



→ **COPERNICUS**

SENTINELS SERVING SOCIETY AND THE ENVIRONMENT

Serving Agriculture but not only...
Monitoring – Precision - Control

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GEOAPIKONISIS S.A. 
CONSULTING ENGINEERS - GEOINFORMATION APPLICATIONS

Outline of the Presentation

The System Approach

“Agricultural Community”: Local 2 Global Actors & Objectives

“Agricultural Community”: Local 2 Global Activities & Tools

“Agricultural Community”: Creating value - Local 2 Global

Missions to Accomplish/ Precursor Services and Copernicus Sentinels

Agriculture Sector Sustainability

Food for ALL

Environment to LIVE

Copernicus Space Component: ESA Sentinels Mission

Opening... the data

The SMEs

Concluding Commentary

“Agricultural Community”: Local – 2 – Global **Actors & Objectives**

□ Policy

- EU; EUROSTAT, EC, EEA, etc
- G: FAO, WFP, etc
- N: Ministries (Environment/ Rural Development, etc)

□ Market

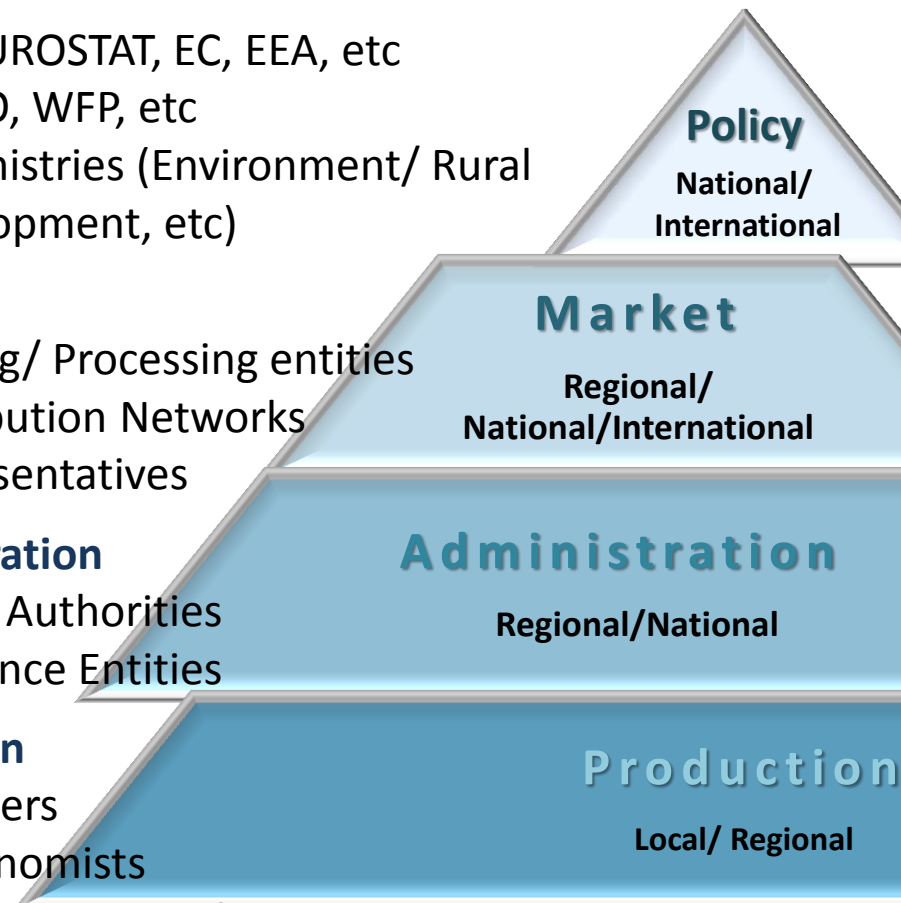
- Trading/ Processing entities
- Distribution Networks
- Representatives

□ Administration

- Public Authorities
- Insurance Entities

□ Production

- Farmers
- Agronomists
- Machinery suppliers
- Labor



- Climate Change; Assessing Risks & vulnerabilities, Optimize resilience
- Ensure vitality of rural areas
- Account/ Soothe economic disparities & Regional differences
- Food Safety & Quality

- Regularize World commodity prices

- Profit, Logistics Optimization

- Natural Resources Protection
- Risks Management
- Subsidies/ Compensations Allocation

- Yield/ Quality optimization
- Climate change mitigation and adaptation

“Agricultural Community”: Local – 2 – Global **Activities & Tools**

Policy

- Assessments
Environment, Rural Development, Risks
- Best Practices & Guidelines
- Monitoring (changes, trends)

- Farm Structure Survey
- FAOSTAT, EMPRES Food Safety, GIEWS, FCC
- Indicators & Statistical Data
- Subsidies

Market

- Trade
- Distribution

- Crops' yield & health data
- Production volume
processed/ directly available

Administration

- Insurances, Control
- Environment Protection
- Natural Resources management
- Monitoring

- Local/ Regional Experts
consultation
- Best Practices/ Directives
- Statistical & Direct Data
- Subsidies/ compensation rules

Production

- Crop Growing
- Yield optimization/ Environment
- Consultancy

- Growing season conditions
- Crops' Health/ stress data
- Pesticides, Nutrients Application

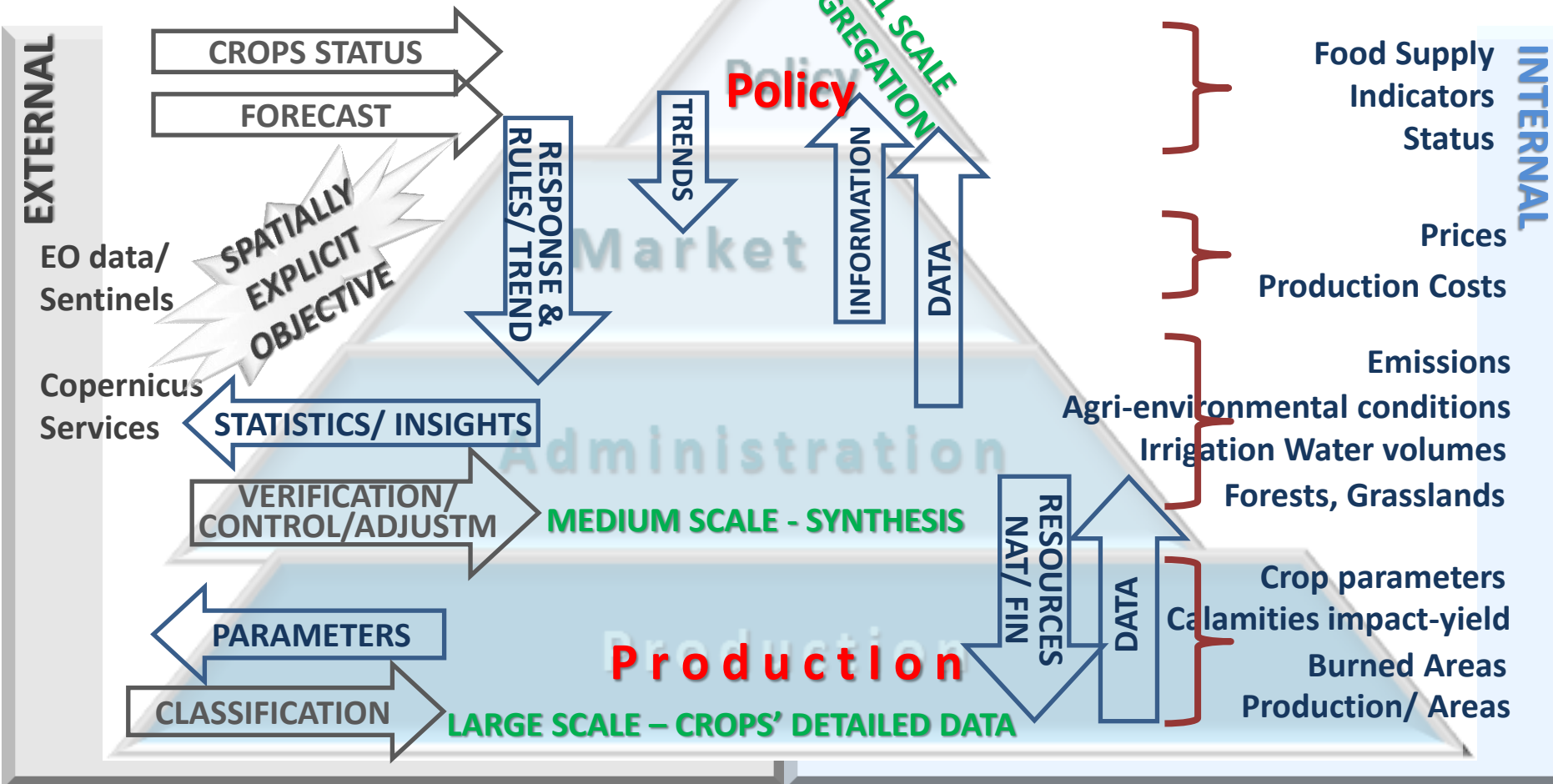
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“Agricultural Community”: Creating value from Local – 2 - Global

Detailed spatial scale of information 4 Planning

Policy Level Requirement



Mission:

Exacerbated negative factors

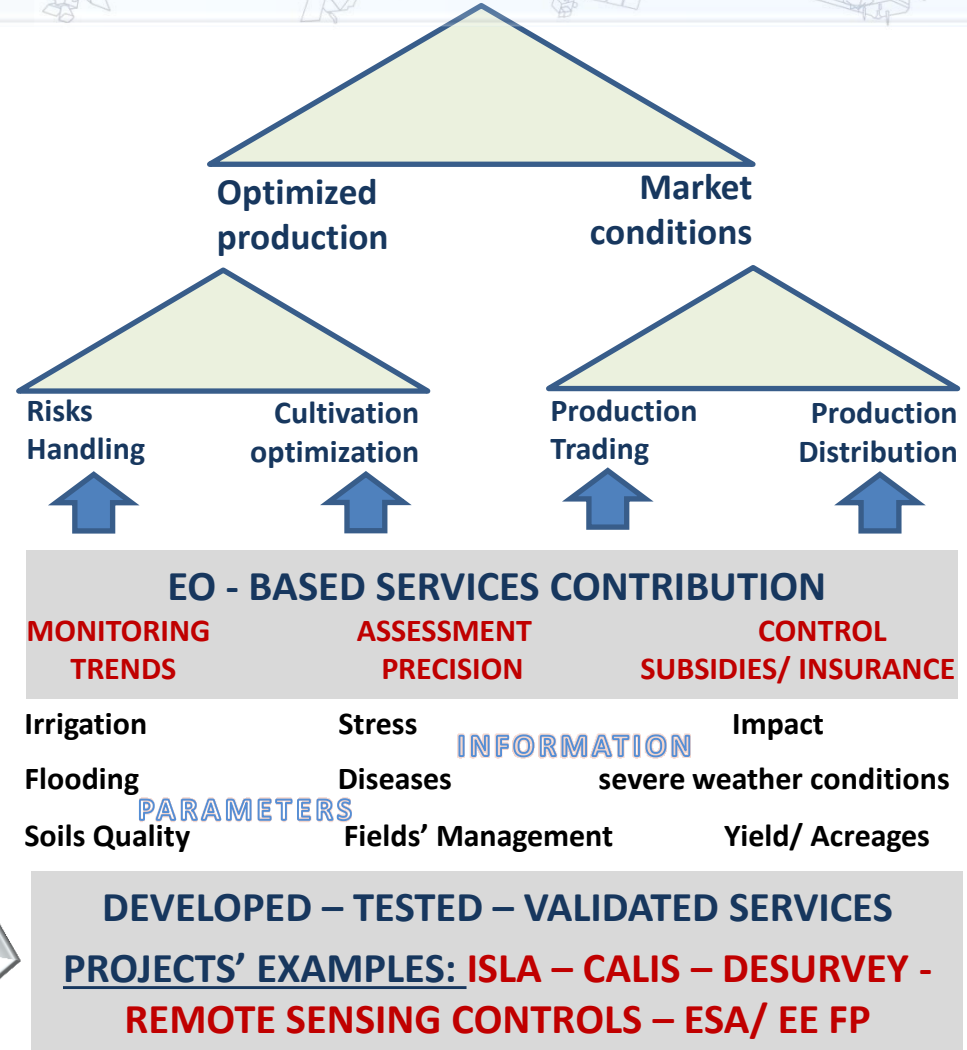
- ❑ **Economic and financial crisis**; severe price fluctuations, and squeezed margins owing to higher prices for inputs such as feed and energy”
- ❑ **Environment at risk**; climatic changes impacting also agriculture and livestock

SENTINEL 2

- ❑ high-spatial resolution
- ❑ wide swath
- ❑ dense spectral sampling
- ❑ systematic geographical coverage
- ❑ frequent temporal revisit

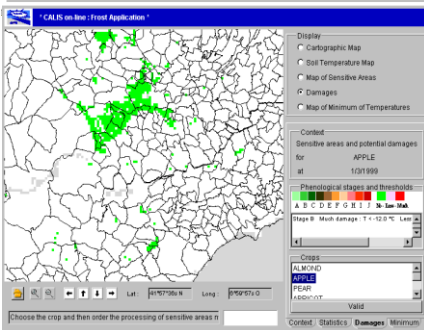
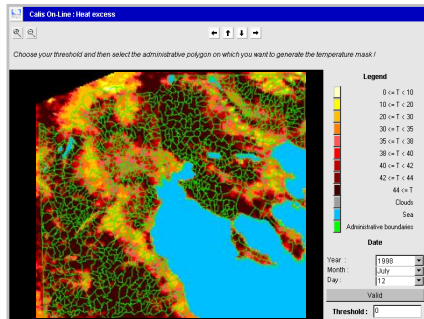
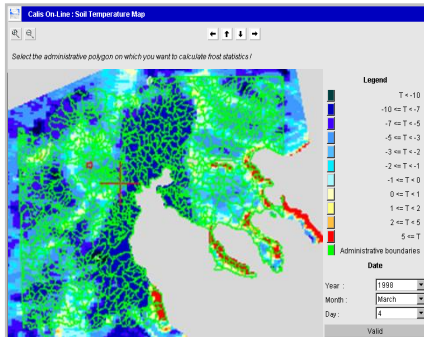


ECONOMIC VIABILITY



Mission:

ECONOMIC VIABILITY



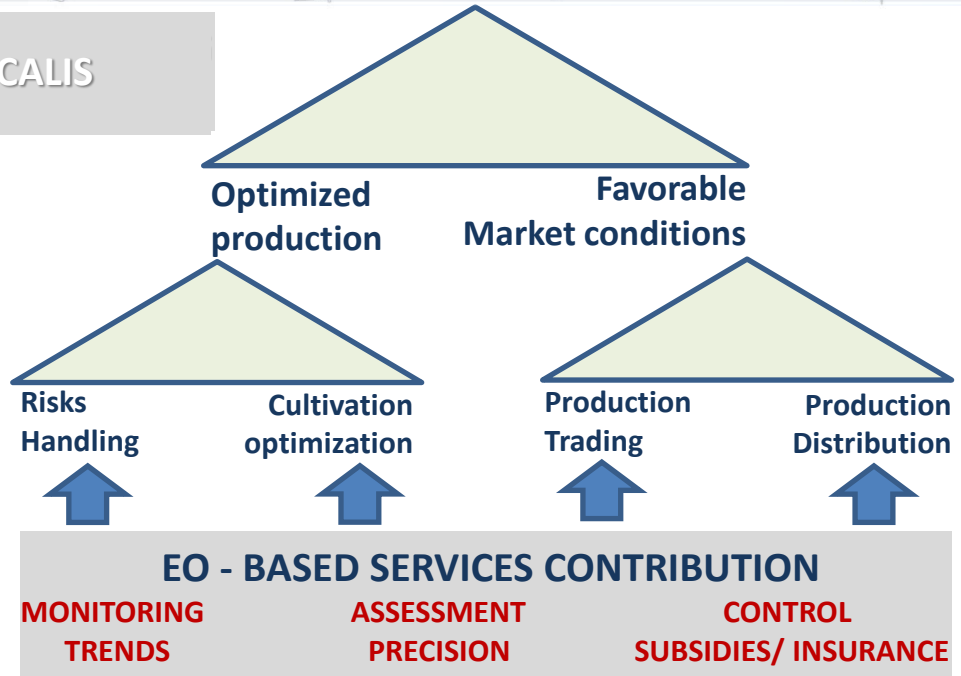
Spatially Explicit Information
Daily Data

MIN Temp

MAX Temp Frequency

Impact on yield

CALIS



Mission:

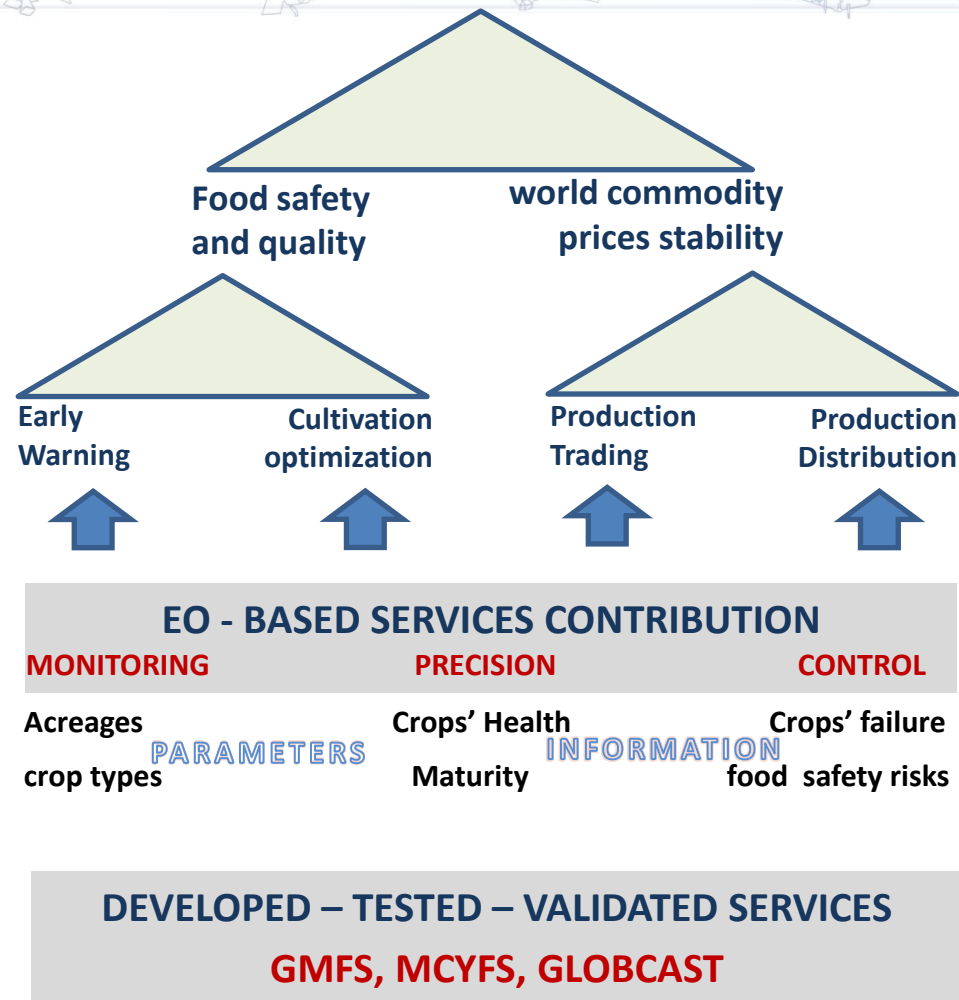
FOOD FOR ALL

Food for more than seven billion...

- Food safety emergencies; Crop failure or famine threads
 - Early warning,
 - Prevention
 - Rapid response
- Well-functioning markets; mitigation-management of risks associated with excessive price volatility of agricultural commodities

SENTINEL 1,2,3

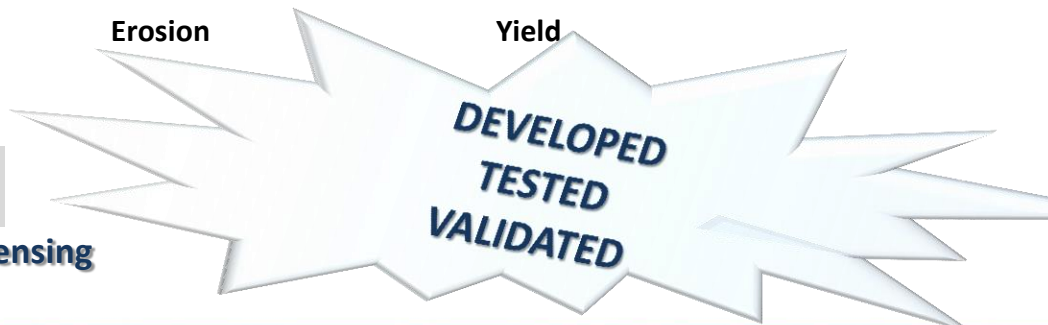
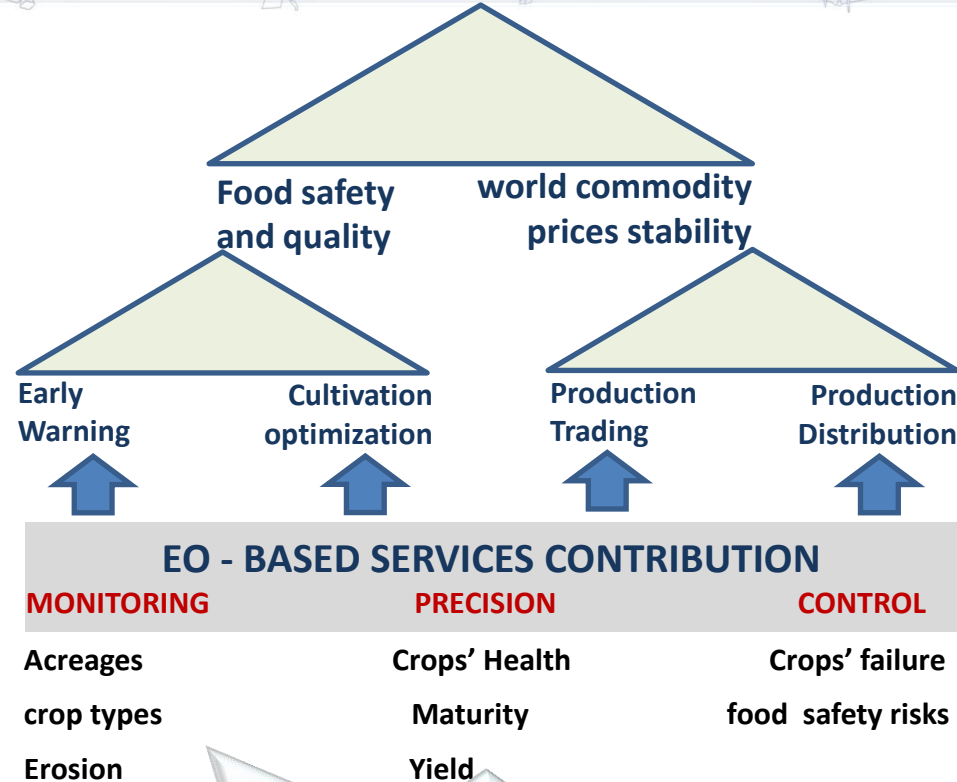
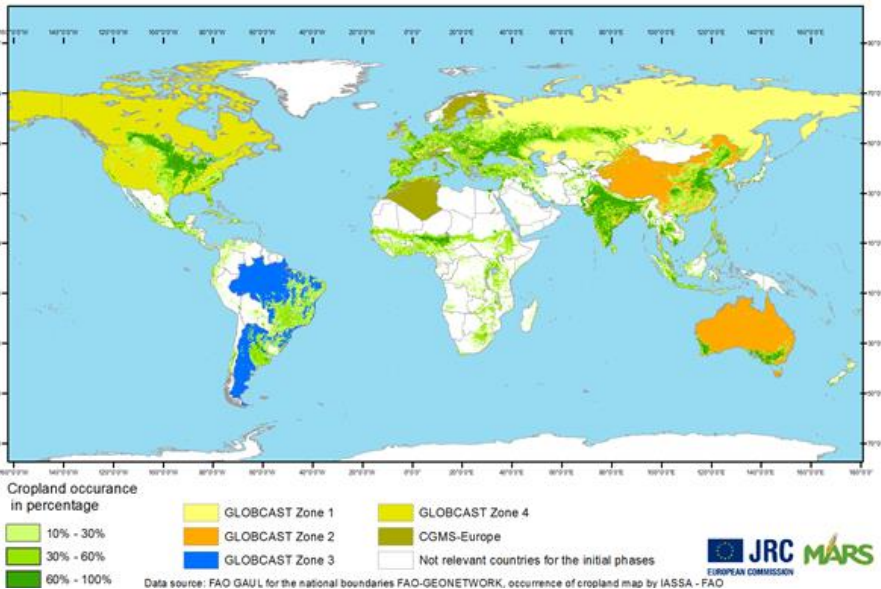
- water and soil
- geophysical variables (leaf chlorophyll content, leaf water content, leaf area index, etc.)
- crop status and growth



Mission:

FOOD FOR ALL

GLOBICAST MONITORING ZONES



GLOBE CAST

MARS Project: Monitoring Agriculture with Remote Sensing

Mission:

Agriculture: Greater demands / land degradation

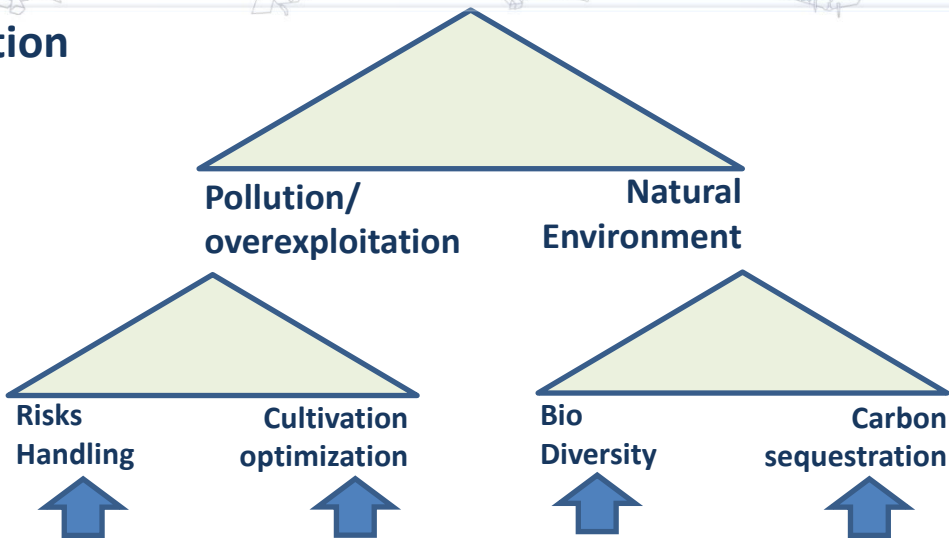
- ❑ Soil processes disrupted each year; monocultures' planting, clear-cutting crop roots, etc
- ❑ Usage of fertilizers; containment, prioritize environmentally-friendly
- ❑ Environment at risk; Farmers' contribution to climate change mitigation and adaptation, biodiversity, protection of water, development of organic farming, etc;

SENTINEL 1,2,3

- ❑ land cover, usage and change-detection; forest, water and soil, agriculture
- ❑ geophysical variables (leaf chlorophyll content, leaf water content, leaf area index, etc.)
- ❑ risk mapping
- ❑ sea and land surface temperature



ENVIRONMENT TO LIVE



EO - BASED SERVICES CONTRIBUTION

MONITORING
EARLY WARNING

ASSESSMENT
PRECISION

CONTROL
SUBSIDIES

Frost, Hail, etc
Water scarcity

PARAMETERS

Desertification
Fertilizers

INFORMATION

grasslands/ forests
cross - compliance

DEVELOPED – TESTED – VALIDATED SERVICES

CALIS – DESURVEY - GAEC – GEOLAND2

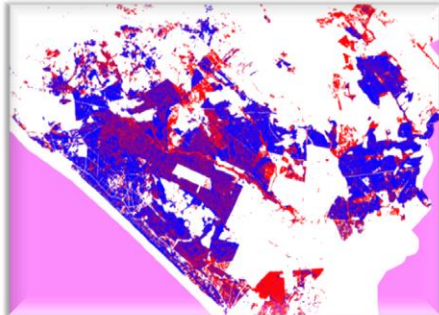
Mission:

ENVIRONMENT TO LIVE

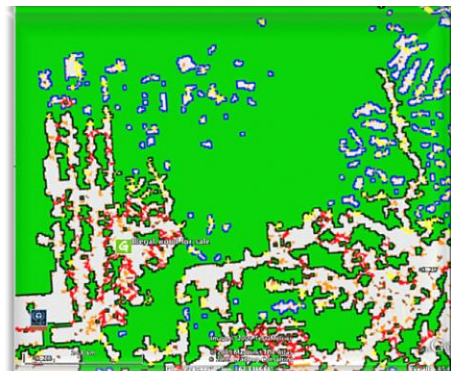
FOREST AREAS



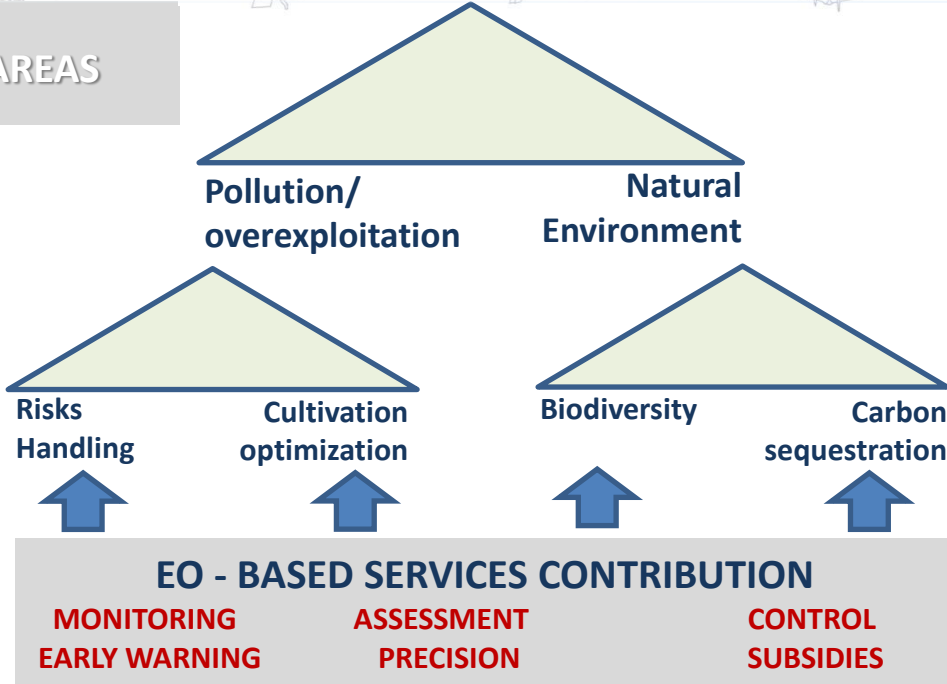
Forest Cover



Forest Types

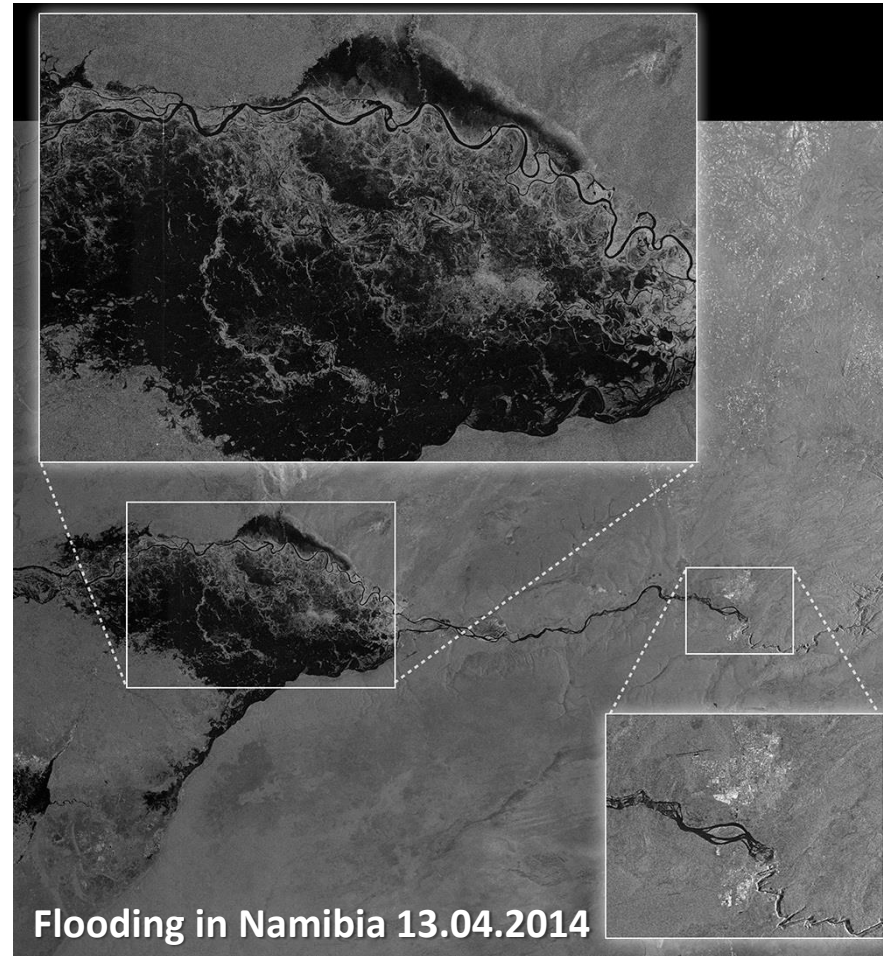


Fragmentation and Connectivity



Copernicus Space Component: ESA Sentinels Mission

- ❑ Sentinel satellites developed specifically for the **needs** of the Copernicus program
- ❑ Contributing Missions (already providing data): complementary after the Sentinels are in orbit
- ❑ **Optimization** of products availability; some hours after acquisition
- ❑ **Assure** the continuity of already developed services
- ❑ **Encourage** the amplification of the services' domain
- ❑ **Full** and **open access** of data acquired from the ESA's Collaborative Ground Segment (Mirror sites)



Opening... the Data

1/2

- ❑ The **Sentinels** data are open and allow free access (Mirror sites)
- ❑ **INSPIRE** (Directive 2007/2/EC) to support environmental policy and to overcome barriers affecting the availability and accessibility of relevant data;
 - Spatial data collection inconsistencies
 - Lack of compatibility among spatial datasets
 - Institutional and legal barriers preventing or delaying the sharing of existing spatial data, etc
- ❑ **Enhanced processing capacities** (supply costs/ technical characteristics) are a reality for the vast majority of stakeholders
- ❑ **Clear benefits** if a common – borders’ agnostic - “geospatial language” is established

Opening... the Data

2/2

□ Free and open data supply to the “Agriculture Community”

- Dimensioned to serve many users in the agricultural domain, without discrimination; farmers, processors, agronomists/ consultants, farmers’ associations, administration, etc
- Alleviates services’ design, implementation and maintenance from tedious/ costly data acquisition processes
- Contributes in amplifying the services domain and enhancing standardization, value of the resulting information and products

□ **Characteristic Example:** Opening LPIS data; parcels’ limits and crop type, orthos, landscape features

➤ In combination with...

Sentinels data: facilitates/ expands local data towards spatially explicit and comprehensive (regional/ national) assessments while allowing the localization of changes’, characteristic landscapes, abandoned areas (status/ distribution) and planning of (new) cultivations, etc.

Copernicus services component: understanding trends, evaluate efficiency of policies (sector & cross sector), assess environmental impact, etc.

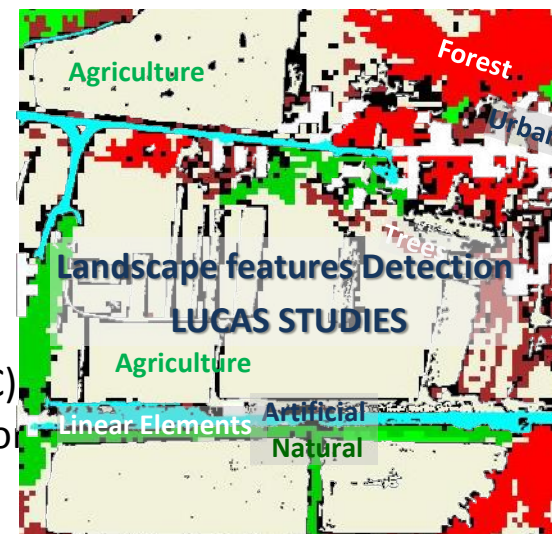
➤ As is...

Measurable data on agricultural management and cultivation practices, resources sufficiency optimization, etc.

The SMEs

- ❑ **Provision of services** at all levels of the “**agriculture community**”
- ❑ **Integration capacities** for enlarging communication and enhancing knowledge **between and among** stakeholders of the different levels
- ❑ **Ample technological background**
 - ❑ **EU R&D projects and experiences**; GMES Service Element, ESA - EOEuropa, Emergencies Response, Precision Agriculture, Water Management, etc
 - ❑ **Operational Services**; COPERNICUS, RS Controls, LPIS, Monitoring the Landscape status, LBS, etc.

- ❑ **Building new service cases**
 - ❑ **Knowledge**
 - Local/ regional conditions, parameters
 - Technology background & needs of stakeholders
 - Agricultural practices
 - ❑ **Processing of Information**
 - Flow / Cross usage; e.g Sentinels' classifications & LPIS (GAEC)
 - Value adding information; stress/ agri-environmental indicators monitoring of particularly important landscapes, etc.
 - Enrichment; multimedia, satellite communications, etc.





Concluding Commentary

- ❑ Copernicus Services Component, through its LAND and EMERGENCY RESPONSE domains already produces and delivers information, which is valuable also for the “agriculture community”
- ❑ Copernicus Space Component enhances the EO monitoring/ assessment capacity through a number of improved characteristics; coverage, timeliness and reliability.
- ❑ EO based **Mature** services - *design, development, test/ operation, validation* – form an ideal technological background for improving the production and provision of systematic and objective information to the “agriculture community” stakeholders through adequately integrating the Sentinels’ imagery
- ❑ Copernicus Program and INSPIRE directive are a solid basis for **Growth** and **Innovation** (geospatial technology SMEs) within EU
- ❑ Appropriate Data opening strategies are of paramount importance towards services and information efficiency, enlargement of the users’ community and transparency & control. Urgent actions have to be undertaken for their implementation by the relevant authorities



END OF THE PRESENTATION

**THANKING YOU...
FOR YOUR ATTENTION!!!!**

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