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## Report and Recommendations of the Balance of Crop Research Working Group of the National Agricultural Research, Extension, Education and Economics (NAREEE) Advisory Board

Mark McLellan  
mark.mclellan@pdx.edu

Leo Holt  
*Holt Logistics Corp.*

Twilya L'Ecuyer  
*CURE Group*

Robert Taylor  
*Florida A&M University*

Julia Sabin  
*J.M. Smucker Company*

*See next page for additional authors*

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**Authors**

Mark McLellan, Leo Holt, Twilya L'Ecuyer, Robert Taylor, Julia Sabin, Milo Shult, Anne Marie Thro, and Paul Heisey

# National Agricultural Research, Extension, Education and Economics Advisory Board

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Office of the Executive Director  
Whitten Building, Room 332A  
REE Advisory Board Office  
U.S. Department of Agriculture  
Washington, DC

Mailing Address:  
STOP 0321  
1400 Independence Ave SW  
Washington, DC 20250-0321  
Telephone: 202-720-8408  
Fax: 202-720-6199

## REPORT AND RECOMMENDATIONS OF THE BALANCE OF CROP RESEARCH WORKING GROUP OF THE NATIONAL AGRICULTURAL RESEARCH, EXTENSION, EDUCATION AND ECONOMICS (NAREEE) ADVISORY BOARD

### A Report on the Re-balancing of the Research Portfolio: Private vs. Public Investments

#### Introduction

In December of 2012, the President's Council of Advisors on Science & Technology (PCAST) issued a report to the President on Agricultural Preparedness and the Agriculture Research Enterprise<sup>1</sup>. The PCAST report recognizes the long-term history of public investment in agricultural research. The report also recognized significant private investment into agricultural research. Significantly, the report is adamant that the agricultural research enterprise is not prepared to meet the challenges of the 21<sup>st</sup> century. The report cited two reasons:

- [1] too little competitive research and
- [2] an imbalance of research priorities between private and public funding sources.

This report addresses the latter issue.

Members of the PCAST met with the National Agricultural Research, Extension, Education, and Economics (NAREEE) Advisory Board during a formal meeting held on May 28-30, 2013. Subsequently, the NAREEE Advisory Board received a formal request by the USDA Office of the Chief Scientist that requested advice regarding the PCAST report calling for a re-balancing of research between public and private sources. This report is the culmination of these discussions in addition to discussion amongst the working group members, a thorough review of the PCAST report, and the review of information provided by the Economic Research Service.

The intent of this report is to guide USDA in its review and actions to address the PCAST concern over imbalance – public versus private funding of agricultural research. Our intent is not to solve this issue in this report.

- The nuance of public funding needs to be captured and recognized including its success to-

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<sup>1</sup> [http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast\\_agriculture\\_20121207.pdf](http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast_agriculture_20121207.pdf)

date.

- Public funding of agricultural research is largely embodied in the following three categories:
  - **USDA** – The education and research programs of USDA including but not limited to – Agricultural Research Service, Economics Research Service, National Agricultural Statistics Service and National Institute of Food & Agriculture. (Education is clearly included here because history has taught us that without education, transformative change will not be widely accepted nor correctly implemented.)
  - **State Governments** – Funding the various state departments of agriculture and assisted funding of the public land-grant colleges of the country and other state funded agricultural research entities.
  - **NGOs and Others** – Various NGOs dedicated to research related activities in agricultural research. Included are also non-land-grant private institutions with dedicated funding to support agricultural research.
  
- Public funding can also take form in various ways. A sample of possible forms are:
  - **Competitive grants programs** – The NIFA programs of funding addressing critical needs across a set of priorities predetermined by the U.S. Congress in the regular enactment of the “farm bill.”
  - **USDA block grants** – grants to the various State Departments of Agriculture.
  - **Built research infrastructure and personnel of the federal government** – largely inclusive of ARS and ERS but also including other smaller federal programs.
  - **Built research infrastructure and personnel of the state governments** – largely inclusive of the public land-grant institutions located inside every state and some territories. Additionally some states maintain research in their state funded department of agriculture.
  
- The nuance of private funding needs to be captured and recognized including its success to-date.
  - Private funding of agricultural research is largely embodied in the following sectors that range from pre-farm to fork industries whose intent is to discover and/or develop:
    - **New crop & animal sources** for the purpose of supporting agricultural production.
    - **New agricultural chemicals and biologicals** for improving crop/animal production, including management of disease and pests as well as promotion of growth.
    - **New agricultural production systems** for crops & animals including such things as farm equipment and protected agriculture structures.

- **Food Manufacturing and Distribution** including new food processing and shelf life extension research areas.
  - **Human Health & Nutrition** including food safety and nutrition impact.
- We must seek a clear understanding of Research versus Development in the private sector. Development dollars are often used to implement a new process or bring a product to market-ready status. However, this should not be confused with Research funding designed to explore and develop new knowledge and new products.
- An illustration of the above is in the food manufacturing sector where significant funds will be expended privately to modify a process to bring a product to market. These funds will typically dwarf the funding for actual research. One food-manufacturing R&D executive stated that the only way this can be easily teased out would be to know what amount is claimed to the Internal Revenue Service for research.

## Considerations

- From a “public good” perspective, the concept of some intellectual property remaining in the public realm might seem of value to society. It could be an answer to the question: *Is it appropriate that all research on a particular subject be “owned” by the private sector, driven by the private sector, and targeted to only what the private sector deems appropriate and of commercial value?* A classic example that might be used in this illustration is the public desire for “organic” related varieties which offer minimal value to the private sector breeding entities.
- A basic question often asked on this topic is on the issue of duplication: *Is there a case where duplication of public and private funding is appropriate?* Clearly science dictates that duplications of results leads to a confirmatory state and evidence of a finding. Often duplication is also desired to erase any perceptions of conflict of interest. Duplication can also address minor nuances such as what might be exhibited in soil differences, cultural practices, etc. Sometimes duplication is to replicate capacity and build redundancy. The software industry does this daily and a case can clearly be made for the field of agriculture too. Appropriate collaboration and duplication can be an additive measure and essential for many reasons.
- The exceptional capability of deep funding that can be directed by the private sector to an issue or focus is extraordinary. And the follow on achievements made possible by this level of funding are of a nature that could clearly produce breakaway discoveries. This should not be understated.
- Much of the research in the private sector could be viewed as near to commercialization where as much of the public sector research could be viewed as highly fundamental and often what might be consider as “pre-competitive.” Futures plans might take advantage of this “natural” segregation as a planning vehicle.
- Training the next generation of plant and animal breeders, mechanical engineers, food scientists, etc. all require researchable projects as a basis for the MS/PhD training.
- Though many problems now require complex teams of specialists, we still need a system that trains the specialists. Funding for single investigator research builds a capability that

helps establish an individual as a leading specialist and a valued member of a multidisciplinary team.

- The PCAST report sheds some shadow on the comparison of competitive versus non-competitive research. However, experience in agricultural research has often led to valuing the non-competitive funding function in at least two ways:
  - **“Boots on the Ground”** – built capacity for continuing improvement and rapid response to emerging issues. An example of this was the Red Bay Beetle, carrying the Laurel Wilt pathogen, invading mainland USA via a port in the State of Georgia and the rapid expansion of infestation south throughout the Florida peninsula.
  - **“Diffusion of new Technology”** – the incredible success of the U.S. Agriculture history is attributed to the insightfulness of establishing the U.S. cooperative extension service throughout the country. This extension of research that addresses adoption, regional difference, performance demonstration, and many other related issues are critical to our success.
  - The true value of non-competitive research should not be dismissed – contrary to the PCAST implications.

### **Recommendations:**

- ***Item 1 — The USDA should commission a set of studies to create an accurate and broad picture of current private and public funding of agricultural research.***
  - **Approach** — The committee recommends a sector-by-sector updated analysis be commissioned by USDA to look at Private and Public research funding.
    - Consideration might be given to identifying an association or society related to each of the sectors and commissioning those associations or societies to work with the related private sector to get this information. An example might be using the Institute of Food Technologist as a society to work with the food manufacturing and distribution sector to identify research investments.
    - Internal USDA Funding (including extension) could be assessed in detail and is likely well captured in current reports and program descriptions.
    - Land-grant research using built capacity (state funding) is another component that should be teased out of a college-by-college reporting.
    - State-based capacities vary greatly, however in heavy agriculture states it may not be uncommon for State Departments of Agriculture to operate some form of research based programs.
  - **Rationale** — The basis of our thinking here is that our casual assessment indicates that current data regarding private sector funding is greatly outdated and may (as illustrated in the case of food manufacturing) be based on a false assumption of defining research to include development. Similarly, we need a true and accurate picture of federal support of agricultural research and state support of agricultural research.
  - **Expected Outcome** — With this type of detailed data in place, a true awareness of

the private versus public support for research will be known.

- In a sector-by-sector review, an assessment and re-balancing could be discussed with a full knowledge of current investments and focus.
- Best practices might well be discerned by exploring other entities that attempt to manage across a public/private divide. This might include other countries such as Australia and other federal agencies such as the EPA and their annual event.

- ***Item 2 — The USDA should host various regional listening sessions to assess public opinion on the issue of rebalancing private versus public funding of agricultural research.***

- **Approach** — The committee recommends that USDA hosts series of regional panels each focused on a sector of agricultural research. These sectors should include:
  - New crop & animal sources for the purpose of supporting agricultural production.
  - New agricultural chemicals for improving crop/animal production including management of disease and pests as well as promotion of growth.
  - New agricultural production systems for Crops & Animals including farm implements, protected agriculture structures.
  - Food Manufacturing and Distribution including new food processing and shelf life extension research areas.
  - Human Health & Nutrition including food safety and nutrition impact.

Panels should consist of major entities that underwrite/sponsor actual research. These might include: Associations, Corporations, NGOs, -- spanning industry sectors noted above. They also could include major principle investigators. Someone speaking to the relative value capacity funding might also shed light on the implications of this type of funding for the particular sector being highlighted.

- **Rationale** — There are many side issues to the concept of rebalancing between private and public funding. By holding the listening sessions, opportunity is created to hear new and different support, concern, or guidance regarding a path forward.
- **Expected Outcome** — With these types of listening session, USDA will receive up-to-date input from the private and public sector regarding the issues that should be weighed from both the private and public sectors as USDA considers what actions, if any, to take.

- ***Item 3 — The USDA should host an annual meeting of a research roundtable for the express purpose of sharing research focus and research needs across public and private entities.***

- **Approach** — The committee recommends that USDA call for an annual meeting of private sector and public sector representatives to share research priorities and future needs from both a private industry and public needs perspective.

- **Rationale** — Any attempt to consider a rebalancing of research priorities will quickly be out of sync with real and perceived needs. An annual sharing and discussion would help to keep awareness high and allow for a more flexible adjustment of research focus based upon timely and regularly updated information. Institutionalizing this type of conversation will lead to relationship building, trust where appropriate, and improved understanding of needs and direction.
- **Expected Outcome** — We expect the annual effort to stay current with industry needs which will yield a better targeting of competitive grants and an opportunity to communicate needs for capacity funded programs to be responsive.

### **A Case for Sensitivity & Caution**

We have built a world-class system of agricultural research that is the envy of the world we live in. It has fostered a green revolution that literally saved the lives of billions of people. It has nurtured and trained agricultural scientists that launched new companies which have literally rewritten the success of agriculture from the fields of plant selection and breeding thru harvesting and storage mechanization and also including food manufacturing, distribution, and nutrition.

To declare it broken would be foolhardy. To understand that it can be improved is simply prudent and as “American” as apple pie and baseball.

So thru this lens, let us embrace the opportunity to target public agricultural research funding in a way that lends value, focus, and leverage to the private sector. Let’s, however, in this process not mistake the possible fickleness of private sector funding aimed at the next quarter’s financial reports and profits, as some sort of replacement of our world-class system.

Agricultural research is an investment in our children’s children. It is a trust that deserves our effort to maximize the synergy of a private-public partnership but to not in any way abdicate to either private sector or the public sector full and total control of agricultural science.

## **Report Developed by the Balance of Crop Research Working Group of the NAREEE Advisory Board**

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**Dr. Mark McLellan (Chair)**, Vice President of Research & Dean of the School of Graduate Studies, Utah State University

**Mr. Leo Holt**, President, Holt Logistics Corp.

**Ms. Twilya L'Ecuyer**, Owner, CURE Group and Owner/Farmer, L'Ecuyer Farms and L'Ecuyer Gardens

**Dr. Robert Taylor**, Dean and Director Land Grant Programs, Florida A&M University, College of Agriculture and Food Science

**Ms. Julia Sabin**, Vice President, Industry & Government Affairs, The J.M. Smucker Company

Additional input was provided by:

**Dr. Milo Shult**, Vice President for Agriculture Emeritus University of Arkansas System

**Dr. Anne Marie Thro**, Senior Science Advisor, USDA Office of the Chief Scientist

**Dr. Paul Heisey**, Economist, USDA Economic Research Service