SIGMA

Stimulating Innovation for Global Monitoring of Agriculture

AGRICAB

Overview

Linking projects…

21 November 2013

SIGMA - Facts

- Start 1 November 2013 – 30 March 2017
- Agriculture AND Environment
- 22 partners, 17 countries
  - VITO, CIRAD, JRC, IIASA, Alterra, RADI, NMSC, DEIMOS, GeoSAS, RCMRD, Aghrymet, RCMRD, Sarvision, Sarmap, INTA, Geoville , UCL, EFTAS, FAO, ITC, GISAT, IKI, SRI
- Argentina, Ukraine, China, Russia, Africa, USA, Brazil, Vietnam, Belgium, …
- 9 M EUR
- GEO! (& GEOGLAM)

EUROPEAN COMMISSION / European Research Area / Environment

EARTH OBSERVATION

SIGMA
Stimulating Innovation for Global Monitoring of Agriculture

AT A GLANCE

Title: Stimulating Innovation for Global Monitoring of Agriculture and its Impact on the Environment in support of GEOGLAM

Instrument: FP7, Collaborative Project

Duration: 42 months

Start Date: November 2013

Consortium: 22 Partners from 17 countries

Project Coordinator: VITO

Project Web Site: www.sigma.info

Key Words: Agriculture, remote sensing, Global, Innovation, GEOGLAM, GEO

Contact: esiteSigma@vito.be

Photo Credit: Isabelle Piccard

THE CHALLENGE

Global population has increased from about 2.5 billion in 1950 to more than 7 billion in 2012 and is projected to reach more than 9 billion by 2050. According to FAO, to achieve *food for all*, **global food production will need to grow** by 70% and up to 100% in developing countries. ***Sustainable intensification of agriculture*** is thereby imperative, requiring a thorough understanding of the impact of shifting cultivation practices on the environment. In this perspective, earth observation based information systems, which are currently mostly focused on **short term** agricultural productivity forecasts, will need to be enhanced with the capacity to assess **the dynamics** of cultivation practises and their **impact on productivity and the environment**. This is a key requirement to explore possible pathways towards sustainable agriculture in the **long term**.

PROJECT OBJECTIVES

The **GEOGLAM** Initiative (Global Agricultural Monitoring), a key component of **GEO** (Group on Earth Observation), aims to improve transparency in global agricultural monitoring. SIGMA's objective is to **actively contribute to GEOGLAM** and in specific to its **research agenda** through the development of methods and products that will enable to better formulate answers to the following sustainability questions:

How and where do changes in crop land distribution affect other ecosystems?

Earth observation

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AGRICAB: Strenghtening Africa's EO capacity for agriculture & forest management

- Start date: 1 October 2011 – 30/03/2015
- Consortium of 17 Partners from 12 countries
  - VITO, RCMRD, ITC, Alterra, ITA, INAM, ILRI, GeoSAS, CSE, CSIR, OSS, ULG, AGHRYMET, INPE, ITC, DRSRS, UEM
- Case studies in South Africa, Tunisia, Kenya, Senegal and Mozambique
- 3.5 M EUR
- GEO! (& GEOGLAM)

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EARTH OBSERVATION

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AT A GLANCE

Title: A Framework for Enhancing EO capacity for Agriculture and Forest Management in Africa as a Contribution to GEOSS

Instrument: FP7, Collaborative Project (SICA)

Total Cost: 4,091,395 EUR

EC Contribution: 3,499,237 EUR

Duration: 42 months

Start Date: October 2011

Consortium: 17 Partners from 12 countries

Project Coordinator: VITO

Project Web Site: www.agricab.info

Key Words: Agriculture, remote sensing, capacity building, Africa

Photo Credit: Thierry Gresen

THE CHALLENGE

GOOD MANAGEMENT REQUIRES GOOD INFORMATION, AND SCIENCE PLAYS A KEY ROLE IN UNDERSTANDING THE DYNAMICS OF AGRICULTURAL AND FOREST RESOURCES. AGRICULTURE IN AFRICA IS DIVERSE AND RANGES FROM SUBSISTENCE TO LARGE COMMERCIAL FARMING. REMOTE SENSING PROVIDES RECURRENT INFORMATION ON NATURAL RESOURCES IN VARIOUS TIMESCALES AND PERIODS. THE KEY CHALLENGE IS TO ENHANCE SCIENTIFIC AND REMOTE SENSING CAPACITY IN AFRICA TO ENABLE AFRICAN INSTITUTES TO INDEPENDENTLY MONITOR AND GENERATE INFORMATION ON AGRICULTURAL AND FOREST RESOURCES TO ADEQUATELY SUPPORT MANAGEMENT AND POLICY ACTIONS.

PROJECT OBJECTIVES

AGRICAB AIMS TO DEVELOP A FRAMEWORK FOR ENHANCING EARTH OBSERVATION CAPACITY TO SUPPORT AGRICULTURE AND FORESTRY MANAGEMENT IN AFRICA. IT AIMS AT IMPROVING AND SUSTAINING CAPACITY FOR DATA ACCESS, AGRO-METEOROLOGICAL MODELING, EARLY WARNING, AGRICULTURAL STATISTICS, LIVESTOCK MONITORING AND FOREST MAPPING. THESE COMPONENTS ARE DEVELOPED THROUGH SPECIFIC CASE STUDIES IN SENEGAL, KENYA, TUNISIA, MOZAMBIQUE, SOUTH AFRICA AND NIGER LEADING TO DEDICATED TRAINING ACTIONS CAPITALIZING ON THE FINDINGS.

Earth observation

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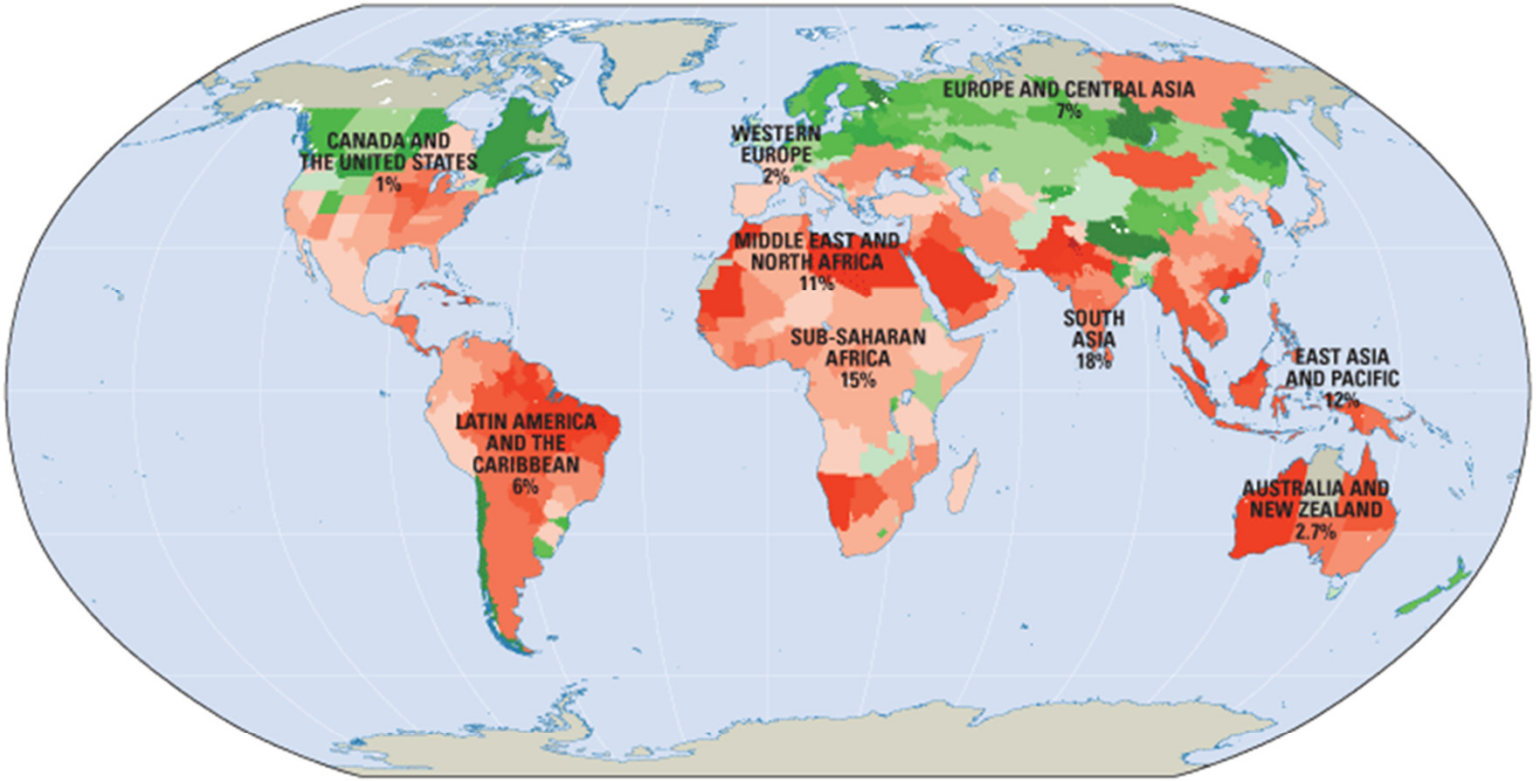
Sharing knowledge & Capacity building

- +50 organizations

Climate change will depress agricultural yields in most countries in 2050, given current agricultural practices and crop varieties



Sources: Müller and others 2009; World Bank 2008c.

Note: The coloring in the figure shows the projected percentage change in yields of 11 major crops (wheat, rice, maize, millet, field pea, sugar beet, sweet potato, soybean, groundnut, sunflower, and rapeseed) from 2046 to 2055, compared with 1996–2005. The yield-change values are the mean of three emission scenarios across five global climate models, assuming no CO_2 fertilization (a possible boost to plant growth and water-use efficiency from higher ambient CO_2 concentrations). The numbers indicate the share of GDP derived from agriculture in each region. (The share for Sub-Saharan Africa is 23 percent if South Africa is excluded.) Large negative yield impacts are projected in many areas that are highly dependent on agriculture.

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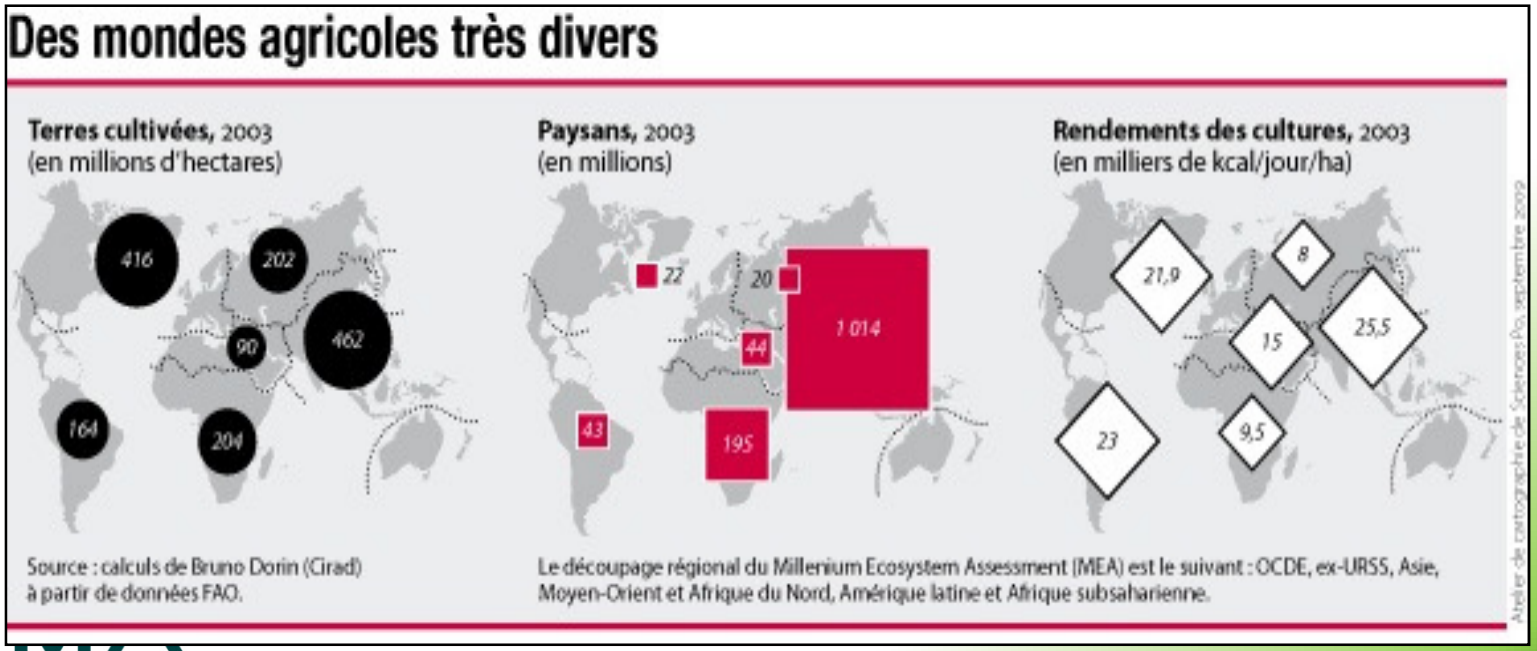
Challenge

- 2050 – 70% increase in agricultural productivity?
- Sustainable *intensification of agriculture:*
  - Agricultural Expansion
  - Agricultural Intensification



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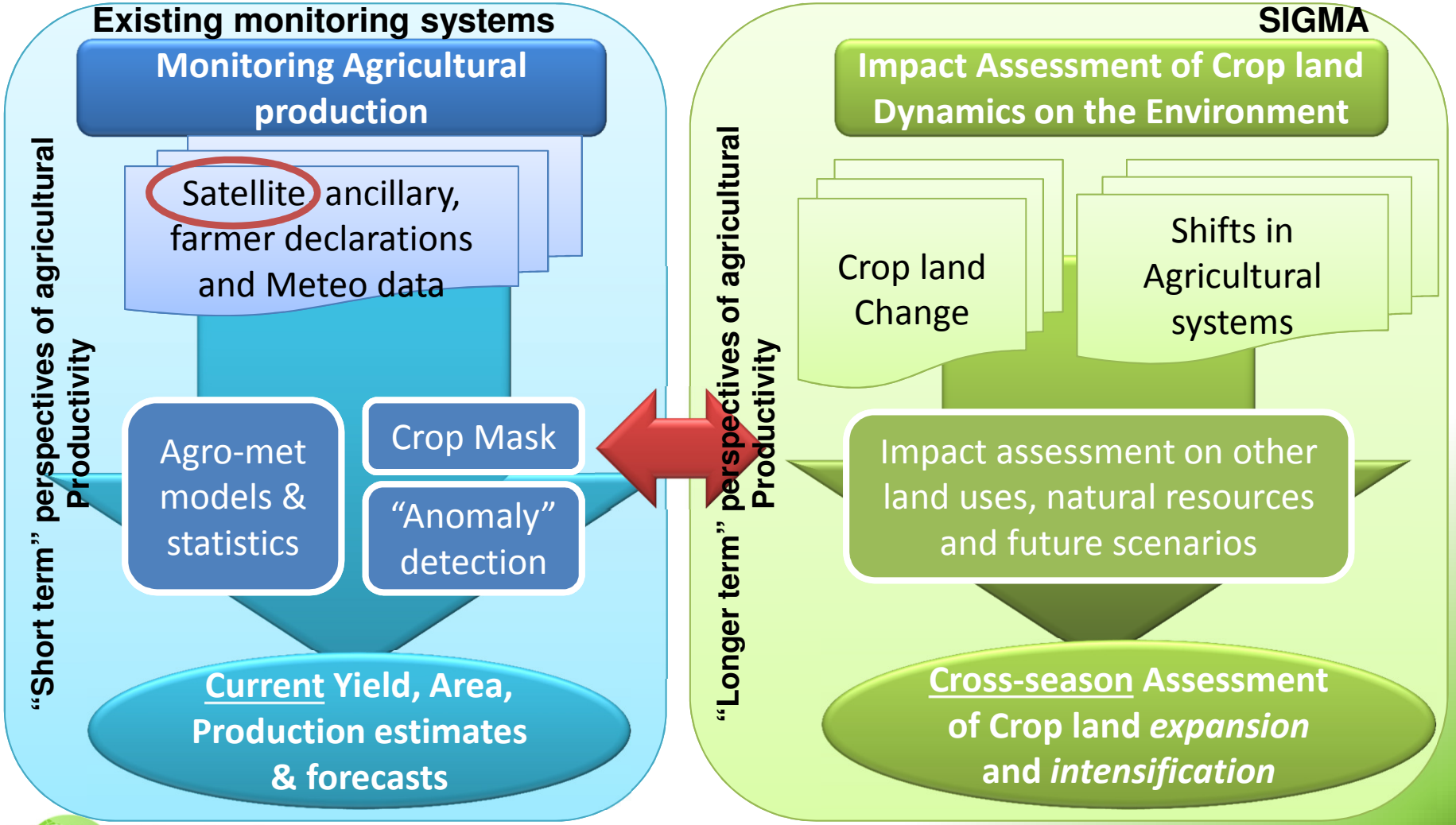
SIGMA Concept



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Activities

Land cover & crop land assessment

(UCL)

Agricultural Productivity

(Alterra)

Env. Impact Assessment of Land use change

(IIASA)

Sites: IKI RAN, SRI, RADI, CIRAD, INTA, VITO, UCL, GEOSAS, AGHRYMET

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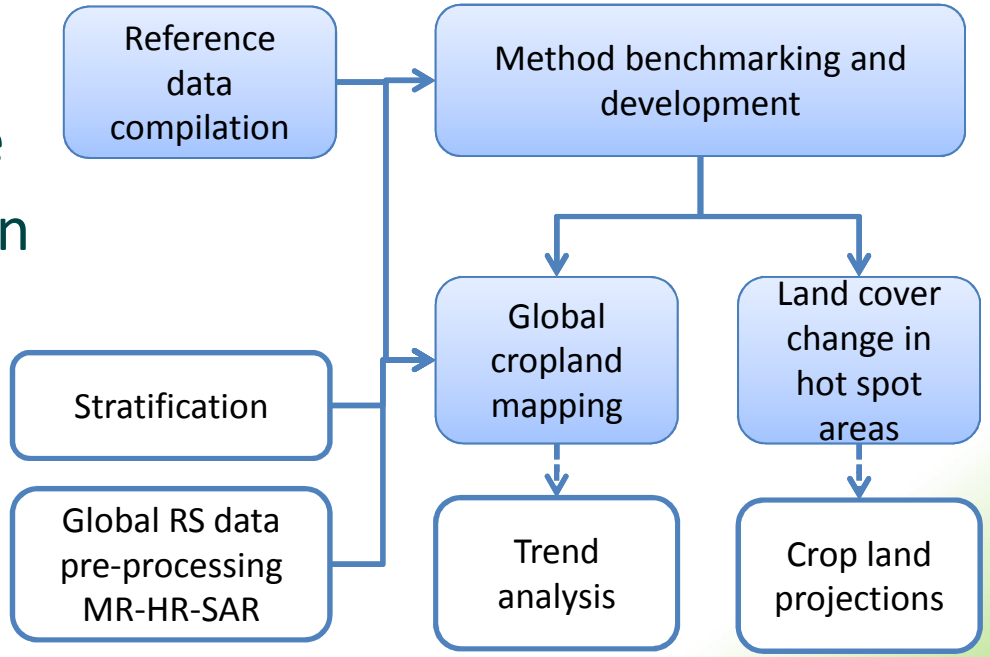
Land cover & crop land assessment

- Challenge:
  - Diversity of systems
  - Variable field sizes, scale
  - Landscape fragmentation
- Approach
  - Agro-env stratification
  - Reference data
  - Method benchmarking
  - Site, Regional, global, hotspots
  - Agricultural statistics



Agricultural Productivity

- Challenge:
  - Agricultural systems dynamics & management practises
- Approach
  - Trend analysis of environmental parameters
    - Multiple data sets & Compatibility
  - Agricultural systems analysis
    - Characterization
      - » Cropping system, species, rotation
  - Analyze Yield gaps using crop models & EO

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Env. Impact Assessment of Land use Change

- Challenge
  - Methodology
- Approach:
  - Local
    - Impact analysis of land use and management changes
    - Identify stress factors of yield gap analysis
  - Projections
    - Projections of cropland and major systems for 2030, 2050
    - Assess impacts on agricultural productivity
  - Global
    - Impact of crop land changes on other land cover types, water use and nutrient balances

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Expected output

- Scientific
- Products
  - Global agro-environmental stratification Database
  - Multi-resolution annual cropland maps
  - Country Land cover analysis database for selected areas
  - Time series of satellite derived parameters
  - Hotspot maps identifying zones with high variability and agro-environmental changes and description
  - Maps of potential/actual yield and gaps
  - Training materials
  - SIGMA Data Management Portal

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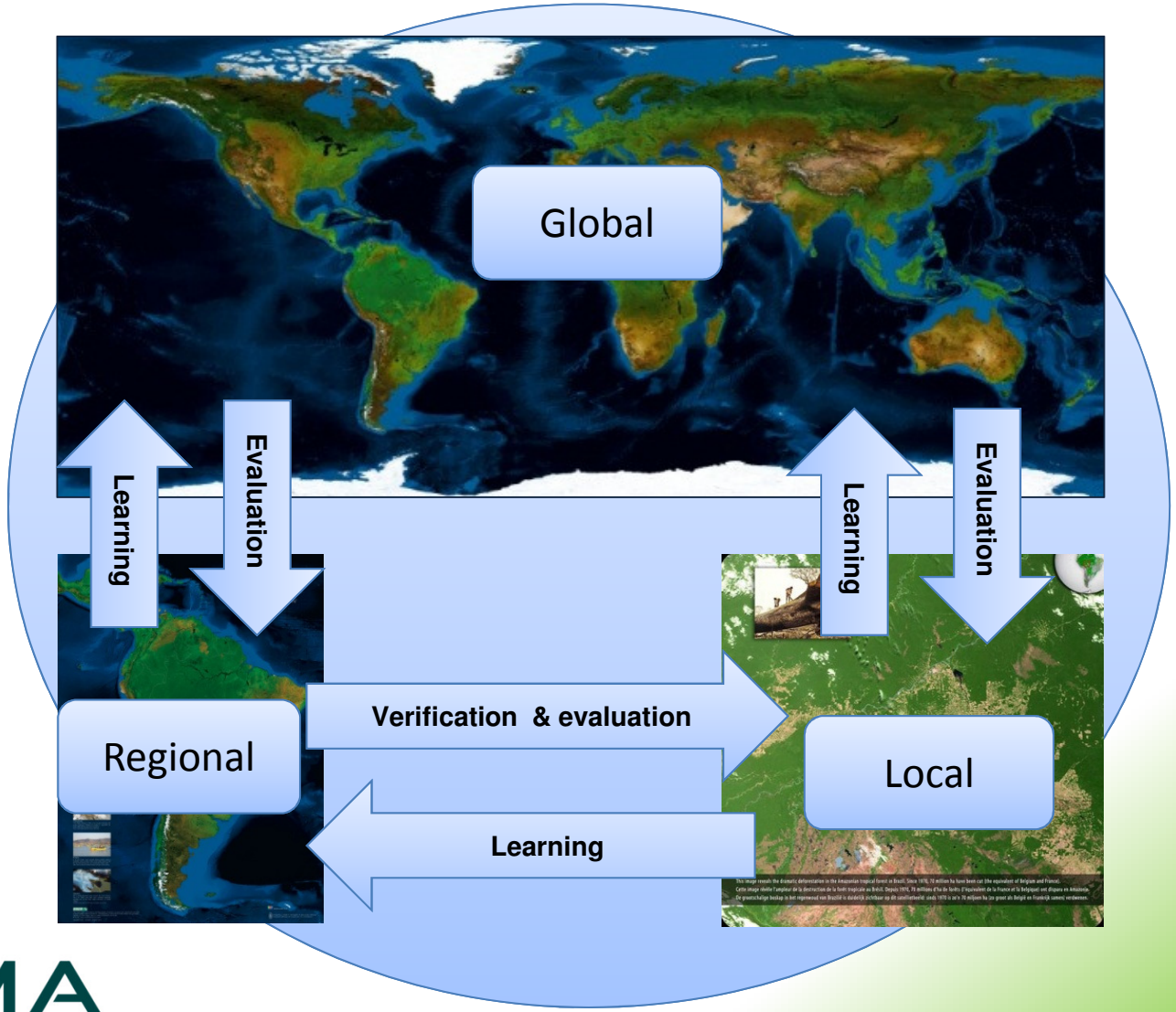
Global?



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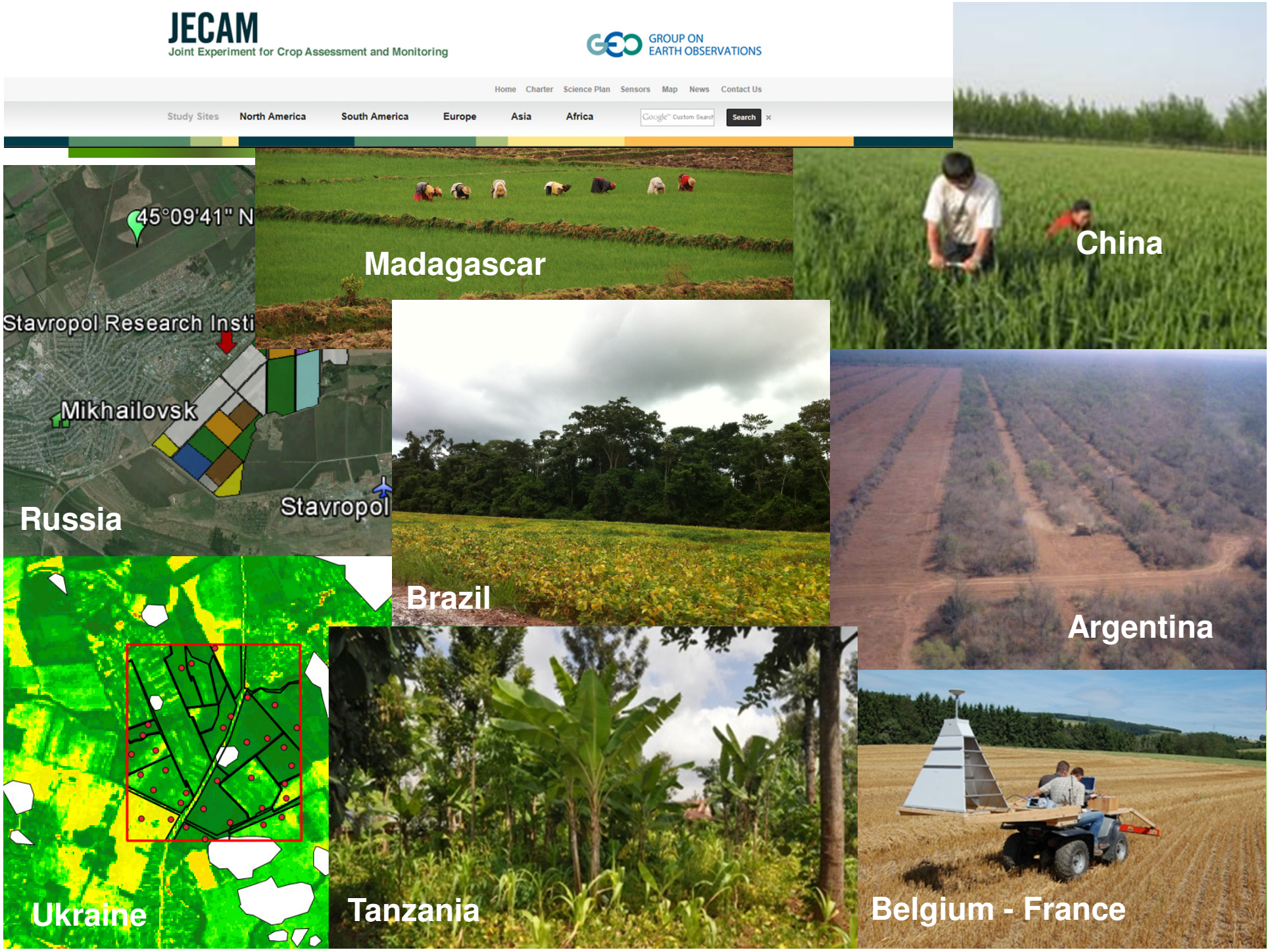
JECAM
Joint Experiment for Crop Assessment and Monitoring
GEO GROUP ON EARTH OBSERVATIONS
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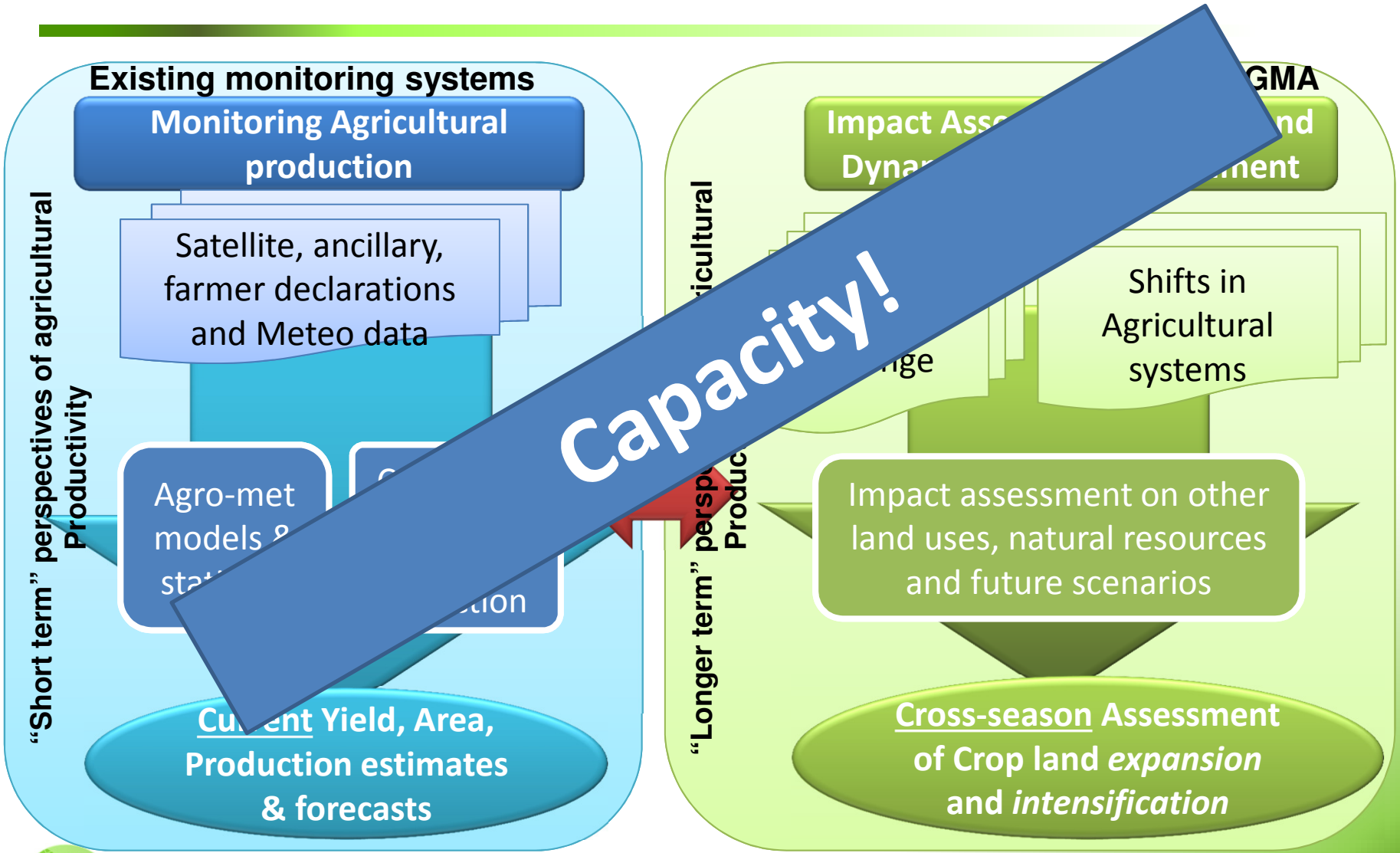
“System of Systems”



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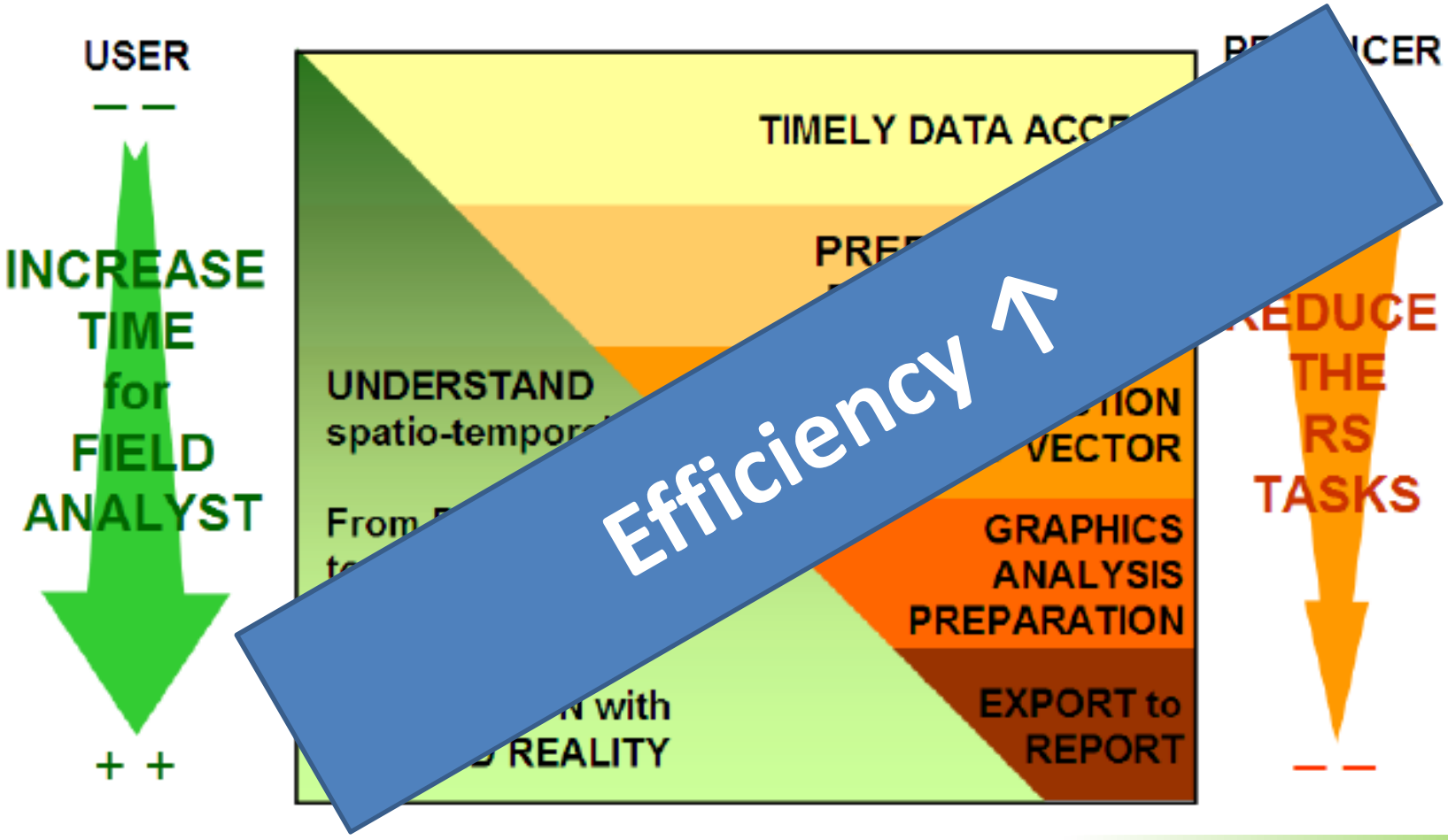
Capacity!



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Capacity!

- **Trainings ab**
- **Regional wo**
- **Stakeholder**
  - In Kenya: (
  - In Senegal
  - In Mozaml
  - In South A
  - In Tanzani
- **Technical** wc
  - In Senegal Nov/2012,
  - In Kenya: I *Nov/2013,*
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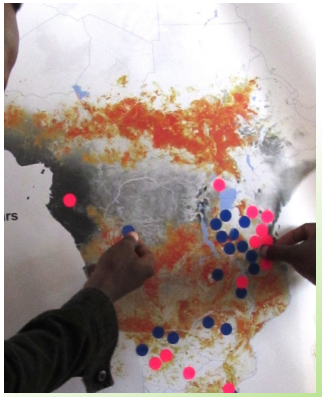

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Key Points…

- More people, more food, one planet
- Understanding Agricultural dynamics

  …… Earth observation contributes
- “Systems of systems”
- Collaborate & Learn
- SIGMA, an opportunity..

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Thank you!

VITO, CIRAD, JRC, IIASA, Alterra, RADI, NMSC, DEIMOS, GeoSAS, RCMRD, Aghrymet, RCMRD, Sarvision, Sarmap, INTA, Geoville , UCL, EFTAS, FAO, ITC, GISAT, IKI, SRI