

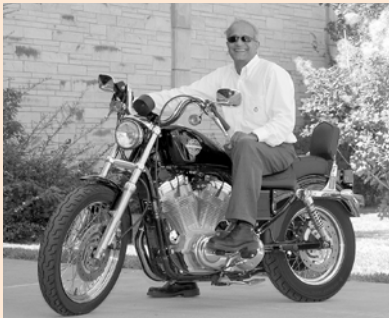
## Strengthening Agricultural and Food Related Science and Education

### A Conversation with Sonny Ramaswamy, Director USDA National Institute of Food and Agriculture

Mary Ahearn and Robbin Shoemaker

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Sonny Ramaswamy was appointed by President Barack Obama to serve as director of USDA's National Institute of Food and Agriculture (NIFA) on May 7, 2012—after a career of research, education, and administration at several land grant universities, including Oregon State, Purdue, Kansas State, Mississippi State, and Michigan State. NIFA is one of four agencies that make up the Research, Education, and Economics Mission Area of USDA. NIFA's mission is to lead food and agricultural sciences to create a better future for the Nation and the world by supporting programs in the Land-Grant University System and other partner organizations. NIFA doesn't carry out research, education, and extension programs, but rather helps fund it at the national, regional, state, and local level—through formula-based grants to each state and increasingly through competitive grants. NIFA also provides national program leadership in defining priorities areas for funding. Agricultural science accounts for roughly \$3 billion annually of the US federal budget, and approximately \$1.3 billion is allocated to NIFA. Agricultural Economists Mary Ahearn, USDA Economic Research Service and Robbin Shoemaker, NIFA sat down with Dr. Ramaswamy to learn more for Choices readers about his goals for NIFA.

#### What is your vision for NIFA?

RAMASWAMY: I would like NIFA to be recognized as the enabler of outstanding research, education, and outreach efforts for our nation on agriculture, food, natural resources, and healthy communities. If you look at the societal challenges we face today, nobody has the market cornered on having the intellectual capabilities. And we have got to bring the best brains to the table, and that's the role I expect NIFA to play.

#### What is your most important message to the American public about our greatest challenges?

RAMASWAMY: There are a couple of important challenges. First is the disconnect in America between the challenges that we face and the investments that we make as a society. This is likely, in part, because of a second challenge. There is an apparent lack of recognition of the importance of food and agriculture to our nation. I think most Americans take our safe and affordable food options for granted. The majority of Americans worry more about other scientific challenges, like putting a man on Mars and energy exploration. All other scientific challenges are moot if we do not continue to get safe, nutritious and affordable food on the table—while using water efficiently, helping to assure clean air, and protecting our natural resources.

My role as the director is to be the spokesperson and have the bully pulpit, to remind people about what's at stake for our nation, and for the world because America plays a major role in feeding the world. We talk about how food and agriculture is good for rural America, but urban America is toast without food and agriculture. People

underestimate the critical nature of food, water, air, and other natural resources that are important to everyone, not just to that 2% or less of the population that is on the land. There is little appreciation of the role played by the long standing U.S. public investment in research, education and Extension programs which created the base for the tremendous productivity of the agricultural and food sectors here and abroad. Developing countries are now mimicking that strategy to increase their own productivity, at the same time we have been slowing growth in our levels of public support for it.

**In the past few years there have been a number of significant events that have important implications for food and agricultural systems and rural America. How do you see these things influencing NIFA and how will you direct NIFA to address these and other issues?**

RAMASWAMY: Global population growth drives the issues of the day, such as managing scarce land, food, shelter, and fuel and is best captured by the “wicked problems” paradigm. I’m very concerned with the immensity of the challenge of feeding a global population that is projected to be well over 9 billion by 2050. Take climate change: how do you improve productivity and yield, water-use efficiency, nitrogen-use efficiency, nutrient-use efficiency or drought tolerance? How can you grow crops in arid conditions? Can you increase salt tolerance of crops, so that they can tolerate irrigation with sea water?

As an agency, NIFA addresses problems through its National Program Leader structure and its targeting of Request for Applications (RFA). National Program Leaders use their knowledge in conjunction with stakeholder input to help set the agenda. For example, stakeholders

have helped NIFA identify subtle shifts necessary for us to address water issues, production agriculture challenges, and human dimensions of dealing with the wicked problems in the next 3-5 years and beyond.

**Many of the issues facing us in the 21st Century require expertise from a variety of disciplines. How do you see NIFA engaging with the breadth of the science community to most effectively address these challenges?**

RAMASWAMY: In the past, we tended to address our problems with a “magic bullet” approach to developing solutions—the American mindset was to find a panacea to problems. We’ve learned that that’s not how nature operates. Our problems aren’t linear. We still need deep disciplinary knowledge, but the “lone ranger” approach is a thing of the past. The challenges we face are complex, with all manner of feedback loops. We need to “crowd source” the best intellectual resources to find solutions. There are some short-term or proximate questions to address—for example, a single insect problem. But when we address that in isolation, another problem emerges—we can’t address issues in piecemeal fashion—we need a comprehensive or systems approach. But we can’t put all our eggs in one basket; we still need deep disciplinary knowledge from a fundamental perspective that we can draw on and bring together to address our challenges.

**Many issues are primarily physical or biological science by their nature, so how do you introduce human dimensions into the issue?**

RAMASWAMY: We’ve ignored the human dimension for decades. Human dimensions are critical—we need to invest more in the human dimensions of our research. By human

dimensions, I mean a research approach that recognizes the behavioral aspects of problems and potential solutions which provide incentives or opportunities to change behavior to achieve a targeted outcome. We need to address both the direct and indirect implications of the basic discoveries, including the unintended consequences. To more fully appreciate the complexity of problems, we need a very thoughtful approach to incorporating human dimensions into our science agenda from the start. We have paid lip-service to it, but we need to invest in it. For some issues, the human dimension aspect trumps the science; biotech is an example of that. People can lose trust in the system if we fail to address the human dimension. Even the push for STEM (Science, Technology, Engineering and Math) education which suggests there are technological fixes to problems may be inadequate, if it overlooks the human dimension in its approach to problems.

**You’ve said you want NIFA to be viewed as responsive to stakeholders. Who are those stakeholders? Who sets the agenda for NIFA?**

RAMASWAMY: Stakeholders are everybody from average citizens to farmers, ranchers, scientists and people from the private sector and university faculties. Ultimately, those conversations with stakeholders, information about the global challenges, and the priorities set out in legislation are what drive us. NIFA’s agenda is set as a collective effort. Our agenda is informed by global challenges as well as more immediate challenges. Congress and the Farm Bill set priorities, stakeholders provide key input, and ultimately we use all of this to make the decisions about the funding priorities. The National Program Leaders synthesize that input into the RFA’s and they reflect NIFA’s priorities and agenda.

**Do you have any special messages for scientists, including applied economists, focused on agricultural issues?**

RAMASWAMY: Scientists can't just talk amongst themselves. Help agriculture not be such a well-kept secret—for example, go out and talk to rotary clubs, high schools, or other community organizations. And avoid jargon. Don't obfuscate. Scientists can make compelling arguments about approaches to problems; they can provide ground truth on proposed scientific solutions with metrics and data about impacts of adopting new research results—but they need to articulate those solutions in plain language. There is a vast audience with critical dependence upon the science which drives U.S. agricultural and food productivity, but little connection to it. Scientists must greatly increase their efforts to better inform the public about the need to continue to invest in the science.

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