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Unpleasant Lessons from the Settlement of the West: Implications for the WAEA and Other Professional Associations

Russell Tronstad

Parallels are drawn between shortcomings and events that occurred in our western heritage with current issues facing agricultural economists. Challenges are made in relation to conflict of interest policies, external funding, cultivating connections with experts outside our discipline, and relevance of research priorities. Survey data on research priorities of upper administrators and faculty within colleges of agriculture are compared to those of Western Agricultural Economics Association members. Upper administrators from land grant colleges rank research focused in the area of competitiveness and profitability less than areas of water usage, food safety, renewable energy, global climate change, or sustainability.

Key words: academic areas, conflict of interest disclosure, external funds, research priorities

> The interpreter said to Geronimo,"*General Miles is your friend*." Geronimo said, "*I never saw him, but I have been in need of friends. Why has he not been with me?*" W.T. Melton, Statement (Geronimo, 1906, p.172)

Introduction

Settlement of the West by European and American frontiersmen occurred through many noble and courageous efforts. However, several events and dealings took place under conditions that lead us to question the ethics, motives, and wisdom of our pioneering leaders. Individuals and the government failed to recognize many public good and common property resource dimensions in the settling of the West. Efforts to assimilate Native Americans from a communal-nomadic to household-sedentary agrarian livelihood failed at least in part due to policies that were developed to appease voters, homesteaders, and investors rather than the legal rights and cultural values of the indigenous Native Americans. In addition, legal battles are still going on over the rights to water and other resources in the West.

The primary objective of this article is to challenge the Western Agricultural Economics Association to enhance our collective credibility, relevance, and lasting legacy by drawing parallels with our western heritage and analyzing data gathered from agricultural and resource economics faculty. Our collective reputation for sound and unbiased research has taken many years to establish,

Russell Tronstad is Distinguished Outreach Professor in the Department of Agricultural and Resource Economics, University of Arizona, Tucson.
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but this reputation can be quickly tarnished if conflicts of interest are revealed. If one author has a hidden motive for skewing policy recommendations, the work of other authors in the same publication will be diminished by association if we do not take adequate precautions to self-monitor against these conflicts of interest.

Unpleasant Lessons with Native Americans

While simply avoiding pitfalls does not guarantee success, compromised integrity and trust often derail things–from curriculum changes to political campaigns–in spite of otherwise positive attributes. The unpleasant lessons that follow are a reminder that broken trust and credibility are not easily rebuilt, even after several generations.

Hidden Motives and Distrust

In 1837, the upper reaches of the Gila River in western New Mexico were Mexican territory. It was here that a Mr. Johnson reportedly lured around thirty Apaches into his camp by offering them "gifts." While the Apaches were examining the "gifts," Johnson and his men set off a concealed cannon, killing two-thirds of the party in seconds (Corle and Santee, 1951). The distrust and negative externalities that grew from this event were felt by many: About a week later and further down the Gila River, Apaches killed fifteen white trappers, who most certainly knew nothing of the Johnson incident. Since the Apache at this time never wore hats, their warfare policy became to "shoot anyone who wears a hat," for he would certainly be an enemy (Corle and Santee, 1951).

While two sides exist to every story and both sides will usually have good and bad people, the motives and incentives of leaders should stand up to the highest scrutiny. John Marshall holds the record for longest term as Chief Justice of the United States, serving from 1801 to 1835. During this period the Supreme Court handed down several decisions related to aboriginal land title and the doctrine of discovery. While Marshall was shaping law on Native property rights, his family had a stake in future rights to Indian land, as many other land speculators did at that time (Robertson, 2005). Marshall may have made decisions that were consistent with his understanding of the law, but his personal interests in the outcomes lead one to question his rulings on Indian land.[1]

Going Alone

Westward-bound wagon trains relied on safety in numbers, but families would sometimes break off from the main wagon train when the majority wanted to rest their livestock and families. After reaching the Pima villages on the Gila River in 1850, the Oatman familiy decided to push on to Fort Yuma alone. During the journey they were attacked by Yavapai Apache (Faulk, 1973). Both parents and the three youngest children were killed while the two oldest daughters, ages 12 and 8, were taken captive. An older boy, Lorenzo, was thrown over a cliff along the river and left for dead. Lorenzo was actually unconscious and would likely have died had he not received assistance from two Pima hunters (Corle and Santee, 1951). The Pimas were known for being friendly and willing to sell grain during this period as they cultivated about 3,000 acres of irrigated wheat (Hurt, 1987).

[1] Even "Honest" Abe Lincoln had some suspicious motives behind his selection of Council Bluffs, IA, as the eastern terminus of the first transcontinental railroad. In November 1859, Lincoln received a quitclaim deed that served as the mortgage for seventeen lots and ten acres along the right-of-way of the Mississippi and Missouri Railroad in Council Bluffs (Pratt, 1943). The next month, Lincoln selected 120 acres of land in Crawford County, IA, about 75 miles from Council Bluffs, for a land bounty he had received almost four years earlier for his volunteer service in the Black Hawk War (Abraham Lincoln Online). The Pacific Railroad Act signed by Lincoln on July 1, 1862, allowed Lincoln to make the decision about the location of the railroad's eastern terminus; Lincoln chose Council Bluffs. Although he may have selected the best site for the country, one is also left wondering whether Lincoln was able to disjoin his personal interests from those of the nation.

Declining Relative Population

In 1874, the population of all Native Americans within the Arizona Territory was estimated to be around 40,000, while the white population was less than 11,000. In just six years, the white population increased to 40,000 as a result of the arrival of a railroad line to the region (Corle and Santee, 1951; Faulk, 1973). Before the Civil War, Apache outnumbered the military by around 100 to 1 in the Arizona Territory. Yet by the time of Geronimo's final surrender in 1886, the 5,000 troops under the command of Brigadier General Miles outnumbered Geronimo's few remaining Apache followers by a similar ratio (Hurst, 2003). The declining ratio of Indians to immigrating whites did not help them in their warfare or bargaining with the Federal government, and many Indians starved as the wild bison population crashed. American hide hunters with no concern for sustainability decimated a population of over 30 million bison in the early 1800s, leaving only 325 individuals by 1884 (U.S. Fish and Wildlife Service).

Missing the Target

Allocation of individual land ownership to Native Americans through the Dawes Act of 1887 was intended to stimulate their assimilation into productive agriculture, much like the earlier 1862 Homestead Act. However, the consequences of the Dawes Act were dire for Indian agriculture. About two-thirds of the Indians' land base (90 million acres) was taken out of Indian control or ownership over the 47 years of the Act's life (Indian Land Tenure Foundation). Because the vast majority of Indian lands were located in arid, relatively infertile parts of the West, most of the land could not be profitably cultivated without irrigation. These areas were more suited for grazing than cultivation, but the government desired cultivation to provide greater employment (Hurt, 1987).

Educational efforts by the federal government primarily targeted Indian men, even though in most tribes women were the primary cultivators, while men were the hunters. Not surprisingly, efforts to transition nomadic male hunters into women's roles were largely unsuccessful. Had the federal government targeted women in their educational efforts on farming and been more favorable to livestock production, the early years of Indian agriculture might not have been so disastrous.

Western Water

Water has been the lifeblood of the West for centuries. Ancestors of the Pimas first developed irrigation canals around A.D. 800 (Hurt, 1987). Tensions started to rise between the Pimas and white population around 1870 as white farmers and miners upstream were diverting so much water away that the Pimas were now only able to raise one crop of wheat each year instead of two; some land lacked water for any irrigation. By 1898, Indian agriculture had nearly ceased along the Gila River from a lack of water (Hurt, 1987).

In spite of the Pimas' legal right to irrigation water, it was not until completion of the San Carlos dam and canals in the 1930s that reliable irrigation water flowed to them again. Unfortunately, by then a generation of Pimas had been working for wages rather than farming. They had little modern farm equipment available, and much of the land previously irrigated had been divided into small ten-acre allotments (Committee on Indian Affairs, 1924). Agriculture on this small of a scale would equate to subsistence farming for most families. Thus, the return to irrigated agriculture on a scale that was economically viable after the San Carlos project was sporadic and slow, but the Gila River

tribal farm continues to increase its irrigated land base and prominence in agriculture by utilizing reserved water rights.[2]

Data Considerations

Data were obtained from three different sources to analyze implications and challenges for agricultural and resource economists in dealing with problems not unlike the lessons introduced above. First, SurveyMonkey™ was utilized to obtain feedback on research priorities from WAEA members, upper administrators (mainly deans and directors), and colleagues in other disciplines. The questionnaire is based on research priorities identified in the *Science Roadmap for Food and Agriculture*, by the Experiment Station Committee on Organization and Policy (Science and Technology Committee). In this study, deans and directors of research, extension and academic programs in the land grant system were asked to participate and nominate up to five other faculty in their college to participate. A total of 457 individuals were identified and 246 participated in the fourth and final round of the ESCOP Delphi survey. Several research priorities were identified, which were grouped into thirteen grand challenge areas.

Because administrators have scarce resources to fund research priorities, responses were solicited from prior ESCOP participants and WAEA members (433 email addresses) on how they would allocate a hypothetical $100 to the ESCOP research priorities identified within each grand challenge area and then between all thirteen areas. Participation was solicited via email in May and June of 2011 and SurveyMonkey™ was used to collect all responses. A total of 60 and 70 responses were received from individuals previously identified by ESCOP and WAEA members for an approximate response rate of 13% and 16%, respectively.[3]

Second, an anonymous Audience Response System (ARS) was used at the 2011 WAEA Presidential Address to probe attendees on their opinion of several issues. The number of attendees that participated in the Audience Response System ranged from 52 to 55.[4] While individuals attending this session are not a random sample of WAEA members, they do represent members likely to participate in the annual business meeting and vote on policies developed by the association. Thus, their views are relevant to the discussion.

Finally, secondary data were obtained from the Food and Agricultural Education Information System to gain insights into recent changes in the relative size of agricultural economics departments versus other units in colleges of agriculture. Because data collection by FAEIS began in 2002 and reporting is relatively sparse for the first couple years, Full Time Equivalent (FTE) faculty for the three-year averages of 2004-06 versus 2008-10 are compared for eight academic areas.[5] A total of

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[2] Reserved water rights for tribes were first recognized in 1908, when the U.S. Supreme Court ruled in the case of *Winters* v. *United States* that land established for reservations also implied sufficient water to irrigate land on the reservation (Nelson, 1977). The case of *Arizona* v. *California* in 1963 also determined that the quantity of water reserved should be based on the number of "practicably irrigable acres." Because reserved water rights have the ability to trump appropriated uses, a great deal of uncertainty exists about how much reserved water will be demanded from both surface flows and underground aquifers.

[3] The one individual that completed a WAEA survey and also participated in the final ESCOP Delphi survey was counted under the ESCOP heads/faculty responses. At least two emails soliciting participation were sent to the ESCOP population and WAEA members.

[4] Two questions that targeted only individuals from an academic institution had 34 to 39 responses. Thus, around 30% of attendees are not currently associated with an academic institution.

[5] The three academic areas of family and consumer sciences, natural resources, and nutritional sciences were grouped using the following FAEIS titles: 1) family and consumer economics and related studies; family and consumer sciences/human sciences business services; family and consumer sciences/human sciences, general; and human development, family studies, and related services; 2) natural resources conservation and research; natural resources management and policy; natural resources and conservation, other; forestry; and wildlife and wildlands sciences and management; and 3) agricultural and food products processing; food science and technology; and foods, nutrition, and related services. Agricultural economics equates to the agricultural business and management title and entomology is a discipline in the FAEIS. All faculty from "agricultural and resource economics," "applied economics," or "resource economics" departments appear to be included in the agricultural business and management academic area of FAEIS.

twenty-three universities had FTE data for agricultural economics, with at least three other academic units reporting to FAEIS for these years.[6]

Implications of Unpleasant Lessons for Agricultural and Resource Economists

The unpleasant lessons with Native Americans and data gathered from agricultural and resource economists are used to develop parallels and describe challenges for the WAEA that may enhance our collective credibility, relevance, and lasting legacy. Implications are first identified for hidden motives and personal Conflict Of Interest (COI) issues that create distrust and negative externalities.

Hidden Motives and Distrust

Just as Johnson's deceptive "gifts" and Chief Justice Marshall's rulings regarding Native Americans created distrust, professional associations need to safeguard against hidden motives and personal conflicts of interest that researchers may have. This issue is becoming more relevant as many university faculty and departments are looking for external funds to replace reduced state support for research, extension, and teaching activities. Historically, the medical profession has been more dependent on corporations and foundations to fund their research activities than other disciplines, and most medical journals have COI disclosure policies in place. In looking at 256 high impact medical journals, Blum et al. (2009) found COI policies in place for 89% of the journals. COI was generally defined in relation to a financial benefit, but it could also include personal relationships or relationships with other organizations. Authors are required to sign a COI disclosure statement in 54% of the journals considered. Virtually all journals that endorsed the International Committee of Medical Journal Editors guidelines had COI disclosure policies (68/69).

Opinions about funding sources and potential COI were solicited from attendees of the 2011 WAEA Presidential Address using the anonymous ARS. When asked, "*If an author receives or expects to receive money from the* [Conservation Reserve Program] *CRP*,[7] *should WAEA require the author to disclose this in a WAEA submission that addresses CRP?*" 61.6% strongly agreed or agreed, 25.0% strongly disagreed or disagreed, and 13.5% had no opinion with this requirement. Individuals with at least a ten-year history with the WAEA had a 79.2% affirmation, while only 53.9% of the assumed younger respondents agreed with this requirement.

If a corporation is the only source of funds for research and the corporation has a vested interest in the outcome of the research, most attendees agree that the research should be done anyway. In response to the question, "*If* [Monsanto] *MON is the only source of funds for a university researcher to investigate the economics of biotechnology, should the work be done anyway if only funded by MON?*" 87.0% agreed or strongly agreed with this question. While it is undoubtedly not an ideal situation where the entity providing the funding also has a desired outcome for the research, most feel it is better to conduct the research than do nothing. Disclosing personal financial interest during outreach presentations was also addressed. When asked, "*If one receives salary from a* [United States Department of Agriculture/Risk Management Agency] *USDA/RMA grant, should this be disclosed if giving a presentation to growers on USDA/RMA crop insurance products?*" 73.0% agreed or strongly agreed with this disclosure requirement. In the settling of the West, distrust spread negative externalities across time and distance so that all sides were collectively worse off. When entities

[6] The twenty-three reporting FAEIS institutions (number of academic areas) meeting data requirements are California State University, Chico (4); California State University, Fresno (7); Clemson University (7); Colorado State University (5); Iowa State University (8); Kansas State University (6); Mississippi State University (8); North Dakota State University (8); Oregon State University (6); Purdue University (7); Texas A&M University (4); Texas Tech University (6); The Ohio State University (8); University of Arkansas (7); University of Illinois at Urbana-Champaign (8); University of Maine (7); University of Maryland (4); University of Missouri (8); University of Nevada, Reno (5); University of Tennessee (7); University of Wisconsin, Platteville (4); University of Wisconsin, River Falls (6); and Virginia Polytechnic Institute and State University (6). Universities and departments that did not report for at least two years of each three-year period were not considered. Of the 876 possible years of data for these institutions and academic areas, 24 (2.6%) were missing.

[7] Items underlined in the ARS questions refer to examples that could be replaced with similar programs, associations, companies, issues, etc.

have a stake in the outcome of a research project or educational slant, disclosing funding sources and any personal interests upfront may be a second best scenario for maintaining credibility as an unbiased source of information with the public. Schroeder argues that agricultural and resource economists should be forthright on funding sources by providing appropriate disclaimers. Given that most journals focus on copyright policy and have little or nothing to say regarding personal gains, disclosure policies on potential personal conflicts should be considered for the WAEA and other professional associations. Flanagin, Fontanarosa, and DeAngelis (2006) report that COI disclosure policies were first instituted by the *Journal of the American Medical Association* in 1989 and most medical journals have followed suit. As public support for higher education and research has declined, associations like the WAEA should adopt COI disclosure policies before our credibility as an unbiased source of information is compromised.

Going Alone

Much like the Oatman family would probably have avoided their disastrous ordeal with the Apaches if they had been traveling with others, the peer review process also provides a greater degree of safety and credibility to research. Associations and journals have the opportunity to "go alone" by not seeking the input of other disciplines and by using language that only a subset of individuals familiar with the literature in an area really grasp. Given that economic questions and issues often involve complex physical and biological dimensions, getting expertise from non-economists to review these issues is important. Even if it requires non-discipline expertise to validate these dimensions for a peer-reviewed article, many WAEA members feel this expertise is needed. ARS feedback to the question "*Should a JARE submission on the economic costs of an Invasive Species have a reviewer that is an expert on the biological dimensions of the Invasive Species–even if it requires a non-economist?*" found that 67.2% agreed or strongly agreed, 14.5% had no opinion, and the remainder disagreed or strongly disagreed with this requirement.

When attendees were asked, "*Should WAEA provide more articles that are readable to the general public and policy makers on agricultural and natural resource issues under debate?*" 75.0% agreed or strongly agreed while 17.9% disagreed or strongly disagreed. For individuals with a ten-year history of membership in the WAEA, 25.9% disagreed and 7.4% strongly disagreed, but only 10.3% of other individuals disagreed and 0.0% strongly disagreed. These results suggest that older members are more satisfied with the readability of WAEA articles than younger members.[8]

Although getting reviews from experts outside a discipline may slow down the review process, these reviews appear necessary to insure that economic analyses adequately address physical and biological components. Exposure to other disciplines is important to assure that "economics is more realistic and relevant as a discipline" (Zilberman, 1994). Reviews from non-economists may require exploring market-based reviews as in open-source coding (Brester, 2006), monetary incentives (Thompson et al., 2010), or cultivating more colleagues in other disciplines. Improving readability to the public may require the WAEA to reevaluate its mix of publication outlets and implement steps to ensure that abstracts, summaries, and conclusions are self-contained with minimal technical economic language. Zilberman (1994) notes that improving our interdisciplinary collaboration capacity requires better communication about what economists can offer, less jargon and abstraction from reality, and recognizing that faculty in other disciplines do not think like economists.

Declining Relative Population

Just as with Native Americans, the relative size and change in a population can provide an indicator of the health of a discipline. FAEIS data are used to evaluate relative sizes and changes that have

[8] Older engaged members of the WAEA are more responsible for current publications and their format than younger members. This fact provides at least a partial explanation as why more older members may be satisfied with the status quo on readability. Additionally, older members may be more accepting of the idea that journal articles are not meant for lay audiences.

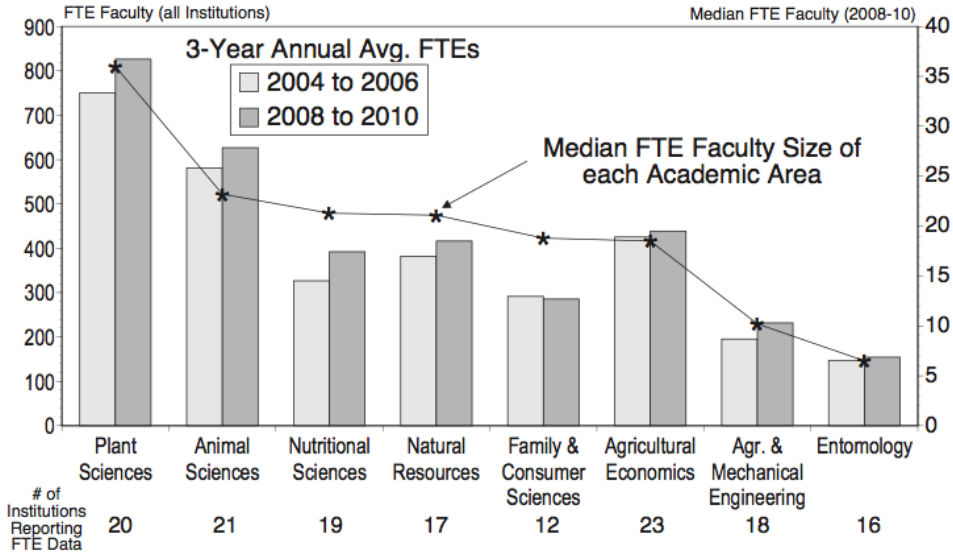

Figure 1. Full Time Equivalent Faculty across Eight Academic Areas for FAEIS Reporting Institutions, 2004-06 and 2008-10

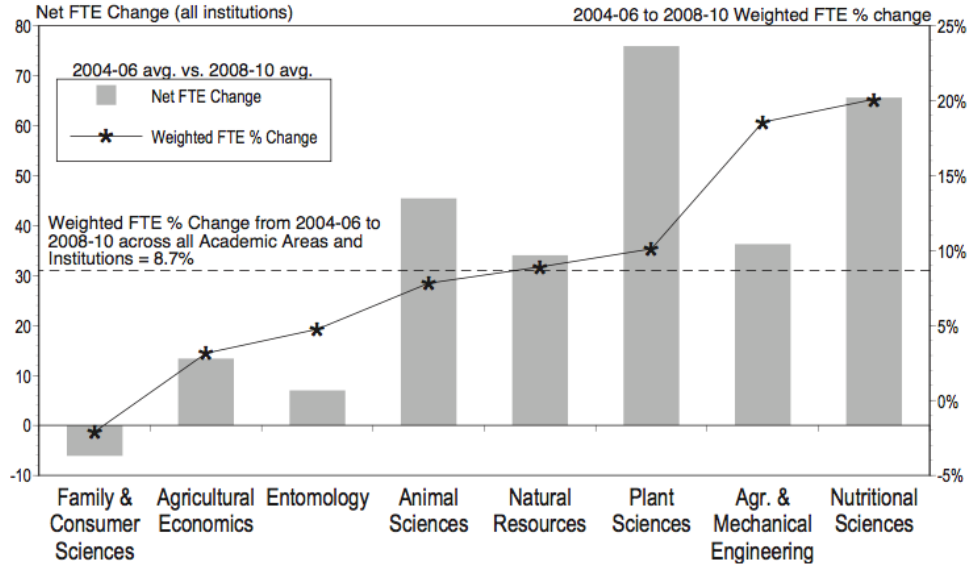

Figure 2. Net Change in Full Time Equivalent Faculty and Percentage Change by Academic Area, 2004-06 to 2008-10

recently occurred in faculty FTEs from twenty-three institutions for eight disciplines within colleges of agriculture. Figure 1 shows how plant sciences is by far the largest academic unit, with a median FTE faculty size of 36.0, while entomology is only at 6.5. The median size of agricultural economics faculty is at 18.5 FTEs, on the lower end of the 18 to 22 FTE mid-size range for four of the eight academic areas considered.

Figure 2 shows the weighted percentage change in FTEs across academic areas for the 2004-06 versus 2008-10 periods. While several institutions showed a dip in FTEs for 2010, FTEs for all units and institutions were 8.7% higher for 2008-10 than 2004-06. Academic areas that declined or increased a smaller percentage than the overall average include family and consumer sciences (-2.1%), agricultural economics (3.1%), entomology (4.8%), and animal sciences (7.8%). The largest percentage gains in FTEs occurred in the academic areas of nutritional sciences (20.1%), agricultural and mechanical engineering (18.6%), plant sciences (10.1%), and natural resources (8.9%). Plant sciences has the greatest number of FTEs and it also showed the largest net increase in total FTEs at 75.9. Nutritional sciences and animal sciences were next in line with net increases of 65.6 and 45.5 FTE.

FAEIS data show that within colleges of agriculture, agricultural economics faculty have declined in recent years in relative size to all other academic areas considered (except family and consumer sciences). While the median size of agricultural economics faculty at universities is still mid-range, the decline in relative numbers is at a point where it deserves some consideration as to why the decline has occurred or how representative the FAEIS data are.

Presidential Address attendees from academic institutions believe that the size of their faculties have stayed about the same or increased a bit relative to other departments in their college. When asked, "*If from an academic institution, in the last five years how have the FTEs for your agricultural economics department changed relative to other departments in your college?*" 23.1% said they increased, 61.5% stayed about the same (within 2% of other departments), and 15.1% indicated a decline in their relative position. However, the sample population likely favors universities and departments that are doing relatively well in FTEs and "hard-money" funding compared to members that are from institutions where agricultural economics is declining. Then again, the largest source of travel funds for individuals attending was grants (35.8%) followed by department (32.1%), foundation (9.4%), college (7.5%), university (7.5%), scholarship (3.8%) and other (3.8%) funds.

Faculty numbers change over time due to a variety of factors that range from retirement to faculty moving to greener pastures. Changes in relative faculty numbers over time also reflect resource allocation changes that deans and directors are making at the margin with their timeliness in replacing faculty, eliminating vacant positions, or creating new positions. In the following section I reflect on how well the research priorities of the WAEA line up with those of upper administrators and other faculty in land grant colleges of agriculture.

Missing the Target

Rapid assimilation of Native Americans into an agrarian society failed at least in part due to policies and educational efforts that were not in line with the productivity potential of most reservation lands and cultural values of the Indians. Similarly, priorities of agricultural and resource economists that are not in line with those of the administrators making budget allocations may fall short in meeting desired outcomes.

Table 1 describes how ESCOP deans and directors, other selected ESCOP faculty, and WAEA members allocated a hypothetical $100 to specific research issues under each of the thirteen grand challenge areas and then among the thirteen areas. Among the forty-three allocations for specific research issues described, WAEA members disagreed with upper administrators on nine issues (a little over 20% of the time using a 10% significance level). In making allocations among the thirteen grand challenge areas as described in figure 3, WAEA members significantly differ in their research priorities with those of upper administrators in two areas. These are (1) developing new plant products, uses and crop production systems and (2) improving the economic return to agricultural producers. Although differing from the view of upper-level administrators in just two of thirteen grand challenge areas, WAEA members identified their most important research priority and resource allocation ($13.17) in the area of improving economic returns. Whereas

Table 1. Allocation of Hypothetical $100 to Research Priorities by Upper Administrators and Selected Faculty from Land Grant Universities plus WAEA Member

Research priorities[a] and thirteen Grand Challenge Areas identified by the Experiment Station Committee on Organization and Policy (ESCOP).	Allocation of hypothetical $100 within each Grand Challenge Area and then among the 13 Grand Challenge Areas			Statistical difference[b] in means		
	(A) ESCOP Deans, Directors and Assoc.	(B) ESCOP Dept. Heads and Faculty	(C) WAEA Members not part of ESCOP	A vs. B	A vs. C	B vs. C
1. Develop Renewable Energy and Biofuels Systems	$9.86	$10.13	$8.37			
In last 3 years, percentage of time spent in this area:	5.83%	2.10%	8.41%	**		***
Develop and implement the use of alternative energy sources.	$28.79	$24.03	$21.94			
Develop agricultural systems.	$21.21	$23.39	$17.29			*
Assess environmental, sociological, and economic impacts.	$13.48	$9.68	$20.40		***	***
Technologies to improve production-processing efficiencies.	$12.34	$15.65	$10.83			
Expand biofuel research.	$12.17	$13.00	$11.30			
Investigate opportunity costs of biofuel production.	$12.00	$14.26	$18.24		**	
2. Manage Agricultural Water Usage	$11.07	$10.39	$9.77			
In last 3 years, percentage of time spent in this area:	5.14%	3.90%	7.74%			
Create new and/or modify existing systems.	$30.17	$28.65	$23.84		**	
Develop technologies to improve production efficiencies.	$24.21	$25.97	$26.33			
Research the effects of global climate change.	$18.31	$14.84	$13.54			
Evaluate and enhance water recharging.	$12.79	$16.61	$13.77			
Examine policy and legal issues.	$14.52	$13.94	$22.51		***	***
3. Develop Agricultural Systems for a Changing Global Climate	$9.79	$8.68	$9.04			
In last 3 years, percentage of time spent in this area:	6.10%	5.90%	4.80%			
Explore global climate change relationships on species.	$24.90	$23.71	$20.93			
Develop biotechnologies to enhance food production with climate change.	$27.28	$27.26	$22.21			
Explore production systems that enhance efficiency and/or reduce greenhouse gases.	$18.69	$22.42	$29.29		***	*
Research breeding programs adapted to global climate change.	$29.14	$26.61	$27.57			
4. Develop New Plant Products, Uses and Crop Production Systems	$5.97	$8.61	$9.40		*	
In last 3 years, percentage of time spent in this area:	2.31%	5.13%	3.07%			
Improve crop productivity.	$32.76	$34.84	$31.43			
Enhance energy efficiency.	$25.69	$25.81	$24.50			
Improve processing efficiency of crop bioproducts.	$19.97	$17.42	$16.36			
Investigate the interdependency of multiple land use decisions.	$21.59	$21.94	$27.71			
5. Enhance Production of Safe and Abundant Food for America	$10.41	$13.42	$8.44			*
In last 3 years, percentage of time spent in this area:	6.21%	13.29%	3.80%			**
Prevent potential food safety hazards.	$27.24	$25.16	$31.40			**
Improve nutritional and health benefits of food.	$26.55	$25.97	$23.10			
Detect and eliminate food-borne illnesses, bioterrorism agents, invasive species, and pathogens.	$21.76	$26.61	$22.00			
Decrease dependence on chemicals harmful to people and the environment.	$24.45	$22.26	$23.50			

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Table 1. – continued from previous page

Research priorities[a] and thirteen Grand Challenge Areas identified by the Experiment Station Committee on Organization and Policy (ESCOP).	Allocation of hypothetical $100 within each Grand Challenge Area and then among the 13 Grand Challenge Areas			Statistical difference[b] in means		
	(A) ESCOP Deans, Directors and Assoc.	(B) ESCOP Dept. Heads and Faculty	(C) WAEA Members not part of ESCOP	A vs. B	A vs. C	B vs. C
6. Develop Animal Production Practices, Products, and Uses	$6.97	$7.23	$6.30			
In last 3 years, percentage of time spent in this area:	1.86%	3.65%	2.44%			
Promote animal health and well-being.	$100	$100	$100			
7. Improve the Economic Return to Agricultural Producers	$4.69	$8.16	$13.17	*	***	*
In last 3 years, percentage of time spent in this area:	4.41%	11.42%	28.29%	**	***	***
Develop sustainable production systems that are profitable.	$62.41	$62.90	$54.64			
Alternatives to the current price support system.	$37.59	$37.10	$45.36			
8. Maintain a Sustainable Environment	$9.59	$9.84	$8.27			
In last 3 years, percentage of time spent in this area:	6.72%	9.74%	4.64%			
Efficient and sustainable farming and food processing systems.	$37.07	$28.06	$24.71	*	**	
Environmentally friendly production systems.	$23.21	$25.48	$24.07			
Protect the environment both on and beyond the farm.	$22.79	$25.65	$26.50			
Reduce the impact of animal agriculture on the environment.	$16.93	$20.81	$24.71		**	
9. Enhance the Uses of Biotechnology	$4.62	$6.29	$6.17			
In last 3 years, percentage of time spent in this area:	2.69%	5.55%	1.60%			
Nanotechnology for pathogen and pest identification, detection, and eradication.	$52.41	$49.03	$47.71			
Safety and effectiveness of genetically-engineered organisms.	$47.59	$50.97	$52.29			
10. Increase Public Awareness of Food, Fiber, and Fuel Production	$4.66	$4.16	$4.64			
In last 3 years, percentage of time spent in this area:	6.28%	2.77%	2.19%	*	**	
Public awareness of agricultural production and processing.	$38.79	$27.68	$31.40	*		
Education to make more informed and healthy food choices.	$25.17	$33.16	$27.61	**		
Understand influences of dietary and health decision-making	$36.03	$39.16	$40.99			
11. Improve the Productivity of Organic and Sustainable Agriculture	$6.45	$5.19	$3.94			
In last 3 years, percentage of time spent in this area:	3.38%	4.90%	1.99%			
Feasibility and sustainability of organic and non-organic systems.	$53.28	$53.39	$56.93			
Improved pest, weed, and disease control.	$46.72	$46.61	$43.07			
12. Develop Human Capital and Capacity in Agriculture	$6.52	$4.42	$6.43			
In last 3 years, percentage of time spent in this area:	12.24%	3.03%	7.73%	**		**
Economic viability, social acceptability, and environmental quality.	$100.00	$100.00	$100.00			
13. Sustain Individual Family and Community Resilience	$9.41	$3.48	$6.04	*		
In last 3 years, percentage of time spent in this area:	7.76%	8.39%	3.16%			
Access to high-quality food, health care, education, social services, and a clean, healthy environment.	$18.41	$17.42	$16.33			
Measure the impact of agricultural, natural resource, and food literacy education in all high schools.	$12.79	$12.68	$11.27			

(continued on next page. . .)

Table 1. – continued from previous page

Research priorities[a] and thirteen Grand Challenge Areas identified by the Experiment Station Committee on Organization and Policy (ESCOP).	Allocation of hypothetical $100 within each Grand Challenge Area and then among the 13 Grand Challenge Areas			Statistical difference[b] in means		
	(A) ESCOP Deans, Directors and Assoc.	(B) ESCOP Dept. Heads and Faculty	(C) WAEA Members not part of ESCOP	A vs. B	A vs. C	B vs. C
Assistance to 4-H, FFA, and private sector youth programs.	$18.62	$12.97	$12.10		*	
Economic impact of entrepreneurship and business development on rural communities.	$15.00	$15.58	$20.29		*	
Strategies for building coalitions to facilitate scientifically sound social change in rural communities.	$10.69	$12.42	$14.37			
Enhance the problem-solving capacities of rural communities.	$11.72	$12.19	$11.56			
Integration of local, regional, national, and global food systems.	$12.76	$16.74	$14.09			
Remainder of time spent on other assignments:	29.07%	20.23%	20.14%			

Notes: Single, double, and triple asterisks (*, **, ***) represent significance at the 10%, 5%, and 1% level
[a] Specific research items under the thirteen grand challenge areas were abbreviated from those utilized in the survey and ESCOP study. Full subtitles are available from the author or at http://escop.ncsu.edu/.
[b] Statistical difference in the means is calculated using a two-tailed t-test with unknown variance (Weiss, 1989).

upper administrators, who control most "hard-money" and faculty line allocation decisions, ranked this near the bottom of their priorities ($4.69). The disparity between deans and directors and WAEA members on this research priority is significant because WAEA members spend the largest portion of their time in this area (28.29%). Heads and faculty identified in the ESCOP study value improving economic returns substantially more than do upper administrators ($8.16 versus $4.69), but still significantly less than do WAEA members. This result implies that at least some agricultural and resource economists may need to transition their research to higher priority areas, rebrand items like cost of production estimates for corn as being a part of renewable energy and biofuels, and educating upper administrators and faculty in other disciplines on how consumers are generally beneficiaries of improved economic returns through efficiency gains.

Significant crossovers exist with the thirteen grand challenge areas. The final ESCOP report actually combines improving economic returns with five other areas under the title of competitive and profitable agriculture, including developing new plant products; developing new animal production practices; increasing public awareness of food, fiber, and fuel production; improving organic and sustainable agriculture; and developing human capital and capacity. However, these areas grouped under more profitable agriculture account for six of the seven lowest dollar allocations from upper administrators among all thirteen areas. In considering thesis topics and funding priorities, Boland and Crespi (2010) find that research priorities related to topics like biofuels, carbon sequestration, food safety, and climate change are increasing in prominence relative to more traditional agricultural economic problems. This indicates that our profession is moving into areas ranked higher in priority by upper administrators, even though the migration may not be as rapid as they would like. On average we spend more time (28.29%) working on improving economic returns (i.e., profitable and sustainable production systems, and alternatives to current price supports) than the resource allocation made by upper administrators ($4.69 out of $100) and WAEA members ($13.17 out of $100). Then again, few doctoral students interested in commercial agriculture issues may result in a future shortage of agricultural economists with skills associated with agribusiness and farm management (Boland, 2009).

Managing agricultural water usage was the most important priority for upper administrators, and it has the second highest ranking for both ESCOP heads and faculty and WAEA members. Within the agricultural water usage area, both ESCOP deans and directors and heads and faculty ranked

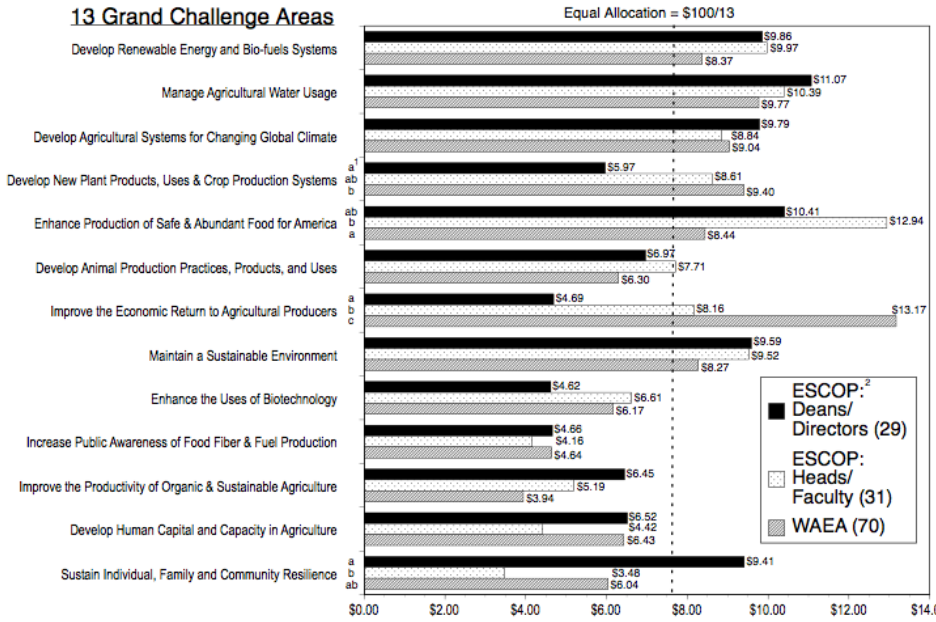

Figure 3. Allocation of Hypothetical $100 to Grand Challenge Areas by Deans/Directors, Heads/Faculty of All Disciplines, and WAEA Members

Notes: [1]Bar values preceded by no letter or by the same letter indicate that the means do not significantly differ for an area at a 10% confidence level using a two-tailed t-test with unknown variance.
[2]ESCOP refers to the Experiment Station Committee on Organization and Policy, and values in parentheses are the number that completed the questionnaire.

"creating new and/or modifying existing profitable agricultural and natural resource systems that conserve use of and recycle water" as their highest priority. WAEA members allocated $23.84 to this priority, but significantly less than upper administrators' $30.17 value (using a 5% confidence level). The greatest difference among WAEA members and the other two populations occurs with policy and legal issues for water. Not surprisingly, agricultural and resource economists believe that policy and legal issues are much more important for allocating scarce water resources than others. WAEA members allocated $22.51 to this area, significantly more (1% level) than either ESCOP deans and directors ($14.52) or heads and faculty ($13.94). It is also interesting to note that among WAEA members, those who identified themselves as from the West had a lower average allocation for managing agricultural water usage than those from other regions ($8.79 versus $10.69). This result probably reflects the tight water supplies that have been experienced in the southeast and southern plains regions recently as a result of extended drought conditions and growing water demands.

A simple linear regression of dollars allocated to each grand challenge area regressed on the amount of time spent in each area (normalized to 100% after removing time for other duties/areas) with an intercept reveals that all three groups have a significant affinity (all at more than a 1% confidence level) to place resources where they spend their time. Thus, not only do agricultural and resource economists lobby for their own self-interests (Johnson, 2007), but deans, directors and faculty across other disciplines also appear to have a soft spot for placing resources in areas where they currently spend more of their effort. In fact, the estimated slope of this relationship for ESCOP deans and directors is greater than that for WAEA members or ESCOP heads and faculty.[9]

[9] The estimated slope coefficients (standard errors) for ESCOP deans and directors, ESCOP heads and faculty, and WAEA members are 0.269 (0.0355), 0.164 (0.0275), and 0.196 (0.0201), respectively.

Brester (2006) notes that in order for individuals to share in the economic growth associated with globalization, they need to either be specialized or constantly adapting to change. New discoveries of knowledge may also require a new research focus in order to obtain resources to support our research. Budgetary situations within many departments are such that faculty need to be able to finance their own graduate students, research, extension programs (Boland, 2009), as well as participation at professional association meetings.

Western Water

As water is the lifeblood for agriculture in the West, external funding has become a major source of livelihood for funding research, extension, and graduate student programs. Perry (2010) observes that graduate programs with healthy grant support will likely survive and maybe even thrive. Nonetheless, uncertainty generally exists with the flow of grants and other external funds available from year to year, and the transaction costs associated with obtaining funds and fulfilling their requirements can vary greatly. ARS data verify that grant funds are not created equal in terms of securing and completing their requirements. When asked "*Which of the following grants, with their requirements, is the easiest money for you to obtain and fulfill the grant's objectives?*" the response was as follows: 1 year (19.6%), 2-3 year (43.5%), 2-3 year, multi-state (6.5%), 2-3 year, multi-disciplinary (23.9%), and 3-5 year, multi-state and multi-disciplinary (6.5%). Not surprisingly, grants with longer funding cycles and no other strings attached are the most attractive, while the multi-disciplinary requirement appears to increase transaction costs less than the multi-state requirement. Although some federal funds have required multi-state effort reporting in recent years, the costs associated with conducting multi-state activities appears to be relatively high, in spite of modern electronic technologies.

To evaluate the transaction costs of external funding from a wider array of sources than just grants, we asked, "*Which of the following sources of funds are the easiest for you to secure and perform for each dollar you receive?*" Funding sources to select from and ARS data obtained were fee-based teaching or extension programs (9.1%); corporation or private grants (11.4%); county/state funds (15.9%); national level funds other than USDA (9.1%); USDA funds (29.5%), and consulting from any source (25.0%). While individuals may have a comparative advantage for securing one source of funds versus another, most individuals find USDA funds and consulting activities to be the sources of external funds with the lowest transaction costs per dollar received. No noticeable difference was observed in the attractiveness of consulting between younger and older individuals (23.8% versus 26.1%), as suggested by when they first became members.

Undoubtedly, the resources expended and transaction costs associated with securing a unit of water in the West have and are likely to continue to increase as reserved water rights place pressure on stream flows and appropriated water users. Similarly, in states where support for higher education, research, and extension continue to decline, more pressure and competition will likely arise to secure external funds. Since USDA is viewed as one of the more attractive entities to obtain funding, more proposals and faculty time per dollar received will likely occur along with greater fluctuations in the flow of resources to individual departments. Much like the Plains Indians would have fared better if they had not been so dependent on bison, departments and faculty should work to not become dependent on one source of funding for their livelihood. Just as we all need to keep an eye on how diversified and reliable our external support is we also need to be sharpening our relevance and credibility with upper administrators, colleagues in other disciplines, and the public to enhance our lasting legacy.

Summary and Conclusions

Changes will certainly continue to occur in the priorities, funding sources, and available funds for agricultural research, extension, and teaching programs. Much like in the settling of the West, departments and individuals that are agile in adapting to these changes will fare better than those

resistant to change. As more programs are funded by entities with vested interests in outcomes, acknowledging personal conflicts of interest upfront is an important step to avoid situations that could threaten the credibility of peer-reviewed publications. The medical profession recognized a need to disclose personal COI over twenty years ago, and declining public support for higher education and research is heightening the need for the WAEA to adopt COI disclosure policies. The WAEA should be a leader among agricultural and resource economists and other agriculture disciplines in this area.

When economic problems and issues involve crucial biological and physical dimensions, validation of these non-economic components is expressed as being important enough to justify securing a reviewer from another discipline, if needed. Obtaining the services of these expert reviewers may require paying monetary incentives, conducting some reviews similar to procedures for developing open-source software, and developing friends in other disciplines. The WAEA should explore having annual meetings at the same time and facility as other associations (e.g., American Water Resources Association, International Association for Food Protection) to improve interdisciplinary communication and collaboration capacity.

Recent full time equivalent faculty numbers from the Food and Agricultural Education Information System database indicate that agricultural economic departments have declined in size relative to other academic areas (except for family and consumer sciences). The median size of agricultural economics faculty is still in the mid-size range, but at the lower end of this range. Underlying forces behind this decline and how representative this sample is for all institutions deserves investigation.

In a survey asking upper administrators to allocate a hypothetical $100 to thirteen different areas of research, results indicate that participants valued agricultural competitiveness and profitability less favorably than water usage, food safety, renewable energy, adapting to global climate change, and sustainable environments. WAEA members have addressed many of these topics in recent dissertations and articles, but on average we spend more time and allocate a greater priority to items we identify as improving the economic returns of agricultural producers than upper administrators and faculty in other disciplines desire. Some individuals may need to rebrand their research, while others may need to migrate to higher priority areas.

Irrigation water is needed for agriculture to thrive in the arid West; similarly, most research, extension, and graduate student programs need external funding to flourish. Transaction costs associated with securing these funds divert time and energy away from other efforts. Grants with multi-state requirements appear to have the greatest costs to obtain and fulfill the grant's objectives. Competition for USDA grants is likely to increase, as they are viewed as one of the more attractive sources for external funding. A diversified mix of funds may also be needed. Engaging upper administrators in a particular research area can also be a way of securing a higher level of their support, as they tend to place a higher priority on areas where they have recently spent time working. And, of course, like Geronimo, we are always in need of friends who do not have hidden agendas or motives, especially among upper administrators, faculty in other disciplines, and stakeholders of higher education.

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References

Abraham Lincoln Online. "Places: Lincoln Land in Iowa." Available online at http://www.AbrahamLincolnOnline.org.

Blum, J. A., K. Freeman, R. C. Dart, and R. J. Cooper. "Requirements and Definitions in Conflict of Interest Policies of Medical Journals." *Journal of the American Medical Association* 302(2009):2230–2234.

Boland, M. A. "Leadership Development in Agricultural Economics: Challenges for Academic Units." *Journal of Agricultural and Resource Economics* 34(2009):367–382.

Boland, M. A. and J. M. Crespi. "From Farm Management to Agricultural and Applied Economics: The Expansion of a Professional Society as Seen Through a Census of its Dissertations From 1951 to 2005." *Applied Economic Perspectives and Policy* 32(2010):456–471.

Brester, G. W. "Research and Publishing: Relevance and Irreverence." *Journal of Agricultural and Resource Economics* 31(2006):455–470.

Committee on Indian Affairs. *Pima Indians and the San Carlos Irrigation Project*. Hearing before the Committee on Indian Affairs, House of Representatives, Sixty-Eighth Congress, First Session, 1924.

Corle, E. and R. Santee. *The Gila: River of the Southwest*. New York: Rinehart, 1951.

Faulk, O. B. *Destiny Road: The Gila Trail and the Opening of the Southwest*. New York: Oxford University Press, 1973.

Flanagin, A., P. B. Fontanarosa, and C. D. DeAngelis. "Update on JAMA's Conflict of Interest Policy." *Journal of the American Medical Association* 296(2006):220–221.

Food and Agricultural Education Information System. Report Builder. Virginia Tech College of Agriculture and Life Sciences and U.S. Department of Agriculture. Available online at http://www.faeis.ahnrit.vt.edu/.

Geronimo. *Geronimo's Story of His Life*. New York: Duffield & Company, 1906. Available online at http://www.ibiblio.org/ebooks/Geronimo/GerStory.htm#p119.

Hurst, J. "Geronimo Surrenders: Skeleton Canyon, 1886." 2003. Available online at http://southernnewmexico.com/Articles/People/.

Hurt, R. D. *Indian Agriculture in America: Prehistory to the Present*. Lawrence, KS: University Press of Kansas, 1987.

Indian Land Tenure Foundation. "Land Issues: Land Loss." Available online at http://www.iltf.org/land-issues/land-loss.

Johnson, M. A. "Finding Peace for Economists in Universities." *Journal of Agricultural and Resource Economics* 32(2007):417–424.

Nelson, M. C. "The Winters Doctrine: Seventy Years of Application of 'Reserved' Water Rights to Indian Reservation." Arid Lands Resource Information Paper No. 9, University of Arizona, Tucson, 1977.

Perry, G. M. "What is the Future of Agricultural Economics Departments and the Agricultural and Applied Economics Association?" *Applied Economic Perspectives and Policy* 32(2010):117–134.

Pratt, H. E. *The Personal Finances of Abraham Lincoln*. Springfield, IL: Abraham Lincoln Association, 1943. Available online at http://name.umdl.umich.edu/5250244.0001.001.

Robertson, L. G. *Conquest by Law: How the Discovery of America Dispossessed Indigenous Peoples of their Lands*. Oxford: Oxford University Press, 2005.

Schroeder, T. C. "Enhancing our Impact in the Midst of Controversy." Western Agricultural Economics Association Presidential Address. Honolulu, HI, July 2004.

Science and Technology Committee. "A Science Roadmap for Food and Agriculture." Association of Public and Land-grant Universities, Experiment Station Committee on Organization and Policy, 2010. Available online at http://escop.ncsu.edu/docs/scienceroadmap.pdf.

Thompson, G. D., S. V. Aradhyula, G. Frisvold, and R. Tronstad. "Does Paying Referees Expedite Reviews? Results of a Natural Experiment." *Southern Economic Journal* 76(2010):678–692.

U.S. Fish and Wildlife Service. "Time Line of the American Bison." Available online at http://www.fws.gov/bisonrange/timeline.htm.

Weiss, N. A. *Elementary Statistics*. Reading, MA: Addison-Wesley, 1989.

Zilberman, D. "Economics and Interdisciplinary Collaborative Efforts." *Journal of Agricultural and Applied Economics* 26(1994):35–42.