

## Impact Case Study

# Making Chinese grape production more resilient to weather and climate



Frost damage is one of the risks faced by vineyards in the Helan Mountain region.

A partnership between UK based company Climate Wine Consulting (CWC Ltd.) and China's Northwest University of Agriculture and Forestry (NWUAF) shows huge potential for the use of environmental data from remote sensing and smart sensors to make Chinese viticulture more weather resilient, efficient and sustainable.

## CHALLENGES

Viticulture is one of China's fastest growing agriculture sectors and in 2015 China became the second largest grape producer in the world. In the UK, smart technology and vineyard-weather modelling tools have been developed to help manage risk and reduce losses to grape harvests, however in China viticulture is much more vulnerable to weather damage. Climate change is very likely to increase future risks.

## UK PARTNERS

Climate Wine Consulting (CWC Ltd);  
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## CHINA PARTNERS

The Northwest University of Agriculture and Forestry (NWUAF) College of Enology;  
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## IMPACT FACTS



- With over 20 litres of water used to make each bottle of wine, water requirements for irrigation are significant in the region and add to competition for water resources. There was evident opportunity for improving efficiency.

## SOLUTIONS AND IMPACT

This Network+ project successfully established a **new UK China private/public partnership** to investigate grape production, focussing on 3 vineyards in the Helan Mountain region.

The project demonstrated clear **potential to exploit existing satellite data and smart sensor technology** (e.g., for soil, weather, crop conditions) and GIS modelling to:

- reduce water inputs, and improve frost and disease management
- identify suitable regions for new vineyard development
- improve sustainability and security of the viticulture sector and the economic development of low-income rural regions

The project clearly shows extensive opportunities for developing the work - given further funding. Ultimately, this could develop into an operational service contributing to improved decision making, long term planning, evaluation of new viticulture areas and agro-economic sustainability in China.

## PARTNERSHIPS AND KNOWLEDGE SHARING

CWC Ltd. has extensive expertise, based on an academic background, in providing the viticulture sector, in the UK and internationally, with **solutions to manage weather and climate risk**.

The Network+ partnership combines this with the NWUAF College of Enology's specialism in **viticulture/wine science research** and training in China. The College also supports the rapidly growing Chinese wine production sector. These links facilitated **site visits and discussions with vineyard managers** and other staff from Pernod Ricard, Chateau Changyu Moser and Cheng Cheng Winery.

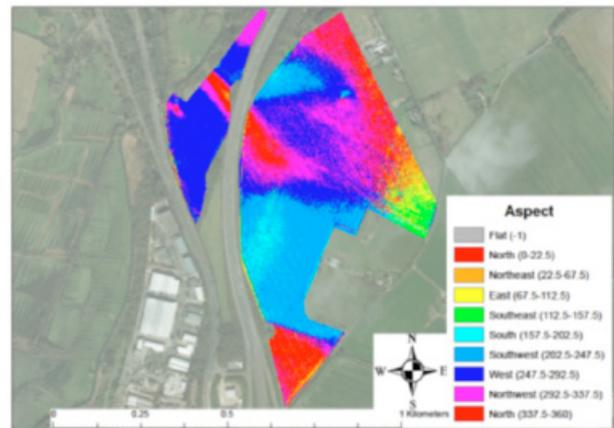
## MORE PROJECT DETAILS...

In the pilot vineyards investigated we found that:

- while geographic and weather data are available (both from remote sensing and on-site sensors), such data are not being used effectively to support decision making, such as for frost protection or targeted irrigation
- frost damage is a known risk (with crop losses of 10-15%), but vineyard frost protection information and products were almost non-existent (other than inefficient water sprinklers)
- no forecast data were being used to anticipate irrigation needs in pilot vineyards; it was estimated by growers that irrigation could be reduced significantly if targeted and driven by soil moisture data
- climate risk modelling would be advantageous for viticulture in China and the Helan Mountain areas - none has been undertaken to-date, leading to even greater risks in the future



**10-15%**  
Crop lost from  
frost damage



A lidar image of site aspect.



## ABOUT THE AGRI-TECH IN CHINA NEWTON NETWORK+ (ATCNN)

- Addressing the challenges facing modern agriculture by developing and supporting new UK/China partnerships.
- Capitalising on the UK's expertise in space-enabled technologies such as remote sensing and robotics.
- Funded through the STFC Newton Agri-Tech Programme, coordinated by staff at STFC's Rutherford Appleton Laboratory.
- Led by Prof John Crawford, Rothamsted Research, UK.

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