Monitoring invasive pest species in Kenya on a regional scale

The Challenge

The researchers at the International Center of Insect Physiology and Ecology (ICIPE) and Tel Aviv University (TAU) wished to monitor the infestation of fall armyworm and other highly harmful pests over a large area in Kenya. They needed a system that could simplify field data collection, particularly by field scouts and lead farmers, and also simplify data analysis.

The Solution

ICIPE and TAU chose the Agritask agronomic platform which simplifies field data collection, automates the creation of a structured database, and generates intuitive visualization for research purposes. One key component utilized in their operations is a user-friendly mobile app for field scouts and lead farmers to report pests from the field.

The Results

The Agritask platform was successfully deployed by both the researchers and the field teams, several of whom using such digital tools for the first time. The system is now routinely used to monitor pests, covering a region with approximately 20,000 subsistence farms in Kenya, in order to identify real time pest trends and give early warning for pest control measures.

The Background
Pests affecting food security on a regional scale

In 2018, the International Center of Insect Physiology and Ecology (ICIPE) and Tel Aviv University (TAU) won a Gates foundation funded research program, the main goal of which was to start monitoring the areas affected by fall armyworm for regional early warning and pest management decision support. Fall armyworm is an invasive pest causing significant damages to several staple crops. It was first reported in Africa in 2016, and spread quickly ever since, posing a major threat to food security in an already vulnerable region. Containing fall armyworm in the smallholder agriculture setting is particularly challenging: There are several limitations on the ability to track and quantify the spatio temporal extent of damage, to schedule control measures, and to coordinate these efforts. The root cause of such issues traces back to the lack of structured and reliable real time field data, without which stakeholders cannot make effective decisions to control the pest.

The Challenge
Streamlining data collection and analysis

The researchers' ground operations had to involve a team of professional field scouts as well as lead farmers, reporting routinely the infestation levels and crop phenological stages. They were looking for a digital platform that could simplify field data collection in the low-capacity operating environment, including a customizable and user-friendly interface, availability in local languages, with offline functionality and automatic generation of user, location and time stamp of data entries. The platform would then create a structured database and translate it into insights such as the distribution map and the statistics of infestation levels, to be used for further research work. TAU and ICIPE chose Agritask for these purposes.

The Solution
A platform for regional pest monitoring, fit for local operating conditions

Agritask delivered practical tools for field scouts and led farmers to report fall armyworm and crop data from the field. The mobile app was tailored to fit the requirements set by the researchers at TAU and ICIPE. For some users, this was their first time using a digital agricultural tool. The app offers several means to ensure the quality of reported data, such as the ability to capture photos from the fields for verification and geo-referencing of data points. In addition, farmers without smartphones can also report pests via a call center. The reported data is automatically processed to generate a centralized view and analysis of infestation patterns - both spatial and temporal - in real time.

In summary, the platform features:

- Customized mobile screens enabling the reporting of different pests and crop phenological stages with measurements as defined by the researchers.

- Flexibility to control reporting access, so that only designated personnel can report certain data, thus ensuring quality control.

- Creation of a structured, clean database of reported pests - quantity, stage, location, time, reporter, crop type, phenological stage, and associated notes and photos.

- Visualization of reported data on the map, with coloured markers to indicate different pest thresholds according to crop stage, in order to easily identify high-risk and low-risk areas.

- Tracking of pest infestation levels over time for each area, such as weekly statistics and more.

The Results
High acceptance among users, expanding in scope and scale

Agritask soon became an integral part of the research project operations spanning across four counties in Kenya - approximately 20,000 small subsistence farms. In addition to fall armyworm, Agritask has been deployed to track other pests and diseases common in the region such as oriental fruit fly, wheat rust, maize stem borer and others.
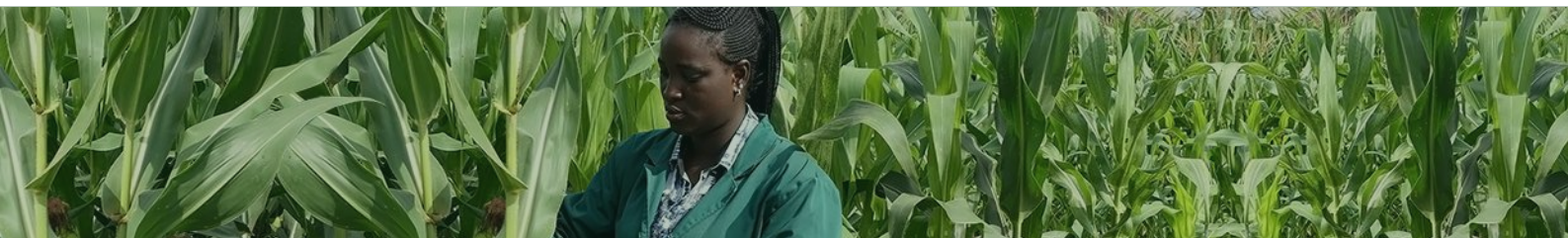
The pest monitoring project has been executed at a regional level using a structured, accountable scouting program, with participation from all levels of local stakeholders. In the course of the last 12 months there have been approximately 12,000 field data records of fall armyworm, in addition to reports of other pests. The ability to capture this data has become very popular and in high-demand, with over 60,000 photos taken during this period, documenting the inspected plants at each point and encompassing different growth stages and infestation levels of the plants.

TAU and ICIPE make some of the data from the Agritask system publicly available on www.pest-watch.com with the purpose of sharing insights generated from their research program with others.

Dr. Opher Mendelsohn of TAU: *"Our Integrated Pest Management project in 4 Kenyan counties focused on introducing structured area-wide field scouting of fall armyworm, an invading pest that threatens food security in many African countries. Agritask was a major contributor to the success of the project and proved its flexibility and simple adaptation to local constraints and needs."*

Ofir Ardon, CEO of Agritask: *"We take pride in supporting the research efforts which seek to address significant regional problems and improve livelihoods of many farmers. With climate change bringing more pest and disease issues, we hope that our platform will contribute more toward such efforts."*
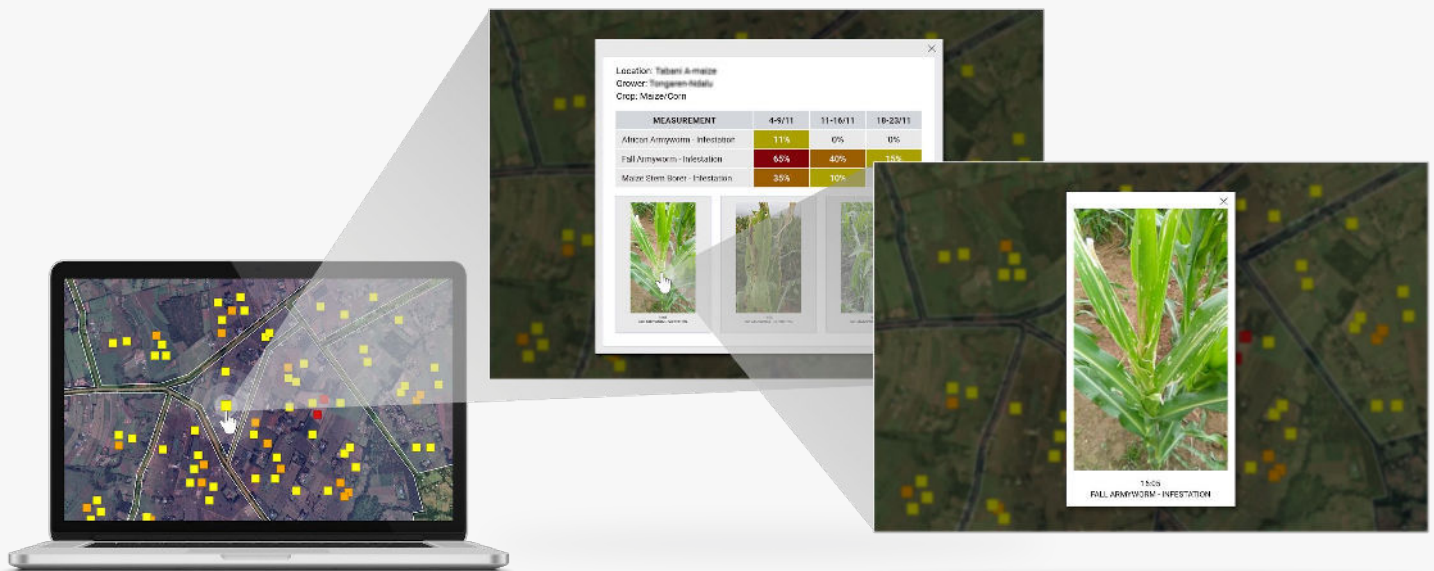
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