

Understanding and Predicting the Impact of Climate Variability and Climate Change on Land Use and Land Cover Change in Southern Africa

JANE SOUTHWORTH, BRIAN CHILD, ERIC KEYS, MICHAEL BINFORD, PETER WAYLEN, YOULIANG QUI, GREG KIKER, RAFA MUNDOZ-CARPENA

This project asks: “how does climate variability and climate change influence land use and land cover change as it works through socio-economic institutions?” To answer this question, the project develops a temporally and spatially multiscale understanding of the relationships between land-cover and land-use change (LCLUC) and climatic shifts in three watersheds that lie in four southern African nations. We hypothesize that socio-economic institutions are the main instruments of human adaptation to climate variability and change, and that the observable outcomes of institutional adaptations are seen in the spatial and material expression of LCLUC. This study will test the resilience of the socio-ecological systems of southern Africa, enhance the use of remote sensing, and provide models for climate scenario planning.

As an ongoing portion of this project, in summer 2010 two UF faculty (Brian Child and Erik Keys) and six UF students (Jessica Steele, Erin Bunting, Jing Sun, Shylock Muyengwa, Patricia Mupeta, Keilani Jacquot) worked in four communities in Botswana and Namibia. Working in teams their objective was to assess livelihoods and how these might respond to impending climate change. They surveyed individual households to determine their production and consumption, what shocks they were concerned about, and how they were responding to them.

While numerical analysis is still underway,



early results from a wildlife-reliant community are fascinating. Although everyone appears to be agricultural, only 8% of the household economy derives from agriculture, and people purchase well over half their food from stores in the nearby town. Jobs



in tourism, and specifically hunting, are enabling more than half of the 62 families in this village to reach a stage where they do not report hunger in the household. However, if hunting is banned, many families will regress into a position of hunger. Hunting earns the village over \$200,000 annually from some 110 animals, employs many people, and funds the transport people use to get into town. The second serious threat to the community is HIV/AIDS. The

primary mechanism for moving out of poverty, defined as families who report hunger, is employment. The loss of family members is traumatizing this village on a personal level, and because many deaths are wage earners the loss of wage income drops families back into hunger.

At a more conceptual level, what is interesting is how little reliance is placed on agriculture in this community, and how therefore climate change is largely nullified. This traditional-looking village is moving rapidly into the wage and retail economy, and the real threats are the vagaries of government policy on the economy (e.g. a much discussed hunting ban) and disease in the form of HIV/AIDS. Additional field seasons and research visits are planned for fall 2010, spring and summer 2011.

Jane Southworth is associate professor in the Department of Geography. This project is funded by an \$870,000 grant from NASA through 2012.