# Nationality, Poverty, and the Prevalence of Disease-Spreading Mosquitoes: A Longitudinal Study in Yunnan, China

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How has the intersection of nationalities and climate impacted the spread of Neglected Infectious Disease (NID) in Yunnan, China? By focusing on the prevalence of dengue viruses (DENV) and their vectors, this study, for the first time, shows how ethnic minorities in southern Yunnan can disproportionately suffer from DENV infections through a combination of eco-epidemiological and anthropic influences. After a month-long fieldwork, interviews with two indigenous communities (the Wa and the Bulang), and modeling using cross correlation and generalized threshold models, this study explores the impact of land-use type, temperature, and precipitation, and the surroundings of indigenous communities on DENV infections and Aedes albopictus density. Average minimum temperature (MMIN) and precipitation (PREP) were found to be closely associated with monthly DENV infection, both at a three-month lag. A MMIN threshold at 12 °C was detected for DENV infection. Upon reaching the threshold , a 1 mm depth increase in PREP could increase DENV infection by 72%. For daily Ae. albopictus density, measured by the Breteau Index (BI), daily minimum temperature (DMIN) and PREP were identified to associated, most strongly with no lag and a 20-day lag, respectively. Upon reaching a DMIN threshold of 20 °C, BI could increase 4.3 fold upon a 1 mm uptick in PREP. Anthropic conditions in minority communities, such as aquatic surroundings in Yunnan could increase mosquitoes' resistance to pesticides by over 30%. How can we reverse the disproportionate impact DENV has on ethnic minorities in Yunnan? This study points to the invention of microbiota-targeted pesticides and local data-sensitive DENV alert systems, and the model elaborated here provides a preliminary yet vital answer.

**Awards Won:**