# VII. Research and Extension

**USDA Agricultural Research Scientists engage in a variety of projects to advance the food and agricultural sciences.**

**Commission Recommendations:** The Commission recognized that the traditional focus of Federal research and extension programs is on improving farm productivity with technological improvements. However, the Commission explicitly recommended that USDA's Research, Education, and Economics (REE) agencies shift resources to improving farm profitability through technologies and strategies that optimize farm management skills, reduce capital and operating costs, produce higher valued products, and capture a larger share of the consumer dollar.

Specifically, the Commission recommended that by 2002, at least two-thirds of the Agricultural Research Service research portfolio should consist of projects that contribute to income-earning capacity and competitiveness of small farms.

## AGENCY HIGHLIGHTS

### Agricultural Research Service (ARS)

- ARS finances and conducts research under seven major program activities: Soil, Water, and Air Sciences; Plant Sciences; Animal Sciences; Commodity Conversion and Delivery; Human Nutrition; Integration of Agricultural Systems; and Agricultural Information and Library Services. Within these programs, ARS is continuously capturing opportunities to enhance the sustainability of small farms and rural communities. Using criteria developed in cooperation with the USDA Commission on Small Farms, 1,109 ARS research projects were evaluated in a two-step process.

  First, the ARS research projects were screened to identify those with no direct relevance to small farms. Seven percent of the projects had no direct relevance but many of these focused on human nutritional requirements and food intake relevant to all Americans. In the second step, the 1,109 remaining projects were evaluated using eight criteria to determine if they had a low, medium, or high direct impact on small farm sustainability. The majority of projects (72%) were in the medium category while 12% were in the high.

Although the current ARS portfolio meets the recommendations of the Commission on Small Farms, the Agency is actively seeking ways to increase the percentage of its projects in the high impact category.

- The ARS is using outreach activities to identify the research priorities of limited-resource farmers. One example is the USDA/ARS National Outreach Workshop, "Better Serving the Historically Underserved Farm Community" on November 14-15, 2000 in Laurel, MD. Participants identified eight categories of research needs for the ARS to address: organic farming techniques and markets; genetic studies; cultivation for native plant restoration and re-forestation; irrigation for small farms; pest/weed control; alternate uses of tobacco crop land; grasslands/pasture conservation and productivity; and low-input ranching and using grazing to reduce forest fires. The workshop report is now available by contacting Melinda McClanahan at *mcclanam@ars.usda.gov.*

Following are some research accomplishments that illustrate ARS's contribution in the areas of knowledge, technologies, improved germplasm, and decision-support tools to make small farms more sustainable.

- ***Dogs are a reservoir for Neospora caninum.*** The number one cause of abortions in dairy cattle in California is now attributed to infections with *Neospora caninum.* Scientists at Beltsville, Maryland have demonstrated that dogs are a reservoir for this parasite that results in costly calf losses throughout the world. This information is a key element to understanding the life cycle of this parasite, and provides an immediate means to break the cycle of infection in cattle with neosporosis.
- ***Improved biological control agent for fire blight identified.*** Fire blight, a bacterial disease of apples and pears, causes serious production losses each year, particularly as more susceptible fruit varieties are planted and existing fire blight bacteria become more resistant to commonly used antibiotics. Scientists in Wenatchee, Washington, using a novel technique to produce crab apple blossoms year round, isolated another species of bacterium that is antagonistic to the fire blight organism and is significantly better at controlling the disease than currently available biological agents. Using this new strain will allow fruit producers to better manage the disease and reduce losses in apple and pear orchards.

- **Mating disruption technology for control of the diamondback moth and cabbage looper.** The Food Quality Protection Act of 1996 puts many of the chemical pesticides used for insect pests of cole crops at risk. The loss of these and other insecticides, along with a lack of

**Researchers and investigators, funded by NRCS, conduct important studies to determine whether increased zinc intakes might prevent or help alleviate behavior problems that directly affect school performance and social development for many children.**

suitable substitutes, threaten the economic existence of many small and medium farms. ARS scientists at Gainesville, Florida have developed a highly effective mating disruption system that conserves insects which are natural enemies to the diamondback moth and cabbage looper in Florida's cole crops. This mating disruption system helps control the damage done by insect pests of cole crops at risk, especially cabbage. Pheromone treated fields generally required 80 percent fewer insecticide applications compared to conventional control practices. This technology has also been used successfully to control beet armyworm in cotton. It is being commercialized by the Shin-Etsu Chemical Company and United Agri-Products.

- **Zinc status is predictive of mood disturbances and behavior problems.** Investigators at the Grand Forks Human Nutrition Research Center, in collaboration with investigators from Texas, have provided the first evidence that zinc status is predictive of mood disturbances and behavior problems in school-aged children. Researchers point to the need for further study to determine whether increased zinc intakes might prevent or help alleviate mood and behavior problems that directly affect school performance, cognitive and social development, and quality of life for many children.

- **Early nutritional deficits affect learning ability.** Investigators at the Arkansas Children's Nutrition Center found that elementary children and junior high school children who were undernourished at a younger age had slower reaction times which point to less automated work recognition, and differences in neurophysiology of specific brain areas, frontal sites, that are often linked to post-decisional information processing. These results are important because they suggest that early nutritional deficits can produce problems related to information processing that can impair learning ability.

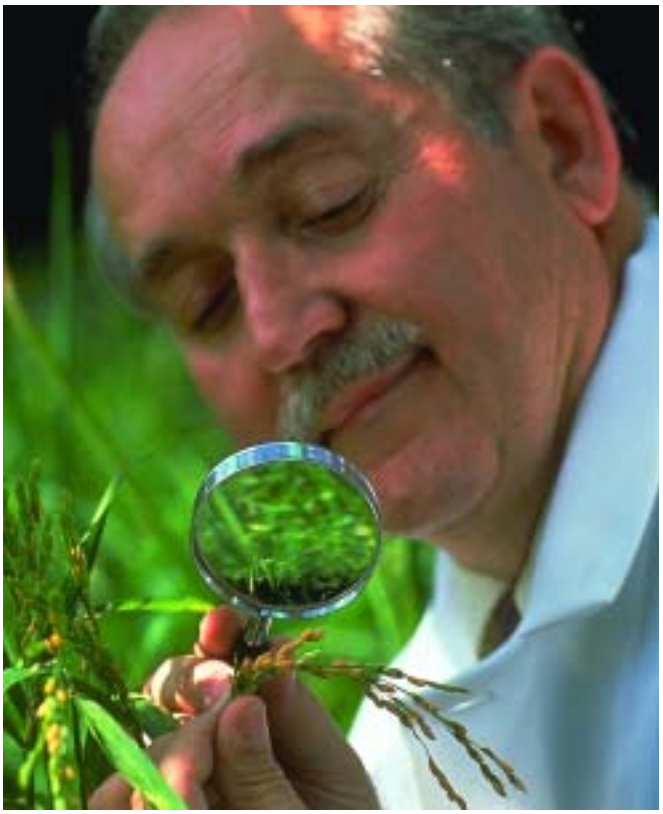
- **Increasing small-farm profitability by supplementing cows on pasture with corn.** Thousands of farms across the South raise beef cattle on Bermuda grass pastures that decline in nutritional value in the late summer. As a result of this nutrient deficiency, producers are not able to put weight on their cattle and have to sell the animals. Researchers in Booneville, Arkansas, using corn to supplement stocker steers on pasture, found that 2 pounds of corn per day per animal increased average daily gain by 26%; 3 pounds by 42%; and 5 pounds by 40%. Economic analysis showed that 3 pounds per day provided the best net return over a wide range of cattle and corn prices. The increased rates of gain allow producers to keep their cattle on the farm longer and add value profitability before they sell the animals in the Fall.

- **Cultural and composting practices improve soil quality and decrease plant disease.** Intensive crop production practices can decrease soil quality and increase the incidence of plant diseases leading to a non-sustainable production system increasingly dependent upon expensive and potentially harmful inputs. ARS researchers at Beltsville, Maryland developed a production system for strawberries and other fruit and vegetable crops using on-farm compost and cultural practices, such as drip irrigation, mulch and use of disease-free stock at planting, that can replace fumigation with methyl bromide, a chemical that will soon be banned. These practices, for example, have been shown to be effective in controlling the devastating red stele disease in strawberries while improving soil tilth. This more sustainable system can be used by all sizes of operations and is especially useful for smaller (e.g., pick your own) growers producing high quality, high value crops.

- **Catfish fingerlings fed daily in mixed cultures have higher production.** Catfish cultured in commercial ponds are often fed every other day during extremely hot weather; however, fewer feeding days can result in lower yields and economic returns. Scientists at the ARS Aquaculture Systems Research Unit in Pine Bluff, Arkansas compared production of mixed size groups of channel catfish fed daily with those fed every other day when pond water temperatures were 90º Fahrenheit or higher. Results showed that fingerlings fed every day had higher survival rates, grew 70 percent larger, and had 23 percent greater net production than fingerlings fed every other day. Based on these results, every-day feeding, even during extremely hot weather, will result in higher production efficiency and profits.

- **Marker strains of Aspergillus flavus facilitate crop resistance determination.** Aflatoxins are natural poisons produced by two common fungi, *Aspergillus flavus* and *Aspergillus parasiticus*. These fungi invade crops such as corn, peanuts, cotton, and treenuts which produce aflatoxins, making the crops unfit for sale under existing regulatory guidelines. ARS scientists have developed marker strains of *A. parasiticus* to monitor the progression of aflatoxigenic fungi during invasion of corn and cotton and their ability to make toxin. These marker strains of the fungus allow rapid screening of the germplasm of affected crops, to determine resistance to fungal invasion and toxin formation.

- **Future weed management strategies may require modification.** It may be more difficult to deal with weeds as atmospheric carbon dioxide increases in the next century. Photosynthesis and growth are stimulated in weeds such as lambs' quarters that use the so-called C3 pathway for carbon assimilation. ARS scientists in Beltsville, Maryland have shown that the sensitivity of lambs' quarters to glyphosate, the active ingredient in a widely used herbicide, is reduced at carbon dioxide levels expected in the next century. Application of the recommended herbicide dose killed 100 percent of the plants at current carbon dioxide levels, but higher doses were required as the carbon dioxide levels increased. In contrast, higher carbon dioxide levels did not affect the herbicide's effectiveness on pigweed, which uses a different pathway for carbon assimilation. These results indicate that weed management strategies may require modification in the future as atmospheric composition changes.



**Scientists at USDA's Agricultural Research Service conduct important studies that have saved farmers, ranchers, and dairy producers millions of dollars in direct costs, increased productivity, and an increase in overall profitability in farm and ranch operations.**

- **Reducing phosphorus supplementation in dairies will improve profitability and environmental quality.** Excessive accumulation and runoff of phosphorus are major environmental concerns when manure is applied to croplands. A survey of farms by ARS scientists at Madison, Wisconsin found that dairy producers frequently feed excess supplemental phosphorus because of a current myth that dairy cattle must be fed above recommended levels to prevent the loss of milk production and poor reproduction. Research at the

U.S. Dairy Forage Research Center showed that the recommended levels easily met the animal's needs for milk production and reproduction without using phosphorus from the bone. Their research also estimated that reducing phosphorus supplementation to recommended levels would save the U.S. dairy producers $100 million annually in direct costs and reduce by 60 percent the number of farms where the phosphorus in manure exceeds the phosphorus used by crops.

- **A region on chromosome 2 in cattle contains a gene(s) that influences birth weight.** Large birth weight is a major cause of calving difficulty and consequent calf mortality. Selection for lower birth weights alone also reduces subsequent growth rate. ARS scientists conducted a genomic study and found that a region of chromosome 2 contains a gene or genes that affects birth weight without any affect on subsequent growth. This discovery is important because it will increase the number of live calves produced and the overall profitability of cattle production. Producers will be able to use DNA markers to select cattle with lower birth weights and less calving difficulty and still be able to maintain high growth rates.

- **Polarization as a methyl bromide replacement.** Methyl bromide, a widely used soil and postharvest commodity fumigant, is scheduled to be banned in 2005 because of damage to the stratospheric ozone layer. Unless practical, economical alternatives are found, growers and other methyl bromide users will be negatively impacted.

An ARS scientist at the U.S. Horticultural Research Laboratory, Fort Pierce, Florida covered the soil under clear plastic for at least 6 weeks during summer to "cook" weed seeds, diseases and some nematodes. Yields on 3 pepper fields were comparable to those receiving methyl bromide fumigation. In tests run on an organic farm, production rose 30 percent, labor dropped 75 percent, and profits jumped 100 percent. This technique works for crops planted in the fall and requires that fields be prepared at least 6 weeks before planting.

## Cooperative State Research Education and Extension Service (CSREES)

- **USDA Advisory Committee on Small Farms and USDA Small Farms Coordination.** CSREES and NASS teamed up to support these two USDA small farms groups: On December 10, 1999, a notification of appointment to the USDA Advisory Committee on Small Farms, containing the names of 19 individuals, was published in the *Federal Register* (Volume 64, No. 237, pg. 69222-69223). The terms of all members expired in November 2001, two years after initial nominations.

  The USDA Advisory Committee on Small Farms was established to maintain an external advisory mechanism on small farm issues after the charter of the National Commission on Small Farms expired in July 1999. Establishment of the Committee also ensured the continued consideration and implementation of the 146 recommendations made by the USDA National Commission on Small Farms in its report, *A Time to Act*. In addition, the Committee does the following:
  - Monitors government and private sector actions, policy, and program proposals that relate to small farms, ranches, woodlots, and farm workers,
  - Evaluates the impact such actions and proposals may have upon the viability and growth of small farms, ranches, woodlots, and farm workers, and
  - Reviews USDA programs and strategies to implement small farm policy and advises the Secretary on actions to strengthen USDA programs for small farmers and ranchers.

The Committee is in the public interest and within the duties and responsibilities of the Department of Agriculture.

- **CSREES Initiative for Future Agriculture and Food Systems (IFAS) Grant Program:** The Farm Efficiency and Profitability Program Component, targeted for small to mid-sized farms, funded 19 projects totaling $18.8 million in FY 2000. The program in FY 2000 placed the most emphasis on marketing strategies, market development, and farm financial management—with half the funded projects in these areas. Multiple projects funded in FY 2000 addressed training of farmers in marketing (Minnesota, South Dakota, Texas, and Montana); expanding markets, particularly direct marketing (Maryland, Pennsylvania, California, New York, Washington, Oregon, Idaho, Tennessee, North Carolina, Georgia, and Kentucky); and farm financial management (Illinois, Arkansas, Wisconsin, and the Farm Service Agency of USDA).

  Five projects were funded to focus on the "whole farm" approach to improved profitability, with particular emphasis on organic and sustainable farming systems. These programs included organic farming efforts in Maryland, Pennsylvania, New Jersey, Ohio, North Carolina, and Iowa. Targeted small farm initiatives were funded in Iowa, Nebraska, Wisconsin, and Mississippi. A unique and important effort was funded to develop and improve market agriculture in the U.S. Caribbean and Pacific Islands, involving land-grant institutions in those territories and the Agricultural Research Service of USDA.

  Issues relating to improved production and marketing systems, and adding value to products, were addressed in two beef cattle projects (Indiana, Michigan, Ohio, Illinois, Kentucky, and Tennessee). Issues relating to the structure of agriculture were addressed in an innovative consortium of service providers that has been formed to assist beginning farmers in New England. In an attempt to retain an existing agricultural industry in the face of global competition, a project was funded to reduce labor requirements and increase profitability of chile pepper production in the Southwest. In a similar manner, research and extension on the production of hybrid catfish in hillside ponds of the Southeast was funded to develop a new source of farm income.

**In FY 2001, USDA funded fifteen proposals totaling $19 million. The proposals were funded under the Farm Efficiency and Profitability component of the CSREES Initiative for Future Agriculture and Food Systems (IFAS) Grant Program, which are targeted for small to mid-sized farms.**

  Fifteen proposals totaling $19 million were funded in the Farm Efficiency and Profitability component during the FY 2001 grant round. Funded projects include value-added horticultural products, season-extending high tunnels for the central Great Plains, tropical mariculture ventures in Hawaii, production systems to improve the profitability of small and economically disadvantaged livestock family farms, enhanced goat production systems for the Southern United States, and collaborative research and outreach for small farm enterprises and community development in the Black Belt South.

- **CSREES Community Food Projects Grants Program (CFPCGP):** The program is designed to provide grants on a competitive basis to support the development of Community Food Projects to: (1) meet the food needs of low-income people; (2) increase the self-reliance of communities in providing for their own food needs; and (3) promote comprehensive responses to local food, farm,

and nutrition issues. Community Food Projects are intended to take a comprehensive approach to developing long-term solutions that help to ensure food security in communities by linking the food production and processing sectors to community development, economic opportunity, and environmental enhancement.

Some examples of how small farms benefit from the CFPCGP are as follows:

- Small family pork producers in Missouri have increased their income and found new markets through a grant to the Missouri Rural Crisis Center.
- In Massachusetts, Cambodian immigrants have been funded to start farms to provide specialty crops to the local Cambodian community.
- The Tohono O'odum people in Arizona have been funded to re-establish flood based agricultural practices and to re-establish native crops to improve the diet of those native people.
- In California, Hispanic farm workers, turned farmers, received training and technical support on small farm production and management.

Many projects support community supported agriculture as a means to increase farm income and provide nutritious produce to communities. From 1996-2001, approximately $13.5 million was distributed among 84 projects. These projects directly benefited small farmers.

- **Research Projects Supported by CSREES 1890 Institution Teaching and Research Capacity Grants Program Benefit Small Farmers:** Small farmers benefit from outcomes of innovative teaching and research projects funded through CSREES' Capacity Building Grant Program, initiated in 1990 to build the institutional capacities of the 1890 Land-Grant Institutions and Tuskegee University. Funded projects involve 1890 scientists, faculty, and Extension professionals working collaboratively in targeted need areas such as the following:
  - Studies and experimentation conducted in plant and animal breeding programs to develop better crops or livestock;
  - Centralized research support systems (e.g., computerized data banks on crop yields); and
  - Technology delivery systems (e.g., computer-based decision support systems to assist small-scale farmers to take advantage of relevant technologies, programs, and policies).

  Some examples of 1890 Capacity Grant projects funded during 2000-2001 which benefit small farmers include:
  - An Internet literacy program to help small farm service providers and limited resource farmers learn marketing concepts through a grant to Lincoln University;
  - A research program to benefit limited-resource farmers in the southeastern United States. This program helps limited-resource farmers by propagating and preserving unique pawpaw germ plasm that, in turn, provides crop diversity for this new commercial tree-fruit crop. It would be accomplished through a grant to Kentucky State University;
  - A grant to Alcorn University to develop efficient marketing systems for new and highly promising alternative crops for small farmers in the southern region; and
  - Researching optimal conditions for washing, sanitizing, and packaging produce to help small farmers in North Carolina add value to produce sold to school systems and local marketing outlets through a grant to North Carolina A&T University.

- **Information for Educators:** CSREES developed a two-page guide for educators, including sources of information on sustainable agriculture education, examples of projects that have developed course work, and funding sources. The guide, "Sustainable Agriculture Resources for University and College Educators," is available on the web on the education page of the Sustainable Agriculture Network (www.sare.org/htdocs/dev/asresources.html) and is publicized through the mail groups sanet-mg and SAEd-Share-L.

- **CSREES *Small Farm Digest* Focuses on Marketing Articles:** The USDA *Small Farm Digest* newsletter produced by CSREES continues to provide timely direct marketing and special topic issues to a diverse readership, including those who serve small farmers in international, Federal, State, and local programs, small farmers and ranchers, and others with a small farm interest.

  To date, the *Digest* has addressed Internet marketing, value-added food products, marketing through farmer-owned cooperatives, new opportunities in the biobased economy, fruits and vegetables as a niche market for small farmers, forestland income opportunities, and diversifying farm and ranch revenue through agri-tourism.

- **CSREES Small Farm Program Web Site:** The CSREES web site provides helpful information for small farmers and specialists who work with the small farm community. The site gets 45 hits per day and received 57,000 hits during FY 2000. Information is intended to help small farmers increase the economic viability of their small farm operations. The web site includes: a Small Farm toll-free phone number (1-800- 583-3071), an electronic mailing group to exchange small farm related information, *Small Farm Digest* newsletter issues, a directory of State Small Farm Coordinators, Research and Education Recommendations for Small Farms, and small farm links.

  Links include: USDA Small Farm Policy; the USDA Advisory Committee on Small Farms; the National Commission on Small Farms report, *A Time to Act; Small Farm Resource Guide*; funding opportunities, including farm loan programs; information about the Alternative Farming Systems' Information Center, Aquaculture Network Information Center, and Sustainable Agriculture Network; a Directory of State Contacts in Value-Added Agriculture; small farm success stories; 3rd National Small Farm Conference notice; upcoming events relating to small farms; and land-grant university maps.

- **USDA/CSREES SARE:** A majority of examples in USDA/SARE Program's new 2001 publication, *The New American Farmer,* show how American farmers and ranchers with small or medium-sized operations are applying diverse approaches and innovations to increase farm profitability and enhance the quality of life, rural communities, their families, and the environment. Available free on the web at www.sare.org/newfarmer or for $10 in hard copy by contacting the Sustainable Agriculture Network at 1-802-656-0484, or via e-mail at sanspubs@uvm.edu.

## Economic Research Service (ERS)

The National Commission on Small Farms recommended that analyses be undertaken to identify production systems, marketing approaches, and financing decisions being used by successful farming operations. ERS has responded to the Commission's recommendations by developing projects in several areas that are directly applicable to recommendation 1.2, recommendation 5.7, recommendation 5.10, and recommendation 6.7.

### Key projects focused on recommendation 1.2 include:

- **Research on Organic Agriculture:** ERS is completing a multi-institutional research project on the market for organic foods with the Universities of Arizona, Georgia, and Massachusetts. Project participants have developed an enhanced understanding of the size and structure of the U.S. organic foods market by focusing on five topic areas: U.S. acreage and production, domestic marketing chain and structure, certification and its impacts, consumer demand, and global market conditions. For example, research on U.S. production is focused on analyzing data from the Organic Farming Research Foundation's 1997 survey of organic farmers and other sources.

  This information, coupled with other ERS research on certified organic acreage by State and commodity group, provides the most complete picture to date on the location of organic farms and commodities they produce. Since organic markets have multiple opportunities for participants with different-sized operations, research results may assist small-scale

organic producers in their marketing plans and provide information to other small-scale producers who are looking for additional marketing outlets**.**

In 2001, ERS developed a web site briefing room on organic farming that may be accessed at www.ers.usda.gov/briefing/Organic/ produced a report on the growth of certified organic farming in the 1990s (ERS Agricultural Information Bulletin No. 770, *U.S. Organic Farming Emerges in the 1990s: Adoption of Certified Systems*); and developed an article on organic wheat production in the United States. The article, *Organic Wheat Production in the United States: Expanding Markets and Supplies*, appears in an ERS publication entitled, Wheat Situation and Outlook Yearbook (page 32). These publications may be found on the ERS web site at: www.ers.usda.gov/publications/

ERS anticipates publishing another report from that project in 2002, and is also working on a new project to study the risk management strategies and needs in the organic farm sector. Some of the work will explicitly target organic market gardeners and other small farmers.

- **Research on Contracting in Agriculture:** ERS has a program of research underway to assess the nature and scope of contracting (marketing and production contracts) in several areas of U.S. agriculture. ERS and the Farm Foundation sponsored a workshop on Contracting Practices in Agriculture on May 23-24, 2000. The workshop included academics and USDA program managers and focused on market power and efficiency in contracting practices in the livestock, field crop, and horticultural crop sectors. ERS researchers have published a series of articles on agricultural contracting in the ERS magazines *Agricultural Outlook, FoodReview, and Rural America.* Similar articles also have been published in longer agency reports (such as ERS Agricultural Economics Report No. 774, *Managing Risk in Farming: Concepts, Research, and Analysis*). In addition, work has begun on a comprehensive report aimed at summarizing our current knowledge on the economic issues surrounding agricultural contracts. This work should be completed in late 2002.

- Another ERS project looks at business practices in fresh produce markets; preliminary results were published in Fall, 2000, and a larger study appeared in an ERS report in January, 2001 (ERS Agricultural Economics Report No. 795, *U.S. Fresh Fruit and Vegetable Marketing: Emerging Trade Practices, Trends, and Issues*). ERS continues to monitor use of contracts as a business arrangement through questions included in its annual Agricultural Resource Management Study. Results from farmers' responses to these surveys indicate that farmers of all sizes incorporate contracts into their farm plans. Surveys conducted in 2000 and 2001, as well as those to be conducted in 2002 all contain expanded sets of questions aimed at gaining information about pricing and incentive mechanisms in farmers' marketing and production contracts.

- **Improving Agribusiness Education:** ERS is working cooperatively with Tennessee State University and Alabama A & M University to develop a model of university-government-industry partnership to improve agribusiness education. The project is designed to assist in developing/providing continuing education to operators

of small farms and agribusiness firms interested in understanding and operating in the supply-chain-based global food and agriculture product markets.

- **More Successful Farms:** ERS research to identify farm and farm operator characteristics that are associated with the likelihood of above average returns, defined by returns to equity and to the operator's labor and management, is continuing to evolve into a multifaceted area of emphasis for the agency. Cooperative research agreements were written with Tennessee State University, Iowa State University, and the University of California to characterize production and management systems of more successful small farms.

  A specific objective of these agreements is to elicit responses from operators of small or moderate size farms about how they measure the success of their businesses. A second primary objective will be to determine if production practices and systems differ from farms of like size and commodity mix for the more successful farms. Results of this work will be used to underpin ERS efforts to write questions that can be incorporated into annual farm business surveys to develop a national perspective. ERS is also cooperating with analysts from Penn State University to analyze the nature and extent of women's economic contributions to farm operations in the United States, including their involvement in farm tasks, farm decisionmaking, farm organizations, and government agriculture programs.

  ERS's Resource Economics Division (RED) has developed cross-branch priority projects to emphasize research conducted on small farms within the Division. One project, Small Farm Success: Goals and Resource Endowment, will explore the goals, motives, and natural resource base of small farm operators, with the ERS Typology used to assess differences among small farm groups. The project will also examine the economics of small farms and their implications for policy changes affecting natural resource and environmental policy goals. A second priority project, *Economic Implications of the Adoption of Bioengineered Crops*, will focus on issues surrounding the adoption of bioengineered crops.

  The general objective of this research program is to address several of the economic dimensions about the adoption of bioengineered crops. Pertinent to ERS' small farm work will be research questions that address the farm-level effects of the adoption of bioengineered crops and what are the factors that have affected the adoption of bioengineered crops and how. The first research question will assess the impacts of genetically engineered crops adoption on yields, farm profits, pesticide use, and financial performance. The second question will examine the role of farm size in adoption.

- **Research to assess the impacts of production, marketing, and financing decisions of farm performance continues:** Two articles, "Factors Affecting the Profitability of Limited Resource and Other Small Farms" and "Factors Contributing to Earnings Success of Cash Grain Farms," appeared in the *Journal of Agricultural and Applied Economics*, and were summarized in an article, *What Makes a Small Farm Successful?* The article was published in *Agricultural Outlook*.

  ERS also published its annual family farm report as *Structural and Financial Characteristics of U.S. Farms: 2001 Family Farm Report*. The report incorporates the ERS farm typology into its framework for analysis. Each of the report's nine major sections draws on the typology so that differences between small and large farms can be identified. Work has begun on the next release of the Family Farm Report, scheduled for late 2002.

Current ERS research on the topic examines the business linkages and arrangements of farms to determine if farms cluster into identifiable groups. It also examines farm performance and information management, managerial decisionmaking and its effect on farm financial performance, and the technical efficiency of family farms at the business and household level.

In addition, a current project takes a longitudinal perspective on farms, by examining the history of farms over the life cycle of the farm and the farm operator. The research will help us to understand the factors behind the continuation of small farms. That project uses a unique longitudinal file built by merging data for individual farms from five agricultural censuses (1978, 1982, 1987, 1992, 1997). An early paper from the project, "Farm Operations Facing Development: Results from the Census Longitudinal File," examines how farmers may alter their operations in the face of expanded residential development.

- **Communicating the ERS Farm Typology:** ERS analysts were involved in several activities to communicate the Farm Typology for use in thinking about farm structure and how programs might be focused to recognize differences among farms and farm households. An article, *ERS Farm Typology:Classifying a Diverse Ag Sector,* was published in *Agricultural Outlook*. Results from the 2001 Family Farm Report, (described above) were summarized in a brochure, *America's Family Farms: Assorted Sizes, Types, and Situations* (ERS Agricultural Information Bulletin No. 769).

  A short article, *A New Typology For a Diverse Ag Sector*, appeared in *Choices*. A paper about small farms (based on the typology) was presented at the National Public Policy Education Conference, sponsored by the National Public Policy Education Committee in Cooperation with the Farm Foundation and State Extension Services. Finally, ERS participated in the ARS National Outreach Workshop to help that agency devise ways to orient research to help small farms, particularly small farms operated by minorities.

  **ERS personnel also presented analyses at regional outreach workshops:**
  - Entrepreneurial agriculture sponsored by CSREES in Texas
  - Extension education held by the Southern Extension Educators
  - Ways to serve small farmers held by the North Central Region Small Farm Task Force

  Regional analysis is necessary, because farms differ across geographic areas and national analysis does not meet the need of specific regions.

### Work focused on *A Time to Act,* Recommendation 5.7:

**Conduct a Review of Current Tax Code and its Effects on Entry and Exit:** A study initiated by the National Commission on Small Farms, *Effects of Federal Tax Policy on Agriculture* (ERS Agricultural Economics Report No. 800) was released in April 2001. The study applies the ERS farm typology to tax data. Investment, management, and production decisions in agriculture continue to be influenced by Federal tax laws, although this influence may be less than in earlier decades. The report also evaluates tax proposals to assist beginning farmers.

## National Agricultural Statistics Service (NASS)

- NASS serves the basic agricultural and rural data needs of people in the United States, by objectively providing timely, accurate and useful statistical information to U.S. agriculture. The agency administers USDA's program of collecting and publishing current national, State, and county agricultural statistics. In addition to the annual statistics program, NASS began conducting the Census of Agriculture, previously conducted by the Bureau of the Census, Department of Commerce, in FY 1997. The census of agriculture, conducted every 5 years, provides comprehensive, local-level data on agricultural commodities across America. This invaluable information

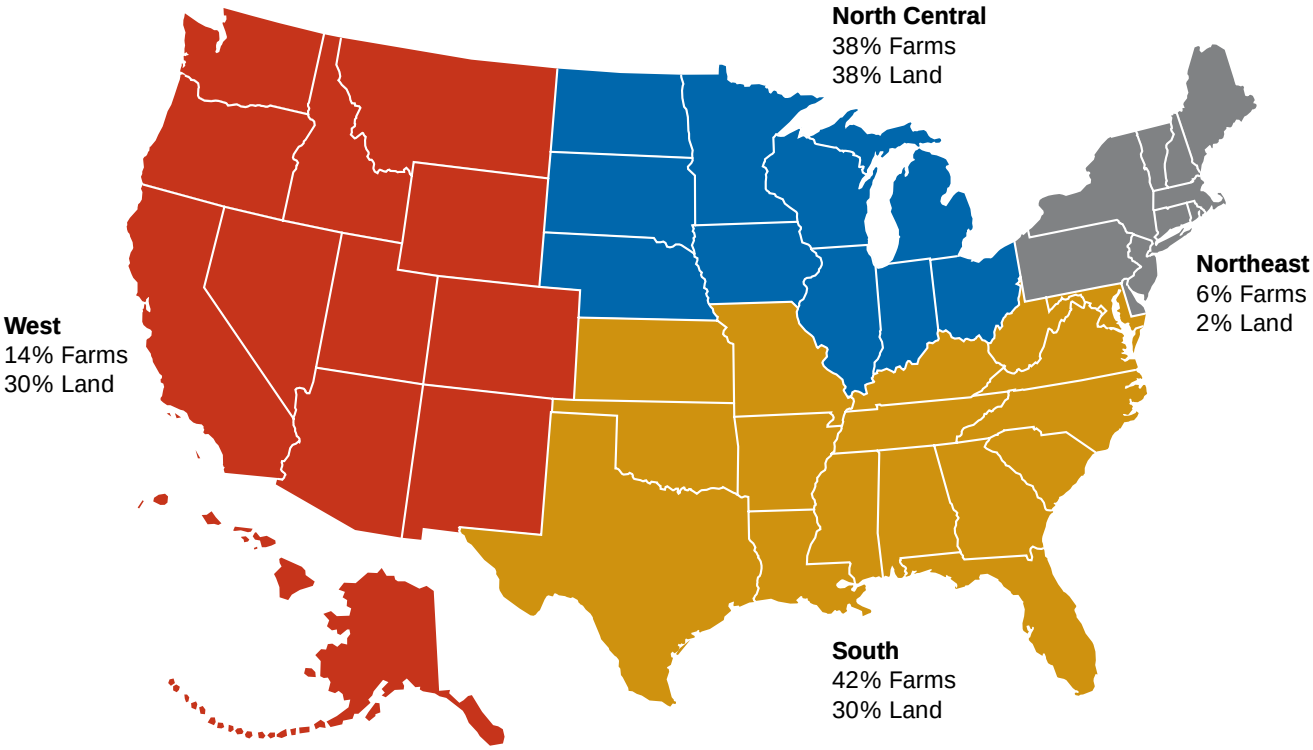
is available to both the public and private sector, including small farmers, ranchers, and the underserved.

NASS's 2002 Agricultural Statistics Board Calendar lists all the reports' release dates. The reports are available on the NASS web site at: www.usda.gov/nass/, or the NASS toll-free hotline at 1-800-727-9540. The 1997 Census of Agriculture was released on the Internet on February 1, 1999 and hard copies of the United States Summary and State Data tables were issued in March 1999. In response to the need for more detailed information on certain sectors of the farm and ranch industry, NASS has conducted three special studies to supplement the census data. These include the 1998 Farm and Ranch Irrigation Survey, the 1998 Census of Horticultural Specialties, and the first ever Census of Aquaculture, which was also conducted in 1998 and issued in February 2000. Results from the 1999 Agricultural Economic and Land Ownership Survey, released in August 2001, provided the first in-depth look at land ownership since 1987.

- NASS staff members assisted the National Office of Outreach in efforts to gain approval for the Minority Farm Register, which was specified in the Civil Rights Action Team (CRAT) report, published in February 1997. Specifically, NASS provided assistance with the Privacy Act approval process and in preparing the Information Collection Approval package submitted to the Office of Management and Budget. The Minority Farm Register will provide an additional tool to help USDA improve its Outreach and Technical Assistance Program for Socially Disadvantaged and Minority Farmers.

- NASS and the Economic Research Service (ERS) staff completed review of the Agricultural Resources Management Study (ARMS) specifications and questionnaire content for the 2000 ARMS III survey. This survey is conducted in cooperation with ERS and focuses on identification of in-business farm operations, multiple operating arrangements, and operations with targeted commodities, chemical use, and farm finances. The

**Distribution of Farms and Land in Farms By Region, 2001**



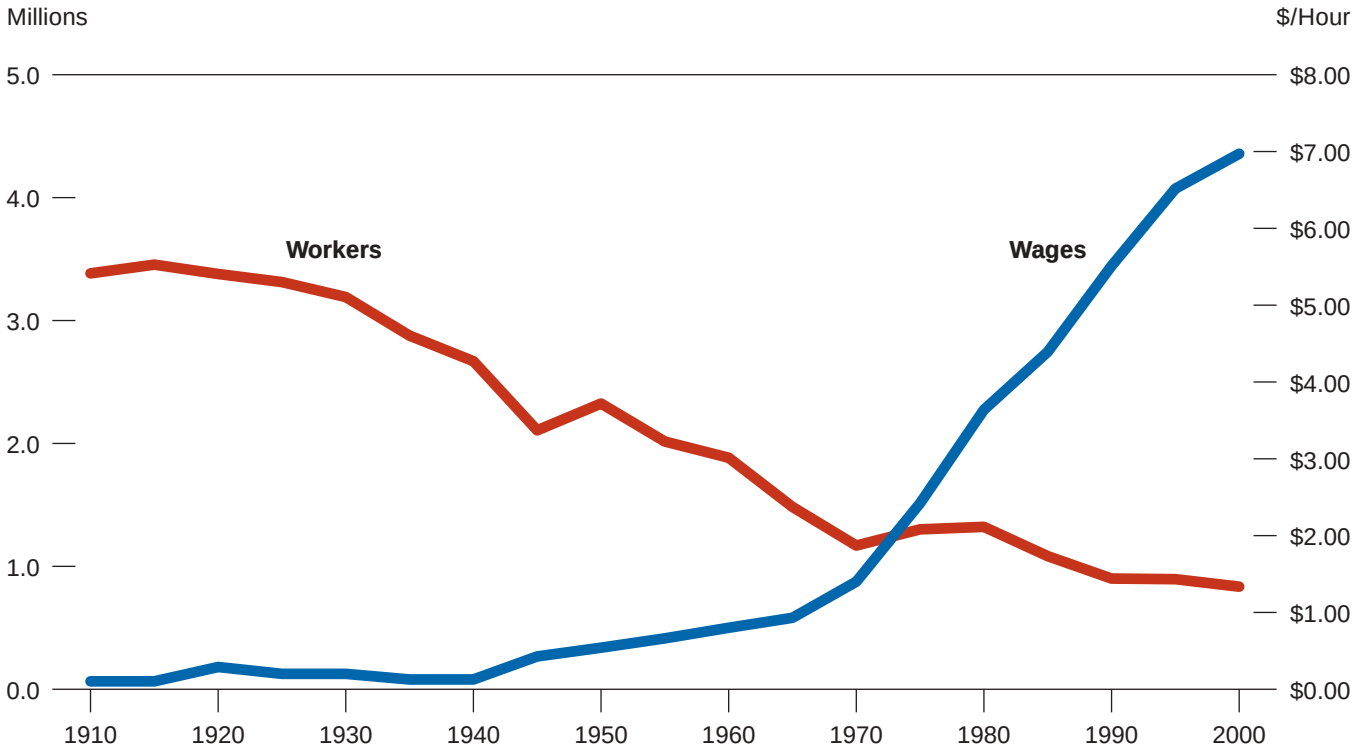
Secretary's report to Congress on the status of the family farm for 1998 was based primarily on information from ARMS.

The ARMS results are included in the ERS report: *Structural and Financial Characteristics of U.S. Farms: 2001 Family Farm Report.* This report was released by ERS in May 2001. In September 2000, the NASS staff gave an overview of the USDA farm labor program to a group of international visitors at the Bureau of Labor Statistics (BLS). Periodically, NASS explains how the USDA accounts for the agricultural work force. BLS is responsible for all sectors except agriculture. NASS State Statistician of the Kentucky State Statistical Office attended a monthly meeting of the Kentucky Farm Labor Task Force to discuss pending legislation that addresses a new amnesty provision for migrant workers. The group's comments were then given to Commissioner Billy Ray Smith for use at the National Association of States Departments of Agriculture meeting in Ohio in September 2000.

The State Statistician of the Minnesota State Statistical Office provided Representative Finseth, Chairman of the Minnesota House Agriculture Committee, data pertaining to the increasing number of Minnesota farms in the less than $10,000 sales category for 1999.

State Statisticians of Idaho, Oregon, and Washington attended an Intertribal Agricultural Council-USDA Western Regional Informational Exchange in Oregon in September 2000. USDA's Risk Management Agency's Northwest Regional Office sponsored the forum. Representatives of 20 tribes spoke on USDA's Outreach efforts and program delivery and suggestions for improvement.

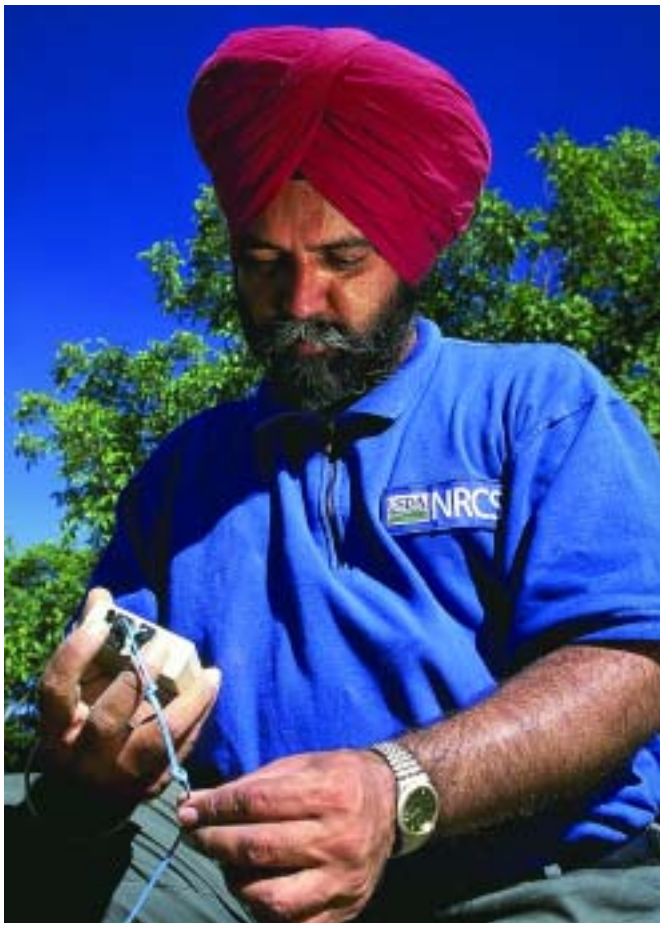
**U.S. Hired Farm Workers & Wage Rates, 1910-2000**



## Natural Resources Conservation Service (NRCS)

- **Kentucky:** Equipment was purchased for use in Wayne County to introduce improved production practices for small vegetable producers. This equipment is still operational and continues to be used throughout the county. A second part of the project was to design and develop erosion plots on a highly erodible site on the Kentucky State University Land Grant Program (KSULGP) farm to measure the erosion and run-off associated with different vegetable cropping and mulching systems raised on erodible lands.

  This location has served as the site of several water quality research initiatives and projects as well as educational tour stops for field days. Numerous cropping systems and vegetable species/variety trials have been conducted on this site.




Information generated has resulted in refereed research journal articles and informational handouts. The erosion plots have become an integral part of KSULGP's water quality research efforts, measuring not only soil run-off, but pesticide and chemical run-off as well. The plots will provide the test site for a new USDA Capacity Building Grant initiative, which addresses the development of a botanical insecticide as a substitute for synthetic pesticides.

The site will allow the monitoring of the field-applied botanical insecticide. The site may also provide the initial site for growing the plant species from which the botanical insecticides will be extracted; thus the plant species can be monitored as a potential crop for limited-resource farmers as well as for its insecticide properties.