Digital Innovation for Sustainable Agriculture: the Greek Approach

COMAGRI Hearing, “EU support for innovation in agriculture“, 18/02/2020

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Director General, GAIA EPICHEIREIN
Scope of Presentation

FOCUS ➔ Digital Innovation

1st PART:
The gaiasense Smart Farming system & its contribution to the sustainability of Greek agriculture

2nd PART:
Lessons learnt & take up for EU decision makers (CAP post 2020, Horizon Europe & broader EU policy framework)
Farming Community
71 agri – coops/ associations
150,000 farmers

Banking Sector

IT Sector
Digital Innovation for Sustainable Agriculture: a best practice from Greece

The **gaiasense** Smart Farming system is a Greek innovation developed by **NEUROPUBLIC SA**, serving the strategic objective of **GAIA EPICHEIREIN** to enhance the balanced sustainable development of Greek agriculture.

**gaiasense** collects data from the **field**, from **satellites**, from **scientists** and from the **farmers** themselves, allowing them to produce more (and better) with less.
From data acquisition to advice

Paving the way for tomorrow's agriculture
What do we measure?

<table>
<thead>
<tr>
<th>Sampling</th>
<th>Observations</th>
<th>Analyses</th>
<th>Telemetric sensors in the field and on the tractor</th>
<th>Remote sensing methods</th>
<th>Vegetation indicators</th>
<th>Soil indicators</th>
<th>Crop applications log</th>
<th>Farm profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>soil</td>
<td>plant</td>
<td>atmosphere</td>
<td>biological factors</td>
<td>spatial variability</td>
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<tr>
<td>temperature</td>
<td>phenological stage</td>
<td>temperature</td>
<td>insects</td>
<td>fertility</td>
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<td>humidity</td>
<td>chlorophyll index</td>
<td>relative humidity</td>
<td>fungi</td>
<td>Mechanical composition</td>
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<td>orientation</td>
<td>nutrients</td>
<td>leaf wetness</td>
<td>pests</td>
<td>climate</td>
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<tr>
<td>gradient</td>
<td>micronutrients</td>
<td>rainfall</td>
<td>climate</td>
<td>vegetation indices</td>
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<tr>
<td>nutrients</td>
<td>water potential</td>
<td>solar radiation</td>
<td>field applications</td>
<td>crop configuration</td>
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<tr>
<td>micronutrients</td>
<td>root system</td>
<td>wind velocity</td>
<td>spraying</td>
<td>Irrigation system</td>
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<tr>
<td>mechanical composition</td>
<td>stomatal conductivity</td>
<td>wind direction</td>
<td>irrigation</td>
<td>planting</td>
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<td>organic matter</td>
<td>residues</td>
<td>barometric pressure</td>
<td>fertilisation</td>
<td>pruning</td>
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<tr>
<td>salinity</td>
<td>symptoms</td>
<td>irrigation water</td>
<td>seeding-planting</td>
<td>historicity</td>
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<tr>
<td>pH</td>
<td>fruit size</td>
<td>salinity</td>
<td>soil treatment</td>
<td>inputs</td>
<td></td>
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<td>calcium</td>
<td>trunk size</td>
<td>pH</td>
<td>harvesting</td>
<td>other activities</td>
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<td>cultivar</td>
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</table>
Smart farming advisory service

- **Fertilization**
  - quantity, type, time, and way of fertilization application

- **Irrigation**
  - quantity, time of irrigation

- **Crop Protection**
  - time & type of crop protection activities

**Smart Farming Service**
- Indicators | maps | reports | advice

**Roles**
- Farmer
- Agronomist
Paving the way for tomorrow's agriculture

Quantified benefits of gaiaSense

<table>
<thead>
<tr>
<th>Crop type</th>
<th>INPUT REDUCTION (%)</th>
<th>YIELD INCREASE (%)</th>
<th>BENEFIT INCREASE (%)</th>
<th>OTHER BENEFITS</th>
<th>TOTAL BENEFIT INCREASE (%)</th>
<th>SAVINGS COST (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Crop Protection</td>
<td>Irrigation</td>
<td>Fertilization</td>
<td>Risk Management</td>
<td>Quality Improvement</td>
<td></td>
</tr>
<tr>
<td>Table Peaches</td>
<td>11.22%</td>
<td>14.10%</td>
<td>68.42%</td>
<td>6</td>
<td>6</td>
<td>48%</td>
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<tr>
<td>Almonds</td>
<td>28.30%</td>
<td>31.70%</td>
<td>59.87%</td>
<td>1</td>
<td>2</td>
<td>40%</td>
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<tr>
<td>Stewed Peaches</td>
<td>13.68%</td>
<td>24.90%</td>
<td>57.45%</td>
<td>4</td>
<td>1</td>
<td>37%</td>
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<tr>
<td>Table Grapes</td>
<td>7.19%</td>
<td>42.70%</td>
<td>46.35%</td>
<td>6</td>
<td>6</td>
<td>43%</td>
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<tr>
<td>Pistachios</td>
<td>0.00%</td>
<td>24.60%</td>
<td>12.90%</td>
<td>1</td>
<td>2</td>
<td>22%</td>
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<tr>
<td>Olives</td>
<td>63.46%</td>
<td>33.67%</td>
<td>33.69%</td>
<td>2</td>
<td>3</td>
<td>43%</td>
</tr>
<tr>
<td>Dry Beans</td>
<td>3.00%</td>
<td>27.80%</td>
<td>29.59%</td>
<td>1</td>
<td>1</td>
<td>16%</td>
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<tr>
<td>Potatoes</td>
<td>9.05%</td>
<td>32.40%</td>
<td>14.67%</td>
<td>2</td>
<td>3</td>
<td>35%</td>
</tr>
<tr>
<td>Cotton</td>
<td>0.00%</td>
<td>45.70%</td>
<td>28.85%</td>
<td>2</td>
<td>3</td>
<td>39%</td>
</tr>
</tbody>
</table>
Overall sustainability benefits of GaiaSense

- Production cost
  - Fertilizer
  - Water-energy
  - Pesticides

- Product quality
  - Residuality
  - Organoleptic attributes
  - Fruit size
  - Preservation

- Environmental risks
  - Desertification
  - Drought
  - Biological imbalance

- Production risks
  - Parasitic diseases
  - Non-parasitic
  - Post-harvest

- Product value
  - Traceability
  - Environmental footprint

- Production quantity

Financial benefit

Environmental benefit

Social benefit
### Smart Farming As a(n Advisory) Service…for all farmers

<table>
<thead>
<tr>
<th>Features</th>
<th>Advantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subscription based</td>
<td>Infrastructure developed, maintained &amp; operated by a central entity. No barrier to entry. Low cost solution accessible to all farmers, even in MS/regions/sectors with high fragmentation &amp; low investment capacity.</td>
</tr>
<tr>
<td>Holistic, modular &amp; customizable</td>
<td>Combining data from all available sources including the farmer himself. Developed around the needs/realities of all farmers/sectors/regions.</td>
</tr>
<tr>
<td>Human-centric &amp; advice oriented</td>
<td>Articulated around local interactive innovation ecosystems where advisors act as innovation brokers accompanying &amp; supporting the farmers throughout the process.</td>
</tr>
</tbody>
</table>
Spatial deployment of gaiaSense

current installations

65 sites
250 stations
6 countries
30 crops
> 100,000 ha

The geographic deployment of gaiaSense
### Funding

<table>
<thead>
<tr>
<th>EU policy</th>
<th>Programme</th>
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<tbody>
<tr>
<td>Research &amp; Innovation</td>
<td>Horizon 2020</td>
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<tr>
<td>Environment</td>
<td>LIFE</td>
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<tr>
<td>Common Agricultural Policy</td>
<td><strong>Under evaluation</strong></td>
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<td></td>
<td>RDP Measure 16-Cooperation (36 Operational Groups)</td>
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<tr>
<td></td>
<td><strong>Not launched yet</strong></td>
</tr>
<tr>
<td></td>
<td>RDP Measure 2-Advisory Services</td>
</tr>
</tbody>
</table>
Lessons learnt

- Low awareness & uptake on behalf of the farming community
- Fragmented & weak advisory system

FARMERS
- Need to cushion risk during the transition phase
- **Trust**: a key factor for adoption & successful implementation
- Mentality shift: from “traditional” advice to innovation-based advice

ADVISORS
- Lack of training
- Need for better interconnection with other actors of the Agricultural Knowledge & Innovation System (AKIS)
EU GREEN DEAL – CAP POST 2020

PRIORITy: Fast & Just Digital Transition for all EU farmers & sectors

PREREQUISITE: Common, Coordinated, Sufficiently Funded, Targeted & Pragmatic policy approaches

No environmental sustainability without the economic & the social dimension
Take up for EU decision makers

Research & Innovation at the service of the farming community (& not the opposite)
• Horizon Europe 2021-2027: place farming community’s interests at the heart of the innovation process, involvement from the very beginning in R&I activities
• Less administrative burden
• 100% funding for participation in Innovation Actions (instead of 70%) and/or using lump sum to cover farmers’ costs

Digital farm advisory services in the AKIS 2.0
• Enhance AKIS & the role of advisors within the AKIS but performance varies great between MS/regions: need to encourage & support “convergence”
• Operational Groups (SCAR AKIS 4th Report): from funding impactful innovation projects → to stimulating supporting services (attention to complete innovation ecosystem)

Boost digital transition investments
• EU Green Deal Investment Plan: enhance sectorial dimension
• Boost & better target investments in the context of a sufficiently funded CAP

Provide farmers with incentives to cushion risk
• Smart farming eco-scheme to support farmers during the transition phase

Exploit the potential of collective farmers’ schemes (agri-coops)
• Advantageous platform for innovation diffusion in an environment of trust
• Territorial dimension: innovation spillover effect

Awareness raising, communication & education
• Targeted awareness raising & communication support
• Digital skills: not only for farmers but also for advisors
• Encourage & support exchanges between farmers (ERASMUS+, future EIP-AGRI actions etc.)
THANK YOU!
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