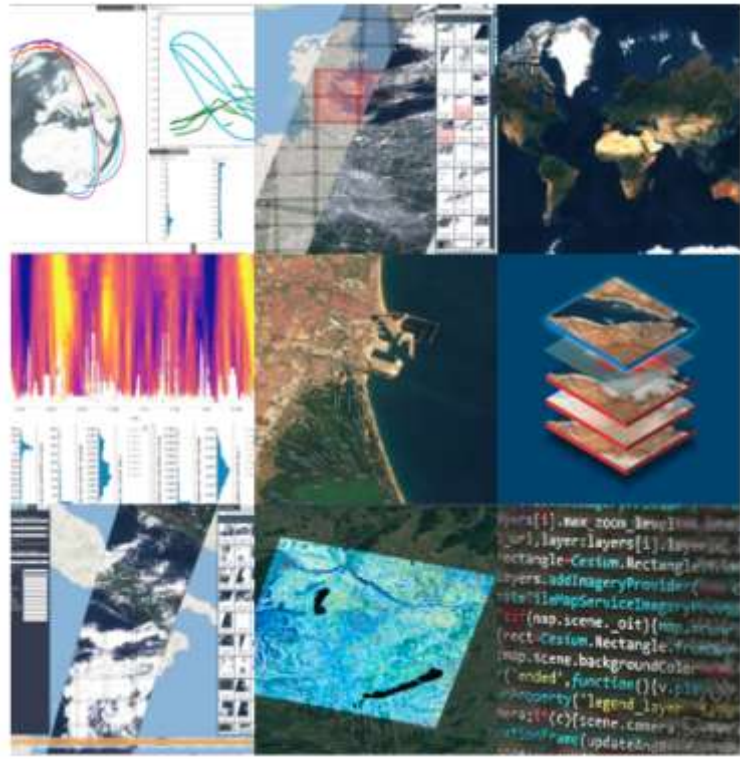

Legújabb képfeldolgozási módszertanok az agrártámogatás monitorozásában, a Területi Monitoring Rendszer adatainak további felhasználási lehetőségei

The data goldmine: unexplored use cases for IACS-GIS and AMS EO-derived products

AgrEO-Europe: *Bernadett Csonka,*
EOX - Austria: *Dr. Gerhard Triebnig, Stefan Brand, Stefan Achtsnit, Silvester Pari, Elias Wanko,*
Pro-Nature - Germany*: Anne Gruböck, Martin Gruböck,*
GeoVille Austria: *Dr. David Kolitzus, Donvan Grobler, Edurne Estevez*

2025-09-09

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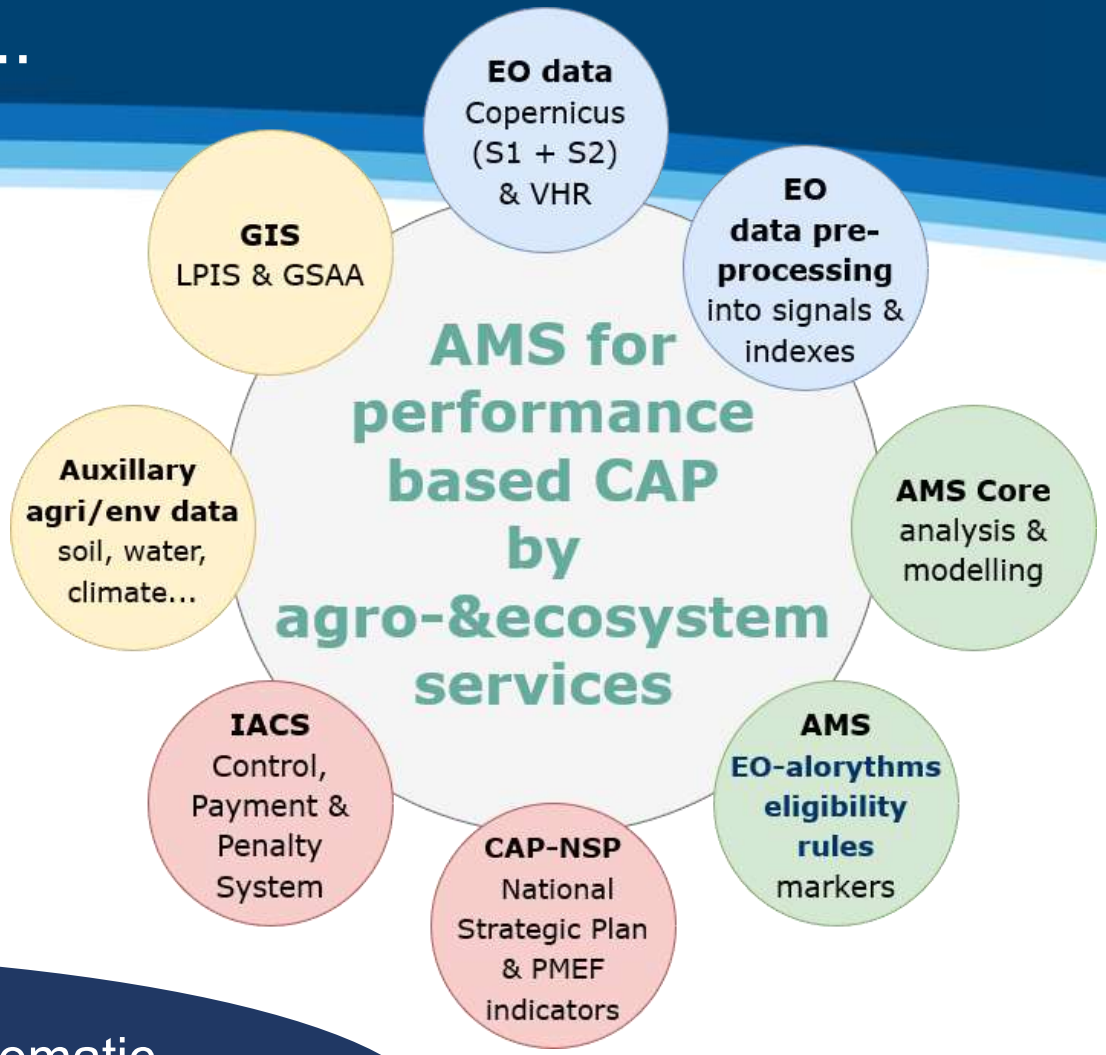
… last slide in ICE-Rome …

EO-data + markers + IACS GIS (LPIS + GSA) can contribute to policies for:

- Biodiversity – ecosystem services
- Climate & force major mitigation
- Managemnt of vulnerable ecosystems
- Natural Capital Valuation,
- Soil and Water protection
- Land use optimalisation: guiding LU change = LU-strategies



Use the intermediate AMS EO-thematic results for targeting actions and for monitoring CAP performance

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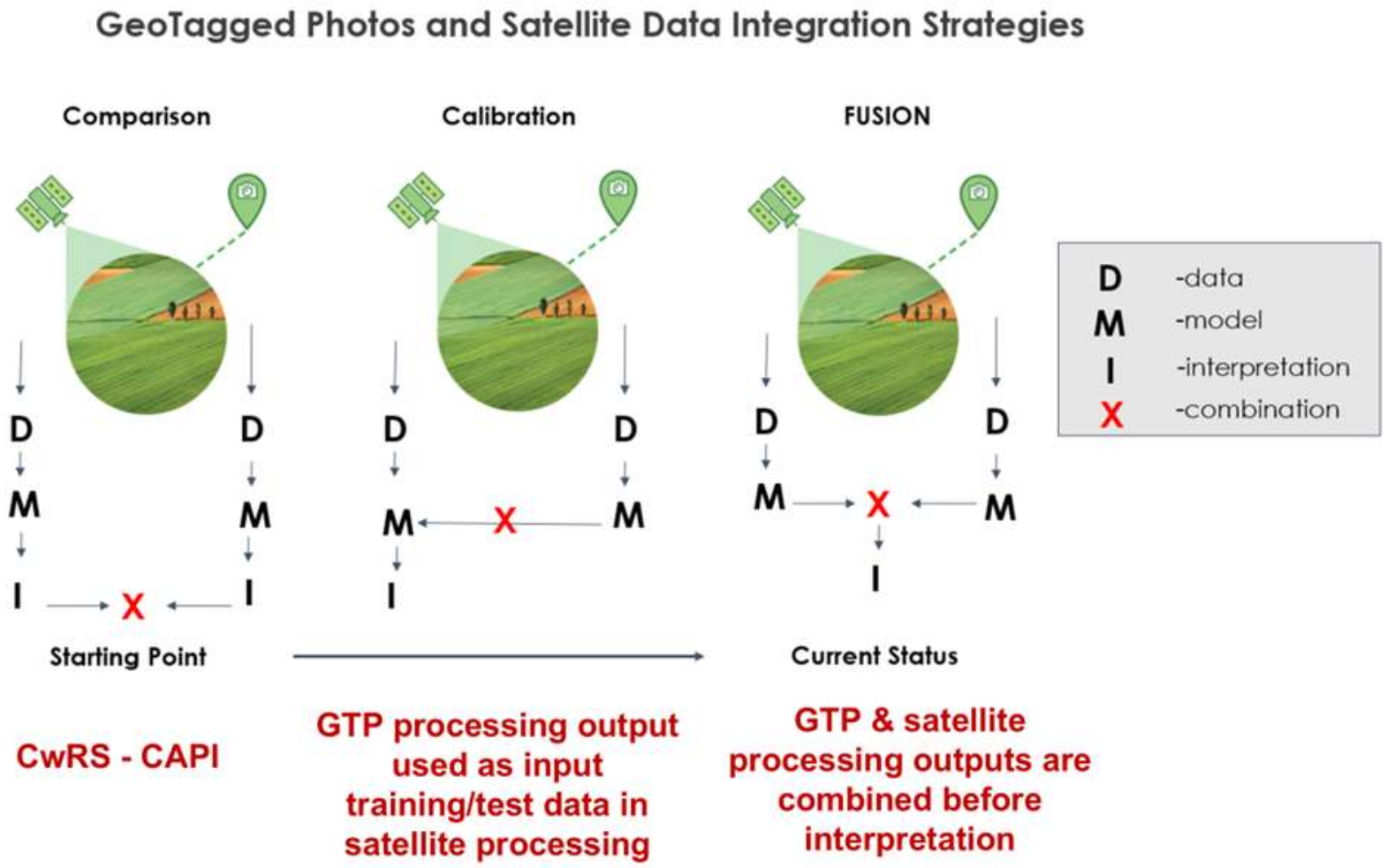
GTP and satellite data integration



Az automatikus GTP felhasználás felhasználási területei a TMR-en belül:

- **Az űrfelvétel osztályozás hatékonyságának növelése:** tanuló és teszt adatok előzetes és valós idejű gyors beszerzése: modell kalibráció, validálás, pontossági mutatók (keverdési matrix) számítása
- A numerikus statisztikán alapuló markerek estében **határértékek (kategorizálás) validálása**
- Űrfelvételekkel nem vagy korlátozottan monitorozható **jogosultsági feltételek bevonása a TMR-be** (pl: tarló/kaszálás magassága, vadriasztó lánc a kaszán, fólia, talajtakarás alatti növény …)

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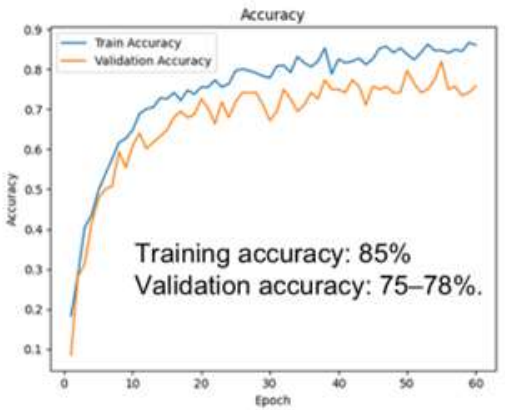
Crop Cover classification on GTPs

GeoVille

GTP Crop Cover classification → Comparison to satellite crop cover output → Confirmation/ Contradiction of results

ResNet18 neural network model

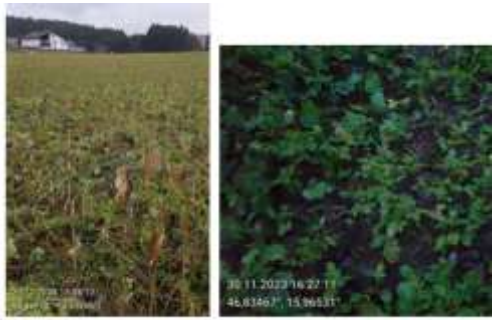


Crop Cover classes

- Bare Soil → Non- Vegetated
- Young Plants
- Grown Plants
- Old, Dry or Dead Plants
- Plants under Snow

→ Vegetated

- Not Agricultural
- Other/Unclear



Label: GP; Prediction: ODD | Label: GP; Prediction: YP

64% Same classification
11% Contradicting the crop cover
3% Low confidence results

22% Check needed due to other reasons

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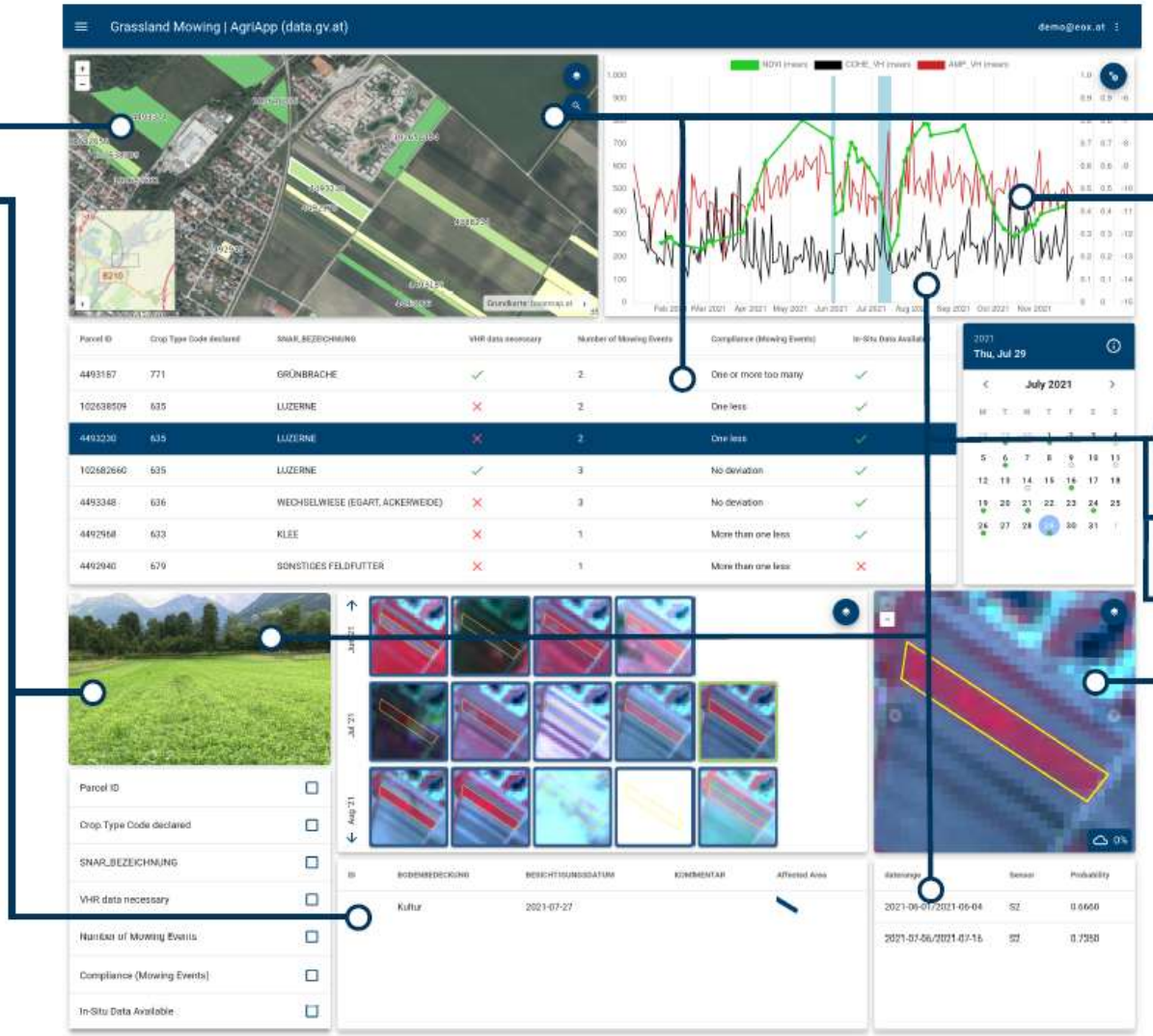
AgriApp – insight to AMS products

You Bring

- Parcel Geometries
- In-Situ Data*
- AMS Compliance Rules*
- 3rd party map product*
- Your own algorithm*
- Your cloud provider*

·optional input



You Get

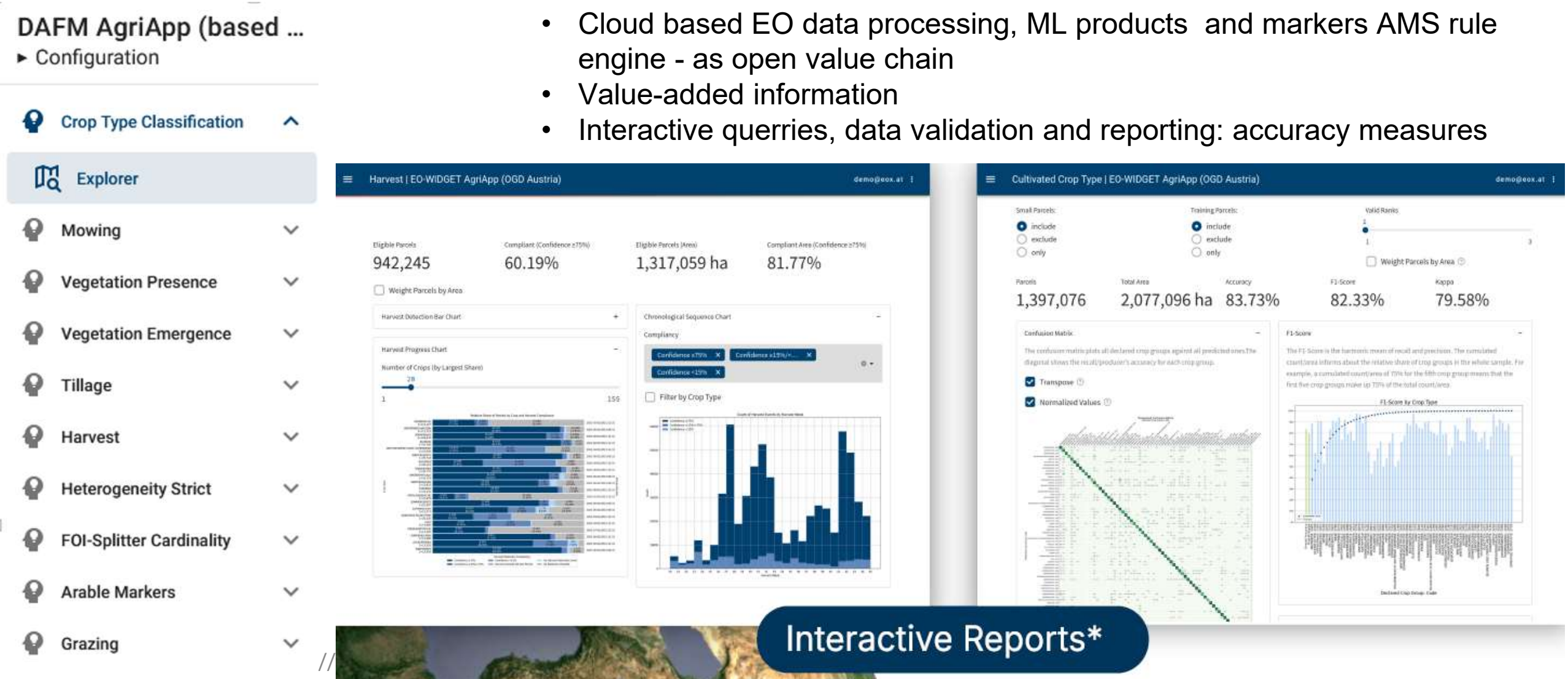
- Compliance Engine
- Radar & optical synergy
- Vegetation Indices
- Water Indices
- EO-image classification by ML
- Quality/accuracy measures
- Event Markers
- Satelite time series

Public demo is at:

https://agri.demo.hub.eox.at/crop_type_classification/parcelexplorer?zoom=15.01

AgriApp – Dashboard service for decisiosn-making based on satellite and in-situ data

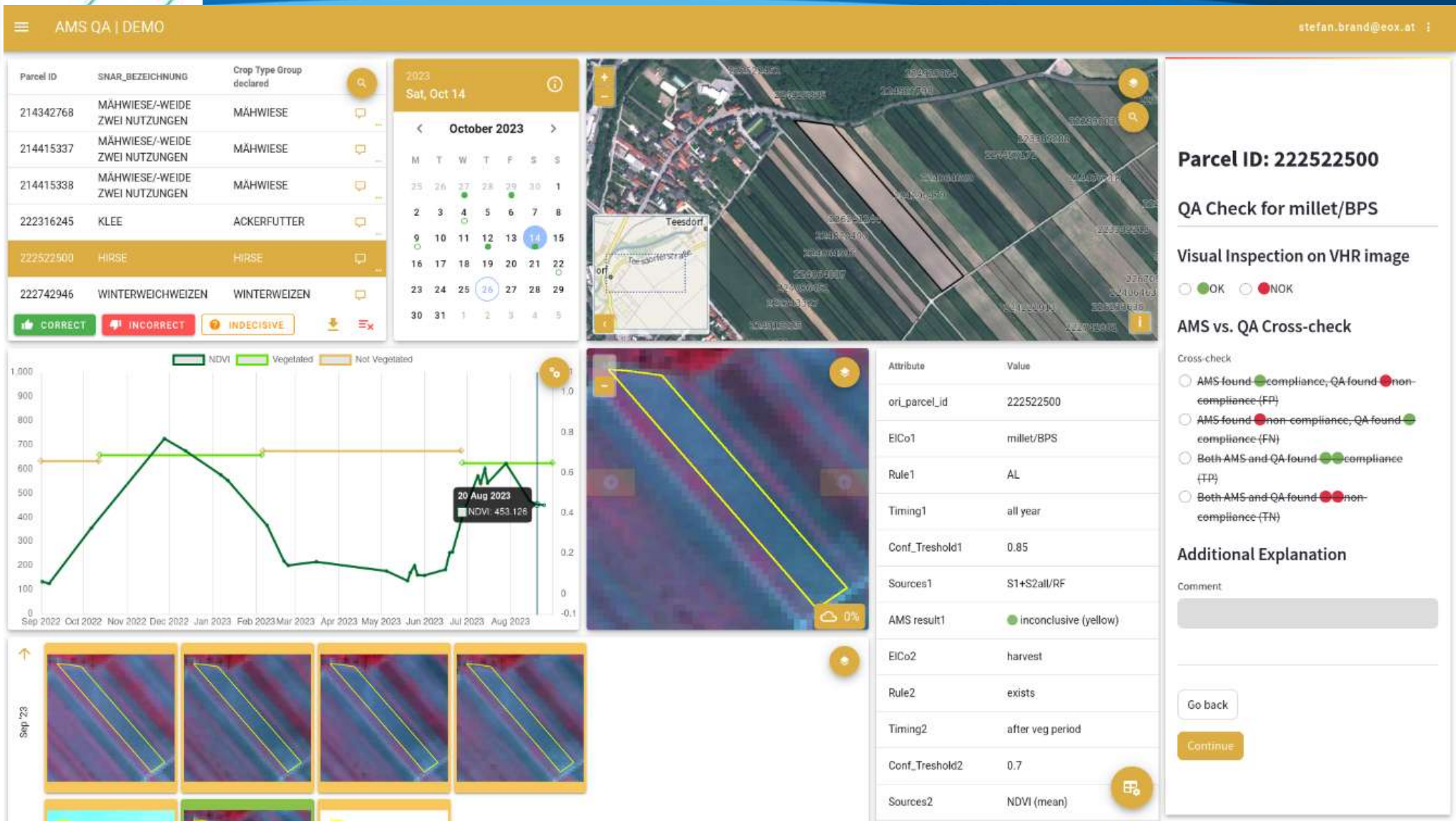
- Cloud based EO data processing, ML products and markers AMS rule engine - as open value chain
- Value-added information
- Interactive querries, data validation and reporting: accuracy measures



Dedicated AMS/QA frontend

External QA on final AMS results

Independent evaluation of AMS result based on the EC/JRC guidance
- chart widget shows the signal profiles / event detection
- actual VHR + any ortho-img are in the map view
- all available EO data are in the Image chips for CAPI



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Concepts of AMS data use beyond the annual payment validation

EO-validated annual, parcel level, marker-based categories

- presents the IACS-ElCo rules by lanes,
- fixed categories,
- fixed tresholds,
- fixed combinations of markers, periodically
- only for the selected parcels,
- made by contractors archived by PA's

EO-signal products = Analyses Ready Data

- vegetation indexes
- optical-radar synergy?
- pixel - object level?
- full country scale?
- continuous all year?
- classifications, ML inputs /outputs?
- data is only at AMS contractors ?

LPIS Land cover + GSA

- rotationally/annually validated on VHR,
- wall-to-wall LPIS/LCC concept?
- classes by CAP/ElCos
- phenology-based LCC

Ex-post evaluation
Predictive modelling
Indicators, Scenarios

External 3rd party datasets

- gap filling: Copernicus HRLs as LCC out of LPIS or Planet Fusion
- new info: soil properties, SOC, drought, waterlog
- increase of open data

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Ecosystem connectivity index

Hungarian use case for ex-post and ex-ante evaluation of Rural Development measures:
Ecological network around the CAP parcels: calculating spatial connectivity, variability and complexity

EO-based LCC data of LPIS from 2013-2024

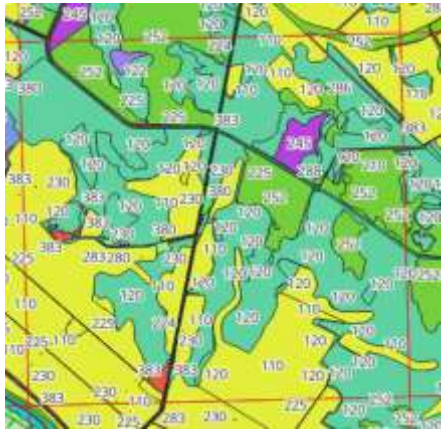
Key point: wall-to-wall physical blocks geom !

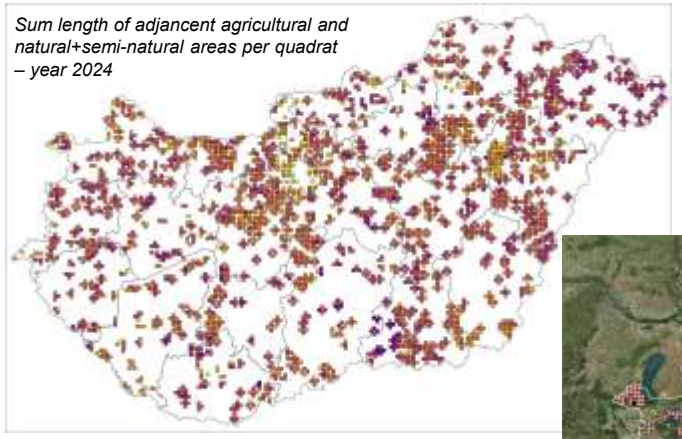
Creating LCC groups by ecosystem function, intensity of use: herbaceous / arboreal dominant, water-det …

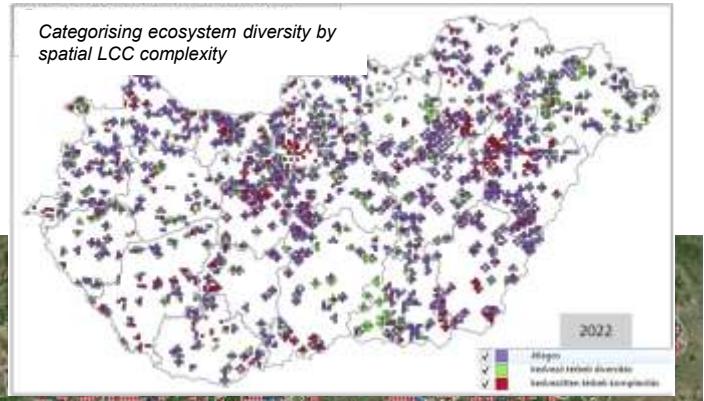
Calculating per kvadrat/year : sum of
- all edge lengths,
- arable and natural + semi nat. habitats,
- arable land + LFs.

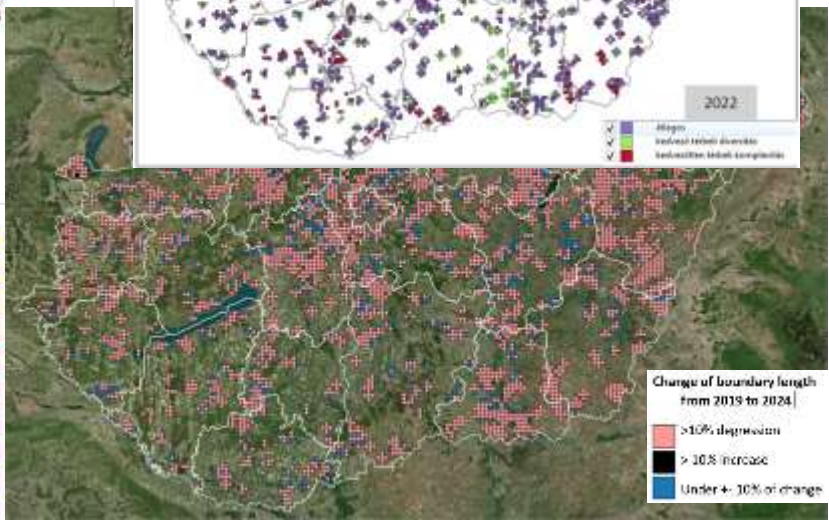
Calculating difference of 5 years, trendlines per quadrat, >10%< change + Categorising the status as: average, over and under ave.

Source:https://www.researchgate.net/publication/341399262_Fine-tuning_of_the_LPIS_philosophy_and_methodology



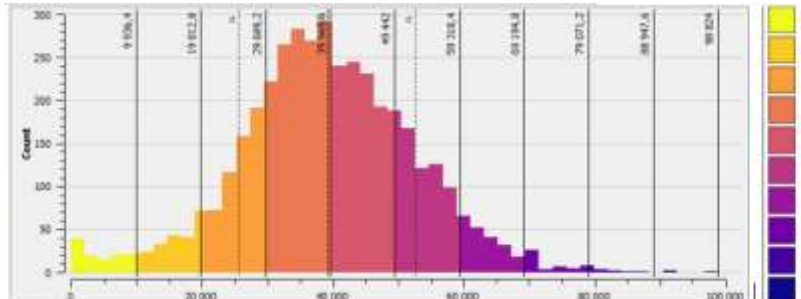




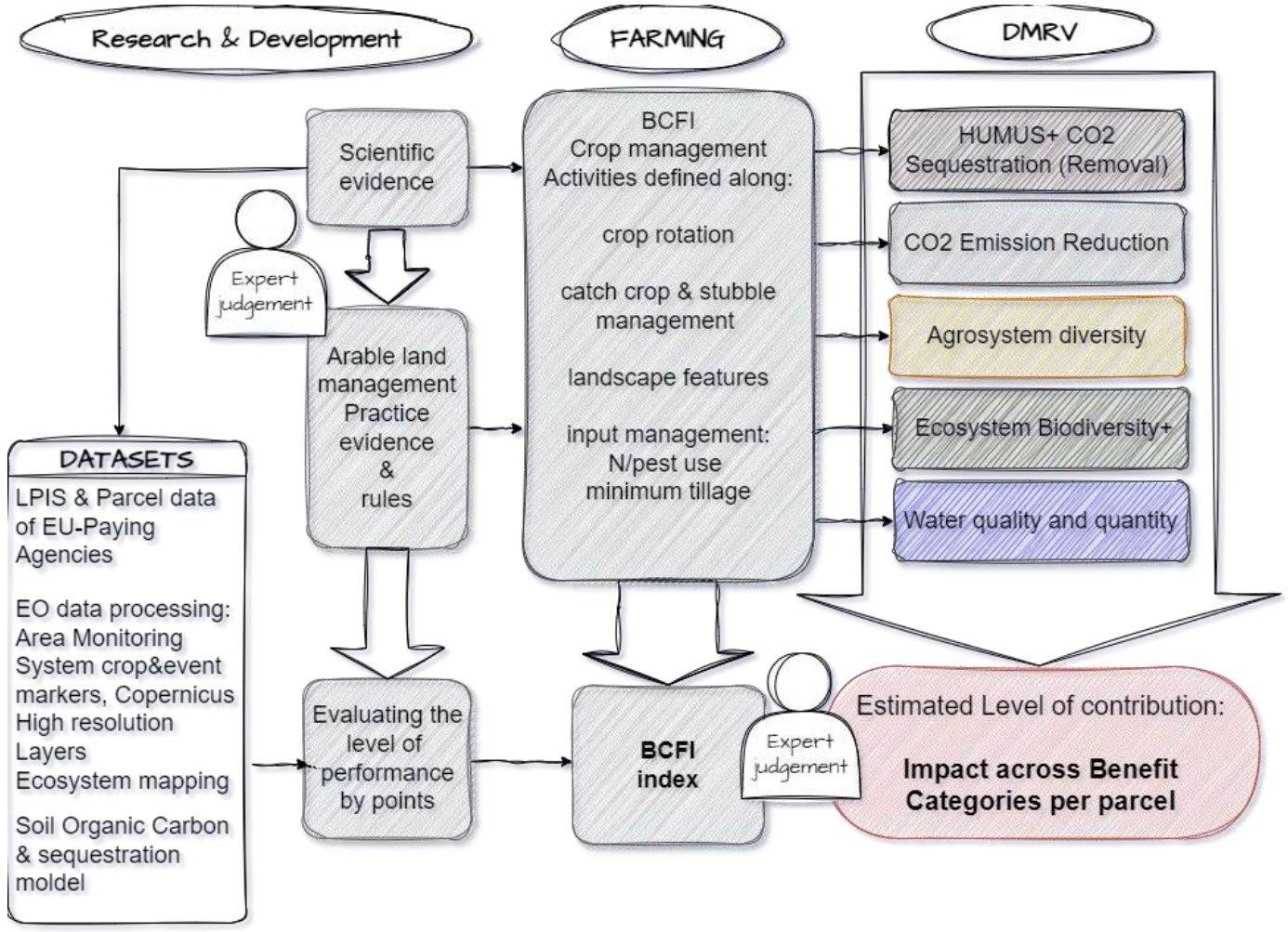


Authors: Bernadett Csonka, László Podmaniczky, Julianna Skutai, Péter Tóth

Partners:



Ecosystemn Indicators
Science-backed Assumptions



Biodiversity Carbon farming Index:

A gazdálkodási tevékenységek hatékonyságának mérése indikátorokkal:

- A talaj meglevő széntartalmának (SOC) - megtartása
- A növényzet éves szénmegkötési képessége
- Pozitív hatások a talajra, növényvédelemre, vetésforgó, másodvetés, tarlókezelés
- Vízvédelmi sávok a N-elszivárgás gátolására,
- Biodiverzitás: Ökoszisztémák térbeli hálózata, komplexitás, szélhatás és ökoszisztéma távolság – értékelés egy adott parcella szempontjából vagy teljes területen (kvadrát elv) - szigetszerű és vonalas tájelemek

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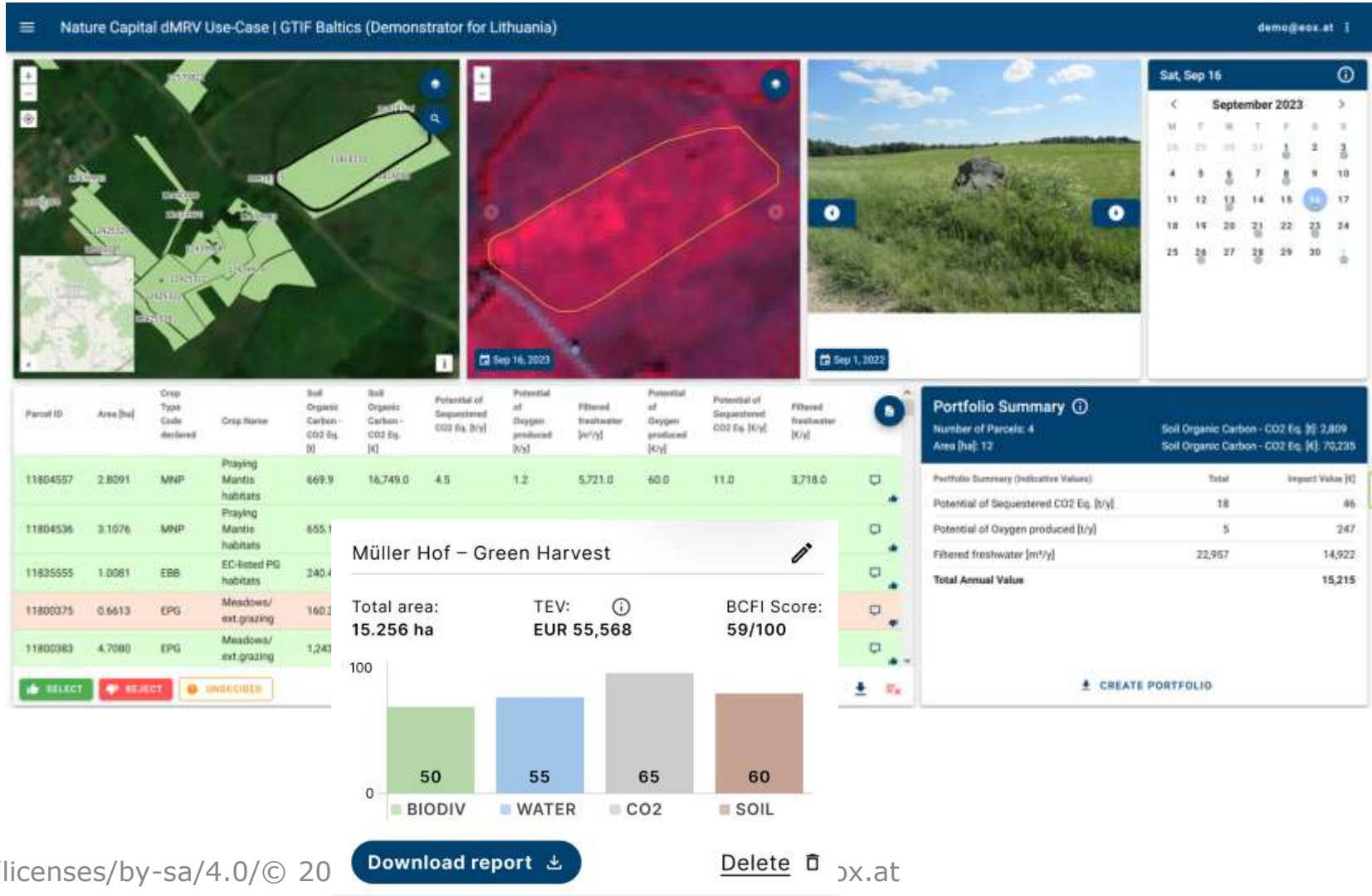
Nature Analytics, dMRV & Portfolio Selection Tool (Demonstrator HNV Grassland)

Clear Monitoring Framework including validated data points (statistical plus in-situ) & verification methodology

Integration with Decision-Making

Scalability & Standardization



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BALTIC GTIF

esa

GREEN TRANSITION INFORMATION FACTORIES–
KICK-STARTERS Funded by ESA

Lithuanian use case of Natural Capital Solutions management Dashboard to presenet Carbon & Biodiversity accounting

https://baltic-gtif.github.io/baltic-client/explore/?x=21.5049&y=55.3669&z=12.1442&date[…]024-01-01&template=expert&indicator=grassland_intensity_lt

Dashboard Development had just started, stakeholder engagement is on-going.

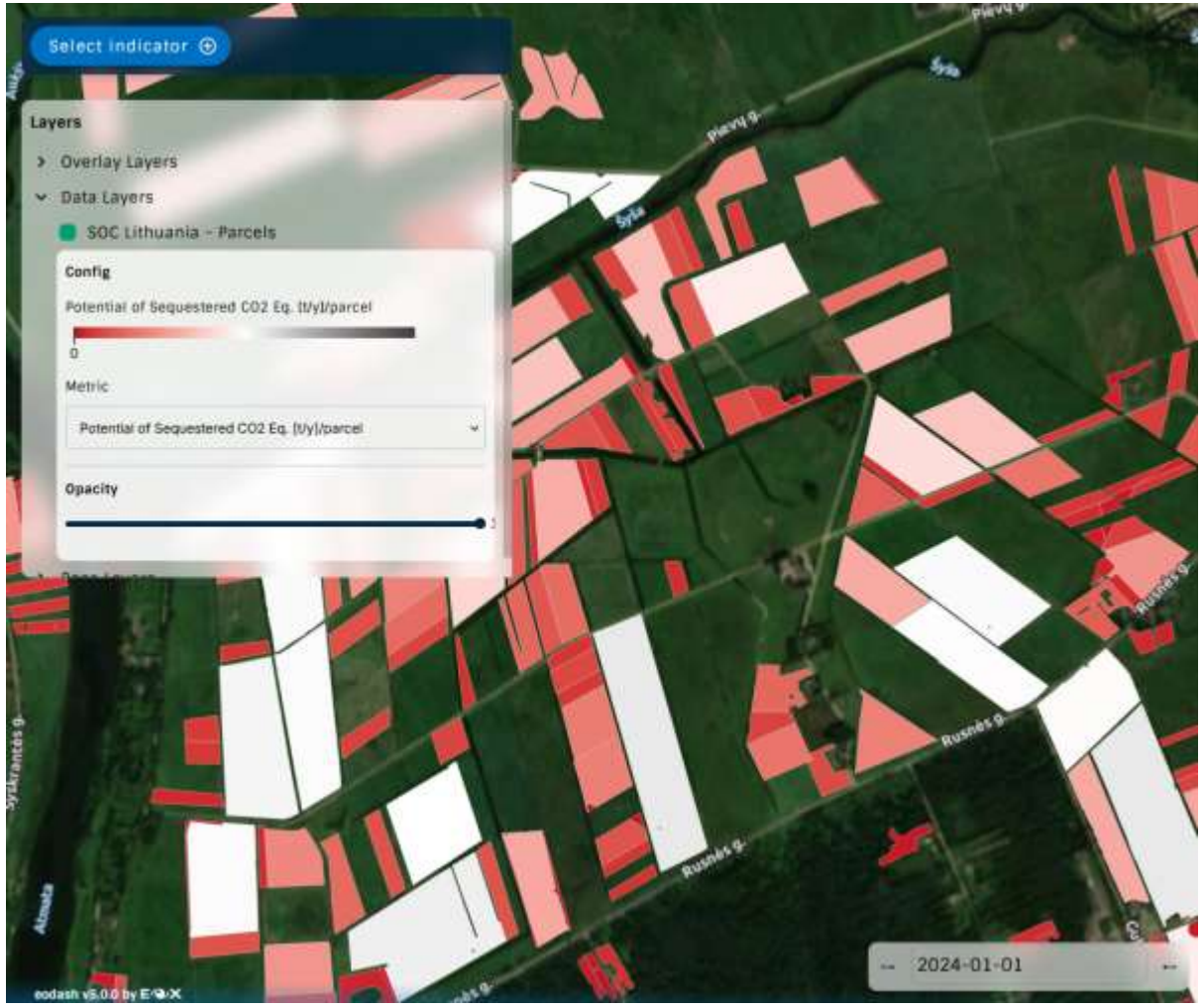
NMA
NACIONALINĖ MOKĖJIMO AGENTŪRA
National Paying Agency of Lithuania

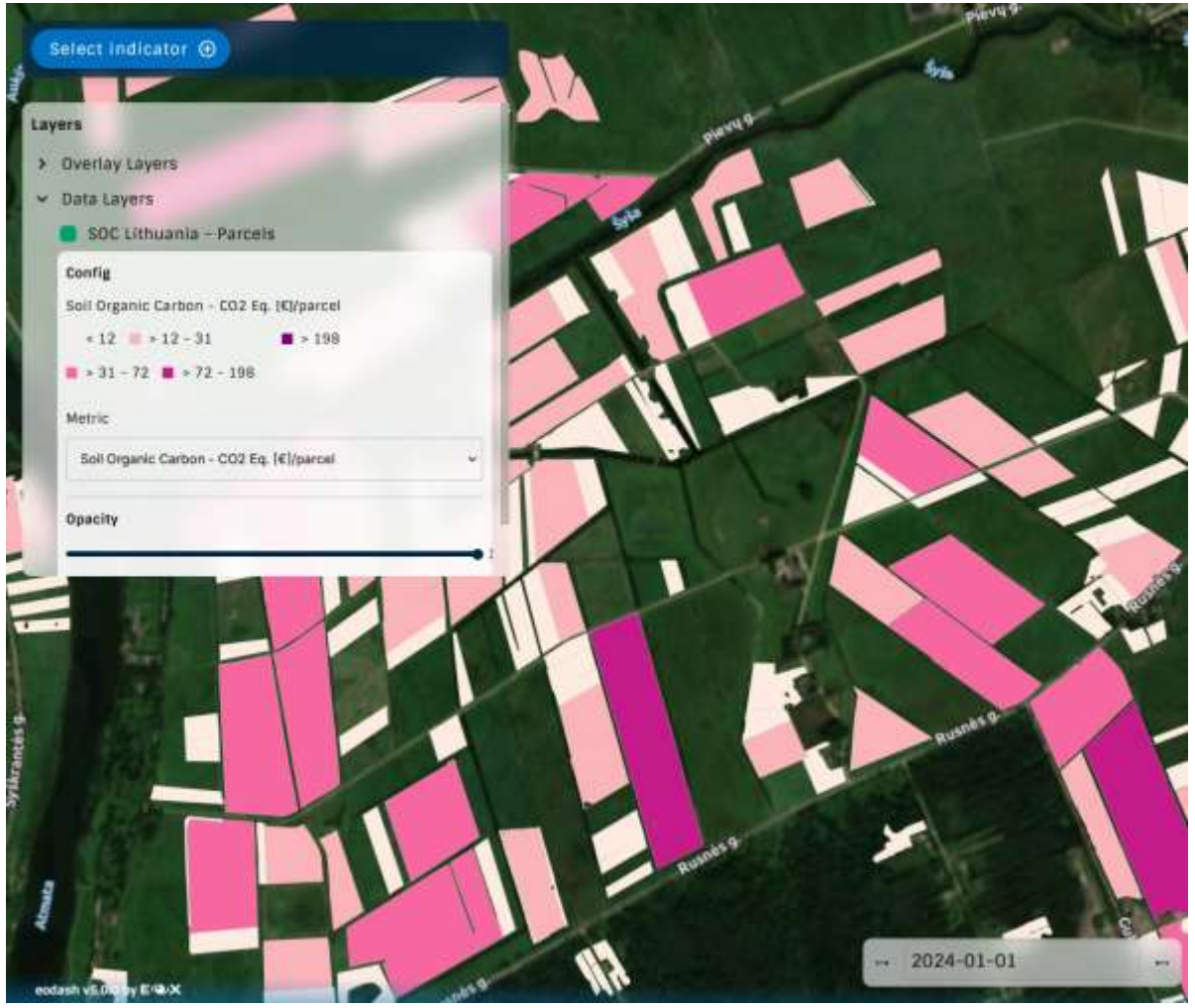
BALTIC GTIF

GREEN TRANSITION INFORMATION FACTORIES–
KICK-STARTERS Funded by ESA

NMA
NACIONALINĖ MOKĖJIMO AGENTŪRA
National Paying Agency of Lithuania

Lithuanian use case of Natural Capital Solutions management
Dashboard to presenet Carbon & Biodiversity accounting





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… to act together for biodiversity, Landscape Feature mapping participate on our questionary:

Do you believe biodiversity matters?

Would you like to contribute to safeguarding ecosystem services across Europe?

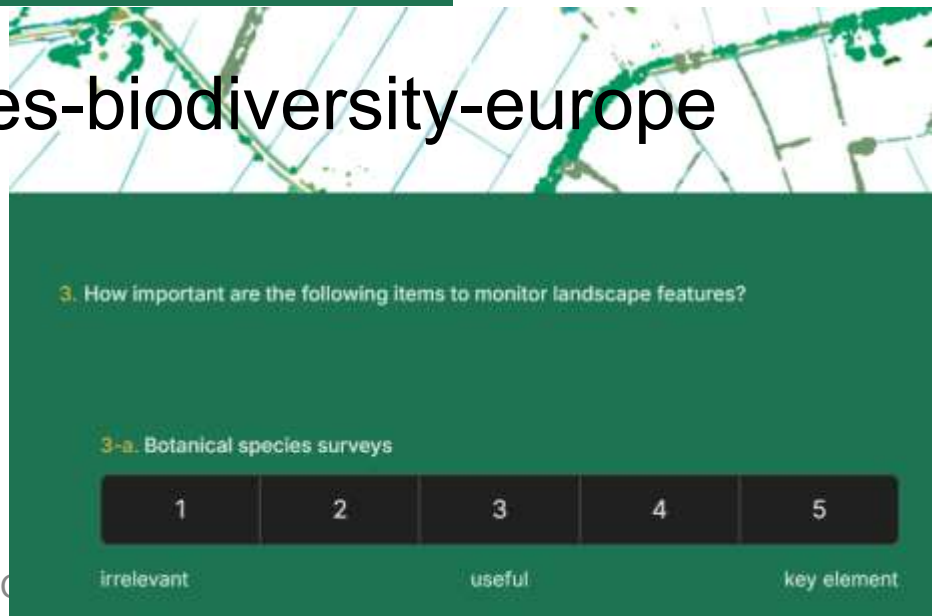
Take a minute to answer a few questions and join us in shaping future European datasets and data services.

NEO
For earth observation

AgrEO-Europe

https://mnmy9cu8.forms.app/landscape-features-biodiversity-europe

With advances in Remote Sensing and AI technologies, we can now monitor the status of Landscape Features with increasing accuracy. The next step is to translate this monitoring power into real policy impact - and for that, collaboration is essential.



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