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

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Agrifood Africa Connect
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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.*
Four countries, three crops, 15 pest models

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

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

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

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

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:

<table>
<thead>
<tr>
<th>Channel</th>
<th>Partner</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extension Services (face to face contact)</td>
<td>CABI Plantwise Plant Clinics</td>
<td>Kenya, Ghana, Zambia, Malawi</td>
</tr>
<tr>
<td>SMS</td>
<td>MoA-INFO, PxD</td>
<td>Kenya</td>
</tr>
<tr>
<td>SMS</td>
<td>Esoko</td>
<td>Zambia</td>
</tr>
<tr>
<td>SMS + Broadcast</td>
<td>iCow</td>
<td>Kenya</td>
</tr>
<tr>
<td>Broadcast</td>
<td>Farm Radio Trust</td>
<td>Malawi</td>
</tr>
</tbody>
</table>

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:

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