Proofminder

# Plant and Leaf-level Farming

## Use cases and results

# AGENDA

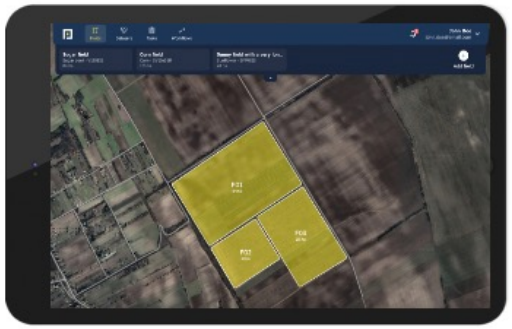
**01 - Proofminder overview**

**02 - Use cases and results**

**03 – Contacts**

# 01.
# PROOFMINDER OVERVIEW

# PROOFMINDER ENABLES INSIGHTS AND PRESCRIPTION MAPS ON PLANT LEVEL




## Drone Images As a Service

Full field, high resolution
Standard equipment
Via Drone Partner Network

## Platform & AI Algorithms

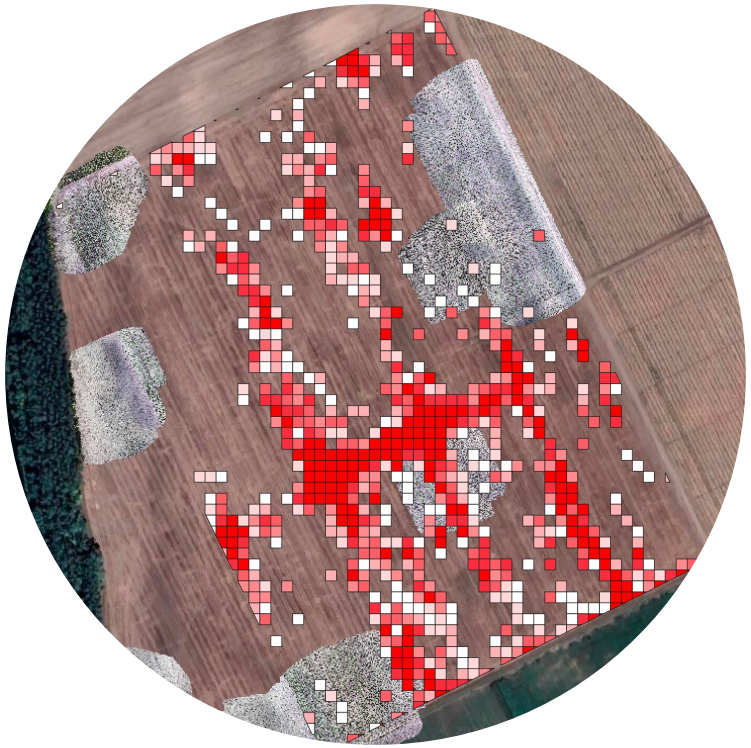
High precision AI models
Easy to use web interface
Fast & Scalable platform

## Insights and Prescription Maps

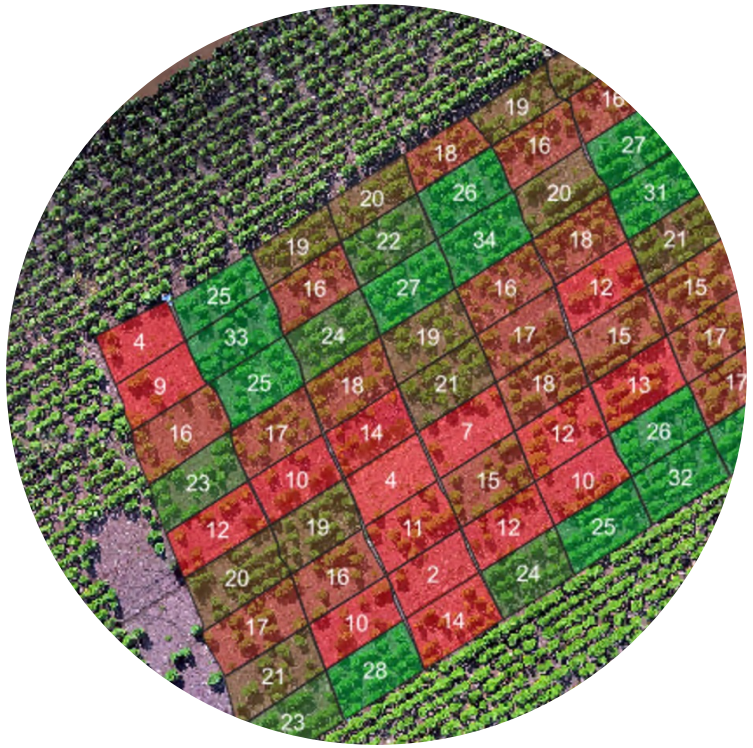
Actionable insights
Plug-and-play prescription maps
Ease of integration

# AVAILABLE USE CASES TO TAKE ACTION AND GAIN YIELD ON PLANT LEVEL

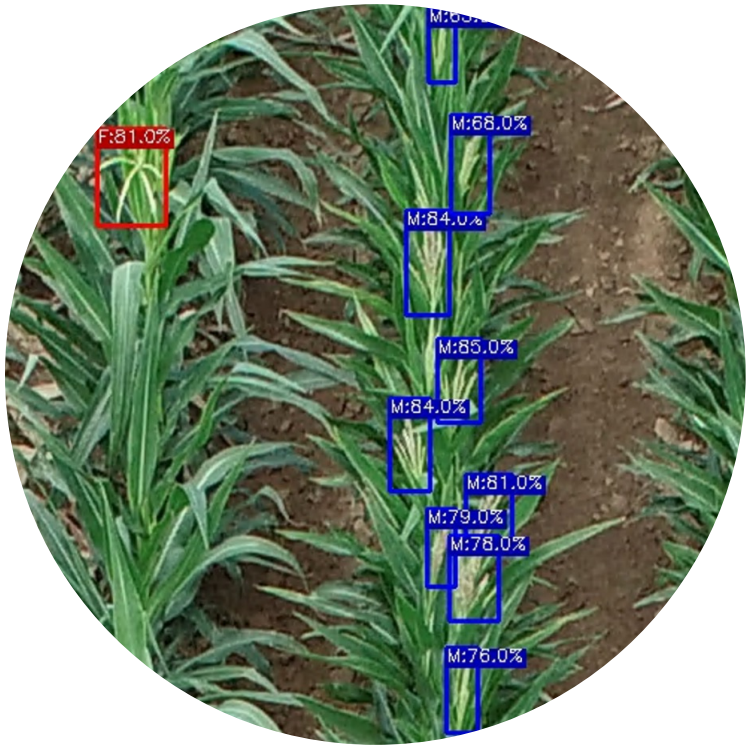
Applicable in corn, sunflower, sugar beet, various trees, avocado, apple, table grape, etc.



**Weed detection & spot spraying maps**



**Crop monitoring & yield forecast**




**Unique use cases**

Proofminder

# AI Models for crops, fruits, vegetables and trees

✅ – ready to deploy
🏁 – on roadmap / in progress
🛠️ – open for joint innovation

| Crop type / Use Case | Plant stand count | Plant Distance & Sowing quality | Missed tassel detection in hybrid corn | Plant disease detection | Weed detection / spraying map | Alien plant | Wildlife damage | Waterlogging | Insect Damage | Canopy Analysis | Yield assessment | Plantation monitoring |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Corn** | ✅ | ✅ | - | 🛠️ | ✅ | ✅ | ✅ | 🏁 | 🛠️ | ✅ | ✅ | ✅ |
| **Hybrid corn** | ✅ | ✅ | ✅ | 🛠️ | ✅ | ✅ | ✅ | 🏁 | 🛠️ | ✅ | ✅ | ✅ |
| **Sunflower** | ✅ | ✅ | - | 🛠️ | ✅ | 🏁 | ✅ | 🏁 | 🛠️ | ✅ | ✅ | ✅ |
| **Wheat** | - | - | - | 🛠️ | 🛠️ | 🏁 | 🏁 | 🏁 | 🛠️ | ✅ | ✅ | ✅ |
| **Sugar beet/Roots** | ✅ | ✅ | - | 🛠️ | 🏁 | 🏁 | 🏁 | 🏁 | 🛠️ | ✅ | ✅ | ✅ |
| **Vegetables** | 🛠️ | 🛠️ | - | 🛠️ | 🛠️ | 🏁 | 🏁 | 🏁 | 🛠️ | 🏁 | 🏁 | ✅ |
| **Apple Orchard** | - | - | - | 🛠️ | 🛠️ | - | 🏁 | 🏁 | 🛠️ | ✅ | ✅ | ✅ |
| **Avocado** | - | - | - | 🛠️ | 🛠️ | - | 🛠️ | 🏁 | 🛠️ | ✅ | 🏁 | ✅ |
| **Table Grape** | - | - | - | 🛠️ | 🛠️ | - | 🛠️ | 🏁 | 🛠️ | 🛠️ | ✅ | ✅ |
| **Trees** | ✅ | 🏁 | - | 🛠️ | 🛠️ | - | 🛠️ | 🏁 | 🛠️ | 🏁 | 🛠️ | ✅ |
| **Vineyards** | 🛠️ | 🛠️ | - | 🛠️ | 🛠️ | 🛠️ | 🛠️ | 🛠️ | 🛠️ | 🛠️ | 🛠️ | ✅ |

*Non-extensive list of crop types / use cases available on the Platform*

# CLIENTS & PARTNERS

CORTEVA™ agriscience

mas seeds UNITED TO GROW

syngenta

Bonafarm® CSOPORT

Limagrain Zaad South Africa

Róna Mezőgazdasági Szövetkezet

IMPACT VENTURES

dji

# AWARDS, ACCELERATORS & RECOGNITION

NAK TECHLAB

A LEGINNOVATÍVABB AGRÁR STARTUP 2021

MC MASSCHALLENGE SWITZERLAND

agro innovation lab

SEED INNOVATION Challenge by RWA & INNOSEED

NVIDIA INCEPTION PROGRAM

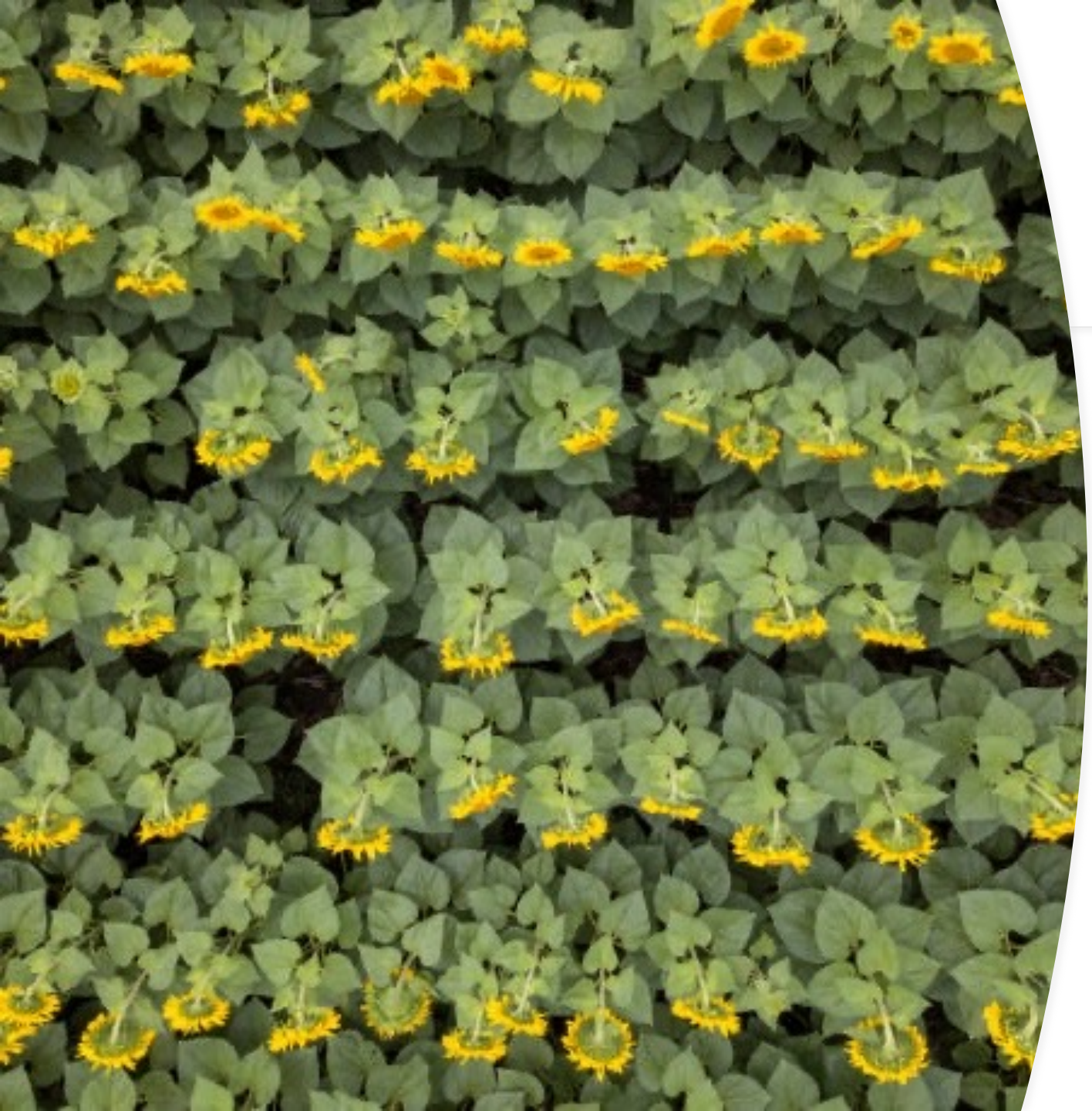
NEXT: BRAZIL

EU-Startups

Forbes


# 02.
# USE CASES & RESULTS


Precise Stand Count
in Corn, Sunflower
and other Crops



# Sample Sunflower Stand Count

- Customer requested sunflower stand count at late stage
- Special AI Model has been developed to allow for that

# Overview Map

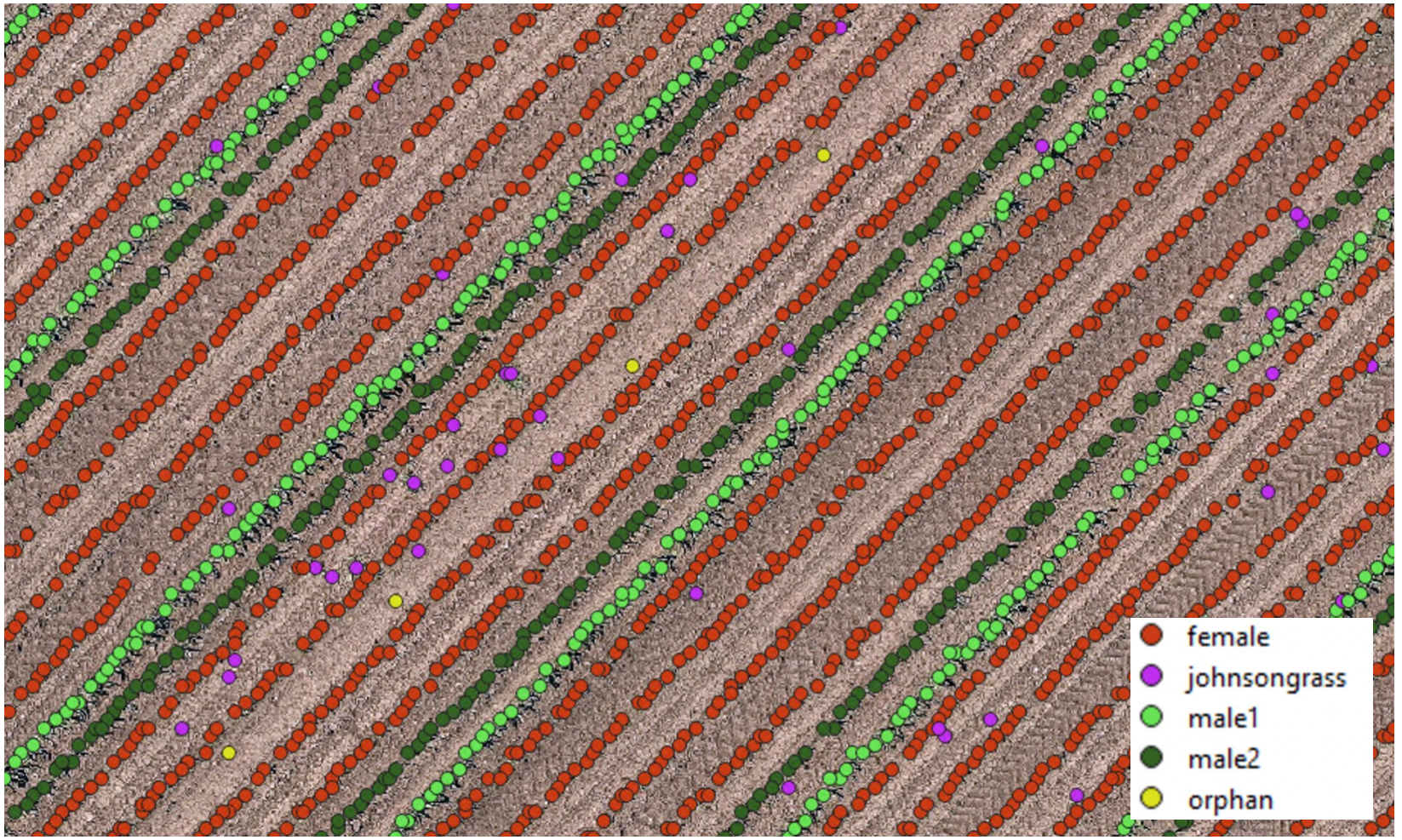
SAMPLE FROM ACTUAL CLIENT PROJECT

This late stage stand count assessment has been done based on counting flowers.
Stand count average for the whole field was 46 024 plants / hectare.

# Proofminder Map view


## Corn Sowing zones and seeding quality analysis

High precision stand count / yield forecast allows verification of zones




# Hybrid Corn Plant stand counting by phenotype and yield estimation

Missed plants detection, its GPS coordinates and plant distance / density

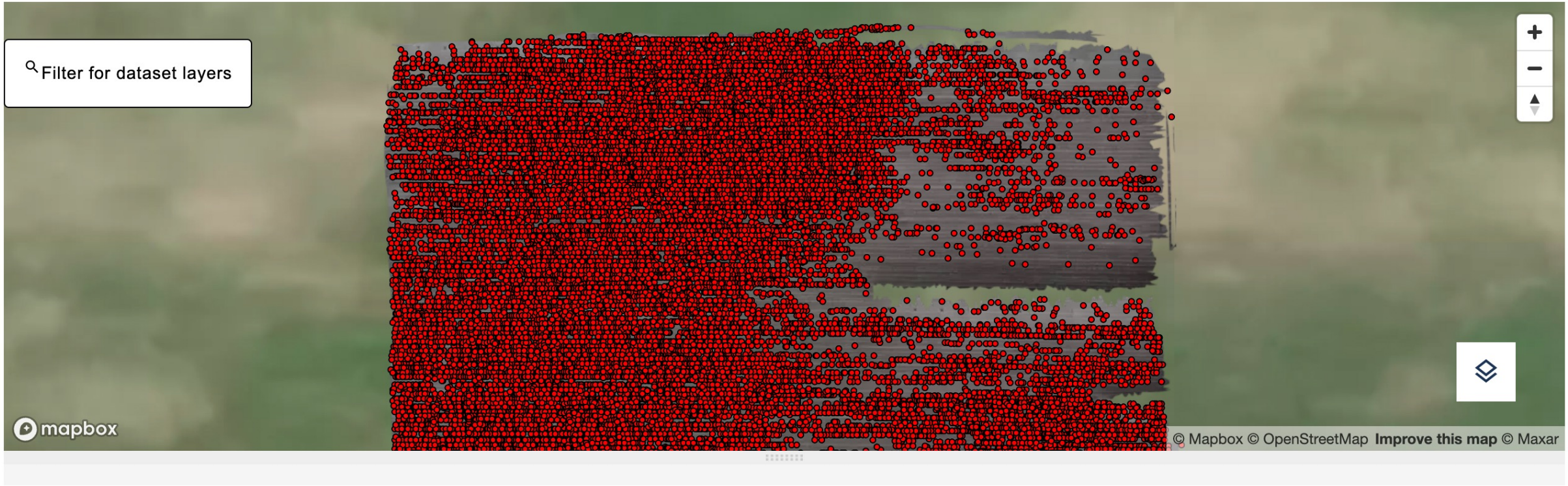
# Plant distance and sowing line identification for sugar beet

Allows to identify density, missing plants, etc. in field trials and in production

## Proofminder Map view

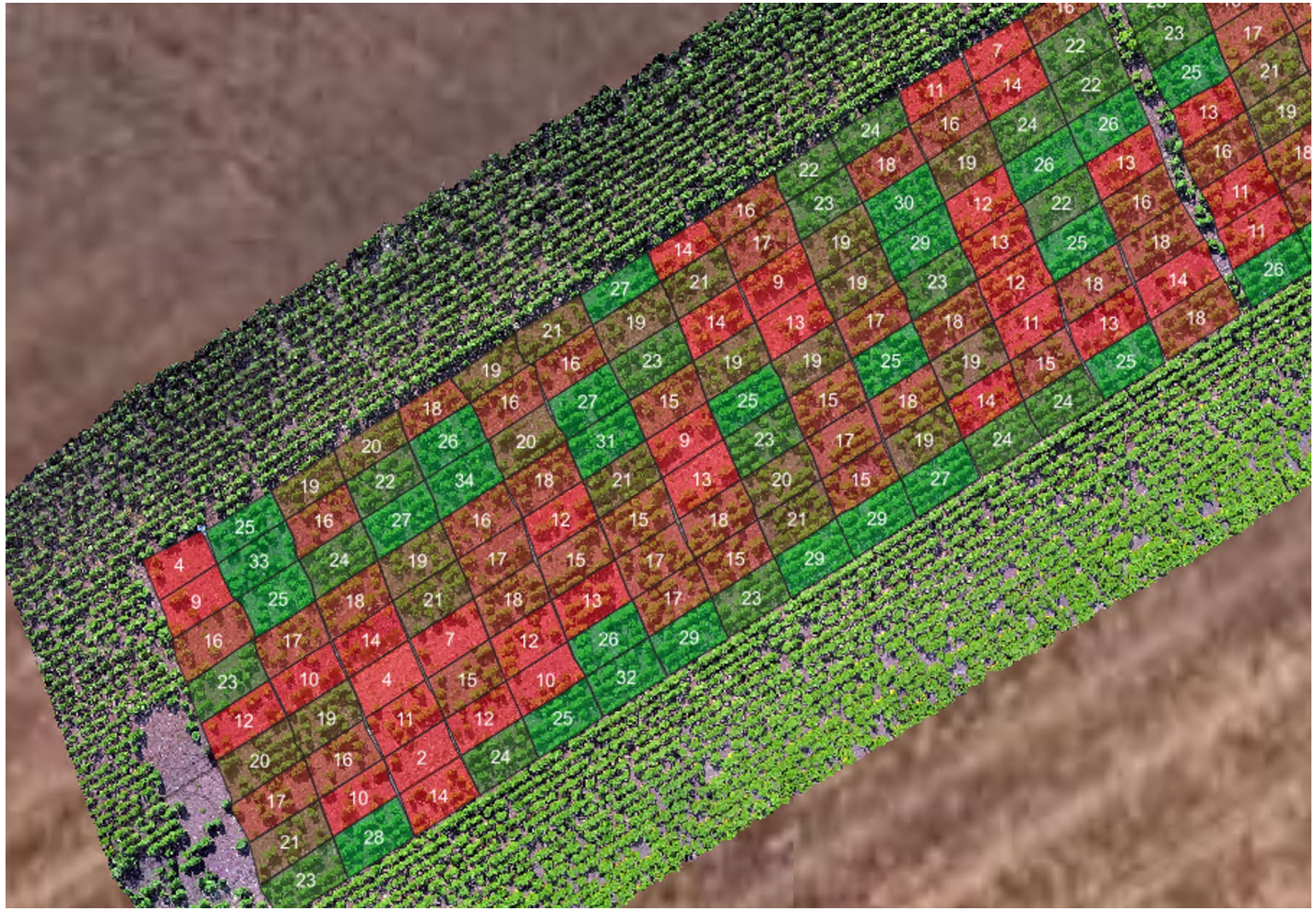

*Numbers in cm*

## Proofminder Map view




# Use Case: Precise Stand Count / Yield Forecast

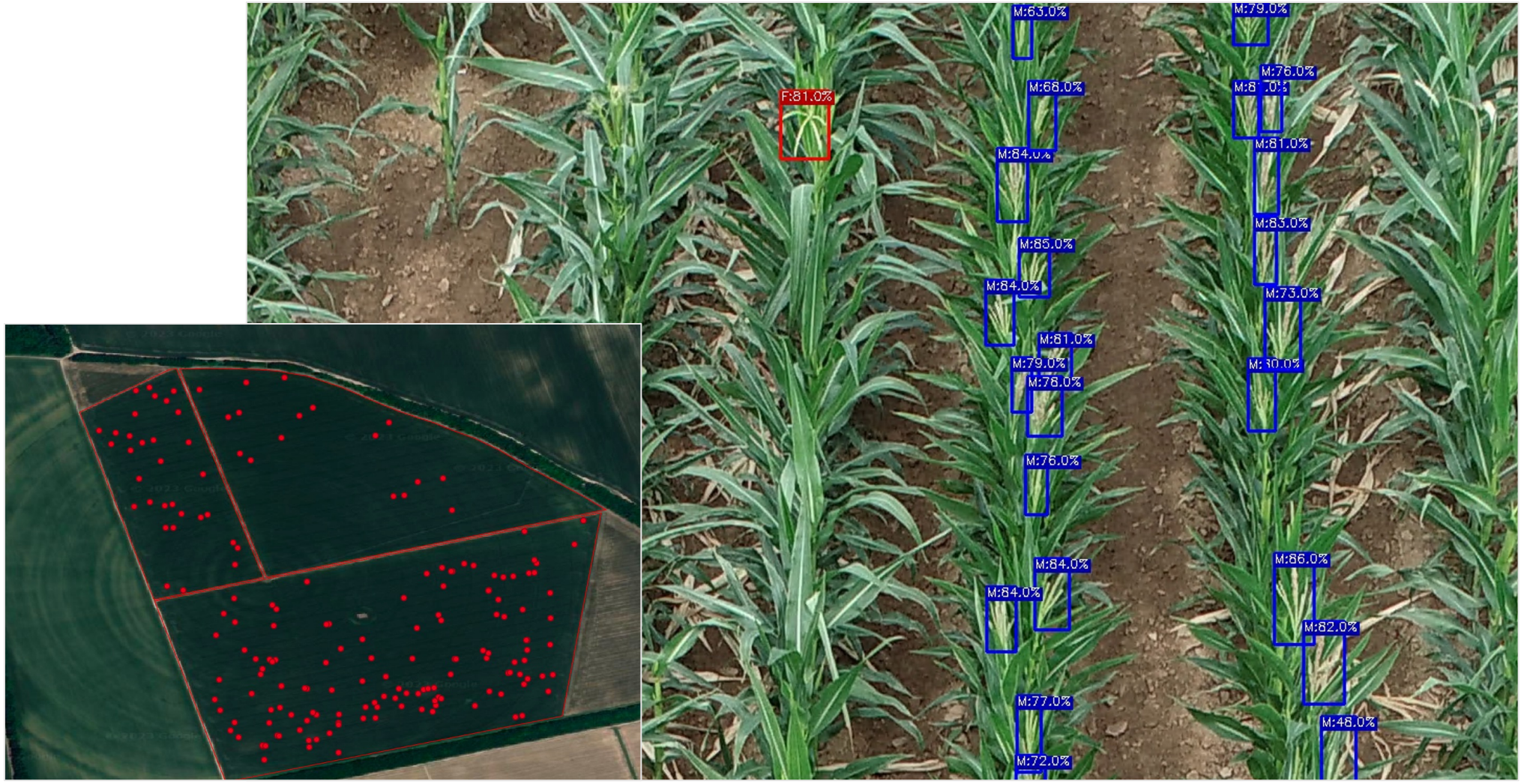
Field view: high precision, each plant has a separate coordinate



# Use case: Number of plants per plot

High precision stand count and missed plants identification

# Missed Tassel Detection for Hybrid Corn Seed Production




# Each tassel marked with GPS coordinate

Industrial grade solution, already being scaled by several customers to thousands of hectares across the globe

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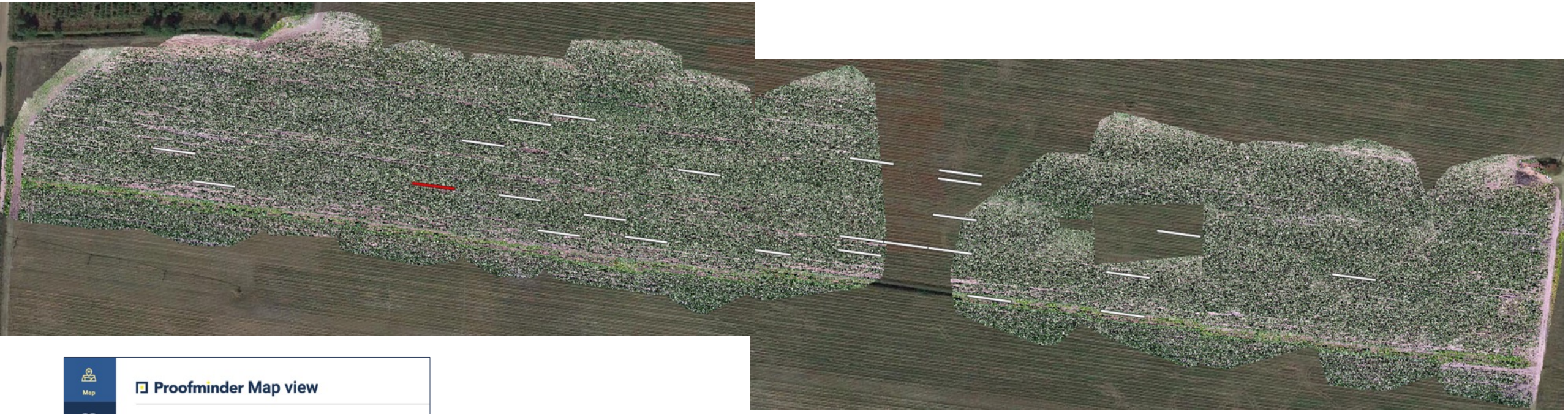
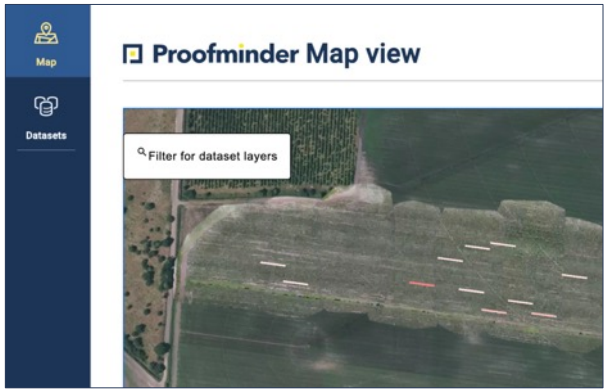
# Use Case: Missed tassel detection in hybrid corn

Industrial grade solution, already being scaled by several customers

# Missed Tassel Detection

## Detailed review of results – Field A






- *Rectangles correspond to 100 m² areas and align with rows.*
- *Red rectangle indicates are with 3 tassels or more – thus focus areas with higher than 0.3% tassel/corn plant ratio*

# Examples of Missed Tassels Found at Field A


(coordinates removed)


(coordinates removed)


(coordinates removed)

*While we assume manual detasseling happened after images were taken, if not, we recommend for an agronomists to verify these coordinates / tassels in person*

# Tassel detection

## Detailed review of results – Field B


- *Rectangles correspond to 100 m² areas and align with rows.*
- *Red rectangle indicates are with 3 tassels or more – thus focus areas with higher than 0.3% tassel/corn plant ratio*

# Examples of Missed Tassels Found at Field B


(coordinates removed)


(coordinates removed)


(coordinates removed)

*While we assume manual detasseling happened after images were taken, if not, we recommend for an agronomists to verify these coordinates / tassels in person*

# Field Trial of Proofminder Detasseling AI on 200+ ha

## Optimizing Detasseling – “GPS Geocaching” tool for individual detasselers


- Mobile Application to track people to tassel spots
- No need to walk full rows, more productivity
- Going across rows to quickly get to spots
- More fun to do

| Professional handheld device with RTK precision | Gamification Payment based on performance |
| --- | --- |
|  |  |

# Hybrid corn quality control saves a PANAMAX cargo ship of food


## IMPACT

**example**

**on a farming area the size of Washington DC**

**20%**
**Labor cost saving**

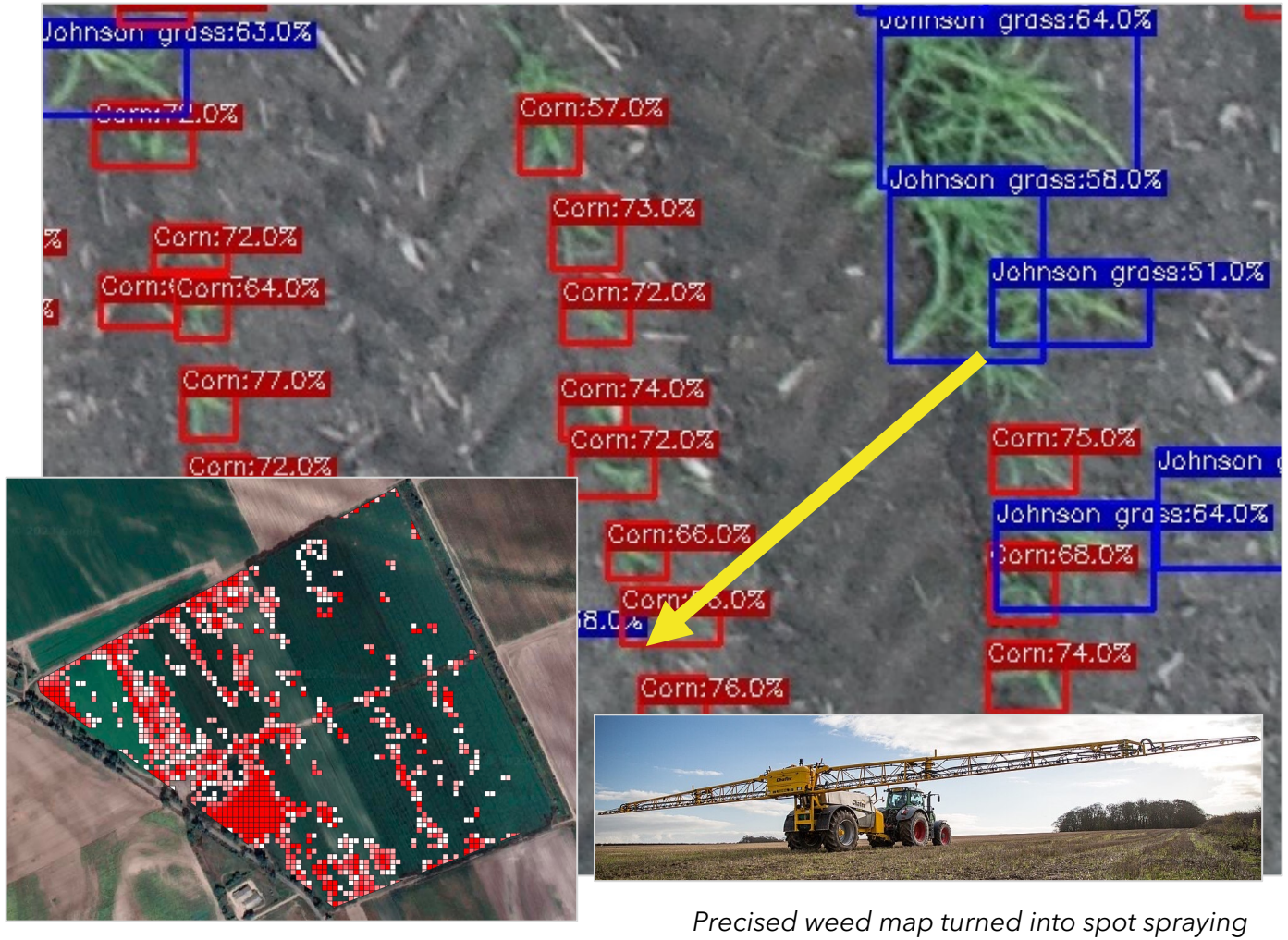
**48.000-96.000 t**
**Extra food created**

**€10-20 M/year**
**Commercial impact at farmers**


Precise weed map
and spot spraying

# Hyper-precise weed map for spot spraying

Allows spot spraying using traditional sprayers or drones or mechanical removal




*Precised weed map turned into spot spraying prescription map*

- Product images show weed detection algorithm in corn but can be applied to other crop types as well
- Johnson grass depicted, but other weeds also available / can be added
- Successful spot spraying with John Deer display driven sprayers, drones, etc. – seamless deployment from e.g. JD operations hub soon available within our Platform

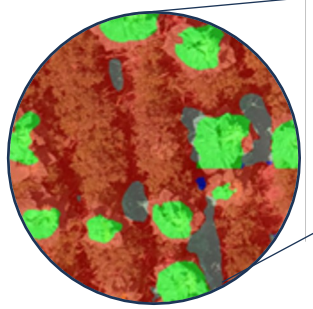
# Ragweed Detection In Sunflower

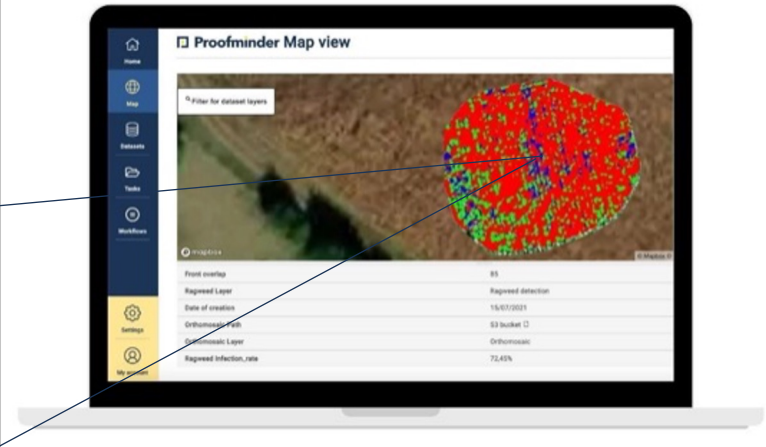
for precise spraying at Corteva Agriscience Hungary

The recognition of weeds provides an opportunity to estimate the weed cover of the areas and to determine the weed composition so that the same crop averages can be achieved with more environmental-friendly protection.

During the project, we found that ragweed covered 71.45% of the area, which without intervention causes significant damage to the crop.


*Ragweed*
*- **71.45%***





# Ragweed Detection In Sunflower

for precise spraying at Corteva Agriscience Hungary

**For this project Proofminder** awarded as the **Most innovative Agri startup in 2021 in Hungary**

NAK TECHLAB

A LEGINNOVATÍVABB AGRÁR STARTUP 2021

NAK

CORTEVA™ agriscience

# JOIN THE REVOLUTION IN SHIFTING FROM FIELD TO PLANT LEVEL FARMING – MAKING A GLOBAL IMPACT

**25-50%**

**LESS CHEMICALS**

**10%+**

**YIELD INCREASE**

**3-5x**

**AVERAGE ROI**

UN Sustainable Goals we aim to contribute to:






*Research and supporting materials available upon request*

# Contact us

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