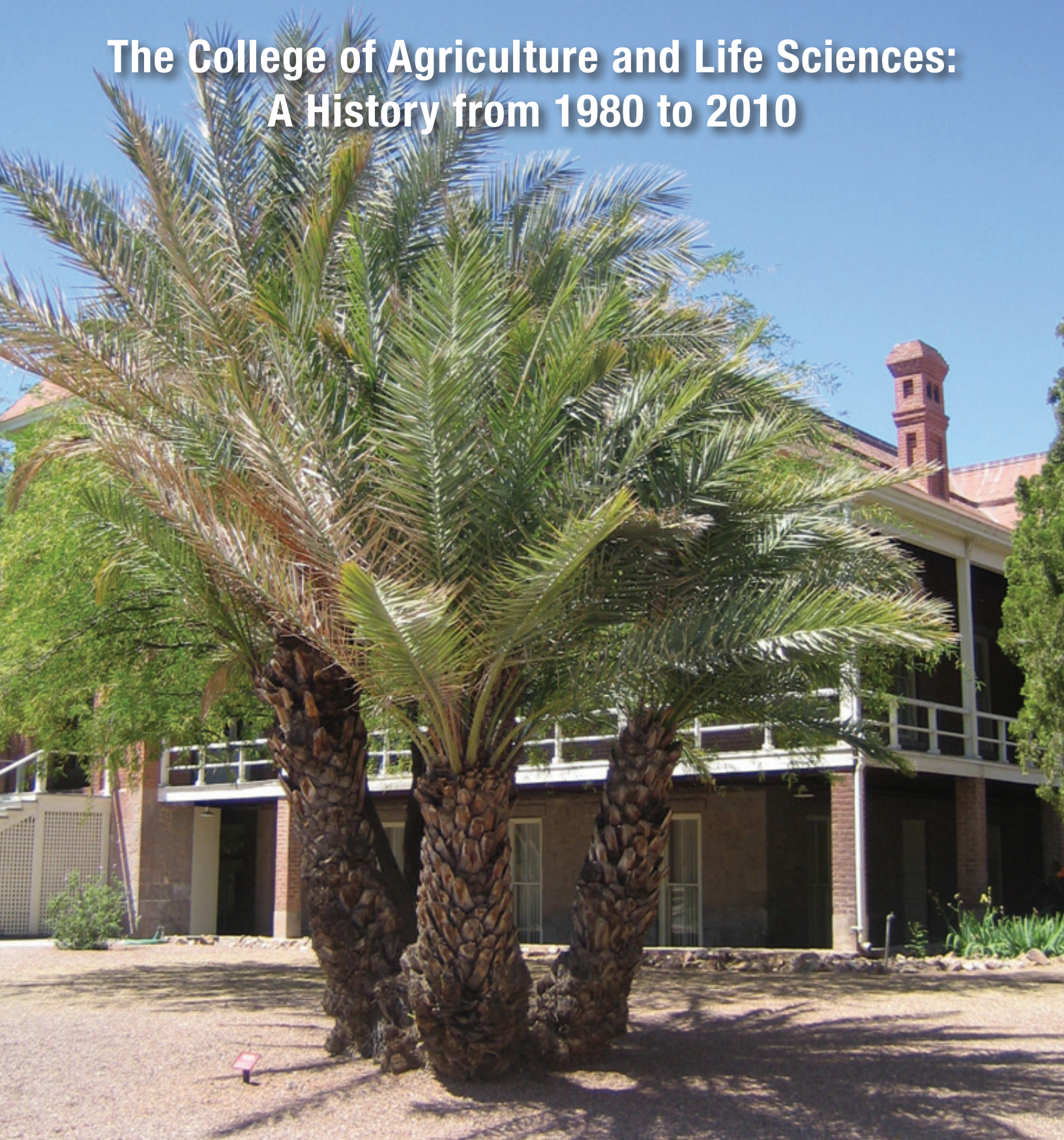


The College of Agriculture and Life Sciences: A History from 1980 to 2010



by Roger L. Caldwell, Professor Emeritus
College of Agriculture and Life Sciences, Tucson, Arizona 85721

The University of Arizona
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Roger L. Caldwell
Professor Emeritus

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College of Agriculture and Life Sciences
University of Arizona
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Table of Contents

Table of Contents, i

List of Figures, iv

List of Tables, iv

Foreword, v

Preface, vi

Highlights viii

Part 1. Introduction and Historic Context, 1

Chapter 1. Introduction, 2

Chapter 2. Historical Periods of the University and College, 12

Chapter 3. The Transition Years Explored, 15

Part 1. Summary, 17

Part 2. Caretaking, Stabilizing, Refocusing and Sustaining, 18

Chapter 4. Caretaking: Looking for a Dean 1978-1980, 19

Chapter 5. Stabilizing: Adapting to a New Era 1980-1987, 20

Chapter 6. Refocusing: Growing Under New Conditions 1987-1997, 22

Chapter 7. Sustaining: Preparing for an Uncertain Future 1997-2010, 24

Part 2. Summary, 25

Part 3. Organization, Planning and Focus, 26

Chapter 8. College Structure and Management, 27

Chapter 9. Providing Recognition, 30

Chapter 10. Views on New Directions Facing Universities, 32

Chapter 11. Planning and Focus, 38

Chapter 12. Politics, Innovations, and Disruptions, 45

Part 3. Summary, 49

Part 4. History Since 1980 from Various Perspectives, 50

Chapter 13. Perspective of Academic Departments and Schools, 51

Chapter 14. Perspective of Dean's Office, 91

Chapter 15. Perspective of Academic Programs, 95

Chapter 16. Perspective of Cooperative Extension, 99

Chapter 17. Perspective of Agricultural Experiment Station, 105
Chapter 18. Perspective of Administrative Services Office, 108
Chapter 19. Perspective of Development and Alumni Office, 112
Chapter 20. Perspective of International Programs, 114
Chapter 21. Perspective of Communications Activities, 118
Part 4. Summary, 124

Part 5. Personal Recollections and Case Histories, 125

Chapter 22. Ten Case Histories of Change, 126
Chapter 23. Developing the Maricopa Agricultural Center, 141
Chapter 24. Recollections of Faculty and Staff, 148
Chapter 25. Excerpts of Oral Histories, 162
Chapter 26. Excerpts From Alumni Newsletter Agri-News, 170
Part 5. Summary, 174

Part 6 Recurring Themes and Change, 175

Chapter 27. Identifying Recurring Themes, 176
Chapter 28. Reacting to Continually Changing Environments, 179
Part 6. Summary, 180

Part 7. Looking Backward and Forward, 181

Chapter 29. Looking Backward 60 Years, 182
Chapter 30. Looking Forward 30 Years, 184
Part 7. Summary, 186

Appendices 187

Appendix A. Key Events at a Glance 1950 – 2000, 188
Appendix B. Arizona Agricultural Trends, 189
Appendix C. University Research Funding Availability, 191
Appendix D. Trends of Societal Change Indicators, 192
Appendix E. Administrative Support Structure and Organization, 196
Appendix F. Units Representing College-wide Programs, 199
Appendix G. Facilities: Campus, Agricultural Centers, Counties, 201
Appendix H. Descriptions of Specialized Units, 204
Appendix I. Listing of Administrative Unit Directors or Heads, 209
Appendix J. Faculty and Staff Honors and Awards Recipients 1980-2010, 217
Appendix K. Endowed Chairs and Their Holders, 227
Appendix L. College Awards to Citizens, 228

Appendix M. Key Driving Forces - Clusters of Related Trends, 236

Appendix N. College Programmatic Focus 2010, 237

Appendix O. Overview of Academic Departmental Name Changes 1905-2010, 238

Appendix P. Faculty Memberships in Professional Associations, 239

Appendix Q. Faculty Involved in Preparing Leaders for Tomorrow, 245

Appendix R. Bart Cardon's Epilogue to First CALS History Report, 248

Acknowledgements, 249

References, 250

Further Reading, 252

First CALS History Book – 1885-1985, 252

Second CALS History, Magazine Format – 1980-2010, 252

References and Footnotes in this Book, 252

Index, 253

List of Figures

- Figure 1 Arizona Population Growth by Decade, 5
- Figure 2. Arizona's Growth Rate is Cyclical and Slowing, 5
- Figure 3. University of Arizona Bachelor Degree Trends, 6
- Figure 4. University of Arizona Graduate Degree Trends, 6
- Figure 5. University of Arizona Research Expenditures, 7
- Figure 6. Public Laws on Agriculture, 10
- Figure 7. Public Laws on Environment, 10
- Figure 8. Frequency of "Pollution" in Books 1900-2000, 11
- Figure 9. Frequency of "Molecular Biology" in Books 1900-2000, 11
- Figure 10. CALS Research Expenditures, 107
- Figure 11. Arizona Agricultural Trends: Wheat, 189
- Figure 12. Arizona Agricultural Trends: Cotton, 189
- Figure 13. Arizona Agricultural Trends: Hay, 190
- Figure 14. Arizona Agricultural Trends: Milk Cows, 190
- Figure 15. Arizona Agricultural Trends: Cattle and Calves, 190
- Figure 16. Percent Annual Growth for NSF R&D All Universities, 191
- Figure 17. Total R&D Expenditures All Universities, 191
- Figure 18. U.S. Public Law Trends for Agriculture, 192
- Figure 19. U.S. Public Law Trends for Environment, 192
- Figure 20. U.S. Public Law Trends on Public Health, 193
- Figure 21. U.S. Public Law Trends for Public Lands and Water Management, 193
- Figure 22. Frequency of Pollution in Books 1900-2000, 194
- Figure 23. Frequency of Molecular Biology in Books 1900-2000, 194
- Figure 24. Frequency of Learning in Books 1900-2000, 195
- Figure 25. Frequency of Agriculture in Books 1900-2000, 195

List of Tables

- Table 1. Representative Arizona Agricultural Yield Improvements, 8
- Table 2. Comparison of College Awards to Citizens from 1950 to 2010, 30
- Table 3. Award Categories for CALS Faculty and Staff, 31
- Table 4. Comparison of Departments and Schools Over a 60 Year Period, 51

Foreword

I have had the privilege of being involved in education and the evolution of the modern Arizona for many years. While cattle ranching was my initial occupation, I became a part of various groups relating to the future of Arizona. I acquired new perspectives, and new friends, from each of these groups, and ended up being the chairman or president of most of them. Examples include the University of Arizona Foundation, the Arizona Board of Regents, the Tucson Airport Authority, Tucson Medical Center, the Science Foundation of Arizona, the Southern Arizona Leadership Council, the former Tucson 30, and Arizona Town Hall.

Along the way I met Roger and I had also heard about some of his activities through other contacts. I learned that he had broad interests and was a unique faculty member. He has served in a variety of university positions and had a special understanding of how universities function, from the multiple perspectives of the various interest groups on campus. In addition, he was a member of a small group of people that assisted the Arizona Board of Regents in the late 1980s in a study to make all three Arizona universities more competitive, efficient, and with increased quality. He has also served on commissions and committees within Arizona going back to the late 1960s. After retirement he was approached to consider writing a history of the College of Agriculture and Life Sciences. I can relate to his variety of interests and knowledge as my own career has covered such a range of experiences.

Reading this book brought back a lot of memories – most of them pleasurable! There, indeed, has been a lot of change and there will be more change in the future. Learning how we navigated the past changes, and understanding why those changes occurred, is an important key to preparing ourselves for the future. This book takes this approach – giving the reader a sense of the past as history but also as a prelude for the future. For those readers who would like to know both the general history of the college, and to some extent the university, as well as the specific history of departments and other aspects of the colleges, this is the book for you.

This book is organized in ways that allow the reader to find specific sections of special interest, but it is not just a single history but also a series of histories, each from the perspective of different groups of people and of different aspects of university life. It reviews how the University of Arizona changed from a primarily teaching institution in the 1950s to a major research university by the 1980s, and how the College of Agricultural and Life Sciences had to refocus efforts as societal issues and science-based changes caused the college to modify its focus and approach to teaching, research, and extension activities. It also describes and clarifies the roles of various deans, presents “recollections” of various faculty and staff, and has some case histories of how specific departments or programs changed. The book ends by summarizing recurring themes, reviews the last 60 years, and comments on the relevance of these themes for navigating the next 30 years.

This book not only presents the history of the college but lists a good deal of reference material ranging from trend information that impacts the college to lists of awards and administrative leaders for campus departments and schools, agricultural centers, and cooperative extension county offices. For readers that have been involved in the college, I hope this book brings back memories for you as it did for me. For other readers, or future college members in leadership positions, you will find the book a worthy addition to your collection.

Fred T. Boice
Boice Financial Company
Tucson, Arizona
May 2011

Preface

The 30-year time period for this book covers a period of rapid change in the College and its audiences. The period included a series of new technologies, financial reductions, new programs and facilities, and reorganizations. It covers the period of two Deans but also provides context based on activities from the previous 30-year period; and it identifies some possibilities for the next 30-year period. To do this, the book overlaps five years with the first CALS history, which covered the years 1885 to 1985 and was published in 1985.

The book focuses on three aspects of the College history:

- A narrative summary identifying and discussing three major themes.
- A compilation of College information to serve as a reference manual.
- A snapshot of the 2010 organization and function.

The three themes are: Stabilizing, Refocusing, and Sustaining. Specific examples are given that explain these themes, but, unlike the first CALS history, the book does not focus on a compilation of a large number of college-specific projects or events.

The history of 1980-2010 is given from several perspectives: academic and administrative units, personal stories of faculty and staff, case histories, planning and college focus, and external conditions and budget. A few anecdotes about various aspects of the college are included. It is divided into seven parts, with a total of 30 chapters. Each part is preceded by an overview of the chapters within that part, and ends with a summary of that part. Each chapter begins with a very brief overview of material in that chapter.

- Parts 1-3 serve as an introduction and overview, presented in a story but also with supporting materials,
- Parts 4-5 focus on historical perspectives of administrative units and recollections of faculty and staff,
- Parts 6-7 summarize recurring themes, learning from the past, and anticipating the future.

In addition, there are descriptions of how a land-grant college of agriculture operates. It is more complex than the university itself and on a par with a college of medicine in its external interactions and its administrative structure, faculty roles, audiences, types of administrative reporting, and formal cooperative relationships with others institutions or groups.

The how and why of changes in the College focus on key events and decisions, the role of the university and events outside the university, and the results of actions taken, or not taken, in the previous 30 years (1950-1980). Overall, the book can be viewed as a “story” about the college’s past, punctuated with facts and recollections of the people, rather than a collection of the many specific things that were done in the areas of teaching, research, or extension.

The reference manual aspect is for anyone wanting particular details on people, organization, or specific actions during this 30-year period. Details include not only a look at how the college is organized, and has changed over time, but how each administrative unit changed and what each unit does today. In addition, types of awards are given and who received them, for faculty and staff as well as for Arizona citizens. The appendices list key changes by decade in the university, Arizona, and the country; names of leaders of all administrative units; and supporting information for some conclusions found throughout the book.

How to find what you are looking for:

- The Table of Contents lists the 30 individual Chapters, Appendices, Figures, and Tables. In addition, it lists the summaries for each of the seven parts.
- Chapters make reference to material in the Appendices when greater detail is needed.
- Some Chapters make reference to other Chapters for related topics.
- The index includes names of individuals except those that are listed as receiving an award (unless their name is listed for other reasons).

The book serves as a snapshot for 2010 so people in the future can have a detailed investigation into many aspects of the College at this time. Many details about an institution are lost over time and sometimes it is almost impossible to accurately reconstruct an accurate history. In some cases archival materials are inadequately indexed or several historic sources give different answers to the same question (this is particularly true of the older sources), but it also happens when people are asked to remember events that were long ago. There are also rumors that evolve from an initial (incorrect) entry that are repeated by others as fact. In these circumstances, I tried to use the answer that seemed most likely and had more than one source. A final source of error relates to the use of calendar year (January to December) vs Fiscal Year (July to June). Most often a single year indicates a calendar year, but not always. In some sections of this book fiscal year is used (and identified as such), but there may be some cases where a particular year is one off because of how the year was defined.

In some cases asking several people to comment on the same issue resulted in sufficient clarification for inclusion. A number of new College activities were developed in the late 1980s and early 1990s, such as awards given, endowments initiated, communication improved, faculty disciplines expanded, and new specializations or units created. Part of these changes were due to the times, part to changing technologies, and part to the people in leadership positions. The CALS history published in 1985 provides a good base for this history. That book and others are listed in a section “further reading” for those wishing more detail in certain areas of the College and the University of Arizona.

Information sources include College and University archives, the University Library Special Collections, Oral Histories through the Arizona Historical Society, personal interviews, departmental annual reports, departmental periodic reviews, newsletters, and a variety of books or articles about various aspects of the college or higher education. But it must also be said that some information was difficult to find or to confirm. The sections on departmental or school profiles and the roles of associate deans were reviewed by the unit heads, directors, or deans for completeness and accuracy. Despite this fact checking, some errors may have crept in, and for these I take responsibility and offer apologies.

Throughout this book the College of Agriculture and Life Sciences is often abbreviated as CALS or College and the University of Arizona is often abbreviated as UA or University. CALS is used as the college name regardless of time (before 2000 it was the College of Agriculture).

Many people contributed to information contained in this book, either by writing a section (their names are included in these cases), participating in interviews, or helping find specific information from hard to find sources. They are listed in Acknowledgements.

The book took about four years to complete. There were many interviews and literature reviews in the early period and initial conclusions were made and discussed with other people. New sources of information were found and integrated when important. Then the project was set aside for a while, and after a fresh look it was expanded and reorganized; this process was repeated two more times as new sections were prepared or reviewed by others. In the end, the delays allowed a clear mind to fully understand the most likely explanation of several parts where there were differences of opinion among the information sources.

The author, Roger L. Caldwell, received his PhD from the University of Arizona Department of Chemistry and was a post-doctoral fellow at the U.S. Food and Drug Administration working on aflatoxin formation. He joined the College of Agriculture in 1967 as an Assistant Professor of Plant Pathology. He moved to the Department of Soil, Water and Environmental Science in 1980, and retired as Professor Emeritus in 2003. In addition to his teaching and research responsibilities, he served as Director of the Council for Environmental Studies, Director of the Office of Educational Communications and Technologies, Special Assistant to two Deans and Special Assistant or Faculty Associate to two Provosts. He also served as the University Energy Coordinator in the late 1970s and as University Information Services Coordinator in the early 1980s, and was on loan to the Arizona Board of Regents for 18 months in 1987-88 relating to assessing the efficiency and effectiveness of the three Arizona universities. He was a Faculty Senator and served or chaired a number of University and College committees as well as worked with a number of state and local agencies and commissions, along with some private consulting. He taught courses in several disciplines and was active in interdisciplinary activities at the university.

Highlights

1. The Great Transition: Moving from the 1950s to the 1980s.

Significant strides in agricultural productivity occurred before 1950 but the easy things had been done. Communication was by radio, group or private meetings, and a variety of publications. Large numbers of students operating on the G.I. Bill increased university enrollments and the baby boom population had just started. This is contrasted to the 1980s, where improvements in agricultural productivity were well under way, communications had changed immensely with television initially and later electronic mail and the World Wide Web. Environmental concerns increased in the 1970s and the relative influence of agriculture declined. Universities also changed to deal with these changing times and changing audiences. The transition from the 1950s to the 1980s impacted the College of Agriculture and Life Sciences in unexpected ways. Briefly put, we waited too late to change, then we changed too rapidly, and we had trouble finding our way. Then we stabilized by working with both the earlier audiences and the newer audiences and had a greater emphasis on looking ahead.

2. Understanding New Ways of Working Together.

In the pre-1980s era we had taken much for granted and had good working relationships with students and other groups. But the students were changing, needs were changing, the techniques applicable to agriculture and other subjects within the college were changing, and we needed to adapt. New awards were designed for both faculty and staff and citizens. Development efforts for new methods of funding started. The potential role of some of the new technologies, both biological and communications, were being recognized. The need for involving our faculty and staff in the governance processes became more obvious.

3. Changes in Planning and Organizing.

The old way of planning could be described as a sheet of paper in the department head's desk drawer. It included ideas for new faculty or new equipment in case new funds became available. This was replaced by strategic directions that were developed by working with all administrators in the College and involving advisory groups of faculty and staff. The early times of having department heads serve up to 20 years gave way to shorter terms of office, with much more participatory management in their departments. There was more thought put into what might be needed in the future rather than focusing only on near-term issues. Many new linkages were formed among new types of units within the College and the University as a whole. Most of these focus on interdisciplinary activities, and they involve institutes (like the BIO5 Institute or the Institute of the Environment), schools, and informal groups. The types of faculty appointments have also changed to include joint appointments in several departments rather than just one. The College has more of these joint appointments than any other college at the University.

4. Much has changed Over the Last 30 Years. The Next 30 Years May Bring Even More Changes.

The students used to be mostly rural; now they're mostly urban. They used to be mostly male and now they're mostly female. They used to mostly go into agriculture and now they go into many fields. What started as domestic science has morphed into a restructured school focusing on retailing, and families and youths. Departments have changed names, other departments have come in, and some have gone. The new types of communications have changed the way we do almost everything. Travel in the 1950s was largely by bus or train and not airplane. The black-and-white televisions of the mid-1950s are now large-screen high-definition color. Electronic communication allows anyone to communicate to anyone else, anywhere in the world, instantly, and from anyplace. Some of these communication techniques are only a few years old and we don't know the full impacts they will have on how we teach, how we do our research, and how we interact with our clientele groups. The rate of change is accelerating, partly due to this increased communication capability and the results of new technologies in many of our subject area fields with the College.

Part 1.

Introduction and Historic Context

We cannot fully understand the last 30 years without reviewing previous 30-year periods. Going back 30 years before 1980 puts us just after World War II, before Richard Harvill became President of the University of Arizona and changed its course, and before Arizona began a long population growth period. Going back another 30-year period puts us at 1920, when much of the Arizona population was engaged in farming and mining, and much of that was done by hand labor. Finally, going back one more 30-year period brings us to 1890, just as the University was beginning its first research and teaching programs and before Arizona was a State (and about the time the first gasoline farm tractor was invented). Each period had its particular characteristics, and reviewing them allows us to better understand what happened in the 1980-2010 period. It also gives us some useful illustrations for the scale of past changes and how the next 30-year period might evolve.

Chapter 1. Introduction

Land-grant traditions and changes, Arizona growth trends, University of Arizona trends.
Changes in Arizona agriculture, cultural trends.

Chapter 2. Historical Period of the University and College

1985-1951 Early history of the University of Arizona.
1885-1951 Early history of the College of Agriculture and Life Sciences.
1951-1969 The traditional years began to change.

Chapter 3. The Transition Years Explored

A traditional dean retires and a transformative dean began.

Chapter 1.

Introduction

This is the second history written for the College of Agriculture and Life Sciences. The first, *College of Agriculture: A Century of Discovery*, was published in 1985, coinciding with the celebration of the University of Arizona Centennial (Haney, Gonzalez, & Paylore, 1985). The first history provided an excellent series of activities that occurred at various time periods during that first 100 years and included a number of photographs showing the contrast over the years. This second history provides major contrasts from the first University of Arizona employee in 1890 (in the Agricultural Experiment Station) to a college with agriculture at its core but expanded to address natural resources, environment, families, youth, and consumer interests. When this first history was written, the Phoenix area experimental farms had just been sold, the World Wide Web did not exist, and cell phones as we now know them were just becoming available. In 1984 the Arizona population had just passed the 3 million mark and in 2005, it passed the 6 million mark – a doubling in only 26 years.

In the years prior to 1980, there were 13 deans of the College, with only two serving more than 5 years (Paul Burgess, who was dean three times with 19 cumulative years) and Harold Myers at 17 years. Since 1980, there were two deans, serving 7 and 24 years. With Dean Cardon and Dean Sander the college has reported to five university presidents.

This second history begins in 1980 and therefore overlaps with the previous book by five years. This was done because of the way college deans came into office and because 1980 marked a turning point in communications technology with the development of the personal computer. Between 1976 and 2010, there were three deans, Darrel Metcalfe (3 years, counting acting), Bartley Cardon (7 years), and Eugene Sander (24 years). Each inherited a different type of college, in a different situation, with different personal histories and perspectives and therefore played a different role.

***A lot happened
in the past 30
years.***

A lot happened in the past 30 years. Using the World Wide Web (Web) or a cell phone has become a near daily routine for a significant majority

of the population. The College changed its name in 2000 from Agriculture to Agriculture and Life Sciences, reflecting its expanded role. The focus on home economics was transformed to youth and families and to retailing and merchandising. Fundamental research in many departments also shifted; while still involving near-term practical agricultural topics, there is a greater emphasis on molecular biology, new methods of pest control, natural resources, environment, and health.

Also changing in this past 30 years were new administrative units through mergers, dis-establishment or

establishment of schools or departments, shifts in Co-operative Extension Program areas, and acquiring units from elsewhere in the UA, such as the Office of Arid Lands Studies and the Environmental Research Laboratory. New methods were found for involving faculty and staff in both existing College activities and new directions. There were new avenues for rewarding both faculty and staff as well as Arizona citizens. Many of these changes originated in the external environment – changing needs of the agricultural community, increased perceptions of the public on areas of concern. But it also happened within the College research efforts, as a transformation occurred for our scientific tools and techniques and the faculty became more involved in interdisciplinary work. The distinctions between disciplines began to blur.

Both the College and the UA have become more integrated across disciplines and more focused on the interactions of how things work rather than approaching problems from the perspective of only one or two disciplines. A perspective by decades summarizes the amount of change:

- In the 1950s, Arizona began to change from agricultural to urban populations, the National Science Foundation was formed, the world's first satellite was launched by the Soviet Union (Sputnik), and Arizona reached one million population in 1955. Some high technology firms begin to locate in Arizona.
- In the 1960s, the UA began a greater emphasis on research after changing leadership in six departments.

- In the 1970s, the country undergoes significant shifts (culture, two energy embargoes, new environmental laws, and changes in regulations impacting agriculture). The College reacted to these changes with some successes and some failures.
- In the 1980s, The College made a number of changes on- and off-campus and in a number of leadership positions, while adapting to major new technological developments. The first endowed chair in the College was created (1986).
- In the 1990s, the Web arrived along with other new ways of communicating. The changes were difficult to anticipate in advance but they changed everything over the decade.
- In the 2000s, the College changed its name, funding variability continued, audiences changed, new “social media” programs arrived, and Arizona population reached six million (2005).

Land-Grant Traditions and Changes

The UA is a land-grant institution. The term land-grant comes from gifts (grants) of federal land to the state to provide funding for education. The Arizona Board of Regents (in 1891) had discovered that by taking advantage of the land-grant legislation they would receive funds to complete the first University building, Old Main. For practical purposes that meant there would be a focus on agriculture and include three areas: on-campus instruction, off-campus information, and research. There are three federal acts that are associated with land-grant universities.

These federal acts, as amended over time, caused the colleges of agriculture to have three divisions: the university campus, the agricultural experiment station, and cooperative extension, where “cooperative” indicates partial funding or other resources are provided by counties for local extension offices; counties also appoint an extension advisory board as required by Arizona state law. The federal government provides some funding, which is matched by the state, for the experiment station and cooperative extension.

The Association of Public and Land-Grant Universities established the Kellogg Commission (funded by the Kellogg Foundation) to address “the future of state and land-grant universities.” In 2000 the commission completed a report that served as a basis for discussion in the public and land-grant universities (Kellogg Commission, 2000). The commission recognized that both social and college cultures had changed

over time and concluded that we were living in a new age and a different world. The commission provided a series of recommendations, including the use of new terminology. For example, it suggested the old terms of teaching, research, and service, be replaced by learning, discovery, and engagement. This is the basis for the College’s use of these terms today. In 2006, John Byrne did an assessment of the impact of the Commission report and found five areas where it had had a significant influence on change (Byrne, 2006). These are: 1) engagement with society, 2) internationalization of the campus (including opportunities for overseas opportunities for students), 3) learning (new approaches), 4) undergraduate research opportunities, and 5) distance and lifelong learning.

The three major federal Acts that define a modern land-grant university are the Morrill Act (established the university), the Hatch Act (established the agricultural experiment station), and the Smith-Lever Act (established the cooperative extension service). The key portions of these acts are described below, and are the reason CALS is different from the other colleges.

The Morrill Act of 1862 (Section 4) commits the state (see original act¹):

- *“to the endowment, support, and maintenance of at least one college where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and mechanic arts, in such manner as the legislatures of the State may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life.”*

The Hatch Act of 1887 set up the Agricultural Experiment Station system with three purposes:

- *“to promote the efficient production, marketing, distribution, and utilization of products of the farm as essential to the health and welfare of our peoples,*
- *to promote a sound and prosperous agriculture and rural life as indispensable to the maintenance of maximum employment and national prosperity and security,*
- *to assure agriculture a position in research equal to that of industry.”*

¹ Cornell University Law School. Legal Information Institute. 7 U.S.C. 301 et seq., College Aid Land Appropriation (Morrill Act of 1862). This contains the original text of the Land-Grant Acts.

The Smith-Lever Act of 1914 established the Agricultural Extension Service (now Cooperative Extension):

- “to disseminate and encourage the application of useful and practical information relating to agricultural, home economics, and related subjects among the people of the United States not enrolled in land-grant colleges.”

Changes in Society, Science and Learning

Beginning with the post-World War II era there were major changes, particularly in science and related research that changed the courses of many universities. Before this period the major research efforts were done by a few well know universities. The first of these events was the publication of “*Science: The Endless Frontier*”, by Vannevar Bush, the Director of the federal Office of Scientific Research and Development during the war and a former dean at MIT (Bush, 1945). The book was written in response to a request by President Roosevelt on ways to continue scientific research during peace time. The result was the establishment of the National Science Foundation in 1950. The second event was the launch of the first space satellite (Sputnik) by Russia in 1957 and the rush for the United States to catch up. A third event was passage of the G.I. Bill (Adams, 2000), which increased college enrollments. Adams also noted the number of new colleges formed between 1900 and 1994 increased from about 20 per year until 1960, then jumped to over 70 per year in 1971, and then dropped to 10-20 per year, by the mid 1980s. The University of Arizona took advantage of these opportunities as they arose.

Geiger has a detailed assessment of what Presidents Harvill and Schaefer did right in this critical period and places those decisions in the context of what other universities faced (Geiger, 1993). Geiger further notes the University of Arizona benefited from funding on space activities in the 1950s, benefited from the “golden age of the 1960s” when the 24 leading research institutions began to lose their dominance, and it “survived the seventies” when the growth years slowed. He summarizes the Arizona situation as:

The University of Arizona in some ways might stand for many state institutions that slowly were transformed into research universities. It was well behind the others, however, in the postwar and Sputnik eras, but this relative backwardness turned into an advantage in the 1970s. In the aftermath of World War II the University of Arizona was a provincial outpost of sorts, one of many state land-grant colleges whose existence was still closely tied to the land. It was woefully underfunded by the state, and was gradually instituting 'reforms'

*that were taken for granted at other universities. On the eve of Sputnik, the university had just two doctoral programs in arts and sciences, and it conducted less than \$ 1 million of separately budgeted research. Thus it was in no position to be an immediate beneficiary of the burgeoning research economy. By the end of the post-Sputnik expansion, Arizona had advanced sufficiently to become a fledgling research university, but it ranked only 68th as a recipient of federal research dollars. By the end of the 1980s, however, Arizona had joined the top twenty performers of academic research— becoming ipso facto a major performer. In part this rise reflected some advantages of residing on a late-developing frontier, as well as a frontier-like pragmatism in the pursuit of academic advancement. On the other hand, the rise of Arizona also revealed some of the forces affecting university research in the 1970s. The same factors that have been identified in the advancement of other research universities— establishing centers of research excellence, academic leadership, and the availability of resources— were vital to Arizona as well. (from Roger L. Geiger, *Research and Relevant Knowledge: American Research Universities since World War II*, Oxford University Press, 1993. p 273).*

The Arizona Agricultural Experiment Station was the first unit at the University of Arizona and is an example of an “organized research unit.” The experiment station model is a forerunner of the types of centers of research excellence that Geiger discussed above².

Total organized research units exist in many universities and have as their focus the research enterprise. The first example at the University of Arizona was the Laboratory of Tree Ring Research, established in 1937 by A. E. Douglass³. In 1960 the director of the Laboratory was William McGinnies, until he became the director of the newly formed Office of Arid Lands Studies in 1964. In the following years there were a number of new organized research units.

A one-page summary of key events for each decade from the 1950s to the 2000s indicates the amount of change, particularly on recent years; see it in Appendix A. Examples are given for the College and the University as well as the society in general.

² See Chapter 17 for a more detailed discussion of how the Agricultural Experiment Station functions like an independent research unit.

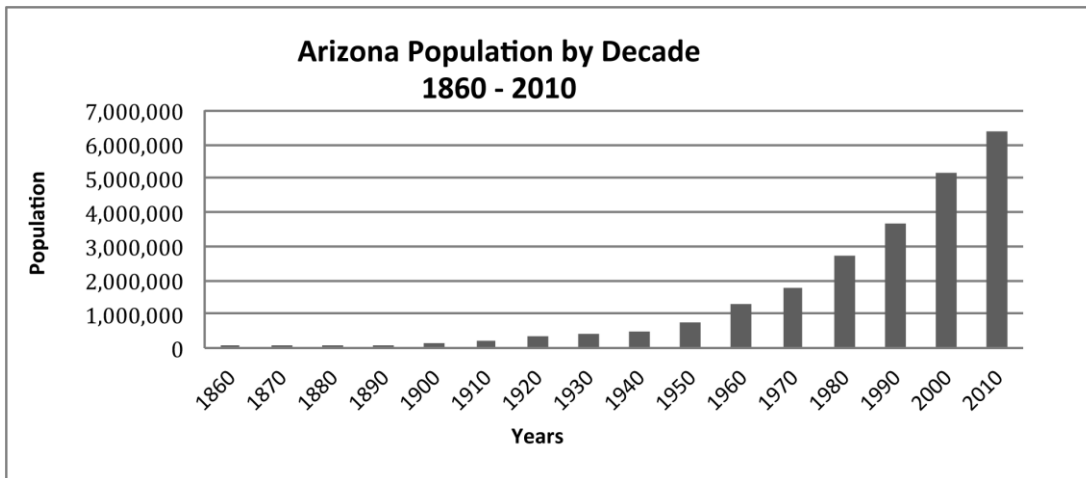
³ Douglass also started the UA Department of Astronomy and built Steward Observatory.

Arizona Growth Trends

After decades of vigorous growth, Arizona appears to be maturing as the growth rates are trending down, the actual population has been increasing more slowly, except for 2010, which shows a drop in population (see Figures 1 and 2).

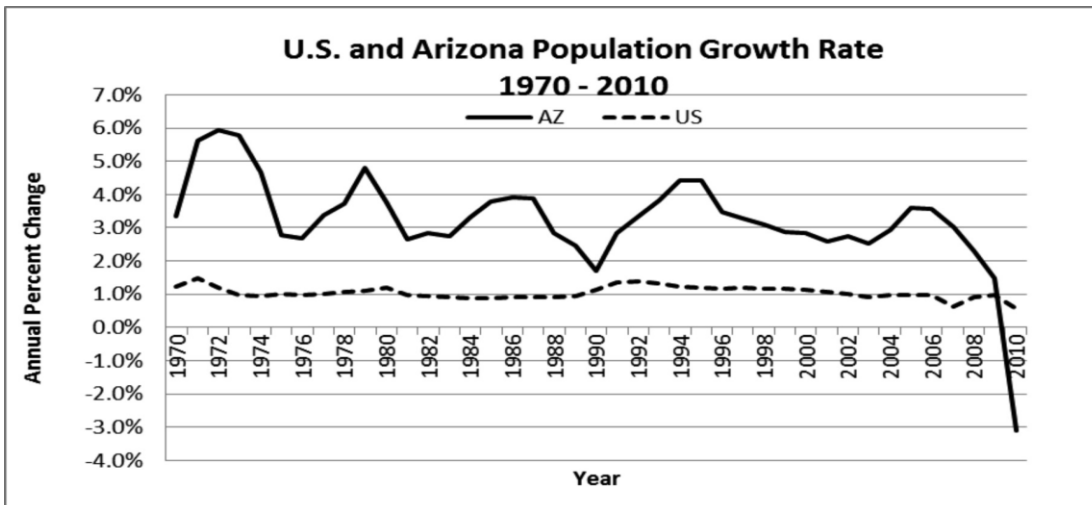
But, other changes are also occurring The audience for Cooperative Extension is becoming more urban, there is a growing interest in farmers markets and local food production, and urbanization continues to impact agricultural lands.

Figure 1 Arizona Population Growth by Decade



Source: U.S. Census Bureau

Figure 2. Arizona's Growth Rate is Cyclical and Slowing



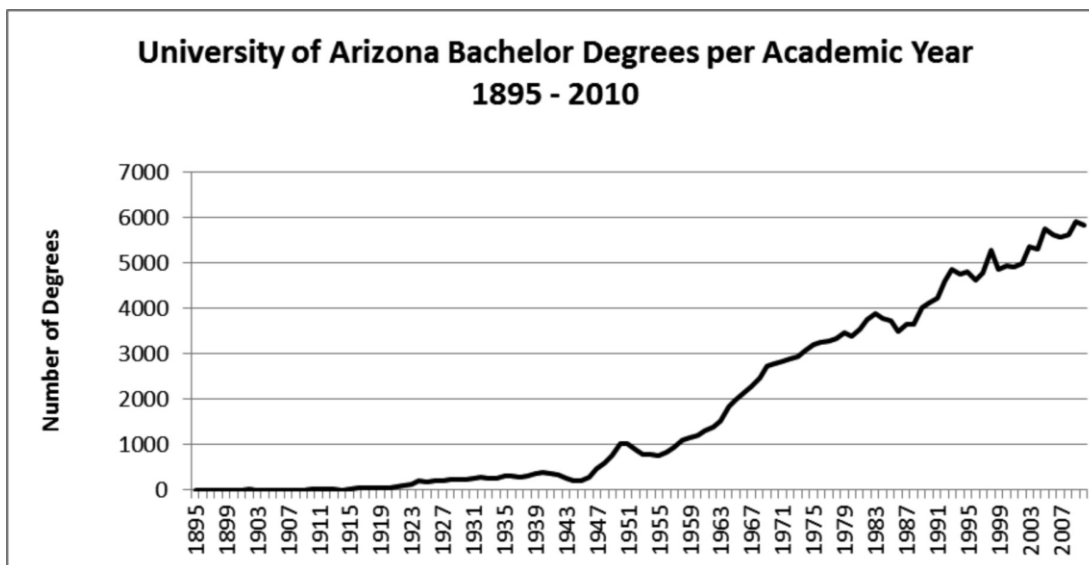
Source: U.S. Census Bureau

University of Arizona Trends

Figures 3-4 show the growth of the University of Arizona degree production. The increasing trend of bachelor's degrees is roughly parallel to the post-World War II population growth, and the dramatic rise in master's degrees reflects the impact of President Harvill's 1958 decision to expand the graduate program. Masters degrees grew rapidly and reached a leveling in the early 1970s. Doctoral degrees took

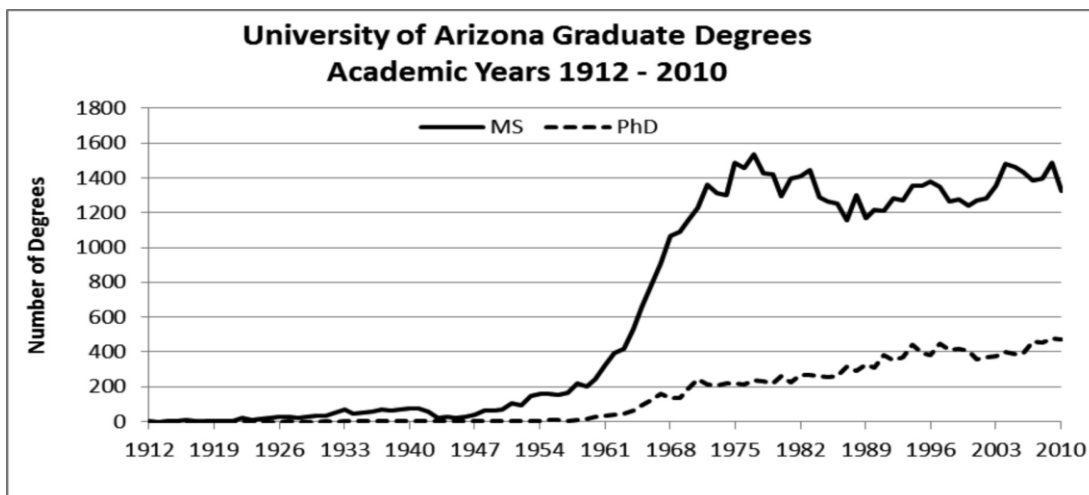
longer to begin the upturn but that growth continues today, as does overall enrollment. Figure 5 indicates that the UA research effort, when compared to all other universities is also leveling. These trends support the observation that Arizona was late getting research started, and that the UA had a teaching focus until the late 1950s, and then transitioned into a more balanced major research and teaching institution.

Figure 3. University of Arizona Bachelor Degree Trends



Source: UA Office of Institutional Research and Planning Support

Figure 4. University of Arizona Graduate Degree Trends

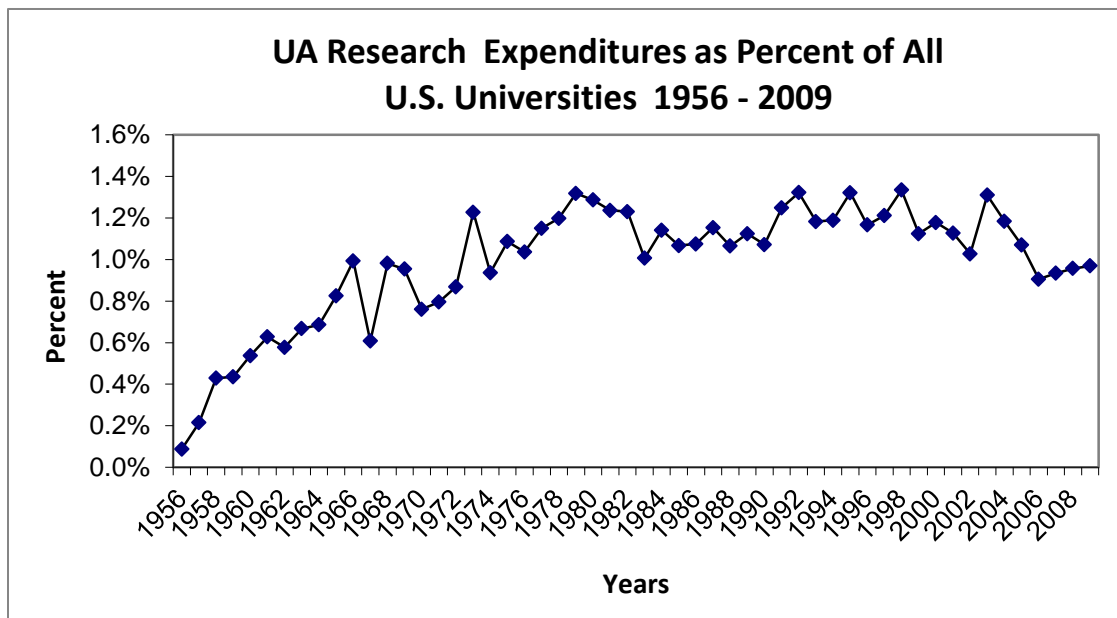


Source: UA Office of Institutional Research and Planning Support

The National Science Foundation (NSF) annually summarizes how much money each university spends as “R&D Expenditures.” These are the grants and contracts from government agencies (state, federal and local), industry, and gifts. They are reported as “expended” rather than the original amount of the gift or award so the grant is spread over the years it is available. Many universities aspire to be in the “top few”, and the competition keeps increasing as a result. Thus it is hard to just retain your ranking. One way of measuring this ranking is the percentage received by

each university compared to the amount received by all universities. If the trend is up, you are gaining on the other universities, if it is relatively flat, as in the UA case, you are working hard but holding your own (see Figure 5). Appendix C shows the total annual growth rate in NSF Research Expenditures for ALL universities. This is cyclical and has ranged from less than 5% to more than 20%. Per year Appendix C also shows the upward trend of total NSF funding for all universities, from 1953 to 2009.

Figure 5. University of Arizona Research Expenditures



Source: National Science Foundation and University of Arizona

Changes in Arizona Agriculture

In the 1950s Arizona began to change. Population increased following WWII, central air conditioning became affordable for many in 1957 as the Federal Housing Authority (FHA) began including the cost of central air conditioning as a part of home mortgages. The character of Arizona that had been described as the five C’s (Citrus, Cattle, Cotton, Copper, Climate) gave way to a more balanced economy. At that time there was still incomplete mechanization of agriculture, and water had not yet become the key factor it is today. In 1964 a U.S. Supreme Court decision required state legislative districts to be “roughly equal in population.” This “one person, one vote” decision, making the state senate composition based on population rather than county, meant that rural counties no

longer had a significant political advantage. The Civil Rights Act of 1964 outlawed major forms of discrimination.

In the 1970s there were new environmental laws, and water especially became more of an issue, culminating in the Arizona Groundwater Management Act of 1980. Also during that decade was the beginning of a shift with students and faculty increasingly having less farm or ranch experience. The 1980s were also transformational, with the arrival of desktop computers and urban populations impacting on the Maricopa County experimental farms. A new type of science, molecular biology, began to dominate some older approaches to the field of genetics. In the 1990s the first U.S. Department of Agriculture (USDA) deregulated cotton transgenic plant was released (insect resistance

via *Bacillus thuringiensis*, Bt), and in 1990 the Human Genome project began, producing a fully sequenced genome by 2003.

The long awaited Central Arizona Project became “substantially complete” in 1994. It delivers water to municipalities, agricultural irrigation districts, and Indian communities.

Agricultural productivity also changed. Yields increased through greater mechanization, greater nutrition and pest control, and improved irrigation and

new approaches such as genetically engineered plant and pest control methods. See Table 1 for yield comparisons for 1950, 1980, and 2010. Other agricultural yield trends are presented in Figures 13-17 (in Appendix B). Wheat production (quantity not yield) peaked in the 1970s, Cotton peaked in the 1950s and again in the late 1970s, cattle and calves peaked in the 1920s and again in the 1970s, and both hay production and milk cows increased over the last 40-50 years (due to the demand for milk and the productivity of herds).

Table 1. Representative Arizona Agricultural Yield Improvements

<i>Crop/Product</i>	<i>Units</i>	<i>1950</i>	<i>1980</i>	<i>2010</i>
Corn (Grain)	Bushels/Acre	15	100	210
Cotton	Pounds/Acre	825	1158	1460
Hay (All)	Tons/Acre	2.6	6.5	7.7
Milk	Pounds/Head	5,900	13,747	23,441
Sorghum	Bushels/Acre	44	80	120
Wheat	Bushels/Acre	25	80	112

Source: USDA National Agricultural Statistics Service (NASS)

Cultural Trends

A brief look at cultural trends is necessary to understand some of the external influences on CALS, particularly during the 1970s. Appendix A lists Key Events in each decade since 1950. These are given for both the university and the college and those occurring in the outside world. Examples from outside the university include:

- 1950s – National Science Foundation established, first transcontinental television broadcast, structure of DNA determined, U.S. Supreme Court rules racial segregation unconstitutional, first commercial jet plane, polio vaccine developed, first nuclear submarine launched (Nautilus), first artificial satellite (Sputnik).
- 1960s – First overhead projector, Peace Corps established, Civil Rights Act, first man walks on the moon, world population annual growth rate peaks, oral contraceptive pill approved by FDA, Civil Rights Act of 1964, Peace Corps established, world population annual growth rate peaks at 2.2%.
- 1970s – Arizona bans DDT and later the Environmental Protection Agency bans DDT, first use of the bar code, Sagebrush Brush Rebellion in western U.S., two oil embargos.
- 1980s – Arizona Groundwater Management Act, IBM personal computer, Southwest Indian Agricultural Association formed.
-
- 1990s - First graphics web browser, first USDA deregulated cotton transgenic plant, global positioning satellite made available for public use.
-
- 2000s – World Trade Center attacked, Human Genome completely sequenced, one billionth song purchased through Apple iTunes website, General Motors declares bankruptcy, first synthetic bacterial cell.

University of Arizona and College of Agriculture and Life Sciences Actions

- 1950s – First CALS International Project, Arizona provides first retirement option package for university employees, Kitt Peak National Observatory established, Harold Myers becomes CALS dean, Richard Harvill becomes president.
- 1960s – First CALS professors (3) focusing on molecular biology,
- 1970s – UA Interdisciplinary Programs Office established (in the 1950s CALS had interdepartmental committees), Gerald Stairs becomes dean, Darrel Metcalfe becomes CALS dean, John Schaefer becomes president.
- 1980s – Phoenix area farms close, Maricopa Agricultural Center established, Bart Cardon becomes dean, Eugene Sander becomes dean, Henry Koffler becomes president.
- 1990s – First CALS and UA websites established, first CALS endowed chair, Lundgren Center for Retailing established, Controlled Environment Agriculture Center established, Manuel Pacheco becomes president, Peter Likins becomes president.
- 2000s – College name change, BIO5 Institute established, Board of Regents creates Biomedical Initiative, Robert Shelton becomes UA president.

Figures 6-7 indicate the number of federal public laws by year for two subjects. Agriculture trends are down, with highs in the 1950s and 1960s and environment trends are up, with highs in the 1970s and 1980s. In Appendix D the two figures are repeated as Figures 18 and 19. In Appendix D Figures 20 and 21 show 1) laws on public health increased in the 1980s and then dropped; public laws for public lands and water have been dropping for decades. Congressional laws serve as an indicator of “national interest. Once a law exists, it sets in place a series of activities in a variety of institutions, including universities, and agency regulations are developed for implementing the laws, which then have further impacts.

Figure 6. Public Laws on Agriculture

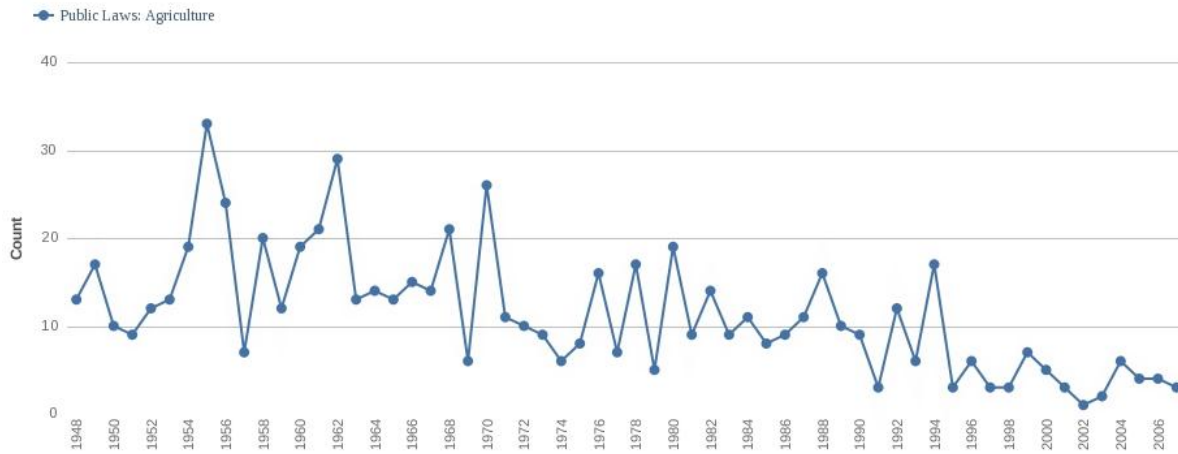
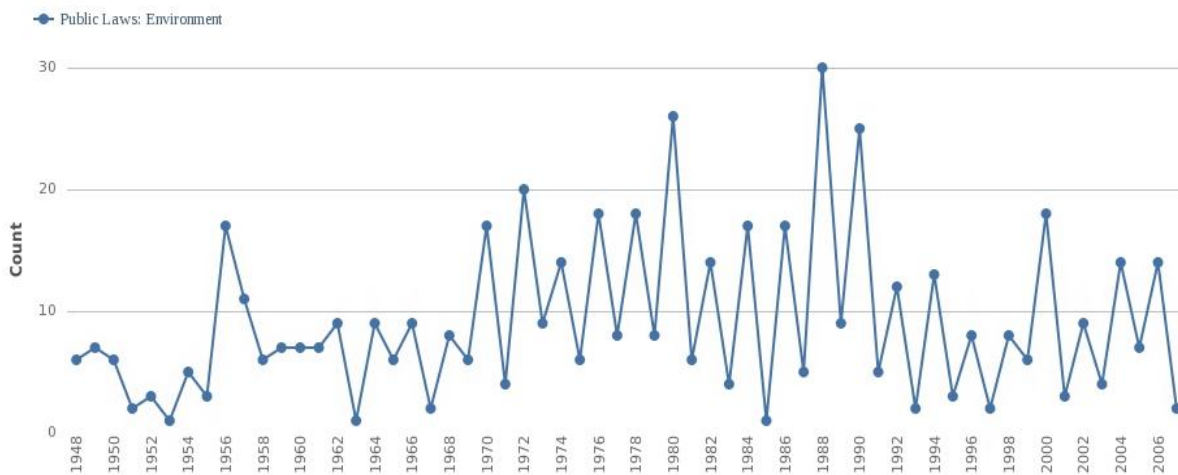


Figure 7. Public Laws on Environment



The frequency of different book subjects over time also provides information. Figures 8-9 below show the increase in pollution (starting to increase in the mid-1960s) and in molecular biology (starting to increase in the early 1960s). In Appendix D these figures are repeated as Figures 22-23 and Figures 24-25 indicate that books on learning are cyclic since about 1920 and books on agriculture peaked in the mid-1960s.

Figure 8. Frequency of "Pollution" in Books 1900-2000

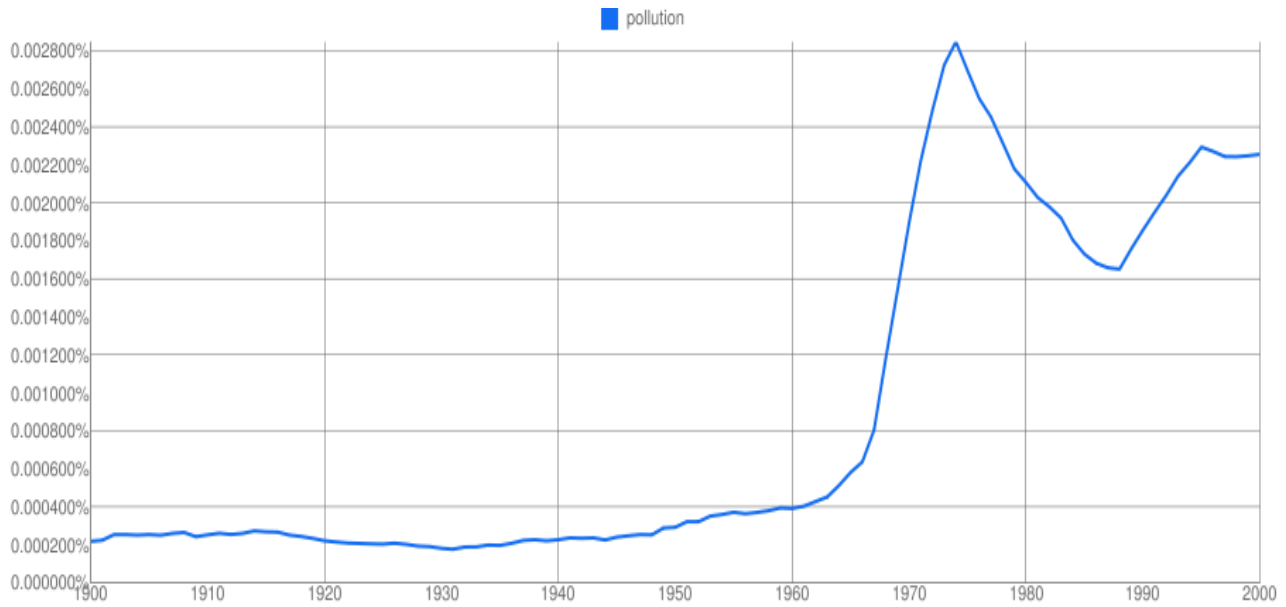
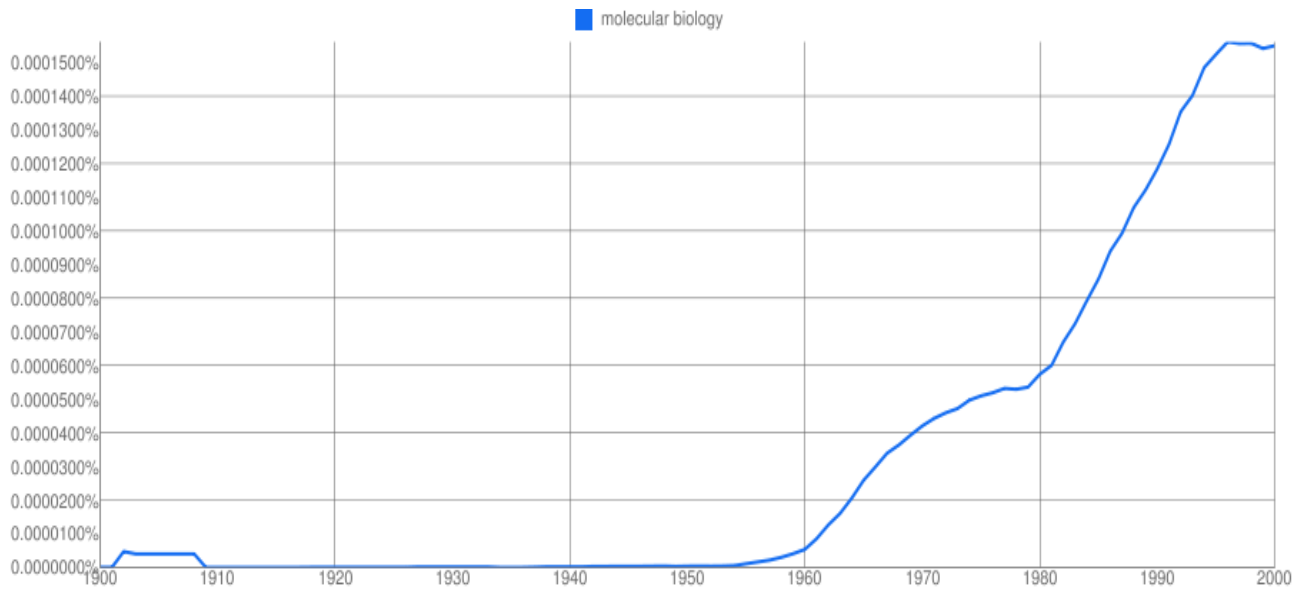


Figure 9. Frequency of "Molecular Biology" in Books 1900-2000



Chapter 2.

Historical Periods of the University and College

While there were many changes in this 60-plus year period for the college, there were many similarities to colleges of agriculture everywhere. Agricultural product yields increased, new crops were tested, and relevant information was disseminated. New departments were created, fundamental and practical research was performed and teaching approaches were generally unchanged.

1885-1951 Early History of the University of Arizona

The first administrative unit in the University was the Agricultural Experiment Station, and the College of Agriculture was the first academic unit (followed closely by the School of Mines). The University also included a Preparatory Department, the equivalent of a high school, as there were only two high schools in the state. While the University was formally established in 1885 (Rice, 1978), the first employee was not hired until 1890, when Frank Gulley became director of the Agricultural Experiment Station. He was technically the second director, because Regent Selim Franklin was identified as the first director to finalize approval to establish the Agricultural Experiment Station⁴ (Mitchell, 1985).

The following year Gulley became the first Dean of Agriculture, three years before the University got its first president, Theodore Comstock. Gulley had hired Comstock as the Director of the School of Mines, and the two of them later became opposing candidates to be the first president. When Comstock became president, he fired Gulley. After three short term directors, a chemist in the Experiment Station, Robert Forbes became the Director and the second Dean. Forbes obtained a reputation by his aggressive work schedule, range of interests, and by the fact he died in 1967 at age 100 (Colley, 1977). By 1915 the University had grown sufficiently that it underwent a major restructuring into the College of Agriculture; the College of Mines and Engineering; and the College of Letters,

Arts, and Sciences (which became the College of Liberal Arts in 1939). In 1915 the Preparatory Department also was dropped, and the College of Agriculture got its own building (now known as the Forbes Building). Prior to 1915 there were no departments, just program areas or divisions, so 1915 represents the first large-scale reorganization of the University. Phyllis Ball published a 100-year photographic history of the university for the 1985 centennial. It contains many photographs but also has the complete history of each building, with descriptions and dates (Ball, 1986). A history of the university's beginning was given by President Harvill in 1953, in a speech to the Newcomen Society in North America (Harvill, 1953) It is easy to be misled about the early history of the University, as each source has a different perspective or focus. For those readers that are interested in the early history, it is worthwhile reading more than one source; a good selection is the ones cited in this chapter. A list of 100 publications for the first 100 years is a good starting guide (Dickinson, 1985).

1885-1951: Early History of the College of Agriculture and Life Sciences

In 1910, the early courses in botany, biology, and chemistry were not taught in the College. In 1914 botany included plant pathology, landscape gardening, grazing, and biology included the herbarium for plants, insects and human skeletons.

The first departments within the University were established in 1915, with six in the College: Animal Husbandry, Agricultural Chemistry, Agronomy, Horticulture, Plant Breeding and Home Economics. By then, Agricultural Extension had become a unit within the College, forming the basic structure of today - teaching, research, and extension. By 1920 there were three more departments, Dairy Husbandry, Poultry Husbandry and Entomology. Agricultural Chemistry had become Agricultural Chemistry and Soils. Agricultural Education was taught in the School of Education. By 1925 two more departments were added, Irrigation Engineering and Plant Pathology. By 1930,

⁴ Care must be taken in understanding the early history of the University of Arizona. In some cases there are early rumors that have been repeated over time and referenced as fact. There are differences in facts within the early University Catalogs (also called the University Record), depending on which year you read. The best source for the very early events are two well researched summaries by Margaret Mitchel and by Virginia Rice (see Bibliography for citations).

Irrigation Engineering had become Agricultural Engineering, and two new departments were formed, Range Ecology, and Agricultural and Home Economics Education.

Over the next 25 years, departmental jurisdictions continued to be fluid as the field of academic agriculture developed rapidly. By 1935 the Department of Home Economics had become a School of Home Economics, and by 1940 two more departments were created, Agricultural Economics and Rural Sociology, and Animal Pathology. Agricultural Economics had previously been taught in the Department of Economics in the newly renamed College of Liberal Arts. There were three name changes by 1940: Agricultural and Home Economics Education had become Agricultural Education (the Home Economics part moved to the School of Home Economics), Entomology became Entomology and Economic Zoology, and Range Ecology became Botany and Range Ecology (the Botany portion had previously been housed in the College of Liberal Arts).

The mix-and-match continued. By 1950, Agricultural Education had become Agricultural and Agricultural Extension Education, Entomology and Economic Zoology had gone back to Entomology, and Agricultural Economics and Rural Sociology became Agricultural Economics. By 1955, Dairy Husbandry and Poultry Husbandry became Dairy Science and Poultry Science, respectively, and Agronomy became Agronomy and Range Management. Agricultural and Agricultural Extension Education reverted to an earlier name, Agricultural and Home Economics Education. Botany and Range Ecology became simply Botany.

1951-1969: The Traditional Years Began to Change



Richard Harvill, an economist, became president of the UA in 1951. He had joined the University in 1934 as an assistant professor and taught at other universities during the summers (for many, it was too hot to stay in Arizona before evaporative cooling became widespread). During the WW II years, he was the manager of

the Phoenix Office for the federal Office of Price Administration (OPA). The OPA set price controls on non-agricultural products and rationed consumer goods. In 1947 the Faculty Senate, at the request of President James McCormick⁵, began a study of the “Future of the University.” Harvill was elected by the faculty to represent the College of Business on this committee. He resigned from the committee after two years (it was a three year study) to become dean of the College of Liberal Arts, and two years later, in 1951, he was told (not asked) by the Board of Regents to assume the presidency of the University.

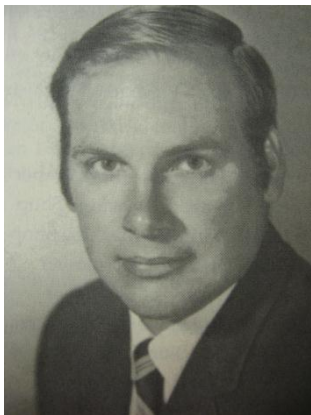
Richard Harvill was in a unique position. He was a respected and long-term faculty member, and he knew a lot of people in the Phoenix area. He had the support of the Board of Regents, and he had served on the first committee to assess the future of the University (completed in 1949). Harvill presided at a time when Arizona and the University were growing rapidly following WWII and the passage of the Servicemen’s Readjustment Act of 1944 (GI Bill for student education). Departments could hire faculty, and deans could hire department heads without having to set up faculty search committees; there were no affirmative action rules. He believed Arizona was ready for its only university to have graduate education; in fact, it needed it to grow and prosper (Arizona State University was renamed in 1958 from Arizona State College). Thus, Harvill in 1958 hired six new department heads in the sciences and engineering to form strong doctoral programs: Chemical Engineering (Don White), Chemistry (Henry Freiser), Civil Engineering (Gene Nordby), Mathematics (Harvey Cohn), Physics (Albert Weaver), and Psychology (Neil Bartlett)⁶. (Bartlett, 1984). Gene Nordby of Civil Engineering later went to Colorado, and returned to the College in 1986 as Department Head of Agricultural Engineering.

Under Harvill’s presidency, the following units were established: Institute of Atmospheric Physics (1954), Kitt Peak National Observatory (1958), Lunar

⁵ This was the first major planning effort by the UA. It was in great detail and included extensive data on current conditions. It is described in more detail in Chapter 11 – Planning and Focus.

⁶ Bartlett describes how President Harvill shifted the university focus to more graduate education when the new department heads were brought in to “move doctoral programs to reality.”

and Planetary Laboratory (1960), Optical Sciences Center (1964), Office of Arid Lands Studies (1964), College of Medicine (1967), and the Office of Graduate Interdisciplinary Programs (1971). In addition, he brought in retired senior faculty from other universities to work with departments (for example, Carl Marvel in chemistry) and sought advice of other senior faculty – Lawrence Clark Powell from UCLA for library development and Ruben Gustafson, a chemist and former president of the University of Chicago. Gustafson was hired to help with university operations but also taught the first televised chemistry course in the early 1960s. The impact of these years on the number of undergraduate and graduate degrees is dramatic (see Figures 3 and 4). In 1969 Pima Community College opened and had a slight downward effect on the enrollment growth (see Figure 3).



John Schaefer, a chemist, followed Harvill as president from 1971 to 1982. Schaefer had been dean of the College of Liberal Arts for less than two years. He changed the incumbents and titles of most individuals in senior administration, including promoting Albert Weaver to Provost for Academic Affairs (later Executive Vice President) and creating the position of Vice President for Research (Richard Kassander). Two of the first things President Schaefer did was to eliminate classes, and faculty and staff work hours, on Saturday mornings (8-12 noon) as well as ending public traffic on the Mall – very popular moves that raised the morale of the entire campus. Schaefer continued the transition efforts begun by Harvill, by hiring deans, in all disciplines, that were leaders and visionaries. He strengthened the promotion and tenure process for faculty and raised the quality requirements for hiring new faculty (including an interview with the president or executive vice president). When departmental faculty positions became available, he moved them into the president’s office for reallocation to deans and department heads that made the case for quality programs.

In 1978 Schaefer moved the UA from the Western Athletic Conference (WAC) to the Pacific Athletic Conference (which changed from PAC-8 to Pac-10).

This was done in concert with Arizona State University, as both ASU and UA were charter members of the WAC and both became charter members of the Pac-10. This was important for more than sports reasons, as people tend to associate the quality of a university with the company it keeps in sports. The PAC- 8 included California (Berkeley), UCLA, Stanford, USC, Washington, Washington State, Oregon, and Oregon State). During his tenure as president, the UA hired its first Nobel Prize-winning professor, Willis Lamb, in physics (1974). Schaefer was also responsible for developing a number of specialized units, including the Center for Creative Photography (1975) and the Arizona Research Laboratories (1979). Schaefer changed the mindset of the UA into a “can do” institution which was driven by programs that had merit and were quality oriented.

At 20 years Harvill was the longest-serving president, and Schaefer was the second longest-serving at 11 years. Together they transformed the University, each bringing special strengths that matched the challenges of their times. Harvill, with his excellent external connections and vision, was able to synchronize changes at the University to take advantage of the changes occurring in Arizona and in graduate education elsewhere. Schaefer, building on the strong academic base Harvill had created, strengthened the quality of the faculty and the reputation of the University. Harvill and Schaefer are the only two UA presidents selected from within the faculty, and both had been Dean of the College of Liberal.

Harvill was a “bridge” president from the old to the new, having the leadership role in each era. The major changes began to take place in 1958, and the president’s Annual Report for that year provides some details of the early part of the transition (Harvill, 1959). A book, reflecting from the perspective of 1990 and from the president’s wife, gives a flavor of traditions and conditions that are long gone. The book was written by Patricia Van Metre, a long-time university administrator, and 22 people that reflect on comments provided by Mrs George Harvill (Van Metre, 1990). The University and the times were very different in post-World War II 1950s and when the university was much smaller. Another historical perspective of the University was published by Jay Rochlin – *Race and Class on Campus* (Rochlin, 1997). It describes the prejudices that existed, by interviews with 45 people that ranged in age and entering college from 1925 to 1990. They also varied by race and by their experiences with the University and with Tucson.

Chapter 3. The Transition Years Explored

There was a significant change in the college, and in the state and country, from the 1950s to the 1970s. The 1950s era had a setting for everyone. Faculty dressed more formally, students had agricultural experience, grants were few and the National Science Foundation was just beginning. The university could be described as an average, regional, state university. The college probably stayed in this mode longer than appropriate. In the 1970s a new dean arrived, who was not an agriculturalist, made changes rapidly, and disrupted the faculty and staff as well as the college clientele. He also left rapidly as a result. But the transition from the 1950s to the 1970s was accomplished.



In 1956, Harold Myers, an agronomist, microbiologist, and soil scientist, became dean of the College of Agriculture. Dean Myers was known for his quick physical movements. When being introduced for a speech, he would sprint to the podium, talk, and return, at a sprint, to his chair. He

was also known to pop into a faculty member's office unexpectedly late Saturday morning "to say hello" (while faculty and staff still had required Saturday work hours). He followed the common UA practice at that time of allowing department heads to pick their faculty and to do most of the planning. He was from Iowa State University and hired a lot of people from Iowa State – the Director of Resident Instruction (now Academic Programs) and the Director of the Experiment Station had both been administrators at Iowa State. Rumor has it that he hired so many faculty from Iowa State that President Harvill had to tell him to halt the practice.

Myers remained in close contact with the agricultural industry and made special efforts to have the College represented at appropriate meetings around the state. This was his way of keeping aware of agricultural issues as well as creating visibility for the College throughout the state. He was a good delegator and much of the daily operation of the College was handled through the three directors of Resident Instruction, the Agricultural Experiment Station, and Cooperative Extension. As early indicators of environmental issues became evident, Myers set up appropriate committees to identify how the College should re-

spond. Then as now, the appropriate response was one that would be both effective and practical.

The problem was that these issues were new, and in many cases the appropriate response was not immediately obvious – neither for the faculty nor the agricultural audiences. Myers did something else, somewhat unexpected by those who may remember him. In 1959 he hired the first molecular biologist in the College, Albert Siegel, based on external recommendations from the California Institute of Technology for improving efforts in the UA plant science areas. This was just after President Harvill began his efforts to raise the research activities at the University. The Myers motto was reportedly "evolution not revolution." In some areas he was a bit revolutionary, but there was also a lot of the "evolutionary" approach, and the College had been accused by some (inside and outside of the University) of not keeping up with the times. There were other departments in the UA that could be described this way too, but they were not subject to as much state-wide visibility. President Schaefer began to increase the quality in all departments and this process was a big factor in changing the university as a whole, as well the College.



In 1973 Dean Gerald Stairs, a forester, replaced Dean Myers. Stairs had a much different approach from Myers and made some significant changes to the College. Some of these changes were due to information developed by President Schaefer, who had requested advice from two senior administrators of other colleges of agriculture before the dean's search was underway. These suggestions noted

the College was quite traditional and focused on agriculture. It also needed more integration of extension with instruction and research and a greater focus on urban areas and biological sciences. Finally, it was suggested that there could be some departmental mergers, including bringing natural resource programs together and a name change for the College.

Stairs was less of a delegator than Myers and immediately transferred titles of Director for Extension and Director of Experiment Station to himself, making the incumbent in those positions into an associate director. In 1974, Stairs established, in accordance with what Schaefer's consultants had suggested, the School of Renewable Natural Resources. The School was compiled from the Department of Watershed Management and from several units in the Department of Biological Sciences in the College of Liberal Arts. He also formed the Department of Plant Sciences from the departments of Agronomy and Plant Genetics, Horticulture and Landscape Architecture (moving Landscape Architecture to the School of Renewable Natural Resources). The Department of Soils, Water and Engineering was put together from the Departments of Agricultural Engineering, and Agricultural Chemistry and Soils. The changes that Stairs made in College direction and organization, along with personal style and interactions with various clientele groups led to strained relations with many in the agricultural community.

In 1973 Stairs began the first college-wide planning effort by having a large number of faculty (79) involved in a comprehensive study of all programs. That effort was chaired by Edward Nigh, Head of the Department of Plant Pathology and Chair of the Dean's Advisory Council. Its purpose was to recommend specific priorities and administrative changes. It was completed in 1975, but it was never acted on for reasons

that are unclear. In 1974 Dean Stairs established the Council for Environmental Studies immediately after receiving a recommendation to do so from the College Environmental Quality Committee. That committee was appointed by Dean Myers and looked for ways to improve how the College addressed the increasing environmental concerns that developed in the 1970s.

Dean Stairs resigned effective December 1977 under some pressure from client groups, some unrest within the faculty and administrators in the College, and concerns in the President's Office.

The 1970s were unique for the country as well as the UA, and especially for the College:

- The U.S. Environmental Protection Agency (EPA) was formed in 1970, and the National Environmental Policy Act (1969) began to require Environmental Impact Statements,
- Arizona banned the use of the pesticide DDT in 1970 (because of milk contamination) and the EPA banned it in 1972,
- The bar code was developed, and the first spreadsheet (VisiCalc) was available on the Apple II computer,
- The Western Sagebrush Rebellion began in 1976 (western opposition to federal land, water and mineral use regulations),
- OPEC (Organization of Oil Exporting Countries) imposed two oil embargoes: 1973 and 1978,
- A new UA president took office in 1971 as President Richard Harvill retired after 20 years, and
- A new College dean took office in 1973 as Dean Harold Myers retired after 17 years.
- Taken together, these changes made a huge difference in how the College set its priorities and was managed.

Part 1. Summary

Introduction and Historic Content

The College of Agriculture and Life Sciences changed significantly in the last 30 years (1980-2010). While there are many reasons why this happened there are a few that are key:

1. The period 1950 to 1980 set the stage for this change. Following World War II there was a substantial increase in university enrollment and Arizona grew. The Arizona economy diversified and agricultural yields continued to increase but in several cases the rates of increase were slowing. There were a number of new laws affecting agriculture and other subject areas within the college, and the National Science Foundation was established.
2. The president of the University of Arizona concluded it was time for the University to become more research oriented. He hired six department heads in the sciences. The number of doctoral degrees awarded began to increase, and continues increasing to this day. The number of masters degrees increased significantly but has been level since the 1970s.
3. New technologies are being developed, that we take for granted today. The changes in Arizona, the University, and the shifting attitudes and interests of society as a whole became a catalyst for the early experiments with these technologies. Two examples are: 1) ARPANET, developed in 1969, is the forerunner of today's Internet and Web applications, and 2) molecular biology, which is the field of how genetic expression actually works and how it might be altered, paved the way for today's understanding of biotechnology and other translational research, where University basic science gets translated into commercial science.
4. Changes were also taking place in social attitudes of the country and the types of laws passed. Examples include pollution controls, energy production and efficiency, and the recognition of unintended consequences for products or decisions by government or industry. The effects of such changes echoed through university systems, affecting the subject matter of available grants, the interest of students, and the needs of client groups of colleges of agriculture across the country.
5. The College did not adjust to the changing circumstances in a timely manner. When it did adjust, that adjustment came too abruptly and in ways that were not conducive to successful change. This resulted in a change of college leadership, but finding a new dean was difficult because of unresolved issues. These issues were resolved, in December 1980, by the hiring of a new Dean. Dean Bartley Cardon had a highly unusual background compared to other deans in agricultural colleges. It was because of this particular Dean that the College was able to complete its transition to the new environment, to repair the damage resulting from the previous seven years of rapid change, and to modernize its management processes and strategic directions.

Part 2.

Caretaking, Stabilizing, Refocusing and Sustaining

This 30-year period represents a substantial change in the way the College operated and how it responded to changes in the University and the outside world. It began with a new University of Arizona President and a new Dean of the College of Agriculture. It also followed a bunch of external events (for example, federal environmental and social legislation, oil embargos and energy changes). This period included making significant changes quickly, and their resulting impacts. These impacts included an unusual way of hiring another new Dean, who was an unusual Dean. It also included changes in College properties in the Phoenix area, and the beginnings of major changes in new communications technologies and molecular biology as a basic theme in agriculture. It was a period of organizational change and as well as a change of focus for the College. It became a different organization than in the previous 30-year periods.

Chapter 4. Caretaking: Looking for a Dean 1978-1980

Several dean candidates are interviewed but none accept an offer.
An associate dean served as dean until a new dean is found.

Chapter 5. Stabilizing: Adapting to a New Era 1980-1987

A new dean addressed internal and external problems and stabilized the College.

Chapter 6. Refocusing: Growing Under New Conditions 1987-1997

The College began to change in management and direction.

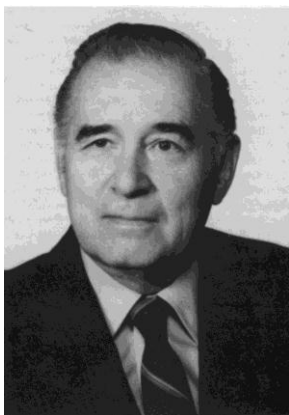
Chapter 7. Sustaining: Preparing for an Uncertain Future 1997-2010

More attention to strategic guidelines.
More attention to employees and audiences.
Keeping innovation moving while maintaining basics.
Achieving sustainability.

Chapter 4.

Caretaking: Looking for a Dean 1978-1980

When Dean Gerald Stairs resigned, the College was faced with several issues in addition to finding a new dean. The 1970s were rocked by inflation, oil embargos, and new environmental laws. Arizona, too, was changing and agriculture was having a declining influence yet it was still significant. But it took longer than usual to hire a dean.



After Dean Stairs left, the Director of Resident Instruction, Darrel Metcalfe, was asked to serve as Acting Dean for one year. This time elapsed and still there was no new dean. There were also concerns by some people that serving as “acting” dean did not provide an environment for making critical decisions. People knew Metcalfe was

not going to be the permanent dean and it was difficult for the college to function well. President Schaefer then made Metcalfe a full dean, and he remained in that position nearly two years.

During this period several searches for a new College dean proved unsuccessful. While reasons for these failures vary by whom is asked, the most common explanations identify candidates’ concerns about the role of two agriculture-related units at the University that were not within the College. The candidates felt they should be). In addition, the College was faced with a task of mending relations with the agricultural audiences, as there had been some ill-feelings develop under Dean Stairs leadership.

But there were also concerns from faculty regarding some of the decisions Dean Stairs had made. One significant decision was his reorganization of the plant-related sciences into a single large department. This came just after the School of Renewable Natural Resources was established. So the College had unhappy clientele, unhappy faculty, and College leadership was seen as in a “caretaker” mode rather in a “leadership” mode.

Metcalfe was in an awkward position. He did not ask for the job as dean but he accepted it as a loyal employee. He had retained his title as Director of Resident Instruction, so he really had two jobs. But, he also had to face two additional challenges:

The changing conditions of the 1970s impacted the College directly and indirectly. Indirectly through increased inflation, energy constraints, and several significant new environmental laws that would affect many of the College’s clientele. It affected the College directly because USDA was rapidly working at addressing pollution control and agriculture in the land-grant colleges of agriculture.

But the University itself was changing. The Promotion and Tenure criteria were becoming more stringent and the University was moving rapidly to increase the quality of faculty and of their research.

However, during the course of all these challenges, Metcalfe managed to maintain a functioning college and even began some new traditions. He began the First Annual Ag Alumni Breakfast, held at Homecoming in November 1980.

The problem of finding a new dean was always in the background, and the informal communications systems that all institutions have had allowed prospective candidates to learn about the reasons why previous candidates had turned down the offers of being dean. The solution was unexpected and it worked because of some unique circumstances.

Bart Cardon became the new dean in December 1980. He had just retired as the Chairman of the Board of Arizona Feeds, and in the 1950s he had been a full professor in the College. He was active in 4-H Youth programs, and was just finishing a project for Governor Babbitt – working to have groundwater legislation so the federal government would continue Central Arizona Project progress. It is realistic to say Bart knew almost everyone. There was no search committee - but no one complained of the selection.

The University did express extreme thanks to Dean Metcalfe for taking care of the College during the previous three years. Given his interests and experiences, personality, the changes taking place in the University and in Arizona, he deserved this thank you.

Chapter 5. Stabilizing: Adapting to a New Era 1980-1987

The College was in need of stabilizing and moving ahead, not just remaining in a caretaking mode. But the 1980s brought other challenges, including the development of personal computers and the changes they brought, the sale of Phoenix area experimental farms, and the first department head that had a molecular biology background.

The year 1980 began the 30-year period which is the focus of this history. It covered three Deans: Darrel Metcalfe, Bart Cardon, and Gene Sander. It includes the establishment of the Arizona Meteorological Network and the selling of the Phoenix area experimental farms, to be replaced by the Maricopa Agricultural Center. It highlighted the two major innovations that had a dramatic impact on the College's growth: 1) molecular biology (begun in the College in the late 1960s and accelerated in the 1980s), and 2) the appearance and implementation of new communication technologies. The latter includes both information technology (which impacted teaching, research, administration, and extension) and agricultural technology (automation, sensors and other aspects of precision farming).



After several meetings with the President, Cardon agreed to become Dean on December 1, 1980, four months after he retired as Chairman of the Board of Arizona Feeds. Cardon had a unique career and character which turned out to be well fitted for what the College needed at this time.

He had a master's degree from the UA in Soil Microbiology and a doctorate in Biochemistry and Microbiology from the University of California, Berkeley. While still a graduate student at Berkeley he was called up for World War II active duty. During the war he rose to the rank of lieutenant colonel and served as a group commander and a group operations officer under General Patton. After the war he returned to Berkeley, wrote the thesis to complete his doctorate in 1946, and was invited by the President of the UA to join the UA as an Assistant Professor of Animal Husbandry (now Animal Sciences). When back in Tucson he started the first Armored Reserve Unit in

Tucson and was the battalion commander as a full Colonel. He left the University in 1954 as a tenured full professor to be Research Director for the Arizona Milling Company, which eventually became Arizona Feeds. In the intervening years, he was heavily involved with the 4-H Program and was one of the initial board members of the 4-H Foundation. He was active in a number of agricultural professional organizations and knew several members of the Board of Regents and College faculty. He was well-known throughout the state, especially in agricultural circles. He served on Governor Bruce Babbitt's Groundwater Study Commission as a representative of agriculture. That commission had representatives of groups involved with water, and it prepared the legislation for the Groundwater Act of 1980.

Shortly after Cardon's arrival, in 1982, Henry Koffler succeeded John Schaefer as President of the University, and Cardon gave him a special tour of Arizona. Koffler was a microbiologist and biochemist and was experienced in working in interdisciplinary settings. He also was the only UA president to receive a Bachelor's Degree from the UA (in Agricultural Chemistry and Soils). He became president just as significant changes were taking place in the biological sciences and information technology. Koffler focused on a number of areas but in particular he thought the biological sciences needed a greater emphasis. Koffler also appointed a Task Force on Information Services, which reported in 1984, and included outside consultants as well faculty and staff. Koffler also had the cabinet develop about a half dozen major white papers. Subsequently, there was a major reorganization of all central computing and communications organizations and new hardware and software purchased to modernize these functions. These efforts included a large expansion in the use of personal computers and electronic mail on campus. Both of these emphasis areas were timely and again two leaders were in sync with the changing environment.

Cardon reestablished good relations with the agricultural community and within the College, but he also worked with other disciplines to bring the College in line with modern management processes and developed a relevant programmatic focus for the changing times. He encouraged the use of the new technology called personal computers, and in 1982 he began the first unit-specific long-range planning process for the College. After seven years as dean, at age 72, Cardon retired and began working with the UA Foundation. Upon retirement Cardon also founded the Ag100 Council – which began as a fundraising group – each member giving \$100 per year. Today the Council continues the “giving” but also serves as a “sounding board” for important issues relating to Arizona agriculture.

Cardon had a commanding presence. A friend (and former member of the Arizona Board of Regents) once remarked that “he had a voice that could be heard as far as Bisbee.” He had been born on a Tucson farm (in the community of Binghampton) at the corner of Country Club and Prince Road. The silo from his farm still stands near the corner and is now an apartment house. In addition to the farm on the south side of the Rillito River, the family had a ranch on the north side of the river. The grazing area for the ranch was roughly from Oracle Road on the west to Redington Pass at the east end of the Catalina Mountains and from the Rillito River north to the base of the Catalina Mountains. He had camped and ridden all over the foothills. Since the UA ROTC was a Cavalry unit at that time, Cardon later remarked that he did especially well in horsemanship. He was also the Cadet Colonel when he graduated.

There are some similarities in Cardon’s role as Dean and Richard Harvill’s role as president. Like Harvill, Cardon had a long history with the UA, knew many people in the state (especially the agricultural commu-

nity), had the full respect of the faculty, and had the future of the College (and the UA) topmost in his mind. This is what was needed to get all parts of the College and its audiences pulling in the same direction.

In 1978 the Arizona Board of Regents appointed an Agricultural Advisory Committee to evaluate the need and use of research farms, with directions to look specifically at urban area farms: Mesa Farm, Salt River Citrus Station, and Cotton Research Center in Phoenix and the River Road Farm (Dodge and River Road); and the Casa Grande Highway Farm in Tucson. The committee reported a year later that the listed farms were to be sold, with the proceeds used to purchase a new facility. In 1983 the Maricopa Agricultural Center was established on a farm previously owned by Fred Enke, Jr. The property is about 25 miles northwest of Casa Grande, near the town of Maricopa. The committee had not initially looked for something in this location or of this size, but Enke was interested in getting out of the farming business and approached the University. Enke’s father had been Coach Fred Enke of the UA baseball team for 36 years. The new site was named the Maricopa Agricultural Center and was divided into two areas: an experimental farm and a demonstration farm (a total of 2100 acres).

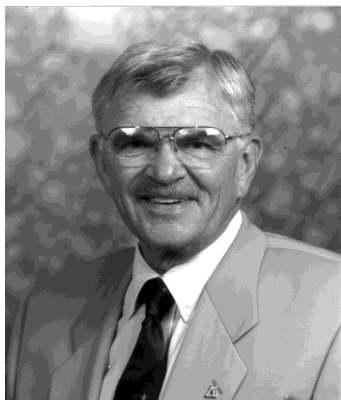
The main building was named the Bartely P. Cardon Research Building in October 1987, just after Cardon retired as Dean, and houses administrative offices, research laboratories, and meeting rooms. In addition to the Cardon Research building and experimental fields (laser leveled and soil mapped), MAC has eight single or double dormitories, wells and special facilities for irrigation experiments, a cotton gin, a weather station (AZMET), green houses, fish production, and an air strip. Cooperative Agreements allow several USDA facilities or industry experiments to be located at MAC. There are also educational facilities for youth through the Ag-Ventures and 4-H programs.

Chapter 6.

Refocusing: Growing Under New Conditions 1987-1997

The mid-1980s represented another change of leadership but also was the beginning of some cultural shifts and a feeling of stability returning after the tumultuous mid 1970s. Some of the faculty hired during the early growth period of the university (mid-1950s) were at retirement age, new department heads were more visionary and more willing to work cooperatively, and they were less “command and control” in their management approach. In part this was due to changes in communications technologies but in part due to changing times.

This period covers roughly the first half of Gene Sander’s role as Dean. It was a time of increasing urbanization which impacted students and faculty as well as College audiences. These groups were also impacted by the changing emphases on the part of federal funding agencies and the maturing of the new technologies which had been introduced by personal computers. There was also the promise of the Internet, which was in its early years.



President Henry Koffler hired Eugene Sander as the new College dean in 1987. Sander arrived at a critical time, where his background and experience became crucial to managing the changes that were taking place on campus. Research in molecular

biology for agriculture (biotechnology is the term for the applied aspects) had begun in the College in the early 1960s and was a growing field. Koffler was a biological scientist and he encouraged interaction across the entire campus to meet the interdisciplinary needs of the biological sciences.

Koffler also established three University-wide departments. These were jointly administered by a group of three deans (Agriculture, Medicine, and Science), so Sander’s knowledge of medical school management became quite useful. The three departments were: Biochemistry (since moved to a department and then merged with the Department of Chemistry to become the Department of Chemistry and Biochemistry), Microbiology and Immunology (the microbiology portion moved to the College and the immunology portion remained in the College of Medicine), and Molecular and Cellular Biology (continued as a department in the College of Science).

Sander’s long experience in medical schools and in both the research and applied aspects of the agricultural and biological sciences brought essential expertise to the campus and the College. He was also skilled in working with other colleges, particularly medicine. Bart Cardon introduced Sander to the Arizona agricultural community early on, and this was an immense help in getting established as a new dean. He quickly became familiar with the agricultural situation and the statewide offices and experimental farms of the College. As dean, he acquired a reputation for raising the questions with the UA administration that needed to be discussed.

Sander received his master’s degree in animal nutrition (with minors in biochemistry and physiology) from Cornell University in 1959 and then then joined the U.S. Air Force. He left as a captain in 1962, as assistant chief of the Bio- specialties Section, Aerospace Medical Research Labs, Wright Patterson Air Force Base, Ohio. He returned to graduate school and received a Doctorate in biochemistry from Cornell in 1965, followed by a two-year postdoctoral fellowship at Brandeis University.

Sander began his academic career by joining the faculty at the University of Florida, College of Medicine, as an Assistant Professor of Biochemistry. After serving as associate departmental chair he left to become chair of the Department of Biochemistry at the West Virginia University Medical Center, followed by head of the Department of Biochemistry and Biophysics at Texas A&M University. After serving as department head for seven years, he became Deputy Chancellor for Biotechnology Development for the Texas A&M University System and Director of the Institute of Biosciences and Technology at Texas A&M University.

Sander was raised on a Minnesota farm, where his father was a Cooperative Extension County Agent. He had been a 4-H member as a child. He has been president of the Glyndon Farms Company in Minnesota since 1999 and previously was vice president from

1986 to 1998. He has served on the board of directors of the Arizona Farm Bureau since 1987, and the Arizona-Mexico Commission since 1993. He is also on the board of directors for the Arizona Seed Trade Association, and a member or chair of a number of University-related national committees and councils.

The College Begins to Change

The CALS transition underway in the 1970s and 1980s was similar to what the UA had gone through in the 1960s and 1970s, where the institution changed from primarily an undergraduate regional university to one with a research focus and to a nationally recognized and competitive university. This took two presidents. Harvill was able to set the stage by expanding the UA's academic base, partly because he was well respected in the state and the University. Schaefer followed, taking the expanded base and not only effectively sustaining the changed University but carrying it to new heights by careful management and attention to quality and need. Similarly, Cardon stabilized the College, continued its movement into new subject areas and re-established good relations in and out of the College, so external support returned. Sander then took the College to new levels and modernized its structure and functions. Both Cardon and Sander also had significant familiarity and experience with current and emerging management methods.

In the late 1980s the enrollment in College majors started going down, and the curriculum was changed at the request of some faculty and some in the private sector; those hiring our graduates wanted science, but also creativity and management skills. The faculty wanted better student quality. The College responded by raising the requirements for chemistry, biology and math to equal those required of regular science majors.

Shortly after Sander's arrival, he appointed a Committee on Potential College Reorganization. The committee consulted previous related studies and the members were all experienced administrators. Several options were developed that covered the range of activities under College control and some changes were made in how the College was administrated. But for the most part, the 1988 report raised issues that resulted in a better understanding of the college for a new dean rather than serving as a blueprint for change. Sander arrived at a time when the UA was being asked by the Arizona Board of Regents to prepare strategic plans with more focus. He took planning seriously and developed a process that involved members of the college as well as College clients and others.

When UA President Manuel Pacheco arrived in 1991, he became interested in a large-scale assessment effort (PAIP – Project for the Assessment of Institutional Priorities) and started the quality management program (CORe – Continuous Organizational Renewal). However, the College already had a Quality Guidance Council, and it was easy to work with the new president on his interests. As part of these processes, Sander streamlined the College planning products and made them into productive management tools rather than just something that we were required to do, and integrated them with annual budget planning sessions.

Sander also put on more miles per year than any other Dean of the College. Every several years he would make the rounds of the state to visit all county Cooperative Extension offices. He attended a number of Arizona agricultural industry meetings and was often at meetings of the Board of Regents, in addition to attending a broad range of national meetings. But all of these meetings and planning thoughts paid off as the College continued its long history of getting its reports in on time, balanced its budget each year, and focused on all of its major audiences – students, research activities, and college clientele.

In 2007 Sander also served as the UA Executive Vice President and Provost, taking a leave of absence from the College for one year. During that year Vice Dean Colin Kaltenbach became Dean, with Associate Dean David Cox becoming Vice Dean. In 2008 Sander returned to his dean position. In 2005, Sander became the longest-serving dean of the College, serving under four University presidents. When he retires in 2011, he will have been dean for 24 years. Sander:

- Established the annual new faculty tour, where faculty (and guests) tour the state in a large bus to learn about Arizona and its agriculture as well as to meet people associated with College activities.
- Encouraged staff and faculty councils and began newsletters to improve communication and feedback opportunities within the College.
- Increased the types and number of awards the College gives to both faculty and staff and to those in the state that should be recognized for their contributions to agriculture and the College.
- Substantially increased endowments and financial contributions to the College.
- Provided an overall framework, by hiring high quality faculty and administrators, that increased departmental rankings, research funding, and significant endowments.

Chapter 7.

Sustaining: Preparing for an Uncertain Future 1997-2010

During the last 15 or so years there has been more uncertainty in funding, a greater interest in interdisciplinary activities, and an increased acquisition of new buildings. All have impacted how CALS reacted to changes in the external environment and to the rest of the UA campus activities.

The late 1990s ushered in a time when life was getting a little more difficult. It was a time when sustaining the college was a more appropriate term than growing or moving into significant new areas.

There were changes in the fields of science, new practical problems in Arizona, and changing audiences for our products. We also had a student population that became more urban and less agricultural, and the technologies available to us for teaching, research, and extension had exploded.

More Attention to Strategic Guidelines

To address these changes, and to ensure sustainability of the organization, CALS became more successful at developing effective strategic plans. These plans were revised each five years, involved appropriate program assessments, and used a planning process that involved faculty, staff, and clients. These plans were compatible with the UA strategic plan, which was revised annually, and over time grew into guidelines for use in departmental budget meetings as well as college-wide direction setting. While budgets had never been developed by a simple “across the board” method of distribution, the use of strategic guidelines and program assessments improved the budget allocation process.

More Attention to Employees and Audiences

While CALS had increased its awards for employees, it had also developed “position descriptions” for all faculty. This is in contrast to a process 20-30 years ago where the original faculty appointment identified the faculty focus; this created problems when a few faculty were reluctant to change direction when the times changed because their original letter effectively codified what they were to do. The new position directions were reviewed annually and modified as conditions changed; they also became the basis for evaluations. Staff reductions increased the workload of the remaining staff and the increasing use of new technologies added new learning responsibilities for the staff.

In 2000 – 2001 a series of significant reductions occurred in the state budget, to add to the problem of adequate funding for essential and emerging programs. These reductions impacted operating funds the most, support staff next, and faculty last. The logic was that faculty could apply for grants and that would be a source of funds for staff. Even at that, however, there were a number of staff and some faculty reductions.

Keeping Innovation Moving While Maintaining Basics

Over time it became relatively clear that this situation of budget constraints was going to be around for a while. Over the years the college and the university had been accustomed to annual increases in budgets (rather than annual decreases). Over the course of a few years CALS moved into a sustainability mindset, where the basic functions in teaching, extension, and research would be covered, and funds would be available for potentially high return investments in emerging research areas.

Achieving Sustainability

The college has some flexibility that is unavailable to other colleges at the UA. The two legislative budget lines for the college are separate from the university, but the college still needs to be in sync with university procedures that pertain to the budget and be a part of the larger institution. All budgeted units are accustomed to the process; data and trends in the various disciplines and state needs are used to form the basis of allocation decisions.

Sustainability is a term that means different things to different people. As defined in the 2010 Strategic Plan “sustainable” is very broad and is not just about the environment (e.g. climate change, energy, water, plants, and animals). It is also about social and economic issues. It includes economics, global trade, food production, development, jobs, institutions, health, security, transportation, families, communities, communication, consumer perspectives, political interactions and infrastructure.

Part 2. Summary

Caretaking, Stabilizing, Refocusing and Sustaining

The College needed some time to readjust to a comfortable working relationship with the faculty and staff, the various clientele groups in the state, the rest of the University that deals with the College, and the changing circumstances of science, technology, people's needs, and University procedures.

1. The College was somewhat drifting following the departure of Dean Stairs. Acting Dean Metcalfe was naturally reluctant to make too many changes with the title of Acting Dean and knowing that a new Dean would prefer to make his own changes. However, finding a dean took longer than expected and Dean Metcalfe became a full Dean but by then people knew that it was only a matter of time before there was a new Dean. This meant for three full years the college was being "held together" in a caretaking mode rather than advancing. However, by all accounts, Dean Metcalfe did an admirable job of keeping the college functioning, especially in light of the changing times that the college faced.

2. When Dean Cardon arrived in December 1980, he came with unique characteristics. These included a) bachelor and master degrees from the University of Arizona College of Agriculture and a PhD in Biochemistry and Microbiology from the University of California at Berkeley, b) an academic career, at the University of Arizona, rising from assistant professor to full professor before leaving for industry, c) a retired Army Colonel, d) a retired CEO, and e) a tall man with a commanding voice. Cardon also knew almost everyone of importance in Arizona a) through his extensive memberships in professional societies, b) the people he met in college and in industry, c) the people he met while in the Army during World War II, and d) his service on state and federal government commissions. Cardon was a good manager, a visionary, and easy to get along with. As a result of all these characteristics, he stabilized the college and prepared it for the next Dean, who came seven years later.

3. A new Dean arrived in 1987 and represented new directions in technology, a range of management experiences in complex university organizations, and was a strategic thinker. Dean Sander was a biochemist, was still involved in management of the family farm, and his father had been a county extension agent. Sander's interests and experience aligned with those of the University of Arizona's President Henry Koffler, and the changing times for many of the life science-related departments on campus. His ability to work across boundaries as diverse as the College of Agriculture, the College of Medicine, and the other colleges within the University, allowed him to be one of the deans most involved in campus activities that the University ever had.

4. In the early 1990s there were changes underway in how the college dealt with alumni, faculty and staff, and various clientele groups. A number of these changes started in 1980 when the Office of Development and Alumni started, but the impacts took time to be recognized. Dean Sander continued the earlier movement but also increased it to have more interactions with faculty and staff, visits to agricultural groups in the state, more communications, and more interdisciplinary work with other colleges on campus. Sander also was a good manager, a good basic scientist, and a strategic thinker.

5. Dean Sander arrived 10 years after Dean Stairs. That period of time was sufficient to have a functioning college, and Sander could pay attention to the changes taking place in Arizona, fields of science, and the rest of the University. During Sander's 24 years as Dean, helped by an Executive Council that worked well as a group, the college prepared itself for the long term and an uncertain future. The College operates more efficiently and effectively than it did in 1980. The building blocks are in place for the next Dean to take the college through whatever conditions occur in the future.

Part 3.

Organization, Planning and Focus

Some level of planning has always occurred in all of the college administrative units, but prior to the early 1990s they were better described as wish lists rather than strategic choices. This was due partly to the fact that that type of planning worked for the Times. Beginning in the 1980s strategic planning began to be a continuing periodic process and areas where the college would focus began to be explicitly defined. In addition to college planning, University provided some direction through its strategic planning efforts, and importantly, there were special external documents that served as roadmaps or guides to new directions. Some of these were done by consulting firms for the Board of Regents, some were done by Arizona institutions other than the educational organizations, and some were done by the regents themselves. In addition, there were an increasing number of studies relating to the future and how one might organize better to address the future than one could find in reading the literature.

Chapter 8. College Structure and Management

Discusses College organization and governance.

Chapter 9. Providing Recognition

The types and numbers of awards for faculty and staff as well as citizens increased substantially.

Chapter 10. Views on New Directions Facing Universities

Reviews the different perspectives on how others see the need for change in higher education. Includes national organizations, Arizona organizations, and former presidents of U.S. Universities.

Chapter 11. Planning and Focus

Formal planning begins in 1949 by President Harvill and 1974 by the Board of Regents. It begins but is not completed by CALS in the mid-1970s and begins in earnest in the early 1980s. Planning varies by the president, the times, and by the Dean.

Chapter 12. Politics, Innovations, and Disruptions

Over the last 30 years there were instances that fit this Chapter title.

Chapter 8.

College Structure and Management

The basic structure of a land-grant college of agriculture contains the Agricultural Experiment Station, Cooperative Extension, and an Academic Program by some name (originally it was Resident Instruction, to distinguish it from Cooperative Extension). However, within that basic structure there are many variations. Some universities have the land-grant activities spread among several colleges, some have multiple-colleges instead of a single college with multiple disciplines, and there are a range of funding and reporting relationships. They all reflect the types of needs in the state and the traditions of clientele and the university. As with our college, over the last 20 or so years there has been a shift toward more integration of extension, research and teaching and a broadening of the types of research done.

Governance and Decision Making

The pre-1973 CALS was a simpler college, in a simpler world, and a lot of delegation occurred to the directors of extension, research, and instruction. There was little involvement of the dean in the details of university matters but significant involvement with the various clientele groups of the college. Planning was primarily at the departmental level, and primarily focused on what types of new faculty were needed. Departments were focused on needs of the state as well as the rapidly increasing basic research areas.

In the mid-1970s the opposite situation occurred. Dean Stairs took the titles of Director of Cooperative Extension, Director of the Experiment Station, and Director of Instruction. He developed a complex management structure that had a large Executive Council and the Experiment Station divided into four areas. Dean Metcalfe continued that structure. There was discussion of making the college even more complex by a form of matrix management, but that never materialized

In 1980 Dean Cardon made a number of changes, including returning to a single experiment station, a smaller executive committee, and had regular department head meetings (that began on time). He returned the title of director to the Experiment Station, Cooperative Extension, and Resident Instruction. Dean Sander continued the smaller and efficient executive committee structure. The department heads group was redefined to meet one month with the executive committee present, and one month with only the department heads. Over time, the heads group was increased by including a representative of the Staff Council, the Appointed Professionals Council, and the Faculty Council.

Cardon was faced with a different challenge as dean that most other deans had avoided – he had not been

a university administrator. However, he had been CEO of Arizona Feeds, had been a full professor at the UA, was a retired Colonel in the army, and had served on a number of committees. It is probably safe to say the university learned more about leadership, management and planning from him than he learned from the university.

Under Sander, while the dean officially had the last word, the Executive Council became the basic decision making group. This particular Executive Council was unique in a way that made for improved decisions. Each member came from a different discipline (Agricultural Education, Animal Sciences, Biochemistry, Sociology, and Finance), and each came from a different type of university – for their formal training and their administrative experience. Even accounting for a change of one person now and then, the majority of the group was together for over 20 years. They had time to fine-tune procedures and approaches, and to allow appropriate discussion and debate to be informed but operated efficiently. In fact, they got along well together; one only had to appear before them to report or to be evaluated to see this in action. Often invited guests appeared if they were to be significantly impacted by a pending decision or had special knowledge about the key discussion issue. Assessments and planning increased over the years, but so did the frequency of budget reductions.

Both Dean Cardon and Dean Sander held an annual meeting for all college faculty and staff. This began as an annual event in the early 1980s and by 2000 had become semi-annual, unless there was a severe budget reduction that reduced it to one meeting. Generally approximately 250 people attended these meetings, about equally divided by faculty and staff. The agenda typically included an announcement of awards, a report on College activities and a question-and-answer session.

In addition, annual meetings are held for all college administrators (department heads, school directors, county directors, agricultural center directors, associate deans and directors, and heads of independent units), where major issues or directions are discussed.

Committees and Councils

The college primary governance method is through a five member Executive Council, formed from the major administrative areas of the college (Dean, Vice Dean and Director of the Agricultural Experiment Station, Associate Dean for Academic Programs, Associate Dean for Cooperative Extension, and Associate Dean for Administrative Services). In addition, the college has councils for the major employee groups in the college (faculty, staff, appointed personnel, students), administrative groups (county extension directors and campus department and unit administrators), and an overall Dean's Advisory Council. While the specific purposes of these groups vary, they all have the responsibility for reviewing appropriate information and providing feedback on a timely basis. They also all have the responsibility for raising issues where the Executive Council should be notified or the topics discussed. These councils are defined in more detail elsewhere. Key best practices in governance for the university with annotations on CALS efforts are listed below in best practices.

University of Arizona Shared Governance and Best Practices as Practiced in CALS

The University of Arizona developed its shared governance process for faculty in 1997, with an extension to other employee groups in 1998 (see the shared governance web site for more information). The Best Practices for shared governance developed by the university are listed with annotations on how CALS implements them⁷.

- Create an Atmosphere that Fosters Trust
- Develop a Collaborative Attitude and Participatory Decision Process
- Communicate Extensively
- Encourage Informed Participation and Training
- Focus on Effective and Efficient Processes and Subjects

⁷ The UA Shared Governance Best Practices, as further defined by CALS are published on the CALS governance website:

<http://ag.arizona.edu/governance/bestpractices.html>

- Allow for Flexibility in Shared Governance Structures.

College of Agriculture Organizational Shifts

The College has changed continually over the years, with accelerated changes when new deans or department heads were hired. However, the three principle areas have always remained at the heart of any reorganization: teaching, research, and extension. In 1995 the College tried to change its name from “Agriculture” to “Agriculture and Life Sciences.” Several colleges of agriculture had already made this shift, which emphasized the increasing breadth of their academic mission. Faculty, staff, and the College clientele approved the change, and after some additional information, the Provost approved it. However, it failed when the required approval from the Faculty Senate was sought. Another attempt was made in 2000, and it proved successful.

Free Standing College Units

There are also some free-standing units that report to the College, principally the Water Resources Research Center (WRRC) and the Office of International Programs. The WRRC was formed in 1954 as the Institute of Water Utilization and was within the College. It was renamed to WRRC in 1964 as a result of the Federal Water Resources Research Act of 1964 and moved out of the College to become a university administrative unit. Over the years it reported to various colleges or departments. It initially focused on irrigation issues, but now as a research grant review agency it deals with a variety of technical and policy issues

The Office of Arid Lands Studies (OALS) was established in 1964 and came into the College in 1981 as a free-standing unit. It was merged into the School of Natural Resources and the Environment in 2009. While the Environmental Research Laboratory (ERL) is not free standing in the College, it was a separate unit in the university when founded in 1967; it is located at the Tucson International Airport. ERL grew out of the Solar Energy Research Laboratory (1957) that was in the Institute for Atmospheric Physics, and located in the old Polo Field, where the University Medical Center is now located. In 1995 the ERL came into the College as a unit within the Department of Soil, Water and Environmental Science. When the College was having trouble finding a dean in the late 1970s, one commonly referenced problem was the potential conflict of the College and two campus units: OALS and ERL. This was part of the discussion when

Bart Cardon agreed to become dean, and OALS came in quickly, with ERL following in a few years.

The first international project began in 1952 when the College collaborated with the U.S. Department of State and the USDA in the development of the Agricultural College of Iraq. This was a seven-year project, and the multi-base palm tree just to the northeast of Old Main is a 1955 gift from the Iraqi students to the UA. International scholars and collaboration projects were increasingly part of the College through the 1970s, so the College established the International Agriculture Programs Office in 1977 with Professor Gerald Matlock as the full-time coordinator. In 1990, the U.S. Congress authorized the International Arid Lands Consortium, with managing director Jim Chamie, and it was located at the College. The nine-member

consortium includes six universities and its vision is to be acknowledged as the leading international organization supporting ecological sustainability of arid and semiarid lands. Although it operates worldwide, the focus is on the Middle East.

The Consortium for International Development was established in 1972 by 11 western region universities and the University of Hawaii and managed by the College. It was terminated in 2002, however, when international activities declined. The peak of international activity was in the mid-1980s, but then it slowed as the U.S. Agency for International Development funding waned, general UA interest declined, and faculty became less willing to be involved on-site in other countries. See Chapter 20 for more information on International Programs.

Chapter 9. Providing Recognition

Significant changes in methods of recognizing the value of others were made in the past 30 or so years. The types of awards given are in two categories: faculty and staff, and non-university people who were recognized for their service or their life's work.

Citizen awards are handled by the CALS Office of Development and Alumni Affairs, working with the University of Arizona Alumni Association and the CALS Alumni Council. The first award recommended by the College was an honorary doctorate in 1925 ; honorary degrees are proposed by a college, approved by the Faculty Senate and the President, and awarded by the University. Providing awards to students has long been recognized as important, and there were a few faculty awards as early as the 1960s, such as Professor of the Year. By 2010 there were 28 types*** of awards made to citizens, although each award is not made each year. The number of awards given increased significantly in the 1970s and 1980s to about six per year, with another increase in the 1990s and 2000s to about 17 per year. In addition, there are a number of awards given to faculty, staff, and students in recognition of special service. By the 1990s it was well recognized that awards took their rightful place in the list of factors that improve morale and make the working environment a better place. A list of CALS awards to citizens is in Table 2 and those receiving awards are listed in Appendix L. A list of CALS awards to faculty and staff is in Table 3 and those who receive the awards are listed in Appendix J.

Table 2. Comparison of College Awards to Citizens from 1950 to 2010

1950	1980	2010
Alumni Appreciation Award * Honorary Doctorate*	Alumni Appreciation Award* Appreciation Award* Distinguished Citizen Award* Extensionist of the Year Friend of Agriculture Honorary Alumnus* Honorary Bobcat* Honorary Doctorate* Public Service Award*	Alumni Appreciation Award Alumni Council Directors Award* Alumnus of the Year Award* Arizona Agriculturist of the Year** Bear Down Award* CALS Alumni Achievement Award Carol Knowles Award for Excellence Distinguished Citizen Award* Early Achievement Award Extensionist of the Year Friend of Agriculture or Friend of CALS Heritage Family Award Honorary Alumnus* Honorary Degree (UA) Lifetime Award Outstanding Achiever Award Professional Achievement Award* Public Service Award* Sidney S. Woods Alumni Achievement Award* Young Achievers Award

*Alumni Association Award, ** Ag 100 Council Award, *** Only awards given in 2005-2010 are shown in table. Honorary Degrees are recommended by the College and approved and awarded by the University. Some additional awards exist but were not given within five years of the dates above.

National awards are given by many organizations. Each professional organization has several types of awards and many of the organizations have a category of “fellow”, for special recognition of a person’s professional career. The only national award category listed here is membership in the National Academy of Sciences. In the list below, the year of the initial award is given after the award name.

Table 3. Award Categories for CALS Faculty and Staff

National Awards and Honors

National Academy of Sciences Members

University Professorial Honors

Regents Professors, 1986
University Distinguished Professors, 1995
Distinguished Outreach Professors, 2003

CALS Endowed Chairs

First Endowed Chair was awarded in 1985 (See Appendix K for endowments and recipients)

CALS Faculty Awards

A+ Advisor, 1995
Bart Cardon Early Career Faculty Teaching Award, 2009
Bart Cardon Sustained Excellence in Teaching Award, 2009
Extension Faculty of the Year, 1993
Faculty Teaching Award, 1993
Research Career Development Award, 2003
Research Faculty of the Year Award, 1993

CALS Staff Awards

Outstanding Staff Award, 1993
Outstanding Staff in Cooperative Extension Award, 1994
Outstanding Staff in Support of Instruction and Student Services Award, 1993
Outstanding Staff in Research Award, 1993

CALS Administrator, Team, and Diversity Awards

Administrator of the Year Award, 2003
Year-to-year Appointed Professional Award of Excellence, 1998
Outstanding Team Award, 1993
Shirley O’Brian Diversity Award, 2005
Outstanding Efforts in Development Award

Previous Award Categories

Professor of the Year
Idea Award (1991-2005)

Chapter 10.

Views on New Directions Facing Universities

A College or the University, just like any other organization, attempts to be aware of the what is happening in the broader world that could change what we do or how we do it. All leaders have some mechanisms, that they developed over their career, to gather information, keep in touch with similar institutions, and watch for signals that may confirm or change the way the institution works. When strategic planning became institutionalized for the Arizona universities in the 1980s, this process became more evident to faculty and staff. Beginning in the mid-1990s, when the world wide web became available, the amount of available information, both relevant and irrelevant, increased dramatically. Having a list of the major driving forces of change, that are relevant to higher education, supports the planning processes by having a common set of assumptions.

The College has prepared such lists over the years, and the 2010 version is in Appendix M. The approach taken was to review studies done by others and assimilate the conclusions into a brief document; something sufficiently comprehensive that covers the appropriate topics, that is presented and organized in such a manner to be understandable, and that is short enough to be read. One component in developing such a list is to review relevant studies by others and learn from the wisdom of respected experts in higher education history and change. It is important for university faculty and staff, as well as administrators, to grasp the notion of fundamental changes in a timely manner. The views of several respected experts are listed below, but the primary focus is on studies within Arizona that review history and anticipate change. Several of these studies involved the three universities. Two examples show the importance of understanding new directions: science and technology, and social attitudes.

Accommodating Changes in Science and Technology

There were two major developments in the fields of science and technology that changed the course of how the College went about its business: information technology (particularly personal computers) and molecular biology (or biotechnology or bioscience) and its associated devices.

Molecular biology began as a new science in the 1930s, but it was not until the early 1960s that it became mainstream, following the structural determination of DNA in 1953. The College was among the first at the University to engage in this field. Professors Albert Siegel and Milton Zaitlin in the Department of Agricultural Biochemistry were the first two faculty in the College to use it. This was the start of technologies with names like biotechnology and genetic engineering, and they brought new techniques and approaches to the field of genetics.

Personal computers became available in 1980, and the numbers in the College slowly increased until mid-1983, when there was a dramatic increase. This increase was due in part to the director of Cooperative Extension, Roy Rauschkolb, deciding to put computers in every county and in part to the University instituting a 50/50 matching program for academic departments. Before long, the College had a very large number of people who were able to use the new com-

puters for spreadsheets, word processing, and limited databases. They radically changed communication, teaching and management. The spreadsheet in its early days seemed like a miracle. The dean's office saved considerable time when they began using spreadsheets in budget preparation; a person could revise a number and see an immediate re-calculation. One could ask questions like "What if we increased salaries for everyone vs. selective increases based on merit pay?" – and get a quick answer (and without the rumor mill finding out what you are evaluating). The communication and World Wide Web technologies changed how people do almost everything.

Accommodating Changes in Social Attitudes

A university and a military installation share one characteristic. From the outside it does not look like they change much. But from the inside, most of the people (the students or the soldiers) are temporary, they are there for a few years and move on. The internal workings also change: how people communicate, what criteria are required for advancement, what the students or what soldiers do on their time off. There are also new technologies or social norms that change, in turn, both the students or soldiers, or the leadership, or the faculty or commanders. But, from the outside, both organizations seem unchanging. In the case of universities, there are still athletics, alumni events, ways of students letting off steam, ceremonies, awards, classrooms, and so on.

Studies by National Organizations

National Intelligence Council

Every five years the NIC publishes a report on trends shaping the future over the next 15 years. The report published in 2010 for the 2025 time frame was titled “Global Trends 2025: A Transformed World.” Some of their conclusions for 2025 are “major discontinuities, shocks, and surprises”, “higher education shapes the global landscape”, and they list relative certainties and key uncertainties. (National Intelligence Council, 2010)

The Association of Governing Boards of Universities and Colleges

Every two years the AGB lists the top 10 public policy issues. Those below are from the period 2003-4:

- Homeland security (higher education must implement costly federal laws to increase homeland security).
- Affirmative action (implications of the Supreme Court affirmative decision).
- Deteriorating economic and fiscal environment (and implications for higher education).
- Surging numbers of diverse students (representing a new generation of students).
- Rapid tuition increases (declining state appropriations forced higher education to significantly increase tuition).
- Reauthorization of the Higher Education Act (affecting student aid and other issues).
- Federal tax policy (policy changes have sharply divided congress and the nation).
- Assessment and accountability (state and federal government want tests and to hold higher ed accountable).
- Scientific research (challenges on available budget, ethics, and bringing research results to market). Intercollegiate athletics (continuing issues of control, finances, and equity). (Association of Governing Boards, 2004)

National Academy of Sciences

The Academy is an honor society of distinguished scholars. Through its National Research Council it is also a group that provides timely publications as an advisory service on a range of topics. The College has

several faculty who are members of the Academy (see Appendix J).

These publications are useful in helping understand the emerging issues or new approaches (and are available free at National Academies Press website (nap.edu). Some recent representative examples are:

- Toward Sustainable Agricultural Systems in the 21st Century (National Research Council, 2010)
- Implementing the New Biology: Decadal Challenges Linking Food, Energy, and the Environment (Whitacre, 2010)
- America’s Energy Future: Technology and Transformation (National Research Council, 2009a)
- A New Biology for the 21st Century (National Research Council, 2009b)
- Toward an Integrated Science of Research on Families (Families, 2011)
- Retooling for an Aging America: Building the Health Care Workforce (National Research Council, 2008)
- Understanding Business Dynamics: An Integrated Data System for America’s Future (National Research Council (National Research Council, 2007)

Studies by Arizona Organizations

*Arizona at Risk: An Urgent Call for Action. Report of the Governor’s Task Force on Higher Education, and Supplement to Arizona at Risk Report*⁸.

This report included issues and strategies on increased participation, increased research and business development, increased capacity and productivity, and need for investment, accountability, and outcomes. The report includes data indicating trends and comparisons with other states, summarizes the implications of these trends and lists recommendations.

The supplement presents “an Action Plan” with a series of recommended strategies and initiatives. The two conclusions are: 1) Arizona is at risk if it does not become a leader in the new, global knowledge-based economy; and 2) Arizona’s institutions of higher edu-

⁸ Office of the Governor. 2000. Arizona at Risk: An Urgent Call for Action, 42 pages. Supplement to Arizona at Risk, 211 pages. Both reports available from Arizona Memory Project. <http://azmemory.lib.az.us>.

cation are the keys to developing the state's workforce and strengthening its economy. The 17 member task force included members of the board of regents, the universities, community colleges, private schools, and several non-education representatives. The governor was Jane Hull.

Arizona Town Hall

Arizona Town Hall is a nonprofit civic organization established in 1962 that brings approximately 150 prominent Arizona citizens together twice a year to discuss issues facing the state and to develop recommendations. The president of each of the three public Arizona universities is a member, and a background report is prepared by one of those universities for each Town Hall meeting. Recommendations following the citizen meetings are published as a report.⁹ Examples of titles include:

- **2000. Higher Education in Arizona for the 21st Century.**
- **2001. Moving All of Arizona into the 21st Century**
- **2002. Arizona Hispanics: The Evolution of Influence**
- **2003. The Realities of Arizona's Fiscal Planning Process**
- **2004. Arizona's Water Future: Challenges and Opportunities**
- **2005. Maximizing Arizona's Opportunities In The Biosciences And Biotechnology**
- **2006. Arizona's Rapid Growth and Development: People and the Demand for Services**
- **2006. Arizona's Rapid Growth and Development: Natural Resources and Infrastructure**
- **2007. Health Care in Arizona: Accessibility, Affordability and Accountability**
- **2008. Who Will Teach Our Children**
- **2009. Riding the Fiscal Roller Coaster: Government Revenue in Arizona**

⁹ Arizona Town Hall. Phoenix, Arizona. <http://aztownhall.org>. Reports since 1999 are posted on the web.

- **2010. Building Arizona's Future: Jobs, Innovation and Competitiveness**
- **2010. Arizona's Government: The Next 100 Years**

Battelle Memorial Institute

During the period 2002-2004 Battelle prepared a series of reports for the Arizona Department of Commerce and the Arizona Board of Regents¹⁰. Battelle identified six core competencies: Ecological Sciences, Agriculture and Plant Sciences, Space Sciences, Computer Modeling & Simulation, Electronics and Optics, and Chemistry and Materials. In addition they identified three technology platforms for operationalizing these core competencies:

- Bioscience (e.g., genetics, diseases, bioengineering, agbiotechnology, health, neurosciences)
- Advanced Communications and Information Technology (e.g., embedded technologies)
- Sustainable Systems (e.g., water, natural resources, environment, agricultural sciences, health, energy)

Battelle prepared another report in 2006, titled Growing Southern Arizona's Bioscience Sector: A Regional Roadmap. It described the industry and its subsectors, the role of the University of Arizona for its research abilities and defined core research competencies. It concluded "the UA has a balanced portfolio in life science research across medical, agricultural, and biological sciences." Of their 10 established strengths, five were in CALS (Plant Sciences, Basic Molecular and Genomic Sciences, Agricultural Sciences, Insect Sciences, and Environmental EcoSciences.

Flinn Foundation

The Flinn Foundation has provided scholarships since 1985 (Flinn Scholars) to selected university students and also has a focus on "Developing Arizona as a Global Bioscience Research and Commercial Center¹¹." The focus on biosciences resulted from a 2002 "Arizona's Bioscience Roadmap" report completed by Battelle, which outlined a 10-year roadmap to "fast track" Arizona to achieve national bioscience stature. That study was funded by the Flinn Foundation. Cur-

¹⁰ Battelle Memorial Institute. A series of reports is available at the Office of the Arizona Board of Regents, Phoenix, Arizona.

¹¹ Flinn Foundation. Phoenix Arizona. <http://flinn.org>

rently, the Flinn Foundation is a major participant in the biosciences activities within Arizona.

Morrison Institute for Public Policy

The Morrison Institute for Public Policy¹² at ASU has developed a series of reports that assess issues of interest in Arizona. Examples include:

2010: Megapolitan: Arizona's Sun Corridor.

- The Arizona Megapolitan region is one of 20 projected megapolitan areas for the nation. It extends from Prescott to Nogales and Sierra Vista.
- Key factors include: blending global and local, governance needs to change, the sun corridor will be costly – who pays, water, and dealing with the sun and warming trends.

2007. Sustainability for Arizona: The Issue of Our Age.

- Sustainability is a defining issue and includes many factors: economy, society, environment.
- Sustainability is a new organizing principle.

2003. Strategies to Improve Arizona's Standing in Science and Technology (What would smart, sustained investment in a high tech future look like in Arizona?) The examples of 4 competitor states suggest that Arizona needs:

- Lasting, enthusiastic leadership that recognizes the economic value of science and technology.
- The right message and strategy to convey the urgency of this matter.
- Investment in the creation and sustenance of first-tier research institutions.
- More and better mechanisms to improve the transfer of ideas into the marketplace.
- A belief that the state can be a leader in science and technology.

2002. The Coming of Age -- Four Scenarios of Arizona's Future: Aging, Health and the Capacity to Care (scenarios are: Boomers Bust the Budget, Technology Enhances the Good Life, Who Will be

Able to Afford the Future, and Arizona Takes Charge).

2001. Arizona Policy Choices—Five Shoes Waiting to Drop on Arizona's Future (the five shoes are: A Talent Shake Up, Latino Education Dilemma, A Fuzzy Economic Identity, Lost Stewardship, and The Revenue Sieve).

2000. The New Economy: Policy Choices for Arizona. Includes: Research & Development, Workforce Development, Venture Capital, Using Technology Wisely, Strategic Alliances, and Quality of Place.

Viewpoints of Former Presidents of U.S. Universities

James J. Duderstadt, former President, University of Michigan (1988-1996). Written in 2000.

Dunderstat concludes: “We have entered a period of significant change in higher education as our universities attempt to respond to the challenges, opportunities, and responsibilities before them. This time of great change, of shifting paradigms, provides the context in which we must consider the changing nature of the university.

“Much of this change will be driven by market forces, by a limited resource base, changing societal needs, new technologies, and new competitors. But we also must remember that higher education has a public purpose and a public obligation. Those of us in higher education must always keep before us two questions: ‘Whom do we serve?’ and ‘How can we serve better?’ And society must work to shape and form the markets that will in turn reshape our institutions with appropriate civic purpose.

“From this perspective, it is important to understand that the most critical challenge facing most institutions will be to develop the capacity for change. As we noted earlier, universities must seek to remove the constraints that prevent them from responding to the needs of a rapidly changing society.” (Duderstadt, 2000)

Frank H.T. Rhodes. Former President, Cornell University (1977-1996).

“The university must change, and it will, but it must change deliberately and responsibly. The challenge is not to revive a flagging institution but to re-energize a vigorous institution and thus make it even better. Only those institutions that can provide significant value-added to the bare bones of information storage and

¹²Arizona State University. Morrison Institute for Public Policy. The Institute published reports on a range of topics, with a primary focus on Arizona. Reports are available at: <http://www.asu.edu/copp/morrison/>

transmission and research are likely to maintain their financial support. This will require a greater selectivity in research and service ventures and a growing responsibility for meaningful validation and certification.

“It will require a return to the ancient concept of learning as the education of the whole person and a commitment to the deliberate use of the university community as both the vehicle of the individual learning and as a means of scholarly inquiry. It will require a reaffirmation of teaching as a moral vocation, of research as a public trust, and of service as a societal obligation. But certain things will not change, and the most significant of these is the role of the traditional residential university as the place to create and nurture leaders of each new generation. There will also be more students as nonresident, part-time, older, and distance learners in institutions quite unlike the research university.” (Rhodes, 2001)

Derek Bok. *Former President, Harvard University (1971-1991). Written in 2003.*

From the publisher: “Is everything in a university for sale if the price is right?” In this book, one of America's leading educators cautions that the answer is all too often “yes.” Taking the first comprehensive look at the growing commercialization of our academic institutions, Derek Bok probes the efforts on campus to profit financially not only from athletics but increasingly, from education and research as well. He shows how such ventures are undermining core academic values and what universities can do to limit the damage.

“Commercialization has many causes, but it could never have grown to its present state had it not been for the recent, rapid growth of money-making opportunities in a more technologically complex, knowledge-based economy. A brave new world has now emerged in which university presidents, enterprising professors, and even administrative staff can all find seductive opportunities to turn specialized knowledge into profit.

“Bok argues that universities, faced with these temptations, are jeopardizing their fundamental mission in their eagerness to make money by agreeing to more and more compromises with basic academic values. He discusses the dangers posed by increased secrecy in corporate-funded research, for-profit Internet companies funded by venture capitalists, industry-subsidized educational programs for physicians, con-

flicts of interest in research on human subjects, and other questionable activities.

“While entrepreneurial universities may occasionally succeed in the short term, reasons Bok, only those institutions that vigorously uphold academic values, even at the cost of a few lucrative ventures, will win public trust and retain the respect of faculty and students. Candid, evenhanded, and eminently readable, *Universities in the Marketplace* will be widely debated by all those concerned with the future of higher education in America and beyond.” (Bok, 2003)

Frank Newman, *Former President of the University of Rhode Island (1974-1983), former Director of the Education Commission of the States, and director of the Futures Project (with Lara Couturier and Jamie Scurry). Written in 2004.*

Newman identifies eight public purposes of a university:

- Improve the quality of learning so as to ensure the skills and knowledge that will be required for the workforce.
- Improve the quality of learning so as to reflect the skills, knowledge, and commitment required for active participation in the civic and social life of the community.
- Provide access and academic attainment for a steadily broadening share of the population of all races, ages, ethnicities, and socioeconomic backgrounds, focusing particularly on access and attainment for those currently underserved.
- Serve as an avenue of social mobility for lower-income and minority citizens.
- Serve as the location (virtual or physical) of open debate and discussion of critical, and often controversial, issues of importance to the community, where the emphasis is on evidence and analysis and the opportunity exists for all sides to participate.
- Support development of high-quality elementary and secondary education through improved education of teachers and school leaders, alignment of curriculum and purpose with the schools, assistance with school reform, and improved research about education.
- Undertake research and scholarship in a manner that is trustworthy and open, in a widening array of fields that serve to advance society.
- Bring the benefit of the knowledge and skills accumulated in colleges and universities to the bene-

fit of the community through outreach and service. (Newman, Couturier, & Scurry, 2004)

Conclusions:

We entered a new era of change with the technological developments of the 1980s and we may be entering a new era best described by sustainability or integration of many changes into a “mega change.” However, when looking back to the 1950s, we have gone through some very large changes, some expected and

some not expected, and that involved a number of topics.

We know how to live with change. Much of this change has been positive (e.g., more efficiency through information technology) but some has been negative (e.g., continual budget cuts). Some of the perspectives of the earlier studies above and the perspectives of former presidents, suggests the future may be quite different for the next 30 years.

Chapter 11.

Planning and Focus

All college and university units have always done some type of planning. This may be something simple, like knowing what type of faculty need to be hired to address the growth of teaching, research, or extension needs. In the old days (pre-1950) this was all that was needed for many units, especially at the departmental level. As Arizona began to grow in the 1950s, which coincided with the growth of potential research funding by the National Science Foundation, formal planning became more obvious.

Overview

For the Board of Regents, the first formal plan, in 1974, was titled “University Development in the Mid-Seventies: A Long Range Plan.” Previous plans could be characterized as approving new programs, and providing general approval for the aspirations of each university (MacVicar, 1988). The Board of Regents had several detailed planning efforts in the early and late 1980s and 2000. Current efforts relate to annual changes to 5-year strategic plans prepared by the Board and the universities. In 1984 the Board formed a Strategic Planning Committee that continues to exist.

For the University, the first formal plan was submitted in 1949. It was a 234 page report that resulted from a request in 1946 from President Alfred Atkinson to the General Faculty (the first Senate was authorized in 1948). Atkinson had been president for nine years when he appointed the committee, and the following year he resigned and a new president and former Dean, Byron McCormick became president. At a meeting of the General Faculty, a vote was taken to create a committee to study the “Future Development of the University.” The 18-member committee was elected by the faculty from the eight colleges that existed at the time.

Richard Harvill was elected as vice-chairman. Early on they defined nine possible new fields to be studied in detail. The report defined the principles needed to make the study, involved all colleges in collecting information, compiled a good deal of institutional data, including the cost of instruction, departmental workloads, facilities needs and costs, and estimates of what similar institutions were doing. The report also included steps to be avoided, recommendations that buildings be air conditioned, and that adequate parking be provided. Two years into the three year study, Harvill resigned because he

was appointed to be Dean of the College of Liberal Arts (when Dean

Robert Nugent was appointed as the first Vice President, the only vice president at the time. In 1951 Harvill was appointed as President of the University. By reading the plan and reviewing some of the things Harvill did as president, it was obvious he used the report to the benefit of the growing university (UA Faculty Committee, 1949).

For the College, the first plan was requested in late 1973 by Dean Gerald Stairs (Stairs became Dean in August 1973 and resigned in December 1977). The report title was “Recommendations for Specific Priorities and Administrative Changes” and was completed in July 1975. It was prepared by the Dean’s Advisory Committee and was chaired by Department of Pathology Head, Edward Nigh. It reviewed the needs and resources of the state and the capabilities and assets of the College. It developed details through seven subcommittees: Instruction and International Agriculture, Extension, Agribusiness, Crops, Animals and Animal Health, Human Resources, and Natural Resources. Dean Stairs held an off-campus retreat for all department heads to review the report – but it was never finalized.

Board of Regents Planning Directives

The first Board planning effort for the individual universities began in 1972 with a meeting of the Long Range Planning Committee. After two years of study this effort resulted in a 1974 report for long-range planning in the mid 1970s (1974-1978). This planning document set enrollment policies, standards for long range capital planning and responsibilities for the universities, including lifelong and continuing education, facilities, research, public service and outreach, campus site/facilities plans, and general objectives of the university system. The document also established criteria for reviewing academic

programs, cooperative arrangements, new construction criteria, and methods for projecting student enrollments. The document also identifies the four characteristics of university education in Arizona as:

- The three state universities are large, comprehensive, general-purpose institutions, which address the characteristics of technological institutions, regional universities, institutions specializing in professionals training, graduate preparatory schools, liberal arts colleges, and serve multiple population areas (local, state, national) and transfer opportunities.
- Each university develops diverse and flexible specializations based on the principle of differentiated functions wherever possible so that high-quality program offerings and products can be developed and maintained.
- Enrollments of undergraduates will increase slowly over the next five years even in a rapidly growing state like Arizona. Given changes in delivery systems and offerings, the importance of lifelong education will increase significantly. At the same time, graduate education and research will play an increasing role in each of the three universities.
- The university, as a creature of the political process and as a concentrated collection of expertise, must increasingly provide public service and research on policy problems of our society through advising, counseling, and technical assistance.

Within this 1974 ABOR plan, the University of Arizona academic plan was to improve teaching and instruction; meet new responsibilities for in-service education for specific groups such as engineers, businessmen, and doctors; to enable adults to re-enter the educational stream; to develop new programs and phase out old ones in response to student demand and to needs within the state; to conduct more effective research (basic and applied); to provide more apprenticeship training to students in the solution of difficult and complex problems; and to maintain and improve the service programs in areas such as agriculture, business, education, and engineering which are of direct benefit to the state.

Within the same 1974 ABOR plan, specific College of Agriculture academic plans were to develop advanced degree programs in interdepartmental disciplines relevant to the food sciences, modify curricula in the Department of Animal Sciences to permit students to pursue options related to the management of agriculturally-related enterprises, to design a

master of science program in land-resource management and administration, and to plan a coordinated program built around the renewal of natural resources.

In 1990 the Board published its first Strategic Plan, "Toward the Year 2000." The Board identified six strategic directions and included mission statements for the system and for each university. Following a Board suggested format, each university presented a mission statement that was 4-5 pages long and was, in effect, a basic description of the university.

In 1995, with an update in 2000, there was a "Transformation into the 21st Century" plan. This plan had a very brief mission and vision statement and principles to follow. Board of Regents' coordinated planning effort then produced a single document with the plan for each university. These plans included mission statements (generally quite lengthy), topical areas the university plans to emphasize, and specific objectives.

The next plan was "A Vision for 2020", completed in 2008, which outlined a path and set targets for the Arizona universities to "raise Arizona to the national average of college graduates in the work force and move Arizona to the status of a large scale center for academic research" by 2020. This would be accomplished by establishing an enterprise model for operations, where the system is governed based on performance metrics and managed by presidents acting individually as university CEOs and together as an enterprise executive committee.

University of Arizona Planning Directives

In 1980 the Board requested a "mission and scope" statement from each of the universities, that was finalized in 1983 after some modifications. It could be accurately described as a compilation of what each university wanted to do. Beginning in the mid-1980s the Board of Regents began to focus more on a system-wide perspective, a greater oversight role, and more attention to strategic planning. The rationale for these changes and was summarized in two reports from the Arizona Auditor General¹³.

¹³ The 1991 Report of the State of Arizona Auditor General (Performance Report 91-9) was part of a Sunset Review process. Following the audit, the Board sought to delegate more responsibility for operational details to the universities so the Board could focus more on policy is-

The first strategic planning directions from the university were in 1987, responding to an Arizona Board of Regents request. This was a large effort that required all the colleges and departments to focus on strategic questions and to submit the information in a uniformly structured format.

The university approach to this was to hand this task to SPBAC, the Strategic Planning and Budgeting Advisory Committee. SPBAC was initially a committee of the Faculty Senate, which was expanded to 21 members in 1997 with the chair jointly selected by the faculty chair and the president

The UA formal strategic planning began in FY 83, with individual discussions with college deans and the provost; this was repeated in FY 84. In FY 85 there were planning statements from each college and in FY 86 a draft planning document was developed as a planning guide. Beginning in FY 1987 each college prepared a revised mission statement, and this was continued in FY 88. But even in FY 88, the formal mission statements were those prepared in 1983, and for the UA it was a 19 page document (the other two universities had a similar problem preparing concise mission statements).

The most recent University Strategic Plan is “Expanding our Vision, Deepening our Roots” drafted in November 2010 for the years 2012-2016. The Mission Statement is:

As a public research university serving the diverse citizens of Arizona and beyond, the mission of the University of Arizona is to provide a comprehensive, high-quality education that engages our students in discovery through research and broad-based scholarship. We aim to empower our graduates to be leaders in solving complex societal problems. Whether in teaching, research, outreach or student engagement, access and quality are the defining attributes of the University of Arizona's mission.

President Koffler

President Koffler initiated a reorganization of the biological sciences and developed three university-wide departments: Biochemistry, Molecular and Cellular Biology, and Microbiology and Immunology. These units jointly reported to three deans. That structure lasted until the late 2000s when the units were returned to the colleges for management and

reporting. Koffler also appointed a Biological Sciences Council in 1993; that council consisted of seven department heads and was charged with addressing the goals and directions of the University's future efforts in the basic biosciences. There were several reports but one that is still used for guidance is the Bio21 report of 1990. It was developed by a committee of the department and division heads of the biological sciences and addressed undergraduate and graduate education as well as research directions and management structures¹⁴. Six department in CALS were involved on the Bio21 Committee. The report served as a roadmap for the biological sciences for years and is still used as a reference document. The 108 page report identified the strengths and weaknesses in the UA biology programs and how the Bio21 report may impact them.

President Koffler also appointed a Task Force on Information Services, in 1982, that prepared a framework for strategic planning within the various components of “information services.” Koffler also provided matching funds for purchase of micro-computers for departments; this resulted in a 7-fold increase in one year. He restructured the computing and communications units (bringing together three units that reported to three different vice presidents into a single unit – Center for Computing and Information Technology). Finally, he presided over the installation of the first commercial and comprehensive administrative software; most software in use at the time was developed at the UA. All three of these steps had a significant influence for the University in taking advantage of the growth of the of information technology during the late 1980s and 1990s.

President Pacheco

President Pacheco initiated the PAIP process (Program for the Assessment of Institutional Priorities), in which each academic and non-academic unit prepared reports and the reports were reviewed by several committees. These reports were useful for planning purposes because they were uniform in structure and all done at the same time. The process was only done once and ended in Spring 1993. Pacheco also appointed a committee to determine ways of

sues. This second Performance Report was in 2001 (01-27).

¹⁴ Biology 21: A Plan for the Development of the Basic Biological Sciences at the University of Arizona for the Twenty-First Century. By the Committee of Biological Sciences Department and Division Heads, March 1990.

doing strategic planning and linking it to budgeting. That structure was implemented in 1993 as the Strategic Planning and Budget Advisory Committee. The committee was advisory to the president and the cabinet.

President Pacheco also instituted a Total Quality Management (TQM) Process called “CORE “ (Arizona Continuous Organizational Renewal). This was done in conjunction with the Dean of Engineering, the Dean of Business and Public Administration, and the Intel Corporation. CALS already had a TQM process and continued its own methods as part of CORE. The CORE program was short-lived (ended by the 1995), but CALS still has its program – the Quality Guidance Council. See Chapter 14 for a description.

President Likins

President Likins stressed diversity and focused excellence, a method of identifying the strategic areas the university would emphasize for research and teaching. This too was a short-lived process, as many departments wanted their programs to be on the list.

President Shelton

President Shelton and Provost Meredith Hay developed a Transformation Plan, which came at a time of deep university budget cuts. The Transformation Plan was to combine units where appropriate and develop new organizational units for addressing the interdisciplinary needs of the future. In the end some programs were eliminated, some were transferred to another college and some were combined with other units. There were several centers and schools established, and one addition of a super-college, that would have four existing colleges report to an Executive Dean of CLAS (CLAS – the Colleges of Letters, Arts, and Sciences). These four colleges are Fine Arts, Humanities, Science, and Social and Behavioral Sciences.

Meanwhile, CALS did what was required by the university administration, continued to submit the requested reports and plans on time¹⁵, and prepared its own strategic plan, internal reorganizations, and made movements toward greater efficiencies and effectiveness.

¹⁵ CALS has a history of being on time with its administrative reports, regardless who is dean.

Comparing Approaches

Each president had his own interests and assessments of what the university needed, and each presided as president at different times in the evolution of new technologies, campus needs, budget realities, and changing external conditions. From a college perspective, these internal changes are to be expected but have to be addressed just as changes in student needs or extension clientele have to be addressed. This requires some flexibility on the part of the colleges.

Early Planning Processes Fit the Times

The early planning process for both the university and the College was by the budget process rather than a formal planning process. If something different was needed for the next budget year (for example, new faculty or staff, new equipment, new programs) it was asked for in the budget. General directions were set by the views of the senior administrator (such as the university president or college dean) and for the College were largely driven by Arizona production agriculture needs or U.S. Department of Agriculture research and extension priorities. This budget equals planning process was how the College operated until the 1970s

CALS Planning

In the early days (pre-1965) planning was done informally and generally left in the hands of the department and unit heads. They generally did a simpler version of planning in a simpler world - estimating the type and number of new faculty then needed for the increasing enrollment and the growing Arizona economy. There was no university-wide planning process or structure in 1980, other than specific items related to annual budget reviews, for either the college or the university as a whole.

In the early 1980s there were several college-level planning efforts to respond to the University planning process. In late 1981 Dean Cardon received his requested long-range plans from the department heads. He had asked for both short- and long-term goals, with the appropriate assumptions and resource implications. In 1982 the college collated the long range plans of the departments. The recommended format included: mission, goals and objectives, current faculty and facilities resources, teaching, research, and public service programs, and department needs. However, while the basic information was provided, the various departments used

different formats and terminology. Previously departmental plans varied and were largely under the control of the department. Plans ranged from formal planning documents to lists of departmental focus and near-term plans for the three major program areas of teaching, research, and extension. In 1984 this information was published as the “CALs Long-Range Plans and Priorities.”

In 1986 the College published a book “Arizona Agriculture: Now and a Vision of the Future” with a publication signature by Dean Bart Cardon and Governor (Bruce Babbitt; Ken Foster was the chair of the effort. In the late 1980s the university finalized its strategic planning process and the College had its second plan. From then on, the process changed. The University updated its plan annually, and the College updated its plan every five years, but the major changes were in format and methods of preparation. The actual content became more focused over time and it became more of a “strategic” plan rather than one with goals and objectives; the College thought those details should be in an “operational” plan.

In December 1987 the College Strategic Planning Committee, which had been appointed by Dean Cardon in January 1986, issued its report to newly arrived Dean Sander. The 28 page report defined four recurring themes throughout the process:

- Decision Criteria for Resource Allocation
- Programmatic Areas of Emphasis
- General Disciplinary Thrusts Within the College
- And Interdisciplinary Nature of the College

The report also listed a series of possible actions and suggested the College consider broadening its name to better reflect the types of activities underway.

Following the College Strategic Planning Committee Report and the 1987 guidelines from the Provost, the College prepared a report in spring 1989 that had 18 Programmatic areas (alphabetical) plus three more that are emerging topics for 21 total:

- Analytical Diagnostic Services Related to Soil, Water, Animals, and Plants
- Animal Production
- Application of Design Principles
- Aquaculture and Fisheries
- Economics of Agriculture and Natural Resources Systems
- Food Systems and Technology

- Human Resources and Social Systems Support and Improvement
- Insect Science
- International Development
- Nutritional Sciences and Health
- Plant and Animal Molecular Biology
- Plant Microbiology
- Plant Production
- Remote Sensing and Geographic Information Systems
- Stress and Ecological Systems in Arid Lands
- Utilization and Preservation of Natural Resources
- Vadose Zone Hydrology and Soil Science
- Water Quality, Management and Reclamation

List of Emerging Topics:

- Economic Impact of Biotechnology
- Ethics, Law and Agricultural and Food Policy
- Value-Added Biosystems Technology

The 1990 strategic plan identified 9 programmatic areas. This is in contrast to the 18-21 programmatic areas listed the year before as changes in the strategic plan were discussed with faculty and staff (listed in original order):

- Agricultural Production Systems Compatible With the Environment
- Biological Research, Biotechnology and Their Applications
- Diet, Human Nutrition, Health, and Food Safety
- Economics of Agriculture and Natural Resources
- Environmental Planning and Design
- Environmental Quality and Water
- Family Well-Being and Lifelong Development
- Multiple Use Management and Conservation of Natural Resources
- Rural Resource Development

Beginning with the 1990 plan, and continuing each five years, the college increased involvement of faculty and staff and used feedback from clientele groups during preparation of the strategic plan. In the early 1990s the College began using focus areas, and began with 28, dropped to 14, and finally 6. It has been basically the same 6 since then, although the specific titles and descriptions have changed.

Copies of background documents were prepared, posted on the web, and in several cases copies of a 4-page summary were published. With the advent of everyone having access to the World Wide Web, this follow-up distribution was stopped and the appropriate web address given. In the strategic planning world the 1990s was a period of revisiting strategic planning and redefining its purpose and approach. This was related to the Total Quality Management movement, also a rebirth of an older approach. So the universities and the College were not the only ones trying to develop successful strategic plans.

The 2000 Strategic Plan Included six program areas (listed in original order):

- Environment and Natural Resources
- Family, Youth and Community
- Human Nutrition, Food Safety, and Health
- Marketing, Trade, and Economics
- Animal Systems
- Plant Systems

The 2010 Strategic Plan includes 6 programs areas (listed in order of decreasing resources applied to the program areas):

- Environment, Water, Land, Energy, and Natural Resources
- Plant, Insect, and Microbe Systems
- Human Nutrition, Health, and Food Safety
- Animal Systems
- Children, Youth, Families, and Community
- Consumers, Marketplace, Trade, and Economics

The full description of the six program areas is in Appendix N. The CALS 2010 Mission Statement is:

To create, integrate, extend, and apply knowledge.

For the last 10 years the focus of the college has been in the same general programmatic areas but the terminology has become more clear. This is partly due to changes in the college from the pre-1980s, when it was still making a transition from the 1950s world, and partly due to the college administration, faculty, and staff becoming more experienced at planning and more aware of changing times.

Complexity of Assessing Multiple Needs

The College and the College of Medicine are the two most complex colleges at the UA. The College is the product of the original land-grant concept, and

therefore its activities and the assessment of those activities involves not only the University, but the state and federal governments and all the counties. All university academic departments undergo a review approximately every seven years.

In the 1980s, the College departments were reviewed by the U.S. Department of Agriculture, and in the early 1990s the process was changed so that a USDA representative now joins the university review process along with external reviewers. In addition, the Agricultural Experiment Station and Cooperative Extension prepare a joint “Plan of Work” every five years, indicating planned programs and how they address issues relevant to the state. The Plan of Work includes feedback from various users of their services. Within the College, since 1995, each academic department head and the Directors of the Agricultural Experiment Station, Cooperative Extension and the Office of Academic Programs meet with the Executive Council each spring to review the previous year’s work, discuss future plans, and evaluate budget requests.

In 1983 Cardon announced the College needed to redirect our resources to meet the new challenges faced by the College. Based on the earlier departmental plan, long-range planning seminars and many discussions over the previous two years, Cardon provided a draft set of College priorities and objectives. The unit heads were to review these documents with their faculty and meet individually with the Executive Council. In 1984 an updated version of plans and priorities was developed, and following this, a two-year large scale study titled “Agriculture – Now and a Vision of the Future” was undertaken jointly for Dean Cardon and for Governor Bruce Babbitt. It was managed by Kenneth Foster of the Office of Arid Lands Studies and completed in 1986.¹⁶

Also in 1986 a College Strategic Planning Committee produced a report on “Strategic Choices” which provided the first comprehensive review of driving forces of change relevant to the College and decision criteria for resource allocation. During 1986-87, based on new Arizona Board of Regents guidelines, Provost Nils Hasselmo requested planning information from the college deans, asking for mission definition and a few goals to address over

¹⁶ Within the CALS the report was known as “Project Agriculture Future”

the next 3-5 years. The College was prepared for the Provost's request. This began a more formal and continuing planning process in the College, which included specific college-wide focus areas and a greater emphasis on interdisciplinary activities, as well as a mechanism to track results.

During 1986 and 1987, there were some electronic brainstorming sessions involving College Administrators, that were helpful in taking some of the complexity out of the College planning documents and reducing the number of programmatic areas. This took several years to have its full effect.

These sessions used the program developed by the UA Department of Management Information's Systems. It consisted of about 15 microcomputers around a large table. Specific questions were prepared in advance and everyone could enter their comments anonymously and simultaneously. In ad-

dition, you could comment on other people's comments and vote on certain issues. At that time (late 1980s) not all administrators were accomplished typists so the dynamics of the "conversation" differed from a face-to-face meeting where everyone could speak (and you knew who made the comments). It was a useful process to get new idea and honest comments on critical issues.

The earlier planning periods resulted in up to 21 areas of emphasis as the College attempted to bring all programs into the strategic planning process. As planning became more sophisticated and people became more aware of changing conditions, the plans became more about direction-setting. In 1990 the College began preparing five-year strategic plans that addressed the mission and general goals, but also identified specific areas of focus.

Chapter 12.

Politics, Innovations, and Disruptions

Sometimes things do not give the results that were anticipated. Factors include internal or external politics of the solution and its consequences. Sometimes it is right for one time period but not for another, and sometimes it has a negative effect in the near term and a more positive effect in the longer term. There are six examples that fall into these categories:

- Northern Arizona University and the Forestry Program
- Three University-wide Departments Came and then Went
- Why the Dean of Agriculture and Life Sciences has the Title of Vice Provost
- Office of Arid Lands Studies and Environmental Research Laboratory Move to CALS
- Black Friday
- College Name Change: Two Attempts - in 1995 and in 2000

Northern Arizona University and the Forestry Program

Both the University of Arizona and Northern Arizona University have programs in forestry and both receive federal McIntire-Stennis Act of 1862 Federal Funding. During an accreditation process by the Society of American Foresters, it became apparent there were important differences in some key words used by the Arizona Board of Regents in assigning responsibilities to specific universities.

The basic problem was that that the University of Arizona School of Renewable Natural Resources did not have authority to offer “forestry” degrees, but that the Northern Arizona University School of Forestry does have this authority. After a number of discussions between the two universities the situation was resolved such that the UA would not offer a degree program in forestry, would not seek accreditation in forestry and would withdraw from the WICHE (Western Interstate Commission for Higher Education) forestry program. NAU would acknowledge that the UA has authority to do research and instruction in forested ecosystems, and would refrain from developing an instructional or research focus in renewable natural resource programs assigned to the UA. This agreement was reached in 1987 by the presidents and provosts of the two universities.

Three University-wide Departments Came and Then Went

Certain academic subjects logically fall in more than one academic unit, particularly among the biological sciences. The Coordinator of Interdisciplinary Studies (Herbert Carter) developed an idea to address this situation and it was implemented by President

Henry Koffler in 1983. By establishing three new departments and having them managed by three colleges it was expected that they would be more economically efficient, have greater quality and less duplication, and allow more interaction among the disciplines. The three colleges were Agriculture, Medicine, and Science and the three departments were Biochemistry, Molecular and Cellular Biology, and Microbiology and Immunology.

Dean Sander was comfortable with the arrangement since he had experience in a medical school and knew the subjects. However, these were dynamic times and changes were occurring in various levels of university leadership and in the fields of science. The eventual result was that Biochemistry split off and became Biochemistry and Molecular Physics, and subsequently merged with the Department of Chemistry, becoming the Department of Chemistry and Biochemistry. Molecular and Cellular Biology continued as a separate department in one college, and the Microbiology and Immunology split with Microbiology going to Agriculture and Immunology remaining with the College of Medicine. What seemed like a good idea became a victim of changing times, management complexity, different interests and personalities of the unit heads, and different strategic directions for the involved units.

Why the Dean of Agriculture and Life Sciences has the Title of Vice Provost

Following several years of discussion about restructuring the university into “super colleges”, the process was started but never finalized. The four Deans of Arts and Sciences, Business, Engineering, and Agriculture would become a vice provost and dean.

Over time, the Dean of Agriculture was the only remaining dean with that title and it stayed with him; the super colleges were no different than the colleges before. A few years later, the College of Arts and Sciences was split into four colleges (Fine Arts, Humanities, Science, and Social and Behavioral Science). In 2008 they became part of a “super college” called College of Letters, Arts and Science, while retaining the four units that make it up as colleges. Curiously it is nearly the same name of the first general college of the university, formed in 1915 and named “College of Letters Arts, and Sciences.” In 1934 it became the College of Liberal Arts.

Office of Arid Lands Studies and Environmental Research Laboratory Move to CALS

These two units were a factor in the selection process for a new Dean in the late 1970s. At that time they were not in the College of Agriculture and both reported to the Vice President of Research. They both did agricultural research, in addition to other activities. In general the types of agriculture were not what the CALS was doing in the 1970s – such as controlled environment for food production and cultivation of native plants. The candidates for dean asked questions about this arrangement and were told it will stay the same; that candidates believed it would be better to have them in CALS. While there were probably several reasons none of the candidates for dean agreed to join the UA, it appears that this “competition” on the campus was one of those reasons. When Bart Cardon was asked to be dean he negotiated the movement of OALS into the College (1981) but decided not to argue for ERL to join the College. ERL began in 1957 as the Solar Energy Research Laboratory, working on heating and cooling houses by solar energy (located where University Medical Center is now). It then became involved in controlled environment arid lands agriculture and aquaculture. In the 1970s the ERL had some changes in leadership, changes in focus, and some financial constraints, and in the early 1990s became a unit of one of the College departments (Soil, Water and Environmental Science). The current ERL is entirely different than the one discussed in the 1970s but the OALS is similar to its earlier structure and focus. From 1981 until 2009 OALS operated as an organized research unit and provided leadership for some interdisciplinary graduate degrees. In 2009 it became part of the School of Natural Resources with the school being renamed to Natural Resources and the Environment.

Black Friday, Spring 1988

The Department of Plant Sciences underwent a short but difficult time as a combination of events resulted in notification of two continuing track faculty that their contracts would not be renewed. This happened on a Friday and hence the name of Black Friday. To understand what happened is complex, but it can be broken in to two sections¹⁷:

- Conditions leading up to Black Friday, and
- What actually happened.

Conditions in the Plant Sciences Department Result in a Unique Situation

- In the mid-1980s a series of faculty retirements caused an above average number of new hires when the first wave of faculty hired after the university’s growth in the late 1950s reached retirement age. The above average number of retirements resulted, therefore, in many faculty positions to be refilled.
- The department of Plant Sciences was formed in 1975 after the precursor units to the department had undergone a series of reorganizations. A number of faculty had expressed strong concern about these changes, and many of them had been in one of the involved departments and found the forced combination to be uncomfortable. At the same time, the college was raising curriculum standards for students. Also, environmental concerns had impacted the traditional way of agriculture. All these factors made for a stressed faculty that largely was from an earlier era. Retirement could have been considered as a solution to their concerns.
- Four university-wide reports prepared during 1985 had indicated a new campus thrust for the biological sciences. New faculty had been hired as early as 1960 that were of the type that were now being emphasized. These reports included the Bio21 study.

¹⁷ Black Friday occurred 22 years ago, memories are not as sharp as they once were, and few at the time had access to all relevant information. Additionally, some of the key factors would have been hard to discover at the time. With the benefit of time, and consulting with several administrators and faculty that were close to the events, I believe the above summary is as accurate as possible.

- The overall direction of the college had been slowly changing for several years toward an emphasis on molecular biology rather than the more historical mix of laboratory physiology, plant breeding, greenhouse and field-type research programs. During this period, the goal of plant breeding, to release varieties, was reduced and emphasis placed on genetics and release of plant breeding material.
- The faculty were under some stress as the long-standing state and federal support of research was shifting and research grants were becoming the norm to fund research. In the eyes of some, receiving a grant from industry removed some of the neutrality from their research results. This too was a change from the 1950s, when the university was more teaching oriented (even though CALS was always teaching, research, and extension) and the types of research were changing. There was one more problem, too. The promotion and tenure process was becoming more stringent and if a faculty member did not have “startup money” to do their research and build their reputation to get grants, they would have a difficult time in the promotion process. Many of these faculty were not provided adequate startup funding or laboratory space.
- When all these factors are combined you have a unique situation and it was very rare to have the opportunity to hire so many new faculty and at a time when the college and the subject of agriculture was undergoing change itself. To an outside observer this could be seen as a unique opportunity to make a significant change, and if the opportunity were not taken, it would be unlikely there would be another one like this.

What Actually Happened: Acting on an Opportunity - Making Two Missteps by Two Deans

- A significant faculty hiring process in Plant Sciences was approved in spring 1984 by Dean Cardon and the Provost. The retiring faculty were to be replaced primarily with faculty of similar focus, with a couple in the field of molecular biology, and mostly they had no startup funding. It is not clear why this was the case, as Cardon understood the pending changes in agriculture and the types of faculty involved in the new hiring process. But, he also knew the problems CALS had with the production agriculture audience as a result of activities during the ten-

ure of Dean Stairs and by the changing environment faced by agriculture. Faculty were aware that Cardon was not going to be Dean forever and when Dean Sander was hired they knew he was a different type of Dean.

- In July 1987 a new dean arrived and was focused on the new agriculture, which would require, in general, a different faculty than many of those hired in the previous several years. He called the department head and asked him not to renew the contracts of two of 17 newly hired faculty (both at an Agricultural Center), based on their research focus and/or their progress. In addition, at the dean’s suggestion, two tenure track faculty in Tucson were advised by the department head of some suggestions and encouragement for their future success in the department.
- The news of these meetings spread rapidly in the department and became known as Black Friday, in Spring 1988. By the following Monday this decision was reversed for the two people at the Agricultural Center, as the Faculty Manual required a committee review. In the end, six were successfully reviewed and all six are still in CALS. Eleven others left because of the new directions the college was taking. Of those that left, all did very well in other locations, some becoming department heads and deans in other universities or working with industry. In July 1988 a new department head arrived.

Overall, the “Black Friday” event did two things at the time: 1) it developed some ill-will among some faculty and stimulated other faculty to leave or to retire, and 2) it made clear there were serious re-directions taking place in the college. In retrospect, the general feeling is that while a re-direction of departmental focus was anticipated, it came very rapidly. Alerting faculty that their reviews would be in the context of the new directions was appropriate, although the process might have been smoother.

College Name Change: Two Attempts - in 1995 and in 2000

The naming or renaming of major administrative units requires formal approval by several groups within the university and by the Arizona Board of Regents. Over the years the role of colleges of agriculture in all states changed, and many of those col-

leges changed their name to better reflect the newer activities. By reviewing what other colleges of agriculture had done and consulting with the college constitute groups and faculty, several possible names were identified. The college could annually track the estimated effort in each of the several programmatic areas in the strategic plan and thus could see how much the college differed from what it had been in the 1950s and earlier. By the early 1990s it had become clear a name change was appropriate and several college committees had raised the issue of a name change, including some analysis of options.

When CALS tried to change the name in 1995, it was approved by several committees and administrative levels. However, when it was at almost the last approval step, the Faculty Senate, it failed by a narrow vote. The representative of the Dean's Council that sits on the Faculty Senate decided to speak against the name change rather than go with the

approval that was expressed by the Dean's Council. This was sufficient to stop the process.

CALS tried again in 2000 for a name change and was successful. By that time the case for change was even stronger and the college noted that only 10 of the 50 land-grant colleges of agriculture still used only "agriculture" in their name, that the old name was misleading to students and recruiters. Furthermore, over 95% of the university-wide general education program biological sciences courses (in Tier 1) were taught by CALS faculty, 85% of the degrees offered in the college involved the life sciences, over half the college undergraduate majors were in the life sciences, and the college constituents in the state, and the faculty and students approved of the change to College of Agriculture and Life Sciences.

Part 3. Summary

Organization, Planning and Focus

The structure and operation of the College have changed in the last 30 years, partly driven by financial reasons but partly for management and productivity reasons. There has been a much greater awareness in the last decade or so about new directions of universities in general and there have been some innovative steps taken to prepare for that.

1. College management has changed markedly from the 1950s style, a mixture of command-and-control and personal interaction because of the relatively small size of most departments in the College. As departments got larger, or merged, and as the interactions between departments increased, new ways of obtaining feedback and providing general direction were developed. Within the College there are a number of advisory councils, methods for shared governance responsibilities, and methods with working with on-campus departments and schools. The involvement of Cooperative Extension Specialists and Agents with campus departments increased and the research responsibilities of both specialists and agents increased. The changes in information technologies made enormous changes in the way the college functions internally as well as working with client groups.

2. There are many more awards given in 2010 compared to 1980, and especially compared to 1950. This is true both for faculty and staff and for Arizona citizens.

3) While books and reports existed for years relative to how universities operate and how they might make improvements, there has been an increase in such books over the last decade or so. A few former presidents have reflected on changes in university administration and have recommended, based on their experience, new approaches. In addition, there are Arizona studies about higher education, its focus and purpose. Studies have been done by the Governor's Office and the Arizona Board of Regents, Arizona Town Hall, Battelle Memorial Institute, Flinn Foundation, and the Morrison Institute for Public Policy at Arizona State University. These studies, as well as comments by experienced former presidents, serve as a rich source of information on how universities might face an uncertain future.

4) The first University long-range plan was in 1949, and the first Board of Regents planning effort for individual universities was in 1974. Since then there has been a significant increase in planning activity at all levels, including the Governor's Office of Strategic Planning and Budgeting. The University and the College began planning studies in the early 1980s. Over time more knowledge was gained on what strategic plans should contain, how they should be formatted, and who should be involved in their development. They have become useful documents, when done well.

5) There have been some hiccups along the way, however. The University of Arizona and Northern Arizona University had some disagreements on forestry responsibilities and an attempt by the University to form university-wide departments was unsuccessful. The apparent stumbling block in hiring a new dean in the late 1970s was due to two non-agriculture units doing agriculture-like activities. Both of these units are now in the College (Office of Arid Lands Studies and the Environmental Research Laboratory). There was also one failed attempt at changing the name of the College before it was successfully changed in 2000.

Part 4.

History Since 1980 from Various Perspectives

Each of the administrative units and college programs experienced change. Some changes were common across the college and others were relatively unique to a specific unit. Some changes could be categorized as the normal shifts in focus or approach that occur over time in any organization. This section summarizes those changes for each administrative unit, indicating details since 1980 and also identifying some historical events that occurred earlier than 1980 when relevant to understanding the last 30 years.

For academic departments a common format is used that includes key changes, unit leaders and names of the unit over time, mission and focus, degrees offered, and how they interact with the rest of the University of Arizona campus and some other organizations. For other units the format varies to fit the particular activities and history of the unit.

Chapter 13. Perspective of Academic Departments and Schools

All academic units are listed using a fixed format to compare over time their history and key changes, mission, focus, degrees and majors, student clubs, specialized units within the department or school, role in graduate interdisciplinary programs, and membership relationships with other University departments of federal or state agencies.

Chapter 14. Perspective of Dean's Office

Describes how the Dean's Office works and what it does, special reporting units, and facilities.

Chapter 15. Perspective of Academic Programs

Describes how students and academic programs have changed.

Chapter 16. Perspective of Cooperative Extension

Describes how Cooperative Extension has maintained the basic mission but with a changing audience, changing communication techniques, changing focus, and changing personnel characteristics.

Chapter 17. Perspective of Agricultural Experiment Station

Describes how experimental farms became agricultural centers.

Chapter 18. Perspective of Administrative Services Office

Describes the administrative complexity of the College and how it changed over the last 30 years.

Chapter 19. Perspective of Development and Alumni Office

Describes how development and alumni activities grew from almost nothing to something significant over the last 30 years.

Chapter 20. Perspective of International Programs

Describes how it increased from the 1952 beginnings, to a peak in the 1970s and then decreased.

Chapter 21. Perspective of Communications Activities

Describes how types of publications changed over time and the impact of electronic mail, internet and the web, and how it changed working relationships as well as producing products.

Chapter 13. Perspective of Academic Departments and Schools

The primary structure for the on-campus administrative units are departments and schools, with some independent organized research units. The unit names change over time as do the types of activities, the degrees offered, and how they interact with the university as a whole. The first departments were designated in 1915, and changes have occurred every five years except for two periods. Generally 3-5 changes are made each 5 years, through mergers, additions, deletions, or name changes. The period 1970-1975 had the greatest change with 10 units involved in mergers and name changes. A few changes were by units coming into CALS.

There are also some supporting units that came and went or merged with another unit. Those are discussed in Appendix F. Departments and Schools are listed alphabetically¹⁸. Table 2 indicates the major changes in departmental names and which departments were part of CALS over the last 30 years.

The format is the same for each unit:

- Unit name and unit heads at various years
- Key Changes during the last 30 years
- Mission, Focus, Majors and Degrees at various years
- Special units within the department, involvement with interdisciplinary programs on campus, membership in programs that exist in other colleges and schools, non-university cooperating units, and newsletters.

In many cases the name of the department and the unit heads are listed from when the unit began. It is possible to get a quick assessment of how a particular unit has changed over the years by reading the key changes and comparing the shifting content in mission and focus. Entries in the “special units” list are more fully defined in Appendix H and a comparison of the number of departmental name changes, editions, or deletions since 1905 are in Appendix O.

Table 4. Comparison of Departments and Schools Over a 60-Year Period

<i>Departments and Schools in 1950</i>	<i>Departments and Schools in 1980</i>	<i>Departments and Schools in 2010</i>
Ag Chemistry and Soils Ag Economics Ag Education Ag Engineering Agronomy Animal Husbandry Botany and Range Ecology Dairy Husbandry Entomology and Economic Zoology Home Economics (School) Horticulture Plant Breeding Plant Pathology Poultry Husbandry	Ag Economics Ag Education Animal Sciences Entomology Home Economics (School) Nutrition and Food Science Plant Pathology Plant Sciences Renewable Natural Resources (School) Soils, Water and Engineering Veterinary Science	Ag and Biosystems Engineering Ag and Resource Economics Ag Education Animal Sciences Entomology Family and Consumer Sciences (School) Natural Resources and the Environment (School) Nutritional Sciences Office of Arid Lands Studies Plant Sciences (School) Soil, Water and Environmental Science Veterinary Science and Microbiology Water Resources Research Center

¹⁸ In 2009 the Office of Arid Lands Studies (OALS) became part of the School of Natural Resources, and the name changed to School of Natural Resources in the Environment (SRNE). Because this is so recent, OALS is listed as a separate unit, but placed just after SRNE.

Academic Departments

Agricultural and Biosystems Engineering

<i>Departmental Names</i>	<i>Department Heads</i>
2010 Ag and Biosystems Engineering	Mark Riley 2009-current
2000 Ag and Biosystems Engineering	Don Slack 1991-2008
1990 Ag Engineering	Gene Nordby (1986-1991)
1980 Soils, Water and Engineering	Wilford Gardner (when department combined with Soils, Water and Engineering) 1980-1985
1970 Ag Engineering	Frank Wiersma 1978-1980
1960 Ag Engineering	Richard T. Frevert 1977
1950 Ag Engineering	Kenneth K. Barnes 1960-1977
1940 Ag Engineering	Harold C. Schwalen 1945-1960
1930 Ag Engineering	George E.P. Smith 1906-1945
1920 No department	

Key Changes in Last 30 Years

The roots of the Ag & Biosystems Engineering program start with the appointment of a Meteorologist and Irrigation Engineer in 1891 (although the name "Agricultural Engineering" was not applied to the department until 1923). He was succeeded by three other persons with titles of Professor of Mathematics and Irrigation Engineering, Civil and Hydraulic Engineering and Irrigation Engineering. In 1906, G. E. P. Smith was appointed as Irrigation Engineer, a position in which he served until 1955. He had been a Professor of Civil Engineering (within the Agricultural Experiment Station) since 1900 and authored Engineering Department Bulletin No. 1, "The Use of Portland Cement in Arizona," in 1905. The Irrigation Engineering faculty within the College of Agriculture grew to two in 1908 and three in 1917. The major was called "Rural Engineering" from 1914 to 1920 and "Irrigation Engineering" until 1927 when it became "Agricultural Engineering." The program remained almost exclusively in the water resources and irrigation areas until an engineer specializing in farm machinery was added in 1946.

The department began in 1925 as the Department of Irrigation Engineering and has continued a focus on irrigation as the topic itself changed over the years. In the early 1990s it added a focus on biological systems, as many agricultural engineering departments did in other universities. In 1972 the department (as Agricultural Engineering) was merged with the Department of Agricultural Chemistry and Soils to become Soils, Water and Engineering. This combination lasted 13 years, until 1985, when the combined department was split into Agricultural Engineering, and Soil and Water Science. In 1991 the department became Agricultural and Biosystems Engineering. The MS degree began in 1958 (Agricultural Engineering) and the PhD in 1995 (Irrigation Engineering). The College of Engineering began offering a BS in Biomedical Engineering in 2009, which may affect future numbers of students in the B.S. biosystems engineering degree, although a high degree of partnership exists between the ABE and BME departments.

In 1992, Dr. David Shoup became Associate Dean and Director of Academic Programs in the College of Agriculture. While in that position, Dr. Shoup undertook development of a unique degree program in Agricultural Systems Management (ASM) in Yuma. Initially the program was administered through the office of the Associate Dean; however, in 1996, Dr. Shoup resigned as Associate Dean and transferred to the Department as a regular faculty member and administration of the degree program was moved to the ABE Department. It was offered as an option in the Agricultural Technology Management Program until 1999 when it

became an independent program approved by the Arizona Board of Regents (ABOR). The ASM program in Yuma had matured to the point that planning authorization was approved by the ABOR and it became apparent that it was essential to locate a faculty member in Yuma to direct the program. Dr. Stephen Poe joined the faculty in July, 1998 as Professor of Agricultural and Biosystems Engineering and Coordinator of UA Academic Programs in Yuma. At that time, Dr. Kathryn (Kitt) Farrell-Poe (Stephen's spouse) also joined the Department as an Associate Professor of Agricultural and Biosystems Engineering with research and extension duties in the area of water quality. She has subsequently become the water quality coordinator for extension programs in Arizona. In 2009, the Ag Systems Management program was modified due to budget driven reduction in low enrollment programs. ASM became an option within the Ag Tech Management program operated by the Department of Agricultural Education. Dr.'s Poe and Farrell-Poe were moved to main campus in Tucson.

The ABE department's undergraduate degrees are joint with the College of Engineering and undergoes periodic ABET (formerly Accreditation Board for Engineering and Technology) accreditation as well as periodic Academic Program Reviews by the University of Arizona and USDA.

Mission 1982

To preserve, teach, and add to man's basic understanding of soils as natural bodies, especially arid zone soils. To apply that knowledge to the solutions of problems in the use of Arizona soils and waters, through the traditional mix of instruction, research, and extension and public service (note: this was when the department was part of Soils, Water and Engineering).

Mission 1993

To become a recognized source of agricultural engineering expertise and to serve the college, university, state and nation through dynamic research, education and extension programs. The focus will be on engineering for agricultural soil, water, plant systems and related environmental issues with a growing focus on strong biological factors affecting these issues.

Mission 2010

The primary mission of the Department is to serve the College, University and State through dynamic research, education and extension programs. The focus will be on engineering for biological systems and water resources as well as related environmental issues and systems management for agricultural systems and enterprises. A particular mission is to provide residents of Arizona with an opportunity to obtain an accredited engineering degree in the field of Biosystems Engineering. The Department provides the only such program in the State of Arizona. Currently, the Department Extension program is focused on agricultural water resources engineering, including water quality, with additional emphasis on agricultural machinery and energy.

Primary Focus 1982

- Minimization of water use in production agriculture in Arizona
- Minimization of energy use in production agriculture in Arizona
- Safeguarding the quality of soils and waters and atmosphere in the state
- Energy Systems and Power
- Farm Structures, Machinery and Mechanization
- Irrigation and Drainage

Primary Focus 1993

- Arid lands agriculture irrigation
- Biosystems and bioenvironmental engineering
- Water resources management

Primary Focus 2010

- Agricultural Water Resources
- Renewable Energy Engineering
- Biological and/or Biosystems Engineering
- Controlled Environment Agriculture Engineering
- Sensors and control systems
- Water Resources and/or Irrigation Engineering

Majors and Degrees 1982

The BS degree is joint with the College of Engineering

- BS Agricultural Engineering, with a major in Agricultural Engineering
- BS Agriculture, with majors in Soil and Water Science, or Agri-Mechanics and Irrigation
- MS Agricultural Engineering
- MS Soil and Water Science
- PhD in Soil and Water Science
- The department participates in college-wide curricula for agricultural business and options in turf grass management, plant protection, and international agriculture.

Majors and Degrees 1993

- BS Biosystems Agricultural and Biosystems Engineering
- MS Agricultural and Biosystems Engineering
- PhD Agricultural and Biosystems Engineering

Majors and Degrees 2010

- BS Biosystems Engineering (joint with College of Engineering)
- MS and ME Agricultural Biosystems Engineering
- PhD Agricultural Biosystems Engineering

Graduate Certificates 2010

- None

Student Clubs

- ASABE – American Society of Agricultural and Biological Engineers
- Alpha Epsilon – Ag Engineering Honor Fraternity

Specialized Units Within the Department (see Appendix H for Details)

- Controlled Environment Agriculture Center
- Statistics Consulting Laboratory

Graduate Interdisciplinary Programs (date indicates when that IDP began)

- Applied Biosciences (2011)
- Arid Lands Resource Science (1968)
- Biomedical Engineering (1997)
- Global Change (1994)

Membership or Joint Programs With Other University of Arizona Units

- BIO5 Institute
- Institute of the Environment

Newsletters

- None



Agricultural and Resource Economics

<i>Departmental Names</i>	<i>Department Heads</i>
2010 Agricultural and Resource Economics	Gary Thompson, 2006-present
2000 Agricultural and Resource Economics	Alan Ker, 2002-2006
1990 Agricultural and Resource Economics	Bruce Beattie 2001-2002
1980 Agricultural Economics	Dennis Cory 1997-2001
1970 Agricultural Economics	Bruce Beattie 1990 - 1996
1960 Agricultural Economics	Jimmye Hillman 1961-1990
1950 Agricultural Economics	Raymond Seltzer 1959-1960
1940 Agricultural Economics and Rural Sociology	George Barr 1937-1958
1930 no department	

Key Changes in Last 30 Years

Agricultural Economics began with an Extension Economist in 1930 but the department was not created until 1937. It emphasized production economics and farm and ranch management until the 1950s, when marketing and consumption became major issues. The department was active in international trade and economic development through the 1960s, 1970s, and 1980s. During the 1970s water, natural resource economics, and environmental issues emerged and now represent the major areas for both teaching and research. In 1964 the department and USDA initiated a cooperative agreement to gather and publish state agricultural data. Prior to this the department, USDA, and Valley National Bank were involved in independent collections of data. In 1989 the State of Arizona established a Department of Agriculture and in 1992 it took over the agricultural statistics function from the Department of Agriculture and Resource Economics. The department was no longer involved in the official data collection.

The department has published “budget reports” since the early 1970s and continues to do this in a modified (but more accessible) format on the web. These provide assumptions and calculations so farmers and ranchers compare with their own operation or evaluate new options. Examples include farm machinery, crops, vegetables and livestock, and financial templates. There has been a gradual shift over this period to more environmental resource oriented policies and economics. Examples include agricultural biotechnology, climate change, endangered species or invasive species, recreation, public lands, water and energy. Consistent with the broadening of topics addressed by faculty and students, the department changed its name in 1990 to the Department of Agricultural and Resource Economics.

Mission 1982

To serve the people of Arizona and the larger constituency of the University by 1) providing on-campus instruction and economics related to agriculture, rural people, and the use of natural resources by all people; 2) to research providing answers to the economic problems affecting the same clientele; and 3) delivering assistance, information and advice directly to the people of Arizona and to the extension and agricultural reporting (statistical) programs.

Mission 1993

To enhance student's abilities to manage society's public and private resources and to think rigorously about complex social issues from an economic perspective. To engage in scholarly activities in domestic agriculture, economic development and international trade, and natural resources and environmental issues, all practically related to arid Southwest conditions. To engage in outreach activities in domestic agriculture, natural resources, and rural development.

Mission 2010

We offer undergraduate programs leading to the B.S. in agricultural economics and management or in environmental and water resource economics. At the graduate level, we offer the M.S. or, in conjunction with the Department of Economics, the Ph.D. Our extension programs are focused on crop and livestock budgets, marketing and management, environmental and natural resource policy, and regional economics and development. We also make available a variety of newsletters, books, extension publications, and research papers.

Primary Focus 1982

- Commercial Agriculture
- International Trade and Development
- Natural Resources
- Rural Area Development

Primary Focus 1993

- Domestic Agricultural Economics
- International Trade and Development
- Natural Resource Economics

Primary Focus 2010

- Agricultural Economics and Management
- Crop and Livestock Budget
- Environmental and Natural Resource Policy
- Environmental and Resource Economics.
- Management and Marketing
- Regional Economics and Development

Majors and Degrees 1982

- BS in Agriculture, major in Agricultural Economics
- MS in Agriculture, major in Agricultural Economics

Majors and Degrees 1995

- BS in Agriculture, major in Agricultural and Resource Economics
- MS in Agriculture, major in Agricultural Resource Economics
- PhD with major in Economics and emphasis in Agricultural and Resource Economics (through the Department of Economics).

Majors and Degrees 2010

- BS in Agricultural Economics and Management (options in Agricultural Economics or Agribusiness Management)
- BS in Environmental And Water Resource Economics
- MS in Agricultural and Resource Economics

- PhD with major in Economics and emphasis in Agricultural and Resource Economics (through the Department of Economics).

Graduate Certificates 2010

- None

Student Clubs

- None

Specialized Units within the Department (see Appendix H for Details)

- None

Graduate Interdisciplinary Programs (date indicates when that IDP began)

- Arid Lands Resource Science (1968)
- Global Change (1994)
- Statistics (2006)

Membership or Joint Programs with Other University of Arizona Units

- Program on Economics, Law and the Environment
Research and education in collaboration with department and College of Law.
- Joint PhD degree program with Department of Economics
- Institute of the Environment

Newsletters

- The Arizona Review
- Positive Externalities



Department of Agricultural Education

<i>Departmental Names</i>	<i>Department Heads</i>
2010 Agricultural Education	Robert Torres 2010 – current
2000 Agricultural Education	James Knight, Acting 2010
1990 Agricultural Education	David Cox, Interim 2008
1980 Agricultural Education	Jack Elliot 2005 - 2008
1970 Agricultural Education	James Knight 2001 – 2005
1960 Agricultural Education	Roger Huber 1990 - 2001
1950 Ag and Ag Extension Education	Floyd McCormick 1967 - 1989
1940 Ag Education	Vincent Salmon, Interim 1966 – 1967
1930 Ag and Home Economics Education	R. W. Cline 1937 – 1966
1920 No department (courses in School of Education)	Lynn D. Klemmedson 1927 – 1937

Key Changes

The department began as part of the School of Education and moved into CALS in 1927. In 1955 the department was the Department of Agricultural and Home Economics Education, and in 1993 the department had a division of Agricultural Communications and Computer Support (previously had been a separate college administrative unit with name of Agricultural Communication). Since the late 1950s the name been Agricultural Education. The department has long had a focus on education programs and on agricultural mechanics. Major changes include taking over the Agricultural Technology Management activities that were in the Department of Agricultural Biosystems and Engineering, providing in-service competency training and support and a field-based graduate program for Arizona's agricultural education teachers, and supporting the FFA activities for Arizona. For a period in the 1980s there was a program in International Agricultural Extension. In the 90s and into 21st century, the Department focused efforts to serve graduate students at a distance through technology using synchronous and asynchronous methods. At the undergraduate level, competency-based curriculum was enhanced by including an additional emphasis on biology and science-related courses. In the 2009, the Department was relocated from the Forbes building to the old Family and Consumer Sciences. The building name was later changes to Saguaro Hall.

Mission 1982

To prepare qualified and competent teachers of vocational agriculture, extension education workers, and international agricultural educators.

Mission 1993

To prepare students for entering careers working with people in a variety of settings. These positions require preparation in basic sciences, technical agriculture, knowledge of the principles and techniques of the teaching-learning process, communication skills and the ability to work with people.

Mission 2010

To serve a diverse population through teaching, application, integration and discovery in agriculture, education and applied science and technology leading to successful careers in Agricultural Education and related businesses and industries

Primary Focus 1982

- Instruction
- Professional Leadership and Development
- Research

Primary Focus 1993

- Agricultural Curriculum Development
- Agricultural Safety and Accident Prevention Education
- Agricultural Technology
- Educational Program Planning and Evaluation
- Environmental Issues
- Instructional Methodology in Agricultural Science and Non-Formal Settings
- Leadership

Primary Focus 2010

- Agricultural Curriculum Development
- Agricultural Technology
- Educational Program Planning and Evaluation
- Instructional Methodology in Agricultural Science and Non-Formal Settings
- Leadership

- Outreach

Majors and Degrees 1982

- BS in Agriculture, with major in agricultural education, with two options: agricultural teaching, agricultural extension.
- MS Agricultural Education
- MEd Agricultural Education

Majors and Degrees 1993

- BS in Agriculture with majors in Agricultural Education (with options of teaching agriculture in formal and/or non-formal settings), or Agricultural Technology Management
- MS Agricultural Education
- MAEd Agricultural Education

Majors and Degrees 2010

- BS Agricultural Technology Management and Education, options
 - Agricultural Education
 - Agricultural Technology Management
 - Agricultural Systems Management (Yuma based).
- Undergraduate Minor in Military Science Leadership
- MS Agricultural Education
- MAEd Agricultural Education
- MAEd and MBA Dual Degree with College of Management

Graduate Certificates 2010

- Certificate on Adult Teaching

Student Clubs

- Agricultural Communicators of Tomorrow
- Alpha Tau Alpha
- Jacobs-Cline Society

Specialized Units within the Department (see Appendix H for Details)

- None

Graduate Interdisciplinary Programs (date indicates when that IDP began)

- Arid Lands Resource Science (1968)

Membership or Joint Programs with Other University of Arizona Units

- None

Newsletters

- Agricultural Education News
-

Department of Animal Sciences

<i>Department Names</i>	<i>Department Heads</i>
2010 Animal Sciences	Ronald Allen 2006 – current
2000 Animal Sciences	Robert Collier 2002 - 2005
1990 Animal Sciences	Roy Ax 1991-2001
1980 Animal Sciences	Bobby Reid 1989-1990
1970 Animal Sciences, Dairy Science, and Poultry Science	Brent Theurer 1983-1988
1960 Animal Sciences, Dairy Science, and Poultry Science	Richard Rice 1975-1982
1950 Animal Husbandry, Dairy Husbandry, Poultry Husbandry	
1940 Animal Husbandry, Dairy Husbandry, Poultry Husbandry	
1930 Animal Husbandry, Dairy Husbandry, Poultry Husbandry	
1920 Animal Husbandry, Dairy Husbandry, Poultry Husbandry	

Key Changes in Last 30 Years

When the university first named its departments in 1915, Animal Husbandry was one of the six departments. By 1920 it had split into Animal Husbandry, Dairy Husbandry, and Poultry Husbandry. By 1980 it had returned to a single department with the more modern designation of Animal Sciences.

A major aspect of the evolution of animal sciences during the last 30 years has been the integration of basic sciences with production research and the shift from state-funded research to government and private sector-funded research. For example, competitive grant funds from agriculture and biomedical sources often support complementary efforts on the same general research project. And, the applications phase of the research enterprise is supported by companies or the agriculture production sector. The 1980s saw the construction of a modern meat science facility that has contributed to research, education and outreach and modern teaching facilities at the Campus Agricultural Center Facility (Campbell Avenue Farm). Recently, the most significant change in our faculty research and teaching activities during the last decade has been a renewed commitment to environmental physiology. Opening of the state-of-art Agriculture Research Complex (ARC), also at the Campus Agricultural Center) has dramatically increased our research capabilities. The ARC includes facilities for studying animal physiology under precise conditions of temperature, humidity and solar radiation, and it contains modern, well equipped, laboratories just a few feet away from the animal experimental rooms.

Major changes in the educational programs included addition of the Race Track Industry Program in 1974, still the only program of its kind in the country. The program not only produces highly sought after graduates, but it hosts the largest annual conference on racing held anywhere in the world. There has also been an expansion of the equine sciences program, including an undergraduate curriculum option. The program has attracted a large number of students with an interest in horses, but their interests often expand to include other livestock species. In all of the animal sciences educational programs there has been an increased emphasis on technology and business.

Mission 1982

Information not available

Mission 1993

To serve human needs through animal agriculture by developing programs and providing leadership to the state, nation and world so that we are recognized as a center for education and research in hot-arid climates

Mission 2010

To serve society by providing animal agriculture and animal recreational groups with education, outreach, research and leadership. We are committed to maximizing success and improving efficiency of Arizona animal producers under our unique semi-arid environment, while supplying consumers with the safest, most nutritious and wholesome food products.

Primary Focus 1982

- Feedlot Nutrition and Grain Processing
- Agricultural Production Systems Compatible With The Environment
- Meat Science and Technology
- Range Livestock Production
- Race Track Management

Primary Focus 1993

- Agricultural Production Systems Compatible With The Environment
- Biological Research, Biotechnology And Their Applications
- Diet, Human Nutrition, Health And Food Safety
- Environmental Quality Agriculture
- Multiple Use Management And Conservation Of Natural Resources
- Race Track Management

Primary Focus 2010

- Agricultural Production Systems Compatible With The Environment
- Biological Research, Biotechnology And Their Applications
- Food Safety
- Multiple Use Management And Conservation Of Natural Resources
- Race Track Management
- Equine management and reproduction

Majors and Degrees 1982

- BS in Agriculture
 - Race Track Management
 - Animal Sciences
 - Poultry Sciences
 - Dairy Sciences
- MS in Animal Sciences

Majors and Degrees 1993

- BS in Animal Sciences
 - Race Track Industry
 - Animal Industry
 - Science and Pre-professional
- MS in Animal Sciences
- PhD in Animal Sciences

Majors and Degrees 2010

- BS in Animal Sciences
 - Race Track Industry Program
 - Animal Industry
 - Equine Science
 - Science and Pre-professional

- MS Animal Sciences with two options
 - Traditional with thesis
 - Non-traditional non-thesis
 - Race Track Industry Program (non-thesis/business path)
- PhD Animal Sciences

Graduate Certificates 2010

- None

Specialized Units Within the Department (see Appendix H for Details)

- Equine Center
- Meat Sciences Laboratory
- Parker Agricultural Research Complex

Student Clubs

- Collegiate Cattle Growers Association
- Collegiate Equestrian Team
- Race Track Student Organization
- Rodeo Club

Graduate Interdisciplinary Programs (date indicates when that IDP began)

- Biomedical Engineering (1997)
- Physiological Science (1989)

Membership or Joint Programs With Other University of Arizona Units

- BIO5 Institute
- Institute of the Environment

Newsletters

- The Livestock Review, published quarterly.



Department of Entomology

<i>Departmental Names</i>	<i>Department Heads</i>
2010 Entomology	Bruce Tabashnik 1996 – current
2000 Entomology	David Byrne, Acting, 1995-1996
1990 Entomology	Henry Hagedorn 1994-1995
1980 Entomology	Elizabeth Bernays 1989-1993
1970 Entomology	William Nutting, Acting, 1988
1960 Entomology	Roger Huber, Acting, 1987
1950 Entomology	William Bowers 1984 - 1987
1940 Entomology and Economic Zoology (College of Liberal Arts)	Larry Crowder, Acting, 1984 George Ware 1967-1983 Laurence Carruth 1949 -1967

Key Changes in Last 30 Years

The department has been called “Entomology” and located in the College of Agriculture and Life Sciences for most of its existence, despite a brief stint under a slightly different name in the College of Liberal Arts. However, the department's emphasis has changed considerably in the past three decades. The department is now best known for its balance of strengths in basic and applied research, teaching, extension, and outreach. Entomology at the University of Arizona ranked second nationally in 2006 among entomology programs, based on faculty scholarly productivity.

During the past 30 to 40 years, the department shifted its focus from pesticide recommendations to Integrated Pest Management (IPM). IPM includes acceptance of some pest presence and determination of “economic thresholds” of pest populations at which control tactics are expected to cost less than the damage the pest would cause. To complement or replace chemical control, IPM can include biological control by natural enemies, genetic control such as sterile insect releases, and cultural control such as sanitation and crop rotation. The department has successfully developed and implemented IPM programs that have markedly reduced pesticide use, increased safety, reduced detrimental effects on the environment, increased profits, and enhanced sustainability in both urban and agricultural systems.

Since the 1980s, the department has been strong not only in IPM, but also in basic insect biology, including genetics, physiology, behavior, ecology, and evolution. During the past 25 years, studies of both basic and applied entomology have been enhanced by the department's strengths in computing and insect molecular biology. Since the 1990s, the department has been a leader in the emerging field of resistance management, particularly in managing pest resistance to genetically engineered cotton that produces insecticidal proteins from the bacterium *Bacillus thuringiensis* (Bt).

The department provides the nucleus for the University of Arizona's Center for Insect Science, which was founded in 1989 to foster collaboration across all aspects of insect biology and includes participants from many other departments. Since 2010, graduate degrees have been offered through the Graduate Interdisciplinary Program (GIDP) in Entomology and Insect Science. Entomology faculty lead this GIDP and work closely with other faculty from the Center for Insect Science. The undergraduate degree in entomology was discontinued in the 1990s to encourage students to obtain broad biological knowledge before specializing in insect biology. While maintaining strong contributions to mentoring and teaching of graduate students, the entomology department has markedly increased contributions to undergraduate teaching since 1996.

Mission 1982

- To provide opportunities for undergraduate and graduate education in entomology

- To conduct basic and applied research on insects and related invertebrates, and to make the results available to the scientific community.
- To carry out an extension program in entomology throughout Arizona.

Mission 1993

- To provide research, training, and extension activities in all aspects of insect biology, development of innovative visitor management of insect pests, application of new knowledge to agriculture and urban areas.

Mission 2010

- To conduct research to better understand insects and their impacts on humanity.
- To provide distinguished education in all aspects of insect biology.
- To disseminate information about insects to improve the quality of life of the people of Arizona and the world.

Primary Focus 1982

- Strengthen and improve county extension programs in the area of insect management and entomology by providing information regarding insects to all agricultural commodity groups and the urban public of Arizona
- Systems improved approach for integrated pest management for both agricultural and urban pest control
- Training for students to become professional entomologists in agricultural production, business, and the sciences

Primary Focus 1993

- Basic Research for Insect Management
- Interdisciplinary Involvement With Other University Departments and Other Organizations
- Modern Agricultural Entomology
- Outreach to a Range of Audiences Related to Technology

Primary Focus 2010

- Insect Behavior, Ecology, Systematics & Evolution
- Insect Genetics & Physiology
- Symbiosis
- Integrated Pest Management for Agricultural, Horticultural and Urban Systems
- Management of Resistance to Insecticides and Transgenic Crops

Majors and Degrees 1982

- BS in Agriculture
 - Agriculture
 - Agricultural Business
 - Agricultural Sciences
 - Plant Protection
- MS in Entomology
- PhD in Entomology

Majors and Degrees 1993

- MS in Entomology
- PhD in Entomology

Majors and Degrees 2010

No degrees are offered through department. MS and PhD offered through the Graduate Interdisciplinary Program in Entomology and Insect Science

Graduate Certificates 2010

- None

Specialized Units Within the Department (see Appendix H for Details)

- Arizona Pest Management Center
- Arizona Plant Diagnostic Network
- Insect Collection
- Sonoran Desert Station for Arthropod Research
- Tree of Life Web Project (Phylogenetic tree's original development site)

Graduate Interdisciplinary Programs (date indicates when that IDP began)

- Entomology and Insect Science (2010)

Membership or Joint Programs With Other University of Arizona Units

- BIO5 Institute
- Center for Insect Science
- Institute of the Environment

Non-University Unit Cooperation

- National Park Service
- Nature Conservancy
- Southwestern Research Station, Portal, Arizona
- USDA Carl Hayden Honeybee Laboratory (Tucson)

Newsletters

- None
-

Norton School of Family and Consumer Sciences

<i>School Names</i>	<i>School Directors</i>
2010 Family and Consumer Sciences (Norton School)	Soyeon Shim, 2000 – current
2000 Family and Consumer Sciences (School)	Rodney Cate, 1995 - 1999
1990 Family and Consumer Resources (School)	Jerelyn Schultz, 1991-1994
1980 Home Economics (School)	Victor Christopherson, 1989 -1990
1970 Home Economics (School)	Robert Rice, 1975 – 1989
1960 Home Economics (School)	Ruth Hall, 1956-1975
1950 Home Economics (School)	Bertha Gregory, 1954-1956
1940 Home Economics (School)	Mildred Jensen, Acting, 1954
1930 Home Economics (Department)	Eleanor Johnson, 1934-1953
1920 Home Economics (Department)	Stella Mather, 1928-1933

Key Changes in Last 30 Years

Home Economics was one of the first six departments in the College of Agriculture, although it began as a “section” while teaching in 1889 within the Preparatory School (the equivalent of a high school) and was known as Domestic Science and Art. In 1913 it was renamed as the Department of Home Economics and began offering a Bachelor’s Degree in the College of Letters, Arts, and Sciences (focusing on food economics, dietetics, textiles, and clothing). In 1922 it moved into the College of Agriculture as the Department of Home Economics and in 1934 it became a School. The name was changed to School of Family of Consumer Resources in 1984, and then a final change was made in 2000 to the School of Family and Consumer Sciences. In 2004 it was renamed to the John and Doris Norton School of Family and Consumer Sciences. This renaming coincided with the beginning of a new and much larger building that was funded entirely by private donations.

In the late 1970s there were two major changes: the nutrition division combined with the nutrition efforts of the Department of Agricultural Biochemistry to become a new unit - Department of Nutrition and Food Science, and the historic emphasis on home economics gave way to an emphasis on families and on consumers. In 2010 the degree in Family and Consumer Sciences Education was eliminated.

In 1990 there was a serious downsizing and refocusing effort which resulted in the division of educational and professional studies folding into the division of family studies and the programs relating to financial counseling, interior design, and counseling and guidance were transferred to another college or deleted. This left two divisions: Family Studies, and Merchandising and Consumer Studies. In 1994 the Merchandising and Consumer Studies Division was renamed as Retailing and Consumer Studies. When the School name was changed from “Resources” to “ Sciences,” in 2000, Family Studies Division added “Human Development, and Retailing and Consumer Studies changed “Studies” to Science

In the 2000s a group of new centers or institutes was established or renamed. In 2003 the Take Charge America Institute for Consumer Financial Education and Research was established. In 2005 the Center for Retailing (formerly Southwest Retail Center for Retailing which was established in 1994) was renamed as Terry J. Lundgren Center for Retailing; and the Institute for Children, Youth and Families, which began in 1997 was renamed in 2008 as the Frances McClelland Institute).

In the mid-1990s the program in Counseling and Guidance and programs in interior design, and textiles were eliminated. The School began its PhD program in 1989, with the first class to be admitted for the Family Studies Concentration. The concentration for the Retailing and Consumer Sciences began in 1994. A Student Services Center was established in the new facility, McClelland Park, in 2008 to advise students in person or on-line in one location.

Mission 1982

- To research, create, and apply knowledge to improve the well-being of families and individuals and increase understanding of the reciprocal relationships among individuals, families, and their several environments. It deals with social, aesthetic, managerial, health, and ethical aspects of family relations, child development, food, clothing, and housing.

Mission 1993

- To provide instruction, research, and extension/outreach to people in the state for them to function productively in society and to achieve the optimum quality of life throughout the life span.

Mission 2010

- To provides instructional, research, extension and outreach programs that enable families, individual family members and consumers to achieve an optimum quality of life throughout the life span. Instructional programs prepare professionals for careers serving families and consumers in a culturally diverse and rapidly changing society.

Primary Focus 1982

- Child Development and Family Relations
- Clothing, Textiles, and Interior Design
- General Home Economics
- Home Economics Education/Consumer Studies

Primary Focus 1993

- Family Studies
- Merchandising and Consumer Studies

Primary Focus 2010

- Family Studies and Human Development
- Retailing and Consumer Science

Majors and Degrees 1982

- BS Consumer Studies and Home Management
- BS General Home Economics
- BS Home Economics Extension Education (Established 1979)

- MS Home Economics Education/Consumer Studies

- MA

Majors and Degrees 1993

- BS Family and Consumer Resources
 - Family Studies
 - Family Life Education
 - Family and Consumer Resources
 - Home Economics Education
 - Merchandising and Consumer Studies
- MA Counseling and Guidance
- MS Family and Consumer Resources
 - Family and Consumer Resources

- Home Economics Education
- MS Home Economics Education
- MAEd Family and Consumer Resources
- PhD Family and Consumer Resources

Majors and Degrees 2010

- BS Family Studies and Human Development
- BS Retailing and Consumer Science

- MS Family and Consumer Sciences
 - Retailing and Consumer Sciences Option
 - Family Studies and Human Development Option

- PhD Family and Consumer Sciences
 - Retailing and Consumer Sciences Option
 - Family Studies and Human Development Option

- Certificates in Retailing
 - E-Commerce and Retail Technology
 - Financial Services
 - Strategy and Planning
 - Promotion and Product Development
 - Sales and Distribution

Graduate Certificates 2010

- None

Specialized Units Within the Department (see Appendix H for Details)

- Frances McClelland Institute for Children, Youth, and Families (1997)
- Take Charge America Institute for Consumer Financial Education and Research (2003)
- Terry J. Lundgren Center for Retailing (1993)

Student Clubs

- Credit-Wise Cats (Financial Education Ambassadors)
- Family Studies and Human Development Student Ambassadors
- Students in Free Enterprise (SIFE)
- Lundgren Center Student Ambassadors

Graduate Interdisciplinary Programs (date indicates when that IDP began)

- None

Membership or Joint Programs With Other University of Arizona Units

- Institute of the Environment

Newsletters

- None

Department of Nutritional Sciences

<i>Departmental Names</i>	<i>Department Heads</i>
2010 Nutritional Sciences 2000 Nutritional Sciences 1990 Nutrition and Food Science 1980 Nutrition and Food Science	Joy Winzerling 2008 – current Linda Houtkooper 2003-2007 Fred Wolfe 1998-2002 Ralph Price, Acting 1996-1997 Bobby Reid 1992-1995 Donald McNamara 1990-1991 James Berry 1986-1989 Darrel Goll 1978- 1986

Key Changes in Last 30 Years

The Department of Nutrition and Food Science was formed in 1978 by a merger of the Department of Agricultural Biochemistry and the Division of Food, Human Nutrition and Dietetics from the School of Home Economics, offering undergraduate and Master’s degrees. Over time, faculty from the dairy, animal, and poultry science departments that focused on nutrition and food science were added to the department. The name and focus of the Department was changed to the Department of Nutritional Sciences in 1993.

In 1950, the Interdepartmental Committee on Agricultural Biochemistry and Nutrition was formed to make a nutrition PhD degree available, and in 1978 it was renamed as University Committee on Nutritional Sciences. In the 1980s, the doctoral program became a Graduate Interdisciplinary Program in Nutritional Sciences. In the early 2000s, the program transitioned to become the Graduate Group in Department of Nutritional Sciences, and then the current Nutritional Sciences Graduate Program (NSGP). Today the NSGP is administered by the Department and a Graduate Executive Committee. Students can receive a MS or PhD in Nutritional Sciences. The NSGP remains a cross-disciplinary program with faculty from 12 different entities on campus.

In 1984 the Cooperative Extension Expanded Food and Nutrition Program that began in 1969 was transferred from School of Home Economics to the department. It took a little while for the new department to refocus following this history of multiple management structures, the incorporation of faculty from related but different disciplines, and the changing needs for the department. As the name suggests, the overall focus of the department moved from food and nutrition to the much broader “nutritional sciences.”

In the 1990s and 2000s the department began greater collaboration with other related units on campus to include joint faculty appointments with University of Arizona units such as the Arizona Cancer Center, Arthritis Center, College of Medicine, Mel and Enid Zuckerman College of Public Health, BIO5 Institute, Department of Molecular and Cellular Biology and other departments within the College of Agriculture and Life Sciences.

Mission 1982

- To provide student training and public education in all areas of food science and nutrition as they pertain to human health. And to do research on the basic principles of nutrition; on the properties and composition of foods and how those may be altered to enhance their nutritive value; on the development of new approaches to increasing food availability such as increasing net protein deposition; locating and developing innovative new sources of foods, and marketing procedures on factors

that may affect food safety (both microbiological and chemical factors); and on methods of delivery of proper nutrition and food to humans.

Mission 1993

- To provide the highest quality undergraduate and graduate instruction and research opportunities to students interested in dietetics or nutritional sciences as professional careers.

Mission 2004

- The Nutritional Sciences Department takes a collaborative and interdisciplinary approach to discovering, integrating, extending and applying knowledge of nutritional sciences to promote optimal nutritional status, health and well being and to prevent infectious and chronic diseases including cancers, diabetes, obesity, musculoskeletal and cardiovascular diseases.

Mission 2010

- To lead in providing cutting-edge research, outstanding Undergraduate and Graduate Programs, and Cooperative Extension activities that advance the discovery and translation of the roles of nutrition in optimizing health for people in Arizona, the nation, and the world. Nutritional Sciences takes a collaborative and interdisciplinary approach in discovering, integrating, extending and applying knowledge of nutritional science to promote optimal nutritional status, health, and well-being, and to prevent and to treat chronic diseases including cancers, diabetes, obesity, heart disease and musculoskeletal disorders.

Primary Focus 1982

- Food microbiology and safety
- Experimental or basic nutrition or nutritional biochemistry
- Innovative new food sources including arid-land and native plants
- Muscle biology and meat science
- Nutrition education
- Dietetics

Primary Focus 1993

- Nutrition and Disease Prevention
 - Human Nutrition and Dietetics
 - Molecular Nutrition
 - Food Safety (being phased out)

Primary Focus 2005

- Nutritional Sciences and Dietetics
- Signature Research Focus Areas
 - Cancer biology and combination cancer therapies (nutrients and pharmaceuticals)
 - Skeletal and smooth muscle biology
 - Lifestyle and behavioral interventions (emphasizing diet and physical activity) for prevention of cancer, osteoporosis and obesity

Primary Focus 2010

- Nutritional Science and Dietetics
- Signature Research Focus Areas
 - Metabolic and Behavioral Factors Influencing Body Composition
 - Bioactive Compounds

- Nutrients and Lifestyle: Relationships to Cancer

Majors and Degrees 1982

- BS Agriculture
 - Food Science
 - Nutritional Sciences
- BS Home Economics
 - Consumer Service in Food
 - Food Service Management
 - Human Nutrition and Dietetics
- MS Nutritional Sciences
 - Dietetics
 - Food Science
 - Home Economics
- PhD Nutritional Science (through the Graduate Interdisciplinary Program)

Majors and Degrees 1993

- BS Nutritional Sciences
 - Dietetics
 - Nutrition
- MS Nutritional Sciences
 - Dietetics
 - Food Safety
 - Nutritional Sciences
- PhD Nutritional Sciences (through the Graduate Interdisciplinary Program)

Majors and Degrees 2004

- BS Nutritional Sciences
 - Dietetics
 - Nutrition
- MS Nutritional Sciences
- PhD Nutritional Sciences

Majors and Degrees 2010

- BS Nutritional Sciences
 - Dietetics
 - Nutrition
- MS Nutritional Sciences
- PhD Nutritional Sciences

Certificates 2010

- Accredited Didactic Program in Dietetics, American Dietetic Association

Specialized Units Within the Department (see Appendix H for Details)

- Center for Physical Activity and Nutrition (CPAN)

Student Clubs

- Nutrition Club

Graduate Interdisciplinary Program Affiliations

- Cancer Biology
- Entomology and Insect Science
- Physiological Sciences

Membership or Joint Programs With Other University of Arizona Units

- BIO5 Institute
- Mel and Enid Zuckerman College of Public Health
- Arizona Cancer Center
- Sarver Heart Center
- Arizona Center on Aging
- Arizona Arthritis Center
- Center for Insect Science
- Animal Sciences
- College of Medicine
- Steele Children's Research Center
- Department of Chemistry and Biochemistry
- Department of Molecular & Cellular Biology
- Centro de Investigacion y Desarrollo, A.C. (CIAD) Mexico
- Therapeutic Development Program
- John & Doris Norton School of Family and Consumer Sciences
- Natural Products Center
- Diabetes Center (beginning in 2012)

Newsletters

- Department of Nutritional Sciences Newsletter



School of Natural Resources and the Environment (School)

<i>School Names</i>	<i>School Directors</i>
2010 Natural Resources and the Environment	Charles Hutchinson 2010 – Current
2005 Natural Resources	Lisa Graumlich 2007-2010
2000 Renewable Natural Resources	Pat Reid 1994 – 2006
1990 Renewable Natural Resources	Edgar Kendirck 1989 – 1993
1980 Renewable Natural Resources	Frank Gregg 1985 – 1988
	Ervin Zube , 1977 – 1984
	David Thoroud, 1974 - 77

Key Changes in Last 30 Years

The School was formed in 1974 under the name of School of Renewable Natural Resources. There were several existing units that became the School, including the Department of Watershed Management, Landscape Architecture (from the Department of Horticulture and Landscape Architecture), and two units from the Department of Biological Sciences (wildlife biology and fishery biology, and fishery management). The initial

program areas were in range management, forest-watershed, watershed hydrology, natural resource recreations, landscape architecture, wildfire ecology, and fisheries science. In 2003 the name became School of Natural Resources, and in 2009 it became the school of Natural Resources and the Environment as the Office of Arid Lands Studies became part of the School. This last change was due to a campus-wide effort to combine units and to increase the visibility of the term “environment.”

In the early 1990s there was a campus-wide effort to reduce the number of majors. During that process the School reduced the names of majors but maintained the original programs by renaming them as options rather than as majors. In addition, the Division of Landscape Architecture moved to the College of Architecture, with a name change to College of Architecture and Landscape Architecture.

In 2009 the Office of Arid Lands Studies became part of SNRE, with the intent of retaining its identity but making the overall structure more efficient.

Mission 1982

- To integrate management, planning, design, and production of commodity and non-commodity resources, such as forage, recreation, timber, water, wildlife, and scenic beauty for the benefit of residents of Arizona and elsewhere.

Mission 1993

- To provide instruction, research, and extension in four areas: Landscape Resources, Range Resources, Watershed Resources, and Wildlife and Fisheries Resources

Mission 2010

- To develop science and solutions for conserving and restoring natural resources in the context of arid and semi-arid environments, while providing professional education for natural resource scientists, managers, and conservationists.

Primary Focus 1982

- Forest and Watershed Resources
- Landscape Resources
- Range Resources
- Wildlife, Fisheries, and Recreation Resources

Primary Focus 1993

- Integrating physical and biological sciences with socioeconomic and political factors
- interdisciplinary activities

Primary Focus 2010

- Landscape Studies
- Rangeland and Forest Resources
- Watershed Resources
- Wildlife and Fisheries Resources

Majors and Degrees 1982

- BS Renewable Natural Resources
 - Fisheries Science
 - Natural Resource Recreation
 - Range Management
 - Watershed Management
 - Wildlife Ecology

- BSLA Landscape Architecture

- MLA Landscape Architecture
- MS Fisheries Science
- MS Range Management
- MS Wildlife Ecology
- MS Watershed Management

- PhD Fisheries Science
- PhD Range Management
- PhD Watershed Management
- PhD Wildlife Ecology

Majors and Degrees 1993

- BS Renewable Natural Resources
 - Range Management
 - Watershed Management
 - Wildlife and Fisheries Science
- BSLA Landscape Architecture

- MLA Landscape Architecture
- MS Fisheries Science
- MS Range Management
- MS Watershed Management
- MS Wildlife Ecology

- PhD Fisheries Science
- PhD Range Management
- PhD Renewable Natural Resource Studies
- PhD Watershed Management
- PhD Wildlife Ecology

Majors and Degrees 2010

- BS Natural Resources
 - Conservation Biology
 - Fisheries Conservation and Management
 - Landscape Assessment and Analysis
 - Rangeland Ecology and Management
 - Watershed Hydrology and Management
 - Wildlife Conservation and Management
- MS in Water, Society and Policy
- MS Natural Resources and Business Administration MBA (Duel Degree)
- MS Natural Resources
 - Rangeland Science and Management
 - Natural Resources Studies
 - Watershed Hydrology and Management
 - Wildlife and Fisheries Science

- PhD Natural Resources
 - Rangeland Science and Management
 - Natural Resources Studies
 - Watershed Hydrology and Management
 - Wildlife and Fisheries Science

Graduate Certificates

- Geographic Systems Management (with the School of Geography and Development)

Student Clubs

- American Fisheries Society (Student Chapter)
- Natural Resources Graduate Student Organization
- Tierra Seca: Student Chapter of the Society for Range Management
- Wildlife Society (Tucson Chapter)

Specialized Units Within the Department (see Appendix H for Details)

- Advanced Resource Technology Laboratory
- Natural Products Center
- Santa Rita Experimental Range
- The Desert Research Unit
- Arizona Remote Sensing Center
- Arid Lands Information System

Graduate Interdisciplinary Programs (date indicates when that IDP began)

- Arid Lands Resource Science (1968)
- American Indian Studies (1982)
- Genetics (1964)
- Global Change (1994)
- Remote Sensing and Spatial Analysis (1977)

Membership or Joint Programs With Other University of Arizona Units

- Biosphere 2
- Institute of the Environment
- Southwest Climate Science Center (CLIMAS)
- Water, Society, and Policy Program (Master's Degree)

Partners/Cooperators with non-university units

- Desert Southwest Cooperative Ecosystem Studies Unit
- National Park Service George Melendez Wright Climate Change Fellowship
- The Walnut Gulch Experimental Watershed
- USGS Arizona Cooperative Fish and Wildlife Research Unit
- USGS Sonoran Desert Research Station
- USGS Natural Phenology Network

Newsletters

- None

Office of Arid Lands Studies

The Office of Arid Lands Studies (OALS) began in 1957 as a committee headed by William McGinnies, the Director of the UA Tree Ring Laboratory. It became an independent research unit in 1964 and moved into CALS in 1981. In 2009 OALS moved to the School of Natural Resources (within CALS) and the school was renamed as the School of Natural Resources and the Environment. OALS will retain its status as an identifiable interdisciplinary research unit within the School.

Directors

- William McGinnies, 1964-1969
- Patricia Paylor, Acting, 1969-1970
- Jack Johnson, 1971-1983
- Kenneth Foster, 1983-2004
- Charles Hutchinson, 2004-2010
- Stuart Marsh – 2009 - current (as a division director within SRNE).

Origin and Reporting

The Arid Lands Research Committee, was appointed by President Harvill in 1957 to be a permanent and campus-wide committee addressing the problems of arid lands. In 1958 the Committee obtained a three-year grant from the Rockefeller Foundation, called the “Utilization of Arid Lands Project” and became much more visible as a result (Hutchinson, 2005).

In 1964 the Committee was renamed the Institute of Arid Lands Research, with William McGinnies as the director. This change was brought about by the award of a research grant from the US Army Research Office. The grant resulted in the publication of a series of books, summarizing the state of knowledge about the world’s arid land, including *Deserts of the World* (1968). The unit was again renamed to the Office of Arid Lands Research, and finally to the Office of Arid Lands Studies.

In the beginning (1964) OALS reported to the School of Earth Sciences and in 1972 it reported to the Office of Coordinator of Interdisciplinary Studies (which was established in 1971 with Herbert Carter as its director). In 1977 it was transferred to the Office of the Vice President for Research (Richard Kassandar). In 1981 it was transferred to the College of Agriculture under Dean Bartley Cardon. In 2009, as a result of the provost’s emphasis on merging of relevant units, OALS became a separate interdisciplinary research unit within the School of Natural Resources.

In 1968 the Office of Arid Lands Studies helped to create the second university wide graduate interdisciplinary program - the Arid Lands Resource Sciences (ALRS) Graduate Interdisciplinary Ph.D. Program. ALRS reports directly to the Dean of the Graduate College and its mission is to provide an academic environment in which to examine the economic, ecological and social factors which determine the long-term sustainable use of arid and semiarid lands. Because of its multifaceted nature, sustainable use cannot be adequately defined nor understood through the tools available in any single discipline. Rather, it must be considered from several disciplinary perspectives. Thus, students in the ALRS program are trained in two or more of the physical, biological, resource, agricultural and social sciences, as they relate specifically to the sustainable use and management of arid and semiarid lands.

Key Changes in Last 30 Years

OALS was always internationally focused because of the nature of compiling the “Deserts of the World” book, which actually was the beginning of OALS. During the process of Patricia Paylor’s gathering of information for this she created a global network of contacts. An early vision of OALS was to be the facilitator of a global network of arid lands scientists. Thus the international activities began in 1964 as the OALS was

formed and peaked in the 1980s; by the 2000s they were a small part of the OALS activities. The overall focus remained on semi-arid or arid lands but the types of activities expanded over time (see OALS Divisions below for the types of activities and how they changed).

Mission 1980

- To promote, conduct, and manage interdisciplinary research directed toward identifying, assessing and developing options to maintain and enhance land productivity in arid and semiarid environments.

Mission 1982

- To promote, conduct, and manage interdisciplinary research directed toward identifying, assessing and developing options to maintain and enhance land productivity in arid and semi-arid environments.

Mission 1986

- OALS is a research and information center that conducts interdisciplinary, multidepartment programs designed to address local, state, national and international problems related to understanding, regenerating and developing the Earth's arid lands.

Mission 1992

- To train arid lands professionals for both academic and nonacademic careers; to understand the nature of arid lands, develop the technology to allow their sustainable use, and anticipate ecological ramifications; and to disseminate information regarding arid lands worldwide.

Mission 2010

- To address emerging natural resource issues and the critical nature of these problems in arid regions (as part of School of Natural Resources and the Environment).

Divisions

1980

- Arid Lands Information Center
- Arizona Remote Sensing Center

1987

- Arid Lands Information Center
- Arid Lands Resources Sciences
- Arizona Remote Sensing Center
- Bioresources Research Facility
- Desert Research Unit
- Economic Development Research Program
- Laboratory of Native American Development, System Analysis and Applied Technology
- Scientific Communications Group

2010

- Arid Lands Information Center
- Arizona Remote Sensing Center
- Desert Research Unit
- Natural Products Center

Degrees

- None

Graduate Interdisciplinary Programs

- Arid Lands Resource Sciences (1968)
- Cancer Biology (1988)
- Global Change (1994)
- Remote Sensing and Spatial Analysis (1977)

Other Activities

- The unit has been the administrative home for the International Arid Lands Consortium (IALC) since its establishment in 1993. The Consortium is composed of six U.S. universities and institutions in Israel, Jordan and Egypt.

Newsletters

- Arid Lands Newsletter (1959 - 2007) – Issues are posted on the web since 1994.

School of Plant Sciences

<i>School/Department Names</i>	<i>School/Department Directors or Heads</i>
2010 Plant Sciences (School)	Brian Larkins, 2010 – current
2000 Plant Science (Department)	Kenneth Feldmann, 2009 – 2010
1990 Plant Sciences (Department)	Robert Leonard, 1994 – 2008
1980 Plant Sciences (Department)	Brian Larkins, 1988-1994
1970 Plant Breeding, Agronomy, Horticulture (all separate)	Brooks Taylor, 1986 – 1988 Brooks Taylor, Acting, 1985
1960 Plant Breeding, Agronomy, Horticulture, Botany and Range Ecology (all separate)	LeMoyne Hogan, 1983 - 1985 R. Phillip Upchurch, 1975 – 1982
1950 Plant Breeding, Agronomy and Range Management, Horticulture, Botany and Range Ecology (all separate)	
1940 Plant Breeding, Agronomy, Horticulture, Botany and Range Ecology (all separate)	
1930 Plant Breeding, Agronomy, Horticulture, Range Ecology (all separate)	
1920 Plant Breeding, Agronomy, Horticulture (all separate)	

Key Changes in Last 30 Years

When the college formed departments in 1915 there were six original departments; three of those were Agronomy, Horticulture, and Plant Breeding. Today all of those are one department – the School of Plant Sciences. Plant Pathology was originally in the College of Liberal Arts, but moved to the CALS in the early 1920s, and became part of the Department of Plant Sciences in 2003. It became the Division of Plant Pathology and Microbiology, to join the other two divisions: Plant, Biology, Genetics and Genomics, and Horticultural and Crop Sciences. The School of Plant Sciences began as the Department of Plant Sciences in 1975,

when the department resulted from combining Agronomy and Plant Genetics and Horticulture. Horticulture had contained Landscape Architecture but that moved to the new School of Renewable Natural Resources. Shortly before this, Agronomy and Plant Breeding had combined to become Agronomy and Plant Genetics.

The School houses the Campus Herbarium (formerly in the College of Liberal Arts) and the Gilbertson Mycological Herbarium (formerly in Plant Pathology); both are located in Herring Hall. Also administered by the School is the Campus Arboretum, formed in 2002, which uses the plants growing around the campus as the actual Arboretum.

There are several significant changes over past 30 years. Following the formation of the Department of Plant Sciences in 1975 there was a transition period as the new structure became more operationally efficient and the change in types of science became accepted. By the late 1980s a major shift in focus from traditional field-oriented to agricultural biotechnology, plant genomics and molecular biology was well underway. A second significant change was the increased interactions with other parts of the university and the inclusion of new units into the School.

Mission 1982

- To be the center of knowledge in Arizona, and the southwestern United States, and the world in the cultivation of plants in arid environments.

Mission 1993

- To sustain the economic production and utilization of plants as they serve man as food and fiber and add to the quality of life and landscapes and the natural environment

Mission 2010

- The overall goal of the Department is to help sustain the economic production of plants as used by humans for food, fiber, and in landscapes and natural environments. Our faculty members discover new knowledge and develop technologies that are of importance to agriculture and the life sciences and that are taught to students, growers, other researchers, and the general public.

Primary Focus 1982

- Agricultural Botany
- Agronomy
- Arizona Crop Improvement Association
- Boyce Thompson Arboretum
- Domesticate Native Crops to Suit Man's Needs in Their Environments
- Horticulture
- Plant Breeding
- University Herbarium
- Weed Science

Primary Focus 1993

- Agricultural Biotechnology
- Agricultural Research Using Biochemical And Molecular Genetic Approaches
- International Agricultural Activities
- On-Campus And Off-Campus Plant Science Education
- Production Of Economic And Horticultural Crops in an Arid Lands Environment

Primary Focus 2010

Three Divisions defined after conversion from department to School

- Plant Biology, Genetics and Genomics
- Horticultural and Crop Science's
- Plant Pathology and Microbiology

Majors and Degrees 1982

- BS Agriculture
 - Major in Plant Sciences
- MS Plant Sciences
- PhD Plant Sciences

Majors and Degrees 1993

- BS Agriculture
 - Major in Plant Sciences
- MS Plant Sciences
- PhD Plant Sciences

Majors and Degrees 2010

Majors

- BS Plant Sciences
 - Controlled Environment Agriculture
 - Horticultural Systems
 - Plant Biology
 - Plant Microbiology
- BS Crop Production
 - Agronomy
 - Turf grass Management
- MS Plant Sciences
- MS Plant Pathology
- PhD Plant Sciences
- PhD Plant Pathology

Student Clubs

- Horticulture Club
- Graduate Student Club

Specialized Units Within the Department (see Appendix H for Details)

- Arizona Genomics Institute (2002)
- Arizona Plant Diagnostic Network
- Controlled Environment Agricultural Center
- Herbarium (Plant and Mycological)
- Karsten Turfgrass Research Facility

- Campus Arboretum

Graduate Interdisciplinary Programs (date indicates when that IDP began)

- Applied Biosciences (2011)
- Arid Lands Resource Science (1988)
- Biomedical Engineering (1977)
- Entomology and Insect Science (2009)
- Genetics (1964)

Membership or Joint Programs With Other University of Arizona Units

- BIO5 Institute
- Institute of the Environment
- Microbiology Commission

Partners/Cooperation with non-university

- Boyce Thompson Southwest Arboretum
- Desert Legume Program

Newsletters

- Journal: Desert Plants



Department of Soil, Water and Environmental Science

<i>Departmental Names</i>	<i>Department Heads</i>
2010 Soil, Water and Environmental Science	Jeffrey Silvertooth, 2000- current
2000 Soil, Water and Environmental Science	Peter Wierenga, 1988-2000
1990 Soil and Water Science	Art Warrick, Acting 1988
1980 Soils, Water and Engineering	Wilford Gardner, 1980 – 1987
1970 Agricultural Chemistry and Soils	Frank Wiersma, Acting 1978-1979
1960 Agricultural Chemistry and Soils	Richard Frevert, Acting 1977
1950 Agricultural Chemistry and Soils	Kenneth Barnes, 1973-1976
1940 Agricultural Chemistry and Soils	Wallace Fuller 1956-1973
1930 Agricultural Chemistry and Soils	
1920 Agricultural Chemistry and Soils	
1915 Agricultural Chemistry	

Key Changes in Last 30 Years

The department was one of the first six departments in the college - formed in 1915 as Agricultural Chemistry. In 1920 the name was changed to Agricultural Chemistry and Soils, which lasted until 1972 when the department was merged with the Department of Agricultural Engineering to become Soils, Water and Engineering. In 1985 the departments were divided again, to become Agricultural Engineering and Soil and Water Science. In 1996 the name was changed to Soil, Water and Environmental Science. Prior to 1956 the department was divided into two parts, each with a unit head – one for instruction/research and one for extension.

Initially the department focus was on plant nutrition and soil fertility, along with the appropriate analytical capability to measure various chemical components in water and soil. In the late 1960s the department began to focus on environmental issues as they relate to agriculture, and by the 1980s environment, broadly defined, had become the major departmental focus. The agricultural components have remained but the department's focus is in the broad arena of environmental science. In 2010 the department has full responsibility for the Bachelor Degree in Environmental Science and joint responsibility for the Bachelor's Degree in Crop Science with the School of Plant Sciences. Environmental Science includes a total of 15 focal areas students can select from that include areas such as contamination remediation; environmental biology, microbiology, chemistry, physics, policy, remote sensing, and atmospheric interactions on soil and water. The department was involved with the college microbiology program after it came to the college in the late 1980s but before management of the program was placed in the Department of Veterinary Science and Microbiology.

During the 1970s and 1980s the department became increasingly involved in environmental aspects of water and soil, as those two substrates are intimately involved in many pollution sources and controls. The movement to environmental areas was a natural evolution as most environmental contaminants become problems - in the soil, plants, and underground water table (and washout of air pollution). And, just like the needs of the agricultural community drove the departmental focus in the early 20th century, the needs of the broader environmental community have driven the focus of the department for the past 25 years. It turned out that the shift made a lot of sense as the department had long studied the vadose zone – that area from the soil surface to the top of the water table. This study area has been expanded to the critical zone, which is the “near surface” environment that goes down to the water table and includes vegetation and surface water. Since the 1980s there has been greater interaction with other departments within the university, including special laboratories that provide analytical services to other units and programs. Inter-departmental interactions have increased significantly. Examples are listed below.

The department moved from Old Main to the newly completed Forbes (Agriculture at the time) building in 1915. In 2010 it occupies five campus buildings: Shantz, Saguaro Hall (formerly Family and Consumer Sciences), Veterinary Science and Microbiology, Forbes, Gould-Simpson, and the Environmental Research Laboratory (at Tucson International Airport).

Mission 1982

- To provide information and service to all sectors of the state, public and private, and to enhance the understanding of soil and water whenever and wherever possible including water for irrigation and other land uses from the perspective of an arid region.

Mission 1993

- To serve the State of Arizona by instruction, research, and extension efforts in the area of soil, water and environmental science.

Mission 2010

- To support education and training, research, service, and extension/outreach in the broad areas of soil, water and environmental science.

Primary Focus 1982 (As Department of Soils, Water and Engineering)

- Agricultural Mechanics
- Agricultural Meteorology
- Energy and Systems Analysis
- Energy and Systems Use
- Engineering Structures
- Environmental Science
- Farm Machinery
- Irrigation and Drainage

- Mechanization
- Power and Processing
- Soil Chemistry
- Soil Fertility
- Soil Genesis, Classification And Morphology
- Soil Microbiology
- Soil Physics

Primary Focus 1993

Understanding the physical, chemical and biological processes occurring within the soil and at the soil/atmosphere interface - in particular

- Bio Meteorology
- Crop Management
- General Environmental Science
- Remote Sensing
- Soil/Plant Relations
- Water Quality And Water Management

Primary Focus 2010

- Critical Zone Science
- Water Quality

Majors and Degrees 1982

- BS Soil and Water Science
- MS Soil and Water Science
- PhD Soil and Water Science

Majors and Degrees 1993

- BS Soil and Water Science
- BS Environmental Science
- MS Soil and Water Science
- PhD Soil and Water Science

Majors and Degrees 2010

- BS Environmental Science with options
 - Biology
 - Chemistry
 - Microbiology
 - Science and Technology
 - Science and Policy
 - Remote Sensing and Geospatial Analysis
 - Soil Science
 - Sustainable Land and Water Management
 - Pollution Science
 - Biosphere Science
 - Communication and Education
 - Ecology
 - Environmental Change
 - Geosciences

- Natural Resources
- Water Resource Management
- BS in Crop Production (joint with School of Plant Sciences), with options
 - Agronomy
 - Turf Sciences
- MS Soil, Water and Environmental Science, with options
 - Environmental Science
 - Soil Sciences
 - Soil-Plant-Water relations
- PhD Soil, Water and Environmental Science (Same options as MS degree)

Graduate Certificates 2010

- Aquaculture
- Water Policy

Student Clubs

- Soil, Water and Environmental Science Club

Specialized Units Within the Department (see Appendix H for Details)

- Arizona Laboratory for Emerging Contaminants
- Arizona Meteorological Network (AZMET)
- Center for Environmental Physics and Mineralogy
- Environmental Research Laboratory
- Lysimeter Facility
- Water and Environmental Technology Center
- Water Quality Center Laboratory

Graduate Interdisciplinary Programs (date indicates when that IDP began)

- Arid Lands Resource Science (1968)
- Global Change (1994)
- Remote Sensing and Spatial Analysis (1977)

Membership or Joint Programs With Other University of Arizona Units

- Arizona Water Institute (disbanded in 2009 because of budget reductions)
- Biosphere 2
- Center for Toxicology
- Institute of the Environment
- School of Earth and Environmental Sciences

Non-university unit cooperation

- School of Earth and Environmental Sciences (2010)
- USDA Water Conservation Laboratory
- Water Resources Research Center

Newsletters

- None

Department of Veterinary Science and Microbiology

<i>Departmental Names</i>	<i>Department Heads</i>
2010 Veterinary Science and Microbiology	Charles Sterling, 2010 – current
2000 Veterinary Science and Microbiology	Jack Schmitz, 2006 – 2010
1990 Veterinary Science	James Collins, 2000 - 2006
1980 Veterinary Science	Lynn Joens, Acting Head, 1999-2000
1970 Animal Pathology	Charles Sterling, 1990 – 1999
1960 Animal Pathology	Cy Card, 1987 - 1990
1950 Animal Pathology	Glenn Songer, Acting Head, 1986
1940 Animal Pathology	John Mare, 1977 – 1985
	Ray Reed, 1967 - 1977
	William Pistor, 1938 - 1966

Key Changes in Last 30 Years

The department was founded in 1938 as Veterinary Science by splitting out a portion of the Department of Animal Husbandry, but within a year was renamed to Animal Pathology. It was renamed Veterinary Science in 1973. Microbiology was added to the name in 1997. Microbiology was initially taught in the Department of Bacteriology, then the Department of Microbiology. In 1983 it came under the Department of Microbiology and Immunology (College of Medicine). It was transferred to the College of Agriculture and Life Sciences in 1992. Initially it was operated as an “undergraduate program in microbiology” with coordination by the Department of Veterinary Science but also involving the Department of Soil, Water and Environmental Science, and the Department of Plant Pathology (now a division in the School of Plant Sciences).

Masters and PhD graduate programs in "Pathobiology" were created in 1992 and changed to Microbiology and Pathobiology in 2006. In 2010 these programs were renamed Microbiology. The Arizona Veterinary Diagnostic Laboratory began in 1983 through a special legislative appropriation and serves as a state resource for animal disease diagnosis for both agricultural producers and veterinarians. Administrative responsibility for this unit was transferred to the Agricultural Experiment Stations in 2010.

The faculty serve on a variety of committees or panels in professional societies and government and educational institutions. There has been increasing enrollment in both the microbiology focus and the animal health focus, partly because these are good majors for pre-medical students.

Mission 1982

- To provide appropriate leadership in the Veterinary Science by diligently searching for the truth through original research, by effectively communicating the truth through excellent formal and informal teaching, and by assisting in the maintenance of animal health by improving the quality of animal disease diagnosis in the state.

Mission 1993

- To provide knowledge, expertise and resources for improvement of animal health and welfare, including zoonoses and animal models of human disease, which influenced productivity and well-being of animals, their owners, and the general public.

Mission 2010

- To serve Arizona's needs for education, research, and problem-solving in animal or human health and welfare, biological or biomedical sciences and biotechnology or related fields which require scientific-based academic preparation.

Primary Focus 1982

- Disease ecology in arid lands
- Reproductive, enteric, and respiratory diseases
- Animal disease diagnostic services
- Counseling to pre-veterinary students

Primary Focus 1993

- Infectious diseases with particular reference to those related to the Mexican border
- Animal health and welfare including zoonotic diseases
- A new focus on new graduate program with the 1992 approval of masters and doctoral degrees
- A new focus on undergraduate education with the movement of the undergraduate microbiology program to the college of agriculture (administered by a college committee)
- Diagnostic services

Primary Focus 2010

- Veterinary and biomedical sciences
- Microbial pathogenesis
- Food Safety
- Aquaculture
- Valley Fever Research
- Diagnostic Services

Majors and Degrees 1982**Majors**

- Animal Health Science

Degrees

- BS Agriculture
 - Animal Health Sciences
- MS (through Interdepartmental Committee on Animal Physiology)
- PhD (through Interdepartmental Committee in Animal Physiology)

Majors and Degrees 1993**Majors**

- Veterinary Science

Degrees

- BS Veterinary Science
- MS Pathobiology
- PhD Pathobiology

Majors and Degrees 2010

Majors

- Veterinary Science
- Microbiology

Degrees

- BS Microbiology
 - BS Veterinary Science

 - MS Microbiology
 - PhD Microbiology
- Note: The above titles of the MS and PhD degrees became effective 2011

Student Clubs

- Alpha Epsilon Delta
- FACES in the Health Professionals Club (Fostering and Achieving Cultural Equity and Sensivity)
- Pre-Vet Club
- Microbiology Club

Specialized Units Within the Department (see Appendix H for Details)

- Aquaculture Pathology Laboratory
- Clostridial Enteric Disease Unit
- Parasitology Laboratory

Graduate Interdisciplinary Programs

- None

Membership or Joint Programs With Other University of Arizona Units

- Arizona Veterinary Diagnostic Laboratory

Newsletters

- Arizona Veterinary Diagnostic Laboratory Newsletter

Water Resources Research Center

Key Changes in Last 30 Years

The Water Resources Research Center (WRRC) began as the Institute of Water Utilization in the College of Agriculture in 1957. In 1964 it was designated to be the campus unit that was required by the Federal Water Resources Research Act of 1964. As a result, it was renamed and the reporting line moved to the university and reported to the Institute of Atmospheric Physics. One requirement of the 1964 Act was to provide a mechanism in the state to distribute federal grant monies. The WRRC reported administratively to different campus units over the years, had directors from various disciplines, and the focus over time was relevant to the major Arizona issues relating to water. The first director, Sol Resnick, had experience working in several

countries and had a personality that allowed him to get along with everyone. This experience came in handy when trying to start a unit of this type, that could compete with what others on campus did. This was a good start for the WRRC, as several water-related units were established over the years and WRRC worked well with all of them.

Unit Where WRRC Reports

- CALS - College of Agriculture and Life Sciences, 2001 - current
- CALS - Department of Soil, Water and Environmental Science, 1997 – 2001
- CALS - School of Renewable Natural Resources, 1991 - 1996
- College of Engineering and Mines, 1985 - 1991
- College of Engineering, 1983 - 1985
- College of Earth Sciences, 1972 - 1983
- College of Liberal Arts, 1964 - 1972
- College of Agriculture, 1957 - 1964

Unit Director and Discipline

- Sharon Megdal, Economist, 2004 - current
- Peter Wierenga, Soil Physicist, 1997 - 2004
- Hanna Cortner, Policy Analyst, 1991 - 1996
- William Lord, Agricultural Economist, 1985 - 1990
- Sol Resnick, Civil Engineer and Hydrologist, 1972 - 1984
- Richard Kassander, Physicist, 1964 - 1972
- Sol Resnick, Civil Engineer and Hydrologist, 1957 - 1964

Relationship to Other Campus Units

In 1991 a Memorandum of Understanding was adopted February 26, 1991 for the WRRC mission, operating, and staffing. It was developed and signed by the Deans' Water Council (the deans of six colleges: Agriculture, Business and Public Administration, Engineering and Mines, Law, Science, and Social and Behavioral Sciences). It was restated in 2000 as a result of the TRIF program (Technology and Research Initiative Fund). It also provided that the director would be recruited and appointed by the Deans' Water Council, that the director would not have tenure or continuing status in the WRRC, but would be in an academic department somewhere on campus. The WRRC as a unit was to be administratively located in the College of Agriculture (initially within the School of Renewable Natural Resources); it was clear that WRRC would retain its identity as a distinct unit. The Deans' Water Council no longer exists but the operation of WRRC still serves as a campus-wide unit that administratively reports to the Dean of CALS.

In 2001 the UA began [what is now known as] the Water Sustainability Program using funding from the UA Technology and Research Initiative Fund (TRIF). This funding was recently restructured and in July 2011 the WSP will be folded into the Water, Environmental and Energy Solutions Initiative (the Water Sustainability Program will continue). The Program includes five UA units, with the overall director, Sharon Megdal, from WRRC. These units are the WRRC, the National Science Foundation Water & Environmental Technology Center, the Superfund Research Program, the Sustainability of Semi-Arid Hydrology and Riparian Areas, and the Engineering Research Center for Environmentally Benign Semiconductor Manufacturing.

In 2006 the Governor Janet Napolitano established the Arizona Water Institute, a consortium with an office on the campus of each state university. The purpose was to have a point of contact on each campus where questions about Arizona water issues could be found. It involved research, education, and technology transfer. State budget reductions eliminated the offices on all three campuses in 2009.

In 2007 the WRRC established a Graduate Certificate Program in Water Policy and in 2010 cooperated in developing a new Master's Degree within the School of Natural Resources and the Environment – Water, Society and Policy.

Location

- During the 1950s it was located in the Forbes Building
- During the 1960s (late) it was located in Douglass Building
- During the 1970s it was in the Douglass Building
- During the 1980s it was on the West Campus Agricultural Center (I-10 and Prince Road)
- During the 1990s and to this time the WRRC has been located at 350 N. Campbell Avenue.

Focus of Water Related Issues

- During the 1950s and 1960s the focus was field work related to efficient water use and alternative sources
- During the 1970s the focus was on water pollution, including field work
- During the 1980s and 1990s the focus was on hydrology, including field work, policy and its role on water use and availability
- During the 2000s the focus was on water policy and management, education and information transfer

Mission

- The 1964 Act charged the WRRC with promoting and assisting water related research at the three state universities, and enhancing their contribution to the solution of critical water problems within the state. In addition, the WRRC continued activities that it began in 1957, working on methods of efficient water use and finding alternative sources (including recharge and minimizing evapotranspiration).
- In 1985 An Arizona “decision package” (special funds for specific uses developed through the legislative process) defined the WRRC mission as “to perform as the Arizona Water Information Center and to increase the effectiveness of disseminating information to the relevant water use communities.”
- In 1991 the mission was defined by the Deans’ Water Council as: to coordinate, facilitate, and support water-related research throughout the University and, in relation to its responsibilities under the Federal Water Resources Research Act, in all institutions of higher learning within Arizona. A secondary mission is to improve communication of water-related research needs from research users to University researchers and of research findings from researchers to potential users of that information. The WRRC will conduct its information transfer programs in close cooperation with Cooperative Extension and other University units with information transfer responsibilities.
- Currently the mission is to promote understanding of critical state and regional water management and policy issues through research, community outreach, and public education. This includes:
 - Assisting communities in water management and policy,
 - Educating teachers, students and the public about water, and
 - Encouraging scientific research on state and regional water issues.

Relationship to the Water Resources Research Act of 1964

The Act authorized establishment of a water resources research and technology institute or center in each state. The institutes were charged with (1) arranging for competent research that addresses water problems or expands understanding of water and water-related phenomena, (2) aiding the entry of new research scientists into the water resources fields, (3) helping to train future water scientists and engineers, and (4) getting results of sponsored research to water managers and the public. The program is administered by the U.S. Geological Survey as the Water Resources Research Act Program under the general guidance of the Secretary of the Interior. Subsequent amendments to the law provided for water centers to match each federal dollar with two non-federal dollars. There are 54 institutes or centers, including one in each state and four territories (reference is U.S. Geological Survey, State Water Resources Research Institute Program (for more information see: water.usgs.gov/wrri/ and snr.unl.edu/nivr/default.asp)

Current Special Programs and Focal Areas

- Water Sustainability Program (in cooperation with other campus water centers)
- Arizona Project WET (Water Education for Teachers)
- Arizona NEMO (Non-point Education for Municipal Officials). In 2011 this program will move to the School of Natural Resources and the Environment. .
- Arizona Master Watershed Stewards. In 2011 this program will move to the School of Natural Resources and the Environment.
- U.S.-Mexico Transboundary Aquifer Assessment Program
- Assessing and Addressing Environmental Water Needs; the Conserve to Enhance Program
- Water Pricing
- Water Planning

Newsletters and Publications

- Arroyo (single topic for each newsletter, began in 1987)
- Arizona Water Resource (began in 1991)
- Issue Papers (occasional topics with in-depth content)
- Special reports, DVDs, and maps.

Outreach

- There are a variety of outreach activities, including workshops, conferences, seminars, and presentations to various audiences. The amount of outreach has increased in recent years.

Chapter 14. Perspective of Dean's Office

The Dean is the chief executive of the college, but the overall organization is not typical of most colleges within the University of Arizona. Three associate deans report to the Dean, but they also have additional titles that give them fiduciary and programmatic responsibility: Director of Cooperative Extension, Director of Instruction, and Director of the Experiment Station. This dual reporting allows the dean to still be the chief executive, but the three associate deans submit reports directly to USDA. Since 1993 there has been a fourth Associate Dean, for Administrative Services.



In 1987 Eugene Sander became dean and made several changes in a short time. He hired three associate deans, changed some programmatic directions, and began new programs. A more complete discussion of Dean Sander and the previous deans (Bart Cardon, Darrel Metcalfe, Gerald Stairs, and Harold Myers) is in Chapters 4-6.

Primary Functions

The Dean is the Chief Executive Officer for the college, but the way that role is carried out varies by who is dean and what the operating conditions are at the time.

- Leading and managing the college
- Serving on university-wide councils, events, and committees
- Maintaining contact with client groups within Arizona
- Attending national meetings of a technical or administrative nature
- Explaining to new administrators (in- and out-of the college) the way that CALS works
- Meeting with various advisory councils
- Fund raising

Organizational Structure

A couple of months after Dean Sander arrived in 1987 he appointed a Committee on Potential Reorganization, and included a list of things the committee should do and should not do. The basic charge to the committee was “consider whether the current organizational structure is the one that will best serve our needs as we look to the future.” Five

months later the committee reported. Dean Bart Cardon had asked a similar question about two years after he became dean. The committee at that time, however, made the assumption that changes were only needed where problems existed. As a result, there was little change. The committee Sander appointed believed it would be better to provide options rather than a single recommendation. They provide three options, ranging from 1) an expanded number of departments and elimination of the school titles, 2) minor modifications, and 3) a new layer of management that would make the whole college structured like schools and divisions rather than departments, probably by one additional school. In the end only minor modifications were made.

The administrative support structure and related councils and committees is described in Appendix E. A listing of administrative unit heads or directors is in Appendix I, and descriptions of the academic departments is in Chapter 13.

Working with Clientele Groups and Government

All deans of agriculture in all states have the responsibility to have good communications with client groups and representatives of various agencies or associations. Pre-1980 this was easier, as a greater portion of the College was associated with agricultural subjects and there were fewer interfering obligations (such as detailed personnel policies, fund raising obligations, and being knowledgeable on a wide range of topics).

When Dean Cardon joined the College in 1980, he had one advantage over all past deans - he knew Arizona and a very large number of people in significant roles. He belonged to many professional associations; was an active businessman for a long time;

was an undergraduate, graduate student, and professor at the UA; and he associated with many of these people in significant roles while he was in either in ROTC or in the army during and after World War II. He used these connections to restore the reputation of the College after clientele relationships had deteriorated under the previous dean.

When Dean Sander joined the College, he had a professional career that took him through several states, the most recent being Texas. He acclimated quickly, however, to the Arizona scene. He became active in agricultural groups, he maintained contact with a number of people, and he built working and personal working relationships across the campus with the other deans. But, he had one other major advantage and that was Bart Cardon, who took Dean Sander around the state and introduced him to the people that he needed to know. There were several reasons that Bart and Gene got along well and had mutual respect for one another. It may have helped that they both had been military officers, both were biochemists, and both had a positive view of the future and what was possible. Both also could swap stories about how it is to drive to Phoenix several times a week.

Planning and Assessment

At the UA, colleges prepare periodic strategic plans for submission to the Provost and for guiding the Dean¹⁹. The departments prepare for annual budget reviews by describing departmental activities and issues and future activities in the context of the college strategic plan. This process started with Dean Sander just after his arrival in 1987, and followed a year where there was an increased interest in UA strategic planning (the Board of Regents requested a plan from the UA and the UA requested a plan from the deans, and so on). Prior planning efforts also were based on needs but were more focused on departmental initiatives rather than college-wide strategic choices.

Communication

Communication methods and topics have changed markedly over the last 30 years. Details for the types of college communications are described in Chapter 21. But, beginning in the mid-1980s, first with the installation of desktop computers, then electronic

¹⁹ See Chapter 11 for planning details and specific focus areas for CALS.

mail, and then the World Wide Web, there were new ways to communicate both with all-college audiences and the college faculty and staff. While face-to-face meetings continued, there were also newsletters, electronic conferences, group email, and finally the CALS Weekly Bulletin, begun in 2000. It was structured so any employee could make an entry (and every employee had to be on the distribution list).

Working with Faculty and Staff

In 1990 CALS began a “new faculty tour” that introduced new faculty to various facets of the state (generally including Maricopa, Pima, Pinal, and Yuma counties). It also gave a chance for faculty and staff to meet some of the college clientele and allowed the faculty to meet one another. In more recent years the group included someone from the university administration and some staff from CALS. The tours had everyone on a single bus, took three days, and, as budget cuts reduced the number of new faculty each year, an increased number of staff were able to participate. The initial project leader on the tours was Merle Jensen.

Prior to the 1980s there were few awards given by the college, or by the university with college recommendation, to citizens within the state. This increased dramatically during the 1980s²⁰. Similarly with awards for faculty and staff. The number of these awards increased but also changed over the years as new issues arose.²¹

Long standing university policy requires that faculty and staff be evaluated annually. The staff process is described by the university but faculty evaluations are more flexible. In 2001 Cooperative Extension began using a specially designed computer program for faculty evaluations. It was called APROL (Annual Performance Report On-Line), and in 2002 it applied to all CALS units. While it took a couple of years to have all faculty become familiar with the system, it became a useful way of obtaining basic data for evaluations. Peer review committees could read about activities where everyone used the same format, faculty could copy any relevant entries from

²⁰ See Chapter 9 for a description of awards and Appendix J for a listing of awards, the year the award began, and who received the award.

²¹ See Appendix J for a listing of faculty and staff awards and who received the awards.

the previous year, and administration could review trend data over several years.

Our faculty represent a range of disciplines. A list of the professional organizations that the faculty belong to is in Appendix P. This listing is long and indicates the variety of disciplines in the College, as science, in particular, has changed over the last 30 years.

Some faculty are interested in learning more about management techniques and leadership styles. Appendix Q includes a listing of the types of programs that are available. Individual participants from the College are also listed in that appendix.

Role of CALS in State Government

Prior to 1991, when Arizona established a Department of Agriculture, the College of Agriculture Dean and/or the Director of the Agricultural Experiment Station had some state regulator obligations. The precursor of the Department of Agriculture was the Commission of Agriculture and Horticulture (established in 1909), where the three-person commission consisted of two appointed members and the Director of the Experiment Station. Examples of additional roles include: the Dean recruited and selected the State Chemist (relating to analysis and registration of fertilizers and pesticides), and the early Deans served as the Agricultural Prorate Commissioner (relating to the amount of agricultural product produced relative to the demand for that product). This reorganization followed a 1971 report on reorganization of Arizona state government²².

Special Reporting Units

Development and Alumni

The Development and Alumni office was formed in 1981 as Development, and the Alumni function was added in 1988. See Chapter 19 for a full description.

²² Government Reorganization: Report to Legislature, by Governor Jack Williams. 1971. This 279 page report was intended to modernize Arizona state government. While there were additional studies, before and after this one, the information in this report seemed to influence how government was eventually reorganized. A copy is available at the Arizona Memory Project <http://azmemory.lib.az.us>.

Indian Programs

The Indian Program began in the 1988 with Howard Jones as an Assistant to the Dean for Native American Programs. In 2000, Joe Hiller became Assistant Director of Cooperative Extension for Native American Programs, and Specialist, Watershed Management. In 2001 he became Assistant Dean for Native American Programs. In 2003 the name changed to American Indian Programs, and in 2009 at times it was just called to Indian Programs.

The role of the office has remained mostly constant since its beginning: to provide leadership for CALS programs, projects and activities with the 22 Indian Tribes in Arizona, including teaching, research, and extension. This includes maintaining appropriate professional and institutional relations with tribal communities and tribal colleges; CALS maintains seven Cooperative Extension offices on five reservations, but the Assistant Dean for American Indian Programs works with all tribes in Arizona and nationally.

Since the 2000, the assistant dean (Joe Hiller) has served as the state Project Director for FRTEP, the Federally Recognized Tribal Extension Program. He is also the Department Head of the University of Arizona's American Indian Studies Graduate Interdisciplinary Program. He served on the President's White House Initiative on Tribal Colleges and Universities and continues to serve as a board member on the Indian Land Tenure Foundation.

Water Resources Research Center

The Water Resources Research Center began in 1964 and moved to CALS in 1991. See Chapter 13 for a full description.

Budgets and Resource Allocation

The CALS budget is separate from the rest of the university. The university receives a budget that is then allocated to the various administrative units. In addition to the above budget there are two more budget items – Cooperative Extension, and the College of Agriculture and Life Sciences. These were legislative changes. However, of course, CALS has to follow university procedures in dealing with the budget just as any other administrative unit does.

The CALS budget process is in several stages:

- The CALS strategic plan defines the general areas of focus and is consistent with the UA strategic plan. All CALS administrative units use

the focus areas (currently six) to estimate their resource uses, broken out by teaching, research, and extension for the previous year.

- The Office of Administrative Services prepares a range of budget scenarios to establish if funds are likely to be up or down the following year.
- All administrative unit heads prepare a short budget briefing document, following guidelines, and meet with the Executive Council. After all units have made their presentations, the Executive Council reviews the reports and the key points of the discussions.
- Final budget decisions are made based on perceived new directions the college should incorporate and the presentations of administrative units.

In recent years, particularly the last 20, there have been budget recessions, assessments, and reallocations from the central administration. All these caused decreases in the CALS budget. The legislature increased budgets over most years but there were reductions by a variety of methods (such as increasing pay for faculty and staff but not providing matching funds for university contributions to health and retirement benefits). Budget changes can be made more than once a year, and in the last 20 years there were 20 such reductions and 14 increases (FY 1990-FY 2010).

Greater efforts at fundraising began in the early 1980s and increased over the years. The types and holders of endowed chairs are described in Appendix K.

Facilities

Until the late 1980s essentially all university buildings were funded by state appropriations. At that time the legislature provided a mechanism for the university to sell bonds to provide for new buildings, and paying the bond by future income from various sources. This caused a number of new buildings to be built. Since the late 1990s there has been a movement to find donors for portions of new buildings, through endowments or donations. This causes people in a dean's position to become fund raisers in addition to their other obligations. See Appendix G for a listing of CALS facilities.

Special Administrative Units That Were Eliminated since 1980.

There have been many changes in administrative units. Some were renamed, some combined, and a few eliminated as their activities were taken over by other units. The eliminations include:

- Center for Quantitative Studies
- Council for Environmental Studies
- Pesticide Information and Training Office

Chapter 15. Perspective of Academic Programs

The Academic Programs office involves all the undergraduate and graduate instructional activities for enrolled students. This includes recruitment efforts, retention, enrollment and advising, scholarship management, student awards, and graduation related activities. The office was originally called Resident Instruction, with a name change to Academic Programs in 1994. Since 1973 the director has also carried the title of Associate Dean. Prior to 1973, with the arrival of Dean Gerald Stairs, the “Resident Instruction” office was operated relatively independently from the other two primary college responsibility offices: Cooperative Extension and the Agricultural Experiment Station. Since 1980, with the arrival of Dean Bart Cardon these three offices are run separately but work cooperatively.



David Cox has been Associate Dean of Academic Programs since 1996. Cox holds three degrees from the UA. After completing his bachelors degree in Agricultural Education, he started the program and taught high school agriculture at Baboquivari High School on the current Tohono O'odham Reservation. He then completed the Master of Science degree while teaching at Arizona Western College in Yuma. He returned to the university working on a grant funded project and completed the Doctor of Philosophy degree. An opportunity arose at Cameron University, a part of the Oklahoma State University System, to begin a teacher education program in agriculture and Cox accepted the challenge to initiate the program. He returned to the College in 1984 as an Assistant Professor of Agricultural Education and earned tenure and promotion to Professor.

Previous Associate Deans or Directors

- David Shoup, 1992-1995
- William Hannekamp, Acting, 1990-1991
- John Law, 1988-1990
- Phillip Upchurch, 1983-1988
- William Hannekamp, Acting, 1982-1983
- Darrel Metcalfe, 1958-1981 (retained title while serving as dean)

Basic Functions

While the basic functions of the office have remained relatively constant for the last 30 years, the details have changed markedly. Some of the common features include overall curriculum design, aca-

ademic advising, financial aid (fellowships and scholarships), student clubs, awards, internships, honors programs, and student advocacy and academic integrity. In CALS faculty teach the courses but teaching assistants are used in laboratories or discussion sections.

Big Changes Have Occurred

In the last 12 years, overall enrollment is up 30%. Undergraduate enrollment increased from 80% to 88%. Hispanic enrollment is up 93% to be 19% of the total and female students are almost 70% of total enrollment. CALS is the fourth highest degree awarding UA college.

1980

The early 1980s represented a major change in the way instruction was given in the college. Prior to that time, lectures were augmented with a slide projector or overhead transparency projector. Occasionally photocopies of selected material would be provided or it would be placed in the library for temporary reading.

Advising was coordinated by the office but largely carried out by the departments, and there were a number of student clubs. Our students were beginning to change from rural to urban, bringing fewer practical agricultural experiences. In 1975 Lawrence Aleamoni joined the university in the College of Education and brought his teaching evaluation system with him. It was the CIEQ (Course/Instructor Evaluation Questionnaire). By the early 1980s this questionnaire was used at the end of each semester for every course in the college. The computerized analysis provided feedback to the instructor for making improvements in both the course design and the method of teaching. The results were shared

with department heads and school directors for use in their annual evaluations of the faculty.

When personal computers arrived in the mid 1980s there was a shift in the way presentations were made. Several classrooms were equipped with “homemade” cabinets for securing a computer. Projection equipment was mounted for showing slides by the computer. This was a little complicated, as there was no standard software for showing the equivalent of slides and faculty were not accustomed to using the equipment. Students generally did not have their own computers but the university was building computer laboratories for open use or reserved for a class period. By the late 1980s electronic mail and computer conferencing (group discussions) became available for class work or for questions to the instructor. In the late 1990s several departments developed their own computer laboratories, and basic computer literacy courses were provided as well as class-specific uses.

1990

While advising was still largely provided by the departments and schools, an increased effort for advising was provided by the Academic Programs Office. These included student walk-in opportunities and the College taking over the periodic checks the university does for student progress.

With faculty becoming familiar with the software and personal computers, they began preparing special booklets for the students to buy at the bookstore. They became known as “course packets” and included a range of materials such as general information about the course and its requirements, special summaries of selected topics by the instructor, and copies of selected journal articles. At about the same time, the university made arrangements for reproducing single chapters from books or other commercially available materials.

Budget constraints and time considerations caused the elimination of some course laboratories, but the lack of practical experience of some of the students caused other laboratories to be developed.

David Shoup, while Associate Dean for Academic Programs, began a long-distance class in Agricultural Engineering in the early 1990s: the instructor was in the UA Forbes building, the students were at Arizona Western College in Yuma, and the microwave communications network was provided by Northern Arizona University. The students could complete a

bachelor’s degree from the UA this way, with offering the specialty courses and with Arizona Western providing the other courses. The program still exists but the content and methods of providing the distance education have improved considerably. Many courses are now taught by CALS faculty members who are located in Yuma. The roles of Northern Arizona University and Arizona Western Arizona College have changed, but all three institutions are involved in courses for the degree. The program is now a Bachelor of Science with an option in Agricultural Systems Management (offered through CALS but only available in Yuma).

Shoup also started the college Ambassadors for Agriculture and Life Sciences. CALS Ambassadors are students who represent the various departments of CALS. They serve as peer recruiters, peer mentors and liaisons for the promotion of programs in CALS. In addition, the School of Family and Consumer Sciences also has Ambassadors for Family Studies and Human Development.

1995

Fred Wolfe, while department head of Nutritional Sciences, developed a general education course in nutritional science. Students could take the course two ways: a traditional classroom experience or by a DVD disk on their own computer. For those taking the course electronically, they had to come to a classroom to take the examinations. The college provided the technical support to record and reproduce the DVDs.

The 1993-95 university catalog was the first UA online catalog, and it contained most of the required information. The following catalog, 1995-97, was the first fully functional catalog on the relatively new world wide web.

2000

All departments have web pages and all students have access to internet sources. This allows new classroom techniques in rooms that range from small discussion sessions to large auditorium classes.

2005

Smart phones are just becoming popular and over the last few years have become part of the teaching experiences. New ways of electronic interaction with the instructor, by a hand held device that will give immediate responses or allow the student to ask questions, even in a large auditorium. One instructor

remarked that she was better able to interact with students in a large classroom with these techniques than she could in a small classroom the old non-electronic way.

Faculty Development and Student Outcomes

During the past several years, led by Academic Programs, the College initiated a more intensive approach to faculty development. Two workshops per semester has become the norm. Those workshops have focused on everything from teaching methods to the use of technology in the classroom. The selected topics for the workshops are actually determined from faculty input and from the most current research and innovations that hold promise for enhancing the quality of the teaching efforts of the faculty members in the College.

In addition, the awards and recognition programs for outstanding teaching and advising have been expanded. Included in this effort was the establishment of the Bart Cardon Academy for Teaching Excellence, which now includes the most highly decorated teaching faculty members in the College with the express purpose of supporting and recognizing excellence in teaching. Awards are presented for academic advising, new faculty teaching excellence, and for sustained excellence in teaching.

An annual follow-up study of the graduates of the College is now in place and seeks to understand their experiences after graduation and specifically asks for their suggestions in terms of the curriculum and programs offered by the College. These data are reviewed with the express purpose of keeping the programs within the College relevant and in tune with not only what is going on in the world in which our graduates find themselves but also in which they will yet live and work in the future.

Curriculum changes have been initiated to be sure students are prepared upon graduation to enter their chosen profession or to attend graduate or professional schools. The number of different programs and majors has been refined over the years and reduced from over thirty to the present fourteen. This has been done in order to remain relevant and to focus on excellence in the academic programs.

Students Have Changed

The number of students with an agricultural background is in the minority. This has shifted the type of teaching as more fundamental examples are pro-

vided where 30 years ago the students had their own experiences that were relevant to classroom instruction.

CALS provides the majority of biological sciences courses for the general education programs (a listing of courses that students can select from to meet their general university requirements).

There are three departments/schools with the most enrollment: the School of Family and Consumer Sciences, Veterinary Sciences and Microbiology, and Nutritional Sciences.

Today the number of student clubs is less than what existed in 1980 even though the enrollment is higher. Student clubs that are department-specific are listed within the “perspectives of departments” chapter and also here:

- Agricultural Communicators of Tomorrow
- Alpha Tau Alpha
- Alpha Zeta (honorary)
- CALS Ambassadors
- Collegiate Cattle Grower’s Association
- Collegiate Equestrian Team
- Family Studies and Human Development Ambassadors
- Horticulture Club
- Jacobs-Cline Society
- Minorities in Agriculture, Natural Resources and Related Sciences (MANRRS)
- Nutritional Sciences Club
- Pre-Veterinary Club
- Race Track Student Organization
- Rodeo Club
- Sigma Alpha
- Soil, Water and Environmental Science Club
- Students in Free Enterprise (SIFE)
- Tierra Seca (Range Management)
- Wildlife Society

Communication

The Office of Academic Programs distributes a “Monday Message Newsletter” by electronic mail to undergraduate students. It includes timely information relating to classes, scholarships and special events. This began in January 2009. Previous methods of communication were paper newsletters made available in the Academic Programs Office.

Scholarships

CALS has had a range of scholarships available to students for a long time. In recent years the number of scholarships has grown as well as the dollar value of the scholarships. Prior to the World Wide Web this information required spending time going through a set of large three-ring binders. Now they can be reviewed on the web and a CALS scholarship application can be completed on-line. Some scholarships have broad criteria and others are very specific (such as the student is from a specific Arizona town). Other financial aid information is also available on-line, including federal grants and loans.

Advising and Recruitment

Pre-1980 advising was done by individual faculty and the Academic Programs office was more involved with assigning students to faculty for advising, curricular issues, and scholarships and recruiting. While the curricular issues, scholarships and recruiting is still an important effort, a good deal of

advising, particularly the non-declared majors, is done through the Advising Resource Center, started by David Cox in 1999. However, the departments still do the majority of advising, but with designated faculty as advisors and in some cases full time staff as advisors. In addition, the Center does degree checks, which used to be done by the University administration.

Faculty Development and Student Assessments

The Office developed a system of faculty development to enhance teaching. There has been a variety of early approaches over the years, including training in personal computer use in the mid 1980s, to seminars about teaching methods, to guidelines for how to teach and work with students.

The Office of Academic Programs follows up with students after graduation to better assess which courses were most useful or where new course subjects should be developed.

Chapter 16. Perspective of Cooperative Extension

Cooperative Extension is one of the three main pillars of any land-grant college of agriculture. Extension is represented on the CALS Executive Council by the Associate Dean and Director and has offices in each of Arizona's 15 counties. Extension in Arizona was structured and operated basically the same from its beginning in 1914 until 1974 when a new dean made some changes in reporting structures. During the 1980s a number of changes were made that are still in place today, including specialists located in academic departments, hiring and evaluation procedures, program focus, and how those programs are delivered. Thus there were major shifts in extension in the mid 1970s, the early 1980s, and the late 1980s. Things became more modernized and more stable with one director since 1989. Details for county office are in Appendix G (facilities) and all college administrators are listed in Appendix I).



In 1989 James Christenson became Associate Dean and Director of Cooperative Extension and made some immediate and significant changes. He moved leadership for making the final hiring decisions of all county faculty to the director's office for more consistency and quality. He also required all new county faculty to have a master's degree or higher and to generate additional resources through grants, contracts, and cost recovery. Jim addressed a series of budget reductions by increasing the amount of non-state funding and by creating "area agent" and "regional specialist" positions, where an agent that specialized in a particular area covers more than one county. The regional and specialist positions are approved by Cooperative Extension and the academic department or school. There is also a method which also allows county agents to be involved in departmental activities.

Christenson's undergraduate degree is in Chemistry and his doctorate is in Sociology. Before coming to the University of Arizona, he was Head of the Department of Sociology at the University of Kentucky. The department was involved in three colleges, including rural sociology and medical sociology. He also had co-authored a book reporting the results of a national assessment of the Cooperative Extension Service (Warner & Christenson, 1984). Christenson brought a new perspective to Cooper-

ative Extension as the first non-production agriculturalist and the most experienced at performing program assessments and evaluations. One of the first things Christenson did was to compile a Source-Book: A Listing of Faculty and Technical Staff (also known as the "Red Book"). It included all extension personal and college faculty and administrators. The list of nearly 300 names described where the people were and what they did and was published in 1993.

All faculty at the UA are required to submit annual reports, which are used as part of the evaluation process. Christenson and Associate Director Deborah Young modified this process by converting it to an electronic format called APROL (Annual Performance Report On-Line). After some trials, it began use in 2001 for extension and in 2002 it applied to all CALS units. There are several advantages of this process, including that it is faster to complete entries and search for key terms and the entries can be used by anyone in the system and from any location. They are also useful to learn what others are doing. For example, APROL was used to identify the professional associations where CALS faculty are members (see Appendix P).

Extension also changed management practices for developing assessment information. Prior to 2000 a system called AEMIS was used to identify specific audiences (Arizona Extension Management Information System). This included estimates for the number and type of attendees for each program offering, as required by USDA. This process was discarded in 2000 and replaced by APROL.

How Does Extension Differ from Typical University Teaching and Research?

Cooperative Extension in Arizona began in 1914 as Agricultural Extension; before that time, the transfer of agricultural information from the UA was through the Agricultural Experiment Station. Over the years the “agriculture” was dropped and the term became “Cooperative Extension.” This made sense as the funding and management is a cooperative effort between the federal government, county government, and the UA. In addition, the relative emphasis among the various extension programs was also changing. State law defines the composition and activities of the seven-member County Extension Advisory Boards that are appointed by each County Board of Supervisors.

These boards review county extension office plans and budgets annually. In addition, the Arizona Board of Regents approves Cooperative Extension plans of work for the following year, and each five years the US Department of Agriculture approves the state plans. As part of the review process, assessments must be done to evaluate program effectiveness and client reactions. Christenson also changed the review process to be joint with the Agricultural Experiment Station, which was also required to submit plans of work. This further increased the complimentary interaction between research and extension.

Previous Directors

Jim was preceded as director by Roy Rauschkolb, who served in that role 1981-1989 and later became Resident Director for the Maricopa Agricultural Center. Rauschkolb made several major changes, including bringing extension specialists into the campus departments. Prior to this, the specialists reported to the extension director. This represented a traumatic change for some of the longer-term specialists, and it took a little while to develop university procedures for the different types of appointment – one type of faculty was “continuing” appointment and the other was “tenure” appointment²³. Rauschkolb had experienced this new approach when he was an Associate Director of the University of Cali-

fornia Cooperative Extension. It served to better connect all extension personal with the academic teaching and research of the academic departments, thus bringing more up-to-date information to extension clientele. Rauschkolb had also been an extension specialist at the UA during 1966-1969. From 1981 through 1989 the director’s office was structured with two regional directors.

The eastern counties were initially administered by Jim Williams, and he was replaced by Howard Jones in 1983. The western counties were administered for this period by Ray Weick. Life was further complicated when La Paz county was formed in January 1983, by splitting Yuma County, and in 1984 La Paz county required an extension office. Rauschkolb also equipped the county extension offices with satellite receiver dishes (some are still visible on county offices, but they are unusable today) and personal computers. This was done at the same time the UA was installing personal computers and the UA had a two-for-one match for on-campus departments to purchase computers. From 1983 to 1984 the number of UA personal computers increased 8-fold due to this funding opportunity.

Rauschkolb was preceded by Craig Oliver, who served about a year and a half (1980 – 1981) and was appointed by Dean Metcalfe. About this time things were becoming stable again. When Stairs became dean, he took the title of Dean of the College, and the titles of Director of Resident Instruction, Director of Extension and Director of the Experiment Station; the previous directors of these units became associate directors. After Stairs left, Metcalfe continued this process, and it was not changed until Bart Cardon became dean. This change caused the long-term extension director, George Hull (1961-1974) to leave (he became Associate Director of Extension at the U.S. Department of Agriculture).

Programs and County Offices

There is an extension office in each of the 15 counties, and several counties have additional offices. Five Indian Reservations have extension offices, but extension serves all 21 reservations. Extension specialists teach some campus courses, and some county agents have become area agents – covering more than one county on issues related to the agent’s specialty. County offices all work with the internet as well as having a variety of traditional contact methods with clientele.

²³ Tenure is focused on publications and continuing appointment is focused on service. The university review process and criteria are different for each, and each have their separate evaluation committees. Prior to the 1980s all extension appointments were tenure.

The specific program emphasis areas within Cooperative Extension have changed over the years, based on needs at the time, clientele views and program assessments, but the four current categories represent the basic subjects over the years (even though the specific names have differed). Current program areas, including their initial focus when the College began, are the following:

- Agricultural and Natural Resources (initially as Agriculture),
- Family, Consumer and Health Sciences (initially as Home Economics),
- Community and Economic Development, and
- 4-H Youth Development (initially as 4-H).

Community and Economic Development was created from Rural Development, which was not an original program area in 1914 but developed in the late 1960s.

Planning and Assessment

Cooperative Extension has multiple levels of involvement in planning. As part of Arizona state law Cooperative Extension is required to submit an annual Plan of Work to the Board of Supervisors. As part of the federal extension system, an additional annual Plan of Work is required. These formats vary but generally require a summary of accomplishments in the previous year and a means of determining needs of the various types of clientele. These requirements have been in effect for many years, but formats and areas of emphasis may change over time.

In addition to the above plans, Cooperative Extension is part of the CALS strategic planning effort and, in addition, has its own strategic plan. All of these plans and assessments are coordinated with the Agricultural Experiment Station and the CALS Executive Committee.

In 2000 Cooperative Extension (and the Experiment Station) began publishing Impact Statements, which contained one-page summaries of a variety of programs and the impacts they had. That format was converted into longer summaries called “Arizona Delivers” (while continuing to publish the short version).

Communications

In the old days (pre-1950s) contact between extension faculty and their clientele was highly individual

and personal. Visits to farms and ranches were common, field days for educational talks or demonstrations, bulletins or pamphlets were focused on a particular topic, and both the UA and most of the county extension offices had radio (and later television) programs and public service announcements. While all of these exist to some extent today, the communications has largely become internet based, whether email, newsletters, discussion groups, or technical publications. See Chapter 21 for examples of college publications.

Budgets and Clientele Change

The original extension funding was to be one third each from the federal government, the state government, and the county government. In the early 2000s, in Arizona, the state provided about 67%, the federal government about 20%, and the remaining 13% from the county. This funding was the long standing example of a stable 3-legged stool approach - support from federal, state, and county. In recent years it has become a wobbly five legged stool, with substantially changed percentages for each leg. In the late 2000s the federal share was 3%, state 34%, county 9%, grants 43%, and fund development 11%²⁴.

At the same time, the audience was shifting to become more urban and the subjects were also shifting to include more gardening, family, and youth, while still providing a significant emphasis on agricultural production. The 2010 listing of topical program areas indicate these shifts.

A New Extension – eXtension

With the advent of electronic communication accessible to large numbers of U.S. citizens, there were discussions of how to best provide extension information more efficiently. For years various state extension services made slight modifications to publications developed in other states, so they would be relevant to new geographic areas. With the ease and speed of electronic access it now became feasible to modernize this old approach.

In 1993, just after the appearance of the World Wide Web, the concept of a national method of distributing extension information was discussed. The next 10 years were spent evaluating types of content,

²⁴ Fund development includes cost recovery (for example, publication sales) or foundation donations.

methods of distribution, and how to be efficient and effective with minimal resource expenditures. Two problems emerged: providing some type of credit to those institutions developing electronic publications and used by other institutions, and accounting for the cultural and environmental differences among the states where those differences might affect the publication content. Solutions were developed but there are still some problems in making the content relevant to a particular state.

In 2008 the national eXtension system was made available to everyone. When you contact the website of eXtension (extension.org) the system knows which state you are coming from (via the address of your computer) and shows you a general page but with a header indicating the name and link for your state extension website.

By 2010 there were over 70 universities involved in the project, including the University of Arizona.

Current Clients and Extension Focal Areas

Extension clientele have become more urban over the years, as Arizona has become urban, and extension followed the demand for program offerings. Many of the agricultural commodity groups and other related organizations are located in the Phoenix metropolitan area and so the old classifications of rural and urban are not as clear cut today.

Comparing Previous Times

In 1985, UA Cooperative Extension had:

- 3,000 Volunteers assisting in 4-H programs
- 40,000 Youth enrolled in 4-H Youth Development Programs

In 2007, UA Cooperative Extension had:

- 9,182 Volunteers assisting county programs; 98,008 hours of time volunteered
- 92,186 Youth enrolled in 4-H Youth Development programs
- 254,525 Participants in Cooperative Extension programs

1985 Focus Areas by the Four Program Areas

Agriculture and Natural Resources

- Efficient irrigation water use
- Natural resources conservation and management

- Producing crops and livestock more economically
- Market development and marketing

Home Economics

- Nutrition and food safety
- Family financial management
- Family self-sufficiency and resource management
- Interpersonal relationships dealing with stress, child abuse, and life transitions

Rural Development

- Rural leadership development program in Project CENTRL
- Development of volunteer programs
- Assist in public issue decision making through group processes /conflict resolution
- Assist rural communities to identify human, natural, and economic resource development needs

4-H Youth

- Youth development of lifelong learning tradition in volunteerism
- Youth development in leadership and interpersonal skills
- Assist youth in career selection
- Assist adults in leadership development

2010 UA Cooperative Extension Topical Programs include:

- * American Indian Programs
- * Animal Foraging Behavior
- * Aquaculture
- * Arizona Livestock Incident Response Team (ALIRT)
- * Arizona NEMO (Non-point water pollution Education for Municipal Officials)
- * Arizona Project WET
- * Beef Quality Assurance
- * Biometeorology and AZMET
- * Bone Builders
- * Brain Builders
- * Citrus Management
- * Climate Science Application
- * Commercial Horticulture
- * Controlled Environment Agriculture
- * Crops and Cropping Systems
- * Cross Commodity

- * Dairy Extension
- * Environmental and Natural Resource Policy
- * Extension Food and Nutrition Education Program (EFNEP)
- * Firewise
- * Forage and Grain Crops
- * Forest Health
- * Fruit and Nut Crops
- * Geospatial
- * Grandparents Raising Grandchildren
- * Horse
- * Integrated Pest Management (IPM)
- * Irrigation Water Management
- * Land Use Planning and Sustainable Development
- * Master Consumer Advisor
- * Master Gardener
- * Master Watershed Steward
- * Meat Science Lab and Food Safety
- * Noxious, Invasive Plants
- * Pesticide Training
- * Plant Disease ID
- * Plant Disease Management
- * Precision Ag and Ag Energy
- * Rangeland Management
- * Safe Food 2010
- * Small Acreage Landowner Education
- * Small Steps to Health and Wealth
- * Soil Fertility
- * Specialty Crops Mechanization
- * Sports Nutrition
- * Supplemental Nutrition Assistance Program Education (SNAP-ED)
- * Sustainable Agriculture
- * Sustainable Economic Development and Economic Analysis
- * Turfgrass
- * Urban Horticulture
- * Urban Integrated Pest Management
- * Vegetable Crops
- * Walk Across Arizona
- * Waste Management and Transformations
- * Water Policy
- * Water Quality
- * Water Reclaimed and Reuse
- * Watershed Management
- * Weed Science

The big changes over the past 30 years have been the increases in youth participants, programs in environment and natural resources, and urban audiences, such as the Master Gardener program. There has also been a shift from rural to urban audiences. Organizational shifts have included the introduction of “area agents” who cover several counties, fewer

central administrators, and shifts to electronic information delivery.

Among the unique activities within Cooperative Extension is Project CENTRL (Center for Rural Leadership). It began in 1981 with funding from the Kellogg Foundation and in 1998 became a non-profit 501(c)(3) organization that partners with Cooperative Extension. The two-year program is intended for individuals already in leadership positions in towns and small cities across Arizona. It offers 12 seminars that provide leadership skills and networking opportunities for current and past participants (over 500 persons). Leadership skills are also provided to youth participants in the 4-H programs that are organized for each county.

Children, Adults, and Volunteer Teachers

There have been 4-H Youth programs from the beginning of Cooperative Extension, with each county selecting the specific programs that are most relevant to the county. Since about the mid-1970s the relative mix of students has shifted from rural to urban, but many of the urban area participants are really suburban and therefore semi-rural. The number of 4-H programs is always changing, and while many topics still focus on traditional subjects (agriculture, sports, citizenship, leadership), a number are reflective of today’s society – science, technology, engineering, and math.

There are specific programs for Teachers, the largest being Project WET (Water Education for Teachers), where materials and training sessions are given for school teachers to become more knowledgeable in water issues. Grades range from Kindergarten through High School. This program began in Arizona in 1989 after South Dakota developed the concept; it is now in all 50 states.

The “Master’s” Designation is given to a few specific programs that work with volunteers to become knowledgeable in selected areas and then serve as advisors to the public in that subject areas. The training programs vary; for the most popular, Master Gardeners, it is over 50 hours of training.

- Master Consumer Advisor
- Master Gardener
- Master Watershed Steward

***2010 CALS Focus Areas by County Extension
Resource Allocation***

The counties' portion of the Cooperative Extension distribution of resources (salaries and operations) among the CALS Focus Areas is:

- Environment, Water, Land, Energy, and Natural Resources – 30%
- Plant, Insect and Microbe Systems – 21%
- Human Nutrition, Health and Food Safety – 11%
- Children, Youth, Families and Community – 27%
- Animal Systems – 6 %
- Consumers, Marketplace, Trade and Economics - 5%

Chapter 17.

Perspective of Agricultural Experiment Station

The Experiment Station has several functions in addition to operating the off-campus Agricultural Centers. Most importantly, it is the administrative arm of all research activities in CALS. It also provides information to the USDA National Institute of Food and Agriculture regarding the types of research underway in Arizona. Each land-grant university provides this information, and the compilation of results is easily compared on a state or national level. These activities allow easy sharing of information among the states and facilitate many cooperative projects that focus on specific research topics. The Experiment Station also engages in multi-state projects (Hatch projects) with other land-grant universities, which are funded by USDA but require state matching funds. More details are available in Appendix G (for facilities) and Appendix I (for head of administrative units).



In 1989 Colin Kaltenbach became vice dean and director of the Agricultural Experiment Station, following the retirement of L. W. Dewhirst, and continues in those positions today.

Kaltenbach was raised in Wyoming and got his doctorate in Animal Physiology from the University of Illinois,

returned to the University of Wyoming as a faculty member, and eventually became Director of the Experiment Station. He has served on a number of national policy and action oriented committees, including modernizing the USDA CRIS (Cooperative Research Information System) process for reporting and comparing the types of research activities in all land-grant universities and developing roadmaps for future directions of the nation's Agricultural Experiment Stations. He served as national chairman of the experiment station directors on two separate occasions. During the last decade or so as budget cuts reduced some administrative positions, Kaltenbach took on additional roles, including Director of the International Agriculture Program (which includes the University of Arizona Peace Corps Office), and Director of Educational Communications and Technologies.

Previous Directors

L. W. Dewhirst arrived in 1957 as an assistant professor of animal pathology, and left the UA in 1974 to be in assistant dean for student affairs in the Col-

lege of Veterinary Science at the University of Missouri. (The Dean of the College of Veterinary Science was a former Professor at the UA). He stayed in Missouri for two years before returning as Associate Dean and Associate Director of the Experiment Station in 1976 (under Dean Stairs the director title was vested in the dean and there were three associate directors of the experiment station). Dewhirst became the first person to hold the title of Vice Dean and Director of the Agricultural Experiment Station.

Richard Frevert was the director before Dewhirst, serving from 1958 to 1975. He represented the last of a series of directors that operated relatively independently from the Cooperative Extension and Resident Instruction units within the college. In the mid-1970s this process changed and three directors worked more as a team on college-wide issues, in addition to their functional responsibilities

Reporting Units

Units that report to the director include:

- Agricultural Center resident directors.
- Academic department heads for the portion of their faculty and project funding that is designated as research.
- Selected administrative units such as the Quality Guidance Council and International Agricultural Programs.
- Special units such as the Boyce Thompson Arboretum State Park (jointly operated by the state, CALS, and the Boyce Thompson Foundation).
- Veterinary Diagnostic Laboratory.

The Relationship of the Experiment Station to a University Organized Research Unit

In the 1950s the University of Arizona, like many state universities, was primarily a teaching institution but with some research. The Agricultural Experiment Station served as an “Organized Research Unit” (ORU), a term that developed later and describes university administrative units that are exclusively to perform research. Geiger has summarized how important ORUs were for the growth of research in American universities, especially post World War II (Geiger, 1990). Geiger noted that in 1950, the five most important examples of federal research funds going to universities (in decreasing order) were Atomic Energy Commission projects, small projects in natural science, large defense projects, agricultural experiment stations, and public health service projects.

The University of Arizona has had a number of ORUs for a long time, beginning with the Agricultural Experiment Station, and followed by the Tree Ring Laboratory in 1937. The next unit was the Institute of Atmospheric Physics in 1954, which began a series of units of this type. Today there are many of these units and they occur at all administrative levels, from department, to a cooperative interdisciplinary unit, to a university-wide unit. The significance of this structure in a university is that the ORU focuses on research. The uniqueness of the land-grant structure was that it blended teaching and research, and later, extension, into a single organization – the college of agriculture. And to make it obvious, the faculty appointments and reporting structures were such that in almost all circumstances except county faculty, the faculty member was jointly appointed between at least two of these three roles. This integrated teaching, research, and extension in ways that caused them to be complementary. This structure still exists today and is further discussed in Chapter 18.

Relationships Among Experiment Stations

The University of Arizona was late getting started with its university (where the Experiment Station was the first administrative unit) when compared with many land-grant universities (the Morrill Act was passed in 1862). There were (at least) two major differences for Arizona in these early stages – the economy was largely dependent on mining as well as agriculture, and the type of agriculture needed some adaptation to the weather and water patterns. But

there also were many similarities to other experiment stations. Kerr published “The Legacy: A Centennial History of the State Agricultural Experiment Stations” (Kerr, 1987), where he describes seven stages of history for a land-grant university:

- Fulfilling the Original Mission: 1887-1940
- War, Prosperity, and the Golden Age of Science: 1941-1961
- Strengthening the Planning Process: 1961-1971
- The Paradox of Success: 1972-1976
- The New Agenda Institutionalized: 1977-1981
- Restoration and Rededication: 1981-1987
- Legacy from the Past.. Promises for the Future

Kerr goes on to say that the country’s needs when the experiment stations began were primarily related to information for farmers that related to their immediate use. Then in the 1960s and 1970s the role expanded into the role of technology on society and the environment. He concludes with the statement “science wedded to opportunity” was a continuing theme, but many things changed – the types of science and opportunities, the structures of the universities and their experiment stations, the methods of cooperating and of funding, and expectations of all parties. Kerr’s observations were applied to the country as a whole and its several regions, and provide both a good background and a useful context to the changes experienced in the Arizona Agricultural Experiment Station.

Research Funding

Overall research funding for CALS has slowly increased over the past 25 years from about 6% to about 10% of the total university research funding (see Figure 10). Research funding is defined as the amount of a grant, gift, or contract funds expended in a given year, regardless of the total amount or length of the grant. Grant and gift sources include the federal government (the greatest part), State of Arizona, Arizona counties and cities, foundations, and commodity groups and industry. Also included are contracts with other universities that involve our faculty in cooperative efforts. The funds, over \$58 million for fiscal year 2009-2010, are used primarily for research, but also include student services, extension, and instruction.

Planning and Assessment

In addition to the university and college planning and reporting requirements, the Experiment Station

and Cooperative Extension must do periodic needs assessments and prepare “Plans of Work” for the next planning cycle. Since the early 2000s the college has submitted a joint report for both extension and research. This is not done by most state land-grant universities but it improves our management abilities and is better for our faculty and clientele groups.

Agricultural Centers

In 1984 the “experiment stations” or “farms” were renamed “agricultural centers” to reflect the presence of both research and extension activities. In 2010 there are eight centers, each managed by a resident director:

- Campus Agricultural Center, Stephen Husman
- Maricopa Agricultural Center, Robert Roth
- Red Rock Agricultural Center, Stephen Husman
- Safford Agricultural Center, Randy Norton
- Santa Rita Experimental Range, (administratively under Campus Agricultural Center but program management is by Mitch McClaran of the School of Natural Resources and the Environment).
- V Bar V Ranch, David Schafer
- West Campus Agricultural Center, (administratively under the Campus Agricultural Center)
- Yuma Agricultural Centers (two locations), Charles Sanchez

A description of development of the Maricopa Agricultural Center is Chapter 23. Those experimental farms that were closed over the years include (with year closed):

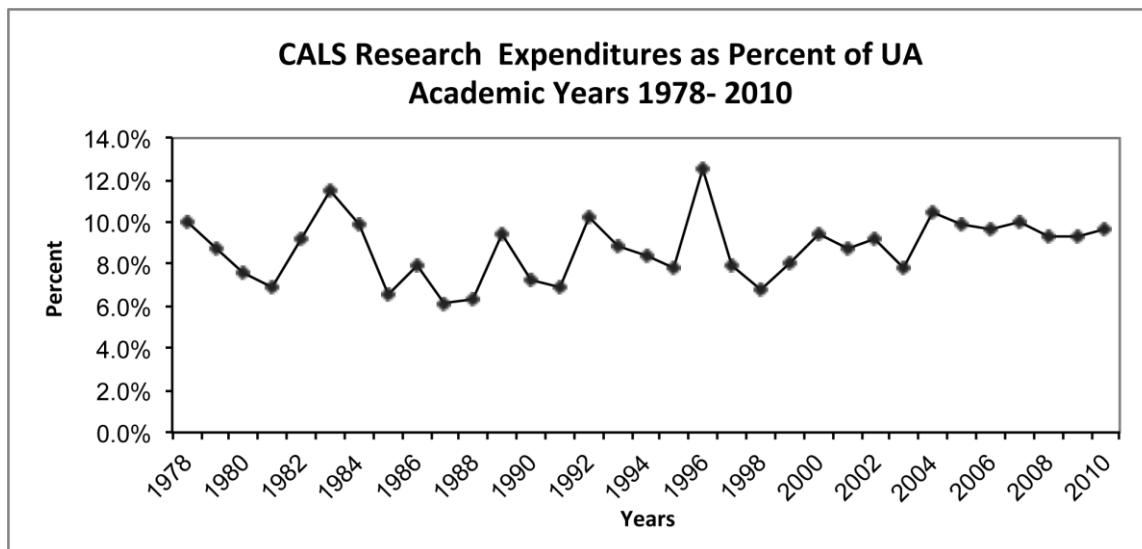
- Citrus Farm, Phoenix (2009)
- Cotton Research Center, Phoenix (1983)
- Marana Farm (sold in two stages) (2004)
- Mesa Farm (sold in two stages) (1983)
- Page Ranch, Tucson (closed/not sold) (1987)
- Salt River Citrus Station (1983)
- River Road Farm, Tucson(1980)

Research Resource Allocation by CALS Focus Area (2010)

As part of the CRIS annual reporting, resource expenditures must be accounted for by various topics. The 2010 data below show the allocation of all research funding, regardless of source:

- Environment, Water, Land, Energy, and Natural Resources - 36%
- Plant, Insect and Microbe Systems - 31%
- Human Nutrition, Health and Food Safety - 9%
- Animal Systems - 16 %
- Consumers, Marketplace, Trade and Economics - 5%
- Children, Youth, Families and Community - 3%

Figure 10. CALS Research Expenditures



Source: UA Vice President for Research. Prior to 1978 data were collected by type of science rather than institutional unit.

Chapter 18.

Perspective of Administrative Services Office

The seeds of an Administrative Services Office began with a staff of one person and continued that way until Mary Rohen retired in 1974 as the Assistant to the Dean (in her words “Office Manager”). The office expanded at this time due to a new dean, new demands on the office, and new rules from the university. The first business manager was hired in 1974. The position changed to Assistant Dean and Director of the Office of Administrative Services in 1988, although the director title was later dropped. There was a change in the Associate Dean position in 2010, so two both incumbents re listed since they were serving this last year.



Sandra Pottinger joined the office in 1988 and became Associate Dean in July 2010. Pottinger originally joined the office in a computer programmer role. Her information technology and business background contributed to a smoothly operating office. She has been in CALS for over 20 years.



Alma Sperr joined the office in 1979, initially working in programming and financial systems. She became Associate Dean in 2002, and in 2006 added a joint appointment in Outreach & Global Initiatives. Alma retired in June of 2010, having worked in CALS for over 33 years.

Both Sperr and Pottinger worked extensively with other parts of the University when new information systems technologies were implemented. The assumption was that if it worked for CALS it would work with any other college.

Previous Associate Deans or Directors

Gordon Johnson was hired in 1988 as Director of Administrative and Financial Services, first as Assistant Dean and later as Associate Dean. He retired in 2000. Prior to that the office was headed by Pat St. Germain, who had been in the office since 1977 when she was hired as an accountant. She took over in 1987 when Edward Frisch left. Frisch was the

first CALS Budget Manager, hired in 1974. This new position was the result of Dean Stairs centralizing the administrative and business affairs for all branches of the College. Before that, each branch had a secretary-bookkeeper who handled the financial work: Cooperative Extension (Sheila Journey), Agricultural Experiment Station (Mary Rohen), and Resident Instruction (Margaret Bonnin). Rohen also handled those activities for the Dean. The first stage of this change was that these three book keepers reported to Frisch. This centralization was a significant change as the three branches of the College had operated relatively independently, especially Cooperative Extension. Shortly after this change, the Director of Cooperative Extension became the director of the national Extension Service and several of the book keepers retired.

By the time Frisch left in 1987 he was Associate to the Dean and Business and Finance Manager. St. Germain later became the Associate Dean of the College of Medicine and Ed Frisch became an Associate Vice President in the Provost’s Office.

Types of Activities

Over the years the number and types of administrative needs increased. The first large-scale change came in the mid-1970s with the formation of a university-wide personnel department. Before that the individual units could write their own position descriptions and hire anyone that was available. There were no salary guidelines. The university was, however, becoming much more intertwined with federal government regulations due to the growth of research funding. Along with a new personnel department (now Human Resources) came new practices for hiring and evaluating staff. Along with increased research efforts came new requirements for conducting certain types of research, and reporting of the expended on research. Faculty often submit-

ted research proposals at the last minute, and approval processes had to be streamlined. College decision making became more dependent on accurate data and on analyzing how and why resources were allocated. As we moved through the 1980s these basic adjustments in administrative support were in place, but the changes over time continued.

The early days also required individual departments to have all documents signed by the Administrative Services Office. Departments had secretary-bookkeepers, but they did not have signature authority for university documents. This allowed for more consistent procedures and assurance of meeting federal reporting requirements.

CALS Administrative Services still reviews and signs certain documents. However, each CALS unit has an employee designated as its business officer who is encouraged (and sometimes required) to take a much more hands-on, active role in the business “big picture.” To that end, CALS Administrative Services provides one-on-one training, conducts workshops, visits units’ sites, and maintains a listserv and a website. CALS Administrative Services client base is diverse and includes the off-campus units²⁵. On any day this office’s personnel, accounting, grant, or information technology sections may be responding to a request from the university’s President or Provost, analyzing data for the CALS Executive Council, preparing a report for a governmental agency, reviewing a faculty member’s grant proposal, or helping a CALS unit hire a student worker. The Office is basically a support unit for faculty and staff as much as it is for administrators.

Administrative Complexity of CALS

CALS is one of the two most administratively complex colleges at the University of Arizona (the other is the College of Medicine).

CALS has to deal with all the activities of any other college (e.g., teaching, research, public service). It also has to work with several federal technical agencies (e.g., Civil Rights), USDA (for planning and reporting), county governments (for county extension offices), and state agencies. It has to deal with both the Arizona fiscal year (July to June) and the federal fiscal year (October to September). In addition, CALS operates farms and ranches (including

working with experimental plots on farmers property), and deals with the public, primarily through the many programs of Cooperative Extension. CALS has to have a personnel system that addresses all the types of faculty appointments (teaching, research, extension) where the university focuses on a single type of faculty appointment, generally either teaching or research.

CALS also has to adapt many university policies and procedures to meet the needs of our off-campus units. Business staff at the off-campus units can’t walk paperwork across campus or attend on-campus training. So, CALS Administrative Services must provide alternate procedures and training delivery to these off-campus units.

The Agricultural Experiment Station operates a little differently than most university units; it basically administers everything on a project basis. There are different types of projects and each faculty member may be on several projects. The process works well within CALS but it is another example of unique procedures that are required by the federal government for USDA funds. In earlier times a typical college might have one account for the whole college where CALS would have many accounts because of the project basis. Now, all departments have multiple accounts because sponsored research is operated on a per project basis.

Pat St. Germain recently retired, but she served as the senior financial administrator for both the College of Agriculture and Life Sciences and the College of Medicine. When asked if these are the two most complex UA colleges to manage, her answer was yes. In addition to the complexities of just managing the transactions and arranging for supporting data for personal actions, the politics are complex with both entities and they are rarely understood outside of the two entities²⁶.

Dealing with Faculty Appointments

The account used for an expenditure should accurately reflect the activity supported by the expense and the source of the funding. For example: laboratory supplies purchased in support of a sponsored research activity would be expensed against a research account rather than an instruction account.

²⁵ In about 1990 the county offices were delegated the responsibility of managing their own financial records.

²⁶ Patricia St. Germain, personnel communication.

Employee funding also reflects the activity the employee is involved in. If a unit head is to administer the activity in a unit involved in teaching, research, and extension, the unit head will be funded on a minimum of three accounts (and have three budget lines). If a faculty member's effort is split between teaching and research, the faculty member will be funded on a minimum of two accounts (and have two budget lines). In 2010 CALS had 45 budgeted units (like academic departments, agricultural centers, and cooperative extension county offices). Each academic department has three budget categories, for instruction, research, and extension. This results in 2,970 expenditure accounts. In addition, each research grant or contract results in another budget account.

All this detail is necessary because of funding requirements based on the early land-grant categories of research, teaching, and extension, and a special type of state budgeting that applies to CALS. The CALS state budget has two categories, one for Cooperative Extension and one for the rest of the College, which are separate from the budget for the rest of the University.

Reporting necessities for USDA require the breakout of expenditures by type of activity. But, it goes further. CALS also has to report the types of research by a series of descriptions (e.g., field of science involved, general subject, specific topic). Since there are federal funds involved, there are also additional record keeping requirements such as type of audiences involved in extension activities.

All this record keeping and data development comes with a price – it is not simple to keep accurate information and it may appear to some that another administrative layer has been added. But, it also provides some benefits, as CALS knows far more about how its budgets are expended than do other units on campus. For example, CALS can estimate the percent of resources by type classification (faculty or staff), activity (teaching, research, or extension), and topic (type of science, commodity, or subject matter). It can also determine the amount of effort a specific faculty member expends on teaching, research, and outreach. In earlier times, when most of the UA faculty did little outreach, simple record keeping was adequate. But outreach by many departments has been increasing in recent years and knowing that information increases in importance. It is also possible to access this information for all col-

leges of agriculture in the country, for easy comparison among other institutions. This is in contrast to most university colleges where they have a single state budget line (instruction) that is a single item. This in turn allows CALS to have improved management opportunities and annual reviews based on sufficient data to evaluate how resources are being expended, and to estimate the impacts of shifting resources to other areas.

The complexity of CALS accounting needs has caused the university problems for years. This is especially true when new accounting systems arrive or comparative data across the university are required by central administration for their own budgeting needs. For example, CALS knows the distribution of funds for teaching, research, and extension, but the distribution across these areas for other colleges across the university varies widely and is not reflected in budgets or consistent from college to college. Differences in the basic organizational functions and reporting requirements between CALS and the UA add to the difficulty in comparing what seems to be similar information on the surface but in detail it is different. It even impacts the definition of faculty.

A New Budgeting Method

After years of discussing different approaches of budgeting for the various units within the university, in 2008 the Provost appointed a “Tuition Funds Flow Task Force.” The purpose was to define a more visible and direct linkage between units that were doing more teaching with more funds from tuition income. This effort resulted in a new approach to budgeting and formation of a Budget Working Group, appointed in 2008, that would begin implementing a Budget Redesign Process²⁷. This first phase, the tuition funds, will fund the departments on 1) how many student credit hours it produces, 2) how many students are majors in the department, and 3) how many degrees are produced. This represents a significant change in the way colleges are funded; it is also a complex conversion to a method that allocates various types of income (e.g., state appropriations, research grants, and tuition) to the various units, while charging the units for various services, e.g., utilities, facilities, and debt ser-

²⁷ In some institutions this is called Responsibility Centered Management. The UA is in the early stages of what will eventually be that type of approach to budgeting.

vices. The plan is to use a single year as the base (FY 2010) and implement the new budget plan over the next couple of years. CALS will be one of the Responsibility Centers.

Change is Constant

In the early days some things were more complex than today.

Extension personnel had the option of having federal retirement rather than state retirement. While this option for new extension appointments was eliminated in January 2003, anyone in the system could remain in it. Several CALS extension faculty are still in the federal system and are not retired. This requires CALS to be familiar with the additional procedures and regulations of an additional retirement system.

In the late 1970s CALS had to do some of its own computer programming because its information requirements were greater than those of the university. This was in the early days of computing and the programming had to be done efficiently to minimize the computing resources. Alma Sperr developed a number of small programs that did very specific things; these were done in FORTRAN. Some of those programs were used for years but are no longer needed with the new methods now available.

When personal (desktop) computers became available in the early 1980s, Sperr developed a database application, using Datastar, that allowed the individual departments to maintain their budget information on their own desktop computer. However, this was short-lived as using the program was labor intensive and spreadsheets provided great flexibility and did the job better.

In the late 1980s, CALS Administrative Services became very adept at pulling data from the various non-integrated university central administrative systems: PSOS (personnel), SPINS (grants and contracts), FRS (accounting), SIS (student info), and Payroll. These data were then linked and joined using locally developed databases and applications to produce the information needed for college-level decision making.

In 1994, the university embarked on a new data warehouse project. CALS Admin Services participated as one of the founding members of the project's workgroup. The result – the University Information System (UIS) – made our quest for data easier. UIS is still used today, but some of its data are historical only because of the implementation of newer systems.

In late 2007, the university started its MOSAIC project – a campus-wide system replacement project meant to upgrade and integrate student, financial, personnel, payroll, research administration, and business intelligence systems. CALS Administrative Services has been a part of this project from day one acting as consultant, pilot unit, tester, trainer, and subject matter expert. One goal of MOSAIC is to replace paper business documents with electronically created, routed, and approved transactions. This will represent a major change in increasing “business intelligence” for decision making, and having key “dashboards” of data designed for individual departments.

However, even with the positive changes to the campus business environment and systems, the need remains for CALS to extract raw data from the central administrative systems to meet our reporting and decision-making needs. The need remains for CALS to monitor business activity at both on- and off-campus locations. Many of the unique business challenges associated with being the College of Agriculture and Life Sciences in the land-grant system are best handled within CALS Administrative Systems.

Comparing 1980 to 2010.

The listing of activities above stands in stark contrast to what was done in 1980. At that time we did not have microcomputers, using the campus “mainframe” sometimes required punch cards but some features were available by remote terminal. Spreadsheets were only a year old and only ran on an Apple II machine with limited capability. Research activity was much less than today, and state and federal regulations were simpler.

Chapter 19.

Perspective of Development and Alumni Office

The Development and Alumni Office began in 1981 as the Development Office and became Development and Alumni in 1983.

The Early Years, 1981 - 2000

The office began in 1981 as the Development Office, with Philip Upchurch as the first director. However before that there was an Alumni Council and the 4-H Foundation. Shortly after the office began, several groups were organized, including Friends of Agriculture, Friends of the Arboretum (Boyce Thompson), and later an oral history project was completed (transcripts are available from the Arizona Historical Society, Tucson). An off-campus facility (the Archives House) was a place for volunteers to collect alumni-related photographs and other mementos. The UA real estate office provided temporary quarters and after a couple of years the collection was moved to the Arizona Crop Improvement building (Campus Agricultural Center).

Some of the early activities included an expanded awards program, “phonathons” (volunteer students calling alumni), collections of photos and other memorabilia, and an expanded burrito breakfast (some displays, silent auctions, and associated golf tournament), retirement receptions, and the Land and People Conference. At the burrito breakfast the College administrators do the serving and the Student Union provides food (to specifications by the College).

The alumni aspects actually began in 1959, with publication of the Ag Alumni Newsletter, started by Professor E.B. Stanley. Darrel Metcalfe began the Ag Alumni Breakfast, held during homecoming. There was also an Alumni Council, beginning in 1982 with Helen Goetz as the President and later as volunteer Executive Manager; it worked out of a corner of an office in the Instruction Office. The old newsletter was replaced by Agri-News in April 1982, which lasted until Fall of 1998, when it was replaced by the current Compendium. In 1983 the Alumni Program collocated with the Development Office, and in 1988 the offices were merged. Upchurch also began several “friends” groups, including Friends of the Arboretum and Friends of Agriculture.

In 1983 Upchurch became the Associate Dean for Instruction and Gerry Eberline became the Development Director, until 1988, when Upchurch became

director of the combined Office of Development and Alumni Affairs. During the interim period, Upchurch continued as leader of the Alumni Program, including publication of the newsletter.

In 1988 the first of several endowments became available (see Appendix K for a list of Endowed Chairs), which fund endowed chairs, distinguished professorships, distinguished fellowships, distinguished administrative positions, specific programs, and student scholarships. Gifts and endowments have increased markedly for the college from 1950 to 2010.

Recent Years, 2000 - 2010

In 2002, Dr. Bryan Rowland became Director of Development and greatly expanded the development office to include two other full time development officers. The new hires, Jim Davis and Suzanne Ornelas, along with Bryan, all working with Dean Sander and Dr. Soyeon Shim, were responsible for many new faculty endowments and chairs, new capital projects including McClelland Park (Campus) and the Glen G. Curtis building in Yuma.

In 2007, Jim Davis was promoted to Senior Director of Development and Alumni Affairs and, along with Ann Stevens and Scott Koenig, continued CALS leadership on campus as the academic leader in fund-raising from 2000-2010.

Coordinators/Directors of Alumni Affairs

- The Alumni Council received its Charter in 1982
- Helen Goetz, Executive Director, 1982-1990
- Monica Delisa, Executive Manager, 1991-1992
- Amy Scott, Executive Manager, 1993
- Julie Lindmark, Executive Manager, 1994
- Kris Smith, Executive Manager, 1995
- Margie Puerta Edson, Executive Manager, 1996 – 2000
- Clint McCall, Executive Manager, 2000 - 2001
- Susan Paul, Executive Manager, 2001 – 2003
- Carol Knowles, Coordinator, 2004 - 2008
- Joanne Eader, Program Coordinator, 2008 - present

Directors of Development and Alumni Affairs

- James M. Davis, 2005 – current
- Brian K. Rowland, 2002-2005
- David Cox (Interim), 2002
- John S. Engen, 1996-2002
- David Shoup (Interim), 1994-1996
- R. Phillip Upchurch (first director), 1988-1994

Editors of the Newsletter

Gordon Graham (in 1982), Monica Delisa, Julie Lindmark, Kris Smith, Carol Knowles, Margie Puerta Edson, Clint McCall, Susan Paul, Jim Davis, Kimberly Bowman, Suzanne Ornelas, Ann Stevens, and Scott Koenig.

Arizona 4-H Youth Foundation

The 4-H Youth Foundation began in September 1970 but operated separately from the main college Development Office. Bart Cardon was one of the initial Trustees. Its purpose was to promote and support the

4-H Youth Development Program of the University of Arizona.

4-H Foundation Development Officers, Executive Directors

- Lee Dueringer, 2006-2008 (last person to hold the office – revisions underway)
- Joseph Leisz, 1999-2005
- John Engen, 1995-1999
- Stuart Shepherd, 1990-1995
- Gerry Eberline, 1979-1990

Gifts and endowments have increased markedly for the college. From 1950 to 1980 there was only \$564,000; from 1980 to 1987 there was \$9 million; and from 1987 through 2010 over \$153 million was received. These funds are used for a variety of purposes, including scholarships, endowed chairs, and specific projects or discretionary uses.

Chapter 20. Perspective of International Programs

The international tradition in the College of Agriculture began in 1916 when a student from Luxembourg enrolled. The first major college international activity began in 1952, with the development of the Iraq College of Agriculture at Abu Gharib. This was a seven year project financed by the International Cooperation Administration in Washington, DC and operated by the University of Arizona College of Agriculture. The peak years for international programs were in the mid-1980s.

Directors, International Programs

- Kevin Fitzsimmons, 2010 – current
- Colin Kaltenbach, 2004-2010
- Kenneth Foster, 1996-2004
- Michael Norvelle, 1990-1995
- Bodo Bartocha, 1988-1989
- Jimmye Hillman, 1986-1988
- John Maré, 1985-1986
- W. Gerald Matlock, 1977-1982

The first international student enrolled in CALS 1916 and the first major international project was in Iraq in 1952. The longest cooperative project was in Brazil for 10 years, 1963-1973. Both of these projects were for agricultural institution or agricultural education development. The student numbers grew slowly over the years but the substantial increase in international student enrollment in CALS, along with visiting scholars and international collaboration projects in the 1970s, led to the establishment of the CALS International Agriculture Programs (IAP) office in 1977. Professor Gerald Matlock was the first full-time coordinator, with an office in the Alumni Building (now Nugent Building).

In the early 1980s, Professor John Maré was appointed Director of CALS Office of International Agriculture Programs, which was charged also with Peace Corps recruiting on campus under the supervision of Mike Pamback; the Peace Corps activities are still within this office. In 1986 when John Mare left for Lesotho (Africa) as UA Research Team Leader in the LAPIS²⁸ Project, Professor Jimmye Hillman succeeded Mare as Interim Director.

During Hillman's leadership, 1986-1988, the CALS Office of International Agriculture Programs was transformed and expanded into a campus-wide Office of International Programs. The OIP had oversight for: a) International Agriculture Programs under Michael Norvelle, as Associate Director and Monkia Escher, as Program Coordinator, b) Study Abroad Programs under Gary Johnson, c) Peace Corps Recruiter and d) campus officer for the Federal Foreign Assistance Act Title XII (Famine Prevention and Freedom from Hunger). Bodo Bartocha was named OIP Associate Director, and became the Director for 1988-1989.

In late 1988, International Agriculture Programs moved out of the university Office of International Programs back to the College of Agriculture and Mike Norvelle was appointed Director. In the early 1990s the university International Programs changed to the university Office of International Affairs and continued its activities focusing on: a) Study Abroad Programs, b) International Student Programs and, c) International Faculty and Scholars. In 1995 the CALS Office of International Programs came under the leadership of Kenneth Foster, who was also the director of the Office of Arid Land Studies. Ken directed both offices until his retirement in 2004. Since 2004 the CALS Office of International Programs has been under the supervision of Colin Kaltenbach, CALS Vice-Dean, with Amir Ajami as the Associate Director. In 2008 Kevin Fitzsimmons became Associate Director upon Amir's retirement; in 2010 Fitzsimmons became the Director..

The mission of CALS International Programs has been consistent over the years and is: to support the participation of CALS in international agriculture research, training, and development. In addition, it supports faculty project proposals for international funding.

²⁸ LAPIS is the Lesotho Agricultural Production and Institutional Support Project.

The Office of International Programs' current functions include:

- Searches various databases for information about potential international projects and activities, tracking potential projects, and circulating this information to the appropriate faculty and departments to determine their interest.
- Serves as the coordinating unit for College of Agriculture and Life Sciences proposal development in response to international proposal requests.
- Develops and coordinates the programs for hosting international agricultural scientists, delegations and short-term training participants.
- Supervises the Campus Peace Corps Recruitment.

The College participation in international research, education, and technical assistance goes far beyond the OIP activities, as various departments initiate and manage international work in the field of their specialization. In addition to the departments, a number of college units are also heavily involved in international activities. These include the Office of Arid Land Studies (OALS), founded in 1964, which began its activities in international arenas focusing on: new crop development, water and energy conservation, farming systems research, remote sensing, and sustainable development of arid land agriculture. International activities are conducted within the framework of the arid and semi-arid environments, providing interdisciplinary project management, research collaboration and training.

International Arid Lands Consortium

The International Arid Lands Consortium (IALC) was authorized by the US Congress in 1990, and is a partnership of organizations dedicated to researching and developing new methods of combating desertification, primarily in the Middle East. Member institutions include the University of Arizona, New Mexico State University, South Dakota State University, Texas A&M University-Kingsville, University of Illinois, Desert Research Institute of the University of Nevada, Higher Council for Science and Technology in Jordan, Ministry of Agriculture and Land Reclamation of Egypt, and the Jewish National Fund. The IALC also contributes to work extensively with the US Forest Service, a founding member of the Consortium. The IALC research and

demonstration projects focus on: land reclamation, land use, water resource conservation, water quality and, ecosystems processes supporting sustainable management of resources in the Middle East.

As competition for international funding among the US universities increased substantially in the 1970s, the Consortium for International Development (CID) was established in 1972 by 11 western region universities and the University of Hawaii at Manoa. CID provided leadership in project development proposals, implementation and monitoring of development projects and training by pooling resources from member institutions. The Consortium succeeded in gaining a lion's share appropriation of US AID funding for international development for its member institutions over three decades. However, as AID funding for food production, enhancement of natural resources, and development of human resources declined substantially beginning in the late 1990s, CID activities decreased drastically which ultimately led to its termination in 2002.

The mid-1980s witnessed the peak of the College international activities when various departments and affiliated units had more than 30 faculty members involved in international collaborative research, technical assistance and projects operation. This mid-1980s peak is also reflected in a peaking of laws related to international activities and foreign aid (see Appendix D). International sponsored projects awards to the CALS faculty totaled over \$5,000,000 during this period. Since 1960, the College's direct participation and/or collaboration with CID in international development, research and, training, exceeded over 50 projects implemented largely in the following regions: Africa (20 projects), the Middle East (12), and Latin America (9). The following offer a sampling of the College International Collaboration.

The peak years for international projects were in 1988-1990, and 23 countries were involved. These included: Afghanistan, Brazil, China, Ecuador, Egypt, Ethiopia, Guyana, Honduras, Indonesia, Jordan, Korea, Libya, Madagascar, Malawi, Mauritania, Malaysia, Mali, Mexico, Myanmar, Peru, Philippines, Senegal, Trinidad. As part of a team working with other groups, some additional countries are added to this list: Yemen, Oman, Kenya, Somalia. In addition, there are visitors to CALS from a variety of countries and some of our faculty serve on committees related to international work.

International programs today are much smaller than in the 1970s and 1980s due to a lessening of university interest in these types of programs and a decreasing amount of available funding through the U.S. Agency for International Development.

Examples of the Large-Scale Project (Size and Duration) Over the Years are:

Iraq, 1952-1959.

The first large international project by the College of Agriculture was in Iraq. The College collaborated with the U.S. Department of State and the U.S. Department of Agriculture to develop the Agricultural College of Iraq at Abu Ghraib (near Baghdad). Following this effort the two-year Agricultural College became a College within the 4-year University of Baghdad. A full report of this project, including the number of test tubes purchased, and their cost, is in the UA Library. The Iraqi government gave the UA a Palm Tree as a thank you. It is planted at the northeast corner of Old Main, with a plaque indicating its origin; it is pictured is on the cover of this book.

Brazil, 1963-1973

This was the first large-scale project and one of the most enduring of the CALS efforts in international work, funded by USAID. The goal of this project was to strengthen the integrated agriculture research, education, and extension capacity of the Federal University of Ceara. Under this ten-year contract a number of Ph.D. and M.Sc. degrees were earned by Brazilians and a number of CALS faculty served in Brazil on long-term assignments.

Mauritania, 1986-1991

The UA was the prime contractor for the five-year USAID funded Mauritania Agricultural Research Project II (AGRES II). It was a farming systems-oriented project focusing on agricultural development along the Sengal River Basin. One of the major objectives of the project was to assist the Mauritania National Agriculture Research Center by identifying promising agricultural techniques for this arid and semi-arid region, and by designing and implementing a research strategy to improve agricultural development along the river.

Lesotho, 1986-1992

In collaboration with the private-sector firm, American Ag. International (AAI), the UA was the lead institution in this CID six-year project in Lesotho.

The Lesotho Agricultural Production and Institutional Support Project (LAPIS), which was funded by USAID, included three components: research, production and, education and training. The project focused on the development of the Lesotho Agricultural College, and the research and extension dimensions in the Ministry of Agriculture along with improvement in the extension and technology transfer to the Lesotho farmers.

Portugal

The Portugal Agriculture Policy and Economic Study is another example of the UA's involvement in long-term international collaboration. In cooperation with USDA's Economic Research Service, the project emphasized combining macro- and micro-economic dimensions to national agricultural policy. The project's specific objectives were to assess the impact of national policy on agricultural production and the effects that policy changes would have on Portugal's entrance to the European Common Market. UA economists and anthropologists worked together, using FRS (Functional Requirements Studies) methodology to identify the constraints to agricultural development and to explore ways in which agricultural policy and government investment in agriculture could be implemented effectively.

Saudi Arabia, 1979-1983

The UA, as the lead university in a CID project, was actively involved in the development and implementation of an education/research program at King Abdulaziz University in Saudi Arabia. The project provided technical assistance to the Institute of Meteorology and Arid Land Studies, later changed to the Faculty of Meteorology and Environmental Studies (FMES). The UA activities included: initiating a research program linked to the needs of the Kingdom, partial staffing of FMES with U.S. scientists, developing a curriculum in the fields of hydrology, meteorology, arid land studies, and environmental sciences.

Egypt, 1991-1994

The University of Arizona provided management responsibility for this CID contract to provide technical assistance to the Egyptian National Agriculture Research Project (NARP). NARP was a very multi-faceted program to upgrade the agricultural research and technology transfer capability of the Agricultural Research Center (ARC) of Egypt. The project contained three main components: research, technology

transfer, and seed program development. It was funded by USAID (\$300 million) and Egypt (\$75 million), and supported nine long-term technical advisors in Egypt.

Asia and the Middle East, 2002-2008

The Sustainable Development of Drylands in Asia and the Middle East Project was a cooperative agreement with USAID and operated through the International Arid Lands Consortium.. The project objectives include: a) improve use and re-use of water, treated wastewater and solid resources at the farm, community and regional levels, b) support

human and institutional capacity development in arid lands agricultural development and conservation by partnering with educational institutions of host- country nations, c) apply appropriate technology to support sustainable arid lands development. The Afghanistan-Pakistan Component has focused on short-term training of some 400 farm leaders and 24 agricultural scientists. The UA has also been involved in the development of an agricultural electronic library for the College of Agriculture at Kabul University since 2004.

Chapter 21.

Perspective of Communications Activities

In the last 30 years the types of communications devices and methods have changed markedly. So have the ways such communications changes have impacted the way the CALS activities are carried out. The key year is 1980; it marks the arrival of desktop computers, affordable satellites, and a series of programs that make the desktop computer a key piece of equipment. Print publications are still important and electronic communications allow the print publications to be distributed electronically (as well as searched, ordered, or downloaded). The first print publication was Agricultural Experiment Station Bulletin Number 1, published in 1890; it was also the first publication of the University of Arizona.

Communication Overview

Some early communications methods are still effective and in use by the College. These include the formal printed publications on technical and general topics, new releases to the media and the resulting newspaper articles, radio and television spots, and personal meetings (individual or as a group). With the appearance of affordable photocopy machines in the 1960s, and especially with electronic communicator in the mid-1980s, the ability to communicate changed. It was now possible to have content more personalized to selected audiences, to prepare printed copy more easily and in a form that communicated better, and to automate delivery of certain types of information. The manner in which College communications were developed and distributed changed over the years. The current unit is Educational Communications and Technologies (ECAT).

A Historical View

Mimeograph or duplicating machines gave way to photocopy machines in the 1960s and made the process of producing multiple copies on a small scale easy (and clean). This process changed what teaching faculty could do in the classroom and extension faculty do in the counties.

So, in the post-World War II era, television use grew rapidly, a little later photocopy machines became popular, and radio remained popular as well. When these new technologies were used with the time-honored personal visits of Cooperative Extension faculty to various clientele groups there was a nice mix of ways to communicate. In the 1970s the University television station KUAT broadcast some extension programs, and radio programs had been given by CALS in Tucson as well as by some of the county extension offices.

Just as the desktop computer made a big change in the 1980s, 30 years earlier in the 1950s television made its changes on post war America. And then, going back another 30 years to 1920, the vacuum tube for radios made its arrival and revolutionized radio, and the first U.S. commercial radio station began operating.

Personal Computers and Central Computers

The 1980s was a decade of significant change in communication methods and the College acted quickly. The Osborne I – a portable but heavy, computer that came with software became available in 1981, and the dean's office purchased five. These computers had a five inch monitor and two floppy disks. One of the 91K disks was for the program and the other for the final data storage. Their use was exclusively for financial assessments using the SuperCalc program (the first spreadsheet on personal computers, following VisiCalc on the Apple II computer). In 1983 Roy Rauschkolb, the new extension director, provided funding to install the newly-developed personal computers in every county. This came at the same time the University provided matching funds for personal computer purchases on campus. All departments in the College took advantage of the match so the whole College, as did much of the University, moved to the new technology quickly.

Electronic Mail

The electronic mail system in CALS in the early 1980s was FIDO, a bulletin board system that would allow everyone to send in their e-mail to one place, and then at midnight FIDO would send the messages to the intended recipients. So you had to wait a day for your mail. Other email systems existed, and depending on which organization you were in you got one or the other. But you could not communicate with people on other systems. FIDO

was in some type of use in the College during 1983-1996.

In 1984 a UA Electronic Communications Committee reported on options for e-mail and conferencing²⁹. They found the administrative people were using one system, the researchers were using another, there were some faculty using some emerging commercial sources.

Examples of the competing programs in use were: Postmaster, Vax Mail, and since the mid-1990s, faculty and staff had to access other universities by BITNET (Because Its Time NETwork) sponsored by EDUCAUSE. In addition, if a faculty members was working with federal agencies, there was one email system for the Forestry Service, and a different one for U.S. Department of Agriculture.

Today, most faculty and staff use college email, but some may use the university email system. The college system began in in the early 1990s, with FIDO, then moved to a server using PINE (you had to log in and as an on-line terminal), then a series of desktop programs to allow you to compose on your personal computer. It offered regular email to your desktop computer or web access to the central server. Also available are listservs, for employee use or state-wide audiences of CALS. Email is used for regular communication but also for diagnosing field problems (e.g., a cell phone picture can be transferred immediately to email for diagnosis on campus and results returned by email.

Computer Conferencing

In 1987 the UA purchased a computer conferencing system (CoSy) that allowed anyone to send electronic mail directly to others on the system. This was before electronic mail services were available for most people at the University, and those who did use electronic mail used different systems, preventing efficient communication campus-wide. But CoSy (for Conferencing System) also provided conferencing so groups of people could be in on a specific discussion. Examples of discussion groups include a business manager's forum, an equipment sharing program, a communications team, and The Coop

(the old Student Union had "The Coop" where students could drop in for food and conversation – CoSy provided a similar light-hearted, on-line, general discussion area). It was also a tool for asking questions about the University. This was not instantaneous, like much of today's conferencing, but it allowed people from all kinds of disciplines around the campus to communicate easily. It had a major impact on the university culture, including extension offices around the state.

In 1990, Roy Rauschkolb required satellite receivers to be installed in each county office. This was a less successful endeavor – there were reception problems, equipment alignment was difficult, and there were limited programs available. Today none of the satellites are functioning, although some can still be seen. Other communications methods, primarily the Web, took over the function.

Internet and the World Wide Web

In 1992, when the first Internet hypertext-like program became available, the College began using it to share information of all types. But Gopher (developed by the University of Minnesota and named after its mascot) was short-lived and soon replaced by a much more capable true hypertext information handling program – the Web. In 1993 the College website became known as AgInfo. Shortly after that, in 1994, the University began their Web service and called it UAInfo. In a 1998 brochure, AgInfo was restructured and had special sections for staff, faculty, students, administrators, visitors, and alumni. It contained calendars of events, available publications, short facts and announcements, and was a link to a variety of sources. The UA site eventually became UAWeb, and both the CALS and UA sites were simply called "the web site."

While these websites made great strides at the time in offering communication opportunities, initially there were too few people with adequate computer access for the sites to be widely used. Today websites are essential for any institution and are far more sophisticated. They handle a major workload for the College by making a wide range of information available in real time. The sites are organized so that anyone can find what is needed, easily and effectively. The Web has revolutionized how the College teaches, conducts research, and provides extension services. It has brought the on-campus and off-campus faculty and staff together. Today, a citizen or an extension agent can take a picture of a

²⁹ The first UA bulletin board based (FIDO) on a micro-computer was by Robert MacArthur of the CALS Computer Applications Group. More information on early UA email activities is by the UA Electronic Committee, chaired by Theodore Downing and reported in 1985.

field situation, email the picture to a specialist or laboratory for review, and potentially have an answer shortly rather than the days required to mail or drive the specimen to the expert.

In 2000 the College implemented its eCommerce-capable website for selling products and publications. It is called CALSmart and was the first such site at the UA. This process facilitates on-line ordering and is particularly helpful for 4-H leaders because of the large variety of publications and the number of new 4-H members each year. In addition, the process is used for sending registration fees for college-sponsored conferences. Orders can be mailed or picked up at the CALSmart office at the Campus Agricultural Center. In 2002 the College began CALS NewsLine, a monthly electronic mail alerting service, for activities and newly released publications.

Internal Communications

COA News no longer exists, but it was a (hard copy) newsletter for employees. Holly Kurtz did the formatting for the 4-page piece and it lasted about two years, 1987-89. This was just after the CoSy electronic conferencing system started and it served as a vehicle to keep all faculty and staff informed of important college information.

CALS Weekly Bulletin

Web only, for all employees (automatic subscription via email for everyone on the payroll with an email address) began in September 2000 and has been published each week since that time. All back issues are searchable. Any employee can submit content and final copy is reviewed by the Dean's office. The Weekly Bulletin serves as the "official" notification process for all employees to be informed of important changes, announcing college-wide events, and departmental or committee activities.

Tuesday Morning Notes.

Tuesday is the day after the College executive committee meeting, and up to date information can be sent to all extension-related employees for relevant key issues or general announcements. This brief weekly summary began in 1999. Written by the Director of Cooperative Extension, Jim Christenson.

Monday Message Newsletter

A student information sheet about relevant information. Students sign up by email and it is mailed

from Office of Academic Programs every Monday morning.

Examples of College Communications and Publications (Electronic and Paper)

The College has had several public-oriented periodicals, beginning with the Agricultural Experiment Station Technical Bulletin (December 1890). A more popular title is Progressive Agriculture (began in 1949) and targeted to a general audience; it became Arizona Land and People in 1982. An alumni targeted publication was Agri-News (began in 1982); it became the CALS Compendium in 2008.

Since April 1988, all Cooperative Extension publications have an item number (currently of the format AZ1000). This single numbering system replaced one that had different numbers to indicate different types of publications. Examples of the old system included short (1-4 page) bulletins (Q-Series, A-Series), larger Technical Bulletins, Circulars, Commodity Reports, and Research reports.

Some counties still publish newsletters (especially directed at 4-H Youth and Master Gardeners), but many of the publications that were county specific have been replaced by publications that are posted on the College and County websites. In addition to these Arizona published reports, CALS is part of eXtension, a national electronic extension service. When a person enters the website (extension.org), the site will know which state you are in, and shows a page that is for your state. So when you access it from Arizona, the header indicates Arizona Cooperative eXtension. The publications for eXtension are normally developed by groups of people from across the U.S. that put together a single publication for a subject of wide interest. This avoids having each state extension program duplicate the work of another state.

There is still a variety of print publications, even in the time of a lot of electronic information. For some publications, like general reading, the paper copy is still preferred by some readers. Some examples include:

Arizona Land and People

This "magazine" began in 1982, and was renamed from Progressive Agriculture, which began in 1949; the same numbering sequence was retained, so it has been published for 52 years and is now the longest continuing publication series of the college. The name change reflected the changing audiences as

well as changes in subject focus within the college. In 1949 the focus was on farmers, ranchers, and homemakers. The focus shifted over the years and now covers a range of audiences and topics. Originally published quarterly, for the last 20 years it has been published as one issue on Arizona Land and People, and one as the annual Arizona Agricultural Experiment Station Research Report.

CALS Compendium and Agri-News

The Compendium began in 1999, and was renamed from the original Agri-News, which began in 1982. It was originally published by the then new college Development Office and was the first publication directed to alumni. It is now published by the Office of Development and Alumni Affairs. Prior to the Alumni office there had been Alumni meetings at homecoming (through the Agriculture Council) and some sporadic communication with alumni, but not through regular publications. Content is focused on issues of interest to CALS alumni and it is published semi-annually.

CALS NewsLine

Began in 2002, it is an electronic (email) listing of new publications (of all types) in the college, published by the Publications section of ECAT. Published monthly.

Annual Research Report

Published by the Experiment Station as an annual report, but it also contains a range of short reports on CALS research results. A financial report is also included, and reports are posted on CALS web as well as distributed to an in-state mailing list.

Impact Reports

Summary listings for about 20 topics a year indicating the impact that CALS research and extension have had on Arizona. Prepared for USDA and posted on CALS website. Beginning in 2000 reports are posted on the web.

Commodity Reports

Published each year for major commodities – describes current conditions, yields, growth variables, and so on. Recent copies are posted on web.

The First College Website

CALS was the first UA college to have a website, developed in 1993. It was a year before general use of the graphics browser, and had to be accessed by Lynx, a text-oriented free software program. The

new site was called AgInfo, and it retained that name until about 2005, when it just became “the college website.” The UA began its website, called UAInfo about a year later, in 1994, and it used that name also until about 2005. The early AgInfo had basic information of interest to both faculty and staff and clientele groups, and it made gradual improvements over the years as the web became the powerful communication tool it is today. In 2010, many administrative units in the college, and the college main site, moved from the traditional html web pages to the “content management” approach using Drupal. This allowed each page to be a location in a database and increased the capability and made maintenance and organization much easier.

Recalling Communications From Earlier Periods

1995

Power point (or equivalent software – there were several brands)

Personal computers, email, web beginning to grow, limited established (Dialcom, Bitnet) pre-web searching done by various means (requiring time and effort), often by specialized mainframe computer programs that required a librarian to do the actual searching.

The graphics browser for web use arrived in 1993 and many more people could feel comfortable using the web. But, early search engines were not very sophisticated, and one had to try several to find the most effective for an acceptable result. Part of the problem was there was not a lot of material on the web, searching routines and computing power were barely adequate for the job.

1980

This was just before the impact of personal computers was felt, and it was before internet grew with the advent of web and graphics browser (1993).

Overhead projectors, photocopy machines (initially Xerox).

1950

Radio, journals for technical people, magazines, mimeograph for duplication.

1920

Extension field days by railroad car displays, visits to farmers and ranchers by car. Share information

among farms, a bit like “intelligence gathering”, where two extension faculty visit a farm, the 4-H Agent/Home Economics Agent goes to the house and the Agriculture agent goes to wherever the farmer is working. Then the agents compare notes as they drive to the next farm. Pretty soon they know what is going on in the county and they have shared solutions and relevant information to both the those working in the home and in the field.

Some Observations

In the last 30 years there have been tremendous changes in the way we communicate. Prior to 1980, we had no desktop computers, no email and no web. There was much more face-to-face meeting, and publications had to be distributed in paper copy.

In the previous 30 years, from 1950 to 1980, we moved from mimeographing for copies as there were no photocopiers and we added television as a communication medium. Overhead projectors came in during this period, but they were for transparencies only (no computer hook-up).

Going way back, two more 30 year periods – 1920 to 1950 and 1890 to 1920, there were few changes, except the use of radio increased and there was more mechanization for farm equipment and other transportation. Thus the large communication changes occurred partly from 1950 to 1980, but the really big changes were in the last 30 years.

The College has the CALS Weekly Bulletin, which goes to all employees with content submitted by anyone. Copies of Executive Council weekly minutes are available by request to the Dean's Office. Two college-wide faculty/staff meetings are held each year. The college has a Communications Team to improve communications. Individual departments often share minutes of their faculty or staff meetings with members of the department. Cooperative Extension has a "Tuesday Morning Notes" that keep all those with extension appointments informed about happenings of special interest to them. Several times a year opportunities are given for feedback on specific issues (via an anonymous web form posted in the CALS Weekly Bulletin).

Organizational History for Communications and Computing

Unit the early 1980s, communication choices were fairly structured; and there was a long history of adding a few new technologies to a stable of core

technologies (e.g., print, radio, television, personal meetings). One unit, Agricultural Communications, had been in existence.

The Educational Communications and Technologies (ECAT) group grew out of a committee recommendation on how to deal with the emerging changes in computing and communications. That committee was appointed by Dean Sander in 1996 and chaired by Gary Woodard. Shortly after the report was final, Dean Sander accepted the recommendation and formed ECAT in 1997 with Roger Caldwell as the first director. That brought three units together: Agricultural Sciences Communications, Computer Applications Group (CAG), and Computer Multimedia Laboratory (CML) When Caldwell retired in 2003, Associate Dean David Cox became the Director. Vice Dean Colin Kaltenbach became director in 2009.

Agricultural Sciences Communications provided a publications service for CALS; writers for news releases, stories, and technical publications; and served in a management role for publication record-keeping, quality control, and technical and regulatory standards. In addition, it developed videos for training or educational purposes, used radio and television programming as either short statements or full programs, and prepared short tapes on a variety of subjects so citizens could call a phone number and select the tape for immediate listening. The unit also had full or part-time employees in Maricopa County for radio programs and to address publications needs. Over the years, the unit had a series of different names and locations, including:

Unit Names

- **Agricultural Communications**, with Gordon Graham serving as director until he retired. Then Lorraine Kingdon was director until she retired.
- **Agricultural Sciences Communications**, with Jim Chamie as Director
- **Agricultural Sciences Communications and Computer Support** became a division within the Department of Agricultural Education
- With the formation of **Educational Communications and Technologies**, Agricultural Sciences Communications and Computer Support was renamed to Publications and Web Programs, as a division in ECAT.

The Computer Multimedia Laboratory was formed by Associate Dean David Shoup in 1993 and was headed by Edwin Carpenter. Its role was to 1) train faculty in using new computer presentation methods for classroom teaching; 2) design the modifications for selected classrooms for the necessary equipment for these new methods, 3) and provide an equipment check-out service for faculty needing specialized equipment. The CML also supported faculty in distance education and had a major undertaking when Fred Wolfe, the head of the Department of Nutritional Sciences prepared the first UA class that could be taken either in a regular classroom or via a DVD disk (students were provided a disk). This project also surprised several people in how the students reacted – they preferred the disk version to the having to attend a regular class. The disk version still required students to come to class on the days when there was an exam. Shoup also used the CML equipment to teach distance education classes in Agricultural Engineering to students at Arizona Western College in Yuma. This worked well in general, but since it was live it depended on a communications network that worked on a continuous basis. They were using the Northern Arizona University microwave network, but some other groups that used the network sometimes caused interruptions in the classroom experience. With the merger, the CML retained its original name.

The Computer Applications Group was formed by Dean Cardon in 1982 to address the needs related to the emerging revolution caused by the new desktop computers. The director from 1982-1984 was Roger Caldwell, and the director from 1984 until the 1997 merger was Robert MacArthur. CAG: 1) provided advice and evaluation for the purchase of desktop computers, 2) provided training and advice for faculty and staff in computer and applications use, 3) managed email (this was before the UA had a single email service), 4) developed an early website (AgInfo) and continued to operate the server for CALS web operations, and 5) developed a variety of special computer projects that assisted faculty in addressing both small and large needs. In the mid 1990s the need for college computer support shifted from the “getting started” mode to building applications that could be used by faculty and staff for a variety of uses. In addition, there were specialized applications that required computer servers and could be used via the Web. When the merger came,

the unit name was changed to “Networking and Data Laboratory.”

An Example of Using the New Technologies: The Southwest Project

After gaining some experience in working with the faculty and staff on ways to adjust to the new communications and computing opportunities, a group of faculty and staff from across the University got together in 1995 to share experiences about what worked and what did not. Two of the principals on the project were from CALS, Robert MacArthur and Roger Caldwell. This took place during President Pacheco’s time and extended into the term of President Likins. Valuable assistance was provided by Vice President Michael Cusanovich (some assistance was financial but Mike’s pragmatic wisdom also played a part) and Karen Smith, a professor of Spanish who was serving as Special Assistant to the Provost for faculty development relating to information technology.

To show the value of the new information technologies, the group wanted to find a project that was of interest to the faculty, that could involve a cross section of the campus, that was affordable, and where a successful outcome was likely. Of course, everyone had their time fully committed to their own programs, so some care was taken in selecting a project.

The “Southwest Project” emerged as the appropriate name. But, one small problem arose – what is the definition of southwest (for example, does it include southern California or portions of other states?). Our solution was to engage in a discussion with Jim Griffith, of the UA Southwest Center and folklore expert. His answer was simple – where the mesquite tree grows (in the Northern Hemisphere).

The basic theme of the project was to use what was already available, with a group of people from multiple disciplines, and see what could be done with the new information technology. Examples included: databases on anything dealing with the Southwest, how information in one discipline might be used by another disciplines, what differences existed for university users vs non-university users, and what new audiences might be attracted to the project if the data were presented in useful ways. The project was renamed “Relationships to the Land” and a presentation was made to President Likins in 1997.

Part 4. Summary

History Since 1980 from Various Perspectives

There are multiple perspectives on how history plays out, depending on your own involvement, your personal biases, and your access to relevant information. To guard against these types of factors, some history was taken from the perspective of different administrative units. Each of these perspectives was developed with the participation and final review of the administrative units involved.

1. The 1970s was a time of significant change in departmental names and in departments being combined. Departmental mission statements changed over the years, as did degree offerings and the specific focus of the department. The College was one of the first to be involved in University interdisciplinary activities and is heavily involved today. In addition, a number of departments have formal arrangements with external organizations and their faculty have joint appointments with other campus units. College faculty are members of the increasing number of institutes and centers developing within the University.

2. The Dean's Office is responsible for leading and managing the college, maintaining contact with client groups, working with other colleges and central administration, doing strategic planning, working with advisory councils, and doing fundraising. Some of these activities began in the last 10 years, and others, while they existed in previous years, have been modified in the last 20 or so years. The Dean's office is also responsible for hiring and promotion standards and for resource allocation.

3. The Academic Programs Office is responsible for on-campus instruction. Over the last 20 years our students have changed substantially. Students are now majority female and majority urban, and with less agricultural experiences. Instructional approaches have changed such that in some cases a large several hundred seat auditorium, that is equipped with electronic devices for feedback, is used for instruction. These students can often interact better with the instructor than students can in a small classroom of 30 students. In 1980 there were essentially no desktop computers, cell phones, or similar electronic devices. Today, 30 years later, nearly all students have access to all of these devices and use them effectively.

4. Cooperative Extension has changed a great deal since 1980. In addition to county agents we now have area agents, specialists are integrated into the academic departments, and county agents can have departmental affiliations. Agents and specialists are required to do research, and agents need at least a Masters degree. Cooperative Extension retains its basic structure but the focus changes as the times change and the client base changes. In the late 1990s there was a major shift in extension publications away from printed copy and into web based information.

5. The Experiment Station was the first Organized Research Unit at the University, and in fact it was the first unit of any type at the University. The original experiment stations were converted to Agricultural Centers in 1984, several were closed and several were combined and moved to a new location. College research grants and contracts have increased in size and number, and have been growing faster than total University grants and contracts.

6. The Administrative Services Office provides the support for all units. The College is one of the two most complex colleges (the other is Medicine). Over time the demands for new processes has grown. The Development and Alumni Office began in 1980, and International Program activities peaked in the mid-1980s.

7. Communications activities had changed markedly over the years, revolutionized by the changes in information technology in the 1980s and 1990s, but they are also beginning to change again because of the newer social media. Some of the older ways are still effective, such as personal visits and paper copy publications.

Part 5.

Personal Recollections and Case Histories

This section draws from comments made by faculty, staff, and administrators that are statements made in their own words. During the 1990s there were a series of "oral histories" that provide a rich dialogue, sometimes in explicit words, about how certain things were done in the college or are just historical conversations. There are also personal recollections from 15 faculty and staff that relate to how the changes that occurred from 1980 -2010 appeared to them. There are also a few anecdotes that are recalled from the above discussions and are worth sharing.

Chapter 22 Ten Case Histories of Change

Case histories cover a range of activities and record the experiences of those closely involved with the change.

Chapter 23. Developing the Maricopa Agricultural Center

The Maricopa Agricultural Center was established when the Phoenix area experimental farms were closed by the Board of Regents. This describes, from several perspectives, how the conversion was made.

Chapter 24. Recollections of Faculty and Staff

Descriptions by 18 faculty and staff on the changes since 1980. This is basically a collection of personal views on how teaching and research changed, how students and faculty changed, and how the ways we communicate changed.

Chapter 25. Excerpts of Oral Histories

The topics focus on retired faculty and staff and how they came to the University of Arizona and what life was like for them.

Chapter 26. Excerpts of Alumni Newsletters

Selections from Agri-News from the first to the last issue. Some content is informative, some is humorous, and some is interesting for its historic context.

Chapter 22. Ten Case Histories of Change

These case histories represent the beginnings of a major change, the complexity of certain activities, and special situations that may make interesting reading. The nine examples are:

- The Beginnings of Molecular Biology in the College of Agriculture: Albert Siegel and Milton Zaitlin
- Molecular Biology Expands to the Plant Breeding Department
- From Genetic Engineering to Pest Control: The Role of Bt Cotton in Arizona
- From Domestic Science to Home Economics to Contemporary Family and Consumer Sciences
- From Agricultural Science to Environmental Science
- The Challenges of Managing a Large University Department
- From Greenhouse Experimentation to Controlled Environment Production
- The Boyce Thompson Arboretum State Park: Coordinating the University, a State Agency, and a Private Foundation
- Building the Archives for a CALS History Project
- Dealing With the 1970s Growth of Environmental Issues

The Beginnings of Molecular Biology in the College of Agriculture: Albert Siegel and Milton Zaitlin

By Milton Zaitlin, Professor Emeritus, Department of Plant Pathology and Plant-Microbe Biology, Cornell University with contributions from Robert Goldberg, Distinguished Professor, Department of Molecular, Cell and Developmental Biology, University of California, Los Angeles.

Albert Siegel was appointed Professor of Agricultural Biochemistry at the University of Arizona in 1959. His appointment was the consequence of a request from Dean Harold Myers to James Bonner (a very esteemed plant physiologist at Caltech) for suggestions on how to upgrade basic plant sciences at the university. Bonner promoted the candidacy of Siegel, who got his PhD at Caltech under the direction of Max Delbruck, who had won the Nobel Prize for his pioneering work with bacteriophages, and was then a postdoctoral fellow at UCLA in the laboratory of Sam Wildman. While at UCLA, Siegel used his molecular genetics background to examine the relationships between variants of tobacco mosaic virus (TMV). Siegel brought his molecular genetics background and expertise to the College of Agriculture, continued his TMV studies, and was awarded a five-year grant from the National Science Foundation. In 1960, Albert hired Milton Zaitlin then at the University of Missouri. Although hired as a postdoctoral fellow, he was given the title of Assistant Professor. Zaitlin later was also appointed to the faculty of the Department of Plant Pathology

where he taught the plant virology course and was promoted to Full Professor. The hiring of Albert Siegel and Milton Zaitlin marked the beginning of molecular biology at the University of Arizona, and served as focal point for the training of a new generation of graduate students and postdoctoral fellows in the plant sciences using molecular tools that were being developed at that time.

Siegel continued his virus studies employing a genetic perspective. In collaboration with Zaitlin and postdoctoral fellow Om P. Sehgal, he treated TMV with mutagenic chemicals and isolated two mutants with unusual properties; instead of developing the normal systemic infection, they remained confined to the inoculated leaf. These mutants were found to have defective coat proteins, and their discovery led to an understanding of the role of the coat protein in viral replication and pathogenesis. In other studies, in collaboration with postdoctoral fellow Andy Jackson, Siegel and Zaitlin discovered the concept of sub-genomic RNAs in the genesis of viral-induced coat protein, and identified other proteins encoded in the viral genome. These were 'firsts' in the plant virus world. Siegel also pioneered studies on the way in which TMV variants competed with one another at the infection site on a leaf (mutual exclusion), and he uncovered the presence of pseudovirions of TMV in which the viral coat protein encapsulated host nucleic acid instead of the

TMV RNA genome. These were truly ground breaking discoveries.

During the 1960s and 1970s Siegel also pioneered work with plant DNA in the College of Agriculture – establishing one of the first plant molecular biology laboratories trying to understand the expression and evolution of plant genes in the pre-recombinant DNA era. With postdoctoral associate K. Matsuda and graduate students Robert Goldberg, Donald Lightfoot, William Thornburg, and Alan Jaworski, Siegel carried out the first experiments to show that rRNA genes are highly repeated in higher plants, and are organized into long tandem repeats which can form a satellite band when centrifuged in CsCl gradients. This classical experiment with plant DNA also showed that rRNA gene sequences are highly conserved between plant species, and that the number of rRNA genes varies greatly within the plant kingdom. These were ground breaking experiments at the time, and set the stage for the explosion in plant DNA research that occurred in the mid-1970s when recombinant DNA technology was invented. Siegel was named a Fellow of the American Phytopathological Society (APS), and served two years in a senior position in the National Science Foundation. Siegel left Arizona in 1972 to become chairman of the Department of Biology at Wayne State University. He passed away in 2007

In addition to his work with Siegel, Zaitlin generated his own research program and established a prominent plant viral research laboratory. He collaborated with Dick Jensen in the Department of Chemistry to study virus replication in leaf cell cultures where the cells had been separated from one another by the use of pectic enzymes. This followed from earlier studies on the nature of the intercellular cement holding cells together. His TMV studies, involving graduate students Dan Bradley; postdoctoral fellows V. Hari, Chester Duda, Roger Beachy, Andrew Jackson and visiting scientist Richard Francki, characterized the single and double-stranded RNAs associated with TMV replication, and additional studies characterizing the proteins encoded in the viral genome. Zaitlin's work on TMV was pioneering, established new areas of plant virus research, provided the conceptual foundation for how plant RNA viruses replicate, and was recognized widely by the virological community for its trail blazing nature. Zaitlin has been honored for his scientific achievements by being elected a Fellow of the APS, the American Society for the Advancement

of Sciences (AAAS), and by receiving the APS Award of Distinction, its highest honor. He also received both a Guggenheim and a Fulbright fellowship. Zaitlin left the College of Agriculture in 1973 to become Professor of Plant Pathology at Cornell University. He retired in 1998.

Molecular Biology Expands to the Plant Breeding Department

By Michael H. Vodkin, Biosafety Professional (retired), University of Illinois and Robert Goldberg, Distinguished Professor, Department of Molecular, Cell and Developmental Biology, University of California, Los Angeles.

Frank Katterman received a BA from the University of Hawaii (1954) and a PhD from Texas A & M (1960). The subject of his dissertation was on the action of a specific cotton defoliant. He continued his cotton studies at Texas A & M with David Ergle looking at various aspects of nucleic acid chemistry. During his stay at Texas A & M, Frank met John Endrizzi, who later became the Head of Plant Breeding at the University of Arizona. Frank joined the Plant Breeding faculty in 1966. John's vision was that Frank's background in plant physiology and plant nucleic acids was well suited to complement the resources that were available in the Department and in the College of Agriculture (e.g., the development of many of the 26 possible monosomics in cotton and all 7 trisomics in barley) and the availability of new technologies at the time (isozyme resolution, isolation of satellite DNA, nucleic acid hybridization, and plant tissue culture).

In the early years of his academic career (1966-71), Frank mentored two graduate students from the interdepartmental Genetics Committee -- Mike Vodkin and John Cherry. He was very active in the lab with his own research, but still devoted considerable time and effort in providing material and intellectual support to his students. John Cherry received a PhD for distinguishing multiple isozyme contributions from each of the genomes of tetraploid domestic cotton by comparing the profiles of the two putative ancestral diploids. Mike Vodkin received a PhD for estimating higher plant phylogenetic relationships by homologous and heterologous ribosomal RNA-DNA hybridizations and melting analysis of the rRNA-DNA hybrids.

Frank taught the course Chemistry of Nucleic Acids, which attracted graduate students from his

home department as well as from Plant Pathology and Biochemistry. It was a challenging, thought-provoking course that was heavy on problem solving. He also contributed periodically to the Special Topics in Genetics seminar.

Frank was always available to Genetics Program and Plant Sciences graduate students for advice on experiments, future research directions, and life in general. He was always present at lectures and seminars, and was part of a terrific group of professors (e.g., Albert Siegel, Milt Zaitlin, John Endrizzi) who dedicated themselves to outstanding graduate student training and to putting plant genetics and molecular biology at the University of Arizona on the map.

Time has gone by fast, but all of those early lessons we learned from Frank, John Endrizzi, Bill Bemis, Milt Zaitlin, and Al Siegel in Tucson during that magical time in the mid- to late- 1960s still endure to this day.

From Genetic Engineering to Pest Control: The Role of Bt Cotton in Arizona

By Bruce E. Tabashnik, Professor and Head, Department of Entomology, University of Arizona

Cotton is notorious for being heavily sprayed with insecticides for pest control, but growers and CALS scientists worked together to break this pattern in Arizona. In 1995, Arizona growers applied an average of 13 insecticide treatments on their cotton. Introduction of Bt cotton in 1996, however, dramatically reduced Arizona cotton growers' insecticide use and served as a cornerstone for more environmentally friendly, sustainable pest control.

Bt cotton is genetically engineered to produce one or more insect-killing proteins from *Bacillus thuringiensis* (Bt), a common bacterium. The Bt cotton first planted in Arizona produces a single Bt protein (Cry1Ac) that kill caterpillars of pink bollworm (*Pectinophora gossypiella*). These caterpillars, which are not native to Arizona, had been devastating Arizona cotton for almost a century by devouring seeds inside cotton bolls. While Bt cotton kills essentially all susceptible pink bollworm caterpillars, it is not toxic to most other living things, including beneficial insects and people. Thus, Bt cotton greatly reduced insecticide use against pink bollworm and preserved the natural enemies that help to control other cotton pests.

One of the major threats to the continued success of Bt cotton is that pests could quickly evolve resistance, just as they have to sprayed insecticides. To delay pink bollworm resistance to Bt cotton, Arizona cotton growers used the "refuge" strategy mandated by the US EPA from 1996 to 2005, which entailed planting at least 5% of their cotton acreage with conventional cotton that does not produce any Bt toxins. These refuges promote survival of susceptible pink bollworm moths to mate with any resistant pink bollworm moths.

Beginning in 2006, as part of the pink bollworm eradication program in the southwestern US and northern Mexico, sterile pink bollworm moths were released into cotton fields and Arizona cotton growers were allowed to plant up to 100% Bt cotton. After four years, this multitactic program had reduced pink bollworm abundance in Arizona by more than 99%. In 2009, no insecticide sprays were made against pink bollworm statewide. Meanwhile, an integrated pest management (IPM) program in Arizona replaced broad spectrum insecticide sprays with selective insecticides for other cotton insect pests.

Overall, taking into account reduced insecticide use and reduced pest damage, Arizona's cotton IPM program saved growers \$200 million from 1996 to 2009. The future looks bright, as Bt cotton that produces two distinct insect-killing proteins is used now, and CALS scientists continue to collaborate with growers to expand the gains made in sustainable, integrated control of cotton pests.

From Domestic Science to Home Economics to Contemporary Family and Consumer Sciences

By Soyeon Shim, Director, John and Doris Norton School of Family and Consumer Sciences, University of Arizona

The evolution of what was once known as Domestic Science, and later Home Economics, has evolved into a modern academic discipline with close ties to schools, government, the nonprofit sector, and business. The contrast between then and now is striking.

In the early days in a College of Agriculture in a land-grant university there were two topical areas – agricultural science and domestic science, or to put it more colorfully, things men worked on in the fields and things that women

worked on in the home. Both topics used science to address practical problems, and domestic science provided a path for women to enter higher education.

Domestic Science was offered when the University of Arizona began its first classes in 1889, and Home Economics was one of the first six department that were established in 1915. During the early part of the 20th century, the curriculum and facilities began to reflect better the scientific influences that were remaking home economics into a scientific field. In 1934 the Department of Home Economics became the School of Home Economics and in 1960 got its own building. During the last quarter of the 20th century, the School of Home Economics became first the School of Family and Consumer Resources (1984) and then the School of Family and Consumer Sciences (2000). During this time topics included family studies, family and consumer resources, interior design, home economics education, and merchandising and consumer studies.

In 2008 the school moved into a new building, McClelland Park, and the school name became the John and Doris Norton School of Family and Consumer Sciences. This is the first University of Arizona building to be 100% funded by private funds, having several large donations but 2,000 individual and corporate supporters.

Today the school consists of two academic divisions: Family Studies and Human Development, and Retailing and Consumer Sciences and offers BS, MS and PhD degrees as well as five certificates in various areas. The School has grown to represent more than 40% of the entire College of Agriculture and Life Sciences undergraduate enrollment. In addition it has three special centers or institutes: the Terry J. Lundgren Center for Retailing (1993); the Frances McClelland Institute for Children, Youth, and Families (1997); the Take Charge America Institute for Consumer Finance Education and Research (2003). The School is also a home to AZ-REACH (Arizona Center for Research and Outreach) funded by the Department of Defense for strengthening military families.

In 2010 the Office of Economic Education was transferred to the Norton School from the Eller College of Management. The Norton School is also the first academic program on campus to offer a distance (online) Bachelor of Science degree in partnership with Arizona Western College (an earlier

program in Agricultural Biosystems Engineering involved Northern Arizona University as well as Arizona Western College). The first cohort of students begins in Fall 2011 and will graduate in two years, providing a four year degree for full time students, without them leaving Yuma, Arizona. The Department of Nutritional Sciences and the Department of Sociology are cooperating in this venture.

From Agricultural Science to Environmental Science

By Jeffery Silvertooth, Professor and Head, Department of Soil, Water and Environmental Science, University of Arizona

The Department of Soil, Water and Environmental Science has its roots as a course in Soils in 1907. It became the Department of Agricultural Chemistry in 1915 when the first departments were established. By 1920 the name had changed to Agricultural Chemistry and Soils. During these periods the department responded to the needs of the agricultural community and had a focus on plant nutrition and soil fertility but also covered soil physics, irrigation, and soil genesis. A number of field experiments involved applying various types of fertilizer to the soil, including sewage sludge and animal wastes. In the late 1960s the department had an emphasis on nitrogen dynamics in soils but also began to direct more attention to environmental concerns with the appropriate recognition of soils as a natural body in terrestrial ecosystems, which would include the use of soils in agricultural systems and much more. In 1972 the department merged with Agricultural Engineering (to become Soils, Water and Engineering). This arrangement lasted 13 years, and Agricultural Engineering returned to its original name but soon became Agricultural and Biosystems Engineering. The remainder of the department became Soil and Water Science.

During the 1970s and 1980s the department became increasingly involved in environmental aspects of water and soil, as those two substrates are intimately involved in many pollution sources and controls. The movement to environmental areas was a natural evolution as most environmental contaminants become problems - in the soil, plants, and underground water table (and washout of air pollution). And, just like the needs of the agricultural community drove the departmental focus in the ear-

ly 20th century, the needs of the broader community drove the focus of the department in the later 20th century. It turned out that the shift made a lot of sense as the department had long studied the vadose zone – that area from the soil surface to the top of the water table. This study area has been expanded to the critical zone, which is the “near surface” environment that goes down to the water table and includes vegetation and surface water.

To reflect this change from an historic focus on plant nutrition to the broad arena of environmental science, in 1996 the name of the department was changed to Soil, Water and Environmental Science (SWES). Environmental education and research in arid environments has become a focus, but agricultural crop issues are still addressed. The department works with a variety of other departments in the college and on campus. For example, in 2008 the Department joined with the departments of Geosciences, Hydrology and Water Resources, Atmospheric Science, and the Laboratory for Tree Ring Research to form the School of Earth and Environmental Science. The department also works extensively with the Water Resource Center, Center for Toxicology, and the university wide Institute of the Environment. Special units have been established within the department which include Arizona Laboratory for Emerging Environmental Contaminants (developing analytical methods for identifying new contaminants), Arizona Meteorological Network, Center for Environmental Physics and Mineralogy, Environmental Research Laboratory, Water and Environmental Technology Center, and the Water Quality Center Laboratory.

The Challenges of Managing a Large University Department

By R. Phillip Upchurch, Former Head of the Department of Plant Sciences, University of Arizona

In early 1975 I was in my tenth year at the Monsanto Company in St. Louis, Missouri, having resigned my professorship at North Carolina State University in 1965 to join the Company. Having reached the level of Manager of Research I was faced with choosing among three options offered by my superior as the Company embarked on yet another reorganization. The most attractive was to move to Japan and develop an agricultural research and development program for Monsanto in the Far-East.

With young children approaching college age I decided to look outside the Company. Attractive offers from USDA-ARS in Washington, D.C., and from Eli Lilly & Company in Indianapolis were turned down as I became engaged in negotiations to join the College of Agriculture of the University of Arizona as Head of a newly formed Plant Sciences Department.

In Spring 1975 I was invited by Dean Gerald R. Stairs to visit Tucson and interview for the position. Apparently more than one interviewee for the headship either found the position too daunting or did not measure up. As a Weed Scientist I was probably considered a compromise candidate not stirring the ire that a horticulturist, agronomist or plant breeder would in one quarter or another. The Department of Plant Sciences had been formed on July 1, 1975 by combining the Department of Horticulture and the Department of Agronomy and Plant Genetics, along with certain personnel from Landscape Architecture and elements of Agricultural Botany and the Herbarium (from the College of Liberal Arts). The Department was headed on an interim basis by Dr. Dean McAllister, a member of the College Administration who was nearing retirement.

About the time of the formation of the new Plant Sciences Department, the headship of Agronomy and Plant Genetics had become vacant as Dr. Martin Massengale, the previous head, had been promoted to Associate Dean by Dean Stairs. However, the creation of the new entity required that the Department Head of Horticulture step down. This led to problems and it may fairly be said that the creation of the Plant Sciences Department took on all the elements of a “shot-gun wedding.” An early example of this was that I learned the impending move of Horticulture into what is now called the Forbes Building, where most of the newly formed department was to be housed, represented a serious problem. Someone had allowed a plan to develop that would keep the horticultural faculty to themselves. One of my early moves was to abort this plan and to create entities based on interests shared by the two groups. As examples, I created a joint cytogenetics laboratory and a joint tissue culture laboratory.

I recall my first day on the job. The Administrative Assistant for the Department was Charlotte Brooke and she took me under her wing and we worked closely together. She gave me her honest opinions but would faithfully carry out my decisions

when we disagreed. Looking back 35 years I can now grasp that running such a large department to the satisfaction of all was impossible, although for the six years I held the position I never admitted to myself that this was so. There were about 80 faculty members all reporting directly to me along with about 80 staff members and about 80 graduate students, in round numbers, with no Associate or Assistant Department Head to lend a hand. I saw this not as an impossible task but rather as a challenge that could be met with a 70-hour work week.

I got an inkling of some dirty laundry on one of my interviews. The chair of the Search Committee, brought in segments of faculty to exchange views. When it came time for Dr. Leland Burkhart to speak he let loose with a tirade which had to do with a longstanding disagreement he had with the College Administration. As the bitterness flowed from him, the chair tried to get him to make nice but Dr. Burkhart insisted on having his say. Fortunately Dr. Burkhart took a liking to me, partly because we had a common bond in having both been Ag faculty members at North Carolina State University. Leland was stationed at the Mesa Experiment Station, one of several remote sites that housed certain Plant Sciences faculty members. This geographical factor added to the challenge of leadership but made it more interesting.

Dean Stairs had insisted that the new Plant Sciences Head organize the Department based on cells in a matrix consisting of lateral elements of disciplines and vertical elements of commodities. For example, the vertical element of cotton interests would have access to cells in which breeders, plant physiologists, weed scientists, and cytogeneticists would be represented. Committee chairs would be assigned to coordinate this maze. I pledged to implement this process but it was for the most part quite un-useful and soon fell by the wayside with no objection from above or below. Dean Stairs also had a grand plan for management at the College level. The Executive Council would be Associate Deans for Plant Aspects and for Animal Aspects, the director of the School of Home Economics and the director of the School of Renewable Natural Resources, the Associate Dean for Instruction and the Associate Dean for Extension, and Dean Stairs.

I believe that one of the reasons Dean Stairs and I got along well is that in a year or so I was able to show a substantial increase in outside funding for

the Department which gave him needed flexible overhead funds and showed favorable departmental activity. He and I had one serious disagreement. When hired I was promised in writing a tenured professorship in addition to my administrative post. As my first year neared an end I was informed the tenured slot had not made it into the records. Stairs had obviously not formalized the arrangement with Executive Vice President Weaver and Stairs wanted me to "apply." I knew the pitfalls of this exercise and insisted on my rights. Stairs became quite angry and declared he would take care of the matter. He was obviously embarrassed to go hat in hand to Weaver who decided he had to back a Dean who had put a commitment in writing without the sanction of the VP. This contretemps had no lasting effect on the favorable rapport that Stairs and I had. It was reinforced at a dinner party Associate Dean of Instruction Metcalfe hosted in his home for the leadership of the Ag College.

In those days a Department Head at the UA College of Agriculture had much leeway in budgeting matters and in assignment of duties to personnel. The assignment aspect was always subject to agreement by the faculty member as they could always say no and fall back on tenure.

On budgeting and space allocation matters I soon took full control. For productive faculty members I increased salary, operating funds, assistantships, and space taking from some from less productive faculty. Over time I came to understand that while what I did was absolutely well-founded and correct, it gained me no friends. The people I took from naturally thought I was being unreasonable but, surprisingly, those who benefitted seemed to take the attitude of "what took you so long" and "is that all there is." These changes along with certain program changes I made provided for what I continued to think was dynamic leadership. However, I never felt I had developed on the part of the faculty "dynamic followship."

It did not take me long to realize that many of the department faculty were far less productive than they might be. My closely held opinion was that the rush to fill slots from a limited pool of applicants after War II led to having some faculty positions filled with modestly qualified applicants who rapidly gained tenure. Furthermore, I felt that many of them had failed to keep their skills current by taking sabbaticals or otherwise. My efforts to shift assignments

to get better productivity were successful in part but with notable failures. I never considered building a case for dismissal of a tenured faculty member as I was aware that local experience showed this to be a futile exercise. My belief was that my conversations with faculty members on changes were low-key and reasonable and they seemed inclined to go along with a plan even if later results showed little or no improvement. In retrospect, it is likely that they saw me as arrogant and overbearing. After a couple of years I engineered an evaluation of my performance by the faculty. It may be said that they did not love me but there was some degree of awareness that I was working hard to improve matters. One got the sense that the faculty preferred to be left alone. For better or worse, that was not my style.

There was response to what some no doubt considered my aloofness or arrogance or hard-driving attitude. Within the first two years gentle guidance was directed my way. Metcalfe took me to lunch and counseled me to develop a more friendly relationship with my faculty. On another occasion an important farmer and strong supporter of the College and Department took me aside and suggested I take time for coffee with the troops daily or at least from time-to-time. These "interventions" were no doubt carefully engineered and with the best intentions and likely with some faculty input. I found their advice hard to follow. If I regularly went to one coffee drinking group and not to another, how would that look? With about 70 plus faculty members to look after and tons of paperwork how could I ever develop friendships with all of them and doing it with just some of them seemed counterproductive.

From Greenhouse Experimentation to Controlled Environment Food Production

By Merle Jensen, Professor Emeritus of Plant Sciences and Gene Giacomelli, Professor of Agricultural Biosystems Engineering and Director of the Controlled Environment Agriculture Center.

Greenhouses in Arizona? The enthusiasm shown by the College of Agriculture administration in the mid 1960s wasn't at all positive when assistance was sought by a group of ambitious young engineers seeking agriculture assistance to support their concept of "Protected Agriculture." Not to be dismayed, they succeeded in obtaining grants from the Department of the Interior, the Rockefeller and Na-

tional Science Foundations, and the Environmental Research Laboratory was born.

With the addition of a Plant Physiologist and Horticulturist, they conquered the nearly impossible, establishing projects in the deserts of the Middle East and North Africa, as well as at "The Land" pavilion at Walt Disney World in Florida. These projects received world-wide attention, with "The Land" attracting over 300 million visitors since its opening in 1982. Today, this technology, termed "controlled environment agriculture" (CEA), is one of the most advanced systems of food production, modifying the natural environment to achieve incredible yields, playing an important role in meeting the world's food production requirements.

In the late 1990s, students continued to approach Dr. Merle Jensen about learning the technology of CEA. Along with Dr. Pat Rorabaugh, who worked with Dr. Jensen on a NASA project, they put together a 5-month class every Saturday, for no credit, on CEA. The class was so successful that in 1999 interest was expressed by the legislature and Jensen, with concurrence by CALS, worked with the legislature and then-Governor Jane Hull to establish the University's Controlled Environment Agricultural Center (CEAC). The proposal was accepted and, today, the University is a world leader in the development of hydroponic growing systems using controlled environments – whether it be within a greenhouse or in a grow chamber at the South Pole. Today the CAEC is jointly operated by the Departments of Agricultural and Biosystems Engineering and the School of Plant Sciences. CAEC offers classes and experiments involving both the plant aspects (plant physiology under controlled environment conditions and insect or disease control) and the physical systems (construction and maintenance, monitoring and optimization).

The Arizona greenhouse hydroponic production industry has invested more than \$250 million during the past 15 years, establishing more than 300 acres of new greenhouse construction, specifically for vegetables. These businesses became successful, in part, because of the favorable conditions in Arizona such as a pleasant winter climate, sufficient high quality water and energy resources, efficient transportation infrastructure to all parts of the U.S. and an available labor pool. Today, over 1500 jobs have been created in the Arizona greenhouse industry, not counting the hundreds of jobs which support

this intensive agriculture industry. The Arizona greenhouse vegetable industry grows mainly tomatoes and cucumbers which are shipped throughout the United States and even Canada during winter.

Added to requests on hydroponics from commercial growers and home hobbyists were the marijuana growers who, unknowingly, were given the phone number for the Tucson Police Department when requesting information.

Another extravaganza was Biosphere II. Unfortunately, the recommended CEA programs failed due to the lack of understanding of basic plant science.

Today, under the leadership of Dr. Gene Giacomelli, Director of the CEA programs, along with his faculty, staff and students, the CEA programs represent a variety of high technology applications from greenhouses, growth chambers at the South Pole and even to NASA for inflatable lunar growth facilities. The South Pole growing chamber has done miracles for the mental wellness of the inhabitants that are cooped up in the Pole facilities for up to eight months. Under such enclosures there are severe problems with SAD (seasonal affective disorder). The mental health situation was so bad that some inhabitants had to be sedated to get through the entire tour of duty. The growth chamber produces up to two salads per day per inhabitant and provided other fresh vegetables as well. This did a great deal to resolve the mental sickness. The environment within the chamber – which grows salad crops, herbs, tomatoes and cucumbers – can be totally computer controlled from the CEAC in Tucson. In addition the CEAC is instrumented to collect many types of information about conditions within the CEAC and to monitor visual conditions through video recorders; some of this information is posted on the website for anyone to watch.

Today, a great deal is being published about vertical farming, where high rise structures and abandoned warehouses will enable employment of many inner city workers and produce fresh, locally grown veggies. It is evident that the persons promoting such agriculture have not seen the thousands of acres of vegetables that grow in Yuma during winter and the Salinas Valley in summer. To use artificial lighting systems to duplicate natural sunlight is economically prohibitive. It is true that new lighting systems, such as LED lights, might one day offer a choice for inner city food production but not today, except for persons who have an exceedingly high

personal income. However, with increased in local food production and possible changes in our energy sources, this approach may prove economically feasible in the future.

A mirror image of the Pole is the development of a lunar habitat for the production of not only vegetables but also high energy crops such as soybeans and sweet potatoes. Yes, it is true that the CEAC programs are out of this world but most importantly they continue to serve not only the students at the University but also the local community as well as national and international programs.

The University of Arizona remains a leader in the development and application of CEA systems through advanced research and education programs to support the growth of CEA in the U.S. and throughout the world. While optimizing resources, including water, energy, space, capital and labor, the CEAC is presently making a major impact helping to feed the world with CEA technologies.

The Boyce Thompson Arboretum State Park: Coordinating the University, a State Agency, and a Private Foundation

By R. Phillip Upchurch, former Head, Department of Plant Sciences, University of Arizona

Most people think of universities in a conventional way, having colleges or schools, departments, administrative units, and increasingly, stand alone or integrated special centers and institutes. Land-grant universities are a little more complex, with the addition of cooperative extension arrangements in each county, research centers throughout the state, and multiple versions of cooperative agreements with client groups. The Boyce Thompson Arboretum State Park, in Superior, Arizona, represents a different type of complexity. In the 1960s the University of Arizona (UA) and the Arboretum Board entered into a bilateral management agreement, and since 1976 it has been managed jointly by the UA, the Arizona State Parks Board, and the Boyce Thompson Arboretum. Thompson owned several large mining companies and he was given the honorary title of Colonel by the American Red Cross as part of President Wilson asking Thompson to work with Russia near the end of World War I. He also founded the Boyce Thompson Institute for Plant Research, initially located in Yonkers, New York, but now on the campus of Cornell University.

The Arboretum at Superior was created and endowed by Col. William Boyce Thompson, with its dedication in 1928 (he died in 1930). This was the first arboretum or botanical garden in Arizona with the initial name of Boyce Thompson Southwest Arboretum. Thompson engaged Dr. Franklin Crider, Head of the UA Department of Horticulture to help design the gardens and to be the first Director of the Arboretum. The enterprise was guided by close business associates of Thompson who for many years in the spring and fall would visit the site as a Board to exercise their mandate.

When the UA took over the Arboretum management, it was with the understanding that the Board would contribute, to the UA, earnings of the original endowment less the sum needed to fund the semi-annual trips of the Board from the east. The UA contributed the funds for the director. Robert McKittrick served from 1965 to 1985, and during the 1975-1976 academic year, my first at the UA, the UA College of Liberal Arts was looking for a new administrative home for the Arboretum. The one-year-old Plant Sciences Department looked like a good fit and McKittrick was transferred to my department as of July 1, 1976. This occurred without my participation or awareness, and the transfer came simultaneously with the implementation of what became known as the Tri-partite Agreement bringing Arizona State Parks in to join the UA and Boyce Thompson Board.

The agreement called for State Parks to furnish all operating expenses and to provide leadership for the entity. The UA would devote its inputs to research at the site. However, until State Parks picked up the full cost, the UA would still be in charge of Board resources and continue to select and manage the Director. State Parks never paid the full tab but did provide a Parks Manager to be on site and provided other valuable resources. There was good harmony and great benefit to the Arboretum as the Tri-partite Agreement was honored in general terms.

Along the way Drs. Frank and Carol Crosswhite had been added to the Arboretum roster, sharing between them one full time position. Both Frank and Carol and Bob McKittrick each in their own way contributed greatly to success at the Arboretum. I retained administrative responsibility for the Arboretum while I was Head of the Plant Sciences Department. For the period 1981-1994 my involvement shifted to being a member of the Arboretum Board

and eventually ascending to the Presidency. In 1981 as Director of Development for CALS I created Friends of the Arboretum (FOTA) and hired Tim Clark as a 1/4th time employee to run this operation. During my association with the Arboretum from 1976 to 1995 I orchestrated several important initiatives in addition to FOTA. In 1978 we began a magazine DESERT PLANTS, with Frank Crosswhite as editor. The inaugural issue appeared in 1979. Frank did a spectacular job, actually researching and writing many of the articles himself. In due course Frank ran out of steam and the editorial baton was passed in 1993 to Dr. Margie Norem who continues to turn out spectacular issues now 32 years on. The venture is joint between the UA and Arboretum, so both get full credit for its excellence.

In 1988 I created, and led until 1994, the Desert Legume Program (DELEP) with the newsletter ARIDUS. Again, it was a joint venture for the three entities and continues as such with much success. Along with this, I proposed a Desert Legume Garden at the Arboretum which came to fruition, and was named for the Taylor Family, whose members were great supporters of DELEP and the Arboretum.

It was my pleasure to be a major moving force behind the creation of a new Visitor's Center at the Arboretum. Prior to the existence of the Center, visitors were invited to put voluntary contributions in a collection box in the Garden. After the Visitor's Center became operational an entrance fee was charged, resulting in an increase in much needed resources. This also provided additional space for the bookstore, plant sales and office space.

The Arboretum got good service from Bob McKittrick, but the arrival of Dr. Bill Feldman as Director in 1985 brought a quantum leap in management skills and method. Bill was hired by LeMoyné Hogan who was the Department of Plant Sciences head at the time. Bill had great horticultural skills and great management skills. He rode herd on the finances and juggled relationships with all management partners well. He presided over creating numerous new features in the gardens, saying grace over concepts, design, fund allocation, installation, and celebrations of each culminating step.

It was a great pleasure to serve in a harmonious collaborative way with State Parks, the Arboretum Board, the major donors, the Director and others. However, there were treacherous paths to be trav-

eled as new Board Members tended to think that their predecessors had not really ceded administrative control to the UA. This was especially an issue as the Board was sometimes puzzled as to why it had to sit still for what seemed like arcane personnel protocols of the UA. All was sorted out in the end. After I retired the Tri-partite Agreement was re-worked and continues today.

One might ask about the pros and cons of the UA being involved in the Arboretum experience along with two other organizations. The broad advantage is that the venture represented an economical way of conducting one form of outreach. It is certainly important for the citizens of Arizona, especially the newcomers, to understand about the unique plants of their state. What better way to do this than through the operation of an Arboretum visited by many tens of thousands of visitors each year. Not to be overlooked is that any great University is well advised to make linkages to a wide variety of institutions. The vibes coming from association with State Parks and Col. Thompson's Garden have been outstanding.

Bill Smith was head of the Arboretum Board for years before and after the Tri-partite Agreement was put in place. His father had been a loyal employee of Col. Thompson for years. As Bill practiced his role at the Arboretum the ghost of the Col. was palpable. Bill had a unique style of management. At semi-annual meetings of the Arboretum hierarchy he would sense the issues in advance. Then he would take key individuals on a walk in the Arboretum and explain his way forward. Your choice was to agree or by your silence to concur. At the formal meeting things went Bill's way with votes being pro-forma. I report this not in a negative way as Bill always had the best interest of the Arboretum at heart. I readily grasped that if I wanted an initiative put in place it was best to broach it to Bill and to let him do his magic on a garden walk. Bill and I had a great rapport. This was affirmed when he let me know he would support my candidacy to head the BTI for Plant Research when there was a vacancy at one point. Bill was followed in his leadership by his son, Dick Smith, who served an equally effective manner albeit in a more conventional fashion.

The effectiveness of the tri-partite consortium was evidenced when the campaign to raise funds for construction of the new Visitor's Center came up short. The Arboretum Board had the vision to de-

vote a portion of the corpus of the Arboretum endowment for the project. This happened on one or two other occasions, thereby providing a sense of harmony and shared purpose.

Until about 1980 the Arboretum Board was primarily composed of people with business backgrounds, but lacking in knowledge of the plant world. It was left to U. of A. personnel to come up with initiatives regarding new ways of structuring the grounds to present plants to the public. Over the years these initiatives have been major with positive impacts. Members of the Board never tried to act like plant experts but were supportive of University proposals, showing reservations only when financial matters became an issue. This harmonious division of labor made the consortium productive.

For many years investment decisions for the Arboretum endowment were made by Board Members from the East. Over time there was a growing feeling that the Board and its endowment should be more Arizona centered. Gradually Board Members from the East were replaced by individuals residing in Arizona. One of the key replacements was Sam Applewhite, a principal in a major Phoenix law firm. Sometime before 2000 the management of the Arboretum endowment was entrusted to a branch of Northern Trust located in Phoenix. Sam was a key to this transfer and it was heartily endorsed by the Board. This shift was symbolic and more. While the vision of Col. Thompson was not diminished it now depended more on an Arizona brain-trust rather than on colleague descendants of the Colonel.

Cabot Sedgewich is deserving of much credit for his support of the Arboretum. He was a fellow undergraduate classmate of Bart Cardon at the U. of A. His home base was the family ranch at Nogales. However, his career was in the U. S. Diplomatic Corps. A few minutes in his presence revealed the characteristics of a charming diplomat. In retirement he sustained his family's role in Arizona political circles. This led to his becoming a member of the Arizona State Parks Board. There he played a role in creating the tri-partite consortium. He later became an Arboretum Board Member.

The matter of the adequacy of the legal rights of the Arboretum to water was an ongoing issue for many years. Arboretum changes in the plant palette and modes of display required more water. The issues were whether it was legally and practically available. The matter was partially resolved when

Jim and Mary Faul became strong supporters of the Arboretum and provided money to drill a deep well. They were farmers just south of Florence with whom I became close friends. After Jim died Mary continued to provide financial support for Arboretum projects.

It is my belief that the Arboretum has benefitted from what I came to understand shortly after I arrived in Arizona in 1975 regarding the historic paternalist nature of Arizona Society. For example, when a plane crashed near the U. of A. Campus a member of the University Board of Regents elected to come to the Campus to make sure his charge would be OK. I soon saw other examples that leaders in all walks of life in Arizona saw themselves as holding in sacred trust the well-being of Arizona, its heritage, and its people. Personalities loomed large and played paternalistic roles in the best sense of the word. Such was the nature of Arizona Society in the last half of the twentieth century. One wonders if it persists in the twenty-first.

Building the Archives for a CALS History

By Carol Knowles, Retired from CALS Development and Alumni Office

In the spring of 1992 the Archives Program was established by R. Phillip Upchurch, director of the CALS Development and Alumni Office and a small number of retirees. The Archives Program volunteers continued in their various projects through 2003. At that time a change in focus for the Development and Alumni Office placed the Program totally in the hands of the volunteers. Volunteers continued to interview agriculturists, collect photos and documents and catalog the thousands of items that had been donated. They continued for several years, until the Program was concluded. The facility at the Arizona Crop Improvement building still houses the documents, photos. Occasionally permission is requested by students, staff and faculty to conduct research using the materials.

Information about the Program was first disseminated through an article in the AgriNews (Vol II, No. 2) issue of June 1992. Highlights of that message include:

- The College of Agriculture has accumulated over 100 years of memories and history and the College

of Agriculture Archives Committee has been formed to preserve this history.

- The committee is seeking documents, photos, or items that should be preserved. Letters, ledgers or other documents of historical interest to the college are examples of what will be kept in the archives. Of course photos and other archival — material are also needed.
- If you have items to be kept in the Archives or wish to be involved with the project please contact the committee through the College of Agriculture Alumni Office, 621-7190.
- Committee members include Beryl Burt, Monica Delisa, Pete Dewhirst, Helen Goetz, Gordon Graham, Amy Jean Knorr, Evelyn Jorgensen and Philip Upchurch.

Many retired faculty and staff volunteered with the Project. The following people served throughout most of the Project. Approximately 40 additional people participated either as oral history interviewers or as volunteers with the various Projects:

L. W. Dewhirst
Gerry Eberline
Bob Fowler
Helen Goetz
Gordon Graham
Robert Halvorson
Clint Jacobs
Evelyn Jorgensen
Frank Katterman
Amy Jean Knorr
Margaret Bonnin
Robert Briggs
Beryl Burt
Philip Knorr
Al Lane
Dean McAllister
Darrel Metcalfe
Esther Minton
Shari Montgomery
Ralph Taylor
Beth Thrall
George Ware
Ray Weick
W. T. Welchert
Frank Wiersma

Directors of the Office of Development and Alumni that Chaired the Project Include:

R. Phillip Upchurch, 1992-1995
David Shoup, 1995-1996
John Engen, 1997-2001
David Cox, 2001-2002)
Bryan Rowland, 2002-2006

Coordinators of the Project include:

Monica Delisa
Julie Lindmark
Clint McCall
Kris Smith
Mergie Puerta Edson
Susan Paul
Carol Knowles

Students participating in the program include:

Joe Leisz, served as co-chair of some committees.
Meg Warburg
Nikki Arriaga
Jennifer Jordan
Jasmine Irani
Ola Printz

Four projects were established to carry out the work of the Program:

The Photo Project, Helen Goetz, chair, Joe Leisz, student assistant. When the Project began, the majority of over 4,000 photos in the collection had not identified. In order to catalog the photos, they were taken to various College events, Homecoming, alumni activities, banquets, 4-H activities hoping for identification of people, places or events. The photos were organized in file cabinets by subject area and venues.

The Documents Project, Bob Briggs & Shari Montgomery, co-chairs. The Project received many boxes of articles, manuscripts, publications, reports and government bulletins, maps, encompassing a wide variety of subjects, from the history of the College and the 4-H activities in Arizona to Cooperative Extension work, handwritten letters from the late 1880's in reference to the Experiment Station at Phoenix, a report on Indian agriculture in northern Arizona in 1920, many research projects, the Brazil Project, a group of 1920 cookbooks, and some other artifacts.

The Genealogy Project, Beryl Burt & Phillip Knorr, co-chairs. It became apparent when the Oral History Project was up and running that genealogy information would be useful from as many people involved in the agricultural community as possible. The format for the Family History questionnaire was designed and copies were mailed to a large number of people, both faculty, retirees, donors, alumni and friends. The information supplied was catalogued by the project.

The first home of the Archives Program was in a University owned house on East Helen Street where there was dedicated space for meetings and storage for photos, documents and other supplies. Monthly meetings were held and lively discussions shared the progress each project had made and guest speakers were invited to share their knowledge and expertise with cataloging, preserving archive materials, and taking oral histories. Individual projects scheduled meetings as needed. In the fall of 1994, the Archives Program was provided with a new home in the Arizona Crop Improvement building at the Campus Agricultural Center. This facility was spacious, well cooled and heated and occupied by other people which imparted a feeling of safety. Surplus steel shelving of over 150 linear feet was purchased, brought to the facility and assembled by volunteers for use by the projects.

The Oral History Project, George Ware, chair. The Oral History Project was intended to preserve the memories, life histories, anecdotes and contributions to Arizona agriculture of those involved in ranching, farming, agriculture banking, equipment companies, water resources, etc. Trained volunteer interviewers met their interviewees. The interviews were taped and transcribed by volunteers. These documents and tapes are located at the Arizona Historical Society, Tucson Office. They are also online from the office website. In addition, the documents and tapes were made part of the Arizona Historical Society's archives. Included below are the interviewees, which included CALS faculty, staff, and administrators, people in the agricultural industry, and others involved with the college in some way:

Al Lane
Albert Face
Alvin Allen
Amy Jean Knorr
Arden Day
Arden Palmer

Bart Cardon
 Bruce Taylor
 Carl Stevenson
 Charles Lakin
 Clark Martin
 Dale Steward
 Darrel Metcalfe
 Dean McAlister
 Don Tuttle
 Dorothy Bowers
 Edgar Kendrick
 Emil Rovey
 Ervin Schmutz
 Fred Enke
 Gladys Klingenberg
 Helen Church
 Iracema De Sa'
 James Park
 James Roney
 John Burnham
 John Norton
 Kelvin Henness
 L. W. "Pete" Dewhirst
 Leon Moore
 Lynn Anderson
 Margaret Clements
 Marion Smith
 Marvin "Swede" Johnson
 Mary Rohen
 Otis Lough
 Paul Klingenberg
 Phillip Upchurch
 Phyllis Hislop
 Ray Weick
 Robert Humphrey
 Robert Moody
 Tom Chandler
 Wallace Fuller
 Walter Hinz
 Wilbur Wuertz
 William Crone
 William Hale
 Winnie Horrell

In 1994, the Archives Project began publishing a newsletter, "Arizona Footprints." Nine issues of this newsletter were published. Joe Leisz who began his tenure as a student served as editor. Later he graduated and joined the office as a 4-H Development officer. Articles focused on the various

committees, meetings, interviews, photos and documents that needed identification.

Dealing With the 1970s Growth of Environmental Issues

By Roger L. Caldwell, former Director of the Council for Environmental Studies, and Professor Emeritus

In the late 1960s people from all backgrounds were becoming more aware of the environmental issues that would become evident to many during the 1970s. There were differences of opinion on the causes and effects of these environmental issues and there was a lack of basic information relating to problem definition, realistic solutions, concerns about long-term effects, and how addressing one problem could cause a new problem to occur.

I joined the College in 1967 and one of my two office mates was a professor emeritus who came in nearly every day, Rubert Streets. I was in the Department of Plant Pathology, and that subject covered diseases caused by living organisms, but also plant problems due to the environment or nutritional imbalances. Streets was aware of the periodic impacts on agriculture by the copper smelter at Douglas, Arizona. He shared some of his thoughts with me and we prepared some information about the relative sensitivity of various plants to sulfur dioxide. About that time Dean Merlin DuVal of the College of Medicine called to find someone who knew about pollution effects on plants. He was serving on a county advisory council and needed some information on pollution and plants. These two events got me involved in local air pollution problems and I took some time to gain some knowledge on pollution in general. Meanwhile, the College was getting questions about pollution effects and their solutions. One of the major problems was nitrogen contamination due to feedlot runoff; others related to water quality, dust control, and public health.

In the late 1960s the College had several committees established to address various pollution issues. It was something all of us were leaning about; the basic sciences were clear in general terms, but the specific effects on agriculture or problems caused by agriculture were not well understood. In 1970 I started a course "Environmental Quality and Agriculture", Agriculture 50. It was a college-wide course so all students could take it, and it was lower division with no prerequisites. Meanwhile, Dean Myers

was anxious to get a better understanding of what the College should be doing in the environmental areas, since it involved so many departments. In 1972 he set up a committee to evaluate options and make recommendations; it was the first University committee that I chaired.

At that time, Cooperative Extension was much more independent of the College than it is today, and we had that organizational constraint to deal with. The committee finished after Dean Myers retired in 1973 and gave the results to a new Dean Stairs. The basic recommendation was to form a Council for Environmental Studies that would report to the Dean. Dean Stairs liked the idea and asked me to be the director; that is when I learned that if you do a good job as a committee chair you will be asked to do more administrative things. The Council objectives were 1) to provide internal and external communication, and 2) to provide advice and coordination on environmental matters within the College. It was not intended to do work that was already being done by the departments.

The Council was formed in 1974. Independent of this activity, the College had just received a grant from the Environmental Protection Agency to address new pesticide regulations facing urban pest control operators and farmers and ranchers (major revisions in federal pesticide laws occurred in 1972). So this function was brought into the Council. The College's first Pesticide Coordinator was hired, Roger Gold, and he became the second employee of the Council; a new secretary made us an office of three. Gold left in 1980 and David Byrne became the Pesticide Coordinator. One of the Council's first efforts was to publish unbiased and accurate information to a range of audiences. Initially there were two newsletters – one on pesticides (monthly) and one for general environment (bi-monthly)³⁰. In the mid-1970s a third bimonthly newsletter was added, dealing with energy. Another thing the Council did was to prepare a Faculty Resource Directory. This allowed everyone in the College to know who had expertise or interest in a range of environmental topics. The key word list had a major area (e.g.,

plants, animals, homes), and a secondary area for more detail. Finally, it had one line (80 characters) for a person to describe their expertise. Scott Hathorn in Agricultural Economics wrote a FORTRAN program to catalog all this information. It was published as a small booklet and was the first faculty resource directory in the University.

Specific activities of the Council included:

- Pesticide training sessions for urban pest control operators, farmers and ranchers, and pest control advisors.
- Monitoring and publishing pesticide information and maintaining a list of the “special use” pesticides for Arizona.
- Working with the U.S. Department of Agriculture, the U.S. Environmental Protection Agency, and State of Arizona agencies to advise them, and be advised by them, on environmental issues as they relate to the various CALS clientele groups.
- Publish newsletters for a variety of audiences. Typical information was both near term announcements and general technical information translated for non-experts to better understand.
- Hold workshops to gain audience feedback on environmental issues and ideas for Council activities.
- Give public presentations on energy and environment topics, attend meetings such as the (former) Governor's Commission on Arizona Environment.
- Visit county Cooperative Extension offices and Agricultural Centers to share ideas and current activities.
- Engage in research related pesticide use, prepare databases on pesticide recommendations (each department published its own recommendations and the Council prepared a database that put all recommendations in one source).
- Meet with College administrators on a regular basis for retreats and other meetings.

³⁰ The three newsletter titles began with the term ACCES, an abbreviation for Agriculture College Council for Environmental Studies. It was intended to suggest “access” as well as describe the unit, but some people noticed the spelling difference.

Subsequently, the University got involved in evaluating environmental activities on campus and in 1975 the University Environmental Council prepared a report on Environmental Education within the University of Arizona. The College had more environmental classes listed in its inventory than any other college on campus. The report was the first of its type on campus – looking at the whole university from the perspective of a broad topic like the environment. Along with this process I met Herbert Carter, retired from the University of Illinois, who became the first Coordinator of Interdisciplinary Programs at the University. As Chair of the National Science Board, he had just signed-off on the 1971 report on “Environmental Science Challenge for the Seventies”, prepared by the National Science Board. He had such an immense amount of experience on such a wide range of topics that I learned a great deal in our many conversations.

Over time the new field of “environmental science” was no longer new and many departments on campus and in the College were involved with environmental topics. There was also increased communication among faculty in other departments, through electronic mail and a greater emphasis on interdisciplinary discussions and projects. The original Agriculture 50 course changed into 450 course

(upper division and graduate) and the title shifted to “Anticipating the Future” – taking the concepts and events we learned during the growth of environmental topics and looking more to anticipating these types of changes rather than reacting to them. The campus and the College also integrated “environment” into their classes and programs. When the energy embargo of 1973, and the second one in 1978, occurred several things had changed. Those faculty in the University that were interested in energy started a series of seminars for the faculty group, where we educated ourselves about the changing times. By 1984 the need for the Council for Environmental Studies no longer existed and it ended. But, by then the University was beginning to form new environmental interdisciplinary groups on campus and that continues today.

As the Council was ending, a new Pesticide Coordinator was appointed. This was Paul Baker and he renamed the function as PITO (Pesticide Information and Training Office). He continued the pesticide newsletter and retained the Council name for a period while the audiences adjusted to the changes. In 2009 Paul turned over the Pesticide Coordinator role to Peter Elsworth at the Maricopa Agricultural Center

Chapter 23. Developing the Maricopa Agricultural Center

The Maricopa Agricultural Center (MAC) was developed as a result of a Board of Regents directive for the UA to sell the Phoenix Metropolitan Area experimental farms. The reason was understandable, as urban development had occurred around all of the farms. There were three farms: the Mesa Farm, the Citrus Farm, and the Cotton Research Center. Land was purchased near the town of Maricopa, northwest of Casa Grande for a single and larger farm area. Buildings were designed and constructed.

The sale of the older farms was timely because of increased urbanization; this summary is about how the university went about finding a new location for the farms and constructing what became “MAC.” Initially it was called CARET (Center for Agricultural Research, Extension and Teaching). When the farms were renamed in 1992 to be Agricultural Centers, people shortened the name by using the first initial of the location and adding AC. Thus Yuma, Campus, Safford, Maricopa, and Marana became YAC, CAC, SAC, MAC and MAC (Marana and Maricopa both began with an M). So Maricopa became Big Mac. When the Marana Agricultural Center was sold, some people continued to call the Maricopa Center Big Mac.

The history of MAC is given from five perspectives: 1) the formal description (from the MAC website), 2) from Robert Roth, the Resident Director of MAC, and someone who was involved from the earliest days, 3) from Fred Enke, who sold the land to the University, 4) from George Ware who was the project director for developing the building plans and their construction, and 5) L. W. Dewhirst, who was director of the Agricultural Experiment Station. This causes a little duplication in some descriptive information but it also places in context the comments from each person.

A Description of the Current Maricopa Agricultural Center (2011)³¹

The Maricopa Agricultural Center (MAC) is a 2,100-acre experimental farm located twenty miles south of Phoenix and twenty miles northwest of Casa Grande, Arizona. The north and east sides of the Center border the Gila River Indian Community Reservation and private agricultural farms border the south and west sides of the Center. It was acquired from Mr. Fred Enke in January 1983 and consolidates activities formerly conducted at the Cotton Research Center in Phoenix and the Mesa Farm in Mesa.

The Bartley P. Cardon Research Building was dedicated in October 1987. This marked the construction completion of the greenhouses, storage buildings, shop, cotton research gins, irrigation facility, guest quarters, and supervisory housing. A unique partnership has been established with other agencies, organizations and agricultural industries to encourage collaborative research projects with faculty and provide industry the opportunity to conduct

their own proprietary research without disclosure or indebtedness to the University.

In the late 1970's the Board of Regents appointed an Agriculture Advisory Committee (Dwight Patterson, Chairman, David Gipe, Cecil Miller Jr., Lynn Sharp, John Smith, Keith Walden, and Sidney Wood) to advise College of Agriculture Dean Bartley P. Cardon and University Administration on the disposition of the Cotton Research Center and Mesa Farm. Both the Cotton Research Center and the Mesa Farm were located in an urban area and the Board of Regents wanted the farms to relocate to an agricultural setting. This Committee presented the purchase plan for the Maricopa Agricultural Center to the Board of Regents in September 1982. The Board of Regents approved this purchase and decided that the acreage to be used for experimental purposes should be controlled by the available budget from the Cotton Research Center and Mesa Farm. It was recommended by the Advisory Committee that the experimental farm size be set at approximately 500 acres and that approximately 100 acres would be set aside for roads, ditches, and building site for support facilities. The experimental farm could be increased in size in the future as research needs and budget support was established.

³¹ This description is taken from the MAC website on April 15, 2010 ag.arizona.edu/aes/mac/mac_history.htm

The use of the remaining 1500 farmable acres was discussed. It was decided not to sell this acreage since it could be a hedge against future needs by the College and the entire 2100 acres had been developed as a single management unit. Any sale or lease of a portion of this farm would require a major change in the irrigation system by relocating wells and ditches. Dean Cardon suggested that the 1500 acres be designated as the Arizona Demonstration Farm (later shorten to Demonstration Farm). This farm would operate on a commercial basis and serve as a facility to demonstrate the commercial viability and manageability of the results from research. The Board of Regents agreed that the proceeds from all sales would be recycled back into the operating account and at the start of each crop year the University would arrange a "crop loan" to finance land preparation and crop production. This loan would be paid back to the University as revenues were received from crops harvested. It was intended and estimated that a sufficient cash reserve could be accumulated so that a crop loan wouldn't be necessary after a few years. It was recognized that in some years it might be extremely difficult to maintain a positive operational cash flow; however, over several years a positive cash flow was essential or the farm's operation would be terminated. These operational restrictions were approved and recommended by the Agricultural Advisory Committee, and agreed to by Dean Cardon. The Board of Regents then approved the formation and operation of the Demonstration Farm.

The Demonstration Farm started planting the first crops in 1983. A Farmers' Advisory Committee was formed that consisted of three farmers in the area (Oliver Anderson, John Smith and Wilbur Wuertz). Later, a fourth member (Dr. John Niederhauser) was added to advise on new crops. A Resident Director was appointed in 1989 to oversee the Demonstration Farm and Research Farm and supervise all superintendents and farm managers. At this time the Farmers' Advisory Committee was increased to 10 members that were appointed to three-year terms.

The **Cotton Research Center** was one of the University farms whose activities were transferred to the Maricopa Agricultural Center in January 1983. The 257-acre Cotton Research Center was located in Phoenix between 40th and 48th Streets, and Broadway and Roesser Roads. In addition to the deeded acreage, the University leased 42 ½ acres from the

Department of Transportation, which adjoined the farm on the southeast. The Cotton Center was originally a 265-acre tract purchased in 1955 by the Arizona Cotton Planting Seed Distributors and the Arizona Cotton Growers Association from the Bartlett-Heard estate for \$207,530. These two cotton-farmer associations donated this land to the University and also contributed materially to the construction of the physical facilities.

The **Mesa Farm** was the other University farm whose activities were transferred to the Maricopa Agricultural Center in January 1983. The Mesa Farm was a 160-acre farm that was purchased in 1914 with funds appropriated by the State Legislature and contributions from many of the Salt River Valley farmers. This farm was located in Mesa between Dobson and Alma School Roads, and Main Street and the railroad tracks. The farm was used for research with both animals and plants from 1915 until 1950. In 1952 the vegetable research program, which had been conducted at the Salt River Valley Vegetable Research Farm (often referred to as the "The University of Arizona Date Garden") was moved to the Mesa Farm. Field research was conducted on many new, unusual and less common crops, most of which were agronomic.

Observations of Robert Roth (April 2011)

After the farms were sold we had to find a new larger and integrated farm that would last a long time. So it had to be in a rural area, and Bart Cardon put together a committee to look for land. They went through several sites before they finally settled at the current location, which they bought from Fred Enke. MAC was started in 1983, when the Mesa Farm, Citrus Farm, and Cotton Research Center closed in the Phoenix Metro area.

The College appointed a scholarly committee of professors to plan the facilities for this new Center. The goal was to make this a state-of-the-art facility and money wasn't an issue. The committee struggled trying to decide where to place the buildings. The Santa Cruz River does run through the center of this farm. It was obvious to some members that the buildings ought to be located in the center of the farm next to the river. They were fortunate in that the Maricopa area received the worst flood this area had seen in anyone's life time. The Committee

quickly picked the dry piece of ground on the east side of the farm. The 1983 flood decided where the buildings would be located and money did become an issue.

The Maricopa Agricultural Center is two farms in one. It consists of a 450-acre Research Farm that is used by scientists for conducting their small plot research and is supported by state and federal funds given to the College. The research results from the small plots are used by extension personnel to demonstrate to growers how this new technology could help them improve yields and profits. The 1600-acre Demonstration Farm was a new concept that had never been tried at any research center in the United States. The Demonstration Farm would act as an Arizona commercial farm. It had to earn all of its revenue through the sale of commodities to support all operation costs, management and labor costs, and equipment costs. The Demonstration Farm would provide a place where the latest technologies developed on the Research Farm could be demonstrated to the growers. The transfer of technology has always been difficult when you ask growers to take a risk on trying technology that was developed on small plots and expand that to very large fields and farms. The Demonstration Farm gave scientists and extension personnel a place where they could test their new technologies in large fields and the University would be taking the risk. The growers were very receptive to this new concept and it worked very well during the 1980's and into the early 1990's. In the mid 1990's the first GMO (Genetically Modified Organism) cotton crop with the Bt gene was grown on the Demonstration Farm in a large field setting outside of a laboratory. This was a very successful study that paved the way for the new GMO crops. Profits from the Demonstration Farm were positive and it was accumulating a revenue surplus.

When the Mesa Farm and the Cotton Research Center were combined to form the Research Farm it was very similar to a marriage when two families are brought together under one roof. There were personnel, equipment, and money that were now controlled by one manager. Each of the farms had trained their personnel to certain procedures on how to prepare a field, plant, irrigate and manage each crop. So as one might expect things were quite interesting on a daily basis. Then the Demonstration Farm was added which was three times larger and it had its own equipment, personnel and money. And

we all shared the same shop, fuel facilities and storage facilities. This was much like a second marriage where there could be children who are yours, mine and ours; there can be trying times. However, things did work out and the two farms were very productive.

Production costs started to rise in the mid 1990's as fuel and fertilizer costs started to climb and commodity prices remained constant and in some cases started to decline. It became clear that the Demonstration Farm revenues weren't able to meet the personnel and operating costs. Arizona growers were also facing the same dilemma with increase costs and reduced revenues. Most growers were using their land as collateral to obtain financing for planting next year's crops. The University wasn't able to use the Demonstration Farm land as collateral to continue their financing. It was a difficult decision but it was decided to change the direction of the Demonstration Farm. Personnel and planted acreage were reduced to where the Demonstration Farm could meet expenditures. Many growers in the area were disappointed but understood that the costs to operate a University Demonstration Farm and meet all the state requirements for new personnel wages and benefits would result in a disaster. It was felt by some growers that if the University Demonstration Farm were to fail it could send a message to their loaning companies that agriculture wasn't a good investment. During this transition the Demonstration Farm was placed under the management of the Research Farm.

It was also during the same time period that the appointment splits of the College faculty started to change. Historically faculty were either full time Extension, full time Research or a combination of Research and Teaching. The full time Research faculty working at the Agricultural Centers were actually performing Extension activities. Gradually, over time faculty assigned to the Agricultural Centers were given split appointments of Research and Extension. In addition County Extension Faculty were also being given research responsibilities and their areas were expanded from a county level to an area or region that could include several counties. This started a change in how the Agricultural Centers would operate.

It was also this period that the first of many budget cuts were being initiated by the state legislators. Historically the Agricultural Centers were giv-

enough operating funds to provide land and operating cost to conduct the scientist's research project. Budget cuts have continued and as a result MAC has to earn more than 50% of its operating budget. This has required the Center to charge all scientists a per acre fee to conduct their research. MAC started working with outside agricultural companies to allow them to conduct their own proprietary research on a per acre fee. In fact MAC has rented its air space to private aviation companies who were interested in conducting noise studies. One such study involved John Travolta's large jet plane. Combining the management of the Demonstration Farm and Research Farm has allowed their uses to be expanded. Some research studies require larger plots (similar to a grower's field) when one is studying insect response and movement due to chemical applications. In other cases seed companies require isolation and having a large farm allows us to provide the needed isolation for these companies.

Recently the USDA was able to obtain funding due to the efforts of College administrators. The funding was used to build a new USDA-ARS (Agricultural Research Service) research facility at the Maricopa Agricultural Center. This facility, the Arid Land Agricultural Research Center, combined the US Water Conservation Laboratory and the Western Cotton Laboratory which had been located on the Cotton Research Center in Phoenix. These facilities have been associated with the University farms for many years and were left behind when we moved to MAC. Much of their research is conducted at this Center. Adding this large research facility adds an additional 20 scientists and 80 support staff to those already at MAC. This addition helps meet one of the original goals of making the Maricopa Agricultural Center a world class agricultural research center. Several private agricultural companies are not only using the agricultural fields for their studies but are also utilizing office and laboratory space to help expedite their research.

When the Maricopa Agricultural Center was purchased from Fred Enke most felt that this location was the end of the world. The town of Maricopa was maybe 500 people which had one restaurant, a mercantile where you could buy some clothes, lunch meat and bread and a Circle K. Most everyone drove 20 miles to Phoenix or Casa Grande to do their real shopping and get medical attention. However, that all changed at the turn of the century

when the housing boom took Maricopa by storm and houses starting springing up at alarming rates. Agricultural land prices sky rocketed and several farms were sold around the Center. The City of Maricopa wanted the University to modify the Santa Cruz River so that lands nearby could be removed from the flood plain. Efforts are continuing to evaluate ways of accomplishing this.

Observations of Fred W. Enke (May 2000 Oral History)

Fred was born in 1924 in Louisville, Kentucky, where his father (Fred A.) was coaching. The following year Fred A came to Arizona to be interviewed by Pop McKale for a basketball coaching job at the University of Arizona. He got the job and was a UA basketball coach for 36 seasons, 1925-1961. Fred W was a professional National Football League player and when he retired after seven years, he became a cotton farmer in Casa Grande, Arizona. Fred W served as a Navy pilot in World War II and following the war got a Master's Degree from the UA. In 1952 Fred W and a partner bought 320 acres of "desert" that had an irrigation ditch on one side and was in a floodplain; that became MAC.

The Regent's Advisory Committee recommended to the University, especially to the College of Agriculture, that we reduce the number of farms, but in particular, sell those that were highly valuable. So Dean Bart Cardon decided that we should make one large farm someplace up near Phoenix. Bart said we would sell the Cotton Research Center, which was in Phoenix and we would sell the Mesa farm, which was, of course, a vegetable and fruit farm over in Mesa. Sell all three (the Salt River Citrus Experiment Station was the third) of those in order to buy a big piece of land that would centralize all of the research activities. Well I'd realized this needed to happen. I mean, we couldn't just carry on these places, across the street from the Mesa farm, was a big shopping center.

So we kept talking about that possibility and Bart would come by about seven o'clock in the morning once or twice and we'd stand out there by my little office and you could look out at the whole thing and visualize. I know he was visualizing like I was and I said, 'You can't beat this and the CAP water was coming in eventually; and it's good water now and it's big enough and so forth. I gave them a cheaper

price than anybody would down there, other people were waiting for the thing to go even higher.

So, we (Bart and Fred W.) negotiated and we were almost out of it and then we got back in it. I think that both of us wanted to do it and so you can't remember those particulars but it was quite a negotiating thing. I said, 'Look at all this space, it's ready to go, all this equipment. Of course he may not have needed all of that, sometimes equipment is worthless if you don't have a place to use it. Anyway, we got together and nobody else would sell a farm for what I was selling mine for, at the time.'

Observations of George Ware (April 1994 Oral History)

I became Associate Director of the Experiment Station in 1983, when they were beginning to secure the bonding for purchasing a new farm, referred to as the Agriculture Endowment bonding. The idea was that we would sell some of our Experiment Stations, put the money into an endowment-like fund and then use the money to pay off the bonds that were issued by the University, in agreement with the Legislature. The first bonding issue was \$24 million. We sold the Citrus Experiment Station in Phoenix, the Dodge Road Animal Farm in Tucson (Dodge and River Roads), and the East side of the Casa Grande Highway Farm. The only ones we didn't sell were the Campus Agricultural Center which was known as the Campbell Avenue Farm and the Yuma Agricultural Centers, there were two farms out there. We bought a large 2100 acre farm up near Maricopa, Arizona, in northern Pinal County and that became our leading research center, which we divided into two areas. We had the Research Farm, which was about 450 acres, and the remaining 1600 acres would be the Demonstration Farm. In reality, the Research Farm was used purely for research and we had a crew that took care of that, but the Demonstration Farm was more to produce crops that could be sold to support the Research Farm. When we did have something that was worthwhile that we could demonstrate on a small scale we would do it on the Demonstration Farm.

My primary mission was to oversee all the construction that was taking place on the Maricopa Agricultural Center. We started by building a very large shop building in which all of the equipment could be maintained, lubricated and repaired - a fairly size-

able building of 5000 square feet. In one corner of that we put our first office headquarters for the Maricopa Agricultural Center. Across the road we built six homes for staff members who would be employed at MAC. Then we proceeded to build the headquarters building and that was truly an accomplishment. We have probably the signal event of construction on a new Experiment Station in the nation, one that is equipped such that we can have a satellite down-loading capability, a satellite communications center, and laboratory space there that can do virtually anything that you can do in any laboratory. We also have a nice conference room and a kitchen. It's been an ideal location and I think it will probably be an international center in the next decade, that it will be a leader lasting for probably the next century. It's relationship knits in so closely with the Mid-East. Those are the countries that have low rainfall, but have good soil and will benefit from the technology that's generated there. But it was my responsibility to oversee construction of those buildings, have them dedicated - the office building at MAC became the Bartley P. Cardon Agricultural Research Building.

Observations of L. W. Dewhirst (July 1993) Oral History

The first farm sold was the River Road Farm which had been mandated by the Arizona Board of Regents.

That occurred while Darrel Metcalfe was still Dean. There were other recommendations from the Regents relating to the farms in the Phoenix area. The Regents noted these farms were in the midst of urban areas, and are no longer characteristic of what farming takes place. So we needed to dispose of those farms and relocate them, preferably combined, in another location in the Maricopa County area. They were very valuable properties in Phoenix, Mesa, and Tempe. Cardon, in working with the University Administration, particularly with Vice President Gary Munsinger, and the Board of Regents to have them agree that any income from the sale or lease of those properties could go into an endowment fund so that the capital would be left for the use of the College of Agriculture. The endowment was to be used for the capital means, with the first priority to replace those facilities; then it could be used to upgrade the facilities, and then for other capital needs within the College.

In the end, Bart was also able to go to the University Administration and with the approval of the Board of Regents, go to the Legislature and get them to agree that the University could issue tax free revenue bonds to be paid off with income from the endowment fund.

There were three properties, the first was the Salt River Valley Citrus Station which was located near the intersection of I-10 and Baseline. The 44 acres there were extremely valuable property. The next was the Mesa Farm which was 160 acres on the south side of Main Street in Mesa bounded by Dobson on the west and Alma School Road on the east. The third was the Cotton Research Center which was about 265 acres on the south side of Broadway between 40th and 48th Street. Part of that had been deeded by the University to the USDA. It was very valuable property. The appraisal of those properties at that time indicated that the Salt River Valley Citrus Station was worth somewhere in the range of \$5.5 million. The appraisal of the Mesa property amounted to considerably more than that because it was right across the street from the Tri-City Mall. The Cotton Research Center was appraised at something like \$ 20 million.

The University, by State law, has to sell the property by Public Auction. The University is, in my opinion, probably the most inept group I've ever seen in attempting to sell property. In the case of the Salt River Valley Citrus Station we got about that amount of money--\$5.5 million. The money was to go into the endowment fund, but if one looks at the Cotton Research Center, there was a 40 acre parcel on the southeast corner of that property which was called the Old Brick Yard, a hole in the ground, a big hole in the ground and unbeknown to us in the College. Vice President Gary Munsinger agreed to buy that property for just about what we got out of the Salt River Valley Citrus Station. But he didn't pay it all off and so that has been a bone of contention by the people who were trying to sell it, they sued the University, but that's perhaps an incidental point.

For the Mesa Farm, 50 acres were sold on the west end of that farm to allow us funding to find property to relocate the three farms in Maricopa County. Several committees were formed, the first was an Advisory Committee to the Dean and had very influential people from throughout the State that were involved; they were involved in a lot of

these things that had to do with establishing the endowment Fund. Another Committee was formed to try to relocate or find property so we could replace the farms that were sold; I chaired that. It had representatives from industry, from the faculty, and from the USDA. Over a period of months we looked for vacant property or property that could be purchased with the available money. One of the places that we originally looked at was the location where the Perryville Prison is located. I can't think of the name of the property but it is considerably west of Phoenix. It was four sections or four square miles. We had been using about 450 acres for the three combined properties in Maricopa County so it was far more than we needed. But if one looks at the accessibility of it from the University of Arizona, it's a long way from the University of Arizona. For a variety of reasons that was not accepted, although, certain members of the Board of Regents would have preferred that we look at that more seriously. We looked at a variety of other properties in Maricopa County and one of those that we looked seriously at was out around the Chandler area, Higley. The problem was there that we could not get enough land together in a common location at an affordable price.

During that period Fred Enke, who was farming in an area east of the Town of Maricopa decided he really didn't want to farm any longer and so he approached us about the possibility of purchasing that property for what we needed. It was a much larger piece of property again than we were considering, about 2100 acres. Over a period of months of negotiating with him, Bart Cardon and Gary Munsinger agreed that this was a piece of property that we could use. We did not need the whole thing for research purposes but we could use what we needed for research purposes. The purchase price was considerably less than other locations. There were real advantages to this location. It had been totally laser leveled, the irrigation runs were for the most part six hundred feet rather than being longer irrigation runs, and it had been totally used for agricultural purposes. It had a heavy infestation of weeds, but other than that, it looked pretty good. It was in the flood way of the Santa Cruz River which created some concern but eventually that property was accepted, purchased and we moved the operations of the Mesa Farm and the Cotton Research Center to this location on January 1, 1983 and closed out the others farms. Whatever, the reason was that we

moved to MAC, I think history has shown and will continue to show that that was a good move; in my opinion that is probably a world-class facility in terms of research and other types of things. We have a number of faculty located there that have offices there. There are scientists from other states and countries that are there all of the time. It was a good move.

The bright star in the whole farm sales project has been the Maricopa Agricultural Center and that to me is a real great accomplishment. I don't know what the greatest accomplishment of Bart Cardon would be, but he certainly knew how to do things that the University and our College did not know how to do well. He had been in business, he knew how to make these contacts, he knew how to ma-

nipulate things that could be done the way that it was done. So, I have to give Bart Cardon a great, great amount of credit for what occurred during that period of time. Cardon was truly a "man for the times" as far as I was concerned.

Concluding Comment

As predicted above, the Maricopa Agricultural Center has developed into a nationally recognized research facility. It was significantly strengthened in 2003 when the USDA-ARS Laboratories that were co-located on the Cotton Research Center were combined into the U. S. Arid Lands Research Center and relocated to the MAC property. This facility has 25+ research scientists who conduct research at MAC; this significantly increases the breadth and depth of the research program at that Center.

Chapter 24. Recollections of Faculty and Staff

Faculty and staff reflect on their time in CALS since 1980. These 16 contributions are in the author's own words and are listed beginning with the person that joined the college the earliest. The author's title and when they joined the College are at the end of their comments. They vary in length, approach, and what they felt was important. The question they answered was "How has the college changed in the last 30 years?"

Selecting from these recollections, the general overall shifts summarized below, from 1980 to 2010, include:

- Extension agents and specialists require more education and higher degrees, shift emphasis to more basic research, and extension funding shifts to more grants.
- Technology (laboratory and computers) changed everything – teaching, research, extension and more collaboration along with more rapid feedback.
- Teaching moves from blackboards and transparencies to slides to PowerPoint projections to web to cell phones.
- Fewer students have rural and agricultural backgrounds.
- Understanding subject areas becomes more complex and more interactive with other subjects.
- Student advising moves from individual faculty to departments and schools, and college.
- Research moved to primary importance and increased in amount.
- Faculty take on more secretarial and communication responsibilities.
- Extension contact moved from personal interaction to electronic communication and collaboration.
- Dealing With the 1970s Growth of Environmental Issues.

Cooperative Extension from 1959 to 1999, by Howard Jones

Research Orientation

From the the beginning in 1914 through the 1960s Cooperative Extension was oriented toward people education. This began to change in the early 70s with a changing attitude at USDA and with the University and College of Agriculture administrations. More emphasis was placed on basic research being carried out by Extension Specialists and practical field research was being done by Extension Agents. This change demanded increased education for Extension Agents, a Master's Degree where a Bachelor's Degree sufficed into the 70s and a Doctoral Degree for Extension Specialists where a Master's Degree had been adequate before. This direction continued through the 1990s and continues today. Tied with the research orientation has been the continual budget restraints particularly thru the late 1980s to the present time, which forced Extension personnel to go after grants (soft money) rather than just receiving the reduced direct federal, state and county appropriated funding (hard money) to continue their Extension education programs across the State of Arizona. Much of the soft

money has been for applied research. Budget played a big part in this changing orientation, but so did the sophistication of a better educated audience.

Rural vs Urban

The primary audience from the beginning, 1914, thru the early 1960s was almost purely rural farm. In the mid-to late-1960s this began to change rapidly as the population of Arizona became more and more urbanized, particularly the Extension 4-H Youth program and the Extension Home Economics program and the advent of the Extension Community Development program. These program areas began reaching out and broadening their programs to reach the urban clientele. Also the Extension Urban Horticulture program became a real high-light program for Extension in the late 1980s and continues for the urban areas of Phoenix, Tucson, Yuma and Flagstaff, as well as some of the smaller communities today.

The Computer

How things changed with the advent of the computer! Educational programs were enhanced and improved. Communications were improved and speeded up making it possible to get research results into the field and to the Extension Agent where it could be used to im-

prove practices, almost immediately. In the late 1950s and early 1960s the big main frames improved research on campus and by the mid-late 1980s saw PCs on most faculty and support staff desks - and information being available almost instantaneously for faculty not only on our own campus but from data bases across the country and around the world. In the 1990s, computers were placed into some county Extension offices where clientele could come into the Extension office and go on line to find answers to their questions or problems, with very little Extension personnel involvement. The computer changed the whole operation of Cooperative Extension from the 1960s through the present time. The computer allowed Cooperative Extension to be able to continue to operate effectively and more efficiently with the continual cuts in budget.

Extension Grew With The Times

In the late 1950s and early 1960s Cooperative Extension was very much a people-to-people program with most education done with face-to-face programs, by printed material being sent out by mail, or through news articles in the local newspapers. Extension marched into the 1970s, 1980s, 1990s, and the turn of the century, with an emphasis shifting to research, with audience dynamics shifting, and with changing and improved technology (computers and smart phones). Extension faculty became better educated and sophisticated. This allowed the Extension faculty to be able to do the required research and deliver the needed and wanted educational programs to the people of Arizona. Extension has struggled at times due to budget constraints, but in the long run the Arizona Cooperative Extension has stayed out front in delivering top notch informal education programs to the people of Arizona.

*Howard Jones
Extension Specialist Emeritus
Former 4-H Director
Former Extension Regional Director
Former Director, American Indian Programs
Joined CALS in 1959 and retired in 1999*

Agricultural Insect Control, by Leon Moore

Extension work in the 1980s was very much farm community oriented. The Extension specialist worked closely with the county staff to address the farmers' problems and to initiate new approaches for develop-

ment. As Extension Entomologist, I had the responsibility to help with insect control in all crops, especially cotton. Integrated Pest Management (IPM) was initiated in Arizona in the early 1970's and resulted in many innovative pest control programs through the 1980's. Three IPM coordinators were employed and stationed at the extension offices in Casa Grande, Phoenix and Yuma. Several successful community-wide insect management programs for cotton were developed by the team comprised of the extension entomologist, county agent, IPM coordinator, and the growers involved. This was a hectic but enjoyable period of time for me as Extension Entomologist and it required long days and lots of travel. The results, however, and what it meant to the growers made it very much worthwhile.

*Leon Moore
Retired Cooperative Extension Specialist
Department of Entomology
Joined CALS 1960 and retired 1992*

Animals, by John Marchello

Upon completion of my PhD in Animal Genetics and Biochemistry at Colorado State University, I started at the University of Arizona in 1965. Shortly after my arrival, the Wholesome Meat Act was passed by congress which mandated that all meat items for sale had to be inspected by either State or Federal inspectors. This new law required significant changes in the procedures used in the Meat Science Laboratory. Additionally the state sent me to a month-long meat inspection program in California.

The Department of Animal Sciences and the Meat Science Laboratory significantly increased course offerings as well as animal harvesting and processing during the 1970s. Our student enrollment in these courses dramatically increased during this time. Due to the new functions of the Meat Science Laboratory, the College of Agriculture provided funds to construct a new laboratory. Much of my time in the 1980s was spent traveling to other Universities to view their Meat Science Laboratories and to gain insight as to building a new facility. After three years of development the new Meat Science Laboratory was dedicated in 1988. This state-of-the-art facility was approved for Federal Meat Inspection, greatly increasing the number of meat animals harvested and processed. I'm greatly indebted to the employees at the Lab for their strong

support and hard work in making this facility a successful “state-of-the-art facility.”

Our outreach endeavors also increased, mainly because we were committed to education of students, consumers and livestock producers. As we entered the 1990s, in my opinion, the students that were enrolled in agriculture changed dramatically. During this decade, many of the students were urban-raised and lacked hands on experience with livestock species. Therefore, once again, we had to change our approach with regard to instruction to be more hands on while maintaining the science based information to the students. The latter was still problematic, as many of the new students lacked the necessary mathematical skills. As we approached the new century our emphasis with regard to teaching and research changed one more time from Meat Science issues to Food Safety. The courses that I teach are very much food safety oriented. The Meat Science Laboratory which is under the Federal Hazard Analysis and Critical Control Point program has become a major food safety entity at The University of Arizona. The Laboratory is self-sufficient with minimal State financial support, but is heavily involved in Food Safety issues with students, consumers and food processors.

I have had an opportunity to instruct over 6000 students during my tenure at The UA, work for 6 different Department Heads, 5 different Agriculture Deans and 6 different University Presidents. I also served as major professor and mentor for 47 graduate students. Thanks to the hard work by the graduate students and the cooperation of colleagues, I have published 72 refereed manuscripts and over 200 popular articles. In 2008, I received the Koffler Award for Public Service and Outreach given by the University.

One of my greatest experiences is working with Rodeo Club. This club has the distinction of being the oldest intercollegiate rodeo club in the world. Recently the College of Agriculture and Life Sciences gave the Club some acreage on which we built a practice arena, which is equipped with horse facilities for the club members. Due to the generosity of former club members and interested people we were able to raise \$32,000 to build this facility. It has been a great 45 years at the University and I look forward to more.

John Marchello
Professor of Animal Sciences
Joined CALS 1965 (longest serving active faculty member)

Students Have Changed Over the Years, by Don Post

I joined the university in 1967 and retired in 1998, but I was asked to teach a course in 2006 and 2007. These recent experiences really show that some majors changes have occurred in our students and in our approaches to teaching over the last 30 or so years.

In the past I've said that the photocopying capability and the computer most impacted my teaching over the years, but now I would certainly say advanced computer technology, the internet, cell phones, and other technologies should be noted. The most contrasting differences I'd note recently is how the personal interaction between student and faculty has changed. So much communication is now via email. I was surprised how much advising was completed in this way, and not necessarily with personal one-on-one conversations. Another observation that is quite contrasting with how it was in the late sixties, is to walk the halls of Shantz Bldg. and the faculty office doors are all closed. The Dean in the early years expected us to have an open door policy to make the students feel welcome. I, of course, understand why the doors are closed now with all the emphasis on research-grants-publications. Another big difference is how the need for secretarial help is less--the faculty are so proficient with the computer capabilities that it's easier to do their own secretarial chores.

I observed with my experience teaching fall semester 2006 that the students expected the notes (power point slides in particular) to be available on-line or through the bookstore. And I think for this reason class attendance was poorer than 25 years ago. Also it seems to me that practical laboratory experiments with a strong science background are less, and field trip experiences are used less now in the current teaching program. "Modeling" with the computer, or lab assignments via the computer are more extensively used. I'll let the educators of today verify if this teaching is effective. I, of course, think lecturing and using the black-green-white board was quite effective. Interesting I think the quality of the students today is as good as in the past. I did note in Basic Soils Class that the Agricultural Technology majors (Ag. Education Department) are weak students, particularly in the basic sciences. But I guess this major has always been with us, and in the past they were the General Agriculture majors.

A couple other points. The number of administrators seems to be more now than 25-30 years ago. Also it should be noted the CALS functions common for the entire college are less. The spring semester "Aggie Day" festivities and the Alpha Zeta "Chicken Barbeque" are no longer with us. Usually 100 to 300 students and faculty attended these functions. Also today membership in honorary organizations is less. Gamma Sigma Delta, the agricultural fraternity, no longer exists in our college

*Don Post
Professor Emeritus
Soil, Water and Environmental Science
Joined CALS 1967 and retired in 1998*

Contrasting 1980 and the mid 2000s, by Harry Ayer

In the 1980s period, most research was done through USDA and other automatic funding, with little need for grants. By the mid-2000s, considerable pressure existed to secure grant funds -- and although most of my own extension work was done through traditional funding sources, some of my extension colleagues secured extensive outside grant funding. In both years, there was a considerable focus on the economics of various issues and policies of interest to Arizona and a significant effort was made to address those issues. Also in both years, there was great departmental administrative and colleague support, great latitude for choosing research topics I recognized as important, and great latitude on how to go about the research and outreach. In both years a wonderful work experience.

In 1980 secretaries did the typing. Our department maintained a small library and a part time librarian. But in the 2000s I did nearly all typing using a personal computer and the small library and librarian were no longer in the department, and much of library type research now done on-line.

Like most economists, most of my day was spent in an office (as opposed to being in a lab or in the field). I did relatively little traveling, either in state or out. Most of my communication with my audiences was through my publications.

There also were some interesting events. In 1980 (as in nearly all years) our department was centrally involved in research and outreach on the economics of water use and policy. Economic assessments of CAP met strong political fire in the 1960s and 1970s, but the political heat had died down by the 1980s.

*Harry Ayer
Retired Extension Specialist
Agricultural Resource Economics
Joined CALS in 1970 and retired in 2003*

New Technologies and New Research Areas Impact Programs, by Dennis Larson

I was involved with systems analysis research and undergraduate instruction, and coordinated senior design instruction, which involved individual and team projects. We used a departmental analog computer to solve differential equation models in 1970s and early 1980s. We also typed out computer cards and carried them to the computer center where we left them for a computer run, then returned later in the day or next morn to get the results; that involved a lot of walking! About 1980, card pickup and delivery stations were established in several campus buildings, shortening the walk. In addition, remote transmission of the computer data via telephone was established, further shortening the response time. Shortly thereafter, we obtained our first Personal Computers (PCs), an Apple, an HP and a couple of brands that didn't endure. We used these for word processing, spreadsheet applications, and AppleCAD to create engineering drawings. We provided minimal computer applications instruction; students had to learn requisite skills on their own.

Then PC capability was steadily increased so that less and less of the work involved the computer center until by the mid 1990s almost all computer instruction and research was done on a PC. I directed design of a computer laboratory in the Shantz annex in about 1992 and of a laboratory principally for college AutoCAD instruction. Initially this was for college engineering students and for FCR student use in the FCR building in 1995, and these labs became centers for a lot of instruction and student homework. ABE then began offering a course in computer Office Applications that soon thereafter became an undergraduate requirement for all CALS students, involving a lot of in-class instruction time.

Prior to PCs and large scale photocopy machines, the mimeograph machine was used to produce classroom materials and this required secretarial help. Most correspondence and papers were handwritten and then typed by a secretary, who then often had to retype all or portions as changes were required. Word processors were first acquired for the secretaries in about 1982, greatly reducing retyping. Soon, we faculty were

preparing the draft documents with our own PC's, sometimes giving the floppy disks to secretaries for cleanup. Then the faculty began editing our own documents and the need for secretarial help decreased and the secretarial pool was reduced.

I was the Principal Investigator of the Coolidge solar power project and, with an extension colleague, was involved with field research mostly in the Marana area. These projects required considerable day travel -once a week to Coolidge for 4 years, and frequent shorter trips to Marana for myself, colleague and grad students. We often used university motor pool vehicles, so pickup and return was a routine part of the activity. These projects were replaced with computer-application and Tucson-farm-sited projects in the late 1980s and our travel times were greatly reduced.

I think students in the 1970s and early 1980s required less detailed instruction and took more responsibility for independent learning. There also were no cell phones, IPODS, or hand held computers to assist or distract them. I commonly had students present their answers to assigned problems in class, and this motivated them in preparing homework answers and to interact during presentation. Ten years later, students were asking me to present the "right" answer to the problems.

We developed a class in renewable energy in 1977 and continued to teach it for about 20 years. Class visits to the Coolidge solar plant, an anaerobic digester at a Phoenix area dairy and other renewable energy projects, as well as hands-on lab experiments with making ethanol and methane, and with capturing solar energy and burning vegetable oil in a farm tractor were particularly fun teaching activities.

The expansion of the agricultural engineering program to include biosystems engineering and the de-emphasis of machine design gradually led to significant curriculum changes and to changes in research emphasis as new bioengineering faculty were hired. The 1985 establishment of a PhD program brought graduate students who assisted with instruction and provided a capability for more challenging research.

A little later, the FCR lab was one of the first to have a computer-connected overhead projector in 1995. This led to the big switchover from slide sets to Power-Point and to WEB access in the classroom.

*Dennis Larson
Professor Emeritus
Agricultural Biosystems and Engineering.
Joined CALS 1973 and retired in 2006*

Broad Perspectives from Several Vantage Points, by Dennis Ray

My tenure, if you include time as a graduate student (I earned my Ph.D. in Genetics in 1981), post-doc (from 1981-1985), and then faculty member (1985 to the present), has basically covered the time period from 1980 to 2010. Over this time there have been many changes in the college, at many levels, yet I would not say that the change has been either good or bad, but just a reaction to the times and available resources. Over-all I feel the administration has done a good job of leadership through these changing times (I do not always agree with what they have done, and there have been mistakes, but over-all they have done well). I have to say that it has been my pleasure to be a part of the college during this time, and in fact I am proud of what the college has accomplished both as a college of agriculture and life sciences and as part of the university.

Teaching and Research

In the 1980s we taught in classrooms with blackboards or green-boards, and I was regularly covered with chalk dust after a lecture. Our classroom "innovations" were overhead projectors, slide projectors and transparencies from the publishing companies. We for the most part taught in rooms with fixed chairs set up in a traditional lecture hall type of seating arrangement. Every faculty member seemed to teach something, and this was an important part of our jobs. Teaching was supported and appreciated, and TA support was good.

Our research was mainly field oriented with laboratories used mainly to analyze samples from the field. We had department vehicles either assigned to us or at our disposal to get to and from the fields. There was a fair amount of technical support from the department to help with our field activities. During this time we moved research from plots in the Phoenix area to the Maricopa Agricultural Center. MAC was really just a large agricultural field with no facilities in the middle of nowhere. We also had secretaries for every two to five faculty, depending upon the faculty's rank and position, who did all of our typing and correspondence. Faculty positions were tied to commodities, and

there was not as much interaction between folks as later on. RA support was good.

In the 1990s the classrooms were not that much different than in the 1980s, although our use of technology was improving. A few rooms had computer access, but the innovations were not much more than the inclusion of VCR players and white boards instead of black/green boards. However it was during the 1990s that the university realized the need to up-grade the classrooms, so renovations did begin. We started teaching larger classes since there were more students but faculty numbers were not increasing, or were in fact decreasing. Teaching Assistant support started to dwindle since these were some of the first cuts that were made by the college in the beginning of our now never ending budget crisis. Teaching became less important with fewer people teaching more and some much less or not at all.

Research was moving from applied to more basic, and more faculty members were hired with little or no agricultural background. Technical support from the department also decreased. New faculty members were given pretty good start-up packages, as opposed to the 1980s when these were minimal or non-existent. We were also losing secretarial support, but were given computers to do our own word processing and other useful tools. The USDA Hatch funds were decreasing, so obtaining grants became necessary. We also moved away from commodity based research, now thinking more globally instead of locally. One could say there was some tension between applied and basic scientists, with not as much understanding of what others were doing and its worth as there should have been. Research Assistant support was still good.

In the 2000s we are now teaching in rooms that are more technologically advanced than the instructors generally are. This is not a bad thing. All classrooms essentially have a computer set-up, internet access, DVD and VCR players. Technologically you are only held back now by your imagination. Most rooms have movable seating to accommodate different teaching styles and techniques, and many are set-up for distance learning as well. It is almost impossible to find a white board, or the set-up in the room is such that it is difficult to use a white board. Teaching Assistant support is becoming almost non-existent, but we are still asked to teach large classes. There still seems to be a disparity in how much folks teach, but this is due to the almost total lack of internal support for research and the necessity to raise grant funds to succeed.

Research is of primary importance now, and our laboratory facilities have improved significantly (we are really world class in facilities). Our field research stations are improving, although we now pay for much more of the basic services. There is now a good feel between basic and applied researchers with much more appreciation and respect for what everyone does and how it fits into the whole picture. Research Assistant support is dwindling, and most graduate student support comes from grants. The emphasis is turning away from training graduate students to the use of post-docs and other research professionals because of the need to produce results in a timely manner so that grant funding will continue.

Working alone or in groups

During the 1980s we were really considered “independent contractors.” We were evaluated on our individual contributions, and cooperative projects were not looked on as highly as individual projects. I was hired during this period and was not given any sort of start-up package, and you were expected to figure out how to make it on your own. This was a time when counting how many first author publications was very important, although the types of publications that were acceptable was much different. There were not many grants available for the types of work we were doing, and there was more support from the agricultural industry, so it was easier to be an independent contractor since your work was funded as such.

During the 1990s interdisciplinary/multi-investigator projects were much more important, since we started seeing much less money from the department/college for basic work. We were still evaluated on a similar basis as in the 1980s, but the types of publications (e.g., journals) that were acceptable did change significantly. Grants were plentiful, and we were expected to get them in order to support our work.

During the 2000s I do not see how anyone can make it “on their own.” As I tell new faculty members, you need to work with others to move up in the system. Grants are difficult to get, and are almost always now given to groups of researchers rather than individuals, and commodity money is almost non-existent.

A typical day in our worklife

This is difficult to differentiate since my days now are different because of my place in the system, or has life really changed that much? Certainly in the 1980s it seemed much more relaxed and I had time to think,

read and discuss. We put in long days, and as a group it seemed that we were very productive. Because students were plentiful we had large crews to carry-out our research. In the 1990s I became more involved in college and university committee work, as well as in my professional organizations, and days just seemed busier. Part of this was due to the computer and that we had to do much of what was formerly done by secretaries. In the 21st Century, well frankly, it just seems we are all overwhelmed. There is little time to think or read at work, and the computer allows us to do things more quickly, but because of this we now do more things. I now find that for creative things I must stay and work at home in the mornings since once I am in my office there is nothing but a continuous stream of interruptions.

Working with students

In the 1980s students were much more like me in background and educational experiences. Students were attentive, took notes and class attendance was expected and was generally good. I had more students from agricultural families and from rural areas, and clubs were very important to the life of the college. Many, if not most, of the students were interested in agriculture or agriculture related careers. Although we did start to see many more students who did not come from agricultural backgrounds and were interested in “non-traditional agricultural jobs.” For instance, during this time David Yetman was a student in one of my classes (he already had a Ph.D. in Philosophy, was a County Supervisor, and was just interested in learning more about agriculture and plants). Students used textbooks and the library as primary sources of information. Graduate students were plentiful and were interested in practical agricultural problems. Most professors seemed to have two or three graduate students during this time. There was a nice mix of domestic and non-domestic students; however, the preparation for graduate work was not equal among graduate students. We had good department and college support for graduate students.

In the 1990s we started seeing fewer students from agricultural backgrounds, and many more students interested in horticultural type subjects. We also started seeing more “non-traditional” students who had tried other things in life and/or other majors. The general preparation was not significantly different than the students in the 1980s, but they were becoming more technologically experienced and savvy. Students were still able to take, and expected to take notes dur-

ing lectures. Class attendance was good, and textbooks and library work still important. Student clubs started to suffer since students now had to work more outside of the classroom to support their education.

We started seeing fewer domestic graduate students (the economy was good and they were going into areas where they could make more money), and some areas of the world were opening up to us for the first time (e.g., we started seeing students from China). This was also a changing time as far as graduate student support, with professors being expected to provide more funds to support their graduate students.

In the 2000s we started to see real differences in undergraduate students (this is actually one of the major topics of conversation among my peers across campus). The students now are not better or worse, brighter or dumber, than before, but different in their background and experiences. First, there are almost no students from agricultural backgrounds, and most of our students are transfers from other majors. They seem to find us once they are at the university, not before. Second, where students in the 1980s and 1990s had similar academic backgrounds to my own (the older faculty), the students of the 2000s are much more technologically inclined. They do not take notes well, or understand why they should take notes (one of the most common comments is “when will you put your notes on the web”). These students are used to finding information on-line, and really do not understand how to use a textbook or library in the traditional sense. They also are not as used to working as a member of a team, and generally want to do much more on their own. Student clubs are struggling since the good students (who in the past would have been active in honoraries) are involved in many things, as well as working to support their education, and there are just so many hours in the day. Classroom attendance is not as good as before, since students are used to getting information on their own, and the classroom experience is not as important to them. They also do not closely evaluate the quality of a reference, since “if it is on the web, it must be OK.”

Where students before would use textbooks to help them learn and to put information into a context/perspective, the present group of students wants information in short “sound bites.” I have gone from requiring textbooks to recommending them as reference material. The math background is also different, with the earlier groups able to do much more “in their heads” and use formulae to explain biological phe-

nomena. This current group of students does not do either as well, and this is reflected in the fact that about 60% are not able to pass the math readiness test to enter college algebra (math is also rethinking how they teach these students). Now having said all of this, it seems that I am rather negative about this most recent group of students, but that is not true. They are just as bright and interesting as the other groups have been, they have just learned the basics differently, so they are “hard wired” differently. It is up to us, and we are doing it, to find new/different ways to teach the same basic concepts. They are as bright and interesting as ever, and they are still excited about learning.

Graduate students are greatly reduced in number, and our support for them has changed significantly. Applicants are almost equal between domestic and non-domestic students, but we are getting many fewer students to matriculate (we also can support many fewer students). Many graduate students now are more aware of the competitiveness between programs and hold-out for the best offers. Graduate students are much less important to individual faculty as far as to their professional advancement, and many faculty members, in fact no longer want to have graduate students as part of their programs.

There was (at least) one “interesting event” during my tenure; in as much as it was really out of the ordinary, was “Black Friday”, where a group of tenure-track faculty were told the department is changing and they should consider going elsewhere. This is one of the few occurrences during my tenure that I felt was handled poorly, and there are still bad feelings about this to this day.

*Dennis T. Ray
University Distinguished Professor
Professor of Plant Sciences
Professor of Arid Lands Studies
Associate Director of the School of Plant Sciences
Joined CALS in 1981 as a Post-Doctoral Fellow,
and became a tenure-track faculty member in 1985*

How Personal Computers Changed University Operations, by Edward Frisch

For those us in the college business offices, the micro-computer led by Osborne provided us with a new tool that we were able to use ourselves and develop spreadsheets using Supercalc and Lotus. For department analysis and recordkeeping we didn't need cen-

tral computing systems and programmers to develop large scale solutions for our day to day operations. We could, with a little thought and ingenuity do it ourselves. For those of us working on grant proposals and budgets, spreadsheet functions allowed easy manipulation of costs and personnel as we built budgets and were a major advance that I took advantage of as we prepared contracts for projects such as in Mauritania, Cape Verde and Lesotho. The work however was primitive by today's standards. Using a 5 ½ inch screen with 52 green characters across was like looking through a knothole compared to the dual screen, color, and advanced spreadsheets and software tools we routinely use today.

In the 80's financial data provided by the university central administrative systems was only distributed in hard copy format and not easily downloadable for deeper department analysis and review. Transactions such as personnel documents, purchase requisitions, bi-weekly payroll hours and approvals were all initiated by hard copy paperwork which was mailed or hand carried between departments across the campus. Today, we rely on desktop computers not only for analysis and recordkeeping but also as the tool for self-service interactions with all of our administrative systems including human resources, financial services, budgeting, purchasing, student affairs, space management and email communications. Direct access is provided to our central transactional systems which incorporate processes that allow for online transaction approvals, provide for real time, downloadable information for departmental use and analysis. These systems, while facilitating data integration with departmental analysis and software, continue to be developed to allow for both standard and customized dashboards allowing up to date reporting and analysis that brings together information generated across our primary administrative systems.

Work has changed significantly in 30 years. No longer is the use of an (updated) Osborne computer an add on benefit to the normal flow of processing, recordkeeping and analysis in a dean or department office. It is now an integral part of everyday work and fully integrated into the workday of virtually every office worker, faculty member and student on the campus. The addition of wireless technology throughout the university has now made the use of laptops and iPADS an essential tool for everyday use. With these advantages there remains a cost to our employees which is best described as the need to develop higher levels of training, understanding, and skill sets in the

use of technology to gain the maximum advantage and potential from the use of our administrative systems today. Without those skills individuals will be at a disadvantage in the workplace and unable to move forward.

*Edward Frisch
First College of Agriculture Business Manager (1974)
University of Arizona Associate Vice President,
Academic Resources-Planning/Management*

Departmental Metamorphosis, by David Byrne

The 1980s was a period of dramatic change for the Department of Entomology as it tried to establish itself as an institution that valued both basic and applied research. Prior to that time, its orientation was primarily focused on providing services for the agricultural community. In 1980 the emphasis was on cotton since there were approximately 631,000 acres in production, where currently about 200,000 acres are devoted to growing of this crop. Vegetable production, which today economically dominates agriculture, 119,000 acres, was of minor importance in 1980 (60,000 acres). With the hiring of new members, including department heads, more emphasis was placed on the basic scientific aspects of the discipline. This resulted in a degree of tumult, as all in the agricultural community did not embrace this new direction.

In the early 1980s there seemed to be three groups of scientists (all with valid points of view); applied entomologists, basic entomologists, and those who attempted maintain a foothold in both camps. This created a clash of cultures and did not always led to harmony. Faculty members often felt torn between the alliances.

The majority of undergraduate students at this time was still oriented toward the practical aspects of the discipline. An increasing number of graduated students, however, were interested in entomology for its own sake. By the mid-1990s the department had made the conversion to a reasonable mixture of both basic and applied entomology. This progression proceeded in fits and starts as a series of department heads left their marks on the department. The generally collegial atmosphere that currently exists is attributable to the mutual respect that is found among faculty and students.

*David N. Byrne
Professor of Entomology
Joined CALS in 1980*

4-H Perspectives From an Urban County, by Curtis Peters

In the 1980s, extension work and in my case, 4-H work, was very personal. I went out to 4-H volunteers homes or met them at a restaurant and we planned meetings, discussed issues, exchanged ideas. I recall numerous times receiving invitations to stay for dinner, to come out on a weekend for some non-work related fun activities, or to join their bowling league or softball team. When face-to-face meetings were not possible communication was done by phone. There were times when I felt like the phone was a permanent part of my ear, where I'd spend 6+ hours of an 8 hour day on the phone. Adding to that "personal touch" was 2-4 evening meetings each week. People had face-to-face meetings on a regular basis, this was the predominant means of communicating between the various volunteers across the county. Today, the phone is still important but not to the same extent. The number of meetings with the volunteers has declined, being made up for by information being exchanged via e-mail or web sites. That "personal" contact has been reduced by communicating electronically, because people don't have the time for meetings, or it has gotten too expensive to drive to meetings.

In the 1980s secretarial staff was always available. Typing was done almost exclusively by the secretaries. They produced memos, typed letters and mailing lists. Few, if any agents, had typewriters in their offices. Many things, like mailing lists, were done manually. For a newsletter mailing list, the list would be started when enrollments came in, and added to as more enrollments arrived. If a change came in for someone, the secretary would have to recall all the lists that person was on and manually makes the changes to all the lists. The receptionist would answer incoming calls and write up messages if you weren't available for the call, and then leave the written note in a mailbox. Today, every agent has a computer and to a large extent, produces their own correspondence. Data, such as 4-H enrollment data, is kept in a central database and particular data can be retrieved at any time in a desired format. In one respect that should reduce the time input, but it seems to only have shifted — as we have more capabilities and can do more things, the volun-

teens request more things and we keep more information.

In some respects, agents had more independence in earlier times. An agent had an area of responsibility and needed to attend to it. "Team" was defined as a collection of individuals working toward a common goal, that if everyone did their individual job, that would lead to a collective accomplishment toward that goal. Without cell phones and other instant communication methods, agents had to be able to make decisions on their own in their areas of responsibility and not be tied to communicating with everyone on the team for a collective decision. Now, the emphasis is on the team being a collection of people that all have a share in the collective good and are specialized. There is a greater need to consult with others before proceeding, keeping the whole team in the loop. A sports analogy might be, in 1985 we more resembled a track team, where everyone on the team participated in individual events, sometimes group events (like a relay), and the team score was determined by how points were accumulated individually and then added up. In the 2000s it is more like a basketball team where everything is interrelated, team success is dependent on everyone working together.

On the other side of independence, agents were expected to be part of things and contribute to the common good. Agents were expected to be at the Extension Annual Conference and Agents were expected to attend and contribute to activities like 4-H Round Up. These were not optional events that one would attend if convenient. Absence was noted and a phone call followed up. Today, the feeling is, "If it works into your schedule..." Mandatory attendance is infrequent.

In many respects, the 4-H members were focused. Part of the focus came from the awards and recognition, part of it came from lack of exciting options. Teen 4-H members in Pima County wanted to go to National 4-H Congress, and to do that they had to produce a quality record book that detailed their activities, and that record book was submitted for county, state and national competition. Teens would get involved in community service activities and partake in leadership opportunities because "it would look good in their record book." The rewards motivated them to participate in activities that they might not otherwise choose to participate in and hence they developed skills they might not have otherwise developed. In the 2000s some of that focus is gone. The recognition often comes only at the local level, or has been re-

duced at the state, national levels. Teens have so many more options for significant experiences that the ones we offer aren't as significant as they once were. Teens pick and choose, partaking in what they want to, and few parents will "force" youth to participate in worthy but not necessarily fun activities like public speaking.

*Curtis Peters
4-H Youth Development Agent
Cooperative Extension
Pima County
Joined CALS in 1982*

4-H Perspectives From a Rural County, by Susan Pater

In the 1980s the median age of county faculty was younger and we had 3-4, 4-H Specialists that specifically supported 4-H programs. We had more support staff on campus and did not rely on grant funding as much. Clientele had limited computer access, communicated by mail or phone, and we used slide shows and overheads to make presentations.

In the 2000s the majority of clientele have computers and email, and we have less federal funding, relying a lot on grants to hire program staff. Powerpoint has replaced most slides and overheads. 4-H celebrated its 100 year anniversary in 2002 and we had a decrease of specialists and an increase of area agents. We increased collaboration with other organizations and agencies. We also observed trends towards organic and local foods and at the same time increased sprawl – exurbanization and loss of open space. We had less secretarial support but increased computerization, and increased opportunities for everyone; this led to an overload for clientele and faculty and increased competition for individuals time. We had more resources online, and an increased technology emphasis - computers and technology were supposed to make us more efficient, but seems like we are busier than ever.

*Susan Pater, Director
Cochise County Cooperative Extension
Joined CALS in 1983*

A View from the Maricopa Agricultural Center, by Robert Roth

One really doesn't feel that things have changed over time until you are given the task of thinking back 25 years or more. My life began at the UA in 1968 as a

graduate student, who later (1973) moved to the Yuma Agricultural Centers and then to Maricopa Agricultural Center in 1989.

Everyone in the 1980s was either 100% extension or 100% research; those with a teaching appointment would also have a research appointment. For those of us off campus it was becoming apparent that growers were coming to those with research appointments for extension information. The administration started making those changes in appointment types in the mid 1980s and today everyone has a split appointment of some sort. There was plenty of Hatch Funds a (type of USDA research funding) available in the early 1980s, so the research people didn't have to get grant funds to complete their research. If you wanted anything you would go to your department and ask for the money, but, depending on the pecking order, you may or may not get anything. Faculty was starting to find sources of grant money in the late 1970s early 1980s. This was a source of money that allowed the scientists to buy goods and supplies without depending on their departments – thus creating independence and control of an individual research program. Of course today, the only money available is grant funds and everyone is applying for them.

In the 1980s we had a College Statistician who reviewed all research projects and helped with the analysis of data. Today we are all our own statisticians. Computers were not available off campus and the old Monroe calculating machines were busy spinning and doing sums of squares and square roots. The students at this time all had very strong agricultural backgrounds. There were a lot of new things that took place in the late 1970s and early 1980s. Drip Irrigation was being introduced from Israel, and the political solution for solving the Colorado River Salinity problems was by building the Yuma Desalting Plant (that hasn't operated yet). Poppies were grown in Yuma to determine if they could be detected from the air and therefore allow control of fields grown in foreign countries (we are still doing the same thing today). Kenaf was grown and the Yuma Daily Sun published the first ever newspaper printed from this fiber. The first and second energy crises occurred in the 1970s and the planting of jojoba fields became important - Jojoba oil was going to solve our oil dependence problem. Some of these fields can still be seen driving along I-8 near Tacna.

A typical day in the 1980s. First of all I didn't have to check for email; I would wait for the mailman to arrive

with any information. I would check for phone messages and make any necessary land line calls. I didn't have to worry about cell phone calls; if you needed to talk to someone it was much easier to get in your pickup and look for them. Everyone was in the field working on their projects. The mornings were spent in the field and the afternoons were in the office analyzing data. Everything was done by hand. DEC Rainbow PC's were our first personal computers. At first we had to speak FORTRAN, then BASIC. Later software packages were developed which made this all much easier. Everyone had trays full of 2x2 slides and a slide projector for making a presentation. Field shots were easy to get, however data slides were more difficult to make; we had to go to Tucson for this technology. We did learn to photograph off of large computer sheets with green and white lines which had more numbers than anyone could comprehend. We practiced until we could make slides off the computer monitor - data slides with color. Who could have ever guessed this could happen. Of course today we use the PowerPoint presentation for almost every event and cell phones and email consume us.

*Robert Roth
Resident Director
Maricopa and Citrus Agricultural Centers
Professor, Agricultural and Biosystems Engineering
Joined CALS in 1983*

From the Old World to the New World, by Soyeon Shim

When I first joined the UA, way back in 1990 (20 years ago!), I had to learn how to operate a widely used machine that was called a "mimeograph" by its manufacturer but referred to as "the ditto maker" by nearly everyone who used it. The ditto maker was a fairly complicated contraption for creating duplicates of printed material. After you carefully affixed a single page of a document to its imprinting cylinder, it would slowly grind out "copies" (I use the term loosely) of that page. In most cases, the document needing duplication would be of the sort that we teachers still use to conduct our classes—an exam, or quiz, or a class handout, or syllabus—in other words, the kinds of documents we now routinely post on a class website. Now, if this old method for spreading information seems cumbersome, just wait. "Dittos," as these copies were called, were printed in a purplish ink that grew fainter with each copy you made. By, say, the thirtieth copy, depending on how much text was on

each page, the printing would often be so faint that you could scarcely read it. The copying process also seemed to take forever if you had to make, say, a 100 copies of a three-page exam, and then you, or a secretary or student assistant, would have to collate the pages manually.

Needless to say, we did not look forward to using the ditto maker, and we tried to avoid needing to make copies on it. Then one day, our school director proudly declared that the School had bought a brand new photocopier machine, one that could make clean, clear duplicates quickly and didn't require a dedicated expert to operate. All you had to do was place your original in the proper spot, close the lid, select the number of copies you wanted, push a button, and—presto!—out churned page after page of crisp black-ink reproductions, the last as clear as the first and all automatically collated. Even better, this new copier produced overhead transparencies! We all cheered.

Our new ability to print many sets of survey questionnaires that were easy to read was also a bonus, although conducting survey research still meant sending out a ton of bulk mail and waiting patiently to get the surveys returned, and then sending the second or third batch of mail out, hoping to get a better return rate. And then of course we still had to enter the collected data manually into an SPSS statistical program. And as for in-house memos and meeting notes or schedule-change announcements and so forth—the originals for all of these had to be produced and disseminated in the same old way, which typically took a fair chunk of time out of every day. But at least the copies were virtually as good as the originals, and the stacks of printed matter that piled up on our desks and in our file cabinets looked a lot better than those reams of faded purple text. We didn't think things could—or would—get much better.

But now, twenty years later, nearly all of that has changed. Now we live in a virtual and instantaneous world. Students don't even have to be in the classroom. They can learn just as much, if not more, and learn it more effectively, online. Even when they are in the classroom, they are connected electronically to more information than we ever imagined could be so readily accessed. They might be listening to you and taking notes, but they might also be busy searching the Web and finding the very same sources you've used, or perhaps even finding more recent information. Now, too, you can conduct a survey online and watch your data piled up as each questionnaire is returned;

better still, the data is automatically entered and analyzed as it comes in. The administrative support staff has also changed significantly over the past twenty years. Today, the staff is smaller but its members are much more broadly and technically skilled and adaptive. I'd say that we view them as more valuable, too, which is a good thing.

So what new great changes might we see in the next twenty years? Or even in the next five? I predict that more and more students will graduate with online degrees, and more of these students will be from out-of-state. In fact, many will be in foreign countries. The Internet will continue to change the way we do science, too, breaking down the walls standing between different regions of the world. The only thing constant is change.

Soyeon Shim
Professor and Director
John and Doris Norton School
of Family and Consumer Sciences
Joined CALS in 1990

Habits Change Due to Technology, by Kathleen Miller

By the early 2000s people were more open to using technologies in daily interactions, computers were more powerful and software more user friendly. With less staff support more faculty and senior administrators prepare and send their own messages and reports. People are more likely to use websites for information once they know and bookmark a link. One of the biggest changes from pre-2000 is a greater preference for use of e-mail to get quick answers, arrange meetings, send reminders, drafts or pdf attachments. Younger faculty and administrators especially seem to prefer this means of communication. Two major dangers are tune out due to overload and loss of personal touch. To reach key audiences effectively, new strategies that counter these challenges should be incorporated for important messages.

Some interesting events.

- Millennium Projects Phase I: Faculty and Phase II: Classified Staff and Appointed Personnel
- 9/11 Campus Reaction: outpouring of support/emotions, wall of expression on mall, consciousness of and attention to issues affecting various groups on campus

- Nursing school shooting, development of better campus response plans, attempts to improve communications in emergency situations, etc.
- New Faculty, Staff and Appointed Professionals meeting format. Great presentations educate employees re relevant, intriguing, research topics. Potential marketing tool if attendees spread the word. Boosts morale and pride in CALS.

Kathleen Miller
Retired Executive Assistant
Joined CALS in 1992 and retired 2009

Changes in Communicating as a Reporter, **by Susan McGinley**

During the 20 years I have spent writing news and magazine articles in the College of Agriculture and Life Sciences, I have noted the following changes and trends:

The 1990s

When I began working in CALS in 1991, computer screens were still black and white, the monitors took up a lot of space on the desks and I didn't have a cell phone. I sent and received only a few emails a day and interviewed faculty, students and staff for stories in person or on the land line. There was a lot of quiet time in the office to write stories—when I was able to stay there. A fairly generous travel budget allowed me to visit different agents and specialists across Arizona to cover their excellent programs on site. Back in Agricultural Sciences Communications (the department name at the time, renamed Educational Communications and Technologies or ECAT in 1997), I wrote double-spaced press releases that I printed, copied, stuffed into envelopes and mailed to more than 100 news outlets on our distribution list. I used a 35 mm camera to shoot pictures that had to be developed into slides and prints at a photo shop.

The early 2000s

By the 2000s, technological changes had streamlined many of my tasks while increasing the volume of information I handled every day. I had a flat-screen monitor on my desk, a cell phone, a laptop computer and later a netbook, and sent my single-spaced press releases by email. No more envelope stuffing! I was searching the Web to check scientific terms, look up background information and download articles from scientific journals instead of going over to the UA sci-

ence library in person to check facts. The number of emails I received daily jumped to about 80 and I got rid of a lot of paper files by storing hundreds of documents online. Reduced funding cut my travel to the counties, but I was able to conduct more faculty interviews by email in addition to doing them by telephone and more locally in person (still the best). I could write stories anywhere that had WiFi. A digital camera replaced the 35 mm SLR camera I had been using to take pictures, and story distribution improved immensely when University Communications began working with units on campus, including ECAT, to post articles electronically to news outlets. The recent adoption of a content management based website enabled units to post items directly to the CALS website.

Into the 2010s

For me, the most exciting change has been the dramatic expansion in the scope and content of CALS academic, research and extension programs over the past two decades, with explosive increases in vocabulary, new concepts and issues for a writer to master in nearly every field. Genomics, nanotechnology; climate change, financial literacy; agricultural biotechnology, grandparents raising grandchildren, nutrigenomics and much more—the programs have become ever more interesting to write about and more importantly, more directly relevant to the needs of people, communities and industries in Arizona, the nation and the world. Yet newspapers have downsized or shut down locally and nationally, resulting in less specialization among reporters. Interpreting science for a lay audience can make a real difference and the need has never been greater for this function in CALS.

Susan McGinley
Educational Communications and Technologies
Science Writer and Editor
Joined CALS as graduate assistant in 1991, went full time in 1994

Classrooms Have Changed Over Time, **by Elaine Marchello**

Years ago, when a student went to college, he brought a note book and pen to class and was prepared to write notes. The instructor would use the chalk board to write key points or maybe equations, but the only way students gained information was by listening and writing. As technology advanced and we got the mimeograph machine, occasionally the instructor

would hand out a page or two of diagrams or equations to help enhance the material he was covering in class. The students were then tested on the material presented in class or in the book. However, in today's college, most of the notes are posted online and students are expected to either print them off or use their laptop during lecture. Many times, the instructor's expectations for these students goes beyond the lecture in the classroom, and although they feel like they are teaching the same amount of material, because of the teaching tools available, the students are actually demanding to know more. On top of this, in order to meet demand, class sizes have gotten much larger.

With the availability of large screen projection, it is not uncommon to have classes as large as 350 to 400 or even up to 1200 in a large venue. However, once again, technology prevails, and instructors now have the use of classroom responders (clickers) so they can ask questions throughout the lecture and get real-time

responses and feedback from the class. In some situations, exams are even given in this format. This is a far cry from a notebook and a pen. What is in the future? More classes and sections of classes will be offered online. Students will not even have to go to a physical classroom, but do everything on their computer. Already, we are seeing whole degrees being offered strictly in an online format and it is clearly the way of the future. Does this mean the traditional classroom setting will disappear? Not likely. There will always be diversity in the way students learn, and all of the various ways of teaching will be required to meet these needs. Yes, the balance is going to shift, but some traditions will never disappear.

Elaine Marchello
Assistant Dean
Agriculture Academic Programs
Joined CALS 1999

Chapter 25. Excerpts of Oral Histories

A series of oral histories was recorded with the cooperation of the Arizona Historical Society. These took place mostly in the mid 1990s but ranged from 1993 to 2001. The idea of oral histories emerged during the 1985 University of Arizona Centennial preparations and the early days of the CALS Office of Development and Alumni. It was part of the Archives Project. The 49 oral histories were primarily faculty, but included some staff and some non-university employees in the state. Original copies of the transcripts are available at the Arizona Historical Society, Tucson. Six of these are briefly summarized below, as excerpts but in the original language. They are all university employees and some of their recollections go back to the 1950s, reaching back 60 years. The contrast from the 1950s to the 1980s is striking, and the 15 or so years since the 1980s that are covered show the beginnings of more significant changes.

John Burnham, former editor for Agricultural Experiment Station
Bartley Cardon, former Dean
Amy Jean Knorr, Professor Emeritus, School Family and Consumer Sciences
Darrel Metcalfe, former Dean
Mary Rohen, former Office Manager
Ray Weick, former Assistant Director, Cooperative Extension

John Burnham

Former Editor for the Agricultural Experiment Station. This is from a transcription taken in July 1993. The interviewer was Lorraine Kingdon, former head of Agricultural Communications.

Kingdon: What did you do before you came to the UA and when did you arrive?

Burnham: I was in Frago, North Dakota, where I was the Experiment Station Editor at North Dakota State University. I came July 1, 1956. Before North Dakota State I was in newspaper work for 25 years.

Kingdon: When you look back over the years, who stands tall or short?

Burnham: The one who stands the tallest, of course, was Richard Harvill, who was President of the University. I felt he was the best president the University has had (in my time, of course). Harvill got out to our Branch Experiment Stations, he got out to our Extension Offices - if any member of the faculty walked across the campus and Harvill was around, he called him by name, he knew us all by name. I have known of his going to our Yuma Experiment Station and turning to one of the secretaries and asking about her younger sister at the university and how she's doing and what college, etc. He knew the people, he knew the antecedents of all the people, all of the ranchers throughout the state, as well as on campus. I don't think that situation has continued since Harvill left. Unless you have a feeling for people, you aren't doing the job.

Kingdon: What changed about the jobs you did?

Burnham: I think we started doing television. I know that I was doing television in agriculture here before KUAT was established. We would go up to Phoenix on a Saturday and we had an hour on Saturday afternoon on KGBK, the ABC station in Phoenix.

Of course, every once in a while - I remember Wally Fuller in Agricultural Chemistry and Soils got a cold and couldn't talk. I asked him one question and he said, "Yes", I asked him another question and he said, "Nope", I asked him the third question and he said, "I don't know", and in three minutes I'd gone through my six questions so I had to fill, by myself, for the next 50 minutes with one break for a commercial in between.

Bartley P. Cardon

Former College of Agriculture Dean. Became Dean in 1980 and retired in 1987 at age 74. He was raised on a combination farm, dairy and ranch in Tucson, but also in Mexico and in Chandler, Arizona. He received BS and MS degrees from the University of Arizona and was president of Arizona Feeds for many years. He was in the military during World War II. This is from a transcription taken in May 1993 (when he was 80 years old). The interviewer was L.W. Denbirst.

Denbirst: Where were you born?

Cardon: I was born in a little community called Binghampton, to the north and a little bit to the east of Tucson, along the Rillito River on 1 October 1913. I remember that the cattle operation that my father had was basically on the south side of the Rillito River, in the area of what now is north Country Club right where it runs into Prince, or where Prince runs into County Club.

The farming operation was on the north side of the river and I can't remember how many acres but I remember we raised corn and it was in silo, and I'll mention the silos in a minute. We had beef animals and we had grazing rights as I imagine, not knowing really what the arrangement was, on what is now the Catalina Foothills Estates. Literally, the range ran from the Oracle Road to the Reddington Road and from Rillito Creek up to and on the mountain. And, I remember several roundups when my Dad let me go with him and, as I recall, I was about age five.

The livestock operation corrals were on the north side and we had both the dairy and beef operation, and the dairy we sold milk in Tucson. I don't remember the details. I remember somebody did the retailing of them but I remember as a little kid, working in the dairy building, washing it down, cleaning it up. And the silage was a very stable part of the livestock rations, both the dairy and the beef. About 1918, I remember it was before the end of World War I, my Dad built two silos, one was just east of the junction of Prince Road and Country Club and it's now been converted into an apartment. The architect, when he converted it, called me and said, "I understand you know something about this silo, would you like to come out and look at the apartments?" I walked in the silo, took a deep breath and could still smell the silage (laughs) that we used to put in the damn thing because my job was to climb in the silo and tromp down the silage and pack it so that the air was pressed out so that it wouldn't sour but would ferment well anaerobically. I didn't know that then but subsequent education brought it out and I remember the chopper and the blower they mounted in a pipe up the side of the silo, over the top. The bottom of that was about ten feet underneath and it was perhaps thirty feet high, as I recall, above ground and so that was a forty foot fall. Some of those big trucks would come down with corn, ears that were chopped, and hit you on the head and you got pretty spry moving around so that they didn't clobber you to death as they chopped the silage.

Denbirst: What was it like when you went to Graduate School at the UA?

Cardon: Before I got into graduate school, during college here at the U of A they had a horse cavalry ROTC Unit. Having been raised on a ranch I had ridden horses all my life and I did very well in that unit. In my freshman, sophomore and junior years I won the cup for the outstanding ROTC student and my senior year I was Cadet Colonel of the Corps.

After a year, and it took me a year to get a Masters degree in the summer of 1940, I then had applied for a scholarship for a Ph.D. I had three places where I was accepted. One was at Wisconsin under Arvan and you know who he is. The other was at Cal Tech under a man by the name of Barker, and the third was another Barker at University of California at Berkeley. I chose the Barker at Berkeley because he'd been a physical chemist, which was what I had as an undergraduate was mostly physical chemistry, and then he decided to go into biology. He had gone to Holland and did postdoctoral work and then he came to Berkeley and he'd been there one year and had a student one semester only, and then he offered me the second scholarship under him. I talked to him on the phone, was intrigued by it and accepted that.

I was in the class of 1939 but I didn't get the degree until 1940 because they had no mid-year Commencement or anything like that and I immediately, starting the second semester of summer school. I registered for some

units under T.F. Buehrer starting the Masters degree and I started to work on it. A year later or actually about nine months later I completed the Masters degree so at Commencement in early June of 1940 I got both degrees. And then I immediately, after that, had a tour of two weeks at Fort Bliss for Reserve Officer Training and immediately after that Charlotte and I left on the train for Berkeley.

Amy Jean Knorr

Amy Jean Knorr was a Professor in the School of Home Economics. She was born in 1916 in Illinois and grew up on a farm. This is from a transcription taken in April 2000. The interviewer was Susan Paul.

Paul: Where did you get your bachelors degree?

Knorr: I always loved reading, and I thought I wanted to be a librarian so I began as an English major. By the end of the first term (we had terms, not semesters) I realized that librarians were not all that easy to place in paying positions. This was, after all, in 1934 that I began and in those years we were still in depression years, but home economics teachers were being placed. I realized that I was going to need to work and so it made sense to me to be in the field where I was likely to get employed. I had always enjoyed my 4-H club work so I then enrolled in the College of Home Economics at Michigan State.

Paul: You got your master's and is that when you started teaching?

Knorr: I taught in high schools when I graduated from Michigan State in 1938; in my first teaching job I taught home economics to grades seven through twelve. I was also the manager for the school lunch program. For part of the time I ran a preschool so that the students in home economics classes would have experience in working with young children. I taught in Wayland, Michigan, and in Allegan and Mt. Morris. That would have been about four and a half years teaching experience before I went to work on my master's. Two years after I got my degree, I did go to the University of Minnesota. I went there in 1956 and had a good teaching experience and it was there that I did meet Philip (her future husband) in 1957.

Paul: Let's go on to the University of Arizona period. You and Philip moved here in 1964. He already had a position here. Now you were going to tell me a little bit about when he came to the University and you tried to apply for a job.

Knorr: Actually, I had been approached about becoming a faculty member here and when I came for an interview one of the things that I mentioned was the fact that Philip and I planned to be married. Dr. Ruth Hall, Director of the School of Home Economics, immediately told me, which of course she should have, that two members of one family could not be employed faculty status. We went through the interview and she suggested that I talk with Dean Harold Myers to see if there was any possibility of going around the rule, I guess you might call it, and there really was not. Philip and I intended to be married anyway, so that we did and I came here in August, 1964.

Ruth Hall was instrumental in making possible other positions for me. Actually two people were instrumental, she (Ruth) and Eva Scully. But first let me tell you about the kinds of things that Ruth Hall opened up. At that time there were going to be students from Nigeria and Kenya and there were students from Brazil here already. Through the Agency for International Development (AID) it was possible to have an academic advisor for them. So I became the academic advisor one-quarter time. The young women from Brazil were settled in and getting along well but the young women from Nigeria and Kenya, had just come, in a sense, from the bush. So in addition to being their academic advisor, I really needed to be their personal advisor. For example, when those young women came, two things they really wanted to do. One was to learn to swim and the other was to learn to drive a car. Actually, they accomplished both. The swimsuits for the class in swimming had not come in so every member of the class was asked to bring her own swimsuit. Well, for kids around here, that was no problem, but for the students from Nigeria, it was. I scouted around for swimsuits and we finally got them all taken care of. It was really one thing after another for making their own personal adjustments here.

Darrel Metcalfe

Former College of Agriculture Dean and Director of Resident Instruction. He came to Arizona in 1975 and retired in 1982 at age 69. He was raised on a dairy farm in Wisconsin and was in the military during World War II. This is from a transcription taken in March 1993. The interviewer was L.W. Dewhurst.

Dewhurst: What were the circumstances that caused you to leave Iowa State and come to the University of Arizona?

Metcalfe: It was very difficult for me to leave Iowa State. I knew that Dr. Myers was Dean down here and he called and asked that I come and look at the job. My friends at Iowa State told me, they said, "Well, it's an unknown institution out in the West. It doesn't amount to anything. We don't think you should go." They were very serious, and they said, "Here is Iowa State, it has prestige, University of Arizona has none, we don't think you should go." And they jokingly said, "All that is out there are Indians and Cowboys." But, because of Harold Myers and others whom I knew, I thought I would come and look it over.

And so I came here and Vice President Nugent picked me up at night and put me in the Pioneer Hotel and said, "Next morning you come out and somebody from the University of Arizona campus will pick you up and take you there."

I came out the front door and I was grabbed by two policemen and put in jail. It's a true story. I tried to fight back but it didn't do me any good and finally the individual from the University came and said, "He doesn't know, he isn't from Arizona, he's from Iowa. He doesn't know this is Rodeo Week. He doesn't know he needs to have western garb on so release him." I was already thinking, "Well, this is sort of Cowboys and Indians."

I got to Campus and surprisingly I saw several men there who joined the University of Arizona faculty from Iowa State. I saw Sol Resnick. I hadn't seen him since 1940 at the University of Wisconsin. There were a lot of friends here already and a year later Dr. Hilton, Iowa State, came here to give a talk and to visit and referred to Iowa State here as Ames Upon the Santa Cruz because we had so many faculty from Iowa State. I spent a couple of days here visiting all of the faculty members and also President Harvill was very supportive of Harold Myers. And others on Campus were supportive too. I still didn't decide to come and I went back home. Harold Myers called me couple times and so finally in May I decided to come here and then Harold Myers said, "Well, you can't come down now you have to wait till July 1," so I said I would wait till July 1. Interestingly, President Hilton said, "Well, you can't take a vacation this year, we'll give you extra pay. We'll give you thirteen months. Will that pay for your transportation and moving your furniture and so forth? I said, "Yes." So I left Iowa State, and felt badly about it because I liked Iowa State but I was better off being back into agriculture.

Dewhurst: What would you consider were the most important and/or memorable things that occurred during that first year?

Metcalfe: Well, I knew Harold Myers from the past, how he operated. He called me in and told me, about Resident Instruction at the University of Arizona. I was in my office and one of the students came in and said, "There is an old man down in the lobby, I think you should go and see him." It was Forbes, Dr. Forbes. They later named the building after him. He came to find his picture. It was on the wall. There were three pictures, pictures of Forbes and two other men. I knew he always wanted to come over here and look at the pictures in the lobby. The University wanted them for their files. I asked that they take the three pictures but give me a small picture of the three of them to hang in the lobby.

Harold Myers also said enrollment was too low in agriculture at the University of Arizona. Harold Myers knew about teaching in every department in the College of Agriculture. I didn't realize that the College had been very highly criticized. It was attracting too few students. They had too few alums. They were critical about the courses. We had to offer more courses and organize new departments, new curricula, do something about it. Harold Myers said, "We've got to have more students." He said, "We've got to recruit better. First of all why don't you visit

the high schools on a personal basis?" I thought, "Well, this might help it a little." At Homecoming last year an alum of ours said he decided, like others, to come to the University of Arizona because I had talked to him in high school years before."

Denbirst: If I recall correctly, there is a note somewhere that you visited every high school in Arizona.

Metcalfe: I did, alone or with a group from the University. Also, we recruited County Agents. I asked each County Agent to have a person from the County be responsible for recruiting. They got the catalog, all the career papers, everything about the University. I became acquainted with the County Agents that way because later on I became Acting Director of the Cooperative State Extension Service for two years.

Mary Rohen

Former College of Agriculture Dean's Office Manager. She came to Arizona in 1937 and was an office manager in the Dean's Office. This is from a transcription taken in May 1994. The interviewer was George Ware.

Ware: Where were you born and where did you grow up? A thumbnail sketch of your background.

Rohen: I went all through school in Chicago, just through high school, and I got a job with an insurance company. I was sixteen at the time. I worked there for about two years and then got an offer of a better job with a dairy company and worked there for five years. Having had pleurisy every winter for several winters, my parents decided it would be a good idea to bring me to Tucson for a while with the dry climate to see if that would improve my health, which it did. I decided then that I just wanted to live in Tucson, so I stayed here and after about two years, I was able to go back to work and I started my first job as a stenographer in the Agricultural Extension Service at the University of Arizona.

Ware: When was that and who was your boss?

Rohen: In 1947 and I worked for Charles Pickerell as a stenographer, the head of the Agricultural Extension Service. Then I worked for five years for the federal Bureau of Agricultural Economics, then I worked at Hughes for one year

Ware: When did you come back to the UA?

Rohen: Dr Hawkins, who was Director of the Experiment Station in the College of Agriculture, called me and asked if he could come over and talk to me. They offered me the job of Secretary in the College of Agriculture Administration Office.

Ware: And you would then be working for Hawkins?

Rohen: Phil S. Eckart was the Dean and he was new, he'd only been there a few months. I worked for Dr. Hawkins because the Dean had his own secretary. So I was there the rest of my working time. I left there in 1974.

Ware: Phil Eckert was replaced as Dean, I think, by Harold E. Myers. So you became the secretary to the Dean?

Rohen: No, the Dean had his own secretary. I was really sort of in charge of the office and was finally given the title of Assistant to the Dean. Up until then no one on campus had titles higher than Secretary. It just seemed to be something that no President would approve. Finally one of the Vice Presidents made his secretary an Administrative Assistant and then that opened the door for other people on campus to be given changes in title.

Ware: It seems to me that you worked under several people including Dean Harold Myers.

Rohen: Right. When Dean Eckert resigned, Dr. Myers was appointed as Dean. I served under him and Dr. Hawkins, although the Dean had his own secretary.

Ware: Describe Harold Myers' physical appearance and his dressing habits and the like.

Roben: He was very conservative, very conventional and formal. I liked him very much. Some people thought maybe he was a little too formal, but he was an honest man and tried to be as fair to everyone as he could be.

Ware: How about his sense of humor?

Roben: Well, it wasn't strong but he did have a sense of humor. He was a very serious person. He couldn't seem to really let go - completely wound up in his work. He just lived to work and enjoyed it.

Ware: How did he dress?

Roben: Very conservatively, very plain clothes - no flash. He always wore a hat outside.

Ware: Describe a typical day, if you would, when you were the Office Manager -- the number of people you worked over, or that worked under you.

Roben: Well, there were three or four other girls in the office while I was in charge of the office and if anything needed to be done, I was supposed to be responsible to see that it was taken care of. They all had their jobs and really didn't require supervision. They were all capable and I just tried to keep things running as smoothly as I could.

Ray Weick

Ray was Regional Director for Arizona Cooperative Extension when he retired. This is from a transcription taken in May 1994. The interviewer was George Ware.

Ware: Where were you born?

Weick: I was born in 1927 in South Dakota and grew up on a farm.

Ware: How far away were you from your town?

Weick: Nine and a half miles was the closest town.

Ware: How did you get to school?

Weick: Went to a one-room country school a half a mile from the house where I grew up, it was called Webster School.

Ware: How many grades were there?

Weick: Well, at that time there were eight grades but I don't think there were even eight children in the school, so I don't think we had all eight grades. We had them scattered from Grade 1 to Grade 8, but all grades didn't have children in them.

Ware: Your brother was older than you and he's probably in the military then?

Weick: He would have been except that he'd had rheumatic fever and had a bad arm, so he ended up starting farming about that time. He farmed in connection with Dad and they rented more land -a lot of farms had been vacated, you know, the family had gone off to go to work in defense plants or go to military and one thing or other, so there were a lot of farmsteads that were vacant and they could just be rented so he ended up renting a lot of land at that time.

Ware: In the same vicinity as where you grew up?

Weick: Yes - not more than four or five miles around. Actually we had about 1,400 acres that we farmed, 700 row crop and 700 small grain crop and we did it all with one tractor. My brother was more of a machinery man, I was more of a livestock man and my Dad was a good fixer so he kept the machinery going and we'd spell off each other. My brother put in long days on the tractor and enjoyed it while I'd rather do the milking, believe it or not.

So that was the farm ties in wartime and then I went off to the Navy myself. Another kid that was in high school with me, when we graduated, why we went off and joined the Navy together.

Ware: Before you get into your Navy, let's talk a little bit about the war years. This is World War II. What can you remember about the shortcomings of supplies, gasoline and that sort of thing?

Weick: Oh, several things. First off, I learned about the attack on Pearl Harbor about 10:30 - 11:00 o'clock at night. We had no electricity and they had battery-operated radios and those would run down, so you didn't always have the radio on. There were a lot of things - things were difficult, but living on the farm you didn't have any meat shortage and you didn't have any grocery shortage. We had plenty to eat during those days, but I can also tell you I grew up with the WPA before those days and we ate citrus fruit and a lot of people couldn't. We had commodity food in those days. Farming was tough before the war. Backing up a little bit now, but I can remember threshing a whole wheat crop in a 55 gallon barrel, it was the "dirty thirties" and we lived through that.

Ware: Were you on the "GI Bill?"

Weick: Yes, on the GI Bill. As I recall, we got \$60 a month.

Ware: Your major at South Dakota State was what?

Weick: Animal Husbandry, now called Animal Science, with a minor in Veterinary Science.

Ware: What were your plans at this stage in your life?

Weick: Well, they kind of went along - I liked livestock real well and I guess I had some kind of a fancy idea that someday I'd have a herd of Purebred livestock, and sheep and cattle, what have you. I wasn't big on hogs but sheep and cattle I liked. I really envisioned starting out with Purebred Shorthorn cattle as a herdsman type of a person. Then along came graduation and there weren't a lot of those to be plucked off the vine. An interesting little thing, I had a friend by the name of Ray Sweitzer, he and I both graduated the same time, he said, "I hear they got some jobs open in Extension." "Yes," I said, "and I've had this letter from the Market News outfit that they are looking for a news commentator down there." He said, "Is that right? I'd sure be interested in that." I said, "I think I'll go talk to Extension." It ended up he took the Market News job and made a career out of it and I took the Extension job and made a career out of that.

Ware: How did that go?

Weick: That summer I worked for the Extension Service - was a 4-H Specialist and Eileen was teaching school up at Wilmot. We got married in June and she was signed up to go back to Wilmot that fall and teach again, actually signed her contract. Sometime during the late summer Al Face who was the Agent down in Yuma, came from South Dakota originally, came back specifically to South Dakota looking for a County 4-H Agent. He was looking for a fellow that had a similar background that I had - grew up on a farm, had been a 4-H member, had managed a Little International, and was in college and had State 4-H office experience, the same kinds of things that Al Face had experienced himself. So he came back and things were different in those days, you didn't have a whole lot of equal opportunity kinds of things - you found somebody you wanted to hire - you got busy and hired him. Al related in his interview that the biggest compliment that Charlie Pickrell, then Director of Extension, ever paid him - let him go hire his own man. We worked that thing out and Al hired me and I didn't hear anything for a long time and finally I had to call Howard Baker and he said, "Oh yes, that's right. That'll give me an excuse to go over to Administration and see what's happened to that

Ware: This was when, about 1953?

Weick: 1953 and it's getting to be late in the fall. My wife's having to get out of this contract and I still didn't have this job in hand. Anyway, things moved along rather quickly and Al had also arranged for Eileen to have a job teaching down at the Crane School in Yuma. We loaded up everything we owned in a U-Haul trailer and she got out of her contract and we did hear from Baker and said we had a contract - didn't have anything in hand - we just headed out for Yuma.

Ware: So you're newlyweds. You married . . .

Weick: Newlyweds, June, and September on our way to Yuma to be an Extension Agent.

Ware: Had you ever been to Yuma before?

Weick: Never been to Yuma before.

Ware: Did you have any ideas or prejudgments about it?

Weick: Yuma, no. I'd been over to New Mexico to some recreation labs and so on as a 4-H staff in South Dakota and thought I liked the desert and they assured me that Yuma had plenty of desert. Anyway, a little story on myself coming down here, I think we were over in the panhandle of Texas, probably some place like that, we were pulling this U-Haul and we were camping out alongside the road at night with our sleeping bags and so we're driving along the road taking a look at this crop out there, trying to figure out what it was. Finally got a spot to pull off, pulled over and went out in the field and walked around through it and Eileen asked as I got back to the car "What is it?" I said, "I don't know, but I think it's cotton." That's how much we knew about one of the big crops in Yuma County when I landed there. I thought I'd seen it once before. We landed there and Eileen had her job teaching school down at the Crane School and I went into the 4-H program.

Chapter 26. Excerpts From Alumni Newsletter Agri-News

The Alumni Newsletter Agri-News was published from April 1982 to Fall 1998, when it was replaced by the Compendium. The excerpts below are listed in 5-year segments and were selected as representative of the types of activities taking place in the College as reported in the Agri-News newsletter. Statements are taken directly from the newsletters with minor editing and were selected to give a “flavor” of the activities of the times.

1982-1985

- The College news magazine "Progressive Agriculture in Arizona" has been published for 33 years and on this day is renamed "Arizona Land and People." Dean Cardon indicated that the new name reflects the breadth of the college. Agriculture is our core, but we also work on other ways to use land and other ways to meet the needs of people. *April 1982.*
- The second annual homecoming breakfast featuring burritos was held in the patio of the Forbes Building in November 1981. *April 1982.*
- Dean Cardon completed his service on President Reagan's "Committee for Private Sector Survey on Cost Control." He was one of 100 executive officers and spent five months addressing various aspects of the federal government. Cardon's role was initially focused on the US Department of Agriculture but the issue of public lands ownership also involved his efforts. During this period Cardon spent approximately every other week in Washington, D.C. *November 1982.*
- The Arizona Crop Improvement Association celebrated its 50th year. The association was founded in Yuma in 1933 to answer a need for improved planting seed. *March 1983.*
- In fall 1981 "Friends of Agriculture" was organized as a unit within the University of Arizona Foundation to provide financial support for the College of Agriculture. As of this date, there were four organization members and 71 individual members. *March 1983.*
- The story behind the Egg Burritos is that they developed by Barbara Zeches of the Nutrition and Food Science Department as a research tool. Barbara and her students have prepared them for our homecoming breakfast for the last three years. Her research focused on whether catering to regional and cultural food preferences could reduce food waste and increase student participation in the Tucson School Breakfast program. It did. *June 1983.*
- Project CENTRL, begun last year with sponsorship of Cooperative extension and educational grant from the Kellogg foundation is recruiting for its second-class. The two-year program emphasizes agriculture and leadership. CENTRL is the acronym for Center for Rural Leadership. The director is Eldon Moore in from the Maricopa County Cooperative Extension Office. *February 1984.*
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- The college begins "Project Agriculture's Future", the project done in cooperation with Governor Bruce Babbitt to assess the natural resources and human needs of Arizona on a county by county basis. A guest editorial by Governor Babbitt lists four challenges: adopt water/energy efficient irrigation systems, improve crop yields, convert to high value cash crops, and develop arid environment cash crops. The nine branch stations of the Arizona Agricultural Experiment Station were all renamed to include the term "Agricultural Center." *June 1984.*

- The School of Home Economics is renamed to be the School of Family and Consumer Resources, noting that this was a traumatic change for some of the old guard. *October 1984.*
- The first male graduate of the School of Home Economics graduated in 1952. He now directs the corporate dietary services at a Pasadena, California, nursing home corporation. *March 1985.*
- The College celebrates the University Centennial by publishing a book titled "*The College of Agriculture: A Century of Discovery.*" *March 1985.*
- Department of Plant Pathology Emeritus Professor Alice Boyle died at age 80. She was the first woman to earn three degrees from the University of Arizona (Bachelor, Master, and Doctorate). Her graduate research focused on the causes of the rot on arms on the Saguaro cactus. *October 1985.*

1986-1990

- 715 breakfasts were served when alumni filled the patio of the Forbes Building when they attended last fall's homecoming, "the regal breakfast.." *February 1986.*
- Dean Cardon reminded people that the College and the Governor's Office (Bruce Babbitt) has sponsored an 18 month study on the needs of the people of Arizona as they relate to land, water, air, plants and animals. The study has been called Project Agriculture's Future. *February 1986.*
- Dean Bart Cardon reminisced about his life as Dean. He notes that he was reluctant to accept this position after it was offered by some members of the Board of Regents and the offer was seconded by President Schaefer. He states he just retired from business after 25 years of involvement, but within hours after accepting he was emotionally swept up in the current activities and events surrounding the College. He notes that he never looked back and certainly the six years have encompassed the busiest, most demanding and rewarding of his life. *October 1986.*
- An interview with Bart Cardon: Scholar -- Soldier -- Entrepreneur -- Dean of Arizona Agriculture. Agri-News noted that Cardon has led an adventuresome and exciting life, and asked him, beyond family and church, what are some of the most satisfying or thrilling experiences you remember. Cardon responded that he talked the third Army (Cardon was an Operations Officer for General Patton) into organizing a series of university classes for GIs who are waiting for rotation back to the U.S. We ran the program from May to December 1945 using a summer school type structure. It included 33 different courses.. Another exciting time was the development of Arizona Feeds, starting with the Erly Fat Livestock Feed Company and merging that with Arizona Flour Mills in 1967. That's when I first started with computers and it is because of a computer and business class that I took. Cardon also indicated that the ability to recognize change and adapt to it is the single most challenge we must meet. *October 1986.*
- Dean Eugene Sander notes how he arrived in Tucson in the summer of 1987. He held a number of meetings with commodity groups, engaged in regular interactions with the University administration, and that he had about finished his project of "walking around" each of the schools and departments in the College. He noted that we have to face the fact that both our society and agriculture have been changing and continue to change at a rapid pace. This means new problems, challenges and opportunities appear. Fortunately our knowledge base has been expanding rapidly. He noted that we must sharpen our focus and organize ourselves to be more effective to meet these challenges. *August 1987.*
- The annual "Symposium of Racing" attracted more than 800 people to the five-day program in Tucson. The program covered track and safety equipment, uniform licensing, international racing issues, legal and legislative issues, as well as new ideas in marketing and communications. The race track industry program at the University is the first program of its kind in any U.S. College. *April 1988.*

- The University redesigns its logo to be a block A. The purpose was to provide standardization of the UA image and to prevent confusion between Arizona State University and University of Arizona. *March 1989.*
- Several new administrators are hired within the college. Elizabeth Bernays is the new head of Entomology, Jerelyn Shultz is the new head of the School of Family and Consumer Resources, James Christenson is the new director of Cooperative Extension, Collin Kaltenbach is the new head of the Agricultural Experiment Station. *September 1989.*
- A summary of the 312 students receiving diplomas shows the following distribution: Bachelor of Landscape Architecture (17). Bachelor of Science in Agriculture (91). Bachelor of Science in Family and Consumer Resources (108). Bachelor of Science in Home Economics (1). Bachelor of Science in Renewable Natural Resources (10). Master of Agricultural Education (3). Master of Landscape Architecture (7). Master of Science (62). Doctor of Philosophy (13). *July 1990*
- Over the next five years the department of animal sciences will be undergoing significant changes. Roy Ax, who was named to lead the department a year ago indicates the department will be taking on a new identity. The primary purpose will continue to be "to improve the efficiency of livestock production resulting in a quality product to the consumer and a profit to the producer." The department will focus more on genetics. *October 1990.*

1991-1995

- The five most popular majors in the College of Agriculture this year are Nutritional Sciences, Merchandising and Fashion Promotion, Family Studies, Interior Design, and Wildlife and Fisheries studies. Enrollment in those majors accounts for slightly less than half of the college's total of 2135 students. *March 1991.*
- The Agri-News newsletter had some changes beginning with this issue. Gordon Graham had been the editor with Monica Delisa as the assistant editor. Monica becomes the new editor, and the office is switching to desktop publishing to produce the newsletter. This not only gives new flexibility in design but it saves money in producing the newsletter. *March 1991.*
- Several new department heads are appointed. Roger Huber, head of Agricultural Education, Donald Slack, head of Agricultural Engineering, and Bobby Reid as head of Nutrition and Food Science. *September 1991.*
- The Horizons Unlimited Science Program celebrates its third year. The program takes the top juniors in Arizona and invites them for a one-week residency at the College of Agriculture to experience applied agricultural science. The past year had 93 students. *Supplement to November 1991 Issue.*
- A new generation of faculty is set to cope with the 1990s teaching problems -- in the last five years the College of agriculture has seen a 40% turnover in teaching faculty, due largely to retirements. *1991 Supplement.*
- The first College of Agriculture "Land and People Conference" to be held annually in the spring in Tucson, has as its theme "Environmental Stewardship." The conference will include presentations by college faculty, and at least one national figure. *February 1992.*
- The College of Agriculture new faculty tour is approaching its five-year anniversary. The tour began in 1990 and introduces new faculty to Arizona agricultural industries, its leaders and citizens of the state of Arizona. *September 1994.*

1996-2000

- Cooperative Extension, as part of their constant evaluation of its research and educational programs, holds a "Moving to Higher Ground" special program review session. 50 Arizona community and business leaders and 30 UA faculty and staff met in Casa Grande for a two day session to discuss the 70 statewide Cooperative Extension programs. Participants were asked to place each program in one of four categories: continue, enhance, spinoff, phase-out. *September 1996*
- The Development and Alumni Office announces its first webpage. It includes information about different events, publications, and conferences. *September 1996.*
- The 1997 New Faculty Tour took place January 8-10. There were 31 new scientists, teachers, extension personnel, and staff to meet the people and organizations that make agriculture happen in Arizona. The first stops in the Yuma area showcase for cattle, vegetable, and citrus industries as well as the programs of youth and family development in the region. Over 400 people attended a January dinner in the Yuma Civic Center. The next day the faculty traveled to the Phoenix area, making several stops, including at Maricopa agricultural center. That evening there was a barbecue at the Compadre Stadium in Chandler, with an attendance of 125. Joining college personnel on the tour were Maurice and Seigny, Dean of the College of Fine Arts, and Dr. Anita McDonald, Dean of Extended University. *April 1997.*
- The UA College of Agriculture hosted the June annual conference of the National Agricultural Alumni and Development Association. The central theme of the conference was "change." *April 1977.*
- The first annual "women in agriculture" conference was held on campus in June. The conference was hosted by the school of family and consumer resources and attended by over 70 women. *September 1997.*
- Beginning with the next issue, Agri-News will have a new name and a new format. The results of several focus group meetings have already generated changes on the Development and Alumni Office website. Beginning in Spring 1999 the new newsletter will be implemented. *Fall 1998 (last issue of Agri-News under old name).*

Part 5. Summary

Personal Recollections and Case Histories

Most changes began slowly and accelerate later. Sometimes, when they finally appear, it seems as if they came out of nowhere. These case histories and personal recollections describe some key changes and how they started and progressed.

1. Molecular biology had its seeds in 1959 when Dean Myers hired Albert Siegel for the Department of Agricultural Biochemistry, upon advice from the California Institute of Technology. Milton Zaitlin was hired in the same department the following year. In making these hires, Myers was reacting to President Harvill's 1958 hiring of six new science department heads (none in agriculture). The next hire was Frank Katterman, Department of Plant Breeding in 1966, still under Dean Myers. Over the years there were more hires, including department heads, that were in molecular biology.

2) In the early days Home Economics was called Domestic Science and focused on food and textiles. Shortly thereafter it became Home Economics, and in 2000 it became the School of Family and Consumer Sciences. This School has been almost completely converted from what it was in 1980.

3) Beginning in the 1970s there was a shift from a major College focus on agriculture to a focus on environmental science, which is now a major effort in the College. Most departments have some role in some aspect of the environment, including the interactions of agriculture and environment.

4) In 1975 a Plant Sciences Department was formed by an amalgamation of several departments. This conversion was not a smooth process and it seems that all participants in the end learned something about managing change. Similarly the Boyce Thompson Arboretum became involved with the College as it was becoming a State Park. This created a situation where the College is one of the three participants in managing the Arboretum, along with the State of Arizona and with the Boyce Thompson Foundation.

5) The development of the Maricopa Agricultural Center resulted from the decision of the Board of Regents to sell Phoenix urban area farms. New land was selected and purchased. The new Center was developed and made operational by 1983.

6) The development of an Archives Program in the Development and Alumni Office began in 1992. It first required collecting materials and identifying key aspects of the CALS history. Separately, a set of oral histories was developed in the early 1990s in cooperation with the Arizona Historical Society. This also was done through the Development and Alumni Office, and included faculty and staff of the College as well as some prominent citizens. The Alumni newsletter began in 1982 (Agri-News) and was published until 1988 when a name change occurred (Compendium). Included here is a series of brief excerpts from the newsletter for five-year periods. This gives some idea of how the College changed, through articles of interest to Alumni.

7. Faculty and staff (16) gave their recollections about how the college changed in the last 30 years.

Part 6

Recurring Themes and Change

What can we learn from these various 30-year periods? What changes and what remains the same? Some basic themes recur and new approaches to thinking about the future emerge.

Includes Chapters:

Chapter 27. Identifying Recurring Themes

Five themes emerge from the multiple changes that have occurred over the last 30 years.

Chapter 28. Reacting to Continually Changing Environments

How the College dealt with change varied by the times and by the leadership. Some solutions work well for one set of circumstances and other solutions change more with the era and how long-term trends change.

Chapter 27. Identifying Recurring Themes

These five themes emerged when reviewing the CALS history, other activities at the UA, and the changes in the general fields of science and technology that are relevant to CALS activities. Often a particular term can be traced back to an early date, but the term may become semi-dormant for a long time. When the time is appropriate, it reemerges. On the other hand, there are entirely new terms that develop and immediately enter into our usage. Both these situations are occurring and it becomes easy to conclude that we are in a major transition period.

- New Terms in Our Vocabulary for Science and Technology
- Disciplines Blur and Transdisciplinary Approaches Grow
- Success Requires Working Together and Communicating Regularly
- Leadership, People, Resources and Times Matter
- Change Occurs Both in spurts and incrementally

New Terms in Our Vocabulary for Science and Technology

Two areas in particular are especially relevant: biology and information technology. In fact both interact to some degree. Modern biology requires computing ability and we are learning about some new approaches to computing and engineering by studying biology. The older term of “computing” has given way to the more comprehensive term of information technology, to cover all uses of computers and related devices. New terms include translational research – where the difference between basic and applied research is blurred, where the incorporation of various disciplines is fundamental, and the process is seen as a continuum from laboratory to application.

Some other relatively new terms are social media, molecular biology, and genomics. Still other older terms take on new meanings. One example is sustainability, initially described as environmental, climate, or energy aspects rather than the emerging use as applying to everything, including the viability of organizations, governments, or basic infrastructures. Some words did not exist 10 years ago: Facebook, iPad, and a host of similar terms that apply to the various types of social media.

Observation:

The growth of knowledge development and its transfer continues to accelerate. These two areas of science and technology are fundamentally changing how society functions. This complicates communication to varied audiences and separates older gen-

erations from younger generations in expected and unexpected ways.

Disciplines Blur and Transdisciplinary Approaches Grow

While we have always had interactions between some disciplines, the lines that define disciplines are more blurred than in the past and the need for having knowledge of more disciplines has increased. The UA is especially good at working on interdisciplinary programs, with a long-standing structure to encourage it (the UA Interdisciplinary Committee on Genetics, in 1964, was the first formal educational program). Visitors to the university notice this and comment. CALS began with a lot of interdisciplinary efforts – if you have a sick plant, it could be food, water, pests, bad seed, weather, and so on. So it took a team of people to address the problem.

Observation:

Continuous education in some form becomes more important and institutional structures must accommodate the research aspects of the transdisciplinary world. Universities have all the building blocks to do this and most are moving in that direction. Examples are colleges that focus on faculty disciplines and school, institutes, or centers to focus on the transdisciplinary activities. This allows a permanent home (or homes) for faculty and temporary or permanent structures that focus on problem areas, whether theoretical or practical. When a new problem arrives, create a new center (and close an old one) but keep the colleges and your faculty; the faculty can be

learning how to communicate and work with other disciplines by these experiences.

Success Requires Working Together and Communicating Regularly

When problems are complex, often working together produces better results. Another change in the last 30 years has been the ability to work together no matter what location you are in. Businesses have long used electronic communication to brainstorm issues or outsource activities from bookkeeping to reading X-Rays.

In the last decade or so the number of people in the world accessible by internet had grown rapidly. At the end on 2010, nearly 30% of the world's population used internet³². CALS has worked with other campus colleges, other universities, and external government agencies for a long time, but in the 1970s this need for cooperation increased with the increased interest in environment and it greatly increased the need for interdisciplinary activity.

How we define research is also changing. What we used to call basic research or applied research is also blurring and becoming translational research, where the two are seen as two parts of the same process. Another approach, that both CALS and the UA are using is to have institutional structures that accommodate the research aspects of a transdisciplinary world.

Observation:

Today almost anyone can communicate with anyone, anywhere, at any time, and from home, office, or out on a hike. **This changes everything.** Universities will change as we are in the business of working together and communicating regularly. Those students now in the university are the “digital natives”, as they grew up with these types of communications. The most important question is how and when the university will change to be successful in this new world of ubiquitous communication and transdisciplinary perspectives.

Leadership, People, Resources and Times Matter

Leaders can be too far behind, too far ahead, or at about the right place. Which condition prevails is

partly due to the individual leader, but it also related to the rest of the people in the organization, to current and emerging external conditions, and the amount of resources available to do the required activities. If several of these factors are going the wrong direction it can be tough to be even a good leader. People increasingly matter and their role in the organization may change as a result of the increased communications now possible. Both CALS and the UA publish electronically much more information and have much more involvement of faculty, staff, and student involvement in how the organization plans and functions.

What a leader is able to do also depends on what has been done in the past within the organization. Institutions such as universities like to study new ideas, feel obligated to make changes when the leadership changes, or recognize something needs to be done differently.

One result from this situation is a proliferation of studies and reports on a range of topics by a variety of sources. Some of them are very good, some are not so good. The last 60 years has had a range of leaders that fit the too slow, too fast, and about right categories. One result of this mix is the person that went too fast followed the person that went too slow; so knowing the times and reacting to them is important.

Observation:

We need to take advantage of what we already know and what others have learned. There is no need to re-invent the wheel by creating new reports because the leader did not realize earlier studies were relevant to the question at hand. One also has to fight the tendency to look negatively on studies that were not done at the local institution. We also need to build leaders from within, and both CALS and the UA has done this by a series of leadership training opportunities.

Change Occurs Both in Spurts and Incrementally

While it is too simplistic to say that cycles occur and those cycles can be anticipated, it is useful to review history to get a feel for such cycles. If a leadership style or a faculty expectation is not in sync with the cycle that is occurring, there will be difficult times. Some cycles can be very long, other short, and of course there are so many possible perturbations

³² Usage statistic from Internet World Stats.
<http://www.internetworldstats.com/stats.htm>

along the way that you may not recognize a cycle is actually happening.

There were more changes in CALS departmental names and in the organization during the 1970s than in any other time period except when the university was in its beginning days. The 1970 decade was a period of significant change occurring in the country and among various College audiences. It is not unreasonable to say that the College was faced with making major adjustments because it had waited too long to make small adjustments. But there were many external changes that strongly impacted the clientele and the types of activities taking place in

CALS. In the 1980s the appearance of molecular biology as an emerging field and the role of the information technology revolution transformed many institutions, universities and other.

Observation:

Knowing the major current trends AND the emerging trends could be immensely helpful to all in the organization. Recognition that change occurs is essential but often just the opposite view is taken, and is one of the stumbling blocks of university life

Chapter 28.

Reacting to Continually Changing Environments

Arizona and the world are changing.

There is one thing that is clear about the next 30 years – they will be different from the past 30. The challenge will be to retain what is good and change what needs changing as circumstances change. We need to understand that recognizing the inevitability of change presents us with new opportunities, but with constraints and uncertainties. Next year (2012) we will celebrate the 150th year of the Land-Grant Act (1862), the same year as the 100th year anniversary of the State of Arizona (1912), and one year after hiring a new Dean of Agriculture (2011). That dean will be faced with new things, will have new tools, and will have new challenges. But, we had similar types of challenges when previous new deans arrived and the college adapted both to the new times and the new dean.

We entered an era of change with the technological developments of the 1980s and we may be entering a new era best described by sustainability or integration of many changes into a “mega change.” However, when you look back to the 1950s, we have gone through some very large changes, some expected and some not expected, and involving a number of topics. We have this experience of dealing with change. One thing we have now is access to much more information and assessments of trends and possible scenarios of the future. One thing that is a problem for us is the rate of change is much faster and has greater effects on all of us. The important point, however, is that we have some experience at adapting to change (rather than fighting it)

- **1885 – 1915**

The university begins with the Agricultural Experiment Station. The first director (Frank Gully) had to hire faculty, obtain equipment, identify and build experimental farms, and keep an accounting of everything.

- **1915 – mid 1950s**

The first CALS departments are formed, agricultural mechanization occurs, replacing people and animals as power sources, two world wars and an economic depression occur. Arizona population growth begins.

- **Mid 1950s – 1970**

Oversee the transition from a rural to an urban state, deal with the social changes accompanying the 1960s, support agriculture in an era of increasing population. In 1958 President Harvill changes the character of the university to become more research oriented.

- **1970 – 1980**

A decade of significant environmental efforts, stresses on the agricultural community, and increased federal legislation. Two world-wide energy embargos, and formation of the Environmental Protection Agency. CALS begins a focus on environmental problem areas. President

Schaefer accelerates the move of the university to be more research oriented and higher quality.

- **1980 – 2010**

Arizona passes legislation to control groundwater use, major revolutions in molecular biology and information technology occur, significant changes in how we conduct research, teach, and provide extension activities. Increase in planning and assessment activities, increased interest in large scale changes and sustainability of our way of life.

We had different types of change to deal with. The first was establishing an infrastructure and staffing the college. The next was working with the pre 1950s world of agriculture and of society. Then came a transition period of significant disruptions to the country and the college as we moved from an agricultural to an urban state. Finally, since the 1980s we began going through major changes in science and technology.

Each of these periods was different, had different leaders, a different type of faculty, staff, and students, and a different clientele base. They all required a learning curve on how to deal with the changing times.

Part 6. Summary

Recurring Themes and Change

Several themes emerge from reading this history. They are grouped under five themes in Chapter 27, each having a general description followed by an observation. The themes are:

- New terms in our vocabulary for science and technology.
- Disciplines blur and transdisciplinary approaches grow.
- Success requires working together and communicating regularly.
- Leadership, people, resources and times matter.
- Change occurred both in spurts and incrementally.

Chapter 28 summarizes the reactions to some of the more significant changes since the University was established. Each of these periods was different: a) different leaders, b) different types of faculty, staff, and students, c) different clientele base, and d) different external conditions relating to funding, societal viewpoints, and types of science.

- **1885 -- 1915**
The Agricultural Experiment Station was established but needed to become functional. Farm locations needed to be identified and designed; classrooms and laboratories needed to be equipped; and faculty needed to be hired.
- **1915 -- 1950s**
The first University departments were formed. Two world wars were fought. An economic depression occurred.
- **1950s – 1970**
A major transition from rural to urban occurred, social attitudes changed, and the University redirected its focus to research and teaching from mostly teaching.
- **1970 -- 1980**
A decade of significant environmental laws and regulations, worldwide energy embargoes, and the University accelerated its move to be more research oriented and higher quality.
- **1980 -- 2010**
Arizona passed legislation to control groundwater use. Molecular biology and information technology grew rapidly as new science and technology fields. The College departments and Schools increased interdisciplinary connections.

Part 7.

Looking Backward and Forward

What about the future? We have concluded that it will likely be much different than the past, more challenging to manage, and will require new approaches over those of the past. However, there are important things to learn from the past when we think about the future. We enter this next 30-year period (2010-2040) with the benefit of understanding how we survived the changes brought during these last four 30-year periods (1890-1920, 1920-1950, 1950-1980), 1980-2010). Some of these changes were significant and most were not anticipated. We have the benefit of this history to better anticipate some of the possible new futures facing the College of Agriculture and Life Sciences.

Chapter 29. Looking Backward 60 Years

Reviewing 1950-1980 and 1980-2010 – each was a very different period.

Chapter 30. Looking Forward 30 Years

Based on the two past 30-year segments, what can we learn about how to deal with the next 30 years.

Chapter 29. Looking Backward 60 Years

The last 60 years can be broken into two 30-year segments.

- 1950-1980 – This was a major period of transition where Arizona changed from a long-standing, pre-World War II agricultural and mining economy to a more diversified and modern economy.
- 1980-2010 – This also was a period of transition but of a different type. Major science and technology changes occurred, impacting both educational institutions and the general economy.

We can learn a lot from the past 30 years. There were only two deans but a tremendous amount of change in the types of audiences, the types of science, the technologies available for teaching and research, and the things that impact ordinary people, such as food, transportation, communication, and jobs. In the previous 30 years, from 1950 to 1980, another tremendous amount of change occurred, moving the College from its strongly agricultural emphasis serving a small-population state to an international institution serving a larger and more diversified economy through its multiple areas of emphasis. One clear message is that we not only need to live with change, but understand the dynamics behind the change.

Ways of learning have also changed – for students, faculty, and others. In the 1950s we used chalk and blackboard, and field trips or demonstrations as primary teaching methods. In the 1980s that changed to pens and whiteboards, slide or overhead projectors, and photocopied handouts. In 2010, we use computers and internet, and increasingly portable devices like cell phones or tablet computers. We are also less involved in “teaching” that is directed at students and more involved in “providing learning opportunities” by using a variety of methods to actively involve students in the process. It is probably safe to say we are in a revolution of how learning occurs.

There is one thing that was unique in the last 60 years. In 1950 the UA was a regional and teaching-oriented institution, where the state employment was still largely agriculture and mining. In 2010, the UA is a major research institution with national and international recognition. Arizona has a much larger population and the employment is more diverse. Thus the characteristics for both the state and the institution have gone through a significant transfor-

mation. This type of change will not be repeated. But, we could consider some of the changes we have seen as early warmings that teach us something about transformations. Possible new transformations may result from new ways of communicating, learning, or organizing, that take place with new types of employment, technologies, and organizations. When looking backward 60 years we should think of new possible transformations and how we survived the last one.

Ten areas of most significant historic changes in CALS include:

- Communication technologies,
- Emphasis on molecular biology in addition to field-oriented agriculture,
- Increase in female students to almost 70% in recent years,
- Increase in minority students from 20% to over 30% in ten years,
- Increased emphasis on consumers, markets, nutrition,
- Increased emphasis on environment, natural resources, and arid lands,
- Methods of student learning and class participation,
- Movement from mostly field agriculture to genetics-based molecular approaches,
- Movement to more interdisciplinary approaches in all aspects, and
- Students and faculty with less farming and ranching experience.

Some changes are so common that we don't think of them as changes:

- College audiences change,

- External world changes (e.g., science and technology, demographics, social norms, economy, resources),
- Faculty, staff and students change,
- Presidents and deans matter, and
- Infrastructure changes (e.g., schools and departments, facilities, communication)

Chapter 30. Looking Forward 30 Years

People that study the future suggest that the number of years one looks ahead should be accompanied by about twice that number of years looking back. One of the lessons from the previous 60 years is that change can happen quickly and unexpectedly, but it also happens slowly and one does not need to be afraid of it. Another lesson learned is that consistency matters for institutional vision, values and general principles. History can prepare us for the future and it can suggest important elements of the future. We don't have to be afraid of change, we just need to better understand the change process and the environment we live in. The Epilogue written by Dean Cardon and published in the 1985 *College of Agriculture: A Century of Discovery* is reprinted in Appendix R (Haney, Gonzalez, & Paylore, 1985).

Appropriate Planning is Important

The latest update of the College Strategic Plan, in spring 2010, defines the College approach for some likely futures. It recognizes the future will be different but that we need some guidance on general directions. It assumes that uncertainty, complexity, and ambiguity will be with us while we are going through rapidly changing times. And it indicates that our approach should be flexible, agile, innovative, and responsive to appropriate signals. Of course, college leadership and resources are critical, but we can expect that the type of leadership needed will itself change with the times.

The current mission statement is brief: “to create, integrate, extend, and apply knowledge.” This is quite a contrast to years past when university guidelines indicated a mission statement should not exceed five pages!

There are many uncertainties – the economy, global roles of the various countries, resource and environmental trends, and new technological techniques or scientific discoveries. For us, perhaps the most important factor may be the easiest to ignore: how universities will be managed and what they will do in the future. In other words, how will universities change? There are a number of reports and books that address this issue, and understanding them is part of preparing for the future.

When essentially everyone in the world has instant access to very large amounts of information and has access to everyone else in the world, without regard to specific location or method of how that access is achieved, things surely will change. With access to so much information one has to make choices and be careful not to gravitate to easily found solutions that reinforce our own biases. This is where universities can assist in developing new

ways of thinking and exposing students to new ideas and new subjects. Just as there is more information available than any individual can comprehend, there are also new ways of organizing and evaluating that information to make it useful. How we evaluate information and give opportunities for critical discussion of the key points is one of our greatest challenges as a university.

In the end, learning is what universities are all about and everyone is involved in the process – students, faculty, staff, and extension clients. But, of course, the processes of learning are undergoing change as much as every other aspect of college life. It's not hard to imagine an assignment of the future that involves a group of students, some of them in other countries or not even members of the class, solving a problem together, and sharing their different perspectives. We already do this with many of the faculty. Likewise in research, it is possible to learn from the old National Science Foundation RANN project (Research Applied to National Needs). It existed from 1971 to 1977 and was discontinued because of competition for funds from on NSF sponsored projects. However, it was an approach that used an interdisciplinary approach to large-scale projects that had national significance. Many of our problems today are amenable to collecting university-wide expertise to develop solutions.

The current strategic plan also encourages a signature programmatic focus on “sustainable integrated systems” in the areas of:

- Arid and semi-arid region agriculture and environment,
- Individuals, families, communities, and organizations, and
- Globally-oriented basic and applied research.

There are six specific focus areas, and most CALS departments are involved in several of them:

- Environment, Water, Land, Energy, and Natural Resources
- Plant, Insect, and Microbe Systems
- Human Nutrition, Health, and Food Safety
- Animal Systems
- Children, Youth, Families, and Community
- Consumers, Marketplace, Trade, and Economics

The preceding 60 years, may provide some guidance to future leaders of the College as well as faculty, staff, students, and our ultimate audiences. We have learned that:

- History matters but don't assume it defines the future,
- We are experienced at dealing with change – for our clientele and ourselves, and
- The right college and university leadership and resources are critical for the specific time period.

A Little Foresight May Go a Long Way

Frequently those who study the future or do strategic planning review driving forces or key trends, look for likely changes in the trends, and develop several scenarios to provide guidance looking at alternative futures. What seems clear includes:

- The rate of change will increase, as will complexity and the need for greater coordination.
- Technological changes are continuing, including those that pertain to the laboratory or to society.
- Communication is so ubiquitous it will transform how society operates.
- Mechanisms are needed to make the complex systems appear simple (e.g, smart systems).
- Large scale concerns (e.g., energy, water, globalization and governance, and climate change).

One could therefore conclude that the way people learn will change markedly in the next 30 years. The role of universities in addressing important problems will increase but perhaps in unpredictable ways. The way all sectors of society, including citizens, acquire information will change. They need to evaluate how reliable that information is.

Anticipating the Future to Make Today's Decisions

We need to anticipate the future (not try to predict it) to provide some guidance for making today's decisions.

The last 30 years was a period of significant change, partly because some changes were truly significant (like the role of information technology), but other changes were relative minor because they were more incremental. For example, the university made a move to more transdisciplinary efforts and established more opportunities for formal interaction across the campus in selected topics, but the basic structure of the university remains the same.

But changes in the previous 30 years (1950-1980) were also significant, as during that period the university and the college moved from a regional institution focused on a more agricultural audience to one that is internationally recognized and a generally urban audience, along with great social changes taking place in the country. Going back another 30 years (1920-1950) we find not so many changes in the university, but externally, with a period of great economic depression, a world war, a change to more mechanization within the agricultural community, and the beginning of a growth period in Arizona population and industry.

We Have a History of Living with Change and Surviving.

There are a lot of signposts and signals about the future that are present in everyday life. We know this either by studying the "messages" on these signposts or just trying to live our lives; we know that there will be even a greater rate of change in the future.

We need to learn to deal with the conditions of the future and not try to simply relive the past. The potential problems and issues facing the world, country, and state require the university's expertise and knowledge for solutions. There are different ways to involve the university in these solutions, but first we have to understand that we need to ask the question of what is the university of the future.

Understanding how the college, and the university, moved through the last 60 years is instructive on how we might work with the next 30 years.

Part 7. Summary

Looking Backward and Forward

We can learn a lot from the last 30 years, and the 30 years before that.

- From 1980 to 2010 there was a great deal of change, or so it seemed because of the visibility and the nearness to our recall. New types of information technology, new types of fundamental scientific achievements, new types of learning, and new types of students all occurred.
- From 1950 to 1980 there was also a great deal of change. We learned how to recover after World War II, and dealt with the cultural shifts of the 1960s and the with environmental awareness and activism of the 1970s.

We can apply what we learned in the last 30 (or 60) years to the next 30 years.

- Appropriate planning is important (appropriate is the key word).
- A little foresight may go a long way.
- Anticipating the future to make today's decisions is better than extrapolating the past.
- We have a history of living with change and surviving.

Appendices

- Appendix A. Key Events at a Glance 1950 – 2000, 188
- Appendix B. Arizona Agricultural Trends, 189
- Appendix C. University Research Funding Availability, 191
- Appendix D. Trends of Societal Change Indicators, 192
- Appendix E. Administrative Support Structure and Organization, 196
- Appendix F. Units Representing College-wide Programs, 199
- Appendix G. Facilities: Campus, Agricultural Centers, Counties, 201
- Appendix H. Descriptions of Specialized Units, 204
- Appendix I. Listing of Administrative Unit Directors or Heads, 209
- Appendix J. Faculty and Staff Honors and Awards Recipients 1980-2010, 217
- Appendix K. Endowed Chairs and Their Holders, 227
- Appendix L. College Awards to Citizens, 228
- Appendix M. Key Driving Forces - Clusters of Related Trends, 236
- Appendix N. College Programmatic Focus 2010, 237
- Appendix O. Overview of Academic Departmental Name Changes 1905-2010, 238
- Appendix P. Faculty Memberships in Professional Associations, 239
- Appendix Q. Faculty Involved in Preparing Leaders for Tomorrow, 245
- Appendix R. Bart Cardon's Epilogue to First CALS History Report, 248

Appendix A. Key Events at a Glance 1950 – 2000

<i>Date</i>	<i>University of Arizona and College Events</i>	<i>External Events</i>
<i>1950s</i>	1951 Richard Harvill becomes UA president 1951 Paul Eckert becomes CALS dean 1952-1959 First CALS International Project – establishing the - University of Baghdad (Iraq) College of Agriculture 1952 Arizona provides first retirement option package for university - employees 1954 UA Institute of Atmospheric Sciences established 1955 Ralph Hawkins becomes CALS dean 1956 Harold Myers becomes CALS dean 1958 Five new UA department heads to increase research focus - - (Biology, Chemistry, Math, Physics, and Psychology) 1958 Kitt Peak National Observatory established	1950 National Science Foundation established 1951 First transcontinental television broadcast- soon replaces radio as - primary mass communication 1953 DNA structure determined (Crick and Watson, and Franklin) – - this begins what we today call “molecular biology” 1954 USS Nautilus launched (first US nuclear submarine) 1954 US Supreme Court rules racial segregation unconstitutional 1955 Jonas Salk developed polio vaccine 1955 Arizona population passes 1 million 1956 Federal Highway Act begins U.S. interstate highway system 1957 First artificial satellite - USSR Sputnik (U.S. in 1958) 1958 First successful U.S. commercial jet airplane (Boeing 707)
<i>1960s</i>	1960 UA Lunar and Planetary Laboratory established 1960s First CALS professors focusing on molecular biology - Al Siegel and Milton Zaitlin, followed by Frank Katterman in 1966 1964 UA Optical Sciences Center established 1964 Office of Arid Lands Studies established 1967 UA College of Medicine established	1960 Oral contraceptive pill approved by FDA 1960 First overhead projector (by 3M Corporation) 1961 Peace Corps established 1963 World population annual growth rate peaks at 2.2% 1964 Civil Rights Act (and 1968) 1966 First Arizona Town Hall study of Higher Education in Arizona 1969 First man walks on moon
<i>1970s</i>	1971 UA Graduate Interdisciplinary Program established 1972 John Schaefer becomes UA president 1973 UA Vice President of Research position established 1973 Gerald Stairs becomes CALS dean 1973 University promotion criteria made more stringent 1976 CALS Office of International Programs established 1978 Darrel Metcalfe becomes CALS dean 1978 UA and ASU join PacC-10 and Leave WAC (athletic conferences) 1979 UA Arizona Research Laboratories established (focusing on - interdisciplinary subjects)	1970 Environmental Protection Agency Formed 1970 AZ bans DDT use in agriculture (U.S. Bans use in 1972) 1972 AZ Constitution Changed: Senators elected by population based - districts rather than by county 1972 Arizona population passes 2 million 1973 First use of Universal Product Code (bar code) 1973 (and 1978) Two OPEC Oil Embargos 1975 Vietnam War ends (began 1959) 1976 Sagebrush Rebellion in western states begins 1979 First spreadsheet (Visicalc) on Apple Computer
<i>1980s</i>	1980 Bart Cardon becomes CALS dean 1980s Mesa farm/citrus farm/cotton center close 1982 Henry Koffler becomes president 1982 -88 Phoenix area university farms sold 1983 Biotechnology funded position filled by Hans Bohnert 1984 First molecular biology/genetics oriented CALS department head - hired (Bill Bowers, Entomology) 1983 Maricopa Agricultural Center established 1986 First College of Agriculture strategic planning effort 1987 Gene Sander becomes CALS dean 1987 UA major revision in mission and scope (Regent’s Requirement)	1980 Arizona Groundwater Management Act 1980 Governor appoints first Arizona Land Subsidence Committee 1981 IBM Personal Computer (milestone in personal computers) 1982 Audio compact disks available (CDs) 1984 Arizona population passes 3 million 1985 Arizona Agriculture: Now and A Vision of the Future Published - (Office of Governor and UA College of Agriculture) 1986 First federal (USDA) approval of field trials for recombinant - DNA (genetically engineered) plants 1987 Southwest Indian Agricultural Association formed 1987 National Research Council published: Agricultural Biotechnology: - Strategies for National Competitiveness
<i>1990s</i>	1991 Manuel Pacheco becomes UA president 1992 Series of Arizona/UA budget reductions begins 1993 Lundgren Center for Retailing established 1993 AgInfo – first college organized website 1994 UA Institute for Study of Planet Earth established 1995 First endowed chair in college (Porterfield, in Plant Sciences) 1997 Peter Likins becomes UA president 1999 Controlled Environment Ag Center (CAEC) established	1990 Human Genome project begins 1993 First graphic web browser (Mosaic) 1993 Arizona population passes 4 million 1995 First USDA deregulated cotton transgenic plant with <i>Bacillus</i> - <i>thuringiensis</i> (Bt) based insect resistance (still regulated by FDA/EPA). 1996 First Mammal Cloned (Sheep in Scotland) 1996 Global Positioning Satellite for Civilian Use 1999 AZ Governor’s Task Force on Higher Education Report
<i>2000s</i>	2000 College name change from COA to CALS 2000 Board of Regents establishes Arizona Virtual University (now - Arizona Universities Network) 2001 BIO5 Institute established (focuses on interdisciplinary research in - 5 colleges (agriculture, engineering medicine, pharmacy, and science) 2002 ABOR Changing Directions Initiative approved (allows - flexibility in universities) 2002 ABOR creates Arizona Biomedical Initiative 2002 UA starts Water Sustainability Program (CALS Dean is director) 2003 ABOR contracts Battelle for Biomedical Studies 2006 Robert Shelton becomes UA president 2006 CALS provides administrative role for UA Outreach program 2007 CALS Dean becomes UA Executive Vice President/Provost 2008 UA first public university to lead Mars mission (Phoenix) 2010 UA series of budget reductions over last several years	2000 AZ Town Hall: Higher Education in Arizona for the 21st Century 2000 Arizona population passes 5 million 2001 Five Shoes Waiting to Drop on Arizona (Morrison Institute) 2001 World Trade Center attack changes US focus to fight terrorism 2002 Arizona Bioscience Roadmap (Battelle Report) 2003 NRC published: Frontiers in Agricultural Research: Food, Health, - Environment, and Communities 2003 Human Genome completely sequenced 2005 Arizona population passes 6 million 2006 U.N. International Year on Deserts and Desertification 2006 One billionth song purchased through Apple iTunes website 2007 IPCC Fourth Assessment Report: Climate Change 2009 General Motors Declares Bankruptcy 2010 Apple iPad is first tablet computer 2010 First synthetic bacterial cell (Craig Venter Institute)

Appendix B. Arizona Agricultural Trends

These trends address significant changes in Arizona Agriculture

Figure 11. Arizona Agricultural Trends: Wheat

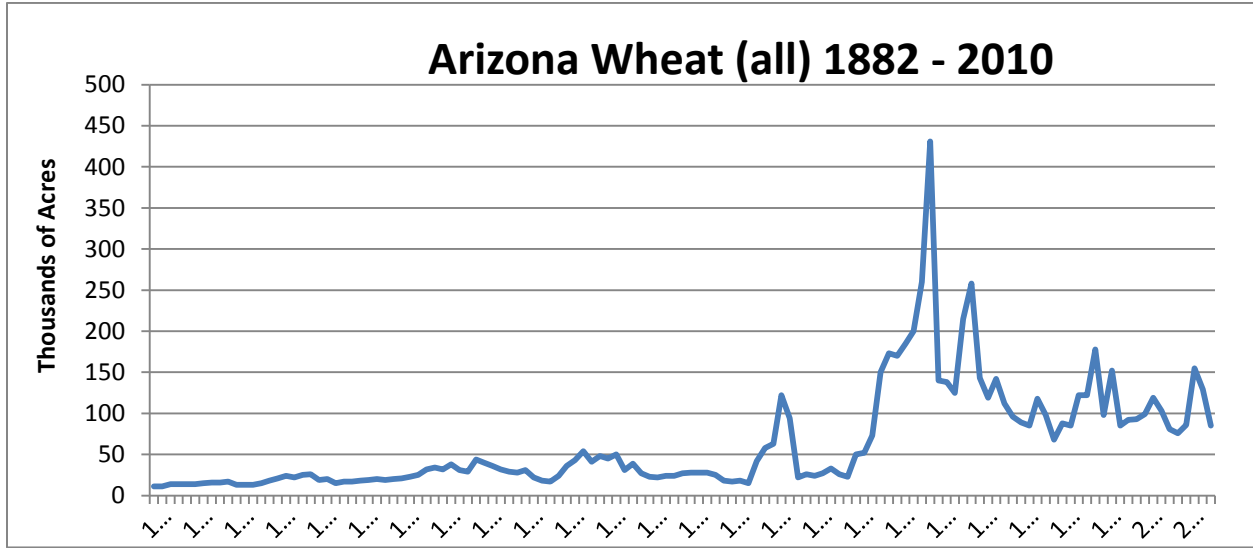


Figure 12. Arizona Agricultural Trends: Cotton

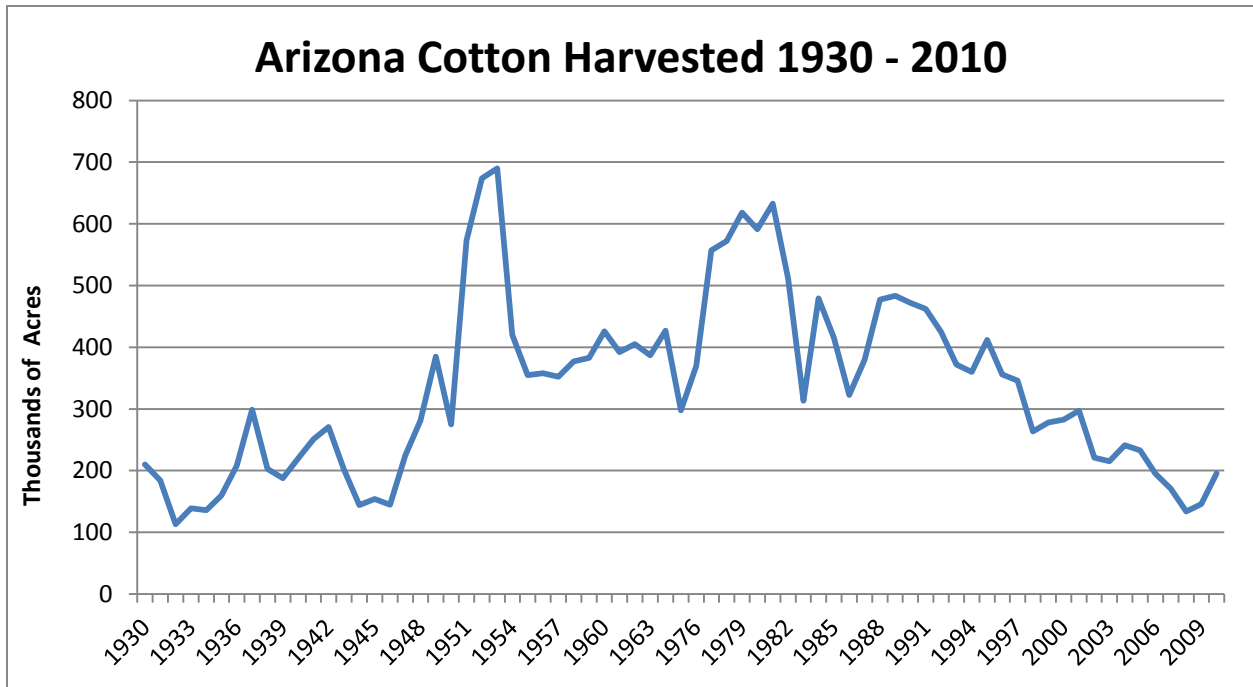


Figure 13. Arizona Agricultural Trends: Hay

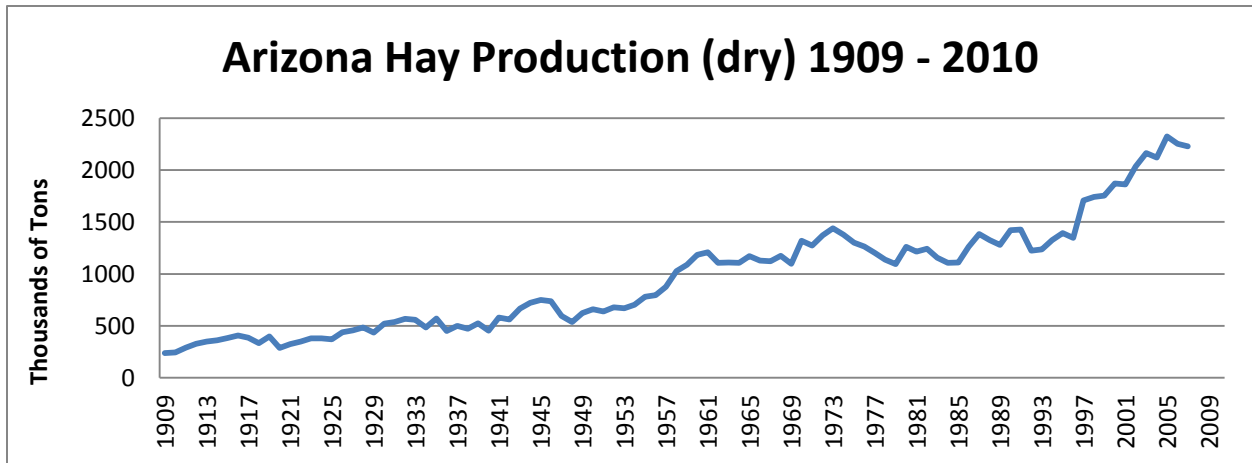


Figure 14. Arizona Agricultural Trends: Milk Cows

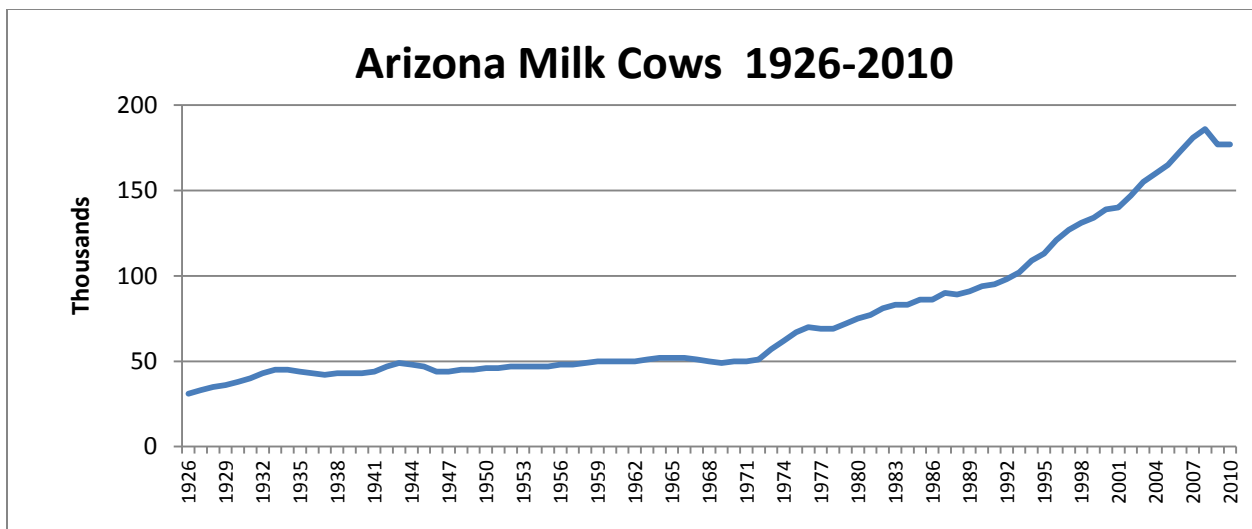
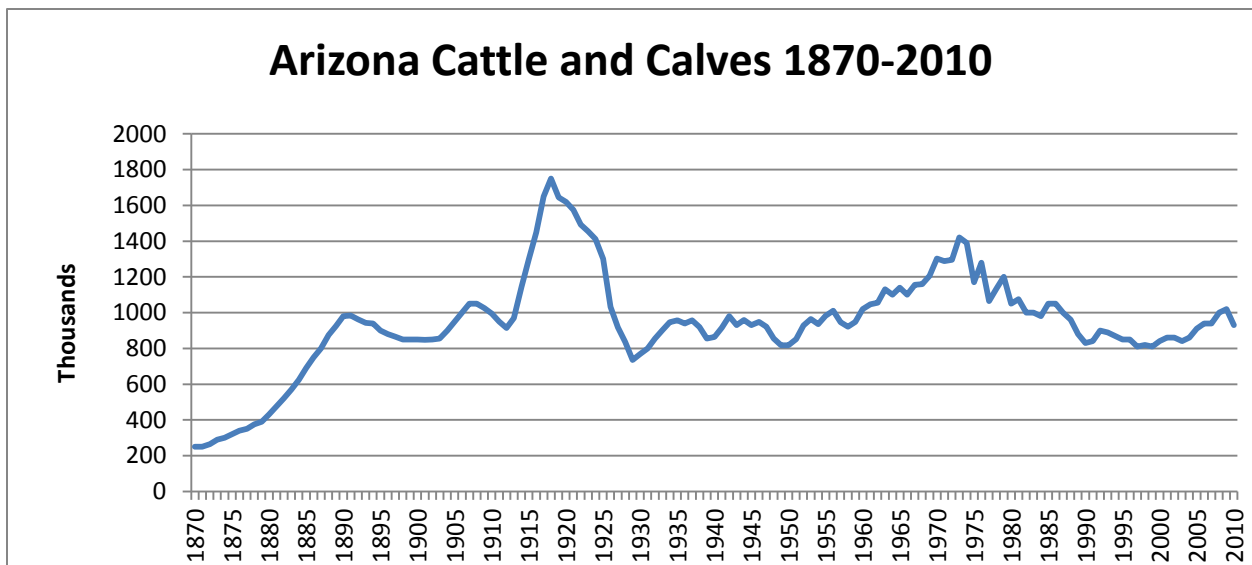


Figure 15. Arizona Agricultural Trends: Cattle and Calves



Appendix C. University Research Funding Availability

Figure 16. Percent Annual Growth for NSF R&D All Universities

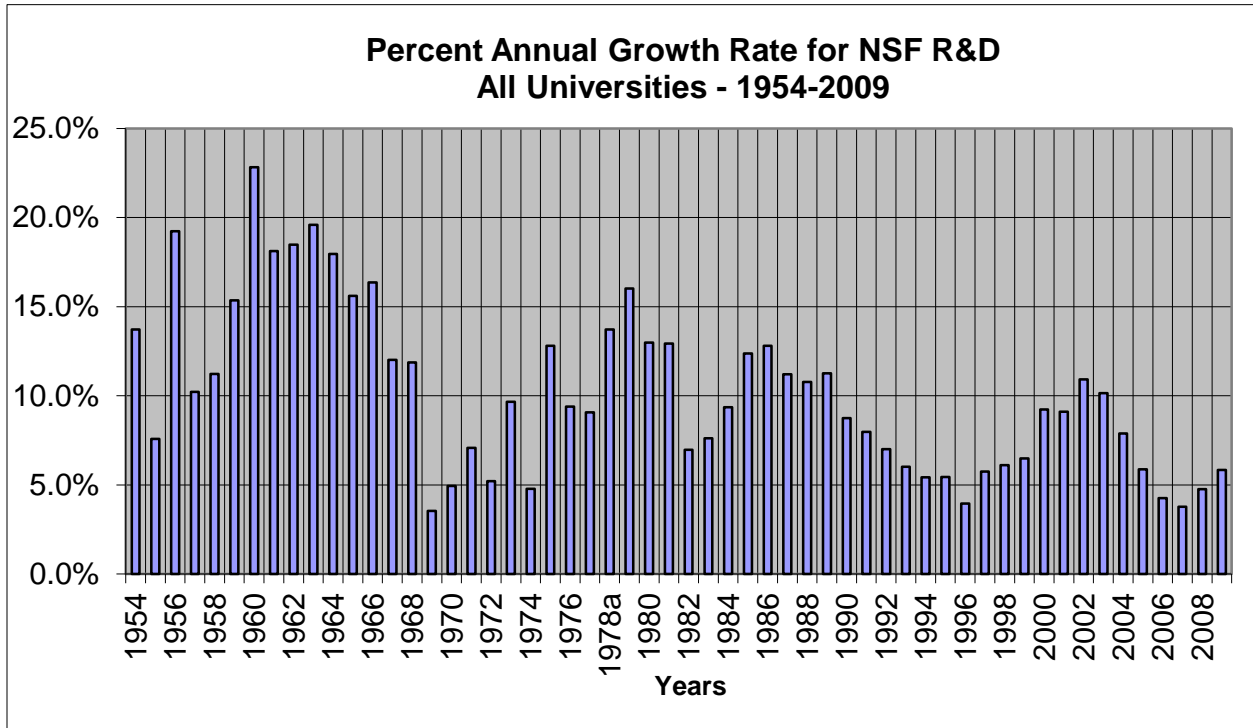
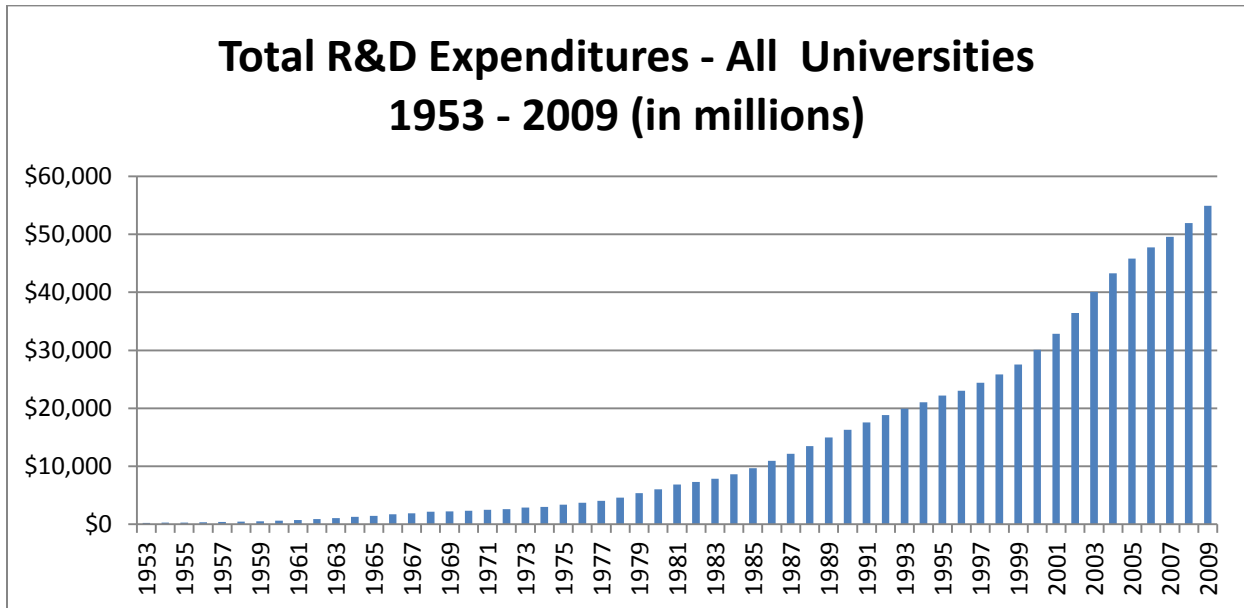


Figure 17. Total R&D Expenditures All Universities



Appendix D. Trends of Societal Change Indicators

Public Law (U.S.) Trends on Four Topics

Congressional laws serve as an indicator of “national interest” in addressing issues, and these laws in turn impact on how federal funds are appropriated, what types of activities take place in a variety of institutions, including universities, and lead to new federal (and often state) agency regulations for implementing the laws.

Source: “The data used here were originally collected by Frank R. Baumgartner and Bryan D. Jones, with the support of National Science Foundation grant number SBR 9320922, and were distributed through the Department of Government at the University of Texas at Austin and/ or the Department of Political Science at Penn State.

<http://www.policyagendas.org/page/trend-analysis> “

Figure 18. U.S. Public Law Trends for Agriculture

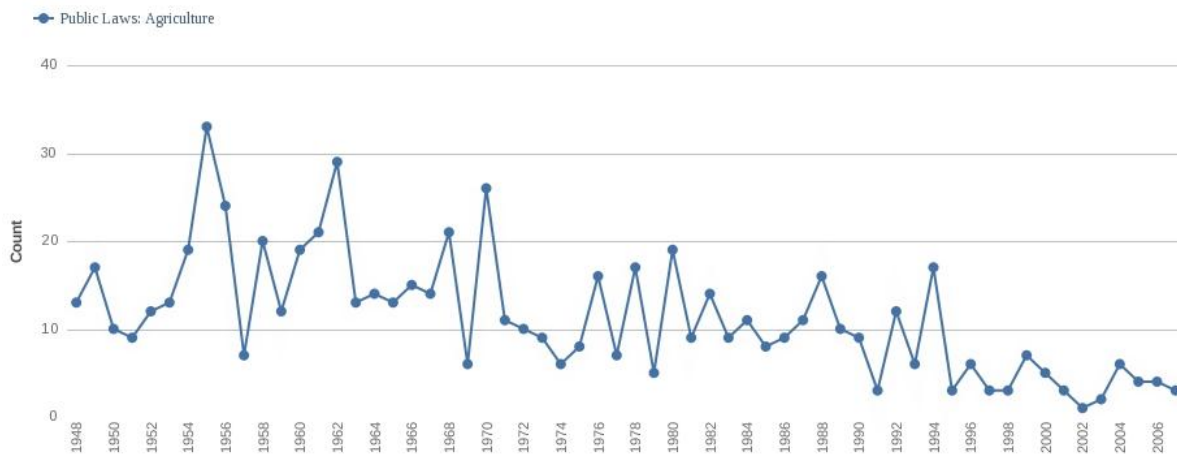


Figure 19. U.S. Public Law Trends for Environment

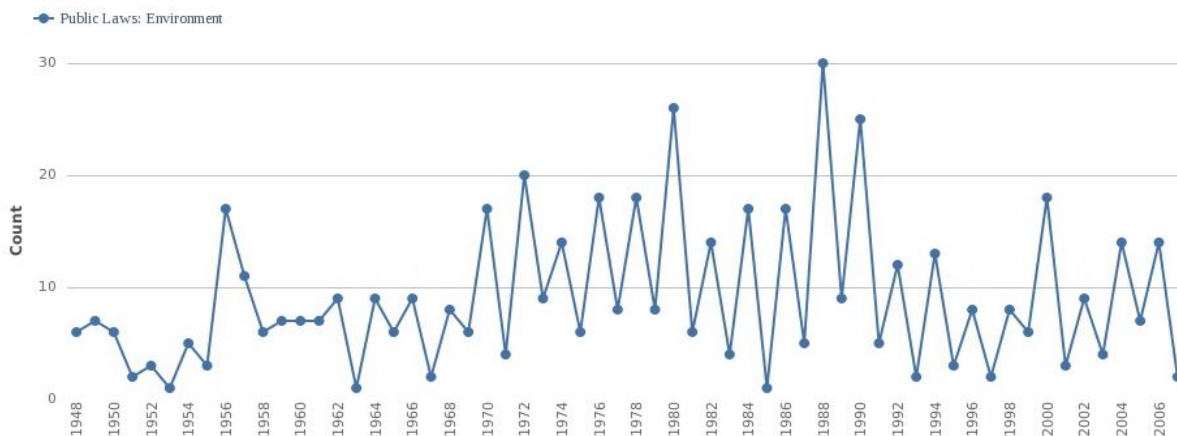


Figure 20. U.S. Public Law Trends on Public Health

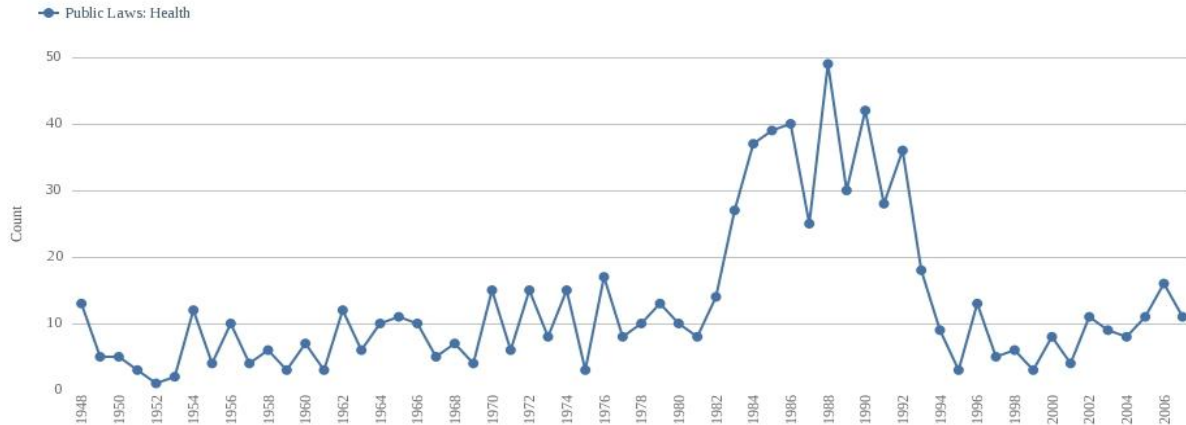
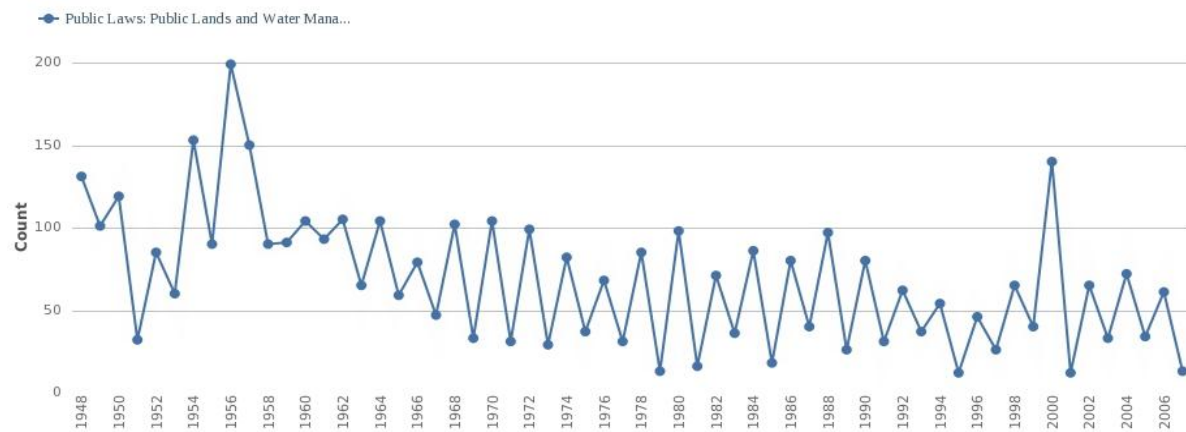


Figure 21. U.S. Public Law Trends for Public Lands and Water Management



Book Publishing Trends on Three Topics

Google has a method for quantifying cultural trends as they are reflected in published books. This process is normalized by the percentage of books with a particular subject compared to the total number of books published in a given year. The data source is the Google Digitized Database. The book listing was compiled in July 2009 and contains over five million books. The data are available through 2008, but Google recommends using 1800-2000 and searching in English for the greatest accuracy. Before 1800 the number of published books is less and more difficult to obtain and after 2000 there were minor changes in how subjects are defined.

Subject Trends in Published Books (from Google Books)

Figure 22. Frequency of Pollution in Books 1900-2000

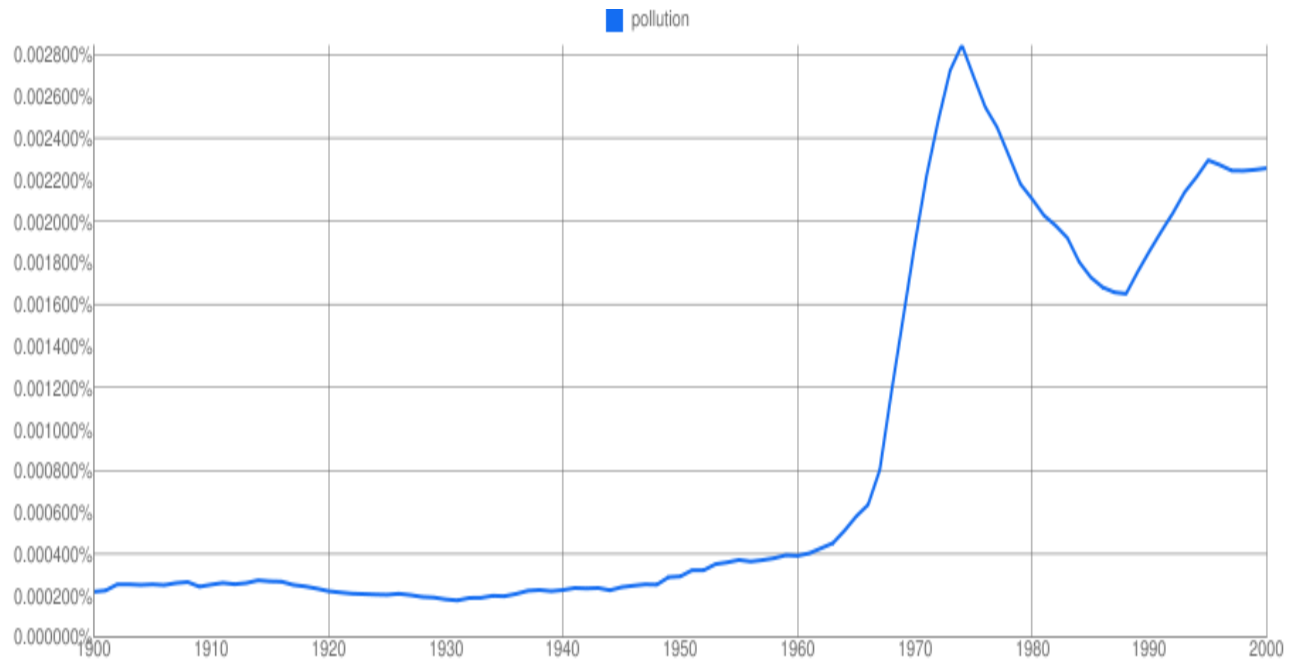


Figure 23. Frequency of Molecular Biology in Books 1900-2000

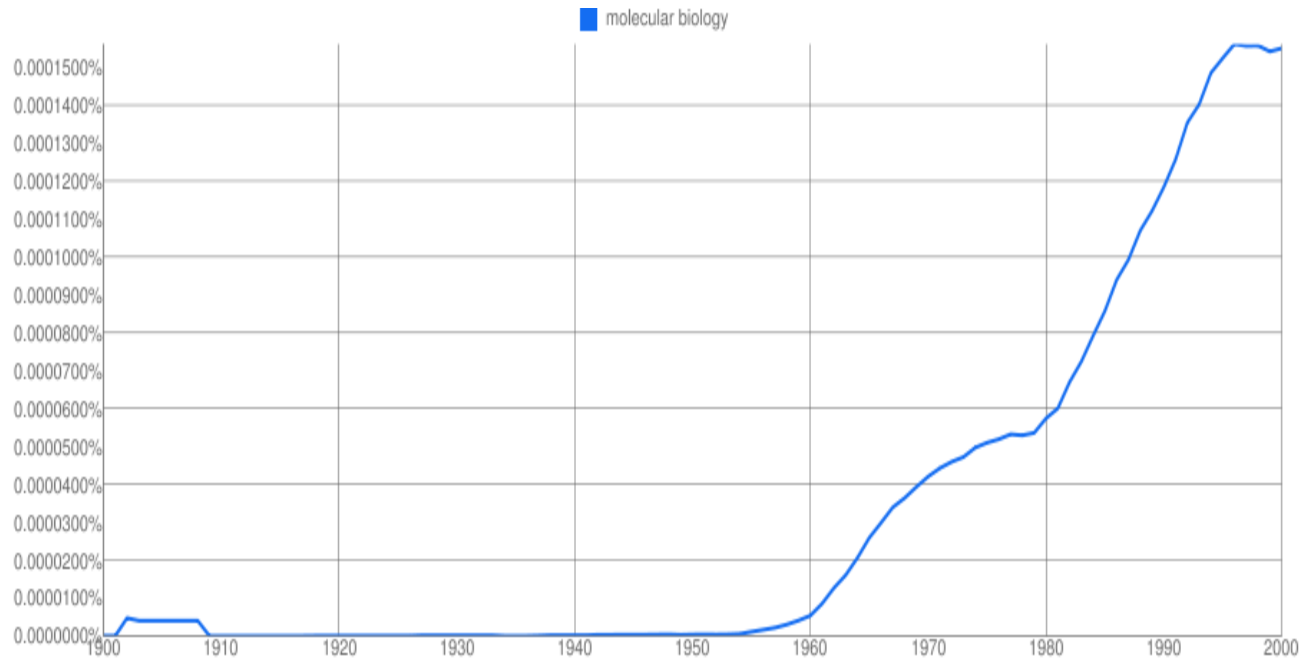


Figure 24. Frequency of Learning in Books 1900-2000

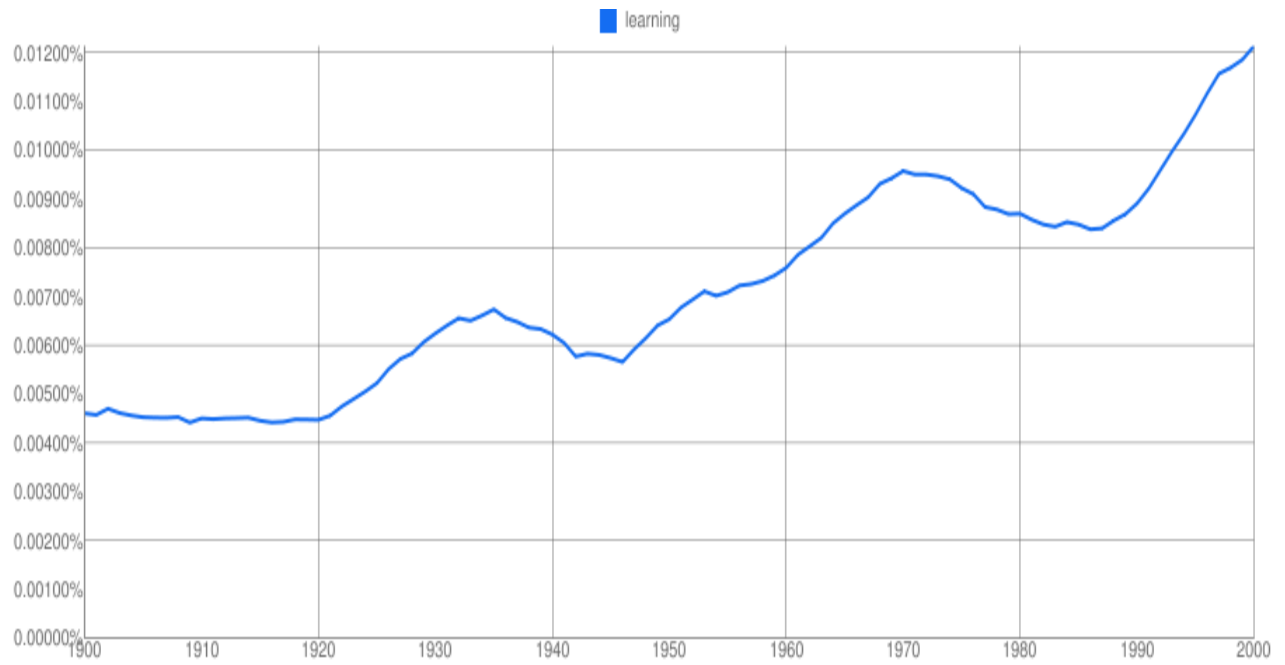
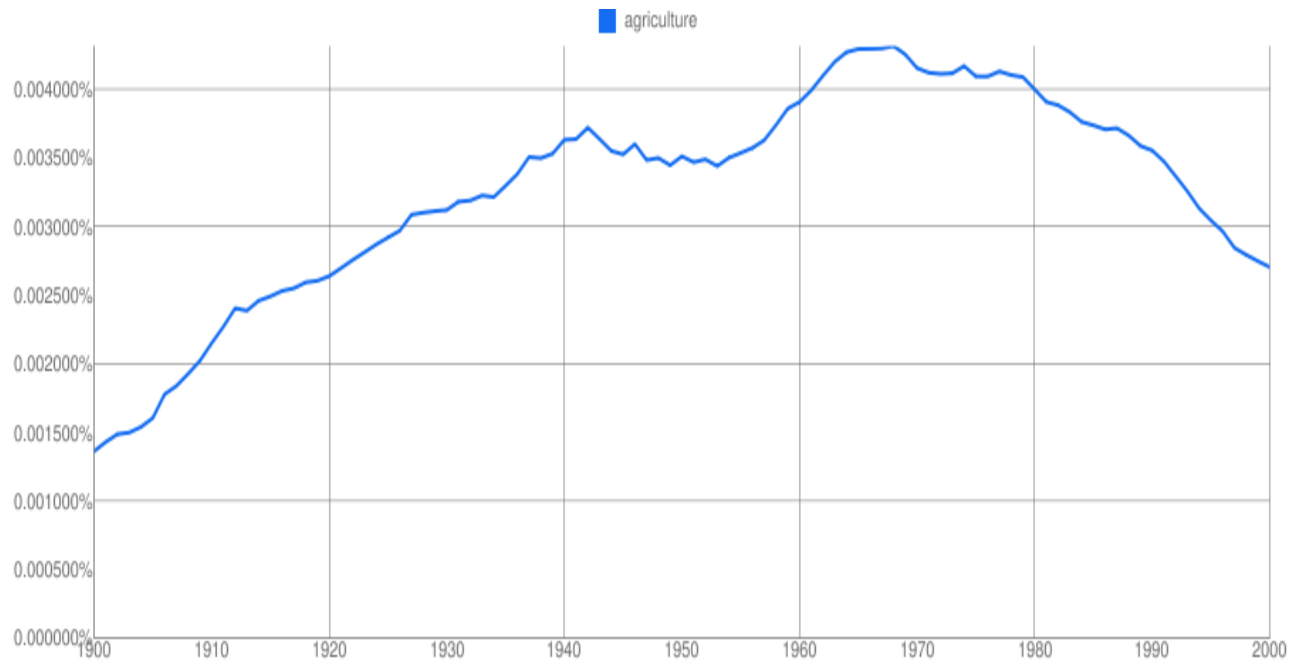


Figure 25. Frequency of Agriculture in Books 1900-2000



Appendix E. Administrative Support Structure and Organization

There is a variety of committees that help in evaluating or supporting various aspects of the College. Those that are more of the policy or advisory type, and meet, regularly are listed below. The role of committees or councils has changed over the years, generally in the direction of having more involvement in College decision making or direction setting. The other change over the years has been an increase in the number of committees and councils. As society changes or as university procedures change, there is always the possibility that there will be another committee. HODs as used below is the Heads of Departments group.

Academic Probation and Disqualification

This committee, which includes an administrator from CALS Office of Academic Programs, is only activated when there is a dispute between a student and a department or school. The committee reviews the information available and issues a recommendation to the dean.

Administrative Council

This group includes the HODs, county extension directors, directors of the agricultural centers, Executive Council, and about five other administrative offices. The total is about 45 and it generally meets at an annual retreat. Topics to be discussed are developed by a committee representing the types of people present.

Alumni Council

The CALS Alumni Council is governed by a board of directors consisting of approximately 32 members drawn from a wide spectrum of alumni throughout the United States. The council fosters and promotes interaction among the CALS students, administration, faculty, and alumni. The council's stated mission is to develop, encourage and sponsor programs that will foster fellowship and mutual benefit among all members and thereby promotes the goals of the council and the college. They meet three times per year: Homecoming, spring and a summer retreat. A second alumni board, the Council of Alumni and Friends of the Norton School of Family and Consumer Sciences, operates independently of the CALS Alumni Council. Gene Sander is the liaison to the Executive Council for the CALS Alumni Council.

Appointed Professionals Council

The council was organized in 2003. CALS APC assists in the process of communicating CALS ap-

pointed professionals issues to the dean and other administrators and provides opportunities to

enhance the future quality of life and work environment for appointed professionals in CALS. There is also a University of Arizona Appointed Professionals Advisory Council. Sandy Pottinger is the liaison to the Executive Council.

CALS Faculty Council

The Faculty Council is made up of all elected faculty senators—including those elected at large—with CALS appointments. They meet with the dean periodically to provide faculty perspectives on current and upcoming issues and concerns. Topics for discussion include issues that come before the Faculty Senate and the college or any other faculty-related topics that would benefit from group discussion. The Council selects its own chair who also serves on the Dean's Advisory Committee.

County Extension Directors Advisory Council

This group is comprised of the extension director from each of the 15 Arizona counties and a Cooperative Extension employee from the Navajo Nation. Liaison for Executive Council to the County Extension Directors: Jim Christenson.

Curriculum Committee

The Curriculum Committee includes faculty active in teaching and advising, representing a broad range of CALS departments and schools as well as Undergraduate and Graduate Council representatives and graduate and undergraduate student representatives. The committee has the following goals:

- Encourage faculty, departmental, and college-wide academic creativity and innovation. As appropriate, encourage interdisciplinary approaches.

- Encourage program initiatives and outreach education to the citizens of Arizona.
- Ensure academic integrity and quality of programs.
- Bring forth issues of special academic concern and opportunity for faculty consideration that can be addressed by faculty task forces.
- Encourage achievement of diversity goals and allowances for special services as approved by university guidelines. Ensure our students academic fairness and equity.
- Encourage an expedient, timely flow of submissions and information exchange. Provide timely recommendations to the director of academic programs and in turn to the dean.

Dean's Advisory Committee

Committee membership includes the Executive Council and representatives from the department heads, county extension directors, Faculty Council, Appointed Professionals, Staff Council, Diversity Committee, Alumni Council, and graduate and undergraduate student representatives. The committee provides overall advice and guidance to the dean and Executive Council on budget and strategic planning matters.

Diversity Committee

Vision: To affect positive change in the CALS community by valuing differences and building respect. Mission: We are a representative team of diverse individuals from CALS united in the fearless goal of highlighting the value of diversity, promoting change through education, recognizing accomplishments in diversity and transferring ideas into action.

Executive Council

This five-member group is comprised of the dean and associate deans for academic programs, research, Cooperative Extension, and CALS Administrative Services. The Executive Council meets weekly and on a monthly basis meets with the campus unit heads. Individual members of the Executive Council serve as a liaison to the major CALS governance councils.

Farm Animal Care

This committee is made up of representatives from the departments of Animal Sciences and Veterinary Science and Microbiology and includes both department heads as ex-officio members.

Heads of Departments Advisory Council

This group includes all administrative heads for on-campus units and numbers approximately 14 units. The HODs meet twice a month; one meeting includes the Executive Council. The head HOD is elected by the group and discussion topics vary widely. Meetings often include presentations by representatives of various offices around the university.

Post Tenure Review Committee

The Post Tenure Review Committee is made up of seven elected faculty who serve staggered three-year terms. Three members represent the biological sciences (Animal Sciences; Entomology; Nutritional Sciences; Plant Sciences; Veterinary Science and Microbiology). Two members each are chosen from the natural sciences (Agricultural and Biosystems Engineering; Natural Resources and the Environment; Soil, Water and Environmental Science) and social sciences (Agricultural and Resource Economics; Agricultural Education; Family and Consumer Sciences). Each year, under the university guidelines for post-tenure review, the committee conducts an audit of the evaluation process for 20 percent of CALS tenured faculty.

Promotion and Continuing Appointment Committee

According to University Handbook on Appointed Personnel (UHAP) guidelines, the committee is made up of faculty with continuing status and primarily includes representatives at full rank. Members are appointed by the dean with consideration for college diversity (geographical location, subject matter, gender, ethnicity, and appointment type) and serve staggered three-year terms. The committee reviews all college requests for promotion and/or continuing status submitted by faculty on the continuing track and submits written recommendations to the dean. Any recommendation of non-retention prior to the mandatory six-year review must also be evaluated by this committee.

Promotion and Tenure Committee

According to UHAP guidelines, the committee is made up of tenured faculty, all of whom are usually at full rank. Members are appointed by the dean with consideration for college diversity (subject matter, gender, and ethnicity) and serve staggered three-year terms. The committee reviews all college requests for promotion and/or tenure (except new hires, which are only reviewed at the departmental

level) and provides written recommendations to the dean. Any recommendation of non-retention prior to the mandatory six-year review must also be evaluated by this committee.

Quality Guidance Council

The Quality Guidance Council is chaired by the vice dean and includes representatives from the department heads, county extension directors, Staff Council, a CALS faculty senator, and the chairs of all sub-teams. Established in 1993, the council provides oversight for the quality improvement process within the college and serves as a review board where procedural difficulties arise in developing or implementing the quality process. The council appoints sub-teams as needed to assess specific areas and recommend changes. Currently active sub-teams include the 1) Communications, and 2) Web-Site Communication and Management teams. The first two teams, in 1993, were Red Tape and Communications. The purpose of the Red Tape team was to remove unnecessary procedures within the College. Its first assignment was to make changes in college procedures for dealing with departmental signature authority relating to university business. Procedures were changed, training was implemented, and the responsibility was delegated from Agriculture Administrative Services to departments. Colin Kaltenbach serves as liaison to the Executive Council.

Sabbatical Leave Committee

This committee is made up of four faculty representing different areas of the college and is chaired by the associate dean for academic programs. According to university policy, the college committee evaluates all requests for sabbatical leave and submits recommendations to the dean.

Staff Council

The Staff Council was organized by members of CALS classified staff with the approval of the dean. Members are appointed by the dean following review of nominations and recommendations by the council. Members serve staggered three-year terms and a representative from the Dean's Office serves as a permanent ex-officio member. An effort is made to reflect diversity within the college. The council's stated mission is to enhance communication between staff and administration regarding the role of classified staff. Members seek to enable staff to improve the quality of their work environment and elevate the morale and spirit of cooperation in

CALS. The Council selects its own chair who also serves on the Dean's Advisory Committee. There is also a University of Arizona Staff Advisory Council with university-wide membership and activities.

State FFA Career Development Field Day

This committee is chaired by the head of the Department of Agricultural Education and is made up of representatives from each department which participates in the field day. The committee plans and coordinates activities for the FFA³³ students who visit the campus annually for this event.

Student Scholarships and Awards

The committee is made up of faculty actively involved with students and includes an administrator from CALS Office of Academic Programs as an ex-officio member. The committee reviews applications and determines awards to be made from the College of Agriculture and Life Sciences scholarship funds available.

University Awards for Citizens

The committee is chaired by the Senior Director for Development and Alumni Affairs and includes representatives from research, extension and teaching. The committee evaluates candidates submitted for award programs for alumni and citizens who are actively involved in or who have strongly benefitted the Arizona agricultural community.

³³ FFA is a national association focusing on students in agricultural fields. It used to be the abbreviation for the Future Farmers of America.

Appendix F. Units Representing College-wide Programs

There are some programs, or websites, that have multiple participating departments. These range from formal units with extensive programs to collections of people interested in a specific subject or need. Some exist as websites and others as “normal” organizations. Departmental abbreviations are defined in Appendix H.

Specialized Centers or Programs

AgData Project

A web portal to bring together a range of agriculture-related data, including weather, watershed, plants, insects, rangelands. Maps and images are included.

Arizona Crop Information Site

Provides visitors with independent, research-based desert crop production and protection information. (Cooperative Extension).

Arizona Pest Management Center

Integrated Pest Management and Pesticide information (Cooperative Extension)

Arizona Remote Sensing Center

ARSC's employs remote sensing and geospatial technologies to solve natural, agricultural and cultural resource problems in the arid and semi-arid regions of the world.

Arizona Plant Diagnostic Network

Website of cooperative effort with University of Arizona, Arizona Department of Agriculture, and USDA Animal and Plant Health Inspection Service. Laboratories for pest identification located in Yuma, Tucson, and several in Maricopa County (Cooperative Extension). Includes links to the herbariums.

Agriculture Network Information Center

AgNIC is a voluntary alliance of over 60 universities and other institutions that organize data focused on agriculture, food and natural resources. University of Arizona has been a long-time member and the Office of Arid Lands Studies has been the primary UA unit involved.

Biodiversity Informatics (BIO5 Institute)

A web portal into the University of Arizona's databases and collections of biological information, including plants, birds, fish, mammals, amphibians, and reptiles, and molecular biology/genomics. Photographs and maps are included. Primarily for those working in these topical areas. (PLS and Department of Ecology and Evolutionary Biology)

Urban Integrated Pest Management

Information directed at urban residents and schools, including learning about the world of insects, spiders, scorpions, plants, and weeds of the southwest (Cooperative Extension)

Water Sustainability Program

The WSP is composed of five UA groups:

- Water and Environmental Technology Center (formerly named the Water Quality Center) in the Soil, Water and Environmental Science Department
- Superfund Research Program
- Water Resources Research Center
- Science and Technology Center for Sustainability of semi-Arid Hydrology and Riparian Areas
- Engineering Research Center for Environmentally Benign Semiconductor Manufacturing

University Units Where CALS Units Cooperate

- Arizona Cancer Center (NSC)
- Bio 5 Institute (ABE, ANS, OALS, ENTO, NSC, PLS, SNRE, SWES, VSM)
- Center for Entomology and Insect Science (ENTO)
- Center for Physical Activity and Nutrition (NSC)
- Center for Toxicology (SWES)
- College of Public Health (NSC)
- Department of Economics (AREC)
- Department of Hydrology and Water Resources (SWES)
- Institute of the Environment (formerly Institute for the Study of Planet Earth) (FCS, SNRE, SWES, WRRRC)
- Program on Economics, Law, and the Environment AREC)
- School of Earth and Environmental Sciences (SWES)
- Southwest Environmental Health Science Center (NSC, ABE)
- Superfund Research Program (SWES, VSM)
- US-Mexico Binational Center for Environmental Sciences and Toxicology (SWES)

State or Federal Government Agencies Affiliated with CALS Department or Schools

- Arizona Department of Agriculture
- Arizona Department of Environmental Quality
- Arizona Department of Water Resources
- Arizona Game and Fish Department
- Boyce-Thompson Arboretum/University of Arizona Desert Legume Program
- Desert Southwest Cooperative Ecosystem Studies Unit (multiple federal and non-governmental agencies)
- USDA Arid Lands Agricultural Research Center³⁴
- USDA Carl Hayden Honeybee Laboratory (ENTO)
- USDA Southwest Watershed Research (SNRE)
- USDA/Southwest Water Research Research Center
- USGS Arizona Cooperative Fish and Wildlife Research Unit
- USGS Sonoran Desert Research Station

College Units that Were Disbanded During 1980-2010

- Council for Environmental Studies
- Computer Applications Group (became part of Educational Communications and Technologies)
- Western Computer Consortium
- Pesticide Training and Information Office
- Center for Quantitative Studies
- Agricultural Communications (became part of Educational Communications and Technologies)

³⁴ The former USDA Water Conservation Laboratory and the USDA Western Cotton Research Laboratory became the USDA Arid Land Agricultural Research Center

Appendix G. Facilities: Campus, Agricultural Centers, Counties

In 1980 there were four campus buildings used by CALS were: they were: Forbes, Biosciences East, Home Economics, and Shantz. Building names are from Ball (Ball, 1986). In 2010 the CALS campus facilities in use were (departments in the building are listed):

Campus Buildings

- Biosciences East Building (Built in 1956 as Biological Sciences; Now Biological Sciences, East)
 - Natural Resources and the Environment
- Cesar Chavez Building (Built in 1952 as Economics; renamed Economic and Business Administration in 1966, and to Cesar Chavez in 2003)
 - Agricultural and Resource Economics
- Forbes Building (Built in 1915 as the Agriculture Building; renamed to Forbes in 1985)
 - Entomology; Plant Sciences, Administrative Functions (Academic Programs, Administrative Services, Agricultural Experiment Station, American Indian Programs, Cooperative Extension, Dean's Office, Development and Alumni, Educational Communications and Technologies)
- Herring Hall (Built in 1903 as Gymnasium)
 - Plant Sciences (Herbarium for Vascular Plants, Mycological Herbarium)
- Keating Bioresearch Building (Built in 2006 for BIO5 Institute).
 - Agricultural and Biosystems Engineering; Animal Sciences; Entomology; Nutritional Sciences, Office of Arid Lands Studies; Plant Sciences; Soil, Water and Environmental Science; Veterinary Science and Microbiology (Departments involved with BIO5 but faculty and staff may not occupy the building).
- Marley Building (Built in 1992)
 - Entomology, Plant Sciences
- McClelland Park Building (Built in 2008)
 - Norton School of Family and Consumer Sciences
- Saguaro (formerly the Family and Consumer Sciences Building and before that, Home Economics). Built in 1959 as Home Economics. Renamed in 1984 as School of Family and Consumer Resources. Renamed to Saguaro in 2009.
 - Agricultural Education; Natural Resources and the Environment (School); Soil Water and Environmental Science
- Shantz Hall (Built in 1962 as Agricultural Sciences, renamed to Shantz in 1985).
 - Agricultural and Biosystems Engineering, Animal Sciences; Nutritional Sciences; Soil, Water and Environmental Science
- Veterinary Science and Microbiology (Built in 1966 as Pharmacy-Microbiology; renamed to Veterinary Science and Microbiology in 1982).
 - Soils, Water and Environmental Science, Veterinary Science and Microbiology

Off -Campus Buildings (Tucson)

International Agriculture Programs, Office of Arid Lands Studies; Soil, Water and Environmental Science; Water Resources Research Center

Agricultural Centers

Campus Agricultural Center

This is a 180-acre mixed use facility that provides teaching space and facilities for several departments in addition to the plant and livestock operations. It also houses the following units,

- Pima County Cooperative Extension Office
- CALSMart Publications Distribution Center
- Controlled Environment Agricultural Center
- Karsten Turfgrass Research Facility
- Meats Sciences Complex and Laboratory
- Greenhouse Facilities at the Agricultural Center and on Campus (on top of a parking garage)
- Horse Center
- Lysimeter Facility
- William J. Parker Agricultural Research Complex (ARC)

Maricopa Agricultural Center (and Demonstration Farm)

Research focuses on cotton, small grains, alfalfa, and new specialty crops that could be used to provide fibers, oils, and pharmaceuticals. The Center also supports extension outreach programs, such as Ag-Ventures, various University classes, and Ag-Literacy for all age groups. See Chapter 23 for more detailed information.

Red Rock Agricultural Center

Currently under constitution on land leased from the State Land Department. The land was originally acquired in the late 1970s and is dedicated to energy and bioenergy activities. It is located north of the Marana Air Park.

Safford Agricultural Center

A 63-acre center in a unique climatic area.

Santa Rita Experiment Range

This unique facility was established in 1902 by the U.S. Department of Agriculture and is the oldest experimental range in the country. It is over 80 square miles and ranges in elevation from 3,000 to 4,500 feet. Parts of the rangeland have been excluded from grazing since 1903 and part of the land is contiguous to a Wilderness Area in the Santa Rita National Forest, which extends the elevation range to 9,000 feet. Activities include studies on the changes in vegetation over long time periods, livestock management options, and landscape management alternatives. In 1987 the College of Agriculture and Life Sciences took over management of the SRER from USDA. It is listed as a field station by the Organization of Biological Field Stations. The Santa Rita Experiment Station is jointly managed by the Agricultural Experiment Station and the School of Natural Resources and the Environment.

V Bar V Ranch

In January 1995, The University of Arizona College of Agriculture and Life Sciences acquired the V Bar V Ranch from Ben and Betsy Zink on a gift/purchase basis. The acquisition was made possible through the use of private funds provided by College supporters and the UA Foundation.

Today, the 77,000-acre Center continues as a working cattle ranch and serves as an educational and demonstration facility focusing on environmental, wildlife and domestic livestock issues in Arizona and the Southwest. Vegetation zones, including high desert chaparral, pinyon-juniper, and pine, are typical of those on most of the commercial ranches in central and northern Arizona.

The V Bar V Ranch was formed in 1927, when the 100 Place and a number of smaller holdings, including one owned by the Bradford family, originators of the V Bar V brand, were bought and incorporated into the V Bar V Cattle Co.

West Campus Agricultural Center

Used to be a poultry farm and it now houses the Veterinary Diagnostic Laboratory and the Aquaculture Pathology Research Program of the Department of Veterinary Science and Microbiology, and a feedlot for Animal Sciences and agronomic plots for Plant Sciences. .

Yuma Agricultural Centers

The Yuma Agricultural Center has two sites: a Valley farm four miles west of Yuma and a Mesa Farm four miles south of the city. The 274-acre Valley Farm includes a diversified range of crops, including cotton, small grains, and such vegetables as lettuce and broccoli. The 240-acre Mesa Farm is focused on citrus production.

County Extension Offices

All counties have at least one extension office and several have satellite offices, offices on Indian Tribal Reservations, or a working relationship with an office on Indian Tribal Reservations.

- Apache – Office in St. Johns
- Greenlee – Office in Duncan
- Pima – Primary office in Tucson with an office in Green Valley
- Cochise – Primary office in Willcox with offices in Bisbee and Sierra Vista
- La Paz – Office in Parker
- Pinal – Office in Casa Grande
- Coconino - Office in Flagstaff
- Maricopa – Office in Phoenix
- Santa Cruz - Office in Nogales
- Gila – Primary office in Globe with offices in Payson and the San Carlos Apache Tribe
- Mohave – Primary office in Kingman with an office in Peach Springs
- Yavapai – Primary office in Prescott and office in Verde Valley
- Graham – Office in Solomon
- Navajo – Primary office in Holbrook with offices in Pinetop and the Hopi Tribe (in Kykotsmovi)
- Yuma - Office in Yuma

Cooperative Extension Offices in Tribal Communities

- Colorado River Indian Tribes - Parker
- Hopi Tribe – Keams Canyon
- Hualapai Nation – Peach Springs
- Navajo Nation – Shiprock, Tuba City, and Window Rock
- San Carlos Apache Tribe – San Carlos

Appendix H. Descriptions of Specialized Units

The academic departments have a number of specialized units within the department. These specialized units were listed under the department descriptions and histories (Chapter 13) and are described in this appendix. Each specialized unit has the abbreviation of the relevant department(s) where it exists. The web site (as of April 2011) is listed for each unit entry.

Some university-wide special units are not listed as they are central resources for everyone. These include the University Library, University Information Technology Services, and the Arizona Research Laboratories.

Abbreviations

Each specialized unit listed below has a code for which department or school has the unit. The department and school abbreviations are those used in the University of Arizona Course Catalog:

- Agricultural and Biosystems Engineering (ABE)
- Agricultural and Resource Economics (AREC)
- Agricultural Education (AED)
- Animal Sciences (ANS)
- Entomology (ENTO)
- Norton School of Family and Consumer Science (SFCS)
- Nutritional Sciences (NSC)
- School of Natural Resources and the Environment (SNRE)
- School of Plant Sciences (PLS)
- Soil, Water and Environmental Sciences (SWES)
- Veterinary Sciences and Microbiology (VSM)

CALS Departmental Specialized Units

Advanced Resource Technology Group (SNRE)

ART was formed in 1988 to provide leadership in new areas of Geographic Information Systems related to agriculture, natural resources, and rural development. <http://cals.arizona.edu/art/>

Aquaculture Pathology Laboratory (VET SCI)

Focuses on diseases of cultured shrimp and provides diagnosis and short courses on diagnostic techniques. <http://microvet.arizona.edu/research/aquapath/index.htm>

Arizona Crop Improvement Association (PLS)

This is not a formal University of Arizona unit, but closely affiliated with the College of Agriculture and Life Sciences. The Association is not a marketing agency but is designated as an official seed certifying agency under Arizona law. The purpose of seed certification is to maintain and make available to the public high quality seed. <http://www.arizonacrop.org>

Arizona Crop Information Site

This is a website rather than an organization. It contains information on crops, pests, pesticides, weather, and irrigation. It contains images of insects, disease responses, and drip irrigation. Upcoming events and past presentations are listed. <http://cals.arizona.edu/crops>

Arizona Genomics Institute (PLS)

The institute was formed in 2002 and is within the School of Plant Sciences. It focuses on the structural, evolutionary, and functional genomics of crop plants, with a main emphasis on cereals. <http://www2.genome.arizona.edu/welcome>

Arizona Laboratory for Emerging Contaminants (SWES)

Focuses on the field of water sustainability. The lab assists faculty, staff, and students in detecting, quantifying, and identifying organic and inorganic micro-pollutants. <http://alec.arizona.edu/>

Arizona Meteorological Network (SWES)

AZMET began full operation in 1986 as an automated weather data collection network. In 2010 there were 28 stations operating in both rural and urban settings. Data are collected at the sites and around midnight the AZMET office computer collects the data from each site (using FIDO, an early but efficient method for doing this). The weather data are used by a variety of crop producers, golf courses managers, and municipal governments. Cooperating agencies include: Arizona Department of Water Resources, Arizona Municipal Water Users Association, U.S. Bureau of Reclamation, U.S. Geological Survey, university departments, water conservation programs, and city water companies. <http://ag.arizona.edu/azmet>

Arizona Pest Management Center (ENTO)

Focuses on Integrated Pest Management for agriculture, urban communities, and natural areas. Partners with the Western IPM Center and the Arid Southwest IPM Network. <http://cals.arizona.edu/apmc/>

Arizona Plant Diagnostic Network (ENTO, PLS)

APDN is designed to link growers and master gardeners with plant experts in CALS. It is a cooperative effort of the USDA Animal and Plant Health Inspection Services, Arizona Department of Agriculture, and the University of Arizona. It coordinates with the Western Plant Diagnostic Network and the National Plant Diagnostic Network. Information includes names of CALS faculty involved in diagnosing pests and pathogens. Also includes all “alerts” (for Arizona and other states) and how people can volunteer to become certified to identify pests and pathogens. <http://cals.arizona.edu/azpdn>

Arizona Veterinary Diagnostic Laboratory (VSM)

Primarily a diagnostic support facility for Arizona veterinarians and producers. Typical laboratory disciplines are pathology, microbiology, immunology, and toxicology. <http://microvet.arizona.edu/AzVDL>

Boyce Thompson Arboretum (Experiment Station)

Located on 320 acres near Superior, Arizona, the arboretum is a State Park and serves to instill an appreciation of plants through educational, recreational, research, and conservation opportunities associated with arid-land plants. It is a cooperative effort of the Boyce Thompson Arboretum, the Arizona State Parks Board, and the College of Agriculture and Life Sciences. The arboretum began in the mid-1920s and in the mid-1960s it formed a bilateral management agreement with the University of Arizona. In 1972 the State Parks Board joined the agreement and the arboretum became a State Park. It is still managed as a trilateral agreement. In 1979 the arboretum began publishing a journal “Desert Plants”; while it is self-supporting, a number of college faculty have published papers through the semiannual journal. <http://arboretum.ag.arizona.edu>

Campus Arboretum (PLS)

In 2002 the University of Arizona Campus Arboretum became a member of the American Association of Botanical Gardens and Arboreta. The “arboretum” is the campus – with maps and walks available to see the range of plants. <http://arboretum.arizona.edu>

Center for Environmental Physics and Mineralogy (SWES)

Combines expertise from fields of environmental physics, mineralogy, and soil sciences with new technologies to characterize the physical and mineralogical nature of the earth’s surface and other porous materials.

Center for Physical Activity (NSC)

Studies the long-term effects of physical activity and nutrition related to community health and wellness programs for children, adolescents, and men and women of all ages. Administered by Department of Nutritional Sciences in cooperation with the College of Medicine Department of Physiology.

Center for Rural Leadership (Project CENTRL)

A program to assist leaders to expand their leadership skills in meeting the needs of rural people in public affairs. Incorporated in 1981 it was formed by the University of Arizona Cooperative Extension and now operating as an independent group but partners with the University. The two-year class experience involves about 30 people/class. <http://centrl.org>

Clostridial Enteric Disease Unit (VSM)

A veterinary laboratory that can culture and identify microbial contamination by Clostridium species.

Controlled Environment Agriculture Center (ABE, PLS)

CEAC began in 1998 and is jointly operated by the Department of Agricultural Biosystems Engineering and the School of Plant Sciences. Controlled Environment Agriculture is defined as an integrated science and engineering based approach to provide specific environments for plant productivity while optimizing resources including water, energy, space, capital and labor.

Desert Research Unit (SNRE)

A program that works with several departments in the College of Agriculture and Life Sciences, other colleges in the University of Arizona, state and local agencies, and non-profit groups to study impacts of contaminants on desert lands, aquifers, and irrigation systems.

Environmental Research Laboratory (SWES)

The ERL performs a range of activities related to environmental research and education in arid regions. Includes the laboratory facilities of the National Foundation Water and Environmental Technology (WET) Center. Includes the Water Village (studies influence of distributions systems on household water quality at the tap). Focuses on physical, chemical, and microbial processes that affect the quality of subsurface and surface waters that are used as potable water supplies. There was an earlier UA unit named the Environmental Research Laboratory. That organization changed leadership and focus, and moved to become a unit within the SWES department in 1995.

Equine Center (ANS)

The center includes both Quarter Horses and Thoroughbred horses. Students get experience in preparing, showing, and marketing horses, and study new reproductive technologies. It is located at the Campus Agricultural Center. <http://animal.cals.arizona.edu/equine/index.html>

Extension Arthropod Resistance Management Laboratory (Cooperative Extension)

To understand the long-term development and maintenance of insect resistance management programs, covering both natural and chemical pesticides.

Herbarium - Mycological (PLS)

The Gilbertson Mycological Herbarium houses over 40,000 specimens of fungi and fungus-like organisms. Holdings are global in origin but with a special focus on macro fungi of Arizona and the southwestern United States. <http://ag.arizona.edu/mycoherb>

Herbarium – Vascular Plants (PLS)

Formally identified as the University of Arizona Herbarium, it houses the world's largest collection of plants from Arizona and Sonora, Mexico, with over 400,000 specimens. <http://ag.arizona.edu/herbarium>

Karsten Turfgrass Research Facility (PLS)

Located at the Campus Agricultural Center since 1991, the 7.5 acre facility has research plots that include U.S. Golf Association specification putting greens, and instrumentation through the Lysimeter Facility to study water use and weather effects on grass maintenance. The primary irrigation source is tertiary effluent from the City of Tucson.

Lysimeter Facility (SWES)

The lysimeter facility allows for precise field measurements of hourly and daily water use by plants. The lysimeters are large underground containers placed below ground scale, such that the container surface is

Frances McClelland Institute for Children, Youth, and Families (SFCS)

Cross-disciplinary research on children, youth and families that relates to their well-being.
<http://mcclellandinstitute.arizona.edu>

Meat Sciences Laboratory (ANS)

A USDA-inspected processing facility with full harvesting capabilities, meat lockers, and an interactive auditorium/classroom for demonstrations and instruction in meat science and food safety.

Natural Products Center (SNRE)

The center began in 1996 and focuses on Sonoran desert plants and their associated microorganisms for development of drugs or as an alternate agricultural systems for desert environments.

Page-Trowbridge Ranch (Experiment Station)

This has also been referred to as the Page Ranch or the Oracle Agricultural Center. It was closed in 1986 but remains University of Arizona Property. Some early CALS experiments were conducted at the Ranch but it eventually became used by the University as a landfill. It is now closed for use.

Parker Agricultural Research Center (ANS)

The Center is a one-of-a-kind environmental control facility with capabilities for varying temperature levels or cycles, solar radiation intensity and cycles, and individual rooms for these controlled studies. Variations in these factors can be studied through the expression of over 20,000 individual genes in cattle and sheep.

Sonoran Desert Station for Arthropod Research (ENTO)

The "Desert Station" was established in 1991 with gifts of land (300 acres) given under restrictive deeds for use exclusively as a biological research preserve. Additional gifts increased the size to 414 acres. Other large-parcel acreage, contiguous to its northern boundary, have been bequeathed to the University of Arizona for later inclusion in the preserve. The Desert Station, about 11 miles northwest of the University of Arizona main campus, is pristine lower Sonoran Desert land of variable relief and exposure in the foothills of the Tucson Mountains. No facilities are currently available on site.

Santa Rita Experimental Range (Experiment Station)

This Experimental Range was established in 1902 by USDA and transferred to the University of Arizona in 1987. It is managed by CALS and is a member of the Organization of Biological Field Stations. It is the oldest experimental range in the country and has data back to 1903. It was initially used for grazing studies but also now includes general environmental studies.

Statistics Consulting Laboratory (ABE)

This is a unit of the Department of Agricultural Biosystems Engineering and is available only to people within the department.

Take Charge America Institute for Consumer Financial Education and Research (SFCS)

To improve financial literacy and help consumers to make informed financial choices, with a focus on educating young people as they move into adult life. <http://tcainstitute.org/>

Terry J. Lundgren Center for Retailing (SFCS)

Research and teaching for retail and other consumer-oriented businesses and outreach relating to economic and social benefits to U.S. and global consumers. <http://terrylundgrencenter.org>

Tree of Life Web Project (Phylogenic Tree) (ENTO)

The project database was originally hosted on College of Agriculture and Life Sciences computers and developed by David and Wayne Maddison when they were at the University of Arizona (both have left). In 2002 the database was moved to the University of Arizona Library and had grown to include many other sites. The project has many contributors from all over the world, and pre-dated Wikipedia by four years. It can be used and accessed by anyone for learning of all types. The Maddison's are no longer at the University of Arizona.

University of Arizona Insect Collection (ENTO)

This unit has three components: 1) A physical collection of insect specimens used for research, identification and teaching purposes, 2) an online database where researchers can review information and make requests for more information, and 3) an Insect Identification Service that can be used by anyone to identify insects. All questions sent to the Department of Entomology regarding insect identification are referred to the Collection unit. The Collection is located in the Forbes Building.

Water and Environmental Technology Center (SWES)

Focuses on immediate questions of potable water quality, water security, and contaminants from agriculture, commercial, and industrial sources. Formerly named the Water Quality Center. It operates within the Environmental Research Laboratory.

Water Quality Center Laboratory (SWES)

Provides chemical analyses of water, soils, wastes, and plant materials. It is used for teaching, research and extension programs. It is part of the Environmental Research Laboratory, which is part of the Department of Soil, Water and Environmental Science.

Water, Society, and Policy Program (SNRE)

Special multidisciplinary degree program for students to understand basic principles of hydrology, social science, management, law, and policy.

Appendix I. Listing of Administrative Unit Directors or Heads

The department head entries are duplicates of those entered in Chapter 13, the “Perspectives of Academic Departments Heads and Schools.” For other administrators, the if the incumbent was in office before 1980, that is indicated with an ? in place of a beginning date. Administrators don’t always take office at the beginning of a fiscal year. The years given are the ones close to hiring and leaving dates, and may be off by one year depending when the person was hired.

Dean

Eugene G. Sander, Vice Provost and Dean, 2009-Current
Colin Kaltenbach, 2007-2008
Eugene G. Sander, Vice Provost and Dean, 1992-2006
Eugene G. Sander, Dean, 1987-1991
Bartley P. Cardon, Dean, 1980-1987
Darrel S. Metcalfe, 1978-1980

Vice Dean and Director of Agricultural Experiment Station

Colin Kaltenbach, 1989-Current
Pete Dewhirst, 1976-1989

Associate Directors, Agricultural Experiment Station

Joe Hiller, 2008-Current
Paul Krausman, 1996-2007
Merle Jensen, 1988-2003
George Ware, 1981-1996
R. Philip Upchurch, 1991-1993

Associate Dean and Director of Academic Programs

David Cox, 1996-Current
David Shoup, 1993-1996
William Hannekamp (Acting 1990-1993)
John Law, 1988-89
R. Phillip Upchurch, 1983-1988
Bart Cardon, 1982-83
Darrel S. Metcalfe, 1958-1982

Associate/Assistant Director Academic Programs

Elaine Marchello, 2008-Current
Paul Kohn, 2000-2004

Associate Dean and Director, Cooperative Extension

James Christenson, 1989-Current
Roy Rauschkolb, 1981-1987
Craig Oliver, 1980-1981
Darrell Metcalfe, 1978-1980

Associate, Deans, Assistant Directors, or Program Directors, Cooperative Extension

Linda Houtkooper, 2008–Current	Associate Director, Programs (half time)
Edward Martin, 2007–Current	Associate Director, Programs (half time)
Deborah Young, 2004-2007	Associate Director, Programs
Deborah Young 1997-2007	Associate Director, Programs

James Wade, 1994-1996	Associate Director, Programs
Shirley O'Brien, 1994-2004 Shirley O'Brien, 1990-1993	Associate Director, Operations Assistant Director, Operations
Nancy Huber, 1990-1993 Robert Lovan, 1980-1981	Assistant Director, Community Leadership/Resource Development Program Director, Community Development
Cy Card, 1992-1993 Roger Huber, 1988-1990 Roger Huber, 1986-1988 Curtis Cable 1982-1985 James Williams, 1980-1981	Assistant Director, Agriculture and Natural Resources Assistant Director, Agriculture and Natural Resources Program Director, Agriculture and Natural Resources Program Director, Agriculture and Natural Resources Program Director, Agriculture and Natural Resources
Ellen Goldsberry, 1990-1993 Shirley O'Brien, 1988-1989 Shirley O'Brien, 1986-1988 Robert Rice, 1985 Nancy Harries-Belck, 1980 Norma Redeker, 1982-1984	Assistant Director, Home Economics Assistant Director, Home Economics Program Director, Home Economics Program Director, Home Economics Program Director, Home Economics Program Director, Home Economics
Kirk Astroth, 2008-Current Lisa Lauxman, 2006-2007 William Peterson, 1995-2005 Frank Williams, 1990-1993 Beryl Burt, 1988-1989 Beryl Burt, 1984-1988 Howard Jones, 1981-1982	Assistant Director, 4-H Assistant Director, 4-H Assistant Director, 4-H Assistant Director, 4-H Assistant Director, 4-H Program Director, 4-H Program Director, 4-H
Ray Weick, 1981-1989 Howard Jones, 1983-1989 James Williams, 1982-1983	Regional Director, West Counties Regional Director, East Counties Regional Director, East Counties

Associate Dean /Assistant Dean, Administration and External Affairs

Michael Proctor, 2006-2009

Associate Dean or Director of Administrative Services (or its earlier office names)

Edward Frisch, 1974-1987
Patricia St. Germain, 1987-1988
Gordon Johnson, 1988-2002
Alma Sperr, 2002-2010
Sandy Pottinger, 2010-Current

Assistant Dean of Administrative Services

Gordon Johnson, 1991-1993
Alma Sperr, 1998-2002
Sandra Pottinger, 2004-2009

Special University Administrative Assignments (while still having a position in CALS)

Jimmye Hillman, Director, International Agriculture
Eugene Sander, Executive Vice President and Provost, 2007-2008
Eugene Sander, Vice President for Outreach, 2006-2009

David Cox , Vice Provost for Instruction
David Cox, Associate Vice President Outreach 2007-2008
David Cox, Executive Director, Continuing Education and Academic Outreach
James Christenson Associate Vice President Outreach, 2006-current
Alma Sperr, Associate Vice President Outreach
Paul Kohn, Acting Director of Admissions
Paul Kohn, Assistant Vice President Admissions and Financial Aid
Michael Proctor Associate Vice President for Outreach, 2008-2009
Roger Caldwell, Coordinator, Information Systems and Communications 1984-1985
Roger Caldwell, Special Assistant to University Telecommunications 1988-89
Roger Caldwell, University Energy Coordinator 1978-79

Boyce Thompson Arboretum (as Director)

Mark Siegwarth, 2010-Current
Mark Bierner, 2006 -2008
William Feldman, 1985- 2005
Robert McKittrich, 1965–1985

Department Heads

Arid Lands Studies (Office)

Charles Hutchinson, 2004-2009
Kennith Foster, 1983-2004
Jack Johnson, 1971–1983
(OALS became part of School of Natural Resources and the Environment in 2009)

Agricultural Biosystems and Engineering

Mark Riley, 2008-Current
Don Slack, 1991-2008
Gene Nordby, 1986-1991
Wilford Gardener, 1980-1985 (when Department was Soils, Water and Engineering)

Agricultural and Resource Economics

Gary Thompson, 2006-Current
Alan Ker, 2002-2006
Bruce Beattie, 2001-2002
Dennis Cory, 1997-2001
Bruce Bettie, 1990-1996
Jimmy Hillman, 1961-1990

Agricultural Education

Robert Torres, 2010-Current
James Knight, Acting 2010
David Cox, Interim, 2008
John Elliot, 2005-2008
James Knight, 2001-2005
Roger Huber, 1990-2001
Floyd McCormick, 1967-1989

Animal Sciences

Ronald Allen, 2006-Current
Robert Collier, 2002-2005
Roy Ax, 1991-2001

Bobby Reid, 1989-1990
Brent Theurer, 1983-1988
Richard Rice, 1975-1982

Entomology

Bruce Tabashnik, 1996-Current
David Byrne, Acting 1995-1996
Henry Hagedorn, 1994-1995
Elizabeth Bernays, 1989-1993
William Nutting, Acting 1988
Roger Huber, Acting 1987
William Bowers, 1984-1987
Larry Crowder, Acting 1984
George Ware, 1967-1983

Family and Consumer Sciences (Norton School)

Soyeon Shim, 2000-Current
Rodney Cate, 1995-1999
Jerrelyn Schultz, 1991-1994
Victor Christopherson (Acting), 1989-1990
Robert R. Rice, 1975-1989

Natural Resources and the Environment (School)

Charles Hutchinson, 2010-Current
Lisa Graumlich, 2007-2010
Patrick Reid, 1994-2006
Edgar Kendrick, 1989-1993
R. Frank Gregg, 1985-1988
Ervin H. Zube, 1977-1984

Nutritional Sciences

Joy Winzerling, 2008-Current
Linda Houtkooper, 2003-2007
Fred Wolfe, 1998-2002
Ralph Price, Acting 1996-1997
Bobby Reid, 1992-1995
Don McNamara, 1990-1991
James Berry, 1986-1989
Darrel Goll, 1978-1986

Plant Sciences (School)

Brian Larkins, 2010-Current
Kenneth Feldmann, 2009-2010
Robert Leonard, 1994-2008
Brian Larkins, 1988-1994
Brooks Taylor, Acting 1985-1988
LeMoyné Hogan, 1983-1985
R. Phillip Upchurch, 1975-1982
Plant Pathology (became a division of Plant Sciences in 2003)

Soil, Water and Environmental Science

Jeff Silvertooth, 2000-Current
Peter Wierenga, 1988-2000
Art Warrick, Acting 1988
Wilford Gardner, 1980-1987

Veterinary Science and Microbiology

Charles Sterling, 2010-Current
Jack Schmitz, 2006-2010
James Collins, 2000-2006
Lynn Joens, Acting 1999-2000
Charles Sterling, 1990-1999
Cy Card, 1987-1990
Glen Songer, Acting 1986
John Mare, 1977-1985
Ray Reed, 1967-1977

Water Resources Research Center

Sharon Megdal, 2004-Current
Peter Wierenga, 1997-2004
Hanna Courtner, 1991-1996
William Lord, 1985-1990
Sol Resnick, 1972-1984

Agricultural Center Directors

Tucson Area Agricultural Centers

Steven Husman, 2005- current
Peter Else, 1996-2005
Bryan Anthony, 1992-1996
James Park, 1988-1992
Roy Nelson, 197?-1988

Marana

Dan Foster, Manager 2000-2004
Glen Barney, Manager 1986-2000
Harold Rayher, Manager ?-1986

Maricopa

Robert Roth, 1997-current
Roy Rauschkolb, 1987-1997
James Park, 1983-1987

Citrus (Maricopa County)

Robert Roth, 1997-Current
Dean Bacon, Superintendent 1983-1987

Safford

Randy Norton, 2003-Current
Lee Clark, 1983-2003

Yuma

Charles Sanchez, 1996 - Current
Robert Rush, 1993-1996
William Blackledge, 1987-1992

V Bar V Ranch

David Shafer, 1997-Current

Director of Development (Renamed to Development and Alumni in 1988)

R. Phillip Upchurch, (First Director), 1981-84
Geraldine Eberline, 1984-1988

Director of Development and Alumni (formed 1988)

R. Phillip Upchurch, (First Director), 1988-1994
David Shoup (Interim), 1994-1996
John S. Engen, 1996-2002
David Cox, 2002
Brian K. Rowland, 2002-2005
James M. Davis, 2005-Current

College Foundations

Arizona 4-H Youth Foundation

Gerry Eberline (date)
Lee Dueringer, Executive Director (dates?)

International Agriculture Programs

Kevin Fitzsimmons, Director, 2011-Current
Colin Kaltenbach, 2004-2010
Associate Director: Amir Ajami, 2004- 2008
Associate Director: Kevin Fitzsimmons, 2008- 2010
Kennith Foster, 1996-2004
Michael Norvell, 1990-1995
Bodo Bartocha, 1988-1989
Jimmye Hillman, 1986-1988
John Mare, 1985-1986
Gerald Matlock, 1977-1984

County Extension Directors— note begins in 1980, acting not indicted, Fiscal Year

Apache

Joyce Alves, 1993-Current
Teddy Goodluck, 1991-1993
Gaylyn Knight, 1989
Leonard Issacson, ?-1990

Cochise

Susan Pater, 2000-Current
Douglas Dunn, 1985-2000
Larry Sullivan, 1981-1985
Jimmy Biles, ?-1981

Coconino

Beth Tucker, 1990-Current
Larry White, ?-1990

Gila

Jim Sprinkle, 2002-Current
Ruth Carter, 1994-2002
William Frost, 1989-1994
Van Wilson, ?-1989

Graham

William Brandau, 2008-Current
Carol Willis, 1997-2008
Ronald Cluff, ?-1997

Greenlee

Kim McReynolds, 2009-Current
Malvina Adolf, 2007-2009
Carol Willis, 2002-2007
Michael Schneider, 1991-2002
Mable Flint, ?-1991

La Paz (County formed in January 1983)

Linda Masters, 2004-Current
Janice Shelton, 2000-2004
Sherwood Winans, 1985-2000
Billy Moore, 1985 (First Director)

Maricopa

Monica Pastor, 2008 -Current
Cynthia Flynn, 2007-2008
Stanley Farlin, 1993-2007
Ruth Ann Fowler, 1988-1993
Lowell True, 1984-1988
Ivan Shields, ?-1984

Mohave

Robin Grumbles, 1987- Current
Marilyn Loveland, ?-1987

Navajo

Juanita Waits, 2007-Current
Stephen Campbell, 1994-2007
Mary Lou Creech, 1990-1994
Robert Racicot, ?-1990

Pima

Steve Husman, 2009-Current
Cynthia Flynn (Ratner), 1994-2009
William Cartee, 1984-1994
Garrett Blackwell, ?-1984

Pinal

Richard Gibson, 1997-Current
Sam Stedman, ?-1997

Santa Cruz

Darcy Dixon, 2007-Current
Dean Fish, 1998-2007
Patricia Merk, 1998
Richard Harris, ?-1997

Yavapai

Jeff Schalau, 1999-Current
Marta Stuart, 1999
Deborah Young, 1988-1998
Carlton Camp, ?-1988

Yuma

Kurt Nolte, 2008-Current
Victoria Steinfelt, 2004-2008
Barry Bequette, 1999-2004
Victoria Steinfelt, 1998-1999
Don Howell, 1980-1997
James Hazlett, ?-1980

Specialized Extension Programs

Project Centrl
Eldon Moore, 1983-1991
Jim Chamie, 1991-1997
Everett Rhodes, 1997-Current

Other Administrative Units

Educational Communications and Technologies (Office began 1997)

Roger Caldwell, 1997-2003
David Cox, 2003- 2009
Colin Kaltenbach, 2009-Current

American Indian Programs

Howard Jones, 1990-2000
Joe Hiller, 2000-2002 Assistant Extension Director and Director American Indian Programs
Joe Hiller, 2002-Current, Assistant Dean and Director American Indian Programs

Center for Quantitative Analysis (Office existed about two years)

Robert Kuehl, 1975-1976

Computer Applications Group (Began in 1982 and became ECAT in 1997)

Robert MacArthur, 1984-1997
Roger Caldwell, 1982-1984

Council for Environmental Studies (Office existed 1974-1984)

Roger Caldwell, 1974-1984

Appendix J. Faculty and Staff Honors and Awards Recipients 1980-2010

Awards and honors are given by the University, the College, and by selected groups within the College. The only honors or awards from outside the university system that are listed here is membership in the National Academy of Sciences.

- National Awards and Honors
- University Professional Honors
- Faculty Award Recipients
- Extension Faculty of the Year

NATIONAL AWARDS AND HONORS

National Academy of Sciences Members

In 2010 there are 17 members of the National Academy of Sciences at the University of Arizona. Three are in the College of Agriculture and two others have joint appointments with the College. Year of selection is given below.

- 2007 John Hildebrand, Professor of Entomology (Joint Appointment)
- 2004 Nancy Moran, Professor of Entomology (Joint Appointment)
- 2002 Vicki Chandler, Director of BIO5 Institute, Professor of Plant Sciences
- 1996 Brian Larkins, Professor of Plant Sciences
- 1994 William Bowers, Professor of Entomology (Emeritus)
- 1983 Wilford Gardner, Soil and Water Science (Left University)

UNIVERSITY PROFESSORIAL HONORS

Regents Professors

A Regents' Professor is the highest level of the faculty ranks and is reserved for full professors with exceptional achievements that have brought them national or international recognition. Established by Arizona Board of Regents Policy in 1986. They are nominated by the faculty and reviewed by an advisory committee. The total number of Regent's Professors is limited to 3 percent of the tenured and tenure-track faculty. The first award was given 1988. Joint indicates they the professor is in another department as their home department but also has an appointment in the CALS department.

- 2003 Vicki Chandler, Director of BIO5 Institute, Professor of Plant Sciences
- 2000 Nancy Moran, Professor of Entomology (Joint)
- 2000 Brian Larkins, Professor of Plant Sciences
- 1998 Nicholas Strausfeld, Professor of Entomology (Joint)
- 1991 John Law, Professor of Entomology (Joint, Emeritus)
- 1991 Elizabeth Bernays, Professor of Entomology (Emeritus)
- 1989 John Hildebrand, Professor of Entomology (Joint)

University Distinguished Professors

The University Distinguished Professor awards, were created by the University of Arizona in 1995 to recognize faculty who have a long-term commitment to undergraduate education and have made outstanding contributions at the University of Arizona. They are nominated by faculty and others and reviewed by an advisory committee. Awards are limited to two per year. The first award was given in 1995.

- 2008 Paul Wilson, Professor of Agricultural and Resource Economics
- 2004 Dennis Ray, Professor of Plant Science
- 2002 Wanda Howell, Professor of Nutritional Sciences

Distinguished Outreach Professors

This award was established by the University of Arizona in 2003 to recognize outstanding contributions to outreach at the University of Arizona, in the State of Arizona and the nation and have demonstrated sustained excellence in the University's outreach mission. They are nominated by faculty, staff, and Arizona citizens and reviewed by an advisory committee. Awards are limited to two per year. The first award was given in 2004.

- 2010 Sharon Megdal, Director of Water Resources Research Center, Professor of Agricultural and Resource Economics
- 2008 Russell Tronstad, Professor of Agricultural and Resource Economics
- 2005 Tim Dennehy, Professor of Entomology (Emeritus)

FACULTY AWARD RECIPIENTS

A+ Advisor Award

The A+ Advisor Award is designed to honor College of Agriculture and Life Sciences (CALs) faculty or staff who have done a particularly meritorious job of advising students. This award is sponsored by CALs student organization, Fraternity of Alpha Zeta Honorary. Alpha Zeta coordinates the voting process.

- 2010 Nancy Rodriguez-Lorta, Office of Academic Programs
- 2009 Elaine Marchello, Department of Veterinary Science and Microbiology
- 2008 Amy Rogers, Office of Academic Programs
- 2007 Felicia Frontain, School of Family and Consumer Sciences, and Kelly Jackson, Department of Nutritional Sciences
- 2006 Janet Decker, Department of Veterinary Science and Microbiology
- 2005 Elaine Marchello, Department of Veterinary Sciences and Microbiology, and Kim Fielding, Office of Academic Programs
- 2004 James A. Knight, Department of Agricultural Education
- 2003 Amy Chandler, School of Family and Consumer Sciences
- 2002 Jennifer Bowers, Departments of Nutritional Sciences; Libby Davison, Department of Plant Sciences
- 2001 Melinda Burke, School of Family and Consumer Sciences
- 2000 James A. Knight, Department of Agricultural Education
- 1999 James A. Knight, Department of Agricultural Education
- 1998 Elizabeth Davison, Department of Plant Sciences
- 1997 Paul Wilson, Department of Agricultural and Resource Economics
- 1996 Jack Elliot, Department of Agricultural Education
- 1995 Frank Whiting, Department of Animal Sciences
- 1994 Phil Ogden, School of Renewable Natural Resources

Bart Cardon Early Career Faculty Teaching Award

The Bart Cardon Early Career Faculty Teaching Award was created to recognize and honor unusual dedication and outstanding performance by a member of the teaching faculty who is within their first 5 years of teaching at the university. The award is given annually, provided a suitable candidate is available.

- 2010 Emily Butler, School of Family and Consumer Sciences
- 2010 Melissa Curran, School of Family and Consumer Sciences
- 2009 Randy Burd, Department of Nutritional Sciences

Bart Cardon Sustained Excellence in Teaching Award

The Bart Cardon Sustained Excellence in Teaching Award was created to recognize and honor unusual dedication and outstanding performance by a member of the teaching faculty who has been teaching at the university for more than 15 years. The award is given annually, provided a suitable candidate is available.

- 2010 Roy Ax, Department of Animal Sciences
- 2009 Mitch McClaran, School of Natural Resources and the Environment

Extension Faculty of the Year Award

The Cooperative Extension Faculty of the Year Award was created to recognize and honor outstanding achievements and contributions by a faculty member in Cooperative Extension in the College of Agriculture and Life Sciences (CALs). One of the major purposes of the award is for peers to recognize outstanding faculty. The award will usually be given annually with a plaque and award of \$1,000 presented at CALs Faculty Conference.

- 2009 Ursula Schuch, School of Plant Sciences
- 2008 Bryan Chadd, Maricopa County Cooperative Extension
- 2007 George Ruyle, School of Natural Resources
- 2006 Susan Pater, Cochise County Cooperative Extension
- 2005 Russ Tronstad, Department of Agricultural and Resource Economics
- 2004 Sharon Hoelscher Day, Maricopa County Cooperative Extension
- 2003 Mary Olsen, Department of Plant Sciences, Division of Plant Pathology
- 2002 Tim Dennehy, Department of Entomology
- 2001 Sherry Betts, School of Family and Consumer Sciences
- 2000 Linda Houtkooper, Department of Nutritional Sciences and Special Assistant to the Directors of Arizona Cooperative Extension and Arizona Prevention Center
- 1999 Paul Brown, Department of Soil, Water and Environmental Science
- 1998 Doug Dunn, Cochise County Cooperative Extension
- 1997 Terry Mikel, Maricopa, Gila, La Paz and Pinal County Cooperative Extension
- 1996 Steve Husman, Maricopa County Cooperative Extension
- 1995 Deborah Young, Yavapai County Cooperative Extension
- 1994 Darcy Dixon, Pinal County Cooperative Extension
- 1993 Julie Leones, Department of Agricultural and Resource Economics

Faculty Teaching Award

The College of Agriculture and Life Sciences (CALs) Faculty Teaching Award was created to recognize and honor unusual dedication and outstanding performance by a member of the teaching faculty. The award is given annually, provided a suitable candidate is available. A plaque and a check for \$1,000 will be presented at Honors Convocation, which is usually held in conjunction with Family Weekend during the fall semester.

- 2010 Tom Wilson, Department of Soil, Water and Environmental Science
- 2009 Susan Koerner, School of Family and Consumer Sciences
- 2008 James Riley, Department of Soil, Water and Environmental Science
- 2007 Leland S. Pierson III, Department of Plant Sciences
- 2006 James A. Knight, Department of Agricultural Education
- 2005 Billye Foster, Department of Agricultural Education
- 2004 Bentley Fane, Department of Veterinary Sciences and Microbiology
- 2003 Carl Ridley, School of Family and Consumer Sciences
- 2002 Michael Riggs, Department of Veterinary Sciences and Microbiology
- 2001 Glen Miller, Department of Agricultural Education
- 2000 William Matter, School of Renewable Natural Resources
- 1999 Dennis T. Ray, Department of Plant Sciences
- 1998 - Jack Elliot, Department of Agricultural Education
- 1997 Donna Christenson, School of Family and Consumer Resources

- 1996 Wanda Howell, Department of Nutritional Sciences
- 1995 Steven Smith, Department of Plant Sciences
- 1994 Roger Dahlgran, Department of Agricultural and Resource Economics
- 1993 Sue DeNise, Department of Animal Sciences

Research Career Development Award

Established as part of CALS Millennium Oversight Committee's effort, the Research Career Development Award was created to provide special support for research by faculty who have assumed an unusually heavy teaching, advising, extension and/or service load in response to unit needs during the past two to three years. An award of approximately \$5000 (a combination of discretionary funds and/or other departmental in-kind) may be given to one or two faculty in the College of Agriculture and Life Sciences (CALs) annually. Discretionary funds are to be used toward research activities (e.g. data collection, research assistantships, research travel, publication costs, computers, or other discretionary purchases related to research).

- 2007 Helen Jost, Department of Veterinary Science and Microbiology
- 2006 Steven Smith, School of Natural Resources

- 2005 Sherry Lotz, Norton School of Family and Consumer Sciences

- 2004 No nominees; award was not presented this year.

- 2003 Mark Arns, Department of Animal Sciences; Mary Ann Eastlick, School of Family and Consumer Sciences

Research Faculty of the Year Award

The Research Faculty of the Year Award was created to recognize and honor outstanding achievements and contributions in research by a faculty member in the College of Agriculture and Life Sciences (CALs). The award will be given annually with a plaque and award of \$1,000 presented at the Fall Faculty Staff Meeting.

- 2010 Jonathan Chorover, Department of Soil, Water and Environmental Science
- 2008 David Hartshorne, Department of Nutritional Sciences
- 2007 Raina Maier, Department of Soil, Water and Environmental Science
- 2006 Lynn Joens, Department of Veterinary Science and Microbiology
- 2005 Rod Wing, Department of Plant Sciences
- 2004 Ron Allen, Department of Animal Sciences
- 2003 Leslie Gunatilaka, Office of Arid Lands Studies
- 2002 Jian-Kang Zhu, Department of Plant Sciences
- 2001 Vicki Chandler, Department of Plant Sciences
- 2000 Mark L. Brusseau, Department of Soil, Water and Environmental Science
- 1999 David W. Galbraith, Department of Plant Sciences
- 1998 David Rowe, School of Family and Consumer Resources
- 1997 Brian Larkins, Department of Plant Sciences
- 1996 Donald Lightner, Department of Veterinary Science and Microbiology
- 1995 Darrel Goll, Department of Animal Sciences
- 1994 Ian Pepper, Department of Soil and Water Science
- 1993 J. Tal Huber, Department of Animal Sciences

STAFF AWARD RECIPIENTS

CALS Outstanding Staff Award

The Outstanding Staff Award was created to recognize and honor unusual dedication and outstanding contributions by a classified staff member in the College of Agriculture and Life Sciences (CALs). Awards in the amount of \$350.00 each will be given quarterly with a maximum of four recipients annually. A check will be presented when the awardee is notified. Individual plaques will be presented at the Spring and Fall Faculty Staff Meetings. A master plaque located in the Forbes Lobby contains the names of all past winners.

- **2010 Quarterly Winners:**
Elizabeth Gradillas, Department of Veterinary Science and Microbiology
Wanda McCormack, Department of Veterinary Science and Microbiology
- **2009 Quarterly Winners:**
Lynnea Spencer, Boyce Thompson Arboretum
Dusty Murdock, Greenlee County Cooperative Extension
Trudy Morrow, Department of Nutritional Sciences
Chiyo Yamashita-Gill, Office of Arid Lands Studies
- **2008 Quarterly Winners:**
Julia Neilson, Department of Soil, Water and Environmental Science
Estella Trevers, Department of Animal Sciences
Malkanthi Gunatilaka, Department of Plant Sciences
Gonzalo Ruiz, Boyce Thompson Arboretum
- **2007 Quarterly Winners:**
Paige Jacobson, Norton School of Family and Consumer Sciences
Joseph Gelt, Water Resources Research Center
Mary Conner, Maricopa County Cooperative Extension
- **2006 Quarterly Winners:**
Joyce Hasselberger, Pima County Cooperative Extension
Erin Chadd, Dean's Office
Andy Honaman, School of Natural Resources
Hamdi Ahmad, Animal Sciences
- **2005 Quarterly Winners:**
Judith Ellwanger, Department of Soil, Water and Environmental Science
Julie Longstaff, Norton School of Family and Consumer Sciences
Glenda Thompson, Cooperative Extension
Ramona St. Cyr, Department of Nutritional Sciences
- **Special Honorary Staff Award for Excellence (2004):**
Dan Baerg, Departments of Animal Sciences and Plant Pathology
- **2004 Quarterly Winners:**
Lyle Browning, La Paz County Cooperative Extension
Kathy Bell, Environmental Research Lab
Mario Marquez, Department of Plant Sciences
Jill Rubio, School of Natural Resources
- **2003 Quarterly Winners:**
Tod Gregoire, CALS Administrative Services
Robert Lanza, Educational Communications and Technologies
Michelle Hintz, Department of Agricultural Education
Chris Spencer, Boyce Thompson Arboretum

- **2002 Quarterly Winners:**
 Debby Janes, Dean's Office
 Gregory DiCenzo, Department of Veterinary Sciences and Microbiology
 Donna Peterson, Department of Nutritional Sciences
 Kimberly Heath, Department of Agricultural and Biosystems Engineering
- **2001 Quarterly Winners:**
 Theresa Spicer, Department of Nutritional Sciences
 Inez Schloss, Pima County Cooperative Extension
 Dawn Bueschel, Department of Veterinary Science and Microbiology
 Linda Lee, School of Renewable Natural Resources
- **2000 Quarterly Winners:**
 Andy Medina, Cooperative Extension
 Judy Smith, Agricultural Experiment Station
 Norman Buck, Department of Entomology
- **1999 Quarterly Winners:**
 Lucas Guthrie, School of Family and Consumer Resources
 Mary Lou Stengel, Department of Entomology
 Janet Christner, Department of Nutritional Sciences
 Kim Brooke, School of Family and Consumer Resources
- **1998 Quarterly Winners:**
 Leah Brown, Department of Nutritional Sciences
 Francine Correll, Pima County Horticulture
 Cinda Baughn, School of Family and Consumer Resources
 Alma Rosa Enciso, Agricultural Experiment Station
- **1997 Quarterly Winners:**
 Patricia Perkins, Office of Academic Programs
 Pete Kohlhepp, Department of Nutritional Sciences
 Kevin Butler, Agricultural Administrative Services
 Sandra Saad, 4-H Youth Development
- **1996 Quarterly Winners:**
 Joyce Cadenhead, Maricopa Agricultural Center
 Peggy Lazarus, School of Family and Consumer Resources
 Joanie Craig, 4-H Youth Development
 Shirley Weber, Department of Plant Sciences
- **1995 Quarterly Winners:**
 Shirley McChesney, Office of Academic Programs
 Louanne Clark, Cooperative Extension
 Bonnie Carnes, Agricultural Administrative Services
 Elenor Loya, Department of Soil and Water Science
- **1994 Quarterly Winners:**
 Vivian Rolfs, Department of Nutritional Science
 Patti Baciewicz, Cooperative Extension
 Carol Knowles, Development and Alumni Affairs
 Mark Shupe, Veterinary Diagnostic Lab

- **1993 Quarterly Winners:**

Steven Crofts, Cooperative Extension
 Mary Miller, School of Family and Consumer Resources
 John Rohr, Department of Veterinary Science
 Wanda McCormack, School of Family and Consumer Resources

Outstanding Staff in Cooperative Extension Award

The Outstanding Staff Award in Cooperative Extension was created to recognize and honor unusual dedication and outstanding contributions by a classified staff member in College of Agriculture and Life Sciences (CAL) Cooperative Extension. Award will usually be given annually with a plaque and award of \$500. The award will be presented at an Extension event held in conjunction with CALS Staff In Service Day.

2010 Carolyne Greeno, Pima County Cooperative Extension
 2009 Ruben Gonzalez, Yuma County Cooperative Extension
 2008 Glenda Thompson, Cooperative Extension Administration
 2007 Marlena Parrott, Yuma County Cooperative Extension
 2006 Sharon Marchbanks, La Paz County Cooperative Extension
 2005 Joy Denning, Yuma Agricultural Center Valley Station
 2004 Fannie Begay, Apache County Cooperative Extension
 2003 Linda Stagi, Yuma County Cooperative Extension
 2002 Darlene Lyman, Maricopa County Cooperative Extension
 2001 Patti Baciewicz, Cooperative Extension
 2001 Debra Pearson, Yavapai County Cooperative Extension
 1999 Steven Crofts, Cooperative Extension
 1998 Sandra Saad, 4-H Youth Development
 1997 Judith Krippner, La Paz County Cooperative Extension
 1996 Peggy Lazarus, School of Family and Consumer Resources
 1995 Karen Burbridge, Yuma County Cooperative Extension
 1994 Julia Jones, Gila County Cooperative Extension

Outstanding Staff in Support of Instruction and Student Services Award

The Award for Outstanding Staff in Support of Instruction and Student Services was created to recognize and honor unusual dedication and outstanding contributions by a classified staff member in support of instruction and student services in the College of Agriculture and Life Sciences (CAL). The award will be given annually with a plaque and award of \$500 presented at Honors Convocation, which is usually held in conjunction with Family Weekend during the fall semester.

2009 Ann Kristen Vann, Department of Agricultural Education
 2008 Daniela Ibarra, Department of Agricultural and Biosystems Engineering
 2007 Mary Helen Scott, School of Family and Consumer Sciences
 2006 No nominees; award was not presented this year.
 2005 Sheri Musil, Department of Soil, Water and Environmental Science
 2004 Nancy Costanza, Department of Veterinary Sciences and Microbiology
 2003 Julie Longstaff, School of Family and Consumer Sciences
 2002 Susan Scalero, Department of Agricultural Education
 2001 Jack Keating, Department of Agricultural and Biosystems Engineering
 2000 Cinda Baughn, School of Family and Consumer Sciences
 1999 Connie McKay, Department of Agricultural and Resource Economics
 1998 Charles De Fer, Department of Agricultural and Biosystems Engineering
 1997 Pat Olsson, Department of Agricultural and Resource Economics
 1996 Kathleen Crist, Department of Agricultural and Biosystems Engineering
 1995 Marion "Lou" Stevens, Department of Agricultural and Biosystems Engineering
 1994 Shannon Easterday, Department of Animal Sciences

1993 Bob Ritchie, Department of Animal Sciences

Outstanding Staff in Research Award

The Outstanding Staff in Research Award was designed to recognize technical, clerical, farm and administrative staff whose service has contributed significantly to the support of research in the College of Agriculture and Life Sciences (CALs). The award will be given annually with a plaque and award of \$500 presented at the Fall Faculty Staff Meeting

2010 Deborah Schaefer, Department of Veterinary Science and Microbiology
2008 Christa Kirk, Department of Entomology
2007 Chris Zou, Department of Soil, Water and Environmental Science
2006 Nancy Bannister, Department of Agricultural and Resource Economics
2005 Catherine Wasmann, Department of Plant Sciences
2004 Charles DeFer, Department of Agricultural and Biosystems Engineering
2003 No nominees; award was not presented this year.
2002 Brenda Hunter, Department of Plant Sciences
2001 Georgina Lambert, Department of Plant Sciences
2000 Phyllis Reid, Department of Nutritional Sciences
1999 Valery F. Thompson, Department of Nutritional Sciences
1998 Tom Orum, Department of Plant Pathology
1997 Phil Evans, Department of Entomology
1996 Suzanne Johnson, Department of Entomology
1995 Carl Schmalzel, Department of Plant Sciences
1994 Michael Young, Department of Soil and Water Science
1993 Sheri Musil, Department of Soil and Water Science

ADMINISTRATOR OF THE YEAR APPOINTED PROFESSIONAL, OUTSTANDING TEAM AND SHIRLEY O'BRIEN DIVERSITY AWARD RECIPIENTS

Administrator of the Year Award

The College of Agriculture and Life Sciences Administrator of the Year Award was created to recognize and honor outstanding achievements and contributions by an administrator in the College of Agriculture and Life Sciences (CALs). This award, which will be given annually, will consist of a plaque for the recipient and a monetary award of \$1000 to be made to the winner's administrative unit in honor of the recipient. This award was first presented in Spring 2003. In 2004, two unit heads were deemed equally meritorious and the Executive Council approved two awards for that year.

2010 Sandra M. Pottinger, Assistant Dean, CALS Administration
2009 No nominees; award was not presented this year.
2008 Jeff Silvertooth, Head, Department of Soil, Water and Environmental Science
2007 Linda Houtkooper, Head, Department of Nutritional Sciences
2006 Joseph Hiller, Assistant Dean, Native American Programs
2005 Don Slack, Head, Department of Agricultural and Biosystems Engineering
2004 Soyeon Shim, Head, School of Family and Consumer Sciences and
2004 Peter Wierenga, Director, Water Resources Research Center and former Head, Department of Soil, Water and Environmental Sciences
2003 Robert Leonard, Head, Department of Plant Sciences

Year-to-Year Appointed Professional Award of Excellence

The Year-to-Year Appointed Professional Award for Excellence was created to recognize and honor outstanding achievements and contributions by an individual in a year-to-year appointed professional position in the College of Agriculture and Life Sciences (CALs). The award will be given annually with a plaque and a cash award of

\$1,000 presented at the Spring Faculty/Staff/Year-to-Year Appointed Professional Meeting. This award was first presented in Spring 1998. In 1999, two people with different areas of excellence were both deemed meritorious by the selection committee and the Executive Council approved two awards for that year.

- 2010 Doug Reed, Race Track Industry Program
- 2009 Elaine Marchello, Office of Academic Programs
- 2008 Kamel Didan, Department of Soil, Water and Environmental Science
- 2007 Donna Rae Marquez, Department of Plant Sciences
- 2006 Patricia Sparks, Department of Nutritional Sciences
- 2005 Donna Peterson, Norton School of Family and Consumer Sciences
- 2004 Jim Chamie, Office of Arid Lands Studies
- 2003 Trent Teegerstrom, Department of Agricultural and Resource Economics
- 2002 Elizabeth L. Davison, Department of Plant Sciences
- 2001 Bobby Browning, Office of Academic Programs
- 2000 Paul Kohn, Office of Academic Programs
- 1999 Judy Brown, Department of Plant Sciences
- 1999 Melinda Burke, Southwest Retail Center
- 1998 Patricia Waterfall, Pima County Extension

Outstanding Team Award

The Outstanding Team Award was created to recognize and honor unusual dedication and outstanding contributions by a team of College of Agriculture and Life Sciences (CALs) employees. The award will be given annually with a plaque and award of \$500 to each team member (maximum of \$2,500). The award will be presented at the Spring or Fall Faculty Staff Meeting.

- 2010 - **Meat Science Laboratory:** Hamdi Ahmad, Raul Islas, Tom Van Haren, Christine Harwell
- 2008 - **Tucson Area Ag Centers Staff:** Arturo Baez, John Bauer, Mark Carson, Francisco Danese, William Davidson, Fred Edson, Billy Foster, Dale Gorney, Andrew Hassan, Mark Heitlinger, Christine Hiemstra, Tatiana Hladky, Brian Kenna, Darren Kerr, Kenneth Kriederman, Rueben Lopez, Nathaniel Ludwig, Daniel Nelson, Kenneth Pruitt, John Pulley, Stephen Roberge, Todd Ruhl, Thomas Schmidt, Albert Settle, Jason Spence, Bruce Steenson, Dale Tenopir, Esperanza Torres, John Torres, Gilbert Walker
- 2007 - No nominees; award was not presented this year.
- 2006 - **Environmental Research Lab (ERL) Maintenance Team:** Gaylen Bennett, Jeffrey Bliznick, William Laughlin
- 2005 - **Controlled Environment Ag Center Greenhouse Program:** Gene A. Giacomelli, Christopher Choi, Joel L. Cuello, Priscilla Files, Roger T. Huber, Mark A. Kroggel, Merle H. Jensen, Chieri Kubota, Allan D. Matthias, Mary W. Olsen
- 2004 - **Mt. Graham Biology Project:** John Koprowski, Vicki Greer, Sadie Bertelsen, Sarah King (School of Natural Resources)
- 2003 - **Animal Sciences Equine Program Committee:** Mark Arns, Wendy Davis, Mary Ann Harris, Susan Rose, William Schurg, Laura Walker
- 2002 - **CALS Diversity Committee:** Shirley O'Brien (Chair), Melvina Adolf, Dan Baerg, Steve Campbell, Jim Chamie, Steven Crofts, Alma Enciso, Billye Foster, Ed Franklin, Natalie Furrey, Becki Hester, Claudia Jackson, Ruth Jackson, Chris Jones, Teresa Noon, Janet Paz, Esperanza Torres

- 2001 - No nominees; award was not presented this year.
- 2000 - **Arizona Teen Pregnancy Prevention Team: Campus County Connections**
Sherry Betts, Ruth Carter, Lynne Durrant, Aleta Garcia, Kim Gressley, Peggy Lazarus and Donna Peterson
- 1999 - No nominees; award was not presented this year.
- 1998 - **Dairy Research Center Team**, Department of Animal Sciences:
Scott Beyer, Steve Faber, Nancy Faber, Charley Hammond, Mark Howard, John Pulley, Tonya Randolph, Julie Stiever
- 1997 - **Maintenance Team**, Campus Agricultural Center:
Dave Fausey, Dale Gorney, Robert Gutierrez, David Linderman, Daniel Nelson, Ken Pruitt, Bruce Steenson, Dale Tenopir, Esperenza Torres
- 1996 - **COA Staff Council Salary Subteam**: Liz Gradillas, Hernan Pesqueira, Leah Brown, Ted McCreary, Tricia Perkins, Jack Roberts, Margo Santucci, Bruce Steenson
- 1995 - **Southwest Retail Center**, School of Family and Consumer Resources:
Soyeon Shim, Roger Kramer, Melinda Burke, Bill Rogers, Mary Ann Eastlick, Ellen Goldsberry, Ken Gehrt
- 1994 - **Greenhouse Crew**, Campus Agricultural Center:
Mark Carson, Peter Else, Tracy Everingham, Gerald Raymond, Abreeza Zeeger
- 1993 - **Race Track Industry Program**, Department of Animal Sciences:
Dave Hooper, Wendy Davis, William Schurg, Michael White, Dolores Wiley

Shirley O'Brien Diversity Award

The College of Agriculture and Life Sciences (CALs) values diversity in its people and programs and strives to foster a diverse, fair, and respectful community. The Shirley O'Brien Diversity Award was created in honor of Shirley O'Brien for her exemplary work in promoting diversity and an inclusive environment within CALs and across campus. We believe that her efforts, in keeping with the College's emphasis on diversity in its student body, faculty and programs, deserve recognition. The award will be given annually and will include a plaque and monetary gift of \$1,000. We encourage members of the faculty, staff, appointed personnel, and student body to nominate individuals who have contributed significantly to the advancement of diversity within the College.

2007 Julie Camp Adamcin, 4-H Youth Development, Pima County Cooperative Extension

2006 Stephen Russell, Norton School of Family and Consumer Sciences

2005 **Graduate Student Showcase Committee, School of Natural Resources**: Mitch McClaran, David Breshears, Courtney Conway, Melanie Culver, John Koprowski, Phil Guertin, Dawn Browning, Vicki Garcia

Outstanding Efforts in Development Award

A new award created to recognize and honor outstanding achievements and contributions to fundraising efforts by employees of CALs. No awards given yet.

Idea Award

The Idea Award was used 1991-2005 and provided quarterly. Any person could submit an idea and a review team selected the winner. The winners are not listed here.

Appendix K. Endowed Chairs and Their Holders

Faculty Chairs are endowed by a donor and the selection is made based on disciplinary requirements of the endowment and made by the department and college administration. The first endowed chair was the Porterfield Chair, in 1985, and was the first awarded to Brian Larkins in 1989.

- Bartley P. Cardon Endowed Chair in Agribusiness and Policy
Dean Leuck, Department of Agricultural and Resource Economics
- Bud Antel Endowed Chair for Excellence in Agriculture and Life Sciences I
Rod Wing, Department of Plant Sciences
- Bud Antel Endowed Chair for Excellence in Agriculture and Life Sciences II
Richard Jorgensen, Department of Plant Sciences
- C.W. and Modene Neely Endowed Professorship for Excellence in Agriculture and Life Sciences
Sharon Megdahl, Water Resources Research Center
- Carl E. and Patricia Weiler Endowed Chair for Excellence in Agriculture and Life Sciences
Vicki Chandler, Department of Plant Sciences
- Cecil H Miller Sr. and Cecil H. Miller Jr. Families Dean's Chair of Excellence in Agriculture and Life Sciences
Donald Slack, Department of Agriculture and Biosystems Engineering
- Fitch-Nesbitt Endowed Chair
Stephen T. Russell, Norton School of Family and Consumer Sciences
- PetSmart Professor of Practice
Melinda Burke, Norton School of Family and Consumer Sciences
- Porterfield Endowed Chair in Plant Sciences
Brian Larkins, Department of Plant Sciences
- Take Charge of America Endowed Chair
Michael Staten, Norton School of Family and Consumer Sciences
- Bart Cardon Associate Dean for Academic Programs (Chair – equivalent)
David Cox, Associate Dean for Academic Programs
- John and Doris Norton Endowed Chair in Fathers, Parenting and Families
Bruce Ellis, Norton School of Family and Consumer Science
- Phyllis and Roy Hislop Endowed Chair in Animal Sciences
Ronald Allen, Department of Animal Sciences
- PetSmart Endowed Chair Norton School of Family and Consumer Sciences I
Anita Bhappu, Norton School of Family and Consumer Sciences
- PetSmart Endowed Chair Norton School of Family and Consumer Sciences
Sabrina Helm, Norton School of Family and Consumer Sciences
- Endowed chairs not yet assigned
Race Track Industry Program Endowed Chair

Appendix L. College Awards to Citizens

Awards made to Citizens by the College of Agriculture and Life Sciences are listed below. The first award was an Honorary Doctorate, in 1925, to Robert Forbes. Award types are listed alphabetically and within the award, the recipient is listed alphabetically by last name. In 2000-2001 the Friend of Agriculture Award was changed to be the Friend of CALS Award. There are about 550 names listed.

Listing of Awards

1. Agriculture Alumni Achievement Award
2. Alumni Appreciation Award
3. Alumni Association Centennial Achievement
4. Alumnus of the Year Award
5. Appreciation Award
6. Arizona Agriculturists of the Year – Ag 100 Council
7. Bear Down Award
8. Carol Knowles Award for Excellence in Development and Alumni Relations
9. Centennial Medallion
10. Distinguished Citizen Award
11. Early Achievement Award
12. Extensionist of the Year
13. Friend of Agriculture
14. Friend of CALS
15. Friend of Rural Arizona
16. Heritage Family Award
17. Honorary Alumnus
18. Honorary Bobcat
19. Honorary Doctorate
20. Leo B. Hart Humanitarian
21. Lifetime Award
22. Outstanding Achiever Award
23. Professional Achievement Award
24. Public Service Award
25. Sidney S. Woods Alumni Achievement Award
26. Slonaker Award
27. University Alumni Achievement Award
28. Young Achievers

Agriculture Alumni Achievement Award

Alston, Lela M	1993
Baffert, Robert	1999
Begay Jr, Walter	2003
Betts, Sherry C	2010
Billy, Bahe	1996
Brandt, William L	2009
Butler, Don	1995
Chrisman, Michael	2008
DeBell, Robyn	2008
Gemmill, John C	2008
Gray, Robert F	2010
Jones, Robert T	2006
Keithly, Kelly & Cheryl	2009
Klein, Mary Kay	2005
Potter, Melvin	2009
Rovey, Paul	2003
Scaramella, Laura V	2010
Shelton, Janice	2007
Turbeville, Pamela	2001
Valdez, Joel	2005
Warner, Katy Moss	1997
Winburne, Gordon William	2005

Alumni Appreciation Award

Abel, Karl F	1975
Aldrich, Daniel G	1971
Al-Gain, Abdulbar	1993
Lundgren, Terry J	2004
McClelland, Norman P	2008
Patterson, Dwight D	1980
Pickrell, William W	1946
Taylor, Robert E	1987
Turbeville, Pamela	2009
Varney, Billy Joe	1982
Woods, Sidney S	1980

Alumni Association Centennial Achievement

Armer Jr, Walter	1998
Boice, Ann	1998
Boice, Fred	1998
Booth, Nancy Davis	1998
Butler, Don	1998
Cardon, Bartley P	1998
Cardon, Charlotte	1998
Craig, Suzanne	1998
Goetz, Helen	1998

Kearns, Jean Ruley	1998
Keating, Thomas	1998
Koffler, Henry	1998
Koffler, Phyllis	1998
Lewis, Delbert	1998
Lewis, Jewell	1998
McClelland, Frances	1998
McClelland, Norman P	1998
Miller Jr, Cecil H	1998
Miller, Duane	1998
Norton III, John R	1998
Obregon, Francisco	1998
Shelton, Cynthia Tidwell	1998
Tidwell, James M	1998
Warkomski, Anne	1998
Warkomski, James	1998
Wuertz, Wilbur H	1998
Yrun-Calenti, Cindy	1998

Alumnus of the Year Award

Keating, Thomas	2002
Norton III, John R	2004
Underwood, Tammy Armstrong	2010
Wuertz, Howard	2006

Appreciation Award

Aepli, David C	1967
Forbes, Robert Humphrey	1967
Hilgeman, R	1967
Jones, Fay	
McGinnies, William G	1985
Moore, Robert E	1978
Myers, Harold E	1973
Pew, Weymouth D	1978
Taylor, Robert E	1967
Woods, Sidney S	1968

Arizona Agriculturists of the Year - Ag 100 Council

Anderson, H Lynn	1993
Barkley, Robert K	1999
Cardon, Bartley P	1996
Dobson, Dwayne	2007
Heiden, W Bruce	2000
Lakin, Charles	2002
McClelland, Frances	2004
Norton III, John R	1999

Oden, Gary	2009	Arzberger, Gus	1992
Rayner, Ronald	2010	Bayless, Virginia	1972
Rousseau, Will	2008	Bell, Charles R	1977
Rovey, Emil	1995	Bernal, Ray	1991
Schlittenhart, Russell E	1996	Billy, Bahe	1992
Scott, C L	2001	Boice, Fred	1979
Stevenson, Carl	1997	Boice, R Grant	2001
Walden, R Keith	1994	Booher, Margaret	1971
Webb, Jim	2006	Booth, Elliott	1993
Wuertz , Wilbur H	2005	Brinsko, George	1997
Wuertz, Howard	2003	Brown, Everett	1978
Bear Down Award		Browning, J Ernest	1973
Armer Jr, Walter	2004	Butler, Don	1987
Brake, Leland	1999	Cardon, Bartley P	1970
Martin, Elizabeth	2005	Carter, James R	1976
Norton III, John R	1998	Chapa, Arthur	2001
O'Brien, Shirley J	2000	Cheatham Sr, Leonard R	1975
Udall, Richard & Myrna	2001	Cole, Dalton J R	1979
		Corpstein, William	1979
		Cowden, Ruth	1971
		Curlee, Jesse	1999
		Day, H Allan	1986
		Dewhirst, Iris O	1988
		Dotson, Rebecca	1976
		Drach, Paula	1995
		Duncan III, Arnott & Kathleen	1999
		Elson, Polly	1997
		Enke, Fred W	1977
		Evans, Kenny J	1994
		Faul, Arthur J	1986
		Fazio, Steve	1988
		Feaster, Carl	1987
		Francis Jr, J S	1977
		Fritz, Fred J	1978
		Gass, Ronald E	1982
		Goodman, John K	1989
		Graham, Nancy Baggott	1994
		Griffin, James A	1984
		Groseta, Andy	1998
		Grounds, Betty Clack	1979
		Gutwillig, Jacqueline G	1975
		Hall, Mary	2008
		Hays, John	1996
		Hefferan, Colien	1984
		Heiden, W Bruce	1980
		Hennes, Kelvin K	1975
Carol Knowles Award for Excellence in Development and Alumni Relations			
Brooke, Kimberley	2007		
Cadenhead, Joyce	2006		
Flynn, Jenny R	2010		
Janes, Deborah	2009		
Knowles, Carol	2004		
Longstaff, Julie	2005		
Centennial Medallion			
Aldrich, Daniel G	1989		
Cardon, Bartley P	1989		
Koffler, Henry	1989		
McClelland, Norman P	1989		
Norton III, John R	1989		
Patterson, Dwight D	1989		
Porterfield, Harry	1989		
Woods, Sidney S	1989		
Distinguished Citizen Award			
Abel, Karl F	1976		
Akers, Stanley W	1973		
Alston, Lela M	1978		
Al-Sudery, Abdelmuksin	1983		
Anderson, Carol	1986		
Anderson, H Lynn	1978		
Anderson, Stuart	2000		
Armer Jr, Walter	1998		

Hess, Reuben M	1972	Rovey, Emil	1980
Horrell, Earl E	1970	Ryan, John	2000
Horrell, Louie P	1970	Schlittenhart, Russell E	1978
Humphrey, Marshall	1977	Scott, C L	1985
Jantzen, Robert A	1981	Sharp, Lynn	1976
Johnson, Marvin D	1985	Sheely, Joe	1976
Jordan, Jennie R	1996	Solheim, Allan Dale	1990
Kai Jr, John	1996	Sossaman, James J	1979
Kapfer Jr, William R	1995	Spar, Floyd	1976
Kavena, Junaita Tiger	1982	Stead, Linda Augar	2007
Keithly, Kelly	2000	Teeter, Carl	1971
Kimball, Thomas L	1964	Tenney, Boyd	1974
Knox, Orville	1978	Thurber, Harold	1972
Lakin, Charles	1999	Tidwell, James M	1979
Lane, Joseph J	1981	Turley, Stan	1977
Lavis, Rick	1998	Uribe, George H	1984
Lent Sr, Albert	1969	Varney, Billy Joe	1988
Loomis, Linda Jacobsen	1997	Vensel, Linda Brooks	1998
Madsen, L S Sam	1975	Vukasovich, Jolene	1990
Matanovich, Jamie Porter	1980	Walden, R Keith	1973
McClelland, Norman P	1983	Walden, Richard	1998
McGibbon, William	1993	Webb , Robert W	1990
McGinnies, William G	1974	Webb, James M	2001
McMullin, R J	1974	Weeks, Marcia	1991
Mets, Keith	1967	Weiler, Carl E	1983
Metzger, H Herbert	1980	Woods, Sidney S	1971
Meyer, W Walter	2001	Wuertz , Wilbur H	1970
Miller Jr, Cecil H	1974	Wuertz, Howard	1971
Mitchell, Grace	1974		
Moore, Robert E	1982	Early Achievement Award	
Morrison, Marvin	1977	Auza, Hank	2007
Norton III, John R	1981	Bell, Daniel	2006
O'Brien, W William	1991	Fish, Dean	2007
O'Haco, Michel Joseph	1981	Glassman, Rodney	2010
Olson, John	1985	Nunn, Seneca	2007
Pacheco Jr, Arthur B	1976		
Packard, Beth	1981	Extensionist of the Year	
Palmer, Arden	1974	Aja, Basilio	2004
Patterson, Dwight D	1980	Anderson, H Lynn	1989
Peterson, Cele	1971	Anderson, Oliver	2010
Pierce, Ted	1999	Bayless, Marge	1984
Prall, Alberta	1989	Bennett, Kristi & Robert	1996
Pretzer, Norman	1993	Bohnfalk, Gerry	2001
Prosser, Bob & Judy	2006	Boner, Lenora	1998
Rayner, Ronald	1992	Burnett, Laura & Don	1985
Richardson, Royce R	1972	Buzzard, Jean	1986
		Byestewa Jr, Conner	1997

Czaplicki, Cheryl	2000	Wuertz Family	2010
Flake, Franklin L. "Jake"	1999		
Goar, Cheryl	2004	Honorary Alumnus	
Gruenhagen, Gary & Carolyn	2009	Barkley, Robert K	2004
Hays, John	1988	Bogle, Jackson	1993
Houston, H. Stuart	1983	Booth, Elliott	1999
Kurtz, Andy	1987	Brown, Everett	1991
Owen, Claire	1989	Buzzard, Jean	1991
Pierce, Delbert	1991	Carlile, Marybeth	1992
Pound, Ernestine	2003	Christenson, James	2009
Quiroz, Jennie	1993	Clark Sr, Tom	1994
Riggs, Jim	2002	Fathauer, Walter	1990
Sandberg, Robert	2009	Faul, Arthur J	1990
Schlittenhart, Russell E	1982	Feaster, Carl	1992
Schnell, Danny, L	2000	Gatley, George	2001
Stryker, Frank	2005	Goldsberry, Ellen	1994
Stuhr, Wayne & Bonnie	2007	Goodman, John K	1994
Tsutumida, Karen	1995	Graham, Nancy Baggott	1998
Velazquez, Joe	1992	Hall, Michael	2004
Young, Elmer & Laverne	1994	Heiden, W Bruce	1991
		Hooper, Roger	1996
Friend of Agriculture		Hunt, Frank	1990
Craig, Larry	1994	Kaltenbach, Colin	2003
DeConcini, Dennis	1992	Knorr, Amy Jean	1993
Fazio, Steve	1977	Kolbe, Jim	1999
Paylore, Patricia	1976	Manning, Doris	2005
Pistor, William J	1964	Metcalf, Darrel S	1985
Vavich, Mitchell G	1975	Morrison, Marvin	1992
		Myers, Harold E	1985
Friend of CALS		Palmer, Arden	1994
Agnos, Shirley	2005	Pastor, Ed	1998
Burns, Jennifer	2007	Reich, Naomi	1998
Cunningham, George	2005	Sander, Eugene G	2000
Curtis, Robert O	2009	Schlittenhart, Russell E	1990
Finley, Dorothy	2007	Shim, Soyeon	2002
Jackson, Barbara	2010	Sossaman, James J	1993
Jackson, Timothy	2010	Upchurch, R Phillip	1996
Lang, Barry J	2009	Varney, Billy Joe	1984
Lynch, F James	2010	Vukasovich, Jolene	1996
McGonagill, Margy	2003		
Rogers, Kevin	2006	Honorary Bobcat	
		Dewhirst, Leonard W	1983
Friend of Rural Arizona		Fazio, Steve	1981
Hardt, A V	1992	Metcalf, Darrel S	1979
Heritage Family Award		Honorary Doctorate	
Groseta Family	2008	Aldrich, Daniel G	1985
Rovey Family	2009	Barkley, Robert K	2009

Basha, Nadine	2009	Boice, Robert G	1998
Boice, Fred	2010	Braden, Forrest	1999
Borlaug, Norman Ernest	1972	Brown, Everett	1992
Cardon, Bartley P	1980	Butler, Don	1999
Coulter, Kyle	1993	Cardon, Bartley P	1992
Cowden, E Ray	1966	Charles, Robert F	2010
Forbes, Robert Humphrey	1925	Chilton, Thomas	2010
Fox, Kel M	1973	Christopherson, Victor	2006
Gentry, Howard Scott	1990	Cullison, Jerry	2005
Hall, Michael	2007	Cuming, James	2005
Harrar, J George	1968	Dahozy, Louva	1994
Johnson, Marvin D	1993	Day, H Allan	1997
Miller Jr, Cecil H	1999	Dewhirst, Leonard W	1994
Niederhauser, John	1992	Dobson, Dwayne	2002
Norton III, John R	1986	Donaldson, John	2005
Pack, Arthur N	1959	Fathauer, Walter	1995
Patterson, Dwight D	1990	Faul, Arthur J	1995
Peebles, Robert Hibbs	1955	Faul, Mary	2006
Snyder, Elmer	1956	Flake, Franklin L	2002
Turley, Stan	1987	Fox, Kel M	1992
Walden, R Keith	1998	Francis Jr, J S	1994
Wallace, Henry A	1934	Goetz, Helen	1992
Wallace, Henry Cantwell	1923	Goldsberry, Ellen	2004
Wharton, Clifford	1995	Goodman, John K	2004
Wood, Sidney S	1984	Graham, Gordon	2006
Wuertz, Howard	1993	Graham, Nancy Baggott	2002
Yeutter, Clayton	2000	Harman, Sarah I	1998
		Harris, Charlotte C	2009
Leo B. Hart Humanitarian		Hays, John	1992
Alston, Lela M	2003	Heiden, W Bruce	1994
Kearns, Jean Ruley	1992	Heness, James K	2003
Wing, Cyndee	2000	Heness, Kelvin K	1998
Yrun-Calenti, Cindy	1997	Hickman, Bill & Gertie	2000
		Hine, James R	2001
Lifetime Award		Honea, Robert L	2004
Aguirre, Gilbert	2009	Humphrey, Marshall	1995
Anderson, H Lynn	1992	Jessen, Jon	2010
Anderson, Oliver	1995	Johnson, Marvin D	1992
Antle, Robert V	2010	Jones, Warren	1996
Armer Sr, Walter	1993	Kavena, Juanita Tiger	1992
Armstrong, Dennis	2010	Kearns, Jean Ruley	1995
Bayless, Marge	1992	Kightlinger, Ellen	2001
Beck, Wayne E	2010	Kneebone, Robert	2006
Benedict, James	1997	Knorr, Amy Jean	1999
Benedict, Samuel	1997	Knorr, Phillip	2007
Bingham, Norman J	2009	Kondora, Nicholas	2001
Boice, Fred	1996		

Lakin, Charles	1993	Walden, R Keith	1992
Lakin, Maxine	1992	Webb, Milton D	1999
Lane, Joseph J	1997	Weiler, Carl E	2004
Layton, Farrel	1992	Whiting, Frank	2008
Manning, Doris	2000	Wilson, David S	2008
Martin, Elizabeth	2009	Woods, Sidney S	1994
Martinez, Gilbert	1997	Wuertz , Wilbur H	1992
Mast, Jim	2006	Wuertz, Howard	2001
McClelland, Frances	1993	Youngker Sr, Charles F	2001
McClelland, Norman P	2007		
Mellor, Julia	2007	Outstanding Achiever Award	
Metcalfe, Darrel S	1993	Barnes, Jackson	2009
Miller Jr, Cecil H	1992	Bia, Johnson	2008
Miller, Duane	2000	Elson, Polly	2007
Moody, Robert	1992	Goucher, Stephen R	2009
Morrison, Marvin	1995	Hodges, Tanya M Rush	2010
Norton III, John R	1992	Manke, Beth	2008
O'Brien, J William	2003	Neeper, Jarral T	2010
O'Haco, Michel Joseph	1993	Schmalzel, Patti	2008
Palmer, Arden	2000	Vazsonyi, Alexander	2008
Patterson, Dwight D	1992	Waters, C R	2007
Paylore, Patricia	1995		
Peterson, Cele	2005	Professional Achievement Award	
Petterson, Sharon Rovey	2008	Bernal, Ray	2009
Pierce, Delbert	2000	Burke, Melinda W	2008
Prall, Alberta	1992	Cairo, George	2006
Rauschkolb, Roy	1999	Goldberg, Robert B	2003
Rayner, Ronald	2002	Hefferan, Colien	2004
Reed, Raymond E	2002	Lenkin, Heather	2005
Ronstadt, Karl	2008	Mace Jr, Arnett C	2004
Rovey, Emil	1992	Miller, Elin Duckworth	2006
Schlittenhart, Russell E	1992	Risser, Arthur	2005
Schrader, William	2007	Turbeville, Pamela	2007
Sheely, Ted	2006	Wild, Peggy	2001
Smallhouse, John Kingston	2002		
Smith, John Elliott	1998	Public Service Award	
Stevens, George	1992	Aja, Basilio	2001
Stevenson, Carl	1996	Bee, Timothy	2008
Stinson, Corinne	1997	Burns, Jennifer	2008
Stump, Bob	2003	Fritz, Fred J	1967
Subia, Joe	1992	Hays, John	2000
Tang, Esther Don	2002	Jones, Robert T	1998
Taylor, Shirley Jo H	2003	Lane, Joseph J	1998
Tidwell, James M	1996	Martori, Steve	
Tuttle, Donald	1996	McGinnies, William G	1981
Upchurch, R Phillip	2004	Napolitano, Janet	2008
		Shelton, Janice	2009

Sidney S. Woods Alumni Achievement

Booth, Nancy Davis	1994
Goetz, Helen	1998
Mellor, Julia	1998
Shelton, Franklin	2008
Taylor, Shirley Jo H	2000
Webb, James M	2009
Wuertz, Howard	1999

Slonaker Award

Elson, Polly	2000
Matanovich, Jamie Porter	1968
Otten, Pat	1993
Shelton , Cynthia Tidwell	1997

University Alumni Achievement Award

Gonzalez, I Miley	1998
Obregon, Francisco	1996

Young Achievers

Anable, Michael	1998
Bee, Keith	1995
Bogle, J C	1993
Daley, Douglas	2003
Delisa, Monica Hardt	2001

Donnelly, Jill Xian	2003
Goar, Cheryl	2001
Gundersen, Carl	1998
Haggard, Karen Salyers	2002
Hill, Becky Anderson	2000
Hodges, Tanya Rush	1997
Jones, Sheldon	2000
Kapfer Jr, William R	1999
Lewis, Kevin	1998
MacNeil, Brett	2001
McGinnis, Mark	1996
Miller, Elin Duckworth	1995
Ollerton, Robyn	1994
Pastor, Monica Kilcullen	1995
Pierson, Leslie	2005
Proctor, Michael	1998
Rademacher, Janet Hogan	1996
Schlittenhart, Arnie	1997
Shelton , Cynthia Tidwell	1996
Smallhouse, Andrew & Stefanie	2003
Todd, Shari Attebery	2000
White, April	2005
Witte, Deborah	2001

Appendix M. Key Driving Forces - Clusters of Related Trends

Selected from the CALS Strategic Plan for 2010-2020 (approved July 2010)

Each of these five “driving forces” is a cluster of trends that identifies the key directions where major changes are anticipated to occur in the next 10 to 20 years. The period less than 10 years is heavily influenced by current trends and the period over 20 years contains too many possible options to make for easy consideration. Each driving force cluster is composed of two terms (e.g., Science and Technology) followed by and two subtopics (e.g., Bioscience and Information Technology). The key implications for CALS are listed for each driving force.

Economic and Financial— • *Globalization* • *Recovery and Effects of 2007 Recession*

The economy is now global, US debt is increasing, and financial and other institutions are undergoing change. The 2007 recession-related activities will have a longer recovery period than historic recessions and the aftermath could last a number of years. The changes made as a result will impact our programs as well as our clients and ripple through all our focus areas. In the US the middle class is decreasing as a percentage of the population but on a worldwide basis it is increasing. More representative measurements of progress than simplistic indicators such as GDP are being developed, and the impacts of aging and entitlement programs will increase.

Implications for CALS: It is difficult to estimate future economic conditions and our resulting funding levels.

Physical and Social Infrastructure— • *Modernization* • *Sustainability*

Urbanization is growing. The central Arizona region is defined as the Arizona Sun Corridor Megapolitan Area, one of 20 such designations in the US. The infrastructure is both aging and changing, and includes buildings, transportation of goods and people, the production and transportation of energy and water, life-support systems, communications systems, and the governance mechanisms and roles of government that allow society to function. For the university to address this requires more than just resources or simple reorganizations.

Implications for CALS: This is a neglected area that will demand much more attention.

Population and Demographics— • *Aging and Diverse Population* • *Digital Natives as Students*

The first baby boomers turn 65 in 2011, several states are heading toward no “majority” cultural populations (increased diversity), and costs for medical care and retirements are unsustainable under current assumptions. The Digital Natives, students (born after about 1980) who grew up with modern information technology, learn and function differently than many faculty. There is no single answer but change is clearly happening.

Implications for CALS: Fundamental shifts in age and diversity will impact our programs and our funding.

Resources and Environment— • *Energy/Water/Food* • *Global Climate Change*

New sources of energy and more efficient water and energy use will increase. Food, both internationally and in the US, will become more vulnerable to climate change, urbanization, and alternative land uses. There are signals that the rate of food production gains over the years may lessen. Global climate change will have an impact on all aspects of the southwest and all our focus areas.

Implications for CALS: This is an area of increased emphasis and need.

Science and Technology— • *Bioscience* • *Information Technology*

Bioscience is continuing to make changes and the implications of those changes on society and agriculture are continuing to unfold. Information Technology brings “smart” everything (including sensor uses and robotics) and changes the way people work, learn, and interact socially. The web has moved from Web 1.0 (library, content) to Web 2.0 (collaboration, social networking), and is becoming “smarter” as it continues to evolve rapidly. These two changes ripple through many of our focus areas. Research and Innovations in some developing countries are increasing.

Implications for CALS: These areas will continue to be important to everyone.

The Bottom Line

We are entering a new era: many things are changing to a significant degree, all at the same time. When the economy recovers in several years we still will be facing additional challenges from these and other factors. The key words are 1) “smart change” on a continuing basis, 2) “system” or “integrated” as many things interact with one another, in expected and unexpected ways, 3) “new normal” because once we get through the impacts of the recession we will not return to the “old normal”, and 4) “sustainability” as an overarching concept (sustainability used here applies to many topics and not just the historic environmental area).

Appendix N. College Programmatic Focus 2010

This listing and descriptions of six focus areas is the 2010 version of the Strategic Plan. Earlier focus titles are described in Chapter 11.

Environment, Water, Land, Energy, and Natural Resources

Concerns the issues related to protection, enhancement and sustainable use of our basic environmental resources. These are soil, air, and water and the conservation, management and use of natural resources (wildlife, fisheries, rangelands, forests, watersheds, and flora and fauna ecosystems). Sustainable use of resources and the environment requires attention to public policy and an understanding of human factors as well as resource assessment, monitoring and management.

Plant, Insect, and Microbe Systems

Addresses the production and biology of plants used for food, fiber, livestock feed, industrial products, and for environmental and aesthetic purposes. Optimal and sustained productivity is based on understanding plants from the molecular to ecosystem levels, and implementing best management practices, including integrated pest management for insects, weeds, and pathogens

Human Nutrition, Health, and Food Safety

Focuses on the relationships of the life sciences to human health promotion, disease prevention and food safety. Programs use interdisciplinary approaches to discovering, translating, and applying how nutrition and physical activity can prevent disease and promote good health and well-being. The safety and quality of food for human consumption includes transportation, processing and consumer handling. Overall approaches range from basic cellular and molecular research to clinical human research studies and educational programs.

Animal Systems

Encompasses contemporary methods of biology to improve productivity and increase the quality, composition, safety, and desirability of animal products; promotes the use of integrated and long term sustainable production systems that are compatible with arid environments; enhances genetic diversity and biological performance; and improves the health and well-being of food and companion animals.

Children, Youth, Families, and Community

Focuses on economic, social, psychological and biological factors affecting individuals, families, and groups over their lifespan. Topics include effective parenting, violence prevention, resource management, responsible decision-making, economic well-being of families and consumers in the marketplace, leadership skill building, and reduced exposure of children to toxins via integrated pest management in schools.

Consumers, Marketplace, Trade, and Economics

Deals with supply-chain management and retailing processes from perspective of both the consumer and the business organization, global and national trade activities, and economic analyses of food and fiber as well as natural resources (including water, land, and the environment). It also contains the economic analysis and resource allocation processes of businesses, governments, and consumers and the strategic analysis the environments in which market participants operate.

Appendix O. Overview of Academic Departmental Name Changes 1905-2010

Changes reflect the change in academic department compared to 5 years earlier.

<i>Time Period</i>	<i>New Departments</i>	<i>Name Changes</i>	<i>Remove Departments</i>	<i>Total Departments</i>
1905	0	0	0	1
1910	0	0	0	1
1915	6	0	1	6
1920	3	1	0	9
1925	2	0	0	11
1930	2	1	0	13
1935	0	1	0	13
1940	2	3	0	15
1945	0	0	0	15
1950	0	3	0	15
1955	0	5	0	15
1960	2	2	0	17
1965	0	0	1	16
1970	0	0	0	16
1975	2	4	2	14
1980	0	1	3	11
1985	0	1	0	11
1990	2	1	1	12
1995	0	2	0	12
2000	0	3	0	12
2005	0	1	1	11
2010	0	2	0	11

Appendix P. Faculty Memberships in Professional Associations

This listing of professional associations indicates the diversity of backgrounds and interests represented by college faculty. It includes 257 international, national or regional associations reported in faculty annual reports for calendar years 2006 and 2009. The listing does not include state or local associations. Memberships are indicative of the range of disciplines within the College of Agriculture and Life Sciences.

Academy of Clinical Psychological Science
Agricultural Biotechnology Communicators
Agricultural Communicators of Tomorrow
Agricultural Economics Society (British)
Agronomy Society of America
American Agricultural Economics Association
American Agricultural Law Association
American Animal Science Association
American Association Endocrinology
American Association for Agricultural Education
American Association for Cancer Research
American Association for Family and Consumer Sciences
American Association for Laboratory Animal Science
American Association for the Advancement of Science
American Association of Agricultural Extension Agents
American Association of Agriculture Educators
American Association of Animal Sciences
American Association of Bovine Practitioners
American Association of Diabetes Educators
American Association of Evaluators
American Association of Family and Consumer Sciences
American Association of Financial Counselors and Educators
American Association of Leadership Educators
American Association of Swine Veterinarians
American Association of Teacher Educators in Agriculture
American Association of Veterinary Laboratory Diagnosticians
American Association of Veterinary Medical Colleges
American Bar Association
American Cancer Society
American Chemical Society
American College of Nutrition
American College of Sports Medicine
American College of Veterinary Pathologists
American Collegiate Retailing Association
American Council of Young Political Leaders
American Council on Consumer Interests
American Counseling Association
American Dairy Science Association
American Diabetes Association
American Dietetic Association
American Economics Association
American Evaluation Association
American Fisheries Society
American Gastroenterological Association
American Geophysical Union

American Heart Association
American Institute of Biological Sciences
American Institute of Medical and Biological Engineering
American Kenaf Society
American Law and Economics Association
American Marketing Association
American Meat Science Association
American Meteorological Society
American Muscular Dystrophy Association
American Ornithologists Union
American Peanut Research and Education Society
American Pharmacognosy Society
American Phytopathological Society
American Planning Association
American Pomological Society
American Psychological Association
American Public Health Association
American Quarter Horse Association
American Rabbit Breeders Association
American School Health Association
American Society for Animal Science
American Society for Biochemistry and Molecular Biology.
American Society for Cell Biology.
American Society for Clinical Nutrition
American Society for Endocrinology
American Society for Horticultural Science
American Society for Microbiology
American Society for Nutrition
American Society for Parental and Enteral Nutrition
American Society for Plant Biologists
American Society for Testing and Materials
American Society for Virology
American Society of Agricultural and Biological Engineers
American Society of Agronomy
American Society of Animal Science
American Society of Civil Engineers
American Society of Landscape Architects
American Society of Mammalogists
American Society of Nutrition
American Society of Nutritional Sciences
American Society of Parasitologists
American Society of Parenteral & Enteral Nutrition
American Society of Photogrammetry and Remote Sensing
American Society of Plant Biologists
American Society of Plant Physiologists
American Society of Preventive Oncology
American Society of Tropical Medicine and Hygiene
American Society of Veterinary Clinical Pathology
American Solar Energy Society
American Statistical Society
American Tilapia Association
American Veterinary Medical Association

American Vocational Association
American Water Resources Association
American Water Work Association
Asia Remote Sensing Research Information Network
Association for Communication Excellence in Agriculture, Natural Resources, and Life and Human Sciences
Association for Fire Ecology
Association for International Agricultural and Extension Educators
Association for Leadership Educators
Association for Living History, Farm, and Agricultural Museums
Association for Research on Nonprofit Organizations and Voluntary Action
Association for Supervision and Curriculum Development
Association for Temperate Agroforestry
Association for the Advancement of Industrial Crops
Association of American Geographers
Association of Childhood Education International
Association of Education and Research Greenhouse Curators
Association of Environmental and Resource Economists
Association of Experiential Education
Association of Fire Ecology
Association of International Agricultural and Extension Educators
Association of Leadership Educators
Association of Natural Bio-Control Producers
Association of Natural Resource Extension Professionals
Association of Official Seed Certifying Agencies

Biophysical Society
British Mycological Society

Cooper Ornithological Society
Crop Science Society of America

Ecological Society of America
Econometrics Society
Entomological Society of America
Equine Science Society
European Association for Cancer Research
European Association of Agricultural Economics
European Association of Consumer Research
European Association of Fish Pathologists
European Geophysical Society

Family and Community Educators
Forest History Society
Forest Products Society

Genetics Society
Golf Course Superintendents Association of America

Indian Association of Hydrologists
Institute of Biological Engineering
Institute of Biomedical Sciences and Biotechnology
Institute of Electrical and Electronics Engineers

Institute of Food Technologists
International Arid Lands Consortium
International Association for Dental Research
International Association for Food Protection
International Association for Society and Natural Resources
International Association for the Study of Common Property
International Association of Agricultural Economics
International Association of Agricultural Information Specialists
International Association of Facilitators
International Association of Fish and Wildlife Agencies
International Association of Landscape Ecologists
International Association of Milk, Food, and Environmental Sanitation
International Association of Relationship Research
International Association of Wildland Fire
International Molecular Plant-Microbe Interactions Society
International Society for Advancement of Cytometry
International Society for Analytical Cytology
International Society for Horticultural Science
International Society for Microbial Ecology
International Society for Quality of Life Studies
International Society for Range Management
International Society of Arboriculture
International Society of Arborists
International Society of Citriculture
International Society of Horticultural Science
International Society of Plant Molecular Biology
International Society of Tropical Foresters
International Soil Science Society
International Solar Energy Society
International Test and Evaluation Association
International Textiles and Apparel Association
International Water Association
International Weed Science Society
Irrigation Association

Muscular Dystrophy Association
Mycological Society of America

National Association College Teachers of Agriculture
National Association County Agricultural Agents
National Association for Agricultural Education Life Member
National Association for College Teachers of Agriculture
National Association for Community Development.
National Association for Family and Community Education
National Association for Family and Community Leadership
National Association for Family and Consumer Sciences
"National Association for Financial Counselors, Planners and Educators"
National Association for the Education of Young Children
National Association for Wastewater Recycling Association
National Association of Agricultural Agents
National Association of Agricultural Economics Administrators
National Association of Agricultural Educators

National Association of Agricultural Extension Agents
National Association of Colleges and Teachers of Agriculture
National Association of Community Development Extension Professionals
National Association of Conservation Districts Community Wildfire Committee
National Association of County Agricultural Agents
National Association of Extension 4-H Agents
National Association of Family and Community Education
National Cattlemen's Beef Association
National Extension Association Family and Consumer Sciences
National FFA Organization
National Restaurant Association
National Retail Federation
National Rifle Association
National Society for Experiential Education
National Vocational Agriculture Teachers Association
Native American Botanics
Native Plant Society
Native Women and Youth in Agriculture
Native Women in Agriculture
Natural Resources Education
Nature Conservancy
Nature Structural Biology

Organization of Racing Investigators

Remote Sensing Society

Society for Adolescent Medicine
Society for Applied Anthropology
Society for Biological Inorganic Chemistry
Society for Conservation Biology
Society for Economic Botany
Society for Experimental Biology and Medicine
Society for Invertebrate Pathology.
Society for Nutrition Education
Society for Photo-Optical Instrumentation Engineers
Society for Range Management
Society for Research on Adolescence
Society for Research on Child Development
Society for the Study of Reproduction
Society of American Foresters
Society of Endocrinology
Society of Invertebrate Pathology
Society of Nematologists
Society of Nutrition Education
Society of Protozoologists
Society of Public Health Educators
Soil and Water Conservation Society
Soil Science Society of America
Southwest Indian Agricultural Association
Southwest Livestock Marketing Association
Southwest Regional Phenology Network

Southwest Vegetation Management Association
Southwestern Association of Naturalists

The American Ornithologists' Union
The American Physiological Society
The Protein Society
The Wildlife Society

Weed Science Society of America
Western Agricultural Economics Association
Western Economic Association
Western National Parks Association
Western Parks and Conservation Association
Western Pecan Growers Association
Western Soil Science Society
Wildlife Disease Association

Appendix Q. Faculty Involved in Preparing Leaders for Tomorrow

Many of the graduates of these programs have become administrators or served in other leadership positions, and most of them here. So we grow our own as well as bring in outside administrators – this makes a nice mix of experience elsewhere as well as here.

Association of Public and Land-Grant Universities (APLU)

The APLU has a range of programs that provide leadership and management experience to beginning administrators or faculty interested in pursuing an administrative career. Some focus on career paths within a college of agriculture or the department of agriculture and others are general and prepare for any career path, but the participants are all members of a land-grant university. Prior to 2005 there were programs organized by university activity – research (through the Experiment Station Committee on Organization and Policy), instruction (through the Academic Committee on Organization and Policy), and extension (through the National Extension Leadership Development Program under the Extension Committee on Organization and Policy). The current approach is called Lead 21 – Leadership Development for the 21st Century.

APLU also has developed a “graduate level” leadership program known as the Food Systems Leadership Institute (FSLI) which offers leadership development to upper-level leaders in higher education, government, and industry to prepare them to meet the leadership challenges and opportunities of the future.

Food Systems Leadership Institute (FSLI)

2009-2010 Jeffery Silvertooth, Soil, Water and Environmental Science

National Extension Leadership Development (NELD)

This program began in 1989 and in 2005 merged into Lead21 (Leadership for the 21st Century)

1992-1994 Deborah Young, Cooperative Extension, Yavapai County Extension Director

1991-1992 Paul Baker, Cooperative Extension, Pesticide Information and Training Office

1991-1992 James Wade, Cooperative Extension, Associate Director, Cooperative Extension

Western Extension Leadership Development Program (WELD)

This program was created in 1999 and the first class was in 2001-2002. The purpose was to create an awareness of leadership styles, develop skills, implement a change activity for the organization, and participate in seminars. These internships are for 15 months, beginning in odd numbered years, and focus on Cooperative Extension faculty in 13 western states and territories.

2011-2012

Amy Parrott, Yuma County Extension

Brent Strickland, La Paz County Extension

2009-2010

Daniel McDonald, Pima County Extension

2007-2008

Melvina Adolf, Greenlee County Extension

Cathy Martinez, Pinal County Extension

Kurt Nolte, Yuma County Extension

2005-2006

Everett Rhodes, Arizona Cooperative Extension and Project Centrl

Jeff Schalau, Yavapai Cooperative Extension

2003-2004

Darcy Dixon, Pinal County Extension

Christopher Jones, Gila County Extension

2001-2002

Joyce Alves, Apache County Extension

Barry Bequette, Yuma County Extension

Sharon Hoelscher Day, Maricopa County Extension

Stephen Husman, Maricopa County Extension

Juanita O'Campo Waits, Navajo County Extension

Lead21 (Academic and Experiment Station Policy Committee Leadership Training)

The current name of the program is Lead21, and the first class under this name was in 2005-2006. The previous name was ESCOP/ACOP, which began in 1990-91. The Lead21 develops leaders in land-grant institutions and their strategic partners who link research, academics, and extension in order to lead more effectively in an increasingly complex environment.

- 2010-2011 Mark Riley, Agricultural and Biosystems Engineering
- 2009-2010 Mitch McClaren, School of Natural Resources and the Environment
- 2008-2009 Ursula Schuch, Plant Sciences
- 2008-2009 Joseph Hiller, American Indian Programs
- 2006-2007 Randy Ryan, Agricultural Experiment Station and Plant Sciences
- 2005-2006 Lynne Borden, School Family and Consumer Sciences
- 2005-2006 Kevin Fitzsimmons, Soil, Water and Environmental Science
- 2004-2005 Paul Kohn, Academic Programs
- 2004-2005 Judy Brown, Plant Sciences
- 2004-2005 Edward Martin, Maricopa Agricultural Center and Cooperative Extension
- 2003-2004 Raina Maier, Soil, Water and Environmental Science
- 2003-2004 Angela Taylor, School Family and Consumer Sciences
- 2002-2003 Ronald Allen, Animal Sciences
- 2002-2003 Mary Ann Eastlick, , School Family and Consumer Sciences
- 2002-2003 Christina Kennedy, , Plant Pathology
- 2002-2003 Billye Foster, , Agricultural Education
- 2001-2002 Leland Pierson, Plant Pathology (now a division in Plant Sciences)
- 2000-2001 Dennis Ray, Plant Sciences
- 1999-2000 Jeff Silvertooth, Plant Sciences
- 1998-1998 Wanda Howell, Nutritional Sciences
- 1997-1998 Jack Elliot, Agricultural Education
- 1995-1996 Paul Krausman, School of Natural Resources (no longer at University of Arizona)
- 1993-1994 David Cox, Agricultural Education
- 1991-1992 David Lei, Nutritional Sciences (no longer at University of Arizona)
- 1990-1991 Soyeon Shim, School of Family and Consumer Sciences (first class)

University of Arizona Academic Leadership Institute

The Institute is open to faculty and shared governance leaders, academic and Administrative department heads, associate and assistant deans, and individuals identified as emerging leaders. First awarded in 2010-2011.

- 2010-2011 Stuart March, School of Natural Resources and the Environment
- 2010-2011 Monica Pastor, Maricopa County Cooperative Extension
- 2010-2011 Mark Riley, Agricultural and Biosystems Engineering

NON-UNIVERSITY PROGRAMS

American Council on Education Academic Fellows

This program selections about 30-40 people annual from the United States and its territories to serve a one year administrative fellowship at their institution or another, along with several week long seminars with various academic leaders. The first two fellowships for the University of Arizona were from the University of Arizona College of Agriculture; while there have been seven Fellows from the University of Arizona through 2003.

1965-1966 Robert H. Maier, Department Agricultural Chemistry and Soils (first class of fellows).

1978-1979 Roger L. Caldwell, Department of Plant Pathology

Bryn Mawr College Summer Institute for Women in Higher Education Administration

This institute is a 6 week residency program that focus on women (the University of Arizona funded one person per year and CALS funded an additional person beginning in 1991, until Bryn Mawr restricted the university to only one candidate).

2007 Billye Foster (2007), Agricultural Education

2000 Wanda Howell (2000), Nutritional Sciences

1996 Deborah Young (1996), Cooperative Extension

1994 Soyeon Shim (1994), School of Family and Consumer Sciences

1993 Mari Wilhelm (1993), School of Family and Consumer Sciences

1992 Shirley O'Brien (1992), School of Family and Consumer Sciences

1991 Jerelyn Schultz (1991), School of Family and Consumer Sciences

Appendix R. Bart Cardon's Epilogue to First CALS History Report

One hundred years is now history. The question is where does the college go from here. Clairvoyance is not a common gift to mankind so the actual future will unfold only as it happens. However, based on our history and recognizing social needs and trends, some fair estimates of future can be made, at least as it relates to the next few decades.

The land-grant system of institutions, for which the University of Arizona is a part, was initiated more than 120 years ago. Its primary objective was the education to the common man. It was judged that the best way to accomplish this mission was to teach the common man the arts and sciences of agriculture and mechanics. In 1862, when President Lincoln signed the enabling Morrill, or Land-Grant Act, the majority of the population was working in agriculture or mechanics. Hence schools, or colleges, of agriculture and engineering were included as an integral part of each land-grant institution.

This mission, as it relates to the College of agriculture at the University of Arizona, has not changed. It is true that the percentage of citizens engaged in the basic production of food and fiber necessary to feed, clothe and house our society has been reduced greatly as compared with the mid-1800s. However, there has been almost a corresponding increase in the segment of population involved in the processing, preserving, storing and distributing of food and fiber. If one also includes persons involved in the agribusinesses such as the machinery, fertilizer and chemical industries that support the basic producer, then the total percentage of the population involved agriculture approaches the percentage involved at the time the land-grant system was inaugurated.

Initially, the primary focus of colleges of agriculture at the State land-grant institutions and at the U.S. Department of Agriculture was on production. As research and technical development was stimulated by the agricultural experiment stations within the system, the percentage of society engaged in producing the food and fiber necessarily was reduced steadily. Unfortunately the expression of the basic mission of the land-grant system also was narrowed as increasing emphasis was placed on production. This narrowed focus inevitably led to a communication and understanding gap between production agriculture and the rest of society. When that trend is coupled with the strain on the environment that is inevitable with an expanding population and the technological development needed to support it, one can understand better the current conflict between many urban populations and agriculture. We in agriculture must accept our share of the blame, for a mission, as it relates to agricultural education, research and technical development, was to all members of society.

As we face the future I feel some trends of the past will continue into the future. Technological development will continue at an ever increasing pace. Displacement of manpower by technology will continue, resulting in a further reduction of the percentage of population that can be classified as farmers and ranchers. Conversely the same trend will increase the agribusiness segment of our society. The population will continue to grow at least for several decades. And the established trend of moving to milder climates like that of the Southwest will continue. All this will place more strain on the environment as well as the management and use of renewable natural resources. Since this is, in a broad sense, agriculture, the challenge to the agriculture colleges is immense.

This college must focus on the basic mission of the land-grant system expressed as it was established in 1862. We must focus not only on special interest groups, that we must represent agriculture, as it relates to education, research and technical developments, for all parts of society.

The College of Agriculture at the University of Arizona has completed 100 years of service to the citizens of Arizona. From a modest beginning it has grown and matured to the eminent position in arid-land education and research that it occupies today. I am confident that it is ready and has accepted the challenges of the future. Our best wishes to all. (Written by Bart Cardon in 1985)

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Further Reading

First CALS History Book – 1885-1985

The University of Arizona College of Agriculture: A Century of Discovery. By Richard Haney, Hector Gonzalez and Patricia Paylore. 324 pages (1985). Hardcover.

This book was prepared for the University of Arizona Centennial and contains a wealth of information about the College from its formative days to its transformation to a modern college. It also contains a number of photographs, beginning with 1890. Eight chapters cover various time periods and appendices list deans of the College and directors of the Arizona Agricultural Experiment Station, Resident Instruction, and the Cooperative Extension service. Also included is a list of honorary doctorate of science degrees conferred and a list of distinguished citizen award recipients. Illustrations include a number of sites around the state, various campus buildings, and selected people.

Second CALS History, Magazine Format – 1980-2010

The College of Agriculture and Life Sciences: A Brief History from 1980 to 2010. By Roger Caldwell. 24 pages (2011). This magazine provides an overview of the story and general themes in the longer book version. A copy is posted on the CALS website: cals.arizona.edu/dean (select history).

References and Footnotes in this Book

Books and documents listed in “References” are generally broad in scope. Footnotes generally address a specific point or a particular to the chapter.

Index

- 4-H Youth Development, 101, 102, 113, 157, 222, 223, 226
- Administrative Complexity of CALS, 120
- Adolf, Malvina, 215
- Advisory Councils
- Administrative, 196
 - Alumni, 30, 112, 196, 197
 - Appointed Professionals, 27, 196
 - Department Heads, 197
 - Extension Directors, 196
 - Faculty, 27, 196, 197
 - Staff, 27
- Ag 100 Council, 30, 228, 229
- Agricultural and Home Economics
- Education
 - See* Departments and Units
 - Agricultural Education, 13, 58
- Agricultural Biochemistry
- See* Departments and Units
 - Nutritional Sciences, 32, 66, 69, 126, 174
- Agricultural Centers
- Campus, 60, 89, 107, 112, 120, 137, 145, 202, 203, 206, 207, 226
 - Citrus, 158
 - Marana, 107
 - Maricopa, ii, 9, 20, 21, 100, 107, 125, 140, 141, 142, 143, 144, 145, 147, 152, 157, 158, 174, 188, 202, 222, 246
 - Red Rock, 107, 202
 - Safford, 107, 202
 - V Bar V Ranch, 107, 202, 203, 214
 - Yuma, 107, 145, 158, 203, 223
- Agricultural Chemistry and Soils
- See* Departments and Units
 - Soil, Water and Environmental Science, 12, 16, 20, 52, 81, 129, 162, 247
- Agricultural Communications and Computer Support
- See* Departments and Units
 - Educational Communications and Technologies, 58
- Agricultural Economics
- See* Departments and Units
 - Agricultural and Resource Economics, 13, 55, 56, 139, 166, 239, 241, 242, 244
- Agricultural Engineering
- See* Departments and Units
 - Agricultural Biosystems
 - Engineering, 13, 16, 52, 54, 81, 96, 123, 129, 172
- Agricultural Sciences Communications
- See* Departments and Units
 - Educational Communications and Technologies, 122, 160
- Agronomy and Plant Genetics
- See* Departments and Units
 - Plant Sciences, 16, 79, 130
- Ajami, Amir, 114, 214, 249
- Allen, Ronald, 60, 211, 227, 246, 249
- Alves, Joyce, 214, 246
- Animal Husbandry
- See* Departments and Units
 - Animal Sciences, 12, 20, 51, 60, 85, 168
- Animal Pathology
- See* Departments and Units
 - Veterinary Science and Microbiology, 13, 85
- Anthony, Bryan, 213
- Arboretum
- Boyce Thompson, 79, 105, 126, 133, 174, 205, 211, 221
 - Campus, 79, 81, 205
- Arizona 4-H Youth Foundation
- See* Development and Alumni, 113
- Arizona Growth Trends, 5
- Arizona Research Labs
- Center for Insect Science, 63, 65, 72
- Arizona Town Hall, v, 34, 49, 188
- Astroth, Kirk, 210
- Awards
- Administrator of the Year, 31, 224
 - Agriculture Alumni Achievement, 228, 229
 - Alumni Appreciation Award, 30, 228, 229
 - Alumni Association Centennial Achievement, 228
 - Alumnus of the Year, 30, 228, 229
 - Appointed Professional Award of Excellence, 31
 - Bart Cardon Early Career Faculty Teaching Award, 31, 218
 - Bart Cardon Sustained Excellence in Teaching Award, 31, 219
 - Bear Down, 30, 228, 230
 - Carol Knowles Award for Excellence, 30, 228, 230
 - Centennial Medallion, 228, 230
 - Distinguished Citizen, 30, 228, 230
 - Early Achievement, 30, 228, 231
 - Extension Faculty of the Year, 219
 - Extensionist of the Year, 30, 228, 231
 - Faculty Teaching, 31, 219
 - Friend of Agriculture, 30, 228, 232
 - Friend of CALS, 30, 228, 232
 - Friend of Rural Arizona, 228, 232
 - Heritage Family, 30, 228, 232
 - Honorary Alumnus, 30, 228, 232
 - Honorary Bobcat, 30, 228, 232
 - Leo B. Hart Humanitarian, 228, 233
 - Lifetime Award, 30, 228, 233
 - Outstanding Achiever, 30, 228, 234
 - Outstanding Efforts in Development Award, 31, 226
 - Outstanding Staff, 221, 223
 - Outstanding Staff in Cooperative Extension, 31
 - Outstanding Staff in Research, 224
 - Outstanding Staff in Support of Instruction and Student Services, 223
 - Outstanding Team, 31, 225
 - Professional Achievement, 30, 228, 234
 - Public Service, 30, 228, 234
 - Research Career Development, 31, 220
 - Research Faculty of the Year, 31, 220
 - Sidney S. Woods Alumni Achievement, 228
 - Slonaker, 228, 235
 - University Alumni Achievement, 228, 235
 - Year-to-Year Appointed Professional Award of Excellence, 224
 - Young Achievers, 30
- Ax, Roy, 60, 172, 211, 219
- Ayer, Harry, 151, 249
- Bacon, Dean, 213
- Barney, Glen, 213
- Bartocho, Bodo, 114, 214
- Beattie, Bruce, 55, 211
- Bequette, Barry, 216, 246
- Bernays, Elizabeth, 63, 172, 212, 217
- Berry, James, 69, 212
- Bierner, Mark, 211
- Biles, Jimmy, 214
- Biology 21 Roadmap, 40, 46
- Blackledge, William, 214
- Blackwell, Garrett, 215
- Bowers, William, 63, 212, 217
- Brandau, William, 215
- Burnham, John, 138, 162
- Burt, Beryl, 136, 137, 210
- Byrne, David, 63, 139, 156, 212, 249
- Cable, Curtis, 210
- Caldwell, Roger, i, vii, 122, 123, 138, 211, 216, 252
- Camp, Carlton, 216
- Campbell, Stephen, 215
- Card, Cy, 85, 210, 213
- Cardon, Bartley, iii, 2, 9, 17, 19, 20, 22, 29, 31, 42, 46, 76, 91, 92, 95, 97, 100, 113, 135, 138, 141, 142, 144, 145, 146, 147, 162, 163, 171, 188, 209, 218, 219, 227, 248
- Carpenter, Edwin, 123, 249
- Cartee, William, 215
- Carter, Herbert, 45, 76, 140
- Carter, Ruth, 215, 226
- Casler, Robert, 249
- Cate, Rodney, 66, 212
- Chamie, Jim, 29, 122, 216, 225, 249
- Changes in Society, Science and Learning, 4
- Christenson, James, 99, 120, 172, 196, 209, 211, 249
- Christopherson, Victor, 66, 212, 249
- Clark, Lee, 213
- Cluff, Ronald, 215
- College Administration
- Name Change, 45, 47
- College Communications and Publications, ii, 125, 126
- College Focus Areas
- Animal Systems, 43, 104, 107, 185, 237
 - Consumers, Marketplace, Trade, and Economics, 43, 185
 - Environment, Water, Land, Energy, and Natural Resources, 43, 107, 185, 237
 - Human Nutrition, Health and Food Safety, 104, 107

- Plant, Insect, and Microbe Systems, 43, 185, 237
- Collier, Robert, 60, 211
- Computer Applications Group
See Departments and Units
- Educational Communications and Technologies, 119, 122, 123, 200, 216
- Controlled Environment Agriculture Center, 75, 77, 206
- Cooperative Extension Counties
 Apache County, 203, 214, 223, 246
 Cochise County, 157, 203, 214, 219
 Coconino County, 203, 215
 Gila County, 141, 203, 215, 219, 223, 246
 Graham County, 203, 215, 225, 230, 232, 233
 Greenlee County, 203, 215, 221, 245
 La Paz County, 100, 203, 215, 219, 221, 223, 245
 Maricopa County, ii, 7, 9, 20, 21, 92, 100, 107, 122, 125, 140, 141, 142, 143, 144, 145, 146, 147, 152, 157, 158, 170, 173, 174, 188, 199, 202, 203, 213, 215, 219, 221, 222, 223, 246
 Mohave County, 203, 215
 Navajo County, 196, 203, 215, 246
 Pima County, 14, 92, 157, 202, 203, 215, 221, 222, 223, 225, 226, 245
 Pinal County, 92, 145, 203, 216, 219, 245, 246
 Santa Cruz County, 142, 144, 146, 165, 203, 216
 Yavapai County, 203, 216, 219, 223, 245
 Yuma County, 52, 59, 92, 95, 96, 100, 107, 112, 123, 129, 133, 141, 145, 148, 149, 158, 162, 168, 169, 170, 173, 199, 203, 214, 216, 223, 245, 246
- Cortner, Hanna, 88
- Cory, Dennis, 55, 211
- Cox, David, 23, 57, 95, 98, 113, 122, 137, 209, 211, 214, 216, 227, 246, 249
- Creech, Mary Lou, 215
- Crowder, Larry, 63, 212
- Dairy Science
See Departments and Units
- Animal Sciences, 13, 60, 61, 239
- Department 1982 Missions, 53, 55, 58, 60, 63, 67, 69, 73, 77, 79, 82, 85
- Department 1993 Missions, 53, 56, 58, 61, 64, 67, 70, 73, 79, 82, 85
- Department 2010 Missions, 53, 56, 58, 61, 64, 67, 70, 73, 77, 79, 82, 86
- Departmental and Unit Centers
 Arid Lands Information Center (OALS), 77
 Arizona Genomics Institute (PLS), 80, 204
 Arizona Meteorological Network (SWES), 20, 84, 130, 205
 Arizona Pest Management Center (ENTO), 65, 199, 205
 Arizona Remote Sensing Center (OALS), 75, 77, 199
 Center for Physical Activity and Nutrition (NSC), 71, 200
- Center for Rural Leadership (Project CENTRI), 206
- Controlled Environment Agriculture Center, 9, 54, 132, 206
- Desert Research Unit (OALS), 75, 77, 206
- Extension Arthropod Resistance Management Laboratory (ENTO), 206
- Karsten Turfgrass Research Facility (PLS), 80, 202, 207
- Lundgren Center for Retailing (FCS), 9, 188
- Pesticide Information and Training Office (ENTO), 94, 140, 245
- Sonoran Desert Station for Arthropod Research (ENTO), 65, 207
- Terry J. Lundgren Center for Retailing (FCS), 66, 68, 129, 208
- Water Quality Center (SWES), 84, 130, 199, 208
- Departments and Units
 Agricultural and Resource Economics, 55, 56, 57, 197, 201, 204, 211, 218, 219, 220, 223, 224, 225, 227
 Agricultural Biosystems Engineering, 54, 129, 132, 206, 207
 Agricultural Education, 12, 13, 27, 53, 57, 58, 59, 95, 122, 172, 197, 198, 201, 204, 211, 218, 219, 221, 223, 239, 242, 246, 247
 American Indian Programs, 93, 102, 149, 201, 216, 246
 Animal Sciences, 20, 27, 39, 51, 60, 61, 62, 72, 149, 150, 197, 201, 203, 204, 211, 218, 219, 220, 221, 223, 224, 225, 226, 227, 239, 246
 Development and Alumni, ii, 19, 25, 30, 50, 93, 112, 113, 114, 121, 124, 125, 136, 137, 162, 170, 173, 174, 196, 197, 198, 201, 214, 222, 228, 229, 230, 235, 249
 Educational Communications and Technologies, vii, 105, 118, 121, 122, 160, 200, 201, 216, 221
 Entomology, 12, 13, 51, 63, 64, 65, 72, 81, 128, 149, 156, 172, 188, 197, 200, 201, 204, 208, 212, 217, 218, 219, 222, 224
 International Agriculture Programs, 29, 114, 214
 Nutritional Sciences, 42, 51, 69, 70, 71, 72, 96, 97, 123, 129, 172, 197, 201, 204, 206, 212, 218, 219, 220, 221, 222, 224, 225, 240, 246, 247
 Office of Arid Lands Studies, 2, 4, 14, 28, 43, 45, 46, 49, 51, 73, 76, 188, 199, 201, 202, 220, 221, 225
 School of Family and Consumer Sciences, 51, 58, 66, 68, 72, 82, 96, 97, 126, 128, 129, 159, 162, 174, 196, 197, 201, 212, 218, 219, 220, 221, 223, 224, 225, 226, 227, 239, 242, 243, 246, 247
 School of Natural Resources and the Environment, 28, 72, 76, 77, 88, 90, 107, 202, 204, 211, 219, 246
 School of Plant Sciences, 16, 34, 46, 47, 51, 78, 79, 80, 82, 84, 85, 128, 130, 131, 132, 133, 134, 155, 174, 188, 197, 201, 203, 204, 206, 212, 217, 218, 219, 220, 221, 222, 224, 225, 226, 227, 246
- Soil, Water and Environmental Science, 204, 224
- Veterinary Science and Microbiology, 51, 82, 85, 197, 201, 203, 213, 218, 220, 221, 222, 224
- Water Resources Research Center, 28, 51, 84, 87, 93, 199, 202, 213, 218, 221, 224, 227
- Desert Research Unit, 62, 206
- Development and Alumni
 Alumni Council, 30, 112, 196, 197
 Arizona 4-H Youth Foundation, 113, 214
- Dewhirst, L. W., 105, 136, 138, 141, 145, 209, 249
- Distinguished Professors, 31, 126, 127, 155, 217, 218
- Dixon, Darcy, 216, 219, 246
- Dunn, Douglas, 214
- Eberline, Geraldine, 112, 113, 136, 214
- Educational Communications and Technologies
See Departments and Units
- Educational Communications and Technologies, vii, 105, 118, 122, 160, 200, 201, 216, 221
- Elliot, Jack, 57, 218, 219, 246, 249
- Else, Peter, 213, 226
- Endowed Chairs
 Bartley P. Cardon Endowed Chair n Agribusiness and Policy, 227
 Bud Antel Endowed Chair for Excellence in Agriculture and Life Sciences, 227
 Carl E. and Patricia Weiler Endowed Chair for Excellence in Agriculture and Life Sciences, 227
 Fitch-Nesbitt Endowed Chair, 227
 John and Doris Norton Endowed Chair in Fathers, Parenting and Families, 227
 PetSmart Professor of Practice, 227
 Phyllis and Roy Hislop Endowed Chair in Animal Sciences, 227
 Porterfield Endowed Chair in Plant Sciences, 227
 Race Track Industry Program Endowed Chair, 227
- Enke, Fred, 21, 138, 141, 142, 144, 146
- Environment, iv, 10, 33, 42, 43, 46, 51, 54, 57, 61, 72, 73, 79, 80, 102, 104, 107, 126, 132, 139, 185, 188, 192, 197, 200, 201, 202, 206, 212, 225, 236, 237, 251
- eXtension, 109
- Facilities, ii, 94, 187, 201, 202
- Faculty Tour, 173
- Family and Consumer Resources
See Departments and Units
- Family and Consumer Sciences, 66, 67, 68, 129, 171, 172, 201, 219, 220, 222, 223, 226
- Farlin, Stanley, 215
- Federal Legislation
 Hatch Act, 3
 Morrill Act, 3, 106
 Smith-Lever Act, 3, 4
- Feldman, William, 211
- Fish, Dean, 216

- Fitzsimmons, Kevin, 114, 214, 246, 249
 Flint, Mable, 215
 Flynn, 215, 249
 Flynn, Cynthia, 215, 249
 Forestry Program, 45
 Foster, Dan, 213
 Foster, Kenneth, 43, 76, 114, 211, 214, 249
 Fowler, Ruth Ann, 215
 Frisch, Edward, 108, 155, 156, 210, 249
 Frost, William, 215
 Gardener, Wilford, 211
 Genetics, 7, 32, 34, 47, 63, 64, 75, 78, 80, 81, 126, 127, 128, 149, 152, 172, 176, 182, 188, 241
 Giacomelli, Gene, 132, 133, 249
 Gibson, Richard, 216
 Gifts, 112, 113
 Gilbertson Mycological Herbarium
 See Herbarium (Mycological), 79, 206
 Glenn, Edward, 249
 Goldberg, Robert, 126, 127, 249
 Goll, Darrel, 69, 212, 220
 Goodluck, Teddy, 214
 Graham, Gordon, 113, 122, 136, 172, 249
 Graumlich, Lisa, 72, 212
 Gregg, Frank, 72, 212
 Grumbles, Robin, 215
 Hagedorn, Henry, 63, 212
 Haney, Richard, 249, 252
 Hannekamp, William, 95, 209
 Harris, Richard, 216
 Hazlett, James, 216
 Heitlinger, 225
 Hiller, 224, 246, 249
 Hiller, Joe, 93, 209, 216
 Hillman, 55, 114, 210, 211, 214, 249
 Hillman, Jimmie, 55, 114, 210, 211, 214, 249
 Hogan, LeMoyné, 78, 134, 212
 Home Economics
 See Departments and Units
 Family and Consumer Sciences, 12, 13, 51, 57, 66, 67, 68, 69, 71, 101, 102, 122, 126, 128, 129, 131, 148, 164, 171, 172, 174, 201, 210
 Homecoming, 19, 137, 166, 196
 Honors
 Endowed Chairs, ii, 31, 112, 187, 227
 National Academy of Sciences
 Members, 31, 33, 217
 Regents Professors, 31, 217
 University Distinguished Professors, 31, 217
 Horticulture and Landscape Architecture
 See Departments and Units
 School of Plant Sciences, 16, 72
 Houtkooper, Linda, 69, 209, 212, 219, 224, 249
 Howell, Don, 216
 Huber, Nancy, 210
 Huber, Roger, 57, 63, 172, 210, 211, 212
 Husman, Steven, 213
 Hutchinson, Barbara, 249
 Hutchinson, Charles, 72, 76, 211, 212, 249
 Indian Programs
 See American Indian Programs, 93
 Information Technology, 34, 40, 204, 236
 Computers, 118, 151, 155, 158
 Internet, 17, 22, 36, 119, 159, 177
 Infrastructure, 34, 183, 236
 Institute for the Study of Planet Earth
 See Institute of the Environment, 200
 Institute of the Environment, viii, 54, 57, 62, 65, 68, 75, 81, 84, 130, 200
 Interdisciplinary Activities
 Graduate Programs, 9, 42, 45, 63, 64, 65, 69, 71, 72, 76, 93, 140, 176, 188
 Research Units, 9, 42, 45, 63, 64, 65, 69, 71, 72, 76, 93, 140, 176, 188
 Irrigation Engineering *See* Departments and Units
 Agricultural Biosystems Engineering, 12, 52, 54
 Issacson, Leonard, 214
 Jensen, Merle, 92, 132, 209, 249
 Joens, Lynn, 85, 213, 220
 Johnson, Gordon, 108, 210
 Johnson, Jack, 76, 211
 Jones, Howard, 93, 100, 148, 149, 210, 216, 249
 Kaltenbach, Colin, 23, 105, 114, 122, 198, 209, 214, 216, 249
 Kassander, Richard, 14, 88, 249
 Katterman, Frank, 136, 174, 188
 Kendrick, Edgar, 138, 212
 Ker, Alan, 55, 211
 Knight, Gaylyn, 214
 Knight, James, 57, 211
 Knorr, Amy Jean, 136, 137, 162, 164, 249
 Knowles, Carol, 30, 112, 113, 136, 137, 222, 228, 230, 249
 Koffler, Henry, 9, 20, 22, 45, 188, 249
 Kohn, Paul, 209, 211, 225, 246
 Krausman, Paul, 209, 246
 Land-Grant, 3, 179, 245, 248, 250
 Land-Grant Traditions and Changes, 3
 Larkins, Brian, 78, 212, 217, 220, 227, 249
 Larson, Dennis, 151, 152, 249
 Lauxman, Lisa, 210
 Law, John, 95, 209, 217
 Leadership Development
 Academic and Experiment Station
 Policy Committee Leadership
 Training, 246
 Food Systems Leadership Institute, 245
 National Extension Leadership
 Development, 245
 University of Arizona Academic
 Leadership Institute, 246
 Western Extension Leadership
 Development Program, 245
 Lee Dueringer, 113, 214
 Leondard, Robert, 78, 212, 224
 Likins, Peter, 9, 188
 Littlefield, Jo Ann, 249
 Lord, William, 88, 213
 Lovan, Robert, 210
 Loveland, Marylyn, 215
 MacArthur, Robert, 119, 123, 216, 249
 Marchello, Elaine, 160, 161, 209, 218, 225, 249
 Marchello, John, 149, 150, 249
 Mare, John, 85, 114, 213, 214
 Martin, Edward, 209, 246
 Masters, Linda, 215
 Matlock, Gerald, 29, 114, 214
 McCormick, Floyd, 57, 211
 McGinley, Susan, 160, 249
 McIntire-Stennis Act of 1862, 45
 McKittrich, Robert, 211
 McNamara, Donald, 69
 McReynolds, Kim, 215
 Megdahl, Sharon, 227
 Metcalfe, Darrel, 2, 9, 19, 20, 25, 27, 91, 95, 100, 112, 136, 138, 145, 162, 165, 188, 209
 Miller, Kathleen, 159, 160, 249
 Molecular Biology, iv, 2, 7, 9, 11, 17, 18, 20, 22, 32, 42, 47, 63, 79, 126, 127, 128, 174, 176, 178, 179, 182, 188, 194, 199, 240, 242
 Moore, Billy, 215
 Moore, Eldon, 170, 216
 Moore, Leon, 138, 149, 249
 Morrill Act of 1862, 3
 National Academy of Sciences Members, 31, 217
 National Extension Leadership
 Development, 245
 Native American
 See American Indian, 77, 93, 224, 243
 Nelson, Roy, 213
 New Electronic Cooperative Extension, 101, 102, 120
 Nigh, Edward, 16, 38, 249
 Nolte, Kurt, 216, 245
 Nordby, Gene, 13, 52, 211
 Norton, Randy, 107, 213
 Norvell, Michael, 114, 214
 Nutrition and Food Science
 See Departments and Units
 Nutritional Sciences, 51, 66, 69, 170, 172
 See Departments and Units
 Nutritional Sciences, 51, 66, 69, 170, 172
 Nutting, William, 63, 212
 O'Brien, Shirley, 210, 249
 Oliver, Craig, 100, 209
 Organized Research Unit, 4, 46, 51, 106, 124, 250
 Pacheco, Manuel, 9, 23, 188
 Park, James, 138, 213
 Pastor, Monica, 215, 246
 Pater, Susan, 157, 214, 219, 249
 Peace Corps, 8, 105, 114, 115, 188
 Peters, Curtis, 156, 157, 249
 Planning
 Board of Regents, i, viii, 6, 13, 26, 27, 34, 38, 41, 42, 49, 58, 68, 90, 92, 101, 103, 106, 156, 184, 240
 College, i, viii, 6, 13, 26, 27, 34, 38, 41, 42, 49, 58, 68, 90, 92, 101, 103, 106, 156, 184, 240
 College Strategic Plan, 42, 43, 184
 See CALS Administration
 Planning, i, viii, 6, 13, 24, 26, 27, 34, 38, 39, 40, 41, 42, 43, 49, 58, 68, 90, 92, 101, 103, 106, 156, 184, 236, 237, 240, 250
 University, i, viii, 6, 13, 26, 27, 34, 38, 41, 42, 49, 58, 68, 90, 92, 101, 103, 106, 156, 184, 240
 University of Arizona, 39
 Plant Pathology
 See Departments and Units
 School of Plant Sciences, vii, 12, 16, 51, 78, 79, 80, 85, 126, 127,

- 128, 138, 171, 212, 219, 221, 224, 246, 247
- Population, iv, 5, 7, 236
- Post, Don, 150, 151, 249
- Pottinger, Sandra, 108, 210
- Poultry Science
See Departments and Units
 Animal Sciences, 13, 60, 61
- Price, Ralph, 69, 212
- Proctor, Michael, 210, 211, 249
- Professional Associations
See Interdisciplinary Activities, iii, 187, 239
- Progressive Agriculture, 120, 170
- Project CENTRL, 102, 103, 170
- Publications, 90, 121, 122, 202, 250
 Agri-News, 112, 120, 121, 125, 170, 171, 172, 173, 174
 Annual Research Report, 121
 Arizona Land and People, 120, 121, 170
 CALS Weekly Bulletin, 92, 120, 122
 Commodity Reports, 120, 121
 Compendium, 112, 120, 121, 170, 174
 Newsletters, 72, 78, 87, 97, 112, 113, 120, 170
 Tuesday Morning Notes, 120, 122
- Quality Guidance Council, 23, 41, 105, 198
- Racicot, Robert, 215
- Rauschkolb, Roy, 32, 100, 118, 119, 209, 213
- Ray, Dennis, 152, 155, 218, 219, 246, 249
- Rayher, Harold, 213
- Recurring Themes, ii, 175, 176, 180
- Reid, Bobby, 60, 69, 172, 212
- Reid, Patrick, 212
- Renewable Natural Resources
See Departments and Units
 Natural Resources and the Environment, 16, 51, 72, 73, 74, 172
- Resnick, Sol, 87, 88, 165, 213
- Rhodes, Everett, 216, 245
- Rice, 60, 212
- Rice, Richard, 60, 212
- Rice, Robert, 66, 210
- Riley, James, 219, 249
- Riley, Mark, 52, 211, 246, 249
- Rohen, Mary, 108, 138, 162, 166
- Roth, Robert, 107, 141, 142, 157, 158, 213, 249
- Rush, Robert, 214
- Sanchez, Charles, 107, 214
- Sander, Eugene, 2, 9, 20, 22, 25, 27, 42, 45, 47, 91, 92, 112, 122, 171, 188, 196, 209, 210, 249
- Schaefer, John, 9, 14, 20, 188
- Schalau, Jeff, 216, 245
- Schmitz, Jack, 85, 213
- Schneider, Michael, 215
- Scholarships
 Academic Programs, 98
 Development and Alumni, 98
- School of Renewable Natural Resources
See Departments and Units
 School of Natural Resources and the Environment, 16, 19, 45, 72, 79, 88, 131, 218, 219, 222
- Schultz, Jerelyn, 66, 247
- Shafer, David, 214
- Shelton, Janice, 215
- Shields, Ivan, 215
- Shim, Soyeon, 66, 112, 128, 158, 159, 212, 224, 226, 246, 247, 249
- Shoup, David, 52, 95, 96, 113, 123, 137, 209, 214
- Siegel, Albert, 15, 32, 126, 128, 174
- Siegwarth, Mark, 211
- Silvertooth, Jeffery, 129, 213, 224, 245, 246, 249
- Slack, Don, 52, 211, 224
- Smith-Lever Act of 1914, 4
- Soil and Water Science
See Departments and Units
 Soil, Water and Environmental Science, 52, 54, 81, 83, 129, 217, 220, 222, 224
- Soils, Water and Engineering
See Departments and Units
 Soil, Water and Environmental Science, 16, 51, 52, 53, 81, 82, 129, 211
- Songer, Glenn, 85
- Special Committees
 Academic Probation and Disqualification, 196
 Curriculum, 196
 Diversity, 197, 225
 Farm Animal Care, 197
 Post Tenure Review, 197
 Promotion and Continuing Appointment, 197
 Promotion and Tenure, 19, 197
 Sabbatical Leave, 198
 Student Scholarships and Awards, 198
 University Awards for Citizens, 198
- Specialized Units
 Environmental Research Laboratory (SWES), 2, 28, 45, 46, 49, 82, 84, 130, 132, 206, 208
- Specialized Units
 Advanced Resource Technology Group, 204
 Aquaculture Pathology Laboratory, 87, 204
 Arizona Crop Improvement Association, 79, 170, 204
 Arizona Crop Information Site, 199, 204
 Arizona Genomics Institute, 80, 204
 Arizona Laboratory for Emerging Contaminants, 84, 205
 Arizona Pest Management Center, 65, 199, 205
 Arizona Plant Diagnostic Network, 65, 80, 199, 205
 Arizona Veterinary Diagnostic Laboratory, 85, 87, 205
 Center for Environmental Physics and Mineralogy, 84, 130, 205
 Center for Physical Activity, 71, 200, 206
 Clostridial Enteric Disease Unit, 87, 206
 Controlled Environment Agriculture Center, 9, 54, 132, 206
- Environmental Research Laboratory, 2, 28, 45, 46, 49, 82, 84, 130, 132, 206, 208
- Extension Arthropod Resistance Management Laboratory, 206
- Karsten Turfgrass Research Facility, 80, 202, 207
- Lysimeter Facility, 84, 202, 207
- McClelland Institute for Children, Youth, and Families, 68, 129, 207
- Meat Sciences Laboratory, 62, 207
- Natural Products Center, 72, 75, 77, 207
- Parker Agricultural Research Center, 207
- Sonoran Desert Station for Arthropod Research, 65, 207
- Statistics Consulting Laboratory, 54, 207
- Take Charge America Institute for Consumer Financial Education and Research, 66, 68, 208
- Terry J. Lundgren Center for Retailing, 66, 68, 129, 208
- University of Arizona Insect Collection, 208
- Water Quality Center Laboratory, 84, 130, 208
- Sperr, Alma, 108, 111, 210, 211, 249
- Sprinkle, Jim, 215
- St. Germain, Pat, 108, 109, 210, 249
- Stairs, Gerald, 9, 15, 16, 19, 25, 27, 38, 47, 91, 95, 105, 108, 130, 131, 139, 188
- Stedman, Sam, 216
- Steinfelt, Victoria, 216
- Sterling, Charles, 85, 213, 249
- Stuart, Marta, 216
- Students Have Changed, 97, 150
- Students in Free Enterprise, 68, 97
- Studies by Arizona Organizations, 33
- Studies by National Organizations, 33
- Sullivan, Larry, 214
- Sustainable, 24, 33, 34, 35, 83, 88, 103, 117, 199, 236, 237, 251
- Tabashnik, Bruce, 63, 128, 212, 249
- Taylor, Brooks, 78, 212, 249
- Technology, 15, 22, 32, 33, 35, 42, 52, 53, 58, 59, 61, 64, 68, 75, 77, 83, 84, 88, 115, 130, 148, 150, 159, 174, 176, 199, 206, 208, 236, 251
- Theurer, Brent, 60, 212
- Thompson, Gary, 55, 211, 249
- Torres, Robert, 57, 211, 249
- Trade, 43, 56, 240, 243
- Traditional, 1, 16, 36, 46, 53, 62, 79, 96, 100, 103, 121, 151, 152, 154, 161
- Traditional Years, 13
- Transition Years, i, 1, 15
- True, Lowell, 215
- Tucker, Beth, 215
- United States
 Department of Agriculture, 7, 8, 19, 21, 29, 41, 43, 53, 55, 65, 84, 91, 99, 100, 105, 109, 110, 116, 119, 121, 130, 139, 144, 146, 147, 148, 151, 153, 158, 188, 199, 200, 202, 205, 207, 248
 Environmental Protection Agency, 8, 16, 128, 139, 179, 188
 University of Arizona

Arizona Research Laboratories -
 Center for Insect Science, 63, 65,
 72
 BIO5 Institute, viii, 9, 54, 62, 65, 69,
 72, 81, 188, 199, 201, 217
 Early History, 12
 Graduate Interdisciplinary Programs,
 14, 54, 57, 59, 62, 65, 68, 75, 78,
 81, 84, 87
 Trends, 6
 University Transformation Process, 33,
 39, 41, 251
 University Units Where CALS Units
 Cooperate, 200
 University-wide Departments, 45
 Upchurch, Phillip, 78, 95, 113, 130, 133,
 136, 137, 138, 209, 212, 214, 249
 Van Metre, Patricia, 14, 249
 Vodkin, Michael, 127
 Wade, James, 210, 245

 Waits, Juanita, 215
 Ware, George, 63, 136, 137, 141, 145, 166,
 167, 209, 212, 249
 Warrick, Art, 81, 213
 Water, iv, vii, 28, 34, 42, 46, 51, 53, 54, 56,
 74, 75, 81, 83, 84, 85, 87, 88, 89, 90,
 93, 97, 103, 104, 129, 130, 144, 151,
 188, 193, 197, 199, 200, 201, 202, 205,
 206, 208, 213, 218, 219, 220, 221, 223,
 224, 225, 227, 236, 241, 242, 243, 245,
 246, 250
 Water Sustainability Program, 88, 90, 188,
 199
 Watershed Management
 See Departments and Units
 Natural Resources, 16, 72, 73, 74,
 93, 103
 Weick, Ray, 100, 136, 138, 162, 167, 210,
 249

 Western Athletic Conference, 14
 Western Extension Leadership
 Development, 245
 White, Larry, 215
 Wierenga, Peter, 81, 88, 213, 224, 249
 Wiersma, Frank, 52, 81, 136
 Williams, James, 210
 Willis, Carol, 215
 Wilson, Van, 215
 Winans, Sherwood, 215
 Windsor, Davied, 249
 Winzerling, Joy, 69, 212, 249
 Wolfe, Fred, 69, 96, 123, 212
 Young, Deborah, 99, 209, 216, 219, 245,
 247, 249
 Youth and Families, 66
 Zaitlin, Milton, 32, 126, 174, 188, 249
 Zube, Ervin, 72
 Zwolinski, Malcolm, 249

