Sustainable Dryland Agriculture Initiative

– College OF –
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& Natural Resources

University of Nevada, Reno
Economic Contribution of Agriculture in Nevada

- Total direct value of sales for Nevada food and agriculture sector was an estimated $4.4 billion (about 1.9% of Nevada’s total output);

- The sector employed 14,491 jobs (1% of total Nevada employment) and paid $687 million in total income (about 1% of Nevada’s total income).

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ECONOMIC ANALYSIS OF THE FOOD AND AGRICULTURE SECTOR
March 2016

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Total Impact of Agricultural Sector to Nevada Economy in Nevada

- The combined effect of the agricultural sector generated an estimated $2.7 billion from food and agriculture production and manufacturing.
- The economic impact of food and agriculture retail and restaurant services was $2.9 billion.
- The economic impact of agricultural supporting industries and activity was $345 million.
Nevada’s Food and Agriculture Sector is Growing

- The number of farm operations is growing (3,750 in 2010 to 4,200 in 2014)

- Agricultural production grew by roughly 50% during same period

- Between 2002 and 2015, agricultural product exports had a value increase of 164%

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ECONOMIC ANALYSIS OF THE FOOD AND AGRICULTURE SECTOR
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“Greatest challenge of our generation is to feed a rapidly growing population...Answering the call requires us to develop a human capital pipeline that will invigorate America’s scientific, technological and business leadership in food and agriculture”

Kimberly Reynolds (Iowa Lieut. Gov.) and Paul Schickler (Pres. DuPont Pioneer)

<table>
<thead>
<tr>
<th>Program</th>
<th>Workforce Supply</th>
<th>Workforce Demand</th>
<th>Demand to Supply (%)</th>
<th>Demand Growth (%)</th>
<th>Monthly Hires</th>
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</thead>
<tbody>
<tr>
<td>Ag Economics, Business, and Management</td>
<td>5,264</td>
<td>41,780</td>
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<td>Ag Mechanization and Engineering</td>
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<td>Animal Sciences</td>
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<td>Plant and Soil Science</td>
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<td>2</td>
<td>6.5</td>
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<td>Food Science and Technology</td>
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<td>36,570</td>
<td>4</td>
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<td>Other Life Sciences*</td>
<td>14,918</td>
<td>80,199</td>
<td>19</td>
<td>6.7</td>
<td>2,746</td>
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</tbody>
</table>

*Biochemistry, Biology/Biophysics/Biotechnology, Molecular Biology, Cellular Biology, Microbiology, Genetics
Global Relevance

- By 2050 = 9 billion people
- Over 40% of the earth’s land area is semi-arid or arid, i.e. dryland
- Home to over 2.5 billion people – and the majority of the world’s poor.
- About 16% of these live in chronic poverty
- Whether manmade or natural, we know the climate is changing
- Nation’s driest state = Nevada
- Land-grant universities e.g. UNR solve real world problems
Tsunami (or Haboob)

- 2 more billion to feed by 2050
- Already a billion hungry
- Malnutrition much higher still especially among children
- Global agricultural production needs to increase 70 percent by 2050
- Output in developing countries will have to double
- With less water
- Under harsher climate
- Sustainably

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FOOD FOR THOUGHT

CURRENTLY THERE ARE
7 BILLION PEOPLE IN THE WORLD

IN 2050 THERE WILL BE
9 BILLION PEOPLE IN THE WORLD

THE WORLD IS NOT ON TRACK TO MEET THE COMING FOOD DEMAND

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Dryland Agriculture

• As irrigation expansion slows, and competition for water grows, crop production must nonetheless increase if food production to keep up with population increases.

• Dryland agriculture is generally defined as occurring in regions where lack of moisture limits crop and/or pasture production part of the year.
Sustainable Agriculture

Legal definition of sustainable agriculture in the U.S. (U.S. Code Title 7, Section 3101):

An integrated system of plant and animal production practices having a site-specific application that will over the long-term:

1. Satisfy human food and fiber needs.
2. Enhance environmental quality and the natural resource base upon which the agriculture economy depends.
3. Make the most efficient use of nonrenewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls.
4. Sustain the economic viability of farm operations.
5. Enhance the quality of life for farmers and society as a whole.
Sustainable Dryland Agriculture

Encompasses more than agriculture

It includes:

• Natural Resources
• Economic Development
• The Environment
• Food Security and therefore nutrition
Green Revolution and Norman Borlaug

Awarded Nobel Peace Prize in 1970 in recognition of his contributions to world peace through increasing food supply.

Credited with saving over a billion lives as “Father of the Green Revolution.”

Wrote and spoke extensively on linkages between food security, economic development, political stability, and peace.

There has yet to be a successful “Green Revolution” in the drylands.
CABNR’s Contribution

• Satisfy human food & fiber needs
• Enhance environmental quality & natural resources
• Make the most efficient use of non-renewable resources
• Alternative crops with improved drought tolerance and water-use efficiency
• Sustain economic viability of ag operations
• Enhance quality of life of producers & society as a whole
CABNR is well positioned—and growing!

Unique interrelated disciplines
- Biochemistry & Molecular Biology
- Natural Resources & Environmental Science
- Agriculture, Nutrition & Veterinary Sciences

Numerous faculty experts
- World-renowned in dryland crops and production systems
- Spanning disciplines from the gene level to whole ecosystems to extension education
Opportunities Based on Value-Chain Analysis

- Meat processing
- Dairy production
- Grain and Oilseed Manufacturing
- Local food supply and markets
- Continued importance of livestock, hay, and horticulture industries
2013-2014 HIRES

• Plant molecular biology Ian Wallace
• Plant molecular biology Dylan Kosma
• Biochemistry instructor Veronica Zepeda
• Eco-hydrologist Adrian Harold
• Soil scientist Ben Sullivan
• Soil scientist Paul Verburg
• Dairy/ruminant nutritionist Antonio Faciola
• Ag Science Instructor Tracy Shane
• Forage Agronomist Juan Solomon
• Plant Biochemist Patricia da Conceição Ferreira dos Santos
• Plant Geneticist Talline Martins
2015 HIRES

- Sustainable Horticulture: Felipe Barrios Masias
- Meat/Food Safety Scientist: Amilton de Mellos (jointly with UNCE)
- Molecular Nutritionist: Brad Ferguson
- Molecular Biologist (Insect-vectored diseases): Monika Gulia-Nuss
- Entomology: Andrew Nuss
- Wildlife Population Ecologist: Kevin Shoemaker
2016 CONCLUDING SEARCHES

- Beef Production
- Remote Sensing (Endowed Position)
- Plant Stress Signal Transduction
- Veterinary/Reproduction Physiologist
- Department Chair, Biochemistry and Molecular Biology
2016 NEW SEARCHES

- Plant Breeder (Quantitative Genetics)
- Bioinformatics
- Department Chair, Natural Resources and Environmental Sciences
- Forestry Ecology and Management
- Hydrologist
- Range Science
ENHANCED PROGRAMS

Desert Farming Initiative

Meat Science, Food Safety

Wolf Pack Meats
LEADERSHIP CHANGES IN CABNR

Associate Dean of Research/Associate NAES Director
Chris Pritsos

Interim Chair, Agriculture, Nutrition and Veterinary Science
Stan Omaye

Interim Chair, Biochemistry and Molecular Biology
Claus Tittiger

Interim Chair, Natural Resources and Environmental Sciences
Nancy Markee
**STRUCTURAL CHANGES**

- Administrative Consolidation between CABNR, Nevada Agricultural Experiment Station, and University of Nevada Cooperative Extension
- Integration of Teaching, Research, and Extension Missions of Land-grant
UNCE and Sustainable Dryland Agriculture

WORKSHOPS and PROGRAMS

• Drought assistance for agricultural producers
• Native American waters on arid lands
• Grazing management in drought years
• Weed control extravaganza
• Beginning farmer and rancher
• Master Gardeners and 4-H

WEBSITES

• Living with Drought
  http://www.unce.unr.edu/programs/sites/drought/
• Living with Fire
  http://www.livingwithfire.info/
Why Should Dryland Ecosystems matter to the US?

• Social and political stability, food security, and agricultural production are related in undoubtedly complex ways
• 1970 Nobel Peace Laureate Norman Borlaug: "As long as there are suffering and lack of food, there will be political uprisings and people killing each other"
• 1949 Nobel Peace Laureate Lord John Boyd Orr: "You cannot build peace on empty stomachs."
Food Security and Nutrition

- Food insecurity is not only a world-wide issue but exists in Nevada.
- Today in Nevada, 1 in 4 children lives in households that cannot reliably provide 3 nutritious meals every day
- One in 7 adults must regularly seek emergency food assistance
- 1/3 of Nevadans are eligible to apply for SNAP (formerly known as food stamps).
- The prevalence of overweight and obesity in children and adolescents has increased over the past 25 years.
- In 2006 the associated economic costs of obesity in Nevada were estimated to be $337 million.
- CABNR, NAES and UNCE have research, teaching, and outreach responsibilities for nutrition and health that can directly impact this situation here and abroad.
Jointly Hosted Field Day
Saturday, September 25