A GEO-SPATIAL APPROACH TO ASSESS TREE OUTSIDE FORESTS (TOF) IN HARYANA STATE, INDIA

K.E. Kumar[1], Ritesh Kumar[1], Promila Bishnoi[2], Vikas Sihag[1], Ravikant Bishnoi[1], Seema Rani[1], Partibha Sindhu[1], Sarika Budhwar[1], Parmod Kalkal[1], Shashikant Sharma[1], Poonam Sharma[1], Ritu Sharma[1], Venkateshwar Pandey[1], Meenakshi Dahiya[1], V.S. Arya[1], T.P. Singh[3], and Vinod Kumar[3]

[1]Haryana Space Applications Centre
[2]Guru Jambheshwar University of Science & Technology
[3]Government of Haryana

December 27, 2020

Abstract

Mapping and monitoring the Trees outside Forests (ToF) is gaining significance in the scientific community as they provide critical ecosystem services such as protecting soil and water resources, wildlife habitat, energy efficiency etc. Also, quantifying ToF can provide useful information on emissions estimation in the Agriculture, Forests, and Other Land Use (AFOLU) category of the Intergovernmental Panel for Climate Change (IPCC). Despite the importance of quantifying ToF, very few studies have attempted to quantify them in India's natural resource inventory programs. In this study, we focus on Haryana state, India, to map ToF using very high-resolution (VHR) Indian Remote Sensing (IRS) satellite data. Haryana's landscape is highly interspersed with croplands and ToF, thus providing a challenging environment to test VHR satellite data's ability to quantify the diversified landscape structure. We specifically used Cartosat-1 panchromatic (2.5m) and Multispectral LISS IV (5.8m) datasets to quantify the vegetation and build a much-needed database on ToF. We used a novel classification scheme based on the geometry, i.e., point, polygon, or polygon formations, to quantify ToF at 1:10,000 scale. Our results suggest ToF with the point, area, and linear block formations of about 2,774,531, 20.51, and 128.83 sq. km, respectively, accounting for ~3.38% of the total study area . Our study highlights the usefulness of VHR satellite data and fused imagery to quantify ToF in highly diverse landscapes, with the case study in Haryana State, India. The results will help address vital ecosystem services from ToF, including greenhouse gas emissions quantification from the AFOLU category.

Hosted file

ToF_paper_18 Dec.pdf available at https://authorea.com/users/385371/articles/500821-a-geo-spatial-approach-to-assess-tree-outside-forests-tof-in-haryana-state-india