2007 University of Arizona Combined Research and Extension Annual Report

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I. Report Overview

1. Executive Summary

MULTI-STATE COLLABORATIONS TO SOLVE PROBLEMS

Cooperating against Lygus. Thanks to a $2.5 million grant from the USDA-Cooperative State Research, Education and Extension Service's Risk Avoidance & Mitigation Program (RAMP), scientists, growers and agricultural industry representatives in California, Arizona, New Mexico and Texas are working together to reduce the risk of Lygus bug infestation at three levels: the individual grower's field, the local landscape and the wider ecosystem. The four-state effort aims to suppress the pest's expansion and reduce its potential damage across multiple crops. In Arizona alone, the Lygus bug has held the title of No. 1 pest in cotton for the past 10 years. The program includes co-PIs from USDA, University of California, New Mexico State University, Texas A&M and the UA as the lead institution. The RAMP team began its first full field study in summer 2007. Based in part on the research and the guidelines developed, Arizona Cooperative Extension programs in one major cotton-producing county helped growers switch from using broadly toxic Lygus insecticides to a new, reduced-risk insecticide that offers better opportunities for natural biological control. Where 100 percent of the sprays in 2006 were broad-spectrum, 52 percent were the reduced-risk type by 2007.

Decoding the corn genome. The 2007 production value of corn was estimated at more than $3 billion. Favorable prices, a growing demand for ethanol and strong export sales have fueled an increase in farmland acreage devoted to corn production. Researchers from the University of Arizona, Cold Spring Harbor Laboratory, Iowa State University and Washington University have completed a working draft of the corn genome. The draft was created based on a genetic "physical map"—some 18,000 pieces of genetic material assembled in the proper order—developed and spearheaded by plant scientists in the UA's BIO5 Institute and Arizona Genomics Institute in conjunction with scientists at the University of Missouri and Rutgers University. By unlocking the genetic secrets of this crop vital to U.S. agriculture, the researchers have gained information that could ultimately help society deal with drought, global warming, population pressures and increasing energy needs. The data contained in the draft genome could be used to develop new strains of maize that need less water or that respond better to climate change, as well as to develop strains with higher yields to help feed the planet's growing population or to improve efficiency in corn used for the biofuel industry. Researchers at Washington University in St. Louis sequenced the ordered pieces to create the draft genome, which is available to scientists worldwide through GenBank, an online public DNA database. The genetic data is also available at maizesequence.org.

SOLUTIONS TO ENHANCE AGRICULTURAL PRODUCTION

Improving fruit harvests. Answering an industry and consumer need for a better way to determine when apples are ripe, a UA scientist and an interested consumer invented the RediRipe® sticker for determining ripeness in apples. The sticker has a dot in the middle that turns from white to blue when attached to a fruit that has begun to produce ethylene, a common maturation indicator naturally released by apples, peaches, pears, apricots, avocados and plums. The sticker is more accurate, less expensive and far easier to use than other ripeness assessment methods, such as gas chromatography and typical laboratory equipment. Individual stickers are expected to cost less than a penny each. In 2006, the RediRipe® sticker was launched for limited commercial testing and promptly won the Arizona Governor's Award for innovation. After further testing, the business partners expect the sticker to be commercially available for the 2009 tree fruit harvest season. Interest in the RediRipe stickers expanded in 2007 to include requests from all over the world, not only from growers, but also from grocers who want to put them on the fruit in their stores. For that purpose, there's potential to combine the RediRipe sticker with the PLU ("Price Look-Up") stickers commonly seen on produce into a single sticker. The UA holds the patent (pending) for the sticker, while RediRipe® LLC is the exclusive licensee.

Alternative energy sources: In addition to corn, sweet sorghum shows promise as a feedstock for ethanol production. In 2006 and 2007, University of Arizona scientists grew and evaluated more than 50 lines of sweet sorghum to determine the best characteristics to use in a breeding program, taking into account biomass, sugar content and type of sugar, time to maturity, susceptibility to lodging (tipping over) and other traits. Eight acres of UA-grown sweet sorghum grown in 2007 contained approximately 32,000 gallons of juice that could represent 3,700 gallons of ethanol when processed. Launched through the Arizona Agricultural Experiment Station, the sweet sorghum project involves a large interdisciplinary team of UA scientists and extension specialists from the College of Agriculture and Life Sciences and the College of Engineering—agronomists, agricultural and chemical engineers, animal scientists, geneticists—along with business and industry professionals. The goal is to increase the yield to about 5,000 gallons of juice per acre, which would convert to about 500 gallons of ethanol per acre. In Arizona, sweet sorghum would be planted in areas where agriculture has dwindled, adding to rural development. The industry could be built around small processing plants, offering jobs and opportunities. As an added incentive, sweet sorghum prices have increased over the past few years.

USING GLOBAL POSITIONING SYSTEMS (GPS)

High-tech farming: In Graham County, Arizona, UA researchers and extension specialists have explored alternative uses for tractor-based global positioning systems (GPS) to help cotton growers improve their bottom line with fewer inputs, but also to lessen the environmental impact of repeated pesticide and fertilizer applications. The UA team collected yield information at specific points throughout the field that were tied to a GPS coordinate and develop a prescription fertilizer regime from that yield map. In that trial, fertilizer applications were reduced 27 percent with a cost savings of about $7 per acre in the collaborating grower's field. Over a 1,000-acre farm, one year of these results would pay for the equipment needed to collect the data and perform the prescription application. Extending the technology to control nematodes, the researchers used GPS coordinates to correlate yield drops in the field with root-knot nematode infestations. They developed a prescription application map for the nematicide, put the map in the tractor's computer and drove through the field, with the sprayer applying the chemical wherever it was programmed to turn on. In one of the trials, the technique resulted in a 56 percent reduction of the nematicide Telone® II. The UA results show that one single application of five gallons per acre will control nematodes for the entire growing season. With the current market value for Telone® II at approximately $11 per gallon, this would equate to a $55 per acre cost just for the material. So, for example, where only 42 percent of the total acreage is treated, the input cost for the material falls to $23 per acre.

Career builder. Training young people for high-tech careers has been identified as a need of the Colorado River Indian Tribe (CRIT), whose representatives wanted their young tribal members to become employable while also developing technological job opportunities on the reservation. 4-H Youth Development in Arizona has formed a statewide 4-H Technology Program to investigate learning opportunities in emerging fields. These include Geographic Information Systems (GIS) and Global Positioning Systems (GPS), now being used in applications such as road construction and compiling census information and maps. CRIT's 4-H program that uses GPS and GIS techniques is helping to fill this need. In Greenlee County, members of the volunteer fire department and 4-H GPS Technology Club partnered to map fire hydrants in the town of Clifton in 2007. A volunteer fire fighter and new 4-H GPS leader worked with six youth to collect waypoints and location information for all of Clifton's fire hydrants. The youth then created maps to share with the fire department showing their exact locations.These maps were also displayed at the Greenlee County Fair as part of a National Geographic Mapping program. The students now are developing a database for the fire department providing locations, addresses, and distances from adjacent fire hydrants.

HEALTHY DIETS, STRONGER BONES

Better nutrition. Two federally-funded nutrition programs address the needs of low-income families and youth nationwide. In Arizona, the Extension Food and Nutrition Education Program (EFNEP) teaches minority families in five counties to stretch their limited food dollars, plan and prepare nutritious foods and make informed choices about food and other lifestyle issues that support family health and well-being. In a recent two-year reporting period more than 3,249 low-income families—which included 12,650 family members and 4,060 youth—attended EFNEP classes in Arizona; 350 volunteers assisted with family nutrition education. Nearly 94 percent reported positive changes in choosing healthy items for meals. About 80 percent improved their general nutrition overall and 65 percent improved their food safety practices. The Food Stamp Nutrition Education Program (FSNEP) promotes health and disease prevention to food stamp recipients. Three key nutrition and health themes are the focus of FSNEP educational materials which include maintaining a healthy lifestyle, physical activity, and gardening.Other messages include how to balance calorie intake from foods and beverages with calories expended; eating 5 fruits and vegetables, plus whole grains and low-fat milk or milk products every day; and how to add family physical activity to every day activities. In one year FSNEP program participants totaled 73,552; of those 60,454 were under the age of 17.

Bone Builders: It is estimated that one out of every two women over 50 will develop osteoporosis and is the number two reason for women's admissions into nursing homes. Older men have also been identified as possibly at risk. "Bone Builders" is a partnership between Arizona Cooperative Extension and the UA College of Medicine and the Mel and Enid Zuckerman College of Public Health. The program recruits and trains community peer educators and identifies those at high risk and encourages them to get screening. In one year Bone Builders partners screened 98 women, reached 4,335 people at 305 classes; taught 220 one-on-one, and instructed 16,445 at 66 health fairs. Over one million people were reached with educational materials, displays, mass media and the Internet.

CITIZEN PARTICIPATION AND LEADERSHIP

Project CENTRL, the Center for Rural Leadership, is an educational program developed by Cooperative Extension under a grant from the W.K. Kellogg Foundation. Its mission is to assist highly motivated leaders improve and expand their leadership skills to become more responsive and effective in meeting the needs of rural people in public affairs. To date 484 graduates have utilized the skills they developed through Project CENTRL to help strengthen their local communities throughout Arizona. The educational program consists of twelve highly interactive seminars scheduled over two years. Class members also attend a five-day state exchange seminar at the end of the first year, which is an in-depth visit to another state with similar rural or agricultural leadership programs. Travel to Washington D.C. to attend a national seminar is the culmination of the training. All class members are required to complete an internship designed to apply leadership skills learned in CENTRL to a community-based project.

Citizen scientists: Project Budburst: The National Phenology Network (NPN) established its National Coordinating Office

headquarters at the University of Arizona in August 2007. Project Budburst, a part of the NPN, is a nationwide project enlisting adults and youth to track when plants leaf out and bloom. The initial stage of Project Budburst ran from April through June 2007 and drew thousands of "citizen scientists" who observed and recorded changes in trees and flowers. The goal is to study how plants are responding to warmer global temperatures. By the end of June 2007, participants in 26 states had reported 913 events, and project scientists are beginning to produce blooming and leafing-out maps by compiling the information submitted through a website. The information will e compared to historical records to see how the nation's backyards, parks and forests are changing.

INTEGRATED PEST MANAGEMENT (IPM)

IPM in schools. Children are among the most vulnerable when it comes to exposure, absorption and potential harm from pesticides. The University of Arizona's urban IPM team has helped Arizona's participating schools to reduce pesticide applications an average of 71 percent and pest complaints by 78 percent since the program started with just a handful of students benefiting in 2001. The schools concentrated their efforts (and capital resources) on identifying the pests, finding where they came from, and preventing their entry into buildings. Arizona's school districts have a current total enrollment of 1,011,959 students. Of these 303,600, students are in school districts that practice IPM, representing 32 percent of the Arizona public school enrollment. The Arizona IPM program for schools has become a model for developing children's environmental health programs in schools across the United States.

IPM in agriculture.IPM in agriculture. A comprehensive integrated pest management (IPM)program implemented in Arizona cotton for the past 12 years resulted in a 62 percent reduction in pesticide sprays for all insects combined,including whiteflies, pink bollworm and Lygus bug and others, reducing insecticide usage by more than 1.6 million pounds. Growers saved over $149 million in pesticide costs and reduced damage by over 16 percent. The last two years, 2006 and 2007, represented the lowest annual insecticide usage in Arizona cotton on record (29 years). In 1995, Arizona cotton growerssprayed insecticides an average 12.5 times, totaling 1,709,000 pounds. By 2006 (and also in 2007), cotton growers were using safer compounds and sprayed an average of just 1.3 times, totaling less than 80,000 pounds—a 20-fold reduction in insecticide use.

ARIZONA OUTDOORS

Agricultural literacy: With increasing urbanization, children as well as adults are unaware of not only the importance of agriculture to Arizona's economy but where food and fiber actually comes from. The Farm Ag-Ventures program brings teachers and students out to the University of Arizona's Maricopa Agricultural Center to visit and experience a working farm close-up. The educational events are adjusted to age, grade level and season. Seventeen different stations on an educational trail represents different vegetative zones of Arizona, including an area featuring information on crops grown by Native American tribes in the Southwest. In 1998, the first year of the program, 1,800 teachers and school children attended. Since then, the number of participants has more than quadrupled to 7,600 people on an annual basis.

Regular exercise. Walk Across Arizona, a program conducted through Arizona Cooperative Extension, uses social support networks to increase physical activity levels by developing and maintaining walking clubs. The 16-week walking program, which has been adopted by seven Arizona counties, is designed for teams of up to 10 people. The teams have a friendly competition to see who can get their pals, neighbors, co-workers and family out to build a healthy walking habit and increase fitness. In the first year, 34 teams totaling 329 registered participants walked 48,872 miles. Four years later a total of 1,908 people had registered for the program. Statewide, 219 teams reported walking 343,858 miles, an increase of 201 percent in miles walked and an increase of 242 percent in the number of teams formed.

Total Actual Amount of professional FTEs/SYs for this State

Year:2007	**Extension**		**Research**	
	1862	**1890**	**1862**	**1890**
Plan	50.0	0.0	105.0	0.0
Actual	50.0	0.0	105.0	0.0

II. Merit Review Process

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

- Internal University Panel
- Combined External and Internal University Panel

2. Brief Explanation

All projects are reviewed at the department level and then submitted to the Experiment Station Office for formal review by a committee appointed by the Associate Experiment Station Director.The appointed review panels are primarily composed of internal university personnel but external reviewers are also utilized depending on the project.

III. Stakeholder Input

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

- Use of media to announce public meetings and listening sessions
- Targeted invitation to traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to selected individuals from general public
- Survey of traditional stakeholder groups
- Survey of traditional stakeholder individuals

Brief Explanation

We depend very largely upon our traditional advisory committees for stakeholder input but also have special sessions with other groups and invited participants.

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

We conduct open listening sessions in various locations around the state.Participants in these sessions are invited by specific invitation and by general announcements.

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

By individual letters of invitation and by general advertisement.

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

Input from these sessions are used as we try to frame research and extension programs.It also is valuable as we determine qualifications of new faculty hires.

Brief Explanation of what you learned from your Stakeholders

Because of labor shortages we are receiving increased pressure to develop expertise in and action toward the development of harvesting equipment. There is also demand for more expertise and activity in precision agriculture.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
1795096	0	3498023	0

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	219650	0	144959	0
Actual Matching	219650	0	144959	0
Actual All Other	0	0	0	0
Total Actual Expended	439300	0	289918	0

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

V. Planned Program Table of Content

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	37%		37%	
111	Conservation and Efficient Use of Water	16%		16%	
112	Watershed Protection and Management	16%		16%	
121	Management of Range Resources	31%		31%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2007	Extension		Research	
	1862	1890	1862	1890
Plan	11.0	0.0	21.0	0.0
Actual	11.0	0.0	21.0	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
40027	0	22282	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
40027	0	22282	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 resouce 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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	15000	20000	6000	500
2007	14800	18150	5400	610

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

Patent Applications Submitted

Year	Target
Plan:	1
2007 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	15	30	0

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

Year	Target	Actual
2007	3	3

Output #2

Output Measure

- Number of individuals participating in educational programs

Year	Target	Actual
2007	15000	14010

Output #3

Output Measure

- Number of individuals adopting new technology

Year	Target	Actual
2007	1000	900

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	35	40

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
121	Management of Range Resources
112	Watershed Protection and Management
111	Conservation and Efficient Use of Water
102	Soil, Plant, Water, Nutrient Relationships

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 Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	10000	11000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
121	Management of Range Resources
102	Soil, Plant, Water, Nutrient Relationships
112	Watershed Protection and Management

Outcome #3

1. Outcome Measures

Volunteers completing Master Gardening training

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	350	410

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
102	Soil, Plant, Water, Nutrient Relationships

Outcome #4

1. Outcome Measures

Create awareness and increase knowledge

2. Associated Institution Types

•1862 Extension
•1862 Research

3a. Outcome Type:
Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	8000	9000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
112	Watershed Protection and Management
121	Management of Range Resources
111	Conservation and Efficient Use of Water

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
- Competing Public priorities

Brief Explanation

The economy and seasonal weather patterns.

V(I). 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	15%		15%	
206	Basic Plant Biology	15%		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%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2007	**Extension**		**Research**	
	1862	**1890**	**1862**	**1890**
Plan	8.0	0.0	36.0	0.0
Actual	8.0	0.0	36.0	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**
65892	0	18255	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
65892	0	18255	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, 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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	17000	30000	5000	1000
2007	18000	30500	6000	1500

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

Patent Applications Submitted

Year	Target
Plan:	2
2007 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	8	35	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of individuals participating in educational programs

Year	Target	Actual
2007	17000	18000

Output #2

Output Measure

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

Year	Target	Actual
2007	50	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
2007	200	200

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
212	Pathogens and Nematodes Affecting Plants
211	Insects, Mites, and Other Arthropods Affecting Plants
206	Basic Plant Biology
201	Plant Genome, Genetics, and Genetic Mechanisms
205	Plant Management Systems
215	Biological Control of Pests Affecting Plants

Outcome #2

1. Outcome Measures

Adoption of alternative crop technologies

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	50	40

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
206	Basic Plant Biology
215	Biological Control of Pests Affecting Plants
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
201	Plant Genome, Genetics, and Genetic Mechanisms

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
2007	1000	1050

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
212	Pathogens and Nematodes Affecting Plants
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
215	Biological Control of Pests Affecting Plants
206	Basic Plant Biology

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

Economy, weather patterns, public policy and availability of labor

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

1. Evaluation Studies Planned

- After Only (post program)

Evaluation Results

Key Items of Evaluation

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	4%		4%	
302	Nutrient Utilization in Animals	17%		17%	
305	Animal Physiological Processes	21%		21%	
306	Environmental Stress in Animals	8%		8%	
311	Animal Diseases	50%		50%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2007	**Extension**		**Research**	
	1862	**1890**	**1862**	**1890**
Plan	2.0	0.0	22.0	0.0
Actual	2.0	0.0	22.0	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**
26503	0	39078	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
26503	0	39078	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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	300	100	1500	200
2007	270	92	1320	195

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

Patent Applications Submitted

Year	Target
Plan:	1
2007 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	5	28	0

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

Year	Target	Actual
2007	22	22

Output #2

Output Measure

- Create awareness and increase knowledge

Year	Target	Actual
2007	1000	892

Output #3

Output Measure

- Expand participation in our Annual Cow College program

Year	Target	Actual
2007	100	120

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

Outcome #1

1. Outcome Measures

Number of farmers adopting more sustainable and profitable large scale dairy production practices

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	20	18

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
306	Environmental Stress in Animals
302	Nutrient Utilization in Animals
311	Animal Diseases
305	Animal Physiological Processes

Outcome #2

1. Outcome Measures

Adoption of more profitable breeds of beef cattle for arid land conditions

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	50	25

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
311	Animal Diseases
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
305	Animal Physiological Processes
306	Environmental Stress in Animals

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

Economy, environmental conditions, border issues andgovernment regulations

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%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2007	**Extension**		**Research**	
	1862	**1890**	**1862**	**1890**
Plan	1.0	0.0	4.0	0.0
Actual	0.0	0.0	0.0	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**
40027	0	13422	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
40027	0	13422	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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	200	300	0	0
2007	210	305	0	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2007 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	2	6	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Develop improved marketing and economic models.

Year	Target	Actual
2007	0	0

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 byparticipating 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
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	500	515

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics
610	Domestic Policy Analysis

Outcome #2

1. Outcome Measures

Number of individuals gaining knowledge byparticipating 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
2007	200	300

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics
610	Domestic Policy Analysis

Outcome #3

1. Outcome Measures

Adoption of management practices that assure a safe food supply

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	200	200

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
610	Domestic Policy Analysis
605	Natural Resource and Environmental Economics

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes

Brief Explanation

The economy, commodity prices and government regulations

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

1. Evaluation Studies Planned

- After Only (post program)

Evaluation Results

Key Items of Evaluation

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%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2007	**Extension**		**Research**	
	1862	**1890**	**1862**	**1890**
Plan	24.0	0.0	5.0	0.0
Actual	24.0	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**
33297	0	1987	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
33297	0	1987	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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	6500	100000	70000	45000
2007	6500	10000	100000	50000

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

Patent Applications Submitted

Year	Target
Plan:	0
2007 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	3	1	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of individuals participating in educational programs

Year	Target	Actual
2007	70000	100000

Output #2

Output Measure

- Number of educational events, training workshops and clinics

Year	Target	Actual
2007	215	200

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
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	7000	7000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development
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
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	14000	14000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

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

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations

Brief Explanation

Deteriorating economy and social unease are the biggest factors

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	33%		33%	
703	Nutrition Education and Behavior	34%		34%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	33%		33%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2007	**Extension**		**Research**	
	1862	**1890**	**1862**	**1890**
Plan	9.0	0.0	9.0	0.0
Actual	9.0	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**
13904	0	49935	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
13904	0	49935	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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	25000	25000	600	20000
2007	25000	25000	500	20000

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

Patent Applications Submitted

Year	Target
Plan:	0
2007 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	3	15	0

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

Year	Target	Actual
2007	0	2

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	2000	2000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior

Outcome #2

1. Outcome Measures

Number of individuals adopting recommendations for nutrition and health

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	5000	5000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations

Brief Explanation

Economy, obesity, and high percentage of an under-served population

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

1. Evaluation Studies Planned

- After Only (post program)

Evaluation Results

Key Items of Evaluation