NRCS issues and research needs: ARS National Program 211 – Water availability and watershed management, 2015

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NRCS National Water Management Engineer
## EQIP Funding Provided for Irrigation Practices Nationwide During FY 2011

<table>
<thead>
<tr>
<th>Conservation Practice</th>
<th>Code</th>
<th>Contracted Items</th>
<th>Federal Payments</th>
<th>Rank by Obligation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irrigation System, Sprinkler</td>
<td>442</td>
<td>2777</td>
<td>$64,586,626</td>
<td>3</td>
</tr>
<tr>
<td>Irrigation System, Microirrigigation</td>
<td>441</td>
<td>1803</td>
<td>$41,817,291</td>
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<tr>
<td>Irrigation Pipeline</td>
<td>430</td>
<td>3984</td>
<td>$46,630,646</td>
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<tr>
<td>Pumping Plant</td>
<td>533</td>
<td>4146</td>
<td>$23,029,712</td>
<td>12</td>
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<tr>
<td>Irrigation Land Leveling</td>
<td>464</td>
<td>1036</td>
<td>$14,630,646</td>
<td>24</td>
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<tr>
<td>Irrigation Reservoir</td>
<td>436</td>
<td>253</td>
<td>$12,267,205</td>
<td>26</td>
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<tr>
<td><strong>Irrigation Water Management</strong></td>
<td>449</td>
<td>5136</td>
<td>$5,813,535</td>
<td>41</td>
</tr>
<tr>
<td>Total Obligation for these 7 practices</td>
<td>-</td>
<td>19135</td>
<td>$208,775,661</td>
<td>-</td>
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<tr>
<td>National 2011 Total ALL Practice Obligations</td>
<td>-</td>
<td>196206</td>
<td>$1,035,674,657</td>
<td>-</td>
</tr>
<tr>
<td>Percent of National 2011 Total</td>
<td>-</td>
<td>10%</td>
<td>20%</td>
<td>-</td>
</tr>
</tbody>
</table>
Micro Irrigation
Need #1- Refining Irrigation Science

• Detecting and verifying real changes in CU at the field and multi-field scale

• Deficit irrigation and optimal yield/profit (multi-year time frames)

• Irrigation ‘insurance’ in humid climates with (possibly) increasing climate variability

• Irrigation and soil health
  • Water holding capacity
  • Surface infiltration rates
Drainage Water Management and water reuse ‘subsurface’
Drainage Water Management is the process of managing timing and amount of water discharges from agricultural drainage systems. The DWM plan provides the target water table level settings needed at specific dates or seasons.

**Target Water Level Settings to Minimize Tile Flows**
Saturated Outlets

• Less data than bioreactors. What we know right now:
  • They are very effective
  • Currently do not seem to be sensitive to width or slope. As always: wider is better. Flatter is better.
  • Accept the interim standard for National posting???
  • MORE design parameters?
Drainage Nutrient Load Reduction

![Diagram showing nitrate loss in conventional and controlled drainage with a bar graph and an adjustable weir structure.]

*Ohio Data: N.R. Fausey et al.*
Need #2- Refining Conservation Drainage Science

• Subsurface Irrigation ‘insurance’ in humid climates with (possibly) increasing climate variability
• Use EOF monitoring results to refine DWM suite of practices
• Conservation drainage and soil health
  • Optimal saturation times and depths
  • Possible schemes to use water table control to optimize cover crop nutrient scavenging
• Water quality inlets
• Rates of adoption
Case Study Location – white bar is one mile in all views
Look at the ‘Irrigation Efficiency’ calculation at three scales:

1. The “Field” Scale ~ 50-200 ac
2. The “Main Canal” Scale ~ 500-1,000 ac
3. The “Basin” Scale ~ more than 10,000 ac

Note: this naming convention and these acreage figures are for this study only.
Look at the ‘Irrigation Efficiency’ calculation at three scales:

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So what changed by looking at a bigger area? We have the same basic components as the previous field.
Mississippi River Basin

Average Annual Nitrogen Load in Streams

N Load, lbs/acre
- Less than 1.8
- 1.8 to 4.4
- 4.5 to 8.9
- 9.0 to 16.0
- 16.1 to 27.1

Watershed Average = 2.6 lbs/acre
Need #3 - Scaling up and transferring effects

- Conservation drainage and sub-basin, in-soil water storage
- Aquifer overdraft amelioration
- Soluble phosphorus fate and treatments
- Treatment of phosphorus overloaded basins
- Aggregating EOF monitoring results
Need #4 – Better Tools

In-field and in-drainage way sensors.
Prediction models for water supply in areas where snow pack variability is increasing (California fire season > 70 days since 2000).
Use of ‘reclaimed’ (grey, storm, brackish) water for irrigation supply.
Outdoor wireless security camera system
LWLH314-3PK

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