



Improving the understanding of agricultural cycles and practices in Afghanistan

by Ross Burgon, Head of the National SPRINT Business Support Programme, UK

Since war started at the end of 2001, the economy was severely devastated in Afghanistan, especially for the agriculture sector. Maize is the third most important cereal crop in Afghanistan, but the productivity of maize has a declining trend which may be caused by low efficiency of maize farmers nowadays.

Maize productivity fluctuated and has been decreasing in past years. In 2017, Afghan maize production was at 0.174 million tonnes, a 44 percent decrease of 0.312 million tonnes in 2016 (FAOSTAT, 2017). The productivity of maize in Afghanistan is substantially lower than that in its neighbouring countries. The low productivity of maize is mainly caused by the lack of knowledge for efficient use of inputs and poor management skills. Given the importance of maize, the increase of maize

productivity is very helpful for improving food security in rural areas of Afghanistan. Thus, it is necessary for farmers to use the available resources in the most efficient ways and to achieve a higher productivity in maize production and a better food security.

Unique insights into crop production

From ‘Economic Analysis of Smallholder Maize Producers: Empirical Evidence from Helmand, Afghanistan’, published in the Journal of Agricultural Science on February 15th, 2020

Read the study online: myMAG.info/e/916

Surrey-based Alcis is a geographic information services company that specialises in supporting fragile and conflict-affected states. The company was founded in 2004 to support UK government



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efforts around crop production in Afghanistan, where through the use of remotely sensed imagery and other geographic data, it has been able to provide unique insights into what was happening on the ground.

The company is very active in this country, primarily working alongside agricultural development programmes to gather relevant, accurate and timely data that helps international donors plan and implement effective

interventions, thereby providing the maximum assistance to the beneficiaries.

It maps and models crop types, land use, population and a range of other factors, joining them together through the use of their location component to derive contextual understanding. By providing this understanding, using on-line tools and maps, it helps to evaluate performance and ensure that the projects are having the desired effect.

Support from SPRINT for Afghanistan project

To enable the analysis of satellite images that will improve the understanding of agricultural cycles and practices in rural Afghanistan, Alcis is collaborating with the University of Surrey on a maize mapping and sustainable water use project in Afghanistan. The University of Surrey is providing geospatial data processing expertise to support the Alcis project.

The project will be funded by a grant from the £4.8 million national SPace Research and Innovation Network for Technology (SPRINT) business support programme that provides unprecedented access to university space expertise and facilities. SPRINT helps businesses through the commercial use of space data and technologies.

The SPRINT project will develop the methodology for mapping maize crops in Afghanistan in past crop cycles, without the need for ground truth data, using imagery from the European Space Agency's Sentinel 1 and Sentinel 2 satellites, and knowledge of the nature of maize growth and climate variables.

It will also develop a new spatial product, derived from globally available Earth Observation data, that will inform on the climate change impacts on water resources in Afghanistan, the water consumed by changing agricultural practices and the sustainability of this consumption in the context of climate change.

Using remotely sensed satellite data, the project will develop signatures for the maize crop based on its phenology and the local meteorological measurements. These signatures will be used to identify this crop at scale across the north of Afghanistan. Following successful trials, the project will then seek to develop this data across the entire country.

Collaboration with the university is key

Tim Buckley, Chief Operating Officer at Alcis said, "Alcis' clients work in fragile, conflict-affected areas, including rural Afghanistan, where getting good quality data is a major challenge. Our driving force is using cutting-edge technology for community-based applications to change people's lives for the better. Longer-term, we're expanding our offerings with other crops in other countries, increasing our footprint geographically, and we believe that this SPRINT project will be a springboard into new markets for us.

"The University of Surrey has such a strong reputation for space research, with a rigorous approach to data analysis and a willingness to experiment. The knowledge, information and theory that is the bedrock of academia can be of vital use in real-world applications, particularly in the space sector. Our relationship with Surrey will enable us to accelerate and develop our processes to make them even more efficient."

University of Surrey brings geospatial data expertise

Belen Marti-Cardona, Associate Professor in Earth Observation and Hydrology at the University of Surrey added, "We have consolidated experience of projects exploring the sustainability of water resources in the context of climate change and expanding farmlands in developing countries. While the Afghan environment poses some new challenges, we share in Alcis' excitement and their vision to tackle them through data analysis.

"We bring expertise in the synergistic combination of different Earth Observation data types and crop phenology to create new information on food production and water resources use. Our big data processing capabilities allow for the regional upscaling of our analysis. Alcis knows how to use this information to inform decision making and have a real-world impact."