

FP7- SPA.2013.1.1-06:

Stimulating development of downstream services and service evolution.



ERMES

AN EARTH
OBSERVATION
MODEL BASED
RICE INFORMATION
SERVICE

Contract N°: 606983

A downstream service to support agro-production, planning and policy

<http://www.ermes-fp7space.eu/>

**Final review meeting
Tuesday 4th April 2017**

Objective:

1. Assess the work carried out under the project in the second periodic period (M18-36)
 - present all the WPs and the progress in the period including how the recommendations from external reviewer were taken into account.
2. Provide a view of the Overall project and achievements

Session 1: Introduction

Session 2: Scientific and technical activities in Months 18-36- part A

- 9:55 – 11:20: ERMES WPs 9 and 7 – Demonstration of ERMES Services and Tools

---- 10:35 – 10:50 Coffee Break ----

- 11:20 – 11:55: ERMES WP 8 – Validation of ERMES Products and Services
- 11:55 – 12:30: ERMES WP 3 - Users' requirements and services' evaluation

---- 12:30 – 13:30: Lunch Break ----

Session 2: Scientific and technical activities in Months 18-36- part B

- 13:30 – 14:00: ERMES WP 10 - Market analysis and business model development
- 14:00 – 14:30: ERMES WP 5 - Geo-product from space-borne and in-situ data processing and integration
- 14:30 – 15:00: ERMES WP 6 - Geo-information from crop modeling and EO product assimilation
- 15:30 – 16:00: ERMES WP 11 - Dissemination and promotion (40 min)

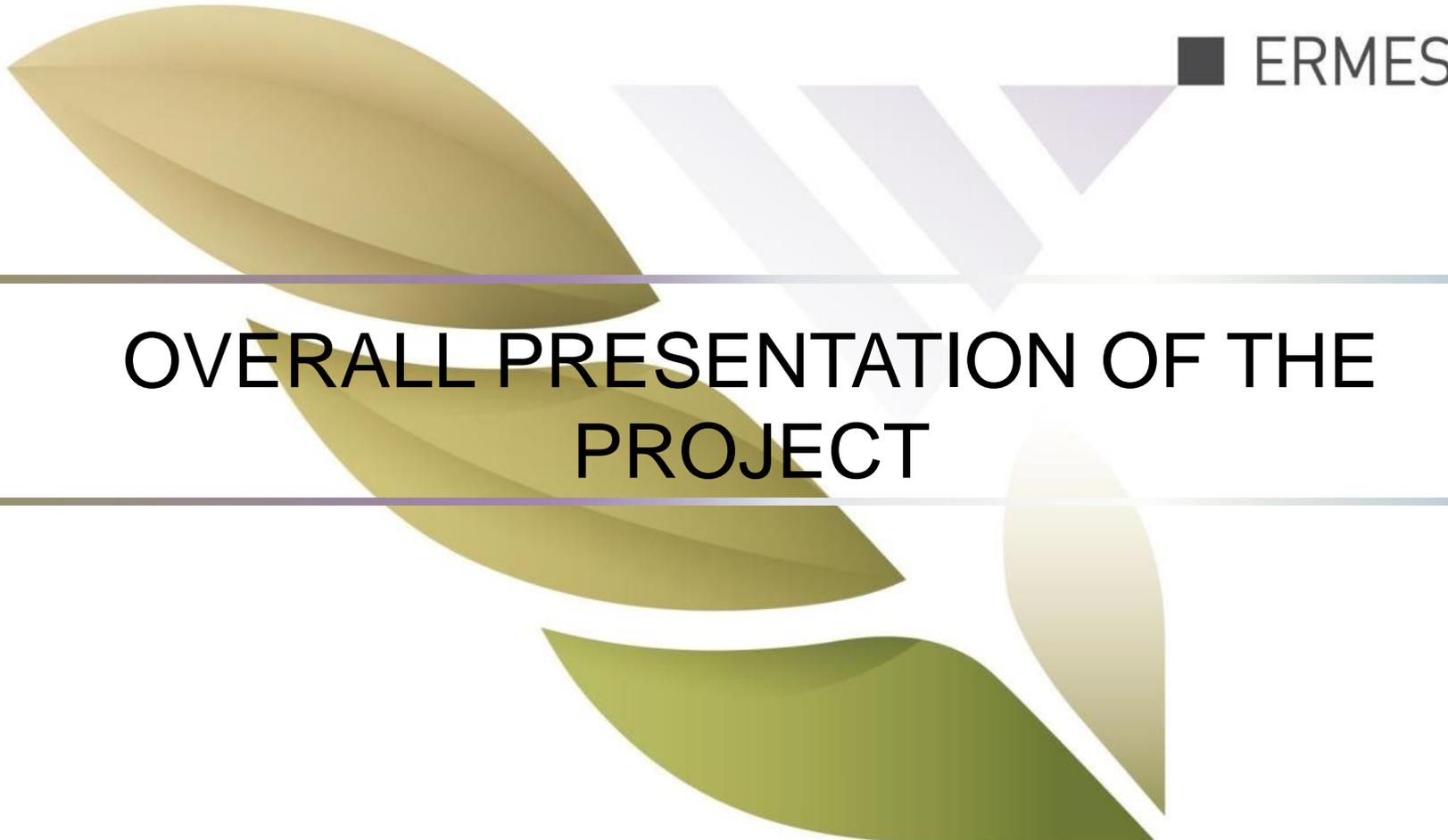
---- 16:00 – 16:20: Coffee Break ----

Session 3: Project Management in Months 27-36

- 16:20 – 17:00: ERMES WPs 1 and 2 – Project Management

Session 4: Conclusions

- 17:00 – 18:00 : Wrap-up on ERMES achievements and open discussion



OVERALL PRESENTATION OF THE PROJECT

Why ERMES: provide information to agro-sector

FP7-SPACE ERMES aims to develop a prototype of downstream service dedicated to rice sector based on assimilation of EO and in situ data within crop yield modelling.

The objective of this service, targeted to European needs, is to:

- contribute to the regional authorities in the implementation of agro-environmental policies;
- provide independent reliable information to the agro-business sector.
- support farming activities for sustainable management practices;



The long term goal is to extend and adapt the service to Asian and African markets, in order to boost European competitiveness and contribute to a sustainable development.

The project/Services Concept

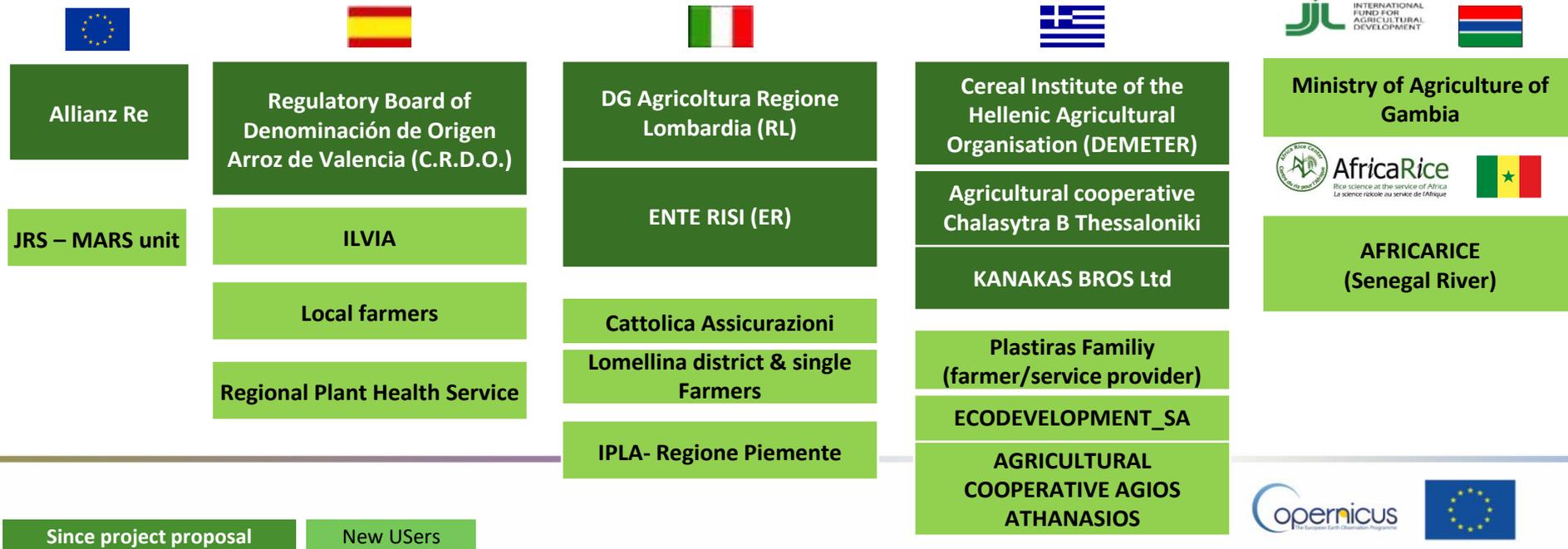


Study areas



- Europe
 - Italy
 - Spain
 - Greece
- West Africa
 - Gambia
 - Senegal

ERMES user



SCIENTIFIC AND TECHNICAL ASPECT

Innovative approach

- Provide (receive) **customized** (ground) **information to** (from) **different END-USERS**, and disseminate it by **SMART technologies** (web 2.0)



Smart app.

Geoportals

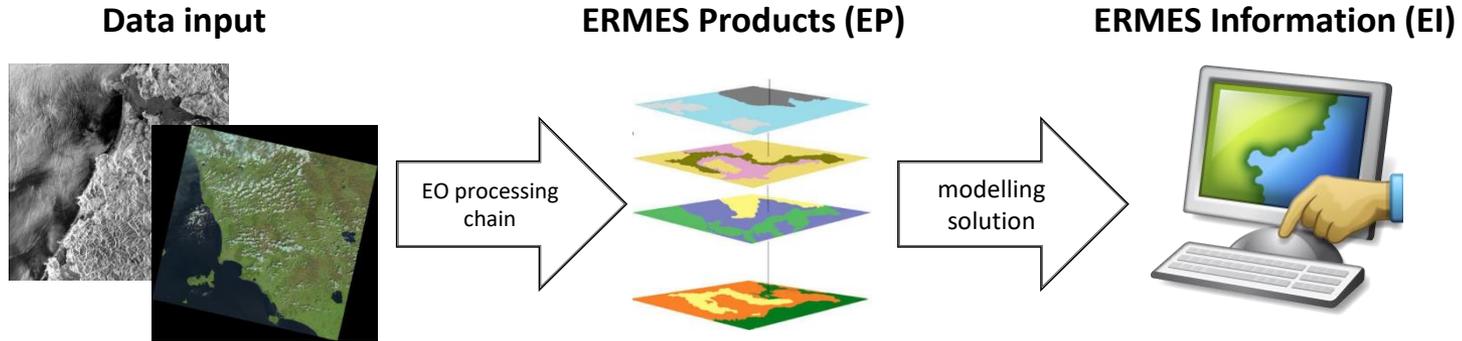
- Synergic use of **SAR and Optical data**, from existing EO satellites and forthcoming ESA Sentinel missions, to derive specific products



Satellite data

- Develop **value added Agro-information** by assimilating i) satellite observations, ii) in situ measurements and iii) Copernicus core services in crop models





Concept

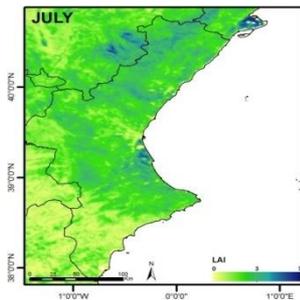
Raw EO (field) data OR Copernicus core products

Added values geo-information to be used in crop modelling and crop monitoring

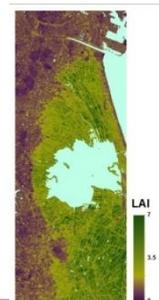
Information required by Users to be used in their work flow

Example

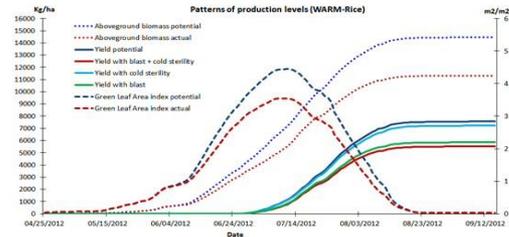
Reflectance images OR Copernicus LAI product @ 1 km resolution



LAI maps @ high resolution

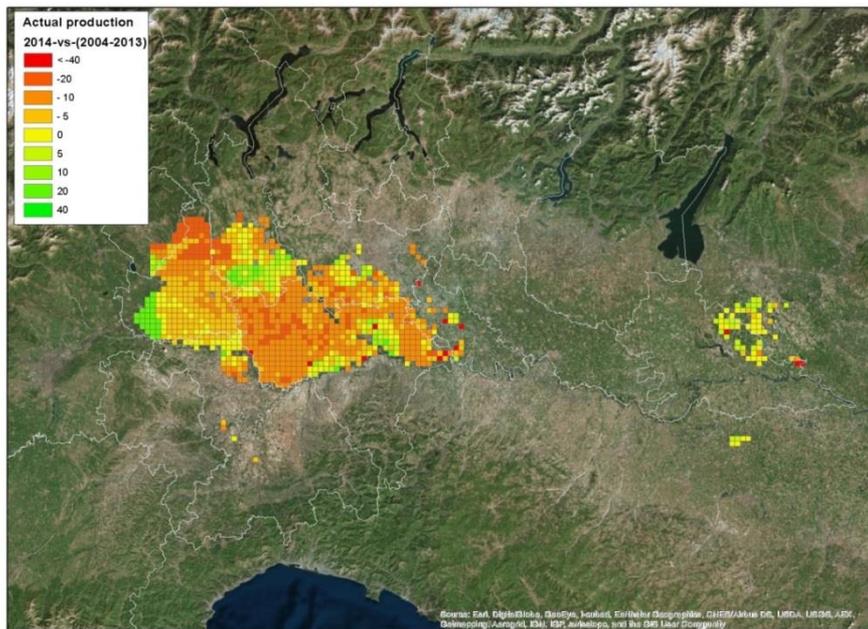


Biomass development and Yield estimation for a single field



A system to monitor **spatial variability of rice production** at regional (district) and local scale

Regional Rice Service (RRS)
@ District scale



→ Provide to authorities (institution with monitoring mandate) customized agro-monitoring system devoted to **regional yield estimates** and **risk alarming**.

Local Rice Service (LRS)
@ Farm scale



→ provide to the private sector (farmers, cooperative, agro-consulting, etc) high level information on **yield variability**, **risk alert** and **crop damage assessment** at farm scale

PROJECT STRUCTURE

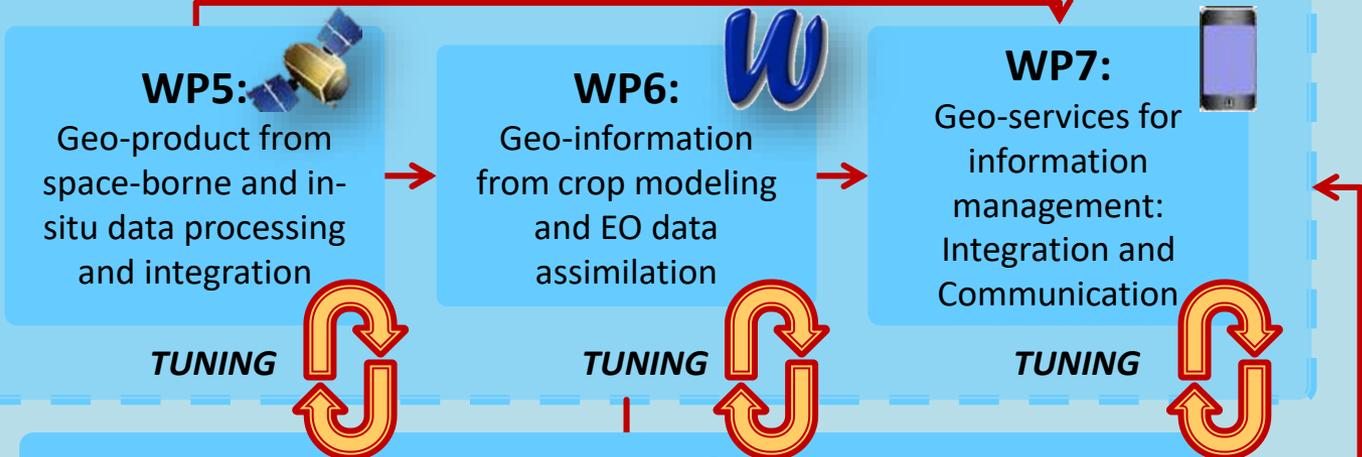
WP1: Project Management

WP2: Scientific and technical coordination

WP3: Users requirement and evaluation

WP4: Services design through analysis of requirements

ERMES SERVICE DEVELOPMENT



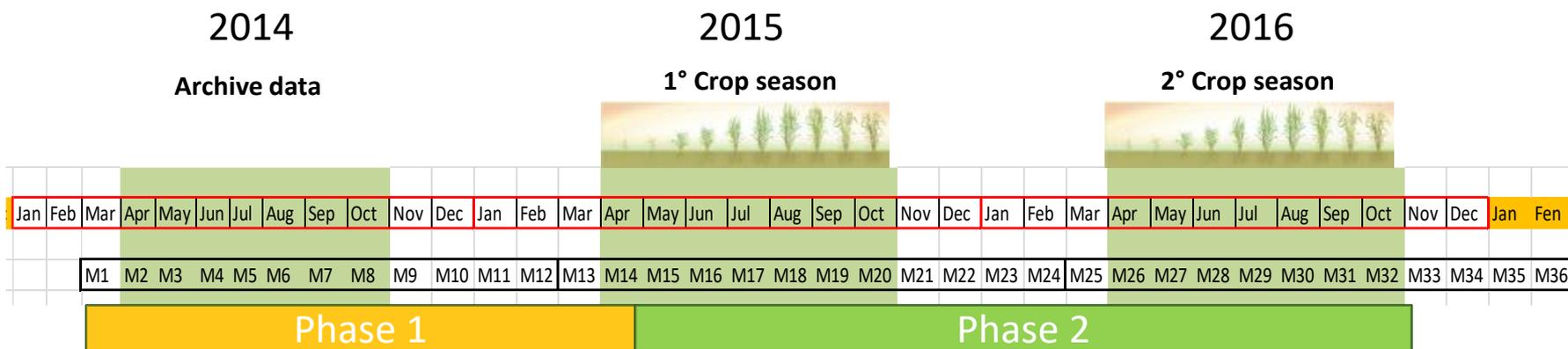
WP8: Sci. & tech. validation of product and services

WP9: Services application and demonstration

WP10: Market analysis and business model development

WP11: Dissemination, exploitation and promotion networking

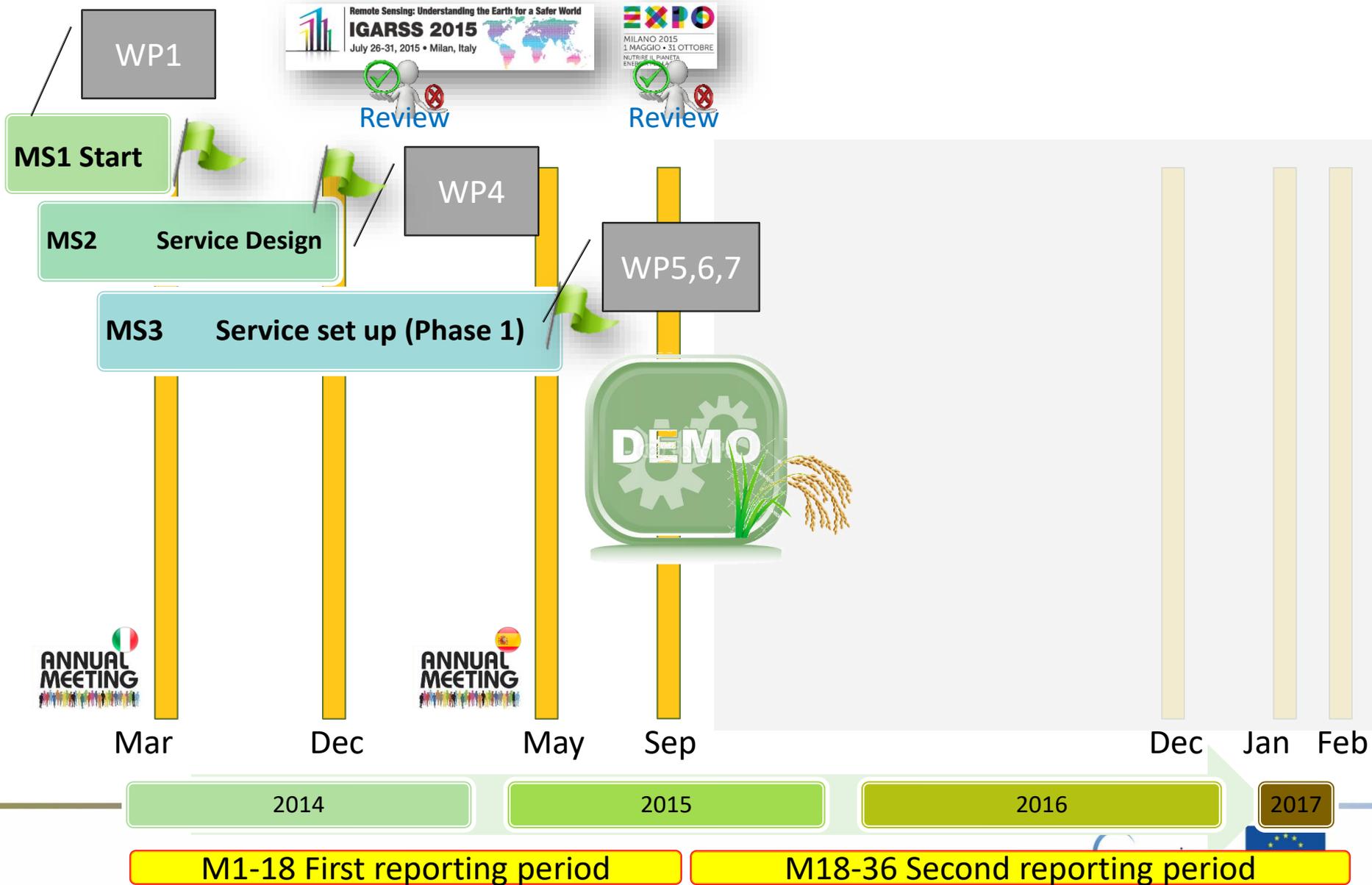
PROJECT PHASES



- **Phase 1: System development: (M5 – 14):** 2014 data (satellite and ground) were used to set up the processing chains: EO data processing, Model customization, Geoportal/Smart app development
- **Phase 2: Service Demonstration & tuning: (M14 – 32):** EO-products and crop model information, **produced for 2015 and 2016 crop season**, will be used to verify and update the processing chain and **evaluate User satisfaction**

Objectives and achievements in previous reporting periods (M1-18)

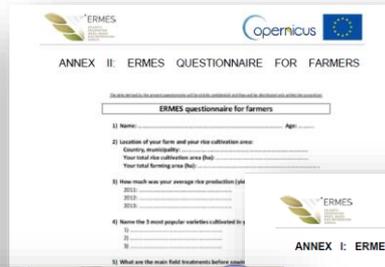
First reporting period activities and achievements



Summary of first reporting period

Users' requirements & local study areas (WP3)

- Interaction with **already involved and new end users** to define their requirements with respect to ERMES services and products (dedicated questionnaires and bilateral meetings).
- Analysis and description of the **European study areas (80% rice production)** and **identification of local test area**

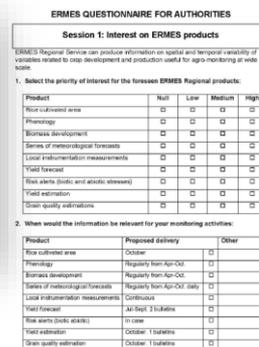



Table 1-2: List of the collected requirements/interests after direct meetings and consultations with regional actors and farmers

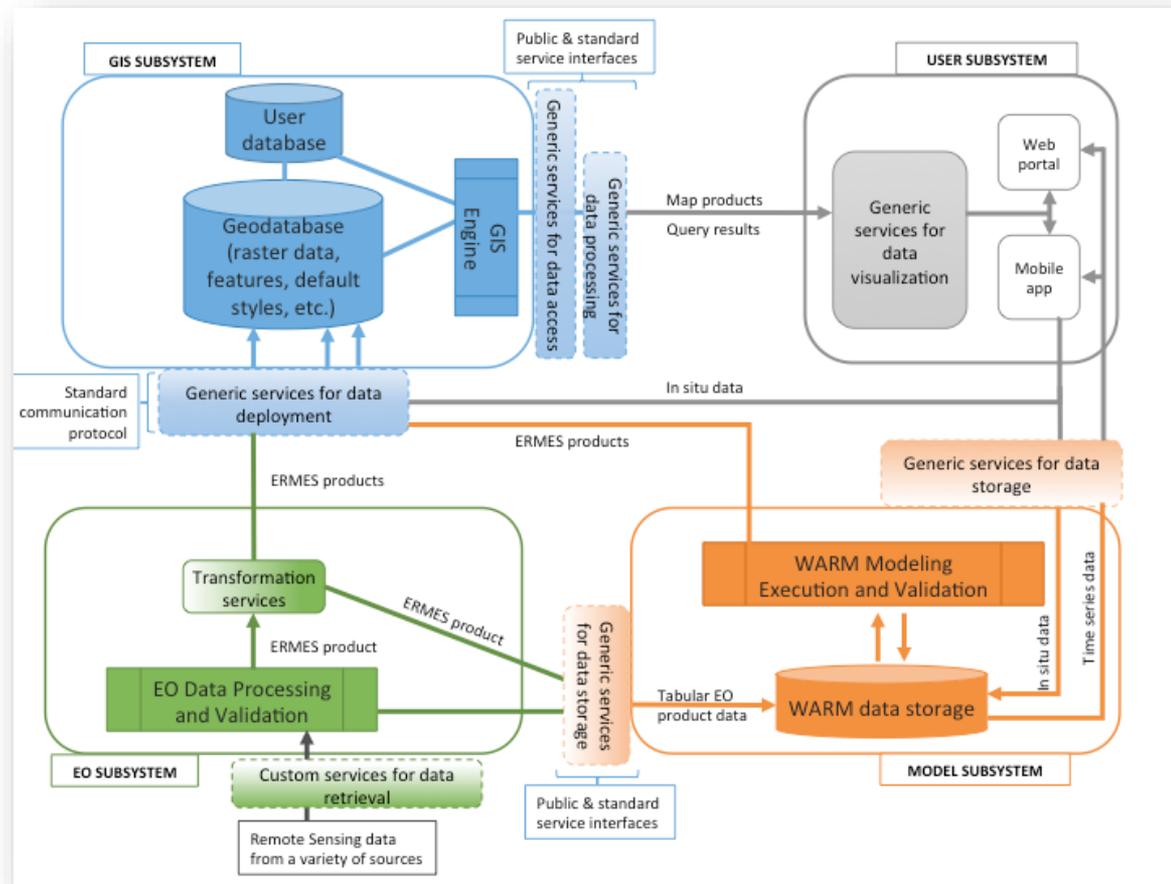
Regional Actors	Local Farmers
Cultivated area	Fertilization support (N and basic)
Field Monitoring*	Fungicide application
Fungicide application	Grain moisture
Grain quality forecasting	Poor emergence
Lodging	Quality forecasting
N fertilization	Risk alerts
Risk alerts	Tools to support agro-practices
Varieties' identification	Weather forecasting
Weather forecasting	Weed infestation
Weed infestation	Yield mapping
Yield forecasting	
Yield Mapping	
Assistance tools	
Agro-bulletin	Web tools
Web tools	



Summary of first reporting period

Service Design (WP4) → Milestone 2 (M 9)

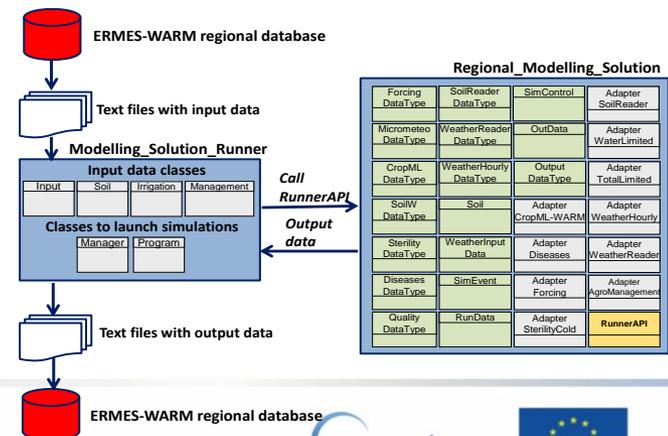
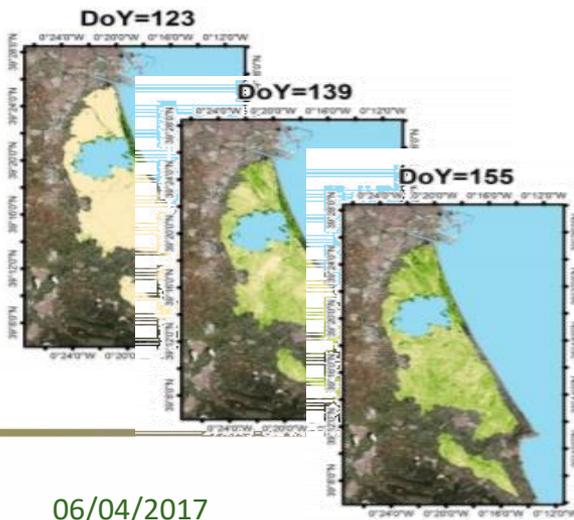
- Define characteristics of the **ERMES products & services**
- Design architecture of the **ERMES systems**
 - strategies for product generation
 - Assimilation in modelling
 - Deployment and dissemination



Summary of first reporting period

Service development → Milestone 3 (M15)

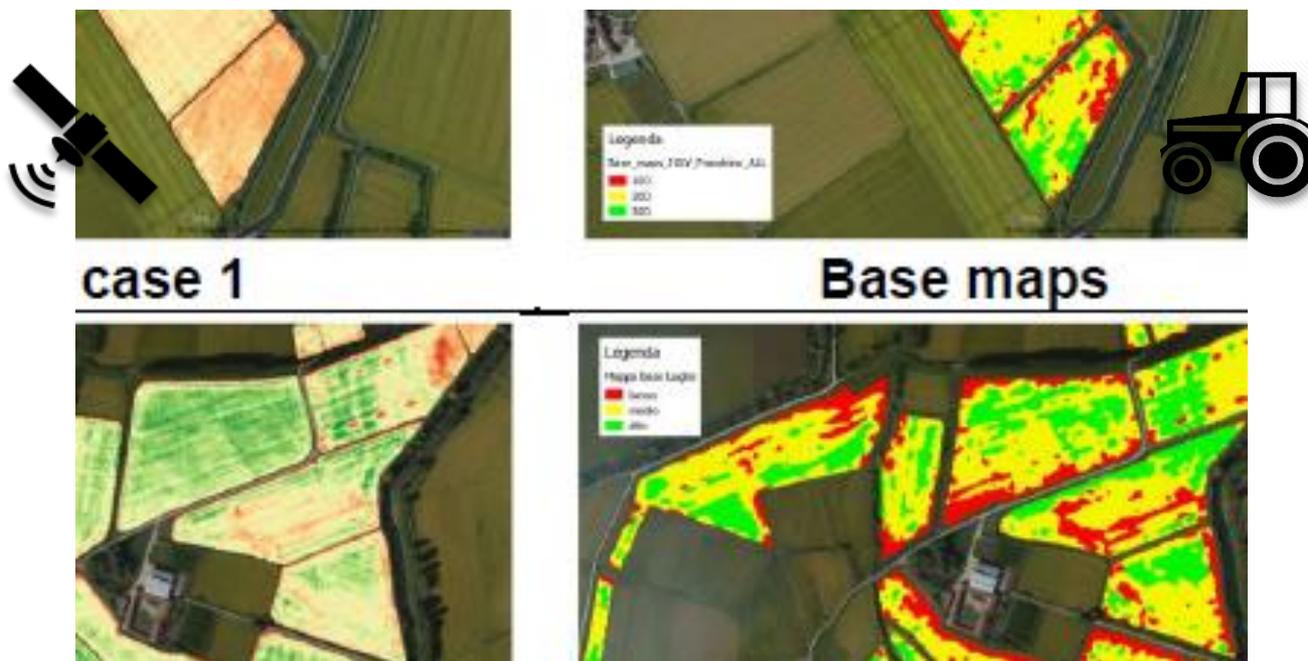
- Development of first prototypes of the processing chains for:
 - EO and meteorological data products (WP5)
 - customized modelling solutions (WP6)
- First release of ERMES SDI, Geoportal and smart applications (WP7)
- Definition of strict protocols for:
 - overall data flow within the ERMES system
 - Integration of EO-product in ERMES WARM modelling solution



Summary of first reporting period

First year of service demonstration (WP8/9)

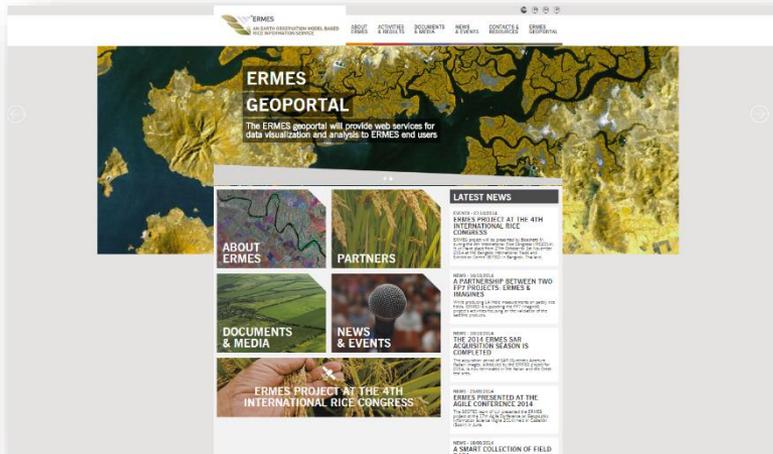
- **Create and disseminate ERMES products** foreseen for **the 2015 rice growing** season both to the general public and ERMES regional and local end users
- **Collect feedbacks** concerning the provided products, to be used for ERMES services tuning



Summary of first reporting period

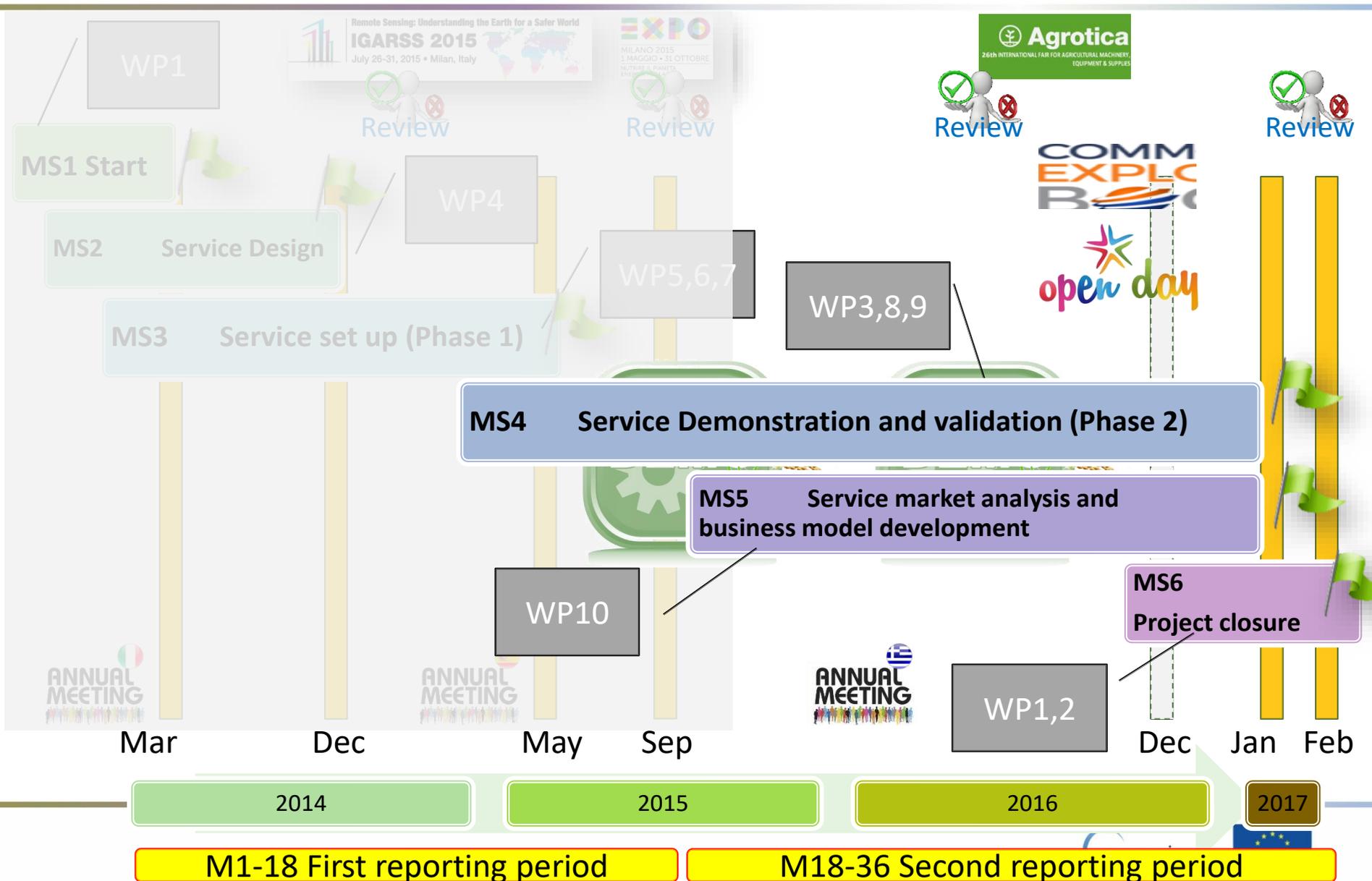
Dissemination and networking (WP11):

- Dissemination of the project main concepts and objectives:
 - creation of adequate dissemination material (Brochures and web site),
 - participation to scientific conferences,
 - organization of bilateral meetings with actual and potential ERMES end-users and/or stakeholders



Objectives and achievements in the second reporting period (M19-36)

Second reporting period activities and achievements



ERMES



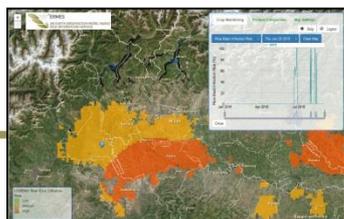
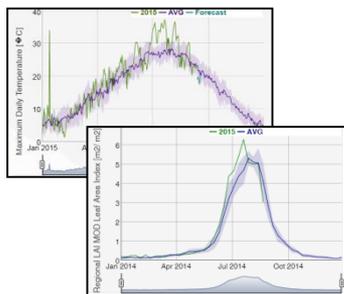
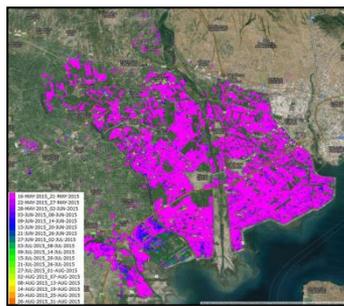
Project impact: considerations on the project achievements and future perspectives

Main achievement was the development of a prototype of NRT operational system for agro monitoring able to cope with the needs of different stakeholders

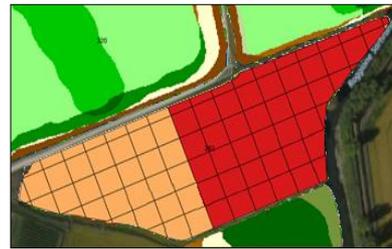


Technical and scientific achievements: Added value information from EO product and model outputs

Monitoring system



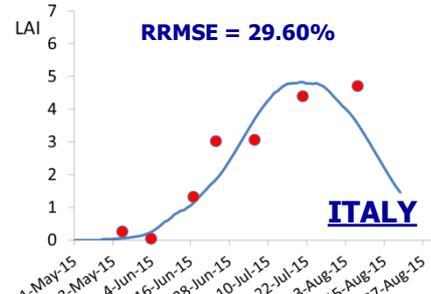
Mapping



Modelling

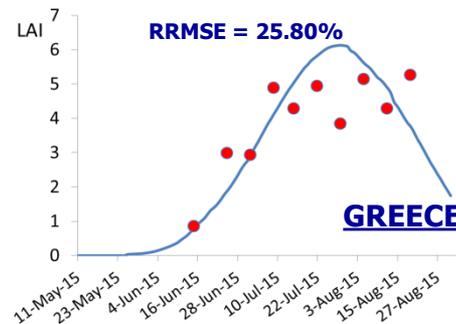
Indica medium

RRMSE = 29.60%



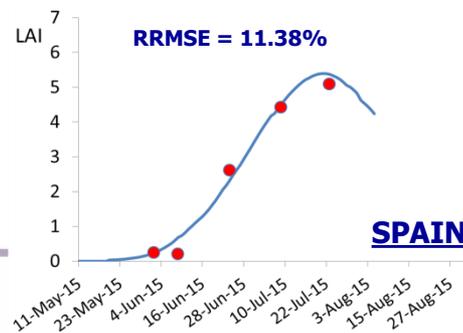
Japonica medium

RRMSE = 25.80%



Japonica early

RRMSE = 11.38%



Bulletins

Il riso

Andamento settimanale del rischio stimato di infezione patogene
Periodo 15 giugno - 24 luglio 2015

Come si evidenzia dalle mappe, ad eccezione della settimana del 23 di giugno, epoca in cui lo stadio fenologico del riso non era da ritenersi compatibile con la diffusa fruttificazione della malattia non ha mai evidenziato criticità particolari, in conseguenza delle temperature al di sopra della norma e delle scarse precipitazioni.

Regione Lombardia
Servizio Fitosanitario

BOLLETTINO RISO - Lungo B

Lomellina e provincia di Vercelli
Data simulata al 31 luglio 2015. Data analisi: 10/08/2015

Le rese previste per il gruppo Lungo-B sono leggermente inferiori a quelle registrate nel 2014 e alla media del periodo 2010-2014. L'anticipo medio sulle date di fioritura è di circa una settimana. Sebbene i primi sintomi di infezione da brusone siano stati rilevati in anticipo rispetto alla norma, le alte temperature e la bassa umidità hanno in seguito creato condizioni sfavorevoli al patogeno. Massime giornaliere superiori ai 35-36°C potrebbero aver generato casi isolati di sterilità fiorale, evento assai raro in clima temperato.

LOMELLINA (PV)
Rea prevista: 6.80 t ha⁻¹
% 2015/2014: - 5.50
% 2015/media 5 anni: - 2.36

PROVINCIA DI VERCELLI
Rea prevista: 6.49 t ha⁻¹
% 2015/2014: - 4.95
% 2015/media 5 anni: - 4.55

Analisi agrometeorologica
Le temperature sono state superiori alla media degli ultimi cinque anni per la maggior parte del ciclo, causando un accorciamento della fase vegetativa. Durante il mese di Luglio le temperature massime hanno raggiunto picchi di 38-39°C che potrebbero, in alcuni casi, aver causato sterilità fiorale.

media degli ultimi cinque anni in tutto il territorio della Lomellina e nel basso Vercellese per via delle elevate temperature e valori di bagnatura fogliare costantemente inferiori alla media.

Media (2010-2014)
2014

Temperatura massima giornaliera (Mortara, PV)

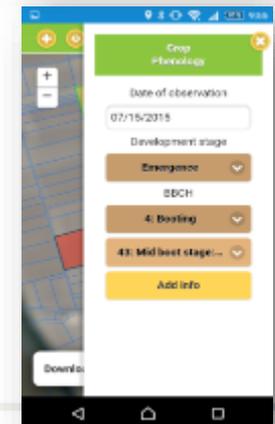
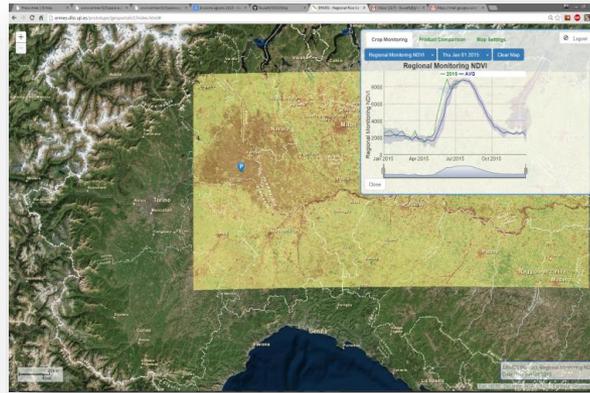
Per quanto riguarda il brusone, il numero di giorni caratterizzati da condizioni favorevoli ad eventi di infezione

Brusone: variazione percentuale rispetto alla media 2010-2014 del numero di giorni caratterizzati da condizioni favorevoli ad eventi di infezione

Metodologia: simulazione eseguita con il modello CERES su una spaziale di 2 x 2 km. Output: proiezione su serie 2010-2014 di statistiche di resa (fonte: Ente Nazionale Risi). Redazione: V. Pagan, T. Guarnieri, L. Fagnardi, L. Quattri, H. Bazzoli, R. Confalonieri. Dati prodotti da Università degli Studi di Milano e Consiglio Nazionale delle Ricerche.

Geoportal & SmartApp to

visualize/analyze data and support farm management/field inspection (agro-management information)



Main project outcomes: Successful story and lessons learnt

2) User Evaluation and feedbacks: participation and request for service continuity

- Generally **very positive feedbacks** at both local (farmers, agriculture cooperatives) and regional (trade companies, insurances, public authorities) level in all the three countries.
- **need for customization of services/products, as well as for agri-consulting and/or expert analysis of data** to achieve a good level of user engagement and products exploitation.



Farmers

- (some) ready to use ERMES like information in VRT techniques, willing to pay for the services but 1) **need for specialists** to provide technical support and 2) **service costs should be shared** by a large group of farmers to make it more cost-effective.



Agro-business

- Interest in 1) provide new service lines and adopt **added-value information in current agri-consulting activities** and 2) emerge on the market as a **“more innovative” company** to gain competitive advantage.



Authorities

- Positive interest but harder to delineate public authorities' inclination to invest in ERMES-like products and services unless within the **framework of specific public budget** for contract research. More complicated to introduce novelties in existing workflows

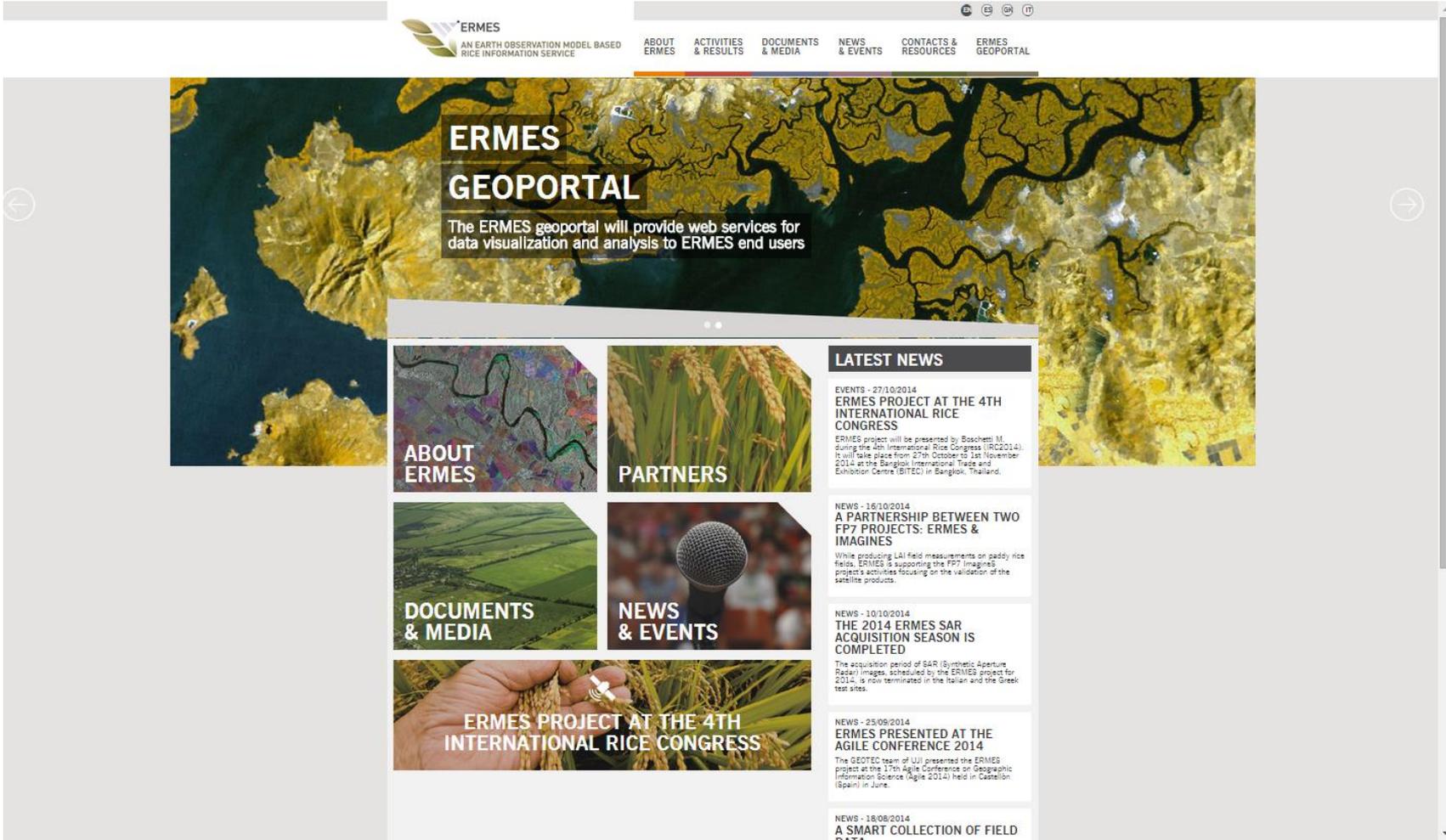
Main project outcomes: Perspectives for future exploitation

3) Market analysis, opportunity & identified potential KER

- The aforementioned considerations suggest that the **market is starting to be mature** for the development of services for the agriculture sector supported by high-level scientific evidence
- Identified some key exploitable results (KER), dedicated respectively to the **European and Extra-European** markets, which could be further developed towards commercialization after the end of the project
- SME and Partners **interest, IPR and roles were identified**. A road map will be defined and business development opportunity highlighted to fully exploit project outcomes

COMM
EXPLC
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ERMES
AN EARTH OBSERVATION MODEL BASED
RICE INFORMATION SERVICE

ABOUT ERMES ACTIVITIES & RESULTS DOCUMENTS & MEDIA NEWS & EVENTS CONTACTS & RESOURCES ERMES GEOPORTAL

ERMES GEOPORTAL

The ERMES geoportal will provide web services for data visualization and analysis to ERMES end users

ABOUT ERMES

PARTNERS

DOCUMENTS & MEDIA

NEWS & EVENTS

ERMES PROJECT AT THE 4TH INTERNATIONAL RICE CONGRESS

LATEST NEWS

EVENTS - 27/10/2014
ERMES PROJECT AT THE 4TH INTERNATIONAL RICE CONGRESS
ERMES project will be presented by Boschetti M. during the 4th International Rice Congress (IRC2014). It will take place from 27th October to 1st November 2014 at the Bangkok International Trade and Exhibition Centre (BITEC) in Bangkok, Thailand.

NEWS - 16/10/2014
A PARTNERSHIP BETWEEN TWO FP7 PROJECTS: ERMES & IMAGINES
While producing LAI field measurements on paddy rice fields, ERMES is supporting the FP7 Imagines project activities focusing on the validation of the satellite products.

NEWS - 10/10/2014
THE 2014 ERMES SAR ACQUISITION SEASON IS COMPLETED
The acquisition period of SAR (Synthetic Aperture Radar) images, scheduled by the ERMES project for 2014, is now terminated in the Italian and the Greek test sites.

NEWS - 25/09/2014
ERMES PRESENTED AT THE AGILE CONFERENCE 2014
The GEOTEC team of UIJ presented the ERMES project at the 17th Agile Conference on Geographic Information Science (Agile 2014) held in Castellón (Spain) in June.

NEWS - 18/08/2014
A SMART COLLECTION OF FIELD DATA