The Human Dimension of Drought Monitoring

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Motivation
Drought prediction methods are primarily relevant to the extent that they effectively capture people’s real experiences. As such, it is important to understand the cultural lens through which people perceive and define drought. This research focused on eight communities in Samburu County, Kenya with the intention of spatiotemporally mapping their lived experiences of drought, or risk, and comparing these with a remotely sensed classification of drought.

Methodology
Defining Drought from the Ground: Riai
Riai is defined by the communities through the impact resulting from lack of rain – not just the lack of rain itself. Because these communities are pastoralist, the threshold for this impact to become riai is when their cattle begin to die. The anthropological data for this research comes from discussions with the communities in which nine instances of riai and their relative severity were documented.

Defining Drought from Satellites: NDVI
Normalized Difference Vegetation Index (NDVI) is a remotely sensed quantity often used to classify drought. The NDVI data for this research comes from NASA’s Global Inventory Monitoring and Modelling System (GIMMS).

Why NDVI?
• Calculated directly from satellites
• Not a model output
• Available in high spatial and temporal resolution
• Closely related to peoples’ definition of drought

Results
Nearl all of the ground-experienced riai years are effectively captured by this NDVI classification (ex. 1984 and 2009). However, the most severe discrepancy between the satellite and ground classifications is evident in 2011. This year appears to be the most severe drought according to the satellite classification, yet this year was not classified as a riai in any community discussions.

Drought Comparison
2011 is thoroughly documented as one of the worst droughts in Kenyan history, and this story is effectively captured in an NDVI anomaly classification. So why was this year not experienced as a drought on the ground?

Experiences of drought are culturally informed and contextualized. Thus, in order to effectively assess drought in a community, it is necessary to capture both objective and subjective inputs.

Conclusions
• The lived experience of drought is culturally relative.
• Effective drought prediction methods must include both objective and subjective inputs.
• Interdisciplinary collaboration is key in discovering systematic interplays and lags in drought processes.

References
Klein, A. H. & Alexander, C. (2005). Drought Monitoring in Kenya Using MODIS NDVI Data. Eighth Conference on Remote Sensing and Environmental Monitoring, Providence, RI. The poster was presented at the meeting of the American Geophysical Union in Providence, RI. The poster was presented at the meeting of the American Geophysical Union in Providence, RI.

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