BIOSPACE: USING SPACE-ENABLED REMOTE SENSING FOR LONG TERM SUSTAINABLE GROWTH OF BIOPESTICIDE USE

Locations
China, Laos

Dates
13/02/2020 - 12/02/2022

Summary
Pests and diseases cause significant losses of crops around the world and are a significant threat to food security. In China and Laos, locusts affect over two million hectares of agricultural land and recently, the fall armyworm is becoming prevalent in China and Southeast Asia, already affecting 35,000 hectares of maize in Laos. Due to a lack of detailed information on where risks to crops are greatest and farmers using inappropriate and ineffective control measures, managing the damage from pests can be problematic. There is also a resistance to chemical pesticides from the farmers and overuse of them cause both environmental and human health harm. In this project, we will use Earth Observation (EO) and meteorological data to provide information to farmers and agricultural authorities to help manage pest risk more sustainably. Inevitably, this will help to reduce hunger and promote sustainable production and consumption of crops by promoting biopesticides.

The problem
In China, the migratory locust affects over two million hectares of agricultural land, while in Laos the yellow spined bamboo locust (YSBL) is widespread across the nine districts of Northern Laos and damaged over 5,000 hectares of crops in 2019.

A new invasive pest, the fall armyworm, is becoming prevalent in Southeast Asia and China. It has been found in 22 provinces in China and affected 35,000 hectares of maize.
hectares of maize in Laos. Experience from Africa shows it can cause almost total crop losses.

Managing the damage from pests can be difficult. There is often a lack of detailed information on where risks to crops are greatest, inappropriate, or ineffective control measures are used, and there is a resistance to chemical pesticides. Furthermore, the overuse of chemical pesticides causes environmental damage in the form of biodiversity loss through chemical residues being left in the environment and on food.

To help tackle the problem, this project will act as an early warning system that will identify the location of high pest populations whilst giving information on how to use biopesticides effectively to control locusts in an environmentally-friendly way.

**What we are doing**

In this project, BioSpace, we will build upon previous work on locust forecasting and promote the use of biopesticides by validating the models in the different climatic region of Hainan, Southern China.

We have shown that EO data can be used in Shangdong, Eastern China and now want to confirm what effects a different climatic region has on the models produced.

Key activities of the project include:

1. EO data will be gathered for the Hainan region which will then be ground-truthed to validate the models in a different climatic region
2. Our models will be adapted to other locust species while simultaneously giving expert advice in helping Laos to control the YSBL with environmentally-friendly biopesticides
3. Disseminate activities and results of the project to Laos and the end-users in China through a workshop and training of trainer activities
4. Working closely with NATESC, start Beta trials of the BioSuccess app (developed as part of a European Centre for Medium-Range Weather Forecasts (ECMWF) funded project) which will aid decision-making on when to apply biopesticides.

**Results so far**

A two-day workshop on the BioSuccess app was held with over 35 employees of China’s National Agriculture Technology Extension Service Centre and extension officers in Laos. Two sets of fieldwork in Hainan were also carried out to validate the model for the oriental migratory locust.

**Donors**

Science Technology and Facilities Council

**Partners**

Lao People’s Democratic Republic, Ministry of Agriculture and Forestry, Aerospace Information Research Institute Chinese Academy of Sciences, National Agro-Tech Extension and Service Center (NATESC), Assimila

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