Agrisense works as part of STARS in Tanzania and Uganda and is led by the University of Maryland (UMD) in partnership with Sokone University of Agriculture (SUA) of Morogoro. Agrisense is piloting methods and tools to improve crop condition monitoring, production forecasting accuracy and timeliness. Agrisense tools include:

- the GLAM-East Africa portal for satellite data time series interpretation,
- GeoODK for fast and efficient electronic field data collection and
- the Crop Monitor for collaborative assessments of the current crop condition and food security.

Agrisense’s operational and experimental remote sensing systems support national food security monitoring and agricultural statistics and involve a range of platforms. The anchor geometries are in Tanzania (Njombe, Kilosa, and Same districts) and Uganda (Moroto district).

THE TOOLS IN DETAIL

GLAM-East Africa: Agrisense’s core technology GLAM is an online system for the automated processing of MODIS satellite image time series and the production of NDVI time series graphs to identify low and high production areas in the country. The East Africa version is a user-friendly, automated portal for MODIS and Landsat time series analysis to monitor and reporting on crop conditions throughout the growing season. Analysts can generate location-specific NDVI time-series graphs and maps.

Tanzania Crop Monitor Portal: Regional and district analysts can submit their reports on local crop conditions. The system facilitates the national monthly bulletins that provide timely, coordinated information on crop conditions as the season develops, in a format that is user-oriented and informs agricultural policies and planning. This has impact on export restrictions, distribution of grains and stocks, mobilization of food aid, and targeted agricultural programs with direct implications for smallholder farmers.

Survey errors. Consequently, field data collection is more precise and better calibrated, giving more credible, accurate and timely outcomes at lower cost. The area frame is based on very high resolution satellite images of DigitalGlobe’s WorldView-2 and Ikonos platforms. Data on crop type, cropped area and production are collected within each sample segment during field campaigns carried out at the end of the growing season. The same area frame lends itself for the collection of other parameters important for food security, such as household data and data on food stores from previous growing seasons.

UAV platforms: Our field data collection is substantially enriched by acquiring time series of extremely high resolution images (4 cm resolution) over a number of 1x1 km test sites. The UAV images support our satellite image interpretation. The project also explores the use of UAVs for cropping system mapping and crop condition assessments using multi-spectral on-board cameras. Both fixed-wing (small airplanes) and rotary wing (helicopter-type) UAVs are in use.

Cropland mask for Tanzania: AgriSense produced a nation-wide cropland mask at 30 m resolution based on composited Landsat tiles from the years 2010–2013, using decision tree classifier methods. Representative training areas were then collected for agricultural and non-agricultural areas using appropriate indices to separate these classes. Validation was done using a random sample and data from Google Earth®. This cropland mask allows analysts to focus on agricultural areas while using GLAM East Africa NDVI data.

ANTICIPATED OUTCOMES

- Near real-time monitoring of crop conditions
- Bulletins containing timely, coordinated national information, on crop conditions from all regions
- Instantaneous access to field data on crop conditions
- Increased efficiency of resource use for data collection.

Field Data Collection with GeoODK: GeoODK is an Android application used by representatives of the Food Security Department at MAF/C, agricultural staff from the district offices, and selected agricultural extension agents from the Morogoro region. The GeoODK system allows the fast and efficient submission of collected field data to intermediate and end-users. GeoODK significantly increases the efficiency of data collection and delivery by direct data submission from a tablet to the online database. The data are instantaneously accessible to any authorized entity within the government and can be used to integrate with other data sources and satellite remote sensing information. Field extension officers in Morogoro region are currently submitting electronic forms, building up the general overview of field conditions, including plant pests and diseases.

Field Sampling Frames: AgriSense has designed a pilot area frame for Kilosa district in Morogoro region for agriculture monitoring to generate crop statistics. Such frames establish representative segments for field data collection using probabilistic techniques that minimize field