



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

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COLLEGE OF
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Artificial Intelligence and Agricultural Sustainability





plant health identification

drone-based precision chemical spraying



harvest evaluation



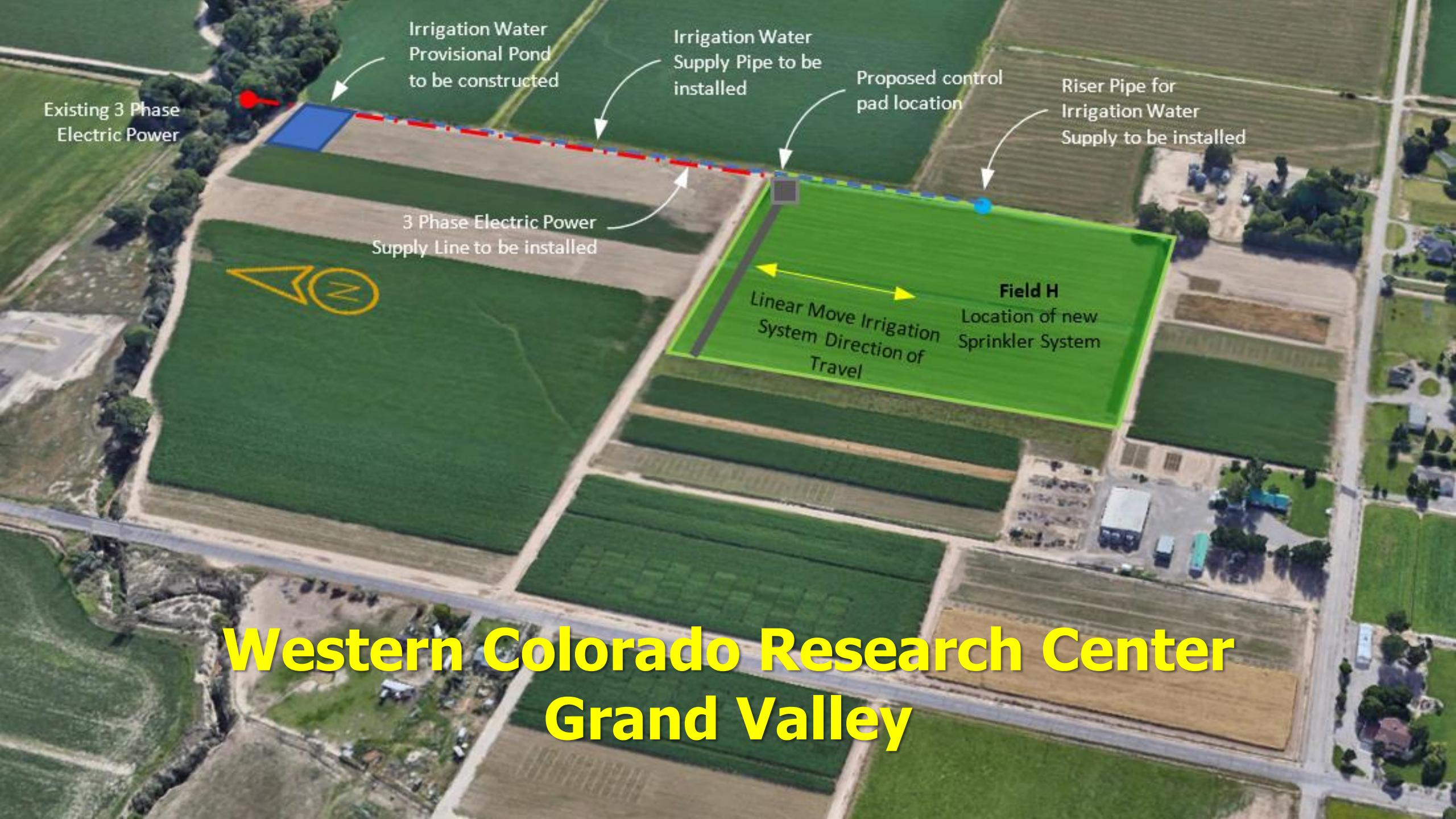
weed locating

“We need to plant curtains up on the irritated pastor.”



“We need to plant
Kernza on the
irrigated pasture!!”





Existing 3 Phase Electric Power

Irrigation Water Provisional Pond to be constructed

Irrigation Water Supply Pipe to be installed

Proposed control pad location

Riser Pipe for Irrigation Water Supply to be installed

3 Phase Electric Power Supply Line to be installed



Linear Move Irrigation System Direction of Travel

Field H Location of new Sprinkler System

Western Colorado Research Center Grand Valley

WCRC-GV Overhead Linear Move Irrigation System (operational Spring 2023)



11.4 ac field

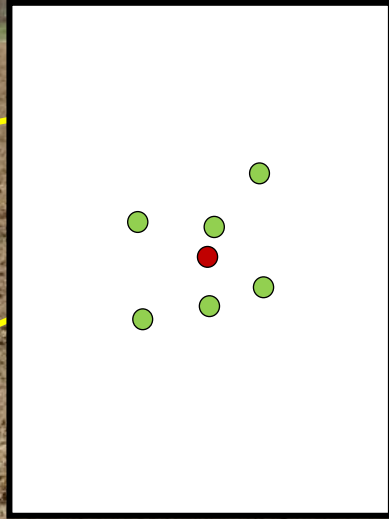
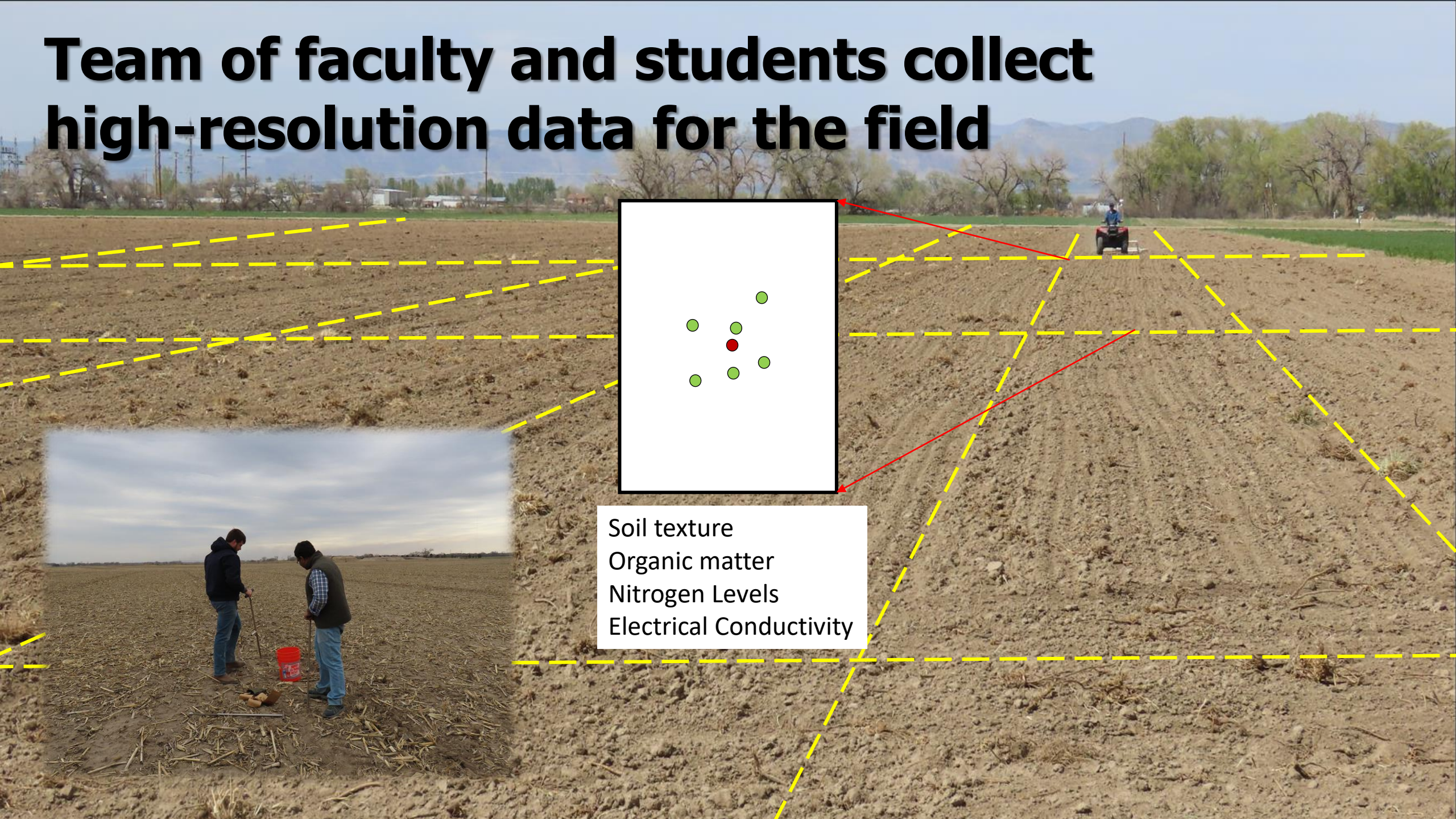
15 zones (40 ft wide) in VRI bands

10 hp pump for 10 gpm/ac

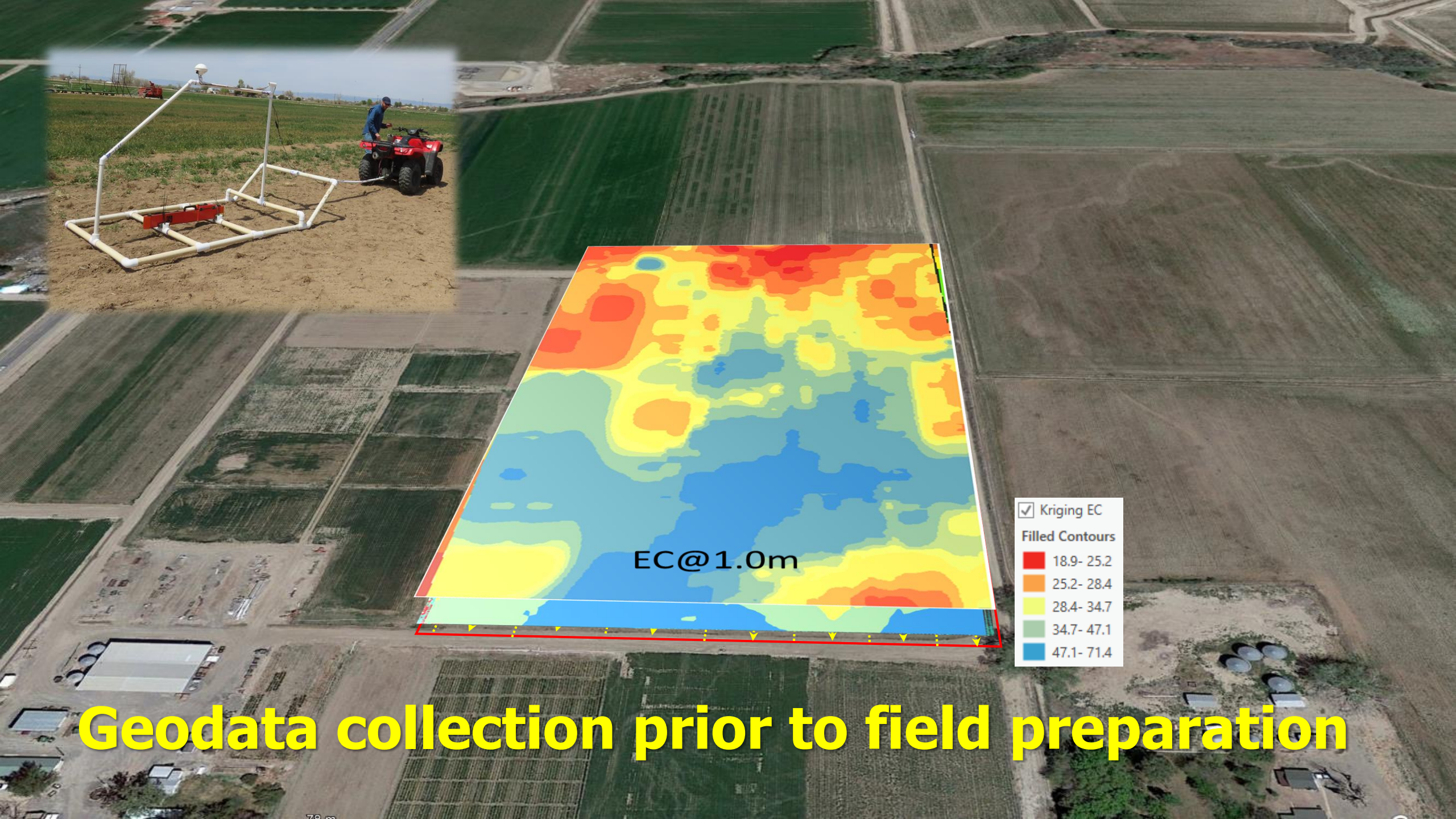


Now what?

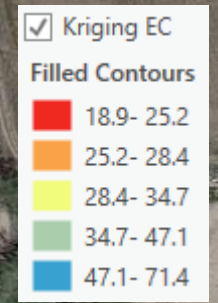
Team of faculty and students collect high-resolution data for the field



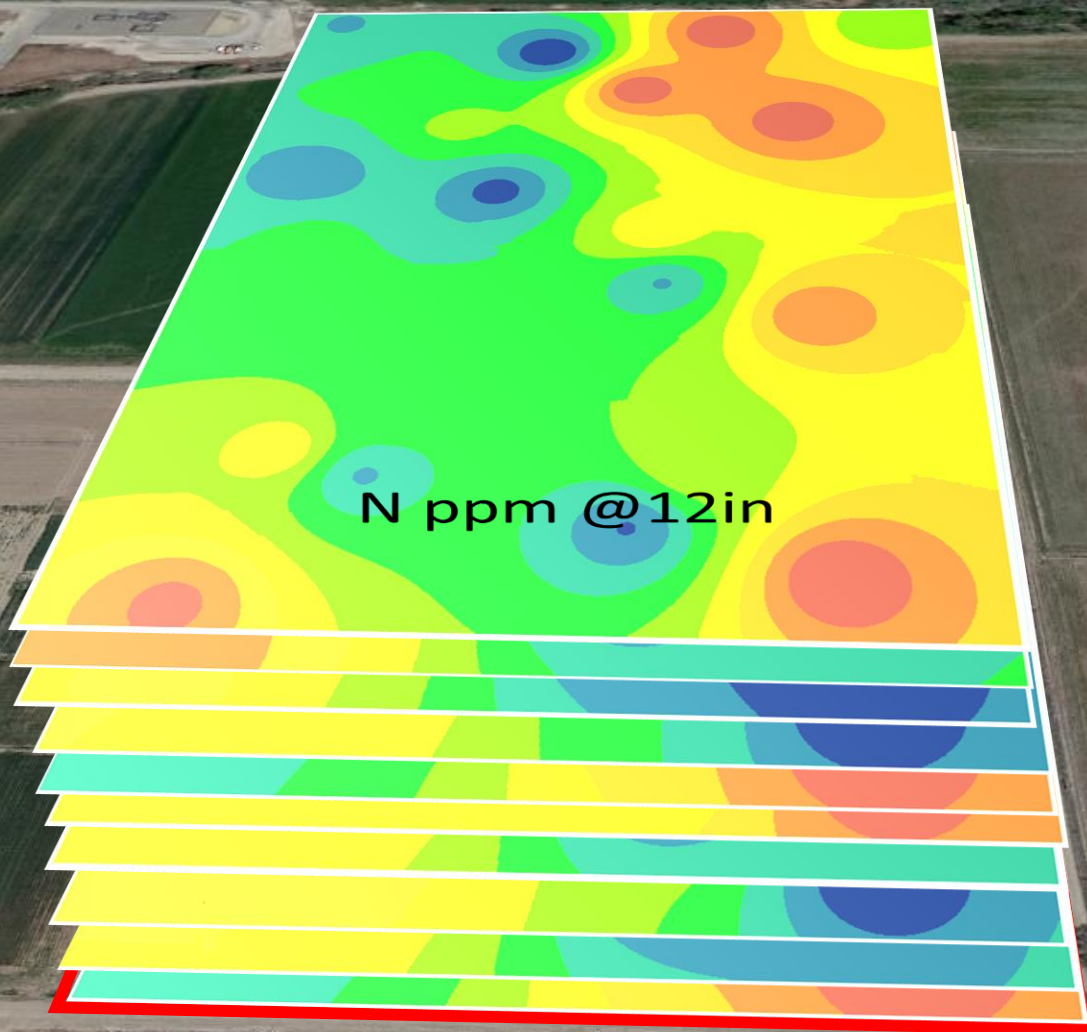
Soil texture
Organic matter
Nitrogen Levels
Electrical Conductivity



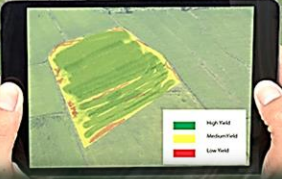
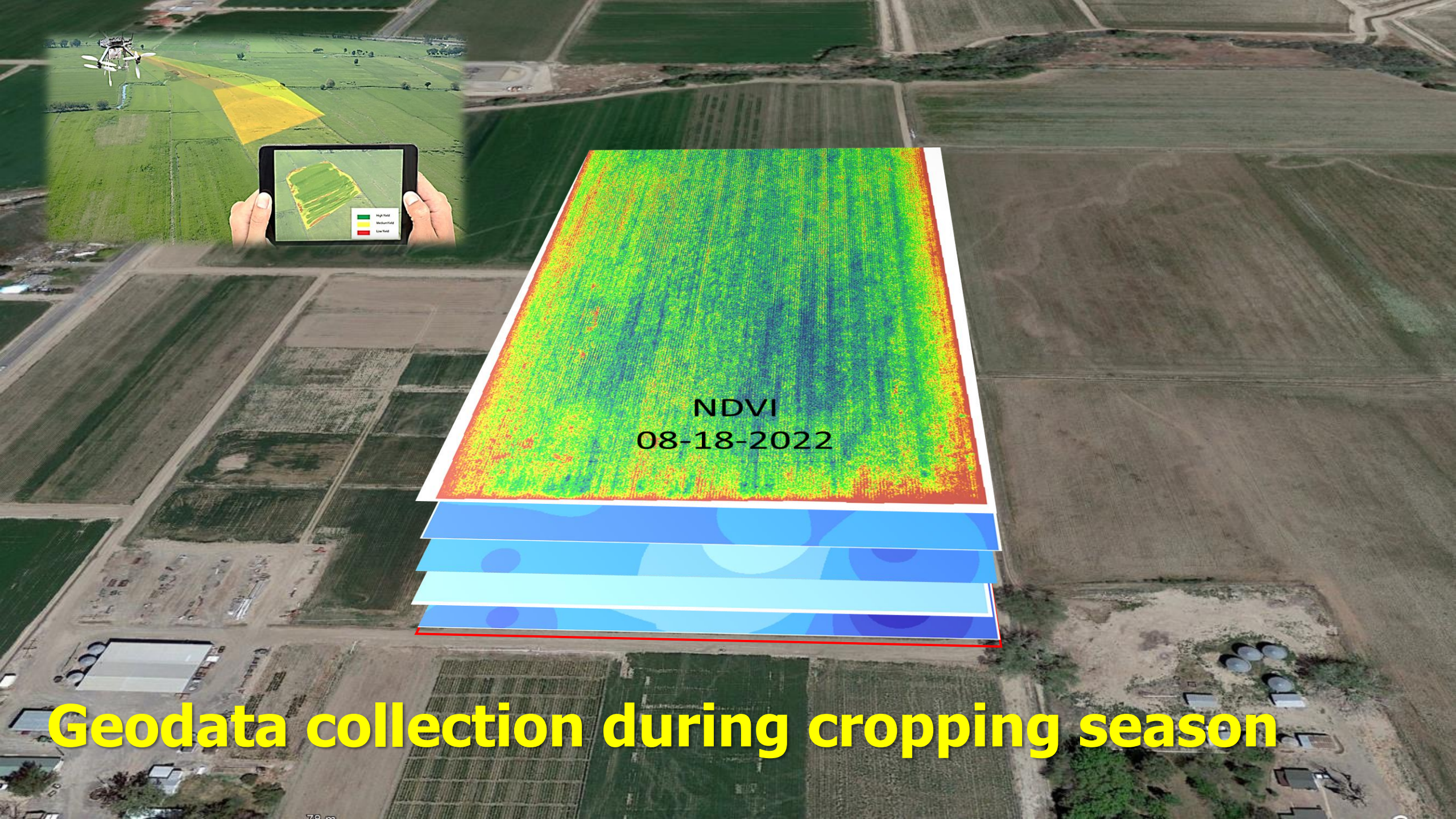
EC@1.0m



Geodata collection prior to field preparation



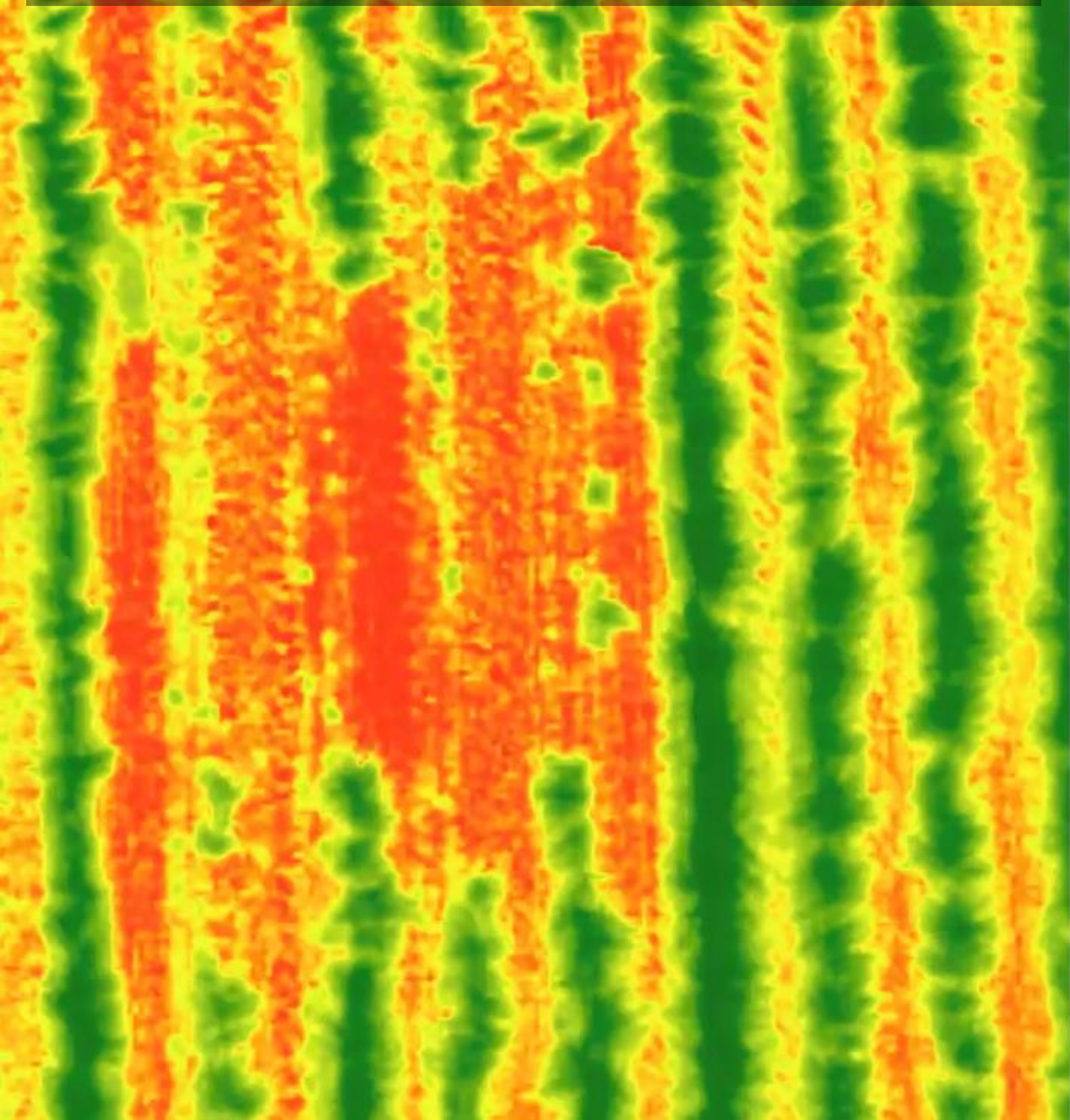
Geodata collection prior to planting ...



NDVI
08-18-2022

Geodata collection during cropping season

Normalized Difference Vegetation Index



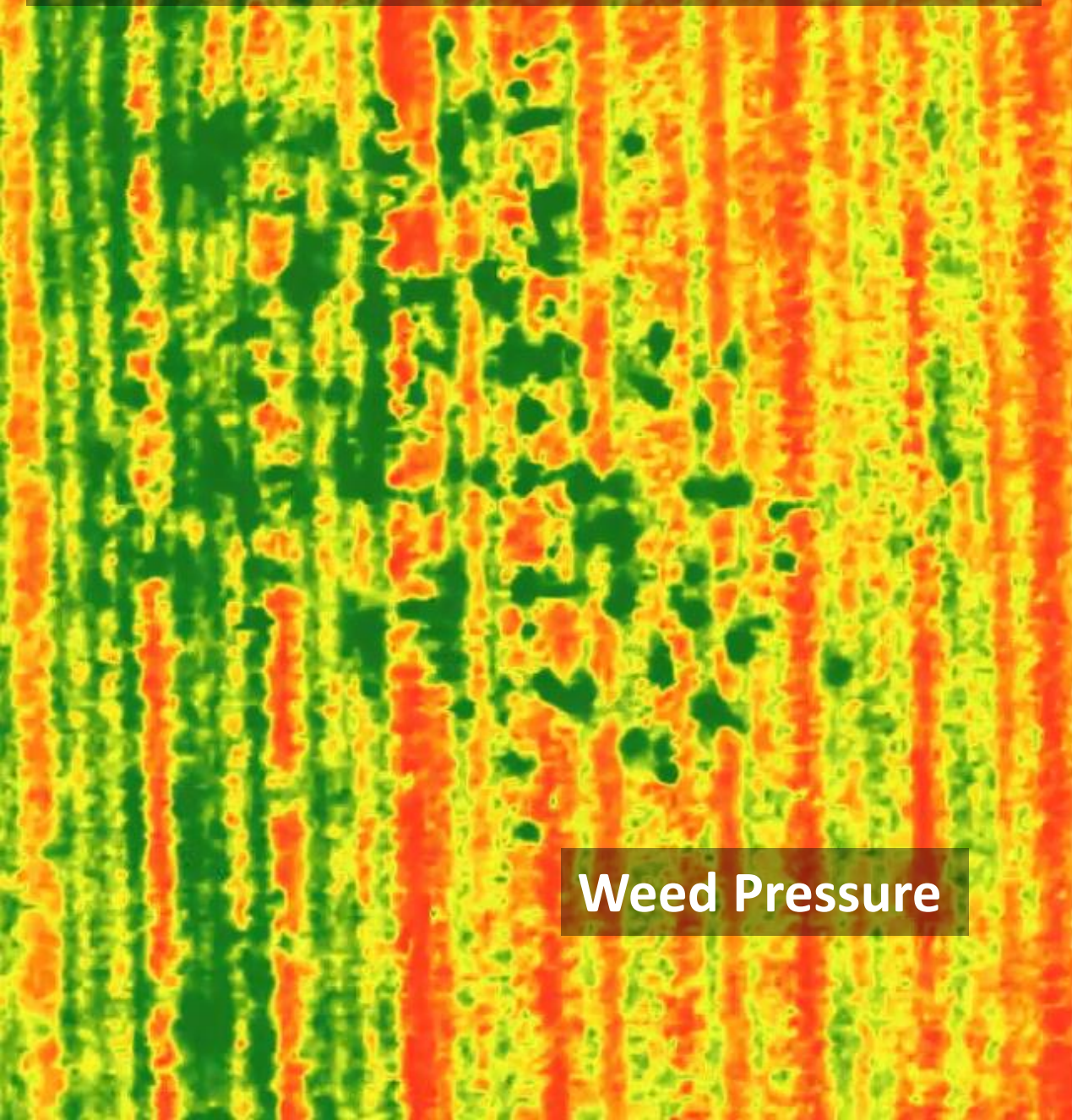
Hyperspectral Imaging



Planter Skip

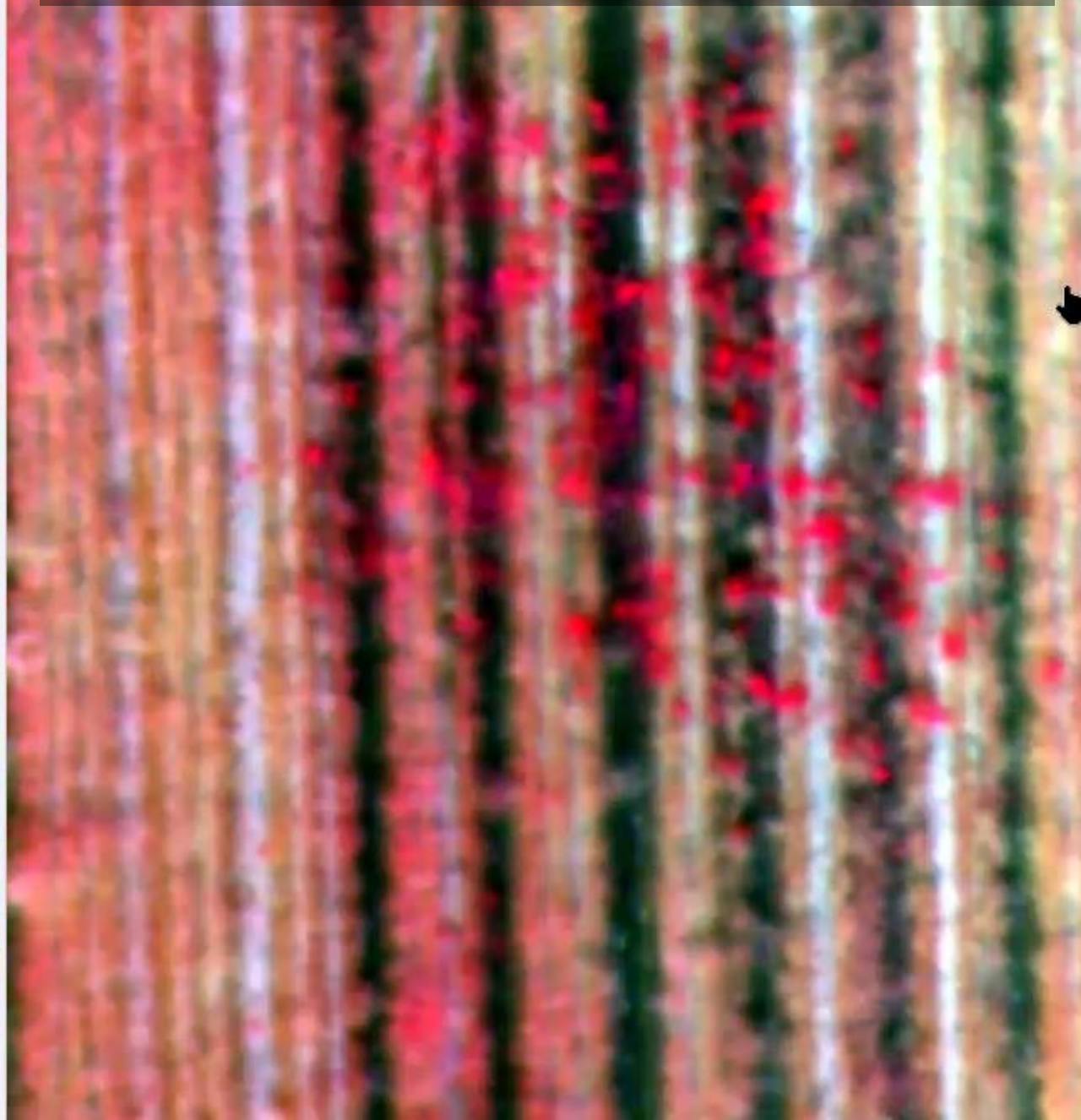


Normalized Difference Vegetation Index



Weed Pressure

Hyperspectral Imaging



Continuous yield monitoring during harvest

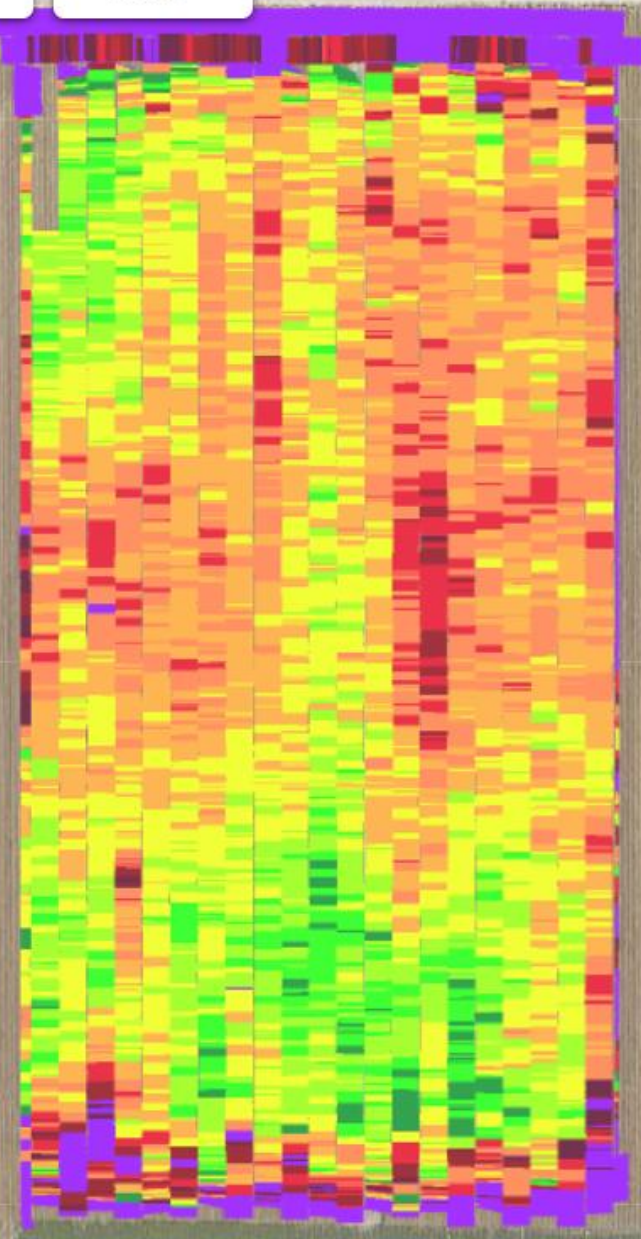
2022 Corn

Yield

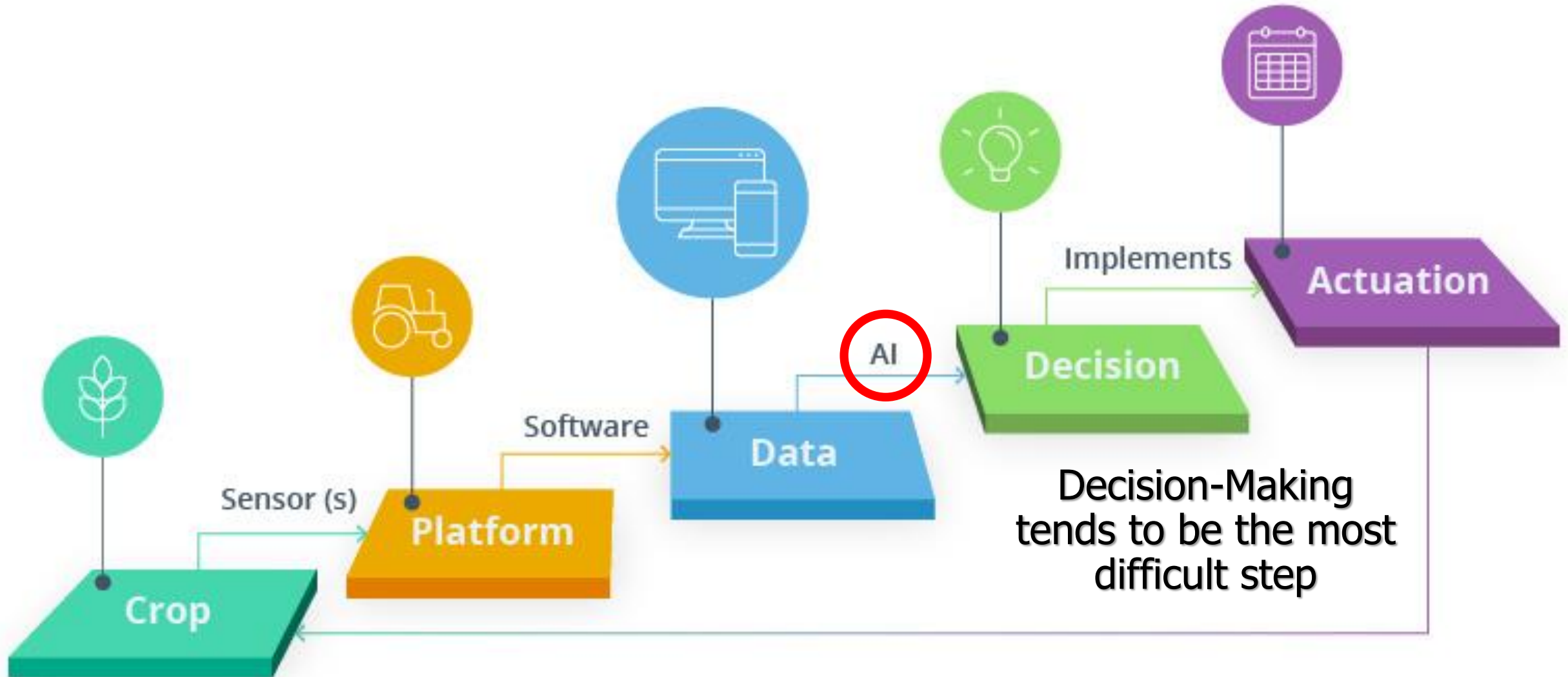
119 Rd

119 Rd

Edit Legend



Artificial Intelligence is a way to transform and act on crop data for complex decision making.





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.

Reinke Vri Tool v 1.1.1.10 [VRI Example.xml]

File Edit View Help

Left Right

100 %
80 %
70 %
60 %
50 %
40 %
30 %
20 %
0 %

Brush Size:
 Show Grid
Transparency:
Colors:
Grid:

Sector	Width	Water Zone(1)	Chemical
01	50.00	0	0
02	50.00	0	0
03	50.00	0	0
04	50.00	0	0
05	50.00	0	0
06	50.00	0	0
07	50.00	0	0
08	50.00	0	0
09	50.00	0	0
10	50.00	0	0
11	50.00	0	0
12	50.00	0	0
13	50.00	0	0

Zone	Width	Water Sector(1)	Relay Address	# Sprinkler
01	21.00	40	A1	4
02	33.50	30	A2	7
03	33.00	40	A3	7
04	33.00	30	A4	7
05	35.50	40	A5	7
06	30.50	30	A6	6
07	22.00	40	A7	7



Ultimately, farmers becomes grand masters of their fields.

