



ICSC Innovation and Community Day

11 Novembre 2025

**DAMA - Tecnopolo Data Manifattura
Emilia-Romagna (Bologna)**

PLANTIVERSE: DALLE PIANTE AI DATI

TECNOLOGIE EMERGENTI PER IL MONITORAGGIO PLANT-DRIVEN

Nicola Nescatelli

 **Innovation and Community Day**

PROBLEM

Agriculture that does not listen to plants wastes resources, crops and opportunities.



60% of farms in controlled environments (such as greenhouses and vertical farms) work with absent or poorly collected data (Source: Global CEA Census Report).



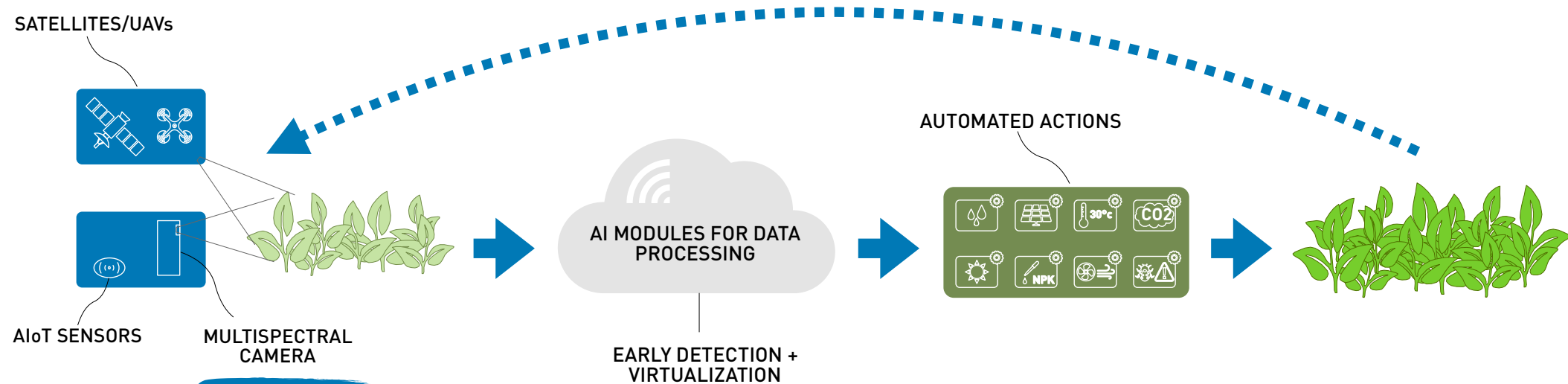
Traditional agriculture wastes 3 out of 5 litres. Even in greenhouses and vertical farms, 1 in 4 liters is lost (Source: Frontiers in Plant Science, World Bank, FAO)



Forty percent of the crop can be lost to pests and diseases. (Source: FAO, CABI)

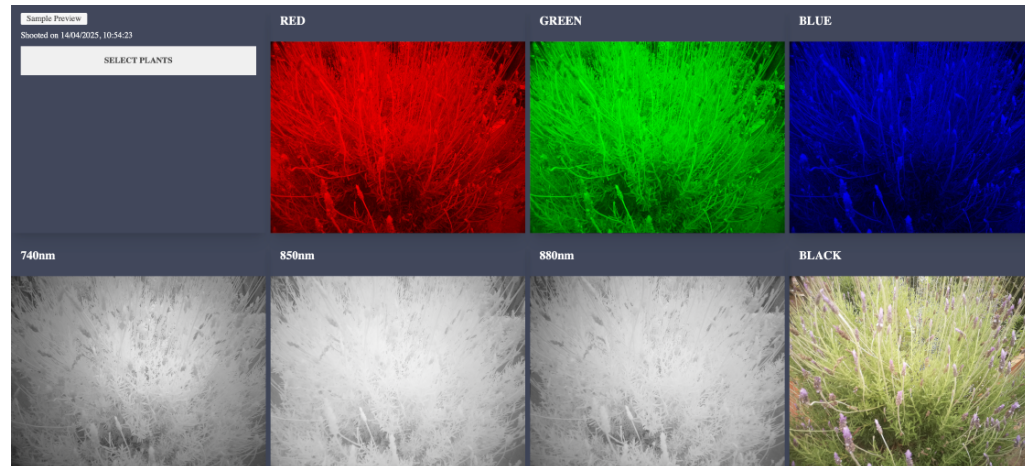
SOLUTION: A PLANT-DRIVEN SYSTEM

Plants communicate their needs for fast and accurate automated interventions.



PRODUCT: PLANTIVERSE PLATFORM

Spectral data - Artificial intelligence - Plant-driven agricultural automation



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Red = 31.65988610704522	Green = 34.37438106463273	Blue = 16.0896664100565	NIR1 = 51.03154625205287
NIR2 = 67.50036659792471	NIR3 = 60.21462326667727		
NDVI = 0.36143998742636474	ARI = 0.6409639579395916		

NDVI1 0.3614	ARI1 0.0095	ARI2 0.641	BGI1 0.4681
BGI2 0.4681	BRI1 0.5082	BRI2 0.3153	CRI500 2.1364
CRI700 1.4846	EVI 0.093	GLI 0.012	GM1 1.4846
GM2 1.6119	GRVI 1.7517	Greenness 1.0857	LA1 0.2186
HI -25.7108	MCARI1 9.6145	MSAVI 0.5291	MSR 0.6397
MTVI 55.8449	NDGI -0.195	NDI1 1	NDI2 0.4595
NDWI -0.2732	NGBDI -0.3301	NGRDI -0.195	NLI 0.9722
PRI -0.3623	PSRI -0.0532	PSNDc 0.615	PSSRa 2.132
PSSRb 2.132	PSSRe 4.1953	RARS 1.6119	RdVI 3.5992
RENDVI 0.2343	RI 0.195	RVI 0.8475	SIP 0.5185
SGI 1.1799	SR 2.132	SR2 1.9637	SR3 1.6119
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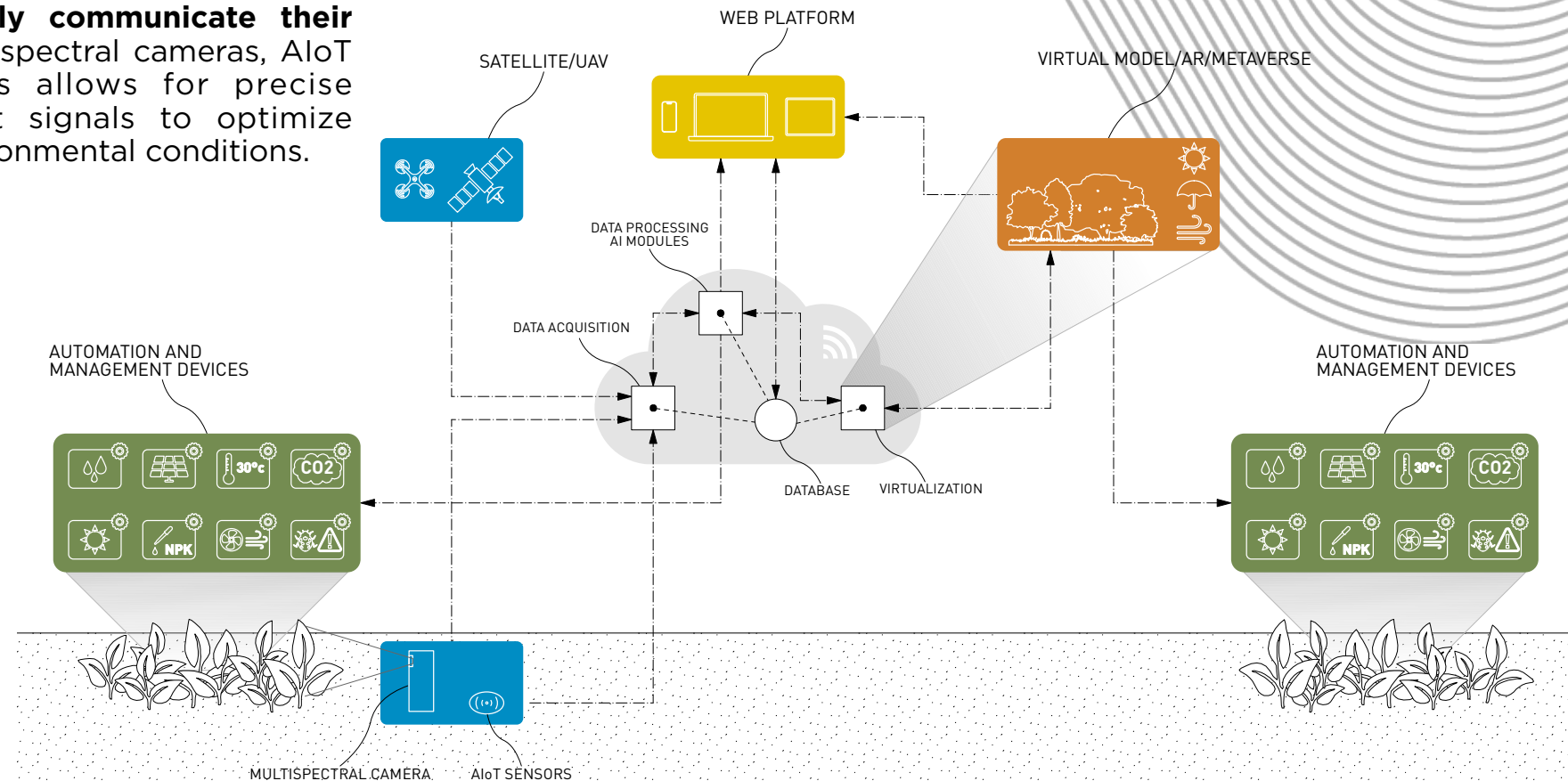


PLANT-DRIVEN + VIRTUALIZATION

In our solution plants autonomously communicate their needs using real-time data from multispectral cameras, AIoT sensors, and satellite inputs. This allows for precise adjustments based on direct plant signals to optimize irrigation, pest management, and environmental conditions.

Key Features

- **Plant-Guided Automation:** Autono system adjustments driven by spec signals from each plant.
- **Scalable Virtualization:** Centralized monitoring by selected plants to efficiently manage large areas with sensors.
- **Precision Insights:** Tailored algorithm that interpret plant-specific data fo timely interventions.



Results:

Initial pilots show **measurable improvements in water use efficiency and stress detection accuracy**, supporting broader adoption and scaling.

PILOTS



Partners: Department of Botany / Sapienza University of Rome

Objective: Real-time monitoring and analysis of specific plant stress factors in controlled environments.

Results:

- 84% accuracy in detecting light stress, improving the growth environment.
- 80% accuracy in detecting environmental stress, enhancing the resilience of the plants.



Partners: Botanical Garden of Rome / CNR

Objective: Targeted pest stress detection and response using plant-specific signals and automated alerts.

Results:

- 88% accuracy in detecting pest-induced stress, leading to faster and more precise interventions.
- Estimated 30% reduction in overall plant stress by preventing damage before it spreads.



Partners: FAO & Sapienza University

Objective: Optimizing water management using a Plant-Driven Decision-Making System that directly responds to plants' needs.

Results:

- 25% reduction in water use due to more precise water delivery.
- 15% increase in crop yield by reducing plant stress.
- 70% accuracy in detecting water stress, with ongoing improvements



Partners: Botanical Garden of Rome

Objective: Monitoring 169 total grape varieties, enhancing biodiversity insights.

Projected Outcomes: Integration of Multispectral and IoT Sensors for Early Disease Detection in Vineyards, objective for a parasite stress detection accuracy above 92% and a 15% reduction in resource usage through targeted and prompt measures.

PARTNERS & AWARDS



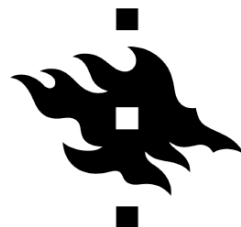
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WorldStartup



UNIVERSITY OF HELSINKI

FASTWEB



natura*si*

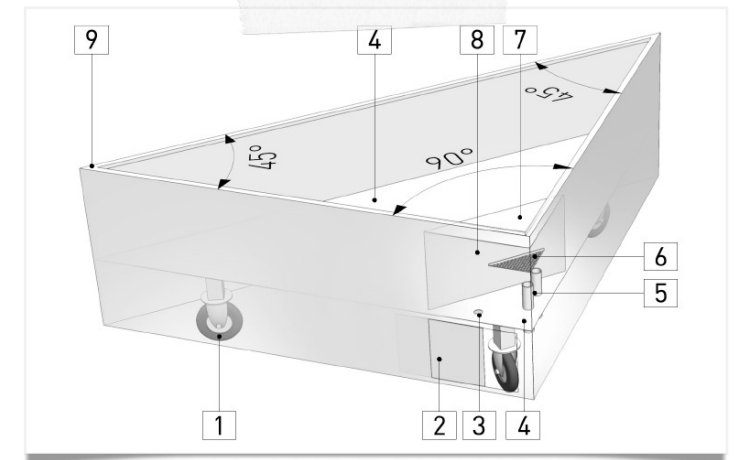
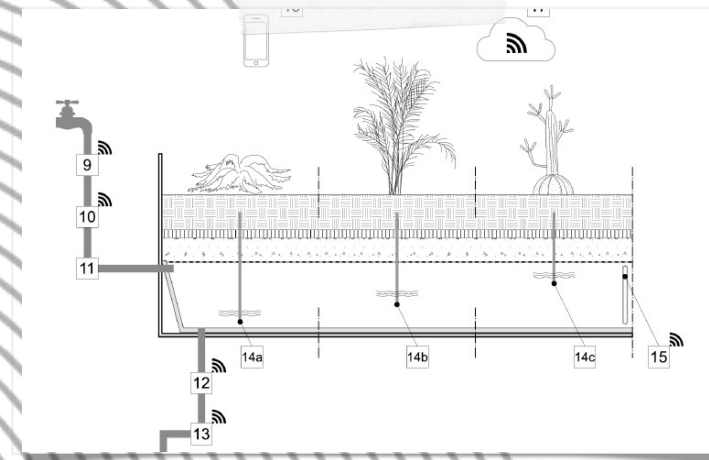
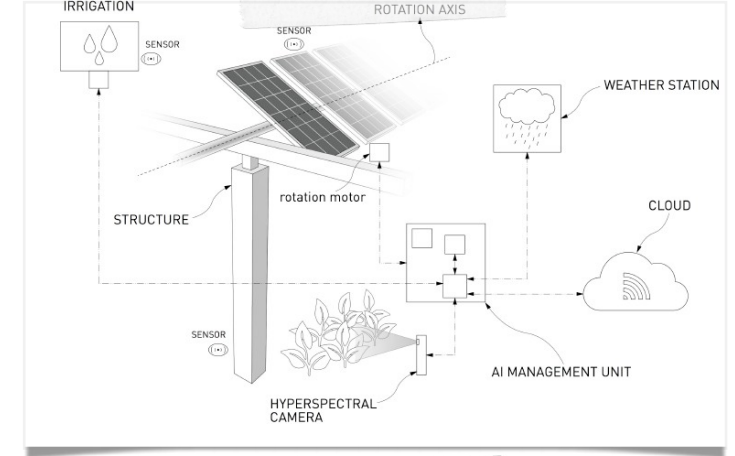
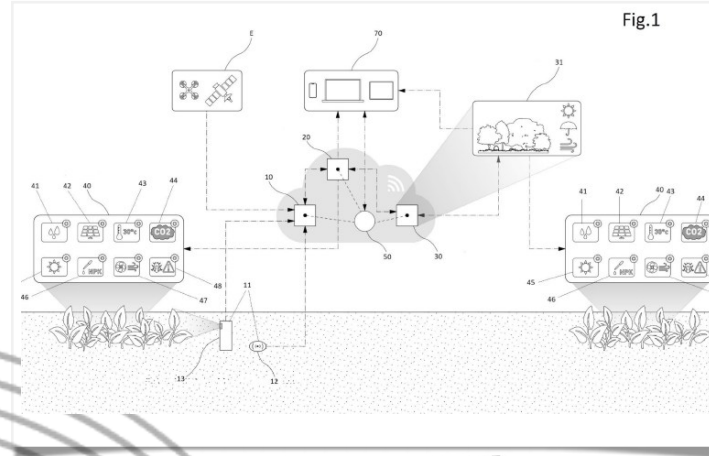


LEGAMBIENTE

PATENTS

Plantiverse holds four patents and two pending patent:

- **Optimal Water Usage System.**
- **Water Management System.**
- **Design innovations for green areas.**
- **Agrivoltaicis systems.**
- **Plantiverse system (pending)**
- **Bio-Driven systems (pending)**



OUR COMPETITIVE ADVANTAGE

*We are the only ones to integrate AI, sensing, biological virtualization, and automation into a single plug-and-play platform

	        								
Country	ITALY	CZECH REPUBLIC	USA	THE NETHERLAND S	USA	USA	ISRAEL	SWITZERL AND	USA
Autonomous Plant-Driven	✓			✓	✓	✓			
Plants Virtualization	✓								
Integrated Multispectral	✓		✓	✓				✓	✓
Satellite Images	✓	✓						✓	
AI Platform/ Data Driven	✓	✓	✓	✓	✓	✓	✓	✓	✓
Knowledge export and API	✓	✓			✓	✓		✓	
Precision Irrigation	✓			✓	✓	✓	✓		✓

MARKET

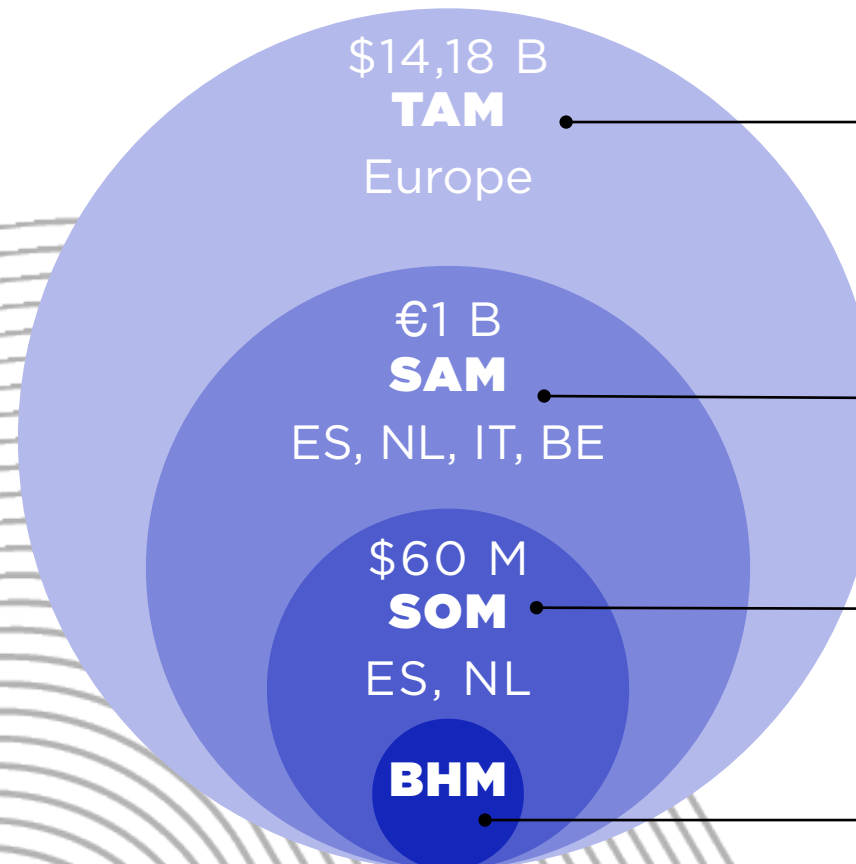
An evolving market toward precision agriculture

Initial target: CEA
(agriculture in controlled environments)

Expansion: high-yield
viticulture and agri-voltaic
systems

Early adopters: Spain and
the Netherlands

GLOBAL CAGR 15.1%



High-tech agriculture in
controlled environments
(Europe)

Countries with high
adoption of precision
farming (ES, NL, IT, BE)

Market entry in the first 2
target countries (ES, NL)

Initial Market Capture:
BHM: \$5M in 5yrs

BUSINESS MODEL

PLATFORM SUBSCRIPTION FEES (SOFTWARE)	Vineyard Management Management	€200/ha/mos.
	Hydroponics	€1,000/ha/mos.
	Vertical Farming	€1,250/sector
	Agrivoltaic Systems	€800/ha/mos.
*HARDWARE SALES (AIOT DEVICES)	Vineyard Setup	€116,000/10ha
	Hydroponics Setup	€78,000/ha
	Vertical Farming Setup	€85,000/ha
	Growth Chambers (under 20sqm)	€24,000/chamber
CONSULTING SERVICES	Customized Agricultural Consulting: Tailored advisory services, offered on a case-by-case basis, for optimizing yield and operational efficiency.	€20,000/chamber
*Multispectral cameras and associated devices are priced to encourage adoption, with costs adjusted for specific use cases		

TEAM & COLLABORATORS

Founders

Nicola Nescatelli
PROJECT
MANAGEMENT



Co-founder and Project Manager. Master's degree in Astrophysics and five-year experience in the Open-Innovation sector.

Andrea Procaccini
DATA SCIENCE



Co-founder, PhD in Theoretical Physics and decennial experience in the study of the dynamics of complex biological systems, co-author of 5 articles with Nobel Prize in Physics Giorgio Parisi.

Federico Di Vincenzo
DESIGN / LANDSCAPE



Co-founder, graduated in Architecture, manages green design and installation, as well as graphic design. Twenty years of experience in Architecture and Design.

Fabio Pallini
IT



Co-founder, Solution Architect and AIoT External Resources Coordinator. Ten years of experience in Information Technology.

Leonardo Giannini
SAT / GIS



Co-founder, Geologist active in projects both in civil and public engineering and expert in methodologies specifically based on spatial statistical analyses.

Sara Zuzzi
BIO-
STATISTICS



Marwa
Boukalmoun
BUSINESS
DEVELOP.



Stephanie
Christou
PREDICTIVE
ANALYTICS



Francesco
Zimbolo
IT



Natalia Pach
COMMS.



Franziska
Knothe
AGRONOMY



Soukaina
Alaoui
AI / ML



Riccardo
Benini
R & D



Jacopo Manni
SALES



Scientific Advisors & External Collaborators: 3 Scientific Advisors: Prof. Attorre (AGRONOMY), Prof. Luigi Faino (BIOINFORMATICS), PhD Mario Santoro (DATA SCIENCE). 7 Trainees/Junior Researchers. We also have the support of the FAO Manager Giorgio Grussu (PoCs DEVELOPMENT) to coordinate FAO / Mountain Partnership resources.



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PLANTIVERSE

Plant Driven Systems



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Grazie per l'attenzione

