Department of Agricultural Economics
Oklahoma State Unversity

Research Update

Summer, 2012

Department Head Comments

Our department continues to contribute significantly to applied economics research, emphasizing subjects important to Oklahoma's agricultural industry, to rural communities, and to food and natural resource issues.

The projects highlighted in this issue demonstrate our commitment to providing timely, unbiased research on things that matter to state taxpayers but also contribute to scholarship at the national level.

The 54 peer-reviewed journal articles published in 2011 demonstrate the productivity of our faculty and the variety of ongoing collaborations with colleagues in other disciplines.

These articles also bring recognition not only to the faculty but also to the department and to OSU.

Damona Doye

Research Update
Published by the Department of Agricultural Economics at Oklahoma State University
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Agricultural economics researchers study a wide range of diverse topics

Agricultural economics and agribusiness offer a multitude of research possibilities in many areas.

The wide range of research topics discussed in this issue of the *Agricultural Economics Research Update* clearly demonstrates that diverse potential.

One research study identifies critical issues and success factors and future research needs for agricultural cooperatives in the U. S.

Two articles focus on broadband usage and its consequences. One study examines the effect of broadband usage on local sales taxes for communities.

In another project, a broadband achievement index is developed to gather information from states more uniformly for easier analysis.

Fertilizing is the topic of another study that examines the effect of the cost of lime on recommendations about nitrogen levels when fertilizing crops.

Yet another study attempts to determine the economic potential of swine effluent as a fertilizer in intensified forage systems.

For the cattle industry, a new data analysis tool to help extension personnel relay cattle sales information to consumers more quickly was developed.

Identifying critical issues and success factors and future research needs for U.S. agricultural cooperatives

Researchers

Phil Kenkel, OSU agricultural economics professor and Bill Fitzwater Cooperative Endowed chair, led a national effort to identify critical issues facing agricultural cooperatives. The project was a unique collaboration of cooperative leaders, academic researchers and extension professionals. OSU Masters student Lisa Brown became involved in the effort and is focusing her thesis research on one of the issues identified by this effort.

Representatives from 12 other land grant universities in the U.S. and two USDA employees also participated in the project.

Farmers Cooperative Exchange, Weatherford, Oklahoma Corn, Oklahoma site

Background

Cooperatives are user-owned businesses that are an important part of the U.S. economy and are vital to the agricultural sector.

In 2009, cooperative businesses in the United States controlled over $3 trillion in assets, generated nearly $654 billion in revenue, employed over 2 million people and distributed nearly $79 billion in income to user/owners.

The unique challenges and the prevalence of cooperatives in U.S. agriculture have encouraged research and education efforts by agricultural economists since the early 1900's.

Cooperatives were included as a part of the original mission of the Cooperative Extension Service in 1926.

Issues

While many of the critical challenges and issues facing cooperatives are not unique to that form of business, most have unique implications. The cooperative business model has different structures for equity creation, profit distribution, and governance relative to investor-owned firms.

The economic relationship between a cooperative and its members and users is different from that of an investor-owned firm. External issues, such as the recent economic volatility, can create the need for additional equity and more robust risk management strategies for cooperatives.

Education of leaders and members about cooperative finance is critical if leaders and members are to understand why a cooperative must be profitable and why cooperative finance practices must be aligned with the cooperative's business model.

Objective

The goal of the project was to identify critical issues, success factors, and future research needs on the economics of cooperatives by developing education and professional discussions between the agricultural community served by cooperatives plus academic audiences and cooperative members and managers.

The overall goal of the project was to increase the research and visibility of work on cooperatives. The project organizers deemed it essential to involve industry stakeholders and to include a wide range of cooperatives including large traditional cooperatives and smaller local food cooperatives. They were also interested in encouraging the participation of younger professionals and stimulating cooperative related research by graduate students. It was also deemed important that the results be communicated to both academic researchers and industry participants.

Project

A national effort to identify the critical issues and success factors for U.S. cooperatives was initiated by the Council on Food, Agriculture and Resource Economics (C-FARE) in January of 2011. C-FARE is a non-profit organization with a mission of enhancing the agricultural sector through economic research and outreach efforts.

OSU professor Phil Kenkel was asked to lead the effort and he coordinated with both the CSREES research committee on cooperatives (NCERA-210) and the eXtension cooperative community of practice (COP).

The NCERA-210 regional research committee has been active since 1993, which makes it one of the longest running such committees in the United States. The committee promotes and coordinates timely research on the cooperative business model and provides interaction between academic and government research and industry participants.

The cooperative COP on eXtension is a web-based informational environment that creates and centralizes the best available information on the cooperative business model and packages it for use by industry and consumer constituents.

Results

The program objectives were met with the following steps:

1. Panel Meeting of Cooperative Professionals

A panel of experts was established to identify critical issues and research needs and also strategies to increase the competitiveness, stability, and success of cooperatives.

One of the panel meetings of cooperative professionals held during the project.

A panel meeting was held at which challenges and opportunities facing agricultural cooperatives in the coming years were identified, and strategies from the applied economics profession were presented to increase chances for success.

The participants were academics, government agents, and cooperative members.

The discussion points for the final papers came from the main themes from the panel discussions. Topics/themes for panel focus included:

- Finance
- Strategy
- Communicating the Value Package
- Governance
- New Cooperative Development

2. Papers by Specialists

These papers addressed topics for the profession to teach students and to serve as communications for professionals in the cooperatives fields.

The research was published in a series of six articles in *Choices Maghazine*, an on-line peer reviewed publication of the Agricultural and Applied Economics Association.

All of the *Choices* articles synthesized previous research and the expert panel's findings and identified priorities for future research.

The papers can be viewed at http://www.choicesmagazine.org/choices-magazine/theme-articles/critical-issues-for-agricultural-cooperatives.

Eight publications were developed and disseminated

through the eXtension cooperative COP,which also provided access to the archived webinar and links to the *Choices* articles.

3. Webinars on Cooperatives of Today-Challenges and Opportunities for Producers

C-FARE worked with the eXtension cooperative COP to hold a national webinar on "Communicating the Cooperative Value Package" after the release of the papers in cooperation with sponsors and partners to complement the papers.

The webinar can be viewed at http://www.extension.org/pages/61310/archived-cooperatives-webinars.

4. Blue Ribbon Expert Panel Examines Future Research Needs

The final component of the project was a pre-conference on Critical Issues Facing Cooperatives held in conjunction with the 2012 Farmers Cooperative Conference in Minneapolis Minnesota, November 3, 2011.

Representatives of the Expert Panel then re-convened in conjunction with the Farmers Cooperative Conference and the NCERA-210 Cooperative Research Committee in Washington D.C. to share the results of the panel's efforts and expand the discussion with a diverse audience of industry professionals and researchers.

Experts from a range of experience levels and geographic locations were involved in an effort to continue future dialog.

Other Outcomes

- 45 individuals, including leaders of the largest cooperatives in the U.S., attended the Washington D.C. panel session.
- In the first four months, the six peer-reviewed articles were accessed over 2600 times.
- Individuals in 75 separate sites across the continental U.S., Hawaii, and Europe participated in the webinar. The webinar was archived on the cooperative COP and continues to be accessed.
- Eighty industry professionals and researchers attended the second panel session at the Critical Issues pre-conference.
- Eight publications were developed and disseminated on the eXtension cooperative COP.
- Results have been integrated into educational material in undergraduate cooperative classes at Oklahoma State University, North Dakota State University, and Texas A&M University.
- Project results were presented at annual meetings of the National Council of Farmer Cooperatives and the National Association of State Cooperative Councils, and at meetings of the Mid-America Cooperative Council, the Texas Agricultural Cooperative Council, the Oklahoma Agricultural Cooperative Council, and the Kansas Agricultural Cooperative Council.

  Over 250 cooperative leaders attended these state level meetings and had the chance to incorporate the results into their strategic planning process.
- Master's thesis and doctoral research focusing on the issues identified is underway at OSU, Texas A&M, and the

Tillman Producers Co-op, Frederick, Oklahoma

Chuck Conner, Executive Director, National Council of Farmer Cooperatives, Lisa Brown, Phil Kenkel, and Tamara Wagester, Executive Director, C-FARE, in Washington, D.C.

University of Minnesota. Additional graduate research is anticipated.

Follow-Up

The issues and research needs identified by the project continue to be communicated to the cooperative community, researchers, and policy makers. The July/August edition of *Rural Cooperatives*, a publication of the USDA Rural Development Agency, highlighted the effort. Project leader Phil Kenkel traveled to Washington D.C., on April 23, 2012 and conducted seminars for House and Senate staff members, describing the project goals and outcomes

Impact

The project provided national exposure to the NCERA-210 research committee and the eXtension cooperative COP.

The Critical Issues pre-conference to the 2011 Farmers Cooperative Conference enhanced interaction between the researchers and industry professionals.

The success of the pre-conference enhanced the potential for future NCERA-210 sponsored efforts.

The *Choices Magazine* articles increased the visibility of research on the cooperative business model and are encouraging new approaches to the research priorities.

The Washington D.C. seminar raised the awareness of the importance of agricultural cooperatives at the congressional level and could contribute to the development of policy and legislation beneficial to farmers and producer owned cooperatives.

Presentations and Publications

Phil Kenkel and John Park."Critical Issues for Agricultural Cooperatives." *Choices Magazine*. http://www.choicesmagazine.org/choices-magazine/theme-articles/critical-issues-for-agricultural-cooperatives/theme-overview-critical-issues-for-agricultural-cooperatives.

The research was presented at a C-FARE sponsored seminar for congressional staff in Washington D.C. on April 23, 2012.

Funding Sources

This effort was supported by USDA National Institute of Food and Agriculture (NIFA) baseline funding through the experiment stations and extension programs of the participating institutions and through funding for the NCERA-210 research committee and one-time funding for eXtension COP development.

Sponsors of the project included CHS Foundation, Farm Credit, USDA Economic Research Service (ERS), USDA National Agricultural Statistics Service (NASS), and NIFA.

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Developing broadband achievement index to provide benchmark for policy decisions on states' achievements in broadband diffusion

High-speed access to the Internet enhances economic prosperity, social development, and global competitiveness. Significant progress has been made in broadband deployment in the last decade. Broadband was reported to have been available to about 90–95% of Americans in 2009.

Broadband has helped bring high speed internet access to rural areas , which has had a large impact on agriculture.

Researchers

Dave Shideler, OSU agricultural economics assistant professor collaborated with Narine Badasyan, and Simone Silva of Murray State University in Kentucky on this project.

Issues

Significant gaps still exist in broadband adoption among the states, regions, and urban and rural areas, but this is just one measure of broadband.

Another indicator of broadband is digital inclusion, which is a measure of how evenly the broadband infrastructure is distributed across the state.

Federal and state legislators and regulators currently use a number of indicators such as adoption, availability, and speed to track states' progress in broadband diffusion to design appropriate policy responses.

Single indicators, however, when analyzed individually, fall short of capturing multi-dimensional aspects of broadband diffusion and, thus, do not provide an integrated and easily comprehensible picture of all states' overall advancements.

To monitor states' overall progress, aggregating various indicators into a composite index that could measure the overall extent of broadband distribution would be useful. A composite index can also provide an important benchmark for designing policies to improve states' overall performance.

For instance, Texas has a very high broadband availability (96.49%, only 16 states have higher availability rates compared to Texas), but the percentage of high speed connections is very low (26.77%, 41 states have higher speed measure) and the state also performs poorly in terms of digital inclusion (37 states do better than Texas).

Objective

The purpose of this project is to provide a more comprehensive picture of where the states stand in their evolution toward high-performance America by measuring each state's current broadband achievement relative to other states and providing an important benchmark for assessing state-specific needs.

Project

In this project, a composite Broadband Achievement Index (BAI) index was constructed that combines various indicators of residential broadband diffusion to measure each state's progress by benchmarking it against other states and, thus, putting each state's achievements into context.

The index uses 2009 FCC's Form 477 adoption data and broadband availability data collected by the National Telecommunications and Information Administration (NTIA) as part of the State Broadband Data and Development Program in 2009 in conjunction with the household data drawn from the Census Bureau's 2005–2009 American Community Survey.

The broadband achievement index was constructed by grouping five indicators that are essential for successful implementation of the goals of the National Broadband Plan. The five indicators are:

- Broadband availability
- Broadband adoption
- Broadband competition
- Broadband speed
- Digital inclusion

Results

The top performing states are Connecticut, New Jersey, New Hampshire, and Massachusetts plus the District of Columbia. On the other hand, Alabama, West Virginia, Montana, Missouri, Arkansas, Mississippi and Kentucky have the lowest measures of broadband achievement regardless of the methodology used. High performing states consistently do well in all indicators, while low performing states perform at average or below average in all indicators with very poor performance in some indicators.

impact

The broadband achievement index can be used by policymakers to assess each state's overall relative performance in broadband diffusion.

Component indicators, on the other hand, can provide policymakers with the opportunity to identify strengths and weaknesses in each state and target policies accordingly.

High or low relative values of the indicators could indicate areas of high or low priority for policy interventions.

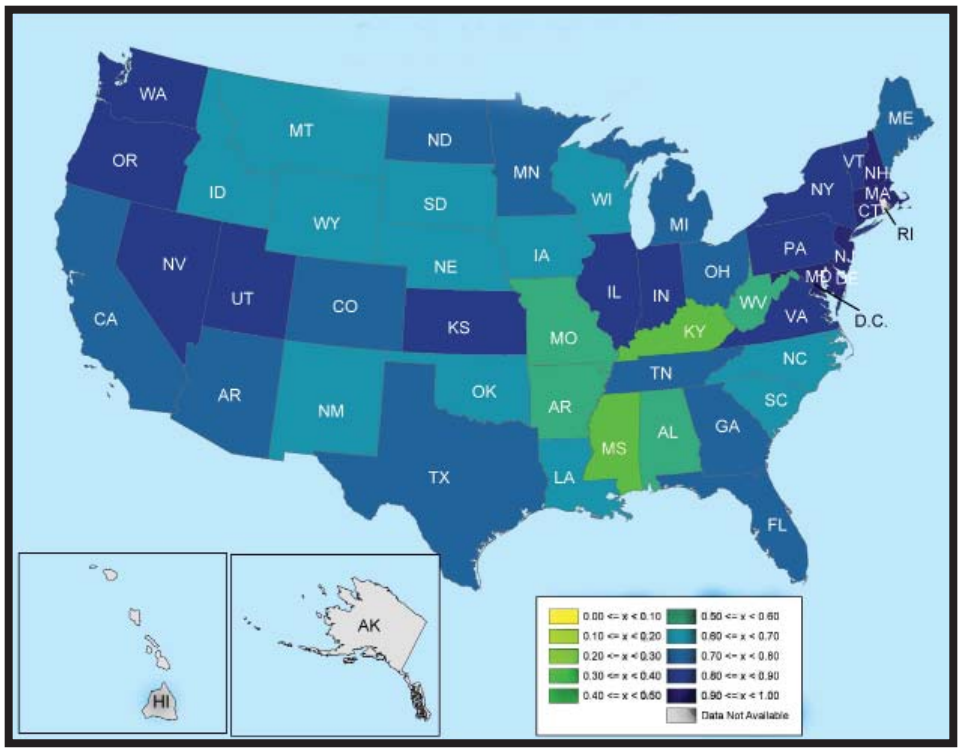
For instance, 20 states outperform Michigan based on one measure calculated, even though Michigan has 97.38% availability. In fact, 12 states outperform Michigan in availability.

However even with high availability, the state has below average adoption and digital inclusion measures that suggest that broadband deployment may not be the reason for low adoption in Michigan.

A closer look at other indicators suggests that the cost of broadband may be prohibitive in this state. About 24 states have higher competition measures compared to Michigan, which suggests possibly higher prices in the state. Thus, the policymakers in Michigan may want to target their policies toward affordability in order to increase adoption and digital inclusion which in turn will increase the state's broadband achievement.

Scope of Impact

The composite index proposed could serve as a classification system to monitor each state's progress, which is crucial for designing and implementing targeted policies to improve broadband diffusion.



Broadband Achievement Indexes by state based on one of four measures calculated

Publications

Badasyan, Narine, Shideler, David, and Silva, Simone. "Broadband achievement index: Moving beyond availability." *Telecommunications Policy* 35(2011):933-950.

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Determining the effects of broadband adoption rates on sales tax collections from local retail sales

Broadband Internet access is becoming more common across the country, which is generally seen as a positive development, since broadband can provide opportunities for commerce, education, and entertainment.

Research has found that higher levels of broadband adoption have led to higher likelihoods of purchasing online.

Because local retail stores often compete with online vendors that can provide many of the same goods, the implications for the local retail sector have been unclear.

Researchers

Brian Whitacre, Agricultural economics associate professor and extension economist, and Lara Brooks, past assistant extension state specialist, worked together on this project.

Issues

Since most online sales do not face an effective sales tax, some community developers worry that local sales tax revenues will decline as more and more people use the Internet. This loss of tax revenue could negatively impact the provision of many public services, such as law enforcement or health infrastructure. In fact, rural hospitals across the nation are often dependent on city or county-level sales taxes passed specifically to help them stay open.

Possible Detriments of Broadband to Local Retailers

In addition to the sale tax issue, other reasons why consumers might prefer online retailing to shopping at more traditional physical locations include the ability to shop for lower prices among many competitors, convenience, access to previously unavailable goods, time savings, or simply avoiding the hassle associated with crowds and travel.

Main Street in downtown Stillwater, Oklahoma, represents a retail environment that could be affected by customers purchasing online.

Recent statistics show that 93 percent of Internet users indicate that they have performed some type of activity related to e-commerce.

Possible Benefits of Broadband to Local Retailers

Some surveys have suggested that local retail stores might actually benefit from higher levels of broadband adoption. Many consumers use the Internet to help them shop locally, an activity known as "research online, buy offline" (ROBO).

Surveys have found high levels of this type of activity. Consumers may perform this type of activity for any number of reasons, including wanting to see or touch an item before purchasing, immediate gratification, or support of local establishments.

Objective

The objective of this project was to examine the effects of broadband adoption rates on local sales tax collections and determine how varying levels of broadband access impact those collections.

Project

This project uses Oklahoma data to examine the relationship between broadband adoption and local retail sales tax collections. Both an intuitive mapping technique and more sophisticated statistical models are used to determine whether more broadband does, in fact, lead to lower tax collections from local retail sales.

In the analysis, data from two distinct periods were introduced. In 1998, broadband access was a rarity – in fact, less than 5 percent of households had access when the first surveys on the

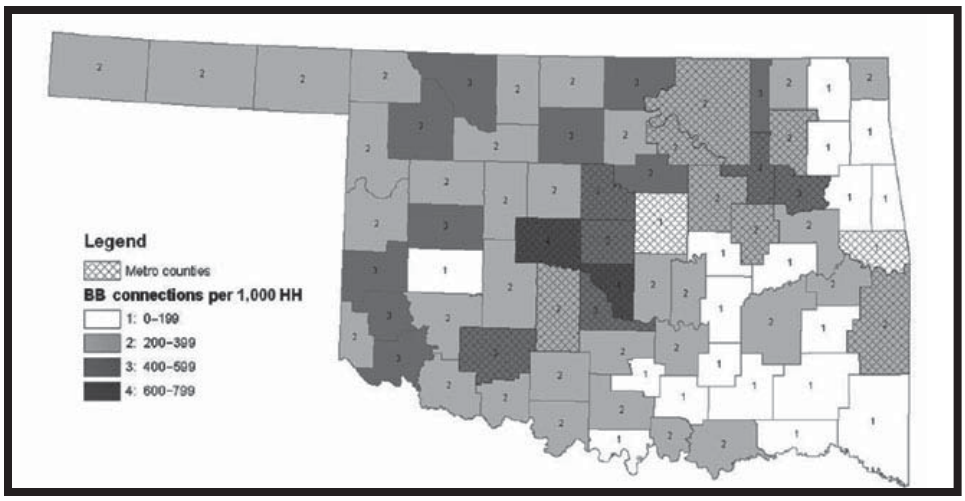

Figure 1. Residential Broadband Connections per 1,000 Households in Oklahoma, 2008

topic were conducted in 2000.

Therefore, the assumption was made that broadband use was negligible in 1998. A decade later, however, broadband access had become widespread, with over 50 percent of households adopting by 2008.

Moreover, data on county-level broadband adoption became available for 2008. The data comes from the Federal Communications Commission and is broken into five categories that represent the number of fixed broadband connections per 1,000 households:

- Category 1: 0 < x < 200 (0 – 20%)
- Category 2: 200 < x < 400 (20 – 40%)
- Category 3: 400 < x < 600 (40 – 60%)
- Category 4: 600 < x < 800 (60 – 80%)
- Category 5: 800 < x (80 – 100%)

Figure 1 shows the level of broadband adoption in Oklahoma in 2008. Since broadband access was virtually nonexistent in 1998, Figure 1 indicates that certain parts of the state adopted broadband at higher rates than others. If broadband access did have some type of relationship with the amount of retail sales tax collections, it should become apparent by observing the changes in retail sales tax collections over this period.

Per-capita retail sales tax collections in Oklahoma's 77 counties in 1998 and 2008 were examined.

Even after adjusting for inflation, the state average increased significantly over this time (from $186 per capita to $226 per capita). Most counties with high sales tax collections in 1998 still had high levels in 2008. Similarly, counties with low collections in 1998 typically still had low levels in 2008.

However, this research was interested in whether the ***change*** in retail sales tax collection was related to levels of broadband adoption.

Figure 2 shows the change in per capita retail sales tax collections between 1998 and 2008. Some counties declined in the amount of per capita collections, although most increased and several had significant levels of growth.

Ultimately, comparing the changes in Figure 2 to those in Figure 1 should help answer whether or not changing rates of broadband access are associated with any changes in retail sales tax collections.

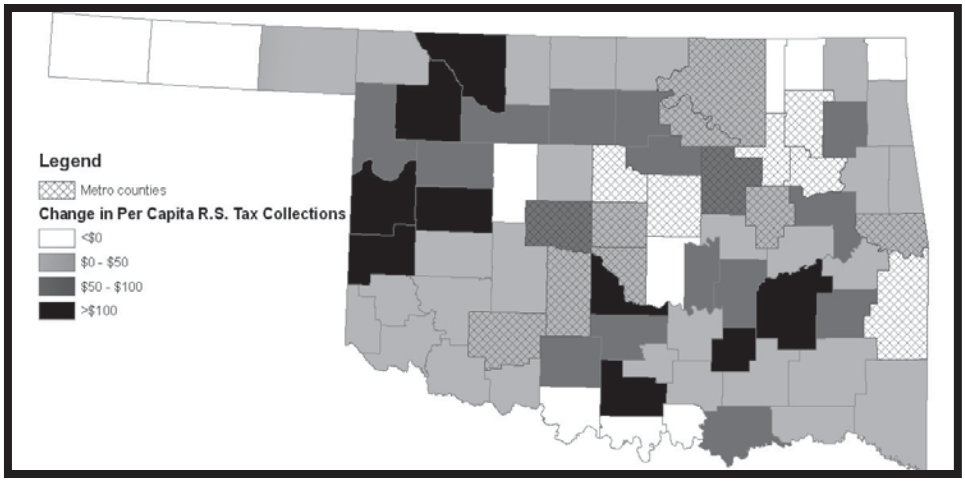

Figure 2. Change in Per-capita Retail Sales Tax Collections, 1998 – 2008 (constant 2008 dollars)

To statistically test whether or

(Continued on page 23)

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Considering the effect of the cost of lime on recommendations for nitrogen levels

Soil acidity is increasingly becoming a problem for many croplands in Oklahoma. In the past decades, soil pH values have declined due to continuous cropping and long-term use of large amounts of ammonium-based nitrogen fertilizers.

Associated with very acidic soils are problems that limit crop and pasture growth and yield. Plant utilization of many nutrients becomes less efficient as soil acidity increases.

Researchers

Wade Brorsen, agricultural economics Regents Professor and A.J. Jacques Chair, worked with Emmanuel Tumusiime, agricultural economics Ph.D. student, and Jagadeesh Mosali, a staff scientist, and Jon T. Biermacher, an assistant professor and extension economist in the Agricultural Division of The Samuel Roberts Noble Foundation, Inc., on this project.

Issues

Using ammonium based nitrogen fertilizers in crop production has been shown to acidify soils. Acidic soils can be amended by liming. The benefits of liming include improved nitrogen fixation and the availability of the essential nutrients calcium, phosphorous, and molybdenum and decreased solubility of toxic elements such as aluminum and manganese.

The per unit cost of lime is low relative to other fertilizers, but lime application rates are significantly higher than for fertilizers such as nitrogen and phosphorous. Because large amounts of neutralizing material are often needed, the benefits of liming come at a significant cost to the farmer.

Recommendations about how much nitrogen to apply typically ignore the cost of lime needed due to acidification from nitrogen fertilization. Ignoring the cost of lime may lead to higher than optimal nitrogen recommendations.

Objective

The objective of this study was to determine the effect of considering the cost of lime on recommendations about the optimal level of nitrogen to apply. To achieve this objective, the study determined the effect of nitrogen fertilization rate, nitrogen fertilization timing, and lime application on soil pH change; and the effect of soil pH, and nitrogen fertilization rate and timing on forage yield of a mixture of rye and ryegrass.

Project

A long-term experiment was conducted at the Red River Research and Demonstration Farm near Burneyville, Oklahoma by the Samuel Roberts Noble Foundation's Agricultural Division.

Forage rye-ryegrass was used because it responds well to high nitrogen fertilizer levels and was expected to have reduced yields in soils with pH values below 5.5.

The problem of soil acidity is likely higher on croplands under forage production than on those

Ryegrass Forage

under grain production since more bases are removed during forage harvest by cattle or baling the forage and removing it from the place of production.

The effect of nitrogen fertilization rates on forage yield and quality was previously analyzed using data from 1979 to 1992. The data set for this project was for rye-ryegrass pasture for the period from fall 1993 to spring 2007.

Experimental site at the Samuel Roberts Noble Foundation Red River Research and Demonstration Farm

Six treatment levels of nitrogen were administered. Nitrogen fertilizer applied as ammonium nitrate was applied in a single application (either all applied prior to planting in the fall, or all applied in the spring) or in two split applications: fall and spring.

Lime was applied in 1979, 1996, 1998, and 2004. Top soil pH was measured twice every season: at the start and at the end of the season.

Results

Acidification due to nitrogen fertilizer increased nonlinearly as the nitrogen rate increased. Nitrogen acidification appears to be more severe with nitrogen application amounts above consumptive levels of the crop than with nitrogen that is used by the plant.

Although the timing of nitrogen application had little effect on forage yield, splitting nitrogen into two applications for fall and spring may be of benefit by reducing acidification due to excess nitrogen fertilization.

Impact

Considering the cost of lime reduces the optimal level of nitrogen recommended.

At current input and output prices, and based on the estimated model, **the optimal level of nitrogen is reduced by 11.3 % from 150 lb/acre by considering the cost of lime due to nitrogen fertilization.**

The results of this study suggest that minimizing leaching of nitrogen by timing and matching fertilizer rates to crop requirements would substantially reduce acidification that results from applying nitrogen.

The Oklahoma Cooperative Extension Service currently recommends lime for forage production when soil pH is below 5.5.

Yield maximizing soil pH levels obtained in this study suggest higher pH recommendations for rye-ryegrass pasture than the current 5.5.

Scope of Impact

This research suggests an additional benefit of precision nitrogen sensing systems, since such systems reduce the amount of excess nitrogen applied. The study finds strong support for applying lime and suggests caution in applying more nitrogen than can be used.

Publications

Tumusiime, E., B.W. Brorsen, J. Mosali, J. Johnson, J. Locke, and J.T. Biermacher. 2011. "How Much Does Considering the Cost of Lime Affect the Recommended Level of Nitrogen." *Agronomy Journal* 103:404-413.

Source of Funding

Partial funding was provided by the Oklahoma Agricultural Experiment Station through Hatch project OKL02170 and by The Samuel Roberts Noble Foundation, Inc.

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Using automated data analysis tool allows OCES educators to quickly dispense livestock market data

In 2000, Oklahoma State University's Cooperative Extension Service, in cooperation with the Oklahoma Cattlemen's Association, launched the Oklahoma Quality Beef Network (OQBN) as an avenue to increase the value of Oklahoma calves.

OQBN is a third-party health management certification program (VAC-45) for calves that meet program specifications for weaning, vaccinations, and other health management practices.

Together, these practices constitute preconditioning. OQBN was re-launched in 2009 as a brand neutral preconditioning program allowing dual certification with industry VAC-45 certification programs.

Program objectives are two-fold:

1. To create producer access to value added markets by hosting OQBN certified sales at local livestock markets
2. To educate Oklahoma cow/calf producers about existing value added marketing activities to encourage participation.

Data analysis tool provides for quick dispersal of sale barn data.

Researchers

Kellie Raper, agricultural economics associate professor, worked with Galen Williams, agricultural economics graduate research assistant, on this project.

Issues

OQBN sales are facilitated through local auction barns as livestock market owners express interest in hosting an OQBN sale. Sales are typically held in conjunction with regular feeder cattle sales, though separate sale dates are sometimes arranged.

Sale prices and cattle characteristics are collected on each lot of cattle sold at every sale. The information the data holds is important to livestock market owners, producers who participate in the sales, the interdisciplinary Extension team, and other interested parties.

For this reason, sale summaries need to be produced quickly to maintain the efficiency and credibility of the Extension program.

Rapid dissemination of information allows Extension personnel to capture the program's fullest potential for educational opportunities with producers and other participants.

Objective

The objective of this project was to develop a tool that would allow Oklahoma Cooperative Extension Service educators to disseminate livestock market data in a timely manner.

Result

An Excel spreadsheet coupled with a Microsoft Publisher template was developed that facilitates rapid data analysis for individual sales in a usable form that is easily distributed to Extension personnel and livestock market owners within days of a particular sale.

Data entered into a Microsoft Excel spreadsheet at sales are summarized using Excel database commands. A link to Microsoft Publisher then generates the sale summary for an individual OQBN sale.

Project Features

The data analysis tool produces sale summaries from data collected at OQBN hosted sales. Raw sale day data are collected via laptop computers in an Excel spreadsheet.

A unique sale identification number is keyed into the

spreadsheet's data analysis page to generate the sale summary. The summary is based on a template similar to USDA's Agricultural Marketing Service market report and reports calf prices by gender, by weight, and by management practice. This format facilitates producer understanding of the summary because many producers are familiar with this format.

Figure 1. Breakdown Process of Price Report

Prices are calculated as weighted averages based on lot size and the characteristics specified in Figure 1. Minimum and maximum prices for each weight category are also reported. Figure 1 illustrates the process of sorting data to generate price reports.

For appropriate comparison, visibly unhealthy cattle are excluded. Data are then sorted by gender because a price differential generally exists between steers and heifers. Finally, data are sorted by weight and by management practice, which allows weighted average prices to be reported for different bundles of management practices.

Microsoft Excel's database commands are used as the sorting mechanism. Each sale is coded with a unique sale identification number. Those cells are linked to a single cell where the sale identification code is easily changed to create the summary for any sale.

Figure 2 shows the price summary in Excel, which mimics weekly price reports from the Agricultural Marketing Service. This format is one that producers, Extension personnel, and other interested parties are accustomed to interpreting. A link to Microsoft Publisher generates the sale summary with specific sale date and location in a distributable form for an individual OQBN sale.

Impact

The information flow from the data analysis ultimately

Price Breakdowns by Weight (Steers)

Head	Wt Range (lbs)	Avg Weight (lbs)	OQBN Price Range	OQBN Avg Price	Vac-45 Non-Cert Price Range	Vac-45 Non-Cert Avg Price	Long-Weaned Price Range	Long Weaned Avg Price	Other Price Range	Other Avg Price
85	300-399	355	135.00 - 135.00	135.00	124.00 - 147.00	136.46	123.00 - 136.00	127.16	81.00 - 81.00	81.00
242	400-499	456	85.00 - 132.00	129.67	112.00 - 137.00	122.84	117.00 - 141.00	128.04	81.00 - 132.00	115.19
543	500-599	554	85.00 - 121.00	117.71	94.00 - 131.50	120.34	87.00 - 133.00	113.61	105.50 - 118.00	116.07
773	600-699	644	103.00 - 115.00	110.94	100.00 - 116.00	109.06	105.50 - 115.00	108.52	92.00 - 108.00	106.70
104	700-799	745	102.00 - 108.00	107.36	107.00 - 108.00	107.37	105.00 - 105.00	105.00	-	
29	800-899	828	-		115.50 - 115.50	115.50	-		-	
0	>900		-		-		-		-	

Price Breakdowns by Weight (Heifers)

Head	Wt Range (lbs)	Avg Weight (lbs)	OQBN Price Range	OQBN Avg Price	Vac-45 Non-Cert Price Range	Vac-45 Non-Cert Avg Price	Long-Weaned Price Range	Long Weaned Avg Price	Other Price Range	Other Avg Price
68	300-399	360	115.00 - 115.00	115.00	93.00 - 115.00	105.83	93.00 - 117.00	100.81	110.00 - 124.00	120.50
587	400-499	450	75.00 - 117.50	115.47	100.00 - 120.00	112.18	84.00 - 116.00	106.36	105.00 - 114.00	109.90
798	500-599	554	100.00 - 107.50	105.03	103.00 - 115.00	107.28	77.00 - 112.00	103.03	97.00 - 100.00	99.44
322	600-699	638	100.00 - 104.50	104.00	100.00 - 107.50	105.21	90.00 - 100.00	95.04	-	
1	700-799	795	90.00 - 90.00	90.00	-		-		-	
0	800-899		-		-		-		-	
0	>900		-		-		-		-	

Figure 2. Price Summary Template in Excel

(Continued on page 23

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Determining economic potential of swine effluent in intensified forage systems

Over the past few decades, farming systems in the Southern Plains of the U.S. have evolved primarily into a wheat-cattle mixed farming system.

An ongoing challenge for producers in the Southern Plains is providing an adequate supply of forage throughout the year. Failure to satisfy forage needs results in increased purchased feed costs and reduced revenue from lower weight gain.

Recent shocks in the energy and corn price markets have affected the mixed farming systems through both higher fertilizer and feed prices, including higher corn prices.

The energy shocks also have an impact on the livestock side of farm operations. Feed prices have trended upward along with corn prices, increasing by 35 percent over the past five years.

In Oklahoma, feed costs now account for 53 percent of animal production costs and are expected to rise even further. Feedlots have responded by discounting cattle prices for underweight animals, providing producers with added incentives to add weight to their cattle before selling them to feedlots.

Researchers

Jeffrey D. Vitale, agricultural economics Associate Professor, and Art Stoecker, agricultural economics Assistant Professor, worked on this project with Seong C. Park, Assistant Professor and Agricultural and Natural Resource Economist at the Texas AgriLife Research and Extension Center in Vernon, Texas; J. Clemn Turner, Senior Research Specialist, and Jeffory A. Hattey, Professor, in the OSU Department of Plant and Soil Sciences at Oklahoma State University.

Issues

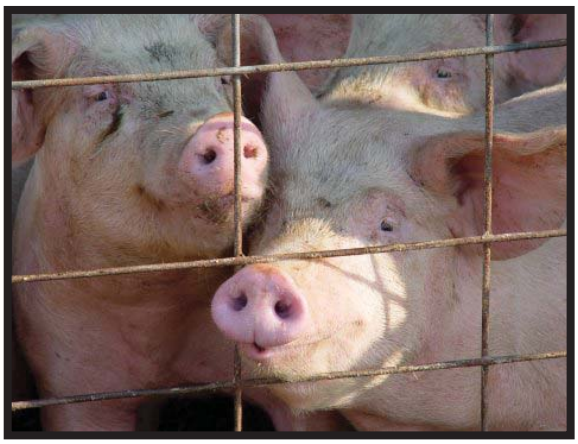
As the value of forage increases over the long-run, producers will search for new production systems to increase forage productivity and lower feed costs. One potential alternative is to intensify forage production through improved management techniques.

In many parts of the Southern Plains, irrigation is available to more intensively produce forage, but the recent run-up in energy prices places a premium on fertilizer costs. As fertilizer prices increase, the use of animal manure becomes feasible.

The Oklahoma Panhandle is a region where concentrated animal feeding operations (CAFO) have increased in size and number, which through manure supplies could provide a comparative advantage for producers in the region.

Swine production in the Oklahoma Panhandle has increased dramatically over the past two decades since restrictions on corporate farming were eased in 1991. The capacity of the swine industry to supply soil nutrients is substantial.

When swine effluent is applied as manure at rates based on plant nutrient requirements, positive economic benefits can be realized by replacing more costly inorganic fertilizer sources without compromising the environment.



Swine effluent as manure was studied for the economic benefits of using it as a less costly organic fertilizer.

Risk Factors

However, certain risk factors are involved with using animal manure.

Agronomists have often found that animal manure has greater yield uncertainty than inorganic fertilizers when manure is used as the primary source of applied nutrients.

Leaching and immobility of nitrogen can also be an issue

with animal manure, and if manure is applied at rates above those needed for plant nutrient requirements, manure can potentially impair soil quality and yield performance.

The variability of dry matter yield suggests that risk could be an important aspect of decision making, for example, when choosing among the alternative forage types.

Project

This study uses experimental data from a study conducted at the Oklahoma Panhandle Research and Extension Center (OPREC) near Goodwell, Oklahoma for seven years from 1999 to 2005 to assess the economic feasibility of intensifying forage production.

A total of 28 grass production strategies were tested using an experimental design that included combinations of three factors:

1. Forage type
2. Nitrogen source
3. Nitrogen rate

This design included four grass species:

1. Bermuda grass
2. Buffalo grass
3. Orchard grass
4. Wheatgrass

Four nitrogen application rates (0, 50, 150, and 450 lbs. nitrogen per acre), and two sources of nitrogen fertilizers (swine effluent and urea) were used.

All plots were fully irrigated under a center-pivot irrigation system following standard practices used by producers in the region.

Risk Simulation Model

A risk model was developed using the forage production data gathered from the long-term OPREC field experiment.

A multivariate simulation was conducted using SIMETAR software to empirically construct the probability distribution of the forage yields for each of the 28 irrigated forage-fertilizer production systems included in the experiment.

The forage alternatives are compared to one another using the certainty equivalent (CE), which measures how much value, in monetary terms, an individual places on an alternative factoring in the effects of risk.

Results

The results found that only the two cool season grasses – orchard grass and wheatgrass – generated positive economic returns under intensification.

The two warm season grasses – Bermuda grass and buffalo grass – had negative economic returns.

Both swine effluent and urea provided similar results based on average economic returns.

Intensifying the production of cool season grasses appears to be an economically viable option for producers in the Southern Plains according to the model results.

Seasonal constraints on forage production drive up prices of cool season grasses, providing cool season grasses with better marketing opportunities than warm season grasses. When combined with lower production costs and more stable yields, cool season grasses have higher returns and less risk than warm season grasses, which often have negative returns.

The performance ranking of each forage species is, however, dependent on the decision maker's attitude towards risk. Urea was found to have less risk than swine effluent and would be the preferred choice for even modestly risk averse producers.

Impact

The results of this study provide useful information to evaluate the risk and economics of intensive forage production systems under four alternative types of forage and two alternative nitrogen sources so that farmers will be able to make better informed production decisions.

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Funding Sources

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Broadband (Continued from page 7)

not increasing broadband rates had any impact on retail sales tax collections, data on a number of variables that could potentially influence sales tax collections were collected for all 77 counties in Oklahoma in both 1998 and 2008.

These variables included items such as the tax rate in a particular county, household income levels, age levels, and whether or not a community had a Wal-Mart.

Results

Mapping

Figures 1 and 2 provide little evidence that there is any significant relationship between broadband adoption rates and changes in retail sales tax collections in Oklahoma.

Some counties with high broadband rates experienced growth in tax collections, while others saw declines. Similarly, counties with low rates of broadband adoption showed both improvements and drops in tax collections, without any apparent pattern.

Statistics

Statistically, only two variables (higher rates of taxes and higher poverty levels) had any impacts on the changes in retail sales taxes collected over this period.

The higher rates of taxes contributed to higher tax collections, while the higher poverty levels in 2008 decreased the levels of tax collections.

Notably, the higher levels of broadband adoption played absolutely no role in the changes that were seen in retail sales tax collections.

Impact

This study suggests that communities in Oklahoma should feel free to offer educational programs to residents about the benefits of broadband. The programs could include encouraging participants to shop on the Internet as they feel comfortable – with some buying online, and others using the Internet as an auxiliary source of information to buy a product locally.

Scope of Impact

This study represents a single state over a single time period. The applicability of these results to other states or regions is not assured. Additional research in different states and over different time periods would be beneficial.

Also, studies have suggested that individuals become more comfortable with purchasing online as they familiarize themselves with the technology, and this fact may in turn have varying impacts over time.

In addition, e-commerce's percentage of total retail sales has been trending upward for an entire decade, and will probably continue to do so over the next decade.

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Data tool (Continued from page 13)

goes to cattleman who participated in the OQBN sale, to those contemplating future participation, and to industry professionals, such as bankers or veterinarians, who are interested in the benefits to producers.

This template could be useful to program administrators who need quick analysis of auction data on the value of different management practices or to individual livestock auction barns who conduct value-added sales and want a quick assessment of impact for producers who consign their cattle.

The template is easily modifiable to fit the specific data collected. Extension personnel could assist auction barn owners in learning how to use the benefits of this template.

Scope of Impact

This tool can be easily modified to analyze livestock market data in preconditioning programs by Extension personnel in states throughout the United States.

Publication

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