Graphically speaking

Growth of Private Agricultural Research

by George Frisvold, Keith Fuglie, and Cassandra Klotz-Ingram

The public and private sectors invest about $7 billion annually in agricultural research, with the private sector playing an increasingly prominent role. Between 1970 and 1995, private agricultural R&D doubled in real terms. Since 1982, the private sector has invested more in agricultural R&D than the federal and state governments combined (figure 1). As real federal spending for agricultural research has stagnated, the gap between private and public R&D investment has grown. Also, state experiment stations have relied increasingly on private industry, other nongovernmental organizations, and product sales to fund their research programs. Between 1970 and 1995, the share of experiment station research funded by private and nongovernmental sources (including product sales) rose from 10.8 percent to 20.2 percent. Several factors have spurred private industry's interest in agricultural R&D, including scientific advances in biotechnology, increased market opportunities, and stronger intellectual property protection for biological inventions.

Growing role of biological innovations

The types of agricultural research pursued by the private (figure 2) and public sectors have also shifted significantly. In the mid 1960s, over two-thirds of private R&D focused on either farm machinery or post-harvest research (food processing and products). Public research concentrated on biological innovations to increase crop and livestock yields, pest control, and natural resources research. Since then, the private sector has developed significant research capacity in areas that the public sector long dominated, such as plant breeding. Between 1966 and 1995, the share of private R&D devoted to machinery and post-harvest research fell to 41 percent, while the share of private R&D devoted to plant breeding and animal health doubled, from 11 to 22 percent. Research on agricultural chemicals has also grown to be the single largest area of private agricultural R&D.

Implications for public research

What does the growth of private R&D, particularly biotechnology, mean for the future of public agricultural research? It could mean that limited public funds could be allocated to areas typically neglected by private industry but yielding high social payoffs. For example, while estimates show high social rates of return to basic research in plant and animal sciences, private investment in basic research remains low. Basic research tends to be more risky and the results are more difficult to patent. In contrast, nearly half the agricultural research conducted at USDA and university labs is classified as basic. Even applied research in areas such as resource conservation, environmental protection, food safety, nutrition, and social sciences are areas that often fail to attract significant private funds because they are less likely to result in marketable products. While there is some evidence that the public sector has shifted toward more basic research and more research in certain areas of natural resource management, food science, and nutrition, these changes have been quite modest.

New institutions raise questions

Several institutional changes have accompanied the increased privatization of agricultural research. The Patent and Trademark Amendments (Bayh-Dole) Act of 1980 allows institutions to patent technology developed through federally funded re-

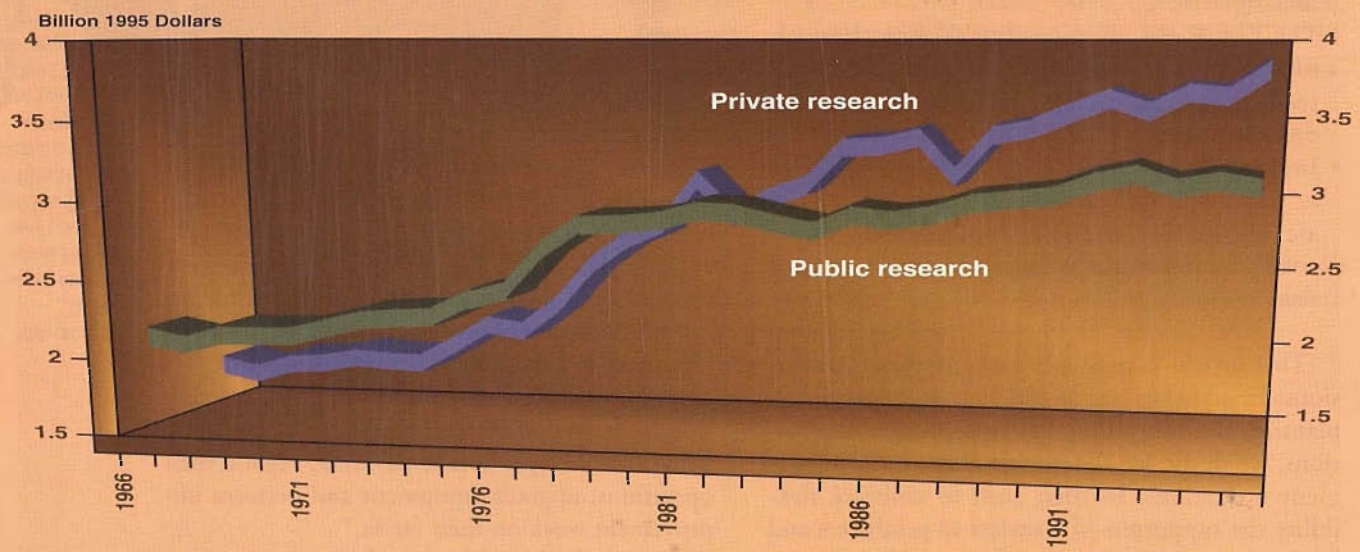

Figure 1. Expenditures for agricultural research in the United States, 1966–95

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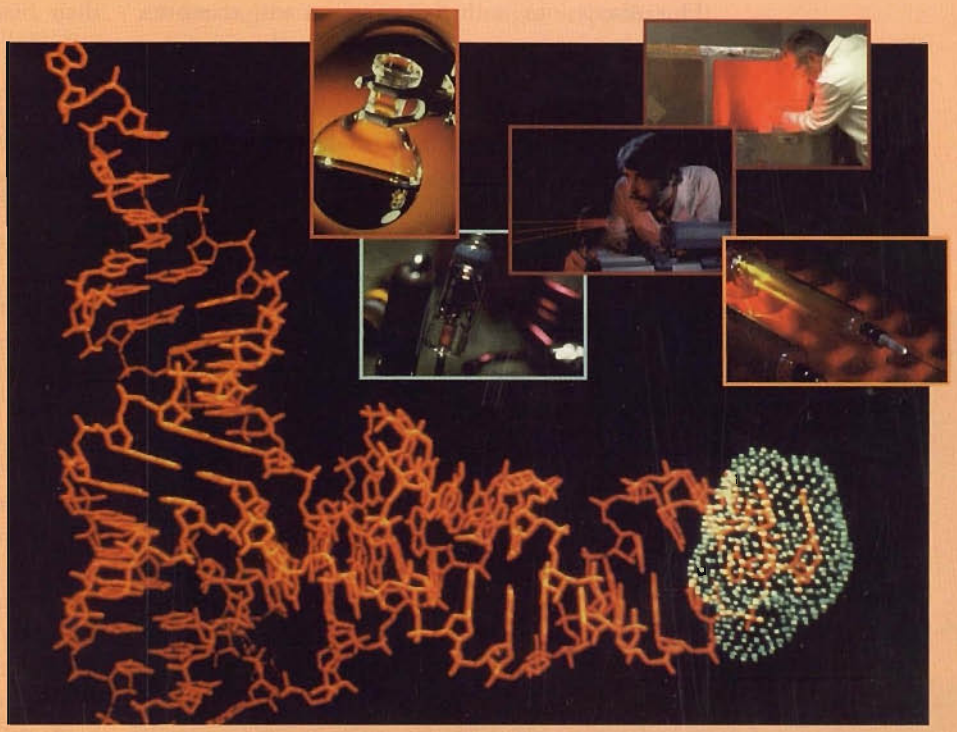
search. Most universities have now established offices of technology transfer to patent and license inventions developed in university labs. The Federal Technology Transfer Act of 1986 established Cooperative Research and Development Agreements (CRADAs) as formal arrangements between federal labs and private companies to develop specific technologies.

Increased public-private research collaboration can reduce research redundancy and lead to a more efficient division of research effort. At the same time it raises several questions. How should land grant institutions respond to changes in intellectual property rights? How will greater public-private collaboration affect the type of research and development undertaken? How will the benefits from agricultural research be distributed? These will continue to be important questions for economic research and agricultural policy debate.



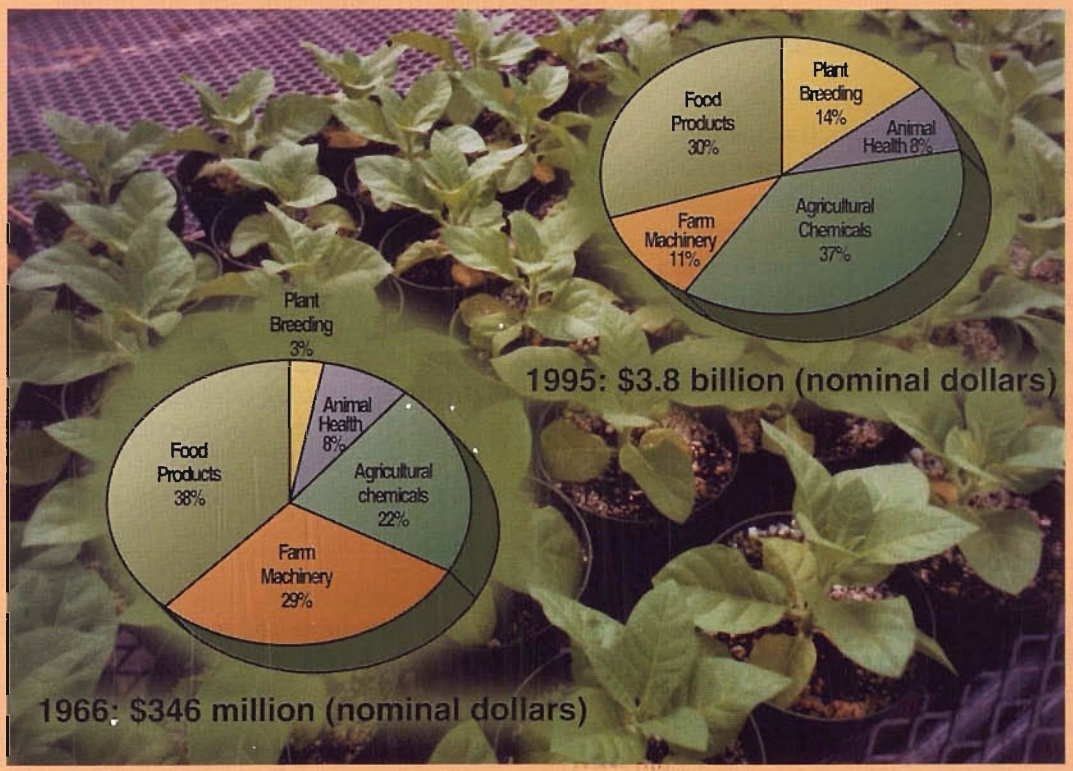


Figure 2. Private agricultural research, by industry

For more information

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