Modelling crop growth

Regional crop monitoring and assessment with quantitative remote sensing and data assimilation.
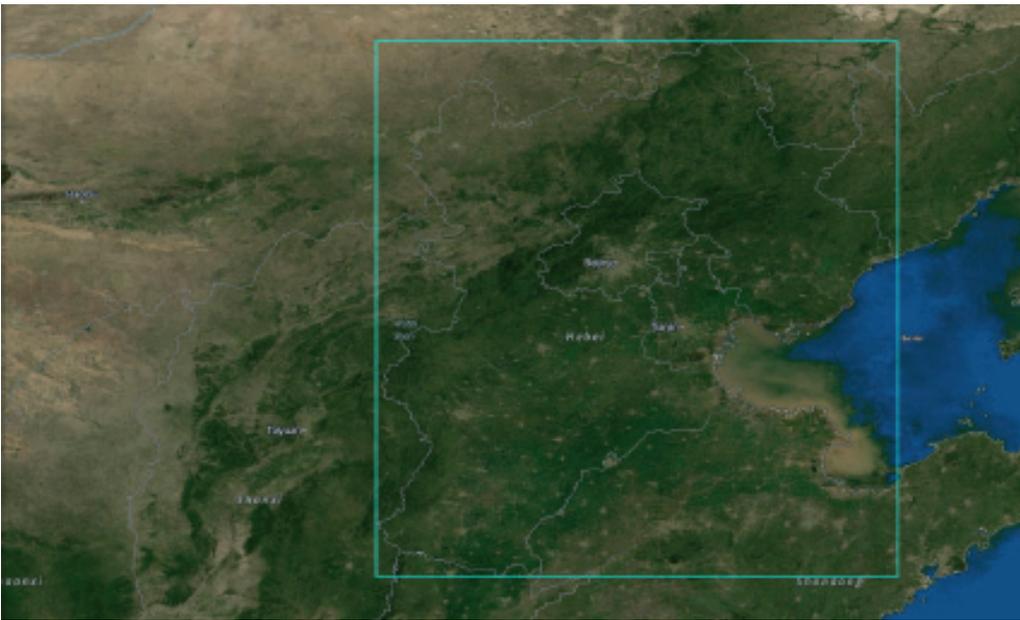
PROJECT LEAD University College London

AREA IN FOCUS
Our study area Hebei lies in the heart of North China Plain, the breadbasket of China.

IMPACT FACTS

- Hebei province, in the heart of North China Plain, the breadbasket of China, produces 75% of China's wheat.

Project Leader, Professor Phil Lewis,
University College London

PROJECT SUMMARY

Ensuring food security for a country the size of China presents significant information challenges. One such challenge is the knowledge of inter-annual patterns of production from local to regional scales and how they relate to policy and farm management practice. Satellite Earth observation (EO) has been used for assessing the extent and type of agricultural production since the 1970s and this project seeks to enhance Chinese systems for exploiting the new generation of EO data sources and modelling approaches for use in a variety of policy contexts.

SOLUTION

The China Ministry of Agriculture currently uses the China Agriculture Remote Sensing Monitoring System (CHARMS) developed and run by lead project partner CAAS-IARRP, which monitors crop acreage, yield, production, drought and other agriculture-related information for 7 main crops in China.

The project seeks to enhance CHARMS in significant and complementary ways. This will be done by enhancing the capacity of CHARMS to assimilate new sources of EO data. This is to be done by applying a new generation of Data Assimilation and modelling techniques developed in the UK. As such, this work will be the first to make use of data from both EU Sentinel and Chinese GF satellites.

Applying UK scientific expertise in advanced Data Assimilation (DA) techniques, the project aims to: 1) provide enhanced information to researchers, regional authorities and agri-tech companies and extension workers advising farmers in China for monitoring and prediction of crop health, vigour and yield, from field to regional scales. 2) assess the impacts of farming practices (importantly, crop type choices and rotation as well as water and other inputs) under current climate and future climate scenarios.

PROJECT IMPACT

The optimizations being undertaken in the project will allow the use of advanced Data Assimilation techniques on regional/national scale which had previously been impossible due to the high computational demand of the algorithms. This will feed directly into improving the quality and usefulness of CHARMS outputs.

Understanding seasonal crop production and yield outcomes for each growing season helps with national scale planning of food production and gives advanced warning of any significant imbalance between food production and demand.

UK PARTNERS

- Professor Phil Lewis, Project Leader, University College London
- Assimila Ltd

CHINA PARTNERS

- Chinese Academy of Agricultural Science
- Beijing Normal University
- Peking University

IMPACT FACTS

- China has only 7% of the world arable land and water resources, but has to feed 22% of the world population.