Landscape classification for epidemiological and geographic analyses in rural and peri-urban field sites in the Greater Mekong Subregion

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Our research group studies infectious disease epidemiology, with a focus on vector-borne diseases. In collaboration with research teams in Southeast Asia, we are currently studying transmission of several viruses carried by mosquitoes of the genus *Aedes* in the Greater Mekong Subregion (GMS). Dengue, Zika, and chikungunya viruses are the three primary *Aedes*-borne viruses that are of global health importance; all three viruses are endemic to the GMS. One relatively understudied aspect of *Aedes*-borne disease epidemiology that we are interested in exploring is the effect of land cover modifications on disease transmission. Changes in land cover can influence mosquito ecology and human mobility, thus altering contact between virus-competent mosquitoes and susceptible human hosts.

The Greater Mekong Subregion is an expansive trans-national area. Our ability to collect ground-based data at field sites is limited by the seasonal inaccessibility of certain areas (i.e. during heavy rains) as well as time and resource constraints. Using high-resolution remotely sensed imagery, we can identify patterns of land cover changes and elucidate proximate causes of change at epidemiologically relevant spatial and temporal scales. We selected a 1-km2 area in Chbar Mon town of Kampong Speu province, Cambodia on which we performed unsupervised classification of land cover types. Chbar Mon town is a densely populated, peri-urban area located in the southwest Cambodian province of Kampong Speu. It has undergone extensive land development to support its growing population and economy. Land development here reflects shifting agricultural practices and construction to support industrial production. Chbar Mon is largely representative of rural and peri-urban areas in the GMS that are experiencing rapid, often unplanned urbanization.

We sourced the most up-to-date satellite image of Chbar Mon from Google Earth at a resolution of 4800 x 2966 pixels. We imported and georeferenced the image, then generated unclassified pixel-based clusters in ArcGIS 10.7.1. We identified 6 meaningful land cover types that we broadly classified as follows: water, forest (dense vegetation), vegetation, rice paddies, and building (urban). We have provided this classified raster and map of Chbar Mon town that we are interested in classifying by the land cover types we have defined. These data will be analyzed alongside epidemiologic and human behavior data to assess the risk of *Aedes*-borne disease infection and in constructing models of human activity spaces in the region.