



ERMES: AN EARTH OBSERVATION MODEL BASED RICE INFORMATION SERVICE

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Introduction

The agricultural sector is facing important global challenges due to the pressure of the continuous demand of food, mainly in developing countries, the increased price-competition produced by market globalization and food price volatility (G20 Agriculture Action Plan) and the needs of more environmentally and economically sustainable farming systems in the developed countries. The Earth Observation (EO) Space satellites sector can significantly contribute to these topics by providing reliable real time information on crop distribution, status and seasonal dynamics.

Project aim

ERMES project, founded in the framework of FP7-SPACE-2013 call, aims to develop a prototype of downstream service dedicated to rice sector based on assimilation of earth observations and in situ data within crop yield modelling. The objective of this service, targeted to European needs, is to: a) contribute to the regional authorities in the implementation of agro-environmental policies; b) support farming activities for sustainable management practices; c) provide independent reliable information to the agro-business sector. 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.

Service component

On the base of previous experience of the consortium partners in i) rice mapping and monitoring with SAR/optical data, ii) biophysical parameters retrieval, iii) rice growth

and development modelling and iv) meteo variables estimation, two services are foreseen:

- **Regional Rice Service (RRS)** to provide to public authorities a customized agro-monitoring system devoted to regional yield estimates and risk alarming. Digital maps and bulletin will be disseminated via web through INSPIRE compliant geo-portal;
- **Local Rice Service (LRS)** to provide to the private sector (farmers and agro-services and insurance companies) high level information on yield variability, risk alert and crop damage assessment at farm scale. Advanced smart technologies will be the basis of distributed collection of in situ data, to be ingested in crop model, and return of added value information to the user.

Expected results and Discussion

Table 1 provides a synthesis of expected ERMES Information (EI). Products derived by EO data processing (EP), can represent both intermediate input needed by crop model as well as value added geo-information provided directly by the service to Users.

Table 1. List of ERMES Information (EI) from the regional (EI_R) and local services (EI_L).

| | Code | Geo-information | Delivery time | Spatial coverage/ Resolution | Added value EO-products |
|-----|-------|--------------------------------------|-----------------------|------------------------------|--|
| RRS | EI_R1 | Crop monitoring*** | Apr-Oct. bi-monthly | Simulation unit | Rice crop map* (EP_R1) |
| | EI_R2 | Yield forecast** | Jul-Sept. 2 bulletins | Simulation unit | Phenology * (EP_R2) |
| | EI_R3 | Risk alert (biotic/abiotic)** | In case | Simulation unit | Meteo variable* (EP_R4) |
| | EI_R4 | Yield estimation and grain quality** | October. 1 bulletins | Simulation unit | |
| LRS | EP_L1 | Cultivated area* | July | <20 m | Soil/biomass constant patterns maps* (EP_L2) |
| | EI_L1 | Yield pattern** | October | <20 m | |
| | EI_L2 | Risk alert (biotic/abiotic)** | In case via Smart app | Farm/Field | Seasonal patterns* (EP_L3) |
| | EI_L3 | Crop damage*,** | October | <20 m | |

* directly from EO data processing; ** from crop modelling assimilating ERMES added value product;

Conclusions

The maturity of GMES/Copernicus core products and the advent of Sentinel data represent the right framework to develop specific earth observations based added value products for agriculture sector. In particular the complementary information of Sentinel SAR and Optical data at high resolution will provide a new opportunity to guarantee operational customised information on crop status making regional agro-monitoring feasible and local agro-consulting possible.

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