

Remote Detection of Cannabis Plantations in Idanre Forest Reserve, Nigeria Using Multispectral Landsat Imagery

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SUMMARY

Cannabis remains the most widely used illicit drug substances in the world. Globally, the number of people who used cannabis at least once in 2008 was estimated at between 129 and 191 million or between 2.9% and 4.3% of the world population aged 15–64. Drug prevention calls for accurate and updated information on cannabis fields as well as monitoring and detection tools that can cover large areas of drug-oriented plants. Hence, the aim of this study is to support the efforts of Nigeria's National Drug Law Enforcement Agency (NDLEA) in tackling the menace from its source through detection of these fields using multispectral remote sensing imagery. By combining spectral measurements of cannabis samples with multispectral LandSat 8 imagery, this study presents a simplified workflow for detecting cannabis plantations in the Idanre Forest Reserve of Ondo State, Nigeria. The spectral measurements of cannabis and other related plants were recorded with a spectroradiometer. Spectral analysis was carried out on the LandSat imagery using the Orthogonal Subspace Projection algorithm of Target Detection in Erdas Imagine software. The results show a consonance in the surface reflectances of cannabis with cassava and maize plants which are usually cultivated on the same plots. Although there is some inter-class spectral variation, the closeness in spectral profile hampers a precise separation of cannabis from the surrounding plants. This is evident in the overall accuracy of 60% in the target identification of cannabis. The results of this study show that Landsat multispectral imagery with medium spatial resolution can be used for cannabis discrimination with up to 60% overall accuracy. Thus, it is a good reconnaissance tool for detecting cannabis plantation locations.

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