

The 2019 Triangle Global Health Annual Conference
One Health: Creating our Shared Future - Humans, Animals, and the Environment.

Biodiversity, Land Use Change, and Human Health: Evidence from Northeastern Madagascar

Given the close relationship between humans, animals and the environment, rapid changes to the environment through land use and climate change underway in many low and middle-income countries make it vitally important to understand how ecosystem changes influence biodiversity and human health, and to identify actions that can improve conservation, while also improving human health. We are investigating how human activities alter ecological communities and influence infectious disease risk near Marojejy National Park in northeastern Madagascar. We are coupling (i) cutting-edge social science methods to investigate the drivers behind human land use decision-making, and (ii) ecological analyses to investigate how these land use decisions impact zoonotic infectious disease transmission in small mammals, domesticated animals, and humans. The study team conducted preliminary fieldwork in 2017, 2018 and 2019 which included household and social network surveys, choice experiment surveys to better understand farmer decision making about sustainable agricultural practices, and trapping of small mammals to screen for parasites and pathogens. Early results show that illness is frequent within the community. We constructed social networks of people to investigate disease risk patterns based on agricultural co-working and social relationships. In addition, the team captured over 500 small mammals and found variation in abundance and diversity across a gradient of human land use. Non-native species have higher relative and total abundance in agricultural fields, with highest relative abundance of introduced species in the unsustainable rice farming setting. Prevalence of *Leptospira*, a pathogenic bacterium transmitted through urine and contaminated water, was over four times higher in paddy rice fields than in forests or hillside slash-and-burn fields. These findings are consistent with the hypothesis that changes in land use and biodiversity can influence animal health, which may in turn affect disease risk for humans.