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“Management of land use systems for enhanced food security:
conflicts, controversies and resolutions”

Agricultural Monitoring for Food Security in Smallholder Farming Systems

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Abstract

National-scale monitoring of agricultural production, as the season progresses, is critical for food security assessments, agricultural policy and decision making. The Food Security Division in the Ministry of Agriculture, Food Security and Cooperatives (MAFC) of Tanzania relies on a large system of agricultural extension agents covering nearly all villages in the country. The system is based on manual field data collection and surveys and tends to not consistently deliver accurate and timely information that is critical for decision making.

The AgriSense-Africa project, part of the STARS initiative (Spurring a Transformation for Agriculture through Remote Sensing), is focused on improving the monitoring and estimation of agricultural production at the national scale. The project is lead by the University of Maryland, United States (UMD) and the Sokoine University of Agriculture, Tanzania (SUA) in close collaboration with MAFC. The project is developing and implementing satellite and unmanned aerial vehicles (UAV), remote sensing techniques, electronic data collection tools using smart phones, internet technology and statistical methods, and is providing comprehensive training and capacity-building. The core technology is an online system for the automated processing of MODIS satellite image time series and the production of NDVI time series graphs to support reporting by MAFC crop analysts. Methods for mapping cropland areas, field sizes and the detection of maize cropping systems from high resolution satellite image time series (Worldview-2, RapidEye) are being developed using field data, aerial photographs and digital surface models derived from UAV imagery. Electronic field data collection using smart-phones and online submission of the data to a central database dramatically increases data quality and data sharing efficiency. The project is also implementing a Crop Monitor portal for Tanzania, which is an online tool and system through which regional and district analysts submit local and current information to be used for food security assessments at MAFC with the objective of developing monthly crop bulletins.

The main project outcome is an improved information base and system incorporating remote sensing data, smart phone and online tools to support decision making by political and business leaders in Tanzania, ultimately benefitting smallholder farmers.

Keywords: Food security, ICT, monitoring, remote sensing, Tanzania