2007 New Mexico State University Combined Research and Extension Annual Report

I. Report Overview

1. Executive Summary

New Mexico (NM) agriculture must remain competitive in U.S. and world markets. This requires a continuous flow of appropriate technology addressing local needs within New Mexico. It is critical that the College maintains and strengthens programs that address these needs. The College recognizes that agricultural competitiveness and efficiency should take into account social and environmental costs. Determining these factors requires a coordinated, team approach within the College and among researchers and Extension faculty.

New Mexico Cooperative Extension has a tremendous role in helping to keep New Mexico's agricultural economy strong particularly in light of international border competition issues. Drought and water disputes, use of expansive range lands, invading diseases and pests, and national economic down turns, all play a role in maintaining, retaining and building New Mexico's agriculture infrastructure. Extension specialists and agents are working toward resolving conflicts through researched solutions, mediation through involvement of clientele in problem solving, incorporation of technology applications whenever feasible, and continuous reintroduction of tried and true practices.

New Mexico is continuing work to ensure an adequate and safe food and fiber system. Researchers continue to address promotion of regulatory compliance, product process development, food safety (contamination and protection) and sanitation, and marketing of specialty food products. Target audiences include clientele in nearly every county along with Native American meat processors and many farmers' market groups. A challenge in programming is to deliver the same basic message at several different levels of complexity to non-technical audiences, multicultural, and multilingual populations, as well as scientists and industry clientele.

Research and education complement each other in the on-going efforts to control and reduce the introduction of pathogens into the food supply. While researchers are constantly seeking ways to reduce or eliminate contamination in the production and processing of food products, extension personnel are working with food handlers to ensure the safe delivery of food and food products from farm to consumer.

Even though New Mexico has a strong agricultural based economy, hunger issues persist for children and families. Extension efforts will continue to focus on improving the accessibility of food that is nutritious, safe, culturally acceptable, and affordable in both rural and urban areas. Food safety and security outreach will include strategies and programs aimed at both consumer and producer education. Extension specialists, agents and educators will continue to implement food safety programs targeted to food managers and handlers, as well as to home food and specialty farm producers and consumers.

A healthy, well-nourished population can be a consequence of access to, safe processing of, and delivery of nutritious foods particularly in households that are economically and nutritionally at risk. Even though agricultural and commercial advances have resulted in abundant food at ever-lower prices, many New Mexico households continue to face obstacles in securing a healthy, well-nourishing diet.

Barriers include a lack of resources and a limited understanding of nutrition. New Mexico State University (NMSU) works annually on strengthening food and nutrition programs and doing research designed to alleviate barriers and improve the nutrition, well-being, and food security of NM citizenry. Agricultural Experiment Station researchers address the research needs of the agricultural products grown in NM. Cooperative Extension faculty deliver food preparation and nutrition education programs.

In this tri-cultural state, not all households choose to consume food in accordance with dietary recommendations nor is regular exercise part of a daily or weekly routine (47.2% are inactive). In recent years, the focus of nutrition and health policy has shifted, because for many Americans, the problem is now one of over-consumption of certain foods or components. In fact, 4 of the top 10 causes of death in the United States are associated with diets that are too high in calories, total fat, saturated fat, or cholesterol or too low in dietary fiber. Improvements in diet and health can reduce illness and productivity losses, improve educational attainment, and prevent premature death. Solutions center on education to improve consumer understanding, behaviors, and food choices.

New Mexico has a rich and diverse land and natural resource base that is arid and semiarid and, in many respects, extremely fragile. This natural resource base is a major contributor to the economic well-being of the state's residents. Its economic uses result in demands for various resources. In addition to direct demands for land and water, there is increasing pressure for recreation-related activities that represent a growing economic opportunity. Activities related to the state's natural beauty and its wildlife make a major contribution to the economy. The potential to develop, manage, and protect natural resources needs to be encouraged.

Both rural and urban human activities can pollute land, water, air, and food. Through teaching, research, and Extension programs, the New Mexico State University College of Agriculture and Home Economics is committed to furthering our understanding of human impact on the environment, and to supporting environmentally-sound agricultural and natural resource practices. The College will continue its efforts to understand the interaction between the environment and production agriculture.

New Mexico's future is increasingly tied to regional environments and a global economy. Clearly defined regional and international perspectives are essential for the programs of the College. The University's traditional programs can be enriched by regional and international components and thereby better achieve their full potential. International activities enhance global understanding by incorporating international dimensions into the ongoing instruction, research, and Extensionefforts of the College. Graduates of the College need an education that will allow them to achieve success in a global economy. They must have the skills necessary to keep New Mexico a supplier of food and fiber throughout the world and keep New Mexico a destination for tourists from around the world.

Economic opportunity and quality of life vary greatly for New Mexican. New Mexico still suffers from some of the highest statistics nationally relative to families with children poverty levels, per capita retirement incomes, numbers of high school graduates, illiteracy, crime, unemployment in rural communities, teen-pregnancy, and uninsured motorists among other unsatisfactory figures. Addressing the quality of life issues is a core piece in New Mexico Extension's educational effort.

Total Actual Amount of professional FTEs/SYs for this State

Year:2007	Extension		Research	
	1862	**1890**	**1862**	**1890**
Plan	38.5	0.0	52.6	0.0
Actual	32.7	0.0	61.5	0.0

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

- Internal University Panel
- External Non-University Panel
- Expert Peer Review

2. Brief Explanation

An internal College Visioning Committee has been meeting for the past two years to review college priorities and goals. A state-wide Extension and Research Support Council met twice during the year to give extension and research input to college priorities. A CSREES Expert Panel conducted a review of the college's Agricultural Economics and Agricultural Business department's academic, research, and extension programs.

This past year a series of six town hall meetings were held in strategic locations across New Mexico. These meetings were organized by the New Mexico State University (NMSU) Extension and Research Support Council, consisting of lay leaders from throughout the state. In preparation for the meetings, a brochure was developed outlining the purpose of meetings and offering ideas to encourage clientele discussion and attendance. Personal invitations were sent to agent-identified clientele and news stories promoted local participation in area newspapers. Every session included the College of Agriculture and Home Economics (CAHE) administration providing a brief statement. Then the floor was open for clientele questions and comments and concluded with a luncheon that created additional opportunities for informal visits with CAHE administration. The town hall meetings were held over a four month period (August through November, 2007).

Stakeholder comments and questions included:

Agriculture and Natural Resources

- Too much information on the College website is just for farmers.

- A lot of great dairy research is being done but it's not reaching producers.

- The College should develop more internship programs in agricultural operations.

- There is a need for more large veterinarians statewide.

- Need to reinstate personal calls on ranches to reintroduce agents to clientele.

- A concern that almost 50% of Extension's budget was being driven by grants and contracts.

- A concern that agents need to get back to doing traditional programs.

- A concern that researchers are not carrying out cotton, alfalfa and peanut breeding programs.

- The College needs to play a bigger role in promoting American and New Mexico agriculture emphasizing healthfulness.

- Extension and research dairy programs in eastern New Mexico are excellent.

- Agricultural lands are disappearing around Las Cruces, New Mexico.

- Individual complimented the College for the increasing number of acres now planted for organic production across New Mexico.

- Should teach Master Gardeners online so more young people could participate.

- Individual thanked the College for their support of farmers' markets.

- Make red worms for compost readily available.

- CES urban horticulture programs are understaffed.

- A self-sufficiency movement should be started.

- Address odors and dust issues associated with feedlots.

- The College should expand its horse breeding program.

- Nitrates in dairy water needs to be addressed.

- Extension agents are switching careers to teaching vocational-agriculture in the high schools due to differential in salaries.

- Beef producers requested help to study the impact of a new beef check-off fee.

- Endangered species protection continues to collide with agriculture and livestock production.

- There is a serious need to purchase newer agricultural equipment for the science centers.

- Extension could play an increased role in helping small farm operations be successful.

Community, Resource and Economic Development

- The international component of the college is deficit.

- Need broader and deeper economic development programs coming out of the College.

- More information needs to come from the College on how to capture wind energy.

- The Rural Public Education Department needs to work more closely with Extension agents.

- Seek creative means to support needed health programs through the Workforce Investment Act.

4-H and Youth Development

- Increase the number of opportunities for migrant farm family children to attend college.

- Extension needs to create more awareness of programs with under-served youth audiences.

- The salaries of Extension agents needs to be increased in order to retain good agents.

- 4-H participation is decreasing across the state. Better promotion is needed.

- Youth need to be taught stronger work ethics.

- Increased efforts need to be made to prepare and transition youth into College degree programs.

- There is interest in promoting NMSU's agriculture degree programs to students at San Juan College, Farmington, NM.

Health and Well-being

- Need to engage College alumni in mentoring students.

- An interest in merging agriculture and health programming together.

- There is a need for more bi-lingual programming.

- Nutrition education should be a requirement in school systems.

<u>Program Support</u>

- CES and AES need to be more visible to potential publics and partners.

- A concern that the hiring process to replace Extension faculty is too cumbersome and slow.

- There needs to be more degree programs offered online for distant students.

•Extension offices and experiment stations need base-budget increases since the last one was about 1992.

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 non-traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to non-traditional stakeholder individuals
- Targeted invitation to selected individuals from general public
- Survey of traditional stakeholder groups
- Survey of the general public
- Survey specifically with non-traditional groups

Brief Explanation
See above checkboxes.

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
- Use Surveys

Brief Explanation

See above checkboxes.

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

Brief Explanation

See above checkboxes.

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 Staff Hiring Process

- In the Action Plans

- To Set Priorities

Brief Explanation

See above checkboxes.

Brief Explanation of what you learned from your Stakeholders

Stakeholders appreciate attention to their issues.Some would like more attention to organic and other sustainable practices.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
1903329	0	2858497	0

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	1903329	0	2858498	0
Actual Matching	1903329	0	2858498	0
Actual All Other	23211545	0	22493585	0
Total Actual Expended	27018203	0	28210581	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

S. NO.	PROGRAM NAME
1	Animal Production
2	Food Safety and Technology
3	Plant and Animal Protection
4	Plant Production
5	4-H and Youth Development
6	Agricultural Markets, Trade, and Economic/Business Development
7	Health and Wellbeing
8	Sustainable Management of Natural Resources

Program #1

V(A). Planned Program (Summary)

1. Name of the Planned Program

Animal Production

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	33%		19%	
302	Nutrient Utilization in Animals	0%		23%	
303	Genetic Improvement of Animals	0%		10%	
304	Animal Genome	0%		10%	
305	Animal Physiological Processes	0%		9%	
306	Environmental Stress in Animals	0%		14%	
307	Animal Management Systems	67%		15%	
	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	3.0	0.0	6.6	0.0
Actual	3.6	0.0	7.0	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**
212795	0	324117	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
212795	0	324117	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
3072527	0	2499287	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

•Research procedures and technology   •Papers, citations, patents   •Train students   •Dissemination of research results   •Educational workshops   •Conferences   •Commercialization of techniques and products

    While there is ample data from research conducted in other species to support a beneficial effect of dietary capsaicin, NMSU research results suggest that when fed capsaicin, in the form of dried jalapeno powder, horses do not experience any enhancements in joint health or function of the immune system. Therefore, further research involving capsaicin and horses should investigate alternative methods of administration of capsaicin to the horse.

2. Brief description of the target audience

The target audience includes: ranchers, feedlot operators, and dairy producers.

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	0	0	0	0
2007	0	0	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	8	28	36

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- The specific output measures will vary according to the specific project being monitored. The development of research procedures and technology, training of students, publishing research papers, and disseminating research results via educational workshops, conferences, and Extension media are important outputs for the various projects falling under this planned program.

Year	Target	Actual
2007	0	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	# of trained professionals
2	# of improved animal varieties
3	# of research publications
4	# of methods, technology, and animal varieties adopted by public and private sectors
5	Economic development increased
6	Successful animal agricultural enterprises
7	# Extension publications

Outcome #1

1. Outcome Measures

 # of trained professionals

2. Associated Institution Types

 •1862 Research

3a. Outcome Type:

 Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	2	4

3c. Qualitative Outcome or Impact Statement

 Issue (Who cares and Why)

 What has been done

 Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
305	Animal Physiological Processes
302	Nutrient Utilization in Animals
301	Reproductive Performance of Animals

Outcome #2

1. Outcome Measures

 # of improved animal varieties

2. Associated Institution Types

 •1862 Research

3a. Outcome Type:

 Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

3c. Qualitative Outcome or Impact Statement

 Issue (Who cares and Why)

 What has been done

 Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
303	Genetic Improvement of Animals

Outcome #3

1. Outcome Measures

# of research publications

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	5	28

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems
304	Animal Genome
306	Environmental Stress in Animals
301	Reproductive Performance of Animals
305	Animal Physiological Processes
302	Nutrient Utilization in Animals
303	Genetic Improvement of Animals

Outcome #4

1. Outcome Measures

# of methods, technology, and animal varieties adopted by public and private sectors

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	1	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #5

1. Outcome Measures
   Economic development increased

2. Associated Institution Types

   •1862 Extension

3a. Outcome Type:
   Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

3c. Qualitative Outcome or Impact Statement

   Issue (Who cares and Why)

   What has been done

   Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals

Outcome #6

1. Outcome Measures
   Successful animal agricultural enterprises

2. Associated Institution Types

   •1862 Extension

3a. Outcome Type:
Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #7

1. Outcome Measures
Extension publications

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:
Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	{No Data Entered}	8

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
306	Environmental Stress in Animals
302	Nutrient Utilization in Animals
307	Animal Management Systems
301	Reproductive Performance of 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
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

New Mexico continues in a drought, which affects the price of cattle. Priorities between between urban, industrial, and agricultural uses of water and land continue to create conflict. The state dairy industry continues to grow, putting pressure on our college to increase support for this sector.

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

1. Evaluation Studies Planned
- Before-After (before and after program)
- During (during program)
- Comparisons between program participants (individuals,group,organizations) and non-participants
- Comparison between locales where the program operates and sites without program intervention

Evaluation Results
{No Data Entered}

Key Items of Evaluation
{No Data Entered}

Program #2

V(A). Planned Program (Summary)

1. Name of the Planned Program

Food Safety and Technology

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
501	New and Improved Food Processing Technologies	50%		25%	
503	Quality Maintenance in Storing and Marketing Food Products	0%		13%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources.	0%		12%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	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	1.5	0.0	0.5	0.0
Actual	1.2	0.0	0.3	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**
72114	0	11526	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
72114	0	11526	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
111728	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Research procedures and technology

- Papers, citations, patents

- Train students

- Dissemination of research results

- Educational workshops

- Conferences

- Commercialization of techniques and products

Initial efforts are to characterize the fermentation process of fresh red cayenne pepper (Capsicum annuum cv. Mesilla Cayenne) as processed in the production facility. The fermentation of chile pepper mash is highly complex and affected by many variables. This is a natural process that currently has few controls. If this process can be fully characterized, then controls can be put into place to ensure a safe and uniform product.

Data from four substances (lemon juice, lime juice, beer and club soda) as well as water investigated as rinsing agents for chicken breasts, pork loin chops and beef strip steaks is currently being analyzed.Preliminary data indicates beer actually increased microbial growth while club soda had little effect on microbial loads.Lemon juice and lime juice were the most effective in lowering microbial loads on the meats, and seemed particularly effective in reducing coliform loads, with both substances reducing coliform loads to 0.00 CFU/cm2 in many instances. The major impact from this research could be a reduction in the risk of foodborne illness from contaminated meats which may be subsequently undercooked.

For the Extension program for protecting food from contamination by pathogenic organisims:

- 80% of participants of educational programming, including county agents, have changed their behavior related to food safety including keeping hands and surfaces clean, proper cooling, preventing cross contamination.

- 40% of NM food service operators have used NMSU for some part of their food product development including chemical and microbial laboratory analyses and technical support.

- 80% of participants of educational programming have used information of food safety, HACCP and required regulations to produce safe food products.

- 15% of participants have implemented a HACCP plan in their operation.

2. Brief description of the target audience

Target audience is food processors in Arizona, Colorado New Mexico, Texas, and Utah.

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	0	0	0	0
2007	0	0	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	0	1	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- The specific output measures will vary according to the specific project being monitored. The development of research procedures and technology, training of students, publishing research papers, and disseminating research results via educational workshops, conferences, and Extension media are important outputs for the various projects falling under this planned program.

Year	Target	Actual
2007	0	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	# of trained professionals
2	# of research publications
3	# of Extension publications
4	% of food processors using NMSU for their food product development
5	Economic development increased

Outcome #1

1. Outcome Measures

# of trained professionals

2. Associated Institution Types

•1862 Extension
•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	2	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
503	Quality Maintenance in Storing and Marketing Food Products
501	New and Improved Food Processing Technologies

Outcome #2

1. Outcome Measures

# of research publications

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	1	1

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

Outcome #3

1. Outcome Measures

# of Extension publications

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	1	0

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
503	Quality Maintenance in Storing and Marketing Food Products
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources.
501	New and Improved Food Processing Technologies

Outcome #4

1. Outcome Measures

% of food processors using NMSU for their food product development

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	20	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
501	New and Improved Food Processing Technologies
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #5

1. Outcome Measures

Economic development increased

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies

V(H). Planned Program (External Factors)

External factors which affected outcomes
- Economy

Brief Explanation

The state economy has precluded hiring moer research and extension faculty to address food safety-related issues.

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

1. Evaluation Studies Planned
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)

Evaluation Results

{No Data Entered}

Key Items of Evaluation
   {No Data Entered}

Program #3

V(A). Planned Program (Summary)

1. Name of the Planned Program

Plant and Animal Protection

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
211	Insects, Mites, and Other Arthropods Affecting Plants	0%		5%	
212	Pathogens and Nematodes Affecting Plants	20%		24%	
213	Weeds Affecting Plants	0%		27%	
215	Biological Control of Pests Affecting Plants	0%		11%	
216	Integrated Pest Management Systems	60%		17%	
311	Animal Diseases	20%		0%	
312	External Parasites and Pests of Animals	0%		13%	
315	Animal Welfare/Well-Being and Protection	0%		3%	
	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	1.8	0.0	11.2	0.0
Actual	5.0	0.0	13.4	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
265993	0	641318	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
265993	0	641318	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
3910489	0	4998575	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

•Nutsedge counts in fields infested with the M. incognita-nutsedge pest complex can be used as a visual predictor of J2 populations, unless the number of nutsedge plants is very low. Certain locally-adapted plants within the Asteraceae were found to be poor hosts of the southern root-knot nematode, and may be of use to small-scale organic vegetable producers and residential dwellers as tools for suppressing this ubiquitous nematode pest. The improved technique developed to provide more reliable recovery of DNA from individual nematodes may be of use to others involved in the use of molecular identification or the study of nematode phylogeny.

•With lower use rates and still obtaining effective season long weed control, potential impacts from leaching and runoff from target application has been virtually non-existent. NMSU researchers have shown for example that weed control in field corn with preemergence herbicides, with irrigation being controlled properly without inducing leaching, that postemergence herbicides do not need to be applied. This scenario also applies to most crops researched at the ASC for broadleaf and grass weed control.

•Our understanding of the distribution and biology of alfalfa weevil strains in the state is a critical component in developing an integrated pest management system specific to the unique conditions of New Mexico. The impact of Lygus on cotton production in New Mexico remains poorly understood. NMSU research will give us a better picture of that impact as well as the proper timing and implementation of management for its control. These data will be presented to growers and consultants and an economic threshold will be released that reflects our new understanding of the impact of this pest on NM cotton. Efficient management of alfalfa and cotton pests can result in a reduction in unnecessary control costs and potentially increase crop yields. This can translate into a significant increase in productivity and profit to New Mexico's growers. Also, fewer insecticide applications can result in reduced exposure of the chemicals to the environment.

•Thee successful completion of a livestock pest project has provided a better understanding of the interactions between livestock and associated pests. Quantitative data allows for economically feasible technology for controlling stable flies on confined and pastured livestock. Such strategies will reduce the impact of these flies on livestock production and the resulting impact on neighboring residential areas. Accurate models of fly population dynamics permit livestock producers to economically implement appropriate control strategies before populations reach levels necessitating insecticide treatments.

•Understanding more about the ecology, genetics, transmission, and weed hosts of beet curly top virus in New Mexico will aid in developing management options for chile growers. A predictive model developed by NMSU scientists for curly top in southern New Mexico has given growers information on the disease so that they can make informed choices on which management methods they will need to use to handle the disease pressure.

•A better understanding of the role that the fungal endophytes of locoweed play in locoism, the genetics of the fungi, and the factors that influence toxin production will lead to new options to mitigate the disease locoism and its impact. The information generated by NMSU researchers thus far changed knowledge significantly, in that fungal endophytes had not previously been known to be involved in locoism, much less responsible for the problem.

•   The impact of NMSU Phytophthera and Verticillium research is that it provides New Mexico chile producers and industry with information on outbreaks of Phytophthora blight in virgin soils, and on synergism leading to increased wilt levels when both P. capsici and V. dahliae are present in production fields. Additional impact of this research is that it provides information to New Mexico peanut producers on emerging diseases such as Sclerotinia blight and the urgency to foster preparedness for managing these diseases.

•   NMSU researchers have determined that plant genotype is a key factor in swainsonine toxicity, which is crucial for informing locoweed control management decisions.

•The knowledge that resistance to both picloram and clopyralid is conferred by a single recessive nuclear gene in yellow starthistle, helps explain the observation that resistance has not spread from where it was first observed. Due to its recessive nature, the resistance allele is less likely to increase in frequency in yellow starthistle populations that are not under strong selection pressure. Therefore, development of picloram resistance in this biotype does not appear to impose a large threat to successful yellow starthistle management as long as auxinic-herbicide management is carried out prudently. Additionally, results from these experiments show that the temperature and nitrogen conditions under which yellow starthistle grew did not alter picloram response suggesting that management of susceptible yellow starthistle with these inexpensive tools, will not be compromised under variable environmental conditions.

- The Fast Agricultural Response Monitoring (FARM) System has the potential of dramatically impacting crop production in the United States and beyond. This initiative will determine the optimum water and nitrogen use strategy to maintain yield and quality, discourage pest insects, reduce environmental contamination, and increase profits. The FARM System's innovative approach to field crop management results in a five-fold effect: (1) optimal agrochemical use, (2) reduced input costs to growers, (3) increased profits, (4) reduced environmental contaminants, and (5) reduced pest densities and crop damage from pest insects.

- The scope of impacts from an alternatives to pesticides research program range from local to international since crops affected by pests are grown in every state of the US and throughout the world. In particular, development of effective controls for nematodes that can fill the void left by the withdrawal of fumigants like methyl bromide will have a tremendous impact for producers of most crops in the US and throughout the world. Additional peripheral impacts include development of technology that will keep the US at the forefront applying biotechnology to develop effective "green" solutions to food production problems that affect the entire world. Maintaining our position as world leaders in this area will also contribute to economic growth in the high tech / biotech sector of the national economy.

- Yellow and purple nutsedge and root-knot nematodes simultaneously reduce yields of many crops grown throughout the southern and western regions. Management that targets the individual pests has not been successful or sustainable due to the beneficial interactions among these pest species. The purpose of our work is to develop ways to manage this pest complex, reduce the use of fumigant nematicides, and increase the profitability of crops affected by these pests. A four-year field study is assessing the effectiveness of nematode-resistant alfalfa for providing economical suppression of all three pests in succeeding chile pepper and cotton crops. These results lead us to conclude that nutsedge counts in a field infested with the M. incognita-nutsedge pest complex can be used as a visual predictor of M. incognita J2 populations, unless the number of nutsedge plants is very low. Nematode population assessment is very difficult and requires that growers take and process soil samples; the results of this modeling indicate that growers may be able to use above-ground plant counts to estimate nematode populations in soil.

•Producers have few options for managing perennial nutsedge in minor crops. Research supporting the use of halosulfuron for purple nutsedge management in chile pepper provided industry with data in support of registration and information to growers on use of this tool. Modeling Yellow Nutsedge (YNS) and Purple Nutsedge (PNS) early season growth and early season root-knot nematode (RKN) reproduction is the first attempt by any group to understand and develop tools to predict the population development of an important pest complex. The data suggest that pre- nutsedge emergence heat units drive early season reproduction from RKN overwintering in the nutsedge tubers. The data also suggest that winter moisture affects numbers of tubers that sprout and that heat unit accumulation prior to emergence interacts with heat unit accumulation after emergence to affect plant growth and development, particularly under stressed conditions. Urban landscapes and crop production land in arid New Mexico are dependent on irrigation water supplied by compacted earthen canals and laterals either continuously or intermittently throughout the nine month irrigation season. Weeds growing along the network of canals reduce the amount of available water for irrigation, obstruct the flow of water, and produce seeds that are deposited and germinate in irrigated lands and surrounding riparian areas. The data obtained over three years of sampling provide for the first time a baseline of information regarding species found on this canal system and models that can be used to predict species location relative to canal capacity and some soil characteristics.

•NMSU entomologists working with Aphthonia beetles have convinced the Angel Fire City Council to modify their new construction laws to limit the movement of soil from any sites infested with leafy spurge.

•Data suggests that insecticide applications for square injury by bollworm could be almost eliminated in southern New Mexico. However realistically many applications are made for insurance against risk, fear of loss and under pressure from sales representatives. A 50% reduction of insecticide applications on non transgenic cotton is ambitious but achievable. Reducing inputs will help in retention of cotton as a rotation crop in the Pecos Valley, and would be the most important impact. Pecan: Our primary impact on pecan will be to avoid losses in yield from insect pests particularly as the landscape changes to a more monoculture environment favoring more insect pest outbreaks. Our strategy is to determine how to use smaller acreage of alfalfa to maintain populations of beneficial arthropods in pecan.

2. Brief description of the target audience

Attention will be given to commodity organizations in or serving New Mexico producers as well as pesticide applicators, Master Gardeners and garden clubs, youth (4H, Future Farmers of America and other groups and conferences) and the general public.

V(E). Planned Program (Outputs)

1. Standard output measures

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

Year	Direct Contacts Adults Target	Indirect Contacts Adults Target	Direct Contacts Youth Target	Indirect Contacts Youth Target
Plan	0	0	0	0
2007	0	0	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	6	31	37

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- The specific output measures will vary according to the specific project being monitored. The development of research procedures and technology, training of students, publishing research papers, and disseminating research results via educational workshops, conferences, and Extension media are important outputs for the various projects falling under this planned program.

Year	Target	Actual
2007	0	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	# of trained professionals
2	# of research publications
3	# of Extension publications
4	% producers adopting NMSU recommendations to protect plants and animsl
5	Successful agricultural enterprises

Outcome #1

1. Outcome Measures

# of trained professionals

2. Associated Institution Types

• 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	2	9

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants

Outcome #2

1. Outcome Measures

# of research publications

2. Associated Institution Types

• 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	3	31

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems
213	Weeds Affecting Plants
215	Biological Control of Pests Affecting Plants
212	Pathogens and Nematodes Affecting Plants
211	Insects, Mites, and Other Arthropods Affecting Plants

Outcome #3

1. Outcome Measures

# of Extension publications

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	2	6

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants
215	Biological Control of Pests Affecting Plants
213	Weeds Affecting Plants
212	Pathogens and Nematodes Affecting Plants
216	Integrated Pest Management Systems

Outcome #4

1. Outcome Measures

% producers adopting NMSU recommendations to protect plants and animsl

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:
Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	20	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants
216	Integrated Pest Management Systems
311	Animal Diseases
212	Pathogens and Nematodes Affecting Plants
215	Biological Control of Pests Affecting Plants
315	Animal Welfare/Well-Being and Protection
213	Weeds Affecting Plants
312	External Parasites and Pests of Animals

Outcome #5

1. Outcome Measures
Successful agricultural enterprises

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:
Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
213	Weeds Affecting Plants

215	Biological Control of Pests Affecting Plants
311	Animal Diseases
216	Integrated Pest Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
312	External Parasites and Pests of Animals
212	Pathogens and Nematodes Affecting Plants
315	Animal Welfare/Well-Being and Protection

V(H). Planned Program (External Factors)

External factors which affected outcomes
- Natural Disasters (drought,weather extremes,etc.)
- Economy
- Public Policy changes
- Government Regulations
- Competing Public priorities

Brief Explanation

New Mexico continues in a serious drought. Land use disputes exacerbate tensions between industry, agriculture, urban and domestic users.

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

1. Evaluation Studies Planned
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention

Evaluation Results
{No Data Entered}

Key Items of Evaluation
{No Data Entered}

Program #4

V(A). Planned Program (Summary)

1. Name of the Planned Program

Plant Production

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	0%		18%	
202	Plant Genetic Resources	0%		33%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plant	12%		19%	
204	Plant Product Quality and Utility (Preharvest)	0%		8%	
205	Plant Management Systems	88%		22%	
	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	7.5	0.0	11.6	0.0
Actual	5.4	0.0	18.2	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**
320965	0	837263	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
320965	0	837263	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
474845	0	6589030	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

•In 2008 NMSU researchers will submit documentation to the NMSU Agricultural Experiment Station to release the NM0307 experimental alfalfa population as a cultivar with improved performance under both optimum and deficit levels of irrigation. This cultivar should benefit alfalfa growers in New Mexico, and perhaps adjacent regions, by providing a forage with enhanced yield potential across diverse production environments. Other more recently developed hybrid-based populations in the NMSU breeding program have been identified that tentatively outperform NM0307. Pending additional state-wide evaluations one of more of these will provide the bases for future cultivar releases. In other research, the integration of DNA marker linkage data with field performance of genetically defined alfalfa research population families under varying soil moisture conditions, has identified markers that can be used to select against alleles that reduce forage and root biomass yield under drought stress. Additional markers were identified that can be used to select for alleles that increase biomass production. Results suggest that selection for specific marker combinations can potentially improve yield performance by 3 to 14% under drought stress.

•The identification of NPGS plant introductions, that can perform well under limited and optimum irrigation management, will provide our program with additional parent populations to use in developing future alfalfa cultivars with greater yield stability/environmental adaptation over widely varying soil moisture conditions. Private industry has expressed concern that yield loss may accompany utilization of unimproved germplasms (e.g. many NPGS plant introductions). Our recent results, however, demonstrate that the forage yield of some hybrids derived from NPGS accessions can equal, or exceed, that of the best commercial cultivars. One private company has shown interest in our results, and we are collaborating on an alfalfa hybrid research project using some NPGS accessions as parents. This study will also provide information on the superiority or inferiority of using genetic male sterility to develop alfalfa hybrids. In other work, our diallel analyses indicate that measuring the general combining ability of a population, which is quite expensive, is not strictly necessary to identify useful parents. Rather, it is sufficient to measure the yield performance of each individual parent population only (not its' numerous hybrids), and the population's fall dormancy response. This later approach requires far fewer resources. Hence, significantly greater numbers of populations can be evaluated and breeding program efficiency can be improved.

•Subsurface drip technology in combination with saline water has been used to irrigate two multi-purpose fields (used for overflow parking during big events at the Aggie Memorial Stadium and for intramural soccer) on NMSU's campus. Master Gardeners have reported that homeowners across the state have expressed interest in applying this water conservation technology in their home lawn. Three athletic fields at the Rio Rancho high school are currently under construction and will receive subsurface irrigation technology.

•Sophisticated irrigation scheduling using computer based climate data can improve pecan crop yield while optimizing water use. However, growers are uncomfortable using computers. Consequently, a hand-held device was created and distributed to growers in New Mexico, Texas, and Mexico in 2007.

•NMSU researchers have found that land application of partially treated wastewater can reduce contamination of surface waterways, while providing alternative crops for small landowners.

•Scientists identified tall fescue turfgrass cultivars and mowing practices amenable to southern New Mexico. These findings will aid desert turf managers in selection of wear-tolerant cool-season turfgrasses.

•A new climate database management system has recently been developed to replace the old one and this new system has the capabilities to intake any type of climate data. The webpage is currently run both the old system and the new system because the old tools are still being transferred to the new system. CoCorahas, the community based rainfall monitoring system, has expanded throughout the state and has over 600 participants. Continuing effort is underway to improve the QC of the system. Researchers and state agencies along with the public are using the data made available on the system to make management decisions. 5000 request per day are being served by the climate server at http://weather.nmsu.edu.

•NMSU scientists developed and released the first public transgenic Bt (insect resistant) cotton cultivar (1517-99W) in the United States in 2005. It was grown in more than 13% (8,417 acres) and 6.8% (3400 acres) of cotton acreage in New Mexico in 2006 and 2007, respectively, according to the "2006-2007 Variety Planted" and "2007-2008 Variety Planted" reported by USDA-AMS. The new cultivar 1517-99W increased cotton production by 70-140 pounds per acre, totaling >600,000-1,200,000 pounds ($300,000-600,000) and 238,000-476,000 pounds ($150,000-300,000) of cotton in increase for New Mexico in 2006 and 2007, respectively. This new insect resistant Acala 1517 cultivar with insect resistance also is expected to reduce production cost and chemical contamination by reducing the use of pesticides.

•Researchers have developed a number of elite germplasm lines with desired fiber quality and high yield potential from interspecific breeding. This represents one of the first successful examples in cotton breeding in an attempt to significantly increase crop yield from interspecific hybridizations by introducing genes from one species to another.

•NMSU scientists constructed a high density linkage map with more than 1000 DNA markers, which can be used for

identifying desirable genes for cotton yield and fiber quality.

•The first Organically Certified research acres at New Mexico State University continue to be used at the Center to assist fruit, medicinal herb, and specialty crop growers interested in producing and marketing organically. Numerous groups of interested clientele visited the Center where they were instructed on organic growing techniques. Based on this research, several local growers have begun to grow and sell organic strawberries grossing the equivalent of up to $40,000 per acre. Research on medicinal herbs as alternative high value crops is based on traditions, culture, and expansion of markets. Results indicate that, depending on current prices, returns per acre can be quite substantial. Interest in fruit and medicinal herb production has grown substantially. Fruit research results were presented at the New Mexico Alternative Crops Workshop, Santa Fe, NM, December, 2007. In 2007 we had an excellent turnout at a multi-topic field day that covered our fruit, medicinal herb, forage, and irrigation/hydrology research (292 plus attended).

•An alternative cropping strategies project, recently completing its third year, has demonstrated that forage sorghums can be grown more efficiently than corn; however nutritive value of the sorghums and corn under limited irrigation is still questionable as quality results indicate that reducing irrigation did not reduce nutritive value of corn to the degree expected. The potential impacts from this project are great, considering the steadily increasing dairy numbers in this region of the U.S. and the amounts of water that can be saved if water use efficient sorghums are broadly accepted by the industry. Evaluation of various sorghums for biofuel potential will begin in 2008 and project is still in the planning phase. The variety testing program is used to evaluate variety and hybrid adaptation to both irrigated and dryland growing scenarios in eastern New Mexico. Use of better-adapted varieties allows growers to utilize their resources more efficiently and leads to economic savings. Particularly, more efficient water and nitrogen utilization contributes to conservation efforts and sustainable agricultural production.

•Composted biosolids may provide a beneficial use of what may otherwise have been waste. In an NMSU study, biosolids appeared to improve tree nutrition and growth, at least during the initial years. This may be an important source of fertility as the price of manufactured inputs continues to rise.

Software was developed and released in 2007 to aid alfalfa growers in estimating yield before harvest using fall dormancy category, cutting, growing degree days, and natural plant height. Forage Brassicas may be particularly useful in the irrigated high-desert regions of the southwestern USA and climatically similar environments. Delaying planting in the southern Rocky Mountains until the 30-d forecast temperature is less than 20°C will likely give highest first harvest yield and may give an opportunity for considerable regrowth for a second grazing or even a third grazing if temperatures remain mild and precipitation or irrigation is adequate. Rape is best for single grazing systems while turnip had greater regrowth potential and kale yield was too low in multiple cut systems to be of much value. Cotton growers can recover input costs when cotton is destroyed by wind or hail by planting cowpeas for edible dry beans as late as mid-June and using deficit irrigation until approximately 30 dap and reduced irrigation every 7 to 14 days during bloom and pod-filling. Harvesting Valencia peanut forage 2 to 3 weeks before pod digging provided the best compromise between forage yield and quality and pod yield and quality. Results from the statewide alfalfa variety testing program in 2006 were summarized indicating that, by selecting higher yielding varieties, growers can increase productivity by as much as 2.92 tons/acre and return per acre by $490.

2. Brief description of the target audience
The target audience is both small as well as medium and large scale agricultural operations, businesses, associations, cooperatives, consulting firms and collectives that may or may not be defined as a farm under the USDA economic return criteria, but rather are land owners, managers, consultants, or students that wish to improve agronomic production and efficiency as do and are other audience participants such as Extension agents, farmers, ranchers, other agricultural specialists, private-tribal-state-federal and even nonprofit 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	0	0	0	0
2007	0	0	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	1	72	73

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- The specific output measures will vary according to the specific project being monitored. The development of research procedures and technology, training of students, publishing research papers, and disseminating research results via educational workshops, conferences, and Extension media are important outputs for the various projects falling under this planned program.

Year	Target	Actual
2007	0	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	# of trained professionals
2	# of research publications
3	# of Extension publications
4	% of producers, growers, homeowners adopting NMSU recommendations
5	# of improved plant varieties released
6	Successful plant agricultural enterprises

Outcome #1

1. Outcome Measures

# of trained professionals

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	2	15

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
202	Plant Genetic Resources
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plant
201	Plant Genome, Genetics, and Genetic Mechanisms

Outcome #2

1. Outcome Measures

# of research publications

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	3	72

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plant
202	Plant Genetic Resources
204	Plant Product Quality and Utility (Preharvest)
201	Plant Genome, Genetics, and Genetic Mechanisms

Outcome #3

1. Outcome Measures

# of Extension publications

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	2	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #4

1. Outcome Measures

% of producers, growers, homeowners adopting NMSU recommendations

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	30	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems

Outcome #5

1. **Outcome Measures**
   # of improved plant varieties released

2. **Associated Institution Types**

   •1862 Research

3a. **Outcome Type:**
   Change in Action Outcome Measure

3b. **Quantitative Outcome**

Year	Quantitative Target	Actual
2007	1	0

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

Issue (Who cares and Why)

What has been done

Results

4. **Associated Knowledge Areas**

KA Code	Knowledge Area
202	Plant Genetic Resources
201	Plant Genome, Genetics, and Genetic Mechanisms

Outcome #6

1. **Outcome Measures**
   Successful plant agricultural enterprises

2. **Associated Institution Types**

   •1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems

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
- Competing Programmatic Challenges

Brief Explanation

New Mexico continues in a serious drought, which affects the amount of water available to farmers. Water availability also exacerbates tensions between industry, agriculture, urban and domestic users. Until all water rights have been adjudicated, users remain in a "use or lose" situation regarding their water amounts.

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

1. Evaluation Studies Planned
- During (during program)
- Case Study
- Comparisons between program participants (individuals,group,organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention

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

4-H and Youth Development

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
806	Youth Development	100%		100%	
	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	5.5	0.0	0.3	0.0
Actual	5.0	0.0	1.2	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**
295548	0	53943	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
295548	0	53943	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
4469130	0	454415	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

• Research procedures and technology

- Papers, citations, patents

- Train students

- Dissemination of research results

- Educational workshops

- Conferences

- Commercialization of techniques and products

During the 4-H program year, 98% of youth involved in 4-H programming will learn subject matter concepts through hands-on experiences such as camps, clinics, workshops, etc; they will develop life skills through project work, competitive events, real-life situations and career exploration opportunities. 50% of youth enrolled in 4-H will gain public speaking skills, strengthening communication and organization abilities. 75% of youth in club will develop cognitive skills, teamwork, leadership and citizenship potential. 85% of Agents and staff will increase professional and personal skills related to life skills and youth development.

Last year several educational programs where conducted in elementary schools leading to an increase in knowledge about good character after the programs. Agents also received quality training in a variety of subjects, college age members gained knowledge and skills through training in the 4-H programs.

To prepare youth for a positive future, the NM 4-H leadership team has built up a lot of skills and knowledge for youth in all counties. 500 youth represent 30 counties participated in service learning projects at state level in 2007. Youth and adults' record book training were conducted across the state. Home Economics has made progress towards the medium term objectives, like giving workshops, and training youth. Holding sewing and baking workshops for youth to built up their skills.

The results of an Agricultural Education and Extension Education project will give direction for agricultural education program development efforts, and pre-service and in-service agricultural education teacher professional development efforts related to developing excellence in New Mexico secondary agricultural education.The results will help validate the "Local Program Success" program as a model for achieving indicators of excellence in New Mexico secondary agricultural education programs.The research will help state agricultural education leaders to diffuse the "Local Program Success" program to secondary agricultural education teachers and programs.

•After the two workshops at the New Mexico 4-H Leaders Forum, 15 greatly improved their knowledge, 17 responded that the information was very useful and 16 found the presentation of excellent quality.   •Presented workshop to County 4-H members and leaders on effective club meetings and parliamentary procedure. Several stated that they were going to take and use what was presented to other organizations. There were approximately 100 in attendance.   •The 2007 County 4-H Rodeo Evaluation was very favorable and the profit looks to be in the $25,000 range for the event.   •Agents worked with the County 4-H volunteers throughout the year to support, maintain, and expand the 4-H Volunteer Leadership program.   •Currently 100% of County 4-H Leaders have completed leader screenings.   •4-H Leaders' Forum participant evaluations indicate that 94% have a better understanding of how to provide an inclusive and safe environment for members.   98% have a better understanding of how to engage youth in learning.

- 96% feel they are better able to provide opportunities for participants to prepare them for the future.

- 98% have a better understanding of how they can structure the program which will enable participants to determine things for themselves.

- 96% have a better understanding of how to provide opportunities for participants to value and practice service.

- 98% feel their local 4-H program will be enhanced.

- 98% of participants are re-energized about 4-H.

- 92% are motivated to expand their role in 4-H.   •New Mexico 4-H Leaders Forum – Designed a workshop with members of the State 4-H Leadership Team on educational activities that leaders could use for workshops or activities during a

4-H meeting. 15% of the leaders attending the event participated in the workshop.   •42% of the parents of youth serving on the State 4-H Leadership Teams gained knowledge related to the teams responsibilities, commitment required.   •95% of all current 4-H Projects have completed Green top Project Summary Guides posted on the 4-H website to be accessed by agents, volunteers, youth, parents and teachers.   •35 out of 40 (85%) Curriculum Committee members participated in conference calls, publication reviews and face-to-face meetings to insure quality and timely resource materials for 4-H youth and volunteers.
    •Nine adult 4-H youth leaders attended a workshop presented by State 4-H Staff on effective leadership for club and project meetings. 44% of participants gained resources to solve a problem they had.   •Character Education Program was conducted in Elementary Schools 5th grade class. 17 students participated in this school enrichment program. There was a 75% increase in knowledge about good character after the program.   •Youth involved in the NM 4-H Leadership team gained knowledge and skills related to teamwork, leadership, service and event planning through their year long commitment.   •Fifteen leaders gained knowledge related to the new Home Economics Lettermen Recognition Program through trainings.   •500 youth representing 30 counties participated in service learning projects at the state level in 2007.   •Participation in Home Economics contests has increased by 25% over the last five years. Specialist provided youth trainings to 14 counties in 2007.   •In Photography Contest 2007, 88 photos were received from 31 youth representing eight counties.   • Ten youth submitted State Records in 2007 in youth and adult Record Book trainings.   •Home Economist took 17 youth to the State 4-H Conference.
    •Favorite Foods workshop was held were participants learned details about this contest such as menu planning, food preparation, food safety, table setting, and basic nutrition.   •Four sewing workshops were held along with fifteen open sewing classes. Members learned the parts of the sewing machine, fabric selection and basic sewing construction.   •188 (77%) of the 243 youth enrolled County 4-H participated in at lest tow of the following: project work, competition, camps, and record books.
    •The 2007 project day camp offered youth opportunities to participate in hands-on activities from the gardening, rocketry, macramé, and scrap booking projects.   •A total of 361 youth were reached through school enrichment efforts by the 4-H Home Economist in 2006-2007 in elementary schools.   •In 2006-2007 three officer leadership trainings were held. Officers gained a better knowledge base on how to use parliamentary procedure, running an effective meeting, and utilizing skills needed to be an effective leader in their clubs and community.

2. Brief description of the target audience
Youth ages 5 to 19 are targeted to learn life, leadership and citizenship skills through: Project Work, Special Interest Groups, School Enrichment, Competitive Events, Fairs, Clinics, Workshops, Record Books, Camps, Community Service, Public Speaking, Elected/Appointed Offices, etc.

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	0	0	0	0
2007	0	0	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	3	10	13

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- The specific output measures will vary according to the specific project being monitored. The development of research procedures and technology, training of students, publishing research papers, and disseminating research results via educational workshops, conferences, and Extension media are important outputs for the various projects falling under this planned program. Numbers of students involved in 4-H programs also will be outputs.

Year	Target	Actual
2007	0	0

V(G). State Defined Outcomes

<div style="background:black; color:white">

V. State Defined Outcomes Table of Content

</div>

O No.	OUTCOME NAME
1	# of Research publications
2	# of Extension publications
3	% volunteers trained

Outcome #1

1. **Outcome Measures**
   # of Research publications

2. **Associated Institution Types**

   •1862 Research

3a. **Outcome Type:**
   Change in Knowledge Outcome Measure

3b. **Quantitative Outcome**

Year	Quantitative Target	Actual
2007	1	10

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

Outcome #2

1. **Outcome Measures**
   # of Extension publications

2. **Associated Institution Types**

   •1862 Extension

3a. **Outcome Type:**
   Change in Knowledge Outcome Measure

3b. **Quantitative Outcome**

Year	Quantitative Target	Actual
2007	2	3

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

Outcome #3

1. **Outcome Measures**
   % volunteers trained

2. **Associated Institution Types**

   •1862 Extension

3a. **Outcome Type:**
   Change in Action Outcome Measure

3b. **Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	35

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

V(H). Planned Program (External Factors)

External factors which affected outcomes
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration,new cultural groupings,etc.)

Brief Explanation

In the funding arena, 4-H and Youth Development encounters difficulty with competing programs for a limited budget. The challenge is set our programs apart from other worthy programs, and be seen for the public benefit they provide.

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

1. **Evaluation Studies Planned**
   - Before-After (before and after program)
   - During (during program)
   - Time series (multiple points before and after program)
   - Comparisons between program participants (individuals,group,organizations) and non-participants
   - Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
   - Comparison between locales where the program operates and sites without program intervention

Evaluation Results
   {No Data Entered}

Key Items of Evaluation
   {No Data Entered}

Program #6

V(A). Planned Program (Summary)

1. Name of the Planned Program

Agricultural Markets, Trade, and Economic/Business Development

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
511	New and Improved Non-Food Products and Processes	23%		6%	
601	Economics of Agricultural Production and Farm Management	0%		15%	
602	Business Management, Finance, and Taxation	23%		13%	
603	Market Economics	0%		22%	
604	Marketing and Distribution Practices	0%		6%	
606	International Trade and Development	0%		6%	
608	Community Resource Planning and Development	31%		13%	
610	Domestic Policy Analysis	23%		13%	
611	Foreign Policy and Programs	0%		6%	
	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	4.9	0.0	7.0	0.0
Actual	4.0	0.0	6.0	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
238803	0	277090	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
238803	0	277090	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
3631168	0	2272079	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Research procedures and technology
- Papers, citations, patents
- Train students
- Dissemination of research results
- Educational workshops
- Conferences
- Commercialization of techniques and products

2. Brief description of the target audience
The target audiences include agricultural producers, business owners, and policy makers.

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	0	0	0	0
2007	0	0	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	6	29	35

V(F). State Defined Outputs

Output Target
Output #1

Output Measure
- The specific output measures will vary according to the specific project being monitored. The development of research procedures and technology, training of students, publishing research papers, and disseminating research results via educational workshops, conferences, and Extension media are important outputs for the various projects falling under this planned program.

Year	Target	Actual
2007	0	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	# of research publications
2	# of Extension publications
3	% of people adopting NMSU policy, economic, or business development recommendations
4	Economic development increased
5	# of trained professionals graduated

Outcome #1

1. Outcome Measures

# of research publications

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	2	29

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
511	New and Improved Non-Food Products and Processes
601	Economics of Agricultural Production and Farm Management
610	Domestic Policy Analysis
603	Market Economics
604	Marketing and Distribution Practices
602	Business Management, Finance, and Taxation

Outcome #2

1. Outcome Measures

# of Extension publications

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	2	6

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

   Results

   4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management

Outcome #3

   1. Outcome Measures
   % of people adopting NMSU policy, economic, or business development
   recommendations

   2. Associated Institution Types

   •1862 Extension

   3a. Outcome Type:
   Change in Action Outcome Measure

   3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	40	0

   3c. Qualitative Outcome or Impact Statement

   Issue (Who cares and Why)

   What has been done

   Results

   4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
511	New and Improved Non-Food Products and Processes
602	Business Management, Finance, and Taxation
601	Economics of Agricultural Production and Farm Management
610	Domestic Policy Analysis
606	International Trade and Development

Outcome #4

   1. Outcome Measures
   Economic development increased

   2. Associated Institution Types

   •1862 Extension

3a. Outcome Type:
Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
606	International Trade and Development
602	Business Management, Finance, and Taxation
603	Market Economics
610	Domestic Policy Analysis
601	Economics of Agricultural Production and Farm Management
604	Marketing and Distribution Practices
511	New and Improved Non-Food Products and Processes
611	Foreign Policy and Programs

Outcome #5

1. Outcome Measures
# of trained professionals graduated

2. Associated Institution Types

•1862 Research

3a. Outcome Type:
Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	{No Data Entered}	8

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area

603	Market Economics	
601	Economics of Agricultural Production and Farm Management	
608	Community Resource Planning and Development	
604	Marketing and Distribution Practices	

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
- Competing Programmatic Challenges
- Populations changes (immigration,new cultural groupings,etc.)

Brief Explanation

{No Data Entered}

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

1. Evaluation Studies Planned

- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals,group,organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention

Evaluation Results
{No Data Entered}

Key Items of Evaluation
{No Data Entered}

Program #7

V(A). Planned Program (Summary)

1. Name of the Planned Program

Health and Wellbeing

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	0%		9%	
703	Nutrition Education and Behavior	0%		27%	
724	Healthy Lifestyle	25%		0%	
801	Individual and Family Resource Management	25%		20%	
802	Human Development and Family Well-Being	50%		31%	
803	Sociological and Technological Change Affecting Individuals, Fam	0%		13%	
	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	7.0	0.0	1.1	0.0
Actual	5.7	0.0	2.1	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**
334560	0	96820	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
334560	0	96820	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
5027772	0	681624	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

• Research procedures and technology

- Papers, citations, patents

- Train students

- Dissemination of research results

- Educational workshops

- Conferences

2. Brief description of the target audience

The target audience includes: teenage mothers, low-income families, families suffering social stress, mal- or undernourished families, diabetics.

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	0	0	0	0
2007	0	0	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	5	1	6

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- The specific output measures will vary according to the specific project being monitored. The development of research procedures and technology, training of students, publishing research papers, and disseminating research results via educational workshops, conferences, and Extension media are important outputs for the various projects falling under this planned program.

Year	Target	Actual
2007	0	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	# of research papers
2	# of Extension publications
3	# of trained professionals
4	% diabetics adopting NMSU recommendations regarding nutrition
5	Improved nutrition among New Mexicans
6	decrease in child abuse
7	decrease in juvinile deliquency

Outcome #1

1. **Outcome Measures**
    # of research papers

2. **Associated Institution Types**

    •1862 Research

3a. **Outcome Type:**
     Change in Knowledge Outcome Measure

3b. **Quantitative Outcome**

Year	Quantitative Target	Actual
2007	1	1

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

Outcome #2

1. **Outcome Measures**
    # of Extension publications

2. **Associated Institution Types**

    •1862 Extension

3a. **Outcome Type:**
     Change in Knowledge Outcome Measure

3b. **Quantitative Outcome**

Year	Quantitative Target	Actual
2007	3	5

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

    Issue (Who cares and Why)

    What has been done

    Results

4. **Associated Knowledge Areas**

KA Code	Knowledge Area

724	Healthy Lifestyle	
802	Human Development and Family Well-Being	
702	Requirements and Function of Nutrients and Other Food Components	

Outcome #3

1. Outcome Measures

# of trained professionals

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	2	10

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
802	Human Development and Family Well-Being

Outcome #4

1. Outcome Measures

% diabetics adopting NMSU recommendations regarding nutrition

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	40	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
703	Nutrition Education and Behavior

Outcome #5

1. Outcome Measures

Improved nutrition among New Mexicans

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle

Outcome #6

1. Outcome Measures

decrease in child abuse

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

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
803	Sociological and Technological Change Affecting Individuals, Fam

Outcome #7

1. Outcome Measures
decrease in juvinile deliquency

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:
Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
803	Sociological and Technological Change Affecting Individuals, Fam
802	Human Development and Family Well-Being

V(H). Planned Program (External Factors)

External factors which affected outcomes
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration,new cultural groupings,etc.)

Brief Explanation

{No Data Entered}

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

1. **Evaluation Studies Planned**
   - Before-After (before and after program)
   - During (during program)
   - Time series (multiple points before and after program)
   - Case Study
   - Comparisons between program participants (individuals,group,organizations) and non-participants
   - Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
   - Comparison between locales where the program operates and sites without program intervention

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #8

V(A). Planned Program (Summary)

1. Name of the Planned Program

Sustainable Management of 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
101	Appraisal of Soil Resources	0%		6%	
102	Soil, Plant, Water, Nutrient Relationships	7%		11%	
103	Management of Saline and Sodic Soils and Salinity	8%		4%	
111	Conservation and Efficient Use of Water	0%		26%	
112	Watershed Protection and Management	0%		6%	
121	Management of Range Resources	0%		7%	
123	Management and Sustainability of Forest Resources	22%		10%	
124	Urban Forestry	15%		0%	
135	Aquatic and Terrestrial Wildlife	5%		19%	
136	Conservation of Biological Diversity	20%		0%	
403	Waste Disposal, Recycling, and Reuse	8%		0%	
605	Natural Resource and Environmental Economics	15%		11%	
	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	7.3	0.0	14.3	0.0
Actual	2.8	0.0	13.4	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**
162551	0	616421	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
162551	0	616421	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
2513886	0	4998575	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

•The New Mexico dairy herd flow has been developed and it is available in the NM dairy program website (dairy.nmsu.edu: Tools). Associated applications, anticipated to be integrated, have been also developed and are available at the NM dairy program website: The Grazing-N and the Alfalfa Yield Predictor. The Grazing-N performs mass balances of N on heifer and dry dairy cow systems whereas the Alfalfa Yield Predictor uses field experimentation records to provide probabilistic estimates of yields according to farm specific conditions. Another application to perform whole dairy farm nutrient balances is under development in close consultation with producers and environmental consulting companies. At least 50% of dairy producers are aware of this project and its implications. Environmental consulting companies who provide service of environmental reporting to about 75% of dairy producers in NM are using at least one of the created applications to comply with these tasks.

•NMSU scientists demonstrated that the organic farming system is sustainable based upon the soil physical properties, soil salinity levels, and mineral nitrogen availability. Even after 10 years of continuous manure application, the salinity levels have gone up to only about 2 dS/m. This was contrary to the popular belief that manure application will increase the salt levels so rapidly that crop production cannot be sustained. This study also showed that the benefits of organic matter additions in the organic farms were likely undercut by conventional tillage in organic farms. There is a need to use management practices, such as reduced tillage, crop rotation, cover crops, that can improve structural characteristics and water retention capacity of these soils and can potentially increase the biomass yield from these arid soils characterized by low rainfall and deficit irrigation.

•Work on chile pepper salt tolerance showed that higher levels of salinity from an organic source such as anaerobically digested grass clippings can be tolerated by crops compared to simple chloride salts. This has important implications for agronomic practices in New Mexico and the surrounding region.

•Research by NMSU scientists on corrosion of penetrator rods in the lab demonstrated that soil quality and health hazards due to depleted uranium (DU) contamination are more severe than previously thought. Earlier field observations had presumed that weathering of DU resulted in obvious and easily recognized coatings, but our findings indicate that the coatings were not always present or noticeable – thereby making collection of DU penetrators in the field potentially more dangerous.

•Through studying surface water-groundwater interactions in acequia-irrigated floodplains in north-central New Mexico, researchers are developing an understanding of the complexity of the hydrological system of the upper Rio Grande Basin that will help stakeholders make informed decisions. They have looked at ditch-seepage, the hydrology of the shallow groundwater and seepage impact on water quality. Currently, they are looking at the integrated floodplain hydrology for sustainable agriculture and healthy ecosystems in river valleys of water-scarce regions. We have found that there are important issues people need to consider before they change how they manage the water in the Rio Grande Basin. The project has gained considerable interest and support among irrigation water users and managers in New Mexico.

•Thanks to NMSU scientists, botanists in New Mexico now have an up-to-date listing of the plants of the state, with correct nomenclature, synonyms, common names, and indication of origin. This is being widely used by numerous land managers, ecologists, ranchers and agriculturalists, professional botanists, consultants, etc. throughout the state, even though the listing has not yet been formerly published (but is available on-line).

•Studies conducted in the Chihuahuan Desert showed that naïve cattle require time to become accustomed to novel pastures and vegetation. After time, naïve cattle begin to learn to forage more effectively, but still do not utilize the rangeland as efficiently as native cattle. Naïve cattle do not select a lower quality diet than native cattle during dry conditions with poor quality forage. In contrast, naïve cattle can select a higher quality diet during periods of high forage quality compared to cattle accustomed to desert conditions. When restocking after a drought, ranchers should try to acquire cattle from rangeland and environmental conditions similar to those in their operations.

•Research conducted by NMSU range scientists has the potential to reduce the adverse impacts of livestock grazing on rangeland soils, vegetation and wildlife. Light stocking leaves more residual vegetation for protection of soils, watershed, and wildlife habitat. Light grazing may allow forage plants to maximize their productivity and it may be more beneficial than grazing exclusion. Light grazing lowers rancher risks and may increase monetary returns over conservative grazing based on preliminary results. This research has the potential to reduce rancher/environmentalist conflicts by providing better technology to maintain and improve vegetation and wildlife habitat. Increased rancher income could reduce rangeland losses to subdivisions and other development. In previous research from this project, we found conservative grazing was advantageous over moderate grazing in terms of maintaining forage production, drought, reducing rancher risk and providing higher net profits.

•Work on risk assessment for invasive species has helped the broader risk analysis/policy analysis community to understand the applicability of the regional and ecological risk assessment paradigms to environmental stressors other than chemical contaminants, and has begun to make ecologists and conservation biologists aware of how those paradigms provide an effective way to link science and policy.

•NMSU researchers have worked closely with the Middle Rio Grande Conservancy District to evaluate and select three sites for development of refugial fish habitats along the middle Rio Grande of New Mexico that can be maintained as wetted habitats during irrigation season by purposely "leaking" water from the irrigation system. This innovative collaboration led to a separately-funded project to the conservancy district. The research conducted in the MRGCD irrigation system led to a series of recommendations on agricultural water management that could improve the status of native fishes in the middle Rio Grande of New Mexico. The work contributed new knowledge on adaptive water management and it demonstrated the feasibility of pursuing win-win strategies for water use that jointly benefit farmers and native fishes.

•Research on prairie dogs will contribute to the debate regarding conflicts between conservation of this keystone species, preservation of endangered species and livestock ranching. Researchers believe that these goals are not incompatible and that all can be achieved with wise use of available resources. Research at Big Bend National Park will impact the management of exotic species thereby contributing to the preservation of our National Parks. This work also will lay the foundation for implementing more rigorous approaches, in this case risk-analysis, to the development of conservation strategies for resource protection in our parks. Finally, work on carnivore movement patterns and connectivity among protected lands will aid the National Park Service and the New Mexico Game and Fish in the development of management plans for conserving their lands and ensuring connectivity among wildlife populations within the region as well as potentially informing harvest strategies for both puma ad black bear.

•Release of the initial findings of the potential impact of climate change on New Mexico's water resources and economic opportunities garnered considerable public and media interest. Following the October press release, the findings were reported by various print, radio, and television outlets including front page coverage in the Albuquerque Journal, articles in the El Paso Times, and the Associated Press, which was picked up also by the New York Times. The impact of raising general public awareness as well as that of state, local, and federal decision makers is difficult to measure, but for economic research of any kind, this level of attention is very rare.

•The studies from a water conservation technology project for small farms and urban landscapes have provided information that can be used to improve water-use and irrigation efficiencies in the semiarid, Intermountain West. The xeriscape study has provided a demonstration of plant species and irrigation scheduling techniques that can be used (and has been used) by urban planners, landscape managers, homeowners, etc., in the design and maintenance of drought tolerant landscapes that require less than 25% of the water required for maintaining a typical cool season turfgrass lawn. Hundreds of visitors to the xerscape garden over the past 4 years have expressed an interest in the project and many have indicted that they've made water-conserving changes in their landscapes based on the information gained during their visit. A low tech, low cost, low pressure microirrigation system that provides an efficient and cost-effective methodology for irrigating small plots has been demonstrated during the second study of this project. The crop production functions and irrigation scheduling recommendations formulated during this study can be used by vegetable growers to improve crop selection strategies based on water availability and to optimize water-use efficiencies (yield per unit of applied water) for drip irrigated tomatoes, chile peppers, and sweet corn.
•chniques and products

2. Brief description of the target audience

Target audiences include:ranchers, farmers, urban landscapers, park departments, state and federal agencies, private homeowners, and recreational users ofparks, forests, and waters.

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	0	0	0	0
2007	0	0	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	23	55	78

V(F). State Defined Outputs

Output Target
Output #1

Output Measure

- The specific output measures will vary according to the specific project being monitored. The development of research procedures and technology, training of students, publishing research papers, and disseminating research results via educational workshops, conferences, and Extension media are important outputs for the various projects falling under this planned program.

Year	Target	Actual
2007	0	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	# of trained professionals
2	# of research publications
3	# of Extension publications
4	% of people adopting NMSU recommendations
5	Successful natural resource management policies implemented

Outcome #1

1. Outcome Measures

  # of trained professionals

2. Associated Institution Types

  •1862 Research

3a. Outcome Type:

  Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	3	6

3c. Qualitative Outcome or Impact Statement

  Issue (Who cares and Why)

  What has been done

  Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife
112	Watershed Protection and Management

Outcome #2

1. Outcome Measures

  # of research publications

2. Associated Institution Types

  •1862 Research

3a. Outcome Type:

  Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	5	55

3c. Qualitative Outcome or Impact Statement

  Issue (Who cares and Why)

  What has been done

  Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife
102	Soil, Plant, Water, Nutrient Relationships
123	Management and Sustainability of Forest Resources
101	Appraisal of Soil Resources
605	Natural Resource and Environmental Economics
112	Watershed Protection and Management
103	Management of Saline and Sodic Soils and Salinity
111	Conservation and Efficient Use of Water
121	Management of Range Resources

Outcome #3

1. Outcome Measures

# of Extension publications

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	3	23

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
123	Management and Sustainability of Forest Resources
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
121	Management of Range Resources
135	Aquatic and Terrestrial Wildlife

Outcome #4

1. Outcome Measures

% of people adopting NMSU recommendations

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	40	0

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
102	Soil, Plant, Water, Nutrient Relationships
123	Management and Sustainability of Forest Resources
111	Conservation and Efficient Use of Water
103	Management of Saline and Sodic Soils and Salinity
112	Watershed Protection and Management
135	Aquatic and Terrestrial Wildlife
121	Management of Range Resources
136	Conservation of Biological Diversity
403	Waste Disposal, Recycling, and Reuse
124	Urban Forestry

Outcome #5

1. Outcome Measures

Successful natural resource management policies implemented

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
103	Management of Saline and Sodic Soils and Salinity
102	Soil, Plant, Water, Nutrient Relationships
135	Aquatic and Terrestrial Wildlife
403	Waste Disposal, Recycling, and Reuse
111	Conservation and Efficient Use of Water
136	Conservation of Biological Diversity
124	Urban Forestry
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
121	Management of Range Resources
101	Appraisal of Soil Resources
605	Natural Resource and Environmental Economics

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
- Competing Programmatic Challenges

Brief Explanation

New Mexico continues in a serious drought, which affects the amount of water available to farmers. Water availability also exacerbates tensions between industry, agriculture, urban and domestic users. Until all water rights have been adjudicated, users remain in a "use or lose" situation regarding their water amounts.

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

1. Evaluation Studies Planned
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals,group,organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention

Evaluation Results
{No Data Entered}

Key Items of Evaluation
{No Data Entered}