Focus on water use and how it matters to you

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THERE IS BEAUTY IN BEING DRY
My Background:
Philippine Agriculture

Avg. Annual Rainfall = 7 ft. (±5 ft.)
Western Kansas Agriculture

Avg. Annual Rainfall = 18 in (±5in)
Continental US
Annual Average Precipitation

Legend (inches)
- Less than 5
- 5 to 10
- 10 to 15
- 15 to 20
- 20 to 25
- 25 to 30
- 30 to 35
- 35 to 40
- More than 180

Period: 1961-1990

Modeling performed by Christopher Daly using the PRISM model, based on 1961-1990 normals from NOAA Cooperative stations and NRCS SNOTEL sites. Sponsored by USDA-NRCS Water and Climate Center, Portland, Oregon.

Oregon Climate Service
George Taylor, State Climatologist
(541) 737-5705
Average Annual Reported Water Used, by County, 1995 to 2012

- **Finney**: 321,581 AF
- **Sheridan**: 83,527 AF
- **Meade**: 173,121 AF
- **Rice**: 26,757 AF

**Irrigation**

- **Municipal**
- **Industrial**
- **Recreation**
- **Stockwater**
- **Other**
Counties

- Produce 1/3 ($6.3B) of the State’s agriculture revenue
We need water to drink + more
7 BILLION PEOPLE TO FEED TODAY | 9 BILLION IN 2050

= 60% more food needed
+19% increase of agricultural water consumption (including both rainfed and irrigated) by 2050

GLOBAL WATER WITHDRAWALS

70% AGRICULTURE

10% INDUSTRY

20% DOMESTIC

EVERY DAY 1 PERSON

DRINKS

2-4 LITRES OF WATER

EATS

2000-5000 LITRES OF VIRTUAL WATER EMBEDDED IN FOOD

ALL WE EAT NEEDS WATER TO GROW

1 APPLE 70 litres (18 gal.)

150G OF BEEF STEAK 2025 litres (535 gal.)

100G OF VEGETABLES 20 litres (5 gal.)

1 SLICE OF BREAD 40 litres (11 gal.)
There is beauty in being dry

MORE
- Growing degree days
- Opportunity to work on the field
- YIELD
- Irrigation water needed

LESS
- Leaching and runoff of nutrients
- Pests and diseases
- Weed pressure
- Spoilage
Why irrigate?
Evapotranspiration = Evaporation + Transpiration

95-98% of water use is for cooling

• Evapotranspiration (ET) is an energy driven process.
• ET increases with temperature, solar radiation and wind.
• ET decreases with increasing humidity.
Figure 3. Normal annual precipitation (1961 - 1990) in Kansas. The area west of the dashed line shows the extent of the High Plains aquifer in Kansas (from Goodin et al., 1995).
Why Irrigate?

Improve yield, stabilize yield, improve quality, improve economy, etc.

<table>
<thead>
<tr>
<th>Time of Irrigation</th>
<th>1991 Yield Bu/Ac</th>
<th>1980-1991 Bu/Ac</th>
<th>1991 Irrigation Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Irrigation</td>
<td>3</td>
<td>56</td>
<td>None</td>
</tr>
<tr>
<td>Tassel</td>
<td>124</td>
<td>141</td>
<td>7/8</td>
</tr>
<tr>
<td>Tassel + 1 week</td>
<td>148</td>
<td>159</td>
<td>7/8, 7/15</td>
</tr>
<tr>
<td>Tassel + 1 + 2 week</td>
<td>155</td>
<td>164</td>
<td>7/8, 7/15, 7/25</td>
</tr>
<tr>
<td>65% depletion</td>
<td>159</td>
<td>172</td>
<td>7/1, 7/23</td>
</tr>
</tbody>
</table>
Moving Towards Better Systems
What is the largest (acreage) irrigated crop in the US?

Turf Grass

3X than Corn with an area larger than Mississippi
1940: One Kansas farmer feeds 19 people

Now: One Kansas farmer feeds >155 people

Photo from the Kansas Historical Society

Quoted: Kansas Department of Agriculture website
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UN WATER.ORG
We don’t need to look far to make a difference...

On our plate

At home

In our yard
ACTION ITEMS

Conserve Raw and Virtual Water

Adopt Relevant Technologies and Management Strategies

Education

Education
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