The Desert Agriculture Soil Health Initiative (DASHI)

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77% of respondents prefer more information about soil health conservation.

**Educational information desired by Yuma County agricultural community**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Prefer a great deal</th>
<th>Slightly prefer</th>
<th>Neutral</th>
<th>Do not prefer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lettuce fusarium wilt management</td>
<td>56%</td>
<td>14%</td>
<td>28%</td>
<td>2%</td>
</tr>
<tr>
<td>Soil health conservation</td>
<td>48%</td>
<td>29%</td>
<td>24%</td>
<td>0%</td>
</tr>
<tr>
<td>Crop nutrient management</td>
<td>41%</td>
<td>34%</td>
<td>23%</td>
<td>2%</td>
</tr>
<tr>
<td>Irrigation management improvement</td>
<td>41%</td>
<td>25%</td>
<td>31%</td>
<td>2%</td>
</tr>
<tr>
<td>More PCA &amp; CCA CEU training</td>
<td>40%</td>
<td>24%</td>
<td>33%</td>
<td>3%</td>
</tr>
<tr>
<td>Leafy greens downy mildew management</td>
<td>38%</td>
<td>21%</td>
<td>37%</td>
<td>3%</td>
</tr>
<tr>
<td>Data Analysis of historic information</td>
<td>24%</td>
<td>36%</td>
<td>37%</td>
<td>2%</td>
</tr>
<tr>
<td>Evaluation of new crops</td>
<td>27%</td>
<td>29%</td>
<td>40%</td>
<td>4%</td>
</tr>
<tr>
<td>Food Safety Modernization Act (FSMA) training</td>
<td>27%</td>
<td>27%</td>
<td>43%</td>
<td>3%</td>
</tr>
<tr>
<td>Remote sensing technology</td>
<td>24%</td>
<td>30%</td>
<td>37%</td>
<td>8%</td>
</tr>
<tr>
<td>Promotion of AZ Crop Protection Association</td>
<td>21%</td>
<td>22%</td>
<td>48%</td>
<td>8%</td>
</tr>
<tr>
<td>Industrial hemp cultivation</td>
<td>21%</td>
<td>22%</td>
<td>46%</td>
<td>11%</td>
</tr>
<tr>
<td>Citrus brown wood rot management</td>
<td>23%</td>
<td>16%</td>
<td>48%</td>
<td>12%</td>
</tr>
</tbody>
</table>

Figure 4. Results from question 4 “What agricultural topics would you like more educational resources provided to you from the Yuma County Cooperative Extension Department?”. 

Source: Masson (2020)
Figure 4. Data indicating the most important soil health goals in their operations as voted by the respondents (total responses 107)
The continued capacity of a soil to function as a vital, living ecosystem that sustains plants, animals, and humans.
The Overarching Challenges

1. Deserts account for almost half (44%) of the world’s croplands and feed over 3 billion people, but how can this continue in the future as the world continues to become hotter and drier?

2. If we don’t produce nutritious fruits and vegetables in the U.S., then we’ll need to import these foods to sustain humans.
The Overarching Challenges

3. Current soil health science fails to address agricultural sustainability in arid and semiarid regions in the United States and globally. **We need to know more about desert soils!**

Desert croplands have unique soils and environments that require tailored solutions.
Why is the current state of soil health science failing desert ag production and sustainability?

This is where soil health assessment has mainly been developed.

This is where soil health management has mainly been developed.
Desert Agriculture Soil Health Initiative (DASHI)
The Mission of DASHI is to:

- Sustain desert ag for the next 100+ years
- Sustain human nutrition and wellness
- Accelerate outreach at state and federal levels to increase awareness and funding of desert agricultural soil health research, which is under-resourced and under-researched given its large and growing importance to global food production.
Strategic Plan for Desert Agriculture Soil Health

Grower/Industry Input → Researcher Input → Strategic Planning → Team Building & Execution of Tactics

Federal Funding Agency Input → Foundation/Philanthropic Input → Engagement with State and Federal Legislators
DASHI Strategic Goals (Working Draft)

I. A standard for assessing soil health in desert croplands

II. Ways to reduce soil salinity using less water

III. Techniques to manage soil health while ensuring food safety

IV. The optimization of fertilizer use, plant nutrition, and crop nutrient density to enhance human health
Soil Salinization

Wu et al., 2014

~3300 BCE

Area of ancient Mesopotamia

Iraq

Salinity in dS/m
- Nonsaline land
- 0.00–4.00
- 4.00–8.00
- 8.00–15.00
- 15.00–25.00
- 25.00–50.00
- 50.00–242.29

Mesopotamia

Iraq
Leaching with Extra Water:
The current way of dealing with high salinity in surface soils
Ways to manage and adapt to soil salinity in croplands using less water

I am looking for collaborators and partners!

~$10 million over 5 years

Water Desalination Technologies
Leaching Enhancers
Soil Fungal Inoculants