



STARS is a research project which is looking for ways to use remote sensing technology to improve agricultural practices in Sub-Saharan Africa and South Asia. Supported by the Bill & Melinda Gates Foundation, the project hopes to significantly advance the livelihoods of smallholder farmers in some of the world's poorest countries.

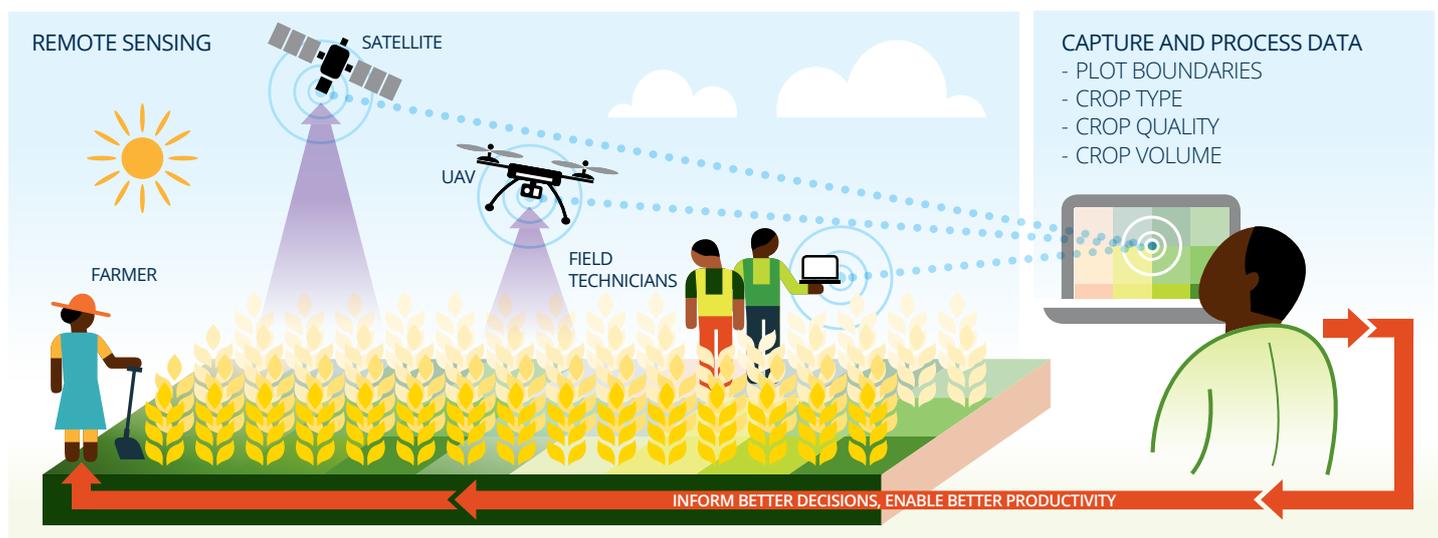
Background - the Challenge

High-income countries have seen recent improvements in their agricultural management systems through modern remote sensing technology, such as satellites, aircraft and the information they collect. Out of the vast amount of data collected, advice can be provided to farmers on the ground to help inform their decisions about farming methods. This leads to better crop yields, higher quality produce and possibly more sustainable practices for the farming communities. This data can also inform higher-level decisions to manage national food supply needs more effectively.

The significant spatial and technical challenges present in Sub-Saharan Africa and Southern Asia, have prevented the use of remote sensing technology in many areas. For example, smallholder farmers, who produce two thirds of the world's food, often have small plots with undefined boundaries, they often grow multiple crops on the same plot and there is significant variety in the farm practices they use.

These conditions make it difficult to distinguish farming practices from the skies and therefore, to capture and collate accurate and potentially actionable information, brought to farmer groups, agribusiness and public agencies.

Challenges such as unproductive soil, plant diseases, pests and drought, mean that many farmers struggle to produce crops consistently and sustainably year-by-year. At a national level, these challenges can also present difficulties in understanding the condition of crops and pastures, seasonal outlooks, access to markets and likely production levels. Decisions such as whether additional food needs to be imported to supplement that season's harvest, have been misjudged in the past due to a lack of information. There have been examples where produce was imported erroneously before what turned out to be a bumper crop, leading to an oversupply of food and financial difficulties for smallholder farmers as food prices plummeted.





The STARS Project

Commencing on June 1st 2014, STARS was established to investigate ways in which some of these challenges can be addressed. The Faculty of Geo-Information Science and Earth Observation (ITC) of the University of Twente in the Netherlands is leading a consortium of some of the world's leading minds on agricultural remote sensing. The consortium will test a number of hypotheses about the feasibility of remote sensing data and assess which types of information are most beneficial over a project period of 20 months.

The consortium includes an international group of research institutes, including:

- the Commonwealth Scientific and Industrial Research Organisation (CSIRO) in Australia;
- the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in Mali and Nigeria;
- the University of Maryland, USA, in Tanzania and Uganda;
- the International Maize and Wheat Improvement Center (CIMMYT) in Bangladesh and Mexico.

The STARS project already has three use cases underway:

In **Mali and Nigeria**, concurrent remote sensing of land tenure in 20+ communities, and 150 individual farmer fields explores ways in which data can lead to the emergence of smallholder-friendly advisory services.



In **Tanzania and Uganda**, the STARS consortium is monitoring four separate, large blocks of croplands to provide data to the National Food security to support monitoring crop condition.



The third project is in **Bangladesh**, where remote sensing data is used to analyse the floodplain of the Bengal Delta to determine whether farmers can be allowed to use surface water to grow a second crop in the dry season.



Benefits

If ways can be found to use remote sensing effectively in Sub-Saharan Africa and Southern Asia, the potential benefits include:

- Smallholder farmers may have access to better advice, allowing them to make better and more sustainable decisions about the types of crops they plant, when to plant them and how to manage them once they have been sown. This may lead to better yields, higher quality produce and increased wealth for some of the world's poorest communities.
- More accurate and transparent spatial information about crops and fields will enable smallholder farmers and their communities to secure land usage rights. This is often the subject of dispute and can lead to land access being lost by the smallholder.
- The STARS project comes at no cost to the local farmer and aims to provide education and training to help put this free information to effective use. Furthermore, it will seek to create pathways to greater development and investment in remote sensing technologies for these emerging economies.

- Emerging economies will be able to more accurately forecast yields at a national level and make informed decisions about the state of food security for their populations.
- Food production processes in emerging economies will be more secure as local markets thrive when farmers are able to produce sustainable and reliable crops. Better export opportunities may also arise from more sustainable farming practices, potentially contributing to a stronger economy.

STARS' ambition is to determine whether remote sensing technology can bring some of these benefits to fruition. In doing so, the aim is to increase the quality, volume and understanding of food production in emerging economies and to improve the farming activities and livelihoods of some of the world's poorest people.

For more information, please see the STARS website at: www.stars-project.org or contact the team at contact@stars-project.org.