2017 University of Nevada Combined Research and Extension Plan of Work

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I. Plan Overview

1. Brief Summary about Plan Of Work

The College of Agriculture, Biotechnology and Natural Resources (herein referred to as "CABNR", or "the College), Nevada Agricultural Experiment Station (herein referred to as "NAES" or "Experiment Station") and University of Nevada Cooperative Extension (herein referred to as "Nevada Cooperative Extension") are founding branches of Nevada's Land-Grant University. All three branches have had a long and distinguished record of fulfilling the tripartite mission of teaching, research, and outreach education benefiting the health and economic vitality of Nevada's citizens. In an effort to be relevant and accountable, CABNR, NAES, and Nevada Cooperative Extension have continuously and systematically reviewed and focused programs to address Nevada's highest priority needs. NAES and Nevada Cooperative Extension fully subscribe to and support the University's goal to achieve recognition as a "Fully Engaged" institution and are committed to the principles of accessibility and program utility that have guided the Land Grant University System for more than 150 years.

Our plan of work encompasses the five major program areas consistent with the NIFA-stated goals: (1) Global Food Security and Hunger, (2) Climate Change, Natural Resource Management, and Environmental Science, (3) Sustainable Energy, (4) Childhood Obesity, Nutrition, and Health (5) Food Safety. In addition, this plan of work includes two State of Nevada mandated program areas: (6) Community and Economic Development, and (7) Human and Family Development.

Global Food Security and Hunger

This NIFA goal seeks to improve community and global capacity, to strengthen food security and fight hunger through sustainable agricultural systems. The US has not yet updated its food system to effectively address the negative short- and long-term effects of hunger on the nation's human population. Nevada Cooperative Extension's research and education seeks to increase food security through integrated food systems, supporting the public demand for "farm-to-fork" agricultural enterprises. This includes analyses and development of public policy to support the social infrastructure necessary to integrate production, processing, distribution, and consumption systems. NAES's goals are to increase the overall quality and health of Nevada's livestock through research and outreach, to understand the biology of plants through basic research, develop potential alternative crops, and to evaluate and promote improved marketing of Nevada products.

Climate Change, Natural Resource Management, and Environmental Science

Through adoption of innovative technologies and cultural practices, agricultural producers, landscape designers, homeowners, and public lands managers have the opportunity to lead and mitigate many influences of climate change. Nevada Cooperative Extension works with agricultural producers to select low-water use alternative crops, integrating applied research and extension to solve problems related to climate change. This program area also includes educating landscape workers, homeowners, and local officials about how to conserve and protect natural resources and mitigate damages due to flooding, wildfire, and drought.

Nevada Cooperative Extension is leading a regional consortium of Extension systems in six states (UT, CA, NM, AZ, HI, NV) focused on climate change research and education. This partnership is sponsored in part by the U.S. Department of Agriculture's Agricultural Research Service and a grant from the National Institute for Food and Agriculture.

The NAES research program forms teams of plant, soil & computer scientists, ecologists, limnologists, and economists to study basic and applied approaches for identifying large-scale factors influenced by climate change and Nevada's natural resources. NAES's research efforts are focused on identifying genetic factors and developing new plant species tolerant of abiotic stress, evaluating long term vegetation changes, grazing impacts, wildfire restoration, pest management, and developing conservation plans compatible in the Great Basin and Sierra Nevadas.

NAES programs will focus on safeguarding the survival of endangered/threatened species; the decline of mule deer in Nevada; wildlife guzzler's effects on survival and recruitment of Nevada's ungulate populations; identifying the incidence of mycoplasma, mannheimia, and lungworm across the genetic landscape of Nevada's bighorn sheep; characterizing mountain lion distribution, abundance, and prey selection in Nevada; impact of agrochemical and environmental contaminants on avian species. Recent decisions about the greater sage-grouse will pressure rural land users, for both private and public lands.

Sustainable Energy

Global and domestic demands for sources of sustainable energy can be addressed through the production of bio-fuel crops. The NAES research program brings together plant biochemists and ecologists and economists to study basic and applied approaches for the efficient production of non-food feedstocks from forested and rangelands with limited freshwater availability as sustainable and renewable sources for biofuel generation within regional production systems.

Childhood Obesity, Nutrition and Health

The prevalence of childhood obesity has dramatically increased nationwide. Almost one-third of children in the US are overweight/obese or at-risk for obesity; increasing their probability of developing chronic illnesses such as high blood pressure, high cholesterol, and Type 2 diabetes. In Nevada, 14 percent of children under the age of five are overweight. The underlying causes range from genetic propensity to socio-economic, cultural, and environmental influences resulting in unhealthful eating and low physical activity practices. Many of these issues stem from poverty-based nutrition. To effectively address obesity and malnutrition, Nevada Cooperative Extension programs are designed to effect change within families and communities. NAES has been making educational investments to secure healthy futures for families and youth for many years. Research will address issues of weight management, nutritional intervention, educational methodology, community development for healthier environments, and analyses of State & Federal programs in Nevada.

Food Safety

Foodborne illness continues to be an urgent issue across the US. The Center for Disease Control estimates that, annually, 1 in 6 Americans (or 48 million people) get sick, 128,000 are hospitalized, and 3,000 die of foodborne diseases. Agricultural producers and food consumers in Nevada require education about the importance of safe food production, handling, and processing to help reduce the risk associated with foodborne illness. Nevada Cooperative Extension seeks to build food safety programs on par with other land-grant universities in the US. This means strengthening the capacity of producers to develop comprehensive farm plans, which include Good Agricultural Practices, Good Handling Practices, and Hazard Analysis and Critical Control Points protocols. Nevada Cooperative Extension and the College of Agriculture, Biotechnology and Natural Resources hired a Food Safety Program Leader with a joint appointment in the two units in 2015. The program leader will develop programs that emphasize meat processing and safety.

With Nevada's steady growth in "farm-to-fork" food supply sources, Nevada Cooperative Extension must educate agricultural producers, regardless of operation size, to control and prevent accidental biological, chemical, or physical hazards that could contaminate food products during production, storage, and transportation. NAES research programs encompass a broad range of approaches from basic cellular and molecular research to cost-benefit analysis and education programs with special attention to underserved communities. NAES has complementary expertise in food safety that integrates knowledge and methods from animal science, food science, and resource economics.

Community and Economic Development

Both NAES and Nevada Cooperative Extension programs integrate research, outreach, and education to help university students and local communities address economic and development problems. Just a few of the challenges are business retention and expansion, tourism development, in- and out-migration, and diversification of income sources. Nevada Cooperative Extension faculty work in tandem with the NAES and the University's Small Business Development Center on a variety of issues including economic expansion, water allocations, and small business development.

Human and Family Development

Nevada has some of the nation's highest rates of teen pregnancy, high school dropouts, and domestic violence. Nevada also ranks among the highest nationally in number of youth who do not successfully transition to adulthood. Programs are designed to teach rural, disenfranchised,limited-resource 18-24 year-olds the skills to improve their employability and potential to attend post-secondary educational programs. Approximately 25% of youth and adults in Nevada have inadequate literacy skills, and more than half of the state's third-grade students read below their grade level. Additionally, the percentage of Spanish-speaking immigrants is expected to increase statewide over the next quarter century. It is likely that greater numbers of children who are English language learners and at-risk for low achievement will be entering Nevada schools during that same time period. Nevada Cooperative Extension programs seek to reach these children as early as possible, ensuring that preschoolers have the reading skills needed to succeed at each successive level of their education. Nevada Cooperative Extension also teaches parents and childcare providers the skills to encourage positive youth development.

Summary

This joint plan of work (POW) effectively addresses the NIFA/USDA goal areas. Full implementation of this plan will require adequate time and sufficient funding. In order to effectively address the complex issues facing citizens in Nevada, the US, and globally, CABNR/NAES/Nevada Cooperative Extension must continue to increase its interdisciplinary and multidisciplinary problem-solving approaches. These goals presume that all three units maintain and grow collaborative partnerships with diverse community organizations, university academic units, local leadership, under-served populations, and federal and state agencies.

As the outreach unit of the land-grant university, it is especially important that Nevada Cooperative Extension and the Nevada System of Higher Education seek and seize opportunities to integrate university research with Extension programming. The University of Nevada, Reno, as Nevada's land grant institution, must recognize Extension's value as a connection between all the state's communities and the university research base and support and reward efforts to meet community needs. In addition, over the next five years, NAES will focus on a number of critical issues shown to be of greatest concern by our stakeholders. These include: rangeland restoration, control and prevention of invasive weeds and the wildfire that ensue; continued protection of Nevada/California's forest; improving Nevada's rangeland beef industry through medical advancements and grazing management programs; developing new alternative crops for consumption and the biofuels industry; fostering rural economic development; and improving the health of Nevadans through nutritional intervention and weight management.

Estimated Number of Professional FTEs/SYs total in the State.

Year	Extension		Research	
	1862	1890	1862	1890
2017	12.4	null	8.5	null
2018	12.4	null	8.5	null
2019	13.0	null	9.0	null
2020	13.0	0.0	9.0	0.0
2021	14.0	0.0	9.5	0.0

II. Merit Review Process

1. The Merit Review Process that will be Employed during the 5-Year POW Cycle

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

2. Brief Explanation

NAES Process

Scientific peer review drives the initial selection of research projects that comprise the NAES research portfolio. NAES solicits applications from NAES appointed scientists in a general call for proposals that identifies the priority areas. Participating faculty submit proposals through an NAES web-based application process. Based upon the principle investigator's home department administration, outside scientific peer reviewers are chosen. Peer reviews are tabulated based upon scientific merit, community needs, and feasibility of completion. Departmental administration also weigh in on the research direction they feel need addressing.

In addition to a departmental peer review process, an outside non-university panel, CABNR/NAES's Advisory Board reviews, evaluate and rank proposals based upon their constituents' inputs.

Both groups submit their ranked research proposals to the Nevada Agricultural Experiment Station director. Approvals are based upon peer reviews and advisory boards' rankings and comments, stakeholder input, and departmental recommendations in consultation with the NAES's fiscal officer.

Nevada Cooperative Extension Process

Nevada Cooperative Extension's merit review takes multiple steps. Annually, Nevada Cooperative Extension tenure-track faculty prepare a Role Statement detailing their teaching,

research, and service activities for the upcoming calendar year. Extension faculty review their individual Role Statements with their respective Area Director and/or Department Chair who ensures that the quality and relevance of planned programming efforts to effectively address formally identified program goals. Both the Area Director and the Dean/Director for Nevada Cooperative Extension review and approve the plan.

Annually, Nevada Cooperative Extension faculty evaluate the teaching, research, and service activities of their peers to assess overall performance and program quality. Peers consider the results of formal needs assessments, programs developed in response to identified needs, and the substance of documented outcomes and impacts in rating peer performance and providing narrative feedback. Area Directors also conduct an annual review of faculty performance and provide narrative feedback. Area Directors then meet individually with faculty to discuss the documented results of the peer review and Area Director's review. The Nevada Cooperative Extension Dean/Director also reviews and formally approves the evaluation documents.

Nevada Cooperative Extension improves and ensures the quality of publications, using a blind peer review process with reviews provided by internal and external experts.

Finally, some Nevada Cooperative Extension efforts are a part of the Multistate Review Committee (MRC) process, which are documented, reviewed, and approved by the sponsoring regional association. These committees are responsible for the review, evaluation, and recommendation of western multistate programs which may involve research, academic programs, extension, and/or international programs.

III. Evaluation of Multis & Joint Activities

1. How will the planned programs address the critical issues of strategic importance, including those identified by the stakeholders?

The Request for Proposal solicitation sent to faculty and listed on the NAES website identifies the research priorities as identified by CABNR, NAES, & Nevada Cooperative Extension strategic planning, which includes stakeholder input. The individual projects are approved based on the project's contribution to critical issues of importance to Nevada and to the educational programs of UNR.

Nevada Cooperative Extension programs are designed to address community issues that have been identified through formal needs assessments and public documents, commissioned reports and publicly available data. Research and scholarly activity have long been recognized as an expectation of Nevada Cooperative Extension faculty and comprise at least 25% of all tenure-track faculty appointments. Programs are grounded in science and involve comprehensive literature reviews, applied research, and a plan, based on the LOGIC model, for achieving short-, medium-, and long-term outcomes and impacts. Programs are rigorously evaluated and designed to contribute to the knowledge base of theory in practice, while achieving significant impacts to effect positive change.

Program collaborators periodically review and evaluate programs for efficacy in addressing identified issues. Collaborators include federal and state agencies, county and local governments, community stakeholders, private and non-profit groups, and campus-based faculty.

2. How will the planned programs address the needs of under-served and under-represented populations of the State(s)?
NAES and Nevada Cooperative Extension needs assessments include and, in some cases, target under-served and under-represented populations. As a result, activities/programs/research are developed to address needs of under-served/under-represented populations of the state, as well as activities/programs/research specific to the needs of these audiences. Under-served and under-represented audiences periodically review and evaluate programs for efficacy in addressing identified issues.

3. How will the planned programs describe the expected outcomes and impacts?
On an annual basis, selected NAES research projects are identified and impact statements prepared for submission into the NIFA annual report system. Many of these impact statements are then used in University of Nevada and CABNR publications. In addition, each NAES funded research project is required to submit an annual progress report to REEport. These annual reports are reviewed by an NAES administrative team and are evaluated for outcomes and impact. On multi-year projects, continued funding requires satisfactory progress towards accomplishing the research goals and providing impact as determined by the principle investigator's annual report and verbal presentation.

Nevada Cooperative Extension's planned programs describe expected outcomes and impacts under each program area and use the planning foundation of the LOGIC model. Formative evaluation is used to target program areas for improvement and refinement, while summative evaluation is used to report program outcomes and impacts as determined by the annual report and verbal presentation.

4. How will the planned programs result in improved program effectiveness and/or

NAES and Nevada Cooperative Extension programs continue to evolve based on the outputs and outcomes measured from past projects. The respective administrative units continuously review all projects within the program areas. The projects and programs that progress and produce yearly outputs, and demonstrate the potential for longer term outcomes have been selected for further funding in this current plan of work.

Output targets in terms of participation, academic publications, and research projects completed provide another basis for monitoring research and extension program implementation. Measures of outcomes provide a basis for estimating program effectiveness. The monitoring of both kinds of measures provides a basis for determining effectiveness, a necessary precursor to determining efficiency.

Also, each of our planned programs has embedded components that will promote staff interactions across our program areas. It is expected that this planned interconnectivity among extension programs and research efforts will result in synergies that in turn increase the efficiency of federal based funding and other non-federal resources dedicated to program efforts.

IV. Stakeholder Input

1. Actions taken to seek stakeholder input that encourages 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 traditional stakeholder individuals
- Survey specifically with non-traditional groups
- Survey specifically with non-traditional individuals
- Other (Use of social media; conduct field days at our University field stations)

Brief explanation.

Stakeholder involvement is the key to program development. Nevada Cooperative Extension needs assessments and program evaluations directly involve stakeholders. Input is gathered throughout the year through the use of listening tours, focus groups, direct observation, interviews, and surveys. NAES has and will continue to conduct listening tours throughout the state for the purpose of obtaining stakeholder input. We also rely on government reports, commission proceedings and the results of public processes. During these tours we invite participants to town hall meetings through general press coverage in the local newspapers, and we invite stakeholder groups and individuals through personal contact, i.e., email, telephone, etc., to attend. Open house style field days allow the public to interact with the principle investigators and project leaders from NAES and Nevada Cooperative Extension projects. These promote an excellent dialog between stakeholders, faculty, and administrators. This information is used to further refine programs in order to better serve stakeholders.

2(A). A brief statement of the process that will be 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
- Other (Informal discussions with key stakeholders)

Brief explanation.

CABNR, NAES, and Nevada Cooperative Extension will continue to meet with and survey traditional and non-traditional stakeholder groups and individuals to collect their input on the development of statewide program priorities and use of its research, extension and education

funds.

Through a variety of methods, Nevada Cooperative Extension faculty members identify individuals and groups to evaluate the extent to which programs effectively address issues or need further refinement. Because Nevada Cooperative Extension programs are issue-based, needs assessments are conducted regularly. Assessment methods include public meetings, reports and proceedings from panels convened by county, state and federal government, public forums, focus groups, key informant interviews, proceedings of public meetings and surveys of general and targeted populations. Assessments identify program opportunities and approaches within the five NIFA themes that can be addressed programmatically. Evaluations involve the input of traditional and non-traditional program audiences.

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

1. Methods for collecting Stakeholder Input

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

Brief explanation.

NAES stakeholder meetings are conducted on a bi-annual basis and designed largely as opportunities for listening to representatives from major stakeholder groups who provide feedback on budgets, activities, outcomes and goals and future directions. Significant input is also routinely collected at the level of individual projects and specific programs. These include formal opportunities for collecting feedback on specific programs through interviews, stakeholder meetings and advisory boards, written or web-based surveys and many informal opportunities that transpire during the course of regular meetings, conferences events and presentations.

Nevada Cooperative Extension uses a variety of methods to collect stakeholder input. Collection of data varies in terms of appropriate method and timing. For several years, Nevada's strategic plan has included listening sessions in each of its 17 counties, as well as needs-assessment meetings with various stakeholder groups, industries, businesses, and other organizations across the state. On at least an annual basis, stakeholder input is gathered, analyzed, and reported.

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
- Other (Strategic planning)

Brief explanation.

Stakeholder input provides the foundation for the research and educational programs developed by NAES. Stakeholders help determine program directions by identifying important new issues and the actual approval and funding of new and continuing projects.

Stakeholder input is routinely used to identify emerging issues, to direct and redirect Extension programs, and establish priorities in the hiring process. Stakeholders include local elected and appointed officials, community leaders, citizens, underserved groups and individuals, university leadership, university academic departments, and Nevada Cooperative Extension faculty and staff. Therefore, the areas targeted in this plan of work reflect the views of a broad set of stakeholders.
Stakeholder input is used to determine the necessary qualifications of those hired and/or in the creating of new positions, as new funding becomes available.
Stakeholders also participate in Nevada Cooperative Extension faculty searches, on campus and for county-based positions. Additionally, stakeholder input is used to help establish program priorities and to acquire necessary funding.

V. Planned Program Table of Content

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Global Food Security and Hunger

2. Brief summary about Planned Program

Although Nevada's agricultural industry is comparatively smaller than its western neighbors, it remains critical to Nevada's economiy and takes into account the fact that Nevada is located with a semi-arid to arid climate.

NAES and Nevada Cooperative Extension plans integrate applied research, outreach, and education to improve the skills of agricultural producers. Programs seek to strengthen cultural management practices and advance rangeland stewardship. This includes identifying and effectively controlling noxious and invasive weeds, pests, and disease. With an increase in small acreage operations and a rising trend in localized food production and consumption, programs emphasize building the skill set of beginning farmers and ranchers while helping larger scale producers increase profitability.

NAES research efforts are being directed towards improving stress tolerance (cold, heat and drought) in plants, evaluating cultivars and clones, investigating neural hormones for use in pest control, assessing new technologies to be used in the greenhouse industry, and improving the nutritional value of certain alternative crops.

Nevada Cooperative Extension's programs include: alternative crop selection and marketing, hoop house production techniques, community supported agriculture (CSAs) planning, risk management practices, adaptive management of rangelands, herd health improvement, and adoption of sustainable agriculture technologies. A special emphasis addresses the needs of agricultural producers on American Indian reservation lands. This includes strengthening the capacity of federal and state agency personnel to work more effectively with American Indian producers. Nevada Cooperative Extension's programs, particularly those tailored for the Great Basin ecosystem, may directly contribute to international work in emerging economies with similar physical attributes.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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%		15%	
111	Conservation and Efficient Use of Water	20%		10%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	10%		25%	
205	Plant Management Systems	0%		5%	
206	Basic Plant Biology	0%		5%	
211	Insects, Mites, and Other Arthropods Affecting Plants	0%		5%	
216	Integrated Pest Management Systems	0%		10%	
307	Animal Management Systems	0%		5%	
502	New and Improved Food Products	30%		5%	
504	Home and Commercial Food Service	30%		1%	
511	New and Improved Non-Food Products and Processes	0%		5%	
601	Economics of Agricultural Production and Farm Management	0%		5%	
701	Nutrient Composition of Food	5%		4%	
	Total	100%		100%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Nevada's landscape is largely semi-arid desert rangelands, with croplands adjacent to the limited number of rivers and streams. The state includes over 70 million acres of land, approximately 87% public land and 13% privately owned. Of the 13% in private farms and ranches, 87% is considered rangeland, 8% cropland, and 5% woodland and other uses. Over 90% of the land in Nevada is considered rangeland, with approximately 80% available for livestock grazing at certain times of the year. The 8% private land considered cropland includes 66% as harvested crops, 26% as pasture, and 8% as idle acres or other uses. Specific crops harvested include 235,000 acres of irrigated alfalfa for hay, 270,000 acres meadow and other hay production, 17,000 acres wheat and barley, 10,000 acres alfalfa for seed production, 8,000 acres for potatoes, and 5,000 acres in garlic, onions and other crops. These figures show that 92% of the cropland produces hay for livestock.

Alfalfa or grass hay is produced on over 92% of Nevada's croplands, and numerous enterprise budgets have demonstrated that producing hay in Nevada is a risky financial enterprise. In addition to the economic risk, Nevada agricultural producers compete with urban and environmental interests for scarce water resources. Because issues related to water supply are critical to Nevada's agricultural producers, alternative crop-production systems are of great interest. Simultaneously, reliable data are lacking

concerning the agronomic and cultural techniques necessary to successfully produce many alternative crops with commercial potential. Because Nevada is unique in many respects, agronomic data from other states have limited applicability to Nevada; therefore, the establishment of various applied research and demonstration trials is necessary to building the knowledge base concerning potential alternative crop production systems in Nevada. The information developed from these trials can then be used to develop educational programs to help commercialize potentially profitable crops.

Priorities include identifying weeds that threaten agricultural productivity and establishing early detection, rapid-response weed control measures in addition to IPM systems.

Agricultural producers have the opportunity to diversify farming operations to satisfy increasing consumer demand for locally grown, specialty products. Producers need education on developing local food production, sales, and distribution systems. Additional programs are needed that focus on the feasibility of producing niche products in a high desert environment.

Program priorities include: strengthening sustainable production systems that conserve, protect, and enhance soil and water resources; reliable cultural management and enterprise budget information; IPM systems; organic production; sustainable agricultural technologies; integrated food production systems; alternative niche crops; market and distribution systems; and educating the nonagricultural public about the role that agriculture plays in the state's economic recovery.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Internal linkages will continue to include the Nevada Cattlemen's Association, local veterinarians, Nevada Farm Bureau, Nevada Department of Agriculture, and other agricultural organizations. Multi-state research and integrated extension programs will be administered through the NAES and CABNR administrative offices in collaboration with Nevada Cooperative Extension. External assumptions include:

- Consumer demand for locally grown, specialty products will remain stable or increase.
- Agricultural producers who diversify farming operations to include specialty products may increase profits.
- Producers who are knowledgeable about local food production, sales, and distribution systems are likely to participate in local production and distribution.
- Knowledge about enterprise budgets and business planning will strengthen agricultural operations of all sizes.
- The number of small scale beginning farmers and ranchers will increase or remain stable.
- Comprehensive control of noxious and invasive weeds is critical to strengthening sustainable agricultural systems.
- Consumer demand will increase or remain stable for organic certified agricultural products.

• Improvements in soil health and productivity will increase farm profitability and improved environmental quality.
• The use of sustainable agricultural practices improves, protects, and conserves soil, water, air, and wildlife.
• Low-income, vulnerable populations are at highest risk for food insecurity.
• There will be a need to develop plants capable to tolerating Nevada's climate.
• Base federal funding will continue to be available and leverage for extramural grants to support this program and the scientific staff who carry out the lines of inquiry.
• Federal base funding will be leveraged to attract state funds.

2. Ultimate goal(s) of this Program

There are three primary outcomes expected of the research aspect of this goal. The first is to increase the overall quality and health of the livestock produced through research and education. Secondly, it is to understand and improve the quality of plants and livestock through basic research. Finally, marketing will continue to be a major focus of research and education. More specifically:

• Increase and sustain agricultural and livestock production.
• Improve and maintain the health status of Nevada's livestock.
• Improve the state's and nation's ability to satisfy the demand for affordable and nutritious food.
• Address hunger and food insecurity in vulnerable populations.
• Assure the economic sustainability of Nevada's agricultural and livestock industries.
• Promote economically sound and environmentally safe agricultural practices.
• Teach and provide support to producers in order to optimize farm profitability.
• Increase the use of sustainable agricultural practices to improve, protect, and conserve soil, water, air, and wildlife.
• Improve cultural management in innovative production environments, such as hoop houses and high tunnels.
• Improve soil health and productivity, resulting in increased farm profitability and improved environmental quality.
• Boost local, state, and national agricultural productivity.
• Strengthen animal and plant management systems.
• Reduce effects of animal and plant insects, diseases, and toxins.
• Increase the skill set and competitive capacity of beginning farmers and ranchers.
• Protect crops and plants from weeds and other pests without causing other damage.
• Expand existing IPM systems.
• Improve marketing and distribution practices for agricultural producers.
• Diversify and strengthen the state's economy through creation of jobs in agriculture and related sectors.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	3.5	0.0	3.0	0.0
2018	3.5	0.0	3.0	0.0
2019	4.0	0.0	3.5	0.0

2020	4.0	0.0	3.5	0.0
2021	4.0	0.0	4.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

• Publish studies, develop curricula, and teach workshops related to plant production.
• Educate local, state, and regional stakeholders about progress in producing plants that are economically viable and environmentally friendly.
• Develop alternative crops suited for Nevada's climate.
• Conduct trials to optimize greenhouse, hoop house, and high tunnel production.
• Continue research into improving stress tolerance and nutritional values of plants grown in Nevada.
• Establish herbicide demonstration/research plots to evaluate the efficacy of these products under local conditions.
• Expand use of Integrated Pest Management (IPM).
• Coordinate Nevada IPM efforts with other western states.
• Educate Nevada land managers, producers, and general public regarding invasive weed identification and control.
• Strengthen the cultivation management and marketing skills of new and small acreage producers.
• Utilize multiple demonstrations/applied research plots to explore high-value specialty crops and manage weeds in agronomic crops with results reported at field days, workshops, or annual professional meetings.
• Develop applications for the research on plant production to directly benefit producers.
• Provide risk management strategies to agricultural producers.
• Provide teaching and research outreach to agriculture businesses to provide in-depth information on small business management, farm profitability, and market development.
• Develop new vaccines to protect livestock health
• Develop new livestock management systems to support sustainable livestock production

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations ● Other 1 (Town hall style meeting) ● Other 2 (Field lab open houses)	● Public Service Announcement ● Newsletters ● TV Media Programs ● Web sites other than eXtension

3. Description of targeted audience

The target audiences for these programs include beginning and existing small acreage operators and

large-scale crop and livestock (primarily beef/dairy/sheep) producers. Specific programs target American Indian, Latino/Hispanic, and women and youth agricultural producers. USDA agencies and other government entities that conduct work in this area are an audience and frequently a program partner. Additional audiences include agricultural service industries, lenders, and policy makers at the local, state, and federal levels.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☐ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of Undergraduate Students Involved in Research.
- Number of Graduate Students or Post-Doctorates Trained.
- Workshops, Demonstrations, and Presentations
- Abstracts, Books, Book Chapter(s), Proceedings, Research Reports, and Technical Publications
- Brochures, Bulletins, Fact Sheets, Newsletter, and Surveys
- Manuals and Other Printed Instructional Materials Produced
- Digital Media and Web Sites Created or Updated
- Leveraged research funds generated.

☐ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of clientele who gain knowledge about improved human, plant, and animal management systems for sustainable agriculture.
2	Number of clientele who implement improved human, plant, and animal management systems for sustainable agriculture.
3	Advance research knowledge, both basic and applied, in the areas of production agriculture to existing and emerging industry and consumer demand regarding genetics, biology, seed production, nutrition, and related topics.

Outcome # 1

1. Outcome Target

Number of clientele who gain knowledge about improved human, plant, and animal management systems for sustainable agriculture.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 307 - Animal Management Systems
- 216 - Integrated Pest Management Systems
- 601 - Economics of Agricultural Production and Farm Management
- 111 - Conservation and Efficient Use of Water
- 205 - Plant Management Systems

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Number of clientele who implement improved human, plant, and animal management systems for sustainable agriculture.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management
- 205 - Plant Management Systems
- 307 - Animal Management Systems
- 216 - Integrated Pest Management Systems
- 111 - Conservation and Efficient Use of Water

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

Advance research knowledge, both basic and applied, in the areas of production agriculture to existing and emerging industry and consumer demand regarding genetics, biology, seed production, nutrition,

and related topics.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 307 - Animal Management Systems
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 601 - Economics of Agricultural Production and Farm Management
- 502 - New and Improved Food Products
- 701 - Nutrient Composition of Food
- 102 - Soil, Plant, Water, Nutrient Relationships
- 205 - Plant Management Systems

4. Associated Institute Type(s)

- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect 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.)

Description

A number of factors could influence the extent to which NAES and Nevada Cooperative Extension are able to meet programmatic goals as planned. Global economic conditions remain unstable and recovery from the worldwide recession is slow. Nevada's county budgets will continue to vary. That is, rural counties are vulnerable to changes in extracted mineral prices. The remaining counties struggle to upright a toppled housing sector and severely deflated tourism and gaming industries.

At best, the state's economic recovery will occur slowly throughout the remainder of this decade. As Nevada seeks to diversify its economy, program changes are likely to occur as a function of changing community issues, populations, and competing public priorities and programs. Responsive public policy and government regulations, particularly as they relate to water and land resources, will likely influence the degree to which program goals are achieved. Negative externalities, as a result of the recession and subsequent reconstruction, have immeasurable potential to influence the extent to

which NAES and Nevada Cooperative Extension can effectively address identified community-based issues.

Finally, natural disasters such as drought are likely to significantly affect food production, supply, prices, and, in turn, generate a myriad of related socioeconomic issues at the community level.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

The evaluation studies for the program LOGIC models included in this plan will incorporate formative and summative approaches.

Formative (process) evaluation will be used for the purpose of improving or refining a program by scrutinizing its teaching activities. This involves pre-testing of educational materials in order to assess their efficacy and quality. It may also involve tracking the number of educational materials and activities, number of program contacts, and the types of barriers encountered in reaching target-teaching outcomes. The results of formative evaluations often lead to modifications to educational materials and activities in order to strengthen the program. The goal of formative evaluation is to identify ways in which to improve educational activities to make the program more efficient, more relevant, and more likely to accomplish a program's learning objectives and goals.

Summative (impact) evaluation will be used to assess program outcomes (changes that occur as a result of the program, without necessarily establishing cause and effect conclusions) and impacts (effectiveness in changing target populations' knowledge/learning, behavior/action, or in conditions).

Summative evaluation is typically appropriate for mature programs as it seeks to measure its overall success in reaching its target goals and occurs at the conclusion of the program or at planned benchmark points during program implementation. External evaluators may be used in order to increase evaluative objectivity. Because each of the plans addresses a broad combination of research and extension initiatives that target multiple audiences, methods, and intended outcomes, a combination of formative and summative evaluation is necessary to provide a comprehensive assessment. As appropriate, single case studies and experimental design (treatment and control groups) will be used in order to make comparisons between program participants and non-participants. In addition, funding partners often require specific methods and data for accountability reports.

Given that much of the research work of NAES faculty and staff does not focus on group level dynamics, many of the more formalized evaluation techniques are not appropriate.

The techniques that NAES continues to use, most of them being qualitative surrogate measures, are:

1. Informal and formal feedback from stakeholders in terms of overall level of satisfaction with NAES processes and products.
2. Feedback from the CABNR/NAES Advisory Board Committee to determine needs of our constituencies;
3. Elected state and federal officials' support for NAES in terms of base budgets, new initiatives, and their request for intervention or action for specific research projects.
4. Support from USDA, feedback from NIFA regarding our federal reports, and feedback and support we receive from other federal agencies.

5. Accountability measures required by extramural grants and contracts and our level of attainment of those required metrics.
6. Peer - reviewed publications and tier level of the journals, as well as other publications.
7. Patents awarded
8. Commercialization of our research findings;
9. Both independent and total summation of our economic indicators in terms of state and federal base funding, extramural funding, and special competitive university funding for our faculty.

Collectively the quantitative and qualitative measures inform NAES and Nevada Cooperative Extension across the needs assessment - formative - summative spectrum. Such feedback will continue to be gathered and will strongly influence both units processes and products throughout this planning period, and beyond.

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Climate Change, Natural Resource Management, and Environmental Science

2. Brief summary about Planned Program

Climate change threatens sustainable ecosystems and will continue to do so well beyond this planning period. Evidence of this claim is seen in the impacts from the recent four years of drought and wildfires in Nevada and California. Natural resources and environmental science are central with NAES and Nevada Cooperative Extension strategic plans that focus on advancing education, research and outreach. Natural resources and environmental science research focuses on managing and sustaining natural resources and ecosystems for the citizens of Nevada, the nation, and the world. All renewable natural resources and related environmental systems are closely tied to climate change and other environmental shifts, both natural and human induced shifts.

Nevada is over 87% publicly owned rangeland. Thus, a significant portion of our research and outreach is and will continue to be public land oriented. Emphasis on 1) reducing and mitigating damages to homeowners and rangeland from wild fire; 2) selection and cultivation of low water-use crops; 3) agricultural risk-management practices particularly relating to drought; 4) rangeland health improvement; and 5) adoption of resource conservation and protection strategies and technologies.

An understanding of how to conserve biological diversity with particular emphasis on, and strengths in, wildlife ecology is key to managing rangelands and surrounding ecosystems. This is critical for a sustained flow of environmental goods and services. Nevada's rangelands are managed primarily in vast allotments. Thus, a continued understanding of the science and managing of such complex landscapes is critical to providing a sound resource base to meet human and wildlife needs. Nevada Cooperative Extension is leading a regional effort to regionalize drought education efforts with the support of the USDA's Agricultural Research Service's Climate Hub effort.

In partnership with Nevada Department of Wildlife, US Fish & Wildlife, Bureau of Land Management, and other partners at the federal, state and local levels, NAES and Nevada Cooperative Extension will continue to advance studies in traditional wildlife programs for game and non-game species, as well as conservation biology programs for protection and restoration of our natural resources.

Forest sustainability is an important research area and requires an understanding of biology, silviculture, management and modeling, and forest products, both from forest science and horticultural science perspectives. These activities include pest management of invasive species, nutrient transport in surrounding soils, and water quality of regional water supplies.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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	0%		3%	
103	Management of Saline and Sodic Soils and Salinity	0%		2%	
111	Conservation and Efficient Use of Water	20%		5%	
112	Watershed Protection and Management	10%		10%	
121	Management of Range Resources	0%		15%	
122	Management and Control of Forest and Range Fires	30%		10%	
123	Management and Sustainability of Forest Resources	0%		10%	
131	Alternative Uses of Land	0%		1%	
133	Pollution Prevention and Mitigation	0%		5%	
135	Aquatic and Terrestrial Wildlife	0%		2%	
136	Conservation of Biological Diversity	0%		2%	
205	Plant Management Systems	0%		5%	
213	Weeds Affecting Plants	10%		10%	
302	Nutrient Utilization in Animals	0%		2%	
304	Animal Genome	0%		2%	
305	Animal Physiological Processes	0%		5%	
307	Animal Management Systems	0%		5%	
311	Animal Diseases	0%		5%	
605	Natural Resource and Environmental Economics	30%		1%	
	Total	100%		100%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

By 2080, climate change researchers predict a seven degree Fahrenheit (3.8 degree C) increase in temperature and a decrease in reliable precipitation patterns for much of the US. These grim predictions will require a proactive natural resource management approach in a state that receives an annual average of less than nine inches of precipitation. Diverse, competing demands for scarce water resources are likely to increase. Efficient water use and the protection of water quality are essential to the sustainability of Nevada's rangeland health, wildlife habitat, agricultural industry, and continued economic growth. In

2015, snowpack accumulation in the western third of Nevada was well below average amounts. This led to economic losses within several agricultural sectors, stresses on groundwater supplies and ecological damage in some areas. Invasive and noxious weeds threaten the productivity of Nevada's range and forest lands.

Climate change and natural resource issues will remain volatile and controversial as they receive increasing attention from policy makers and the public. Diverse and competing interests for Nevada's natural resources will complicate these issues even further. Science-based information will become more valuable as mitigation strategies for climate change evolve.

Decisions about the utilization of natural resources, particularly public lands and water, have major impacts on ecosystem sustainability as well as the socioeconomic well-being of current and future generations. Yet views of what constitute appropriate land and natural resource use are increasingly polarized.

An extensive review of scientific work showed that the Great Basin rangeland resource has changed significantly over the past 150 years. The change has resulted in a reduction in plant species diversity and a movement toward extensive monocultures of pinion juniper and larger scrub species rather than mosaics of grassland savannas and shrubs. In addition, alien plant species that can form extensive monoculture plant communities, which cover increasing areas in the Great Basin environment. The effect of this trend is a reduction of forages for a diverse population of wildlife and domestic livestock. In turn, this change is reducing the economic sustainability of the Great Basin livestock industry and the continued sustainability of recreational activities developed around wildlife.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Although the snowpack in Nevada's mountain ranges has been above normal in 2015-2016, reservoir storage remains below the targets needed to sustain normal water releases for irrigation.

- Over time, applying and using sound scientific-based management principles can bring about improvements in rangeland health, weed management, watershed health, and mitigate the impacts of wildfires.
- Compliance with the Clean Water Act requires ongoing education of property owners, land managers, and landscape industry professionals.
- The U.S. Fish and Wildlife Service prescribed administrative measures to avoid including the Greater Sage Grouse on the national endangered species list. These require actions on the part of public and private land managers to comply with the conditions of not listing this species.
- Because Nevada is the driest state in the nation, conservation, efficient use, and protection of water resources are critical issues.

- The removal of water resources from agricultural to commercial and urban usage poses the potential for negative externalities on the environment.
- The Nevada Drought Forum produced recommendations for improving resiliency to drought conditions. These may be accompanied by minor changes in Nevada water law and educational programs focused on water conservation.
- Nevada is particularly challenged by severe drought.
- Wildfire remains an important and expensive challenge.
- Soil, water, rangeland, and wildlife comprise much of Nevada's renewable natural resource wealth.
- Multiple economic and social interests with competing demands for Nevada's natural resources will increase.
- Noxious weeds spread easily between public and private lands and require collaborative partnerships to control effectively.
- A sufficient supply of clean water is critical to sustaining rural communities, commerce and industry, and urban areas.
- While water will be relatively scarce to agricultural and urban areas alike, climate change will exacerbate water scarcity.
- Education and science-based information are essential to encourage water conservation and protection.
- Advances in irrigation technologies and adoption of innovative cultural practices can sustain agricultural production in Nevada.
- Base federal funding will continue to be available and leverage for extramural grants to support this program and the scientific staff who carry out the lines of inquiry.
- Federal base funding will be leveraged to attract state funds.

2. Ultimate goal(s) of this Program

Develop research and educational programs that will provide the science-based knowledge and skills required to:

- Maintain and restore rangeland health, reduce weeds, improve watershed health, and mitigate the impacts of wildfire.
- Protect, sustain, and improve terrestrial and aquatic wildlife habitat in Nevada.
- Conserve and effectively use water resources for agricultural and urban purposes.
- Protect and manage watersheds and riparian areas.
- Improve soil conservation and quality.
- Identify alternative means of coping with global climate change, especially community and agricultural resiliency.
- Apply collaborative problem-solving to mitigate natural resource disputes.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	2.5	0.0	3.0	0.0
2018	3.0	0.0	3.0	0.0
2019	3.0	0.0	3.0	0.0
2020	3.0	0.0	3.5	0.0

2021	3.0	0.0	3.5	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

To address these critical issues, NAES and Nevada Cooperative Extension research, teaching and outreach efforts will:

- Educate and partner to enable the recovery of the sage grouse and pygmy rabbit habitat to avoid there listing as a threatened or endangered species.
- Conduct applied research to determine management options that slow or stop the cycle of cheat grass and fire on previously burned areas through range rehabilitation, seeding programs, and nontraditional approaches to grazing management.
- Educate property owners about managing wildfire risk through fuels reduction strategies.
- Educate producers and agency personnel on the need for continued range evaluation, monitoring, and management improvements and the role of grazing management in sustainable resource management.
- Educate the public on responsible use and the value of multiple uses on rangelands.
- Illustrate the need for management and control of pinion-juniper forests to restore watershed, wildlife habitat, and forage values on rangelands.
- Partner with and educate the general public, livestock producers, and agency personnel on the identification and methods of control of the specific noxious and invasive species.
- Provide research, educational training, and collaborative problem solving to facilitate rehabilitation of degraded watersheds, protect and manage watersheds, and conserve, manage, and enhance efficient water use.
- Educate producers and agency personnel to evaluate, monitor, and sustainably manage range resources.
- Demonstrate through applied research the role of grazing strategies in sustaining water quality and range health.
- Educate the public on responsible use and the value of multiple uses on rangelands.
- Conduct research and demonstrate the need for pinion-juniper forest control to restore watershed, wildlife habitat, and forage values on rangelands.
- Educate the public with respect to adapting to global climate change.
- Partner with and educate the general public, livestock producers, and agency personnel to improve noxious and invasive weed control.
- Conduct research into forest health and pest management.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods

● Education Class	● Public Service Announcement
● Workshop	● Newsletters
● Group Discussion	● TV Media Programs
● One-on-One Intervention	● Web sites other than eXtension
● Demonstrations	● Other 1 (Trade Publications/Print Media)
● Other 1 (Social networks)	● Other 2 (Extension Publications)

3. Description of targeted audience

The target audience includes agricultural producers and ranchers, mining industry representatives, environmentalists, green industry professionals, small acreage owners, general public, federal and state natural resource management agencies, and other resource managers.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☐ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of Graduate Students or Post-Doctorates Trained
- Number of Undergraduate Students Involved in Research
- Workshops, Demonstrations, and Presentations
- Abstracts, Books, Book Chapter(s), Proceedings, Research Reports, and Technical Publications
- Brochures, Bulletins, Fact Sheets, Newsletter, and Surveys
- Manuals and Other Printed Instructional Materials Produced
- Digital Media and Web Sites Created or Updated
- Leveraged research funds generated

☐ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of individuals who gain knowledge about improved human, plant, and animal management systems that relate to climate change and/or natural resource use.
2	Number of clientele who implement improved human, plant, and animal management systems as related to climate change and/or natural resource use.
3	In conjunction with companion agencies and organizations, advance research in rangeland and forest management and ecology to promote advances in best management practices
4	Reduce ecological losses due to wildfires and invasive weeds that destabilize the health of Nevada's rangelands
5	Meet federal and state needs for research data related to Nevada ecosystems as the demand arises.
6	Advance research knowledge, both basic and applied, in the areas of rangeland and forest management to existing and emerging industry and consumer demand regarding genetics, biology, seed production, nutrition, and related topics.
7	Meet local groups, community, USDA, USDI, and other stakeholder demands for scientific knowledge to inform existing and emerging issues/practices in wildlife including wildlife health, human wildlife use/conflicts, and human to human conflicts related to wildlife and use.

Outcome # 1

1. Outcome Target

Number of individuals who gain knowledge about improved human, plant, and animal management systems that relate to climate change and/or natural resource use.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 112 - Watershed Protection and Management
- 111 - Conservation and Efficient Use of Water
- 307 - Animal Management Systems
- 131 - Alternative Uses of Land
- 205 - Plant Management Systems
- 213 - Weeds Affecting Plants
- 122 - Management and Control of Forest and Range Fires
- 605 - Natural Resource and Environmental Economics
- 121 - Management of Range Resources
- 133 - Pollution Prevention and Mitigation
- 123 - Management and Sustainability of Forest Resources
- 102 - Soil, Plant, Water, Nutrient Relationships

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Number of clientele who implement improved human, plant, and animal management systems as related to climate change and/or natural resource use.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 135 - Aquatic and Terrestrial Wildlife
- 102 - Soil, Plant, Water, Nutrient Relationships
- 121 - Management of Range Resources
- 111 - Conservation and Efficient Use of Water

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

In conjunction with companion agencies and organizations, advance research in rangeland and forest management and ecology to promote advances in best management practices

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 121 - Management of Range Resources
- 122 - Management and Control of Forest and Range Fires
- 103 - Management of Saline and Sodic Soils and Salinity
- 102 - Soil, Plant, Water, Nutrient Relationships
- 605 - Natural Resource and Environmental Economics
- 123 - Management and Sustainability of Forest Resources
- 205 - Plant Management Systems

4. Associated Institute Type(s)

- 1862 Research

Outcome # 4

1. Outcome Target

Reduce ecological losses due to wildfires and invasive weeds that destabilize the health of Nevada's rangelands

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 131 - Alternative Uses of Land
- 123 - Management and Sustainability of Forest Resources
- 103 - Management of Saline and Sodic Soils and Salinity
- 111 - Conservation and Efficient Use of Water
- 121 - Management of Range Resources
- 205 - Plant Management Systems
- 112 - Watershed Protection and Management

- 605 - Natural Resource and Environmental Economics
- 122 - Management and Control of Forest and Range Fires

4. Associated Institute Type(s)

- 1862 Research

Outcome # 5

1. Outcome Target

Meet federal and state needs for research data related to Nevada ecosystems as the demand arises.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 213 - Weeds Affecting Plants
- 121 - Management of Range Resources
- 122 - Management and Control of Forest and Range Fires
- 205 - Plant Management Systems
- 131 - Alternative Uses of Land
- 605 - Natural Resource and Environmental Economics
- 123 - Management and Sustainability of Forest Resources
- 103 - Management of Saline and Sodic Soils and Salinity
- 311 - Animal Diseases
- 307 - Animal Management Systems
- 102 - Soil, Plant, Water, Nutrient Relationships
- 112 - Watershed Protection and Management
- 133 - Pollution Prevention and Mitigation
- 111 - Conservation and Efficient Use of Water
- 135 - Aquatic and Terrestrial Wildlife
- 136 - Conservation of Biological Diversity

4. Associated Institute Type(s)

- 1862 Research

Outcome # 6

1. Outcome Target

Advance research knowledge, both basic and applied, in the areas of rangeland and forest management to existing and emerging industry and consumer demand regarding genetics, biology, seed production, nutrition, and related topics.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 123 - Management and Sustainability of Forest Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 121 - Management of Range Resources
- 205 - Plant Management Systems
- 605 - Natural Resource and Environmental Economics
- 213 - Weeds Affecting Plants
- 131 - Alternative Uses of Land
- 103 - Management of Saline and Sodic Soils and Salinity

4. Associated Institute Type(s)

- 1862 Research

Outcome # 7

1. Outcome Target

Meet local groups, community, USDA, USDI, and other stakeholder demands for scientific knowledge to inform existing and emerging issues/practices in wildlife including wildlife health, human wildlife use/conflicts, and human to human conflicts related to wildlife and use.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 605 - Natural Resource and Environmental Economics
- 136 - Conservation of Biological Diversity
- 304 - Animal Genome
- 135 - Aquatic and Terrestrial Wildlife
- 311 - Animal Diseases
- 305 - Animal Physiological Processes
- 307 - Animal Management Systems

4. Associated Institute Type(s)

- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect 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.)

Description

The possibilities of shifts in public policy, regulations, and shifts in demand will affect outcomes. This includes drought, coupled with pest and diseases that are often climate related. Exotic species such as cheatgrass are a significant external factor. Availability of state and federal base funding to ensure a core faculty and staff, availability of extramural funds, and programmatic demands that often exceed resources, will also affect outcomes.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

The evaluation studies for the program LOGIC models included in this plan will incorporate formative and summative approaches.

Formative (process) evaluation will be used for the purpose of improving or refining a program by scrutinizing its teaching activities. This involves pre-testing of educational materials in order to assess their efficacy and quality. It may also involve tracking the number of educational materials and activities, number of program contacts, and the types of barriers encountered in reaching target-teaching outcomes. The results of formative evaluations often lead to modifications to educational materials and activities in order to strengthen the program. The goal of formative evaluation is to identify ways in which to improve educational activities to make the program more efficient, more relevant, and more likely to accomplish a program's learning objectives and goals.

Summative (impact) evaluation will be used to assess program outcomes (changes that occur as a result of the program, without necessarily establishing cause and effect conclusions) and impacts (effectiveness in changing target populations' knowledge/learning, behavior/action, or in conditions).

Summative evaluation is typically appropriate for mature programs as it seeks to measure its overall success in reaching its target goals and occurs at the conclusion of the program or at planned benchmark points during program implementation. External evaluators may be used in order to increase evaluative objectivity. Because each of the plans addresses a broad combination of research and extension initiatives that target multiple audiences, methods, and intended outcomes, a combination of formative and summative evaluation is necessary to provide a comprehensive assessment. As appropriate, single case studies and experimental design (treatment and control groups) will be used in order to make comparisons between program participants and non-participants. In addition, funding partners often require specific methods and data for accountability reports.

Given that much of the research work of NAES faculty and staff does not focus on group level dynamics, many of the more formalized evaluation techniques are not appropriate.

The techniques that NAES continues to use, most of them being qualitative surrogate measures, are:

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2. Feedback from the CABNR/NAES Advisory Board Committee for helping to determine needs of our constituencies;
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4. Support from USDA, feedback from NIFA regarding our federal reports, and feedback and support we receive from other federal agencies.
5. Accountability measures required by extramural grants and contracts and our level of attainment of those required metrics.
6. Peer - reviewed publications and tier level of the journals, as well as other publications.
7. Patents warded
8. Commercialization of our research findings;
9. Both independent and total summation of our economic indicators in terms of state and federal base funding, extramural funding, special competitive university funding our faculty

Collectively the quantitative and qualitative measures inform NAES and Nevada Cooperative Extension across the needs assessment - formative - summative spectrum. Such feedback will continue to gathered and will strongly influence both units processes and products throughout this planning period, and beyond.

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Sustainable Energy

2. Brief summary about Planned Program

The U.S. remains reliant upon nonrenewable energy sources despite the negative environmental impacts on air, soil, and water quality. The current demand for alternative sustainable energy sources is unprecedented. In response, industrial and agricultural producer interest in bio-fuel crops has increased. Unfortunately, science-based information is lacking concerning the adaption and production potential of these crops in Nevada. This knowledge gap severely slows efforts to complete feasibility analyses to develop a sustainable energy industry or provide recommendations regarding the production of these crops.

The sustainable energy program emphasizes both basic and applied research, with a broad range of initiatives, from genetically engineering stress tolerant adaptive traits into potential fuel crops, to the agronomic potential for alternative bio-fuel crops in Nevada. Additionally it addresses energy conservation through environmentally responsible lifestyles, including recycling, alternative transportation, energy use, and conservation.

Immediate expansion of this program is necessary. Public policy education is needed regarding wind and solar energy production, implications of energy subsidies and conservation incentives, the influence of community policies and practices on energy use and conservation, the effects of sustainable community development on local businesses, and the costs and benefits of alternative waste management strategies.

The NAES research program brings together plant biochemists, ecologists, and economists to study basic and applied approaches for the efficient production of non-food feedstocks from forested and rangelands with limited freshwater availability as sustainable and renewable sources for biofuel generation within regional production systems.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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%		10%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		20%	
204	Plant Product Quality and Utility (Preharvest)	0%		20%	
206	Basic Plant Biology	0%		25%	
511	New and Improved Non-Food Products and Processes	0%		25%	
	Total	0%		100%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Nevada, as the rest of the US, relies heavily on nonrenewable energy. Currently Nevada imports 90% of its energy consumed from outside the state. Yet, Nevada ranks second nationally in terms of its capacity to generate electricity from solar and geothermal sources. The State's Energy Portfolio Standard requires 25 percent of electricity to come from renewable energy resources by 2025. Additionally, the demand for sources of bio-fuels for transportation will continue to increase. Approaches to enhancing biomass production will become very important.

Applied research and educational programs are needed to educate the public about sources of sustainable, renewable energy. This includes discovery of a portfolio of programs to develop biomass used for bio-fuels, design optimum crops for bio-energy production, and produce value-added bio-based industrial products.

Sustainable energy also encompasses programs that seek to enhance public awareness of the long-term environmental effects of reliance upon nonrenewable energy sources. These programs must provide science-based alternatives to reduce reliance on nonrenewable energy sources, including alternative transportation, recycling, and designing functional sustainable communities.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

• Bio-fuels are a set of emerging technologies that will provide the basis for additional agricultural revenue to those with large quantities of crop residues.
• Interest will continue to grow in this area and biofuels will become a part of the energy complex of this country, as well as the world.
• As long as traditional energy sources are less expensive, movement to biofuels will be slow.
• Petroleum supplies will be limited due to increasing national and global demand
• A large investment of public resources is necessary to support the development of a science-based bio-fuels industry.
• Funding is available for renewable resources with federal, state and industry support only increasing.
• Base federal funding will continue to be available and leverage for extramural grants to support this program and the scientific staff who carry out the lines of inquiry.
• Federal base funding will be leverage for continuing to attract state funds.

2. Ultimate goal(s) of this Program

Goals in this planned program are oriented to providing the biological, chemical, physical, engineering, and social research and extension programming necessary to build a system for sustainable energy and advanced materials. Specifically:

• Identify which bio-fuels or genetically modify feedstocks that are best suited to Nevada's climate and resource base.
• Depending on the emergence of technologies suited for Nevada's primary sources of bio-fuels, develop economically and socially viable alternative energy sources and production processes that can provide additional revenue to agricultural producers and processors.
• Enhance public awareness and motivation to live environmentally-responsible lifestyles to include waste recycling, alternative transportation, and designing functional sustainable communities.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	0.0	0.0	1.0	0.0
2018	0.0	0.0	1.0	0.0
2019	0.0	0.0	1.5	0.0
2020	0.0	0.0	1.5	0.0
2021	0.0	0.0	1.5	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

• Conduct research on alternative and genetically modified crops as potential bio-fuels and methods of production that are well-suited for Nevada.

• Conduct research into Nevada's highly prolific rabbit brush and gumweed as a good candidate for industrial products (i.e., rubber, plastics, coatings, lubricants and adhesives) and energy feedstocks (i.e. biodiesel and cellulosic-based liquid fuels.
• Report on and adapt research to educate producers outlining benefits and costs.
• Educate the public about sustainable practices, renewable energy use, and environmentally responsible lifestyles.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations	● Public Service Announcement ● Newsletters ● TV Media Programs ● Web sites other than eXtension ● Other 1 (Newspapers/Magazines/Print Media) ● Other 2 (Extension publications)

3. Description of targeted audience

Target audiences include agricultural producers, general public, citizen and special interest groups, related industries, and federal, state, and local government agencies.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of Graduate Students or Post-Doctorates Trained
- Number of Undergraduate Students Involved in Research
- Workshops, Demonstrations, and Presentations
- Abstracts, Books, Book Chapter(s), Proceedings, Research Reports, and Technical Publications
- Brochures, Bulletins, Fact Sheets, Newsletter, and Surveys
- Manuals and Other Printed Instructional Materials Produced
- Digital Media and Web Sites Created or Updated
- Leveraged research funds generated

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of individuals who gain knowledge about sustainable energy and environmentally responsible lifestyles.
2	Number of individuals who implement practices related to or in support of sustainable energy and environmentally responsible lifestyles and practices.
3	Programs in this area will develop strategies to engage producers, industrial partners, and consumers groups resulting in effective leadership-oriented partnerships.
4	Annually the program will report, in conjunction with industrial partners, non-proprietary research gains made to the consuming public to garner interest in adoption of new products and processes when released.
5	Increased understanding of energy alternatives, resources and project support.

Outcome # 1

1. Outcome Target

Number of individuals who gain knowledge about sustainable energy and environmentally responsible lifestyles.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 511 - New and Improved Non-Food Products and Processes
- 206 - Basic Plant Biology
- 204 - Plant Product Quality and Utility (Preharvest)
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Number of individuals who implement practices related to or in support of sustainable energy and environmentally responsible lifestyles and practices.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 206 - Basic Plant Biology
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 204 - Plant Product Quality and Utility (Preharvest)
- 511 - New and Improved Non-Food Products and Processes

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

Programs in this area will develop strategies to engage producers, industrial partners, and consumers groups resulting in effective leadership-oriented partnerships.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 511 - New and Improved Non-Food Products and Processes
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 204 - Plant Product Quality and Utility (Preharvest)

4. Associated Institute Type(s)

- 1862 Research

Outcome # 4

1. Outcome Target

Annually the program will report, in conjunction with industrial partners, non-proprietary research gains made to the consuming public to garner interest in adoption of new products and processes when released.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 511 - New and Improved Non-Food Products and Processes
- 206 - Basic Plant Biology
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 204 - Plant Product Quality and Utility (Preharvest)
- 201 - Plant Genome, Genetics, and Genetic Mechanisms

4. Associated Institute Type(s)

- 1862 Research

Outcome # 5

1. Outcome Target

Increased understanding of energy alternatives, resources and project support.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 206 - Basic Plant Biology

- 204 - Plant Product Quality and Utility (Preharvest)
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 511 - New and Improved Non-Food Products and Processes

4. Associated Institute Type(s)

- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

A number of factors could influence the extent to which NAES and UNCE are able to meet its programmatic goals as planned.

• Supply, costs, transportation costs/impacts, and demand for petroleum products, and shifting projections of world reserves of crude oil and natural gas, as well as U.S. access to these, are critical external factors.
• New sources of biofuels from Nevada's natural resources are an external factor.
• Availability of feedstocks in Nevada, and regionally, and at what costs, economic, social and environmental costs, are external factors.
• Economic shifts such as cost of processing equipment or production costs, public policy shifts, regulations, and shifts in demand will be impact outcomes.
• Factors such as the availability of base funding to ensure a core faculty and staff, availability of extramural funds, and programmatic demands that often exceed resources, all will affect outcomes.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

The evaluation studies for the program LOGIC models included in this plan will incorporate formative and summative approaches.

Formative (process) evaluation will be used for the purpose of improving or refining a program by scrutinizing its teaching activities. This involves pre-testing of educational materials in order to assess their efficacy and quality. It may also involve tracking the number of educational materials and activities,

number of program contacts, and the types of barriers encountered in reaching target-teaching outcomes. The results of formative evaluations often lead to modifications to educational materials and activities in order to strengthen the program. The goal of formative evaluation is to identify ways in which to improve educational activities to make the program more efficient, more relevant, and more likely to accomplish a program's learning objectives and goals.

Summative (impact) evaluation will be used to assess program outcomes (changes that occur as a result of the program, without necessarily establishing cause and effect conclusions) and impacts (effectiveness in changing target populations' knowledge/learning, behavior/action, or in conditions).

Summative evaluation is typically appropriate for mature programs as it seeks to measure its overall success in reaching its target goals and occurs at the conclusion of the program or at planned benchmark points during program implementation. External evaluators may be used in order to increase evaluative objectivity. Because each of the plans addresses a broad combination of research and extension initiatives that target multiple audiences, methods, and intended outcomes, a combination of formative and summative evaluation is necessary to provide a comprehensive assessment. As appropriate, single case studies and experimental design (treatment and control groups) will be used in order to make comparisons between program participants and non-participants. In addition, funding partners often require specific methods and data for accountability reports.

Given that much of the research work of NAES faculty and staff does not focus on group level dynamics, many of the more formalized evaluation techniques are not appropriate.

The techniques that NAES continues to use, most of them being qualitative surrogate measures, are:

1. Informal and formal feedback from stakeholders in terms of overall level of satisfaction with NAES processes and products.
2. Feedback from the CABNR/NAES Advisory Board Committee for helping to determine needs of our constituencies;
3. Elected state and federal officials' support for NAES in terms of base budgets, new initiatives, and their request for intervention or action for specific research projects.
4. Support from USDA, feedback from NIFA regarding our federal reports, and feedback and support we receive from other federal agencies.
5. Accountability measures required by extramural grants and contracts and our level of attainment of those required metrics.
6. Peer - reviewed publications and tier level of the journals, as well as other publications.
7. Patents warded
8. Commercialization of our research findings;
9. Both independent and total summation of our economic indicators in terms of state and federal base funding, extramural funding, special competitive university funding our faculty

Collectively the quantitative and qualitative measures inform NAES and UNCE across the needs assessment - formative - summative spectrum. Such feedback will continue to gathered and will strongly influence both units processes and products throughout this planning period, and beyond

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Childhood Obesity and Human Health

2. Brief summary about Planned Program

The primary goal of Nevada Cooperative Extension is to improve human health and quality of life. Learning about and adopting healthy lifestyle, which include food choices and eating habits, are a necessary program component. Many of the activities in this program area focus on preschool and grade-school youth and their parents. The benefits of physical activity as part of a healthy lifestyle and physical activities are part of teaching activities.
A number of educational approaches are designed to effectively target at-risk individuals and families, including low income and ethnic minorities. Programs combine research and education to target new parents, youth in school and after school, as well as childcare settings. Programs also target senior populations as well as women who struggle with substance abuse, which correlates to underlying eating disorders and related health and nutrition problems.
Newsletters, publications and other informational materials will be distributed to participants, families, teachers, and to professional health educators as well as to the general public. New curriculum and educational materials are being developed and tested.
NAES research efforts are being directed towards understanding molecular causes and effects on the human condition with emphasis on obesity and heart disease.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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	10%		100%	
703	Nutrition Education and Behavior	66%		0%	
805	Community Institutions and Social Services	24%		0%	
	Total	100%		100%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

According to the Nevada Hospital Association, over 60 percent of hospital costs in Nevada are directly

attributable to lifestyle or behavioral choices such as smoking, chronic drinking, poor diet, poor weight management, and lack of exercise. The leading cause of death in Nevada is heart disease, followed by cancer, respiratory disease, stroke, and motor vehicle accidents. Further, deaths from liver disease, lung cancer, and pulmonary disease are among the highest in the country. This is a reflection of the higher number of smokers and the high rate of chronic drinking.

The Behavioral Risk Factor Survey (BRFS) provides estimates of high-risk behaviors among the adult population in the U.S. The Center for Disease Control has coordinated the survey since 1982. Since 1991, Nevada has participated in this survey. Obesity is associated with a number of chronic diseases including coronary heart disease, diabetes, and cancer. 20 to 25 percent of Nevadans are at risk for being overweight. Males, older adults and those with lower education levels are more likely to be overweight.

Dietary characteristics, including dietary fat and fruit and vegetable intake were assessed also. Dietary fat was assessed using a series of questions regarding the frequency of eating certain types of high-fat foods. This information was then used to identify those at the highest risk with regard to total fat intake. Those with the highest intake, defined here as those who fell above the 75th percentile, include males, younger adults, and those with less education. Residents in the rural counties reported a slightly higher intake as well; 29 percent of rural respondents fall above the 75th percentile compared to 20 percent in Washoe County and 27 percent in Clark County. Further, it is estimated that 76 percent of Nevadans do not meet the National Cancer Institute recommendation of five servings of fruits and vegetables each day. Those with an income less than $20,000 and young adults are least likely to meet this goal. Ongoing programming to address lifestyle and behavioral choices have focused on prevention of heart disease, diabetes obesity and delayed early childhood development. The faith community and physicians are used to reach populations at risk for heart disease.

Although most data is derived from adults, food habits are established early in life. Needs assessment data indicate that families with limited resources are at high risk for poor nutrition that may put them at immediate risk to the cognitive and physical development of their children, and long-term risk for chronic diseases such as heart disease, diabetes, and cancer. While many agencies/organizations provide nutrition education to this clientele, there is no statewide mechanism to facilitate programs for families with limited resources. Thus the Nevada Nutrition Network, including representatives from all Nevada agencies/organizations that provide nutrition education, was formed to develop a statewide Food Stamp Nutrition Education Plan to increase the consumption of low-fat, calcium-rich foods by school-age children, initially focusing on adolescent girls (12-15 years) since they appear to be at greater risk. Focus groups have helped shape the educational program, which is currently being designed for implementation and evaluation.

Nevada estimates the costs associated with treating conditions related to overweight and obesity is $337 million annually. A recent report released by the Nevada Institute for Children's Research and Policy on the health status of children entering kindergarten in the Nevada school system (n=3,597) stated 21% of the children in the study were obese and an additional 13% were overweight.

A person's relationship with food and physical activity begins in infancy and is molded during childhood. Studies have demonstrated a link between low-income, and subsequently food-insecure families, and negative health outcomes. This is particularly true for early childhood obesity and obesity in later years, which leads to diminished societal productivity and increasing health care costs.

Nevada's senior population has increased nearly twice as fast as the state's population over the past ten years, with 61 percent of senior citizens residing in Clark County. Health concerns largely relate to the high cost of health care providers, medication and health insurance. Other health concerns include availability and quality of health care, including the availability of program and services which are prevention oriented.

It is estimated that 20 percent of males, 17 percent of females, and 25 percent of children in Nevada are medically uninsured. These children are less likely to receive routine or preventive medical care. Further, when a family member is ill, an inability to pay often prevents them from seeking care until the illness has become very serious. Nine out of every ten pediatricians surveyed indicated that children from low-income families have difficulty accessing primary health care, citing inability to pay as the most important reason. To improve health care, almost half were in favor of school-based clinics.

Early and high quality prenatal care is an effective means of improving pregnancy outcome. It is estimated that for every dollar spent on prenatal care, ten dollars are saved on infant care. In Nevada, unfortunately, only 71 percent of pregnant women receive adequate prenatal care. According to the American Public Health Association, this is among the worst rates in the country (44th), although the proportion of women receiving care during their first trimester has increased from 24.7 percent in 1984 to 28 percent in 1990. Household income is believed to be the single most significant barrier to receiving early and effective prenatal care.

Low birth weight is defined as a birth weight of less than 2500 grams. Mothers most likely to have low-birth weight infants are also more likely to live in poverty, receive little or no prenatal care, have a low level of education, be unmarried, and be a member of a racial minority.

Another issue involves substance abuse, one of the leading health indicators of the Healthy People 2020 objectives. Substance abuse is associated with violence, STDs, pregnancy, motor vehicle crashes, homelessness, rising health care costs, and obesity. Some of the common health and nutrition issues associated with stimulant and other illicit drug use include poor dietary practices and family meal planning, inactivity, extreme weight gain during recovery, body image dissatisfaction and disordered eating patterns, poor hygiene, and mental health issues. Additionally these failed nutrition and physical activity practices within the family unit can have direct impacts on child health and obesity. Of particular interest to the health community is the widespread abuse of stimulants among women including cocaine, methamphetamine (meth), and other stimulants. The seductive allure and pleasurable side effects of stimulants, such as meth, include weight loss, increased energy levels, alertness, decreased appetite, and euphoria. These side effects, along with elevation of self-esteem make them the drug of choice among many young women.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

• The relationship between food and human health develops during pregancy and continues during the early childhood years.
• High dosage educational programs that teach children about healthy food choices and physical

activity can impact childhood obesity rates.
• Social acceptance of a variety of body shapes and sizes is important to the development of a positive, individual relationship with food.
• Families who are educated along with young children can support the practice of healthy, learned behaviors at home.
• Low-income families are at highest risk for health and nutrition problems.
• Substance abuse may be correlated with eating disorders.
• Base federal funding will continue to be available and leverage for extramural grants to support this program and the scientific staff who carry out these lines of inquiry.
• Federal base funding will be leveraged to attract state and extramural funds.

2. Ultimate goal(s) of this Program

• Strengthen preschoolers' understanding of the relationship between food and human health.
• Strengthen the capacity of preschool educators to help children learn how to become healthier and more active.
• Conduct research that focuses on establishing healthy lifestyle habits, including diet, exercise and prevention of smoking and substance abuse.
• Biochemical and behavioral research to elucidate factors relating to chronic diseases, including but not limited to obesity, diabetes, heart disease, pulmonary disease and cancer, coupled with education to reduce the burden of the disease among populations displaying their greatest incidence.
• First-time parents gain an understanding of vital pre- and post-natal needs of mothers and their infants through behavior-focused education.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	1.1	0.0	0.5	0.0
2018	1.1	0.0	0.5	0.0
2019	1.1	0.0	0.5	0.0
2020	1.1	0.0	0.7	0.0
2021	1.1	0.0	0.7	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

• Conduct research with respect to obesegenics, health, and nutrition.
• Conduct nutritional research and education to enhance human nutrition and nutrition-related behavior.
• Develop and provide intensive, high-dosage educational activities for preschool children about nutrition, physical activity, and social acceptance of diverse body shapes and sizes.
• Develop and provide workshop and one-on-one intervention to educate parents of preschoolers about

their child's development and how these issues impact their behavior.
- Develop, teach, and evaluate research-based programs focused on health and nutrition.
- Partner with professional educators to educate youth and families to improve health and nutrition.
- Publish curricula, journal articles, and fact sheets pertaining to health and nutrition.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Demonstrations ● Other 1 (Music/Dance videos, materials)	● Public Service Announcement ● Billboards ● Newsletters ● TV Media Programs ● Web sites other than eXtension ● Other 1 (Extension Publications)

3. Description of targeted audience

The primary target audience is pre-school and grade school children and their families. Secondary audiences are senior citizens, health care professionals, professional educators and childcare providers. Programs also target women struggling with substance abuse.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☐ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of Graduate Students or Post-Doctorates Trained
- Number of Undergraduate Students Involved in Research
- Workshops, Demonstrations, and Presentations
- Abstracts, Books, Book Chapter(s), Proceedings, Research Reports, and Technical Publications
- Brochures, Bulletins, Fact Sheets, Newsletter, and Surveys
- Manuals and Other Printed Instructional Materials Produced
- Digital Media and Web Sites Created or Updated
- Leveraged research funds generated

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of individuals who gain knowledge about nutrition and health.
2	Number of individuals who implement behaviors to improve health and nutrition.
3	Apply new knowledge to programs at the field level with a goal of significant long term weight loss and overall improvement of health in those who participate.
4	To identify research activities such as new data sources, improved techniques for data analysis, and improved hypotheses for obesity research questions.

Outcome # 1

1. Outcome Target

Number of individuals who gain knowledge about nutrition and health.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 702 - Requirements and Function of Nutrients and Other Food Components

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Number of individuals who implement behaviors to improve health and nutrition.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

Apply new knowledge to programs at the field level with a goal of significant long term weight loss and overall improvement of health in those who participate.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 702 - Requirements and Function of Nutrients and Other Food Components

4. Associated Institute Type(s)

- 1862 Research

Outcome # 4

1. Outcome Target

To identify research activities such as new data sources, improved techniques for data analysis, and improved hypotheses for obesity research questions.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior

4. Associated Institute Type(s)

- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)
- Other (Grant availability)

Description

• Shifts in economy can impact all aspects of people's lives, psychologically, socially, and physically, including obesity.
• Public monies, and the fluctuations in appropriations of such, having dramatic (both positive and negative) effect on human well-being, as do levels of government support for obesity education.
• Public policy and the publics' priorities and perceptions, including popular culture and trends/fads, as well as people's food and lifestyle choices are major external factors impacting this program.
• Migrant populations entering the community and workforce, or new populations who have recently immigrated into the area, and are ill prepared to sustain themselves to the extent they can purchase healthy foods and/or have access to public education/assistance programs that promote healthy eating and lifestyle choices.

• Learning styles, disabilities, one's background/education, social status, affect individual's eating habits and lifestyle choices.
• Cultural behaviors instilled into individuals psyche and behavior and change is slow.
• Availability of base funding to ensure a core faculty and staff, availability of extramural funds, and programmatic demands that often exceed resources, will affect outcomes.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

The evaluation studies for the program LOGIC models included in this plan will incorporate formative and summative approaches.

Formative (process) evaluation will be used for the purpose of improving or refining a program by scrutinizing its teaching activities. This involves pre-testing of educational materials in order to assess their efficacy and quality. It may also involve tracking the number of educational materials and activities, number of program contacts, and the types of barriers encountered in reaching target-teaching outcomes. The results of formative evaluations often lead to modifications to educational materials and activities in order to strengthen the program. The goal of formative evaluation is to identify ways in which to improve educational activities to make the program more efficient, more relevant, and more likely to accomplish a program's learning objectives and goals.

Summative (impact) evaluation will be used to assess program outcomes (changes that occur as a result of the program, without necessarily establishing cause and effect conclusions) and impacts (effectiveness in changing target populations' knowledge/learning, behavior/action, or in conditions).

Summative evaluation is typically appropriate for mature programs as it seeks to measure its overall success in reaching its target goals and occurs at the conclusion of the program or at planned benchmark points during program implementation. External evaluators may be used in order to increase evaluative objectivity. Because each of the plans addresses a broad combination of research and extension initiatives that target multiple audiences, methods, and intended outcomes, a combination of formative and summative evaluation is necessary to provide a comprehensive assessment. As appropriate, single case studies and experimental design (treatment and control groups) will be used in order to make comparisons between program participants and non-participants. In addition, funding partners often require specific methods and data for accountability reports.

Given that much of the research work of NAES faculty and staff does not focus on group level dynamics, many of the more formalized evaluation techniques are not appropriate.

The techniques that NAES continues to use, most of them being qualitative surrogate measures, are:

1. Informal and formal feedback from stakeholders in terms of overall level of satisfaction with NAES processes and products.
2. Feedback from the CABNR/NAES Advisory Board Committee for helping to determine needs of our constituencies;
3. Elected state and federal officials' support for NAES in terms of base budgets, new initiatives, and their request for intervention or action for specific research projects.
4. Support from USDA, feedback from NIFA regarding our federal reports, and feedback and support we receive from other federal agencies.
5. Accountability measures required by extramural grants and contracts and our level of attainment of those required metrics.

6. Peer - reviewed publications and tier level of the journals, as well as other publications.
7. Patents warded
8. Commercialization of our research findings;
9. Both independent and total summation of our economic indicators in terms of state and federal base funding, extramural funding, special competitive university funding our faculty

Collectively the quantitative and qualitative measures inform NAES and Nevada Cooperative Extension across the needs assessment - formative - summative spectrum. Such feedback will continue to gathered and will strongly influence both units processes and products throughout this planning period, and beyond

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Food Safety

2. Brief summary about Planned Program

Agricultural producers and food consumers in Nevada require education about safe food production, handling, and processing to help reduce the risk associated with foodborne illness. Nevada Cooperative Extension seeks to build food safety programs on a par with other land grant universities in the US. This means developing outreach programs designed to strengthen the capacity of producers to develop comprehensive farm plans, which include Good Agricultural Practices (GAPs) and Good Handling Practices (GHPs). With Nevada's steady expansion of its "farm-to-fork" supply chain, Nevada Cooperative Extension must educate all agricultural producers, regardless of operation size, to control and prevent accidental biological, chemical, or physical hazards that could contaminate food products during production, storage, and transportation.

The NAES research programs will encompass a broad range of approaches from basic cellular and molecular research to cost benefit analysis and education programs with special attention to underserved communities. NAES has complementary expertise in food safety that integrates knowledge and methods from animal science, food science, and resource economics.

Nevada's food safety programs focus efforts toward: a zoonotic disease/public health program (human-animal disease transfer), a beef quality assurance with emphasis on Spanish peaking producers, bio-terrorism/natural disaster emergency management program, an international animal health programs, reducing care facilities food-borne illnesses, and regulations and liability educational programs designed for the small producers of Nevada.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
308	Improved Animal Products (Before Harvest)	0%		5%	
315	Animal Welfare/Well-Being and Protection	50%		0%	
504	Home and Commercial Food Service	0%		10%	
601	Economics of Agricultural Production and Farm Management	0%		60%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	25%		0%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	25%		5%	
723	Hazards to Human Health and Safety	0%		20%	
	Total	100%		100%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Foodborne illness continues to be an urgent issue across the United States. The CDC estimates that, annually, 1 out of 6 Americans (or 48 million people) get sick, 128,000 are hospitalized, and 3,000 die of foodborne diseases. Maintaining an affordable and safe national food supply is essential to agriculture and the nation. The ability to detect and prevent contamination by intentional or naturally occurring causes is a priority to ensuring food safety throughout the production, processing, and distribution system.

A number of endemic zoonotic diseases are found in the Great Basin Area. Emerging and foreign zoonotic disease may become a threat to animal and humans through natural, unintentional or intentional introduction. Bovine Spongiform Encephalopathy (BSE), West Nile virus, and highly pathogenic avian influenza are examples of zoonoses that are major concerns to different sectors of Nevada's population.

Emergency management planning and response has been very important for many years in the fire fighting sector and in the states with serious hurricane events. Only in the past decade has there been significant development in other arenas. The events of 9/11/01, hurricanes Katrina and Rita, and the fires in California and Nevada (Rim Fire 2013) have driven home the need for a broad based multi-hazard response capability.

Because of Nevada's growing elderly and young populations and the economic dependency on food service related tourism, we are particularly vulnerable to food-borne illness. And according to previous research a large educational gap exists between care givers and their understanding of food-borne illness prevention.

The majority of agricultural operations in Nevada are considered small-scale, earning less than $10,000/year, and are very interested in adding value to products. These producers have expressed a

desire to learn about food safety regulations, farm and ranch safety inspections, minimizing food safety risk, and steps that can be taken to deal with legal risk following a food safety violation.

NAES priorities include:

• Insuring the safety of Nevada's food supplies while striving to improve communication between all the entities within our state that are held accountable for food safety and security,
• Providing scientific expertise to the international community,
• Addressing the educational needs Nevada's caregivers by focusing on changing false beliefs about food preparation, and storage,
• Provide workshops designs for the small-scale producer.

Developing and providing outreach education based on accurate science will promote food safety from production to consumption. Crop and livestock production systems must be protected from economically significant pests, pathogens, diseases, and toxins whether naturally occurring or introduced. Throughout production, processing, distribution, and preparation the food supply must be sheltered from contamination by organisms, toxins, and chemical residues that cause disease in or harm to humans.

Nevada Cooperative Extension will focus primarily on teaching agricultural producers farm safety planning as part of the National Good Agricultural Practices (GAPs) program. Producers will receive training and one-on-one support to develop farm/ranch plans to prepare for voluntary audits, conducted by Nevada Department of Agriculture inspectors, in compliance with the Food Safety and Modernization Act. This includes training for Nevada's growing number of community and school garden managers and suppliers to local farmer markets and restaurants. Also, Nevada Cooperative Extension will educate food workers in care facilities to ensure they have the knowledge and skills to ensure safe handling of food prepared for clientele.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

• Food safety is a critical issue as the number of small producers, community and school gardens, and farm-to-fork supply operations increases.
• Farm workers are a critical audience for food safety hygiene training and GAPs/GHPs implementation.
• Cottage food industries and other small food manufacturers often lack the specific knowledge to process foods safely.
• Food service workers are a critical audience to reduce the risk of foodborne illness in care and retail facilities.
• Food consumers benefit from improved understanding of practices to prevent food contamination and foodborne illness.

• Base federal funding will continue to be available and leverage for extramural grants to support this program and the scientific staff who carry out the lines of inquiry.
• Federal base funding will be leverage for continuing to attract state funds.

2. Ultimate goal(s) of this Program

• Increase the number of methods that reduce food contamination and growth of foodborne organisms.
• Support the development and transfer of practices and intervention strategies that manage, reduce, or eliminate food safety risk throughout the food chain.
• Increase the number of agricultural producers who develop farm plans to ensure food safety.
• Increase the number of agricultural producers who voluntarily complete farm/ranch audits to receive GAPs certification.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	1.0	0.0	0.2	0.0
2018	1.0	0.0	0.2	0.0
2019	1.0	0.0	0.3	0.0
2020	1.0	0.0	0.3	0.0
2021	1.0	0.0	0.3	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

• Conduct a statewide assessment to identify specific food safety program topics and further identify target audiences.
• Provide educational and extension outreach support to market livestock and produce growers, to owners and operators of small and very small plants, and to food preparers and handlers, including minority populations such as Asian Pacific Islanders, and American Indians.
• Educate agricultural producers about methods to reduce food contamination and growth of foodborne organisms.
• Conduct in-depth cattle handling workshops to increase production and improve animal health through decreased stress.
• Support the development and transfer of practices and intervention strategies that manage, reduce, or eliminate food safety risk throughout the food chain.
• Educate agricultural producers about farm planning to ensure food safety, direct marketing, including legal, financial, and marketing risks.
• Educate agricultural producers about GAPs and GHPs.
• Provide producers educational and extension support for the implementation of HACCP.

• Partner with Nevada Department of Agriculture to build awareness of volunteer GAP and GHP certification processes.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● One-on-One Intervention ● Demonstrations	● Public Service Announcement ● Newsletters ● Web sites other than eXtension ● Other 1 (Newspapers/Magazines/Print Media) ● Other 2 (Extension Publications)

3. Description of targeted audience

This program targets:

• Agricultural producers, small acreage operators, and managers/operators of school/community gardens.
• Livestock producers who participate in Beef Quality Assurance (BQA)
• 4-H and FFA youth participating in statewide and local competitive events with market projects
• Food safety programs also target professionals in the retail food industry and custodial food providers in child and senior care facilities.
• Specific individuals or groups who have expressed a need for food safety research and extension information that is to be derived through new research, extracted from on-going research, or is derived from scientific literature.
• Other scientists, scientific groups and political entities.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of Graduate Students or Post-Doctorates Trained
- Number of Undergraduate Students Involved in Research
- Workshops, Demonstrations, and Presentations
- Abstracts, Books, Book Chapter(s), Proceedings, Research Reports, and Technical Publications
- Brochures, Bulletins, Fact Sheets, Newsletter, and Surveys
- Manuals and Other Printed Instructional Materials Produced
- Digital Media and Web Sites Created or Updated
- Leveraged research funds generated

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of individuals who gain knowledge about foodborne illness, farm/ranch food safety, and quality assurance.
2	Number of individuals who implement practices to prevent foodborne illness, which include farm/ranch food safety plans and quality assurance practices.
3	Reduce food borne pathogens in the food supply chain.

Outcome # 1

1. Outcome Target

Number of individuals who gain knowledge about foodborne illness, farm/ranch food safety, and quality assurance.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 315 - Animal Welfare/Well-Being and Protection
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
- 308 - Improved Animal Products (Before Harvest)
- 504 - Home and Commercial Food Service

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Number of individuals who implement practices to prevent foodborne illness, which include farm/ranch food safety plans and quality assurance practices.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 308 - Improved Animal Products (Before Harvest)
- 504 - Home and Commercial Food Service
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
- 315 - Animal Welfare/Well-Being and Protection

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

Reduce food borne pathogens in the food supply chain.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 504 - Home and Commercial Food Service

4. Associated Institute Type(s)

- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect 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.)
- Other (Grant funding available)

Description

The food safety program could be impacted by:

• Climatic extremes could impact the quantity and quality of food supplied as well as the timely distribution of food before contamination is an issue.
• Climatic extremes could impact supply or foster growth and dispersion of pest and pathogens.
• Economic shifts such as to cost of processing equipment or production costs, public policy shifts, regulations, and shifts in demand will be impact outcomes.
• Problems with acceptance by individuals and groups.
• New biological and chemical threats.
• Factors such as the availability of base funding to ensure a core faculty and staff, availability of extramural funds, and programmatic demands that often exceed resources, will affect outcomes.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

The evaluation studies for the program LOGIC models included in this plan will incorporate formative and summative approaches.

Formative (process) evaluation will be used for the purpose of improving or refining a program by scrutinizing its teaching activities. This involves pre-testing of educational materials in order to assess their efficacy and quality. It may also involve tracking the number of educational materials and activities, number of program contacts, and the types of barriers encountered in reaching target-teaching outcomes. The results of formative evaluations often lead to modifications to educational materials and activities in order to strengthen the program. The goal of formative evaluation is to identify ways in which to improve educational activities to make the program more efficient, more relevant, and more likely to accomplish a program's learning objectives and goals.

Summative (impact) evaluation will be used to assess program outcomes (changes that occur as a result of the program, without necessarily establishing cause and effect conclusions) and impacts (effectiveness in changing target populations' knowledge/learning, behavior/action, or in conditions).

Summative evaluation is typically appropriate for mature programs as it seeks to measure its overall success in reaching its target goals and occurs at the conclusion of the program or at planned benchmark points during program implementation. External evaluators may be used in order to increase evaluative objectivity. Because each of the plans addresses a broad combination of research and extension initiatives that target multiple audiences, methods, and intended outcomes, a combination of formative and summative evaluation is necessary to provide a comprehensive assessment. As appropriate, single case studies and experimental design (treatment and control groups) will be used in order to make comparisons between program participants and non-participants. In addition, funding partners often require specific methods and data for accountability reports.

Given that much of the research work of NAES faculty and staff does not focus on group level dynamics, many of the more formalized evaluation techniques are not appropriate.

The techniques that NAES continues to use, most of them being qualitative surrogate measures, are:

1. Informal and formal feedback from stakeholders in terms of overall level of satisfaction with NAES processes and products.
2. Feedback from the CABNR/NAES Advisory Board Committee for helping to determine needs of our constituencies;
3. Elected state and federal officials' support for NAES in terms of base budgets, new initiatives, and their request for intervention or action for specific research projects.
4. Support from USDA, feedback from NIFA regarding our federal reports, and feedback and support we receive from other federal agencies.
5. Accountability measures required by extramural grants and contracts and our level of attainment of those required metrics.
6. Peer - reviewed publications and tier level of the journals, as well as other publications.
7. Patents warded
8. Commercialization of our research findings;
9. Both independent and total summation of our economic indicators in terms of state and federal base funding, extramural funding, special competitive university funding our faculty

Collectively the quantitative and qualitative measures inform NAES and Nevada Cooperative Extension across the needs assessment - formative - summative spectrum. Such feedback will continue to gathered and will strongly influence both units processes and products throughout this planning period, and beyond

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Community and Economic Development

2. Brief summary about Planned Program

Record unemployment rates, shrinking gross domestic product, high housing foreclosures, and shrinking tax base have challenged most state economies for the last several years. Although recently the national economy has shown signs of improvement, Nevada's recovery continues at much slower pace than other states. This is why state, county, and community leaders are increasing economic development efforts centered on sustainable economic development.

Managing population growth and diversifying the economic base will comprise primary goals for Nevada for community leaders from urban and rural areas. While sustainable economic development programs have been offered in Nevada's urban and metropolitan areas (Washoe and Clark counties) for some time, the need for sustainable economic development in rural counties is even more critical.

This state-mandated program area will strive to:

1. develop local leadership skills;
2. teach small business owners basic principles of business planning and management;
3. build the capacity of rural communities to develop comprehensive economic development strategies;
4. help counties develop regional strategies for sustainable development; and provide to state, counties, and communities research and technical assistance related to sustainable economic and community development.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
112	Watershed Protection and Management	0%		30%	
122	Management and Control of Forest and Range Fires	0%		10%	
213	Weeds Affecting Plants	0%		10%	
601	Economics of Agricultural Production and Farm Management	0%		5%	
605	Natural Resource and Environmental Economics	0%		15%	
608	Community Resource Planning and Development	100%		20%	
610	Domestic Policy Analysis	0%		10%	
	Total	100%		100%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

The economic situation in Nevada is improving. Nevada has successfully attracted high technology industries, including Tesla's gigafactory, an Apple data center and the Faraday electric car company. The median home price in southern Nevada rose from a low of $109,000 in 2010 to $195,000 in late 2015. In northern Nevada, median home prices rose from $154,000 to $282,000 in the same period. This has had a very positive effect in Nevada's two largest metropolitan areas. With regards to unemployment rates, Las Vegas's 2010 rate has decreased from 14% to the present rate of 6.3%. Reno's unemployment rate peaked at 13% in 2010 and has decreased to the current rate of 5.5%. However, in Nevada's rural counties home values have not improved at the same rate, nor have unemployment rates. In some, including Nye County and Eureka County, property tax revenues have not been sufficient to support services that are not mandated by county and state statute, such as health clinics and veterans services. Many rural counties are subject to the boom and bust cycles associated with mineral extraction. While the state continues to diversify its tourism and mining dependent economy, economists estimate that Nevada's urban economies may improve more quickly than those in rural areas.

Nevada's rural communities continue to deal with many of the same problems other rural communities across the US face, including a reduced demand for skilled workers in agriculture and natural resource extraction. This is primarily due to increased production efficiency and automation, continued lack of new knowledge-based and technology-based job creation, continued divergence between Nevada's rural and urban economic fortunes, and a continued inability to attract new manufacturers as a result of downward global pressures on wages. Compounding this problem is a general lack of skillful and knowledgeable personnel in Nevada's rural communities when it comes to sustainable, long-term development and economic diversification.

Nevada's rural communities currently depend heavily on the expertise of NAES and Nevada Cooperative Extension faculty to deliver the expertise needed. Extension faculty will develop local expertise, through

educational programs, such as Engaged Leadership and the Local Leaders Institute. Both NAES and Nevada Cooperative Extension faculty will assist in strategic rural economic development, and provide technical assistance in a variety of program areas including natural resource development and management, rangeland conservation and reclamation, and local government administration.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

• While the state works to diversify its tourism and mining-dependent economy, economists estimate that Nevada's housing sector may require at least the rest of this decade to recover.
• Nevada's unemployment rate, particularly in urban areas, will remain higher than the national average until the state diversifies it economy to rely less heavily on gaming and tourism.
• Rural Nevada communities will continue to experience boom and bust cycles until leaders make concerted efforts to help diversify local economies to rely less heavily on nonrenewable resource extraction.
• Local government officials who acquire knowledge and develop skills in ethics, governance, and leadership can make effective decisions that lead to sustainable community and economic development.
• The majority (95%) of Nevada businesses are considered small by having fewer than 20 employees.
• Programs that build the capacity of small-business owners to develop and follow business plans improve the likelihood of their success and longevity.
• Advisory boards and special-interest groups can effectively assist local government efforts by acquiring leadership, collaborative problem solving, and effective decision-making skills.
• Comprehensive economic development strategies better prepare rural Nevada communities, particularly those with close proximity to Clark and Washoe counties, to manage long-term growth.
• Regional economic development strategies can provide long-term stability for Nevada's sustainable economic recovery and growth.
• Base federal funding will continue to be available and leverage for extramural grants to support this program and the scientific staff who carry out the lines of inquiry.
• Federal base funding will be leverage for continuing to attract state funds.

2. Ultimate goal(s) of this Program

• People in rural communities work together as a regional team to develop and implement an economic development plan that builds on the current and emerging economic strengths of the region.
• Small-business owners learn how to access and compete for local, state, and federal procurement contacts.

• Small-business owners learn basic business principles and the skills necessary to grow their individual businesses.
• Small-business owners learn and demonstrate best practices through training, technical assistance, and connectivity with business support resources.
• Community stakeholders learn how to utilize development and planning tools, such as asset mapping, secondary data analysis, and social network analysis.
• Community stakeholders strengthen their capacity to participate in community development planning.
• Guided and supported community-based research produces community and regional economic development strategies for Nevada.
• Elected and appointed officials develop the capacity to support sustainable economic development and viability at the community, county, regional, and state levels.
• Elected and appointed officials strengthen their leadership and decision-making ethics.
• Elected and appointed officials acquire practical knowledge about Nevada's fiscal system, land-use planning, natural resource management, and economic growth.
• Education and evaluation research targeting the most vulnerable youth to increase their capacity related to life skills.
• University students learn and practice civic engagement via Extension service learning assignments.
• University service-learning builds social capital in Nevada's rural and urban communities.
• Nevada's rural communities end the boom-bust cycles, which have been tied to extraction of natural resources and those commodity prices since turning from territory to state.
• Nevada, on a statewide basis, diversifies its economy, decreases its unemployment and underemployment rates, increases its knowledge capital, and recovers from the housing crisis.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	1.3	0.0	0.2	0.0
2018	1.3	0.0	0.2	0.0
2019	1.3	0.0	0.3	0.0
2020	1.3	0.0	0.3	0.0
2021	2.0	0.0	0.3	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

• Develop and expand applicable knowledge of natural resource and environmental economics commensurate with demand from multiple stakeholders for multiple outcomes, e.g. profit, preservation, esthetics.
• Explore and advance theoretical and applied economics of domestic/international trade and development as it relates to Nevada and national needs.
• Enhance understanding of domestic economic policy analysis in terms of government policy impact on agriculture and natural resources

• Strengthen capacity among community stakeholders to participate in community-development planning, including asset mapping, secondary data analysis, and social network analysis.
• Conduct applied research to assess regional economic development strategies for Nevada.
• Conduct applied research to help rural communities develop business matching models.
• Develop educational resources to build the capacity of elected and appointed officials to support sustainable economic development and viability at the community, county, regional, and state levels.
• Conduct workshops for elected and appointed officials focused on leadership ethics, Nevada's fiscal system, land-use planning, natural-resource management, and economic development.
• Develop service-learning activities via Extension programs to teach university students about civic engagement and community level problem solving.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention	● Public Service Announcement ● Newsletters ● Web sites other than eXtension ● Other 1 (Reports/Studies) ● Other 2 (Extension publications)

3. Description of targeted audience

Target audiences include elected and appointed leaders and officials, business owners, general public, youth leaders, service-learning university students, land-use planners, and economic development professionals.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of Graduate Students or Post-Doctorates Trained
- Number of Undergraduate Students Involved in Research
- Workshops, Demonstrations, and Presentations
- Abstracts, Books, Book Chapter(s), Proceedings, Research Reports, and Technical Publications
- Brochures, Bulletins, Fact Sheets, Newsletter, and Surveys
- Manuals and Other Printed Instructional Materials Produced
- Digital Media and Web Sites Created or Updated
- Databases and Models
- Leveraged research funds generated

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of individuals who gain knowledge about community and economic development.
2	Number of individuals who implement knowledge about community and economic development.
3	Stakeholders will have the necessary models that will improve on the forecasting of risk, demand, and prices in various commodity sectors leading to enhanced decision making, increased profits, and reductions in uncertainty.
4	Research finding on valuing environmental resources, e.g. lakes, wetlands, river restoration, and how it applies to stakeholder needs for demonstrated gains in profits, resources sustained, and/or actions mitigated.
5	Biological complexity analyses to understand human-nature interactions at the landscape level that informs human enterprises, leading to demonstrated profitability, environmental protection, and/or improvements in quality of stakeholders' lives.
6	Market and non-market valuation of environmental resources that have often lacked economic justification that meets client needs, and informs individual, group, and government decision making.

Outcome # 1

1. Outcome Target

Number of individuals who gain knowledge about community and economic development.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 605 - Natural Resource and Environmental Economics
- 608 - Community Resource Planning and Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Number of individuals who implement knowledge about community and economic development.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 608 - Community Resource Planning and Development
- 605 - Natural Resource and Environmental Economics

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

Stakeholders will have the necessary models that will improve on the forecasting of risk, demand, and prices in various commodity sectors leading to enhanced decision making, increased profits, and reductions in uncertainty.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 610 - Domestic Policy Analysis
- 608 - Community Resource Planning and Development

- 605 - Natural Resource and Environmental Economics
- 601 - Economics of Agricultural Production and Farm Management

4. Associated Institute Type(s)

- 1862 Research

Outcome # 4

1. Outcome Target

Research finding on valuing environmental resources, e.g. lakes, wetlands, river restoration, and how it applies to stakeholder needs for demonstrated gains in profits, resources sustained, and/or actions mitigated.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 605 - Natural Resource and Environmental Economics
- 608 - Community Resource Planning and Development
- 601 - Economics of Agricultural Production and Farm Management
- 122 - Management and Control of Forest and Range Fires
- 112 - Watershed Protection and Management

4. Associated Institute Type(s)

- 1862 Research

Outcome # 5

1. Outcome Target

Biological complexity analyses to understand human-nature interactions at the landscape level that informs human enterprises, leading to demonstrated profitability, environmental protection, and/or improvements in quality of stakeholders' lives.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 112 - Watershed Protection and Management
- 213 - Weeds Affecting Plants
- 601 - Economics of Agricultural Production and Farm Management
- 122 - Management and Control of Forest and Range Fires
- 608 - Community Resource Planning and Development
- 605 - Natural Resource and Environmental Economics

4. Associated Institute Type(s)

- 1862 Research

Outcome # 6

1. Outcome Target

Market and non-market valuation of environmental resources that have often lacked economic justification that meets client needs, and informs individual, group, and government decision making.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 608 - Community Resource Planning and Development
- 605 - Natural Resource and Environmental Economics
- 601 - Economics of Agricultural Production and Farm Management
- 122 - Management and Control of Forest and Range Fires
- 213 - Weeds Affecting Plants

4. Associated Institute Type(s)

- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect 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.)

Description

• Public monies, and the fluctuations in appropriations of such, can have dramatic (both positive and negative) effects on human well-being, as do levels of government regulations.
• Public policy, priorities, and perceptions are major external factors impacting this program.
• Priorities of economics research for limited dollars, and the resulting competition, impact the extent that research can be carried out.

- Weather related factors impact the conditions and attributes that are being studied by creating uncertainty that cannot be controlled for.
- Availability of base funding to ensure a core faculty and staff availability of extramural funds.
- Programmatic demands that often exceed resources, will affect outcomes.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

The evaluation studies for the program LOGIC models included in this plan will incorporate formative and summative approaches.

Formative (process) evaluation will be used for the purpose of improving or refining a program by scrutinizing its teaching activities. This involves pre-testing of educational materials in order to assess their efficacy and quality. It may also involve tracking the number of educational materials and activities, number of program contacts, and the types of barriers encountered in reaching target-teaching outcomes. The results of formative evaluations often lead to modifications to educational materials and activities in order to strengthen the program. The goal of formative evaluation is to identify ways in which to improve educational activities to make the program more efficient, more relevant, and more likely to accomplish a program's learning objectives and goals.

Summative (impact) evaluation will be used to assess program outcomes (changes that occur as a result of the program, without necessarily establishing cause and effect conclusions) and impacts (effectiveness in changing target populations' knowledge/learning, behavior/action, or in conditions).

Summative evaluation is typically appropriate for mature programs as it seeks to measure its overall success in reaching its target goals and occurs at the conclusion of the program or at planned benchmark points during program implementation. External evaluators may be used in order to increase evaluative objectivity. Because each of the plans addresses a broad combination of research and extension initiatives that target multiple audiences, methods, and intended outcomes, a combination of formative and summative evaluation is necessary to provide a comprehensive assessment. As appropriate, single case studies and experimental design (treatment and control groups) will be used in order to make comparisons between program participants and non-participants. In addition, funding partners often require specific methods and data for accountability reports.

Given that much of the research work of NAES faculty and staff does not focus on group level dynamics, many of the more formalized evaluation techniques are not appropriate.

The techniques that NAES continues to use, most of them being qualitative surrogate measures, are:

1. Informal and formal feedback from stakeholders in terms of overall level of satisfaction with NAES processes and products.
2. Feedback from the CABNR/NAES Advisory Board Committee for helping to determine needs of our constituencies;
3. Elected state and federal officials' support for NAES in terms of base budgets, new initiatives, and their request for intervention or action for specific research projects.
4. Support from USDA, feedback from NIFA regarding our federal reports, and feedback and support we receive from other federal agencies.
5. Accountability measures required by extramural grants and contracts and our level of attainment of those required metrics.

6. Peer - reviewed publications and tier level of the journals, as well as other publications.
7. Patents warded
8. Commercialization of our research findings;
9. Both independent and total summation of our economic indicators in terms of state and federal base funding, extramural funding, special competitive university funding our faculty

Collectively the quantitative and qualitative measures inform NAES and Nevada Cooperative Extension across the needs assessment - formative - summative spectrum. Such feedback will continue to gathered and will strongly influence both units processes and products throughout this planning period, and beyond

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Human and Family Development

2. Brief summary about Planned Program

All children face risks as they grow and develop, and most children can benefit greatly from positive interactions with caring adults. Children who have strong interpersonal skills and support are less likely to participate in risky behaviors, such as drug and alcohol use, early sexual involvement, and dropping out of school. Nevada Cooperative Extension's traditional 4-H program focuses on positive youth development as a proactive measure to ensure youth avoid risky behaviors. In 2015, Nevada passed a comprehensive tax package to support education from pre-school through high school. University of Nevada, Reno's priorities for the next legislative session include a focus on advanced manufacturing. University of Nevada Cooperative Extension is well prepared to lead extra-curricular efforts to introduce STEM concepts in rural and urban areas through 4-H. This can include introducing 4-H participants to robotics and unmanned aerial vehicles. Additionally Nevada Cooperative Extension developed 4-H After School Club programs to teach children basic life skills including math, reading, science, positive communication, goal setting, self-responsibility, decision-making, and good nutrition. Youth who have these life skills are less likely to participate in risky behaviors.

Even though traditional 4-H programs are firmly established in every county, Nevada still ranks among the highest in the nation in:

1. number of reported acts of domestic violence;
2. per capita juvenile incarceration rates;
3. number of young adults unemployed and not in school;
4. teen suicides;
5. high school dropout rates; and
6. teen pregnancies.

Nevada ranks among the lowest nationally for youth and adult literacy rates. These negative factors are exacerbated for disenfranchised youth from rural, limited-resource, and/or single-parent families.

This State mandated program area primarily addresses:

1. improving family literacy;
2. reducing developmental risk factors for school-aged youth;
3. improve youth to adult transition rates in rural area;
4. training first responders how to effectively interact with domestic violence victims; and
5. promoting positive youth and family development through its foundational 4-H programs.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
802	Human Development and Family Well-Being	100%		0%	
	Total	100%		0%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Nevada has one of the highest per capita juvenile incarceration rates in the nation. State and county costs of incarceration of Nevada juveniles continue to increase. Currently the average cost to incarcerate a juvenile is $84 per day with a seven-month average stay for a total of approximately $18,000 per child per year; and few alternatives to state operated juvenile detention facilities exist. In comparison, positive youth development programming that targets first-time juvenile offenders is estimated to cost $400 per family per year. Several Nevada studies indicate that taxpayers support community-based prevention programs rather than punitive detention programs.

Census data indicate that Nevada's rural communities have some of the highest rates in the nation regarding issues of youth having difficulty transitioning to the workplace or adulthood. Research supports the need to target families with the least financial resources and family support to help youth prepare themselves for post-secondary education or the world of work.

Family literacy is the foundation for youth success in school and later life. The Nevada Literacy Coalition estimates that nearly 25% of youth and adults in Nevada have inadequate literacy skills. This places Nevada's youth at extremely high risk for developing illiteracy-related problems in the future. Such problems include lack of grade retention, school failure, school dropout, delinquency, unemployment, and underemployment. Approximately 51% of third-grade and 47% of fourth-grade students are below basic reading levels. Additionally, the percentage of Spanish-speaking immigrants is expected to increase in Nevada over the next 25 years, increasing the likelihood that larger numbers of children who are English-language learners and at risk for low achievement will enter Nevada public schools.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

- The application of evidence-based programs to appropriate audiences can effectively change to

behavior and conditions.
• Children with strong interpersonal skills and support are less likely to participate in risky behaviors, such as drug and alcohol use and early sexual involvement.
• Children with strong interpersonal skills and support are more likely to stay in school and do better in school.
• Educational programs focused on young adults, ages 18-24, unemployed, and out of school can increase their likelihood of successful transition from youth to adulthood.
• First-time juvenile offenders who receive high-dosage educational programming to improve self-confidence and decision-making complete are less likely to reenter the juvenile system.
• Youth who participate in after-school and in-school 4-H clubs and programs develop the life skills necessary for positive successful youth development.
• 4-H programs that emphasize science, technology, engineering, and mathematics (STEM) prepare Nevada youth to enter post-secondary educational programs, study STEM subjects, and prepare for STEM related careers.
• First responders who are knowledgeable about domestic violence crimes can effectively interact with and help victims of domestic violence.
• Funding of the program will continue in a stable manner.

2. Ultimate goal(s) of this Program

• Increase Nevada 4-H youth program enrollment through 4-H clubs, camps, after-school programs, community center projects, home study sessions, and school enrichment programs.
• Increase the number of adult and teen volunteer leaders who help in these educational efforts.
• Teach and provide support to 4-H volunteer leaders in order to strengthen 4-H youth experiential learning and developmental success.
• Incorporate STEM components into 4-H and statewide youth development programs to better prepare youth for STEM post-secondary education and STEM related careers.
• Increase the number of after-school sites to teach children basic life skills including math, reading, science, positive communication, goal-setting, self-responsibility, decision-making, and good nutrition.
• Low-income and homeless youth attending urban and rural high-risk elementary schools receive positive support through after-school programs, resulting in lower high school dropout rates.
• Nevada's childcare providers have the knowledge and skills to provide safe and positive environments for children attending childcare centers.
• Through Nevada Cooperative Extension, Nevada GEAR UP, first-generation, college-going students are better prepared to enter and succeed in college.
• Rural unemployed and out-of-school youth, ages 18-24, realize more successful transition to adulthood, becoming more productive members of their communities.
• Incarceration rates decline for Nevada's juvenile offenders, saving taxpayers millions of dollars.
• Nevada's family literacy rates improve.
Victims of domestic violence learn the skills and utilize resources to diminish incident of violence.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	3.4	0.0	0.0	0.0

2018	3.4	0.0	0.0	0.0
2019	3.4	0.0	0.0	0.0
2020	4.0	0.0	0.0	0.0
2021	4.0	0.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct research with respect to human and family development issues.
- Develop and publish research-based, peer-reviewed curricula and journal articles in support of programs.
- Support the positive development of at risk youth and young adults through the use of Nevada's Nationally Recognized Evidence-Based Programs, Bootstraps and Project Magic.
- Teach parents of pre-school and elementary school youth how to increase family literacy.
- Develop and use statewide 4-H STEM program to help prepare Nevada youth for success in secondary and post-secondary education and STEM careers.
- Incorporate STEM components into Nevada Cooperative Extension's GEAR UP program.
- Train professional caregivers the skills necessary to provide safe, positive environments for children.
- Recruit, screen, and train adult volunteers to work effectively with youth.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Workshop ● Group Discussion ● One-on-One Intervention ● Other 1 (Reports/Studies) ● Other 2 (Extension publications)	● Web sites other than eXtension

3. Description of targeted audience

Target audiences include youth, young adults, parents/families, childcare providers, and other youth/family professionals. Target audiences also include at -risk families, including military families and seniors.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

☐ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of youth, families, and professionals who gain knowledge about positive human and family development.
2	Number of youth, families, and professionals who implement positive human and family development behaviors.

Outcome # 1

1. Outcome Target

Number of youth, families, and professionals who gain knowledge about positive human and family development.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Number of youth, families, and professionals who implement positive human and family development behaviors.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being

4. Associated Institute Type(s)

- 1862 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)
- Other (Grant funding availability)

Description

A number of factors could influence the extent to which Nevada Cooperative Extension is able to meet its programmatic goals as planned. Global economic conditions remain unstable and weak, both which indicate a slow recovery from the worldwide recession. Nevada's county budgets will continue to vary. That is, while several rural counties that rely upon mining as a primary economic driver continue to prosper, the remaining counties struggle to upright a toppled housing sector and severely deflated tourism and gaming industries. The significant loss of revenue from those counties most affected by the housing debacle and decline in tourism, Clark and Washoe, will affect the Nevada's ability to fund public education due to diminished state revenues. At best, the state's economic recovery will occur slowly over the next decade. As Nevada seeks to diversify its economy, program changes are likely to occur as a function of changing community issues, populations, and competing public priorities and programs. Responsive public policy and government regulations, particularly as they relate to water and land resources, will likely influence the degree to which program goals are achieved. Negative externalities as a result of the recession and subsequent reconstruction have immeasurable potential to influence the extent to which UNCE can effectively address identified community-based issues. Finally, natural disasters such as drought and rising energy prices are likely to significantly affect food production, food supply, food prices, and, in turn, generate a myriad of related socioeconomic issues at the community level.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

The evaluation studies for the program LOGIC models included in this plan will incorporate formative and summative approaches.

Formative (process) evaluation will be used for the purpose of improving or refining a program by scrutinizing its teaching activities. This involves pre-testing of educational materials in order to assess their efficacy and quality. It may also involve tracking the number of educational materials and activities, number of program contacts, and the types of barriers encountered in reaching target-teaching outcomes. The results of formative evaluations often lead to modifications to educational materials and activities in order to strengthen the program. The goal of formative evaluation is to identify ways in which to improve educational activities to make the program more efficient, more relevant, and more likely to accomplish a program's learning objectives and goals.

Summative (impact) evaluation will be used to assess program outcomes (changes that occur as a result of the program, without necessarily establishing cause and effect conclusions) and impacts (effectiveness in changing target populations' knowledge/learning, behavior/action, or in conditions).

Summative evaluation is typically appropriate for mature programs as it seeks to measure its overall success in reaching its target goals and occurs at the conclusion of the program or at planned benchmark points during program implementation. External evaluators may be used in order to increase evaluative objectivity. Because each of the plans addresses a broad combination of research and extension initiatives that target multiple audiences, methods, and intended outcomes, a combination of formative and summative evaluation is necessary to provide a comprehensive assessment. As appropriate, single case studies and experimental design (treatment and control groups) will be used in order to make comparisons between program participants and non-participants. In addition, funding partners often require specific methods and data for accountability reports.