

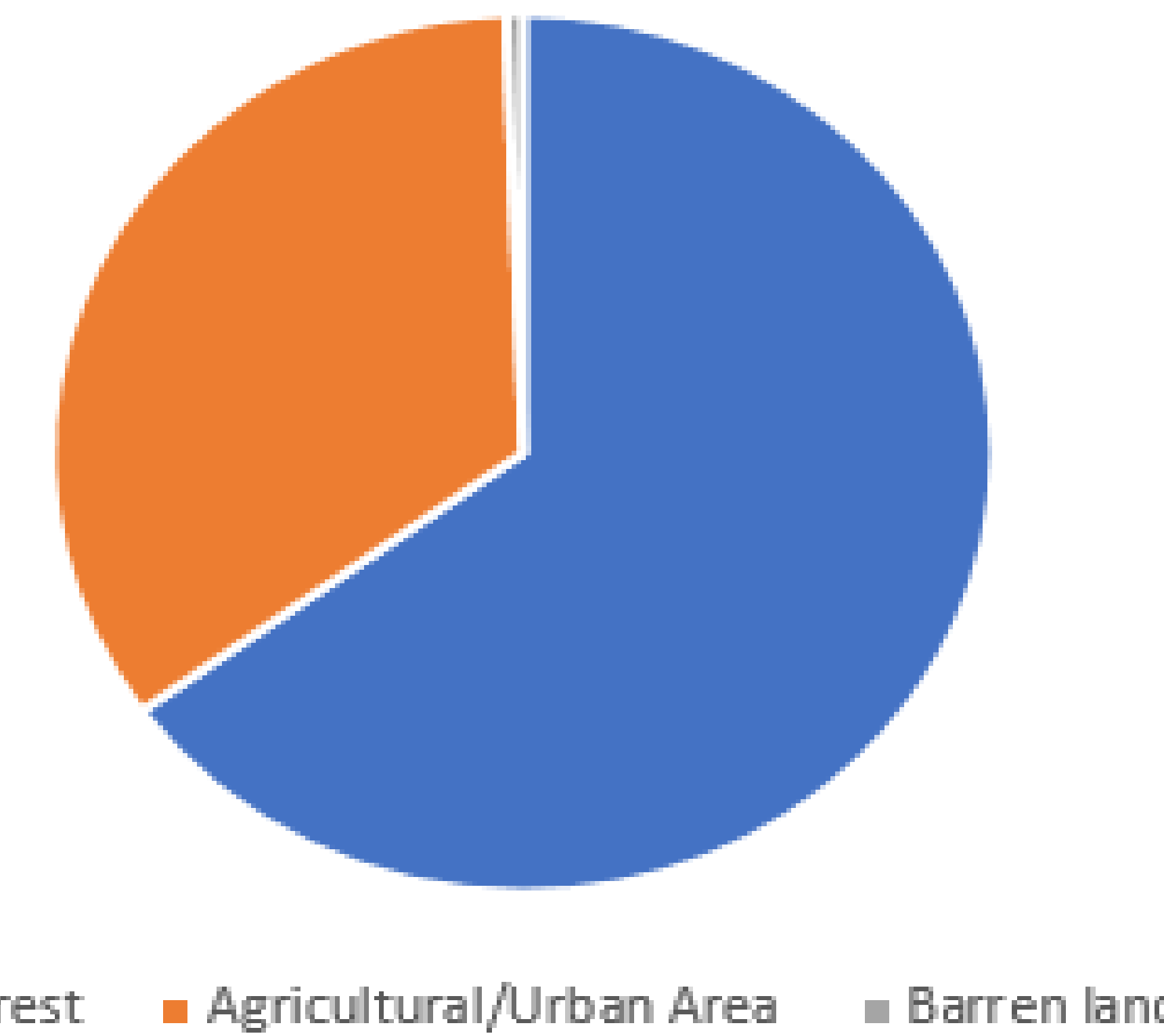
Analysis of Change in Land Use in Nilgiri, Tamil Nadu, India

By Navya Kolli

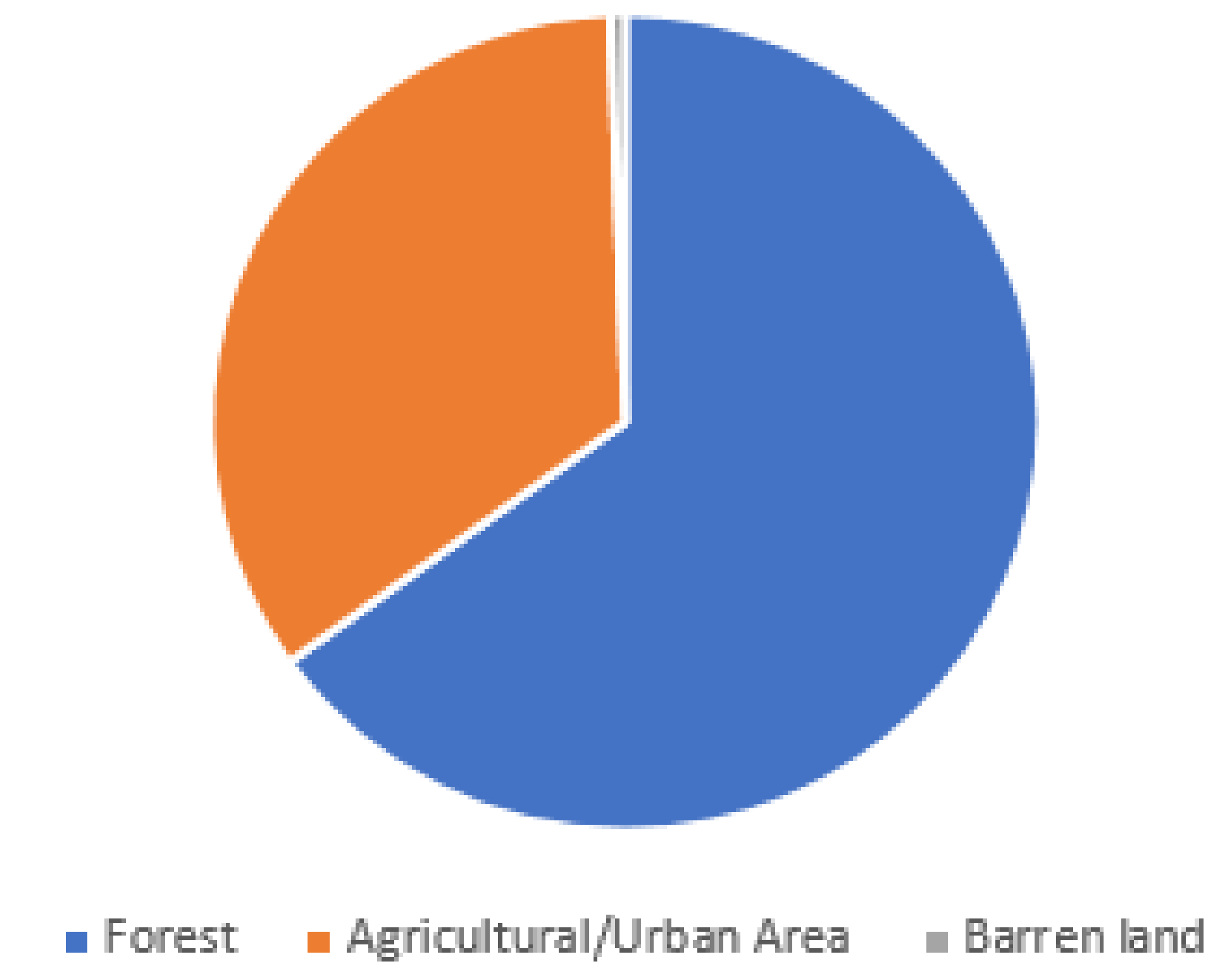
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This research will focus on Nilgiri Biosphere Reserve, a mountainous region located in the Western Ghats of southern India that encompasses several major national parks. Recent developments have caused mass deforestation in the region for lumber and area for plantations. In addition, more roads are being developed connecting urban centers to Nilgiri, which is only worsening the deforestation issue. In this research, Landsat satellite images will be used to track change over time with regards to deforestation and the development of road networks to see how that impacts wildlife. Geospatial data geoprocessing tools will be used to categorize change in land use over time (the change in some land areas from forest/untouched reserve to agricultural or urban centers). False and true color composites in addition to Normalized Difference Vegetation Index (NDVI) assessments will be undertaken to track the deforestation and differentiate between land types, since vegetation will be in a bright red, soil will be brown, and urban areas will be cyan blue to determine how much live green vegetation there is in the reserve as well.

Land Use in Nilgiri in 1985



Land Use in Nilgiri in 2005

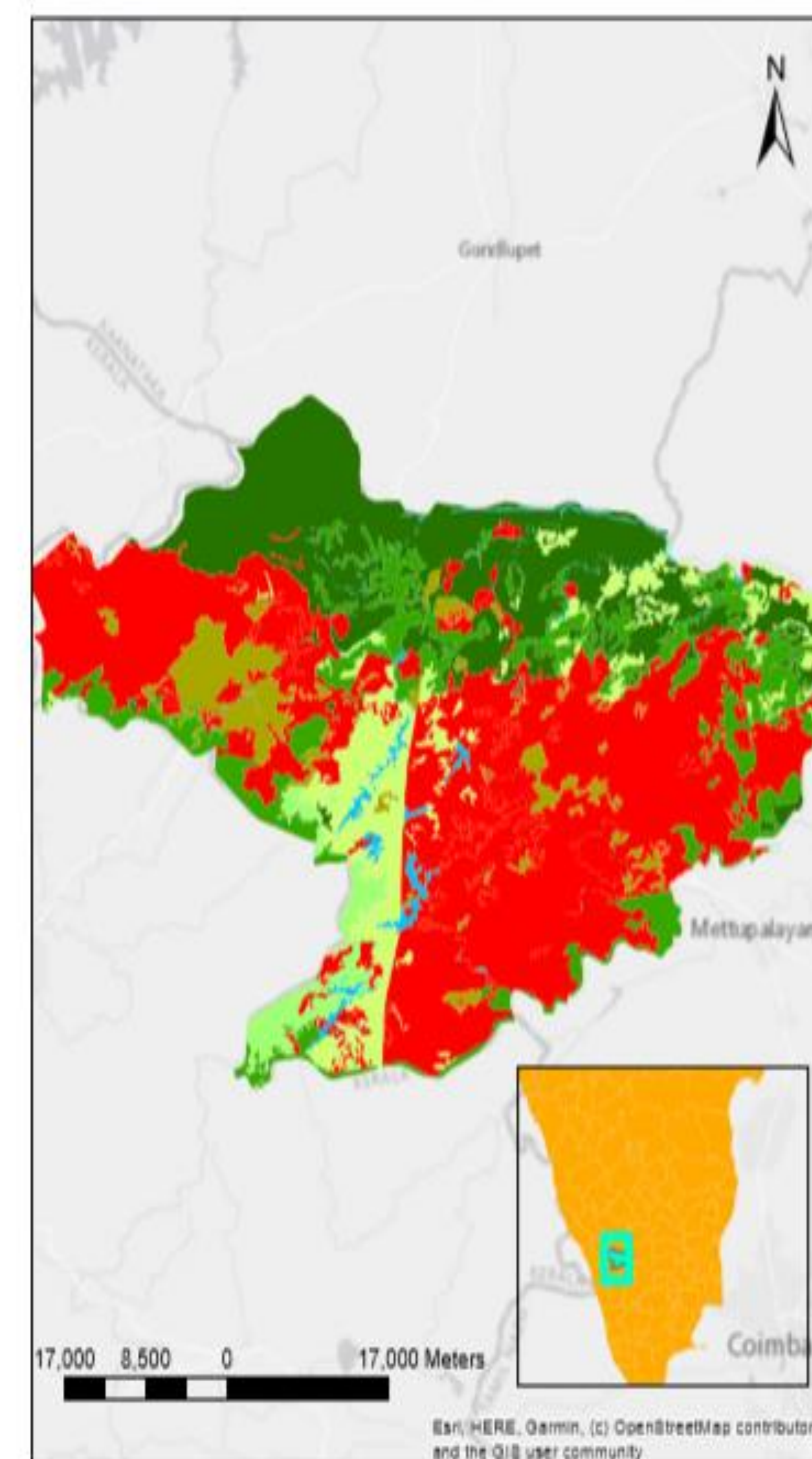
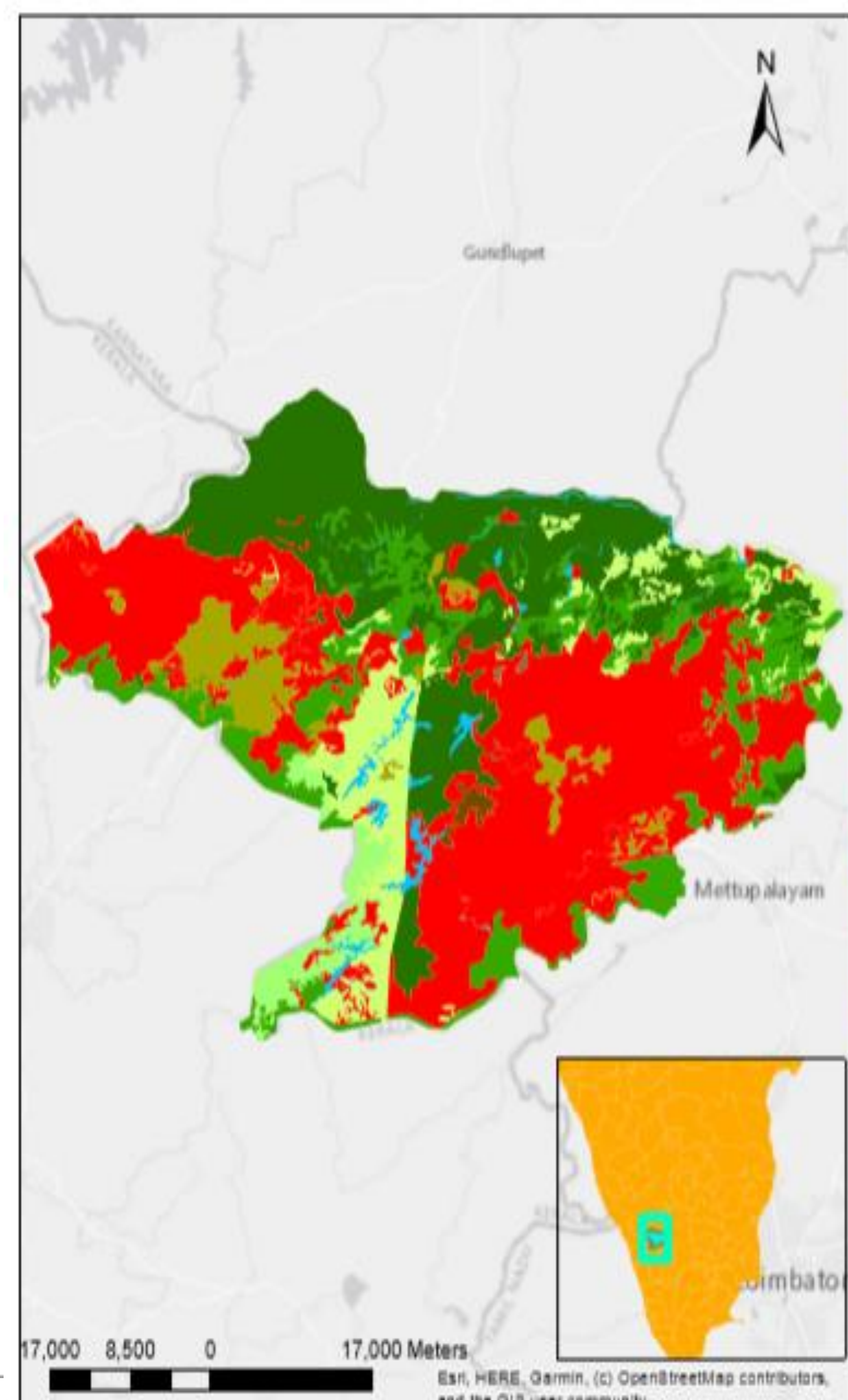
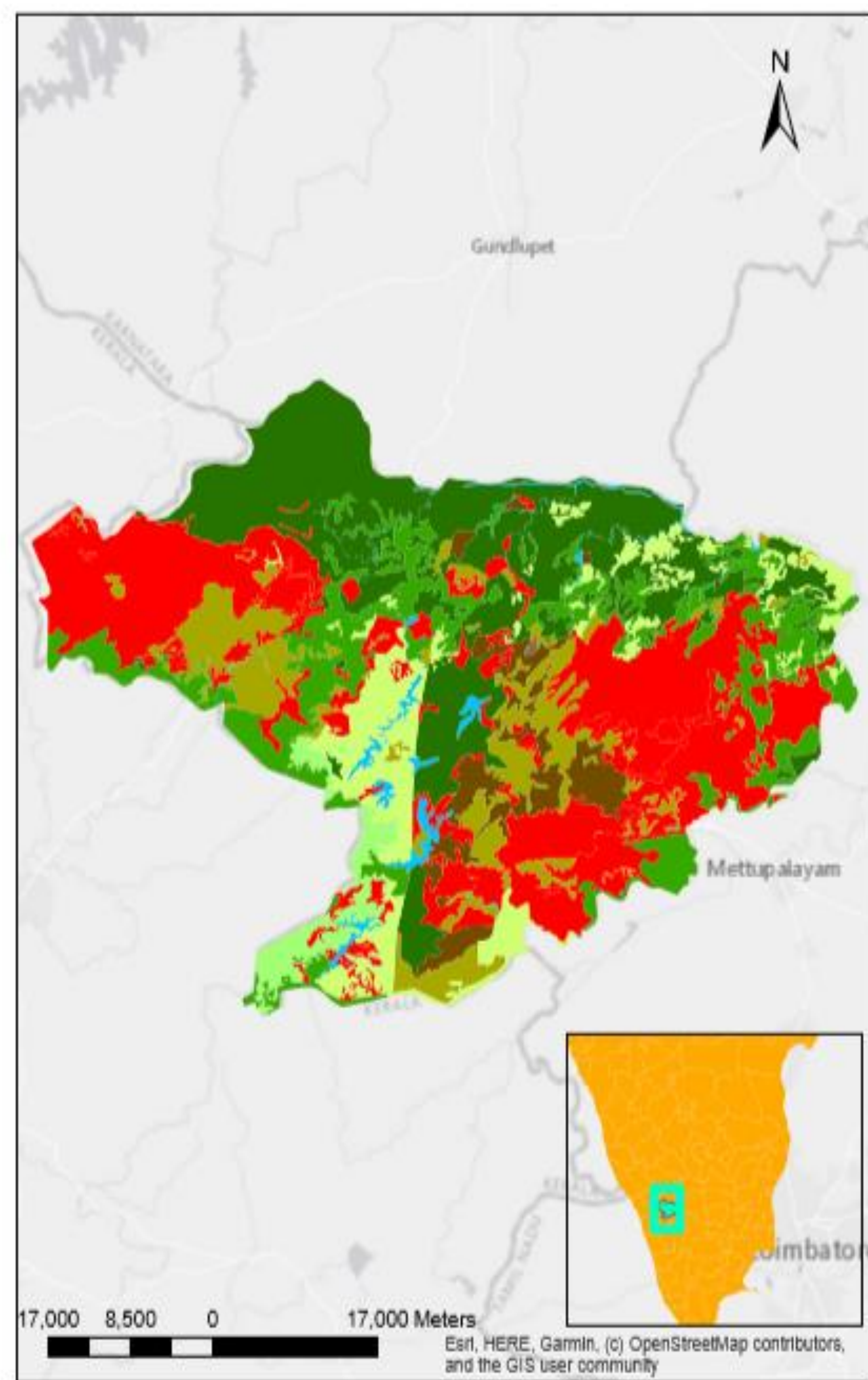


In 1985, forest and other natural habitats accounted for 68% of land in Nilgiri; in 2005 the percentage dropped to 65. These pie charts reveal a roughly 3% loss in forest cover in Nilgiri in a 20 year span. This is on par with the forest cover loss many other protected areas are experiencing in the world right now, as many areas lost 3-5% of their forest cover in the time frame Nilgiri did. In just the past decade, forest cover loss has accelerated, and now forests are losing 3% in just a decade.

Human Land Use in Nilgiri in 1985

Human Land Use in Nilgiri in 1995

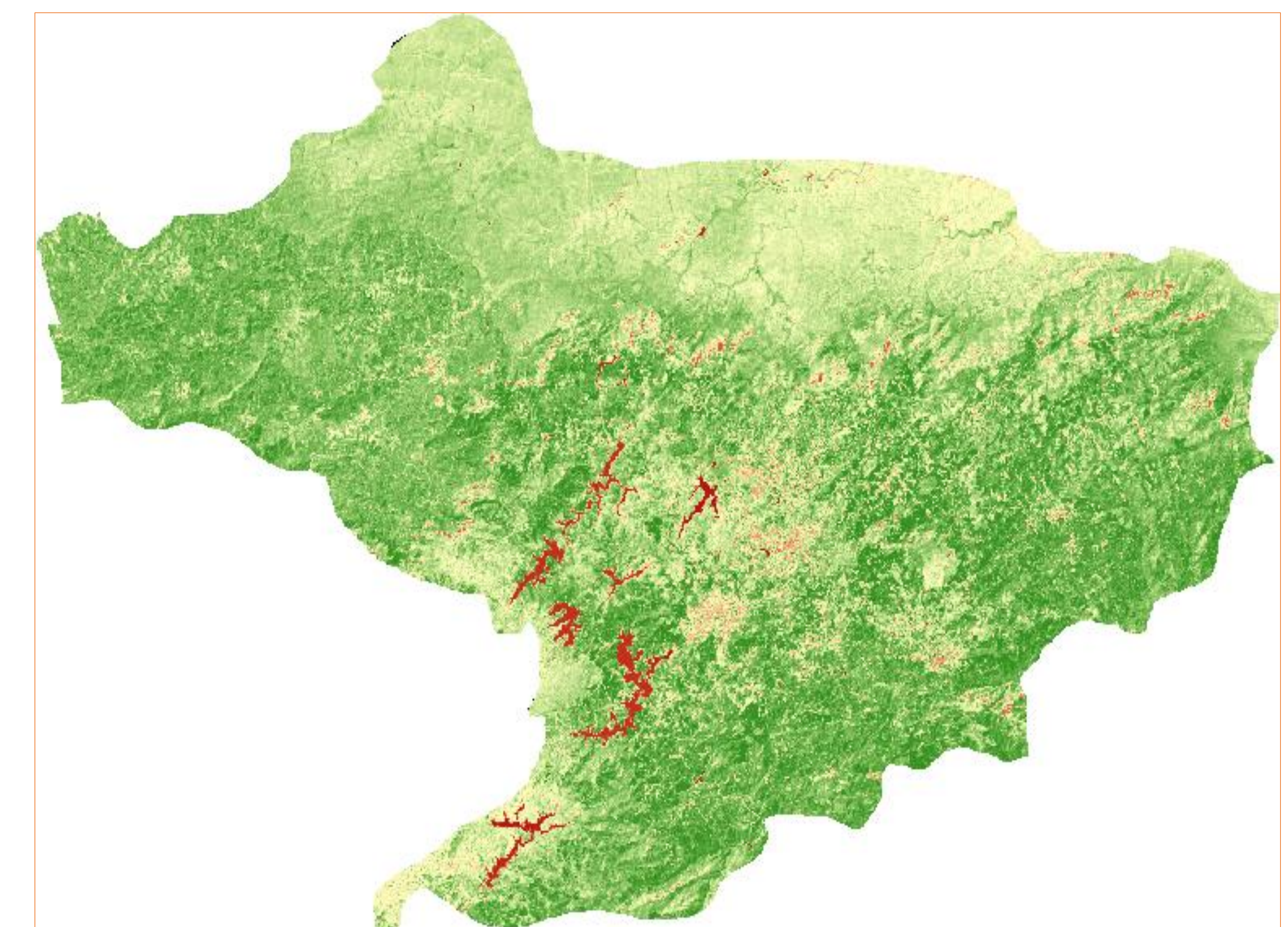
Human Land Use in Nilgiri in 2005



Legend

- Human Land Use
- Nilgiri**
- Land Use**
- Deciduous Broadleaf Forest
- Cropland
- Built-Up Land/ Urban
- Mixed Forest
- Shrubland
- Barren Land
- Fallow Land
- Wasteland
- Water Bodies
- Plantations
- Aquaculture
- Mangrove Forest
- Salt Pan
- Grassland
- Evergreen Broadleaf Forest
- Deciduous Needleleaf Forest
- Permanent Wetlands
- Snow and Ice
- Evergreen Needleleaf Forest
- Light Gray Canvas Reference
- Light Gray Canvas Base

In the sequence of maps from 1985-2005, the red symbolizes a growth in human land use, which includes plantations, croplands, and urban areas. The area increases dramatically over time not due to urbanization, but to the rapid development of exotic tree plantations that grow non-native trees for commercial sale such as eucalyptus or wattle trees. Nilgiri is a grassland biome with some evergreen tree patches, and in recent decades has experienced an explosion in woody plants due to commercial plantations and the fact that many of these plants are invasive species in the area.



U.S. Geological Society. Landsat-8: Bands 4 and 5
January 27, 2020

Sources: Esri, DeLorme, HERE, and other contributors
Light Gray Canvas Map

P.S. Roy, P. Meiyappan, P.K. Joshi, M.P. Kale, V.K. Srivastav, S.K. Srivasatava, M.D. Behera, A. Roy, Y. Sharma, R.M. Ramachandran, P. Bhavani, A.K. Jain, Y.V.N. Krishnamurthy
Decadal Land Use and Land Cover Classifications across India, 1985, 1995, 2005
ORNL DAAC, Oak Ridge (2016)
<https://doi.org/10.3334/ORNLDAAC/1336>

The image to the right is an NDVI assessment of Nilgiri on January 27th of 2020. It was derived using Landsat bands 4 and 5, and the areas with higher levels of vegetation correlate with the red areas of the maps on human land use above. The dark green areas are mainly representative of plantations while the light green areas (such as that seen in the northernmost border) is representative of what Nilgiri's natural biome is: the grasslands.