



Moving Agriculture Forward...

Copernicus Thematic Workshop: Compliance Assurance

Session 3: EO current and future products and services

Dr. Machi Simeonidou
Co-Founder & General Manager
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ENVISION Project



- Supports the **Common Agricultural Policy (CAP)** by improving the monitoring & compliance of agricultural practices.
- Assists in the implementation of sustainable agricultural practices in line with **EU environmental directives**.

EO-based services
Scalable, Reliable

Platform
Actionable insights

Paying Agencies
Certification Bodies
Policymakers

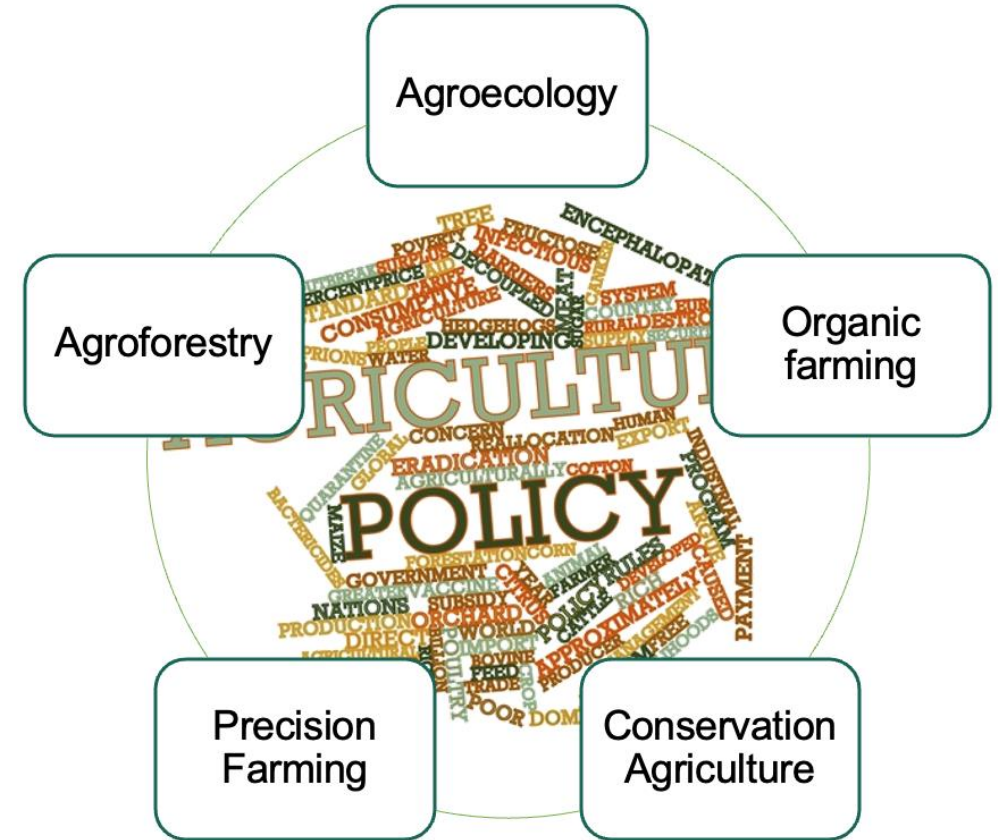
- Provides robust data and insights for the **development of new policies for EU's environmental and agricultural sustainability goals**.
- Enhances monitoring capabilities for **more accurate compliance assessment**.
- Leads to better **enforcement of existing regulations**.



Supporting EU Policies through ENVISION



envision



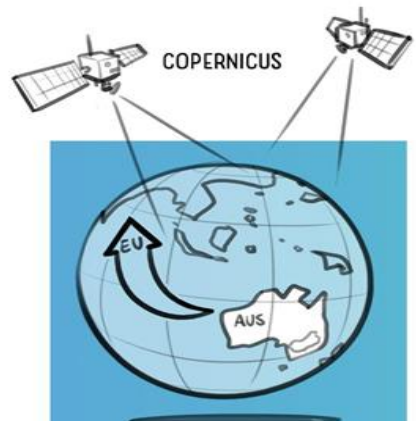


Moving Agriculture Forward...

ENVISION

Empowering Sustainable Agriculture through Advanced Monitoring and Compliance Solutions

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WaterSENSE Making SENSE of the water value chain in Australia

Operational water-monitoring system built on **Copernicus EO data** to provide water managers with a toolbox of reliable and actionable information on **water availability and water use**, anywhere in the world, in support of **sustainable water management** and transparency across the entire water value chain.

1 January 2020 – 30 June 2024
Website: www.watersense.eu
LinkedIn: [WaterSENSE](https://www.linkedin.com/company/watersense)

Steven Wonink
Operations Manager eLEAF
WaterSENSE Project Coordinator

Thursday 20th of June 2024

KCEO Deep dive assessment on the use of Earth Observation for Compliance Assurance

Session 3: EO current and future
products and services



European
Commission



Irrigation Compliance Monitoring

- Irrigation Mapping
- Irrigated Water Use Quantification

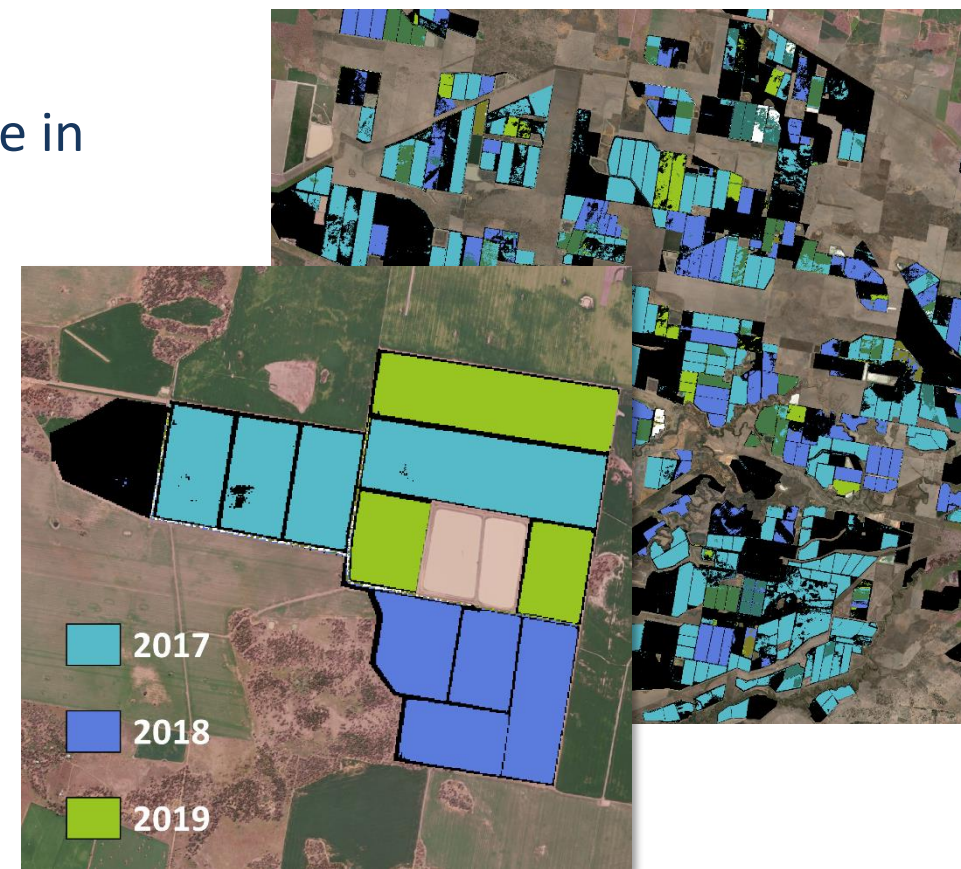


Irrigation Compliance Monitoring

Where, When, How much?

- Water Scarcity is increasing rapidly, 2.3 billion people live in water-stressed countries
- Climate change and population growth exacerbate this.
- Agriculture accounts for 70 percent of the freshwater withdrawals
- Integrated water resources management and accountability is essential to meet this challenge
- Water Authorities lack reliable information to plan, act and enforce legislation
- **Earth Observation data can fill this information gap, anywhere in the world, at low cost**

Irrigation mapping



Water extraction policy is national/local, no direct EU regulations apply (and often low on the priority list)



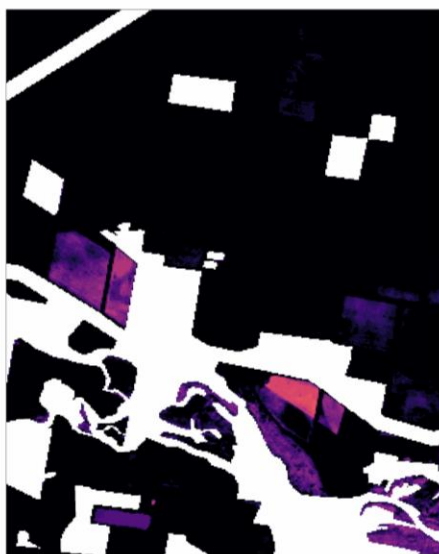
Earth Observation based Monitoring

- Actual Evapotranspiration (ET_{act}), i.e. Crop Water Consumption, is calculated with (Copernicus) EO data
- Incremental ET is the human induced evapotranspiration due to irrigation (irrigated ET – natural ET)
- Applied irrigation water is estimate by correcting for the irrigation efficiency, using the Irrigation Map

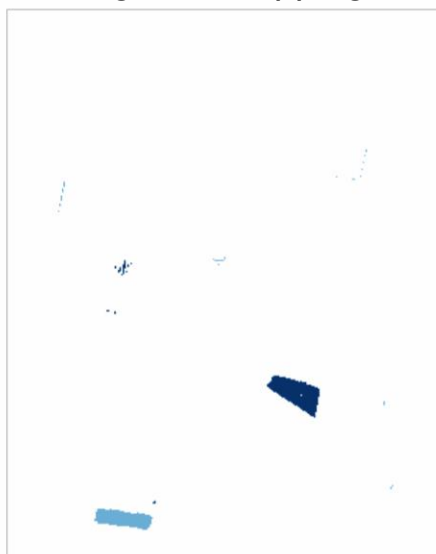
Actual Evapotranspiration



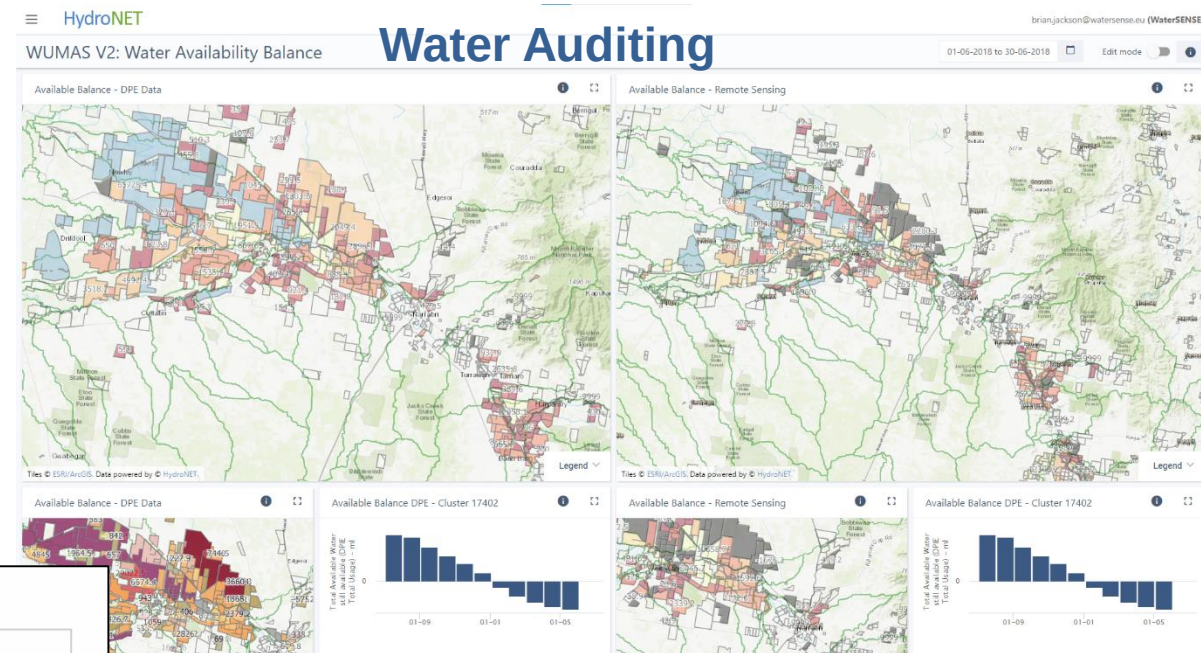
Incremental ET



Irrigation Mapping



Mar 2023 May 2023 Jul 2023 Sep 2023 Nov 2023 Jan 2024 Mar 2024



- Aggregation of EO data (raster) to field and cluster (license unit)
- Compliance check against licensed water allocation volume (Authority data)
- Monitored on a weekly basis
- Accessible through Water Control Room

Monitoring biological diversity in agricultural landscapes - MonViA

Stefan Erasmi
– Thünen Institute

Heike Gerighausen
– Julius Kühn Institute



Biodiversity: Policies and initiatives



Nature Restoration Law

- **Objectives:**
 - Improve biodiversity
 - Increase the resilience of nature
 - Support natural climate protection
- **Time-bound targets** for restoration measures
- Assessment of target achievement requires **monitoring**

Article 11: Restoration of agricultural ecosystems

- (2) Member States shall put in place measures which shall *aim to achieve an increasing trend* at national level of at least two out of the three following indicators in agricultural ecosystems, [...]:
 - (a) grassland butterfly index;
 - (b) stock of organic carbon in cropland mineral soils;
 - (c) share of agricultural land with high-diversity landscape features.

EO & Biodiversity: Activities at MS level

NRL, Article 20: Monitoring

(9) Member State monitoring systems shall [...] maximise the access and use of **data and services from remote sensing technologies, earth observation** (Copernicus services), [...].

NRL, Article 14: National restoration plans

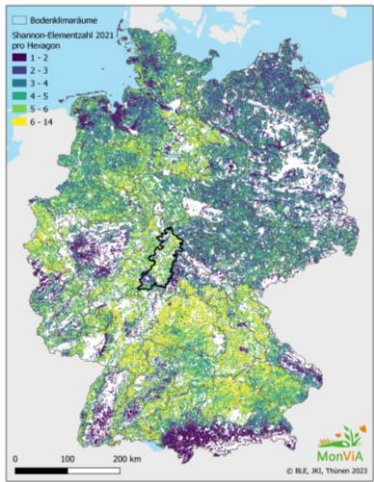
(9) Each Member State may, by [...] develop a **methodology to complement the methodology** referred to in Annex IV, in order to monitor high-diversity landscape features [...].

➔ **Prewrite / overlap/ synergies** of current monitoring initiatives at national level?

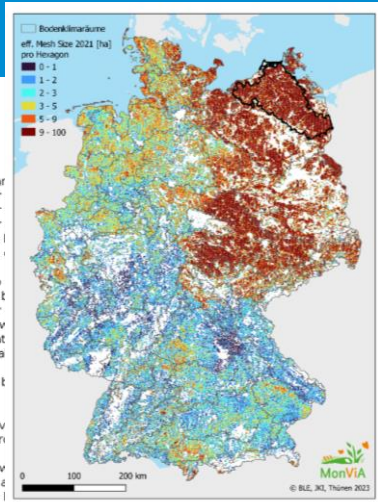
MonViA – Monitoring biodiversity in agricultural landscapes (in Germany)

Monitoring „high diversity landscape features“ in MonViA:

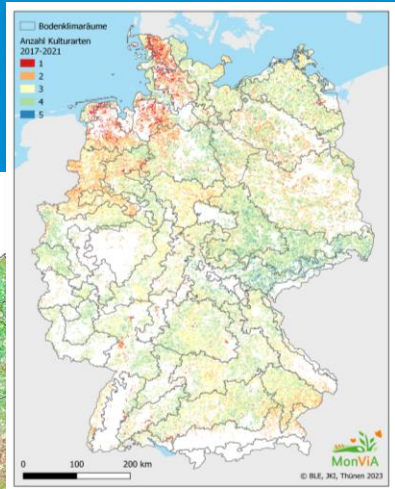
- Non-productive areas
- Fallow land
- Hedgerows
- Potential areas (Article 14(6))



MonViA-Indicator cropland diversity



MonViA-Indicator habitat configuration



MonViA-Indicator crop sequences

10.11.2021: [10.11.2021: zenodo.10640528](https://doi.org/10.1111/zenodo.10640528)



Opportunities:

- Wall-to-wall products for continuous monitoring
- National activities support EU targets

Challenges of EO to support EU compliance assurance:

- Reliability / accuracy of data / products
- Complementary with CLMS products (e.g. VCC, SWF)
- Consistency (with other products / of time series)



MINEYE - Earth Observation techniques for mine life cycle monitoring using ML data fusion approach

HORIZON Innovation Actions

Total cost EUR 5.77 M

13 partners (9 countries)

Project start JAN-2024



Develop a set of web-based products based on EO data for stakeholders in the mining value chain:
Mining companies, Geological surveys, Environmental agencies and Policy makers

EO data supporting: Exploration, Ore deposit modeling, Extraction, Waste inventory & valorisation, Environment

MINEYE technologies (TRL 7) will be demonstrated at several European pilot sites with varying mining contexts.

Exploitation: Knowledge sharing (Public deliverables) and uptake of the technologies (Commercialisation)



COLLECTED AND EXISTING EO DATA

MINEYE DATA



Exploration

3D Geo
-models

Extraction

Processing

Ground
Stability

Waste
Monitoring
& Re-mining

Environmental
Footprints
& Social
Responsibility

MINEYE PRODUCTS

IPOP

IMPACTS

SUSTAINABLE MINING

Thank you for your attention!



Project Coordinator
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TERRANIGMA

etam.
consulting services



SORICO.M. S.R.L.
Società a partecipazione paritetica



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Contribution of SINTETIC project to illegal logging control

Gianni Picchi, Coordinator (CNR – CTFC)

KCEO Earth Observation for
Compliance Assurance 2024



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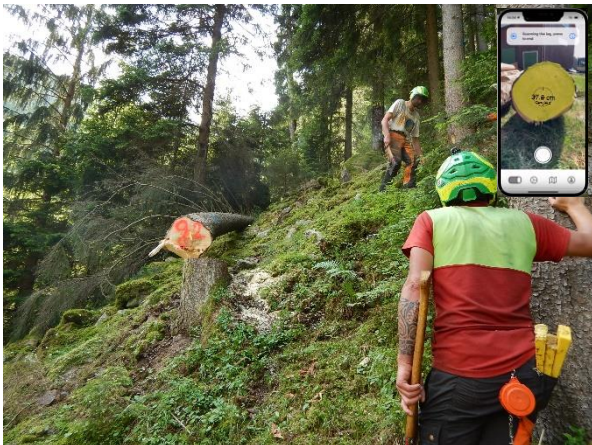


Digital ground data for satellite detection

- 1) train NDVI index interpretation
- 2) filtering legal operations

- Interaction of ground and satellite data
- Traceability of operations and timber products
- Automatic discrimination of legal operations

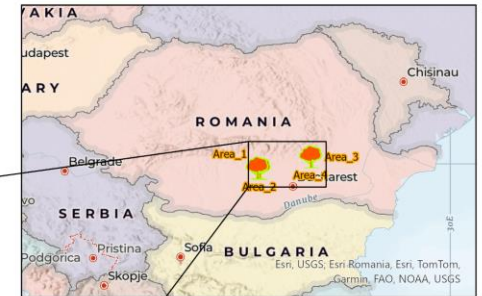
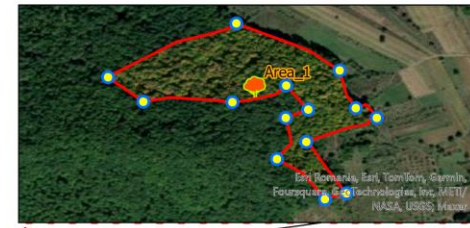
Fully mechanized



Manual system

StanForD 2010:

- Diameter of tree
- GNSS position
- Timestamp
- # of logs
- ID of tree/logs
- Other...





SINTETIC project

Timeline

- Project started June 2023 > prototype and geodatabase development
- Task 5.3 Illegal logging detection, just started

Regulations, end-users and stakeholders

- EUDR
- Forest contractors, industry

Challenges and opportunities

- Involvement and acceptance of operators crucial
- Tasks addressing privacy and economic aspects





Sintetic

SINGLE ITEM IDENTIFICATION FOR FOREST
PRODUCTION, PROTECTION AND MANAGEMENT

Thanks!

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<https://sinteticproject.eu/>



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