National Research Agenda

American Association *for* Agricultural Education's Research Priority Areas for 2011 – 2015

American Association for Agricultural Education

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Change and focus. Focus and change. Both can be a noun and a verb. Separately, their respective meanings can be used to describe a current status or inspire thoughts of a future point or state of being. When combined, these two words have the potential to create powerful outcomes of historical significance.

In the midst of today's seemingly constant state of change, the ability to focus attention and resources on emerging challenges and opportunities increases the likelihood of achieving positive outcomes—perhaps of historical significance. Such is the path before us. In the past decade, there have been many changes in the food and agricultural systems both within the United States and around the world. While portions of these changes have resulted from rapid advances in science, many were influenced by societal changes and shifts in economies, priorities, and the environment.

Within this backdrop, we find that it is the human dimension that is both the driver and the passenger of change of the U.S. food and agricultural systems. As such, increasing our focus on these human dimensions through research, education, and extension activities has the potential to yield incredible advances, impactful outcomes, and positive change.

The American Association for Agricultural Education (AAAE) developed this research agenda as a signpost for our colleagues across the food and agricultural systems indicating both our focus and commitment towards addressing the issues and problems facing individuals, organizations, and communities both locally and globally. This agenda also serves as our profession's internal compass focusing our collaborative efforts and resources in the light of recent change and a future laced with opportunities and challenges.

It is our hope that the outcomes of our profession's research agenda facilitates, supports, and inspires the human dimension of our global food and agricultural systems for years to come.

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As used in this document, *Agricultural Education and Communications* includes agricultural education in schools, universities, and other postsecondary institutions; education and other nonformal, community education, and outreach programs; leadership development in individuals, communities, organizations and agencies; and communication within and throughout the agricultural and natural resources industries. Also included are university programs designed to develop educators, leaders, and professional communicators for all aspects of the vast agriculture industry. Agricultural Education is a broad, applied field that draws foundational knowledge from psychology and sociology, while focusing on the human dimensions of science and practice in agriculture and natural resources management.

Recently the Association of Public and Land-grant Universities' Experiment Station Committee on Organization and Policy, Science and Technology Committee released its report titled *A Science Roadmap of Food and Agriculture* (2010). That report was framed around the following societal needs (p. 2):

- The need for U.S. food and agricultural producers to be competitive in a global environment.
- The need for food and agricultural systems to be economically, environmentally, and socially sustainable.
- The need for U.S. agriculture to adapt to and contribute to the mitigation of the effects of climate variability.
- The need to enhance energy security and support a sustainable bioeconomy in the United States.
- The need for safe, healthy, and affordable foods.
- The need to address global food security and hunger.
- The need to be good stewards of the environment and natural resources.
- The need for strong and resilient individual, families, and communities.
- The need to attract and develop the next generation of agricultural scientists.

The breath and depth of these individual needs, not to mention the vastness generated through their interdependence, is more than a single researcher or single discipline can hope to tackle in a short period of time. However, a focused, collaborative research effort within a discipline and in cooperation with other disciplines has the potential to address these societal needs. This research effort must include both fundamental and translational research to achieve the desired outcome.

This is the spirit and intent that the American Association for Agricultural Education utilized in creating its initial national research agenda (Osborne, n.d.). The development of that national research agenda coincided with increasing recognition of the value and unique contributions of social science research in developing sound solutions for complex agricultural problems. The final product used a four-level framework for detailing the profession's research priorities that were organized into five broad disciplinary dimensions: agricultural communications, agricultural leadership, school-based agricultural education, extension and outreach education, and agricultural education in university and postsecondary settings.

Subsequent fundamental and translational research activities by the profession have further illustrated that effective education and communication strategies are indeed integral to the development, acceptance, and evaluation of creative solutions in food and agricultural systems. Yet within the light of this seemingly validation of our discipline, we still find those who do not understand nor appreciate the foundation for success created by sound research conducted within and across the human dimensions of the food and agricultural systems.

Beyond this lack of understanding by others and the simple passage of time, rapid advances in science and technology, changes in societal needs and behaviors, a changing budgetary environment, and increasing global economic and environmental interdependence call for the creation of a new research agenda by our profession. With a combination of understanding the current and emerging needs, trends, and problems combined with forward-looking, systems-approach thinking, our discipline can focus our individual and collective talents, energies, and resources towards the creation of products, programs, and services that meet these societal needs.

[1] The APLU's report *A Science Roadmap of Food and Agriculture* (2010) defined translational research as being integrated with teaching and outreach to effectively address societal needs (p. 2).

The development of this national research agenda was initiated by 2009-2010 AAAE President Lloyd Bell who in September 2009 asked David Doerfert of Texas Tech University to lead the task. In his capacity as then AAAE Research Committee chair, Doerfert enlisted others to serve as a leadership committee to complete the agenda development process (Appendix A).

Drawing upon lessons learned through the development of the initial national research agenda, the leadership committee began the process with three goals:

- Involve the full membership of AAAE in the research agenda development process with additional involvement from peer organizations.
- Utilize a long-term approach to developing the research agenda that includes foresight beyond the five-year framework of this report.
- Commit the development of a research agenda to be an on-going, integral part of AAAE's research efforts.

From these goals, the leadership committee developed a three-phase process that included (1) identifying research needs, (2) defining the resulting research priorities, and (3) creating the final national research agenda report and supporting dissemination tools. The initial phase began with a two-round nominal group process conducted via a web-based survey tool (Survey Monkey®). The first round of this process was a single question

> *"What are the primary/major/fundamental problems and issues in the broad agricultural education discipline (including education, communication, leadership, and extension) that should be addressed through research in the next five years?"*

This single question generated 297 items from 136 respondents. Review by the members of the leadership committee to eliminate duplicate items reduced the list of items to 170. In round 2 of the nominal group process, respondents were asked to rate each of these items individually as critical, important, or not important. From these results, mean scores were created for each item. In addition, an overall ranking was created as well as ranking by individual faculty rank (assistant, associate, or full professor) and by the five discipline dimensions.

While the leadership committee examined these results, the committee members also immersed themselves in the writings of other agriculture-related organizations and agencies, including those involved with social sciences research such as peer organizations and potential research funding sources, as a means to ensure that the committee fully understood the potential research needs our profession should address. Armed with this wealth of information, the leadership committee extended invitations to ten additional individuals to participate in the process of defining the initial version of the national research priorities. The members of this Priority Development Team (Appendix B) reviewed this information without knowledge of previous leadership committee discussions. Through the use of telephone conference calls, email, and discussions via National Association of Agricultural Educators' (NAAE) Community of Practice (CoP) discussion tool, the group defined eight initial research priorities with a key outcome for each priority.

These eight priorities were shared with the AAAE membership present at the 2010 annual meeting in Omaha, Nebraska. From feedback collected at the meeting as well as through written correspondences received by committee members during the subsequent summer months, the leadership committee reduced the initial eight national research priorities to the six priorities contained in this report. In concluding its work, the leadership committee also created additional tools designed to facilitate the efforts of the AAAE membership in sharing these priorities through their individual communication and research collaboration efforts.

PRIORITY 1: Public and Policy Maker Understanding of Agriculture and Natural Resources

As our global population grows to a projected nine billion people by 2050, the non-agriculture population has little to no understanding of the complexities involved with sustaining a viable agriculture system. The potential negative impact of an uninformed population on the United States and global agriculture and food systems is great. An informed citizenry, including policy decisions at all levels, will create win-win solutions that ensure the long-term sustainability of agriculture, natural resources, and quality of life in communities across the world. Our areas of scientific focus should include:

- Increasing our understanding of related message and curriculum development, delivery method preferences and effectiveness, and the extent of change in audience knowledge, attitudes, perceptions and behaviors after experiencing an educational program or consuming related information and messages.
- Demonstrating the impact of agricultural literacy efforts on a variety of stakeholder behaviors including consumer behavior (e.g. K-12 test scores, voting behavior, food consumption behavior). Literacy research efforts must be reciprocal in that members of the agriculture industry must also increase their understanding of various stakeholder group needs and/or behaviors
- Determining the potential of emerging social media technologies, message formats, and strategies in realizing a citizenry capable of making agriculture-related informed decisions.

PRIORITY 2: New Technologies, Practices and Products Adoption Decisions

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.

PRIORITY 3: Sufficient Scientific and Professional Workforce That Addresses the Challenges of the 21st Century

An examination of the last one hundred years of U.S. agriculture often highlights the increase in productivity, the technological developments, changes brought about through consumer influences, and policy changes that have both advanced and provided course corrections to the industry. New trends in today's global economy require greater capacity of the agricultural workforce. In order to further improve agricultural productivity efficiency and effectiveness in meeting our global food, fiber, and energy needs, a sufficient supply of well-prepared agricultural scientists and professionals is needed to drive sustainable growth, scientific discovery, and innovation in public, private, and academic settings. Our areas of scientific focus should be:

- Developing the models, strategies, and tactics that best prepare, promote, and retain new professionals who demonstrate content knowledge, technical competence, moral boundaries, and cultural awareness coupled with communication and interpersonal skills.
- Creation of programs that develop the skills and competencies necessary to improve the communications and knowledge sharing effectiveness of all in the agriculture-related workforces of societies

PRIORITY 4: Meaningful, Engaged Learning in All Environments

The design, development, and assessment of meaningful learning environments which produce positive learner outcomes are essential to properly educating the citizens of the 21st century. Yet, this task is complex. Research is needed to achieve the goal of having all learners in all agricultural education learning environments actively and emotionally engaged in learning, resulting in high levels of achievement, life and career readiness, and professional success. Our areas of scientific focus should:

- Deepen our understanding of effective teaching and learning processes in all agricultural education environments.
- Examine the role of motivation, self-regulation, metacognition, and/or reflection in developing meaningful, engaged learning experiences across all agricultural education contexts.
- Examine the role of diversity and multiple perspectives in meaningful learning across agricultural education contexts.
- Develop and assess various learning interventions and delivery technologies to increase problem-solving, transfer of learning, and higher order thinking across all agricultural education contexts.
- Examine various meaningful learning environments in assorted agricultural education contexts for their impact on specific cognitive, affective, and psychomotor learning outcomes.

PRIORITY 5: Efficient and Effective Agricultural Education Programs

Learning is the single most significant element molding our being. It is the driving force that combines with our experiences, our needs, and our desires to make us what we are while influencing the social structures to which we belong. Highly effective educational programs will meet the academic, career, and developmental needs of diverse learners in all settings and at all levels. Further, accurate and reliable data that describes the quality and impact of educational programs and outreach efforts at all levels must be distributed to respective decision groups. As such, our areas of scientific focus should:

- Define the characteristics of effective agricultural education programs and teachers and the means to correctly access the current state of these characteristics.
- Demonstrate the effective integration of STEM (science, technology, engineering and math) into agricultural education programs.
- Determine the means to effectively and efficiently document the outcomes and impact of agricultural education programs on an individual, community, industry, and societal levels.

PRIORITY 6: Vibrant, Resilient Communities

Strong local communities have effective leaders and engaged citizens who ensure high quality educational and career development opportunities for youth and adults and proactively sustain an environment conducive to positive community change and growth. Communities that lack vigor and capacity have great difficulty in responding to the increasingly complex challenges present in many communities today. Additional research is needed to ensure the environment where positive community change transforms unhealthy communities into high-capacity communities. Our areas of scientific focus should:

- Examine the aspects of vibrant, resilient communities that encourage youth and adults to become future members and leaders of the community.
- Develop mechanisms to evaluate the capacity of a local community to lead positive change, and identify the factors that exert significant influence on change processes and outcomes.
- Determine the factors that influence the educational and career aspirations of citizens in rural communities.
- Determine the effects of technology use and interpersonal and mass communication methods on community dynamics and citizen engagement.
- Design and test models for increasing civic engagement in local communities and for increasing the social capital of local communities.

PRIORITY 1: Public and Policy Maker Understanding of Agriculture and Natural Resources

Key Outcome: Consumers and policy makers will have an accurate understanding of and informed opinions about agriculture and natural resources. Further, policy decisions at all levels will reflect win-win solutions that ensure the long-term sustainability of agriculture, natural resources, and quality of life in communities across the nation.

Background

In the year 2010, the earth's human population almost reached seven billion. This growing population is experiencing changes in demographics, increased urbanization, increased worldwide agricultural production needs, and changes in agricultural trade policies. In the midst of these changes, the world population is still dependent upon an agricultural system that will provide them with food and clothing as well as an increasing variety of other products (including energy) designed to enhance their living environment.

The foundation to this important economic, political, and life-sustaining system is still the farm. However, less than two percent of the U.S. population lives on a farm—a stark contrast to 30% in 1920 and 15% in 1950 (National Research Council, 1988). Technological and economic advances have led to reductions in the number of farms and rural community population and a comparable increase in average farm size. One of the consequences of these shifts is that the majority of today's elementary school children are at least two generations away from first-hand knowledge of agriculture (American Farm Bureau Federation, 2002; Farm Bureau Federation, 1983). The result is a profound revelation that the future of American agriculture rests in the hands of ninety-eight percent of the United States population who do not reside on a farm and may have little to no understanding of agriculture.

Beyond the farm, American agriculture is a broad-based, growing industry that employs people in virtually every community in the nation, plays a vital role in the history of the nation and the food and fiber system, and contributes to our nation's economy and national security. Unfortunately, this ability to produce food and materials for human usage is a system that the average American takes for granted. This seemingly ambivalent attitude combined with the population shift from rural communities to more urbanized areas has weakened the real success story of American agriculture (Jepsen, Pastor, & Elliot, 2007; Pope, 1990).

Arguably, an understanding of agriculture's history and current economic, social, and environmental significance, both domestically and internationally, is important for all Americans. Supporting this argument is the increasing influence of special interest groups involved in issues such as animal rights, pesticide usage, soil and water conservation, and other environmental concerns as they seek to gain the media's and public's attention— often through emotional pleas or capitalizing on negative events in agriculture to better position their cause.

As such, it becomes increasingly imperative that the general public understands the history and current challenges of agriculture and how it affects each person's life on a daily basis (Law, 1990; Sharp, Foster, & Elliot, 2007). In 1988, the National Research Council defined agricultural literacy as the goal of "education about agriculture." Agriculturally literate people are defined as those who have some knowledge of food and fiber production, processing, marketing, and

the practical knowledge needed to care for their outdoor environments, which include lawns, gardens, recreational areas, and parks (National Research Council, 1988).

Vital to the continued success of the U.S. agriculture industry and the nation as a whole, is a well-informed, literate society that has the capability to make informed decisions about agriculture (Igo & Frick, 1999; Ryan & Lockaby, 1996). Bekker et al. (1999) defined an informed decision as one where a reasoned choice is made by a reasonable individual using relevant information about the advantages and disadvantages of all the possible courses of action, in accord with the individual's beliefs. For agriculture, this relevant information must include some knowledge of food and fiber production, processing, and domestic and international marketing, as well as agriculture's role in renewable energy, natural resource management, community resiliency, human nutrition, food safety, and other bio-based products and processes.

To achieve this end, consumers and policy makers must have access to information that is critical for informed decision making about agriculture, food, and natural resources. There exists a general belief among K-16 educators, as well as scientists, that people must be scientifically and agriculturally literate in order to make wise and informed economic and political decisions about the use of renewable resources (Cardwell, 1994; Glassman, Elliot, & Knight, 2007). Though functional agricultural literacy does not imply a high scientific level of understanding about agriculture, it does consist of minimal knowledge levels which take into account an understanding of basic agricultural methods, the basic vocabulary of agricultural terms, and the ability to understand the impact of agriculture on society (Frick & Spotanski, 1990). Yet, the problem of agricultural illiteracy remains widespread, having serious ramifications in the arenas of public policy development, development of personnel to serve the broad agricultural industry, and in the education of people from kindergarten through adult levels (Russell, McCracken, & Miller, 1990; Wals, 2010).

Challenges

As fewer people are directly involved in production agriculture, public support of the industry becomes even more important. Agriculturally literate people make personally informed decisions about agricultural related topics such as food safety, genetic engineering, and pesticides versus non-pesticide use issues. In contrast, individuals without a basic understanding of all sides of an issue may react without reason, possibly frightening themselves and their families. The resulting damage to the agricultural industry is unrepairable (Glassman, Elliot, & Knight, 2007; Tisdale 1991).

The issues and problems facing agriculture today are important to the general public as well as those employed by the industry. Food safety, soil conservation, and animal welfare are examples of issues that directly affect agriculture and are of serious concern to a broad range of citizens (Birkenholz, 1990; Leising, Igo, Heald, Hubert, & Yamamoto, 1998). The complexity and interwoven nature of these issues and problems has increased since the initial agricultural literacy definition in 1988 creating new research needs. For example, the growth of agricultural biotechnologies has also come with problems, especially visible in genetically engineered foods. The controversy over genetically engineered food in Europe and more recently in the U.S. has prompted many agricultural educators and scientists to begin engaging in more open dialogue with the public in order to provide education as to the safety and benefits of this new technology (Lundy, et al, 2002). More recently, policy decisions made to increase the scale of bio-energy within the U.S. energy supply has had a ripple effect on grain and livestock supplies and consumer food prices not to mention the use of water and other resources impacted by these production related decisions—all of which is typically misunderstood by the public.

The agriculture issues that are coming before legislators and the general public are complex and the decisions made will impact the future of the agriculture industry. While the agricultural education profession continues its efforts to create an agricultural literate society, we need to know if our intervention efforts are targeting too elementary of a level to impact these more complex issues. In addition, we need to better understand how to create more effective educational and informational messages that increases the public's understanding of these complex agriculture issues.

In the midst of this, a major issue with past, current, and probably future agricultural literacy programs is the question, "Who is the authority on curriculum or program content?" Activist groups who oppose factory farms, grazing, pesticides, hormones, etc., point to science as the problem and not the source of authority on these matters. The urbanization of the planet is overwhelming and direct ties to farming are becoming rare. When they do occur, the settings are often bucolic and unrealistic to modern farming techniques. It is imperative that research that links environmental, socio-cultural, and agricultural factors occur in the future (Elliot, 2007; Wals, 2010).

Another primary issue with agricultural literacy programs is the educational impact of such efforts. Should research be focused on agricultural knowledge, pedagogy enhancements, communication channels, or something else? Depending upon the audience, the answers differ. The "something else" may be a new, open-minded way of thinking (Wals, 2010). It may be developing strategies for individuals to determine their own informed conclusions, the creation of autonomous thinkers.

Opportunities to Respond

Previous research efforts by the profession related to this priority have established a foundation for future disciplinary and interdisciplinary efforts including the use of systems-based approaches and research methodologies. This foundation has increased our understanding of related message and curriculum development, delivery method preferences and effectiveness, and the extent of change in audience knowledge, attitudes, perceptions and behaviors after experiencing an educational program or consuming produced information and messages. In spite of more than twenty years of agricultural literacy research success, changes within agriculture and our society have increased the need for further research.

Currently, educational programs and products that focus on educating people about sources of food are often perceived as self-serving to the agricultural industry and seldom do they emphasize agriculture's environmental impact and interaction. In spite of some national efforts such as "Ag in the Classroom," most efforts are sporadic in quality, delivery mechanisms, and effectiveness (Jepsen, Pastor, & Elliot, 2007). How agriculture affects the environment and our natural resources and how the environment affects agriculture are critical issues that need more attention in many agricultural literacy programs (Wals, 2010).

Because of the high stakes testing emphasis from the No Child Left Behind legislation, many public schools have closed their doors to outside influences. Many administrators are so consumed with improving test scores that they resort to "more of the same" types of delivery, and alternative and effective means to achieve those goals are not considered (Franklin, Haverland, & Elliot, 2006). Therefore, even effective agricultural literacy programs such as "Ag in the Classroom" are not allowed in the schools because of the perceived notion that the program won't aid in improving students' test scores. However, such programs engage more senses in the teaching process, and the authentic delivery of the material results in retention of key scientific, math, and other principles. Studies demonstrate that test scores improve when

teachers teach using the world around them as the context (Elliot, 1999; Jepsen, Pastor, & Elliot, 2007).

The emergence of social media technologies, message formats, and strategies will also have an influence on public and policy maker understanding about agriculture and natural resources. Research is only beginning to reveal the impact of social media and its potential to inform and persuade the user towards desired thoughts, attitudes, and behaviors. Additional research will expose the potential of these digital technologies and strategies in realizing a citizenry capable of making agriculture-related informed decisions.

> "...the future of American agriculture rests in the hands of ninety-eight percent of the United States population who do not reside on a farm and may have little to no understanding of agriculture."

PRIORITY 2: 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.

Background

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 that provided the basis for a theory that has influenced agricultural education research and practice. Research conducted on the release of hybrid corn in 1928 by the Iowa State Agricultural Experiment Station to farmers yielded an adoption-diffusion process that has influenced subsequent information dissemination efforts for more than sixty years (Ruttan, 1996). Within the study by Ryan and Gross (1943) of the hybrid seed corn adoption, the researchers documented the importance of interaction in the adoption process. The authors stated:

> There is no doubt but that the behavior of one individual in an interacting population affects the behavior of his fellows. . . . The decision to adopt the new practice [hybrid seed corn] is a product not only of the operator's position in respect to some pre-existing conditions, but also of the influences and incentives brought to bear. (p. 23)

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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).

Everett Rogers, considered to be the seminal author of the innovation diffusion theory and practice, periodically summarized the literature base through his book consistently titled *Diffusion of Innovations*. In spite of its influence on current research and instruction practice, Rogers (2003) acknowledge criticisms of the theory that research has failed to address including:

- A Pro-Innovation Bias—The implication that an innovation should be diffused and adopted by all members of a social system, that it should be diffused more rapidly, and that the innovation should be neither re-invented nor rejected.
- Individual-Blame Bias—A tendency for diffusion research to side with the change agencies that promote innovations than with the individuals who are potential adopters. As such, the individuals who do not adopt the innovation are blamed for their lack of response.

» Issue of Equality—Diffusion researchers have not paid much attention to the issue of how socioeconomic benefits of innovation are distributed among individuals in a social system.

Challenges

Rogers (2003) concluded the preface of his fifth edition with the following:

> We do not need more-of-the-same diffusion research. The challenge for diffusion scholars of the future is to move beyond the proven methods and models of the past, to recognize their shortcomings and limitations, and to broaden their conceptions of the diffusion of innovations. (p. xxi)

TEXAS ALLIANCE FOR WATER CONSERVATION

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.

We are furthered challenged by reported cases of individual farmers and other stakeholder groups creating their own information sharing systems (e.g. communities of practice) outside of traditional information distribution systems. Such examples illustrate that previous research and models for opinion leaders or peers sharing information may no longer be relevant. Related to this increase in self-directing behavior is the increased use of the participatory process or approach to engage all stakeholders in guiding and shaping their own development. Over time, this approach or process secures a lasting commitment and strong sense of ownership and may have great influence on future adoption-related research and models.

We also need to examine the cause and the extent of the criticisms summarized by Rogers (2003) including the possibility that our profession may be a contributor to these problems. This self-critical research of our profession's research and subsequent activities will be necessary if we are to major contributors to agriculture's future. Further, we need to engage the agricultural community more completely in research programs that lead to agricultural technologies, practices, and policies for increasing resilience and adaptive capacity (APLU, 2010). This systems approach to diffusion approach will facilitate the development of models and practices that best serve 21st century agriculture and consumers.

Opportunities to Respond

"Today more than ever, public and private decision makers need new technologies and information to transform agriculture into an industry that is more resilient and adaptive to change" (APLU, 2010, p. 4). 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 agricultural and natural resources, it is our profession that has the potential to best respond to these traditional and emerging challenges.

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) state 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.

"Today more than ever, public and private decision makers need new technologies and information to transform agriculture into an industry that is more resilient and adaptive to change."

PRIORITY 3: Sufficient Scientific and Professional Workforce That Addresses the Challenges of the 21st Century

Key Outcome: A sufficient supply of well-prepared agricultural scientists and professionals drive sustainable growth, scientific discovery, and innovation in public, private, and academic settings.

Background

An examination of the last one hundred years of U.S. agriculture often highlights the increase in productivity, the technological developments, changes brought about through consumer influences, and policy changes that have both advanced and provided course corrections to the industry. Within this history of success and challenges is another factor that has both influenced and been altered by changes in the industry – the agricultural workforce. A report by Dimitri, Effland, and Conklin (2005) titled *The 20th Century Transformation of U.S. Agriculture and Farm Policy* summarized the change in agriculture.

> American agriculture and rural life underwent a tremendous transformation in the 20th century. Early 20th century agriculture was labor intensive, and it took place on a large number of small, diversified farms in rural areas where more than half of the U.S. population lived. These farms employed close to half of the U.S. workforce, along with 22 million work animals, and produced an average of five different commodities. The agricultural sector of the 21st century, on the other hand, is concentrated on a small number of large, specialized farms in rural areas where less than a fourth of the U.S. population lives. These highly productive and mechanized farms employ a tiny share of U.S. workers and use five million tractors in place of the horses and mules of earlier days. (p. 2)

New trends in today's global economy require greater capacity of the agricultural workforce. In order to improve agricultural productivity, we will need to increase the level of human capital of the agrarian population (Zubovic, Domazet, & Stosic, 2009). Recently, the National Academy of Sciences (2009) report titled *Transforming Agricultural Education for a Changing World* stated that: "Our world is changing at an increasing pace and unleashing a complicated set of problems and opportunities" (p. 1). The report further commented on the challenges this present to the human resource needs of U.S. agriculture:

> As the largest food producer in the world, the U.S. agricultural system has benefited from years of investment in technological improvements to agriculture, entrepreneurial and well-developed markets for agricultural inputs and products, public support of agricultural businesses, and a natural environment that is conducive to growing plants and animals. But because agricultural production is embedded in social and natural systems, it is affected by changing circumstances in those systems, such as increasing international competition in agricultural products, changing consumer demands and expectations of agriculture and food, declining levels of public research support, evolving immigration and labor policy, growing demands to regulate the environmental externalities of agriculture, and emerging constraints of the natural resource base. In addition, rising rates of obesity are leading to increased incidence of preventable disease while structural and economic issues affect access to fresh fruits and vegetables in many communities. How will we respond to these challenges? Do we have a pool of individuals capable of navigating us through these changing waters? (p. 3)

The answer to their question is no. A recent report by Purdue University and the U.S. Department of Agriculture's National Institute of Food and Agriculture predicts more than 54,000 agriculture-related job openings annually between 2010 and 2015. But despite the promising employment outlook, there is a talent shortage in the applied agricultural sciences. Challenging our profession's ability to respond to this need is a changing higher education environment highlighted by universities that have dropped or consolidated programs in the agricultural sciences because of low enrollment and dwindling funds.

For nearly fifty years, knowledge is recognized as a fourth economic pillar alongside those of land, labor, and capital (Riveria & Alex, 2008). "In a knowledge economy, resources such as skills, expertise and intellectual acumen are often more critical than other economic resources such as land, labor, and even capital because of the difficulty in measuring its levels" (Zubovic, Domazet, & Stosic, 2009, p. 456). It has also been stated that education is widely considered the most important form of human capital (Becker, 1993)

Addressing our societal and industry challenges will require a diverse workforce that includes scientists and professionals with knowledge and skill beyond today's standards. These individuals must be well prepared for discovery science, teaching and learning, science, technology, engineering, and mathematics (STEM) integration, and application of innovation for public, private, and academic settings. Without a focus on the development of effective human capital as a life-long process, we will fail in addressing the societal challenges that lie before us.

BRITTNI DRENNAN

BRITTNI DRENNAN

Challenges

With the global population expected to increase to nine billion by 2050, food security is of paramount importance to countries everywhere. Failure to address food security concerns could cause political instability in many parts of the world. Riveria and Alex (2008) connected this global need to a need for change in the development of the agricultural workforce:

> Greater commercialization of agricultural systems and increasing trade liberalization dictate the need for better capacity on the part of the agricultural workforce in the 21st century. Global changes in the roles of the public and private sectors and dramatic advances in technology have also strongly affected agricultural workforce development needs. These evolving changes have important policy, institutional, and programmatic implications. (p. 374)

The need to provide a highly educated, skilled workforce capable of providing solutions to 21st century challenges and issues has never been greater. The issues that face our society have grown increasingly complex and harder to solve, even with the products of sophisticated scientific discovery and application. In the meantime, our educational system is being challenged by cultural, economic and structural factors that threaten our nation's standing as a global leader in scientific and technological innovation. There is therefore a growing need to develop strategies to create a society of diverse, highly educated professionals and knowledge workers to address major societal challenges and develop innovations that drive the engines of economic growth.

There is also a commensurate need for relevant, rigorous, and actionable research into the human factors that influence educational preparation, quality teaching and learning outcomes and life-long human capital development of our workforce, especially in discovery science and STEM disciplines. This will require changes in university-level agricultural education.

If we are to be able to recruit and retain students to study in and prepare for careers in agriculture and natural resources related fields, we must be able to better understand the models, strategies, and tactics needed to best prepare, promote, and retain new professionals who demonstrate the requisite content knowledge, technical competence, and cultural awareness, coupled with communication and interpersonal skills. This will require that adequate numbers of well-prepared, highly effective agricultural educators, communicators, and leaders be made available to meet current and future needs.

Opportunities to Respond

The agriculture industry represents a major driver of economic growth and development; it requires a stable, qualified workforce that possesses a diverse range of skill sets suitable for employment in jobs ranging from the on farm setting to positions as Ph.D. scientists in highly sophisticated laboratories. However, attracting the best and the brightest to pursue careers in agriculture remains a challenge. According to the Coalition for a Sustainable Agricultural Workforce (n.d.), major obstacles exist to recruiting students into careers in the agricultural sciences, including budget constraints, student misconceptions and competition for the most talented from the basic sciences and industry.

These challenges also represent our opportunities. The National Academy of Sciences (2009) stated that:

> During the next ten years, colleges of agriculture will be challenged to transform their role in higher education and their relationship to the evolving global food and agricultural enterprise. If successful, agriculture colleges will emerge as an important venue for scholars and stakeholders to address some of the most complex and urgent problems facing society. (p. 1)

Our discipline is uniquely positioned for an immediate, positive impact on this need as research outcomes are quickly communicated and integrated into K-12, pre-professional, and professional-level educational opportunities. Our profession's knowledge base is rich with cognitive, affective, psychomotor and experiential research and practical understandings. Collectively, we have a foundation towards a comprehensive theory of human learning. This includes retraining existing and developing new human capital in agriculture as part of a life-long learning system.

Our specializations in teacher education, agricultural communication, leadership development, and extension education are grounded in the applied research tradition of solving problems, and our knowledge bases focus on understanding the dimensions of human and social capital in educational and organizational settings. The research endeavors of those in the agricultural education profession are focused on discovering, testing and refining those very models, strategies, and tactics that will be needed to create a sufficient scientific and professional workforce that can effectively address current and future challenges.

> "Addressing our societal and industry challenges will require a diverse workforce that includes scientists and professionals with knowledge and skill beyond today's standards."

PRIORITY 4: Meaningful, Engaged Learning in All Environments

Key Outcome: Learners in all agricultural education learning environments will be actively and emotionally engaged in learning, leading to high levels of achievement, life and career readiness, and professional success.

Background

Early discussions of teaching and learning were primarily philosophical and epistemological debates absent of empirical research on the human mind. Recent research in the cognitive sciences, human development and behavior, and in the social and cultural aspects of learning environments have provided educators with a much more sophisticated view of learning and of the creation of environments to develop meaningful learning (Bransford, Brown, & Cocking, 2000).

Learning is the active, goal-directed, construction of meaning. Meaningful learning occurs when learners go beyond a rote memorization of facts to the ability to interpret the interconnectedness of facts or material, regulate their understanding, transfer the understanding of concepts to new situations, and think creatively, solve problems, and/or experience a change in attitudes, opinions, skill development, and knowledge constructed (Darling-Hammond, George Lucas Educational Foundation, Barron, & Pearson, 2008). Meaningful learning occurs when the learning environment is multi-disciplinary in nature or illustrates the interconnectedness of subject matter. Further, meaningful learning is embedded in authentic environments or include real-world tasks or applications.

The role of the teacher in meaningful learning is to move from being the sole source of knowledge to becoming a facilitator of a holistic learning environment and engaged learning process. Successful learners in meaningful environments take responsibility for their learning, and they are active and goal-directed. Successful learners in meaningful learning, approach learning as a problem-solving process whereby they advance from novices to experts, they reflect on the process and the development of their expertise, and adjust the learning goals to advance in their thinking. In meaningful learning contexts, learners are metacognitive or can think about their own thinking, they can transfer knowledge and skills to new contexts, and are thereby prepared to meet the challenges required of the complex environments in the 21st century.

SECOND LIFE SCREENSHOT

Challenges

Despite a very solid base of research on how people learn and of principles for transferring the science of learning to the practice of teaching, many learning environments still rely heavily on rote memorization of narrow facts. While it's useful for learners to have a solid foundation in factual knowledge, the skills needed to be successful in the 21st century workforce are much more complex. Today's employees must be able to communicate effectively, work in teams, develop creative solutions to complex problems, and synthesize a large and ever-changing base of information. According to the U.S. Department of Labor, the top in demand jobs didn't exist ten years ago. Thus, education must prepare individuals to learn how to learn and solve problems in dynamic work environments where the information, conditions, and technologies are ever changing (Darling-Hammond et al., 2008).

Today's learners are more diverse than ever. They come from differing cultural and socio-economic environments. They display diverse preferences for learning and they possess different levels of prior knowledge and academic preparation. Learners are motivated differently through extrinsic factors as well as intrinsic needs. Learners who are not engaged in meaningful learning are either at risk for failure or become adept at memorizing rote facts, but are not proficient at solving complex problems with an ever changing knowledge base. Given these variables and constraints, one of the challenges for teachers in engaging learners for meaningful learning is the problem of how to reach all students.

The second challenge to providing meaningful engaged learning in all environments is that of teacher preparation. While recent studies have outlined the impact of the teacher on student outcomes (Rivkin, Hanushek & Kain, 2001; Rockoff, 2004), the literature is still deficient in a very solid empirical base that specifically codifies teacher preparation and professional development programs that educate the most highly qualified, expert teachers (Boyd, Grossman, Lankford, Loeb, & Wyckoff, 2009). Further, depending upon the learning environment, many teachers have not engaged in any formal preparation or professional development programs. For example, many Extension professionals and university professors are subject-matter experts with little to no formal education in teaching and learning. As mentioned before, more than 40 years of research has been conducted regarding how people learn, how the mind works, the biology of learning, and how the science of learning connects to practice of teaching. Yet, a gap still exists between what the literature indicates in regard to the science of learning, and teaching practice. Whether due to a lack of preparation, ineffective models of preparation, or a reliance on personal assumptions versus evidence-based practice, a gap still exists between the science of meaningful learning and the practice of teaching for meaningful learning. Thus, a second challenge for developing meaningful learning environments involves the problem of preparing and developing teachers as adaptive experts in all learning contexts.

A final challenge to the problem of creating meaningful engaged learners involves the design, implementation, and assessment of pedagogies and models for meaningful learning. Learners, teachers, the subject matter, the context of the classroom, the cultural dynamics both inside and outside of the classroom, and the opportunities, constraints, and resources of the specific learning context all influence meaningful learning. Given such complexities, agricultural education professionals are challenged by the designing, developing, implementing, and assessing pedagogies for meaningful learning. Further, agricultural education professionals should measure the learner, teacher, and environmental outcomes associated with a variety of meaningful learning pedagogies.

Opportunities to Respond

Designing, developing, and assessing meaningful learning environments that produce positive learner outcomes is essential to properly educating the citizens of the 21st century. Yet, this task is complex. First, many teachers rely on their own beliefs and assumptions regarding "what works" in classroom teaching through their own contexts and prior experiences. Further, teachers who are best able to teach meaningfully are those who have developed adaptive expertise (Crawford, et al., 2005). They are metacognitive, self-regulated, reflective learners who have reflected on the problems of their practice and applied solutions from evidence-based practices. Further, teachers who are adaptive experts have managed to develop such expertise in complex, ever-changing classroom environments (Darling-Hammond & Bransford, 2005).

Agricultural educators, as experts in researching, designing, assessing, and creating professional development programs for meaningful engaged learning must focus on how people learn, how meaningful learning environments are created, assessing the outcomes of those environments, and how to educate and develop teachers as adaptive experts who are proficient in creating such environments themselves.

Scholarship in learning and teaching has been a primary focus for research in agricultural education throughout its early disciplinary roots. Further, agricultural educators as a whole are engaged heavily in the practice of teaching and focus on fostering excellent teaching, and meaningful learning environments in their own teaching contexts. Through their expertise in learning at a disciplinary level and commitment to learning at a practitioner level, agricultural educators are well positioned to be the leaders in scholarly investigations of teaching and learning as well as college and campus wide experts for professional development in teaching and learning.

> "Further, teachers who are best able to teach meaningfully are those who have developed adaptive expertise."

PRIORITY 5: Efficient and Effective Agricultural Education Programs

Key Outcome: Highly effective educational programs will meet the academic, career, and developmental needs of diverse learners in all settings and at all levels.

Key Outcome: Accurate and reliable data that describe the quality and impact of educational programs and outreach efforts at all levels will be distributed to respective decision groups (e.g. students, parents, administration, industry, policy makers).

Background

The agricultural industry has evolved greatly since the passage of the Smith-Hughes Act in 1917. The industrial revolution resulted in farm power transferring from oxen and horses to massive petroleum powered pieces of equipment. This time period also resulted in a decline in the percentage of individuals involved in production agriculture from 38% to 2.6% in 2000 (United States Department of Agriculture & Utah State University, 2005).

At the start of the 20th century high school agricultural education programs were dominated with production agriculture content. These programs were designed to assist young men to prepare for a career in production agriculture. Just as the agriculture industry evolved over the past century, agricultural education programs have also changed. The objectives have shifted from preparing students for a career in production agriculture to preparing students for a career that requires knowledge of agriculture. The expanded mission of agriculture education has led to a more diverse group of learners and information stakeholder including females, minority populations, and urban residents. Within formal education, the target population of agriculture education programs has also expanded to include middle/junior high school and post-secondary students. Many educators utilized these opportunities as a platform to teach all students basic academic skills, including math and science, within the context of agriculture and natural resources.

Challenges

As we enter the 21st century, education is faced with numerous issues including limited resources and skyrocketing drop-out rates (CNN, 2010). Low performing schools and programs became news stories as well as political platforms, all which has led to new relationships with education and its customers. And within this shift, choice has become a key word in this discussion (Biesta, 2004). This use of the word choice is about the behavior of the consumer in a market where their aim is to satisfy their needs. In the K-12 system, this is about choices for what is best for their child. This can include choices about the educational environment (public, private or home schooled) or the rigor of the courses (e.g. regular instruction or advance placement) not to mention the possible career clusters that are available to each child.

Satisfying consumer needs is not limited to K-12 education system. Adult education and training programs, especially those outside of higher education, have been leaders in multiple methods for and levels of program evaluation for more than half a century. Authors such as Donald Kirkpatrick (1998) first proposed in 1959 that we needed to evaluation training programs at the reaction (customer satisfaction), learning (knowledge, skills, and attitudes), behavioral change, and final results (e.g. increased production, decreased costs, improved quality levels). Additional authors such as Phillips (1997) have called for a fifth level that documents the return on investment from training programs.

As such, demands to demonstrate the effectiveness and efficiency of educational efforts is not a new phenomenon. Rather, this is a trend that has been growing with the passage of time fueled by the growing demands of customers for a product (or process or system) that meets their changing needs. In this information age, the arguably natural outcome of this trend is an information-based accountability system that allows the customer to comparison shop.

However, accountability is not a single concept. Rather, it has been described by Heim (1995) as multi-faceted involving responsibility, authority, evaluation, and control and that some of the challenges with conceptualizing accountability is related to its fluid and pervasive nature.

> Although the difficulty of the educational task may vary greatly from school to school, from classroom to classroom, and from student to student, and although all the factors contributing to successful learning may not be fully controlled or even fully understood, the most basic compact between the schools and the public is that the public school and its teachers must make a difference in the lives of children and youth. School accountability for student outcomes, then, must highlight the ways and extent to which the school has contributed to making a difference. Information that shows student status in terms of performance standards at a point in time is useful, but information that shows growth or improvement over time is essential. (Heim, 1995, School/Classroom Accountability for Student Outcomes section, para. 3)

While recent state and federal efforts have attempted to create systems for comparison framed in standards, performance measures, and accreditation programs, we have yet to achieve an outcome that is satisfactory to all stakeholders including the customer. As such, efforts continue to determine what processes and measures can best document educational program effectiveness, efficiency, and impact.

Agricultural education programs will not be an exception. In order to provide evidence of program effectiveness, agricultural education programs must collect and maintain accurate data that describes the quality and impact of its programs and outreach efforts at all levels. The data must be summarized and reported to all respective decision groups (e.g. students, parents, administration, industry, policy makers).

Effective programs require an up-to-date curriculum. An up-to-date curriculum is dependent on an instructor who is also familiar with recent research and the state-of-the-art practices in the profession. Keeping a modern curriculum is complicated with the fact that technological advancements in today's society and within agriculture occur at a increasing rate. The challenge is to have in place a system that allows teachers to stay up-to-date with the ever-changing advancements in education and in the agriculture industry. Teacher preparation programs must also remain current to prepare preservice teachers for entry-level positions in the profession.

For effective program evaluation that provides our customers with the information they need and want, there must be a recognized set of program standards. However, agriculture is as diverse as the climate and geographic features of the fifty states. For local programs to be effective, the diversity of the local agriculture industry as well as the entire global food and agriculture system must be reflected in the curriculum. Within this diversity lies the challenge. How do you develop a set of national standards that allow for individual community diversity while reflecting the breath and depth of a global system?

High schools across the United States are facing an increased demand for instruction in the basics: writing, mathematics, and science. In many situations these demands have been met at the sacrifice of career and technical education opportunities available to the students including agriculture. The agriculture curriculum is based on solid science concepts that rely on a significant mathematical component as well as the basic reading and writing components that are incorporated into the curriculum. Agricultural education has the obligation to show that its curriculum can be used to meet the academic challenges of today's school system while preparing students for a career in the agriculture industry.

Teachers are experts in assessing individual student achievement. Student evaluation is one aspect of pedagogical skills that is included in most, if not all, preservice teacher preparation programs. However, when it comes to assessing program effectiveness, teachers do not receive the same level of preparation. The challenge is to reverse this trend to where as much time and effort is devoted to preparing teachers in the evaluation of programs as the evaluation of individual student learning.

The research needs in program efficiency, effectiveness, and impact is not limited to the K-12 educational system. Traditional adult education systems such as Extension and high education are also being pressured to document the outcomes of their efforts including at the cost-effectiveness or return-on-investment levels. Recent budgetary decision to reduce or eliminate adult-level educational programming and structures may be an indication that such research is already too late.

Opportunities to Respond

Learning is the single most significant element molding our being. It is the driving force that combines with our experiences, our needs, and our desires to make us what we are while influencing the social structures to which we belong. The outcome of every learning situation and educational program is that the person is changed.

The work of our discipline and its sub-dimensions occurs within a network of cultural, social, institutional, and psychological forces. Research that clearly illustrates the factors that influence learning efficiency and effectiveness is critical to responding to our changing global environment and advancing our future education, research, and outreach efforts. In addition, graduates of our programs must be equipped with the understanding and tools necessary to be successful educators in this customer-driven, life-long learning age.

> "... agricultural eductaion programs must collect and maintain accurate data that describes the quality and impact of its programs and outreach efforts at all levels."

PRIORITY 6: Vibrant, Resilient Communities

Key Outcome: Local communities will have effective leaders and engaged citizens who ensure high quality educational and career development opportunities for youth and adults and proactively sustain an environment conducive to positive community change.

Background

Research has verified the critical role of families and communities in helping youth obtain the knowledge and skills they need for productive lives (Israel, Beaulieu, & Hartless, 2001). Schools are not solely responsible for student academic success, and families and communities must work together to help students reach their full potential (Lerner, 1995).

Communities with strong and active social networks have high civic engagement and focus on activities that serve the public at large (Putnam, 1993). These communities have a pattern of community action that is characterized by positive youth-adult relationships in a caring community environment. However, communities today face a number of increasingly complex challenges, including changing economic drivers, wide-ranging income levels, population and demographic changes, land use decisions, accessibility to information and communications technologies, civic apathy, and management and protection of natural resources and the environment. When compared to urban areas, higher poverty, hunger, and more limited health care and recreational opportunities have historically plagued rural communities.

According to Israel et al. (2001), localities differ in their ability to enhance community social capital.

> Inequality, isolation, dependency, and gaps in the organization and institutional structure can inhibit community action. Communities that are fragmented, manipulated by outside organizations, or limited by smallness or distance are less likely to increase their social capital or...be able to address local youths' educational achievement. Until these structural deficiencies are confronted, many communities will be less able to muster the social capital needed to make a real difference in local youths' lives. (p. 63)

In addition, citizens in communities with lower educational levels, income levels, and job skills tend to withhold investments in education, which may further suppress educational attainment and career aspirations (Israel et al., 2005). In contrast, Drabenstott and Sheaff (2001) suggested that prosperous communities regularly invest in the human and social capital of their people and institutions.

Despite efforts by numerous agencies over the years to strengthen local communities, many citizens are not engaged in proactively shaping the future vitality and character of their communities. According to Beaulieu and Israel (2010), civic engagement is on the decline by groups that typically comprise the majority of small communities – those who are less educated, older, and have less wealth. These researchers found that the quality of educational resources, level of educational attainment, and personal and community aspirations exert a major influence on community civic health. For many years some of the best and brightest youth in rural

communities – those who could become future leaders in the community – have relocated to urban areas where employment opportunities are more diverse and attractive.

In addition, a growing proportion of the population in all types of communities is neither engaged in nor knowledgeable about agriculture and the vital role it plays in sustaining the abundant way of life enjoyed by many Americans. Agricultural education programs in local schools and communities have thus far been unable to stay ahead of the curve and provide citizens and leaders with the information they need to make informed and objective decisions affecting agriculture.

Local leadership capacity and level of civic engagement can dramatically affect the quality of life in a rural community. Greater educational opportunity and achievement, a more diverse economic base, higher career aspirations, and greater community vitality can be created by effective leaders and citizens engaged in shared community goals. Once the vision of a dynamic community is embraced, strategic planning, quality of life considerations, leadership and economic development, and a sense of community logically follow (Center for Rural Affairs, 2010).

Challenges

Communities that lack vigor and capacity have great difficulty in responding to the increasingly complex challenges present in many communities today. Maintaining an engaged citizenry and diverse economic base in rural communities, including profitable agricultural enterprises and other significant economic drivers (e.g., natural resources, tourism, manufacturing, mining), requires capable leadership and strong social networks. Low-capacity communities commonly have limited employment opportunities, educational resources, and worker skills. These limitations can create a downward spiral in which unhealthy community characteristics become more ingrained in the mindset of citizens, leaders, and youth in the community.

The absence of civic engagement and action in communities that lack vitality and resiliency can bring community change to a standstill. With few opportunities to exceed the community norm, the educational and career aspirations of youth remain at low levels. Citizens and leaders fail to recognize and seek opportunities to proactively create a dynamic, healthy community.

Lack of citizen and leader understanding and appreciation of the vital role that agriculture plays in their daily lives leads to policy decisions and community action that ignore the needs of a prosperous agriculture industry and its ability to meet societal needs. Agricultural education programs that reach only a small proportion of the local population are unable to meet the need for objective, research-based information as policy decisions are made. In addition, strong local agricultural education programs are needed to inspire young people to seek agricultural careers as a way of stabilizing the agriculture sector in the local communities and at a broader level.

Ineffective community leadership prohibits the positive community change needed to transform unhealthy communities into high-capacity communities characterized by diverse employment opportunities, skilled workers, high levels of educational attainment, and broad career aspirations in youth and adults.

Opportunities to Respond

As a discipline, agricultural education with its five sub-dimensions is uniquely positioned to assist in developing solutions related to the human dynamics of struggling communities. With a focus on the development of individuals as capable, informed, and independently productive citizens who can effectively interface in diverse group and team settings, particularly in an

agriculture and natural resources context, agricultural education researchers can effectively apply their disciplinary expertise in education, communications, leadership, and change processes to the complex problems and challenges faced by local communities today.

TEXAS ALLIANCE FOR WATER CONSERVATION

> “Agricultural education with its five sub-dimensions is uniquely positioned to assist in developing solutions related to the human dynamics of struggling communities”

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APPENDIX A

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