



**ABDRONE**

- Spot Spraying  
with field robots  
& drones

Capigi 2023

Leks Bolderdijk  
[www.abdrone.nl](http://www.abdrone.nl)



ABDRONE

# ABdrone

- ▶ Agricultural drone operator
  - ▶ 1500 drone flights since 2016
  - ▶ Research
    - ▶ Pioneering and Product development
    - ▶ RGB and multispectral crop monitoring
  - ▶ Applied
    - ▶ Taskmaps with AI analysis for spot spraying
    - ▶ Maps for organic matter
- ▶ WeedaGo
- ▶ SABE Demonstrator Farm



# Potential

## Common practice:

- Yields of 30 to 90 tons per hectare in the same field with potatoes and with standardized inputs
- Losses by soil compaction
- Lack of biodiversity creates less resilient crops



# Potential

We can't have sustainable farming if we don't match our farming inputs with the varying needs of our crops.



# Potential

We need crop management per  
plant



# Potential

We need crop management per plant

We need to manage our soil per square meter



# Potential

**Mapping fields with plant level resolution**

**Applying taskmaps with plant level accuracy**



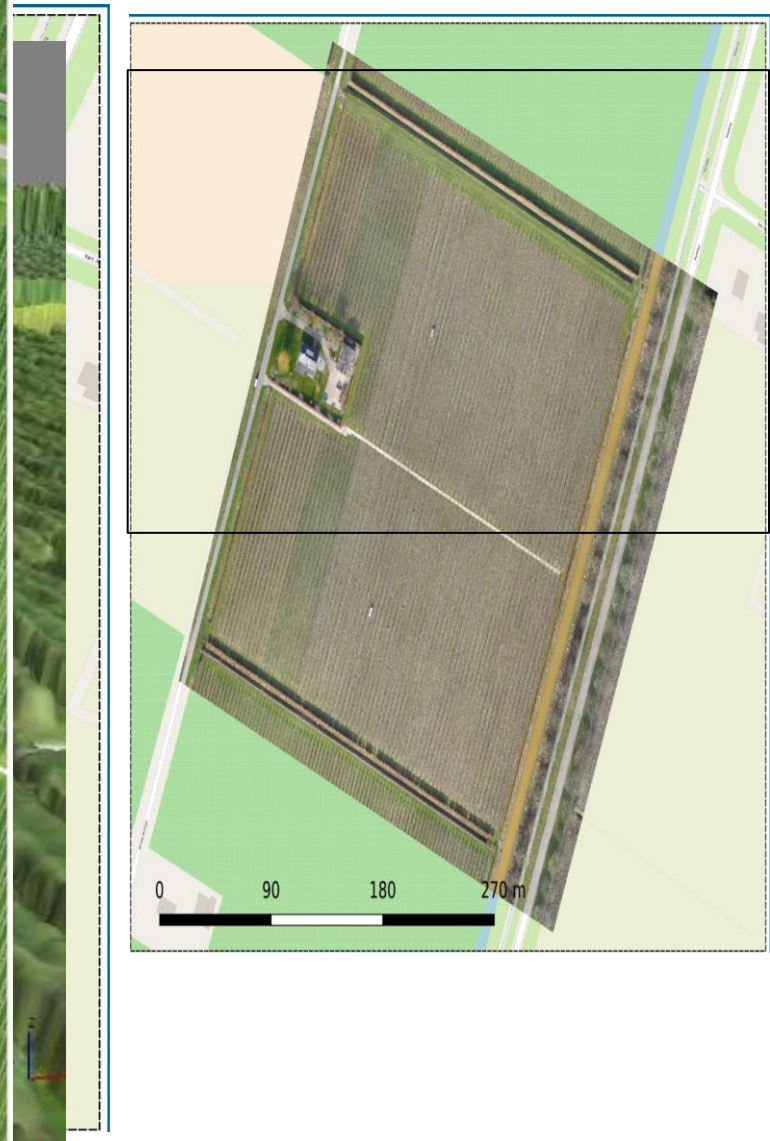
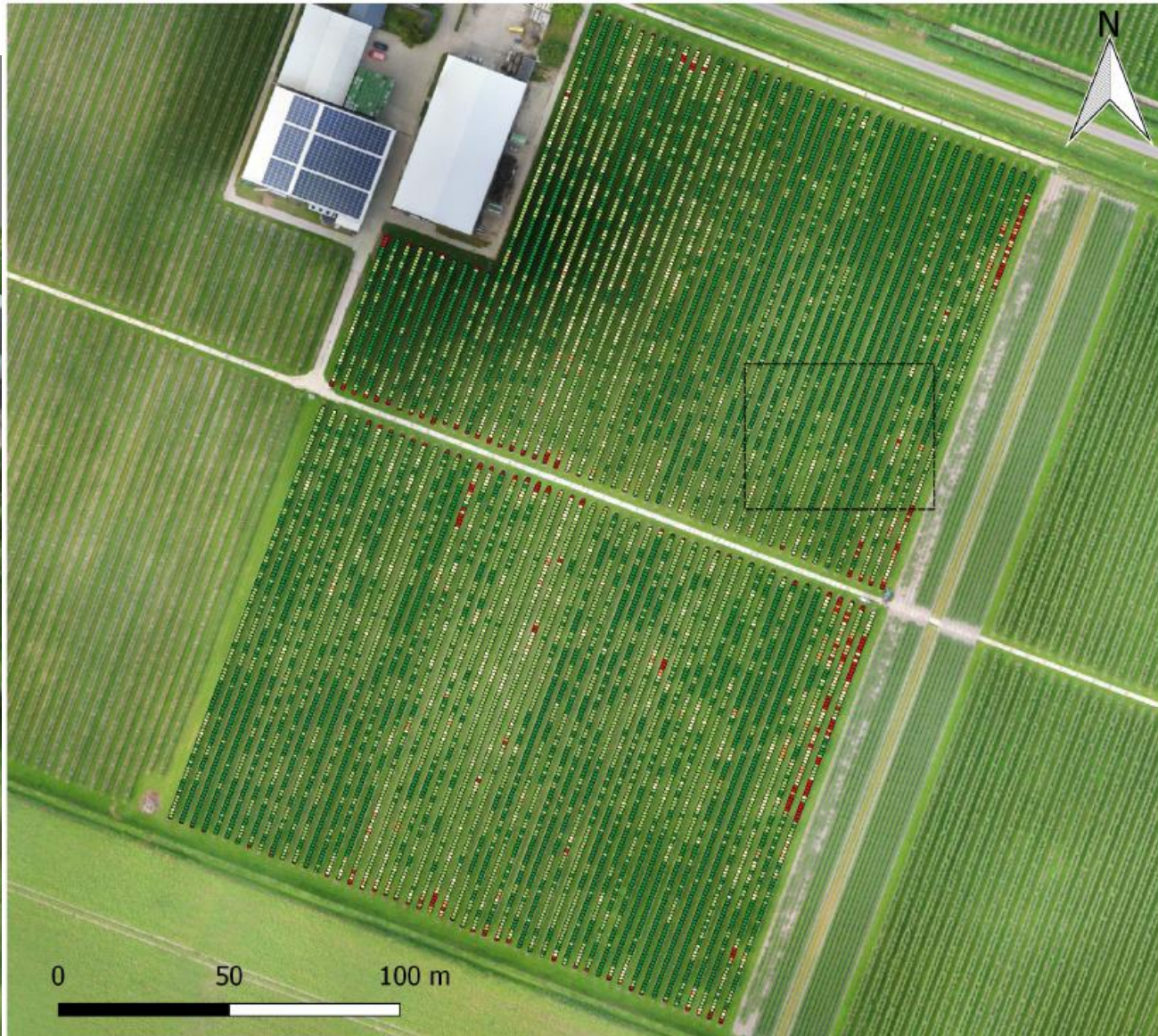


# Precision farming

- ▶ Precision farming = allocating resources better
- ▶ Huge variety in yields = Huge variety in required inputs
- ▶ License to operate
- ▶ Not about replacing, but about automating a farmers expertise



# Example 1: Crop management per tree



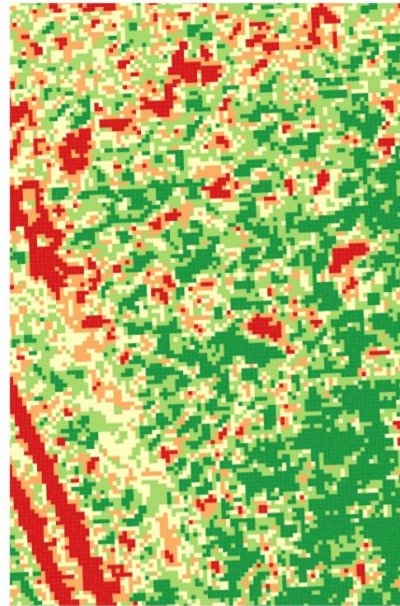
# Example 2 Crop management per plot





Date: 24-08-2017  
Dronewerker: Aurea Imaging  
UAV: senseFly  
Camera: Multispec4C

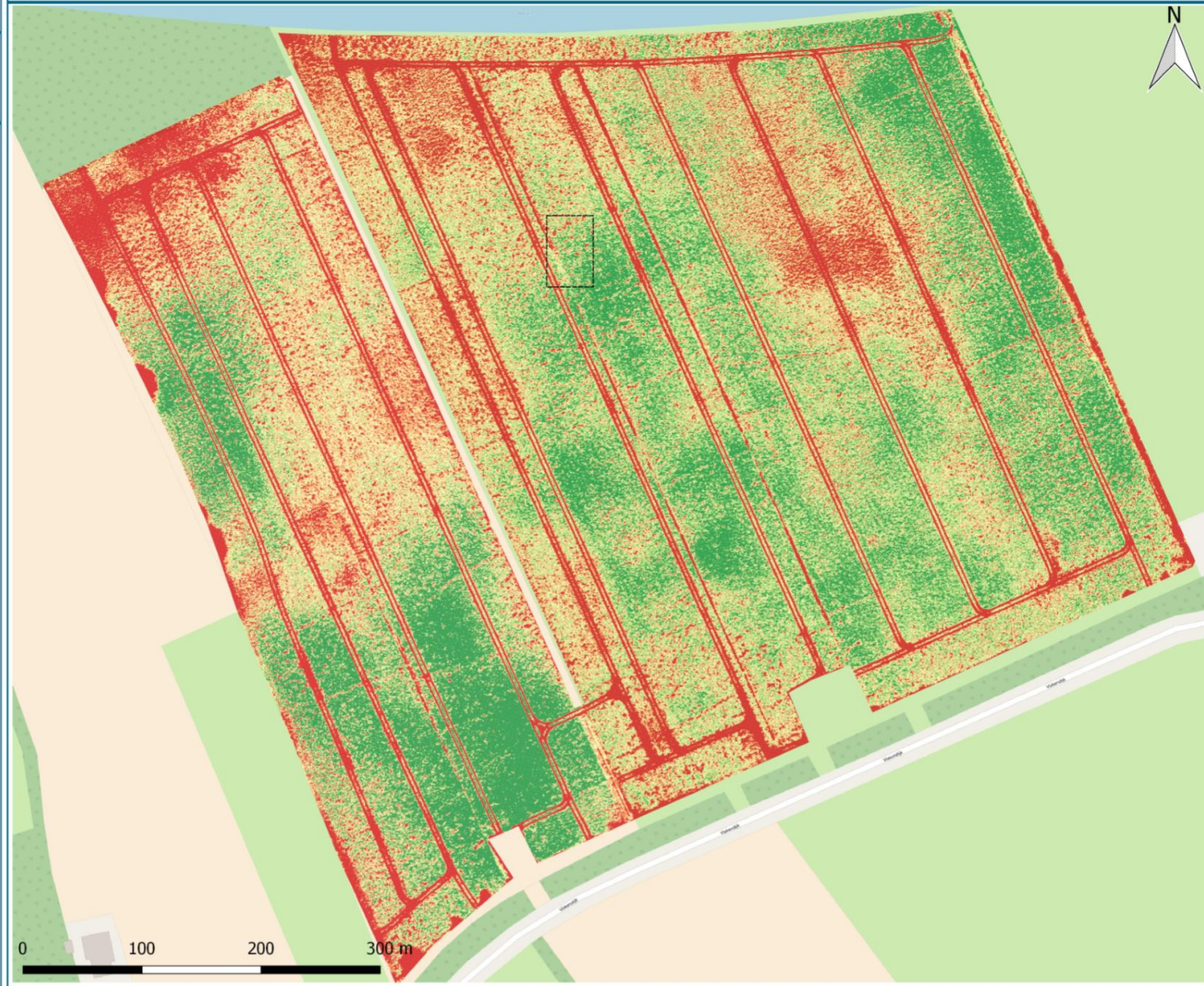
Area of Interest



0 4 8 12 16 20 m

Legend

- Regione (L/ha)
- 0.2 - 2.2
  - 2.2 - 3.0
  - 3.0 - 3.5
  - 3.5 - 3.8
  - 3.8 - 4
- OpenStreetMap



Example 3: Crop management on 25cm grid



Example 4: Spot spraying per weed

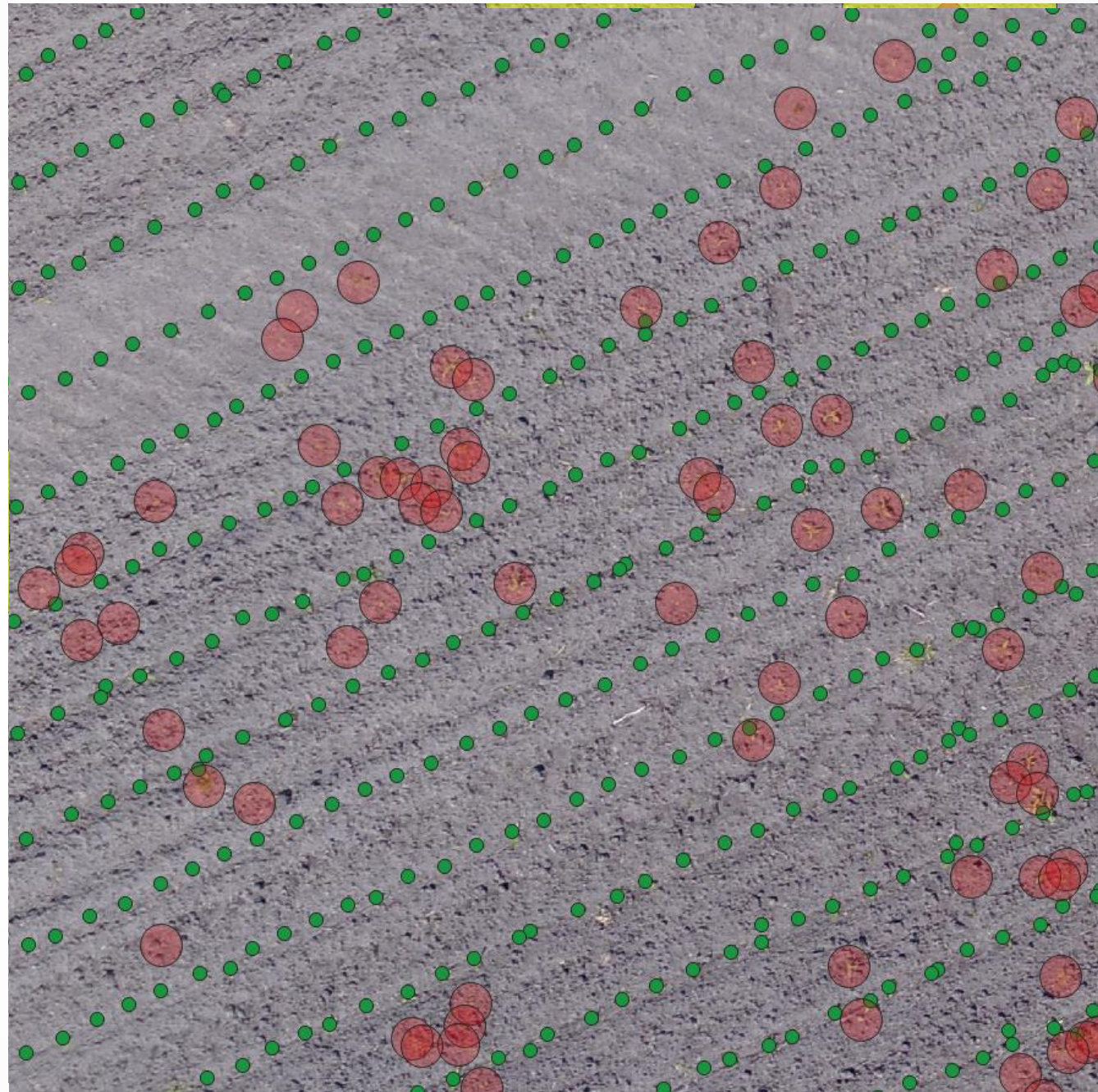


## Spot spraying 2018-2022

- Savings between 75% and 95% with field sprayer in 2022
- Grass and clover combinations are saved
- Higher yields with fewer herbicides

# Spot Spraying in the coming years

- ▶ Spot Spraying taskmap for field sprayer
- ▶ Spot Spraying taskmap for robot sprayer?



An aerial photograph of a field with rows of young plants. The image is split into two parts: the left side shows the original field, and the right side shows the same field with semi-transparent purple overlays indicating areas where spot spraying has been performed. A large green arrow-shaped banner is overlaid on the bottom half of the image.

Spot spraying  
with field robots  
and sprayer drones



# Sprayer drone and field robots

## Changing the paradigm

- Plant level farming
- No tillage applications
- VRA Seeding and fertilizing
- Stripcropping & Pixelfarming
- Real crop protection
- Field robots and drones working on shortest path algorithms



# Sprayer drone and field robots

## Research goals 2023

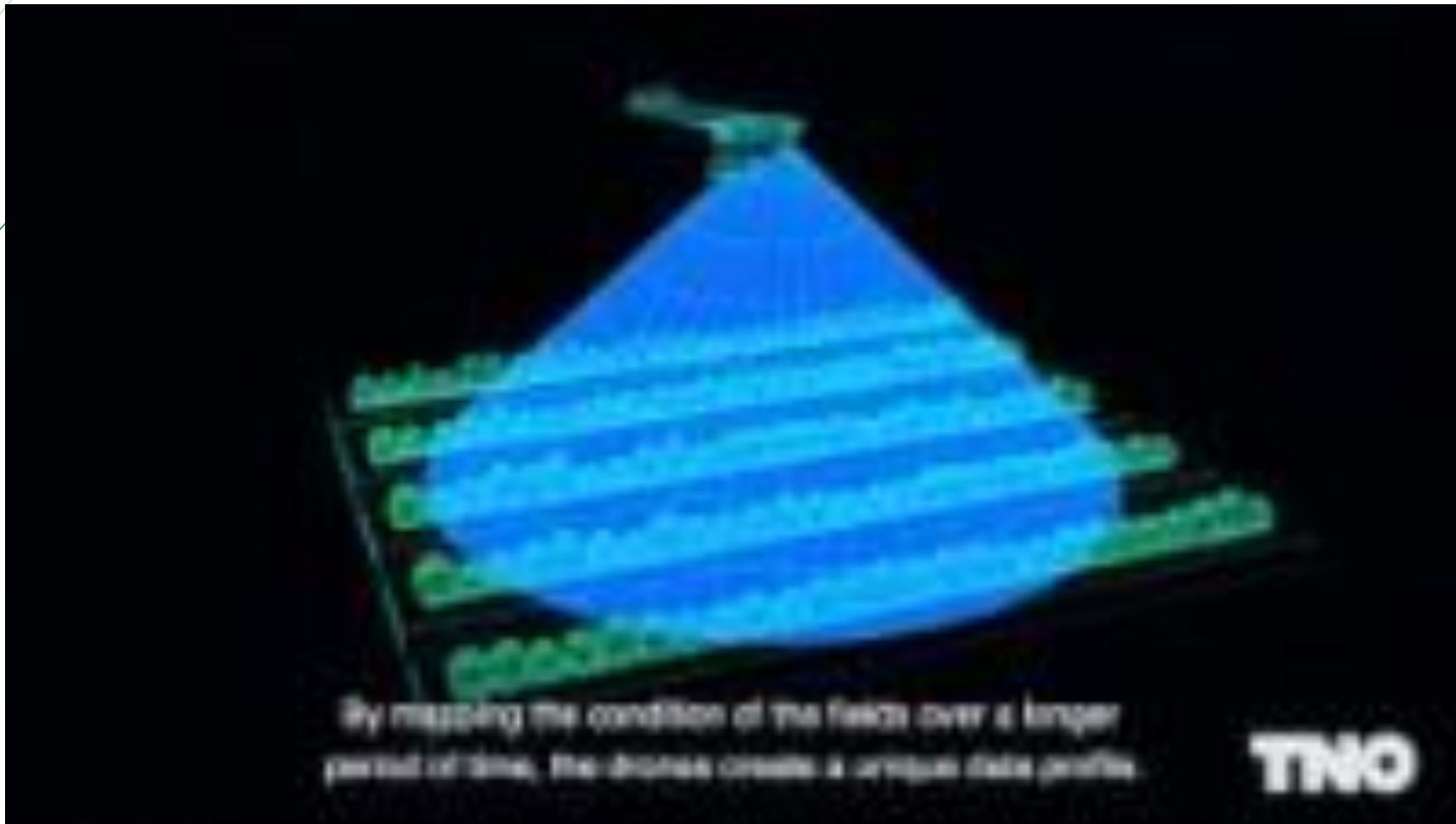
- Impact and potential of spot applications
- Farm management of robot/drone swarms
- Developing a legal framework for autonomous vehicles and sprayer drones

Let's match our machines to  
the potential of our soils!



Everything automated

<https://youtu.be/DtyQruyVfk8>





Thank you!



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