Integrating land use planning and water governance in Amazonia: towards improved freshwater security in the agricultural frontier of Mato Grosso (XINGU)

Call: Freshwater Security
NSF code: G8MUREFU3FP-2200-156
Lead PI: Alex Krusche, University of Sao Paulo, Brazil
Partners:
Christopher Neill, Marine Biological Laboratory, USA
Michael Coe, Woods Hole Research Center, USA
Maria Victoria Ballester, University of Sao Paulo, Brazil
Silvia Guerra Molina, University of Sao Paulo, Brazil
Antônio Ribeiro Almeida Júnior, University of Sao Paulo, Brazil
Vanessa Empinotti, University of Sao Paulo, Brazil
Mark Stephen Johnson, University of British Columbia, Canada
Leila Harris, University of British Columbia, Canada
Helmut Elsenbeer, University of Potsdam, Germany
Fernanda Reichardt, University of Sao Paulo, Brazil
Maria Elisa de Paula Eduardo Garavello, University of Sao Paulo, Brazil
BF/G8HORC sponsors: FAPESP, NSERC, DFG, NSF
Amount: €1,909k
Time period: 36 months

The expansion of intensive crop agriculture in tropical forests is a global phenomenon driven by land availability, shifts in diet to more meat consumption and growth of human populations and incomes. These land-use changes have not been accompanied by significant improvements in water governance. This will become increasingly important as changes to climate impact the amount, timing and variability of precipitation upon which this agricultural system depends. Moreover, we will examine the critical issue of Freshwater Security associated with expanding soybean agriculture in the agricultural frontier of Amazonia (upper Xingu River Basin, Brazil). We will identify: 1) how impacts from land conversion, cropland expansion and agricultural intensification interact to affect regional evapotranspiration, rainfall generation, river flooding, water quality and stream habitats and the thresholds of change that will endanger agricultural production, traditional regional livelihoods and downstream water-related infrastructure, and 2) what mechanisms of water governance and distribution of environmental information services are best suited to facilitate integrated water management by decision makers, resource uses and other stakeholders. We will engage soybean farmers and cattle ranchers through existing collaborations. We will also involve municipal officials, small producers, fishers and river-based businesses to determine to what extent virtual water and hydrological modeling tools can influence stakeholder understanding of water security and will seek to identify potential institutional mechanisms to manage inevitable water management tradeoffs. To provide support for an informed decision making process, we will analyze regional population movements, social and cultural integration of migrants, relations between indigenous and non-indigenous local population regarding livelihood, water resources and the role of media in relation to environmental policy and decision making regarding freshwater security.