

2015 New Mexico State University Combined Research and Extension Annual Report of Accomplishments and Results

Status: Accepted

Date Accepted: 06/13/2016

I. Report Overview

1. Executive Summary

New Mexico State University College of Agricultural, Consumer and Environmental Sciences (ACES) research, academic, and Extension activities fall into three broad strategic themes, which consist of our planned programs for this Plan of Work. Each planned program is comparable to a NIFA portfolio, with associated Knowledge Areas (KAs). The three college strategic themes are: Agriculture and Natural Resources; Community and Economic Development; and Human Capital. Each strategic theme has administrative support and civil rights functions associated with it. NIFA has developed five mandatory priority areas. We have explicitly addressed two areas (Global Food Security and Hunger; Food Safety) by renaming and reorganizing existing planned programs. The remaining priority areas are reported in our existing research and Extension programs. We have listed those priority areas separately, although we will not report anything in those areas per se.

ACES uses the Academy of Sciences definition of agriculture: the service of producing, distributing, marketing, and consuming food and fiber.

This incorporates use, conservation, development, and management of air, land, and water resources. **The Agriculture and Natural**

Resources strategic theme, then, includes the following planned programs: Sustainable Management of Natural Resources; Global Food Security and Hunger; and Food Safety.

- The Sustainable Management of Natural Resources planned program contains the KAs covering Soil, Plant, Water, Nutrient Relationships; Management of Saline and Sodic Soils and Salinity; Management of Range Resources; Management and Sustainability of Forest Resources; Urban Forestry; Aquatic and Terrestrial Wildlife; Conservation of Biological Diversity; Waste Disposal, Recycling, and Reuse; Drainage and Irrigation Systems and Facilities; and Natural Resource and Environmental Economics.

- The Global Food Security and Hunger planned program contains the KAs dealing with animal genetics and genomics, nutrition, reproduction, physiology, stresses, and management systems; genetics, genomics, stresses, efficiencies, and management systems of plants; and pests and pathogens of plants and animals, weeds, biological control and integrated pest management systems, and animal welfare/protection.

- The Food Safety planned program incorporates the KAs dealing with new and improved food products and processing techniques, quality maintenance, and protection from pathogens.

The **Community and Economic Development** strategic theme contains the Agricultural Markets, Trade, and Economic/Business Development planned program. This covers marketing, community development, and economic policy.

ACES' **Human Capital** strategic theme contains two planned programs: Health and Wellbeing; and 4-H and Youth Development. The Health and Wellbeing planned program covers nutrition and nutrition education, healthy lifestyles, family resource management, family development, and how social changes affect individuals. The 4-H and Youth Development planned program incorporates all remaining programs involved with youth development.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	38.5	0.0	61.0	0.0
Actual	30.9	0.0	52.1	0.0

II. Merit Review Process

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

- Internal University Panel
- External University Panel
- External Non-University Panel

2. Brief Explanation

We use internal faculty review and external advisory group review of our planned programs. As appropriate, departments are reviewed by a panel of NIFA and land-grant university peers.

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.

New Mexico State University uses a variety of methods to inform and collect feedback from our stakeholders. We continually evaluate their effectiveness and consider new ways to communicate with our stakeholders.

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.

NMSU uses advisory committees, focus groups, and knowledge by specialists and agents to identify stakeholders.

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 specifically with non-traditional individuals
- Meeting with invited selected individuals from the general public

Brief explanation.

The College of ACES meets with individuals and groups throughout the year to garner input directly.

3. A statement of how the input will be 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.

Feedback from our stakeholders is used to plan the College's priorities in research and extension. This includes deciding budgets and hiring decisions.

Brief Explanation of what you learned from your Stakeholders

Federal priorities often do not align with state/local priorities.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
2132086	0	2088091	0

2. Totalled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	2132086	0	2088091	0
Actual Matching	2132086	0	2088091	0
Actual All Other	0	0	0	0
Total Actual Expended	4264172	0	4176182	0

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

V. Planned Program Table of Content

S. No.	PROGRAM NAME
1	Global Food Security and Hunger
2	Agricultural Markets, Trade, and Economic/Business Development
3	Sustainable Management of Natural Resources
4	Food Safety
5	Health and Wellbeing
6	4-H and Youth Development
7	Climate Change
8	Sustainable Energy
9	Childhood Obesity

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Global Food Security and Hunger

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	5%		5%	
201	Plant Genome, Genetics, and Genetic Mechanisms	6%		6%	
202	Plant Genetic Resources	6%		6%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	14%		14%	
204	Plant Product Quality and Utility (Preharvest)	6%		6%	
205	Plant Management Systems	5%		5%	
211	Insects, Mites, and Other Arthropods Affecting Plants	4%		4%	
212	Pathogens and Nematodes Affecting Plants	6%		6%	
213	Weeds Affecting Plants	10%		10%	
215	Biological Control of Pests Affecting Plants	1%		1%	
216	Integrated Pest Management Systems	2%		2%	
301	Reproductive Performance of Animals	10%		10%	
302	Nutrient Utilization in Animals	10%		10%	
305	Animal Physiological Processes	10%		10%	
306	Environmental Stress in Animals	2%		2%	
307	Animal Management Systems	3%		3%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	14.6	0.0	26.8	0.0
Actual Paid	11.7	0.0	30.7	0.0

Actual Volunteer	0.0	0.0	0.0	0.0
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2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
25585	0	1112953	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
25585	0	1112953	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Remote sensing might permit pecan tree plant moisture status to be detected early, and this may improve drought detection and monitoring. Using a hand held spectroradiometer, AES scientists conducted a study simultaneously on two mature pecan orchards, a sandy loam (La Mancha) and a clay loam (Leyendecker) soil. We were particularly interested in detecting moisture status in the -0.90 to -1.5 MPa midday stem water potential range because our previous studies indicated this was the critical range for irrigating pecans. The decline in photosynthesis averaged 34% in La Mancha and 25% in Leyendecker orchard when midday stem water potential ranged from -0.9 to -1.5 MPa. Average canopy surface reflectance of well-watered trees (midday stem water potential between -0.4 to -0.85 MPa) was significantly higher than the same trees experiencing water deficits (midday stem water potential between -0.9 to -1.5 MPa) within the 350 to 2500 nm bands range. Conversely, soil surface reflectance of well-watered trees was lower in trees experiencing water deficits over all bands. At both orchards, all soil and canopy bands and surface reflectance indices showed low relationship with midday stem water potential ($R^2 < 0.62$). Discriminant analysis models of well-watered and water deficit trees that emerged after combining soil and canopy reflectance data had high classification accuracy. This research indicates that canopy and soil hyperspectral data derived from a handheld spectroradiometer hold promise for discerning the midday stem water potential of pecan orchards subjected to flood irrigation.

The NMSU cotton breeding program continued to make progress in further increasing cotton yield and improving other traits, providing promising breeding lines in the pipeline for producers in the southwest region. The use of these new products will significantly increase the net income for the New Mexico producer through technology transfer and dissemination. Major results can be summarized below:

- Several new cotton breeding lines are promising as they appeared to out-perform the check Acala 1517-08 in yield potential.
- At least one glandless line is promising as it had comparable lint yield to Acala 1517-08 and may be released as a new glandless cotton cultivar in 2015.
- One Pima line, which outyielded a commercial Pima cotton cultivar by 20% when tested in 4 acres of a local farm in 2013, had higher yield than the best commercial Pima cultivar by >20% in the National Pima Variety Test in 2014. Seed increase will be arranged in 2015.

An up-to-date comprehensive meta-analysis was performed on more than 2100 cotton QTLs reported previously in ca. 100 papers. QTL clusters and hotspots for yield, fiber quality and stress including disease resistance traits were identified. A QTL database for all the published papers is under development and it will also have functions to accommodate online submissions and view of QTLs from researchers. This specialized QTL database will be an addition to other cotton genomic databases, providing an important tool for breeders to choose important markers anchoring consistent QTLs with large effects if marker-assisted selection is desired. To demonstrate the usefulness of the meta-analysis and the QTL database, QTL clusters and hotspots for *Verticillium* wilt resistance are being analyzed and will be reported in 2015.

By enhancing the ability of local growers to have product during more of the year, they may be able to pursue additional markets, including school lunches and year-round farmers' markets. High tunnels used in research are relatively inexpensive to build, and rely only on sunlight to build up heat inside of the tunnel. Producers need reliable information on which crop cultivars will produce well in their region. Some strawberry cultivars available in seed and nursery catalogs will do fine in other parts of the country, but will fail in New Mexico because of climate and soil differences. Results from our study show which cultivars grow well in our region. Jujubes, an important crop in China for thousands of years, could become an alternative tree fruit crop in New Mexico where traditional tree fruit crops such as apple and peach lose their crop in many years because of late spring frosts. Jujubes flower later, thus avoiding late spring frosts, producing a crop essentially every year. Our research will provide cultivars adapted to the region. Water used by agriculture is under intense scrutiny as supplies are tight and demand increases from non-agricultural sectors. Hydrologic research researchers at the Alcalde Sustainable Agriculture Science Center are collaborating on builds our understanding of how water diverted into community irrigation systems (acequias) of northern New Mexico can seep from ditches and percolate below fields and then reside in shallow groundwater for a time before returning to the river. This storage and release function provides water to the river in times of low flow and may actually save water on a regional basis by reducing evapotranspiration losses.

Chile-pepper is an important cash crop of Southwestern United States, with nearly 8,000 to 10,000 acres harvested annually in New Mexico alone. It has been classified as moderately sensitive to salinity with a threshold level of 1.5 dS/m, above which yield begins to decline. To our knowledge, most of the saline studies conducted so far on peppers used NaCl either as sole or as dominant salinizing agent. Therefore, research on the use of natural brackish groundwater which along with Na⁺ and Cl⁻ ions, also contains a considerable amount of Ca²⁺, Mg²⁺, K⁺, SO₄²⁻, HCO₃⁻ and many others, for irrigation is needed for sustaining chile-pepper production in arid southwest USA. Objectives of this study were to assess: 1) the effect of saline groundwater irrigation at various growth stages of Chile-peppers; and 2) the relative salt tolerance of five Chile-peppers. The experiments are conducted to determine the effect of saline water irrigation on germination, emergence, and growth stages of chile peppers. The experimental work and data analysis is in progress.

Pure cultures of ruminal bacteria on varying carbohydrate sources were assessed for their ability to cause luminescences in clones of *Vibrio harveyii* that had mutations for differing quorum sensing capabilities. Concurrently, researchers worked with University of Wisconsin to detect N-acyl homoserine lactones (AHL) in ruminal fluid collected from 3 breeds of cattle, 2 ages of cattle, and 5 sheep to quantify AHL in ruminal contents. All of the cattle samples were from animal consuming forage while sheep were consuming a high starch diet. Additionally, available genomes of ruminal bacteria were screened for quorum sensing genes and their homologues. Select AHLs were incubated with ruminal fluid and forage samples in an in vitro system to determine their impact on forage digestion. The result of the in vitro work were inconclusive. The luminescence assays revealed that not all ruminal bacteria use the same quorum sensing system and this was confirmed with the genome queries. Furthermore, some ruminal bacteria possess quorum sensing genes but do not illicit a quorum sensing response in clones of *V. harveyii*. We were not successful in the qualitative analysis of ruminal fluid regardless of source for AHLs.

The Western Pecan Growers Association (WPGA) comprises growers from California, Arizona, New

Mexico, and Texas. Its annual conference is attended by pecan producers from each of those four states, as well as southeastern US and northern Mexico. Since 1966, this conference has offered pecan producers, especially those in arid production areas, the best opportunity of its kind for attending presentations by researchers and other experts in pecan production. Additionally, this conference allows growers to network with other growers and industry representatives from around the world. As in previous years, more than 300 attendees were at the 2015 WPGA Conference, hosted by NMSU Extension. They mostly came from southern and central New Mexico, west Texas (El Paso, Culberson, Pecos, and Gaines counties), southern Arizona, and the California Central Valley. Many also came from the southeast and south central US (mainly Georgia and Texas) and northern Mexico (mainly Chihuahua and Sonora states). A survey was administered at the end of the WPGA conference. Sixty-eight percent of survey respondents indicated that they will incorporate information from the program into their orchard management in the coming year. While this is very good, it is not as good as it was in 2014, when 85% of respondents said they got information that they would incorporate into their orchard management. In the 2015 survey, 92 percent indicated that they plan to attend the 2016 WPGA conference, while only 4% indicated that they do not plan to attend the 2016 conference (4% did not respond to that question). Fully 100% of respondents in the 2015 survey said that they will recommend this conference to other growers.

The increased size of many of the SW dairies presents a unique opportunity for development of safety interventions since daily duties and tasks become highly specific and specialized. This specialization of duties dealing with either animals in the milking parlor or outside behind the feed lanes, or tasks dealing with specific feeding equipment and/or routines, presents particular and critical control points where education and training could become a direct and major point of intervention. Given that many work related fatalities occur with workers from different geographical and cultural origins, it seems imperative and appropriate that programs developed be based on understanding of linguistic and cultural barriers and attitudes towards working with animals and or equipment. Simultaneously, and no less important, better understanding of animal behavior and welfare through education and training will aid in the development of more effective procedures and practices; which can help ease concerns of the general public and the retail industry regarding the well-being of dairy animals in large herds.

Results of the research are: NMSU Dairy Extension has developed an employee training DVD "Considering Human and Animal Safety" which helps producers train and prepare new employees for particular positions on the dairy. To date about 3,000 copies have been distributed to producers. Researchers found that in years with lower forage allowance (LOW, kg of forage per capita) cows traveled farther than counterparts in exposed to high forage allowance (HIGH) during 24h periods and daytime hours ($P < 0.01$) but traveled shorter or similar distances during post-sunset ($P=0.05$) and pre-dawn ($P=0.29$) nighttime periods, respectively. Cows in LOW exhibited more sinuous movement paths than cows in HIGH during daytime, post-sunset, and predawn periods ($P \leq 0.01$). Cows in LOW explored larger areas of the pasture in any given day and spent more time in woodlands than counterparts in HIGH ($P < 0.01$). Weather factors associated with thermal comfort affected daily variation in both day- and nighttime movement patterns of cows. Calf weaning weights (WW) were positively correlated ($P < 0.01$) with post-calving distance traveled by the dam during daytime hours, area explored by cows during 24h period, and a dam's woodland preference but were negatively correlated ($P < 0.01$) with nighttime distance travelled and path sinuosity of dams. We believe that these results are highly relevant because, to our knowledge, they are the first to demonstrate clear connections between a dam's spatial behaviors and animal production indicators (calf WW) that are important to a rancher's livelihood.

2. Brief description of the target audience

The target audience includes: ranchers, feedlot operators, dairy producers. small/medium/large-scale agricultural operations, business, associations, cooperatives, consulting firms and collectives that might or might not be defined as a farm under the USDA economic return criteria, but are land owners, managers, consultants, or students who wish to improve agricultural production and efficiency. Other audience participants include Extension agents, other agricultural specialists, pesticide applicators, Master Gardeners and garden clubs, youth (4H, Future Farmers of America and other groups) and the general

public.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

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

Patent Applications Submitted

Year: 2015

Actual: {No Data Entered}

Patents listed

{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	10	15	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	Actual
2015	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	# Extension publications

Outcome #1

1. Outcome Measures

of trained professionals

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	36

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

New trained professionals are required to replace the ranks of retiring professionals.

What has been done

Students have received professional education.

Results

New professionals have been graduated.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems

301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
305	Animal Physiological Processes
306	Environmental Stress in Animals
307	Animal Management Systems

Outcome #2

1. Outcome Measures

of improved animal varieties

Not Reporting on this Outcome Measure

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	Actual
2015	140

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The research results published in peer-reviewed journals matter to other professionals in the disciplines, by advancing the knowledge in the discipline.

What has been done

Knowledge has been generated and reported.

Results

Professionals have a deeper knowledge base from which to draw.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
305	Animal Physiological Processes
306	Environmental Stress in Animals
307	Animal Management Systems

Outcome #4

1. Outcome Measures

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

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Extension publications

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
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3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Extension professionals rely on the information in Extension publications.

What has been done

Knowledge has been disseminated.

Results

Professionals have a deeper knowledge base from which to draw when informing or advising stakeholders.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
215	Biological Control of Pests Affecting Plants
307	Animal 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

Budget cuts have affected the number of faculty and staff available to generate and disseminate knowledge.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Agricultural Markets, Trade, and Economic/Business Development

Reporting on this Program

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	1%		1%	
601	Economics of Agricultural Production and Farm Management	15%		15%	
602	Business Management, Finance, and Taxation	2%		2%	
603	Market Economics	14%		14%	
604	Marketing and Distribution Practices	30%		30%	
608	Community Resource Planning and Development	20%		20%	
610	Domestic Policy Analysis	16%		16%	
611	Foreign Policy and Programs	2%		2%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	4.9	0.0	3.5	0.0
Actual Paid	4.8	0.0	4.0	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
1758971	0	156607	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1758971	0	156607	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

State-and-transition models (STMs) provide a framework for ecosystem valuation. A lacking component of STM models are estimates of the probability that the system will transition from one state to another, or between community phases. As defined by the widely used STM framework, management decisions affect the probability of transition, but the degree of change in transition probabilities from both good and bad management decisions are rarely known. Nine blue grama (*Bouteloua gracilis*) study sites located in eastern and southern New Mexico were monitored for 35 years by NMSU rangeland scientists, providing the data required to estimate the probability that a short-lived invasive weed called broom snakeweed (*Gutierrezia sarothrae*) will transition to different levels of infestation. Logistic regression models were developed to relate transition probabilities to environmental and management factors. Key drivers of transition for the invasive weed included seasonal rainfall patterns (especially dry periods), the amount of snakeweed found on the site the previous fall, and the amount of herbaceous material remaining on the site at the end of the previous grazing season. Because grazing reduces end-of-season herbaceous material, increased grazing use increases the probability of broom snakeweed transition to a less desirable production state. Estimated snakeweed transition probabilities, and how grazing decisions affect those probabilities, were incorporated into a stochastic economic model. The economic model was used to evaluate the economic benefits of controlling broom snakeweed and the effect of grazing decisions on the longevity of the treatment. Uncertainty about rainfall conditions were incorporated into the economic model.

Researchers continue to work with industry associations, e.g., New Mexico Chile Association, examining opportunities to produce and market value-added products. One economist recently helped the chile association develop and evaluate service marks for an industry-organized and led certification program, and will continue to help them evaluate the successfulness of the program and ways in which the program may be improved.

Agricultural economists worked with pecan growers to explore consumer preferences for pecans with increased antioxidant levels. In addition, they are developing pecan crop budgets that will help producers evaluate the economic return of increasing nut antioxidant levels via cultural practices, e.g., hedging programs and zinc fertilization.

2. Brief description of the target audience

The target audiences include agricultural producers, business owners, and policy makers.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

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

Patent Applications Submitted

Year: 2015

Actual: {No Data Entered}

Patents listed

{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	2	2	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	Actual
2015	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	# trained professionals

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	Actual
2015	12

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The research results published in peer-reviewed journals matter to other professionals in the disciplines, by advancing the knowledge in the discipline.

What has been done

Knowledge has been generated and reported.

Results

Professionals have a deeper knowledge base from which to draw.

4. Associated Knowledge Areas

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

Outcome #2

1. Outcome Measures

of Extension publications

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

trained professionals

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	4

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The field of agricultural economics and business requires new trained professionals to replace retirees.

What has been done

Students have received graduate training.

Results

New professionals have been graduated.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation
603	Market Economics

604	Marketing and Distribution Practices
610	Domestic Policy Analysis

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

Budget cuts have affected the number of faculty and staff available to generate and disseminate knowledge.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The majority of adult program evaluations carried out by New Mexico Extension agents and specialists are pre-post and post-program knowledge gain instruments. The majority of youth (primarily 4-H club) program evaluations are demonstrations of knowledge gained and applied in teaching others, competitive events, and climbing 'youth career ladders'. Rarely, if at any time, does an agent or specialist report that participant knowledge attained/gained was less than satisfactory. One can only assume that knowledge gain survey questions are fairly worded, and that audience participation was not mandatory. The only exception to this is with Master Gardener and Integrated Pest Management qualification exams. But again, participation is initially by application and the desire to learn and apply what is learned.

Key Items of Evaluation

What is interesting to note is that most Extension faculty now use goal setting, program objectives, and evaluation instruments in their program plans (as opposed to 10 years ago, when there was a great degree of resistance). The next step in program evaluation is to assist Extension agents and specialists to develop precision evaluation instruments. On-going training, such as the Western Extension Cohort (Evaluation) Training (WECT), needs to be organizationally supported and participation needs to be encouraged by all Extension faculty. Also, the American Evaluation Association has an Extension group section and should become a legitimate and heavily encouraged professional Extension association. The Association does more than any other organization to encourage evaluation 'best practices.'

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Sustainable Management of Natural Resources

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	10%		10%	
103	Management of Saline and Sodic Soils and Salinity	5%		5%	
121	Management of Range Resources	30%		30%	
123	Management and Sustainability of Forest Resources	10%		10%	
124	Urban Forestry	5%		5%	
135	Aquatic and Terrestrial Wildlife	10%		10%	
136	Conservation of Biological Diversity	5%		5%	
405	Drainage and Irrigation Systems and Facilities	10%		10%	
605	Natural Resource and Environmental Economics	15%		15%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	4.6	0.0	14.5	0.0
Actual Paid	5.9	0.0	16.6	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
153510	0	626427	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
153510	0	626427	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Water saving, productivity, and quality of the chile pepper were evaluated under three irrigation treatments. Three drip irrigation treatments used were (1) control; where water was applied at the surface using two drip emitters, (2) partial rootzone drying vertically (PRDv); where subsurface irrigation was applied at 20 cm depth from soil surface, and (3) partial rootzone drying compartment (PRDc); where roots were divided into two compartments and irrigation was applied to one of the compartments on every alternate day cycle for 15 days. Continuous measurements of soil water content were carried out during the growing seasons of 2013 and 2014, respectively. During both growing seasons, the stomatal conductance and photosynthetic rates were similar among all treatments including the control. In both PRD treatments, a higher rooting depth and root length density (RLD) than the control likely compensated for the water stress in dry soil zones by taking up more water from the water available parts of the root-soil system. In PRDc and PRDv treatments, 30% less water was applied than control without significant changes to plant stress expressed by stem water potential, plant height, capsaicinoid concentration and yield. The increased irrigation water use efficiency demonstrated water saving potential of both PRD techniques for chile pepper production in water limited arid environments.

The majority of beef production systems around the world utilize plants in the form of fibrous feed, incorporated into ruminant diets at all phases of production. Utilization of fibrous feeds by ruminants is unique due to the fact that the host animal itself is incapable of digesting this dietary component and must rely on the activity of the microbial population present in the rumen. One problem that plagues the use of high levels of forage in ruminant diets is resulting decreases in efficiency and rate of gain when compared to feeding high levels of cereal grains. Due to increasing cost of cereal grain usage in ruminant diets, opportunities exist to decrease production costs and enhance sustainability by using greater amounts of forage in ruminant diets. However, methods to enhance production efficiencies with high forage diets need to be addressed. In most grazed forages, digestion of carbohydrate fractions is much slower than digestion of corresponding protein fractions. One way that ruminal microbes can sense nutrient asynchrony and make adjustment in cell physiology is through quorum sensing. Limited research has focused on the actual impact of nutrient asynchrony on the productivity of ruminal microbes and subsequent efficiency of the host animal. Recognizing the need to improve the utilization of fibrous feeds by ruminants, researchers proposed to study the impact of ruminal nutrient asynchrony by grazing ruminants on quorum sensing capabilities of ruminal microbes and the influence of the host animal on rumen microbial ecologies. Researchers reported a major journal article that gave long-term results relating to objectives one, two and four. No differences were detected in forage standing crop and cow-calf productivity between light and conservative grazing treatments. Perennial grass productivity in lightly stocked pastures recovered more quickly from drought than those conservatively stocked. Conservative stocked pastures may provide higher financial returns in non-drought years than light stocked pastures. However this is nullified by higher

short term losses from herd liquidation in conservative stocked pastures compared to light stocked pastures in drought years. Results suggest that light grazing use of forage is a practical approach for Chihuahuan Desert cow-calf operations to minimize risk of herd liquidation during short term drought. Light grazing appears to be well suited to ranchers who prefer a passive, low risk, low-input management approach. Light grazing is also suggested for ranchers where improved range condition is a goal and there is concern a threshold will be crossed where range recovery may not occur. Conservative grazing is best suited for ranchers who want to actively manage their rangelands, are willing to do intensive monitoring, and have a high proportion of their land in late seral or climax condition. Ranchers using conservative stocking must be willing to quickly reduce livestock numbers in dry years. Under these conditions there may be an economic advantage to conservative grazing.

Soil chemistry is significant in addressing issues in both an agricultural and environmental context. One of the primary goals of the Agricultural Experiment Station is to optimize the multiple uses of natural resources (e.g., water and soil) and to apply relevant environmental sciences to improve the quality of life for New Mexicans. Soil organic matter (SOM) content is typically very low in arid and semi-arid soils yet it may be critical to the fertility and nutrient cycling in those ecosystems. It is also important in the development of aggregation, infiltration, microbial diversity and many other physical and biological soil properties. In studies of native grassland conversion to cultivated cropland, decreases of SOM are noted. However, in arid regions such as the southwestern U.S., the conversion of native desert to irrigated agricultural land may actually increase SOM due to higher plant productivity and population density. While soil organic carbon (SOC) has been previously reported to be significantly related to biomass yields, in a more recent study, SOC was not found to be an important factor in determining the biomass yield. Work done in northern New Mexico showed that organic amendments did not improve soil quality and plant growth on mine tailings appreciably (Hawthorne et al., 2015). However, work conducted in the greenhouse using certified organic farm soil to grow cotton under saline conditions indicates that organic matter may lessen the impact of salinity on plant growth. That is, salt damage to cotton seedlings was less in organic rich soils compared to soils with a smaller amount of organic matter. A new soil quality project is underway in 2015 to determine the minimum data set required to characterize soil quality in arid and semi-arid regions.

The Extension Wildlife Specialist's was successful in helping mobilize aquaponics growers eager to change regulation in the state of New Mexico to allow Tilapia to be grown in New Mexico. Bill HB201, passed in September 2015 and should pave the way to the development of new aquaponics and aquaculture ventures in the state. There has also been an increase in the number of requests from agents and clientele for materials and consulting on a variety of aquaculture-related issues, including regulations, species information, facility construction, water quality management, and sustainable greenhouse aquaponics. Because of the increased awareness and interest in aquaponics, it was one of the major topics at the 2015 NM Sustainable Agriculture Conference, where the Specialist was invited to give a talk on Water quality in aquaponics systems. Her support and assistance in promoting shrimp aquaculture in New Mexico has led to the creation of a new research priority area within the next WRAC (Western Regional Aquaculture Center) funding cycle that includes recirculating shrimp aquaculture. This will provide an opportunity for funding of projects that aim to optimize diets and improve economic growth potential for such recirculating production systems in arid climates such as New Mexico.

As coordinator of the Range Improvement Task Force, an Extension Wildlife Specialist supports the efforts of 6 RITF members in meeting the RITF 3-part mission through weekly meetings, travel and research monitoring funds, and vehicle management. This year endangered species and grazing issues on federal grazing allotments topped the list of activities coordinated in fulfillment of the RITF mission. The Specialist coordinated or assisted RITF members in organizing meetings, workshops, and allotment visits with livestock producers, state and federal agencies, and federal, state and local government representatives. The Specialist worked and consulted with New Mexico's Congressional Representatives on grazing and endangered species issues impacting ranchers. At the request of the Federal Lands Council, 4 RITF

members serve on the State Wildlife Action Plan revision committee to review and make suggested revisions of the draft SWAP when completed. All RITF members reviewed, commented and provided suggested revisions to the draft SWAP prior to it going before the NM Game Commission. NM Game Commission did not sign off on the document and requested that it be revised further; partly based on our review. The NM Department of Game and Fish requested that I and the RITF be involved in their revision effort in 2016. RITF members continued through 2015 to be heavily involved in agricultural, ecological and management issues regarding the Endangered New Mexico meadow jumping mouse (NMmjm). Efforts have had positive results on the agricultural producers impacted by the listing. The effects typically are to reduce the negative impact of changes in grazing management or infrastructure or positively affect interactions among federal agencies and affected agricultural producers. In addition to mitigation efforts, RITF was successful in assisting USDA Forest Service to refine their Rapid Assessment of NMmjm Primary Habitat Constituents. RITF continues to assist the USDA Forest Service in defining the inferential space and determining appropriate inferences.

To accomplish the goal of understanding the distribution of carnivore populations and their connectedness, AES scientists have adopted an approach that falls under the general sub-discipline of landscape genetics. In this approach, landscape ecological approaches, such as the use of Geographic Information System (GIS) tools are used to delineate potentially suitable habitat for a particular species of interest. Then, corridors are identified that may link suitable habitat patches. Together, the habitat suitability models and the corridors create a linkage map. The map represents a hypothesis regarding the spatial distribution and connectivity of populations, which can, at a minimum, be evaluated with empirical datasets. Patch-occupancy models can be used to assess the suitability of habitats - the main premise here is that habitats of higher suitability should contain the species of interest more often than habitats of poor suitability. Corridors identified as connecting carnivore populations can be evaluated by comparing the relatedness of populations that occur on either side of the corridor -- the main premise here is that populations connected by good corridors should be more closely related to one another than populations connected by poor corridors. This latter evaluation employs molecular genetic techniques, which require the collection of tissue samples using methods commonly employed in wildlife biology. Corridors, either those connecting populations or migration corridors, can also be assessed with both traditional and satellite telemetry. The movement patterns of individually tagged animals are compared to model predictions. Puma (Puma concolor) was used as a model organism to examine connectivity among the entire states of New Mexico and Arizona. This project involves researchers from UNM, Northern Arizona University, USGS Coop at University of Arizona, New Mexico and Arizona Departments of Game and Fish and The Nature Conservancy. Researchers have completed the landscape models and published first results in PLoS One. They have also genotyped 272 New Mexico puma samples and 340 Arizona puma samples across 16 microsatellite loci; together with previously available data for New Mexico and Arizona, they will have 855 genotypes for analysis.

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 of parks, forests, and waters.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

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

Year: 2015
 Actual: {No Data Entered}

Patents listed
 {No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	3	5	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	Actual
2015	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

Outcome #1

1. Outcome Measures

of trained professionals

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	21

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The natural resources disciplines need to replace retiring professionals.

What has been done

Students have been trained.

Results

New professionals have been graduated.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
103	Management of Saline and Sodic Soils and Salinity
121	Management of Range Resources
123	Management and Sustainability of Forest Resources
135	Aquatic and Terrestrial Wildlife
405	Drainage and Irrigation Systems and Facilities
605	Natural Resource and Environmental Economics

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	Actual
2015	44

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The research results published in peer-reviewed journals matter to other professionals in the disciplines, by advancing the knowledge in the discipline.

What has been done

Knowledge has been generated and reported.

Results

Professionals have a deeper knowledge base from which to draw.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
103	Management of Saline and Sodic Soils and Salinity
121	Management of Range Resources
123	Management and Sustainability of Forest Resources
135	Aquatic and Terrestrial Wildlife
405	Drainage and Irrigation Systems and Facilities
605	Natural Resource and Environmental Economics

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	Actual
2015	7

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Extension professionals rely on the information in Extension publications.

What has been done

Knowledge has been developed and disseminated.

Results

Extension professionals have recommendations and knowledge to disseminate.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
103	Management of Saline and Sodic Soils and Salinity
121	Management of Range Resources
123	Management and Sustainability of Forest Resources
135	Aquatic and Terrestrial Wildlife
405	Drainage and Irrigation Systems and Facilities
605	Natural Resource and Environmental Economics

Outcome #4

1. Outcome Measures

% of people adopting NMSU recommendations

Not Reporting on this Outcome Measure

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

Budget cuts have affected the number of faculty and staff available to generate and disseminate knowledge.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Food Safety

Reporting on this Program

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%		50%	
502	New and Improved Food Products	5%		5%	
503	Quality Maintenance in Storing and Marketing Food Products	25%		25%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	20%		20%	
Total		100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	1.7	0.0	0.8	0.0
Actual Paid	1.2	0.0	1.8	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
19189	0	64731	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
19189	0	64731	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Researchers are developing protein rich food products with composite flours utilizing gossypol free cottonseed meal (GCSM), a non-GMO variety crop that has low pest pressure in New Mexico. Protein isolate from GCSM has the potential to be used as an additive in food products such as a binder in restructured meat products or as functional ingredients to improve the nutritional quality of foods such as breakfast cereal, breads and non-dairy milk. Composite GCSM flour foods and snacks complemented with GCSM protein isolate can have a direct impact on child and adult obesity in New Mexico and the country. We found that the best solvent for protein extraction was 0.1 N KOH. The adequate temperature for protein extraction and pH value for protein precipitation, were used to optimize the protein isolation. Glandless cottonseed meal would have potential applications in food industry for improving quality of foods and developing new high protein content product.

The Southwest Border Food Protection Emergency Preparedness Center, operated by NM Cooperative Extension Service in cooperation with the NM Department of Agriculture, planned/participated in a state-wide emergency response scenario held in Socorro. There were 233 participants, including county agents, Extension district department heads, county emergency managers, first-responders, state veterinarians, and public health. A Facebook page was created for this event to enlist/engage participation from county agents outside the event. Eighty percent of respondents reported having a Facebook account; 38% (8) reported participating in the event using Facebook. One reason for non-participation included "other obligations." Fifty percent think Facebook is effective to very effective as a communication tool in emergency/disaster planning and response.

Since the proper malting conditions are different for different sorghum varieties, it is necessary to develop a malting process suitable for NM grown sorghum. Such studies must determine the proper time-temperature profiles for the soaking phase as well as address questions about the flood-drain sequence and the optimal composition of the flooding fluid, which is typically water treated with minerals and perhaps hormones to enhance germination. The germination phase also needs to be examined to determine the optimal time-temperature-humidity profiles. In the arena of process development research, if we are to produce pilot-scale quantities of sorghum malt and then produce test batches of gluten-free beer, it is necessary to design and construct a pilot-scale malting and brewing operation. Of immediate interest will be a malting process sufficiently large enough to obtain an estimated 50 to 100 pounds of malt in each batch. Additional experimental work was conducted on the mashing of commercially available gluten free malts. Several variations on sorghum and buckwheat malts were evaluated. The preliminary results indicated that these malts cannot be treated in the usual manner and that, as expected, enzyme addition must be considered. It was also discovered that the typical water:malt ratio must be significantly increased to have a mash of suitable consistency. Also, it was observed that the starches in these malts gelatinize at higher temperatures than barley starches and that a modified temperature profile in which the mash is heated to first gelatinize the starch and then cooled for the enzymatic conversion of the starches to sugars to occur may be necessary. Current work is aimed at selecting a suitable enzyme(s) and the appropriate mashing time-temperature profiles.

2. Brief description of the target audience

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

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

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

Patent Applications Submitted

Year: 2015

Actual: {No Data Entered}

Patents listed

{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	1	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	Actual
2015	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

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	Actual
2015	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The field of food safety requires trained professionals to replace retirees.

What has been done

Students have received graduate/professional training.

Results

Trained professionals have been graduated.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
502	New and Improved Food Products
503	Quality Maintenance in Storing and Marketing Food Products
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #2

1. Outcome Measures

of research publications

Not Reporting on this Outcome Measure

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	Actual
2015	13

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Extension professionals rely on the information in Extension publications.

What has been done

Knowledge has been developed and disseminated.

Results

Extension professionals have knowledge and recommendations to disseminate to stakeholders.

4. Associated Knowledge Areas

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

712 Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #4

1. Outcome Measures

% of food processors using NMSU for their food product development

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Public Policy changes
- Government Regulations

Brief Explanation

Budget cuts have affected the number of faculty and staff available to generate and disseminate knowledge.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Health and Wellbeing

Reporting on this Program

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	20%		20%	
703	Nutrition Education and Behavior	25%		25%	
704	Nutrition and Hunger in the Population	5%		5%	
724	Healthy Lifestyle	25%		25%	
801	Individual and Family Resource Management	10%		10%	
802	Human Development and Family Well-Being	10%		10%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	5%		5%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	2.5	0.0	1.4	0.0
Actual Paid	2.0	0.0	3.8	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
51170	0	104404	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
51170	0	104404	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The primary purpose of the proposed study is to identify FCS middle and secondary teachers in the state of New Mexico to create a database of programs offered, email addresses and schools, and to survey the FCS teachers to develop a demographic profile and to gather information concerning their programs, the challenges associated with their programs, their satisfaction with their profession, beliefs about culturally diverse classes, use of technology in the classrooms, and their recommendations for teacher education curriculum. In addition, FCS teachers and pre-service teachers would be surveyed to determine what content they feel is relevant for today's students and their feelings about the appropriate cultural component associated with that content. In addition, a needs assessment would be conducted of the FCS middle and secondary teachers to include their participation in national and state professional organizations (AAFCS, NMAFCS, FCCLA, ACTE) and their perception of the value-added components of membership benefits with those organizations, and to develop strategies to meet the needs of the FCS middle and secondary pre-service teachers including proposed adjustments to the FCSE curriculum at NMSU. Another objective would be to develop media and print recruiting materials for distribution to all the FCS teachers in NM in an effort to increase enrollment in all FCS majors, but primarily for FCS Education. In addition, FCS teachers would be surveyed to determine their interest in and demand for an online Master's degree in FCS Education as a possible offering by NMSU. A final objective would be to compare the New Mexico FCS teachers and programs with their cohorts in West Texas, Colorado, Utah, and Arizona. All findings would be provided to appropriate stakeholders through presentations at professional organizations, journal articles and other venues. The database continues to be a goal. The recruiting issue has reached a critical mass, as numbers in FCS programs, especially education programs across the nation continue to fall. The project aims to have New Mexico designated as a state of critical need with documented shortages. The building of a recruiting campaign focused on New Mexico has become the primary goal. Plans are under way to produce both print and video products to be distributed to the stakeholders in New Mexico.

Fit Families is a 12-week class series geared towards the family unit to address the concerns surrounding childhood obesity. In Spring of 2014, Fit Families took a break from holding a class series to improve on its curriculum. As of Fall 2014, the curriculum update was complete and a pilot class to test the new curriculum was carried out. Although the number of participants did not provide for a great deal of quantitative results, the amount of qualitative results was remarkable. Both families and instructors were happier with the time frame, they were more engaged in the hands on activities and the incorporation of cooking lessons for the dinner meal, as well as continually being motivated to participate through incentives that helped reinforce the days lesson while outside of Fit Families. The goal of the program is to increase the consumption of fruits and vegetables, as well as encourage an overall healthy lifestyle for the entire family. Incentives are given to the families and children after each class as a form of positive

reinforcement for participating. Pre and Post questionnaires are filled out to determine if there were any changes to the families'/child's way of thinking about nutrition. A total of five families (1 Arabic decent, 4 Hispanic decent) were registered. Of the five families, two graduated from the program (completing the required attendance at 10 of the 12 classes). From the beginning of the class to the end, the knowledge base of the families increased in the area of nutrition. The families were able to offer suggestions to each other and were also impressed by the willingness of their children to participate in trying newly introduced foods.

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.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

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

Patent Applications Submitted

Year: 2015

Actual: {No Data Entered}

Patents listed

{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	3	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	Actual
2015	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

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	Actual
2015	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The research results published in peer-reviewed journals matter to other professionals in the disciplines, by advancing the knowledge in the discipline.

What has been done

Knowledge has been generated and reported.

Results

Professionals have a deeper knowledge base from which to draw.

4. Associated Knowledge Areas

KA Code	Knowledge Area
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population
724	Healthy Lifestyle
801	Individual and Family Resource Management
802	Human Development and Family Well-Being
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

Outcome #2

1. Outcome Measures

of Extension publications

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

of trained professionals

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	15

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

New trained professionals are needed to replace retiring professionals.

What has been done

Students have received professional training.

Results

New professionals have been graduated.

4. Associated Knowledge Areas

KA Code	Knowledge Area
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population

724	Healthy Lifestyle
801	Individual and Family Resource Management
802	Human Development and Family Well-Being
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

Outcome #4

1. Outcome Measures

% diabetics adopting NMSU recommendations regarding nutrition

Not Reporting on this Outcome Measure

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

Budget cuts have affected the number of faculty and staff available to generate and disseminate knowledge.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

4-H and Youth Development

Reporting on this Program

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 FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	4.0	0.0	0.5	0.0
Actual Paid	4.9	0.0	0.5	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
123661	0	22969	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
123661	0	22969	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The Memorial Middle School Agricultural Extension and Education Center (MMSAEEC) website has been used by NMSU administrators, legislators, program stakeholders, 4-H agents and other educators to find out information about the program. Web-based curriculum has been identified and consolidated on one

site and serves as a clearinghouse for STEM-based curriculum for use by educators, 4-H agents, or other interested individuals, providing a single site for resource search. Feedback from 4-H agents and educators indicated that it is beneficial to have a single source for curriculum materials. Lastly, maintaining a Facebook page links MMSAEEC activities to the 4-H Facebook page. A website has been developed for the Center and can be found at <http://mmsaeec.nmsu.edu>. The website continues to be updated as warranted by program changes or needs. Current work on the website includes: linking to curriculum resources in agriculture and natural resources and Center activities. The goal of linking to curriculum resources is to create a clearinghouse for agricultural and natural resource curriculum for use by educators, 4-H agents, or other interested individuals and to provide a single site for resource search.

H-H youth participate in state contests to compete for state titles and an opportunity to represent New Mexico at the national level. The extension specialist coordinated workshop subjects such as tips for living the college life, leadership skills, dance skills, team work, outdoor recreation, promoting the 4-H program and working with community organization through community service. The youth attend evening business sessions that are conducted in a meeting format during which they watch nationally renowned speakers talk about prosperous growth and developments for the future, elect new officers, and receive awards and scholarships for their successes in the contests. The workshop presenters, guest speakers, and special events are planned in cooperation with the State 4-H Leadership Team, Team Advisers and the specialist who then implements the action plan for State 4-H Conference. According to youth evaluations related to contests, 86% developed or improved skills in judging, 98% in presentation contests, 88% in identification contests and 88% in bowl contests. The youth also participated in a variety of workshops during the event. From the evaluations 62% of the youth felt they received excellent instruction, 23% felt they received very good instruction, and 8% felt they received good instruction while participating in workshops targeting in teamwork, leadership, independence, and planning recreational activities. For the community service challenge, the youth from counties attending provided items for trauma care cases like small stuffed animals, small pillows, and pillow cases.

The researchers have been working on Goals 1 and 3 by starting to develop and pilot test STEM-based, experiential, and inquiry-based climate science lessons and learning activities for 8th grade students at the Memorial Middle School Agricultural Extension and Education Center (MMSAEEC) in Las Vegas, New Mexico. Lessons and activities developed in Year 1 are on the greenhouse effect, measuring surface temperatures using infrared thermometers, and weather and climate. The researchers have also worked on Goal 6 with one refereed poster presentation and published abstract, and one refereed journal article submitted during 2014-2015. Two abstracts from Year 1 work are ready for submission to NACTA for a poster presentation and an oral presentation at its annual research conference in 2016. The researchers are also working on a grant proposal to purchase i-Pads for 8th grade and university student use in lessons and learning activities that tie them into National Weather Service and SC-ACIS climate databases. The hope is to pilot these lessons and learning activities with the i-Pads at the MMSAEEC in Fall 2016.

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.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

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

Patent Applications Submitted

Year: 2015

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	3	5	8

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	Actual
2015	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	% volunteers trained
4	# professionals 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	Actual
2015	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The research results published in peer-reviewed journals matter to other professionals in the disciplines, by advancing the knowledge in the discipline.

What has been done

Knowledge has been generated and reported.

Results

Professionals have a deeper knowledge base from which to draw.

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	Actual
2015	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Extension professionals rely on the information in Extension publications.

What has been done

Knowledge has been developed and disseminated.

Results

Extension professionals have usable knowledge to disseminate to stakeholders.

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	Actual
------	--------

2015 4064

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Volunteers are the life blood of 4H and other youth development programs at NMSU.

What has been done

All 4H volunteers are trained to properly instruct and lead youth development activities.

Results

We have great support in our local communities for youth development programs, as a result of the training and interactions with NMSU Extension professionals.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #4

1. Outcome Measures

professionals trained

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	6

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Agricultural and Extension Education needs a pool of trained professionals to replace the ranks of retirees in the field of youth development.

What has been done

Graduate education provides the discipline training.

Results

Trained professionals have been graduated.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Appropriations changes
- Public Policy changes
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

Budget cuts have affected the number of faculty and staff available to generate and disseminate knowledge.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Climate Change

- Reporting on this Program
Reason for not reporting

We do not have any faculty addressing this Planned Program.

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.5	0.0
Actual Paid	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
Actual Volunteer	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 Matching	1890 Matching	1862 Matching	1890 Matching
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 All Other	1890 All Other	1862 All Other	1890 All Other
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

V(D). Planned Program (Activity)

1. Brief description of the Activity

See the section on the Sustainable Management of Natural Resources Planned Program.

2. Brief description of the target audience

Undergraduate and graduate students are the target audience.

3. How was eXtension used?

{No Data Entered}

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

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

Patent Applications Submitted

Year: 2015

Actual: {No Data Entered}

Patents listed

{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Conduct classes on climate change.

Year	Actual
2015	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of students trained.

Outcome #1

1. Outcome Measures

Number of students trained.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

{No Data Entered}

What has been done

{No Data Entered}

Results

{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Competing Programmatic Challenges

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 8

1. Name of the Planned Program

Sustainable Energy

- Reporting on this Program
Reason for not reporting

We do not have faculty working on this Planned Program.

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.0	0.0
Actual Paid	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
Actual Volunteer	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 Matching	1890 Matching	1862 Matching	1890 Matching
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 All Other	1890 All Other	1862 All Other	1890 All Other
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

V(D). Planned Program (Activity)

1. Brief description of the Activity

See the section on the Sustainable Management of Natural Resources Planned Program.

2. Brief description of the target audience

Students and producers are the target audiences.

3. How was eXtension used?

{No Data Entered}

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

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

Patent Applications Submitted

Year: 2015

Actual: {No Data Entered}

Patents listed

{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of students trained.

Year	Actual
2015	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	# students trained.

Outcome #1

1. Outcome Measures

students trained.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

{No Data Entered}

What has been done

{No Data Entered}

Results

{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Government Regulations
- Competing Programmatic Challenges

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 9

1. Name of the Planned Program

Childhood Obesity

- Reporting on this Program
Reason for not reporting

We address Childhood Obesity as part of our general Health and Wellness Planned Program.

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.0	0.0
Actual Paid	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
Actual Volunteer	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 Matching	1890 Matching	1862 Matching	1890 Matching
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 All Other	1890 All Other	1862 All Other	1890 All Other
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

V(D). Planned Program (Activity)

1. Brief description of the Activity

See the section on the Health and Wellbeing Planned Program.

2. Brief description of the target audience

Children, youth, and families are the target audiences.

3. How was eXtension used?

{No Data Entered}

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

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

Patent Applications Submitted

Year: 2015

Actual: {No Data Entered}

Patents listed

{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Conduct workshops and classes on healthy food choices.

Year	Actual
2015	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	# of youth adopting healthy food choices

Outcome #1

1. Outcome Measures

of youth adopting healthy food choices

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

{No Data Entered}

What has been done

{No Data Entered}

Results

{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

VI. National Outcomes and Indicators

1. NIFA Selected Outcomes and Indicators

Childhood Obesity (Outcome 1, Indicator 1.c)	
0	Number of children and youth who reported eating more of healthy foods.
Climate Change (Outcome 1, Indicator 4)	
0	Number of new crop varieties, animal breeds, and genotypes with climate adaptive traits.
Global Food Security and Hunger (Outcome 1, Indicator 4.a)	
0	Number of participants adopting best practices and technologies resulting in increased yield, reduced inputs, increased efficiency, increased economic return, and/or conservation of resources.
Global Food Security and Hunger (Outcome 2, Indicator 1)	
0	Number of new or improved innovations developed for food enterprises.
Food Safety (Outcome 1, Indicator 1)	
0	Number of viable technologies developed or modified for the detection and
Sustainable Energy (Outcome 3, Indicator 2)	
0	Number of farmers who adopted a dedicated bioenergy crop
Sustainable Energy (Outcome 3, Indicator 4)	
0	Tons of feedstocks delivered.