Evaluating Alternative Low-Water-Use Crops

Carol Bishop, Asst. Professor, NE Clark Co Extension
Staci Emm, Assoc. Professor, Mineral Co Extension
University of Nevada
Outline

- Overview of program
- Water Issues
- Crops considered for Nevada
- WATER-ACIS
- Programming results
Situation:
Producers are Under Pressure to Reduce Water Use

- Hydrologic cycles have changed in the last 50 years and water is increasingly scarce
- Populations in Western US are growing
- The resulting urban and commercial water demands increases competition for available water supplies
Objective: Economic Solvency

- Challenge of sustaining the economic viability of their enterprises with less water
- Alternative low-water-use crops may be an option
Addresses needs of producers involving:

- Economic, political and environmental benefits of reducing water use in agriculture

- Basic agronomics of alternative crops available to producers

- The components of evaluating the economic feasibility of low-water-use crops
Methodology: Train the Trainer

- The audience was composed of rural Extension educators, tribal staff, Department of Agriculture personnel, NRCS employees, county staff, conservation district staff, FSA personnel and other agribusiness professionals.

- The all-day seminars funded by Western SARE included informational sessions and a hands-on utilization of program tools.
Program Tools

- **Curricula:**
  - Five separate modules: water issues, agronomics, marketing, crop selection and implementation assistance
  - Each module includes a rationale, set of objectives, central topic, worksheets and hands-on activities
  - A user manual for WATER-ACIS, a spreadsheet tool developed in Nevada to assist producers in determining the amount of water use and application timing for optimal economic benefits on low water use crops

- **CD:**
  - Copies of all PowerPoint presentations
  - WATER-ACIS spreadsheet
  - Word document with clickable links to all online resources
Module 1
Water Issues

Staci Emm, Extension Educator/Associate Professor
University of Nevada Cooperative Extension
Objectives

- Understand the need to reduce water use and the potential benefits of alternative crops
- Increase awareness of issues surrounding water law
- Estimate the amount of surface water available for the following year on a given parcel
Why reduce water?
Hydrological Cycles

- Man made changes...
  - Populations increase
  - Recreation
  - Hydropower generation
  - Other in-stream uses
Annual Rainfall Data

- What do you see?
- How much rainfall do you get per year?
- Does spring and summer snow melts provide the majority of stream flow?
As more water is diverted from agriculture use, more and more challenges present themselves such as dealing with delivery systems.
Common Concepts of Water Law?
Laws Of The Land

- **Theory or Reality with water rights...**

  - Common law. Like court cases are decided alike....Precedent is set by previous court cases.

  - Legislative Law. Changes with the publics perceptions and attitudes...driven by political forces.
Water Right

- A right given to someone or something to use water.

- Beneficial Use
  - A water right encompasses who has the right to use the water, what it is used for and where it is used.
State statues have some jurisdictions that result in the water resources administration for each state.

- Surface water
- Ground water

A multifaceted web of local, state and federal laws and court decrees.
Prior Appropriation

- Developed in the western United States due to water scarcity in the mining camps.

- First in time, first in right!

- First user is guaranteed supply (subject to flow and water availability), the next senior has the second priority, and so on down the line, as long as the water still flows.
Nevada Water Law

- Contains a ‘use it, or lose it’ policy for groundwater rights.

- Surface water rights are subject to abandonment on after 10 years of non-use.

- First user is guaranteed supply (subject to flow and water availability), the next senior has the second priority, and so on down the line, as long as the water still flows.
Utah Water Law

- Contains a ‘use it, or lose it’ policy stating...
  “When an appropriator or the appropriator’s successor in interest abandons or ceases to use a portion of a water right for a period of seven years, the water right or the unused portion of that water right is subject to forfeiture...”
Idaho Water Law

• Title 42-104 states... “The appropriation must be for some useful or beneficial purpose, and when the appropriator or his successor in interest ceases to use it for such purpose, the right ceases.”
New Mexico Water Law

- New Mexico's water law is derived from the mixture of Spanish and Mexican law utilizing the prior appropriation doctrine.
- New Mexico's water law also accommodates historic pueblo rights and reserved Indian rights.
- Unlike other Western states, New Mexico applies the doctrine of prior appropriation to both surface water (§ 72-5-1 et seq.) and to groundwater (§ 72-12-1 et seq.)
- New Mexico water law has a use it or lose it policy?
  - 4 years of non-use, void water right....
Drought Outlook

- National Weather Service predicts the drought outlook for three months in advance

- Surface water available – example on page 11 in workbook.
- Snowpack in Great Basin – example on page 12 in workbook

- Complete Worksheet #1
Are there potential issues with reducing water use?
Potential Issues

- No incentives?
- Water law?
- Beneficial use?
- What else?
“Managers are increasingly coming to agree that ‘watershed management,’ although dependent of science and engineering, is fundamentally social in nature.”

Korfmacher, 2002
Your World View/Finding A Balance

• A basic understanding...

• Individuals, while they need to be presented with new information and ideas, need the autonym to adopt “change” as they choose.

• Many of the attitudes individuals have are an integral part of their culture and belief system.
Agronomy of Alternative Crops - Module 2

Carol Bishop, M.S.
Extension Educator
Northeast Clark Co.
Market Opportunities for Alternative Crops – Module 3

Kynda Curtis, Ph.D.
Associate Professor
Applied Economics, USU
Selecting Alternative Crops - Module 4

Carol Bishop, M.S.
Extension Educator
Northeast Clark Co.
Northwest Nevada Alternative Crops

- Researched possibilities of seven alternatives using alfalfa as the control
- Forage/grains
  - Teff
  - Malt barley
- Vegetables
  - Onions
  - Lettuce
- Fruits
  - Wine grapes
- Biofuels /native
  - Switchgrass
  - Great Basin wild rye
WATERACIS

- Worksheet Appraisal to Estimate Returns from Alternative Crops and Irrigation Strategies
- Irrigation strategies to optimize yields
- Energy cost estimator for pumping water
- Comparative profit analysis
- ALWAYS save changes under a different file name to avoid deleting defaults
Programming Results
Pre/Post Knowledge Gained

- Of the 86 participants, 77 completed evaluations.
- On a scale of 1 to 5, the average rating for curriculum content was 3.84.
- The average increase in knowledge gained over all curriculum subjects was 44 percent.
- Ninety-seven percent of workshop attendees would attend future workshops on agricultural water management and/or alternative crops.
## Knowledge Gains

To what extent do you understand the following subjects?

<table>
<thead>
<tr>
<th>Subject</th>
<th>Pre-Test</th>
<th>Post-Test</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic, political, and environmental benefits of reducing water use in agriculture</td>
<td>3.12</td>
<td>3.73</td>
<td>20%</td>
</tr>
<tr>
<td>Basics of water law in the Great Basin States</td>
<td>2.52</td>
<td>3.43</td>
<td>36%</td>
</tr>
<tr>
<td>Estimating surface water availability</td>
<td>2.40</td>
<td>3.27</td>
<td>36%</td>
</tr>
<tr>
<td>Identification of prevalent soils in a given location</td>
<td>2.97</td>
<td>3.75</td>
<td>26%</td>
</tr>
<tr>
<td>Great Basin soil types and issues associated with typical desert soils</td>
<td>2.75</td>
<td>3.68</td>
<td>34%</td>
</tr>
<tr>
<td>Locate and use online data regarding climate for a particular location</td>
<td>2.82</td>
<td>3.99</td>
<td>41%</td>
</tr>
<tr>
<td>Accessing market data and estimating market size</td>
<td>2.14</td>
<td>3.43</td>
<td>60%</td>
</tr>
<tr>
<td>Product markets and distribution methods</td>
<td>2.32</td>
<td>3.36</td>
<td>45%</td>
</tr>
<tr>
<td>Setting product pricing</td>
<td>2.16</td>
<td>3.21</td>
<td>49%</td>
</tr>
<tr>
<td>Creating an enterprise budget</td>
<td>2.51</td>
<td>3.45</td>
<td>38%</td>
</tr>
<tr>
<td>Estimating variable and fixed costs</td>
<td>2.65</td>
<td>3.46</td>
<td>31%</td>
</tr>
<tr>
<td>Evaluating product profit potential</td>
<td>2.43</td>
<td>3.38</td>
<td>39%</td>
</tr>
<tr>
<td>Benefits and use of the WATER-ACIS spreadsheet</td>
<td>1.30</td>
<td>3.42</td>
<td>164%</td>
</tr>
<tr>
<td>Availability and use of federal (RD, NRCS, etc.) programs</td>
<td>3.10</td>
<td>3.81</td>
<td>23%</td>
</tr>
<tr>
<td>Services provided by Cooperative Extension</td>
<td>3.23</td>
<td>4.00</td>
<td>24%</td>
</tr>
</tbody>
</table>
Implementation

- 45% have introduced workshop curriculum and other SARE resources into producer programming

- 35% have worked one-on-one with producers to evaluate the economic feasibility of alternative low-water-use crops on their farm/ranch

- 30% assisted agricultural producers in implementing low-water-use crops on their farm/ranch

- 30% assisted producers with the measurement of changes in water use and resulting environmental improvements such as water and soil quality

- 35% assisted producers with the measurement of changes in profitability and economic sustainability of alternative crop use

- (n=20) responding to the six month follow-up survey
Thank you!

Questions?