Joint Research Centre (JRC)

IES - Institute for Environment and Sustainability

Ispra - Italy
http://ies.jrc.ec.europa.eu/
http://www.jrc.ec.europa.eu/

MARS Unit / AGRI4CAST Action

PRESENTATION

- AGRI4CAST action (JRC / IES /MARS Unit)

- Main fields of work

- Major interests in E-AGRI (vs BioMA)

EL AYDAM Mohamed

![JRC European Commission logo] EC/JRC/IES/MARS Unit/AGRI4CAST Action ![ies Institute for Environment and Sustainability logo]

JRC IES MARS Unit/AGRI4CAST 24-25/03/2011 – Kick off meeting / E-AGRI project – VITO, Mol, Belgium

Structure: overview

The Joint Research Center (JRC) is a Directorate-General of the **European Commission**, located in Brussels. Beside the DG, there are **seven** JRC institutes are located on five separate sites in Belgium, Germany, Italy, the Netherlands and Spain.

The Institutes are:
The Institute for Reference Materials and Measurements (IRMM)
The Institute for Transuranium Elements (ITU)
The Institute for Prospective Technological Studies (IPTS)

… and In Ispra:
The Institute for Energy (IE)
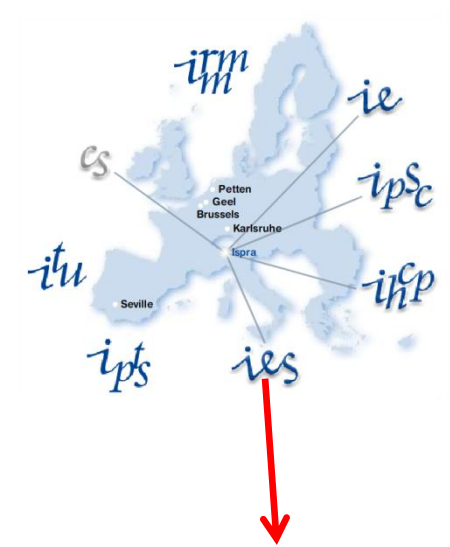The Institute for the Protection and Security of the Citizen (IPSC)
The Institute for Health and Consumer Protection (IHCP)

MARS Unit belongs to
Institute for Environment and Sustainability (IES) :

This institute includes 7 scientific units.
MARS Unit (from 1st January 2011) stands for:

The mission of the Institute for Environment and Sustainability > scientific-technical support to EU's policies for the protection and sustainable development of the European and global environment

Monitoring Agricultural ResourceS Unit

provides scientific and technical support on **EU Agriculture and Food Security policies**.

➢In Europe, activities related to the management and control of the **Common Agriculture Policy**
➢special emphasis is placed on **Africa and food insecure countries**
➢development of **European capacity for Global Agricultural Monitoring** for key crop production and modeling of climate change impacts.

AGRI4CAST deals with crop production forecast and climate change analysis

Crop monitoring activities <u>are performed </u>under EU law with regard to their maintenance, operation and analysis (<u>Council Regulation (EC) No 78/2008</u>).

>> crop yield forecasting system organized since 1993

Which implies development of
- **Monitoring systems (MARS Crop Yield Forecast System)**
- **Diffusion of information (bulletins, web tools, meetings on CGMS…)**
- **technological follow-up (Software development, new platforms (BioMA…)…)**
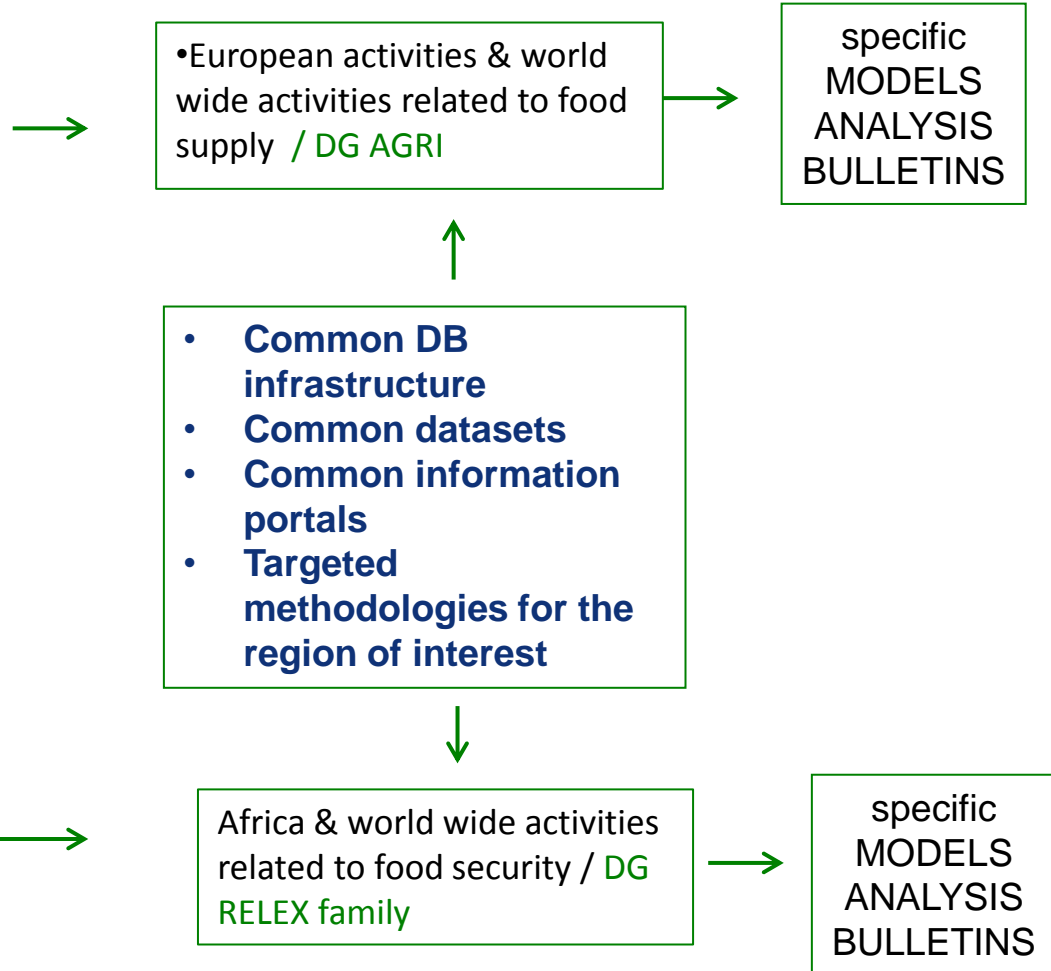
Main customers:

- DG Agriculture and Rural Development,

- DG EuropeAid Development and Cooperation
- DG Enlargement
- DG Eurostat
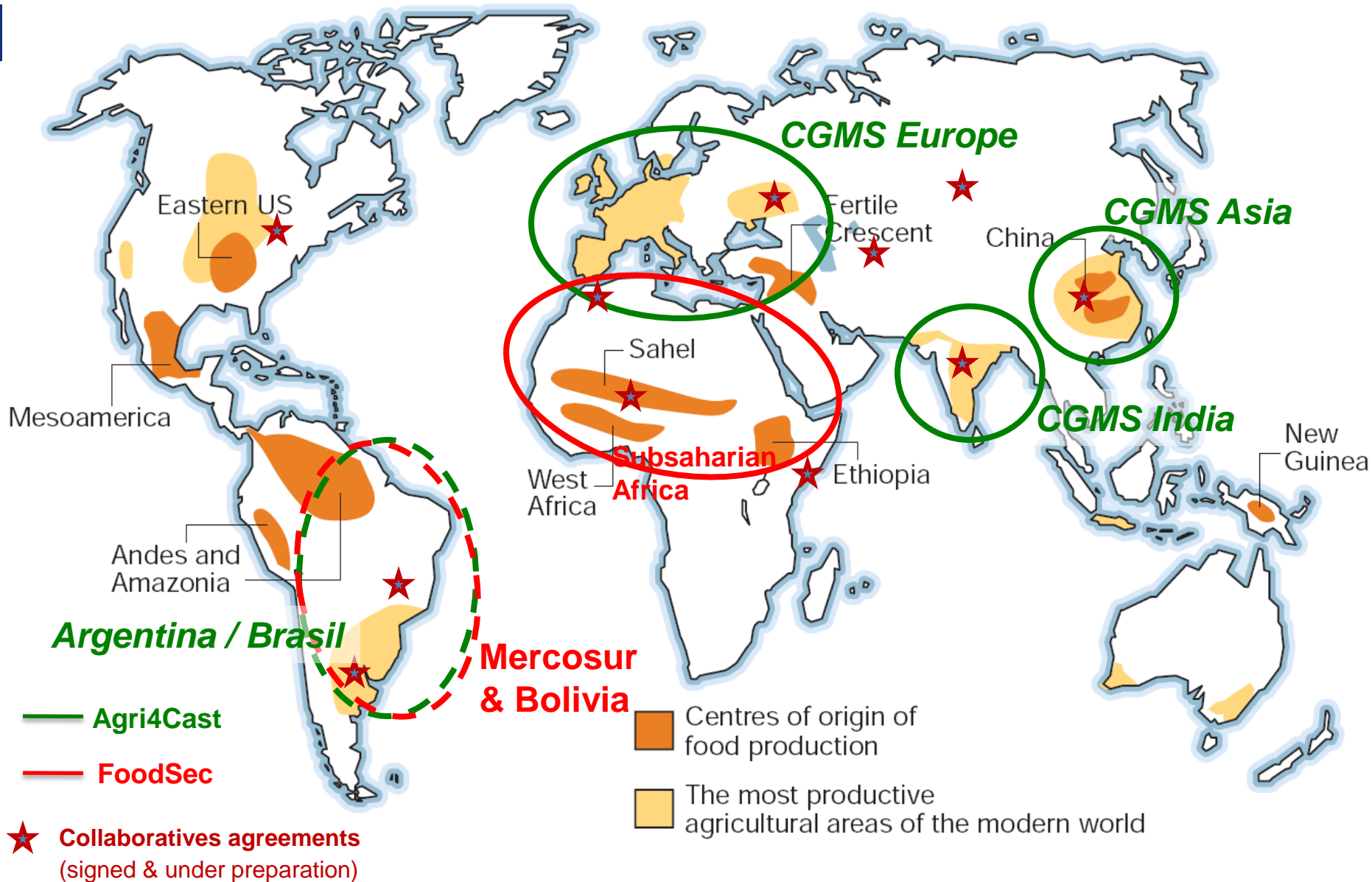- European Food Safety Agency (EFSA)

Action 21103 - AGRI4CAST is centered on JRC's **crop yield forecasting system**

➢ crop <u>yield forecasts</u> and <u>crop production biomass</u> for the Union territory and other strategic areas of the world

➢ evaluation of global productions in <u>support to CAP</u> management decision

➢ support to a <u>reviewed CAP</u> for the next 10 years

➢ supporting the <u>Climate Change policy</u> agenda of the EC (studies on changing production scenarios and impact on agriculture)

Strong interaction with Action42002 - FOODSEC (same Unit):

➢ regional monitoring and forecasting in various parts of the world (Russia and the New Independent States, the Mediterranean Basin, Eastern Africa and South America and in food insecure areas).

•European activities & world wide activities related to food supply / DG AGRI

specific MODELS ANALYSIS BULLETINS

- **Common DB infrastructure**
- **Common datasets**
- **Common information portals**
- **Targeted methodologies for the region of interest**

Africa & world wide activities related to food security / DG RELEX family

specific MODELS ANALYSIS BULLETINS

CGMS Europe

CGMS Asia

CGMS India

Eastern US

Mesoamerica

Andes and Amazonia

Argentina / Brasil

Fertile Crescent

China

Sahel

West Africa

Subsaharian Africa

Ethiopia

New Guinea

Mercosur & Bolivia

— **Agri4Cast**

— **FoodSec**

★ **Collaboratives agreements** (signed & under preparation)

Centres of origin of food production

The most productive agricultural areas of the modern world

Diamond, Nature 418, 700-707 (2002)

35 countries covered

11 crops monitored

36 years of meteo and agrometeo data

20 crop's indicators are daily simulated by crop models

21 years of low resolution satellite information

Practical implementation : throughout MARSOP3 project (led by Alterra (NL) in the frame of a consortium including VITO (BE), GIZAT (CZ), Meteoconsult (NL) and TAMSAT ((UK))
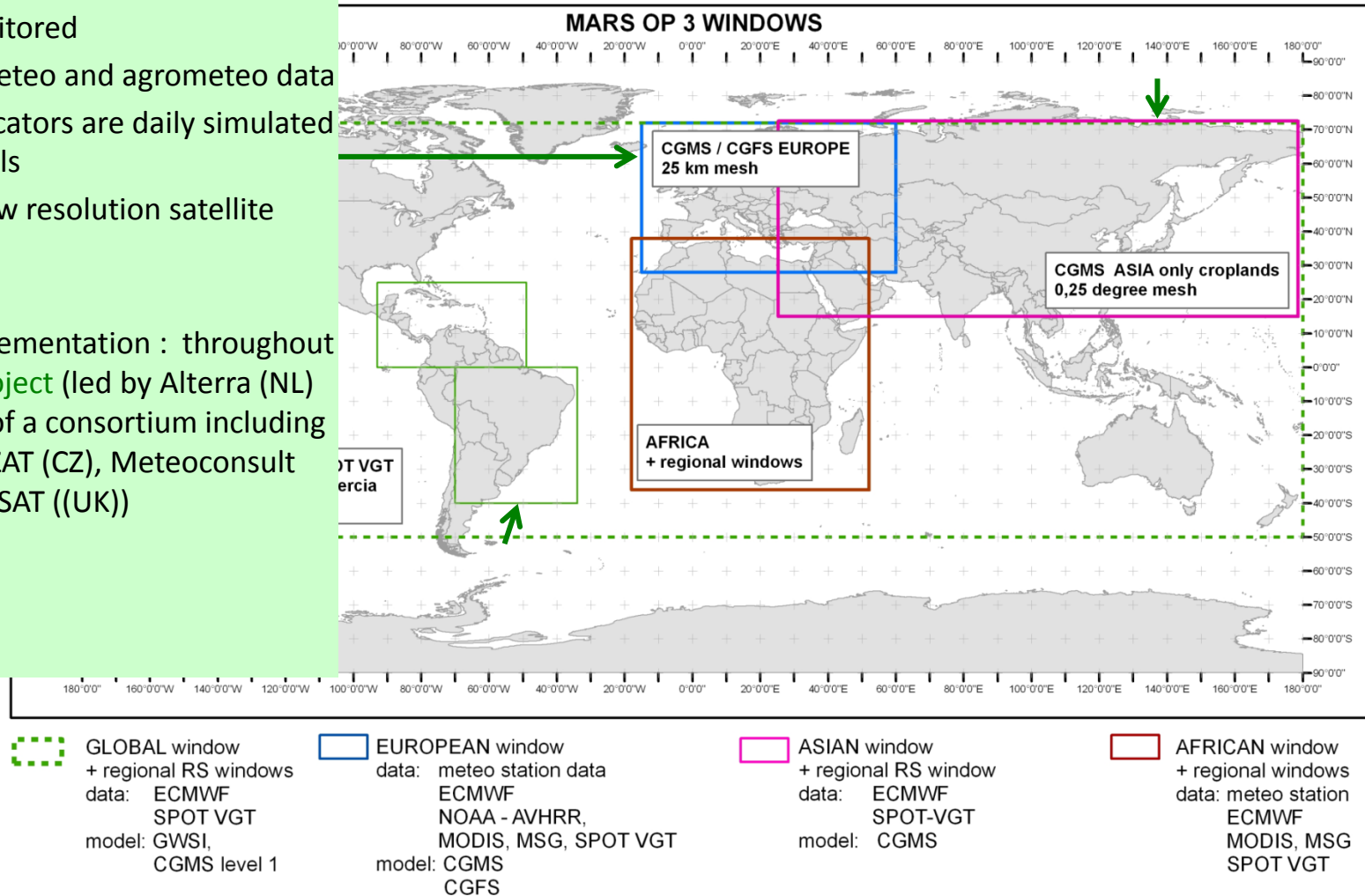
"Collaboration Agreement" signed* or in preparation with the following institutions:

- USA*: **US Department of Agriculture** including also exchange of scientists
- Morocco*: **Institut National de la Recherche Agronomique** including also exchange of scientists
- Tunisia: **Centre National de la cartographie et de la Télédétection**
- Ukraine*: **Leonid Pogorilyy UkrNDIPVT**
- China*: **Chinese Academy of Agricultural Sciences**
- Argentina* **: ITNA (Instituto Nacional de Tecnologica Agropecuaria**

Statistical infrastructure
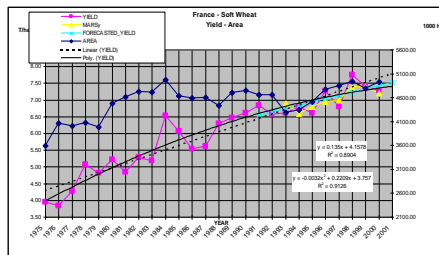
time series regression,
similarity analyses

Remote Sensing infrastructure
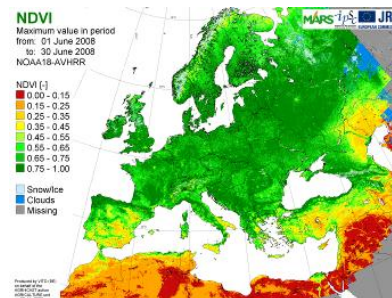
Vegetation state & meteo indicators
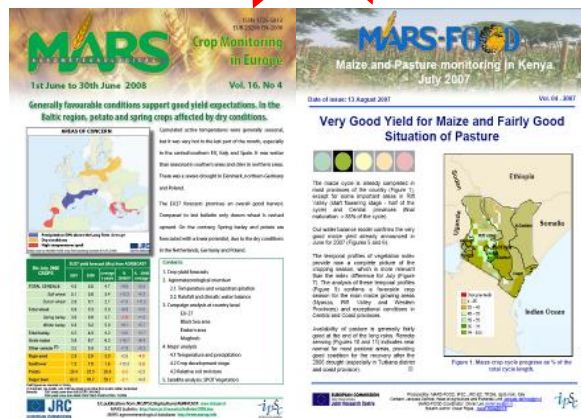since 1981 Europe, 1998 worldwide
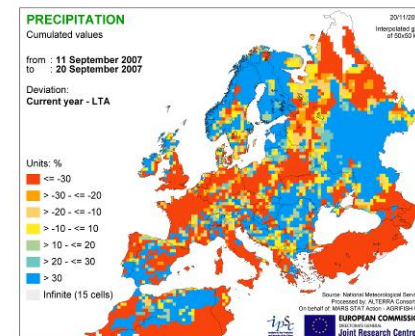
Yield forecasts
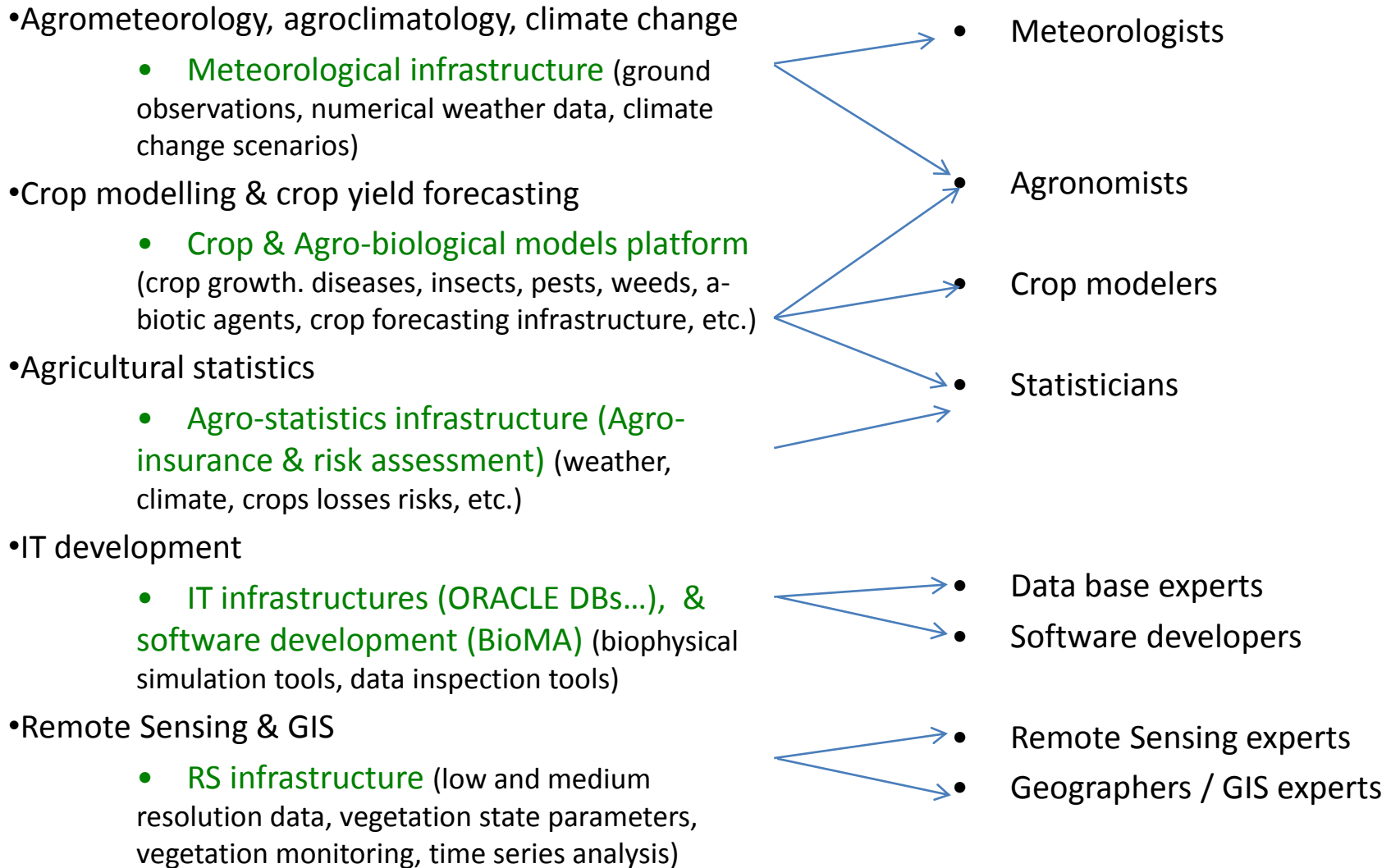## Crop assessment

Crop Model infrastructure
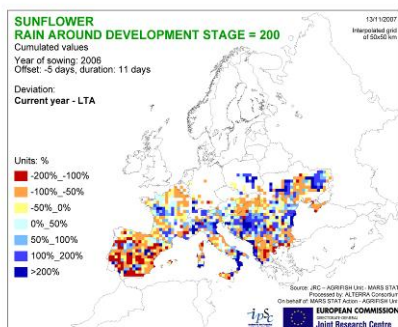
Agrometeo indicators derived
from crop growth model –
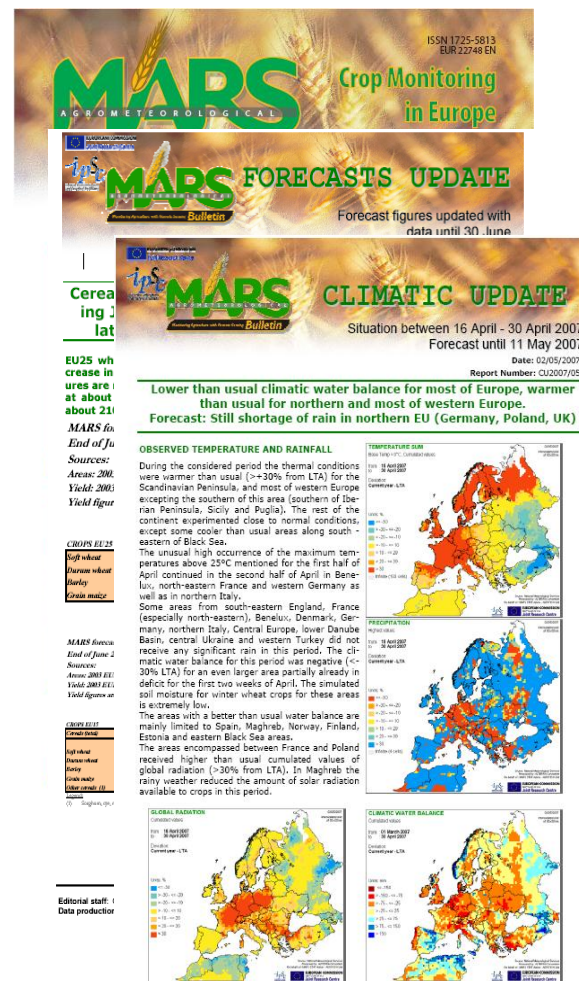WOFOST
LINGRA > Pasture
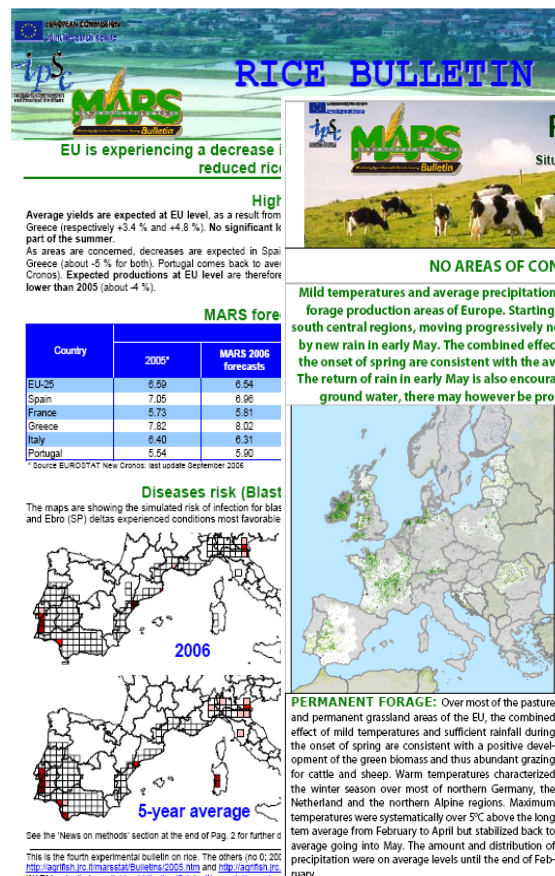WARM > rice ; and GWSI

Meteorological infrastructure

observed data since 1975 Europe
under construction for Africa
worldwide ECMWF data + archive

- Agrometeorology, agroclimatology, climate change
  - Meteorological infrastructure (ground observations, numerical weather data, climate change scenarios)
- Crop modelling & crop yield forecasting
  - Crop & Agro-biological models platform (crop growth. diseases, insects, pests, weeds, a-biotic agents, crop forecasting infrastructure, etc.)
- Agricultural statistics
  - Agro-statistics infrastructure (Agro-insurance & risk assessment) (weather, climate, crops losses risks, etc.)
- IT development
  - IT infrastructures (ORACLE DBs…), & software development (BioMA) (biophysical simulation tools, data inspection tools)
- Remote Sensing & GIS
  - RS infrastructure (low and medium resolution data, vegetation state parameters, vegetation monitoring, time series analysis)

- Meteorologists
- Agronomists
- Crop modelers
- Statisticians
- Data base experts
- Software developers
- Remote Sensing experts
- Geographers / GIS experts

## Main crops bulletins

Special issues

E-AGRI meets different objectives of the Specific Action's :

1. provide near real-time <u>crop growth monitoring</u> and <u>yield forecasting products</u> based on the JRC-MARS Crop Yield Forecasting System
2. To <u>assess climate change impacts on agriculture</u> through the simulation of impacts of climate change scenarios with crop models
3. **To further enhance the JRC-MARS Crop Yield Forecasting System by extending its simulation capacities for forecasting crop yields in the EU and key regional production areas such as Asia and Latin America towards global coverage**
4. To provide <u>training in crop monitoring and modeling systems and technology transfer</u> in support to **<u>EU-27 neighborhood countries</u>**

Challenges for the evolvement of the system

- Multiple demands : climate change impact, enlargement of the system towards global monitoring, regional analyis, farming systems ….

- calls for enhanced / additional simulation capabilites

- calls for tailored modeling solutions

- calls for enriched data bases

- calls for better use of multiple sources including RS
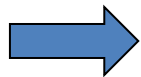
➡ **Started development of BioMA**

To quickly respond to demand of analysis of various aspects **a model framework has been developed** at AGRI4CAST

BioMA – **Biophysical Models Application** – is a platform for running biophysical models on generic spatial units

The key requirements of its design aim at maximizing:

- Extensibility with new modeling solutions

- Ease of customization in new environments

- Ease of deployment

- Transparency of workflows