

CABI's expertise in Earth Observation technology for greater food security highlighted at EO4AGRI 2024

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Dr Bryony Taylor, CABI's Head of Data Sciences and Modelling, delivered a presentation giving an overview of CABI's EO projects to help farmers grow healthier and more profitable crops free from crop pests and diseases.

These included the 'Pest Risk Information Service' (PRISE) which uses 'ERA5 weather data' to produce advisories for smallholder farmers on when to intervene against pests – such as fall armyworm (*Spodoptera frugiperda*) on maize in Africa.

Dr Taylor also described how the 'Global Burden of Crop Loss' (GBCL) brings together people, data, and ideas to develop a data-driven methodology to quantify the scale of yield loss by crop, geography, and attribute it to biotic or abiotic causes.

Growing pressure on agriculture

The EO4AGRI 2024 workshop recognises that there is a growing pressure on agriculture and the entire food system to increase the global production, while at the same time ensuring healthy, nutrient-rich products and sustainability both in the

terms of sufficient income for farmers and in terms of impact on the soil and other inputs, as well as on the environment and the climate.â?•

The [European Space Agency](#) (ESA), the [European Commission](#) (EC), the [World Food Programme](#) (WFP), the [Food and Agriculture Organization](#) (FAO) and [GEOGLAM](#), co-organised EO4AGRI 2024 to follow up from these previous events.

Priorities for future projects

The workshop brought together those working on EO-based science and solutions for agriculture as well as users, including scientists, data and service providers, national and international agencies and other institutions and organisations to discuss the priorities for future projects of **Horizon Europe** and **FutureEO**.

Dr Taylor said, "Advances in the quality and accessibility of Earth Observation information have led to rapid advances in data driven decision support, especially in pest risk. Historically, applications associated with pest management have focussed on monitoring and detection of pest incursions, however in many cases early intervention is required before detectable damage has occurred. Where preventative action is needed, strong linkages with agricultural extension systems are required to understand how information can better inform preparedness and decision making."

Dr Taylor spoke about the development of a suite of projects that use optical, radar and weather EO data products combined with ecological modelling methods to provide information to farmers and decision makers on when to intervene and where risks will be highest on a broader spatial scale.

Temperature-driven phenology models

In respect of PRISE, Charlotte Day, PRISE project executive, presented a poster which outlined how PRISE "which was implemented in Kenya, Ghana, Malawi, and Zambia" developed temperature-driven phenology models for major maize, bean, and tomato pests.

Using downscaled and processed EO data to drive the models, PRISE partnered with Assimila LTD who provided the EO expertise and built the infrastructure which when working with African national agencies allowed the team to communicate pre- and in-season pest alerts that forecast the time to act against key insect pests. Alerts were designed to be integrated into country-specific Good Agricultural Practice (GAP) recommendations to provide a complementary package to agricultural stakeholders.

End line studies with farmers showed that those who received information about the target crops including PRISE pest forecasts, reported better outcomes in terms of reduced losses and increased incomes compared with farmers who did not.

Authoritative evidence

Dr Anna Szyniszewska, GBCL technical lead, highlighted the opportunities and approaches for using EO data to enhance understanding the crop losses on a larger scale for a variety of cropping systems in different geographies. By integrating satellite remote sensing, climate and socio-economic data, and on-ground surveys, the program seeks to assess the impact of pests, abiotic factors, and climate change on crop yields. EO data can provide insights into broad spatial and long-term trends, enabling the assessment of yield variability over time," Dr Szyniszewska added.