are likely to continue to demand more from their food than ever before. This desire will continue to drive the nutritional enhancement of our traditional food crops as well as new advancements in development of nutraceutical foods.

New challenges and technologies have brought together scientists from many disciplines in the plant, animal, and natural resource sciences to address these issues in ways we perhaps never dreamed possible. The result is a stronger and more cooperative network of science that can be used against the problems posed by hunger and malnutrition. The ARS mission and its scientists are committed to a long-range and global view of high-quality science that will positively affect the lives of many people.

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