

BACT

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MEMORANDUM

DATE: July 28, 2000
TO: George E. Cooper, Deputy Administrator
FROM: Judith Smith for Colin Kaltenbach *Judith Smith*
SUBJECT: POW

Please find attached the Plan of Work submitted to CSREES by The Agricultural Experiment Station and Cooperative Extension, College of Agriculture and Life Sciences and University of Arizona for the period of October 1, 1999-September 30, 2004. Also attached a letter from Charles Laughlin upon receipt and the approval, and a copy of the FedEx shipment receipt dated 7/9/99. If you have any questions, please do not hesitate to call.

Thank you.

Attachments



United States
Department of
Agriculture



Cooperative State
Research, Education,
and Extension Service

Washington, DC
20250

XC → EGS
Done 10/14

OCT 4 1999



Dr. C. Colin Kaltenbach
Director, University of Arizona
Agricultural Experiment Station
Tucson, Arizona 85721

Dear Director Kaltenbach:

This is to inform you that the Plan of Work (POW) for the combined research and extension program at the University of Arizona has been approved for the fiscal years (FYs) 2000 through 2004. Enclosed is a listing of comments and suggestions related to your plan that you may wish to consider in subsequent revisions; however, no changes are required at this time. Also enclosed is a listing of generic observations that were compiled from comments made by the National Program Leaders who reviewed State POWs. Although these generic comments may not apply to your specific institution, they do provide background on the POW process, and help to document the strengths and weaknesses that we encountered with this process. You can use them as a check list to strengthen future POWs.

Your plan was reviewed by a team of National Program Leaders and by an Executive Review Team. We will be grateful if you will share our team's comments and suggestions with appropriate staff and express our appreciation for their good work in developing the plan.

Please note that a supplement to your POW will be necessary to address the requirements of sections 105 (multi-state extension activities) and 204 (integrated research and extension activities) of the Agricultural Research, Extension, and Education Reform Act (AREERA) of 1998. Cooperative State Research, Education, and Extension Service (CSREES) staff worked with a group of State representatives to draft administrative guidance which has been posted to the CSREES, AREERA web page (<http://www.reeusda.gov/part/areera>) to give each State the opportunity to comment. CSREES anticipates the final guidance will be posted to the AREERA web page by October 1, 1999. States will be asked to submit the supplement to the POW by February 15, 2000, and CSREES will approve the supplements by April 1, 2000.

We recognize that the POW represents your perspective of the future and how you plan to spend the resources to meet research and extension program needs. If there is a substantive change in planned programs; or if the change in Federal agricultural research

Dr. C. Colin Kaltenbach
Page 2

and extension formula funding plus the matching requirement is 10 percent or greater in 1 year from the FY 1999 base year; or if the cumulative change during the 5-year period is 20 percent or greater than the FY 1999 base year, then a POW Update should be submitted to CSREES for review by July 1 before the beginning of the next FY.

An annual report of accomplishments and results will be due on or before December 31 of each year with the first report being due on December 31, 2000, for FY 2000. You will receive a separate "Letter of Authorization" in October 1999 from the CSREES Funds Management Branch notifying you that your first quarter Year 2000 formula funds are available for drawdown if your plan is approved.

We appreciate your efforts to work with us to continually improve our reporting and accountability system. If you or your staff have any questions about the comments regarding your Plan, please do not hesitate to contact Dr. Daniel Jones (202-401-6854, ddjones@reeusda.gov), CSREES, National Program Leader, who served as facilitator for your State.

Sincerely,



CHARLES W. LAUGHLIN
Administrator

Enclosures

cc:

James A. Christenson, State Extension Director
Louise Ebaugh, Office of Extramural Programs, CSREES
Daniel Jones, State Facilitator, CSREES

USDA-CSREES REVIEW OF PLAN OF WORK REVIEW TEAM SUMMARY

State: Arizona

Institution: University of Arizona

State Contact: Colin Kaltenbach

1862 institution? Yes
Research POW? Yes
Extension POW? Yes

1890 institution? No
Research POW? No
Extension POW? No

The recommendations regarding your Plans of Work are based on the input provided by the CSREES Review Team. This Review Team Summary reflects the consensus opinion of the review team members regarding your Plan of Work.

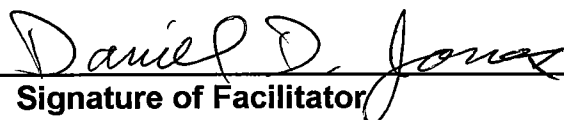
Strengths of the Plan of Work:

- o The plan contains strong mission, vision, and values statements.
- o The plan effectively identifies state-specific issues.
- o The plan exhibits a positive, upbeat tone in the face of challenging agricultural problems.
- o There is a perceptive identification of short-term, intermediate, and long-term issues.
- o The plan contains a comprehensive treatment of all 5 national goals.
- o Diverse mechanisms for obtaining stakeholder input are described.
- o The use of the stakeholder survey questionnaire seems particularly effective.
- o The plan describes commendable work with tribal colleges.
- o The plan describes appropriate use of technologies such as biotechnology and global positioning.
- o The development of the program impact database is visionary and forward-looking.

Suggested Improvements:

- o The review team recommends that Arizona develop a broader, organized process to gather input from an inclusive cross-section of stakeholders having interests across the 5 national goals.

Required Improvements:


Signature of Facilitator

9-22-99
Date

PLAN OF WORK

SUBMITTED TO CSREES

BY

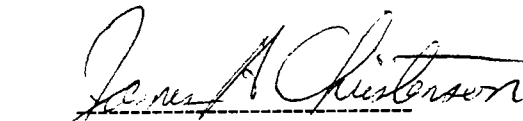
THE AGRICULTURE EXPERIMENT STATION

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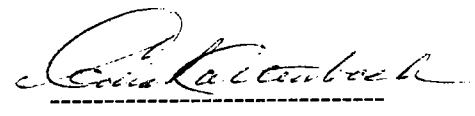
COOPERATIVE EXTENSION

**COLLEGE OF AGRICULTURE
UNIVERSITY OF ARIZONA**

**For the period
October 1, 1999 --September 30, 2004**



James A. Christenson
Associate Dean and Director
Cooperative Extension



Colin Kaltenbach
Vice Dean and Director
Agricultural Experiment Station

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Introduction

Arizona Agriculture is struggling. Prices are down and it is only the diversity of Arizona agriculture that helps many farmers and ranchers survive. There are a host of challenges looming rather clearly on the horizon that will help to shape the future of Arizona agriculture in the year 2000 and beyond. Over the next ten years, Arizona agriculture will likely be challenged by more international competition, more environmental regulation, changes in technologies and the food and fiber production chain, and increased risk. But we expect both individual management decisions and actions by government, land grant colleges, and grass roots groups of agricultural producers to meet these challenges.

Historically, Arizona farmers have been early adapters of new technologies, including laser leveling, drip irrigation, transgenic cottons, insect growth regulators (IGRs), and others. Informed, innovative farm managers, as well as price and yield incentives, helped spur this early, widespread adoption. Thus progressive farm management attitude and practices already in place will help assure the use of new technologies in the next decade.

Technology is currently available to deal with many natural resource problems. To minimize adverse impacts on soil and water resources, ranchers will continue to adjust their livestock grazing systems. However, specific methods are needed to demonstrate effectively the benefits of instituting environmentally sound natural resource management programs. The College of Agriculture can be a leader in this arena. The social and economic benefits from these new practices need to be quantified and compared to the costs of not implementing these programs.

New developments in precision implements, communication, and computer technology promise to change some farming and ranching activities. For example, data from precision implements will be analyzed and shared through on-line tools, permitting improved interaction between farmers and various other players in the food and fiber production system. GPS and GIS will be an important part of precision farming. A new relationship with NASA will build on the GPS and GIS activities and its practical application at the local level. Agribusinesses will be more closely linked by these technologies and provide inputs tailored to individual field and feedlot needs.

Farms will use more biotechnology, especially for managing pests. Bt and Roundup Ready cotton provide good examples of ways that biotechnology will help meet the challenge of long-run price declines and environmental challenges. For the last few years, the UA cotton management team has worked closely with Arizona cotton growers in implementing the use of insect growth regulators and Bt cotton in their fields. Because of these new technologies the average number of insecticide applications statewide was reduced from 12.5 sprays in 1995 to 5.69 applications in 1996, with an average savings of approximately \$73.00 per acre in 1996. Along with resistance management, these IPM efforts reduced insecticide use, conserved biological control agents, and enhanced sustainability and profitability.

Collective actions will also affect farming in the next decade, perhaps even more so than in the past. At the federal level, economic policies seem on track to foster low interest rates, a crucial factor for capital-intensive agriculture, and a growing economy. Higher incomes will encourage demand for value-added and specialty agricultural products. Research and extension activities at the federal and state levels will provide information to reduce producer risk. At off-campus locations, the College of Agriculture will use new computer and communications-based technologies to increase and make scientific information more accessible to farm and agribusiness managers and employees.

Although it shows ups and downs, most of Arizona agriculture has prospered over the last ten to fifteen years by successfully meeting the challenges of declining real commodity prices, increasing input prices, serious pest problems, drought, and increasing government regulations. This capacity to meet challenges bodes well for the future.

We speculate that ten years from now Arizona agriculture will have about the same number of very large farms producing most of the state's agricultural production, the dairy sector will continue to expand, ranching may decline somewhat, and cropped acreage will be at about its present level, although the acreage of individual crops may change over the years. Native American agriculture will likely increase with the availability of affordable water. More noticeable changes will occur in production technologies, the degree of vertical integration, and increased interaction with the international market.

Our family and youth programs will also experience change. In this era of federal deregulation and block grants to states, Arizonans have both the opportunity and the responsibility to cope with the gap in children's health care coverage, the tragedies of child abuse and neglect, and the struggles of parents without job skills. There is clear evidence that community effort can help prevent teenagers from having babies, committing crimes, and dropping out of school.

Fortunately, we have the tools we need to face these challenges. The risk indicators confirm that focused attention, money, and uninterrupted effort over time will produce good results. As a result of increased federal and state investment, more children now have access to quality preschool, and more parents are getting help in paying for child care. Thanks to sustained outreach efforts and funding, more women are receiving prenatal care and fewer babies are dying. With much community attention, both the numbers of children killed by guns and the rate of babies born to teenage mothers have dropped since 1994.

We have a long way to go to reach the point where every Arizona child has the opportunity to succeed. The rate of reports of child abuse and neglect needing investigation grew about 30% between 1991 and 1998. The rate of child deaths due to abuse or neglect nearly doubled during that time. And perhaps the most alarming statistic is the 25% jump in the percentage of Arizona children living in foster care. These are the most vulnerable children in our communities, growing up without the security of a stable family. The challenge of our program is to provide unique research-based university outreach efforts in partnership with local and state government to address these crises conditions.

Vision:

To be the nation's leading College of Agriculture and to provide a better quality of life, through learning and development of knowledge, for our students, the people of Arizona and society.

The College of Agriculture outreach program seeks to make science useful for the people of Arizona, the nation and the world. Cooperative Extension, located in every county and on many Indian Reservations, is the window to the University and to the national Land Grant System. Approximately 140 faculty members carry full or partial Extension appointments. The Arizona Agricultural Experiment Station, the research arm of the College of Agriculture, supports a network of research activities, applications and outreach that occur on the campus and across the state. Approximately 260 faculty members carry full or partial Experiment Station appointments. The research program is located in ten Departments, the Schools of Renewable Natural Resources and Family and Consumer Resources, the Office of Arid Land Studies and in nine Agricultural Centers located across Arizona. Over the past ten years, the College has developed an integrated program with teaching, research, and outreach that employs many of these components, both on and off campus.

Mission:

The College of Agriculture stimulates learning through exploration and discovery to enhance agriculture, the environment, our natural resource base, family and youth well-being and the development of local communities. We accomplish this mission by the integration, dissemination, and application of knowledge in the agricultural and life sciences.

Values:

We will achieve continuous improvement in both program quality and employee development through cooperation and flexibility, commitment and dedication, honesty and integrity, scholarship and innovation, open communication and trust and diversity and mutual respect.

Responsibilities of the College include teaching, research, and extension. There is an emphasis on teamwork and integration of these functions, utilizing an interdisciplinary approach.

Cooperative Extension

Cooperative Extension emphasizes non-formal education and transfer of knowledge to audiences throughout the state, based on research information from within the College and elsewhere. There are 19 offices in the 15 counties plus five offices on Native American lands. The extension area of the College is coordinated by Arizona Cooperative Extension.

Strategic Direction: We are dedicated to providing quality educational programs to address Arizona's needs through continuous learning and integrated approaches to the acquisition and application of knowledge.

Goals:

- Promote communication technology use among faculty, facilitate networking with data and information systems, and provide customers electronic access to relevant information.
- Expand programmatic and funding partnerships with industry and government.
- Improve measures of program accomplishments.
- Strengthen connections within the College and across the campus with county-based programs.
- Reconcile results of needs assessment with college expertise and available resources.
- Provide professional development and in-service training for extension faculty.

Agricultural Experiment Station

Strategic Direction: We are dedicated to conducting scholarly and creative research of the highest quality, integrated with the educational experience.

Goals:

- Promote and facilitate cooperative research across departments and colleges within the University, and with institutions and agencies outside the University.
- Improve measures of research quality and productivity.
- Increase acquisition of grants and contracts.
- Increase graduate research assistantship opportunities and recruit nationally competitive graduate students.
- Consider needs of the state in developing research programs.
- Link research to graduate and undergraduate education and to Cooperative Extension programs.

Stakeholder Input

1) Advisory Boards

A) *Cooperative Extension.*

The Legislature of the State of Arizona accepted the provisions of the Smith-Lever Act in 1915. It authorized the Board of Regents of The University of Arizona, the Land Grant University in Arizona, to “organize and conduct agricultural Extension work which shall be carried on in connection with the College of Agriculture of the University of Arizona in accordance with the terms and conditions expressed in the Act of Congress aforesaid”. This State legislation also empowered county governments to appropriate funds for the county Extension program.

Currently, according to Arizona State Law *ARS 3-124-127*, each County Extension Board consists of seven persons, who are residents of the county, four of whom have as their principal business the production of agricultural commodities, and the other three of whom are representative of organizations or persons who utilize the county Cooperative Extension offices. Extension faculty are sensitive to including membership representative of their county regardless of racial or ethnic background. Names of Advisory Boards for each Arizona county are available at the Cooperative Extension web site (<http://ag.arizona.edu/extension/>).

The County Extension Boards have three responsibilities. First, in order to build educational program priorities that are based on needs of local people, the Extension Board must approve the Annual County Plan of Work. The county Extension faculty present a prioritized list of potential programs and the Board may suggest others. In setting priorities, Cooperative Extension is interested in involving a broad-based, representative county group that may include commodity groups, 4-H councils, family consumer groups and community development groups.

Another role of the Extension Board is to annually approve the county Extension budget, submitted to the Extension Board by the County Director. This budget covers all funds expended for Extension work in the county. According to the legislation, the Board of Supervisors of each county must provide reasonable rent-free office space for the conduct of extension work in that county.

Finally, the Extension Board approves the Annual Report of Extension work in the county. County reports are available at the Cooperative Extension web site.

B) Experiment Station

Individual advisory boards have been established for each of the following Agricultural Centers: Maricopa and Citrus, Safford, Yuma, Oracle, Santa Rita Experimental Range and the V-V Ranch. The boards have representatives from the agricultural community, the agri-business community and include consumer representatives who are appointed on a rotational basis. These boards meet from two to four times per year to review ongoing programs and make recommendations for change. In addition, the State 4-H Youth Development program, the Departments of Agricultural and Biosystems Engineering and Animal Science and the Schools of Renewable Natural Resources and Family and Consumer Studies have separate advisory committees that provide input to the programs of these units.

2) State Program Evaluation

Accountability is increasingly important to secure new resources, maintain visibility, and market effectiveness. Every faculty member in the College of Agriculture provides an Annual Performance Report (APR) of accomplishments and impacts for the previous year, and a plan of major commitments for the coming year. By January 2000, faculty will have the opportunity to prepare their APRs on-line. This new system is called APROL.

By the year 2004, the College of Agriculture will have a searchable database of programs and their impacts. Key components of the database are: (1) college-wide reporting, linking extension, research and teaching; (2) agricultural experiment station reporting of federal project data; (3) Cooperative Extension reporting of federal clientele contact data and outreach activities.

In the past year, Cooperative Extension sponsored several program retreats -- V-V Ranch (Agricultural Center), Family and Consumer Sciences, Horticulture, Renewable Natural Resources as well as several county reviews for 4-H Youth Development. Statewide program priorities for the

next three to five years were identified during these exercises. Extension faculty are committed to an on-going process of self-improvement in outreach programs.

3) Public Input for College of Agriculture Programs

Public input is extremely important to the College of Agriculture. Because we are a Land Grant College committed to serving the needs of the State of Arizona, the College regularly seeks stakeholder input, programmatic feedback, and advice on future directions from citizens. As noted above, Extension Advisory Boards provide stakeholder input to Extension faculty on a yearly basis.

Two statewide planning sessions occurred in 1995. First 50 community and business leaders and 30 University faculty, staff, and 4-H youth met to review and evaluate statewide programs by the College. Second, the College of Agriculture developed a five year strategic plan based on faculty, staff, student and stakeholder input. Six program areas were identified as the College-wide framework to guide all administrative units in developing and directing their programs:

ANIMAL SYSTEMS
 ENVIRONMENT AND NATURAL RESOURCES
 FAMILY, YOUTH (4-H), AND COMMUNITY
 HUMAN NUTRITION, FOOD SAFETY AND HEALTH
 MARKETING TRADE AND ECONOMICS
 PLANT SYSTEMS

These six programs are the basis for budget allocations and annual program reviews.

As part of our ongoing review process and as a first step toward renewal of the Strategic Plan, we mailed a survey in April of 1999 to stakeholders including board members, former students and community leaders. The survey focused on the six program areas within the College. We asked six questions: How are we doing in these programs? How frequently do you use these programs? Are programs provided in a professional manner, in a timely basis, with quality information and education? What are programs that are particularly important to you? What kind of problems are you concerned about? How satisfied are you with the College of Agriculture and the University of Arizona?

The survey was sent to 45 students who graduated from the College in 1994; 47 students who graduated in 1997; 105 County Extension Advisory Board members (appointed by County Supervisors to represent county interests); 46 principals of high schools, the Council of the Southwest Indian Agricultural Association; the Council for the School of Renewable Natural Resources; the Advisory Board of the Yuma and Maricopa Agricultural Centers; student leaders of FFA, College student ambassadors, and the 4-H Teen Council. Approximately 388 surveys were sent and 179 were returned, for a response rate of 46 percent. The occupations of the respondents is provided in Table 1. In summary, 78 percent were white, 58 percent male, 60 percent had lived in Arizona more than 10 years, 72 percent had some college experience, 48 percent had attended the University of Arizona,

and 53 percent had incomes of under 50,000 dollars. County Extension Advisory Board members had the highest response rate (62 percent). Former students had the lowest response rate. The results of this survey are included in Appendix A. The input from this survey, along with yearly approval of elected officials of our local plans of work guide reallocation of funding and help us in the setting of priorities for new projects.

International Activities

The College maintains an Office of International Agriculture Programs that supports and encourages participation in international agriculture research, training and development. This includes recruitment of Peace Corps volunteers, attracting international sponsored students, training of international faculty at the University of Arizona and participation in development programs in the Americas, Africa, the Middle East and Asia. We serve as the host Institution for the International Arid Lands Consortium (University of Arizona, University of Illinois, New Mexico State University, South Dakota State University, Texas A & M University-Kingsville, The Jewish National Fund and affiliate members--Egyptian Ministry of Agriculture and Land Reclamation, and the Jordanian Higher Council for Science and Technology) a non profit organization that provides expertise in the areas of water conservation and harvesting, development of stress-tolerant plants, agroforestry, range management, fire control, remote sensing, and drought mitigation on arid and semiarid lands, both nationally and internationally. Distance learning through the Internet has expanded our international clientele.

PLANNED PROGRAMS

NATIONAL GOALS

Goal 1: An agricultural system that is highly competitive in the global economy. Through research and education, empower the agricultural system with knowledge that will improve competitiveness in domestic production, processing, and marketing.

Issues:

The 1997 Census of Agriculture reports 6135 farms and ranches on nearly 29 million acres in Arizona. The 1997 Census reports that 402 of the 6,135 farms (6.5%) are operated by persons of Spanish, Hispanic or Latin origin. The Census of Agriculture does not include Native Americans in their count but lists an additional 3,980 farmers and ranchers as Native Americans in an appendix (Census of Agriculture, Arizona, appendix B-1). In relation of Federal Formula Fund allocation, Native Americans are excluded from the count, thus significantly reducing the Federal allocation of Smith Lever and Hatch funds to Arizona. It is difficult to give a concise picture of Arizona Agriculture, because some programs are listed in the main text of the Agriculture Census and another 40 percent are listed in an appendix with different criteria. It should be noted that approximately four percent of the College of Agriculture total budget of 81 million dollars comes from formula funding,

with over 50 percent coming from state funding, and another 40 percent coming from grants, gifts, contracts, and local funds.

We include all farmers and ranchers in the state when providing programs and educational opportunities. Thus in subsequent discussion we are basing our reports on all farmers and ranchers. All these farms and ranches contribute greatly to our economy. Cash receipts from all commodities (crops and livestock) exceeded 2 billion dollars in 1997. Arizona's farmland produces jobs and economic activity. The production of cotton, cattle and copper has long defined Arizona land issues. The competing needs for recreation, power, agriculture and urban populations have sparked battles concerning usage rights for land, water and air. The growing debate over natural resources leads to confusion over the roles played by ranchers and farmers in land and water usage. There is growing public concern regarding 1) ranching, farming and other agricultural operations; 2) the potential impact on the soil, groundwater, food safety and quality; and 3) public and animal health.

Animal Systems Performance Goals:

- 1) To improve productivity and increase the quality, composition, and desirability of animal products.
- 2) Promote the use of integrated and long-term, sustainable production systems.
- 3) Enhance genetic diversity and biological performance.
- 4) Improve the health and well-being of food and companion animals.
- 5) Analyze costs and benefits

Plant Systems Performance Goals:

- 1) To improve the production practices of plants used for food, fiber, livestock feed, industrial products, and for environmental, aesthetic, conservation and ornamental purposes, based on best cultural management practices.
- 2) Utilize plant genomics to better understand plant molecular mechanisms and plant, microbe and insect interactions.
- 3) To improve pest management practices and adaptability and use of plants in arid environments.
- 4) To analyze costs and benefits
- 5) Analyze, monitor and enhance wildland forage for livestock and wildlife.

Output indicators:

Animal systems

- 1) Identification of mechanisms by which extreme heat affects animal performance.
- 2) Development of unique meat by-products.
- 3) Understanding the factors affecting grazing behavior of elk and cattle on public lands.
- 4) Determine optimum beef cattle breed type for desert southwest conditions.
- 5) Identification, isolation and characterization of genes that affect production traits of cattle.
- 6) Improved management practices for wildland forage.

Plant systems

- 1) Optimized production practices that affect cotton production.
- 2) Appropriate practices to manage resistance to pesticides.
- 3) Biological control practices for insects and disease.
- 4) Identification, isolation and characterization of genes that affect production traits agronomically important plants.

Outcome indicators:*Animal systems*

- 1) Increased pounds of calf weaned per cow exposed.
- 2) Reduced cost per pound of calf weaned.

Plant systems

- 1) Per acre reduction in production costs.
- 2) Adoption of new technology to reduce pesticide use and increased use of biocontrol agents.
- 3) Adoption of practices to control development of resistance to pesticides.

Key Program components:

The College of Agriculture provides educational programs to youth and adult audiences throughout the state in agriculture and life sciences. Research and educational activities will be conducted on campus, at all of the College's nine Agricultural Centers that are strategically located throughout the state, and at farms and ranches through county Extension offices where appropriate. In addition to specific research and demonstration activities there will be field days, grower meetings, newsletters and other publications.

Internal and external linkages:

All other states (12) in the western region plus 19 additional states (FL, GA, IA, IN, KS, KY, LA, MI, MN, MO, MS, NC, NE, NY, OH, SD, TN, TX, VA) from other regions are involved in multi-state projects W-006, 102, 112, 168, 173, 177, 185, 186. Other external linkages include the Arizona Cattle Growers, Arizona Cotton Growers Association, Western Growers, United Dairymen Association, Arizona Dairy Herd Improvement Association, Cotton Research and Protection Council, all state commodity check-off programs, other commodity based interest groups, other cooperating entities including but not limited to USDA-ARS, NASA, Southwest Indian Agricultural Association and several individual Native American Tribal Councils. The College has formal MOUs with New Mexico State University, Utah State University to multistate programs on the Navajo Nation and elsewhere related to state boundaries. In addition, MOUs are signed with 11 Native American Tribes and Nations, Dine' College and Monterrey Tech in Sonora, Mexico. Agreements also exist with the California Desert Station, The University of California, Davis and other entities in the State of California.

Target audiences:

We will be addressing agricultural producers, both farmers and ranchers, throughout Arizona. Under-served populations are reached through educational programs located in each county, through partnerships with 21 reservations with offices on the Navajo, Hopi, Colorado River Indian Tribes, and San Carlos Apache Reservations.

Program duration:

This program will continue for the five year life of this plan.

Short term:

- 1) Development of unique meat by-products.
- 2) Appropriate practices to manage resistance to pesticides.

Intermediate term:

- 1) Understanding the factors affecting grazing behavior of elk and cattle.
- 2) Biological control practices for insects and disease.
- 3) Determine optimum beef cattle breed type for desert southwest conditions.

Long term:

- 1) Identification of mechanisms by which extreme heat affects animal performance.
- 2) Optimized production practices that affect cotton production.
- 3) Identification, isolation and characterization of genes that affect production traits of cattle and agronomically important plants.

Allocated resources:

Category	FFY 2000	FFY 2001	FFY 2002	FFY 2003	FFY 2004
EXT (FTE's)	\$1.2 Mil (8)	\$1.24 mil (8)	\$1.27 Mil (8)	\$1.31 mil (8)	\$1.35 Mil (8)
RES (SY's)	\$2.7 Mil (9)	\$2.78 Mil (9)	\$2.86 Mil (9)	\$2.95 Mil (9)	\$3.04 Mil (9)

Goal 2: A safe and secure food and fiber system. To ensure an adequate food and fiber supply and food safety through improved science based detection, surveillance, prevention, and education.

Issues:

The risk of serious outbreaks of food borne illness continues to increase in Arizona. New developments in processing and packaging of fresh salad and table vegetables, increasing imports of produce from Mexico, increasing exports of food from Arizona to other States, and expanding food processing industry activity in Arizona have dramatically increased the potential health hazards in the food supply, both in the State and beyond. An interdisciplinary, research-based approach to education and outreach/extension is needed to clarify the issues relating to factors affecting the safety and quality of the food supply from the farm to the table.

As well, domestic and imported produce and meat products are at serious risk due to spoilage. The issues relating to food safety also apply to spoilage risks, and prevention programs cannot be implemented effectively until the research is accomplished to define the breadth of the problems.

Performance goals:

The College of Agriculture will build on the USDA/CSREES national goals:

- 1) Improve the ability of all components of the food system to make informed, responsible decisions related to food safety and quality issues.
- 2) Strengthen the ability of Cooperative Extension to be a dynamic, pro-active and responsive educational system recognized for its interdisciplinary, research-based approach to education on the issues affecting the safety and quality of the food supply.

Output indicators:

- 1) Safe food training sessions on food safety from farm to table.
- 2) Hazardous Analysis Critical Control Points (HAACCP) training for small food service retail and processors using both in-person and distance learning.
- 3) New, and/or improved rapid methods to detect hazardous and spoilage microorganisms in meats, produce, and processed foods must be found.
- 4) Understanding of the mechanisms of pathogenesis for food borne pathogens.
- 5) New methods for controlling microbial contamination of meat must be discovered and implemented.
- 6) The sources of microbial contamination in foods in both pre and post harvest, must be discovered, and steps taken to eliminate hazards.
- 7) Identification and control of microbial contamination in imported produce and meat must be accomplished.

Outcome indicators:

- 1) Safe food practices as indicated by decreased foodborne illness and thus fewer health costs and lost wages. This will result in greater profitability for food service and supporting industries and greater collaboration between partners in the food industry.
- 2) Improvements in food handling practices in restaurants identified by county sanitarians.
- 3) Extended shelf life and reduced risk of health hazards in foods due to the control of microbial contamination.
- 4) Adoption of new sanitation procedures for imported produce and other foods.

Key Program components:

Research and educational programs will be conducted on campus, across the state, and in Mexico by the Food Safety Team composed of faculty from departments of Nutritional Sciences, Animal Sciences, Veterinary Science and Microbiology, Cooperative Extension and other units of the College. This team will work with various aspect of industry and with USDA-APHIS. The overall safety and quality of food is addressed by programs in animal and plant health, stored feed and food products, transportation, processing, and consumer handling.

Internal and external linkages:

The multi-disciplinary research/educational team described above. Six other states in the western region plus Michigan that are involved in Multi-State Project, W-122. We are also linked with: producers, importers and shippers of vegetable products from Mexico and federal inspectors from USDA and FDA; cooperative programs with public health personnel at the Arizona Prevention Center at the College of Medicine, and their affiliates across the State; other external partners including governmental agencies, school districts, neighborhood associations, social service agencies and not-for-profit groups. Volunteers are an important component of outreach programs throughout the state. There are strong ties to agribusiness groups.

Target audiences:

We will be addressing agricultural producers, agency personnel; producers, shippers and distributors of imported produce and meats; producers, shippers and distributors of domestic produce and meats; in-state food processing plants; and the general population. Under-served populations are reached through educational programs located in each county, through partnerships with 21 reservations with offices on the Navajo, Hopi, Colorado River Indian Tribes, and San Carlos Apache Reservations.

Program duration:

This program will continue for the five year life of this plan.

Short term:

- 1) Testing of new compounds to control microbial contamination on meat and vegetable products.
- 2) Determination of the main contaminating microorganisms and their sources in the production chain for both imported and domestic fresh produce.

Intermediate term:

- 1) Development of improved rapid methods to detect hazardous microorganisms in meats and produce.
- 2) Identification and control of microbial contamination of imported produce and meats.

Long term:

- 1) Development of integrated control systems for elimination of microbial hazards associated with foods, pre and post harvest.

Allocated resources:

Category	FFY 2000	FFY 2001	FFY 2002	FFY 2003	FFY 2004
EXT (FTE's)	\$.075 Mil (.5)	\$.077 Mil (.5)	\$.080 Mil (.5)	\$.082 Mil (.5)	\$.084 Mil (.5)
RES (SY's)	\$0.24 Mil (1)	\$0.25 Mil (1)	\$0.255 Mil (1)	\$0.26 Mil (1)	\$0.27 Mil (1)

Goal 3: A healthy, well-nourished population. Through research and education on nutrition and development of more nutritious foods, enable people to make health promoting choices.

Issues:

Nutritional studies in the College of Agriculture are directed towards a wide range of disorders, including the health impacts of dietary cholesterol and fat, osteoporosis prevention and management, nutritional impacts on AIDS, and obesity prevention; as examples. Several educational and research programs are aimed at sedentary adults, who are at greater risk of dying of heart disease and developing arthritis, colon cancer, diabetes, obesity, osteoporosis, and high blood pressure. Obesity and osteoporosis are particularly troublesome problems in Arizona. Osteoporosis affects 28 million Americans. It costs the United States nearly \$14 billion each year to treat osteoporosis-related fractures. Good nutrition practices throughout life can help prevent the onset and reduce the severity

of this crippling disease. Recently, with the help of special funds from the State of Arizona, we expanded our efforts at osteoporosis prevention and treatment.

Nutrition education for children and for teenage parents is another area of concern. Researchers have found that nutritional attitudes are related to educational levels of the consumer. In a study of young adults, high school graduates who do not attend college were more concerned about the ability of foods to satisfy their appetites than about nutrition. In contrast, college students were more interested in the convenience of foods than nutrition. Finally, college graduates were more concerned about nutrition than food cost. The researchers recommend that in order to be successful, nutrition messages should be aimed at individual's age and education levels.

Performance goals:

- 1) Promote the capacities of individuals, families, and communities to lead healthier lives.
- 2) Strengthen community leadership and involvement in developing program strategies and tailoring local health infrastructures to meet promotion needs for community health.

Output indicators:

- 1) Understanding of the role of mineral nutrients such as iron, copper and zinc in the regulation of disease related gene expression, and the relationship of molecular and cellular events in growth and development to disease.
- 2) Development of new experimental methods to relate body composition measures to degenerative diseases, and other abnormal health states.
- 3) Discovery of methods to create (and measure the effectiveness of) outreach/educational programs that promote healthy food and lifestyle choices.
- 4) Increase the number of Arizonans who have adopted sound dietary practices to result in: decreased prevalence of obesity; reduced average dietary fat intake; increased calcium intake.

Outcome indicators:

- 1) Arizona residents acquire the knowledge, skills, attitudes, and changed behavior necessary for nutritionally sound diets and to contribute to their personal and family diet and nutritional well-being.
- 2) New therapies for nutritionally related diseases (i.e. new recommendations for exercise, estrogen therapy and nutrition in osteoporosis prevention and treatment).
- 3) Molecular level targets for disease prevention.
- 4) A reduction in the incidence and severity of selected nutritionally related diseases, such as diabetes and osteoporosis, afflicting the people of Arizona.
- 5) A reduction in health care costs for treatment of nutritionally related degenerative diseases.

