

BIOME
MAKERS



POWERED BY BECROP

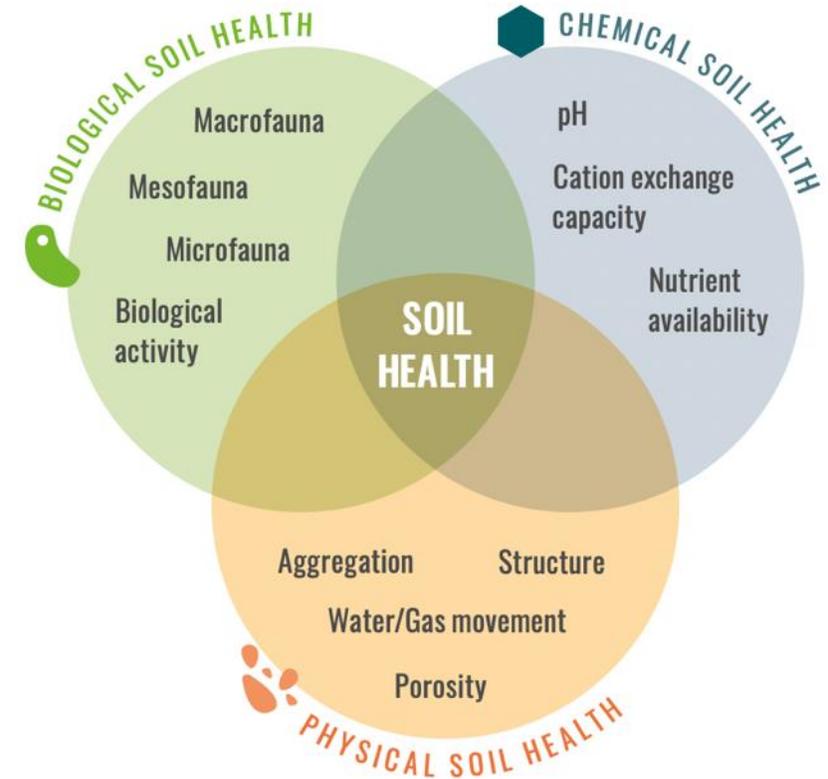
The role of **Artificial Intelligence** in soil microbiome research for crop resilience.

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CSO- Cofounder
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Soil Health (FAO)

Soil health is “the ability of the soil to sustain the productivity, diversity, and environmental services of terrestrial ecosystems” (FAO, 2020).

Ecosystem Services	Provisioning Plant production (food) Biotechnology	Supporting Habitat Biodiversity conservation
	Regulating Climate regulation Atmospheric composition Hydrological services	Cultural Natural capital



Soil health is defined by interaction of **chemical, physical and biological** factors (FAO, 2015) with equal importance.



Soil **Microbiome**, a reliable **biomarker**

Sustainability Indicators

Soil Biodiversity

Soil Organic Carbon

Agronomic Indicators

Nutrient Cycling

Pest & Diseases

Environmental Stress



Biome Makers Training Dataset



56

Countries

207

Crops

100K

Soil Biodiversity Data
Points

20K

Soil Chemical Data
Points

60K

Farmers Impacted

240

Ag Products Tested

662

Field Trials

55MM

Largest Taxonomic
Database

41K

Microbial Species
Detected

1060

Detected
Pathogenenic Species

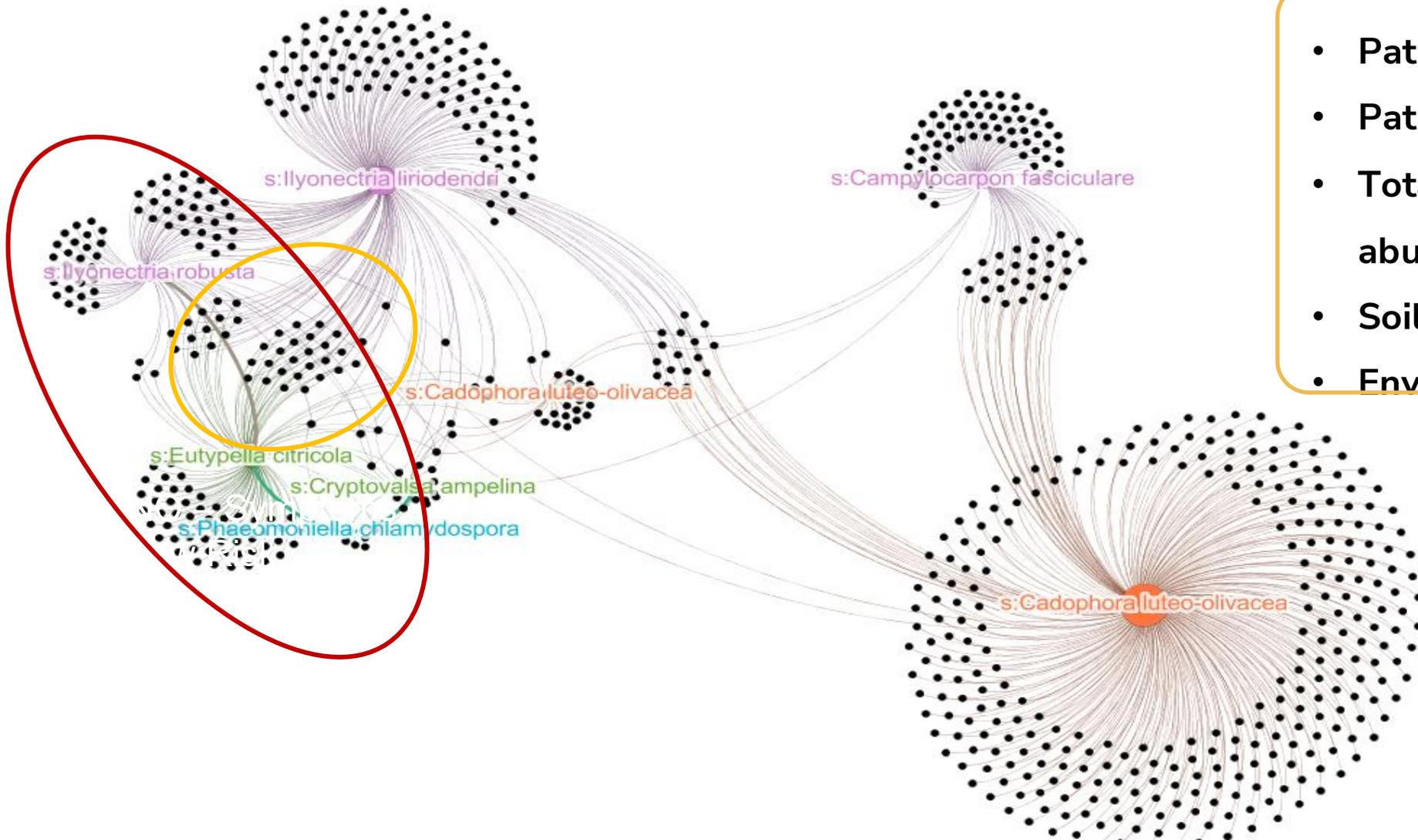
20MM

Environmental
Metadata
Collected

10Y

Collecting
Data

BeCrop[®] Test: Disease Risk Factors



- Pathogen detection
- Pathogen abundance
- Total biocontrol abundance
- Soil Biodiversity
- Environmental context

Farms list

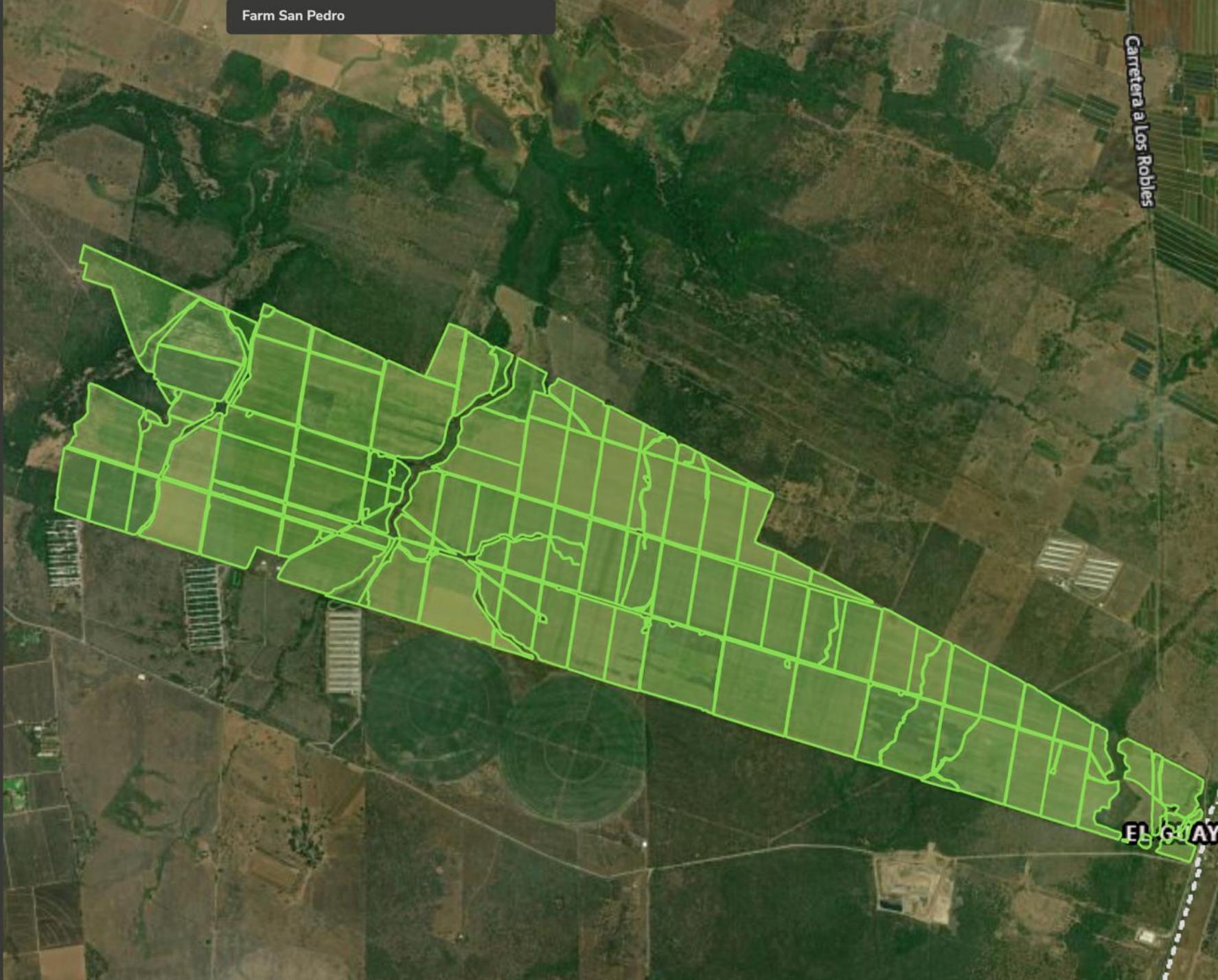
Navigate through the farms, click on any farm to see it on the map. If this farm is compatible with AI Gen, it will be indicated by the "AI Gen" tag

Search your farms by typing your name here ...

ASR (D56) Hill View Sugarcane	Fields x148 587.06
ASR (D56) San Lorenzo Sugarcane	Fields x27 162.49
ASR (D56) Guinea Grass Sugarcane	Fields x149 809.23
ASR (D56) Farm Local Sugarcane	Fields x166 235.25
ASR (D56) Farm San Pedro Sugarcane	Fields x131 610.91
ASR (D56) Farm Estanzuela Sugarcane	Fields x97 457.94
ASR (D56) Farm India Sugarcane	Fields x78 307.39
ASR (D56) Farm Barbacoas Sugarcane	Fields x18 75.17
ASR (D56) Farm Júcaro Sugarcane	Fields x58 362.93
ASR (D56) Farm Progreso	Fields x171 52.73

Add Farms

Get into the one-click process for creating new Farms



AI – Smart **Sampling Tool**



Digital soil mapping uses soil samples and biogeochemically-informed predictors (derived from remote sensing and environmental data) to estimate chemical and Biological Indexes across space.

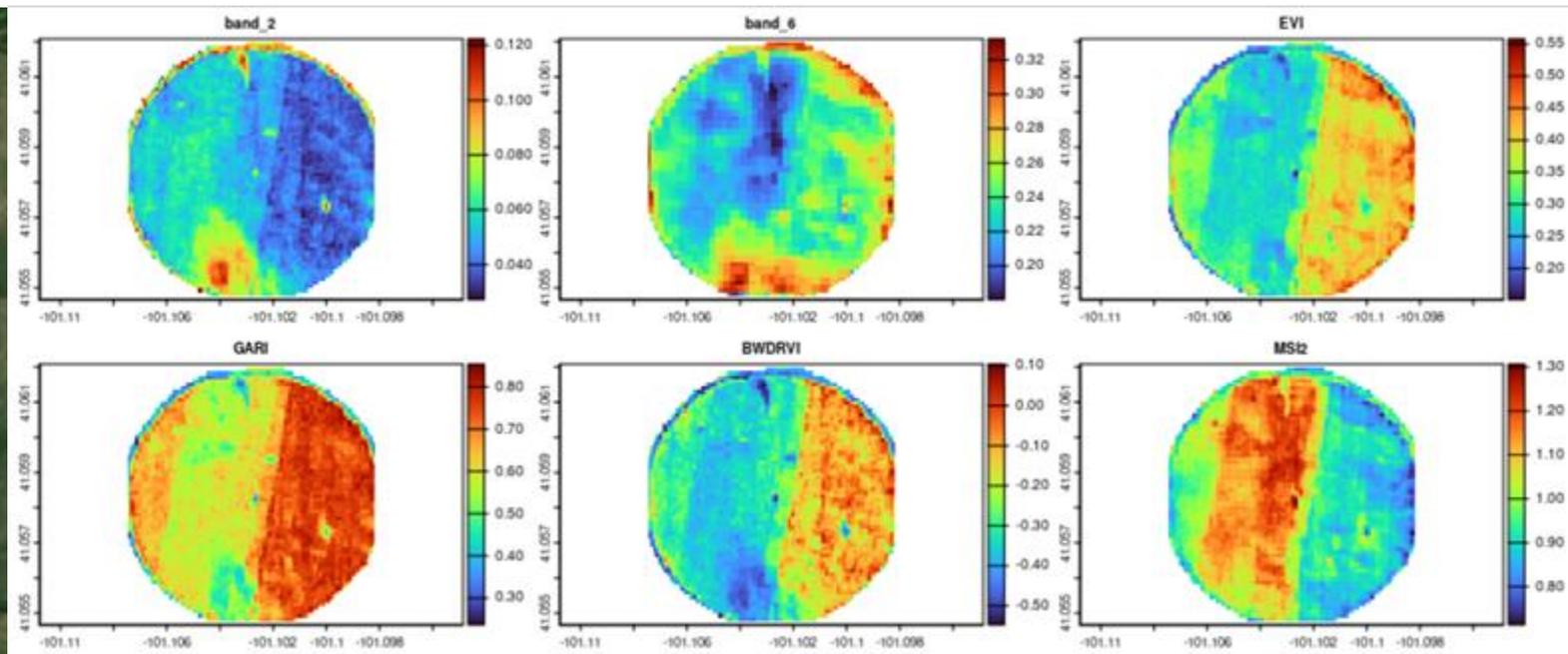
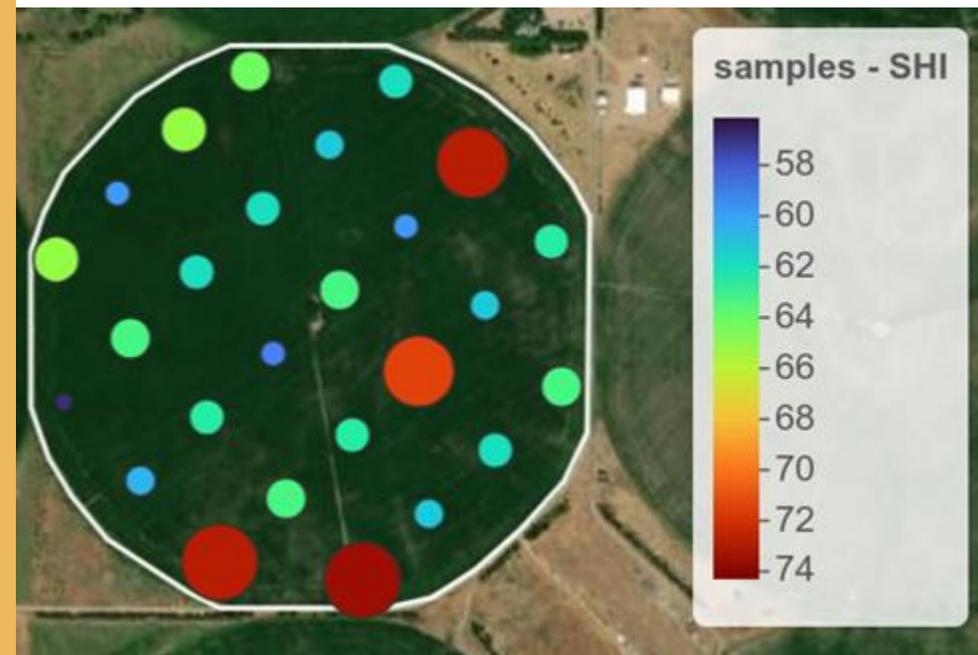
Soil Samples:

- Sampling date
- Sample coordinates
- Parcel polygon
- BeCrop index

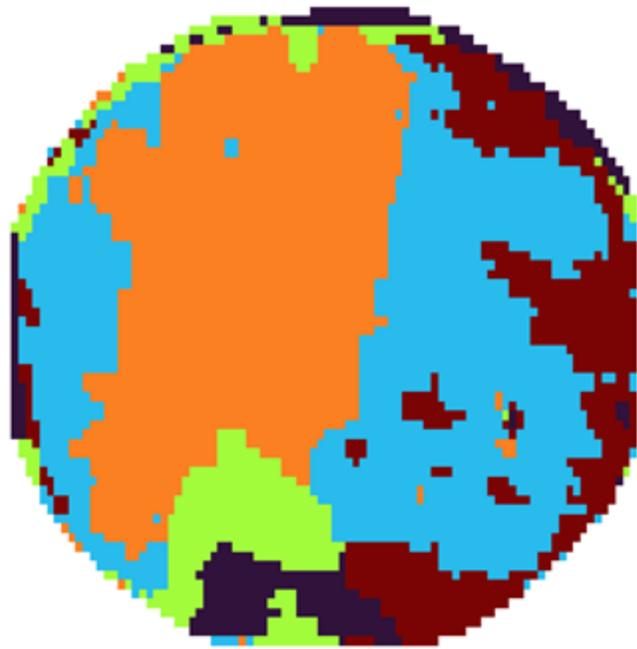


Sentinel-2 image (satellite data at 10m):

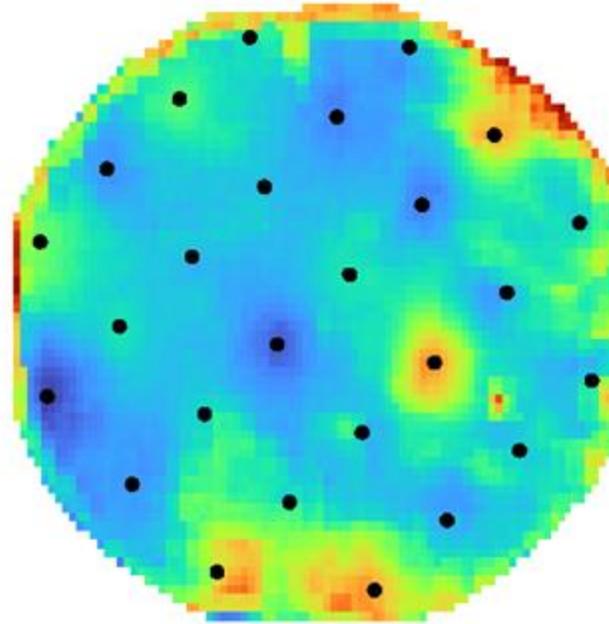
- Taken at similar date
- 36 predictors (soil and plant cover)



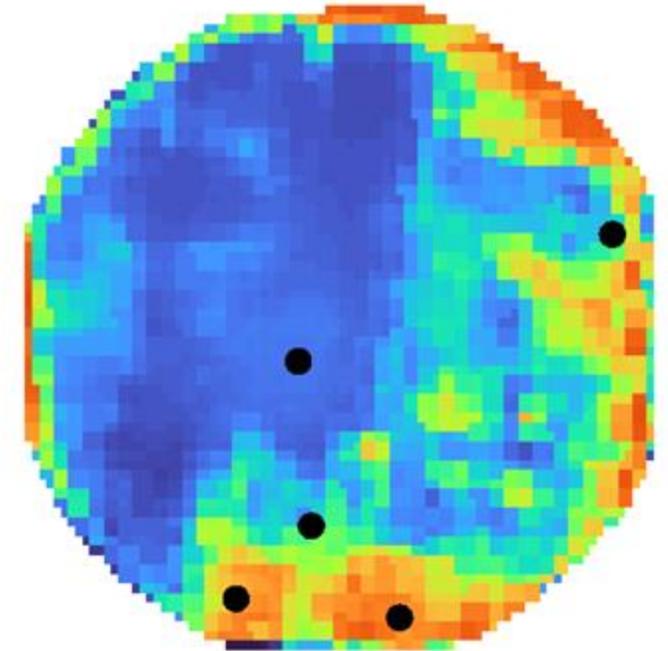
AI – Smart **Sampling Tool**



24 Samples



5 Samples



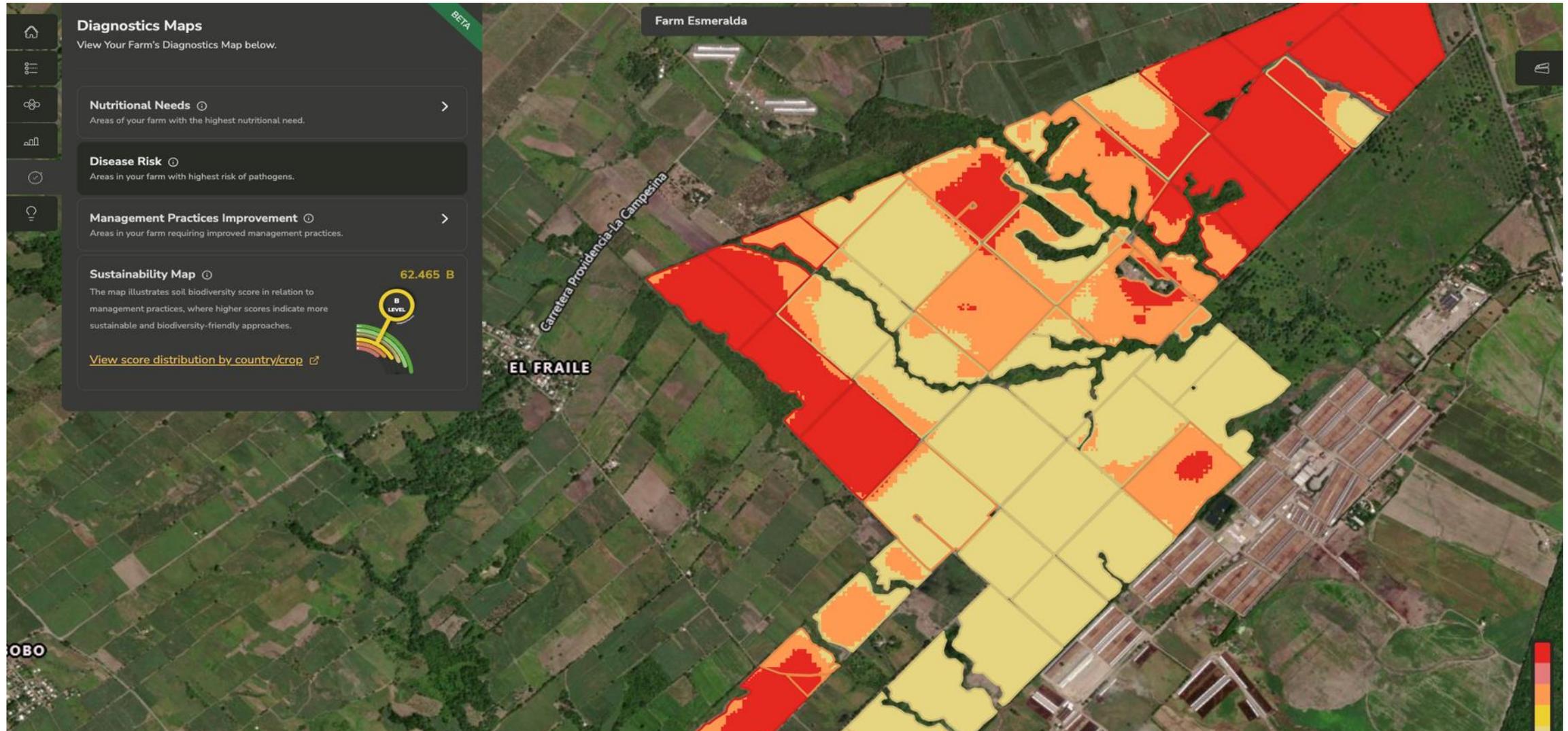
V1. 148 parcels - 1186 samples

Regression 10.5%

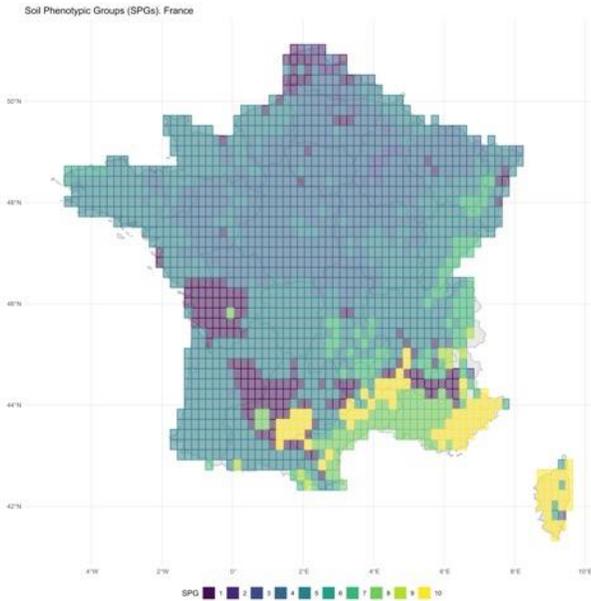
AI – Smart Sampling Tool

The screenshot displays the BECROP Farm AI Smart Sampling Tool interface. At the top, a breadcrumb trail shows the navigation path: Home > Proposals > D56-2-231219 > San Pedro > Zones. Below this, the BECROP TRACKING SAN PEDRO logo is visible, along with two active zone buttons: "San Pedro" (Acreage: ---) and "Zone 1" (Acreage: ---). The main area is a satellite map of a large agricultural field, with a yellow grid overlaid to indicate sampling points. Each grid cell contains a small icon of a sampling tool. The map includes various geographical features like roads, fields, and a river. A vertical sidebar on the left contains navigation icons for HOME, DASHBOARD, and PROPOSALS. In the bottom right corner, there are zoom controls (minus, plus, and refresh icons). The BIOMEMAKERS logo is located in the bottom left corner of the map area.

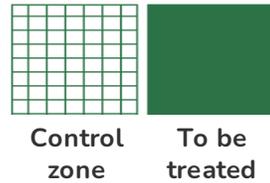
AI – Mapping Projection



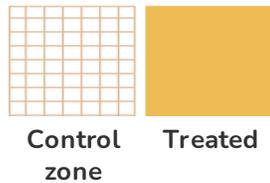
AI – Agronomic Advice



Before input



After input



EN
 ALBERTO

CATEGORY	METRIC	EFFECTTYPE	EXF15622H_440
Healthiness	Botrytis bunch rot	T3-T0	-100%
Healthiness	Botrytis bunch rot	T2-T0	-98%
		T3-T0	-98%
Healthiness	Botrytis bunch rot	T2-T0	-87%
Healthiness	Botrytis bunch rot	T1-T0	-23%



Gheomizer

Relevant Results

Fungicide Product Type	Gheomizer Test Project Name	 Grape Tested Crop
2023 Year	6 Locations	
Global Geographical Scope		

Effectiveness

HEALTHINESS

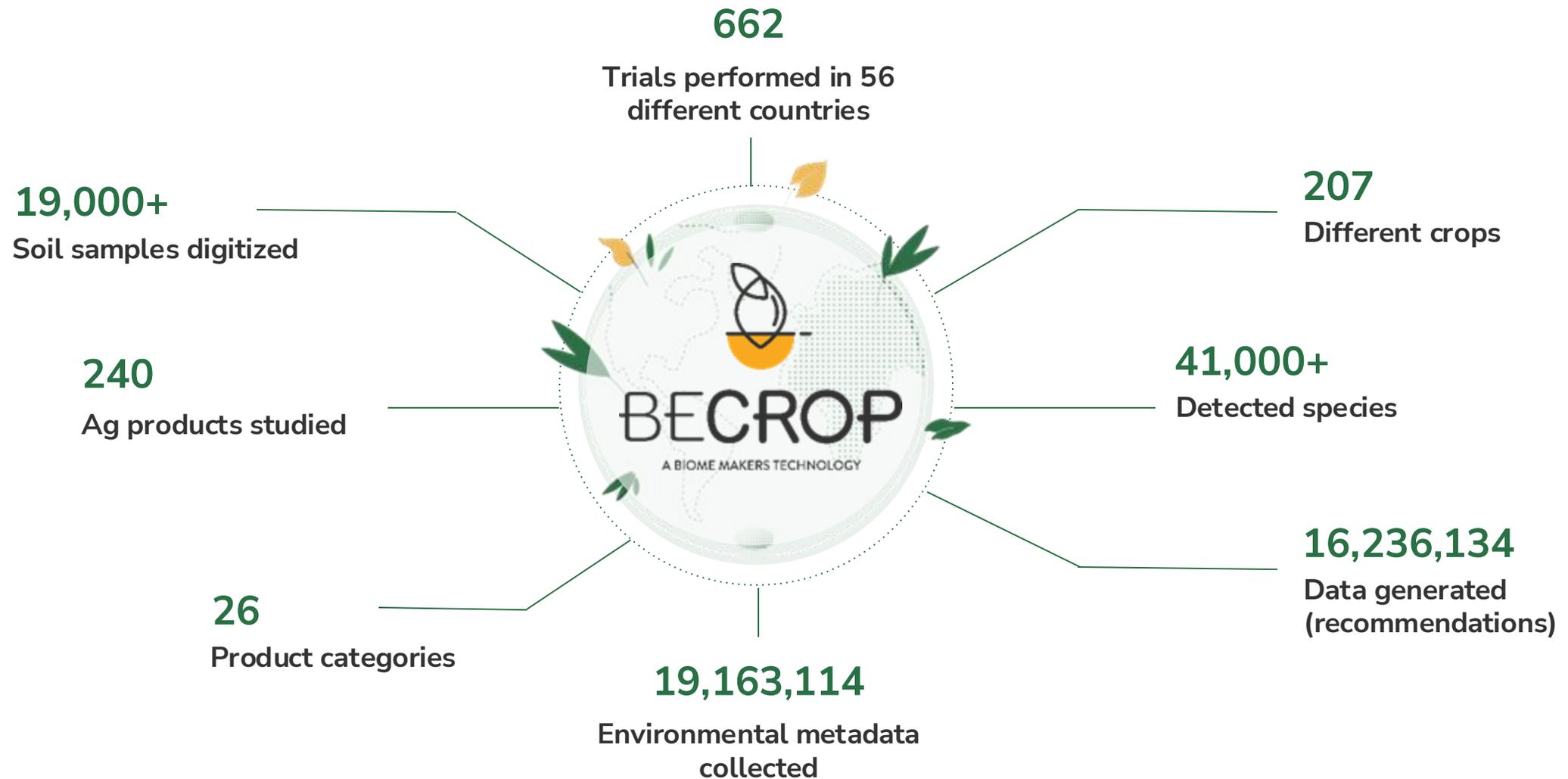
BOTRYTIS BUNCH ROT (2 locations)	OTHER FUNGAL DISEASES (2 locations)
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Biodiversity

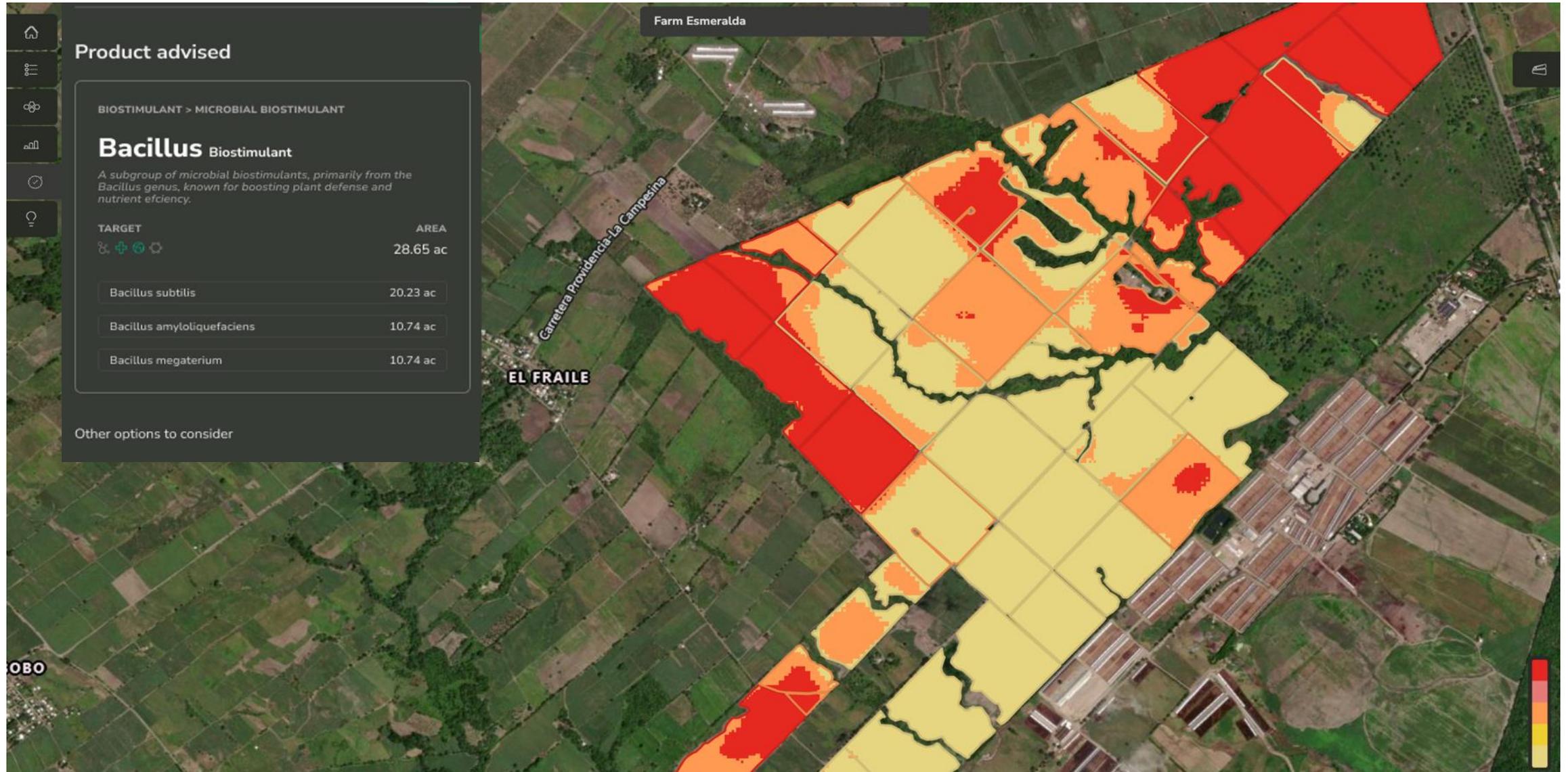
SOIL BIOSUSTAINABILITY

(2 locations)

BeCrop AI vs ChatGPT



AI – Mapping Projection

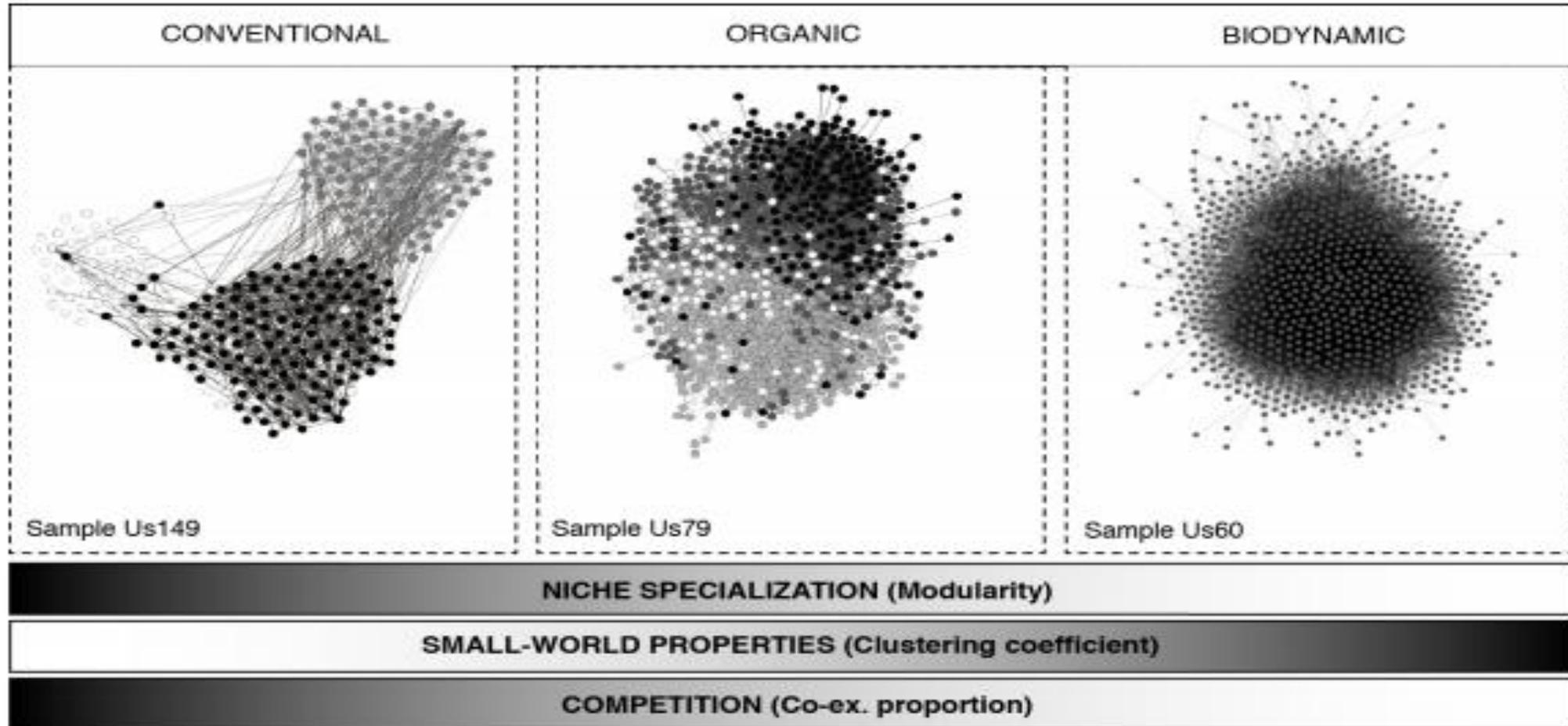




BeCrop Rate

A metric to assess soil biosustainability

AI – Biodiversity



Network Properties of Local Fungal Communities Reveal the Anthropogenic Disturbance Consequences of Farming Practices in Vineyard Soils

DOI: <https://doi.org/10.1128/mSystems.00344-21>

AI Teaching Model – Dataset



51597 samples

Management	Train n = 5000	Test n = 525	Validation n = 46072
Low Diversity	0.38% (n = 42)	0.38% (n = 2)	0.06% (n = 28)
Conventional	54.08% (n = 2704)	65.33% (n = 343)	12.65% (n = 5830)
Organic	30.54% (n = 1527)	24.19% (n = 127)	3.28% (n = 1510)
Biodynamic	12.34% (n = 617)	8.57% (n = 45)	0.86% (n = 395)
Forestal	2.2% (n = 110)	1.52% (n = 8)	0.59% (n = 273)
<i>Undefined</i>	-	-	82.56% (n = 38036)

Case 4. Model Accuracy

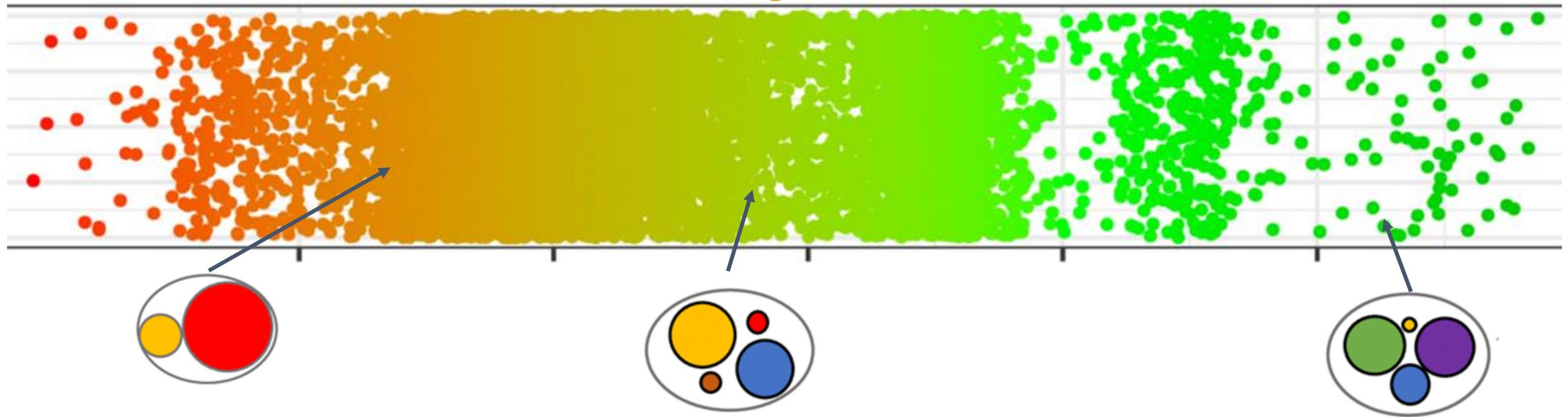


BeCrop® Rate: Score that provides an impact assessment of human intervention on agricultural lands and best management practices- worldwide

Model's Accuracy: 96%

Standard Deviation: 2,9

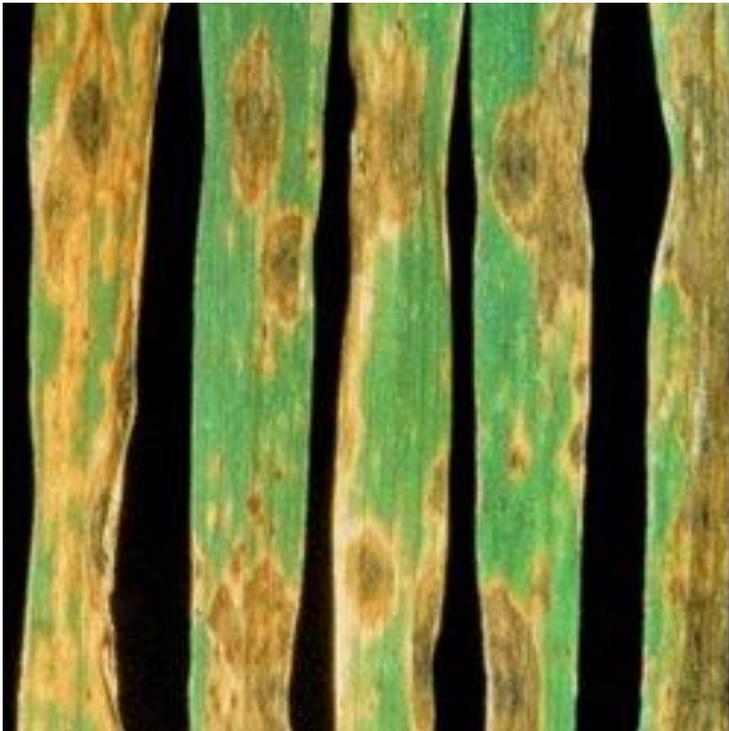
Conventional  Organic  Biodynamic



BeCrop Rate – Relation with Diseases



BeCrop® Category		BeCrop® Index	cor	pval
All	-	Septoria speckled leaf blotch		
Disease	-	Septoria speckled leaf blotch	-0.198	0.033



- **Higher rate index**
- **Decrease disease risk**
- **More yield**

Leaf blotch diseases, with severity >50% at DC 73–77, caused an average yield loss of 1114 kg/ha in spring barley across all countries over 5 years.

Thank You!

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