

ARS Research: Past, Present, and Future

As we await the turn of a new millennium, this special magazine issue reflects on an unprecedented era of agricultural science and accomplishment. We also look forward to more achievements that will benefit our nation.

As part of this musing, we gathered the thoughts of a few of our renowned scientists (see box) on the history and promise of agricultural research. Three of these scientists were working for USDA when the Agricultural Research Service was created in 1953 to consolidate much of USDA's scientific research into one agency. They saw the establishment of four regional centers, built in the 1940s, to develop new uses for agricultural products.

“Most of us thought, ‘we can do great things here.’” [W.A. Reeves]

And they did. Articles in this issue chronicle research discoveries ranging from basic plant and animal biology to new products for consumers to high-tech vaccines and advances in natural resource conservation.

“High-yield agriculture has long been associated with environmental devastation. But through genetics and management, we’ve moved closer to obtaining these yields with benign environmental consequences. For example, today we’re seeing the economic and environmental benefits of years of investment in reduced tillage that started when I was in high school.” [R.J. Cook]

Other scientific and cultural challenges remain for present-day scientists.

“While virtually all of the major insect pests affecting agriculture are being controlled on a year-by-year basis, the threat that they pose for agriculture under the current farm-to-farm management procedure is as great as ever at the beginning of each crop-growing season.” [E.F. Knipling]

“Local ownership of research programs and local participation in management are essential to attract large numbers of producers to use the technology.” [W.H. Wischmeier]

“It is a temptation to adopt new methods just because they are high-tech, even though they may not have been shown to be better and more economical than traditional methods.” [L.B. Crittenden]

The ongoing challenge for the future will be to develop technology that allows ever greater food production for a growing world, while maintaining or improving food safety and environmental quality.

New approaches to insect control will help, such as the areawide programs instituted in recent years by ARS to control insects like codling moths in apples, or weeds like leafy spurge.

“The objective should be to manage the total populations of major insect pests on an areawide basis. The investment will be very low, compared with the economic and environmental benefits that will be realized.” [E.F. Knipling]

New areas of research, including biotechnology, will also be key.

“What we’re doing today in genetic engineering is quite crude compared to what we’ll be able to do when we understand more about all plant genes, their function, and how they are expressed.” [R.J. Cook]

“If I was a young scientist, I would want to get into biotech. That’s a specialization that can really help agriculture.” [W.A. Reeves]

“One exciting outgrowth of agricultural biotechnology is the development of plants and animals that produce nontraditional products such as pharmaceuticals and plastics. This may result in novel products that are cheaper and more environmentally acceptable than could be produced by other manufacturing methods.” [L.B. Crittenden]

Whatever the future brings, ARS will continue to play a lead role in developing innovative solutions and products for agriculture.

Kathryn Barry Stelljes
ARS Information Staff

Five of ARS' Best

These 5 are among the more than 40 scientists who have so far been inducted into the ARS Science Hall of Fame for their outstanding career contributions to agricultural research:

R. James Cook (at USDA 1965-1998) introduced biological control strategies for plant pathogens and designed sustainable approaches to growing wheat with reduced tillage.

Lyman B. Crittenden (at USDA 1961-1989) led development of the first transgenic chicken, genetically engineered to prevent infection by certain avian leukosis virus strains.

Edward F. Knipling (at USDA 1931-1973) pioneered the sterile insect release technique to suppress insect pests, which led to screwworm eradication in the United States, Mexico, and parts of Central America.

Wilson A. Reeves (at USDA 1946-1975) developed chemicals and techniques for treating cotton fabrics to impart improved characteristics such as wrinkle or fire resistance.

Walter H. Wischmeier (at USDA 1940-1976) created the Universal Soil Loss Equation for predicting soil erosion under specified physical and management conditions.