

Principles for Public Investments in Agriculture Sciences

The Case for US Leadership

The United States has long been a world leader in agriculture through the hard work of its farmers, the leadership of its scientists and extension agents, and the wisdom of its policy makers to invest in publicly funded research and development.

Behind this unmatched leadership has been:

- significant public investment in food and agricultural research;
- public and land-grant universities -- in every state of the union – successfully educating future researchers, teachers, and a highly-skilled workforce;
- a healthy, competitive environment for agricultural business and trade; and
- federal, state, and private sector support for innovation by farmers and ranchers themselves.

These investments have increased productivity, made us a major food exporter, and spurred the Green Revolution that helped many other countries, especially in Asia and Latin America, develop their agriculture sectors, making them even stronger trading partners and allies. In recent decades, however, our publicly funded research has declined markedly: USDA's R&D funding has fallen to just 1.6% of the agency's budget in 2016, roughly half 1970's level and the lowest point on record. China's public R&D budget now exceeds that of the United States, and combined, China, India and Brazil spend \$2.35 for every \$1.00 the United States spends. This decline in US public investment comes as farmers around the world will be challenged to feed a growing population and to do so in ways that are sensitive to the relationship between agriculture and the environment.

It is time for the United States to reassert its leadership, prioritize agriculture R&D, and remove obstacles that hinder the international collaboration of scientists, universities, and research centers. The following principles should guide how the United States undertakes this endeavor.

- 1 Both domestic and international research need to work together on common goals.** A cross-pollination of both will better leverage resources and produce solutions to complicated problems such as plant and animal disease, malnutrition, post-harvest loss, and the degradation of soil and water resources. Section 1402 of the National Agricultural Research, Extension, and Teaching Policy Act of 1977, for example, discourages USDA from funding international research activities.
- 2 R&D in agriculture, nutrition and food systems at home and abroad advances US economic and security interests.** It helps American farmers maintain their competitive edge in productivity and export capacity. It adds vitality to rural communities, improving their citizens' quality of life and economic opportunities. By investing in activities that promote economic growth here and abroad, we can eliminate hunger and severe poverty, which in turn contributes to political and economic resilience, increased trading relationships, and a more prosperous and peaceful world.
- 3 Use Funds Effectively.** Funds need to be utilized for greatest impact by improving coordination; removing obstacles to greater collaboration; leveraging those resources by creating strategic partnerships with the private sector and other research entities; and identifying key challenges that may require an inter-disciplinary approach. The Foundation for Food and Agriculture Research has achieved a good start in establishing research partnerships. Greater inter-agency collaboration can also be achieved with USDA leadership.

- 4 Collaboration among international agriculture research centers and universities benefits Americans.** Plant and animal diseases too easily cross borders, finding their way into the United States to cause harm to our farms and ranches. This includes diseases that may have been eradicated years ago in the United States. Scientists working together can prevent or stop plant and animal disease outbreaks. For instance, in 2013, preliminary research to counter a toxic mold begun by the USDA Agricultural Research Service was successfully adapted demonstrating how it could be applied to protect staple crops by a Kenyan IITA research scientist -- a breakthrough that can be adopted back in the United States and other countries.ⁱⁱⁱ
- 5 Farmers deserve rapid and open access to research and access through markets to innovative technologies.** All farmers should have a choice in the technology they use without facing undue regulatory barriers that are not evidence-based. Under U.S. law, publicly funded research is available for timely and widespread dissemination, allowing farmers to act on new data and make the best choices for their operations. The impacts of scientific breakthroughs can only be fully realized if governmental regulatory systems are open to new, science-based commercial opportunities. There should be a clear regulatory path that allows innovative products of basic research to efficiently move to the market. Under such systems, farmers will have the freedom and opportunity to decide what technologies best meet their needs.
- 6 Agriculture R&D needs to be more closely linked to nutrition and food systems.** Research on improving the nutritional quality of food, such as golden rice, orange-fleshed sweet potato and bio-fortified cassava, and supporting better nutrition throughout the food system will have positive benefits on health and economic productivity at home and abroad.^{iv} Attention to nutrition and food systems can complement efforts related to access for marginalized populations. Malnourishment can cause irreparable physical and cognitive damages such as blindness, growth stunting, intellectual and learning disabilities, low work productivity, and even premature death. It is estimated that, globally, nearly 23% of children younger than 5 have stunted growth.^v
- 7 Funding from public sources has value above and beyond that conducted by the private sector.** Some valuable types of research do not have an immediate or tangibly profitable return on investment, making them unattractive to profit-making organizations. However, such research has served as the basis for applied research that often, with time, generates large economic, environmental and social impacts. It is estimated that every dollar invested in food and agriculture R&D generates \$32 dollars of benefit.^{vi}
- 8 We need to build the next generation of scientists.** The United States risks losing R&D capacity as young scientists are unable to find support for their USDA research. Over the long haul, this will undermine American capacity to compete in the world. A lack of international experience will deprive them of additional knowledge that could help US farmers respond to challenges, especially as weather and climate patterns change.

ⁱ Pardey, Philip G., and Vincent H. Smith. "Waste Not, Want Not: Transactional Politics, Research and Development Funding, and the US Farm Bill." Washington, DC: American Enterprise Institute, 2017.

ⁱⁱ Beddow, Jason M. and Philip G. Pardey. "Revitalizing Agricultural Research and Development to Sustain US Competitiveness." Philadelphia, PA: Farm Journal Foundation, 2017.

ⁱⁱⁱ None given. "IITA research scientist Dr Charity Mutegi wins the prestigious 2013 Norman Borlaug Award." IITA.org. <http://www.iita.org/news-item/iita-research-scientist-dr-charity-mutegi-wins-prestigious-2013-norman-borlaug-award/> (Accessed 2/5/2018).

^{iv} None given. "Biofortified Cassava." Washington, DC: IFPRI, 2006. Also: Cook, Charis. "Orange sweet potato champions biofortified foods in Africa." Biofortified.org. <https://www.biofortified.org/2012/08/orange-sweet-potato/> (Accessed 2/1/2018).

^v None given. "Undernutrition contributes to nearly half of all deaths in children under 5 and is widespread in Asia and Africa." Unicef.org. <https://data.unicef.org/topic/nutrition/malnutrition/> (Accessed 2/1/2018).

^{vi} Hurley, Terrance M., Philip G. Pardey, and Xudong Rao. "Are Agricultural R&D Returns Declining and Development Dependent?" Milwaukee, WI: Agricultural & Applied Economics Association, 2016.