Nine billion people are expected to inhabit Planet Earth by 2050. Without agricultural research, there is little hope of sustaining this population surge, given that arable land and water supplies are fixed commodities. Yet for decades the agricultural sector has suffered from neglect. If we want to combat new strains of pests that destroy crops, find new crop varieties enriched in nutritional value, improve yields, develop resistance to disease and drought, and provide environmentally sensitive cultivation practices, then agricultural research must be a priority. Why isn’t it?

In the 1970s, as a biology professor at Stanford University, I worked with the Office of Science and Technology Policy in the White House to discover what incentives might encourage the growth of competitive peer-reviewed agricultural research. At the time, other major federal agencies such as the U.S. National Institutes of Health were enjoying boosts in competitive research funding. On the other hand, the U.S. Department of Agriculture (USDA) used “formula” funding on a regional or commodity-focused basis, largely through the public land-grant universities. That process yielded key advances, increasing our ability to feed more people: improved fertilizers, artificial irrigation, harvest mechanization, and hybridization. But many researchers believed that advances in basic science would provide new ways to revolutionize agricultural production. We found it hard to understand why a brilliant cell biologist had to seek support from another agency to fund innovative research, rather than make a major contribution to how we grow food through support from USDA. A modest competitive grant program was launched then, but its survival in future budget cycles turned out to be perilous.

What happened? Over the past 35 years, new ventures in U.S. public investment in agriculture research and development confronted a steady decline. At the same time, great advances in biochemistry, cell and molecular biology, and genetics were being made through increased funding to other agencies for competitive merit-based research grants. Because of the earlier history, agricultural research is now in a deficit position with respect to the infrastructure, human capital, and policies needed to address the challenges of food security.

A real revolution in agricultural research is possible if today’s deeper knowledge, new tools, and advanced capacities could be effectively blended. Fortunately, in response to a USDA task force (headed by William Danforth, then the chancellor of Washington University), Congress created the National Institute of Food and Agriculture (NIFA) within USDA in 2006 as a means to modernize the management of fundamental agricultural research. NIFA now manages $200 million in competitive merit-based grants for fundamental agricultural research through its Agriculture and Food Research Initiative. That new agency is one of the rare federal research programs to have shown steady increases over the past 5 years, making this a major turnaround in competitive research support.

Despite this success, the current level of funding for USDA falls short of the opportunity presented by the agricultural sciences. Certainly, today’s fiscal climate makes it hard to argue for extending discretionary federal spending. That is why nonpartisan science-based groups that have seen the need to bolster research in agriculture and are willing to work for its improvement are important players. One is the recently created organization called Supporters of Agriculture Research (SoAR). William Danforth, appropriately, is its chairman. SoAR includes eminent scientists across disciplines as well as representatives of consumer and commodity groups, and I am eager to work with them. High on SoAR’s agenda is to increase funding for competitive grants, so that USDA can encourage interdisciplinary and innovative research.

The much-needed revolutions in agriculture can only come about through the investments that we make now. Nine billion people will, we hope, reap the benefits of today’s wise decisions.

— Donald Kennedy
Building agricultural research

Donald Kennedy

Science 346 (6205), 13.
DOI: 10.1126/science.346.6205.13