Equipment to Support Artificial Intelligence for Sustainable Water, Nutrient, Salinity, and Pest Management in the Western US

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Artificial Intelligence and Agricultural Sustainability

Crop Yield prediction & Price forecasts
Identify the output yield of crops and forecast prices for the next few weeks will help the farmer to obtain maximum profit

Intelligent spraying
AI sensors can detect weed affected areas and can precisely spray herbicides in the right region reducing the usage of herbicides

Predictive Insights
Insights on “Right time to sow the seeds” for maximum productivity. Insights on the impacts created by the weather conditions

Artificial Intelligence in Agriculture

Agriculture Robots
Using Autonomous robots for harvesting huge volumes of crop at a higher volume and faster pace

Crop and soil monitoring
Using ML/AI, we can monitor the crop health for diagnosing pests/soil defects, nutrient deficiencies in soil, etc.

Disease Diagnosis
Prior information and classification of Plant diseases help farmers control the disease through proper strategy.
drone-based precision chemical spraying

plant health identification

weed locating

harvest evaluation
“We need to plant curtains up on the irritated pastor.”
“We need to plant Kernza on the irrigated pasture!!”
Western Colorado Research Center
Grand Valley
WCRC-GV Overhead Linear Move Irrigation System (operational Spring 2023)

11.4 ac field
15 zones (40 ft wide) in VRI bands
10 hp pump for 10 gpm/ac
Now what?
Team of faculty and students collect high-resolution data for the field.

- Soil texture
- Organic matter
- Nitrogen Levels
- Electrical Conductivity
Geodata collection prior to field preparation
Geodata collection prior to planting ...
Soil moisture sensor

Geodata collection during cropping season
Normalized Difference Vegetation Index

Hyperspectral Imaging

Planter Skip
Continuous yield monitoring during harvest
Artificial Intelligence is a way to transform and act on crop data for complex decision making. Decision-making tends to be the most difficult step.
So what am I actually trying to do here?

You’re trying to write an “irrigation prescription”
Actuation

Variable rate irrigation (VRI) can spatially vary water application depths across a field ... to apply water more precisely based on crop needs.
Ultimately, farmers become grand masters of their fields.