

Supplementary Materials for

Mapping *Opuntia stricta* in the Arid and Semi-Arid Environment of Kenya Using Sentinel-2 Imagery and Ensemble Machine Learning Classifiers

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Supplementary Table S1 – vegetation indices

The support information provided in this file presents the common formulas used to derive vegetation indices from optical Sentinel-2 images. Details regarding each of the presented spectral and topographic indices can be found in the main papers referenced.

Table S1. Formulas of vegetation and topographic indices in this study.

Name	Equation	Reference
RVI	$RVI = \frac{B_{NIR}}{B_{RED}}$	[70]
PVI	$PVI = \left(\frac{1}{\sqrt{a^2 + 1}} \right) (B_{NIR} - ar - b)$	[71]
NDVI	$NDVI = \frac{B_{NIR} - B_{RED}}{B_{NIR} + B_{RED}}$	[72]
IPVI	$IPVI = \frac{B_{NIR}}{B_{RED} + B_{NIR}}$	[73]
ARVI	$ARVI = \frac{B_{NIR} - B_{RED} - y(B_{RED} - B_{BLUE})}{B_{NIR} - B_{RED} - y(B_{RED} - B_{BLUE})}$	[74]
MSAVI	$MSAVI = \frac{2B_{NIR} + 1\sqrt{(2B_{NIR} + 1)^2 - 8(B_{NIR} - B_{RED})}}{2}$	[75]

Note: B_{NIR} , B_{RED} , B_{GREEN} , B_{BLUE} correspond to Near Infrared, Red, Green and Blue Sentinel 2 bands, y = quotient from components of the atmospheric reflectance in blue and red channels, $a = 1.17$, $b = 3.37$.

Supplementary Table S2 – Topographic indices

The support information provided in this file presents the common formulas used to derive topographic index from a Digital Elevation Model (DEM) data. Details regarding each of the presented spectral and topographic indices can be found in the main papers referenced.

Table S2. Formulas of topographic indices in this study.

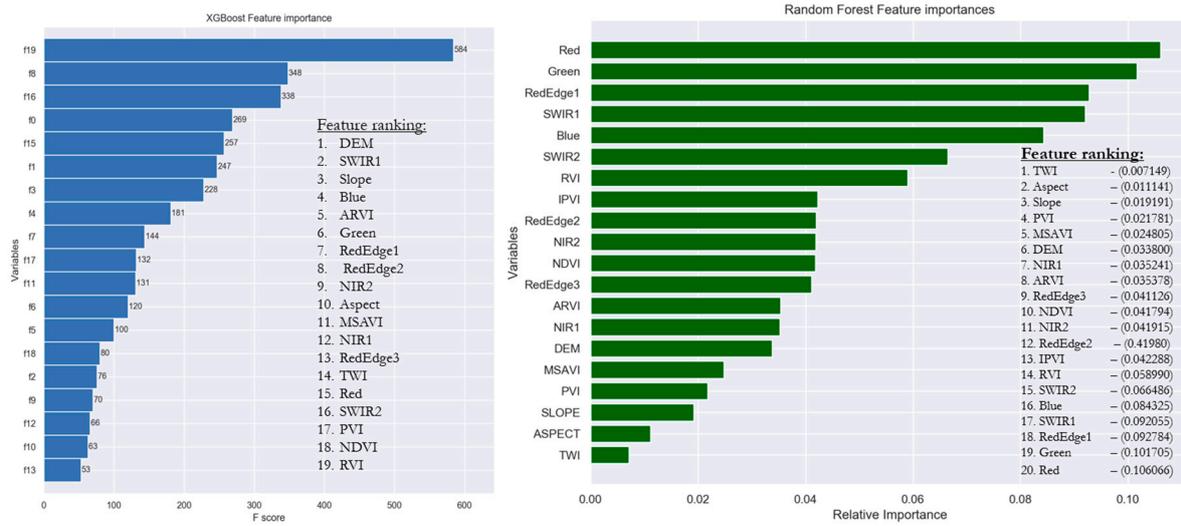


Figure S1. model 2.a and model 2.b feature importance analysis.