



Agricultural Research Policy and the 2007 Farm Bill: Some California Perspectives * Julian M. Alston and Philip G. Pardey **

Introduction

Title VII of the Farm Security and Rural Investment Act of 2002, the current Farm Bill, concerns research and related matters. USDA spending under “Research, Education and Economics” accounted for \$2.7 billion, only 2.2 percent of USDA spending in 2005, but is much more important than the expenditure share would suggest. Agricultural research has played an important but often unappreciated role in economic development and improving the lives of people in rich and poor countries alike. In the world’s poorest countries, productivity gains from agricultural research have lifted the shackles of poverty, saved millions from starvation, and primed the pump for economic progress more generally. Continuing productivity growth of the same types will be necessary to meet the challenges of a still-growing world population faced with a shrinking natural resource base. In the world’s richest countries, too, agricultural science has benefited consumers and the environment, not just farmers.

Enhanced productivity as a result of agricultural R&D means that consumers have access to a more abundant, cheaper, safer, higher quality, and more diverse and convenient food supply, produced with lower stress on the natural resource base and the environment. Along with benefits to consumers in the United States, the international competitiveness and prosperity of U.S. agriculture has depended and will continue to depend on steady and rapid productivity growth fuelled

by public agricultural R&D enabled by federal government support. In California, gains in agricultural productivity during the past 50 years have allowed agricultural production to more than double without significantly increasing the overall quantity of inputs.

A great quantity of largely consistent and collectively compelling evidence has now accumulated from formal benefit-cost analysis of the private and social payoffs to U.S. agricultural R&D through enhanced farm productivity. This evidence generally suggests benefit-cost ratios of well more than 10:1, more typically in the range of 20:1 or more. Very few public or private investments can be expected to return dividends on this scale. This evidence shows two important things: first, public spending on agricultural R&D pays off very handsomely for society; and second, in spite of significant government support, the United States as a whole has continued to substantially under-invest in agricultural research.

Trends in U.S. Agricultural R&D Spending

In the United States, agricultural research is conducted and funded by federal and state governments and the private sector. Agricultural research and extension spending grew rapidly during most of the 20th century, and especially during the 1960s and 1970s. More recently the growth has continued, but at a generally slower rate, especially for extension. In 2004, \$1.6 billion was spent on agricultural extension, 80 percent from state

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and local sources. Over \$4.3 billion was spent on public agricultural R&D, of which the federal government contributed about half, \$2.2 billion, and state governments contributed a bit more than one third, \$1.5 billion.

The federal government disburses research funds in many ways. The United States Department of Agriculture (USDA) conducts intramural research (\$1.1 billion in 2004), mainly through the Agricultural Research Service (ARS), in addition to distributing federal funds to the State Agricultural Experiment Stations (SAESs) through a combination of formula funds, grants, and contracts. In 2004, the SAESs spent \$3.2 billion, of which 30 percent came from federal sources, 47 percent from state government, and 22 percent from industry. Other income was earned from sales, royalties, and various other sources.

The recent patterns are of particular interest. Combined spending on all SAESs and USDA intramural research grew rapidly during the 1960s and 1970s, averaging an increase of 2.91 percent per year in real terms over this period. Since then growth has generally slowed, and become quite erratic. During the 1980s total spending on public agricultural R&D grew by just 0.56 percent per year and by 1.24 percent per year from 1990 to 2004 (but by only 0.54 percent per year during the 1990s followed by 2.63 percent annually from 2000 to 2004). Federal support for intramural research conducted by the USDA has stagnated, but this has been offset by increased federal support for SAES research. Support for extension has also stagnated in real terms, especially federal government support. Private agricultural research spending grew relatively rapidly in the past 10-20 years, to total \$5-6 billion by the late 1990s, but preliminary data indicate that private spending has declined in real terms since then.

In addition to these broad changes in funding patterns, the balance among the types of research being undertaken has shifted, at least in the public sector, with a drift away from research emphasizing on-farm productivity enhancement towards research emphasizing other subjects—such as

post-farm processing, food safety and quality, human health and nutrition, and natural resources and the environment. Many of these subjects have important implications for farmers and agricultural production, even when their immediate focus is far from farming, and many could be expected to have social payoffs comparable to those from farm productivity-enhancing research. At the same time, however, a drift of the research emphasis away from farm productivity enhancement can be expected to result eventually in slower rates of farm productivity growth and a commensurate decline in global competitiveness of U.S. agriculture.

These effects will take a long time—perhaps decades—to become evident, but then will last for a long time. We have already begun to see early warnings of a slowdown in U.S. agricultural productivity growth at a time when competitors like China, India, and Brazil have higher rates of productivity growth and are ramping up their agricultural research investments. Nevertheless, the U.S. trends away from research directed towards on-farm productivity seem likely to continue. One indicator is the emphasis of proposals that have been suggested for revisions to the Research Title of the 2007 Farm Bill.

Proposals for New Research Priorities and Funding Processes

Various groups have proposed that in the 2007 Farm Bill research resources should be directed towards new priorities related to specialty crops and biofuels. New federal funding initiatives in these areas, especially specialty crops research, are of particular interest to California, but the overall payoff will depend on how those initiatives are implemented. These new priority areas could entail research that results in enhanced farm productivity, but the rationales for the proposed new priorities have not been expressed in terms of the net benefits from productivity enhancement. Rather, they have referred to concerns about global warming, energy self-sufficiency, and obesity. It seems unlikely, then, that priorities for such projects will emphasize farm productivity improvement; any such effects are more likely to be incidental than

intended. Further, even though the proposals generally called for enhanced total funding, there is a risk that increases in funding for research on areas such as environmental issues, biofuels, and specialty crops may come at the expense of on-farm productivity enhancement. A major concern is the possibility that, rather than attracting new funding, these new initiatives will further divert the already too small and shrinking resources away from general agricultural R&D that supports farm productivity enhancement, exacerbating the long-term trend.

Other proposals have asked for substantial increases in total federal funding for agricultural R&D, and for changes in the mechanisms used to distribute those funds to increase the use of competitive grants. The antithesis of open competition is allocation of funds based on political interest. A sizeable and growing fraction of federal agricultural research funding has been directed by congressional earmarks. Earmarks come at the expense of research priorities that are likely to have higher and broader longer-run social payoffs. Compared with formula funds and block grants, and especially earmarked funds, well-conceived competitive grants mechanisms can result in a more efficient allocation of funds among research institutions, without undue burdens on scientists in applying for funds and in reporting on their use.

California has a proven track record of winning competitive grants, but these funds are small within the current federal (especially USDA) funding system for agricultural R&D. California should benefit from an increased emphasis on competitive funding processes. That said, the pendulum should not swing too far, too fast. Given the long-term nature of many research programs, competition for resources should allow long-term projects for which researchers have confidence about future funding. For similar reasons, changes should be implemented with care and gradually, and the final outcome will probably continue to require a mixture of competitive grants and other funds.

Long-Term Implications of Changing Research Priorities

The accumulated evidence from many studies consistently and convincingly shows that the United States has persistently underinvested in research directed towards maintaining productivity in the face of evolving pests and tighter environmental constraints, let alone enhancing future farm productivity. The evidence clearly shows that the benefits to the nation from such investments have been many times greater than the costs. The same may be true of other types of agricultural research (and indeed other types of scientific, industrial, and medical research) but much less evidence is available on the returns to research in these other areas; in many cases the benefits are much more difficult to demonstrate. The available evidence justifies an increase in total federal support for agricultural research and, in particular, increased, not reduced funding for research to enhance farm productivity.

The consequences of reductions or shifts of research support will not be immediately obvious: successful agricultural research takes a long time to affect productivity, but then it affects the path of productivity for a long time. In many cases it may take 20 years before we begin to feel the effects of a change in research spending implemented today. Several developing countries, for example China, India and Brazil, are ramping up their agricultural research spending and producers in these countries are already significant competitors with American farmers. A reduction in the rate of U.S. spending on productivity-enhancing agricultural R&D implies a slowdown in the rate of growth of U.S. agricultural productivity, and an erosion of U.S. competitiveness on world markets. These consequences may take decades to become apparent, but will then take decades to reverse. The 2007 Farm Bill can ensure U.S. agricultural productivity continues to grow to the benefit of U.S. farmers and consumers.