Does the use of modern agricultural inputs by smallholder farmers reduce deforestation? A case study for Zambia.

Presenter: Johanne Pelletier; Atkinson Center for a Sustainable Future, Cornell University
Presenter Email: johannepelletier@gmail.com
Authors: Jayash Paudel, Boise State University

Increasing food production to meet growing demand while reducing tropical deforestation is one of the greatest sustainability challenges the world faces. Agricultural expansion is the main driver of deforestation in the tropics. Forests and woodlands play a crucial role for biodiversity conservation and provide a suite of products and ecosystem services for humanity. Reducing emissions from deforestation and increasing terrestrial carbon sinks are also pillars of the global mitigation strategy to stabilize our climate system. Limiting agricultural expansion into forested lands is therefore crucial. This issue is especially important in Sub-Saharan Africa (SSA), which faces critical problems with food security and increasing deforestation. In SSA, patterns of forest cover loss are associated with agricultural expansion by smallholder farmers, who may respond more to increase in productivity by reducing forest conversion than large-scale producers. The objective of this research is to test empirically the effects modern input use on forest cover loss in order to orient policies that could address the dual challenges of increasing global food security and reducing deforestation. Using Zambia as a case study, we use an innovative monitoring and evaluation approach to analyze the impacts of modern agricultural input use by smallholders on forest cover loss at a national scale. We make use of detailed nationally representative panel agricultural survey data on smallholder farm households. Using small area estimation techniques, we predict inorganic fertilizer and improved seed use for the country. We then test the effects of using these inputs on forest cover loss with mixed effect models, controlling for spatial and temporal characteristics. We find that the use of inorganic fertilizer and improve seeds have opposite effects on forest cover loss. These results call for re-visiting assumptions on how agricultural intensification can spare forestland for conservation and to adopt policies that are consistent with empirical findings.