

Overlook agricultural research at our peril

Dear President Obama,

With great excitement, I read your speech to the National Academy of Sciences about your commitment to increased funding for science and technology (1). As an active research scientist, I am more than aware of the importance of fundamental research in paving the way to new solutions for the most pressing issues facing our country. Although your bold commitments to medicine and engineering are essential to our future economic development, I was disappointed that a comparable commitment to agricultural research was not part of your vision for a strong America. I am dismayed because solutions for two of the greatest challenges of the 21st century, developing sustainable clean energy and feeding 10 billion people by 2050, depend on transformational breakthroughs in agriculture.

Mr. President, one of the essential elements of clean energy and our economic recovery is bioenergy. Bioenergy's goal is simple: transform the products of photosynthesis into useful energy currencies such as liquid fuel or electricity. A major source of bioenergy is multicellular plants, in which substantial efforts are needed to develop new "energy crops" that maximize the quantity of photosynthetic product per acre with minimum inputs (such as water, fertilizers, and pesticides). Crop yields are a fundamental area of agricultural research, so shouldn't this be a major thrust of our scientific investments?

If addressing the needs of the clean energy economy isn't enough justification, I hope solving the inevitable food crisis facing humanity is. There is wide consensus that the earth's population will increase by almost three billion people by

2050. Developing sustainable production systems that feed this many mouths will require a substantial increase in crop productivity. The global food crisis revolving around rice availability last year was a brief example of what we are facing. Unfortunately, yields across much of the globe are restricted by environmental and economic capacity. Addressing these constraints with more intensive inputs is economically and ecologically unsustainable. Again, transformational breakthroughs focused on "new" traits in modern crops and improved growing practices are desperately needed. Finally, it is easy to overlook agriculture as one of the largest ecosystems in the continental United States. Transforming this ecosystem into an environmentally friendly enterprise must be a fundamental component of any environmental policy that addresses global climate change.

In your speech, Mr. President, you stated that "science is more essential for our prosperity, our security, our health, our environment, and our quality of life than it has ever been before" (1). I am afraid we won't realize the full potential of your administration's commitment to the scientific enterprise without visionary investment in agricultural science because future breakthroughs in medicine and engineering will pale against the environmental costs of current energy sources and the loss of life caused by an inadequate food supply. Mr. President, please place agricultural research on your list of research priorities for the 21st century.

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1. Obama B (2009) President Barack Obama addresses the 146th Annual Meeting of the National Academy of Sciences. *Proc Natl Acad Sci USA* 106: 9539–9543.

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