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Arizona Review

economic perspectives on Arizona's agriculture and natural resources

THE UNIVERSITY OF ARIZONA.

Paul Wilson

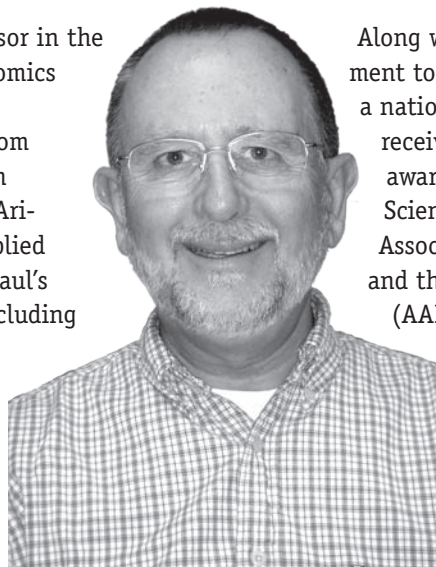
An Interview with a Distinguished Educator and Researcher

George Frisvold

In this issue, we interview Paul Wilson, professor in the Department of Agricultural and Resource Economics at the University of Arizona. Paul received his bachelor's degree in business administration from Arizona State University, his master's degree in agricultural economics from the University of Arizona, and his doctorate in agricultural and applied economics from the University of Minnesota. Paul's research publications are many and diverse, including publications in the top academic journals in agricultural economics and development economics and publications with a wide range of focal areas: irrigation management and technology, environmental policy, range management, rural appraisal, Arizona agribusiness, Mexican agriculture, western water policy, and international trade.

In 1992, he authored *An Economic Assessment of Central Arizona Project Agriculture* at the request of the Office of the Arizona Governor. In 2004, Paul with Gary Thompson (also of AREC) received honorable mention for the best article published in the *Review of Agricultural Economics*.

Paul's research focuses on the economics of irrigated agriculture, trust as a business asset, strategic investment decisions by agribusiness firms, and transboundary conflicts (such as water and dust) along the interface between rural and urban areas. These projects involve varying degrees of collaboration with agricultural engineers, biologists, agronomists, and animal scientists. Paul has also served as president of the Western Agricultural Economics Association as well as serving for more than a decade as faculty advisor for the University of Arizona Agribusiness Club.



Along with an active research program and commitment to university and professional service, Paul has a national reputation for teaching excellence. He has received numerous teaching awards, among them awards from the College of Agriculture and Life Sciences, the University of Arizona, the National Association of Colleges and Teachers of Agriculture, and the American Agricultural Economics Association (AAEA). In 2005, Paul received the AAEA Distinguished Teaching Award in the category of undergraduate teaching by faculty with more than 10 years of experience.

Paul and his wife, Ellen, have been married for thirty-one years. Both were raised in small, farming communities in Arizona. They have three children: Jessica, Jonathan, and Mark. Jessica is a graduate student in counseling and guidance at Denver Seminary and Jonathan is an information technology specialist at the UCLA medical school. Mark is a junior at the UA, majoring in classical guitar performance.

I visited with Paul recently to discuss his thoughts on university teaching and student learning.

Arizona Review. *As a former chairman and active member of the AAEA Teaching, Learning and Communication Section, you've devoted a lot of thought and effort to answering the question of what works in the classroom to stimulate student learning. So, what does work in the classroom?*

Wilson. What I think works best is when students don't know what is going to happen that day in class.

Arizona Review. *When they don't know?*

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Arizona Review

Economic Perspectives on
Arizona's Agriculture and
Natural Resources

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Editors George Frisvold
Russell Tronstad

Associate Editor Nancy Bannister

Layout and Design Nancy Bannister

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ArizonaReview
economic perspectives on Arizona's agriculture and natural resources

Welcome

to the seventh issue of the *Arizona Review*, highlighting AREC teaching activities of undergraduate and graduate students along with off-campus outreach programs. First, we interview AREC's Paul Wilson—recent winner of the American Agricultural Economics Association Distinguished Teaching Award—to get his insights about undergraduate education. Gary Thompson reports on two innovative AREC graduate courses conducted in collaboration with American Express and with Arizona Electric Power Cooperatives, Inc. Through these courses, AREC graduate students develop skills and gain practical experience in economic forecasting—skills and experience highly valued in today's increasingly sophisticated business world. Dean Lueck provides an update of Cardon Endowment activities. Among these are the new Program on Economics, Law and the Environment (ELE), a joint research and education initiative of the James E. Rogers College of Law and AREC.

AREC education programs reach well beyond the campus through statewide outreach programs. Russell Tronstad and Trent Teegerstrom report on three outreach activities to help Arizona producers with marketing and risk management. First, they discuss AGR-Lite, a new gross revenue insurance product targeting small- to medium-sized operations. They also report on a new website helping livestock producers improve ranch management. Finally, they announce a new website portal connecting direct farm marketers and producers to consumers.

Tauhid Rahman reports on ongoing research to develop "quality of life" measures for the state and individual counties in Arizona. We also announce the publication of *Arizona Water Policy* edited by AREC's Bonnie Colby and Katharine Jacobs, executive director of the Arizona Water Institute. Finally, Satheesh Aradhyula and Russell Tronstad update commodity production and price trends in the regular Arizona's Agricultural Situation column. We hope this issue of *Arizona Review* provides a good sense of the breadth and depth of AREC education programs.

—George Frisvold and Russell Tronstad
Department of Agricultural and Resource Economics
The University of Arizona


A Note on the Cardon Endowment

Last year I began what I want to be a tradition of updating our readers on the Bartley P. Cardon Endowment for Agricultural and Resource Economics. The Cardon Endowment was established in 1997 to honor Bartley “Bart” P. Cardon, former professor and dean of the College of Agriculture and Life Sciences (CALs). [Please see the *Arizona Review*, volume 3, issue 2, for a tribute to Cardon.] Cardon Endowment funds are used to support research in agricultural and resource economics by providing resources directly for research, by providing assistantships and scholarships to undergraduates and graduate students, and by bringing national and international scholars to visit the University of Arizona. Much of the research supported by the Cardon Endowment can be accessed from the Cardon Research Papers in Agricultural and Resource Economics, an online repository for scholarly research. The Endowment also supports academic outreach and Arizona’s agriculture through this newsletter, the *Arizona Review*, a publication providing economic perspectives on the state’s agriculture and natural resources; the Arizona Agribusiness Forum (in its 21st year); and many other activities and publications.

In 2006, the Endowment supported a wide variety of students, scholars, and projects. Student support includes Ph.D. students Carmen Carrion-Flores, Haimanti Bhattacharya, and Arnab Mitra, all working on topics that explore the link between agriculture, land use, and environmental policy; master’s students Sarah McDonald (working on the law and economics of conservation easements) and Li Zhu (working on the economic impact of state ‘Right to Farm Laws’). The Endowment also supported a visit from Dr. Roger Sedjo, senior fellow from Resources for the Future, who gave a seminar on “The Economics of Global Climate Change.” Dr. Sedjo also visited with students informally to share his insights into research and policy on climate change. Dr. Sedjo is among a select few who have served on the influential International Panel on Climate Change (IPCC).

The Cardon Endowment is also pleased to support the new Program on Economics, Law and the Environment (ELE). This is a joint research and education initiative

of the James E. Rogers College of Law (LAW) and the Department of Agricultural and Resource Economics (AREC). The new ELE Program—the first of its kind in the nation—will draw upon the combined environmental expertise currently exhibited by the faculties of AREC and the Rogers College of Law. This expertise encompasses nationally known scholars with specialties in water economics and water law; the economics of natural resources and the law of natural resources; land use economics and land use law; the economics of property and property law; and the law and economics of environmental regulation, biodiversity, sustainability, federalism, and risk management. The ELE Program will begin in the spring 2007 semester’s Economics, Law and the Environment Workshop at which internationally recognized scholars will present original research to faculty and interact with AREC and LAW students. In the future, the ELE Program intends to host an annual distinguished public lecture, and student fellowships, scholarships, and assistantships. In sum, its goal is to be a preeminent organization for economic and legal analyses of important agricultural-, environmental-, and resource-related problems.

As you can see, the Cardon Endowment provides vital intellectual and academic support to AREC, CALs, the University of Arizona, and Arizona’s agriculture, and it is greatly appreciated. 

—Dean Lueck

For More Information:

Cardon Research Papers in Agricultural and Resource Economics

ag.arizona.edu/arec/pubs/researchpapers.html

Arizona Review

ag.arizona.edu/arec/pubs/azreview.html

Arizona Agribusiness Forum

ag.arizona.edu/arec/dept/agbusforum2006.html

Economic Impacts from Agricultural Production in Arizona

ag.arizona.edu/arec/pubs/econimpacts.html

Dean Lueck is the Bartley P. Cardon Professor of Agricultural and Resource Economics. Professor Lueck joined the University of Arizona in 2004 and directs the resources of the Cardon Endowment.

Advanced Applied Econometrics Classes Tackle Real World Problems

Gary D. Thompson

garyt@ag.arizona.edu
Professor and Interim Department Head
Agricultural and Resource Economics
The University of Arizona

American Express and Applied Econometrics

How did three recent M.S. graduates find jobs in the summer of 2005 with American Express in New York City and Phoenix? Why would a Fortune 500 company with global operations like American Express be interested in Agricultural and Resource Economics (AREC) M.S. students from Arizona? The quick answer is that our students possess the econometric and business skills highly sought by large corporations these days. But how did AREC students at Arizona come by these skills? The answer requires telling a slightly longer story.

In 2002, Professor Gary Thompson began teaching a master's course titled Advanced Applied Econometrics. The course was developed around a collaborative relationship with Open Small Business Network (OSBN) of American Express in Phoenix. Students in the class worked on a real-world business problem posed by OSBN staff using OSBN's proprietary data. The class culminated with students making a formal business presentation to OSBN staff in Phoenix.

The class was so successful that every fall semester since, students in Professor Thompson's class have

continued to work on business problems posed by American Express personnel. The relationship has become important enough to American Express that they have given scholarship money for two M.S. students for the next two years.

Dr. Alan Ker, head of the Department, and Dr. Thompson initially approached American Express in 2001 about the idea of a class based around solving a real business problem. Ker, Thompson, and others in the Department, were in the process of developing an M.S. specialization in applied econometrics. The class with American Express would function as the capstone to the four courses required for the specialization.

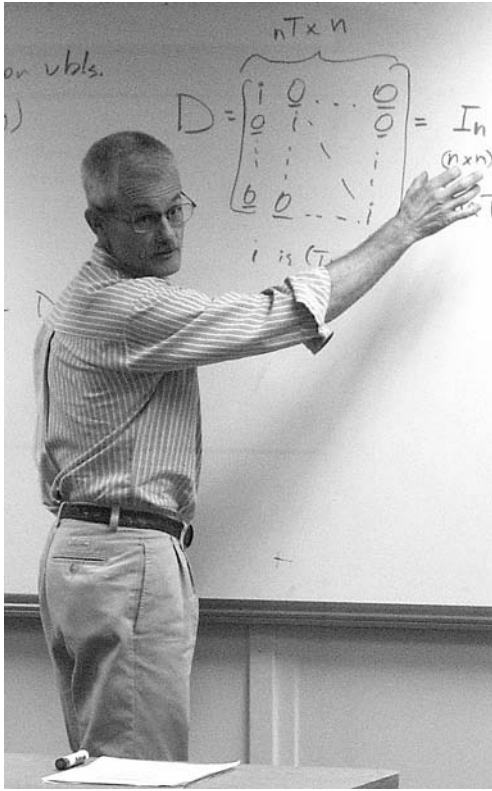
Chuck Lyon, an alumnus of the Department (M.S. 1988) at American Express, expressed willingness to experiment with the class. Surprisingly enough, American Express had hired nearly 100 Ph.D.s in agricultural economics and economics at that time. Lyon, who received his Ph.D. in applied economics at the University of Minnesota in 1993, landed his first post-doctorate job at American Express in Phoenix. Lyon currently holds the position of vice president, risk management/chief credit officer at American Express.

Maintaining close ties with alumni has paid rich dividends to master's students in the Department. Students have the opportunity to compete for prestigious scholarships, they gain real-world experience while still in school, and they become eminently employable on graduating. American Express staff get valuable outside perspectives on pressing business problems and can hire excellent prospects who require minimal training to become productive employees.

Arizona Electric Power Cooperatives, Inc. and Applied Econometrics

In the spring of 2005, representatives of Arizona Electric Power Cooperatives, Inc. (AEPCCO) met with several Agricultural and Resource Economics (AREC) faculty to discuss a project designed to improve AEPCCO's forecasts of electricity demand. AEPCCO is composed of seven electric cooperatives serving primarily rural areas in southwest Arizona and is a member of Touchstone Energy. When AEPCCO forecasts are too low, they must





After several intermediate meetings with AEPCO staff to follow up on questions and report preliminary results, the class culminated in a formal business presentation in December 2005 to AEPCO directors and staff in Benson.

Was the class project a success? AEPCO staff agreed the statistical model developed by the class usually predicted as well as or better than AEPCO forecasts. AREC statistical forecasts made three days ahead on Fridays of each week were generally more precise than AEPCO forecasts. Forecasting hourly demands when isolated weather events occur during the summer in the Sonoran Desert was the most challenging; both AEPCO and AREC have difficulty providing good forecasts when isolated storms appear suddenly.

For their part, students benefited immensely from working on a real-world problem with actual data. They learned the ins and outs of interacting professionally with AEPCO staff. Making a formal business presentation with a demanding deadline was a new experience for them as well. Last, students learned how seemingly abstract statistical and econometric techniques can be applied to solve real-world problems such as how to lower costs of providing electricity to rural Arizonans.



Gary D. Thompson conducts research on international trade, agribusiness, and consumer demand. His empirical studies range from the aggregate demand for imports to the retail demand for perishable food products such as bagged salads, organic milk, and fresh tomatoes. One common theme in these studies is applied econometrics.

purchase extra power, often at high prices on the spot market.

Professor Gary Thompson agreed to collaborate with Clifford Cathers, manager of corporate planning, Sierra Southwest Cooperative Services, Inc., the management arm of AEPCO, in designing a class project to improve forecasts. Both agreed that a class project in Thompson's Advanced Applied Econometrics course could serve as a forum for assessing alternative forecasting methods. As a result, in the fall semester of 2005, AREC master's students began to work on AEPCO's forecasting problem.

Mr. Cathers identified next-day hourly forecasts as the forecasts most in need of improvement.

The staff at AEPCO assembled twelve years of hourly electricity consumption figures—108,816 consecutive hours of electricity consumption!—from the seven electric cooperatives to be analyzed. Three M.S. students in Thompson's course "volunteered" to tackle the problem of improving day-ahead hourly forecasts.

The class project was designed to accomplish several important goals: provide useful results for AEPCO while permitting students to work on real-world problems. In the initial phase of the project, students met with AEPCO staff to learn more about the forecasting problem and why it was an important one for AEPCO. AEPCO staff conducted a tour of the Apache Station power generating station as well as the real-time electricity monitoring facilities in Benson.



Risk Management Education Activities

Russell Tronstad

tronstad@ag.arizona.edu
Professor and Extension Specialist
Agricultural and Resource Economics
The University of Arizona

Trent Teegerstrom

tteegers@ag.arizona.edu
Research Specialist
Agricultural and Resource Economics
The University of Arizona

AGR-Lite

On November 2, 2006, Agriculture Secretary Mike Johanns announced the expansion of Adjusted Gross Revenue-Lite (AGR-Lite) insurance to include Arizona and nine other states in the West for 2007. AGR-Lite is a federally subsidized insurance product for gross revenues of all agricultural commodities produced by a farm. AGR-Lite relies on a producer's five-year historical average of gross farm revenues as determined from the Schedule F tax form and the current year's farm plan. Similar to Actual Production History (APH) and Crop Revenue Coverage (CRC) federal crop insurance products, the government pays 48 percent, 55 percent, and 59 percent of the total premium for 80 percent, 75 percent, and 65 percent coverage levels. AGR-Lite differs from other insurance products in that gross revenue coverage can be provided for multiple commodities through one policy. If used jointly with other federal crop insurance products, the premium for AGR-Lite will be reduced because revenues obtained from other policies are included in gross revenue calculations for the tax year. Indemnity claims for AGR-Lite are settled after income taxes for the tax year insured are filed. Loss of revenue due to market fluctuations or to any unavoidable natural occurrences including, but

not limited to, production losses from adverse weather, fire, insects, disease, wildlife, or failure of irrigation water supply are covered. No payments will be made for losses due to negligence, mismanagement, crop abandonment, or similar causes. A commodity profile for the last two years of beginning inventories, if applicable, and the expected production and price are required to help minimize opportunities for individuals to take advantage of this insurance product.

AGR-Lite was first made available in Pennsylvania for 2003, where it was developed by their Department of Agriculture. In 2004 the product expanded to several other states in the Northeast and it was made available to four northwestern states including parts of Alaska in 2005. AGR-Lite is now available in 28 states. Initially, the product had a maximum coverage amount of \$250,000, but this limit was increased to \$1,000,000 in 2006. The product is likely to change more over time as better actuarial information becomes available.

For more information on AGR-Lite policies and forms, please see:

<http://www.rma.usda.gov/policies/>

To make AGR-Lite premium calculations (figure 1) for your county and enterprise of activities, please visit:

<http://www.rma.usda.gov/tools/premcalc.html>

To view a list of crop insurance agents or purchase a policy, please visit:

<http://www3.rma.usda.gov/apps/agents/>

We thank those that provided information this last summer to help set the initial crop risk ratings that are being used to calculate the initial premium rates. If you are interested in attending a workshop where AGR-Lite education is provided, please contact either Trent Teegerstrom (520-621-6245, tteegers@ag.arizona.edu) or Russell Tronstad (520-621-2425, tronstad@ag.arizona.edu).

Livestock Management (livestockrecords.arizona.edu)

Keeping detailed records on pasture rotations and what cattle numbers have been on a grazing allotment has

The screenshot shows the USDA Risk Management Agency (RMA) website. At the top, there is a navigation bar with links for Home, About RMA, Field Offices, News, Opportunities, Publications, Help, and Contact Us. Below the navigation bar is a search box labeled "Search RMA" and a "Go" button. To the left of the main content area is a "Browse by Subject" menu with categories like Actuarial Documents, Bulletins and Handbooks, Crop Policies, Data, Federal Crop Insurance Corporation, Laws and Regulations, Livestock, Pilot Programs, Reinsurance Agreements, State Profiles, and Tools and Calculators. The main content area is titled "Tools and Calculators" and features a "Premium Calculator" section. This section includes a description of the "Premium Calculation Online Tool" (covering 2000 and succeeding years) and "Premium Calculation Software for 1999" (downloadable version). It also provides instructions for downloading data and lists the disks included (Disk 1, Disk 2, Disk 3, Disk 4, Disk 5, Disk 6). A "Media Help" section provides instructions for viewing PDF files (requiring Adobe Acrobat Reader) and Flash files (requiring Macromedia Flash Player). At the bottom of the page, there is a footer with links for RMA Home, USDA.gov, Civil Rights, Report Fraud, Copyright Information, Jobs, Site Map, FOIA, Accessibility Statement, Privacy Policy, Non-Discrimination Statement, Information Quality, FirstGov, and White House.

Fig. 1 Premium Calculator at RMA Site

always been important for Arizona ranchers, given our dependence on public grazing. However, matters associated with animal disease outbreaks and the long-term goal of 48-hour traceback to all livestock and premises that have had direct contact with a disease of concern will require another level of record keeping. To assist ranchers with recording, storing, and retrieving this traceback information while improving their capacity to manage their ranch, we have developed a website with individual password-protected accounts. The URL is <http://livestockrecords.arizona.edu/> and we encourage individuals with livestock to request an online account here. The web interface and underlying database allow for the linkage of livestock events, financial transactions, and range-stocking activities through time. Specific livestock events for individual animals can be recorded. Livestock events have pull down menus to generate reports including vaccinations, tag number changes, body condition scores, animal weights, birth dates, and pregnancy test results. (See figure 2.)

After obtaining an account, ranchers enter baseline information for their ranches. This includes defining all pastures, livestock, equipment, and cash on hand for the ranch. Even though the target species for this website is cattle, flexibility exists so that other user-defined animals (e.g., sheep, goats, llamas, etc.) can be linked to specific expense and revenue categories. Flexibility also exists for a ranch to separate out registered and commercial livestock activities, if the rancher has this information, so that profitability of the two entities can be tracked. PFP (Planning for Profitability) is the acronym used to describe this tool since enhancing profitability while managing risk is a primary goal of this effort. Profits may be enhanced through identifying where costs are in excess or enhanced through obtaining a better market price.

Other features and uses are possible with the data entered on the site. Groups of livestock producers from a tribe or region can use the site to verify production practices and track genetic progeny. This will provide them a sound base to collectively market a more homogenous product using a common label than they would otherwise be able to do. Also, it will be possible to export financial transactions to Quicken so that records will not need to be entered more than once to take advantage of income tax software.

Key advantages of a database format on the web over a desktop system are that software updates to generate new reports are easier. Moreover, the web-oriented structure easily accommodates possible mandatory reporting of livestock movements to the U.S. Repository database. Because data confidentiality is an issue

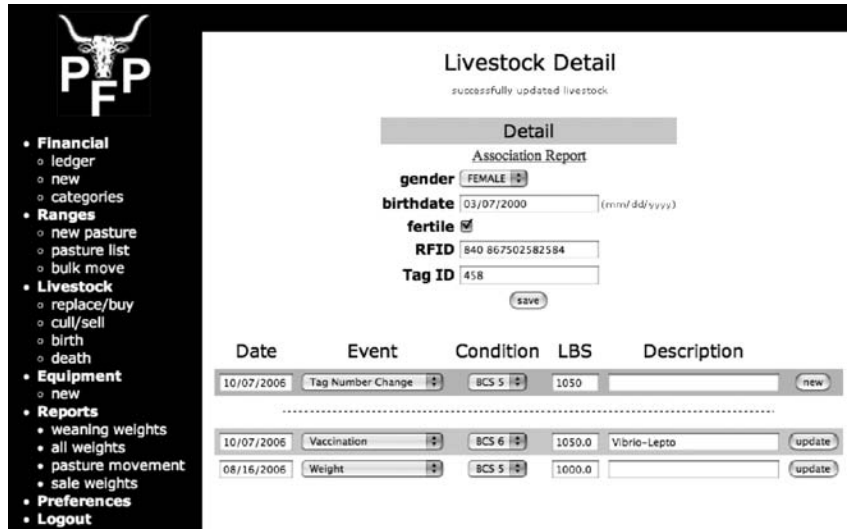


Fig. 2 Livestock Records Site Showing Specific Livestock Events for Individual Animals

of concern, for enhanced security, data records are encrypted like most online banking accounts when they are stored. However, the only information requested in obtaining an account is name, address, phone, fax, email, and any website the ranch may have.

The website was developed through a partnership with the Department of Agricultural and Resource Economics, College of Agriculture and Life Sciences, University of Arizona; Risk Management Agency; and Growing Business Solutions. Please contact the authors if you would like to receive additional information on obtaining an account or instruction on how to utilize this online tool for recording and managing livestock, finances, and range use.

Connecting Consumers with Direct Farm Marketers (www.dfntp.org)

Two growing segments of agriculture include large-scale farms focused on low-cost production of raw commodities and small- to mid-sized-scale niche producers concentrated on increasing price and improving market access by selling differentiated products. An expanding group of consumers with relatively high incomes fuel the latter segment; these customers are willing to pay for food attributes that support various cause/status issues. That is, food products have traditionally been differentiated through appearance (e.g., sight, touch, smell) and experience (e.g., taste, sweetness, flavor) attributes, but an increasing number of consumers are demanding extrasensory or credence attributes that cannot be discerned by consumer inspection or experience. Credence attributes may include where and how the product was grown (e.g., organic, pesticide free, no antibiotics), animal welfare, fair wages, environmental

friendliness of product, and even the conformation to religious beliefs (e.g., Kosher). Some consumers are willing to pay a premium for locally grown food products not just because they believe they are fresher, but because they also want to support their local economy and improve the environment by reducing pollution. In addition, many researchers believe that consumers have a greater desire to buy directly from a producer so they can hear firsthand how a product was produced and make their own judgments about food safety and environmental issues.


Although the growth of smaller-scale niche agriculture is difficult to measure, the growth in farmers' markets can stand in for growth that has been occurring for producers that sell directly to consumers. The U.S. Department of Agriculture has published a directory of farmers' markets every two years since 1994, and the number of markets has steadily increased from 1,755 in 1994 to 3,706 in 2004. This represents an annual growth rate of 7.7 percent. The *Nutrition Business Journal* estimates that organic foods sales were \$14 billion in 2005 or about 2.5 percent of total U.S. retail food sales. Although still relatively small, organic sales have grown about 20 percent annually since the mid-1990s and the journal expects they will grow to \$24.4 billion by 2010.

In spite of this rapid growth, it is still very difficult for small farms producing specialty items to obtain market visibility for select consumers that may wish to buy their food products. To direct consumers to these specialty-oriented producers, there is a newly launched website: the Direct Farm Marketing and Tourism Portal (<http://www.dfmp.org/>). Producers obtain their own password-protected account so that they can input their own crops, growing and harvest calendars for each food product, and any special events (e.g., pumpkin

festival) that may occur on their farm. In getting started, a producer inputs beginning, active, and ending harvest dates by clicking on boxes for weeks of the year when these events occur for each crop. These dates are then used for consumers to search for food products that are within a specified distance or "search buffer" of the zip code they enter. (See figure 3.) The site searches zip codes for the five southwestern states of Arizona, Colorado, Nevada, New Mexico, and Utah.

The website allows producers to have a presence on the web without needing to invest in the design and programming of their own website. If they wish, producers can also briefly describe their operation and have link to their own website.

Growing Business Solutions, with direction and input from the Department of Agricultural and Resource Economics at the University of Arizona, provide development and maintenance of the Direct Farm Marketing and Tourism Portal. Financial support for developing this site has been directly or indirectly provided by the Risk Management Agency (Outreach), University of Arizona Cooperative Extension, Western Center for Risk Management Education, and the Department of Agricultural and Resource Economics.

Instruction on using the website will be given at a Sustainable Ag and Direct Farm Marketing Conference on December 4 (9 AM to 3 PM) at Central Arizona College, Signal Peak Campus, Gloria R. Sheldon Room. Please contact Rick Gibson (gibsonrd@cals.arizona.edu, 520-836-5221, x 227) or the authors for more information on this event. Also feel free to contact us if you would like to receive additional information on obtaining an account or instruction on how to enter the crops and growing/harvest calendar information into this web portal. 

Russell Tronstad's research and extension activities focus on marketing, management, and policy issues germane to Arizona's production agriculture.

Trent Teegerstrom's work focuses around production economics for all commodities, with a special interest in agricultural labor, farm/ranch finance, new technology adoption, and risk management.

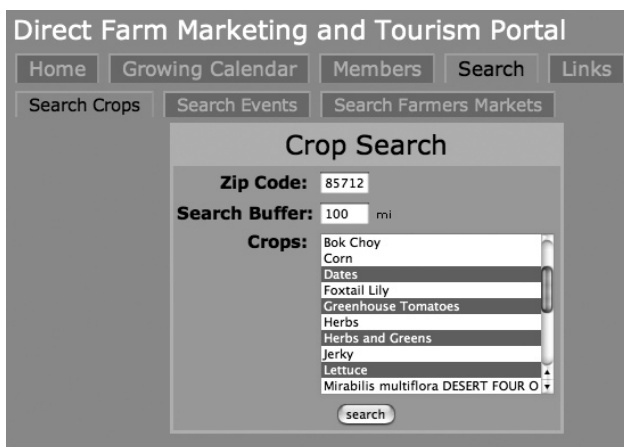


Fig. 2 Using the Crop Search Function of the Direct Farm Marketing and Tourism Site

Wilson. What I mean is that they don't know how material will be presented. From the syllabus, they know what subject or material will be covered, but they won't know how the material will be presented or exactly what they will be doing in class. I present material in different ways. One day it will be a straight lecture, another there'll be discussion, or I'll show a video clip or start by showing something off the Internet. I also have surprise, pop quizzes and team quizzes or exercises where the students work together. The students are more alert and ready to learn if they are off guard or off balance. I don't want them to be passive learners.

Arizona Review. *Some agricultural economists, like you, study teaching methods seriously to try to improve them, but they seem to be a rare breed. Why is that?*

Wilson. I don't know if I consider myself that rare. Looking around the country, I think our department is blessed with faculty who are very good teachers. I take all three responsibilities of the land-grant mission seriously, research, teaching, and outreach or extension. I've been inspired by teachers I have had, both good and bad, to do a better job. Rather than approaching it as improving teaching, I prefer to think of new ways to enhance student learning. That may sound like a semantic point, teaching versus learning, but it's really about what students learn. After a class I ask myself, "What did the students learn today?"

Arizona Review. *Introductory economics courses at public universities can have 800 to 1,000 students in one lecture. How do you engage students in large classes?*

Wilson. Well first, courses in our department aren't that big. My environmental management class

has 150 students, though. For large classes, you have to be somewhat of a performer. I have a cordless mike in the class and move around amongst the students. I use a variety of methods to present material. It keeps students curious about the material. Students value classes where professors are passionate about their research and what they teach.

Arizona Review. *Students come from such diverse backgrounds and levels of preparation. How do you motivate and provide opportunities for the stronger students?*

Wilson. In smaller classes, such as financial management, I give assignments that challenge the entire class, but only the stronger students will accept the challenge. A frustration in larger classes is that it is harder to find those students. But, students will come to me in office hours one-on-one and ask for more work or reading. Then I can give them more resources and references. Students in the Honors College at the U of A can develop Honors contracts with faculty. They get Honors credit for doing extra assignments of special research projects over and above the basic course requirements.

Arizona Review. *Next question, how do you keep weaker, or less-prepared students motivated and engaged?*

Wilson. It is easy for students who are less-prepared to get lost in the system. Students that become "lone rangers" who become isolated can run into trouble. I encourage students to come to office hours and I have an open door policy. I also do a lot of undergraduate advising. I also have a lot of exercises and opportunities in class where students work in teams. Students working in teams really bond and teach each other. Early on, students exchange emails and phone numbers and they can help each other. For a number of students what they

learn through teamwork means the difference between a failing and a passing grade.

Arizona Review. *You seem very positive about team assignments, but don't you run into problems with students not participating or pulling their weight?*

Wilson. I only have team exercises and quizzes in class. Out-of-class team assignments don't work because some students are too tempted to free-ride off others. Also, most of our students have off-campus jobs and find it nearly impossible to attend a team meeting outside of class. In class, though, team exercises work quite well. If a team member isn't contributing, his or her teammates shame them and they usually accept the challenge and step up and contribute. The team assignments are a small share of their grade. It is the final and larger assignments that really determine their final grade. Good students are penalized, but teamwork pulls up the performance of weaker students. The good students are also learning how to teach and to lead.

Too often, students are just passive listeners in college courses. In real life you have team projects or presentations or you have to work with others on committees. I think it is important for students to get experience at this. Often the students are better at explaining things to each other than I am. What really matters about an explanation is whether someone understands it.

I had one student that really took leadership of a team. She not only raised their test scores in team assignments, but throughout the semester, the team members' scores on individual assignments also improved. She really was instrumental in their learning.

Arizona Review. *There is a lot of new technology available in*



classrooms today. How useful do you think students find new technology-based teaching methods?

Wilson. Some of it is useful and some of it is not. I don't put lectures online because the more material online, the greater excuse not to come to class. Data and my own experience show students that don't come to class are not going to do well. I give pop quizzes in classes to give students more of an incentive to show up every day.

As I said, I do mix up media—some video, some PowerPoint, web-based material—along with more traditional presentations. But, I've had students complain that they get bored if a professor is just talking through PowerPoint presentations.

There are professors in our department who are absolutely wonderful teachers who use no more than a pen and dry erase board. That's harder to do, though, in large classes. A microphone helps moving around the class. I'm a firm believer that classroom space is important. There are some classrooms that are so long and narrow that you literally can't reach the students. So, I refuse to teach in them. If I'm assigned one of those, I request another room.

Once I had to be out of town, serving on a USDA committee, and taped a lecture. So the day of class the students got to see me appear on a large screen.

Arizona Review. *Like Fidel?*

Wilson. (laughing) Yes, like Fidel. On the tape, I'd ask questions and have been told that some of the more enthusiastic students occasionally raised their hands. But, one student said, "I liked the tapes, but they're not the same as an instructor." Another said that he was paying tuition to have a person, not a tape. Students want a committed, motivated, passionate individual in front of them.

Arizona Review. *Do you bring your research experiences into the classroom?*

Wilson. Yes, in different ways depending on the class. For mixed classes of majors and non-majors in our program I tell stories and give real-life examples. In more advanced courses, like financial management, we go through technical journal articles and formal case studies. Having an active research program improves your teaching. The University of Arizona emphasizes research. At other schools that don't focus as much on research, I think there's more of a danger of getting stale. If you're just teaching the same course over and over without new research to bring something fresh to the classroom, it's harder to keep students motivated.

Arizona Review. *Does it work the other way? Does teaching help you in other professional areas?*

Wilson. Well, you learn how to communicate to the general public better. But being a good teacher doesn't make you a good researcher. It's important to have an active research program and also to keep up with the latest research by colleagues in the field. That lets you bring more, new material into the classroom.

Arizona Review. *Do you try to introduce Arizona-specific issues in your courses?*

Wilson. I haven't really thought, how can I include Arizona examples? It just happens naturally because of my research interests. In risk management, we'll look at how Arizona businesses are organized. We'll look at water issues, irrigation, and the politics of the Colorado River Compact. Sometimes I bring current events into the classroom to start a discussion. I've found that students really remember a good story. Sometimes I include farming stories from my Ph.D. dissertation fieldwork when I was interviewing Minnesota farmers.

One thing I've discovered is that you have to keep the examples that you bring to class current. I'm getting older but the students stay the same age. You can't use examples from the 1980s. Anything prior to 1985 is before they were born. It's history. You can't refer to the OPEC oil embargo or double-digit inflation and assume students know or relate to what you're talking about. Most students don't remember *not* having a computer in their home! The examples you use in class have to slide with, I'm struggling for the word...

Arizona Review. Their period of reference?

Wilson. Yes, exactly, their period of reference.

Arizona Review. *Do you ever hear from former students? Are they using what they learned?*

Wilson. You know you've been here (the U of A) awhile when the kids of your former students are in your classes—the nieces, the nephew—the next generation. That's when you know you've reached "codgerhood" (laughs). A number of former students are now movers and shakers in Arizona in agriculture, in law, in water

management, in credit and lending. It's easier to keep in touch with the graduate students and the web makes it easier to keep in touch with international students. Something that was personally touching was just recently when a former graduate student brought his family in to meet me. He had graduated in the 1980s and is now a successful vice president at a bank working in the area of agricultural lending. But, he was visiting Arizona and he brought his family in to meet me.

Arizona Review. *It's more likely that parents of college students or soon-to-be college students will be reading this, but what would you say are habits of successful students?*

Wilson. This may sound obvious, but you have to come to class, you have to keep up with course reading. Young students, freshmen, sophomores are suddenly given all this freedom and they don't always know how to handle it. I do a lot of undergraduate advising and see students hurt by alcohol abuse and the party culture. Then you have the hard task of helping them salvage their college careers. As I said, I have an open door policy and I'm willing to work hard with

any student who is really making an effort. There are students who are less prepared for college and have a hard time of it. But they are willing to work hard and I'm always ready to help those students. Something less obvious is that students have to work with one another and teach one another.

Arizona Review. *What do you think students want from an instructor?*

Wilson. Students tell me that they appreciate the fact that I'm well-organized, that the course is well-organized. Many of our students have jobs, so they value their time. So, they want you to be organized. They want you to be passionate about what you're teaching.

Arizona Review. *Any last thoughts?*

Wilson. I'd say I truly enjoy teaching and advising college students. I'd like to work in a graduate course in development and international economics some day, but it's hard given time constraints. I have my multiple research projects ongoing and other university and professorial commitments. But, I'm always updating and re-designing my courses to improve student learning.

AR

Human Development in Arizona

Tauhidur Rahman

tauhid@ag.arizona.edu

Assistant Professor and Extension Specialist

Agricultural and Resource Economics

The University of Arizona

Decision makers use measures of well-being for (at least) five purposes. *First*, they use aggregate indices of economic activity to summarize the overall performance of an economy. *Second*, they may wish to compare conditions across different places. *Third*, well-being indices can be used to track changes in people's welfare over time. *Fourth*, well-being measures can be used to estimate the economic standard of living that an economy is capable of sustaining over the long run. *Finally*, well-being indices are used to evaluate alternative economic policies.

There is a general consensus that simple measures of income—such as per capita income—are inadequate measures of overall human well-being. Researchers and policy makers have increasingly felt the need for

a better measure of well-being. Since 1990, the United Nations Development Program (UNDP) has published an annual *Human Development Report* that compares the human development and progress of all countries. Many nations have followed the UNDP's lead and now publish their own country-specific annual human development reports. Human development is a multi-dimensional assessment of a people's overall well-being based on several socioeconomic indicators including income, literacy, health, access to safe drinking water, and gender issues.

In a similar spirit, I am currently working towards publishing a first-ever human development report for Arizona. The proposed Arizona report will highlight the state's progress and challenges in enhancing education, health, income, and rural and tribal livelihoods. It will also document development at the county level. This article reports on some preliminary analysis for this Arizona human development report.

Income Inequality Grows in the United States and Arizona

The most common measure that economists use to measure income inequality is the Gini Index, named after the Italian statistician Corrado Gini. The Gini Index is a number between 0 and 1. A "0" means perfect equality—everyone has the same income. A "1" means perfect inequality—one person has all the income. Inequality is greater if the Gini is 0.8 than if it is 0.4. Income inequality in the United States has been increasing since the mid-1960s, becoming more pronounced since the early 1990s (figure 1). In 1967, the richest 20 percent of households had 44 percent of the income, while the poorest 20 percent had 4 percent. By 2003, the richest 20 percent of households had 50 percent of the income, while the poorest had about 3 percent. Income inequality in Arizona has increased in step with this national trend.

Arizona's Income Growth Lags Behind

Even though income is an imperfect and incomplete indicator of human well-being, it is an important component of it. Figure 2 shows the trends in U.S. and Arizona per capita income, adjusted for inflation. Three points stand out. First, U.S. and Arizona per

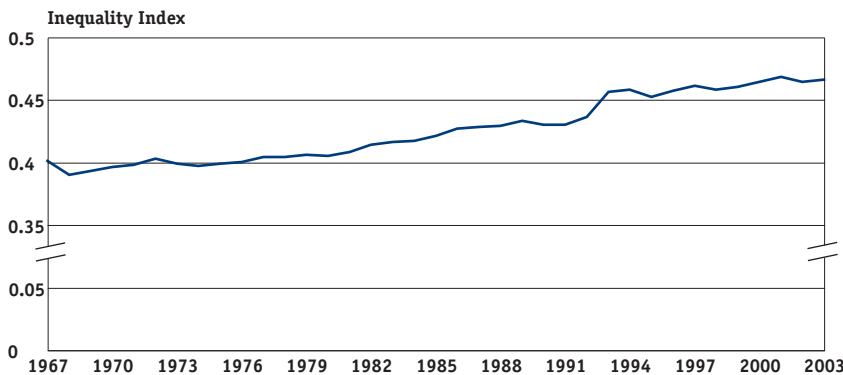


Fig. 1 Gini Index of Income Inequality in the United States

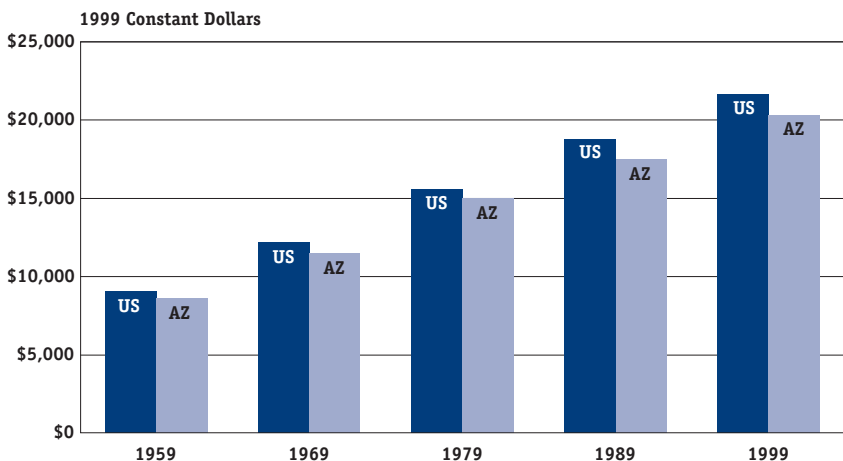


Fig. 2 U.S. and Arizona Per Capita Income (1999 Constant Dollars)

capita incomes have increased steadily. Second, Arizona per capita income is consistently lower than the U.S. average. Third, the gap between Arizona and the U.S. per capita income has increased over time. In 1959, the gap between per capita incomes of the United States and Arizona was \$418, but it had increased to \$1,312 by 1999 (figure 3). Arizona's per capita income growth has been falling behind the rest of the country's income growth.

Trend Indicators for Arizona

Trend indicators gauge the direction and magnitude of Arizona's economic development. Trend indicators can be divided into *performance indicators* and *development capacity indicators*. Performance indicators (table 1) focus on the state of the current economy or environment and include measures such as the unemployment rate, average annual pay, poverty rate, percentage of poor children without health insurance, homeownership rate, and total toxic releases per capita. Development capacity indicators (table 2) measure trends in factors important to future economic growth. These may include energy consumed from renewable sources, venture capital investment dollars per worker, heads of household with at least 12 years of education, population without primary health care (per 1,000 people), per worker private research and development (R&D) spending, and the average cost of electricity.

Table 1 shows that except for an increase in the unemployment rate from 2000 to 2004, Arizona's performance indicators have improved in recent years.

- Average annual pay (adjusting for inflation) increased by 14.9 percent from 1999 to 2003.
- The poverty rate decreased from 14.3 percent in 1999 to 13.5 percent in 2003.
- The share of children at or below 200 percent of the poverty line without health insurance fell significantly.
- The home ownership rate increased slightly.

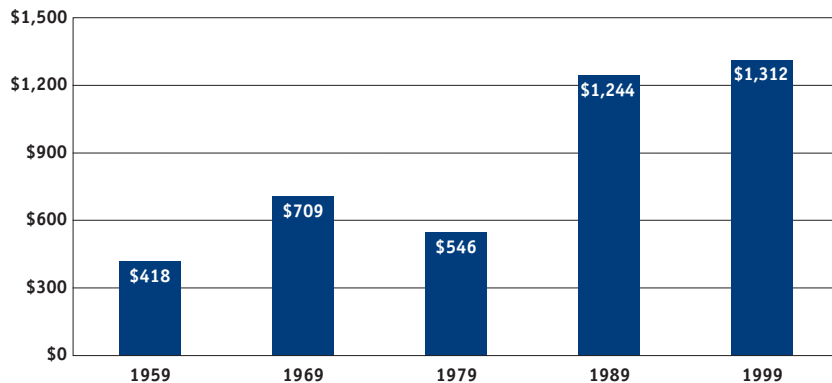


Fig. 3 The Gap Between Arizona and U.S. Per Capita Income Has Grown

- Total pounds of toxic substances released per capita fell 73 percent from 1998–2002.
 - Since 2004, the state unemployment rate has fallen below 5 percent, another indicator of stronger short-term economic performance.
 - The development capacity indicators tell a less positive story about Arizona's longer-term growth prospects (table 2).
 - Per worker venture capital investment fell from \$162 in 2000 to \$28.9 in 2003.
 - Household heads with at least 12 years of education decreased by 0.4 percent between 1998 and 2002.
 - The number of people without primary health care increased from 79 people per thousand people in 2001 to 138 per thousand by 2004.
 - Per worker private R&D decreased by 39 percent from 1999 to 2002.
 - The average cost of electricity increased by 6 percent from 1999 to 2004.
 - The state has increased its reliance on non-renewable energy and decreased reliance on renewable sources since 1997.
- Taken together, these numbers suggest that Arizona's capacity for future growth has deteriorated.

Table 1 Arizona Performance Indicators

Trend Indicator	1998	1999	2000	2001	2002	2003	2004
Unemployment Rate (%)			3.9	4.7	6.2	5.6	5.0
Average Annual Pay (US\$, in 2004 prices)		30,523	32,606	33,408	34,036	35,056	
Poverty Rate (%)		14.3	12.0	13.2	14.1	13.5	
Very Poor Children without Health Insurance (%)		37.3	29.7	27.8	26.4	26.9	
Homeownership Rate (%)			68.0	68.1	65.9	67	68.7
Total Toxic Release (pounds per capita)	224	186	144	114	60		

Source: Corporation for Enterprise Development, 2006

Table 2 Arizona Development Capacity Indicators

Trend Indicator	1997	1998	1999	2000	2001	2002	2003	2004
Venture Capital Investment Dollars <i>(per worker)</i>			108.3	162	52.1	16.3	28.9	
Heads of Household with at Least 12 Years of Education (%)		84.6		82.1	83.4	84.2		
Population without Primary Health Care <i>(per 1,000 population)</i>					79	61.7	136	138
Dollars of Private R&D Spending <i>(per worker)</i>			1,962	1,084	875	1,200		
Share of Energy Consumption from Renewable Sources (%)	13.1		9.5	8.7	7.1			
Average Cost of Electricity <i>(cents per kilowatt hour)</i>			7.2	7.3	7.3		7.2	7.6

Source: Corporation for Enterprise Development, 2006

Comparing Arizona Counties

Table 3 shows the trends in per capita incomes of Arizona counties using census data. What can we see from this table? First, all counties have experienced steady growth in per capita incomes. Second, Apache County has remained the poorest county in the state, while Maricopa County has remained the richest. Third, in 1959 Maricopa, Pima, and Yavapai were the only counties that had per capita incomes above the state average, but in 1999 only Maricopa had a per capita income above the state average. Finally, the income disparity between the richest and poorest county (Maricopa and Apache) has remained more or less same during the last 50 years (the ratio was 2.54 in 1959 and 2.47 in 1999).

Arizona County Age Profiles

Table 4 shows selected socioeconomic indicators of Arizona counties in 2000. The second column of the table shows the median age of the population. Half of a county's population is older than its median age, and the other half is younger. For example, half the population of Apache County is younger than 27 years old, while half the population of La Paz County is older than 46.8 years old. Counties with lower median ages tend to have relatively more children and have higher requirements for schooling and pediatric care. A growing median age is an indicator that a county's population is aging. The third column shows the proportion of population that is 65 years old or older, a more direct measure of the aging population. Population aging has many important socioeconomic and health consequences, including an increase in the old-age dependency ratio. It presents challenges for providing local public health services (and indicates vulnerability to the possible bankruptcy of Medicare and related programs) as well as for economic development (shrinking and aging of labor force, and possible

bankruptcy of social security systems). Currently, demographers consider a society relatively old when the fraction of the population aged 65 or over exceeds 8–10 percent. By this standard, most of the counties in Arizona are relatively old.

County Economic Differences

Over three-quarters of Arizona's population live in Maricopa or Pima counties. Maricopa County accounts for 60 percent of Arizona's population and Pima accounts for 16 percent. Because of this, overall state averages are quite close to the averages of the state's two major urban counties (table 4). This hides the fact that economic conditions in rural counties can be quite different from average state conditions or conditions

Table 3 Trends in Per Capita Income of Arizona Counties (US\$, in 1999 Prices)

	1959	1969	1979	1989	1999
United States	7,259	9,816	12,224	14,420	21,587
Arizona	6,922	9,243	11,800	13,461	20,275
Apache	2,967	4,035	5,593	5,399	8,986
Cochise	6,165	8,066	9,615	10,716	15,988
Coconino	5,796	7,569	9,436	10,580	17,139
Gila	5,670	7,358	9,235	10,297	16,315
Graham	5,341	6,039	7,747	8,955	12,139
Greenlee	5,745	9,099	11,004	9,794	15,814
La Paz	4,050	7,015	8,484	9,240	14,916
Maricopa	7,534	10,121	12,931	14,970	22,251
Mohave	6,628	9,627	11,182	11,933	16,788
Navajo	4,203	5,253	7,515	7,586	11,609
Pima	7,405	9,385	11,976	13,177	19,785
Pinal	5,011	6,962	8,903	9,228	16,025
Santa Cruz	6,098	7,314	9,127	9,007	13,278
Yavapai	6,985	8,161	10,808	12,657	19,727
Yuma	6,428	8,139	9,689	10,428	14,802

Table 4 Selected Socioeconomic Indicators of Arizona Counties, 2000

County	Median Age	Percentage of Population 65+ Years	Percentage of Adults with Less Than a Ninth Grade Education	Percentage of Population in the Labor Force	Unemployment Rate	Poverty Rate
Apache	27.0	8.3	18.8	46.1	10.1	37.8
Cochise	36.9	14.7	9.4	56.4	3.4	17.7
Coconino	29.6	7.0	7.0	68.6	4.8	18.2
Gila	42.3	19.8	6.4	50.1	4.8	17.4
Graham	30.9	11.9	8.8	49.3	5.7	23.0
Greenlee	33.6	9.9	6.3	60.0	3.8	9.9
La Paz	46.8	25.8	9.9	44.3	3.5	19.6
Maricopa	33.0	11.7	7.4	64.6	3.0	11.7
Mohave	42.9	20.5	5.0	52.8	3.7	13.9
Navajo	30.2	10.0	12.0	50.4	6.2	29.5
Pima	35.7	14.2	6.4	60.3	3.2	14.7
Pinal	37.1	16.2	10.6	47.9	3.9	16.9
Santa Cruz	31.8	10.7	20.4	52.4	4.0	24.5
Yavapai	44.5	10.3	4.6	52.7	2.7	11.9
Yuma	33.9	16.5	17.4	50.3	5.7	19.2
Arizona	34.2	13.0	7.8	61.1	3.4	13.9

in urban counties. For example, Santa Cruz County has the highest percentage of the adult population whose highest level of education was less than ninth grade (20.4%). This is nearly triple the state average. Apache County has the highest percentage of individuals below the poverty line (37.8%), again nearly triple the state average. Apache County also has the highest unemployment rate (10.1%), yet again about triple the state average. In contrast, Coconino has the highest rate of labor force participation at 68.6 percent. The percentage of population in the labor force measures the number of workers relative to dependents and the unemployed. Regions and countries with a large number of workers relative to dependents have historically experienced faster economic growth.

Summing Up

Arizona's income inequality has grown along with the U.S. average inequality, but growth in Arizona's per capita income has lagged behind the U.S. average.

Short-run indicators of Arizona's economic performance have improved in recent years, but measures of the state's longer-term development capacity are a cause for concern.

Looking at only state average measures of economic performance can give a biased picture of what is going on in Arizona's rural counties. **AR**

Tauhidur Rahman's research focuses on the topics of economic development, inequality, well-being, migration, and health economics. His extension work consists of delivering outreach education on quality of life, rural development, agri-tourism, and specialty agri-products to socially disadvantaged communities in Arizona.

New Book Available

Arizona Water Policy: Management Innovations in an Urbanizing, Arid Region

Bonnie G. Colby and Katharine L. Jacobs, Editors

RFF Press

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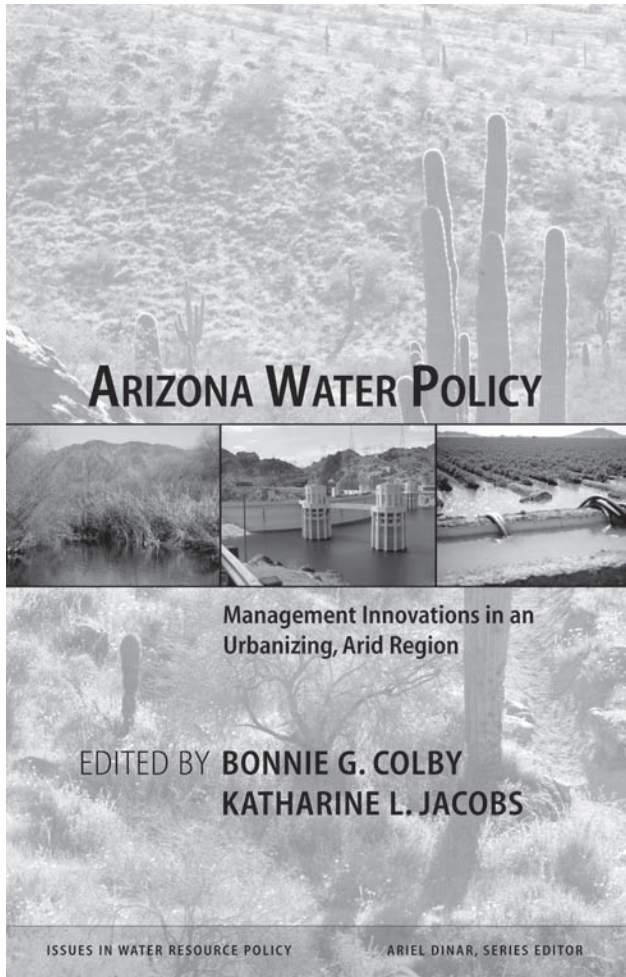
The central challenge encountered by Arizona and many other arid regions in the world is keeping a sustainable water supply in the face of rapid population growth and other competing demands. This book highlights new approaches that Arizona has pioneered for managing its water needs. The state has burgeoning urban areas, large agricultural regions, water-dependent habitats for endangered fish and wildlife, and a growing demand for water-based recreation. A multi-year drought and climate-related variability in water supply complicate the intense competition for water. Written by well-known Arizona water experts, the essays in the book address these issues from academic, professional, and policy perspectives that include economics, climatology, law, and engineering. Among the innovations explored in the book is Arizona's Groundwater Management Act. Arizona is not alone in its challenges. As one of the seven states in the Colorado River Basin that depend heavily on the river, Arizona must cooperate, and sometimes compete, with other state, tribal, and federal governments. One institution that furthers regional cooperation is the water bank, which encourages groundwater recharge of surplus surface water during wet years so that the water remains available during dry years. The Groundwater Management Act imposes conservation requirements and establishes planning and investment programs in renewable water supplies. The essays in *Arizona Water Policy* are carefully edited so they are accessible for a broad policy-oriented and nonacademic readership. The book explores Arizona's water management and extracts lessons that are important for arid and semi-arid areas worldwide.

Katharine L. Jacobs is the executive director of the Arizona Water Institute, a consortium of Arizona's three universities. She is also deputy director of the SAHRA NSF Center at the University of Arizona, and has more than 20 years of experience in water management with the Arizona Department of Water Resources. Her recent research includes the use of scientific information in policy and decision making.

Bonnie G. Colby is professor of agricultural and resource economics and hydrology and water resources at the University of Arizona; she specializes in the economics of water right negotiations and transactions, dry-year reliability, and water policy.

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"One of the most important lessons to emerge from the history related here is the ultimate importance of institutions and institutional arrangements in managing water resources. This lesson illustrates how the effectiveness of institutions outweighs in importance technological innovations in managing water scarcity."

—from the Foreword by Henry Vaux, Jr.

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Arizona's Agricultural Situation

Satheesh Aradhyula

satheesh@ag.arizona.edu

Associate Professor

Agricultural and Resource Economics

The University of Arizona

Russell Tronstad

tronstad@ag.arizona.edu

Professor and Extension Specialist

Agricultural and Resource Economics

The University of Arizona

According to USDA's latest forecast, 2006 U.S. cotton production is projected at 20.3 million bales, 15 percent below last season's record crop. Upland cotton production is estimated at 19.5 million bales, 3.7 million below production last season. Extra-long staple or Pima production, on the other hand, is forecast at a record 825,000 bales, an increase of about 200,000 bales over 2005. Arizona's Upland production is also expected to decrease in 2006—by about 5.7 percent over the previous season—while Pima production is estimated to increase from 7,000 to 13,000 bales.

Although more cotton acres were planted nationally and in Arizona than in recent seasons, poor crop conditions have led to lower crop production estimates for 2006.

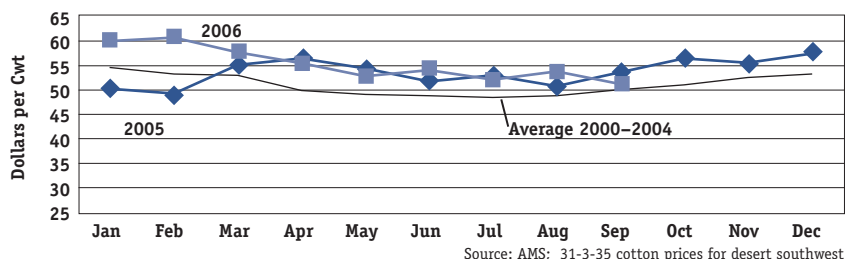
Despite a smaller U.S. cotton crop for 2006, USDA forecasts global cotton production to rise by about 1.3 million bales to 115.6 million bales. Remarkable yield surges for India's cotton and increases in Chinese production have contributed to larger global cotton production estimates for 2006.

The end of the Multifiber Arrangements (MFA) in 2005 may have boosted consumption of cotton products in the United States and Europe, since the MFA's quotas restricted cotton textile imports more stringently than imports of other fibers. In addition, rising urban incomes in Asia have expanded demand for cotton fabrics. As a result, world consumption of cotton is expected to continue to grow in 2006–2007, albeit at a slower rate than during the previous two years. USDA estimates world cotton consumption for 2006–2007 to be at 122 million bales—a 4.3 percent increase over last year and exceeding world production for the third time in a row. Continual declines in world cotton ending stocks are expected to eventually strengthen cotton prices.

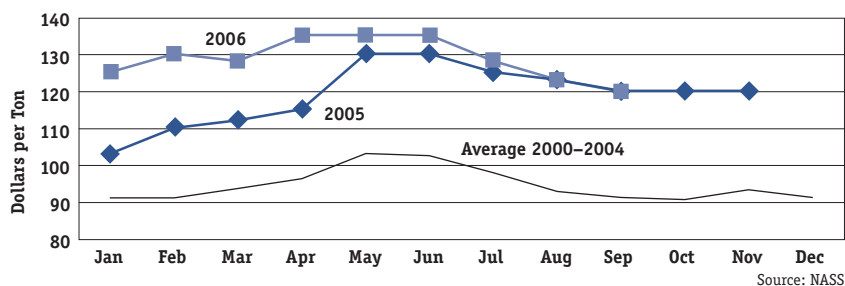
The area of alfalfa hay harvested in Arizona for 2006 is estimated at 250,000 acres, down 10,000 from 2005. This decrease in area harvested is somewhat offset by a small yield increase, resulting in only a modest decrease in production. According to Arizona Agricultural Statistical Service, Arizona farmers are expected to harvest 2.175 million tons of alfalfa hay in 2006—a 9,000 ton decrease from 2005. Alfalfa prices received by farmers in 2006 appear to be cooling off to last year's levels but are still significantly higher than 2000–2004 levels.

Demand for lemons is traditionally strongest during the summer months. As a result, grower prices for lemons are generally higher for the months of July–September and the 2006–2007 season appears to be no exception. Early indications are that lemon prices

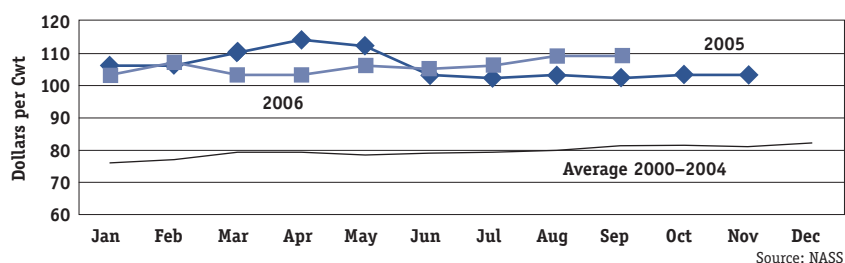
Arizona Upland Cotton Prices



Arizona Alfalfa Prices



Arizona Slaughter Steer and Heifer Prices



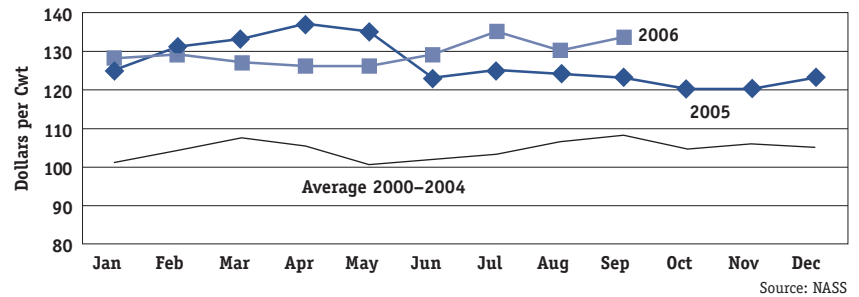
for the fall of 2006 will be among the highest in recent years. California lemon acreage has been slowly declining during the last several years. But new lemon acres were planted in 2005–2006 and the domestic supply for lemons should be in line with recent years' supplies.

Prices for feeder steers and heifers and calf prices have been running a solid 20 to 30 percent above their 2000–2004 five-year average. Cattle prices moved to higher levels this last summer than they were for the record levels set in 2005, even though beef production for August was 5 percent higher than last year's production. Arizona cattle on feed numbers for September are up 7 percent from last year. Beef exports are supporting the market with a 65 percent increase over the January to June period of 2005. Mexico is currently the largest importer of U.S. beef products, surpassing the next largest importer of Canada by a factor of four. Overall, the trade balance for U.S. beef has been negative with strong domestic demand for lean beef offsetting the gains seen in export volume. In 2005, only 2.8 percent of U.S. beef production was exported compared to 9.5 percent before BSE. Even though Japan is accepting beef of less than 20 months of age from the United States, exports to Japan are still essentially zero compared to pre-BSE levels. Exports to Japan for July 2006 were less than 1 million pounds versus a five-year average level of around 70 million pounds prior to BSE. Agriculture Secretary Mike Johanns recently announced that Mexico will resume trade of U.S. dairy heifers under 24 months of age. In 2003, the United States exported \$103 million worth of dairy heifers to Mexico.

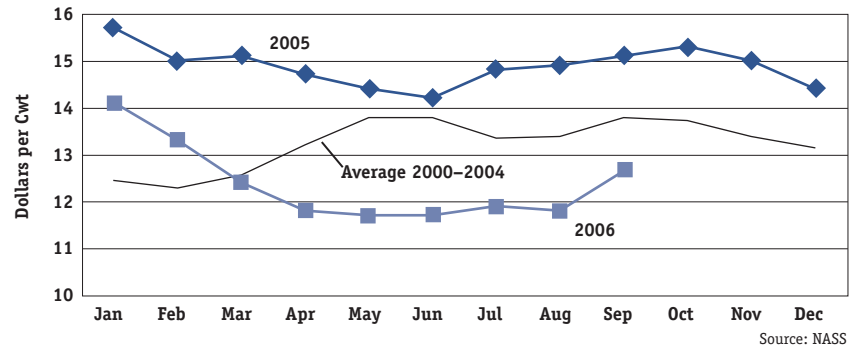
Drought conditions over much of the Great Plains region last year have forced many producers to drastically trim cow numbers. The increase in cull cow slaughter from the drought has also been the primary contributor to a 23 percent increase in frozen boneless beef stocks over last year. Poultry production is off almost 2 percent from last year and this has also helped support the beef market. Lingering effects of the drought have also caused ranchers to wean their calves sooner than otherwise. This early weaning increased feedlot placements for cattle weighing less than 600 pounds by 62.7 percent over last year. The increase in cattle on feed for these lighter weights strengthened the nearby Live Cattle Futures contracts but weakened the more distance contract months. On a positive note for cow-calf producers, the drought is expected to dampen the cow herd expansion that has been occurring the last two years as part of the rebuilding phase of the cattle cycle.

A couple loads of 800 pound "all natural" steers recently sold in Nebraska for a \$10 to \$15 per cwt.

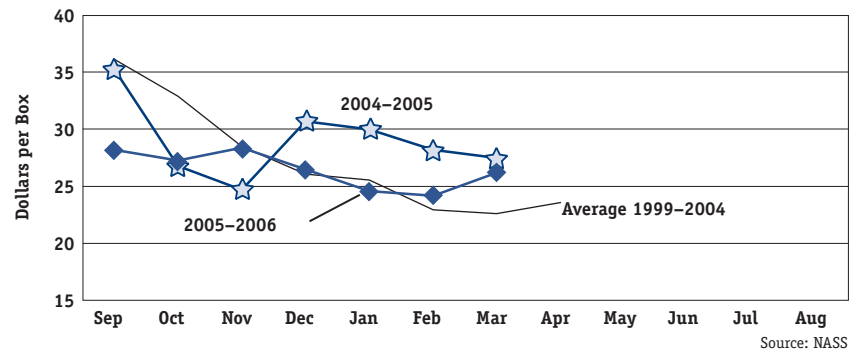
Arizona Calf Prices



Arizona Milk Prices



Arizona Lemon Prices



premium. While many feel that premiums for "all natural" don't exist in the beef industry, the premium can be quite substantial if the right buyer and seller can connect. Congress recently passed a bill to extend mandatory price reporting for cattle and beef for four more years with relatively minor changes to the original bill. If the trend towards more differentiated beef products continues (e.g., natural, organic, Certified Angus), determining market equilibrium prices will likely become more difficult in spite of mandatory price reporting. **AR**

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Agricultural and Resource Economics
PO Box 210023
University of Arizona
Tucson, AZ 85721-0023



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