

## **Brenner Discusses USDA Research, Technology**

*The Entrepreneur*

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Few people know that the Department of Agriculture is one of the leading governmental research organizations with a long history of commercializing what is developed in its labs and jointly. Dr. Rick Brenner, who was named the Assistant Administrator in ARS for Technology Transfer in October 2004 and represents the Secretary of Agriculture on issues pertaining to management of intellectual property arising from USDA research, and has the delegated authority for licensing inventions developed through intramural research in any of the USDA agencies, provides insights into the enormous impact his agency has on the economy of the country.

### **How Long Has The Department Of Agriculture Been Involved With Technology Research And Development?**

The USDA has been conducting research since its inception in 1862. President Lincoln coined the phrase “The People’s Department” in establishing USDA, largely because of the strong emphasis on solving problems in agricultural industries and delivering the solutions to the end users for adoption — a strong sense of public good. Research is conducted by a few of the 17 agencies and 12 offices within USDA. By far, the largest is the Agricultural Research Service (ARS) which is the principal intramural research arm of USDA, followed by the Forest Service; the Animal & Plant Health Inspection Service, Wildlife Services; and the Food Safety and Inspection Service. The Cooperative State Research Education and Extension Service (to be renamed the National Institute for Food and Agriculture on October 1, 2009) is the extramural agricultural research component in USDA.

How many laboratories do you have, the number of researchers employed and the amount of money that is invested in research and development?

The ARS conducts research at over 100 locations in the U.S., and 5 overseas labs, involving approximately 2100 permanent full time scientists (about 8,000 employees). The Congressional appropriation for ARS in FY 2008 was approximately \$1.1B.

### **What Are The Research Areas You Are Focused On?**

ARS conducts research in 1,100 projects grouped into 21 national programs in 4 broad areas: Animal Production and Protection; Crop Production and Protection; Nutrition, Food Quality and Safety; and Natural Resources and Sustainable Agriculture Systems. A quick perusal of the list of national programs, at <http://www.ars.usda.gov/Research/Research.htm> reveals the profound scope of ARS research “...from farm to fork.”

How does a private sector company learn about the research you are doing and then form partnerships with ARS for commercialization?

Private sector companies discover ARS research capabilities through a number of mechanisms including contact with scientists at scientific society meetings, industry workshops, field days sponsored by local

laboratories, scientific publications, Agriculture Research magazine produced by the ARS Information Staff, daily news feeds to the media, and through the website. Partnerships established to commercialize research outcomes include patent licensing, and research conducted under a Cooperative Research and Development Agreement (CRADA).

Technologies available for licensing, and cooperative research opportunities can be discovered at <http://www.ars.usda.gov/Business/Business.htm>. In addition to the “available technologies” listed on the webpage, companies can self-subscribe to “Tech Alerts” and receive notification via email when a new technology becomes available in any of a number of specific categories. Clear instructions on submitting a license application are also found on this webpage. CRADAs offer particularly good opportunities, especially for small businesses.

If there is a researchable problem identified by industry, and it is consistent with the mission and priorities of ARS, as identified in the National Programs, a CRADA may be established. Congress created the CRADA mechanism with passage of the Federal Technology Transfer Act of 1986 to provide the private sector in-kind access to the research expertise of federal agencies such as ARS.

Under a CRADA, the private sector shares in the cost and execution of the research (a true cooperative research effort), and has the right to negotiate an exclusive license to any technology that is wholly or jointly owned by the government that results from that cooperative research. Both the licensing, and establishing of CRADAs are the responsibility of the Office of Technology Transfer (OTT). Our Technology Transfer Coordinators, geographically dispersed across ARS, can assist in identifying that expertise, and in determining whether establishing a CRADA is warranted.

### **How Many New Commercial Products Have Been Developed Over The Years?**

This is difficult to say with any precision, so I am hesitant to provide an estimate. Here are the complications: The transfer of the technology to end users is the principal objective of conducting the research. In many cases, we do not need to protect intellectual property in order to effectively have industry adopt the research outcomes and produce products. In these instances, it is nearly impossible for us to track the development of these new products.

In other cases, an ARS invention should be patented when a private sector partner is needed to achieve technology transfer, and that partner requires some scope of exclusivity to protect the capital investments needed to commercialize the invention (e.g., further R&D investments). In these instances, we can track product development and availability through the licensing and license monitoring functions of OTT.

A further complication arises because many of our inventions are jointly owned by universities whose scientists jointly conduct research with our scientists. In those instances, we license our rights to the university so that the consolidated rights can then be licensed exclusively by the university to a private sector company. The university is obligated to report to ARS when sales occur, but may not track all the separate products.

Having said all that, let me provide a couple of statistics that demonstrate how successful our licensees are in taking ARS inventions to commercialization: In all, there are approximately 315 active licenses arising from ARS inventions. Of these, 112 are producing products that are for sale to end users. I suspect that

ratio is among the highest of federal agencies. It is also significant to note that of those 315, approximately 130 are joint with universities, and 28 of those have product for sale.

This attests to the strong cooperative relationships we have with our university scientists. To get a better total perspective of successful commercialization arising from ARS research, I urge your members to go to the webpages of ARS and get a copy of the ARS publication *Science in Your Shopping Cart*. This colorful publication describes a large number of products that have arisen over the years.

### **How Many New Companies Have Been Launched From The Technology Developed In Your Laboratories?**

We are just now trying to develop this information, so I don't have specific figures at this time. This will also be difficult to compile from universities licensing our joint inventions, but let me provide a few statistics from our FY 2008 USDA Annual Report on Technology Transfer: Thirty three percent of all our licenses are with small businesses. About 19 percent are with large businesses, including foreign multinationals with major U.S. presence. Of 27 licenses

executed in FY 2008, 41 percent were with universities and 52 percent were with small businesses; four were startups based on ARS technologies.

### **What Has Been The Greatest Success Your Organization Has Had?**

That would require an entirely subjective interpretation of "success." For example, all Roma tomatoes trace back to the original plant breeding of ARS scientists. Nearly all of the turkeys produced in the U.S. arose from the "Beltsville white" breeding line, developed by ARS at the Beltsville Agricultural Research Center in Beltsville, Md. Much of the snack food industry (e.g., potato chips) traces back to patents and research conducted by ARS in Wyndmoor at the Eastern Regional Research Center.

This included technologies needed to dehydrate foods, produce varieties with excellent 'chipping' characteristics, and the engineering research for mass processing systems. The corn starch polymers that make up the absorbent materials in diapers and undergarments arose from ARS research in Peoria, IL at the National Center for Agricultural Utilization Research.

Approximately 85 percent of all poultry consumed in the U.S. was vaccinated as embryo chicks, utilizing ARS patented technologies, to protect the birds from disease. Soy inks were developed by ARS, and the material and processes used to keep fresh cut fruits and vegetables from browning was developed by scientists at the Western Regional Research Center in Albany, CA. The insect repellent DEET that is the most common commercial product for personal protection was an ARS invention.

This list can go on and on. Again I refer your readers to the "Science in Your Shopping Cart" publication, as well as the "technology successes" section on the website. I also suggest your readers take a look at the "Downstream Outcomes" section of our annual reports on technology transfer from ARS; these are available at the <http://www.ars.usda.gov/Business/Business.htm>. Web site.

### **How Can Your Office And ARS Increase Commercialization Opportunities And Assist In Sustainable Economic Development For The Nation?**

I'm glad you asked this question. It became clear during 2008 that our nation is facing grave emerging issues of food security, water availability and quality, sustainable biofuels and alternative energy development, increased global competition, and economic instability. Traditionally, innovation and small business development have been critical to the nation's global competitiveness and in achieving sustainable local / regional economic development.

The global economic downturn of 2008 has furthered highlighted the urgency to focus on innovation, competitiveness, and job creation. So, to help meet these challenges and enhance partnering with small businesses, ARS has initiated an Agricultural Technology Innovation Partnership (ATIP) program to facilitate adoption of ARS research outcomes by private sector companies for commercial production of goods and services. Key to this initiative is the use of Partnership Intermediary Agreements (PIA) with technology-based economic development entities.

Intermediaries are strategically chosen by geographic region and for their ability to serve small businesses by providing assets complementary to ARS's research and innovation capacities. A strategic network of perhaps 6-8 PIAs across the United States would increase opportunities for businesses – through the intermediary – to gain access to the ARS research capabilities, and strengthen partnerships with our university researchers. Intermediaries facilitate business development and competitiveness by helping ARS identify companies to license ARS innovations. They also assist small businesses whose research needs can be matched to the expertise of ARS scientists conducting research addressing high priority agricultural issues.

Let me give you an example of progress and how this is envisioned to work. In the closing days of FY 2007, ARS executed it first Partnership Intermediary Agreement with the Maryland Technology Development Corporation (TEDCO). During the year, TEDCO funded a Maryland licensee (start-up company) of a technology from the Southern Regional Research Center in New Orleans, and three CRADA partners.

On Oct. 30, 2008, TEDCO and ARS co-hosted a Green Technologies Showcase highlighting technologies and research capacities of scientists across the agency. From that event, several new research partnerships were developed. ARS entered into a second PIA with the Mississippi Technology Alliance (MTA), in December 2008, so we're just beginning to define the opportunities for partnerships assisted by MTA. I apologize for the long answer, but I am really enthusiastic about this new initiative, and the way in which this can serve the nation in both innovation and sustainable economic development.

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