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Predicting Tree Mortality Patterns Using NDVI of Aster Imagery in the Dry Afromontane Forests, Northern Ethiopia

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Abstract

Spaceborne remote sensing has given a cost effective and useful data which have been widely used to examine the spatiotemporal dynamics and understand various ecological processes in forest ecosystems. The forest ecosystems of northern Ethiopia were highly affected by natural and human factors. High mortality of trees, which may be caused climatic factors, was observed along the western Escarpment of the Rift Valley in the northern Ethiopia. In this research we examined the applicability of Normalized Difference Vegetation Index (NDVI) of the Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) data in predicting the spatial patterns of overstory tree mortality. We used *Olea europaea* L. subsp. *cuspidata* tree species, which is a widely grown tree species in the study area as indicator species in assessing tree mortality patterns along the landscape. Field data on live and dead trees were collected using 18 plots (50×50 m) and dead to live tree ratio of every plot was compared with their respective NDVI values derived from the optical bands of the ASTER imagery, which is taken in the dry season of 2006. Our result indicates that NDVI is a good estimator (R^2 =0.58) tree mortality patterns along the landscape. The result suggests that ASTER imagery has the potential to predict tree mortality patterns, which is useful information in managing the degraded dry Afromontane forests in the northern Ethiopia. Since our result is based on NDVI only, further studies that may improve the estimation of tree mortality in the study area are discussed.

Keywords: ASTER, Dessa'a forest, NDVI, northern Ethiopia, tree mortality

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