Impact Case Study

Designing an agricultural information management system for farms in China

A new public/private partnership has designed and successfully trialled a prototype agri-information management system for farmers, extension workers and researchers in China. Functions include managing pests and diseases, fertiliser management and a discussion forum.

CHALLENGES
A wealth of agricultural data are being collected across China: on soil and weather, crop performance and management practices for example. Research into the use of new technologies and satellite applications in Chinese agriculture is also adding to the pool of data and understanding.

However, few digital agricultural information management systems exist in China, especially for local use by farmers, advisors and researchers. It is vital that a management system is developed to integrate, validate and analyse this growing volume of valuable information.

SOLUTIONS AND IMPACT
A new private/public partnership, involving businesses and research institutes in the UK and China, has scoped an agri-information management system to store and analyse information for a range of Chinese farming systems (small, medium and large scale). Functions include: managing pests, diseases and fertilisers; and a forum for the exchange of ideas and advice.

A simple mock-up of the system was trialled by smallholder farmers, the majority of whom said they would use the app if it were made functional.

Ultimately, such a system could increase agricultural productivity and food security in China through more effective application of the increasing wealth of ground- and space-based data.

The proposed design uses a mobile app interface and is based on the needs of farmers, extension workers and researchers. The project also identified existing Chinese agricultural apps which could be incorporated.

This work is being taken forward with further Network+ funding to: develop and trial a more sophisticated prototype system; further investigate existing apps and to understand better the drivers and barriers in agricultural decision making and app use. This work will also integrate other developments from across the Network+.

IMPACT FACTS

• An information management system is vital for China’s farmers, extension workers and researchers to help transform the agricultural sector.
PARTNERSHIPS AND KNOWLEDGE SHARING
This Network+ project enabled the formation of a new partnership between businesses and academia in the UK and China:

- UK companies ADAS and Courtyard Agriculture Ltd. bring expertise in (i) software development and remote sensing and (ii) precision farming, soil and nutrient management.
- In China, VIPFarms provides precision agriculture services while the Chinese Agricultural University (CAU) has a leading team on the theory and practice of precision agriculture in China. The CAU Science and Technology Backyard (STB) experimental farm programme provided the project with contacts and access to farmers.

MORE PROJECT DETAILS...
Face-to-face interviews and questionnaires were carried out with 36 farmers, 30 advisors and 27 researchers. This provided the key user requirements on which the information system was based.

What users wanted from the information management system:
- **Farmers** - physical information about their farms; tools to help with management decisions and monitoring pests and diseases.
- **Advisors** - as for farmers, plus help locating problem areas; cropping maps, and a forum for the exchange of ideas and advice.
- **Researchers** - farm level data, plus analytical and visualisation tools and a forum for better communication with farmers and advisors.

The proposed system design has four functions provided to users through a mobile phone app with connection to a central database: fertiliser recommendation; pest and disease monitoring; forum; mapping. Data input (e.g., soil data, current crop) will be provided by farmers or from remote sensing.

A number of existing apps were identified with functionality that could potentially be transferred to the information management system.

ABOUT THE AGRI-TECH IN CHINA NEWTON NETWORK+ (ATCNN)
- Developing and supporting new UK-China partnerships
- Translating UK excellence in remote sensing, agri-tech and data-intensive innovation for enhanced productivity and sustainability in rural China
- Funded under the UK’s Science and Technology Facilities Council (STFC) innovation programme, coordinated by STFCs Rutherford Appleton Laboratory
- Lead by Prof John Crawford, Rothamsted Research, UK

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Of the farmers interviewed, over 90% used a smart phone, but only 50% used a tractor
Students from CAU took a mock-up of the mobile app to four villages in Quzhou County where it was trialled by 20 farmers. They found the fertiliser and pest and disease functions most useful. A number of farmers actively disliked the components for recording soil types and crop types on their farms.