

# 2008 University of Arizona Combined Research and Extension Annual Report of Accomplishments and Results

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## I. Report Overview

### 1. Executive Summary

Over the past 7 years, a fully implemented cotton IPM program has resulted in a 69 percent reduction in pesticide sprays for all insects combined, including whiteflies, pink bollworm, Lygus bug and others. Annual insecticide usage in Arizona has decreased by more than 1.6 million pounds. Growers cumulatively have saved over \$201 million in pesticide costs and in reduced insect damage since 1996, which decreased by more than 37 percent. Almost half of the state's 150,000 acres of cotton was never sprayed for insect pests, and for the first time since the mid-1960s growers reported zero sprays for pink bollworm in 2008. The IPM plans have been exported for use in California, Texas, northern Mexico, Australia and Latin America.

Another successful IPM program implemented a county-wide, host-free melon period in 2007. The growers disked their spring melon crop in July—and any subsequent volunteer melons or other hosts—and waited 30 days before planting the fall crop in August. As the virus cannot live without a host for more than 7-10 days, hungry whiteflies disperse to other fields. The 2008 summer host-free period helped growers achieve a 20 percent reduction in the severity of CYSDV in the fall 2008 melon crop.

Trees contribute to quality of life and reduce the nation's "carbon footprint." It was recently shown that 2000 street trees on the University of Arizona Campus annually sequester 246,620 tons of carbon dioxide (CO<sub>2</sub>), reduce the energy costs for UA facilities by \$18,230, reduce emissions, pollutants and particulates by 9,994 pounds; and intercept more than a million gallons of rainfall or stormwater (reducing flooding). Each tree on campus contributes an estimated \$33 to \$156 every year, by saving energy and water, sequestering carbon dioxide, and providing aesthetic value. Additional studies have shown that proper shading of the home can reduce energy consumption by as much as 20 percent. "Operation Cool Shade" began in 2000 when the University of Arizona Cooperative Extension in Pima County joined with Tri-Co Electric Cooperative to provide shade trees and training annually to interested residents.

As a result of Operation Cool Shade, 578 households in Pima County reduced their energy consumption by an estimated 839,834 kilowatt hours during the peak summer months of June, July and August in 2008. Based on an average peak household consumptive rate of 7,263 kwh for that period—and a 20 percent projected savings—the 1,168 shade trees planted around the homes collectively saved a projected \$80,640 in electrical costs. Since 2000, a total of 12,726 trees have been distributed to customers in Pima County, reducing energy consumption by 6,414,000 kwh, with a cumulative energy savings of \$615,884.

Food safety is an important component of everyday life. Campylobacter is now the number one food-borne pathogen in the United States and the world, surpassing Salmonella. In the United States alone, 2.4 million cases are reported annually, with costs exceeding \$1 billion. A recently developed vaccine at the University of Arizona has been shown to reduce Campylobacter organisms in chickens by 98 percent compared with a control group. Adoption of this vaccine could be significant: about 8.9 billion broilers go to market annually in the U.S., with a value of \$21.5 billion.

Good records are the foundation for starting and growing a business, and are fundamental for participating in most federal farm programs. Many Navajo, Hualapai, Hopi and Apache livestock producers have adopted new record systems for their operations as a result of past trainings. Preliminary results based on a survey of the participants show that of 126 responses received so far, 34 percent of the producers use the recordkeeping workbook to collect/record financial records; 32 percent currently use some aspect of the recordkeeping workbook; 25 percent reported improved knowledge regarding where expenses are going; 19 percent reported improvement in recordkeeping skills; 11 percent reported that using the workbook increased the prices they receive when selling their animals and completed management plans; 9 percent reported that they have received a feed reimbursement; and 3 percent reported receiving a loan since keeping records. More than 90 percent of these producers reported that on average, they shared information learned during the trainings with 4 or more individuals.

Water quality and availability in the arid West are issues that affect all Arizonans, including youth. By training teachers to present water awareness education in K-16 classrooms, Arizona Project WET (APW), administered through the University of Arizona's Water Resources Research Center, assists in building water-related decision making skills in both students and adults. According to survey data, 96 percent of the teachers participating in the statewide workshops "intend to become a better water steward as a result of this workshop," and 97 percent said the "workshop met my expectations and will have an impact on my teaching." Volunteers provided 3,290 service hours delivering water festivals in 2008, a contribution valued at \$64,187 (using

Independent Sector value of \$19.51). Among teachers, 98 percent agree that their students are more likely to conserve water after they attend a festival. Of 5,103 students participating in 10,206 contact hours of instruction, only 10 percent could correctly identify the location of groundwater before the festival. After the festival, 40 percent correctly understood that groundwater is found between grains of sand and gravel under the ground

Master gardeners answer literally thousands of questions annually. In Maricopa County, about 400 master gardeners donate 28,000 hours every year by fielding telephone calls. Statewide, 1,010 volunteers in 12 counties donated 64,080 hours last year. Using the Independent Sector value of \$19.51 per hour, this contribution totals \$1,250,200. According to a state survey, about 75 percent of clients who attended master gardener clinics said they were willing to use alternatives to pesticides and 95 percent said they would contact Cooperative Extension again when they had a gardening question.

Nationwide, 18 million people have full-blown diabetes and another 41 million already have pre-diabetes. Almost 65 percent of adults are either overweight or obese and 20 to 30 percent of children are overweight or at risk for becoming overweight. Regular physical activity can help prevent or improve these conditions. Walking is a local, inexpensive and convenient way to develop fitness and healthy habits. Begun in 2001, "Walk across Arizona" is 16-week walking program designed for teams of 10 people each. Statewide since its inception, 917 teams with 8,086 participants (some repeated) from 13 of Arizona's 15 counties have reported walking a combined 1,798,134 miles. Data analyzed from 2005-2007 participants identified the top three benefits of participation: 1) Increased exercise they were already doing, 2) Increased their energy, and 3) Helped them to feel less stressed.

Osteoporosis is both treatable and preventable. One in 2 women and 1 in 4 men will have osteoporosis fractures in their lifetimes. Bone Builders is a community education partnership between the Arizona Cooperative Extension and Arizona Prevention Center, and various public and private partners. All seniors completing the physical activity class improved in at least 1 out of 6 fitness assessments. Seniors improved from 10 to 90 percent on individual tests. BoneBuilders.org had 31,538 visitors in 2008, with 829,518 hits or 87 visitors per day. More than 55,000 people visited the page on high calcium foods and 58,000 visited the one on weight-bearing exercise.

**Total Actual Amount of professional FTEs/SYs for this State**

Year:2008	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	50.0	0.0	105.0	0.0
<b>Actual</b>	29.0	0.0	59.0	0.0

**II. Merit Review Process**

**1. The Merit Review Process that was Employed for this year**

- Internal University Panel

**2. Brief Explanation**

All new proposed Hatch Projects are reviewed by an ad hoc review panel of 3 qualified faculty with no conflicts of interest. All renewal projects are reviewed by a panel of 2 similarly qualified faculty. The Associate Director oversees this process and ensures that any suggested changes are made to the satisfaction of the reviewers and the Associate Director. External review of programs and projects is obtained from County Extension Advisory Boards and from Agricultural Center Advisory Boards who meet on a regular basis.

**III. Stakeholder Input**

**1. Actions taken to seek stakeholder input that encouraged their participation**

- Survey of traditional stakeholder groups
- Survey of traditional stakeholder individuals

**Brief Explanation**

In 2008, a survey was developed to solicit faculty, staff and stakeholder input on the strategic plan for Extension and applied research. This builds on the strategic plans for the College of Agriculture and Life Sciences (<http://cals.arizona.edu/dean/planning/>) and the University of Arizona (<http://plan.web.arizona.edu/strategic-plan.pdf>) for 2010-2014. This also corresponds with the Federal strategic plan. The survey was distributed across the state. Over 300 participants completed the survey. The survey will set hiring and program priorities for allocation of new funds as we evolve from these difficult economic times. See Plan of Work section IV for complete description.

**2(A). A brief statement of the process that was used by the recipient institution to identify individuals and groups stakeholders and to collect input from them**

**1. Method to identify individuals and groups**

- Use Advisory Committees
- Use Internal Focus Groups
- Use External Focus Groups
- Open Listening Sessions
- Needs Assessments

**Brief Explanation**

By State Law, over 100 county advisory board members provide input and priorities to county programs on an annual basis. More than 350 stakeholders are annually involved in both Extension and Research programs. See Plan of Work for further details.

**2(B). A brief statement of the process that was used by the recipient institution to identify individuals and groups who are stakeholders and to collect input from them**

**1. Methods for collecting Stakeholder Input**

- Meeting with traditional Stakeholder groups
- Survey of traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals
- Survey of traditional Stakeholder individuals
- Meeting with the general public (open meeting advertised to all)
- Meeting with invited selected individuals from the general public
- Survey of selected individuals from the general public

**Brief Explanation**

See previously described explanation of 2008 survey.

**3. A statement of how the input was considered**

- In the Budget Process
- To Identify Emerging Issues
- Redirect Extension Programs
- Redirect Research Programs
- In the Action Plans
- To Set Priorities

**Brief Explanation**

Information gathered was shared in printed summaries and is available on line. See Plan of Work.

**Brief Explanation of what you learned from your Stakeholders**

Climate Science has become of much greater concern as an area where university science is making a difference.

**IV. Expenditure Summary**

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
1719741	0	2020635	0

<b>2. Totaled Actual dollars from Planned Programs Inputs</b>				
<b>Extension</b>			<b>Research</b>	
	<b>Smith-Lever 3b &amp; 3c</b>	<b>1890 Extension</b>	<b>Hatch</b>	<b>Evans-Allen</b>
<b>Actual Formula</b>	438684	0	81328	0
<b>Actual Matching</b>	3030012	0	3364888	0
<b>Actual All Other</b>	0	0	0	0
<b>Total Actual Expended</b>	3468696	0	3446216	0

<b>3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous years</b>				
<b>Carryover</b>	0	0	0	0

**V. Planned Program Table of Content**

<b>S. NO.</b>	<b>PROGRAM NAME</b>
1	ENVIRONMENT, WATER, LAND AND NATURAL RESOURCES
2	PLANT SCIENCES
3	ANIMAL SCIENCES
4	MARKETING TRADE AND ECONOMICS
5	FAMILY, YOUTH, AND COMMUNITY
6	HUMAN NUTRITION, HEALTH AND FOOD SAFETY

**Program #1**

**V(A). Planned Program (Summary)**

**1. Name of the Planned Program**

ENVIRONMENT, WATER, LAND AND NATURAL RESOURCES

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	35%		37%	
111	Conservation and Efficient Use of Water	18%		16%	
112	Watershed Protection and Management	16%		16%	
121	Management of Range Resources	31%		31%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2008	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	11.0	0.0	21.0	0.0
<b>Actual</b>	9.0	0.0	18.0	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
195780	0	27496	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1221164	0	1321175	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

Extension specialists and their clients need expanded knowledge about water quality and quantity to help protect the environment and safeguard our food supply.

**2. Brief description of the target audience**

Natural resource managers, Governor's Office and state agencies, municipal organizations and leaders, households, consumers, youth, master gardening and master watershed programs

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

**Target for the number of persons (contacts) reached through direct and indirect contact methods**

	<b>Direct Contacts Adults</b>	<b>Indirect Contacts Adults</b>	<b>Direct Contacts Youth</b>	<b>Indirect Contacts Youth</b>
<b>Year</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
<b>Plan</b>	15000	20000	6000	500
2008	14000	22000	6500	1000

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

<b>Year</b>	<b>Target</b>
<b>Plan:</b>	1
2008 :	1

**Patents listed**

E. Coli Detection Device

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Plan</b>	0	0	
2008	9	36	45

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Effectiveness of the research program will be used to reach direct and indirect contacts  
*Not reporting on this Output for this Annual Report*

**Output #2**

**Output Measure**

- Number of individuals participating in educational programs  
*Not reporting on this Output for this Annual Report*

**Output #3**

**Output Measure**

- Number of individuals adopting new technology  
*Not reporting on this Output for this Annual Report*

**Output #4**

**Output Measure**

- Energy Conservation

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2008	{No Data Entered}	0

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O No.	OUTCOME NAME
1	Effectiveness of research programs will be based on publications, external grant support, and integration into existing extension programs
2	Number of individuals gaining knowledge by participating in educational programs
3	Volunteers completing Master Gardening training
4	Create awareness and increase knowledge



**Outcome #1****1. Outcome Measures**

Effectiveness of research programs will be based on publications, external grant support, and integration into existing extension programs  
*Not reporting on this Outcome for this Annual Report*

**Outcome #2****1. Outcome Measures**

Number of individuals gaining knowledge by participating in educational programs

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2008	10000	12000

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Water quality and availability in the arid West are issues that affect all Arizonans, including youth. By training teachers to present water awareness education in K-16 classrooms, Arizona Project WET (APW), administered through the University of Arizona's Water Resources Research Center, assists in building water-related decision making skills in both students and adults. APW is recognized as the only comprehensive water education program for K-16 audiences with a statewide partnership and delivery system.

**What has been done**

Water education curricula were developed by water resource specialists working together with teachers. APW staff are working on curriculum integration with 6 school districts. In 2008, statewide water education programs involved 866 teachers reaching 84,975 students annually. Also, 13 Arizona Conserve Water workshops held across Arizona involved 227 educators who reported reaching 16,882 students each year. Community Water Festivals use structured Arizona Project WET lessons that meet 4th grade water education standards and cover the water cycle, the value of water and conservation, watersheds, and the ground water system. Eight water festivals were held in Arizona in 2008, involving 470 trained volunteers.

**Results**

According to survey data, 96 percent of the teachers participating in the statewide workshops intend to become a better water steward as a result of this workshop, and 97 percent said the workshop met my expectations and will have an impact on my teaching. Volunteers provided 3,290 service hours delivering water festivals in 2008, a contribution valued at \$64,187 (using Independent Sector value of \$19.51). Among teachers, 98 percent agree that their students are more likely to conserve water after they attend a festival. Of 5,103 students participating in 10,206 contact hours of instruction, only 10 percent could correctly identify the location of groundwater before the festival. After the festival, 40 percent correctly understood that groundwater is found between grains of sand and gravel under the ground. A parent of a student who participated in a water audit program reported that her daughter had begun timing her showers, reminded her family about conserving water, and had learned skills she will utilize her whole life.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water

**Outcome #3**

**1. Outcome Measures**

Volunteers completing Master Gardening training  
*Not reporting on this Outcome for this Annual Report*

**Outcome #4**

**1. Outcome Measures**

Create awareness and increase knowledge

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2008	8000	500

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Although trees offer more than aesthetics in a landscape, the true value of their contribution is usually unknown. A street tree inventory conducted on the University of Arizona campus assisted a larger effort undertaken by the City of Tucson's Department of Urban Planning and Design to assess the species distribution, annual costs/benefits and maintenance priorities for municipal trees.

**What has been done**

The UA Campus Arboretum conducted a study from November 2007-November 2008 documenting the distribution, yearly costs and benefits of more than 2,000 individual trees flanking campus roads. Information for each tree, including species, size, condition and location, was logged into a PDA and loaded into a software program called STRATUM, part of the i-Tree Suite of software developed by the Center for Urban Forest Research at UC Davis. The model in the software was adapted for Phoenix and desert Southwest tree species.

**Results**

According to the inventory, the 2,000 street trees in the study annually sequester 246,620 tons of carbon dioxide (CO<sub>2</sub>); reduce the energy costs for UA facilities by \$18,230; reduce emission, pollutants and particulates by 9,994 pounds; and intercept more than a million gallons of rainfall or stormwater (reducing flooding). If all 7,000 trees on campus were inventoried, the combined benefit of the UA's urban forest could be three to four times higher. Within species, each Chinese pistache on campus contributes about \$74 every year, including energy and water saved, carbon dioxide sequestered, and aesthetic value. Mesquites contribute \$112; Aleppo pine, \$156; California palm, \$33 and blue paloverde, \$93. With some campus trees living 40, 60 or even 100 years, their contributions can be considerable over their life spans. The trees contribute to quality of life and reduce the university's carbon footprint.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water

**V(H). Planned Program (External Factors)**

**External factors which affected outcomes**

- Appropriations changes

**Brief Explanation**

State appropriation decreases are making it very difficult to maintain programs

**V(l). Planned Program (Evaluation Studies and Data Collection)**

**1. Evaluation Studies Planned**

- After Only (post program)

**Evaluation Results**

**Key Items of Evaluation**

**Program #2****V(A). Planned Program (Summary)****1. Name of the Planned Program**

PLANT SCIENCES

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
201	Plant Genome, Genetics, and Genetic Mechanisms	22%		22%	
205	Plant Management Systems	18%		15%	
206	Basic Plant Biology	12%		15%	
211	Insects, Mites, and Other Arthropods Affecting Plants	19%		19%	
212	Pathogens and Nematodes Affecting Plants	19%		19%	
215	Biological Control of Pests Affecting Plants	10%		10%	
	<b>Total</b>	<b>100%</b>		<b>100%</b>	

**V(C). Planned Program (Inputs)****1. Actual amount of professional FTE/SYs expended this Program**

Year: 2008	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	8.0	0.0	36.0	0.0
<b>Actual</b>	7.0	0.0	15.0	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c 111247	1890 Extension 0	Hatch 31944	Evans-Allen 0
<b>1862 Matching</b> 525697	<b>1890 Matching</b> 0	<b>1862 Matching</b> 599558	<b>1890 Matching</b> 0
<b>1862 All Other</b> 0	<b>1890 All Other</b> 0	<b>1862 All Other</b> 0	<b>1890 All Other</b> 0

**V(D). Planned Program (Activity)****1. Brief description of the Activity**

Effectiveness of the research program will be based on publications, external grant support and integration into extension programs

**2. Brief description of the target audience**

Commodity groups, state agencies, pest management advisors, pesticide applicators, youth, ag ventures program.

**V(E). Planned Program (Outputs)****1. Standard output measures****Target for the number of persons (contacts) reached through direct and indirect contact methods**

	<b>Direct Contacts Adults</b>	<b>Indirect Contacts Adults</b>	<b>Direct Contacts Youth</b>	<b>Indirect Contacts Youth</b>
<b>Year</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
<b>Plan</b>	17000	30000	5000	1000
2008	15000	35000	6000	2000

**2. Number of Patent Applications Submitted (Standard Research Output)****Patent Applications Submitted**

<b>Year</b>	<b>Target</b>
<b>Plan:</b>	2
2008 :	1

**Patents listed**

Withaferin A Analogs and Uses Thereof

**3. Publications (Standard General Output Measure)****Number of Peer Reviewed Publications**

	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Plan</b>	0	0	
2008	7	35	42

**V(F). State Defined Outputs****Output Target****Output #1****Output Measure**

- Number of individuals participating in educational programs

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2008	17000	16500

**Output #2****Output Measure**

- Number of research projects conducted on all aspects of Plant Sciences

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2008	55	52

V(G). State Defined Outcomes

**V. State Defined Outcomes Table of Content**

O No.	OUTCOME NAME
1	Adoption of better management practices for crop production
2	Adoption of alternative crop technologies
3	Adoption of more cost effective means for controlling plant diseases and insect damage

**Outcome #1****1. Outcome Measures**

Adoption of better management practices for crop production

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2008	200	150

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Yuma County melon producers suffered crop losses of 60 percent or more to the whitefly-transmitted Cucurbit yellow stunting disorder virus (CYSDV) when it first appeared in 2006. Damages amounted to about \$14 million. Yuma County produces about 75 percent of Arizona's melon crop, including cantaloupe, honeydew, watermelon and mixed melons. The virus has now become established in the desert Southwest, requiring management to reduce crop losses.

**What has been done**

Through a partnership between the University of Arizona's Yuma Agricultural Center (YAC), Yuma County Cooperative Extension and local growers, a wide-scale whitefly and virus monitoring program was implemented in Yuma County, along with a voluntary host-free period during the summer to reduce whitefly infestations, and other strategies. The monitoring effort is based on results collected from 105 sticky traps spread in a uniform grid across 200,000 acres in rural and urban areas in the county. GIS software is used to produce maps showing the weekly dispersal of adult whitefly populations. The system can also pinpoint areas where virus symptoms have appeared.

**Results**

The GIS maps have confirmed the benefits of a countywide, host-free melon period first implemented in 2007. The growers disked their spring melon crop in July and any subsequent volunteer melons or other hosts and waited 30 days before planting the fall crop in August. As the virus cannot live without a host for more than 7-10 days, hungry whiteflies disperse to other fields. The 2008 summer host-free period helped growers achieve a 20 percent reduction in the severity of CYSDV in the fall 2008 melon crop.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants

**Outcome #2****1. Outcome Measures**

Adoption of alternative crop technologies

*Not reporting on this Outcome for this Annual Report*

**Outcome #3****1. Outcome Measures**

Adoption of more cost effective means for controlling plant diseases and insect damage

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2008	1000	800

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

During the mid-90s, insecticide applications in cotton typically accounted for about half of all insecticide use in the United States. In 1995, nearly 100 percent of Arizona's cotton acreage was sprayed multiple times for pink bollworm and silverleaf whitefly. New technologies have enabled cotton growers to reduce their spray applications significantly while maintaining competitive yields. These technologies also help growers implement more ecologically-based IPM programs and become less dependent on broadly toxic insecticides.

**What has been done**

An integrated pest management program (IPM) established in Arizona in 1996, refined in 2006, and continued through 2008 uses insect growth regulators (IGR's effective against whiteflies) and transgenic cotton (with Bt-Bacillus thuringiensis effective against pink bollworms). Safe for humans, these tools kill only their target pests, allowing natural processes to play a larger role in the control of all other insects. The program was initiated by the University of Arizona College of Agriculture and Life Sciences in collaboration with growers, the USDA, the Arizona Department of Agriculture, the Arizona Cotton Growers' Association, Cotton Incorporated, Arizona Cotton Research & Protection Council, industry and others.

**Results**

Over the past 7 years, the fully implemented cotton IPM program has resulted in a 69 percent reduction in pesticide sprays for all insects combined, including whiteflies, pink bollworm, Lygus bug and others. Insecticide usage decreased by more than 1.6 million pounds. In 1995, cotton growers sprayed on average 12.5 times with broadly toxic insecticides totaling nearly 1.71 million pounds. By 2008, cotton growers sprayed just 1.6 times with safer compounds totaling less than 80,000 pounds, a 20-fold reduction in insecticide use. Growers cumulatively have saved over \$201 million in pesticide costs and in reduced insect damage since 1996, which decreased by more than 37 percent. Almost half of the state's 150,000 acres of cotton was never sprayed for insect pests, and for the first time since the mid-1960s growers reported zero sprays for pink bollworm in 2008. The IPM plans have been exported for use in California, Texas, northern Mexico, Australia and Latin America.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
205	Plant Management Systems
215	Biological Control of Pests Affecting Plants
211	Insects, Mites, and Other Arthropods Affecting Plants

**V(H). Planned Program (External Factors)****External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations

**Brief Explanation**

See earlier statement

**V(I). Planned Program (Evaluation Studies and Data Collection)****1. Evaluation Studies Planned**

- After Only (post program)



### **Evaluation Results**

IPM Assessment is a key focus of the Arizona Pest Management Center. We have developed tools to measure IPM adoption and impact, including a statewide pesticide use reporting database. Last year, we evaluated the adoption of UA Cooperative Extension cross-commodity guidelines for whitefly management (<http://cals.arizona.edu/pubs/insects/az1319.pdf>). Our spatial analysis revealed a 4-fold difference in the use of key whitefly management tools between cotton growers in cotton-intensive versus multi-crop areas of Yuma, consistent with what our guidelines recommend, though adoption levels were lower in other parts of the state ([http://cals.arizona.edu/apmc/APMC\\_RIPM2005.html](http://cals.arizona.edu/apmc/APMC_RIPM2005.html)). In addition, we annually engage agricultural clientele through a series of Crop Pest Losses workshops to evaluate yield losses and economic impacts in major crops due to insects, weeds and plant pathogens (<http://cals.arizona.edu/apmc/croplosswg.html>).

### **Key Items of Evaluation**

Using these data, we have documented a savings of over \$200 million to Arizona cotton growers since 1996, and a 20-fold reduction in pesticide use between 1995 and 2006 ([http://cals.arizona.edu/apmc/docs/IPM\\_Delivers.pdf](http://cals.arizona.edu/apmc/docs/IPM_Delivers.pdf)). See earlier statement.

**Program #3****V(A). Planned Program (Summary)****1. Name of the Planned Program**

ANIMAL SCIENCES

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
301	Reproductive Performance of Animals	6%		4%	
302	Nutrient Utilization in Animals	19%		17%	
305	Animal Physiological Processes	17%		21%	
306	Environmental Stress in Animals	8%		8%	
311	Animal Diseases	50%		50%	
	<b>Total</b>	<b>100%</b>		<b>100%</b>	

**V(C). Planned Program (Inputs)****1. Actual amount of professional FTE/SYs expended this Program**

Year: 2008	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	2.0	0.0	22.0	0.0
<b>Actual</b>	2.0	0.0	8.0	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
59712	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
479968	0	649897	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

**V(D). Planned Program (Activity)****1. Brief description of the Activity**

Develop innovative new methods to fight animal diseases.  
Develop improved livestock through genetics and molecular biology

**2. Brief description of the target audience**

Commodity groups, state agencies, producers, youth.

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

**Target for the number of persons (contacts) reached through direct and indirect contact methods**

	<b>Direct Contacts Adults</b>	<b>Indirect Contacts Adults</b>	<b>Direct Contacts Youth</b>	<b>Indirect Contacts Youth</b>
<b>Year</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
<b>Plan</b>	300	100	1500	200
2008	275	200	1550	225

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

<b>Year</b>	<b>Target</b>
<b>Plan:</b>	1
2008 :	0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Plan</b>	0	0	
2008	2	20	22

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Effectiveness of the research program will be based on publications, external grant support, and integration into existing extension programs

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2008	22	14

**Output #2**

**Output Measure**

- Create awareness and increase knowledge
- Not reporting on this Output for this Annual Report*

**Output #3**

**Output Measure**

- Expand participation in our Annual Cow College program
- Not reporting on this Output for this Annual Report*

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O No.	OUTCOME NAME
1	Number of farmers adopting more sustainable and profitable large scale dairy production practices
2	Adoption of more profitable breeds of beef cattle for arid land conditions
3	Development of effective vaccines

**Outcome #1****1. Outcome Measures**

Number of farmers adopting more sustainable and profitable large scale dairy production practices  
*Not reporting on this Outcome for this Annual Report*

**Outcome #2****1. Outcome Measures**

Adoption of more profitable breeds of beef cattle for arid land conditions  
*Not reporting on this Outcome for this Annual Report*

**Outcome #3****1. Outcome Measures**

Development of effective vaccines

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2008	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Most people are familiar with Salmonella and its potential to make people ill. But fewer know about Campylobacter jejuni—even though it makes more people sick. Raw chicken is one of the most common carriers of the bacteria. Campylobacter is now the number one food-borne pathogen in the United States and the world, surpassing Salmonella. In the United States alone, 2.4 million cases are reported annually, with costs exceeding \$1 billion. Americans consumed 86 pounds of chicken per person in 2006, the most recent numbers available.

**What has been done**

Funded by the USDA, faculty and graduate students in the Department of Veterinary Science and Microbiology developed a new poultry vaccine using Salmonella to induce chicks to make antibodies to Campylobacter proteins in their intestines—where the infection begins. The vaccination process is simple, easy to produce and protective to the chick. The Salmonella lives four to five days, enough time to stimulate antibody production, and dies. Chickens need to be vaccinated early because they become infected at just two to three weeks of age. The goal is to halt the contamination before it spreads and survives on raw chicken sold in stores. The vaccine may be available in 3 to 5 years

**Results**

Ongoing research trials show the vaccine has significantly reduced the pathogen's ability to colonize young chickens' intestines. In the first study, Campylobacter infection was reduced by 98 percent compared with a control group; 270 million Campylobacter organisms were present in non-vaccinated birds, compared to 67,000 organisms in the vaccinated birds. At least 500 organisms are needed to produce the disease in humans, but the chlorine in the packinghouse chillers usually reduces bacteria by 1,000 to 100,000 organisms. Vaccinated chickens should be free of Campylobacter after processing, according to the researchers. The vaccine's effect could be significant: about 8.9 billion broilers go to market annually in the U.S., with a value of \$21.5 billion. Europe has similar broiler production figures. The vaccine could serve as an intervention method for Campylobacter when the USDA and FDA mandate reduced numbers of food-borne pathogens in chicken, most likely in the next few years.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
311	Animal Diseases

#### V(H). Planned Program (External Factors)

##### External factors which affected outcomes

- Appropriations changes

##### Brief Explanation

Reduced state appropriations are making it difficult to maintain faculty numbers and faculty support.

#### V(I). Planned Program (Evaluation Studies and Data Collection)

##### 1. Evaluation Studies Planned

- After Only (post program)

##### Evaluation Results

##### Key Items of Evaluation

**Program #4****V(A). Planned Program (Summary)****1. Name of the Planned Program**

MARKETING TRADE AND ECONOMICS

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
605	Natural Resource and Environmental Economics	60%		60%	
610	Domestic Policy Analysis	40%		40%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)****1. Actual amount of professional FTE/SYs expended this Program**

Year: 2008	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	1.0	0.0	4.0	0.0
<b>Actual</b>	1.0	0.0	4.0	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
40158	0	2000	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
331093	0	336681	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

**V(D). Planned Program (Activity)****1. Brief description of the Activity**

Effectiveness of the research program will be based on publications, external grant support and integration into extension programs

**2. Brief description of the target audience**

Commodity groups, state agencies, financial institutions, producers, marketing organizations.

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

**Target for the number of persons (contacts) reached through direct and indirect contact methods**

	<b>Direct Contacts Adults</b>	<b>Indirect Contacts Adults</b>	<b>Direct Contacts Youth</b>	<b>Indirect Contacts Youth</b>
<b>Year</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
<b>Plan</b>	200	300	0	0
2008	210	400	50	100

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

<b>Year</b>	<b>Target</b>
<b>Plan:</b>	0
2008 :	0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Plan</b>	0	0	
2008	3	15	18

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Develop improved marketing and economic models.

*Not reporting on this Output for this Annual Report*



**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O No.	OUTCOME NAME
1	Increased financial stability of Arizona's producers
2	Number of individuals gaining knowledge by participating in educational programs
3	Adoption of management practices that assure a safe food supply

**Outcome #1****1. Outcome Measures**

Increased financial stability of Arizona's producers

**2. Associated Institution Types**

•1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2008	500	375

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Good records are the foundation for starting and growing a business, and are fundamental for participating in most federal farm programs. Good records are also needed for producers to file a Schedule F tax form and qualify for risk management programs like AGR-Lite and many Disaster Assistance programs. Many Navajo, Hualapai, Hopi and Apache livestock producers have adopted new record systems for their operations as a result of past trainings. However, full adoption of any record keeping system by producers requires continued support

**What has been done**

Through a series of hands-on recordkeeping workshops, tribal outreach extension professionals reached over 370 Navajo, Hualapai, Hopi and Apache producers in 2008. Independent of the workshops, a program assessment was developed and administered on the Navajo Nation to determine the effectiveness of the past trainings and workbooks.

**Results**

Preliminary results based on a survey of the participants show that of 126 responses received so far, 34 percent of the producers use the recordkeeping workbook to collect/record financial records; 32 percent currently use some aspect of the recordkeeping workbook; 25 percent reported improved knowledge regarding where expenses are going; 19 percent reported improvement in recordkeeping skills; 11 percent reported that using the workbook increased the prices they receive when selling their animals and completed management plans; 9 percent reported that they have received a feed reimbursement; and 3 percent reported receiving a loan since keeping records. More than 90 percent of these producers reported that on average, they shared information learned during the trainings with 4 or more individuals.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics

**Outcome #2****1. Outcome Measures**

Number of individuals gaining knowledge by participating in educational programs

*Not reporting on this Outcome for this Annual Report***Outcome #3****1. Outcome Measures**

Adoption of management practices that assure a safe food supply

*Not reporting on this Outcome for this Annual Report*

**V(H). Planned Program (External Factors)**

**External factors which affected outcomes**

- Appropriations changes

**Brief Explanation**

Reduced state appropriations continue to make it difficult to maintain faculty numbers and faculty support

**V(I). Planned Program (Evaluation Studies and Data Collection)**

**1. Evaluation Studies Planned**

- After Only (post program)

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

**Program #5**

**V(A). Planned Program (Summary)**

**1. Name of the Planned Program**

FAMILY, YOUTH, AND COMMUNITY

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
802	Human Development and Family Well-Being	40%		40%	
806	Youth Development	60%		60%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2008	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	24.0	0.0	5.0	0.0
<b>Actual</b>	20.0	0.0	5.0	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
18020	0	12110	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
153174	0	151611	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

Conduct research and deliver services, products and information

**2. Brief description of the target audience**

Parents, educators, youth, community groups

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

**Target for the number of persons (contacts) reached through direct and indirect contact methods**

	<b>Direct Contacts Adults</b>	<b>Indirect Contacts Adults</b>	<b>Direct Contacts Youth</b>	<b>Indirect Contacts Youth</b>
<b>Year</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
<b>Plan</b>	6500	100000	70000	45000
2008	7000	105000	75000	50000

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

<b>Year</b>	<b>Target</b>
<b>Plan:</b>	0
2008 :	0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Plan</b>	0	0	
2008	21	15	36

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Number of individuals participating in educational programs  
*Not reporting on this Output for this Annual Report*

**Output #2**

**Output Measure**

- Number of educational events, training workshops and clinics  
*Not reporting on this Output for this Annual Report*

**Output #3**

**Output Measure**

- Address issues of grandparents raising grandchildren

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2008	{No Data Entered}	500

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O No.	OUTCOME NAME
1	Adoption of essential life skills by Arizona's youth that leads to a responsible, productive, and healthy life-style
2	Adoption of life building skills including self-discipline, responsibility and leadership

**Outcome #1****1. Outcome Measures**

Adoption of essential life skills by Arizona's youth that leads to a responsible, productive, and healthy life-style

**2. Associated Institution Types**

•1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2008	7000	4600

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Arizona has one of the fastest growing populations in the nation, with an accompanying increase in obesity and diabetes. Nationwide, 18 million people have full-blown diabetes and another 41 million already have pre-diabetes. Almost 65 percent of adults are either overweight or obese and 20 to 30 percent of children are overweight or at risk for becoming overweight. Regular physical activity can help prevent or improve these conditions. Walking is a local, inexpensive and convenient way to develop fitness and healthy habits.

**What has been done**

Begun in 2001, "Walk across Arizona" is 16-week walking program designed for teams of 10 people each, administered through Arizona Cooperative Extension and the UA's Community Health Advancement Partnership. Teams of friends, neighbors, co-workers and families include people of all ages, from children to senior citizens. Each county has a link on the Walk Across Arizona site, where team captains can access forms and record weekly miles, and county coordinators can manage the program and update local activities. Nutrition, energy levels, social interaction and other factors are also tracked.

**Results**

During 2001, the first year of the campaign, 34 teams with 329 registered participants walked 48,872 miles. In contrast, 284 teams (52 percent increase from 2007 of 10 individuals walked 663,453 miles with 2,147 registered participants in Cochise, Graham, Maricopa, Pima, Pinal, Navajo and Yuma counties. Statewide since its inception, 917 teams with 8,086 participants (some repeated) from 13 of Arizona's 15 counties have reported walking a combined 1,798,134 miles. Data analyzed from 2005-2007 participants identified the top three benefits of participation: 1) Increased exercise they were already doing, 2) Increased their energy, and 3) Helped them to feel less stressed.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
802	Human Development and Family Well-Being

**Outcome #2****1. Outcome Measures**

Adoption of life building skills including self-discipline, responsibility and leadership

**2. Associated Institution Types**

•1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2008	14000	14907

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Arizona has long been a destination for newcomers unfamiliar with its challenging growing conditions. Longtime residents often need guidance on home horticulture as well. The nationwide Master Gardener program answers this need. In neighborhoods throughout the state, volunteer master gardeners create and maintain regionally specific demonstration gardens that showcase new plants, new planting methods, composting techniques and new irrigation methods for homeowners, schools and a wide range of community applications.

**What has been done**

Arizona Master Gardeners are university-trained volunteers who serve as community educators. Working with the UA College of Agriculture and Life Sciences, they provide research-based information on environmentally responsible gardening and landscaping to the public. After completing a semester-long course concentrating on gardening and the environment, master gardeners associates volunteer to serve their communities, and then become Certified Master Gardeners. In 13 Arizona counties, trained volunteers promote the concept of an "earth-friendly backyard," including ways to save energy and water, preserve water quality, and use integrated pest management techniques.

**Results**

Master gardeners answer literally thousands of questions annually. In Maricopa County, about 400 master gardeners donate 28,000 hours every year by fielding telephone calls. In Cochise County, certified master gardeners answered clientele inquiries, completed projects and contributed more than 3,000 volunteer hours in 2008. Statewide, 1,010 volunteers in 12 counties donated 64,080 hours last year. Using the Independent Sector value of \$19.51 per hour, this contribution totals \$1,250,200. According to a state survey, about 75 percent of clients who attended master gardener clinics said they were willing to use alternatives to pesticides and 95 percent said they would contact Cooperative Extension again when they had a gardening question.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
802	Human Development and Family Well-Being

**V(H). Planned Program (External Factors)****External factors which affected outcomes**

- Appropriations changes

**Brief Explanation**

Limited state appropriations are making it very difficult to maintain programs

**V(I). Planned Program (Evaluation Studies and Data Collection)****1. Evaluation Studies Planned**

- After Only (post program)

**Evaluation Results****Key Items of Evaluation**



**Program #6**

**V(A). Planned Program (Summary)**

**1. Name of the Planned Program**

HUMAN NUTRITION, HEALTH AND FOOD SAFETY

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
702	Requirements and Function of Nutrients and Other Food Components	27%		33%	
703	Nutrition Education and Behavior	40%		34%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	33%		33%	
<b>Total</b>		100%		100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2008	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	9.0	0.0	9.0	0.0
<b>Actual</b>	8.0	0.0	9.0	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
13767	0	7778	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
318916	0	305966	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

Conduct research, conduct workshops, meetings, deliver services and information

**2. Brief description of the target audience**

General public, educators, health professionals, extension educators

**V(E). Planned Program (Outputs)****1. Standard output measures****Target for the number of persons (contacts) reached through direct and indirect contact methods**

	<b>Direct Contacts Adults</b>	<b>Indirect Contacts Adults</b>	<b>Direct Contacts Youth</b>	<b>Indirect Contacts Youth</b>
<b>Year</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
<b>Plan</b>	25000	25000	600	20000
2008	21500	20000	1000	18000

**2. Number of Patent Applications Submitted (Standard Research Output)****Patent Applications Submitted**

<b>Year</b>	<b>Target</b>
<b>Plan:</b>	0
2008 :	2

**Patents listed**

Novel inhibitors for Akt  
Active Inhibitors for Akt

**3. Publications (Standard General Output Measure)****Number of Peer Reviewed Publications**

	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Plan</b>	0	0	
2008	8	15	23

**V(F). State Defined Outputs****Output Target****Output #1****Output Measure**

- Effectiveness of the research program will be based on publications, external grant support, and integration into existing extension programs

*Not reporting on this Output for this Annual Report*

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

<b>O No.</b>	<b>OUTCOME NAME</b>
1	Create awareness and increase knowledge
2	Number of individuals adopting recommendations for nutrition and health

**Outcome #1****1. Outcome Measures**

Create awareness and increase knowledge

*Not reporting on this Outcome for this Annual Report***Outcome #2****1. Outcome Measures**

Number of individuals adopting recommendations for nutrition and health

**2. Associated Institution Types**

•1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2008	5000	6200

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Osteoporosis is both treatable and preventable. One in 2 women and 1 in 4 men will have osteoporosis fractures in their lifetimes. U.S. Surgeon General Richard H. Carmona, M.D., warned in his 2004 report that by 2020, half of all American citizens older than 50 will be at risk for fractures from osteoporosis and low bone mass if no immediate action is taken. It causes a serious and costly decline in the health of the elderly, and is the No.2 reason women enter nursing homes. The 2001 Arizona Behavior Risk Surveillance Survey found over half (51.4 percent) of Arizonans consume less than two (three recommended) servings of milk or milk products per day. More than half of Arizona's population lives in Maricopa County, with the corresponding highest number of people at risk for osteoporosis.

**What has been done**

Bone Builders is a community education partnership between the Arizona Cooperative Extension and Arizona Prevention Center, and various public and private partners. The goal is to develop health promotion and train volunteers to help women ages 25-55 in Maricopa County adopt dietary and exercise behaviors to reduce their risk of developing osteoporosis. In 2008, basic Bone Builders classes were taught for 78 Maricopa County community groups with 1,329 participants, plus 135 one-on-one. Four county projects reported 3,319 people in 2008 at 110 classes, 158 one-on-one contacts and 16,554 attendees at 59 health fairs; 1,234 people were received ultrasound screening. One million total were reached with education, displays and media.

**Results**

All seniors completing the physical activity class improved in at least 1 out of 6 fitness assessments. Seniors improved from 10 to 90 percent on individual tests. One 83-year-old woman said Bone Builders gave her life back to her! BoneBuilders.org had 31,538 visitors in 2008, with 829,518 hits or 87 visitors per day. More than 55,000 people visited the page on high calcium foods and 58,000 visited the one on weight-bearing exercise. Through a partnership with Arizona Osteoporosis Coalition and WellWoman, Bone Builders was able to conduct 458 ultrasound screenings (180 had low bone density) plus education in Coconino, Yavapai and Yuma Counties, and 750 in Maricopa County. Of 87 DEXA scans performed, 61 patients had osteopenia and 14 had osteoporosis. If ONE hip fracture can be prevented from early screening/education it would save \$81,000 in health costs. In a sample of 211 community class participants taken 6 months later, 39 percent said they had actually increased their calcium consumption as a result of the classes, and 36 percent had increased their weigh-bearing exercise.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
703	Nutrition Education and Behavior

**V(H). Planned Program (External Factors)**

**External factors which affected outcomes**

- Appropriations changes

**Brief Explanation**

**V(I). Planned Program (Evaluation Studies and Data Collection)**

**1. Evaluation Studies Planned**

- After Only (post program)

**Evaluation Results**

**Key Items of Evaluation**