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Neuropublic in a Nutshell

NEUROPUBLIC

- An innovative Informatics and Technology company founded in 2003 in Piraeus
- Specializing in the development of Web- and Cloud-based integrated information systems & applications.
- Being the first and only large-scale Internet of Things infrastructure in Greece, serving the Agriculture sector.

800k
End Users

107
Employees

7 mil. €
Investments

WE CREATE
THE DIGITAL FUTURE

AGRICULTURE SECTOR

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DIVERSE DATA COLLECTION

- Sampling Observations Analyses
- Telemetric sensors in the field and on the tractor
- Remote sensing methods Vegetation indicators Soil indicators
- Logging of crop applications Farm profile

soil
- temperature
- humidity
- orientation
- gradient
- nutrients
- micronutrients
- mechanical composition
- organic matter
- salinity
- pH
- calcium

plant
- phenological stage
- chlorophyll index
- nutrients
- micronutrients
- water potential
- root system
- stomatal conductivity
- residues
- symptoms
- fruit size
- trunk size
- cultivar

atmoshpere
- temperature
- relative humidity
- leaf wetness
- rainfall
- solar radiation
- wind velocity
- wind direction
- barometric pressure

irrigation water
- salinity
- pH

biological factors
- insects
- fungi
- pests

field applications
- spraying
- irrigation
- fertilisation
- seeding-planting
- soil treatment
- inputs
- harvesting
- other activities

spatial variability
- fertility
- mechanical composition
- climate
- vegetation idices

crop configuration
- Irrigation system
- planting
- pruning
- historicity

FROM DATA ACQUISITION TO ADVICE

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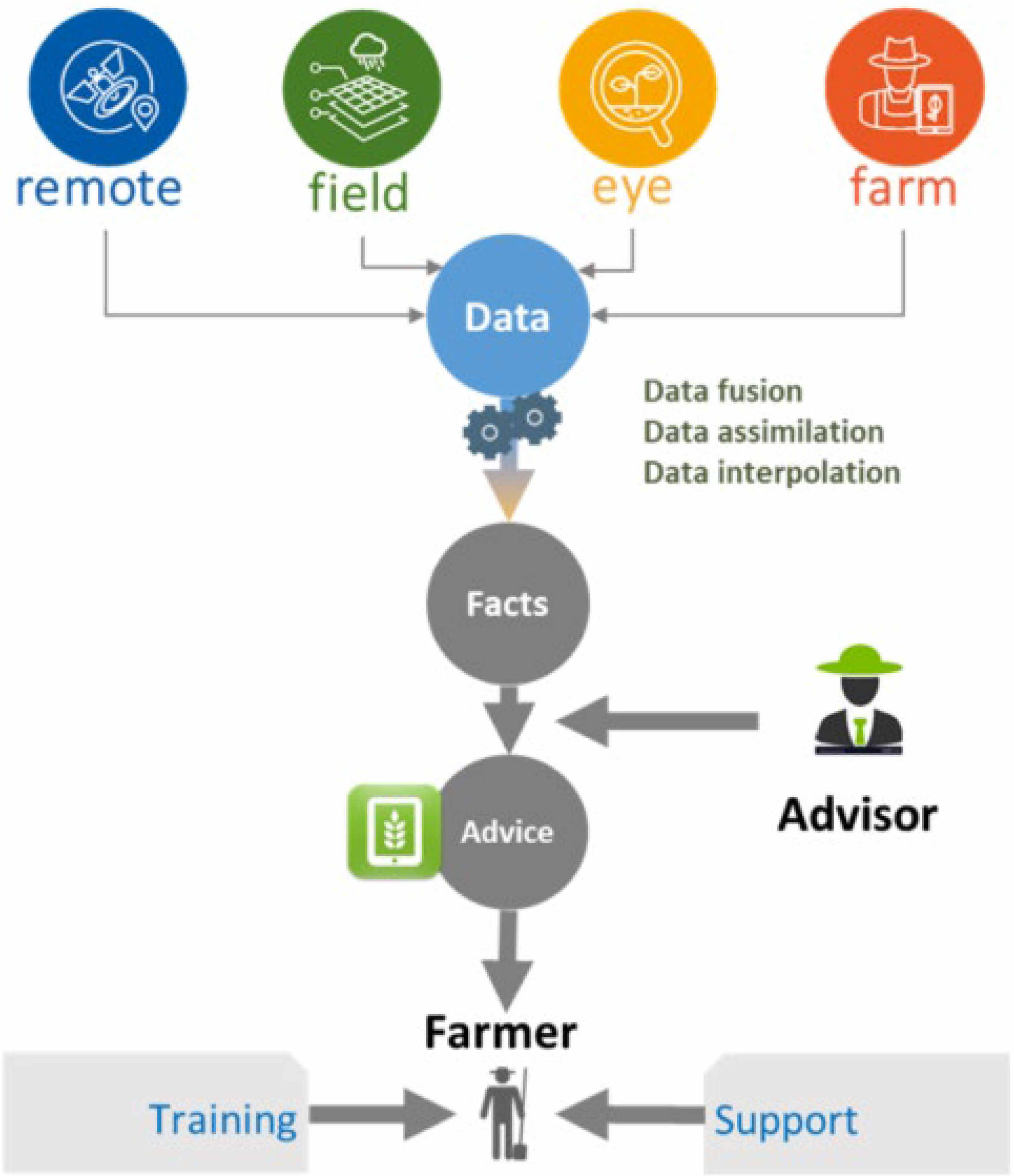

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JOINT VENTURE – AG CLUSTER

Agri-food Cluster of Central Macedonia

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Scope:

Co-design, develop and promote a system:

1. Capable to reduce inputs and low environmental footprint in the agri-food sector,
2. Provide certification protocols as "environmentally friendly" agri-food products.

Pilot Studies for 2 growing Seasons

Integration Mature of Digital Solutions

Data Collection from diverse sources

Data Quality Assessment & Data analysis / Research

Develop, Test and evaluating of Algorithms for Carbon Footprint

Κοινοπραξία Συνεταιρισμών Ομάδων Παραγωγών Νομού Ημαθίας

EUROAGRO καλλιεργούμε την ανάπτυξη

Novaplan

αειφορική Α.Ε. ΥΠΗΡΕΣΙΕΣ ΥΠΟΣΤΗΡΙΞΗΣ ΑΓΡΟΠΕΡΙΒΑΛΛΟΝΤΙΚΟΥ ΧΩΡΟΥ

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ΑΣΠΚΜ Αγροδιατροφική Σύμπραξη Περιφέρειας Κεντρικής Μακεδονίας

Ευρωπαϊκή Ένωση
Ευρωπαϊκό Ταμείο Περιφερειακής Ανάπτυξης

ΠΕΡΙΦΕΡΕΙΑ ΚΕΝΤΡΙΚΗΣ ΜΑΚΕΔΟΝΙΑΣ
ΕΙΔΙΚΗ ΥΠΗΡΕΣΙΑ ΔΙΑΧΕΙΡΙΣΗΣ
Ε.Π. Περιφέρειας Κεντρικής Μακεδονίας

ΕΣΠΑ 2014-2020
ανάπτυξη - εργασία - αλληλεγγύη

Με τη συγχρηματοδότηση της Ελλάδας και της Ευρωπαϊκής Ένωσης

Agri-food Cluster of Central Macedonia

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Carbon Cycle

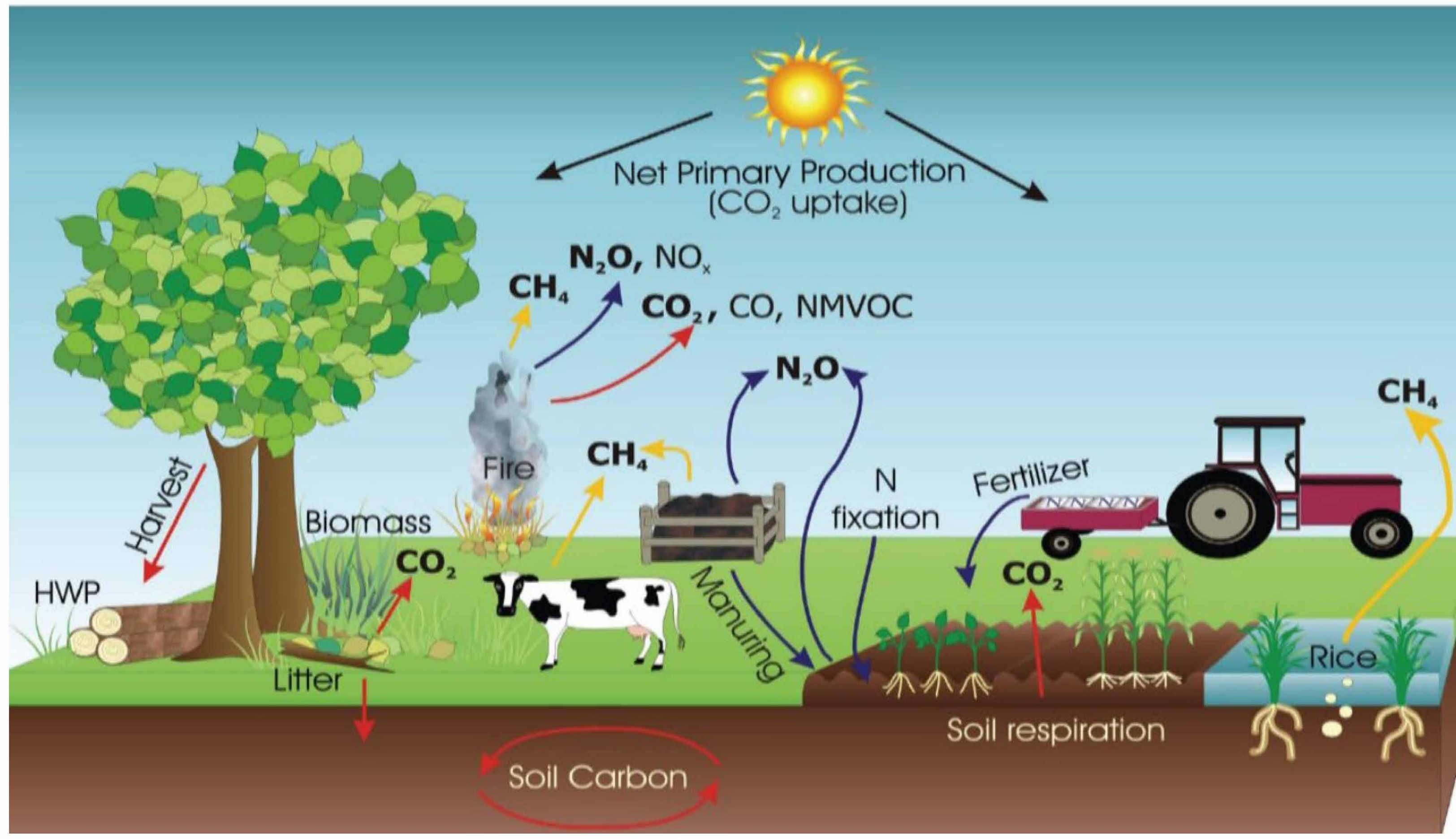
- GHG emissions in EU are **10% in 2012** – decreased from **24% between 1990 and 2012**
- -> Globally emissions grew by 14% (2001-2011)

Source: EEA's Article

Inputs:
- Photosynthesis
- Maintain organic matter in soil

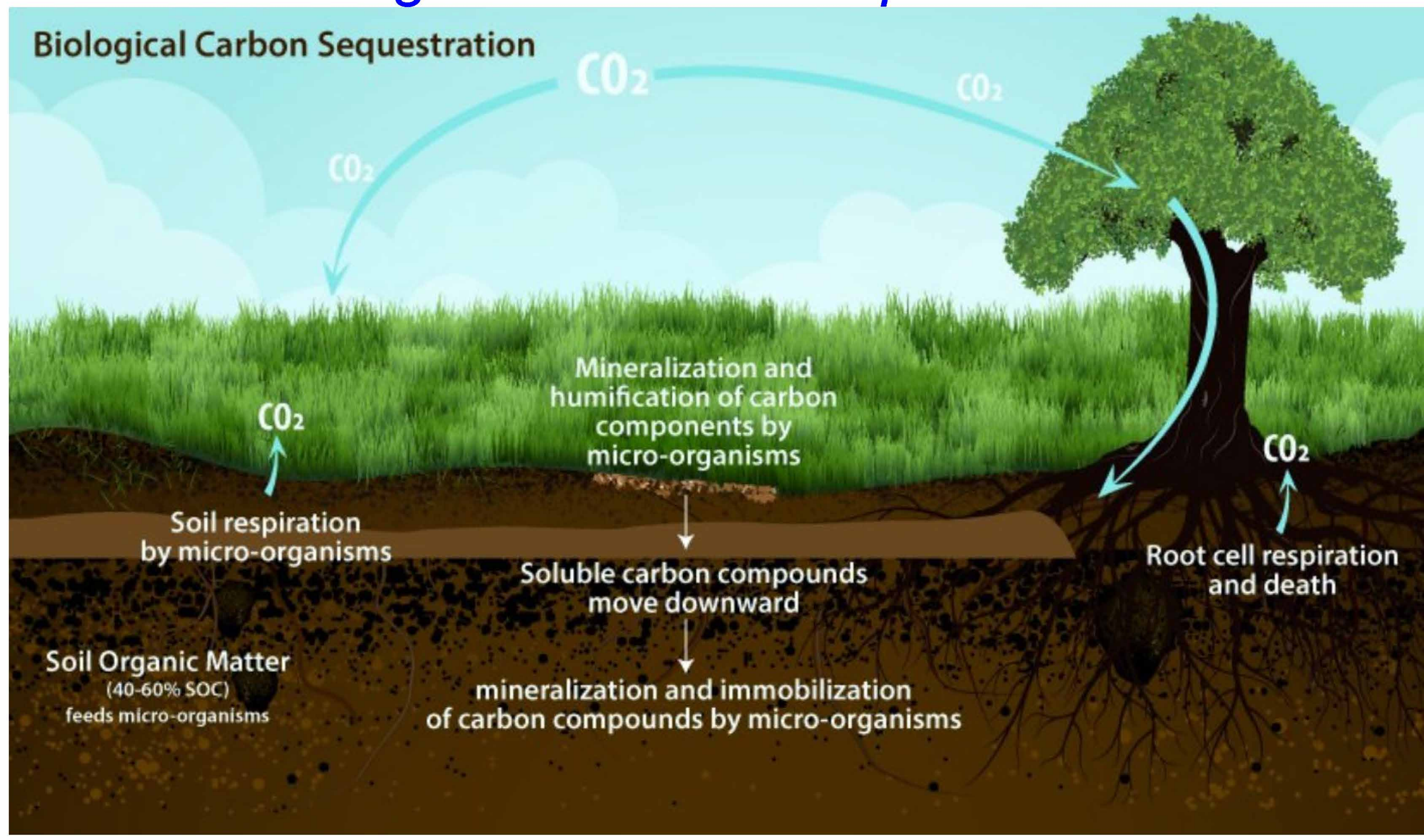
Outputs:
- Oxidation of organic material
- Agricultural energy use

CO2 emissions & removals



Source: IPCC, 2006

Biological Carbon Sequestration



Source: CalRecycle

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Pilots – Table Peaches & Kiwi

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- **INPUTS** Natural photosynthesis, & Biomass Production, Soil organic matter formed (e.g. record residue incorporation or organic fertilization practice
- **OUTPUTS** Loss of biomass/Harvesting, fuel consumption (Diesel), electricity for irrigation, use of natural resources, use of fertilization, Loss of organic matter (Residue incorporation)

  +

  Transportation from field (Diesel etc.)
  Energy consumption for maintenance/cooling
  Storage Material (wooden / plastic)

Process, QA + Algorithm Development

Calculation of CO2
per parcel
per growing season

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ΥΠΗΡΕΣΙΕΣ ΥΠΟΣΤΗΡΙΞΗΣ ΑΓΡΟΠΕΡΙΒΑΛΛΟΝΤΙΚΟΥ ΧΩΡΟΥ

ΑΡΙΣΤΟΤΕΛΕΙΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΘΕΣΣΑΛΟΝΙΚΗΣ

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CO2 footprint Calculation

- openLCA is an open source and free software for Sustainability and Life Cycle Assessment. It was introduced by GreenDelta, a German company founded in 2004.

- It is used by business world-wide for life cycle assessments, sustainability research and environmental impact due to it’s fast calculation of results with the largest set of data available for LCA.

openLca

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Calculation of Carbon Footprint

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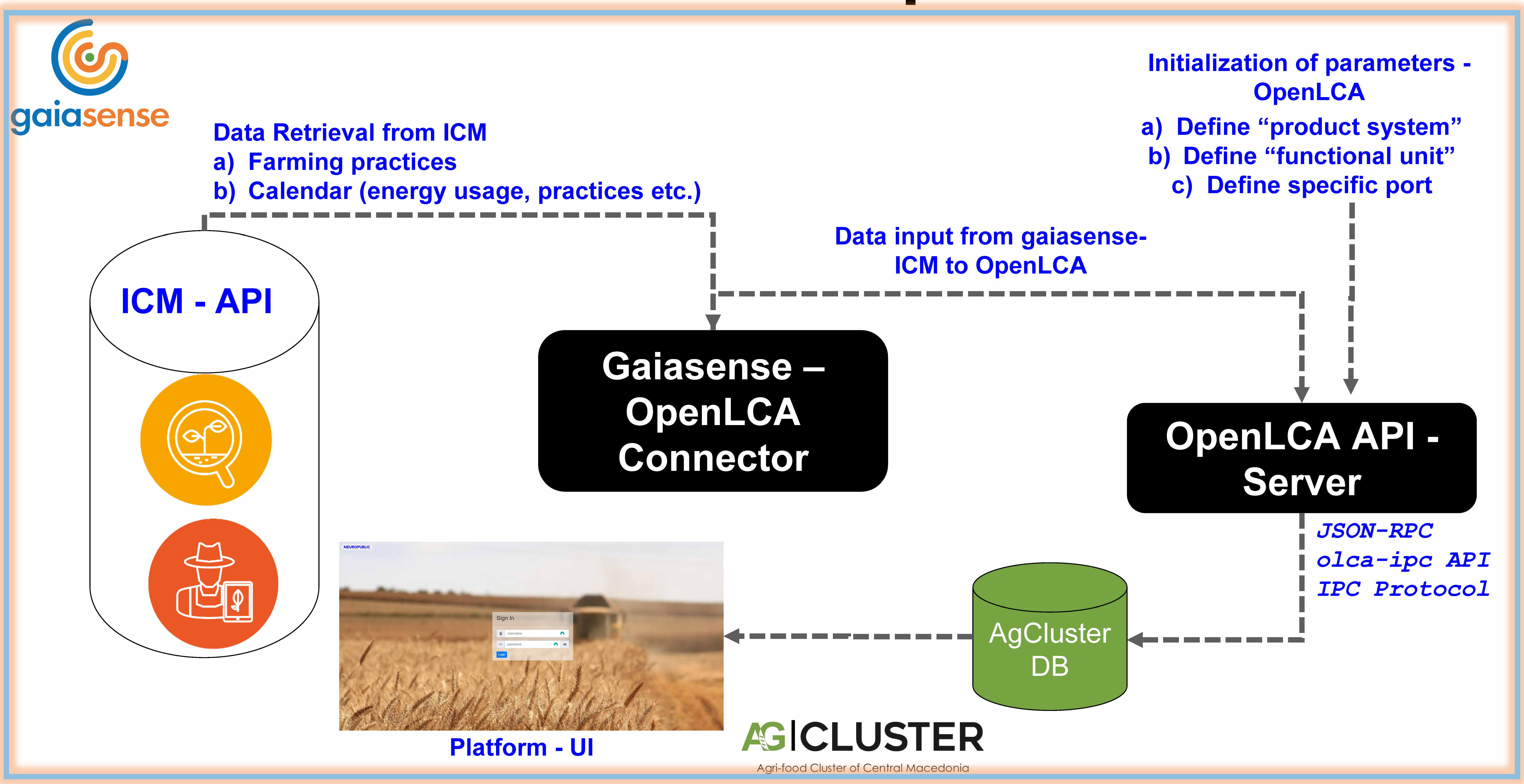

Πλατφόρμα - UI

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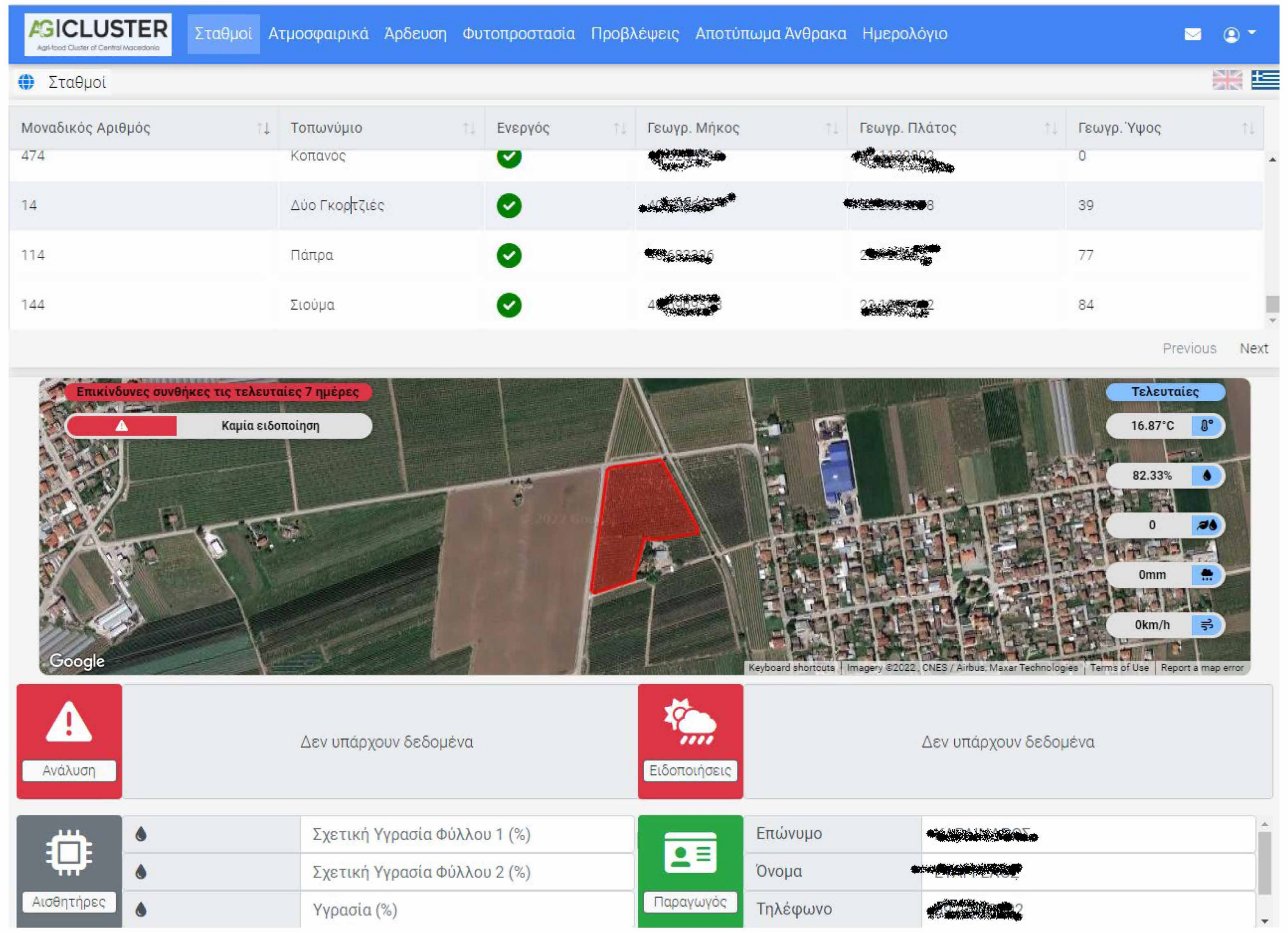

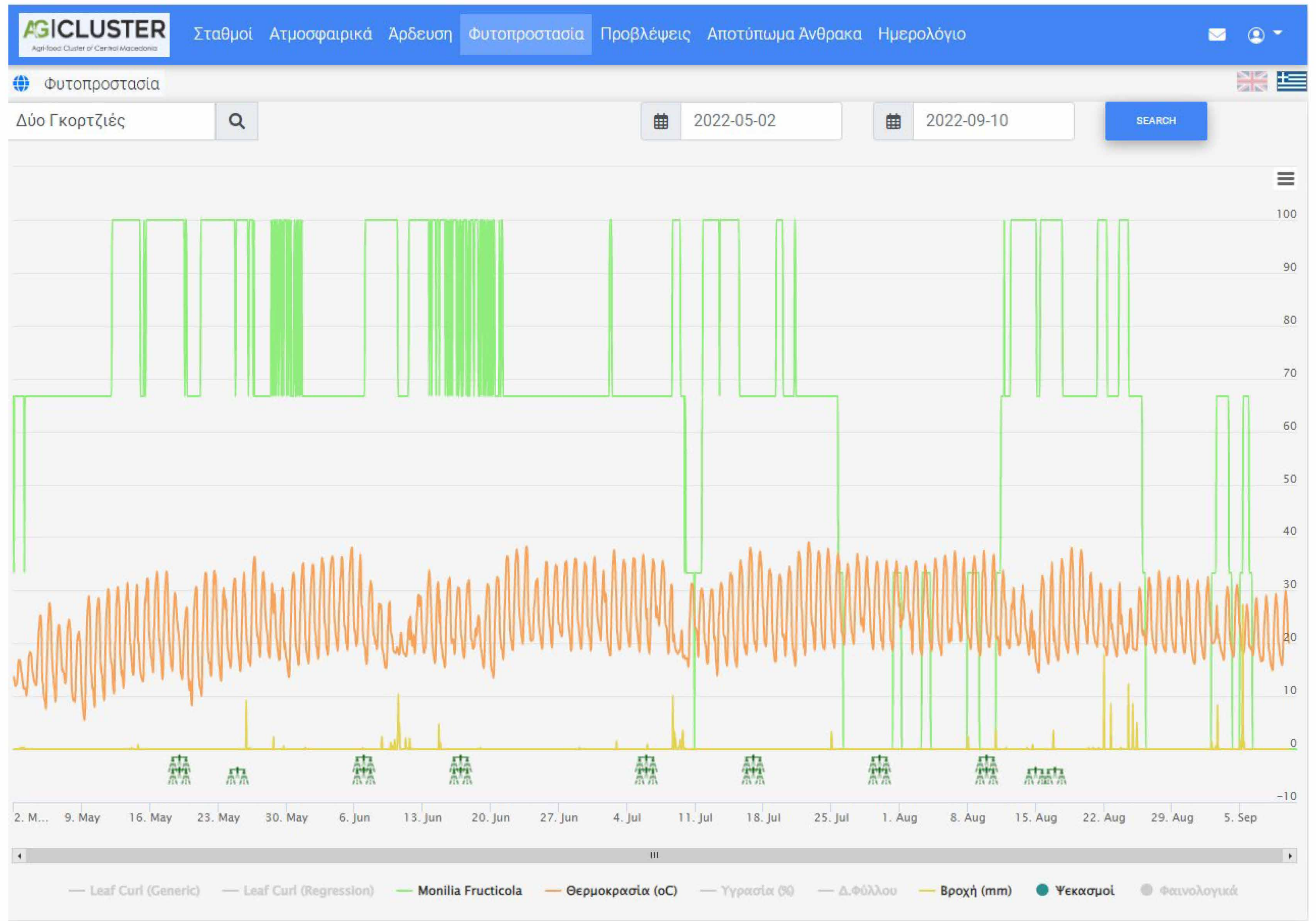

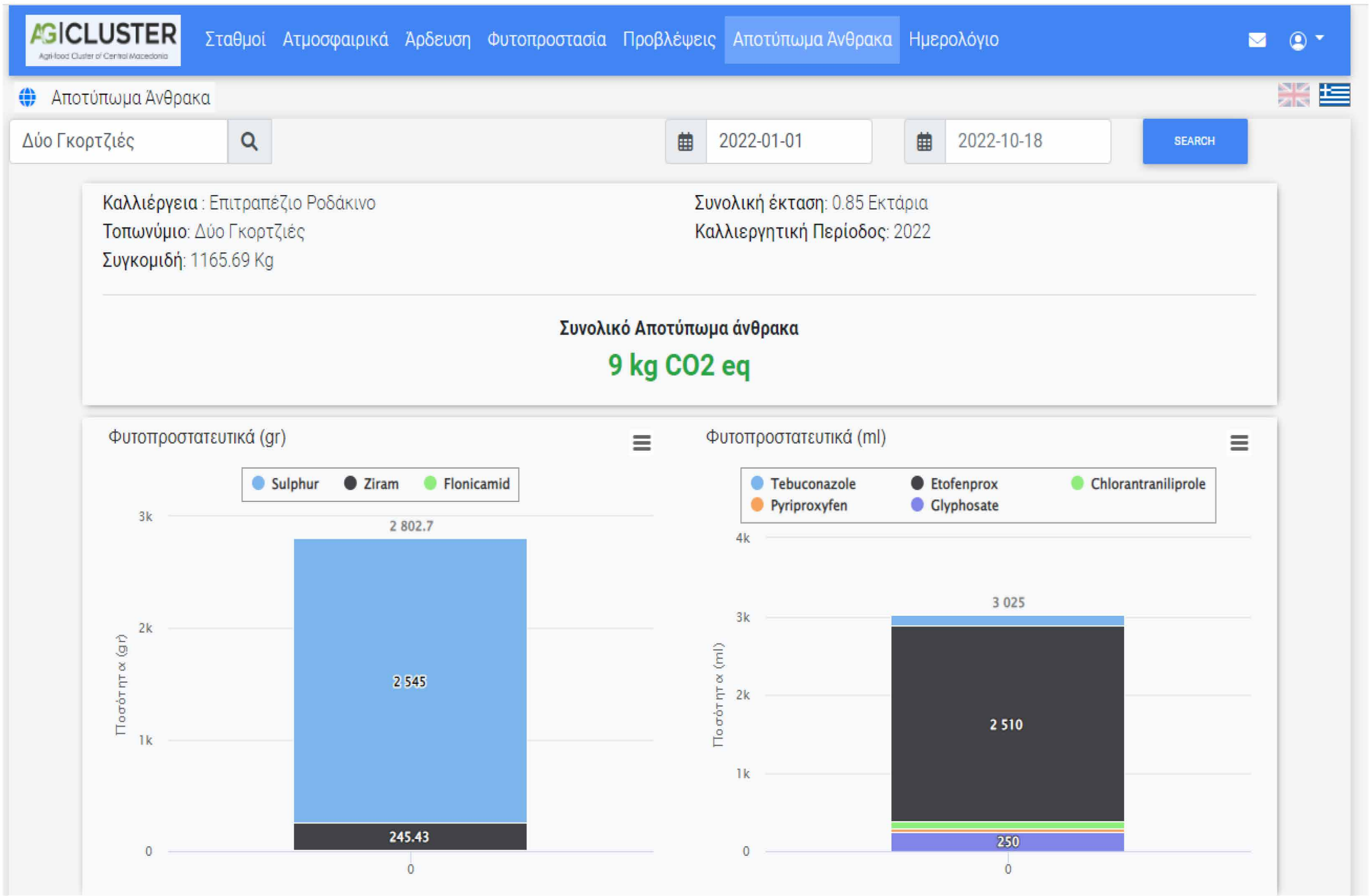

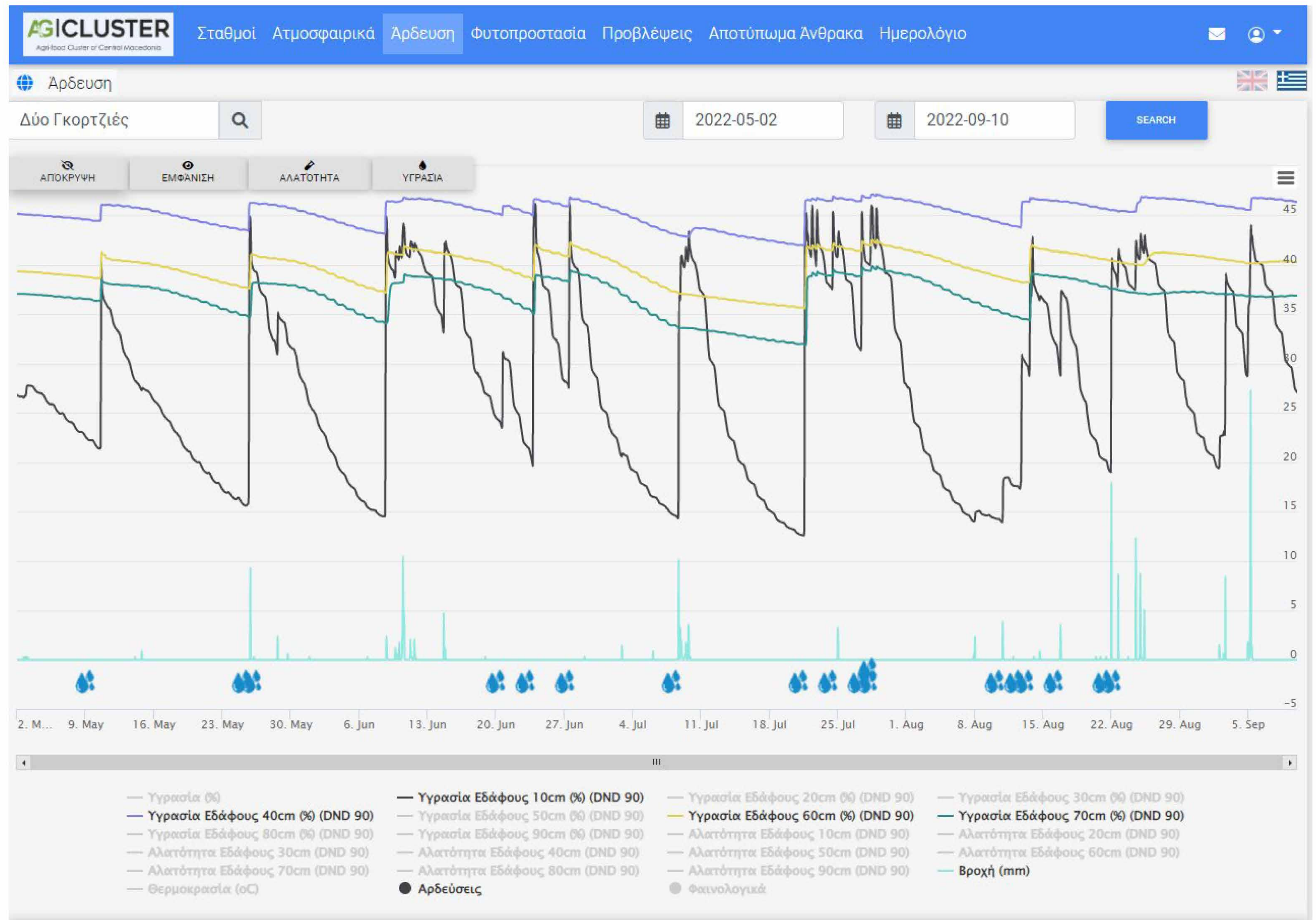

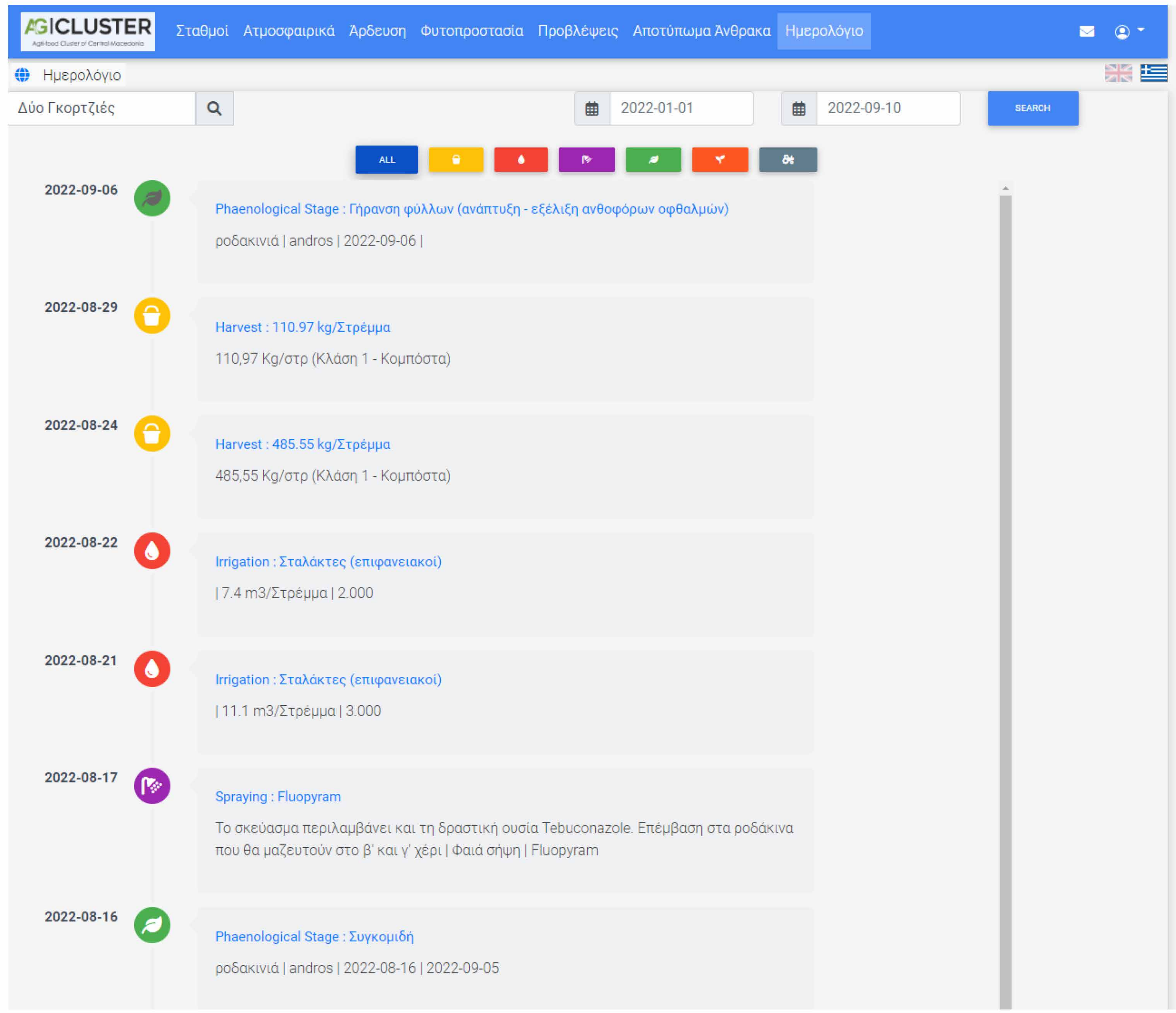

Πλατφόρμα - UI

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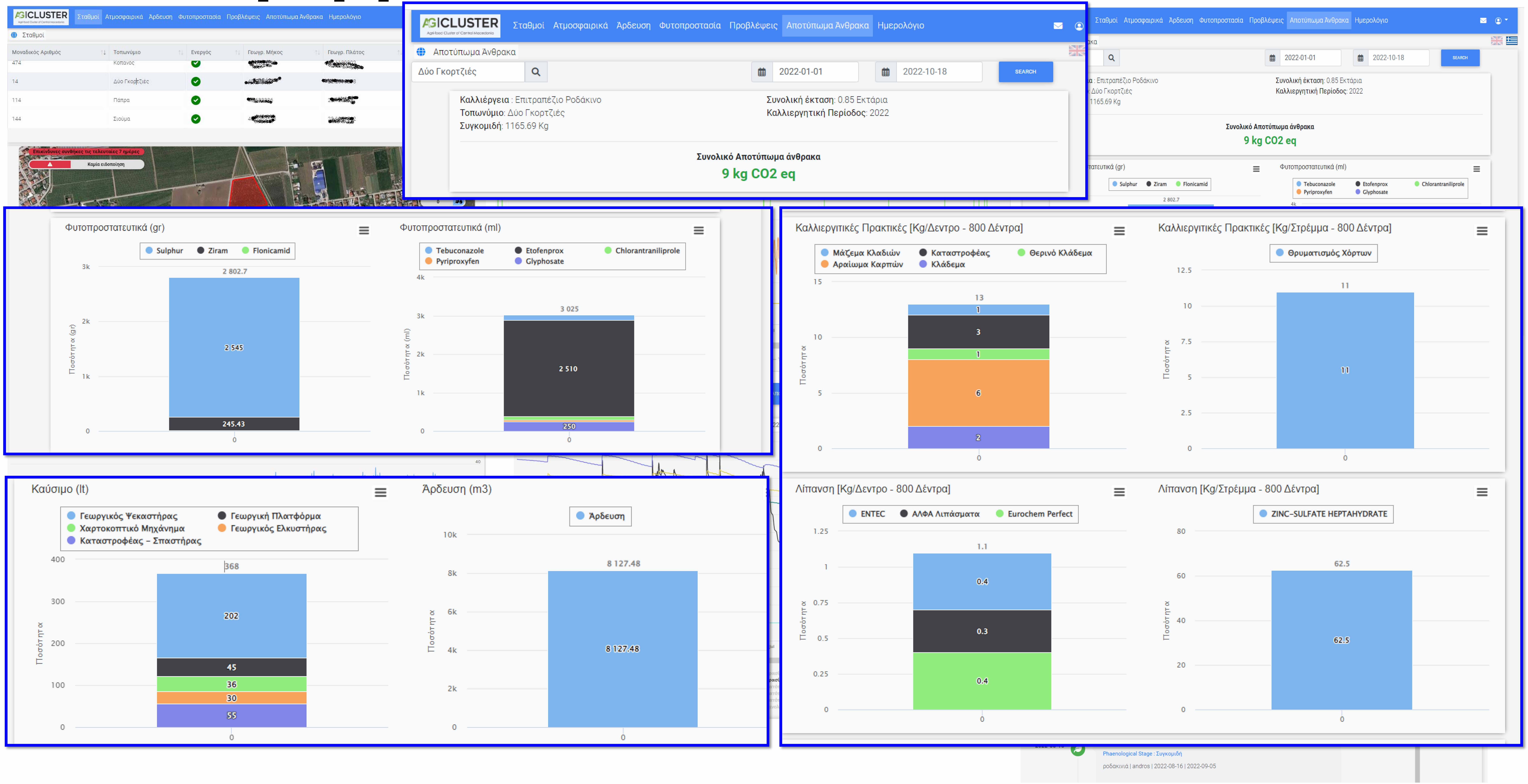

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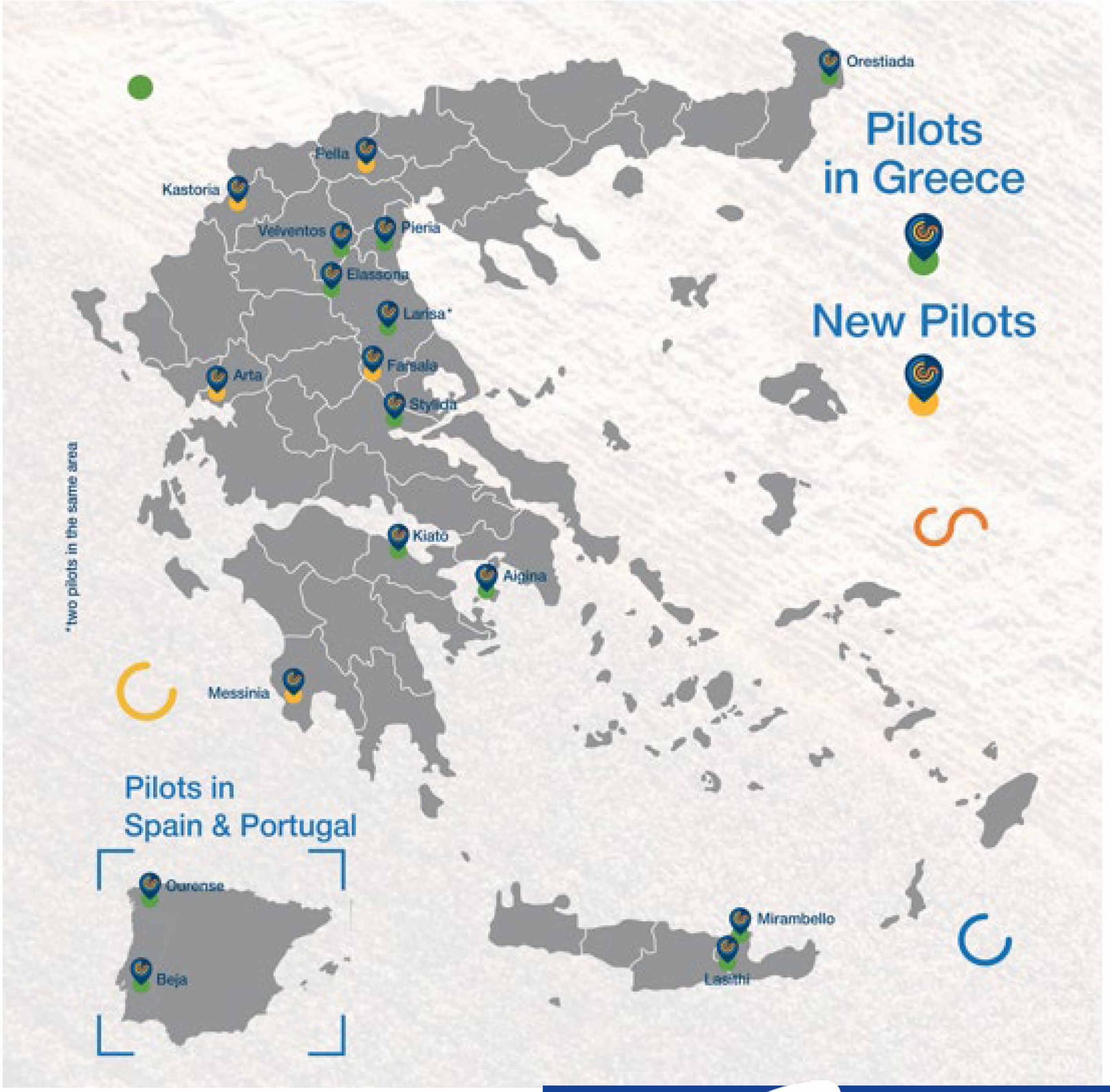
Smart Farming as a key enabler for CO2 Emissions & Carbon Farming measuring



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Case Study

- 18 pilot sites (Portugal, Spain, Greece)
- 9 different crops
- 70+ Telemetric Stations & sensors

IRRIGATION COSTS	FERTILISATION COSTS	CROP MANAGEMENT COSTS	ENERGY CONSUMPTION COSTS
Achieved reduction 20,23%	Achieved reduction 21,89%	Achieved reduction 33,72%	Achieved reduction 20,18%

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The project LIFE GAIA Sense is co-funded by the LIFE Programme of the European Union under contract number LIFE17 ENV/GR000220

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Smart Farming as a key enabler for CO2 Emissions & Carbon Farming measuring

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&
Similar
Smart Farming
digital solutions

- Reducing use of pesticides
- Optimizing use of fertilizer
- Data gathering + Monitor of Practices

CO2 Footprint

Reducing pollution + Human health

Reducing GHG emissions mineral nitrogen by balancing use of organic & mineral fertilizer

Carbon Farming

Increase soil ability to sequester Carbon

Increase of agriculture area under high diversity

Combination of organic and mineral fertiliser -> sequester more carbon in agricultural soils

Balance the trade-offs - GHG emissions N2O

15 EU Crop Sites -> Machinery + Manufacturing + Transport & Storage of **Pesticides** and **Fertilizer** & use of **irrigation** -> Accounted on av. 15,6% of field's net GHG budget + 16.4% from N2O emissions from fertilizers & crops residues

For the **Carbon Farming schemes** -> We need to consider the **whole farm GHG budget** when **assessing sequestration benefits**

Source: *Pesticide Action Network & Working Paper No. 264 by CCAFS*

Lessons Learned -> Way forward

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- Smart Farming and Digital technologies are key solutions responding to **Carbon Cycle** needs (**Measuring** both **Carbon Farming** & **Reduction of CO2 emissions**)
  - ✓ Whole cycle from **Reliable Data** & **Analytics/Intelligence** & **Advisor** & **Monitor Practices** & **Measuring** (Carbon Farming & CO2 reduction)
- **Adaptation** of **Algorithms** in each area (main Crops)
  - ✓ Different practices, field activities etc.
  - ✓ Factors contributing to the increase of **Carbon farming** & reduction of **Carbon footprint**
  - ✓ Room for improvements (e.g. reduction and optimal use of inputs)
- Design plan for **CO2 reduction** & **Carbon farming** practices
  - ✓ Make use of digital means and Smart Farming
- Implementation of the plan in pilot fields (different crops &/or areas)

Lessons Learned -> Next steps

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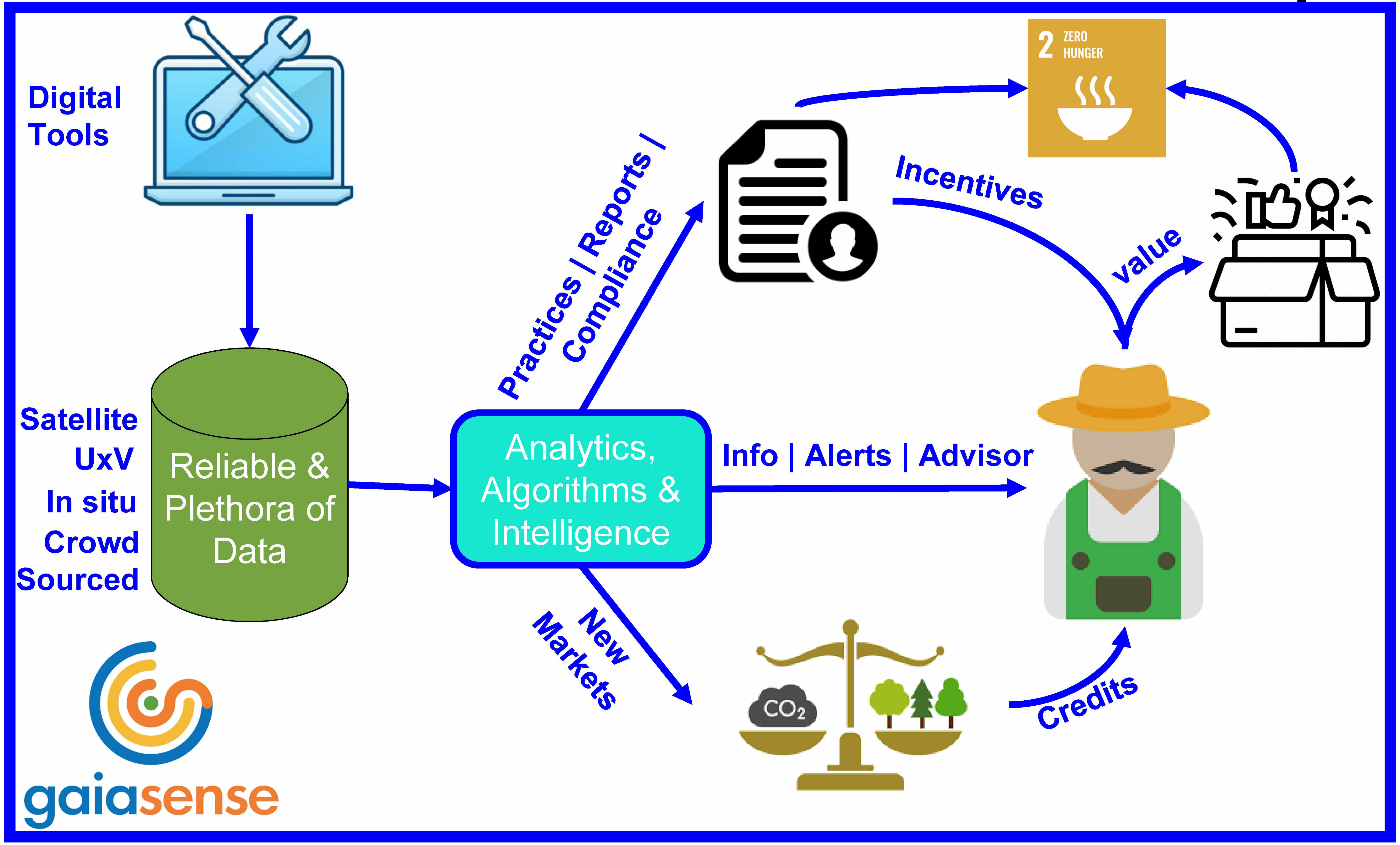
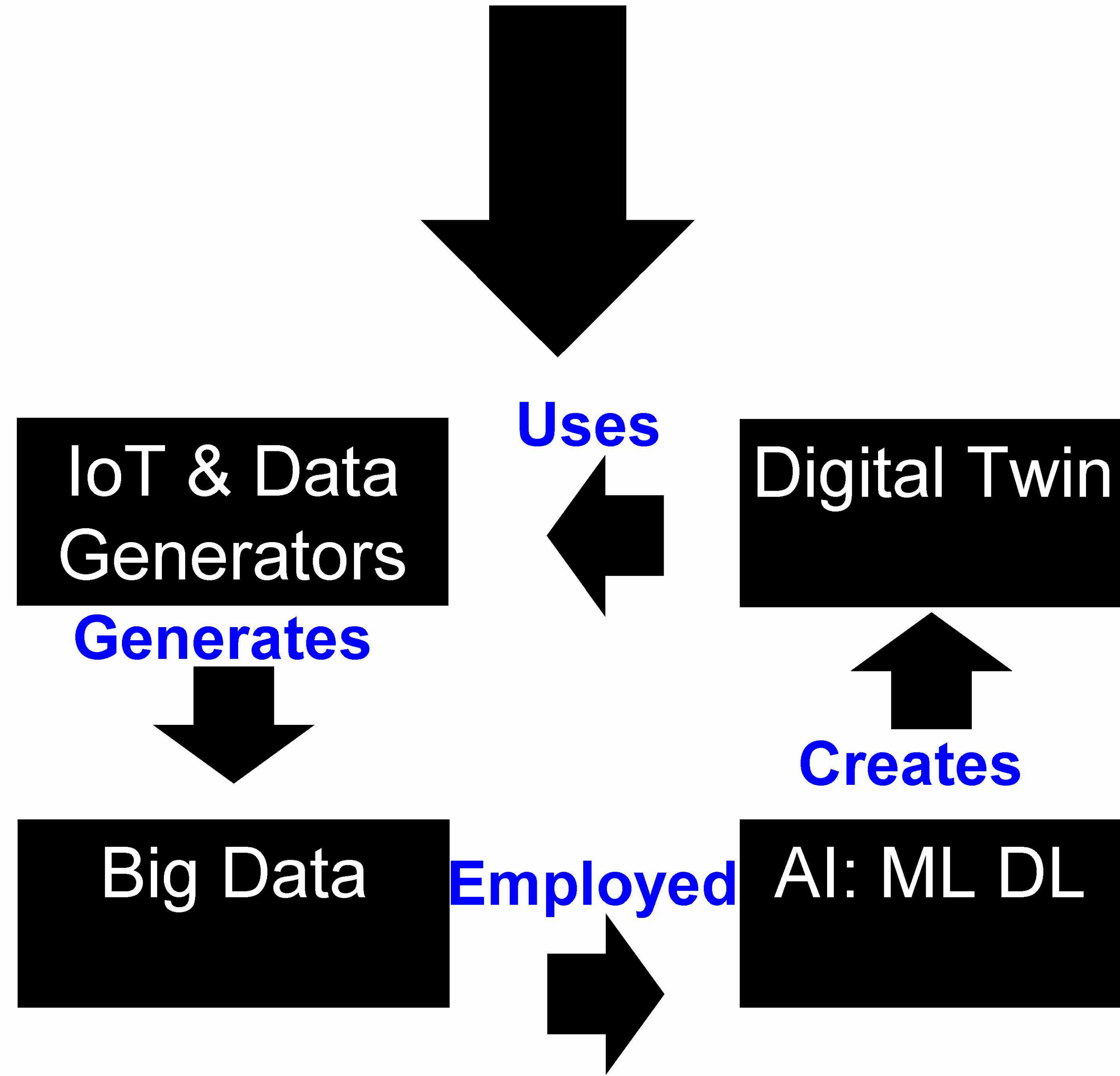


- Balance the need of data
- Quickly adopt new technologies
- Short-term evidence on reducing Farmers' production cost and increasing income



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Thank you

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