V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Global Food Security and Hunger

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
111	Conservation and Efficient Use of Water	15%			
121	Management of Range Resources	19%			
205	Plant Management Systems	19%			
211	Insects, Mites, and Other Arthropods Affecting Plants	3%			
216	Integrated Pest Management Systems	6%			
307	Animal Management Systems	3%			
601	Economics of Agricultural Production and Farm Management	5%			
602	Business Management, Finance, and Taxation	8%			
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	10%			
806	Youth Development	12%			
	Total	100%			

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	9.0	0.0	0.0	0.0
Actual Paid	5.0	0.0	0.0	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
746065	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
746065	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
250524	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The Greenhouse Project, an active partner in the Future Farmers of America program for high school students, includes a commercial-sized greenhouse (2,100 square feet), 65 raised beds, a 33-foot hoop house and a small orchard. The project has strong connections to the school agriculture/horticulture program. Special needs High School students have daily classes in the greenhouse and on the site during the school year. The southern Nevada Research Center and Orchard researches new varieties of fruit producing trees, vines and other plant materials in sustainable ways. It is also a place where hands-on training/teaching opportunities can be held for home owners and commercial clientele. The Agriculture and Natural Resource Heritage Program includes educational presentations about the historic and rapidly disappearing Basque sheepherders and their cultural impacts on the Great Basin. The program also offers demonstrations of the Native American use of indigenous natural resources (primarily trees and shrubs) for primitive tools. Collectively, these topics emphasize the historical importance of sustainable agricultural and use of natural resources. Producers and agency staff often lack knowledge about the concepts of plant growth, plant response to grazing, ecological site potential, the processes of vegetation change, disturbance ecology, and the role and effect of fire. The Alternative Crop Production in Nevada Walker Basin Program evaluates and demonstrates crops that use less water and offer increased income potential to Nevada agricultural producers. The Biofuel Production program evaluated various plants as potential biofuel crops in Nevada. Evaluation of promising crops are expanded as the potential for commercial production increases.The Alternative Crops and Disturbed land Reclamation Project evaluates low water use crops and discovers cultural practices necessary to reclaim farm lands where irrigation water has been removed. Alfalfa hay, alfalfa seed and small grains are the principle crops produced in much of the northern tier of Nevada. Alfalfa hay remains by far the most important crop in terms of both acres harvested and value of production. Despite an 80% reduction in alfalfa seed acreage over the last eight years, it remained in second place followed by "other hay" production. Small grains are grown as a rotational crop between the establishments of alfalfa crops. As a means to increase the profitability of local farmers, an educational program on growing soybeans as a high income rotational crop was developed. Grow Your Own, Nevada is a fee-based program that provides horticultural information to homeowners who desire to become successful backyard food producers in Northern Nevada's high-desert climate. The program consists of eight two-hour sessions and covers topics ranging from vegetable cultivar selection to composting and harvesting and preserving produce. The Master Gardener Program is an educational and volunteer-recruitment program. Avid gardeners from the community learn and promote science-based horticulture and environmentally sound gardening practices. Trained volunteers "give back" to the University by passing on their knowledge and training to the public. The Horticulture program in White Pine

County seeks to build awareness and interest in horticultural crop production in the high desert. The Integrated Pest Management Program examines the need for potential pesticides necessary for producing forages in Nevada and submits requests to the IR-4 program for federal testing and registration. Nevada Extension tested and demonstrated appropriate IPM methods applicable for weed management in Nevada and presented the results to agricultural producers and public land managers. The IPM program includes Urban IPM managers and consumers and conducts pesticide safety and education programs with the goal of increasing the number of trained, licensed, pesticide applicators in Nevada. The Herds and Harvests program developed educational courses, workshops, technical assistance, business advice and mentoring support network for Nevada agricultural producers who are beginning or diversify a farm or ranch operation. It also helped farmers and ranchers understand the fundamentals of business plans, enterprise budgets, and production and marketing strategies, under the general themes of 1) So you want to be a produce farmer; and 2) Artificial Insemination of Livestock. The People of the Land program grew as a national program. Nevada Extension piloted the new curriculum (People of the Land II for the Hopi tribe) and the Navajo Nation with more than 68 tribal producers. Workshops were held in Reno, Nevada and Spokane, Washington focusing on American Indian land tenure and the American Indian Probate Reform Act dealing with estate planning. We contracted with Indian Land Tenure Foundation to provide legal expertise and I taught the Indian land segment. Nevada Extension has also begun working on economic development activities such as business development, agriculture production, and marketing concepts with tribes across the western United States.

2. Brief description of the target audience

Nevada Extension worked with backyard and small-scale fruit producers and traditional large commercial production facilities. This year the program was expanded to include students for whom English is a second language. Nevada Extension worked with land users and managers (including Native Americans) with an interest in cultural and historical land-use practices, as well as youth and others interested in Native American use of indigenous vegetation. Nevada Extension worked with resource users and natural resource professionals, especially public and private land managers. Nevada Extension worked with livestock producers, domestic and foreign agency resource management staff, policy developers, and individuals/organizations interested in rangeland resources. Nevada Extension worked with producers. and land managers interested in reclaiming farmland from which water rights were removed. Nevada Extension worked with the commercial landscape horticulture industry, including nursery workers and owners, arborists, pesticide applicators, landscapers, irrigation specialists, and landscape designers and architects. Nevada Extension worked with experienced and new gardeners desiring information to become more self-sufficient and produce more of the food they consume locally. This program also appeals to gardeners wishing to commercial explore small-scale local food production. Nevada Extension worked with homeowners, property managers, land managers, government personnel, agency personnel, extension educators, master gardeners, green industry professionals. Nevada Extension worked with American Indian farmers and ranchers.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	17082	0	38014	0

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

Patent Applications Submitted

Year: 2014

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	13	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Not reporting on this.
  Not reporting on this Output for this Annual Report

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of individuals 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.

Outcome #1

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
A 2012 needs assessment found water conservation, education on pesticide alternatives, growing your own food, alternative food production methods and environmental issues to be important to consumers and the Green Industry. Alfalfa hay remains by far the most important crop in terms of both acres harvested and value of production. Small grains are grown as a rotational crop between the establishments of alfalfa crops. Noxious and invasive weeds are widespread throughout Nevada, and threaten the productivity of cropland, pasture and rangeland. Rural areas are susceptible to significant adverse economic damage. Most of the information about backyard and small-scale fruit growing comes from commercial, orchard production in non-desert environments. High quality backyard and small-scale fruit production must be planned and managed differently from traditional large commercial production. Information about fruit growing for small-scale production in desert environments is very limited to nonexistent. The establishment of various applied research and demonstration trials is critical to building the knowledge base regarding potential alternative crop production systems in Nevada. Many Nevada communities (29 out of 487 census tracts) Nevada are considered food deserts. A survey of Nevada Extension Educators indicated almost universal support for a statewide educational, non-volunteer alternative to the Master Gardener program. Public issues and needs identified within the state were consistent with those identified in the surrounding states and include home food production and edible landscaping (n=4), diagnosis and management of plant pests (insects, disease, weeds) (n=4), local food production and urban agriculture (n=3), sustainable landscaping practices (including native plant landscaping) (n=3) and landscape water conservation (n=2). The demand for hops grown locally for consumption by local micro-brewing companies and home brewers is increasing in concert with the increasing number of microbrew establishments. The increased demand results in substantially higher prices for locally produced hops than those available on the large commercial markets. Because hops are hardy, tolerant of alkaline soils and

can be irrigated using water saving techniques such as drip irrigation they are a prime candidate for evaluation in Nevada. Producers and agency staff often lack knowledge about the concepts of plant growth, plant response to grazing, ecological site potential, the processes of vegetation change, disturbance ecology, and the role and effect of fire. Teff is a small seeded grain crop used to make flat bread known as Injera which is a staple in the diet of Ethiopian people and used in every Ethiopian restaurant. It is also an important source of gluten free flour required by individuals who suffer from Celiac disease. The production of biofuels and other industrial oil crops is an increasing priority in Nevada and the nation due to the cost and availability of petroleum based products. Nevada has had no data regarding the production potential of these crops. American Indian farmers and ranchers provide an important economic base for rural reservations. USDA programs are designed to help make farms and ranches more profitable. Research with Indian producers and agriculture/natural resource professionals on the 12 of the largest Indian reservations in Arizona, Idaho, Nevada, Oregon, and Washington identified a significant knowledge gap for professionals about the social, political, and economic environments unique to Indian reservations. USDA programs that might benefit Indian reservation agricultural producers in the five-state region are, therefore, not widely implemented.

What has been done

For the Greenhouse Project (TGP), Nevada Extension coordinated activities and work assignments. Nevada Extension taught statewide Risk Management educational efforts and the Nevada Beginning Farmer and Rancher Project (Herds & Harvest) with statewide and regional partners. Nevada Extension held demonstration classes in Southern Nevada for small-scale fruit producers. Nevada Extension established three, large scale, replicated trials of 13 forage sorghum and sorghum/sudangrass varieties as well as two forage soybean varieties at the Newlands research station, on a private farm, and on the Agricultural Experiment Station's Main Station farm in partnership with two private firms (Advanta US, Stanislaus Farm Supply. The data were statistically analyzed and presented at Experimental Farm field days in Fallon and Reno. Nevada Extension completed trials with several spring canola varieties and continued a multi-year hop evaluation study. Nevada Extension provided input to the Western IR-4 region coordinator concerning the need for labeling of a Dow Chemical Company herbicide, GoldSky (florasulam, fluroxpyr, pyroxsulam) and Glyphosate for use on teff. Extension responded to a severe outbreak of armyworms on teff crop, identifying an insecticide (Bacillus thuringiensis Bt) to implement an emergency registration for a conventional insecticide.

Results

Students and volunteers produced and donated over 4,000 pounds of produce to food banks in Carson City. There were 802 student visits. Thirty-eight special needs students worked daily putting in over 375 hours. Six AmeriCorps interns volunteered 3,300 hours. Student hours, including classes, tours and juvenile probation work totaled approximately 3,011 hours. Non-student volunteers donated approximately 1,500 hours. This yielded an in-kind value of $33,210 to The Greenhouse Project. The number of students doing their senior projects increased from 2013. Four agriculture/horticulture students are doing their supervised agriculture experience in the greenhouse with the greenhouse site manager as their mentor. The Artificial Insemination of Livestock workshop revealed increases in knowledge of 14 out of 21 indicators, with the top two indicators being what equipment is needed for artificial insemination to be successful, and how to properly care for a semen tank. A slaughter and processing certification classes revealed increases in knowledge in all 15 subject area indicators, with the top two indicators being identifying different cuts of meat, and the number of cuts of meat from different livestock

carcasses. The So you want to be a producer farmer workshops revealed statistically significant increases in knowledge for all 17 indicators, with the top indicators being enterprise budget development and marketing agriculture products for sustainable farming. Specialty crop producers (30%) and livestock producers (30%) reported taking actions to change their production practices after attending workshops related to risk management, water efficient and alternative crops. This is the 3rd year of the Hops Project, with new varieties being tested and given to three local breweries to evaluate. There are 70 vines and 8 varieties being tested. Harvest results are pending. Community gardeners donated approximately 420 pounds of vegetables to a senior living facility and to food banks. Latigo is the only herbicide currently legal for use on teff (approved by USEPA in 2012 with support from Nevada Extension) and provides growers the only practical method of controlling broadleaved weeds in this important crop. The EPA also established tolerances for the herbicide Glyphosate with the tolerances published by the Environmental Protection Agency in the Federal Register on May 1, 2013. As a result, virtually every acre of teff grain planted in Nevada in 2013 was treated with to manage broadleaved weeds. This action allows interested companies to add teff as a legal use to herbicides containing this active ingredient and will greatly increase herbicide availability to producers. People of the Land II was piloted with representatives of the Hopi tribe. Participants reported that they increased their knowledge in all program indicators based on workshop content.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
121	Management of Range Resources
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
216	Integrated Pest Management Systems
307	Animal Management Systems
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
806	Youth Development

<u>Outcome #2</u>

1. Outcome Measures

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

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)
- Other (Grant funding availability and diminished Smith-Lever allocations)

Brief Explanation

Nevada's slow economic recovery, in addition to the increasing demand for locally-produced foods, inspired a steady increase in small farm/ranch operations, CSAs, and community and school gardens. Traditional large-scale producers were challenged by severe drought conditions, the spread of invasive weeds, and the potential for sage grouse to be listed as a threatened or endangered species.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Nevada Extension faculty evaluate the outcomes and impacts of programs largely through participant/stakeholder self-evaluations. Evaluations of selected Global Food Security and Hunger programs in 2014 included horticulture classes focused on efficient residential and commercial landscape use, alternative crops, and small-scale urban food production. Evaluations included pre- and post-event comparative surveys with participants. With respect to knowledge gain, workshops held to discuss results of alternative crop field trials indicated a gain in knowledge by the participants of between 30 to 45 percent.

Key Items of Evaluation

As a result of IPM education, virtually every acre of teff grain planted in Nevada was treated with Latigo® to manage broadleaved weeds, ensuring that Nevada Extension's educational programs will have a significant impact on the profitability of teff farmers. Grow Your Own, Nevada participants reported an average of 29.4% to 80.6% knowledge gains in a variety of areas regarding growing and producing food for local consumption. Additionally, the program website was accessed nearly 18,000 times in 2013. Eagles and Agriculture enhances participant knowledge in wildlife habitat and local agriculture. Approximately 400 people attended the 2013 event, and respondents (n=69) gained a better understanding of Carson Valley agriculture (4.14), have a greater appreciation for the role agriculture plays in providing wildlife habitat (4.00), and have greater understanding for the benefits agriculture provides our society (3.86) (5 point Likert-type scale, 1=strongly disagree and 5=strongly agree).