

■ Research, Analysis, and Outreach: Meeting Challenges of the Future

Three major challenges face U.S. agriculture in the coming decade: To increase U.S. competitiveness in a rapidly changing global market; to meet the public's continued demand for safe, nutritious food produced under environmentally-friendly conditions; and to respond to the increasing industrialization of American agriculture.

Helping to meet these challenges is USDA's Research, Education, and Economics (REE) mission area, which includes four USDA agencies: the Agricultural Research Service (ARS), Cooperative State Research, Education, and Extension Service (CSREES), Economic Research Service (ERS), and National Agricultural Statistics Service (NASS). These four Agencies work together to help ensure an abundant, safe food supply; to sustain a viable and competitive food and agricultural economy; and to maintain our environmental and natural resource base. And working together, the four Agencies provide knowledge and cutting-edge technology to ensure that high-quality food and other agricultural products are available to consumers.

REE does economic and social research that supports other USDA programs and policies, providing data, information, education, and economic and statistical analyses on a variety of topics, including rural development, the environment and natural resources, food safety, food prices, farm labor, farm income, financial conditions, commodity markets, and international trade. U.S. agriculture is continually counted, measured, priced, analyzed, and reported to provide the facts needed by Americans working throughout this vast industry.

REE serves American agriculture and rural communities by providing meaningful, accurate, and objective statistical information. Forecasts and estimates for over 165 different crop and livestock commodities are provided annually to help farmers, ranchers, other agribusinesses, policymakers, Members of Congress, and the public make informed decisions.

USDA research and education help develop new products and new uses, improve farming and processing efficiency, explore profitable marketing strategies, increase food safety, and find resource-saving technologies. For example, USDA scientists are developing biodegradable plastic from corn starch, printers ink based on 100 percent soybean oil, and frozen concentrated milk for people who can't get to the supermarket often.

Studies demonstrate that consumers reap the benefits of investing in agricultural research: Every tax dollar invested in the U.S. agricultural system has paid back at least \$1.35. These returns have been broadly shared through lower prices to American

consumers, increased international competitiveness for farmers, jobs for working families, and increased profitability in agricultural industries.

The U.S. agricultural research system, long pre-eminent in the world and a model for other countries, is retooling for the next century by focusing on outcomes. For example, precision agriculture uses satellite systems and tractor-mounted computers to measure yields and anticipate fertilizer and pesticide needs within 2 to 6 feet of the tractor. This will help farmers increase production while preserving the environment. Such dramatic developments will usher in many more—from new discoveries in bioengineering to pathogen reduction in farm animals—which will help U.S. agriculture meet the challenges of the future. The emphasis in today's agricultural research is on integrated pest management (IPM), which puts nature's own biological agents to work along with state-of-the-art farming practices to beat back crop-destroying pests and reduce our need to apply pesticides and herbicides.

USDA works with land-grant institutions and industry to move know-how and technology from the laboratory to farmers, consumers, and agribusinesses. With an eye toward reaping an abundant harvest of scientific expertise, USDA supports research by young people and seasoned scientists at colleges and universities, including 1890 land-grant colleges, throughout the United States. REE works in partnership with the State agricultural experiment station system based at land-grant universities to carry out a balanced program of fundamental and applied research.

USDA's water quality program is a coordinated effort to protect the Nation's waters from contamination by agricultural chemicals. It offers farmers, ranchers, and other land managers the know-how, technical means, and financial assistance to address environmental concerns and State water quality requirements.

Through its sustainable agriculture research and education program, USDA awards competitive grants to producers for on-farm studies and demonstration projects, ranging from specific production practices (such as mechanical weed control or crop rotations) to studies on the quality of life in rural regions. Benefits of these programs include improved profitability, an enhanced natural resource base, and a reasonable quality of life for producers and their communities.

REE also focuses on practical education that Americans need to deal with critical issues in their lives, by linking scientific research to the needs of people. For example, the expanded food and nutrition education program (EFNEP) reaches limited resource audiences, especially youth and families with young children, to improve family diets and nutritional well-being. Since its inception, EFNEP has directly affected over 19 million adults and 4-H youth in all 50 States and in American Samoa, Guam, Micronesia, the Northern Marianas, Puerto Rico, and the Virgin Islands. REE also offers information on issues ranging from community economic development and health care concerns to food safety, water quality, children, youth and families, and sustainable agriculture. Information technology is crucial in the delivery of this knowledge, so REE works with local communities to provide access to information resources via the information superhighway.

REE is also home to the National Agricultural Library (NAL)—a key information resource for agricultural researchers worldwide. Established in 1862, NAL is the largest agricultural library in the world and one of three national libraries of the United States; the other two are the Library of Congress and the National Library of

Medicine. As the Nation's chief resource and service for agricultural information, NAL offers researchers, educators, policymakers, farmers, consumers, and the general public approximately 48 miles of bookshelves in a 14-story building, plus access to the library's two million volumes through its computerized network or electronic bulletin board.