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# **U.S. Public Agricultural Research**

## **Changes in Funding Sources and Shifts in Emphasis, 1980-2005**

David Schimmelfennig and Paul Heisey



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A Report from the Economic Research Service

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# U.S. Public Agricultural Research Changes in Funding Sources and Shifts in Emphasis, 1980-2005

**David Schimmelpfennig and Paul Heisey**

## Abstract

Over the years, proposals have recommended shifting the focus of public agricultural research from applied to basic research, and giving higher priority to peer-reviewed, competitively funded grants. The public agricultural research system in the United States is a Federal-State partnership, with most research conducted at State institutions. In recent years, State funds have declined, USDA funds have remained fairly steady (with changes in the composition of funding), but funding from other Federal agencies and the private sector has increased. Efforts to increase competitively awarded funds for research have fluctuated over time, as have special grants (earmarks). Along with shifts in funding sources, the proportion of basic research being undertaken within the public agricultural research system has declined. This report focuses on the way public agricultural research is funded in the United States and how changes in funding sources over the last 25 years reflect changes in the type of research pursued.

**Keywords:** Agricultural research, Current Research Information System, CRIS, State Agricultural Experiment Stations (SAES), competitive and formula funds

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## Summary

Public agricultural research has been a major contributor to advances in agricultural productivity that have led to abundant and affordable food and fiber in the United States. A period of sustained growth in public agricultural research-and-development (R&D) investment that began in the 1930s ended in about 1980, with smaller and more variable increases observed since that time. Private investment in agricultural R&D surpassed public investment for the first time in 1980. The slowdown in public research funding growth has coincided with new demands from consumers and taxpayers for environmental and food safety advances based on public research.

### What Is the Issue?

The public agricultural research system in the United States is a Federal-State partnership. The Federal Government funds intramural research through USDA agencies such as the Agricultural Research Service (ARS) and extramural research at State institutions such as the State Agricultural Experiment Stations (SAES), which are located at land-grant universities. SAES are also funded by State legislative appropriations, a variety of private sources, including industry funding, and Federal agencies other than USDA.

This decentralized State-led structure has resulted historically in geographically specific applied research. Policy proposals in recent decades have recommended shifting the focus of public agricultural research to more basic research, giving higher priority to peer-reviewed, competitively funded grants. The 2008 Food, Conservation, and Energy Act (Farm Act) created the National Institute for Food and Agriculture to coordinate USDA's agricultural research funding.

### What Did the Study Find?

Real public agricultural research spending—that is, spending from all funding sources adjusted for inflation—fluctuated but remained basically level from 1980 through the mid-1990s, then fluctuated. In the late 1990s, SAES funding from Federal sources outside of USDA as well as non-Federal sources continued to increase. Federal intramural funding of ARS research leveled off.

Funding levels from the various sources that support public agricultural research have changed since 1980. Funding sources include State appropriations, formula funds, and competitive and special grants, but also include support provided by the private sector. In inflation-adjusted terms, shifts in funding from these various sources have resulted in constant or slowly increasing overall expenditures on public agricultural research:

- USDA funds intended for the States, administered by the Cooperative State Research, Education, and Extension Service (CSREES), have remained essentially constant in real terms since 1980. However, the composition of CSREES funds has changed over time:

- Formula funds declined in real terms by about half over the 1980-2005 period. These funds are based on statutory formulas governed by legislation.
  - Competitive grant funding rose in real terms, more than quadrupling by the mid-1990s, and has fluctuated since that time. Peer-reviewed competitive grants are awarded in response to proposal requests.
  - Special grants (Congressional earmarks) rose by 250 percent in real terms until the mid-1990s, fell through 2001, and then rose again.
  - Other CSREES-administered funds have risen the most rapidly of all research funding in real terms since the late 1990s.
- Grants from other Federal agencies, like the U.S. Department of Energy, the National Institutes of Health, and the National Science Foundation, to SAES and other cooperating institutions more than tripled in real terms from 1980 through 2005. Funding from these non-USDA sources is now nearly as large as the funding obtained from private companies and SAES sales of research byproducts.
  - State agreements with private companies and commodity organizations, sales of products and intellectual property, and other non-Federal sources of funds have grown continuously in real terms since 1980.

USDA intramural research expenditures have fluctuated, especially at ARS. Intramural spending (by USDA agencies on inhouse research) declined slightly in real terms from 1980 to the late 1990s, before returning in real terms to its 1980 level. Most of this pattern can be explained by expenditure trends at ARS. The number of ARS scientists, which had been declining, rose with this increase in spending, but not enough to match the 1980 number.

CSREES funding of basic research has declined. Of the three main CSREES funding instruments for which detailed data are available, competitive grants are directed more toward basic research than are formula funds, and formula funds are directed more to basic research than are special grants. CSREES has been viewed as setting the direction of extramural public agricultural research, particularly because of the matching funds supplied by State legislatures. This perception exists even though all CSREES funding going to the States currently accounts for only a little over 10 percent of all public agricultural research expenditures. Although Federal support might be expected to favor basic research, instead:

- The percentage of agricultural competitive grants devoted to basic research fell from 76 percent to 65 percent from 1998 to 2003.
- Over the same period, the total amount of formula funds declined in real terms as the percentage of those funds devoted to basic research remained at about 40 percent.
- Although the percentage of CSREES special grants going to basic research increased slightly, the percentage of funding devoted to basic research fell for CSREES as a whole.

Since private agricultural input companies tend to focus their research on near-market research, it can be assumed that industry funding is usually

directed more toward applied research than basic research, doing little to offset other reductions in basic research. USDA intramural research is divided roughly equally between basic and applied topics.

## **How Was the Study Conducted?**

This report focuses on how agricultural funding mechanisms changed between 1980 and 2005; the years when comparable data are available. The Current Research Information System (CRIS), National Science Foundation, and USDA agency budget directors supplied the data required to address patterns of public research funding. Economic Research Service researchers had previously developed a research deflator that was updated for this project and used to convert nominal dollars to real constant dollars.

Expenditures from CSREES funds in 1998 and 2003 (years for which data on research topics are comparable) were analyzed following specialized queries to the CRIS system. This allowed disaggregation not available in published reports. This analysis determined the division between basic and applied/developmental research by funding instrument and research topic for CSREES funding of State institutions. The division between basic and applied/developmental research for ARS was supplied by the ARS budget office.