

# NATIONAL RESEARCH AGENDA

American Association *for* Agricultural Education  
 2011- 2015 Research Priority Areas

## Technologies, Practices & Products

### New Technologies, Practices and Products

**Key Outcome:** *Agriculturists, rural landowners, homeowners, and consumers will embrace new technologies, practices, and products derived through agricultural and natural resources research.*

Informed  
 Choices

Scientific &  
 Professional  
 Workforce

Meaningful,  
 Engaged  
 Learning

Efficient &  
 Effective  
 Programs

Vibrant,  
 Resilient  
 Communities

#### Background

It has been estimated that the amount of scientifically produced information has doubled every 15 years since the early 1900's. The sheer volume of new information that must be acquired and consumed by technology savvy professionals is staggering. Yet today's agriculture leader, policy maker, and consumer demands more information, not less. Within the context of agriculture, it is our profession that has the potential to best respond to these traditional and emerging challenges.

Agricultural enterprises encompass components such as labor, marketing, finances, natural resources, genetic stock, nutrition, equipment, and hazards. When managed as a system, these components can realize positive economic, environmental, and societal impacts. These positive outcomes are not limited to production agriculture, but can be felt locally as well as globally within each societal challenge we face. Such was the case with a seemingly small event in 1928 when the Iowa State Agricultural Experiment Station research conducted on the release of hybrid corn to farmers yielded an adoption-diffusion process that has influenced subsequent information dissemination efforts for more than sixty years (Ruttan, 1996).

The findings from the study implied that if innovative farmers were identified and targeted to adopt practices or technologies, other farmers would soon follow thus speeding up the adoption of new agricultural practices. Stephenson (2003) stated that this idea was simple, compelling, and provided the basis for a model of agricultural development that the Extension Service continues to use today. Subsequent research that cites innovation diffusion theory, as well as academic courses that include this theory, continue today (Lionberger & Gwin, 1991; Stephenson, 2003).

#### Challenges

This challenge serves to change and focus our profession's diffusion-related research that will also be paramount to our future programming efforts. Yet within these demands for change, what Ryan and Gross (1943) found in their classic study remains true today—that human interaction is a

critical component of the adoption process. While their study found neighbors as the most influential source of information, today's social networking technologies can find that neighbor halfway around the world. Our discipline's research must embrace that the human interactions that occur throughout the adoption process are both present and evolving in this information age.

To achieve positive outcomes in current and future diffusion systems, related research, education, and outreach activities must continually change to address the new challenges and opportunities brought about by rapidly advancing technologies, evolving consumer demands, needs, and behaviors, and the need to make positive contributions to environmental, human, and animal health. Our research must also remain cognizant that the chains of production, distribution, and marketing of agricultural products are complex. The stakeholders associated with each of these links in the chain make decisions based on unique types of data and have their own sensitivities (Association of Public and Land-grant Universities (APLU), 2010). As such, we are furthered challenged to create transdisciplinary systems research approaches that holistically examine technological adaptation and policy design while accounting for all of the components of agricultural systems, from farm to the market and the consumer and back again.

#### Opportunities to Respond

Foundational research is needed to determine what types of knowledge, skills, environment, and support systems help decision-making processes by individuals and groups in today's information age. More deeply, cognitive and cultural factors have a major influence on how scientific information and scientific uncertainty are communicated, accessed, understood, and responded to by various stakeholder groups and will likely require longitudinal, multidisciplinary research designs. This includes research that validates effective educational methods that help individuals and groups make informed decisions and behavioral choices. In addition, APLU (2010) stated that social science research goals will need to address: (a) gaps in knowledge, socioeconomic biases, and other factors that

constrain effective communication to various target audiences, (b) the proper framing of issues for optimum communication effectiveness for various target audiences, and (c) the use of new technologies and social networking tools for communication to selected target audiences.

Our research within this agenda must also incorporate advances in decision sciences that could improve uncertainty communication and the design of mitigation and adaptation-oriented diffusion strategies. APLU (2010) recommended that this include (a) risk perception, investment decision making under uncertainty, and the role of temporal discounting, (b) the role of participatory processes in scenario development, and (c) extensive testing and design for adaptation and mitigation measures appropriate for different producers and consumers.

Finally, we must move boldly into the creation of systems-based models that will advance our understanding of information and technology diffusion and its practice. Such understanding will subsequently shape our information dissemination, educational programming, and stakeholder engagement practices and structures for the next generation of agriculturist and consumers.

To achieve positive outcomes in current and future agriculture-related diffusion efforts, related research, education, and outreach activities must continually change to address the new challenges and opportunities brought about by rapidly advancing technologies; evolving consumer demands, needs,

and behaviors; and the need to make positive contributions to environmental, human, and animal health. Our social science research must also remain cognizant that the chains of production, distribution, and marketing of agricultural products are complex. We must create transdisciplinary, systems research approaches that holistically examine technological adaptation and policy design while accounting for all of the components of agricultural systems, from farm to the market and the consumer and back again. Our areas of scientific focus should:

- » Determine the types of knowledge, skills, environment, and support systems that facilitate decision-making and adoption processes by individuals and groups.
- » Identify potential gaps in knowledge, socioeconomic biases, and other factors that constrain effective communication and educational efforts to various target audiences.
- » Determine which advances in decision sciences could improve risk and uncertainty communication and the design of mitigation and adaptation-oriented diffusion strategies.
- » Develop and validate systems-based models that will advance our understanding of information and technology diffusion and its practice.

---

## REFERENCES

- Association of Public and Land-grant Universities (APLU), Experiment Station Committee on Organization and Policy—Science and Technology Committee. (2010). *A science roadmap for food and agriculture*. Retrieved from [escop.ncsu.edu/docs/scienceroadmap.pdf](http://escop.ncsu.edu/docs/scienceroadmap.pdf)
- Lionberger, H., & Gwin, P. (1991). *Technology transfer from researchers to users: A textbook of successful research Extension strategies used to develop agriculture*. University of Missouri
- Ruttan, V. W. (1996). What happened to technology adoption-diffusion research? *Sociologia Ruralis*, 36, 51-73
- Ryan, B., & Gross, N. C. (1943). The diffusion of hybrid seed corn in two Iowa communities. *Rural Sociology*, 8, 15-24
- Stephenson, G. (2003). The somewhat flawed theoretical foundation of the Extension Service. *Journal of Extension*, 41(4). Retrieved from <http://www.joe.org/joe/2003august/a1.php>



## ADDITIONS