

Integrating satellite and weather data to help reduce crop losses caused by pests across sub-Saharan Africa

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Agrifood Africa Connect
Earth Observation Technologies and Data for African Agriculture Webinar

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6th July, 2023

Problem

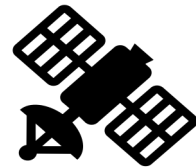
- It is **estimated that 40% of crops are lost to pests and diseases**. **Insect pests** are a major challenge to smallholder crop **production** in **Sub-Saharan Africa (SSA)**
- On average, smallholders grow several crops, usually a combination of subsistence and cash crops
- Most of the important crops in all major cropping type regions (e.g. 'mixed maize system) **now affected by one or more serious pests**

Solution

- **The Pest Risk Information Service (PRISE)** is an early warning system that **forecast the risk of pest outbreaks**



Developed in Kenya, Ghana, Zambia, and Malawi



Combines **earth observation** derived **weather data** with **pest risk models** to give optimum time to act based on near real-time weather data



Models give the optimum time to apply intervention for maximum 'kill' of early stages of pest

- It is designed **to provide farmers with actionable advice** to reduce crop losses from pests and disease

*PRISE is implemented by CABI, Assimila Ltd, and the Science and Technology Facilities Council's Centre for Environmental Data Analysis, the UK, and **in-country partners from government agencies** in **Ghana, Kenya, Malawi, and Zambia**.



THE PRISE SYSTEM

(LINE DIRECTION INDICATES FINAL MODEL FLOW)

3RD PARTY INFORMATION RESOURCES

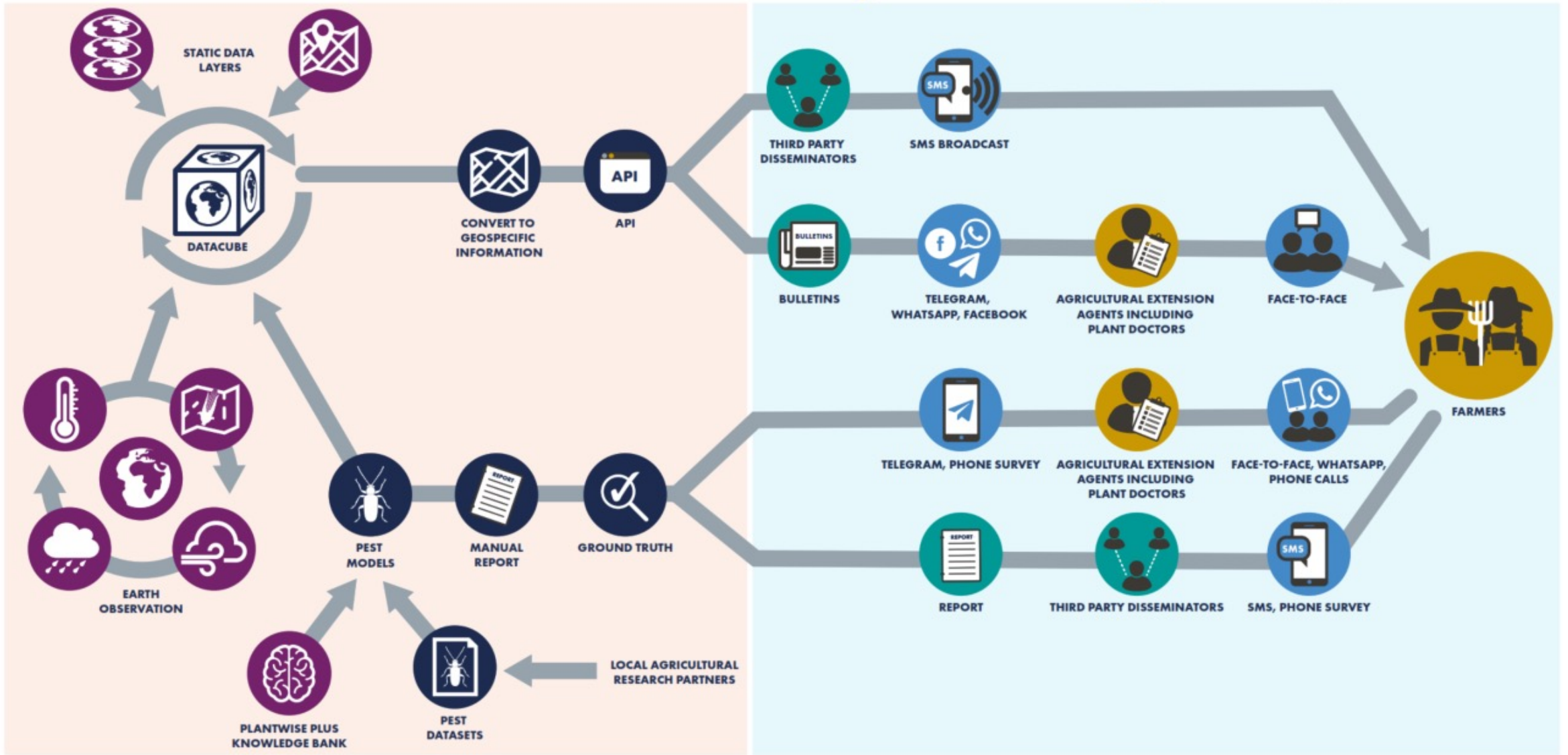
PRISE

OUTPUT FROM PRISE METHOD OF COMMUNICATION

USERS

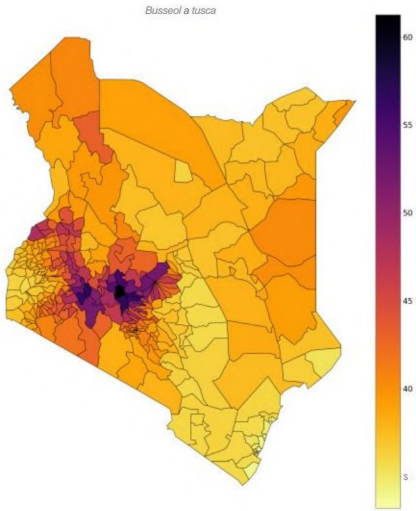
METHOD OF REACH

REGULAR UPDATES

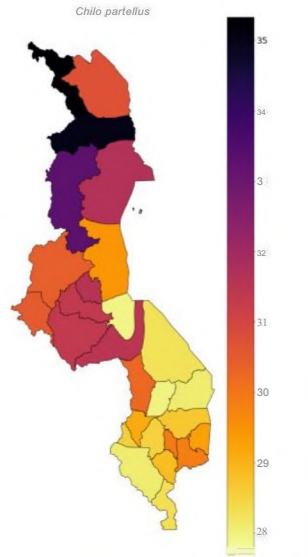


Four countries, three crops, 15 pest models

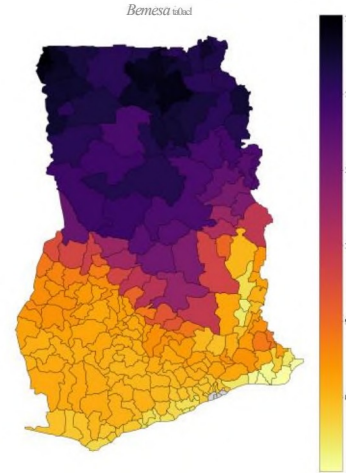
Country: Kenya
 Pest: Maize Stalk Borer (*Busseola fusca*)
 Crop: Maize



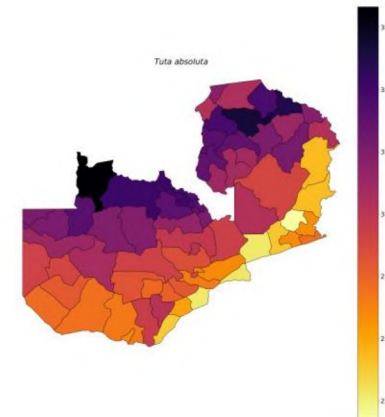
Country: Malawi
 Pest: Spotted stem borer (*Chilo partellus*)
 Crop: Maize (also applies to sorghum, millet)



Country: Ghana
 Pest: Silverleaf whitefly (*Bemisia tabaci*)
 Crop: Various, incl beans



Country: Zambia
 Pest: South American tomato moth (*Tuta absoluta*)
 Crop: Tomato



Crop	Species	Scientific Name
INSECTS		
Maize	Spotted stem borer	<i>Chilo partellus</i>
	African stalk borer	<i>Busseolafusca</i>
	Fall armyworm	<i>Spodoptera frugiperda</i>
	Bollworm	<i>Helicoverpa armigera</i>
	Bean fly	<i>Ophiomyia phaseoli</i>
Bean	Whitefly	<i>Bemisia tabaci</i>
	Pea leafminer	<i>Liriomyza huidobrensis</i>
	Tomato leafminer	<i>Tuta absoluta</i>
Tomato	Whitefly	<i>Bemisia tabaci</i>
	Bollworm	<i>Helicoverpa armigera</i>
	PATHOGENS	
Maize	Grey leaf spot	<i>Cercospora zea-maydis</i>
Bean	Angular leaf spot	<i>Phaeoisariopsis griseola</i>
Tomato	Early blight	<i>Alternaria solani</i>
	Late blight	<i>Phytophthora infestans</i>

Shown here are example national-scale model outputs. This data can be converted to short form text/SMS or broadcast messages

The scale is a number representing the days between planting and when action should be taken against pests. Farmers would receive different advice depending on location and their actual planting date.



How PRISE Advisory is disseminated to farmers

PRISE Advisory messaging can be adapted for a variety of dissemination mechanisms

Channel	Partner	Country
Extension Services (face to face contact)	CABI Plantwise Plant Clinics	Kenya, Ghana, Zambia, Malawi
SMS	MoA-INFO, PxD	Kenya
SMS	Esoko	Zambia
SMS + Broadcast	iCow	Kenya
Broadcast	Farm Radio Trust	Malawi

We have an MOU with **Kenya** Agricultural and Livestock Research Organization (**KALRO**) to disseminate messages to farmers in Kenya

Benefits of the PRISE approach

PRISE end line surveys have consistently demonstrated a range of **positive economic and sustainability benefits**.

For example:

- During the 2019/2020 short rains season in Kenya, PRISE model outputs were integrated in the MoA-INFO SMS service. At the end of this season, **59% of farmers** who received the service changed their practices based on PRISE recommendations for fall armyworm, with the **most common outcomes being reduced population of the pest and an increase in maize harvest**.
- In the 2020/2021 short rains season, **87% of maize farmers** surveyed believed the time recommended to take action by PRISE was correct.

The benefits of PRISE are multiple:

- Economic - increased productivity and reduced crop losses through better management activity
- Sustainability - better pest management decisions reduce reliance on chemical treatments
- Delivery of SDG goals - PRISE is making demonstrable contributions to SDG 1 and 2

Thank you

We wish to acknowledge the support of our funders and partners who make PRISE possible

Core donor:



With co-finance from:





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Ministry of Agriculture and Rural Affairs, People's Republic of China

