Enhancing Adaptation and Resilience to Drought in Dry Tropical Social-Ecological Systems: The Guanacaste, Costa Rica Example (FuturAgua)

Call: Freshwater Security
NSF code: G8MUREFU3FP-2200-139
Lead PI: Tim McDaniels, University of British Columbia, Canada
Partners:
Raffaele Vignola, Tropical Agricultural Research and Higher Education Center (CATIE), Costa Rica
Grégoire Leclerc, Agriculture Research and Development (CIRAD), France
Douw Gerbrand Steyn, University of British Columbia, Canada
Mitchell Small, Carnegie Mellon University, USA
Mark Johnson, University of British Columbia, Canada
Kai Chan, University of British Columbia, Canada
Hadi Dowlatabadi, University of British Columbia, Canada
Iris Grossman, Carnegie Mellon University, USA
Gabrielle Wong-Parodi, Carnegie Mellon University, USA
BF/G8HORC sponsors: NSERC, ANR, NSF
Amount: €1,389k
Time period: 36 months

Three teams of diverse natural and social scientist will engage in a collaborative regional case study set in the arid region of Guanacaste, Costa Rica. The partners will work closely with the civil society organizations in the region as well as the entities that manage water, giving particular focus to the community values and economic circumstance that influence water related decisions. Interviews with the leaders and managers of these entities will assist the partners in translating mental models to graphically portray the impacts of drought on social-economical systems. The partners will characterize the water balances, flows, and allocation in key sub-watersheds of the region by identifying current and historical influences on the system's network. This research will be coupled with GCM based rainfall pattern research to develop new analytical perspectives that ascribe additional value to forecasts that build system intelligence. The partners, in collaboration with local leaders and managers, will ultimately create sets of alternative actions that could build specific kinds of resilience in water-oriented SES.

The proposed project would provide a fuller characterization of relevant SES dynamics, including effects of external drivers and multiple scales of governance. It would create a deeper understanding of the biophysical and social processes affecting these systems, of the benefits affected by these processes, and how these processes are addressed in regulatory and water allocation. It would produce a more appropriate representation of the complexity and uncertainty within SES in conceptual and methodological terms, which will contribute to improved decision processes that generate better alternatives and greater insight for decision-making at multiple scales.

Civil society organizations will play an important role in project design. The research teams will be managed by the leading PI and will meet regularly to discuss progress, and will have close contact with civil society organizations throughout the project.