Agriculture technology solutions

Technology to help growers manage water and energy

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Farming is different than other sectors.

Source: https://gardenerspath.com/how-to/disease-and-pests/diatomaceous-earth/

Source: https://pixabay.com/photos/tomato-blight-disease-garden-608290/

Source: Don Cameron, Terranova Ranch
Recently, it has become more difficult to farm

1. Agriculture Regulation
   - Labor Regulation
   - Fertilizer Regulation
   - Water Regulation

2. Complicated utility billing
   - Changing rates
   - Energy statements
     - Detail of Bill (NEMA)
We turn data into answers

Solutions for the whole team:
- Worker in the field (text alerts)
- Manager at the office (website)
- Team meetings (weekly reports)
One platform, three solutions

**Water**
- **Assets:** Pumps & fields
- **Value:** manage water demand and supply

**Energy**
- **Assets:** pumps, solar & buildings
- **Value:** optimize energy cost and solar generation

**Food**
- **Assets:** crops
- **Value:** increase profits with better crop yield
Innovation to manage water

Well Pump  Utility smart meter  Energy data + pump test  Water use records
(examples from small farm)
Innovation to manage solar

1. Track solar energy generation and alert when its time to clean the panels
2. Track energy balance so no credits go unused
3. Track return on investment

Solar ROI (example from large farm)
Innovation to bring it all together

- Report that provides a wholistic picture to the farming team
  - Cost of pumping, pump efficiency, Time-of-Use losses

<table>
<thead>
<tr>
<th>Ranch: Test Ranch</th>
<th>Ranch Pumping Hours: 161.16</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pump</strong></td>
<td><strong>Water Source</strong></td>
</tr>
<tr>
<td>Pump 1</td>
<td>Well</td>
</tr>
<tr>
<td>Pump 2</td>
<td>Well</td>
</tr>
<tr>
<td>Field Booster North</td>
<td>Booster</td>
</tr>
<tr>
<td>Field Booster South</td>
<td>Booster</td>
</tr>
<tr>
<td>Deep well 3</td>
<td>Well</td>
</tr>
</tbody>
</table>
Do these innovations work?

- Example from large farm management firm
  - 200+ pumps
  - ~7000 acres
- Reduction in energy use and cost
  - Leveraging surface water and rain
  - Irrigating off-peak hours

$320,000 less (from off-peak operation)
Current research (EPIC project)

- Funded by California Energy Commission (EPC 16-051)
  - How far can we push water/energy efficiency in commercial agricultural operations by integrating new data and technology?
  - Can we track the impact of the digital transformation on disadvantaged communities (role of new education programs)?

Delano area (SCE and PG&E)

Grape: 38 in
Pistachio: 48 in
Almond: 54 in
Citrus: 52 in
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