

## **LCLUC Abstract**

### **Deforestation and Degradation in Southern and Central African Savannas**

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An integrated land degradation and deforestation detection system will be developed for the Southern African Development Community (SADC) region plus southern Zaire. The scale for the inventory and monitoring will be 1 km<sup>2</sup>. Using our past experience with degradation studies in Africa, the analysis of very large volumes of Landsat data, socio-economics of land and fuelwood, and inference of biophysical variables for large areas from remotely sensed measurements, we will map land cover and biophysical properties of the land surface related to degradation, thus moving beyond classification of land cover to monitor the processes involved. Socio-economic drivers of land cover change as well as biophysical factors will be employed to select processes that can be expected to cause degradation and to choose representative study areas. Radar and optical methods will be implemented to measure biomass. Primary productivity of crops, rangelands and forests will be monitored using models driven by remotely sensed data. Soil moisture and runoff will be derived from surface water and energy balance models also driven with remotely sensed data. Finally biophysical, socio-economic and cultural variables will be combined to create empirical models that we hope will identify leading indicators of environmental degradation. The 15 year archive of Advanced Very High Resolution Radiometer data constitutes a baseline having an appropriate temporal scale for this purpose. Up to ten detailed study sites will be selected in which representative degradation processes are known to occur. Landsat (1972-present) and synthetic aperture radar data will be acquired where higher spatial resolution is needed to understand the mechanisms of land cover change that are taking place. The aim of the study will be to develop a prototype degradation early warning system (DEWS) that can be applied to the whole of southern and central Africa and provide a pattern for similar areas worldwide.