



The LifeWatch ERIC Biodiversity
& Ecosystem eScience Conference

PLOVDIV, BULGARIA

7-10 JULY 2026



EO for Agroecology

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09 July 2026



SEF (Stakeholder Engagement Facility)

ABOUT US

We engage with a wide range of stakeholder communities to understand **how EO data and services can help** address their real needs, and to provide practical support for uptake.





Survey



Why Monitor Agriculture From space?



Large and disperse Areas

Agricultural landscapes cover vast territories and cannot be monitored continuously from the ground



Constant Change

Crops, vegetation, water availability, and management practices change throughout seasons and years



Increasing Environmental Pressure

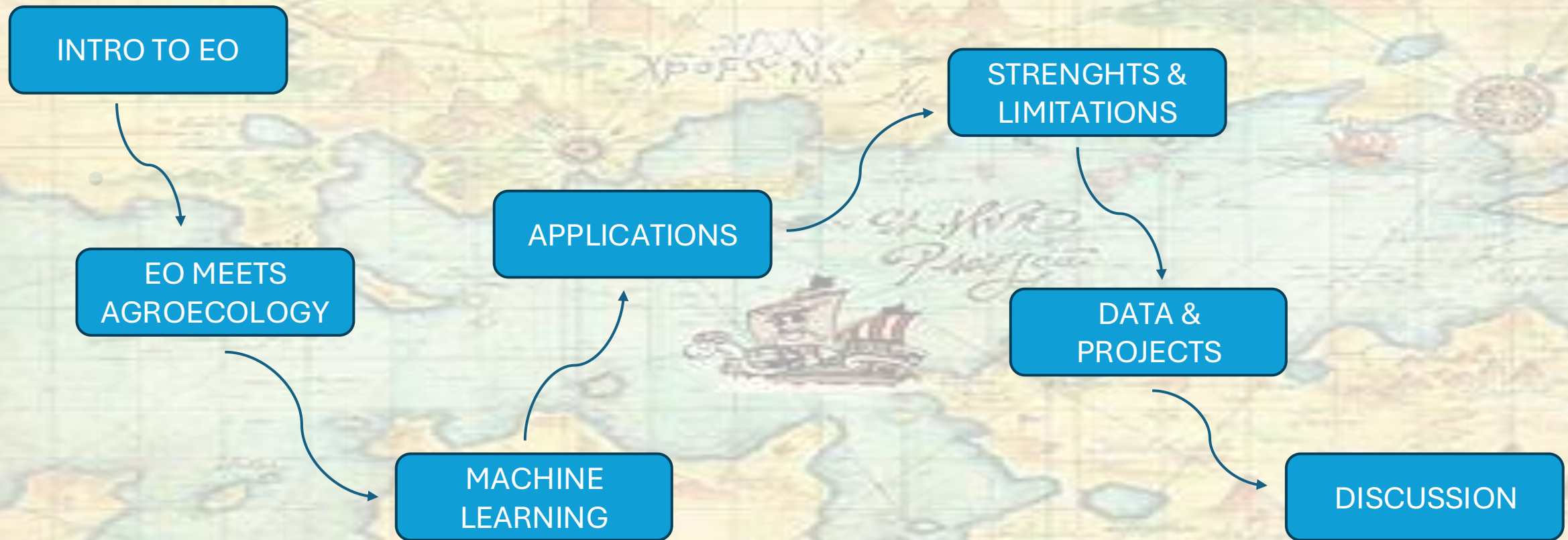
Droughts, heatwaves, water scarcity, land degradation, and extreme events increasingly affect agricultural systems



Growing information needs

Farmers, researchers, governments, and policy makers need timely and consistent information to support decisions

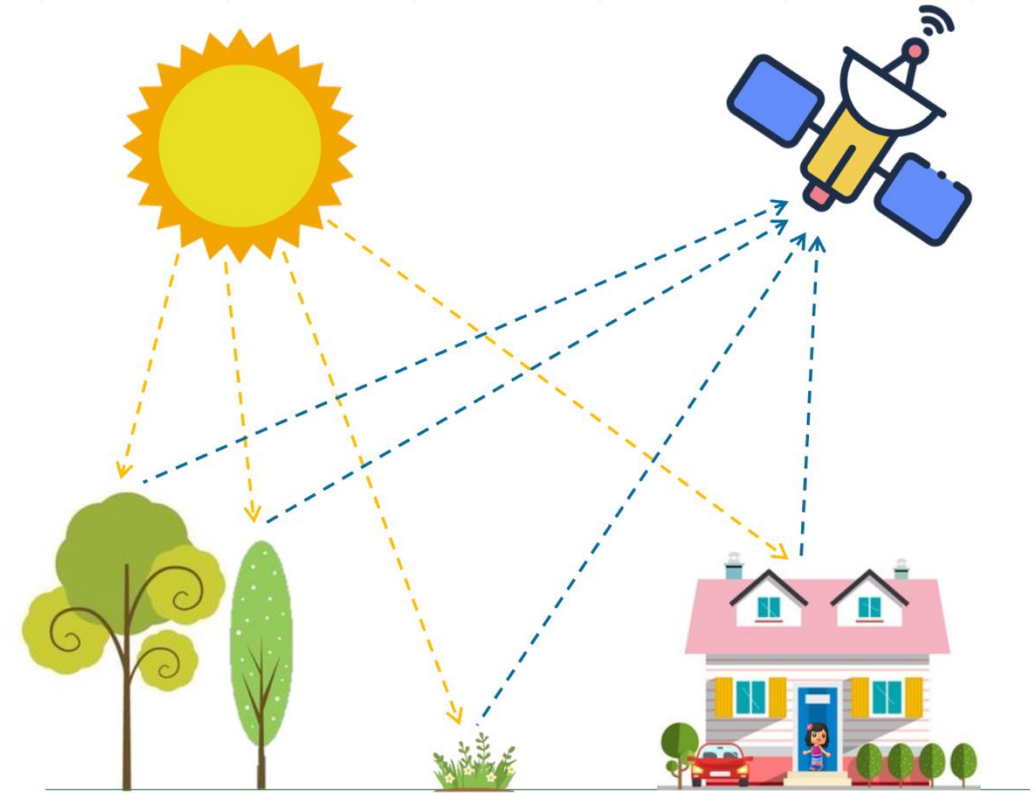
Earth Observation provides repeated observations of agricultural landscapes across large areas and over time.



Introduction to EO

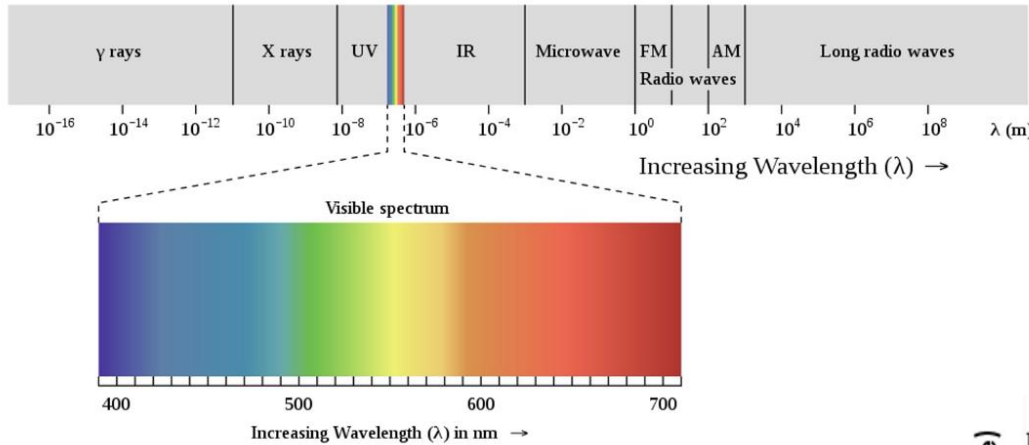
Earth Observation

- Earth Observation is the process of **monitoring the Earth's surface and atmosphere** using remote sensing technologies.
- Satellites explore Earth Surface, ensuring a **continuous monitoring** with repeated observations over time
- **Long time series** of data available

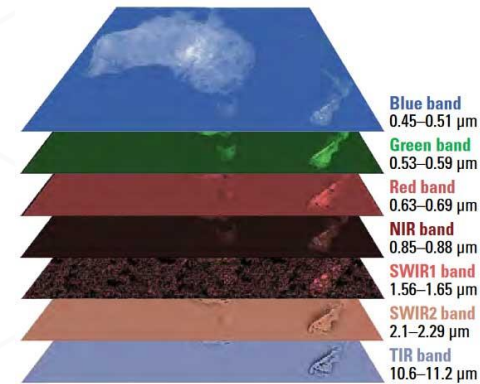


Optical satellites measure reflected solar radiation

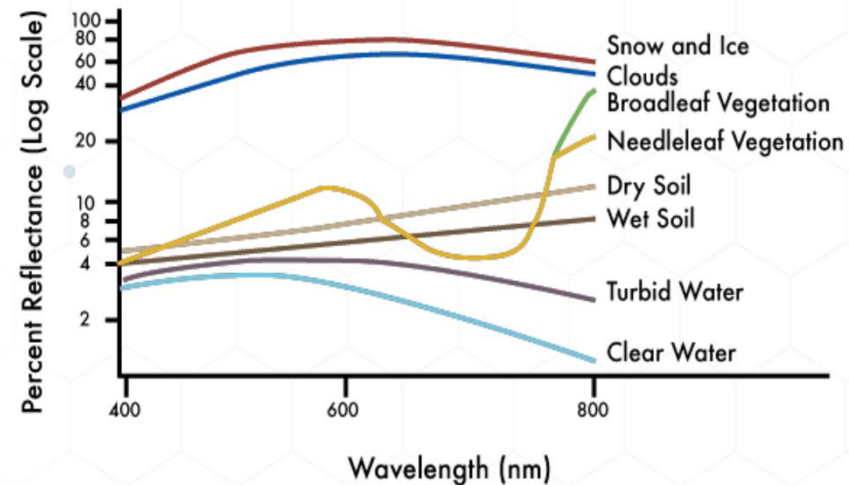
The electromagnetic spectrum



Sensors can “see” different parts of the electromagnetic spectrum and **measure** how light is reflected at different wavelengths.



The different portions of the spectrum that can be measured by a sensor are called **bands**.

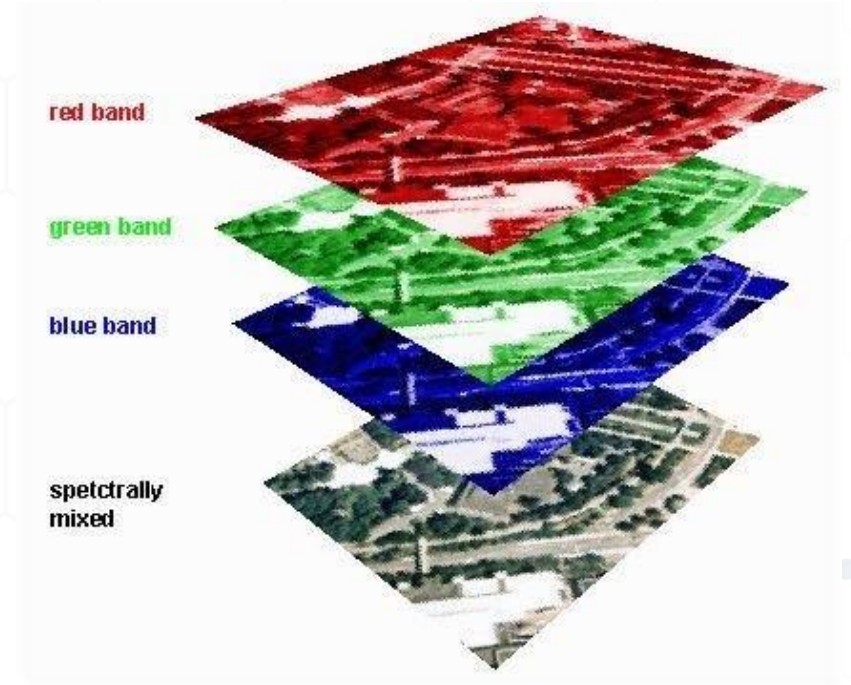
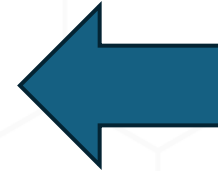


Different materials reflect and absorb different wavelengths of electromagnetic radiation, and have a different **spectral signature**

Composites

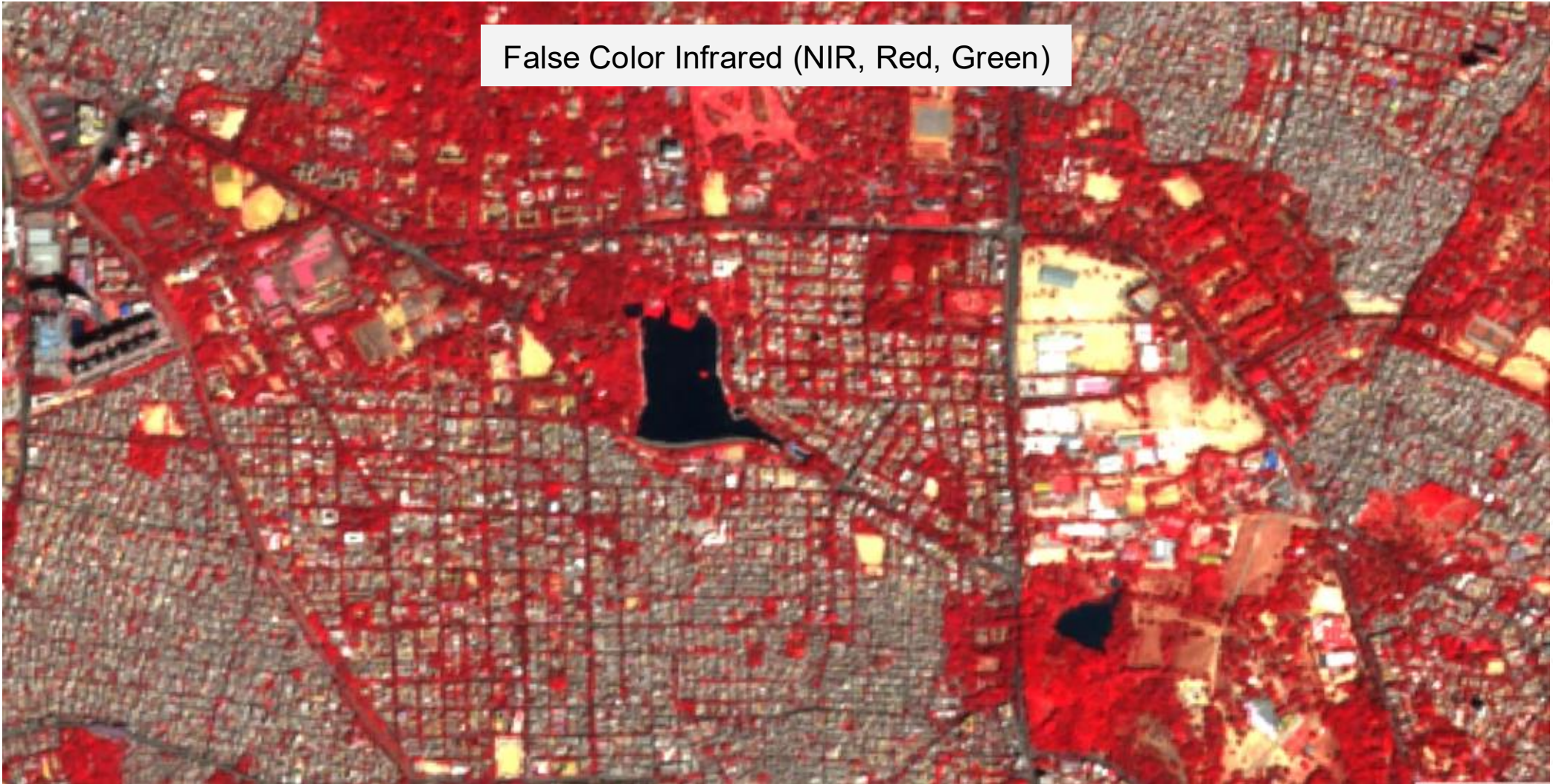


Composites

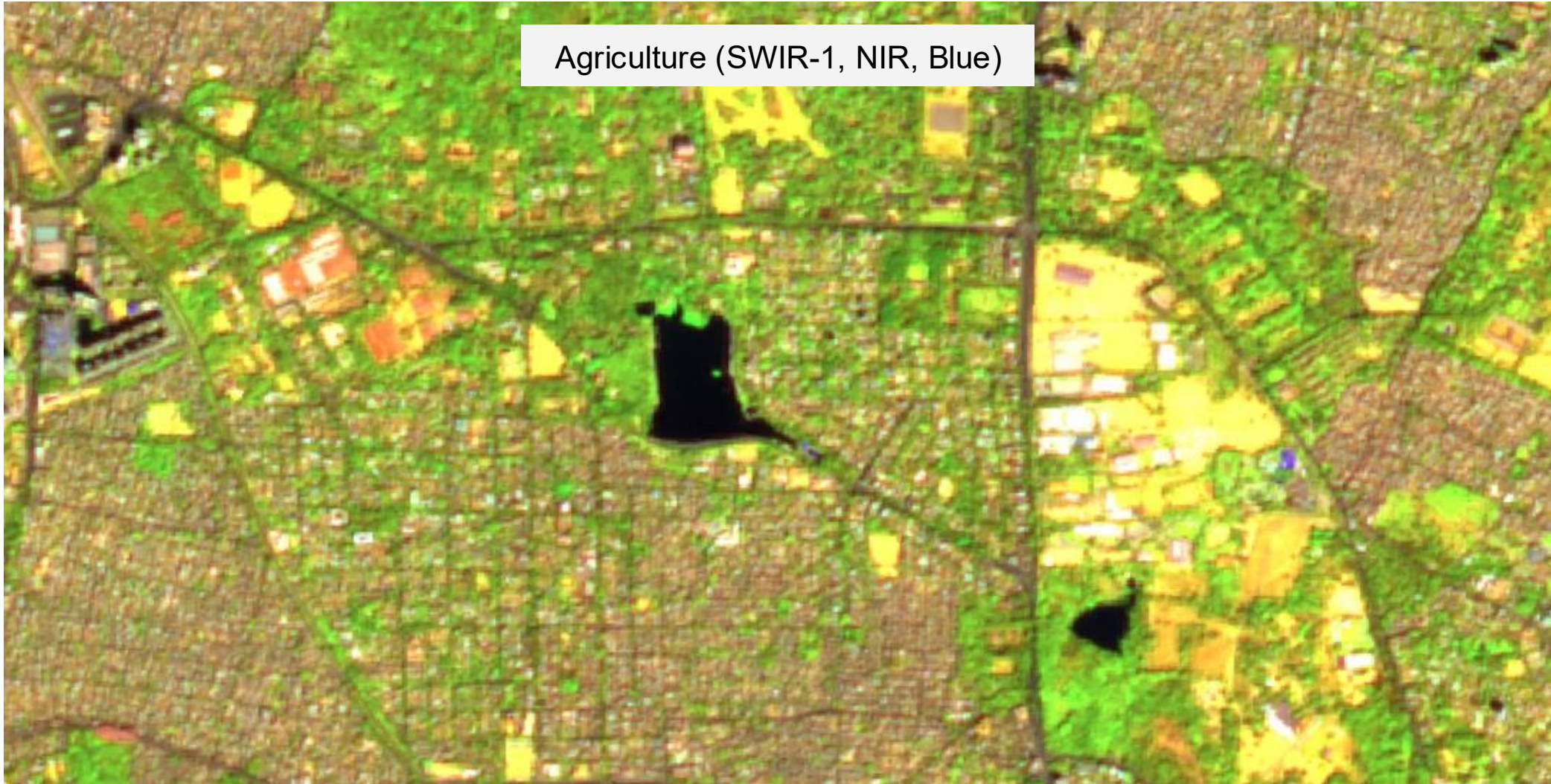


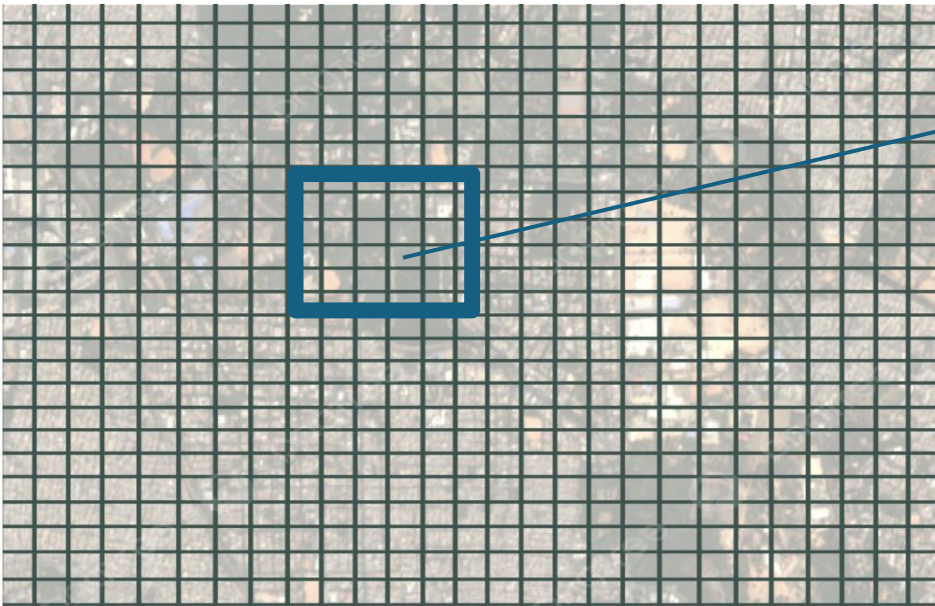
Composites

False Color Infrared (NIR, Red, Green)



Composites



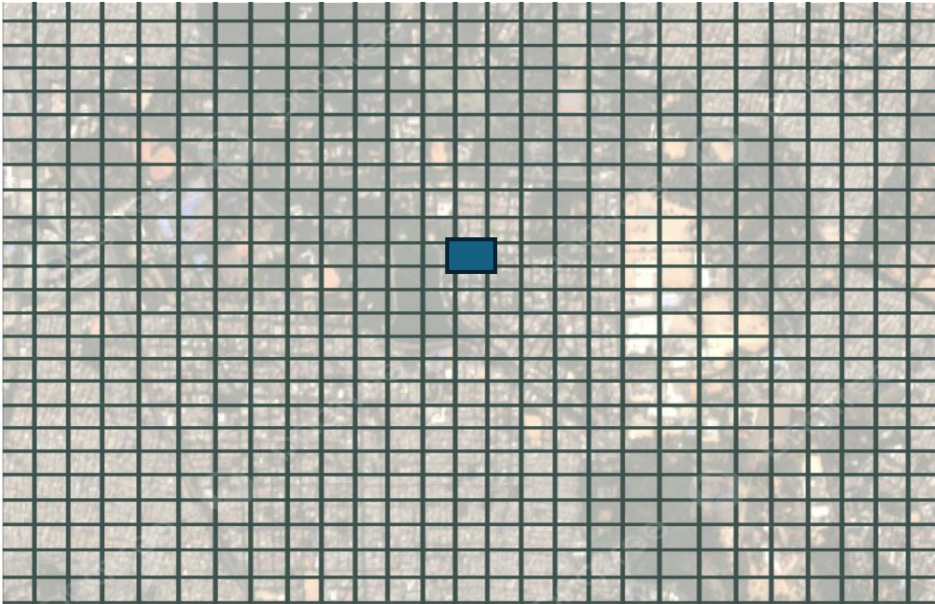


170	238	80	255
45	0	243	150
110	136	119	211
60	89	127	70

$$\rho_{\lambda} = \frac{\Phi_{reflected}}{\Phi_{incident}}$$

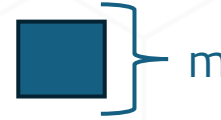
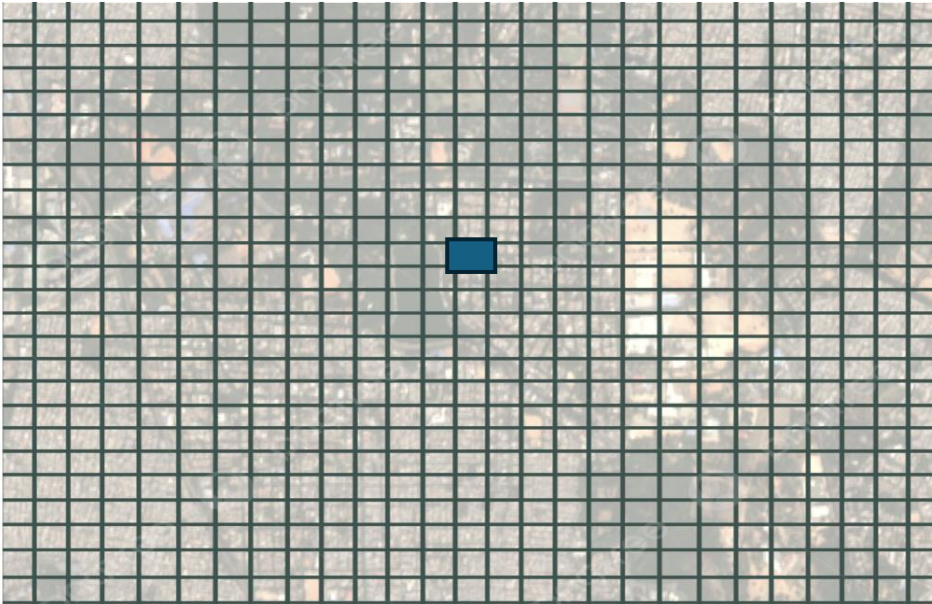
The value of a pixel is a **digital number** representing the **reflectance** measured by the sensor and rescaled at 8 or 16 bit.

Pixels Properties

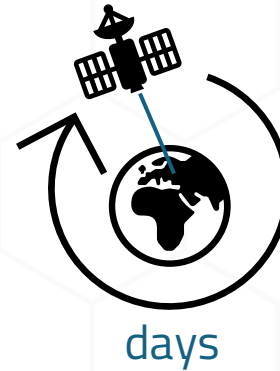


Spatial Resolution: physical ground area covered by a single pixel

Pixels Properties

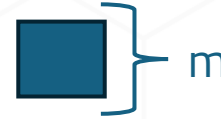
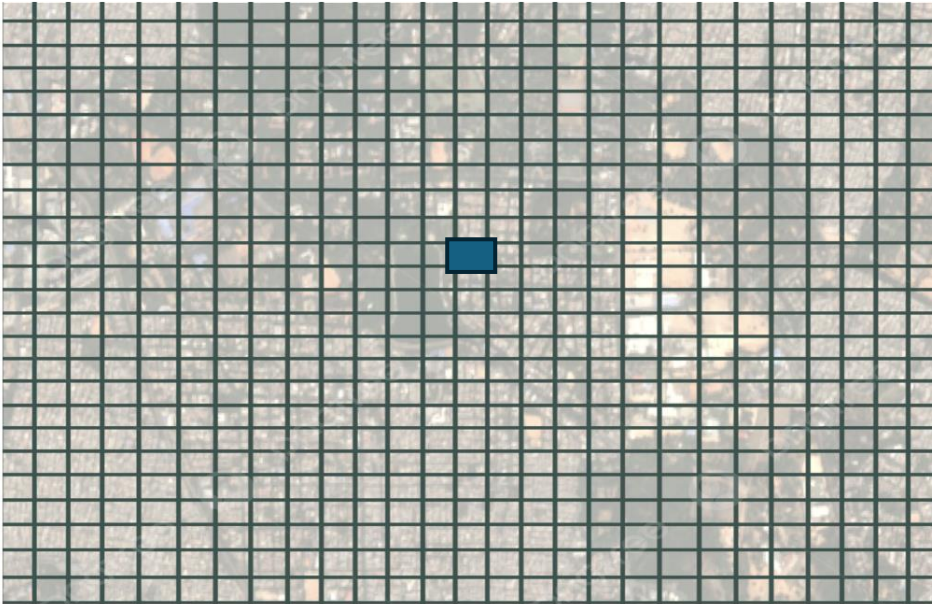


Spatial Resolution: physical ground area covered by a single pixel

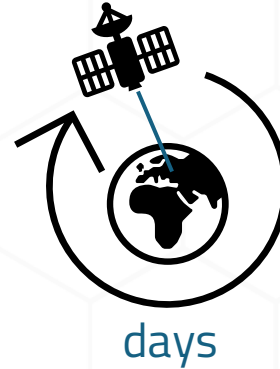


Temporal Resolution: revisit time required for a satellite to record the exact same pixel location on Earth

Pixels Properties



Spatial Resolution: physical ground area covered by a single pixel

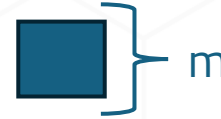
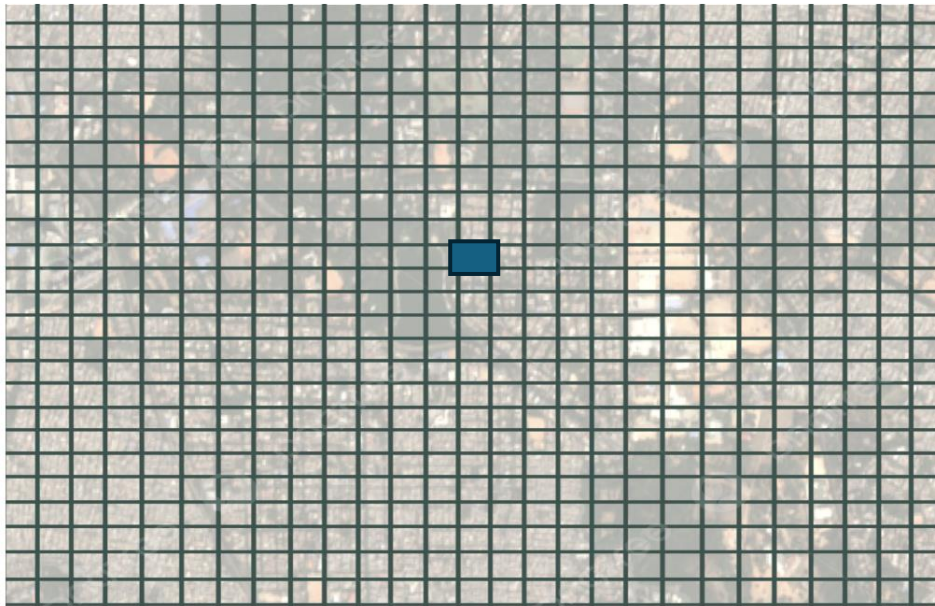


Temporal Resolution: revisit time required for a satellite to record the exact same pixel location on Earth

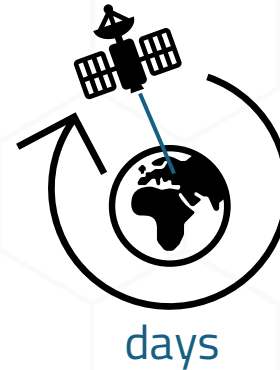


Spectral Resolution: The number and width of electromagnetic wavelength bands (e.g., visible light, infrared) recorded by the sensor

Pixels Properties



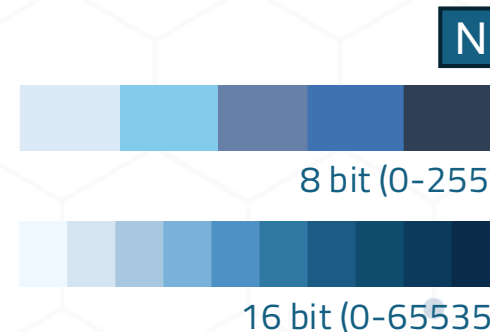
Spatial Resolution: physical ground area covered by a single pixel



Temporal Resolution: revisit time required for a satellite to record the exact same pixel location on Earth



Spectral Resolution: The number and width of electromagnetic wavelength bands (e.g., visible light, infrared) recorded by the sensor



Radiometric Resolution: bit-depth of the pixel, determining the sensor's ability to distinguish fine differences in energy (e.g., 8-bit or 16-bit)

Types of Data

Optical

- Measures **sunlight reflected** by the Earth's surface in visible, near-infrared, and short-wave infrared bands



Sentinel-2 (Optical) – True color
10 m resolution



Optical
Passive sensor



Optical
Affected by clouds



Radar
Observes through clouds



Optical
Measures reflected radiation



Radar
Measures microwave backscatter

Radar

- Sends microwave pulses** toward the Earth's surface and measures the returned signal (backscatter), which is influenced by surface structure, roughness, and moisture



Sentinel-1 (SAR) – VV polarization
10 m resolution



E0 meets Agroecology

Agroecology

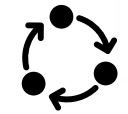


- Agroecology applies **ecological principles to agriculture**
- It aims to produce food while:
 - Maintaining **soil health**
 - Supporting **biodiversity**
 - Reducing external inputs
 - Improving **climate resilience**
 - Enhancing **ecosystem services**

What information agroecologists need?



Vegetation Health



Crop Rotation



Water Stress



Landscape Diversity



Cover Crops



Crop Growth



Tillage practices



Water Availability

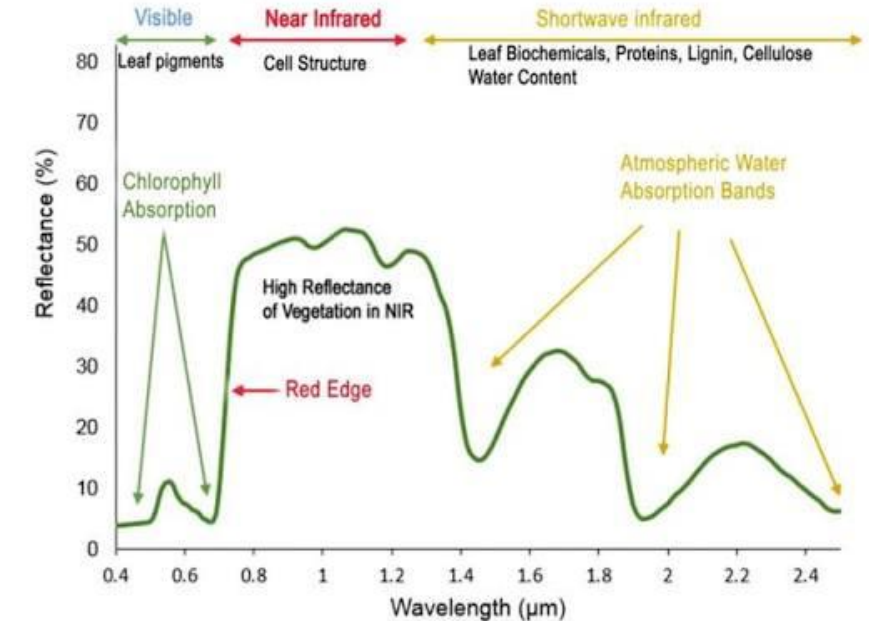
EO Indicators

- Metrics derived from EO data
- They translate **raw geospatial data into actionable intelligence** for tracking climate change, agricultural health, and urban development
- They help **describe environmental conditions and changes over space and time**



Vegetation Indices

- Vegetation indices are **mathematical combinations of spectral reflectance values** designed to enhance the signal of vegetation and estimate its biophysical and biochemical properties.
- Common vegetation indices:
 - NDVI (Normalized Difference Vegetation Index):** vegetation greenness and vigor
 - EVI (Enhanced Vegetation Index):** improved sensitivity in dense vegetation and reduced atmospheric and soil effects
 - GNDVI (Green Normalized Difference Vegetation Index):** sensitive to chlorophyll content and vegetation condition
 - SAVI (Soil-Adjusted Vegetation Index):** vegetation monitoring in areas with exposed soil
 - MCARI (Modified Chlorophyll Absorption Ratio Index):** chlorophyll content
 - Red-edge indices (e.g., NDRE, C_{green}):** sensitive to chlorophyll content, canopy condition, and early vegetation stress



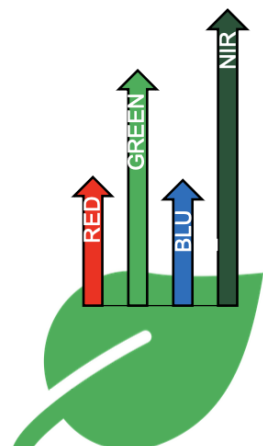
$$\frac{NIR - red}{NIR + red}$$



DEAD
LEAF



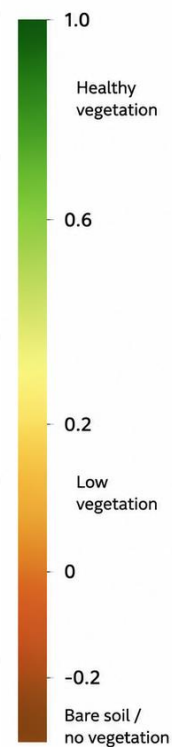
STRESSED
LEAF



HEALTHY
LEAF

NDVI

Example map

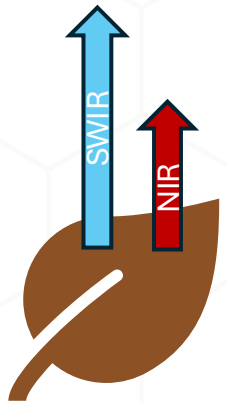


Moisture Indices

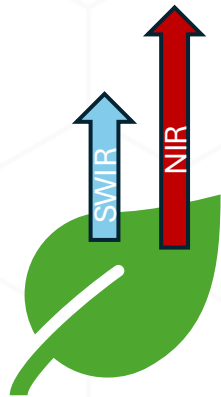
- Moisture indices use **differences in spectral reflectance**, particularly in the **NIR and SWIR regions**, to provide information about **vegetation water content and surface moisture conditions**
- Common moisture indices:
 - **NDMI (Normalized Difference Moisture Index)**: vegetation water content and crop water status.
 - **NDWI (Normalized Difference Water Index)**: several variants exist; some estimate vegetation water content (using NIR and SWIR), while others are designed to detect open water (using Green and NIR).
 - **MSI (Moisture Stress Index)**: sensitive to vegetation moisture stress.
 - **GVMi (Global Vegetation Moisture Index)**: designed to improve sensitivity across a wide range of vegetation densities.



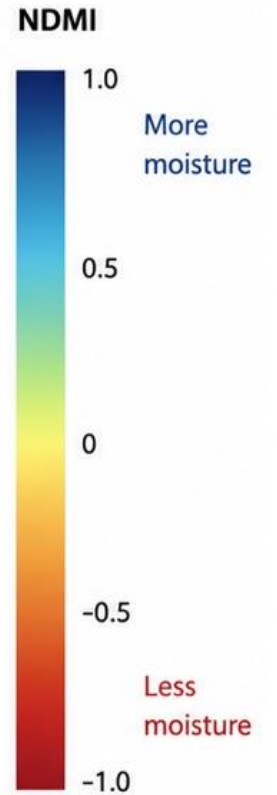
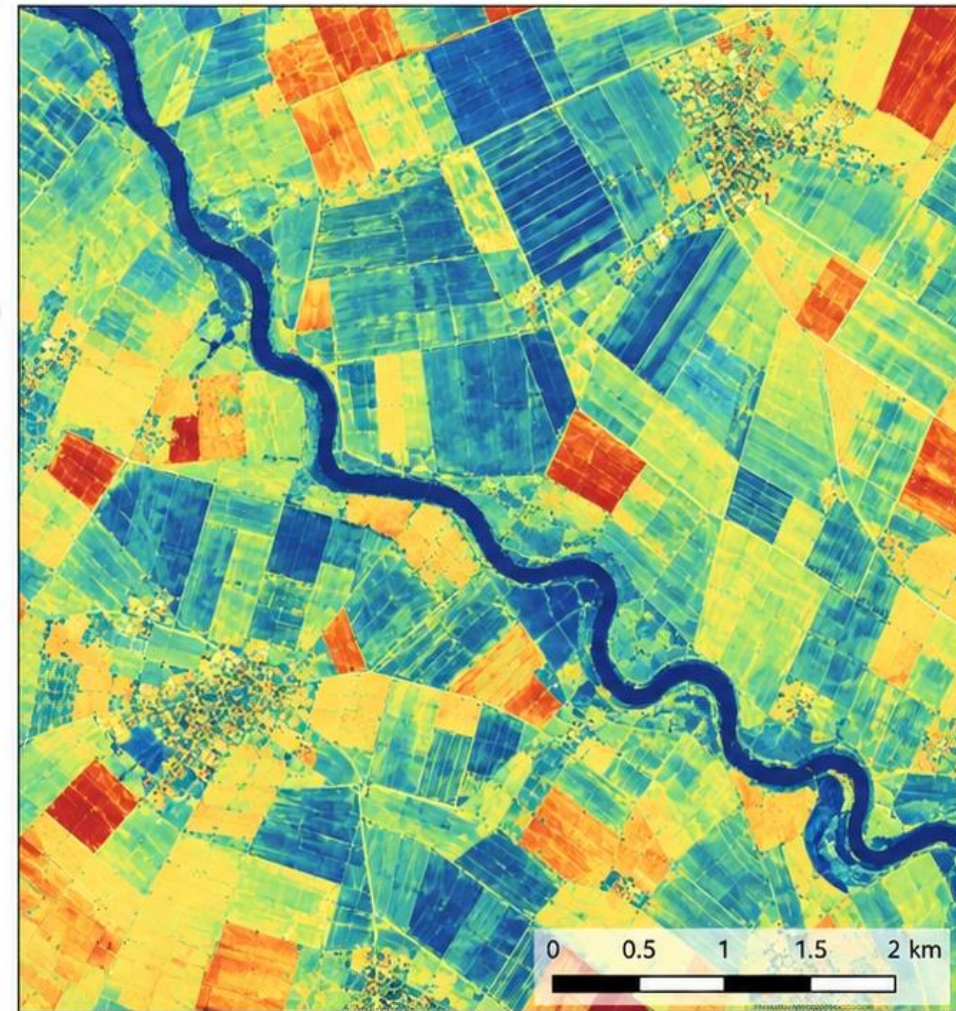
$$NDMI = \frac{NIR - SWIR}{NIR + SWIR}$$



DRY/STRESSED
VEGETATION



MOIST/HEALTHY
VEGETATION



Derivative metrics are **biophysical variables** retrieved from satellite observations using radiative transfer models or empirical relationships. They provide quantitative information about vegetation structure, land cover and surface thermal conditions.

LAI – Leaf Area Index

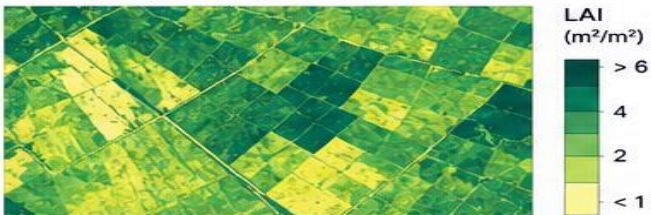
Represents the total one-sided leaf area per unit of ground area.

$$\text{LAI} = \frac{\text{Total one-sided leaf area}}{\text{Ground area}} \quad (\text{m}^2/\text{m}^2)$$

How it is derived

- Uses reflectance in multiple spectral bands (VIS, NIR, SWIR, red-edge).
- Retrieved with radiative transfer models or machine learning algorithms.

Example (LAI map)



Useful for

Canopy development, biomass estimation, productivity, light interception.

FVC – Fractional Vegetation Cover

Represents the proportion of ground area covered by green vegetation.

$$\text{FVC} = \frac{\text{Vegetated area}}{\text{Total area}} \quad (0 - 1 \text{ or } \%)$$

How it is derived

- Often estimated from vegetation indices (e.g., NDVI) using the mix of vegetation and bare soil.
- Requires reference values for bare soil and full vegetation.

Example (FVC map)



Useful for

Soil protection, erosion risk, habitat monitoring, land degradation assessment.

LST – Land Surface Temperature

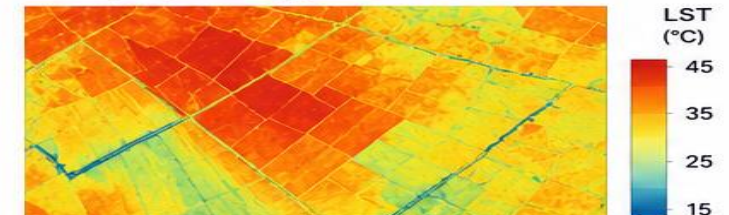
Represents the radiative skin temperature of the Earth's surface.

Derived from thermal infrared (TIR) emission (~10–12 μm) and atmospheric correction.

How it is derived

- Thermal infrared data are converted from radiance to brightness temperature.
- Atmospheric correction retrieves the actual land surface temperature.

Example (LST map)



Useful for

Surface energy balance, evapotranspiration, water stress, heat stress, drought monitoring.

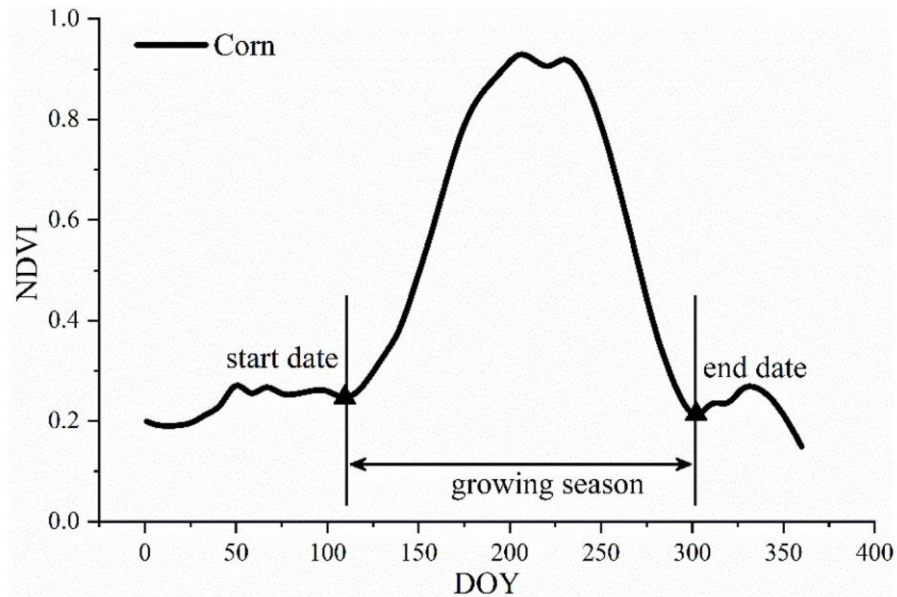
FROM SATELLITE TO DERIVED METRIC



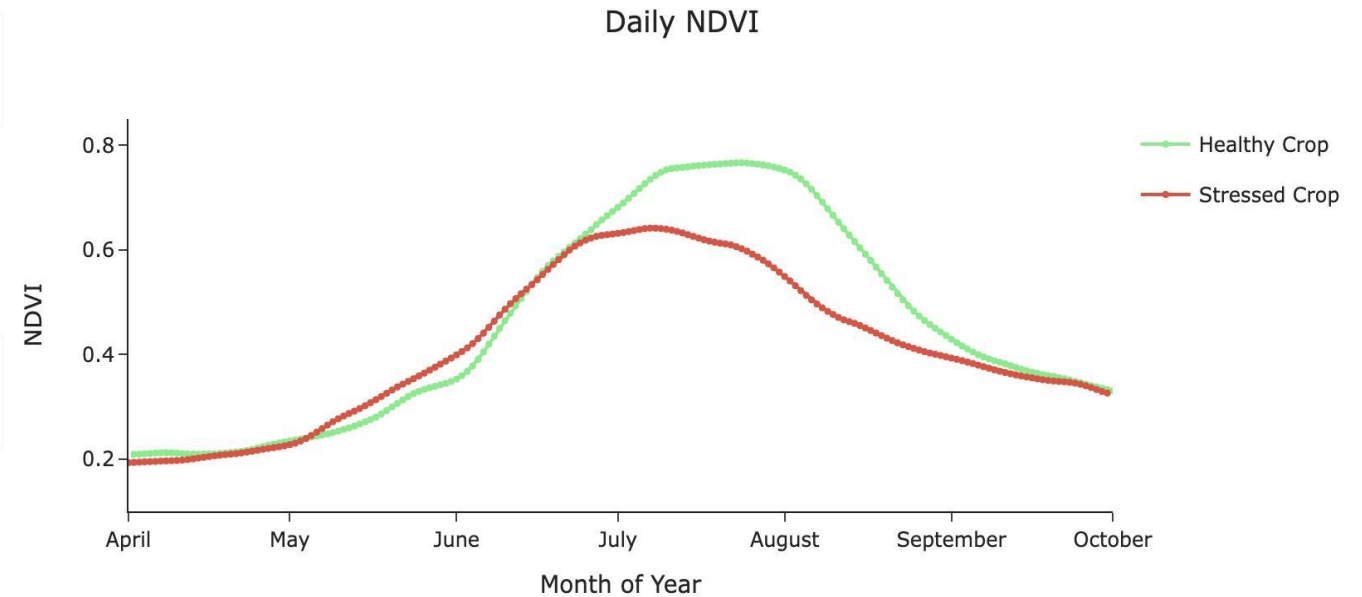
WHY IT MATTERS?

These metrics turn satellite data into actionable information for agroecology and sustainable land management.

Time series



A single image shows today,
a time series shows how the field
changes through the season



A time series can be used to track crop
emergence, monitor growth stages,
detect harvest dates, identify crop
rotations and to compare seasons and
years

EO alone is not enough

EO gives us millions of observations. The challenge is turning those observations into information such as:

- Which crop is present?
- Was the field irrigated?
- Did tillage occur?
- Is this season unusual?



MACHINE LEARNING

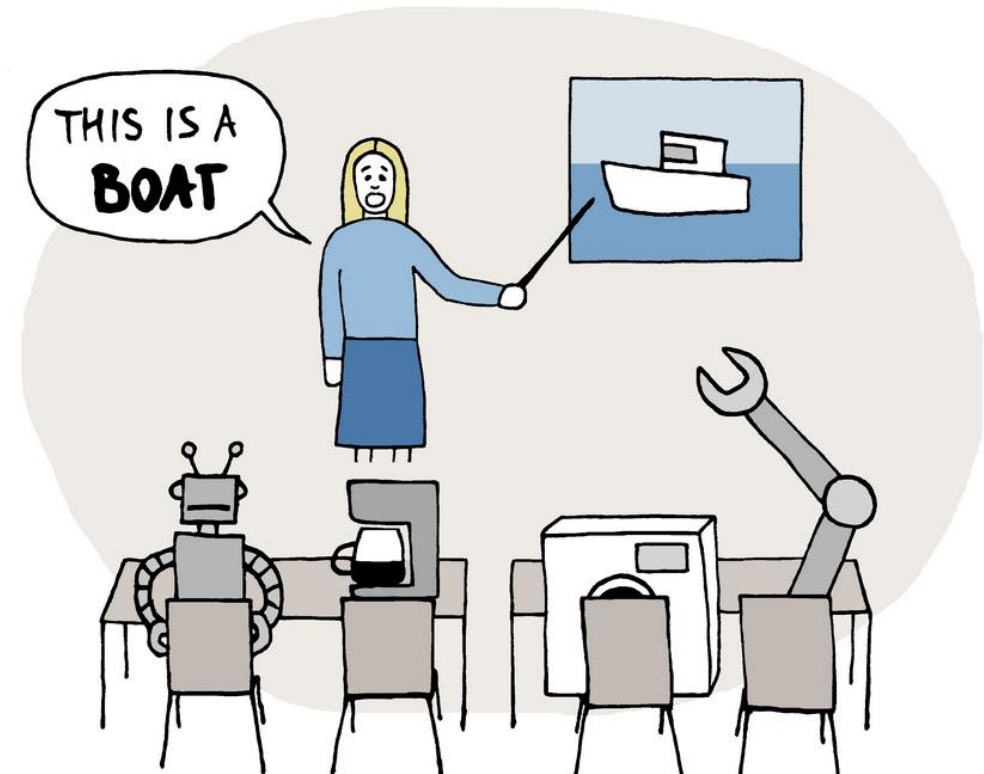
EARTH OBSERVATION

Machine Learning

Machine Learning

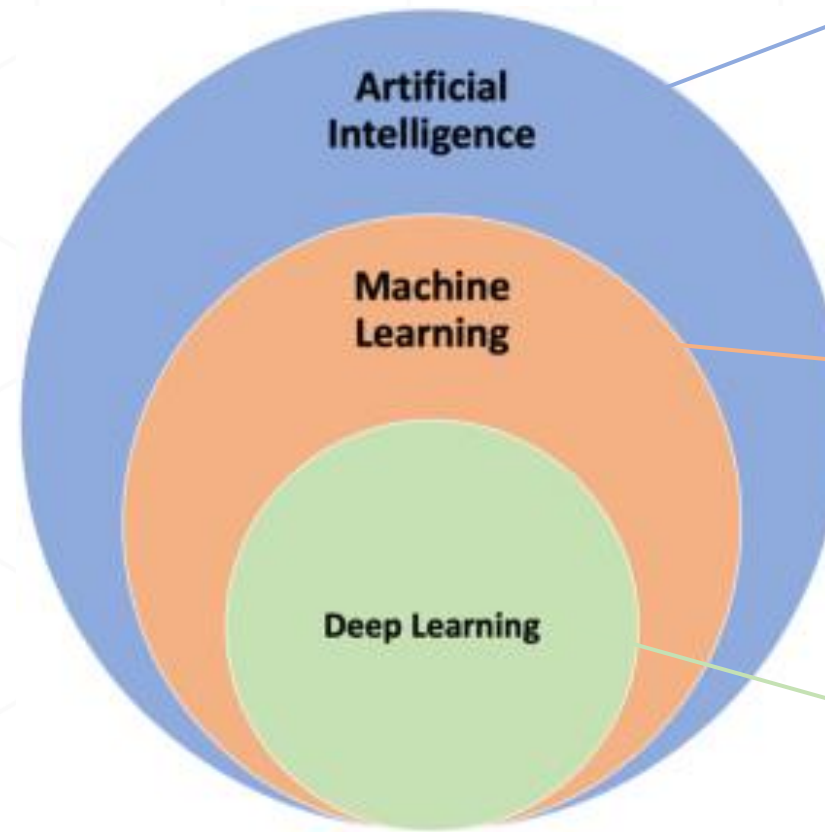
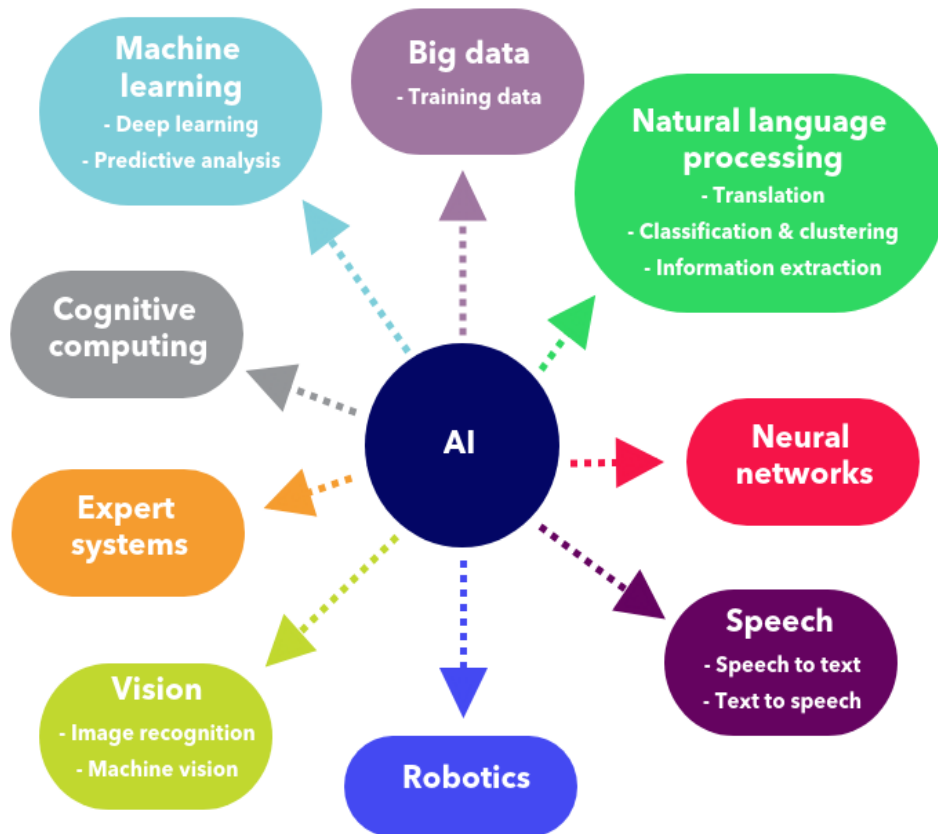
- Machine Learning (ML) is a branch of Artificial Intelligence that enables computers to learn patterns from data and make predictions or decisions without being explicitly programmed for every task.
- Machine Learning can:**
 - recognize patterns
 - classify objects
 - detect anomalies
 - make predictions

MACHINE LEARNING



AI, Machine Learning and Deep Learning

THE BRANCHES OF ARTIFICIAL INTELLIGENCE



Artificial Intelligence is the broad field of developing computer systems capable of performing tasks associated with intelligent behavior, such as reasoning, perception, learning, and decision-making

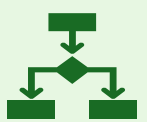
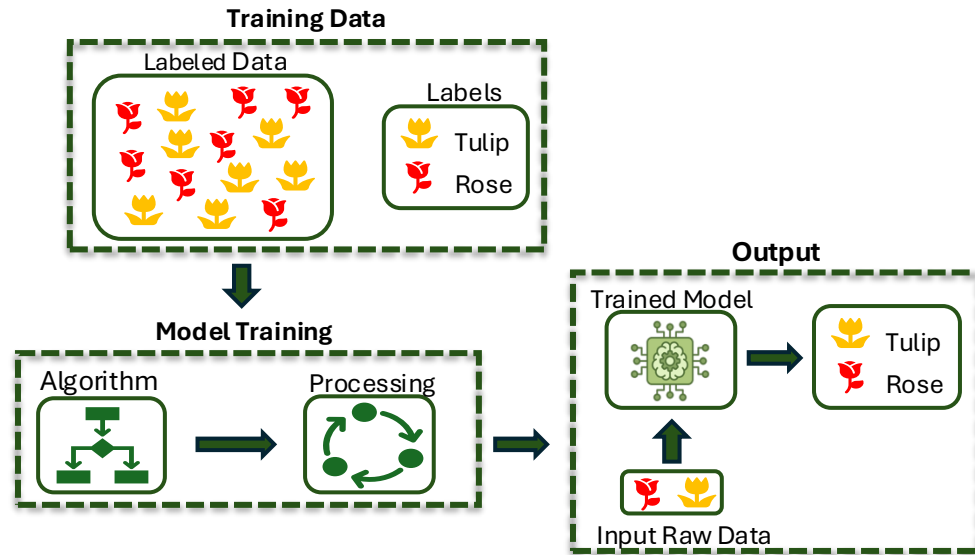
A subset of AI where computers analyze large datasets to "learn" and improve at tasks without being explicitly programmed for them

A subset of machine learning that uses multi-layered artificial neural networks to solve complex problems

Types of ML

SUPERVISED LEARNING

ML technique that uses labeled datasets to train models to identify the underlying patterns and relationships.



Main Algorithms:

- Random Forest
- Neural Networks
- Gradient Boosting
- k-Nearest Neighbors

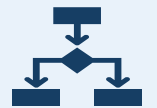
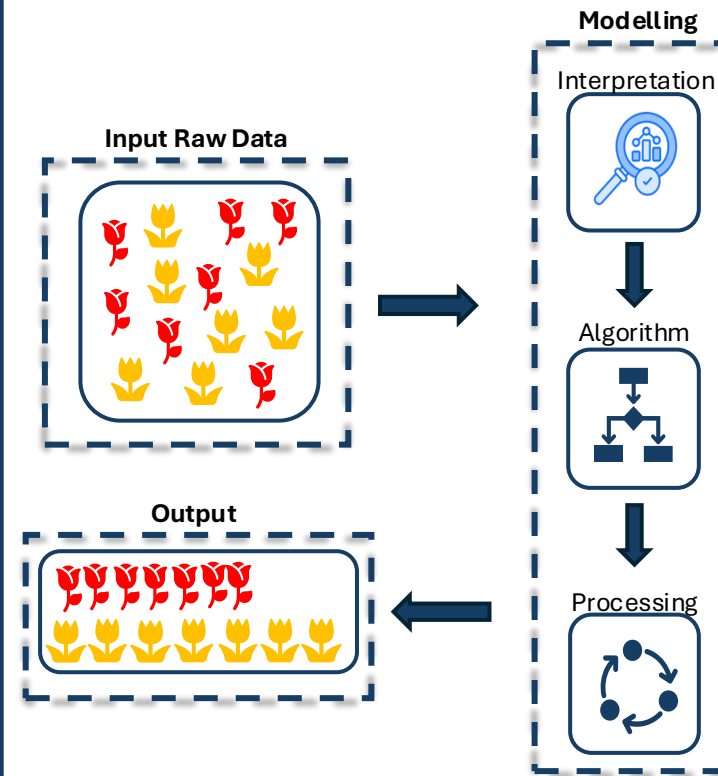


Applications:

- Crop classification
- Yield prediction
- Irrigation detection

UNSUPERVISED LEARNING

ML technique where algorithms analyze unlabeled datasets to discover hidden structures, patterns, or similarities without human intervention



Main Algorithms:

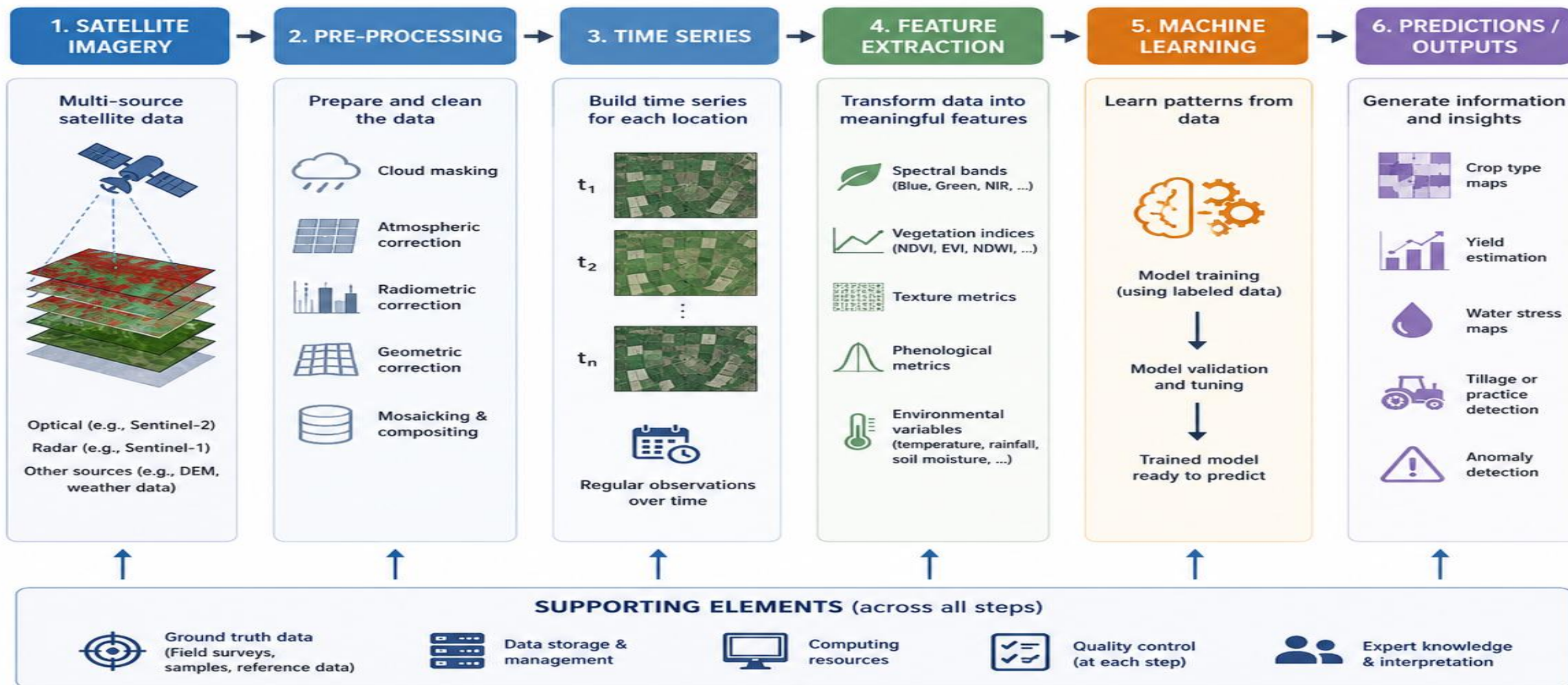
- K-means clustering
- Hierarchical clustering
- DBSCAN
- Principal Component Analysis (PCA)



Applications:

- Similar field behavior
- Clustering vegetation dynamics
- Detecting unusual fields

Typical EO + ML workflow



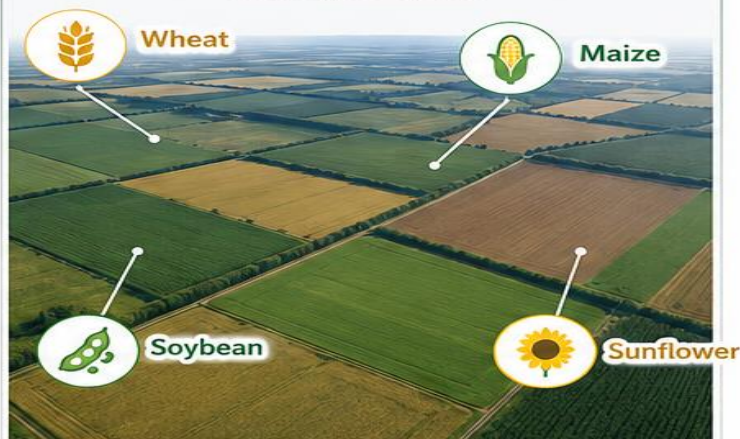
Applications

Crop classification

THE CHALLENGE

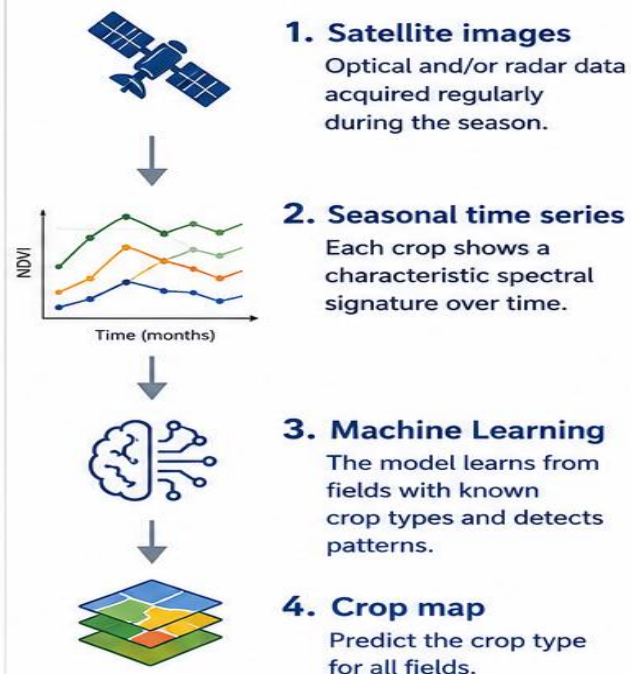
From a single image, different crops can look very similar.

Crops have distinct growth patterns over the season.



Goal: Assign the correct crop type to every field, every year.

HOW EO + ML WORK TOGETHER



OUTPUT

Crop type map for each field



- Wheat
- Maize
- Soybean
- Sunflower
- Barley
- Rapeseed
- Other
- Non-crop



Crop type for each field



Regional crop statistics



Annual crop maps

WHAT INFORMATION IS USED?



Spectral bands
(Blue, Green, Red, NIR, SWIR, ...)



Vegetation indices
(NDVI, EVI, NDWI, ...)



Seasonal evolution
(time series)



Phenological metrics
(sowing, peak, harvest dates, ...)



Sometimes radar data
(e.g., Sentinel-1) adds value

WHY IS CROP CLASSIFICATION USEFUL?



Agricultural statistics



Food security



Crop rotation monitoring



CAP monitoring



Environmental assessment



Yield estimation



By combining the power of **satellite time series** and **machine learning**, we can map crops accurately and repeatedly over large areas.

Monitoring Agricultural Practices

THE CHALLENGE

Sustainable agriculture depends on management practices that change over space and time.

These practices are not directly visible from space, but they leave spectral and temporal signatures.



Goal: Provide consistent, large-scale information on key management practices to support agroecology and informed decision-making.

HOW EO + ML WORK TOGETHER



1. Satellite data

Optical (e.g., Sentinel-2) and radar (e.g., Sentinel-1) acquired regularly.



2. Time series

Build multi-temporal profiles that capture the evolution of the field.



3. Machine learning

Models learn patterns associated with different management practices.



4. Maps of practices

Predict and map practices at field level and track changes over time.



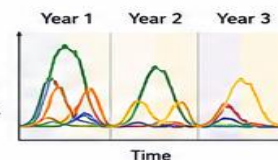
Ground truth data (field surveys, farmer records) are used to train and validate the models.

WHAT WE CAN MONITOR



Crop rotation

Identify the sequence of crops grown on the same field across seasons/years.



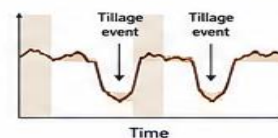
Cover crops

Detect presence of vegetation during the off-season.



Tillage

Detect soil disturbance events through changes in backscatter and spectral signal.



Irrigation

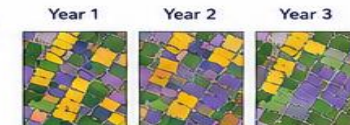
Identify irrigation events and irrigated vs. rainfed areas.



Regular monitoring throughout the season and across years makes it possible to detect practices and their timing.

EXAMPLES OF OUTPUTS

Crop rotation map (3-year sequence)



Wheat Maize Soybean Other

Cover crop map (off-season)



Tillage events (number of events)



Irrigation map (probability)



These maps help farmers, advisors and policy makers promote sustainable practices, monitor programs and target interventions.

WHY THIS MATTERS



Supports sustainable intensification and soil health



Improves water management efficiency



Reduces environmental impact and greenhouse gas emissions



Enables monitoring at scale, objectively and repeatedly



Informs policy design and incentives for agroecological practices



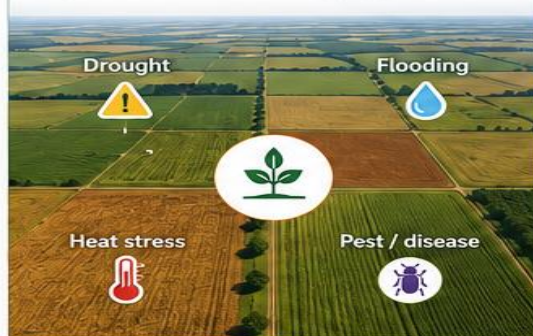
By combining satellite time series and machine learning, we can move from **seeing** fields to **understanding** how they are managed.

Yield Estimation & Anomaly Detection

THE CHALLENGE

Farmers and decision makers need to know:

-  How much yield to expect?
-  Are there areas under stress?
-  Where are unusual or risky conditions developing?



 **Goal:** Provide timely and reliable information to reduce risks and improve food security.

HOW EO + ML WORK TOGETHER



1. Multi-source data

Satellite time series (optical & radar), weather data, soil data, and historical yields.



2. Time series & features

Vegetation indices (e.g., NDVI), temperature, rainfall, soil moisture, and phenology metrics over the season.



3. Machine learning

Models learn relationships between features and yield or abnormal conditions from past data.



4. Predictions & alerts

Predict yield for each field and detect anomalies early.

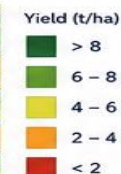


Ground truth data (field yields, recorded losses, management information) are used to train and validate the models.

WHAT WE CAN PRODUCE

YIELD ESTIMATION

Predicted yield (e.g., tons/ha)



Field-level or regional yield prediction



Seasonal forecasts and scenarios



Supports planning, markets and food security

ANOMALY DETECTION

Example: vegetation condition anomaly



Early warning of stress or losses



Drought, heat, flood, pests, diseases, nutrient stress



Focus field visits and interventions where needed

EXAMPLES OF APPLICATIONS



Farmers
Know expected yield, plan harvest, manage inputs, reduce risks.



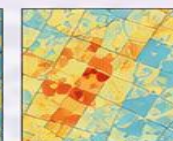
Advisors & Governments
Monitor food production, allocate resources, manage risk and insurance programs.

EXAMPLE: EARLY DETECTION OF DROUGHT IMPACT

Early season (May)



Mid season (July)



Late season (Sept)



Anomaly increases over the season



Early detection enables timely actions that can reduce yield losses.

DATA WE USE



Satellite data (optical & radar)



Weather data (rainfall, temp.)



Soil data (moisture, texture)



Management information



Historical yields

WHY THIS MATTERS



Improves food security



Reduces economic losses



Supports efficient water and input management



Strengthens climate resilience



Informs policy, insurance and emergency response



By combining satellite time series, environmental data and machine learning, we can predict yields and detect problems early—before they become visible on the ground.

Strengths & Limitations



EARTH OBSERVATION (EO)



Large area coverage

Observe millions of hectares consistently and objectively.



Frequent observations

Monitor fields every few days to follow changes through the season.

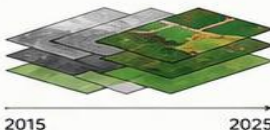


Time



Historical archives

Analyze trends and changes over years or decades.



2015

2025



Free and open data

Sentinel, Landsat and other missions provide open access to high-quality data.



EO provides the observations,
ML turns them into actionable information.

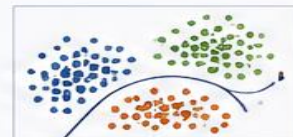


MACHINE LEARNING (ML)



Handles complex data

Learns relationships in large and complex datasets that are difficult to capture manually.



Automates mapping

Processes thousands of images quickly and consistently, reducing manual work.



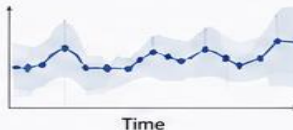
Scalable

Can be applied to large regions and many years of data without loss of consistency.



Learns patterns

Discovers patterns in the data and makes predictions for new, unseen situations.



Time



Stronger together

The combination of EO and ML enables timely, consistent and cost-effective information to support sustainable agriculture and better decision-making.





EARTH OBSERVATION (EO)



Weather & cloud cover

- Clouds limit optical observations and reduce data availability.



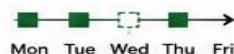
Spatial resolution

- Small fields may be mixed within one pixel.



Temporal gaps

- Revisits may miss short events or rapid changes.



Indirect measurements

- Satellites measure reflectance, not the biophysical variable directly (e.g., yield, biomass).



Historical limitations

- Older archives may have lower resolution and less consistency.



MACHINE LEARNING (ML)



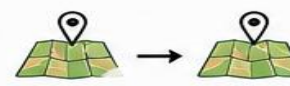
Depends on quality data

- Requires good training data.
- Poor or biased data leads to poor predictions.



Limited transferability

- Models trained in one area or year may not work well elsewhere or in other years.



Uncertainty & errors

- All models have errors.
- Uncertainty should be assessed and reported.



Model generalization: Underfitting vs. Overfitting



Underfitting

- Model is too simple.
- Misses important patterns.
- Poor performance on both training and new data.



Overfitting

- Model learns the training data too closely.
- Excellent on training data.
- Poor performance on new fields, seasons, or regions.



A good model should generalize well to unseen data.



Sensitive to data quality

- Noisy inputs, missing values or inconsistencies can strongly affect results.



OPERATIONAL CHALLENGES



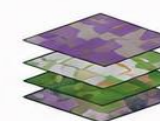
Ground truth needs

- Field data collection is time-consuming and costly. May not always be available.



Data preprocessing

- Requires technical expertise, time and careful quality control.



Computational resources

- Large datasets and complex models need storage, memory and processing power.



Continuous updates

- Models and workflows need regular updates to remain relevant over time.



Context matters

- Management practices, varieties, soil and climate differences influence model performance.



Key takeaway: EO and ML provide powerful insights, but they are not a substitute for field knowledge. The best results come from combining satellite data, machine learning and ground observations.



Related Projects and Data

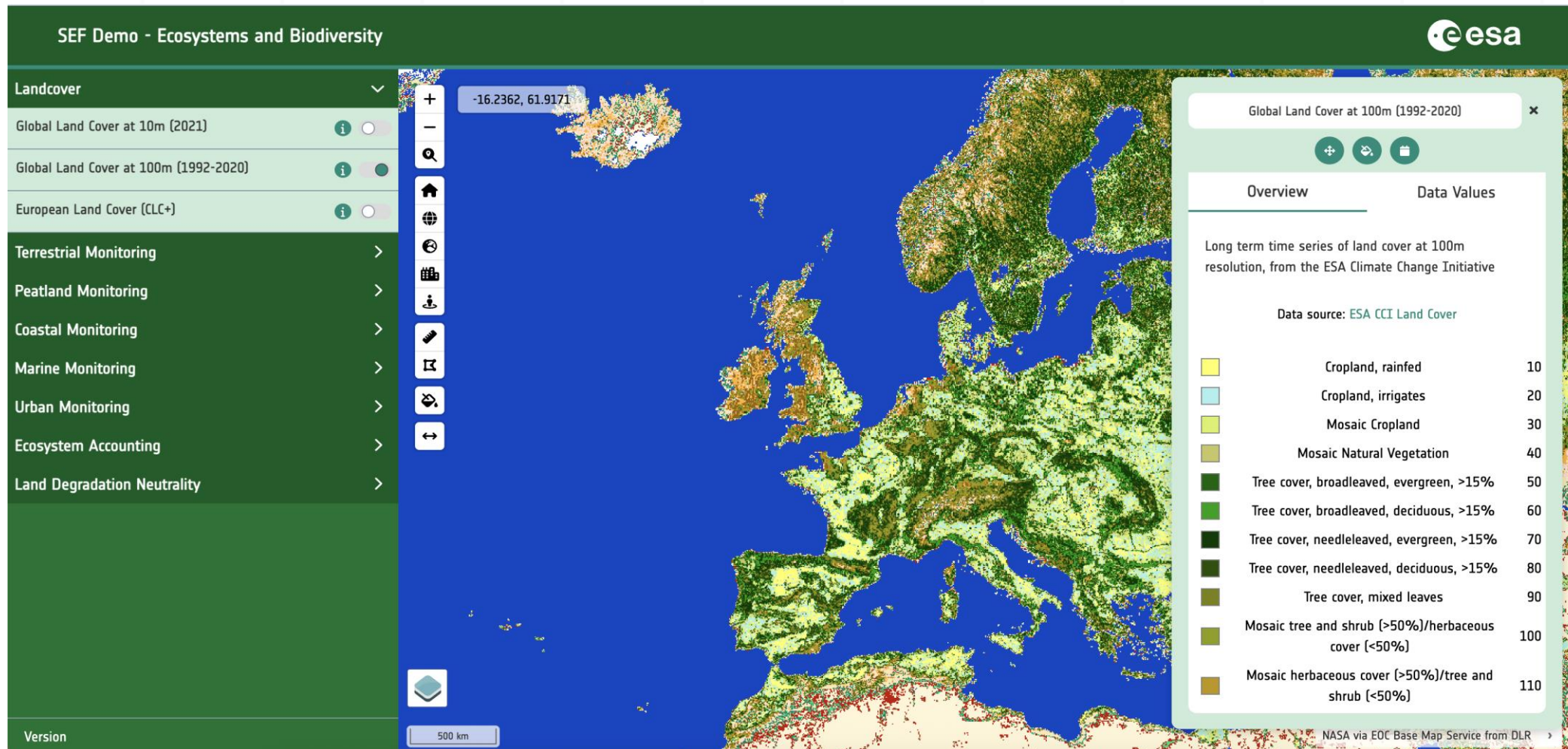
<https://explorer.sef-foodsystems.apex.esa.int/>



ECOSYSTEM



FOOD
SYSTEMS

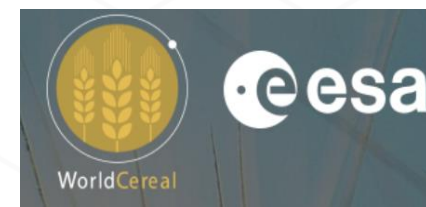




EO-based monitoring of agricultural eco-schemes under the Common Agricultural Policy (crop rotation, cover crops, grasslands, irrigation, carbon stock)



Global soil information platform supporting soil health, carbon monitoring and sustainable land management.



Global 10 m crop type, cropland and irrigation mapping using Sentinel data and machine learning.

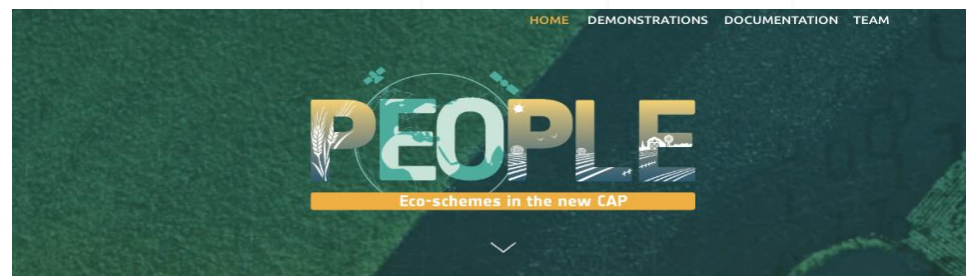


EO workflows supporting National Statistical Offices with agricultural statistics derived from Sentinel missions

World AgroCommodities



EO services supporting sustainable agricultural commodity supply chains, traceability and environmental monitoring



Pioneering the use of Earth Observation for Agriculture Eco-Schemes

Eco-schemes are a key new feature of the Common Agricultural Policy (CAP), aimed at supporting farmers in adopting sustainable practices that reduce the negative environmental and climate impacts of agriculture. By participating in eco-schemes, farmers are incentivized by the EU to preserve natural resources and deliver public goods, which offer societal benefits that are not captured by market prices. Eco-schemes are instrumental in advancing the objectives of the European Green Deal and in meeting the targets outlined in the Farm to Fork Strategy and the Biodiversity Strategy, which together aim to create a more sustainable and resilient food system in Europe.

Use case / Agricultural practice	Netherlands	Czechia	Spain (Castilla y León)	Sweden
Crop rotation		YES		
Land lying fallow	YES	YES	YES	YES
Extensive use of permanent grassland	YES		YES	YES
Winter soil cover and catch crops	YES			
Geotagged Photos	YES	YES	YES	
Managing crop water demands		YES (selected farms)		
Estimation of carbon stock		YES (selected farms)		

The main objectives of the project



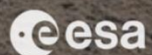
Develop innovative EO-based methods, indicators, products, tools and services to support the European Commission's New Common Agricultural Policy and its Eco-schemes.



Demonstrate and validate the developed methods in collaboration with Paying Agencies, and be able to integrate them into a national Area Monitoring System (AMS).

WORLDISOILS

Monitoring global topsoil using space-borne EO data



WORLDISOILS is an application project funded by the [European Space Agency \(ESA\)](#) developed within the [EO Science for Society](#) slice of the 5th Earth Observation Envelope Programme (EOEP-5).



WORLDISOILS Monitoring System

WORLDISOILS aims to develop a pre-operational Soil Monitoring System to provide yearly estimations of **Soil Organic Carbon (SOC)** at global scale, exploiting space-based **EO data** leveraging large **soil data archives** and **modelling techniques** to improve the spatial resolution and accuracy of SOC maps.



End-users

The project engaging and bringing together **authoritative end users** with a mandate on reporting on soils, the proximal soil mapping community, the digital soil mapping community and **EO experts** for developing in close cooperation **soil indices relevant for monitoring the global top soils** as baseline information for downstream research, institutional and commercial applications and services (e.g. reporting, soil management systems, agricultural applications, ...).



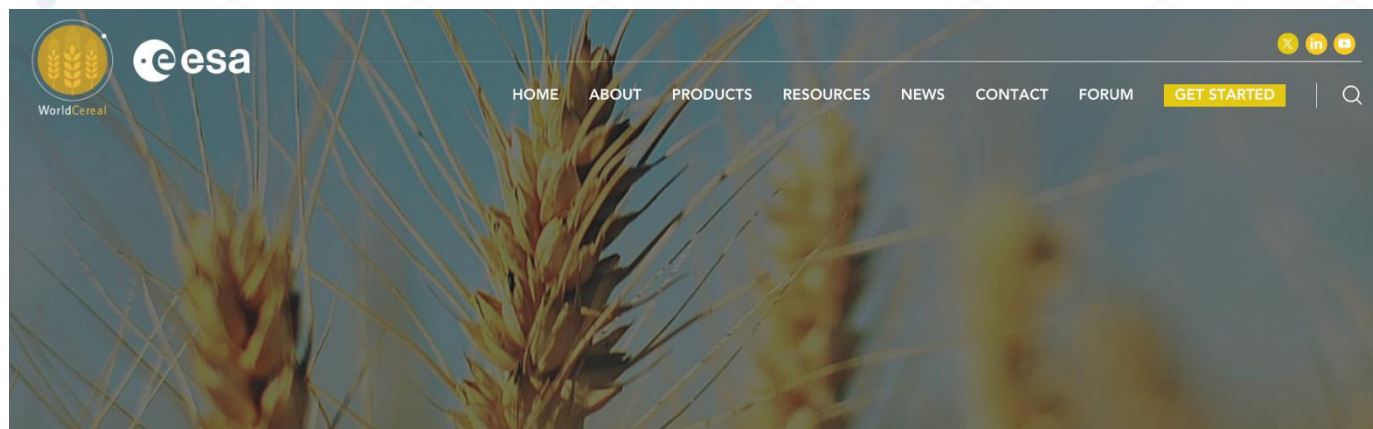
Case Studies

The EO-driven approach has been tested in **three pilot regions** to validate the system. These regions represent **different bioclimatic regions of European territory** with a range of vegetation types, land use and soil types.

SOC Product Browser

WORLDISOILS provides a Graphical User Interface based on web service to allow users downloading the SOC products generated by this monitoring system. Click in the image below to open a new window with the product browser:





Towards an open, user-friendly, customisable global crop mapping system to support global food security

WorldCereal is a research project funded by the European Space Agency, aimed at providing a free, cloud-based processing system to generate high-resolution custom crop location and type products at local and global scales.

Learn more about our [objectives](#) and subscribe to the WorldCereal mailing below to stay informed!



VIEW AND DOWNLOAD WORLDCEREAL MAPS

The WorldCereal project produced the first **seasonally updated temporary crops, crop type, and irrigation maps** at 10-meter spatial resolution and at global scale. Currently, our product collection contains data for 2021, but more products will be added by the end of 2026.

We recommend using the official [WorldCereal Interactive Viewer](#) to quickly visualise our global maps and associated statistics. You can find guidance on how to use this application [here](#).



WorldCereal 10 m resolution temporary crops map for 2021.

There are also several ways to download the products for integration into your own applications:

- Do you want to **download a portion of the map for your area of interest**? Use our convenient [web interface](#) to draw your area and start the download with just a few clicks! Get detailed instructions on [Github](#) or in this [video](#).
- Or do you want to **download the full global products**? Consult our product collection in our [Zenodo repository](#).



What we provide



Cost efficiency

Using EO data in a statistical framework to maximize the statistics accuracy (i.e. low variance) at low cost (free data, «simple» methods).



Spatial Disaggregation

Using EO data to allow statistics disaggregation at over smaller administrative areas (e.g. province, county).



Sampling design

Using EO data to support the building of an area sampling frame and to find the optimal samples size and segments size.



Estimates Timeliness

Using EO data to forecast statistics before the official publication and possibly, provide seasonal estimates.



Reduce uncertainties in survey data

Using EO data to support the calculation of specific indicators of interest for the SDG's reporting.



SDG's reporting

Using EO data to contribute to increasing the quality of the ground data collected through official agricultural surveys.

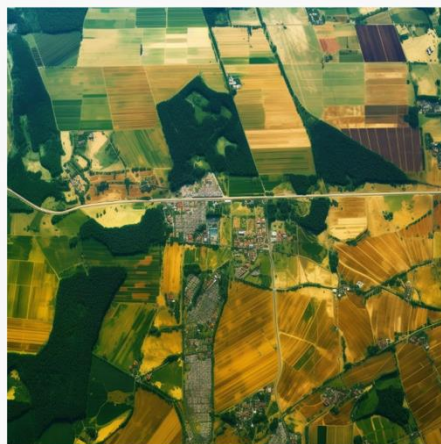
Strengthening agriculture with EO & statistics

The Sen4Stat open-source system ingests and processes automatically Sentinel-1, Sentinel-2 and Landsat 8 time series in a seamless way in order to deliver automatically or on request 5 types of products:

1. 10-m optical cloud-free and SAR temporal syntheses.
2. Time series of spectral indices (NDVI, NDWI, coherence, etc.) and biophysical variables (LAI, FAPAR, FCOVER).
3. 10-m crop type maps along the season based on in situ dataset and stratification.
4. Large set of crop growth condition metrics (including meteorological data).
5. Crop yield estimation at various aggregation levels (national, regional, etc.).

It is associated with statistical modules to integrate these EO products with statistical surveys and support improved agricultural statistics. Sen4Stat is an open source operational solution for national processing and for local applications, in near real-time along the satellite data acquisition or off-line, on the cloud or locally. It is easily configured through a graphical user interface to launch the production and monitor the

Our system is designed to be versatile, whether you want to use it locally or on the cloud. You can download the necessary package for free and start exploring it right away!



Discussion

Key Takeaways

- EO enables regular monitoring of agricultural systems.
- Time series reveal seasonal dynamics.
- ML transforms satellite measurements into actionable information.
- EO and ML complement, rather than replace, field observations.
- Understanding the limitations is essential for responsible use.



Discussion

- What are the biggest monitoring challenges in your work?
- Which agroecological indicators would be most useful?
- What information is still missing from current EO products?
- How could EO better support sustainable agriculture in your context?



The LifeWatch ERIC Biodiversity & Ecosystem eScience Conference

PLOVDIV, BULGARIA

7-10 JULY 2026



LEARN MORE

Case studies, recordings, updates,
resources, geospatial explorer...

sef.apex.esa.int → Ecosystems & Biodiversity



THANK YOU!

Questions?

esa-sef@evenflow.eu