

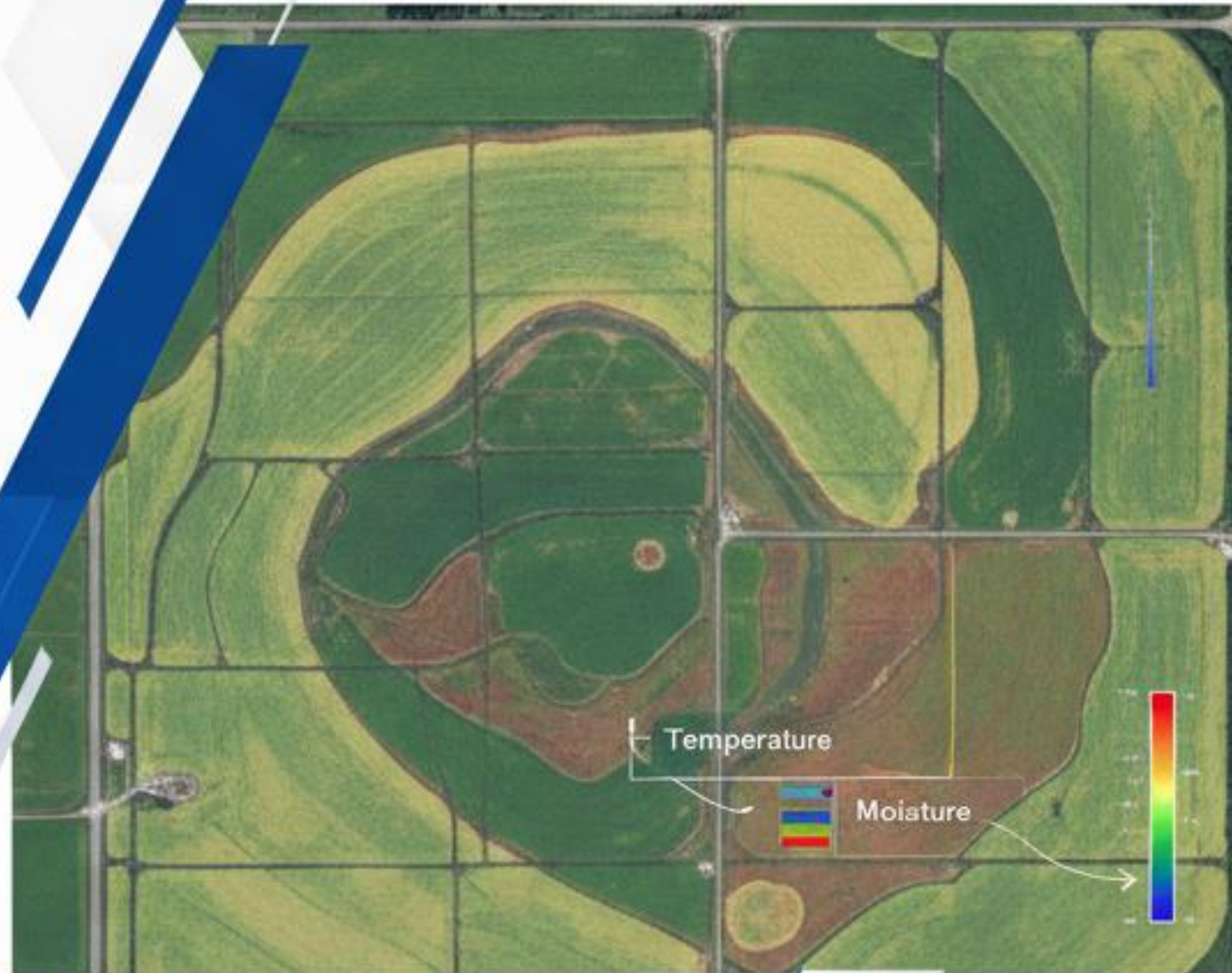
Mapping Micro-Climate Variations Within a Single Farm Using Satellite Data & AI

How sub-field climate differences impact crop performance and how satellites **reveal** them



The Hidden Problem Inside Every Farm

- We treat the whole farm as one uniform unit
- Same irrigation, same fertilizer, same practices
- But crop growth is never uniform
- Why? Micro-climate variation within the same field
- Even 2 acres can have different temperature, moisture, and stress zones



What is Micro-Climature in Agriculture?

Variations in:

- Small climatic differences within short distances
- Land Surface Temperature (LST)
 - Soil moisture
 - Soil moisture
 - Humidity influence
 - Shade patterns
 - Elevation & slope.
- These directly affect crop growth.

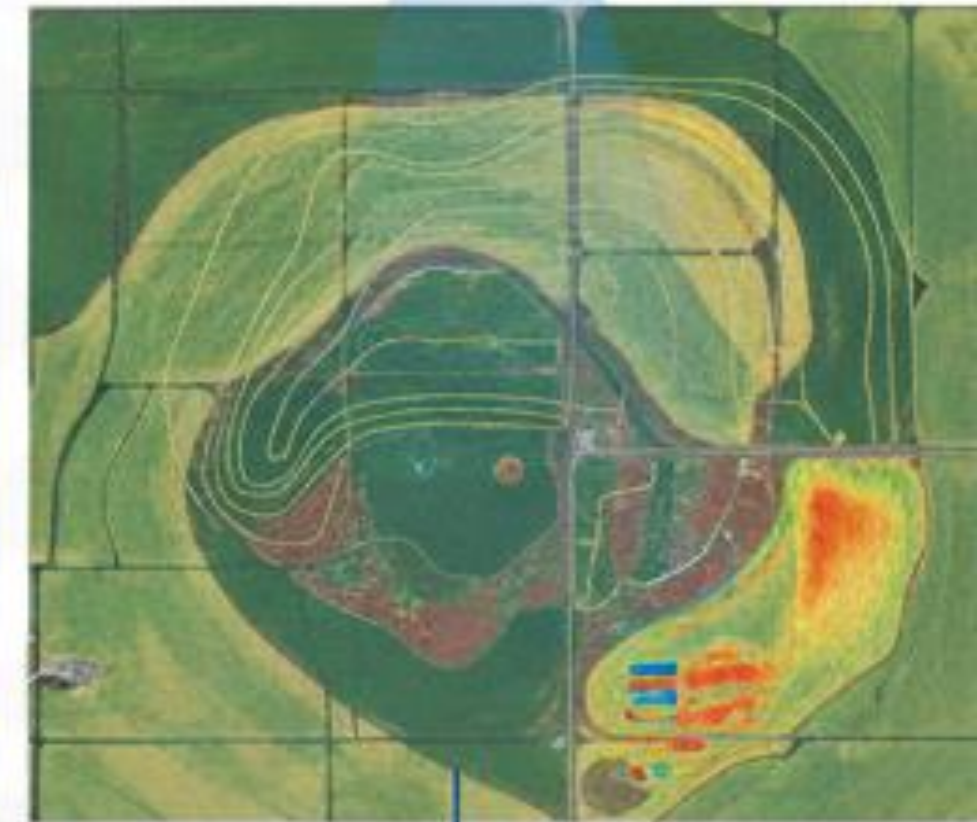


Why Farmers Cannot See Micro-Climate Differences

- Not visible to naked eye
- Field visit cannot measure temperature variation across farm
- Instruments measure only at one one point
- Requires spatial observation → Satellites



Satellite Observation

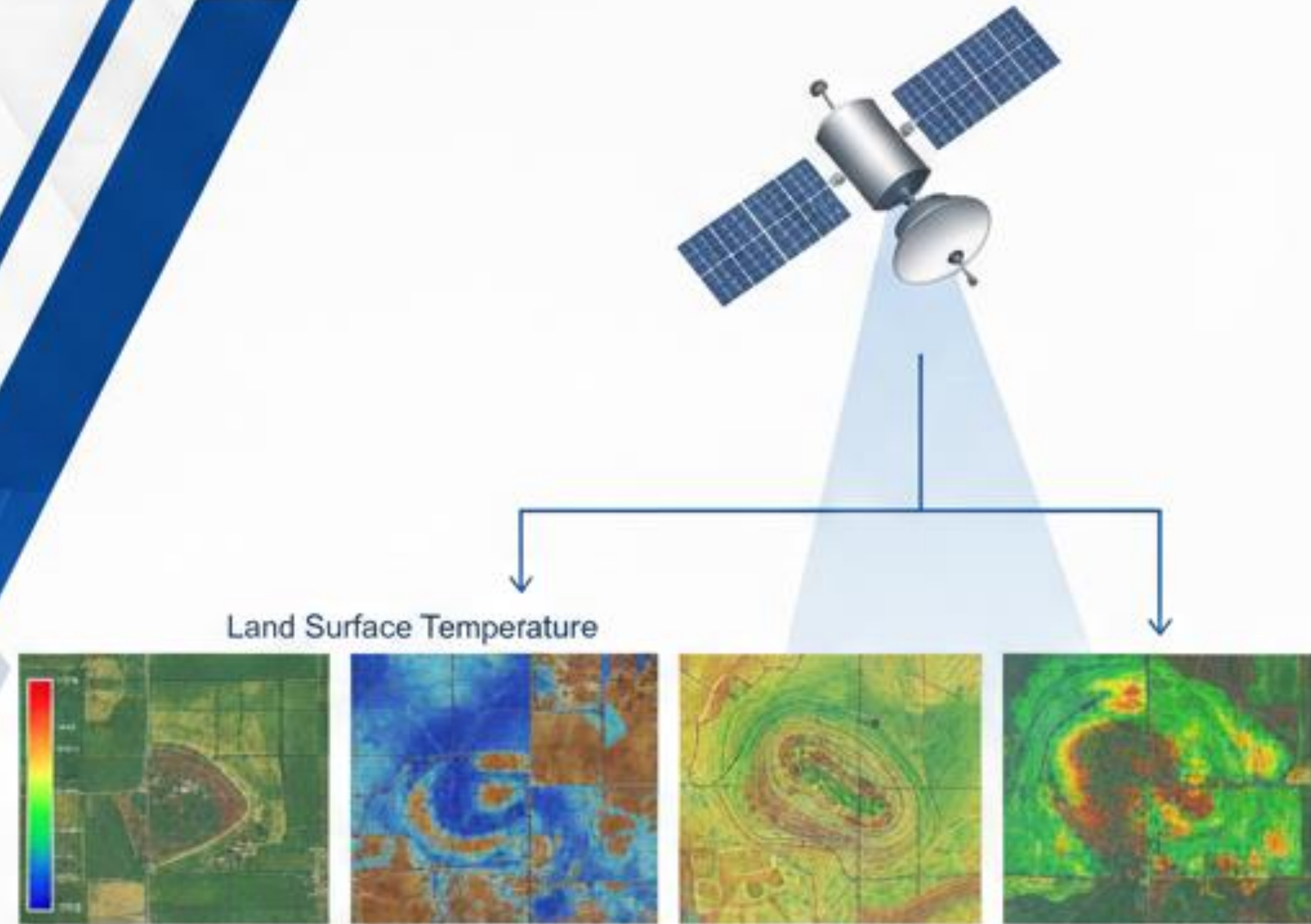


Invisible Data Revealed



Role of Satellites in Micro-Climate Mapping

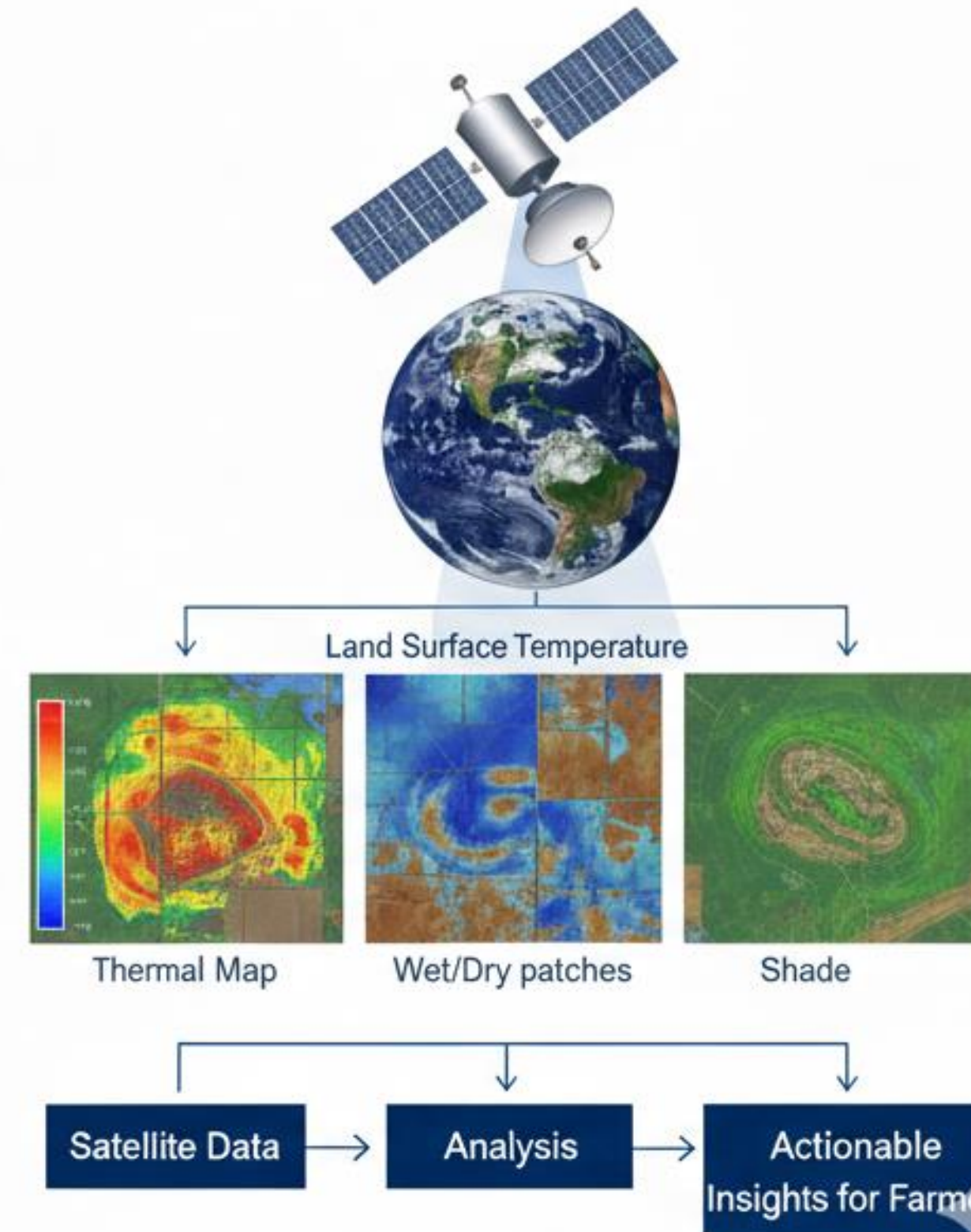
- Thermal bands → Land Surface Temperature
- Radar data
- DEM data → Soil moisture variation
- Optical data → Shade, vegetation response
- Time-series → Pattern over season



Time-series → Pattern over season

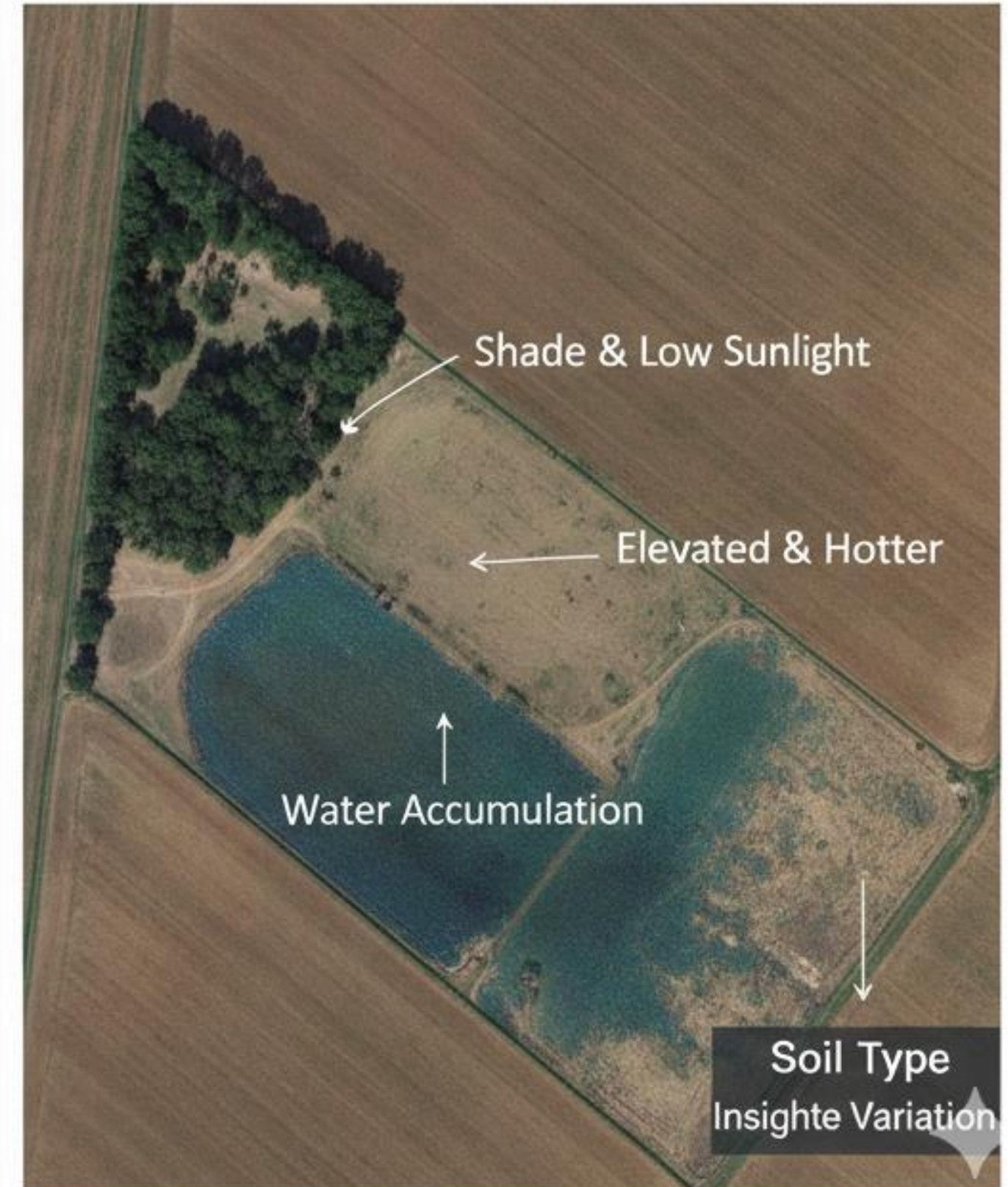
Key Satellite Parameters Used

Parameter	What it Indicates
LST	Heat zones
Soil Moisture	Plant reaction to micro-climro-climate
NDVI response	Water flow & accumulation
Shadow	Shade impact



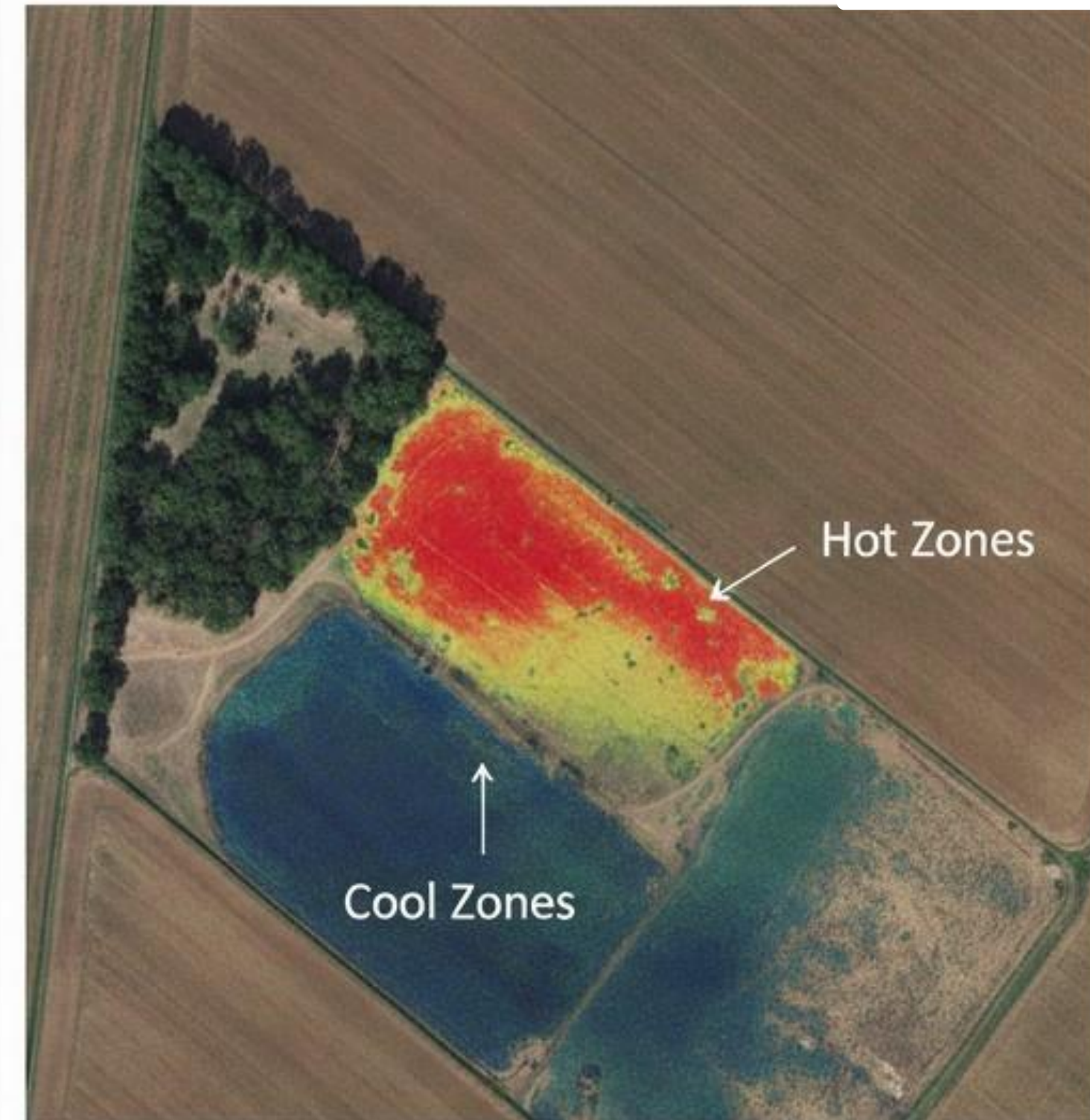
How Micro-Climate Inside a Farms

- Low-lying area → water accumulation
→ accumulation → cooler, waterlogged
- Elevated → dry & hotter
- Tree/building shadow → low sunlight
- Soil variation → different heat retention



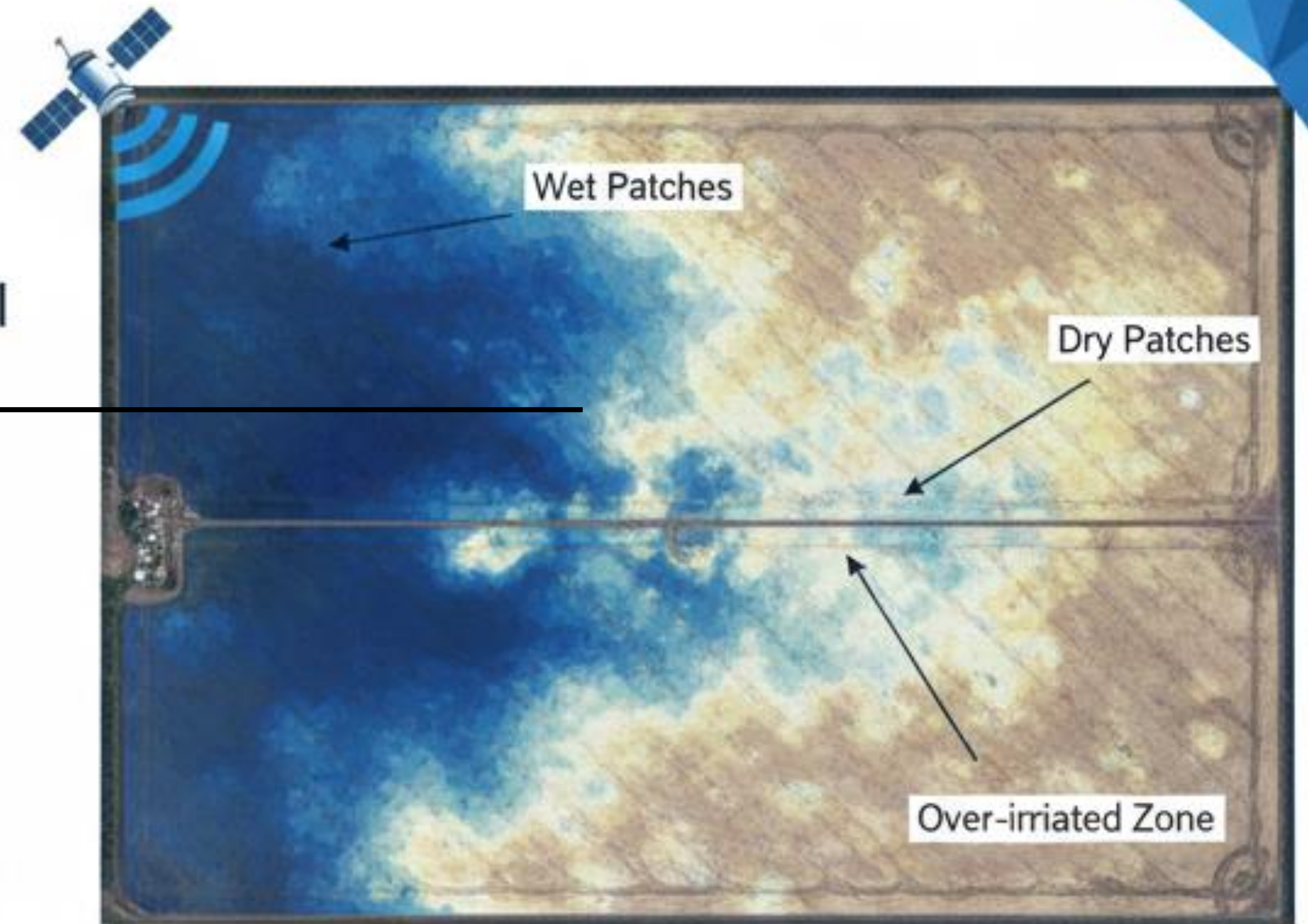
Land Surface Temperature (LST) Mapping

- Detect hot and cool zones within same field
- Detectet → dry & hotter
- Heat stress areas identified early
- Guides irriation and mulching decisions

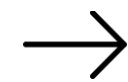


Moisture Variability from Radar

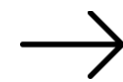
- Radar penetrates clouds and soil surface
- Identifies wet vs dry patches
- Detects over-irrigated and under-irrigated zones



RADAR DATA



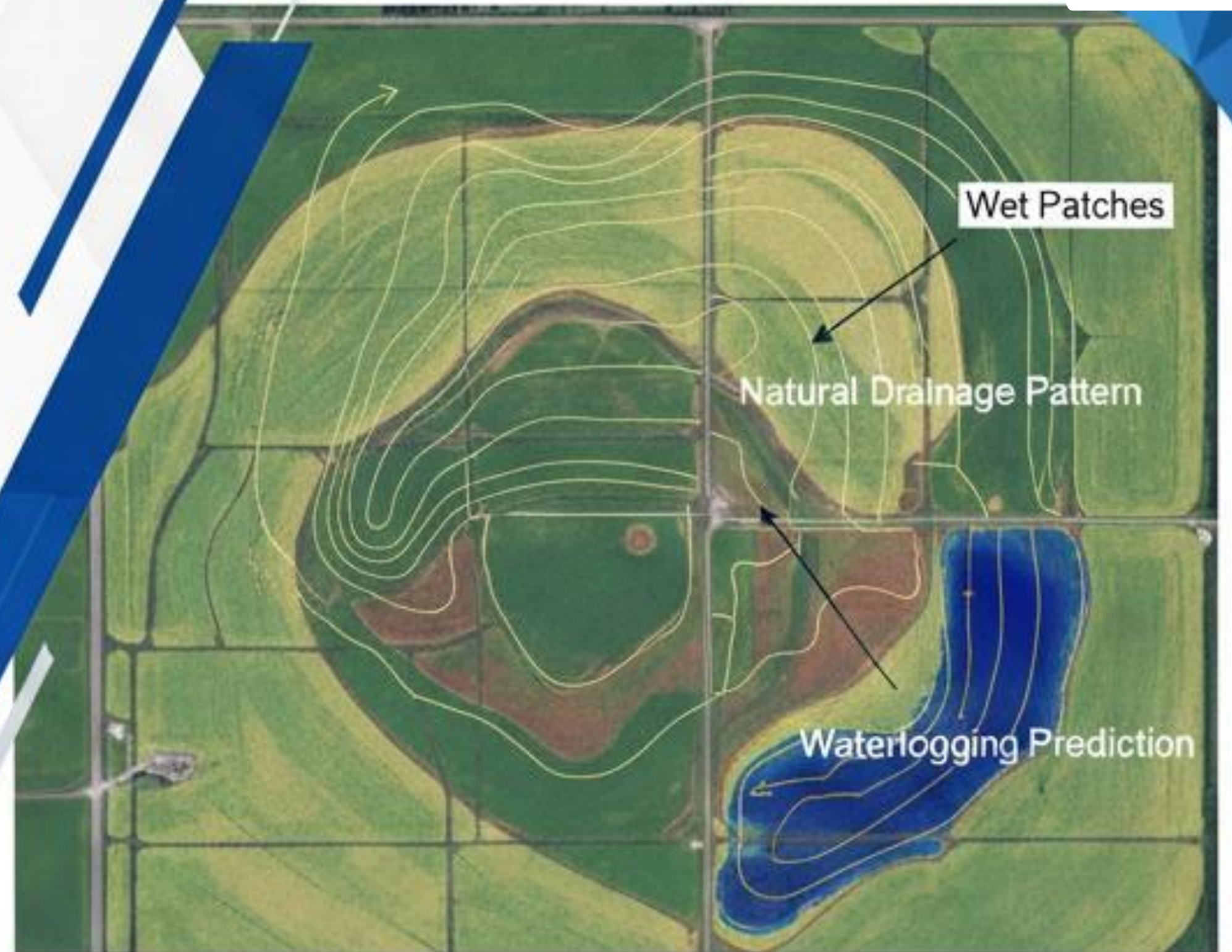
Soil Moisture
Analysis



Targeted
Irrigation

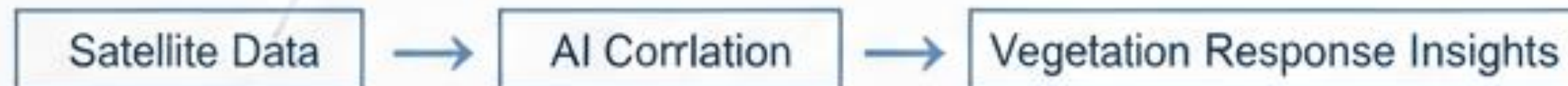
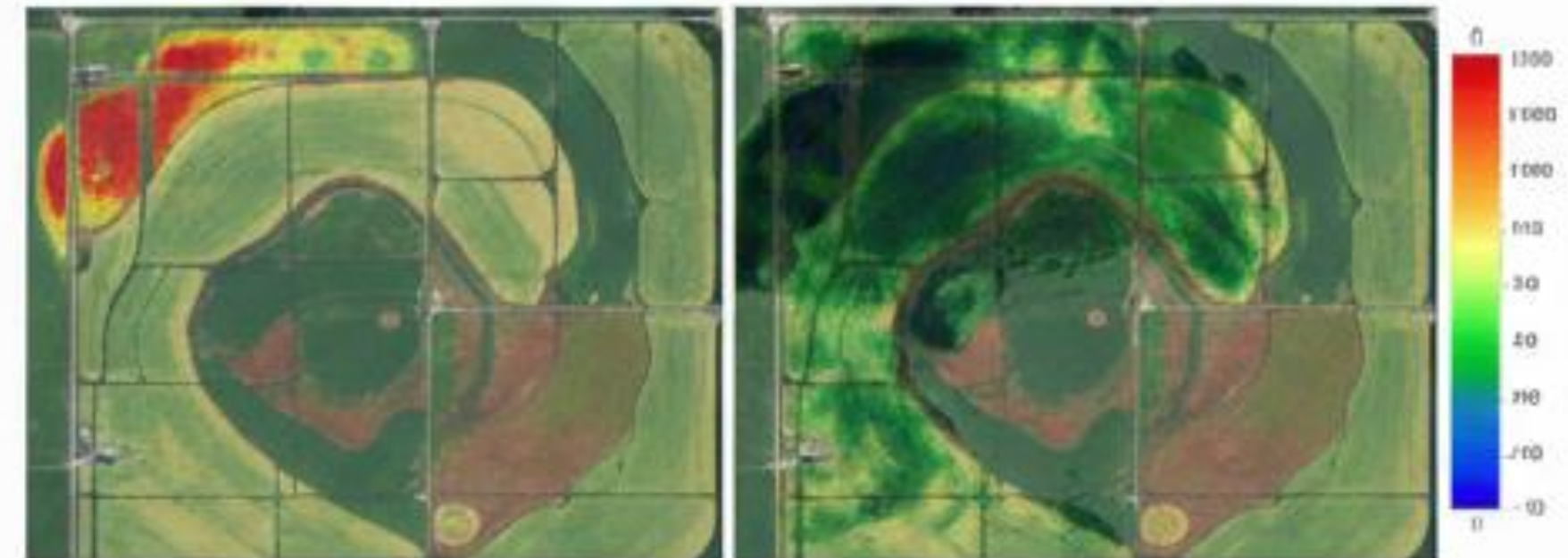
Elevation & Slope Impact (DEM)

- Water flows to lower elevation
- Natural drainage pattern
- Shade patterns
- Predict waterlogging before or after



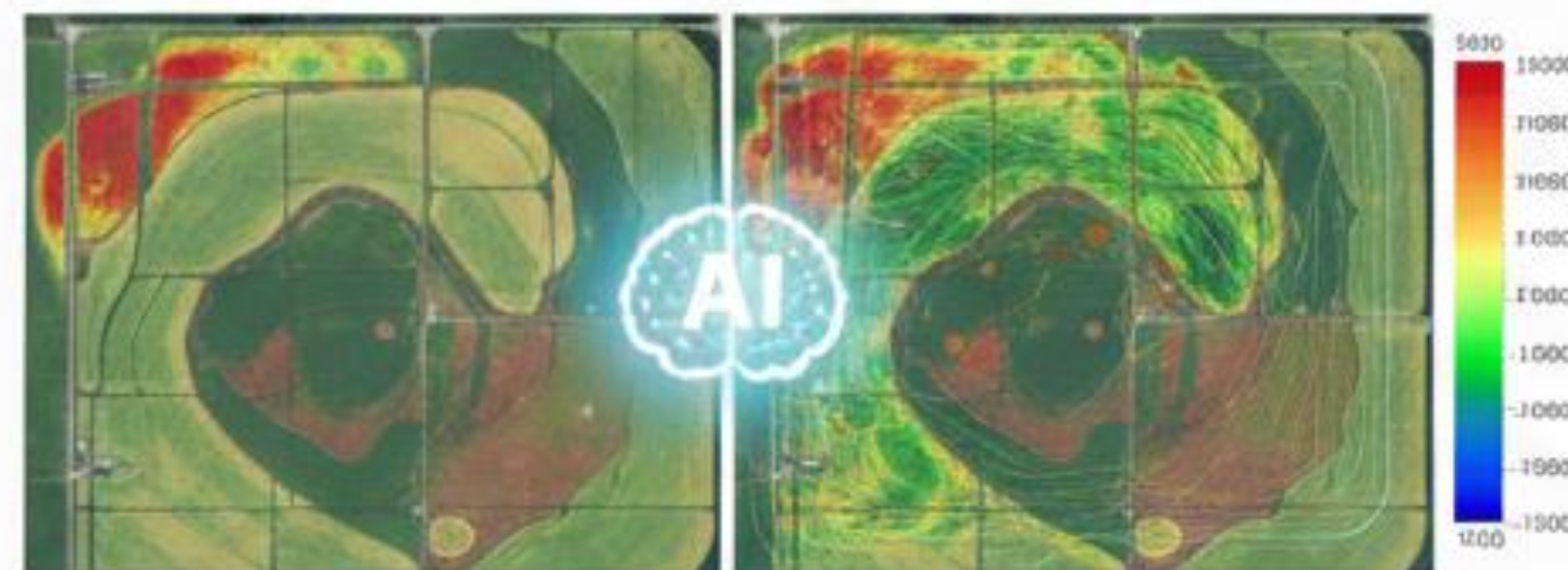
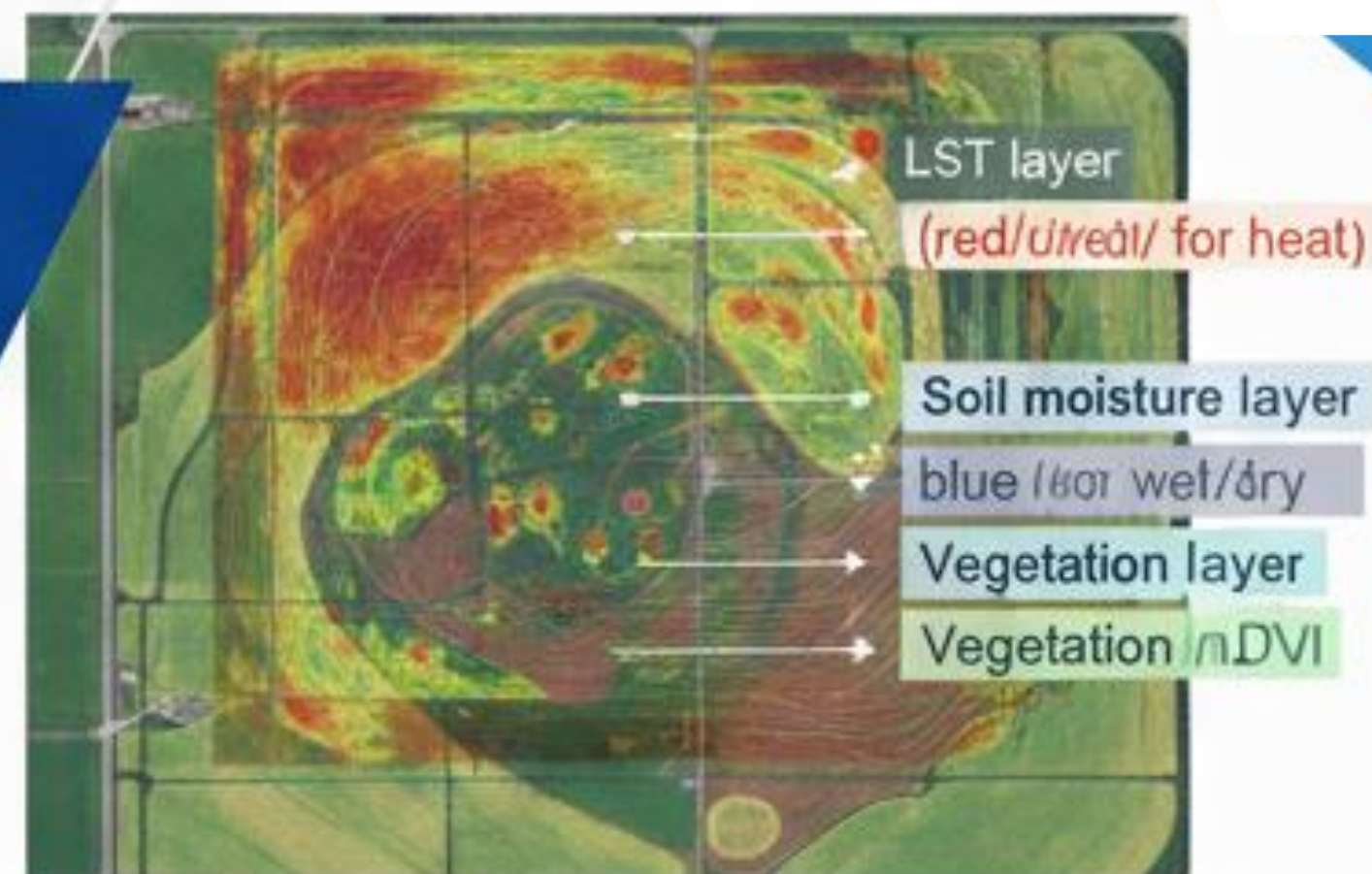
Vegetation Response to Micro-Climate

- Same crop, same date of sowing
- Different NDVI trend across patches
- Due to temperature differences
- Due to temperature & variations correlates vegetation response with micro-climate layers



AI Layer Stacking by PlanetEye FarmAI

- Same crop, same date of sowing
- LST layer
- Different NDVI trend across patches
- Due to temperature differences
- DEM layer
- AI creates Micro-Climature Zones Map



All Layers Data



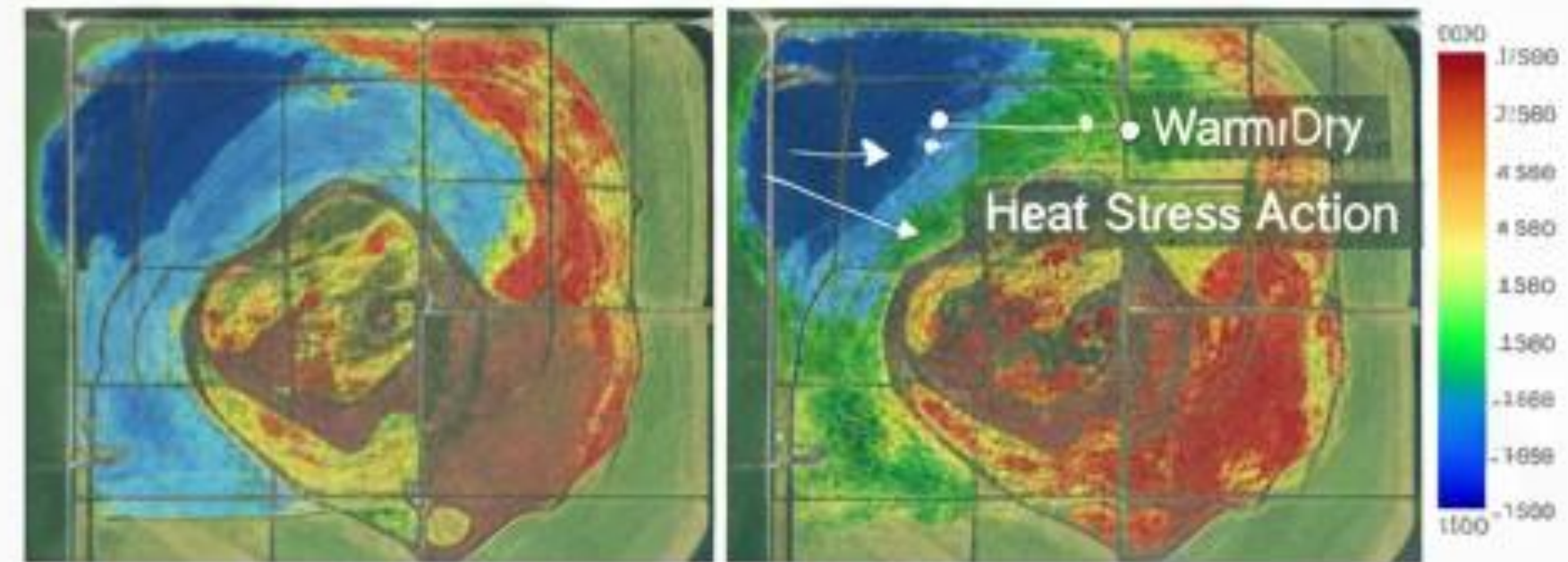
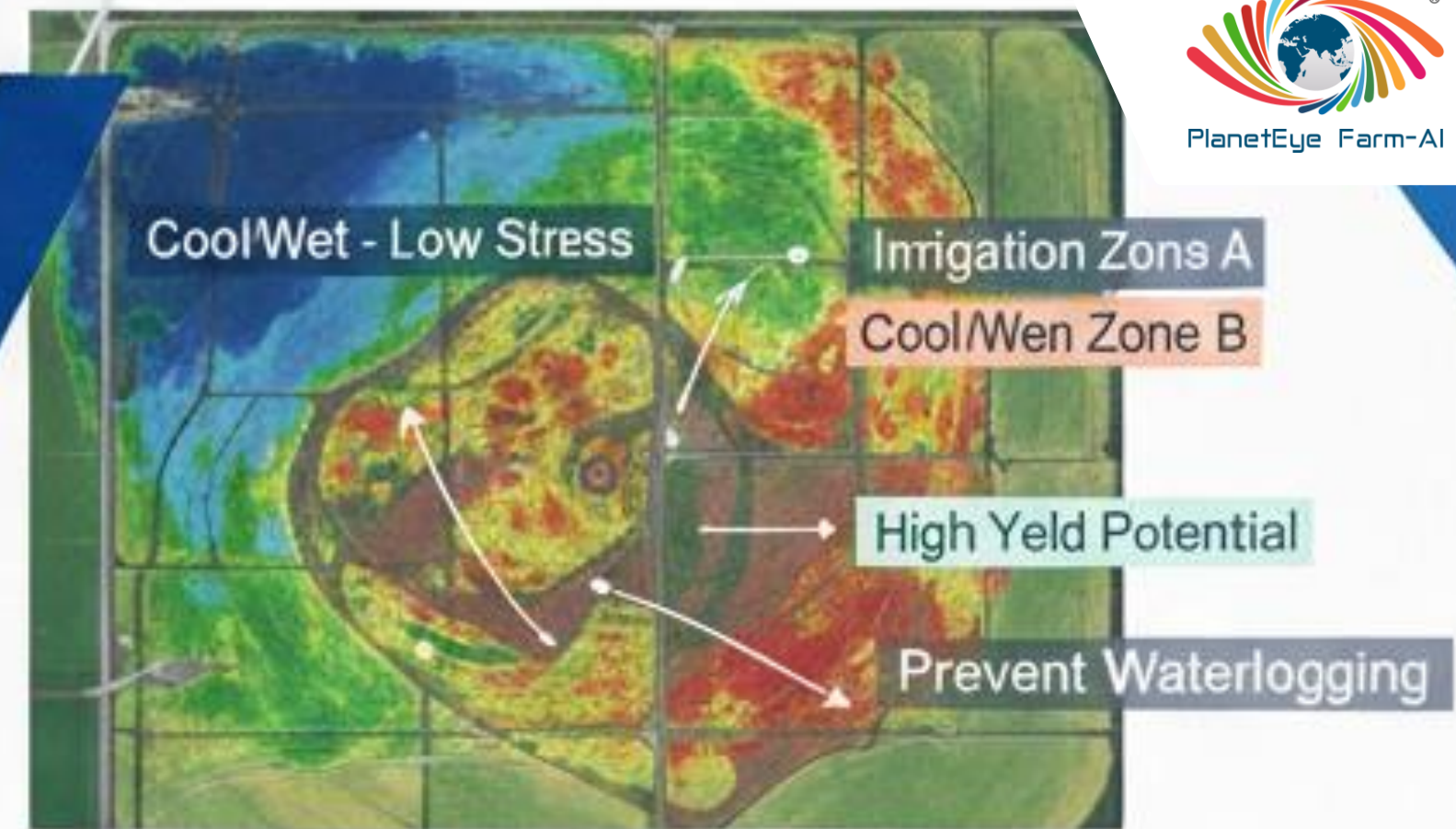
PlanetEye FarmAI (AI Processing)

Practical Decisions from This Map

- Zone-wise irrigation scheduling management zones

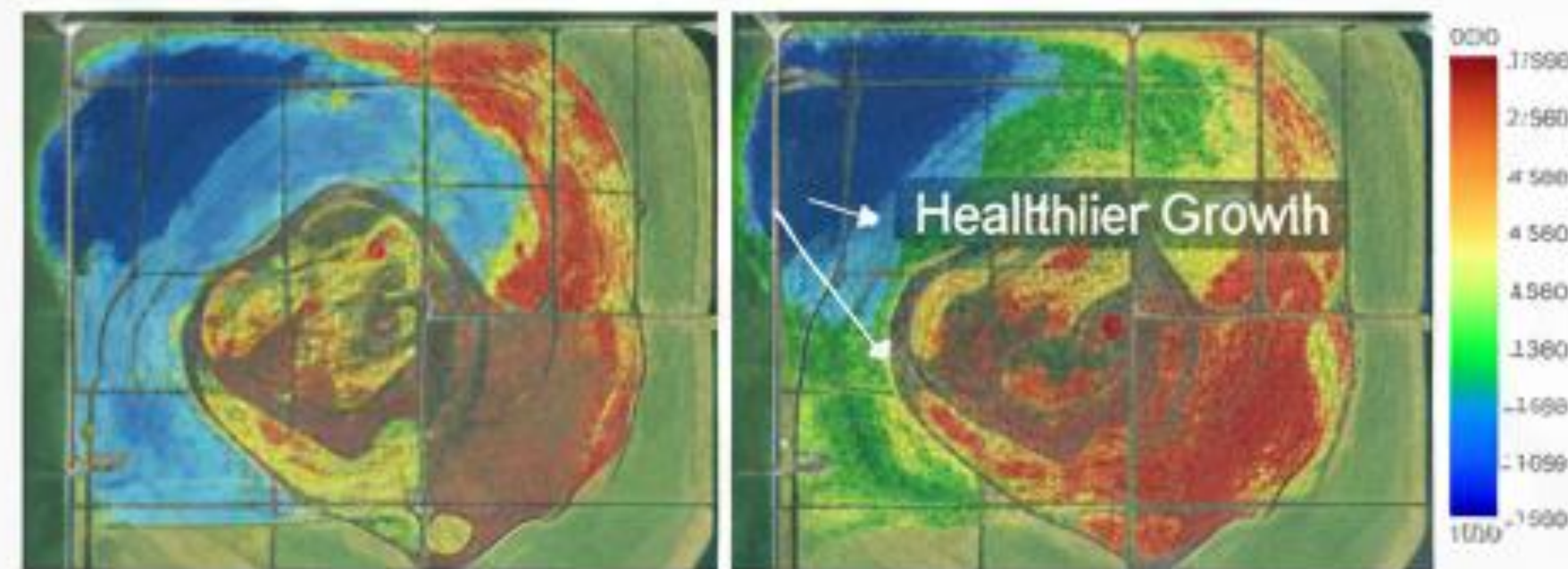
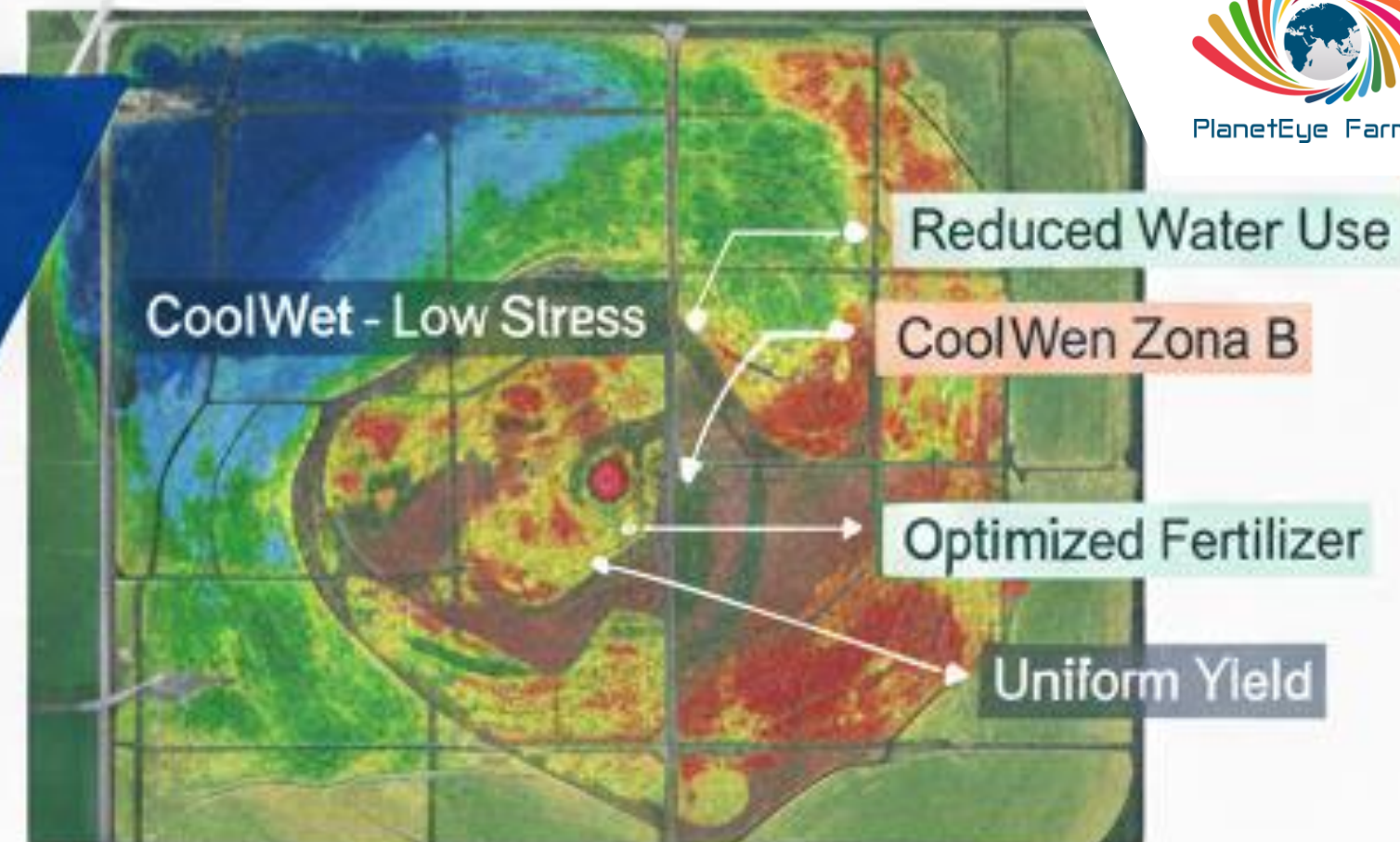
Zoning helps is:

- Avoid waterlogging
- Defining stress response area
- Precision input application
- Better yeild uniformity



Impact on Crop Yield & Cost

- Reduce over-irrigation
- Reduce fertilizer costs
- Reduce fertilizer wastage
- Prevent root diseases
- Improve uniform crop growth
- Increase yield consistency



Slide 16 – Use Cases

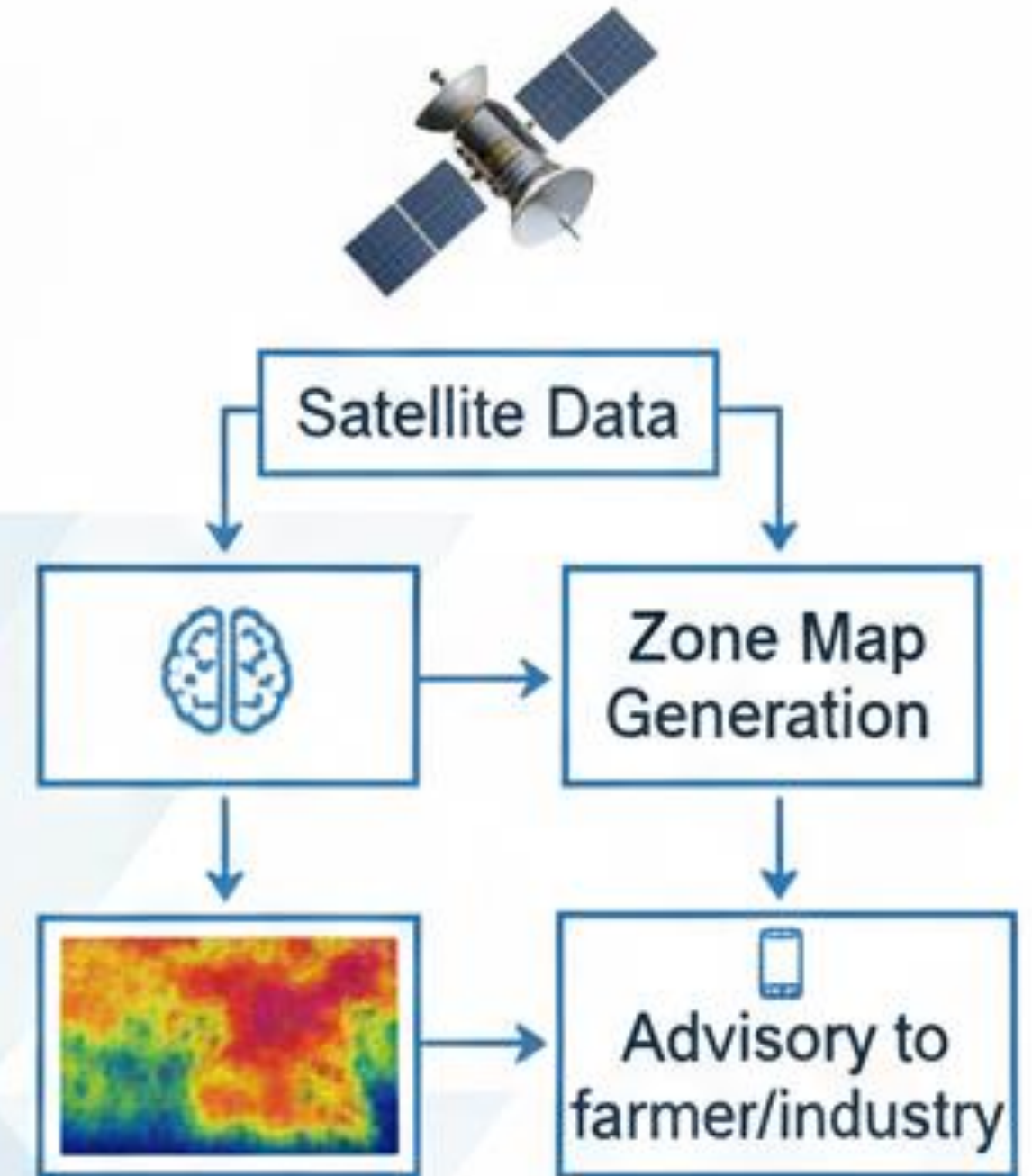
- Sugacane
- Grapes
- Pomegrante
- Vegetables
- Orchards
- Large FPO farms



Micro-Climature Zones Map → Targeted Farm Management → Diverse Use Cases

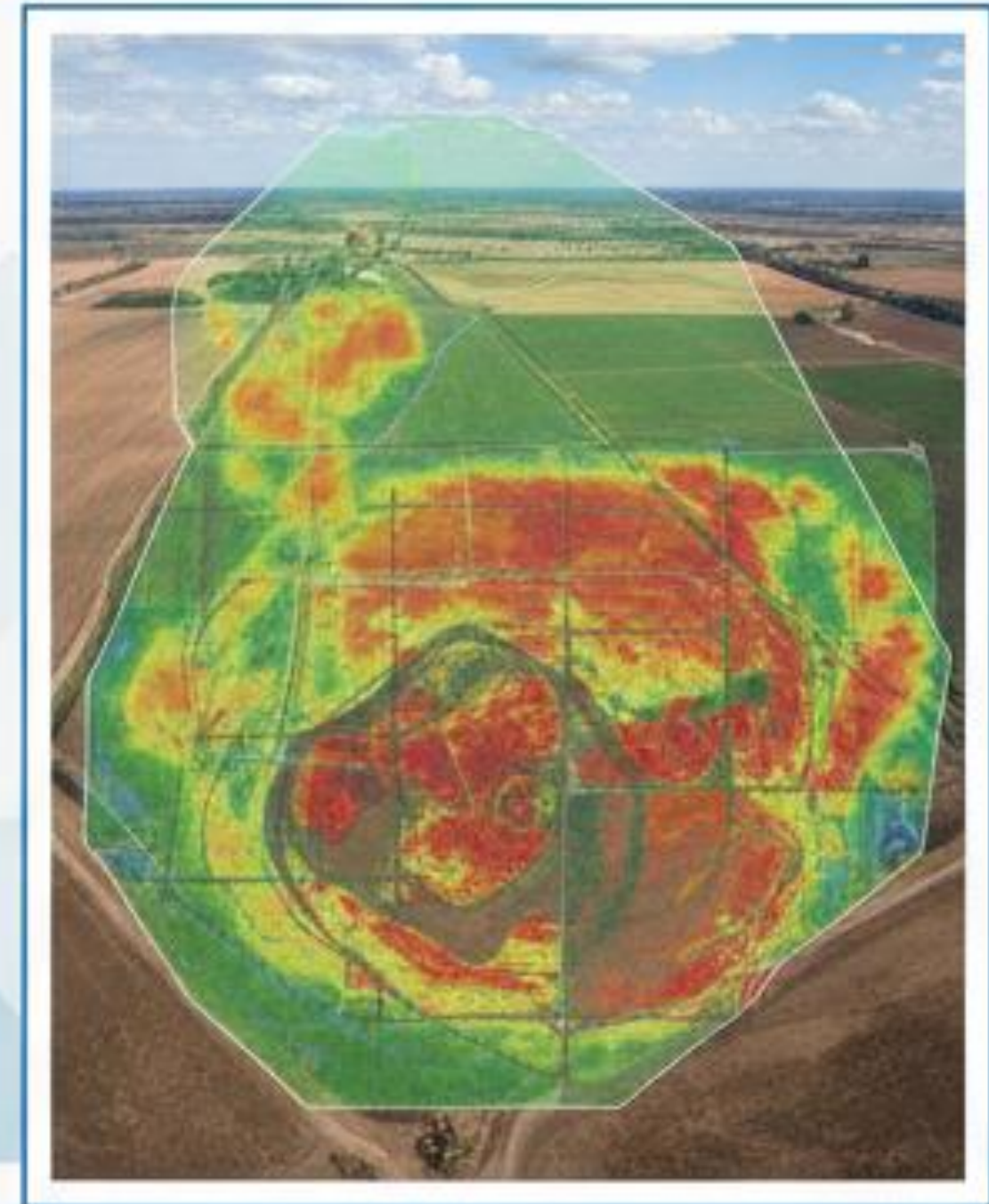
Slide 17 — How PlanetEye FarmAI Delivers This

- Satellite data ingestion
- AI processing
- Advisory to farmer/industry



• Conclusion

- *“A farm is not one climate. Is multiple climates in a small area. Satelites and AI help us see the invisible.”*





Thank You

PlaneteyeFarm AI



www.planeteyefarm.ai



+91 8275830454



sales@planeteyefarm.ai

