

EO-BASED AGRO MONITORING SYSTEM TO SUPPORT REGIONAL DECISION-MAKING

The ERMES FP7 project's downstream services provide decision and policy makers with high-quality, large-scale information on crop evolution and yield forecasting.

The challenge

There is an increasing demand for systems able to provide Near Real Time (NRT) information on crop condition and timely yield forecasts, given the potential interest for a variety of authorities within the agricultural sector, including private companies and institutional stakeholders. Such operational agro-monitoring systems, able to deliver timely early warnings and yield forecasting maps over large areas, may provide decision makers with information on seasonal dynamics and potential crop production shortages, useful to monitor agro policies, coordinate relief initiatives and control food prices' volatility. Nevertheless, they form a major technological challenge, as they require the gathering and integrating of huge amounts of information derived from remote sensing, weather and modelling data, and then the presenting of this processed, multi-scale, temporary variable data as actionable information to the end users in a useful, understandable and user friendly way.

The space based solution

Our focus was on developing a platform able to create, manage and disseminate NRT spatialised maps derived from the integration of remote sensing images, weather data and crop modelling solutions. We used free-of-charge satellite imagery and EO products from the European Copernicus Programme (e.g. Sentinel-1/2A data, SPOT/VEGETATION - PROBA-V (GEOV1) LAI) and NASA (e.g. MODIS and OLI data) to: i) assess the seasonal extent of rice cultivated area and agro-practices, ii) estimate occurrence of phenological stages, and iii) retrieve crop leaf area index to highlight anomalous conditions of rice development in the on-going season. Customised regional products from the Water Accounting Rice Modelling

(WARM) solution were current and forecasted biotic risks for rice cultivations and yield forecasts obtained from the assimilation of EO data and statistical post-processing of model simulations.

Timely and user-friendly dissemination and delivery of these products to stakeholders were as relevant and fundamental as the products themselves to accomplish the expected benefits and impacts. A regional geoportal was specifically developed to allow efficient access to the rice-monitoring information produced for regional services.



ERMES regional geoportal interface showing the rice map for the Spanish Mediterranean area. Users get access to a variety of products from crop monitoring from the eye icon on the left side.

Benefits to Citizens

Adoption of the ERMES regional products can surely be beneficial for many distinct European stakeholders, including public authorities (e.g. regions, provinces, environmental protection agencies, etc.) with the mandate of i) monitoring cultivated surface and yield, ii) implementing agro-policies, and iii) providing information to farmers concerning potential risks of biotic/a-biotic injuries or suggesting best-practices for cultivation.

Thematic Area



AGRICULTURE,
FOOD, FORESTRY
AND FISHERIES

Region of Application



VALENCIAN
COMMUNITY
LOMBARDY
CENTRAL MACEDONIA

Sentinel mission used



S1
S2

Copernicus Service used



-

Usage Maturity Level



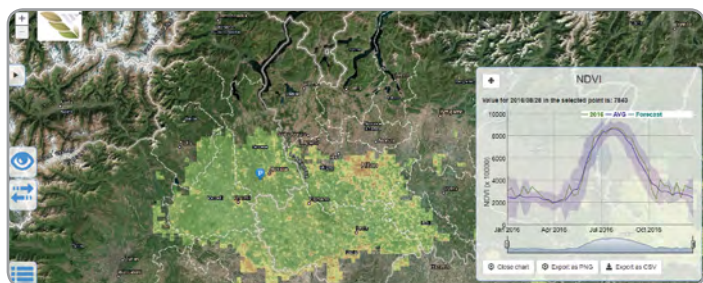
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For example, the ERMES regional geoportal provided spatially explicit NRT information on rice season development together with biotic/abiotic risk at regional/district scale. Rice crop maps allow regional authorities to understand the spatial distribution of rice cultivation practices and their inter-annual variations, obtaining initial estimates of the total area earlier than official statistics obtained from CAP subsidies declaration.

Outlook to the future

The regional geoportal offers downloadable products and charts to support both additional analysis and production of crop monitoring bulletins. For example, a public agency of the Lombardy Region produces daily bulletins of current and forecasted risk of rice blast infection aggregated at municipality scale (www.ersaf.lombardia.it/servizi/bollettini/index.aspx).

Private insurance companies in the agricultural sector, traders/millers or large cooperatives of farmers could also benefit from ERMES products and tools to deliver added-value services. A major Italian insurance company, for example, delivers risk information derived from the ERMES agro-monitoring regional service to its customer pool as a support to reduce the risk of yield losses.



ERMES regional geoportal showing Normalized Difference Vegetation Index (NDVI) map and temporal trends for the Regione Lombardia (Italy).

“The ERMES product of blast infection risk is more useful than others, such as the estimation of blast risk occurrence derived from in-situ measurements.”

Regione Lombardia

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This Copernicus User Story is extracted from the publication “**The Ever Growing use of Copernicus across Europe’s Regions: a selection of 99 user stories by local and regional authorities**”, 2018, Edited by NEREUS, the European Space Agency and the European Commission.

The model cases focus on local and regional authorities who successfully applied Copernicus data in 8 major public policy domains. The views expressed in the Copernicus User Stories are those of the Authors and can in no way be taken to reflect the official opinion of the European Space Agency or of the European Commission.

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