



Precision application & Digitalisation

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BBRO Weeds Seminar
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Digital Technology in Agriculture

1. Adoption of modern agriculture:



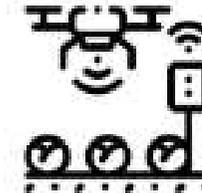
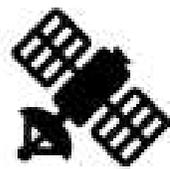
2. Mechanisation post-WW1:



3. The green revolution:

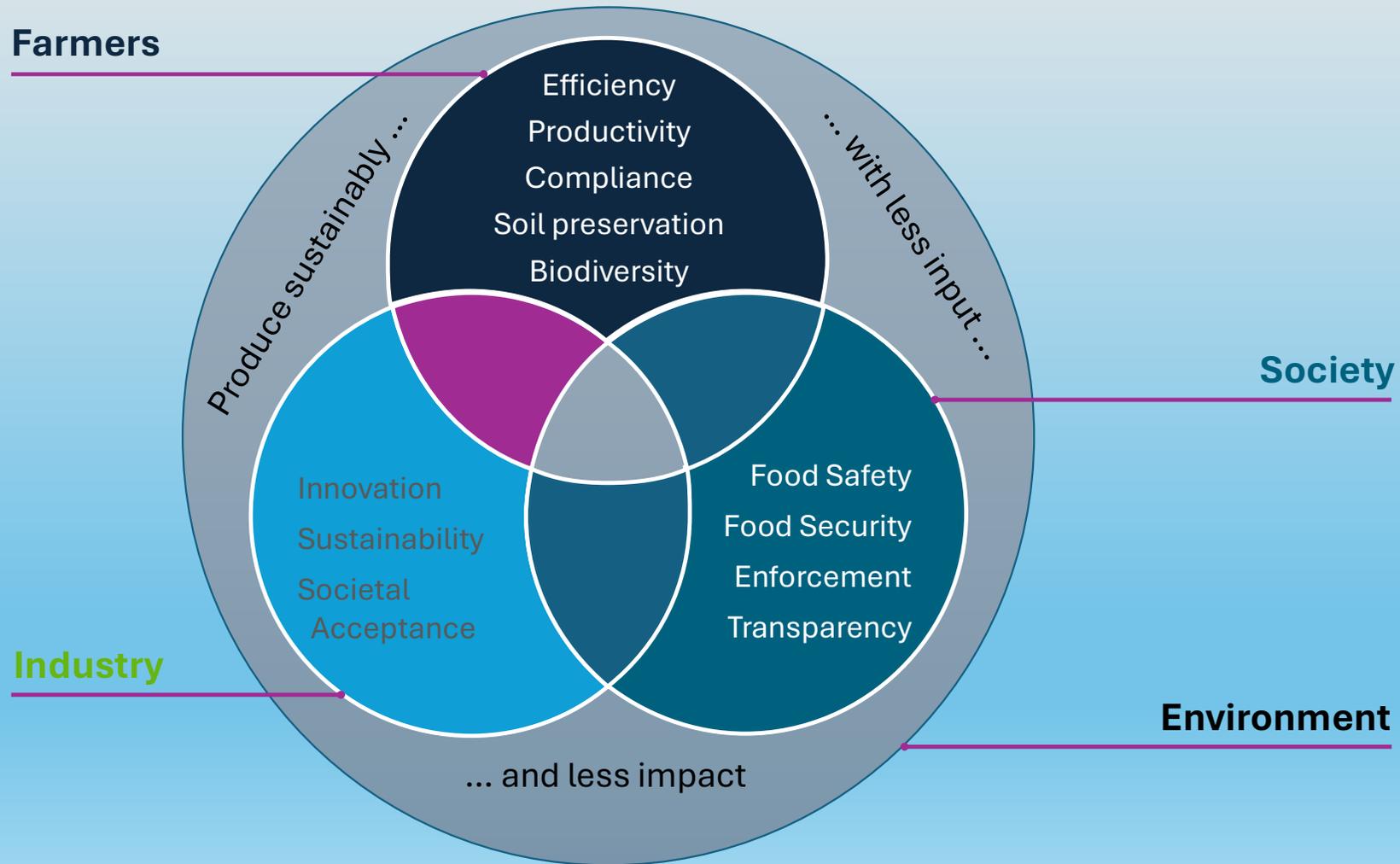


4. The digital revolution





Digital Farming: Opportunities for all stakeholders





Digital Farming:

Seamless integration of product information, agronomic & environmental data, weather forecasts and mitigation options provides agronomic and environmental benefits

Product information & mitigation measures

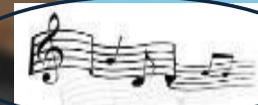
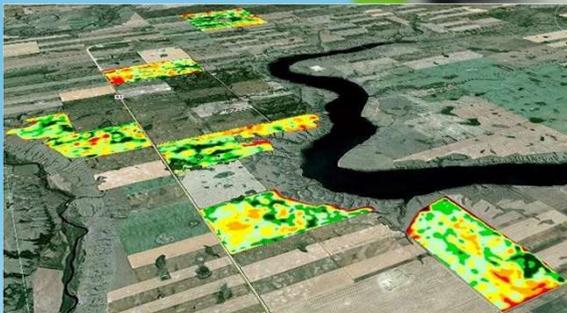


Weather forecast



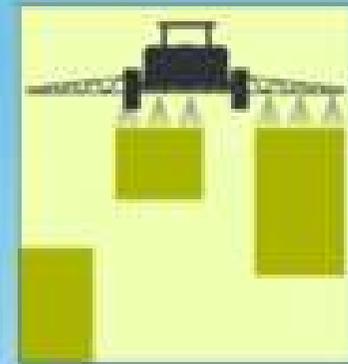
Farm planning software:
Full integration of data for optimized solutions

Characteristics of field and crop in space and time



Optimized, targeted application, full compliance & documentation

Precision Application



DIGITAL FARMING ACCELERATES AS FARMERS STRIVE TO IMPROVE

In an increasingly volatile world, farmers are turning to digital technology to optimize their operations. As global food demand continues to grow, farmers are actively seeking innovative solutions to improve yield and quality while maintaining affordability and promoting sustainable practices. Farmers view digital technology as a vital resource for addressing these challenges, leveraging tech to inform their strategies and drive efficiency in their farming operations.

Farmer Voice — 6
Supported by Bayer

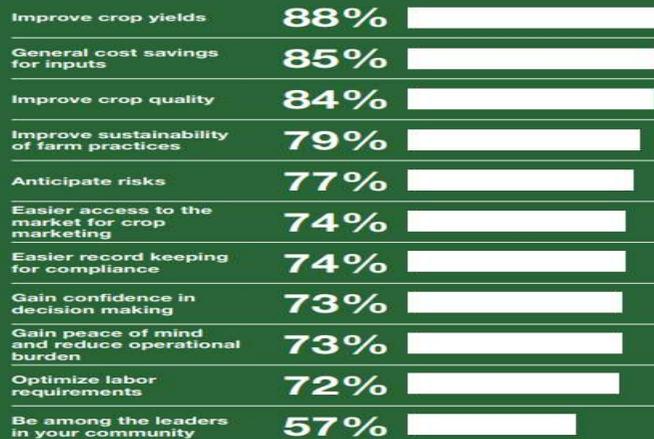


Farmers use digital technologies for a wide range of purposes. Among the most common are forecasting, improved decision-making, and precision applications



Current applications of digital technologies among farmers.

Improving productivity and quality as well as reducing costs are key factors driving digital adoption



Motivations behind adopting digital technologies.



"It is essential because today there's GPS, autopilot, drones for spraying, which make the job easier, give us lower input costs, greater coverage of the land, give us more productivity."

FARMER FROM BRAZIL



"Digital technology has given us access to critical information on an acre-by-acre basis to better be able to make informed decisions on our farm. We now have information related to every field pass ... all at our fingertips."

FARMER FROM USA



"We can no longer do without them if we want to be environmentally conscious."

FARMER FROM GERMANY



[The Scientific Foresight Study](#) published by the European Parliament underlines that precision agriculture methods can lead to a 20–30% decrease in pesticide use and a 50–80% reduction in the area where pesticides are applied. Given the current challenges and our goal of moving toward a more sustainable future, we need to produce food more efficiently while also reducing greenhouse gas emissions and keeping agricultural land use stable or lower.

Our sector is making significant investments in digital farming tools for European farmers. We've pledged to invest €10 billion by 2030 in new innovations related to precision and digital technologies.



Benefits of Optimized Applications

Reducing input

Patch, spot or band spraying

Use up to 81% less herbicide with sensors for weed detection or map-based boom section control

Reducing number of treatments and area by targeted applications in time and space

Producing more with less impact on-field

Innovative application techniques

Drones; Continuous data collection; Mechanical weeding; Reducing carbon footprint; reducing soil compaction

Environmental Benefits on-field

Producing more with less impact off-field

Reducing run-off, drainflow and run-off

Optimized management of fields and field margins with customized local mitigation measures

Environmental Benefits off-field

Precision Labelling Proposal

- 1st Jan 2028



- (9) The label of the product should inform professional users about the conditions of use of the authorised plant protection product, including the possibility of using precision application techniques. These techniques allow users to apply the authorised plant protection products in a more precise and accurate manner compared to conventional application equipment. They allow a reduction of the plant protection product applied per hectare while maintaining the authorised application rate on the target crop surfaces. Precision application techniques may contribute to an overall reduction of the environmental exposure to plant protection products and may encourage a more efficient, targeted, and sustainable use.

European Precision Application Task Force

– includes UK

Scientific Platform to gather expertise & dialogue

1. **Identify categories of Precision Application (PA)**

- Identify use categories describing precision uses of PPP, on the basis of an inventory of equipment and corresponding aims of treatment (volume & drift).

2. **Standardise the language used to describe the PA**

- Develop appropriate language to best describe the use category, to be used in a GAP table.

3. **Identify how to change the regulatory assessment and how to implement**

- Identify potential changes to Risk Assessment (RA) and the potential for Risk Mitigation Measures (RMM) for each use case.

4. **Develop adapted RA's for each use case.**

5. **Compile a Compendium**

- Prepare material to be entered in the Compendium on RMM's and Precision Application of the EU Commission.

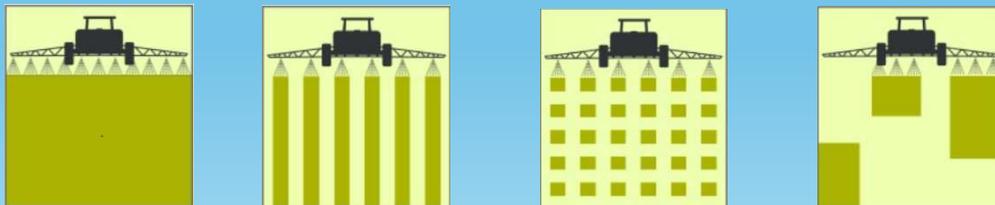
6. **Compare PA techniques for effectiveness**

- Develop equivalence tables of tool performances regarding risk and use reduction.

Precision agriculture: European Precision Application Task Force

- Industry-led initiative to propose how new technologies reflected in pesticide risk assessment.
- Key point. Not necessarily about the technology in itself, but rather the way in which the technology results in the pesticide being applied to the target area.
- Identified: broadcast, band, spot, patch and variable rate applications. Possible to assign (on conservative basis) associated reduction in use, but

Ongoing evaluations to add band application to product labels



Geometry	broadcast	band	patch	regular spot	irregular spot	single plant
pure geometry						
geometry outline						
geometry online						
geometry VRA						
geometry outline VRA						
geometry online VRA						



UAV/Drone Applications

Example: Use of UAVs in the Asia-Pacific region

- UAV application is rapidly growing in Asia-Pacific, e.g. in China
- Fully automated and autonomous operations
- Very low application volumes: 10 to 50 L/ha
- Enables continuous improvement by live data collection

Area treated with UAVs in China (in million hectares)



Auto Filling Station

Autonomous Flight

Automatic Landing

Terrain Tracing

Obstacle Avoidance

Swarm Operation

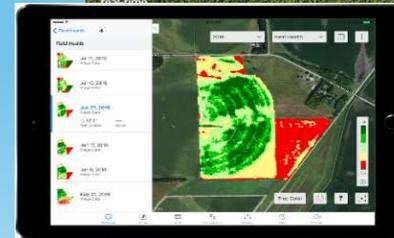
Night Operation

Target Recognition



Real-time field insights for harvest, planting and spraying

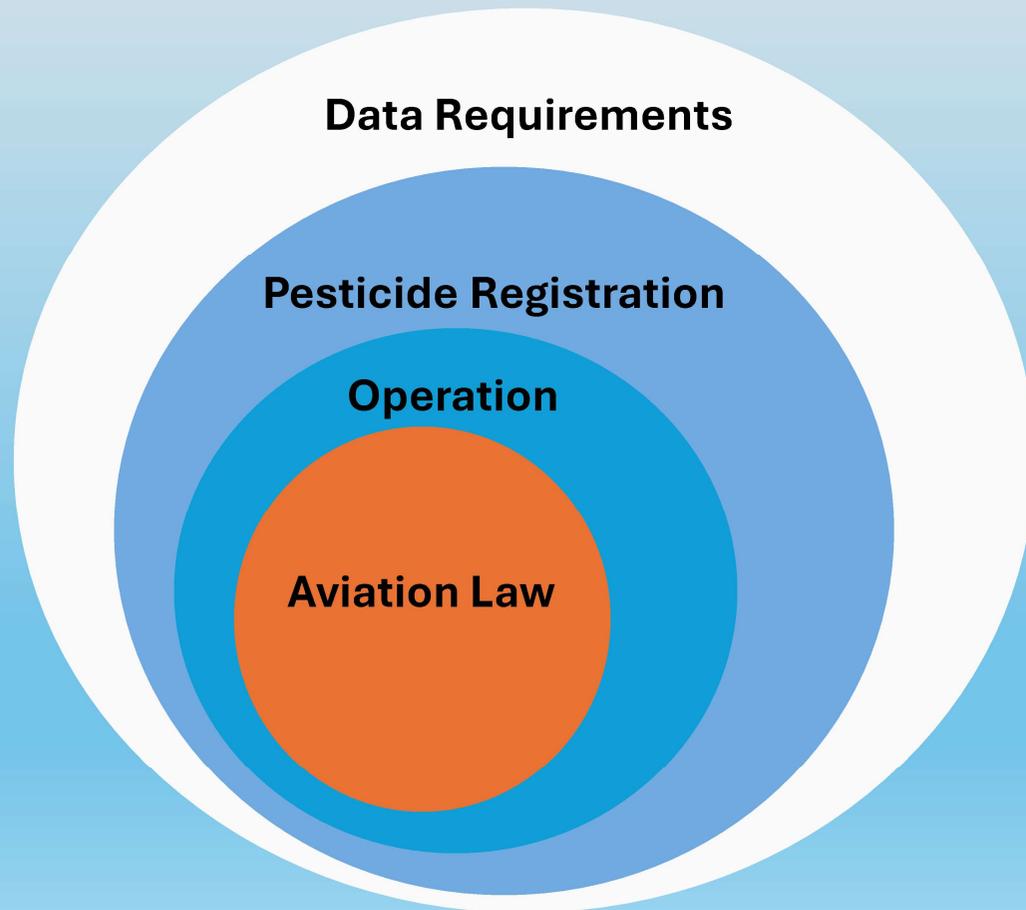
See field and application maps build in real-time





Innovative Machinery: Drone Applications

Regulatory approval of drone applications



-
- 1 Aviation**
 - Vehicle specifications
 - Flight restrictions
 - 2 Operation**
 - Pilot licensing training
 - Safe Use SOP
 - 3 Pesticide Registration**
 - Regulatory scheme
 - Drone Code of Conduct
 - 4 Data Requirements**
 - Drone Efficacy Trials
 - Drift Phytotoxicity
 - Drone Residue Trials
 - Drift Operator Safety
 - Drift Environmental Safety

OECD & UK HSE Work

- OECD WPP sub-group of regulators, industry & researchers; UK lead 2019
- State of knowledge report 2021, with recommendations to outline assessment approach
- Series of work packages established under industry UAPASTF (Unmanned Aerial Pesticide Application System Task Force)
 - Database of data (under evaluation by UK HSE CRD on behalf of OECD)
 - Classification of drones
 - Best practice guidance
 - Standard methodologies
 - ISO standards
- Summary report 2025 with approaches and tools for regulators
- UK HSE evaluation of trials permit applications for drone application

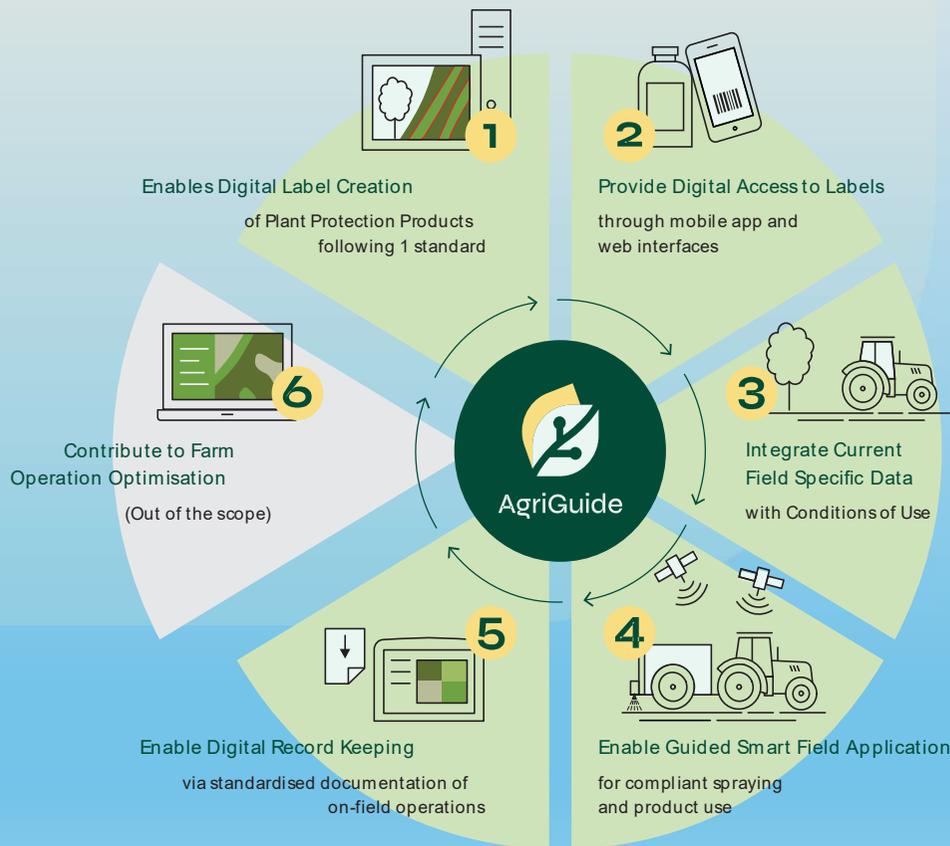
Digital Labelling from 01/01/2028



- the outcome of the risk assessment.
- (6) Digital labels could improve the communication of the potential risks of plant protection products and could offer users advantages like larger fonts, auto-search, voice assistance or translation into other languages. Moreover, digital labels on plant protection products could enhance the transition to digital agriculture and the uptake of precision application techniques, enabling the transfer of the authorised conditions of use to the application machinery, local maps, or weather stations, as well as simplifying the reporting in line with Commission Implementing Regulation (EU) 2023/564⁷. Therefore, it is appropriate to require a digital label for plant protection products, in addition to the physical label, and to lay down requirements concerning the digital labels.

AgriGuide Release Strategy

AgriGuide's release strategy consists of two phases, focused on label digitisation and compliance



PHASE 1 – LABEL DIGITIZATION

Work package (WP) 1 – Step 1 & 2

- Have an accurate **digital database** for appropriate **for each country**
- **Mobile/web application** available for growers and users to access digital label information
- Serves as the framework upon which future AgriGuide Functionalities will be built

Work package (WP) 1.5 – Step 5

- Basic **e-record keeping feature** built into AgriGuide label app
- **Enabling growers** with to comply with regulation 2023/564 for e-record keeping

PHASE 2 – COMPLIANCE GUIDANCE

Work package (WP) 2.0 – Step 3 & 4

- Provide growers with **field-specific use instructions derived from label data structured**
- Advanced **integration capabilities** with multiple FMS platforms via member company owned solutions
- Enhanced **user interface** and experience for all users

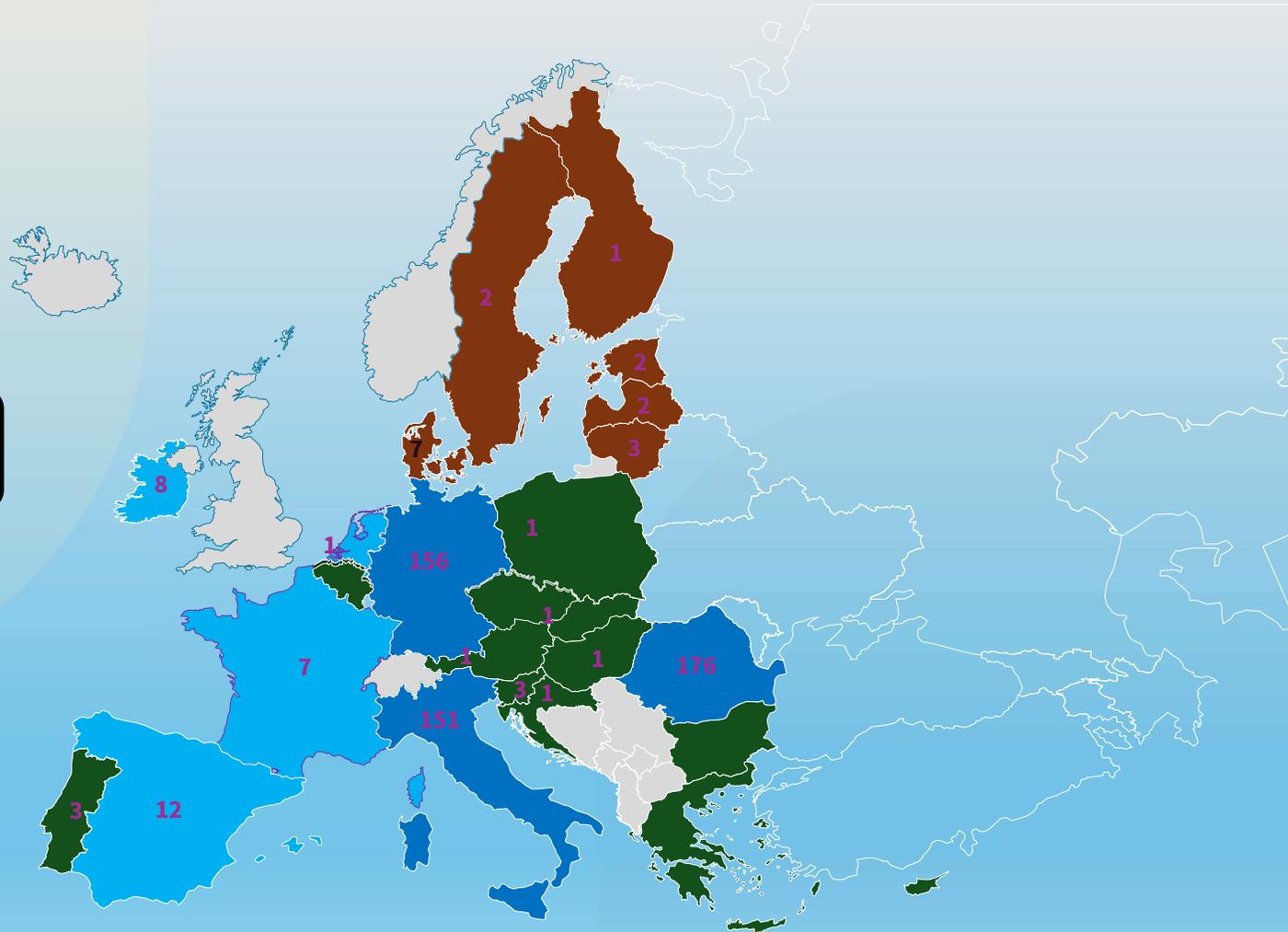
CLE : Label Digitisation status of countries (WP1)

Status of EU 27 Rollout

env 530 labels published in
Mobile app for 20 countries

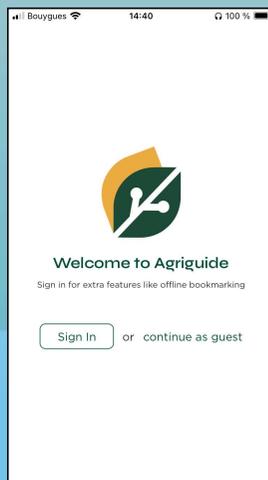
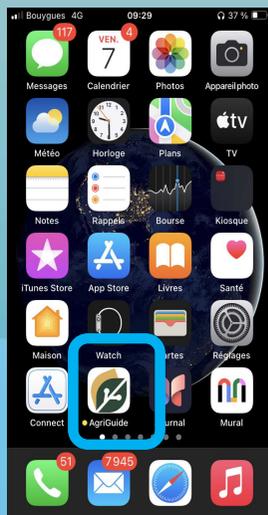
Out of Scope

- Bio-stimulant products
- Fertilisers

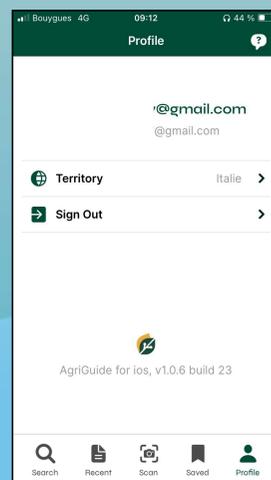


Mobile & Web Application Overview

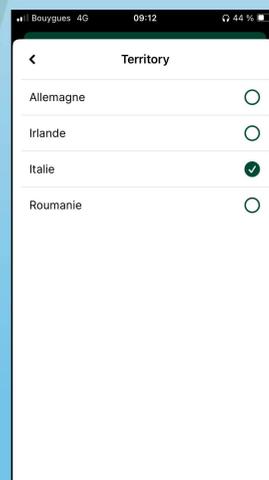
- ✓ **Available on Web and Mobile** to maximise **ease of use**.
- ✓ **Open to all** end users on Free access.
- ✓ **All information on paper label** available without specific limitation.
- ✓ Two modes of access available:
 1. No Registration mode
 2. Registration mode (Email address only)
 - Both options provide access to same information but differs in availability to keep record of previous use and favourites



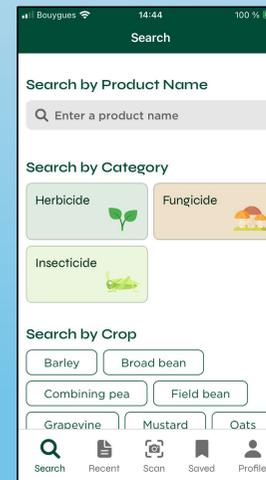
First Page
Sign in decision



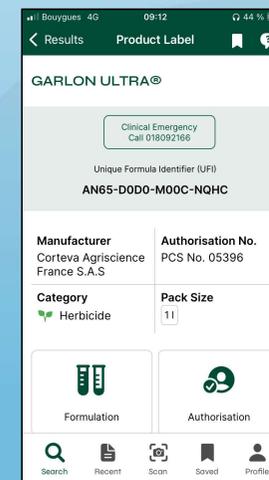
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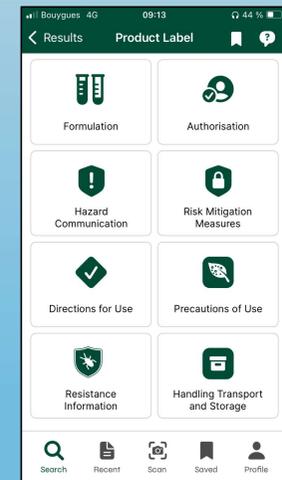
Sign in Page
Country Selection



Search Page
 ✓ Name
 ✓ Categories
 ✓ Crop



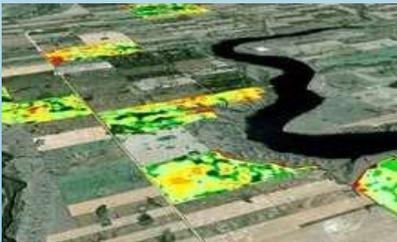
Product Label
Top Part



Product Label
Bottom Part



Take-home Messages



- Digital solutions will reduce environmental exposure, further minimize potential human impact, and increase flexibility for farmers, when included in the labels of PPPs
- The introduction of precision application techniques in the regulatory process for PPP will provide more realistic real-world assessments of PPP loading on the environment.
- The introduction of digital solutions in the regulatory processes for plant protection products can enable site-specific risk evaluation at the field level leading to more tailored risk mitigation.
- Availability of Digital product labels a necessity and will be open to all



Thank you!

