

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Global Food Security and Hunger - Agricultural Production in a Semi-Arid Environment

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships			6%	
103	Management of Saline and Sodic Soils and Salinity			21%	
131	Alternative Uses of Land			4%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants			32%	
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals			25%	
504	Home and Commercial Food Service			6%	
701	Nutrient Composition of Food			6%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	3.0	0.0
Actual Paid Professional	0.0	0.0	1.2	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
0	0	217497	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	282616	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Conduct research to enhance agricultural production in Nevada, publish the research findings in peer reviewed journals, educated our stakeholders through outreach by conducting rural tours and participating in town hall meetings, holding field lab open houses to demonstrate our research findings, submit news releases on new findings, publish an on-line CABNR Quarterly Newsletter that features research and education successes from the College of Agriculture, Biotechnology and Natural Resources (CABNR) and the Nevada Agricultural Experiment Station (NAES), include publications on the CABNR/NAES web page, report impacts through the CABNR/NAES web page, and share results with extension faculty to partner in the extension outreach programs.

2. Brief description of the target audience

The target audience for research and educational programming is agriculture and livestock producers, veterinarians, agency personnel and local government organizations as well as students taking classes or participating in research activities.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	264	0	300	0

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

Patent Applications Submitted

Year: 2012
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	0	6	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Peer reviewed journal articles, publications in commodity group publications, presentations at scientific meetings, presentations at stakeholder, Native American and agency meetings

Year	Actual
2012	29

Output #2

Output Measure

- Demonstrations and Field Days Conducted

Year	Actual
2012	3

Output #3

Output Measure

- Newsletters Produced

Year	Actual
2012	3

Output #4

Output Measure

- Leveraged Research Projects

Year	Actual
2012	517947

Output #5

Output Measure

- Web Sites Created or Updated

Year	Actual
2012	3

Output #6

Output Measure

- Digital Media Created or Updated
Not reporting on this Output for this Annual Report

Output #7

Output Measure

- Manuals and Other Printed Instructional Materials Produced
Not reporting on this Output for this Annual Report

Output #8

Output Measure

- Number of Graduate Students or Post-Doctorates Trained

Year	Actual
2012	1

Output #9

Output Measure

- Number of Undergraduate Students Involved in Research

Year	Actual
2012	14

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Peer reviewed journal articles, presentations at scientific meetings, presentations at stakeholder, Native American and agency meetings.
2	Developing Wine Grape Cultivars for Northern Nevada

Outcome #1

1. Outcome Measures

Peer reviewed journal articles, presentations at scientific meetings, presentations at stakeholder, Native American and agency meetings.

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Developing Wine Grape Cultivars for Northern Nevada

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Grape production is one of the most important agricultural commodities in the USA and is threatened by global warming. This is particularly relevant in a semi-arid state such as Nevada with a rapidly growing population competing for scarce water resources. There is an emerging grape and wine industry in Nevada which has the potential for a very large economic impact on the state and the local grower. This project addresses which wine-grape cultivars are most water use efficient and seeks to select genotypes varying in enzymes, hormones and proteins production that can be used to improve water use efficiency and drought resistance.

What has been done

Microarray comparison experiments on Cabernet Sauvignon shoot tips (sink, growing) and leaves (source, photosynthetic) in response to drought were conducted. Using the latest bioinformatic tools, cluster and hierarchal analysis, the team has discovered that over 11,000 leaf and 14,000 shoot transcripts change significantly between stressed and unstressed plants. And with new proteomics techniques, the team identified almost 2,300 different proteins with 79 proteins being highly involved in dehydration.

Regulated deficit irrigation has been used successfully to grow grapes with less water, an

important feature in arid regions such as Nevada. These drought stress experiments have identified thirteen cultivars for Northern Nevada.

The Cabernet Sauvignon gene had not been sequenced, so the UNR team has sequenced over 80% of the genome to date.

Results

To facilitate plant dehydration assays, the UNR team has developed a novel method that quickly dehydrates plant samples in a control environment. This technique will help future scientists control relative humidity and temperature when studying drought stress plants.

A tripartite program has been setup that provides training to the general public on how to grow grapes in Northern Nevada, how to make wine, and a wine tasting class held throughout the year. Because of this program, the community has formed a 501c3 non-profit organization, "Nevada Vines and Wines" dedicated to improving Northern Nevada's wine industry.

One student was able to leverage the expertise of a team of scientist from Verona, Italy on illumina sequencing technology. Another student was able train at Macquarie University, Sydney, Australia, one of the top proteomics labs in the world.

4. Associated Knowledge Areas

KA Code	Knowledge Area
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants

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 Programmatic Challenges

Brief Explanation

Another year of State budget shortfalls continue to narrowed the breadth of NAES's research programs. Fewer research projects will be supported and recruiting graduate students will be difficult.

The Experiment Station is still trying to recover from the 31 hard money positions lost after the 2010 circulation review. Until a number of critical areas are re-staffed the agricultural program will be severely diminished. The circular review has also produced a number of administrative issues that contribute to the outcomes of our Ag program: the potential merger with Cooperative Extension, all faculty changing from 12 month to 9 month appointments, and the uncertainty regarding administrative changes (Dean/Director).

This past year has seen yet other new obstacles affecting NAES's ability to conduct

research that supports the agricultural community. NAES's Main Station Field Lab (MSFL), situated along the Truckee River, provides high quality agricultural opportunities and is an easy commute from UNR's main campus. However, MSFL has seen 168 acres sold to the city based upon eminent domain. Surplus water rights were sold by the university, but proceeds were not returned to NAES. And, the university has rezoned another 104 acres (some of the richest soils) for commercial use, opening the door for the future sales of another section of MSFL.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

- Conducted over 20 workshops on cultivating, pest management and wine production
- Attracted the attention of hundreds of backyard-amateur viticulturists
- Trained 15 students
- Leveraged over \$500,000 in extramural funds
- Created a community that wants to grow and promote the wine industry in Northern Nevada

Key Items of Evaluation

Established a 501c3 non-profit organization "Nevada Vines and Wines"