

Figure 2: Demonstration of the methodological approach adopted for the third objective.

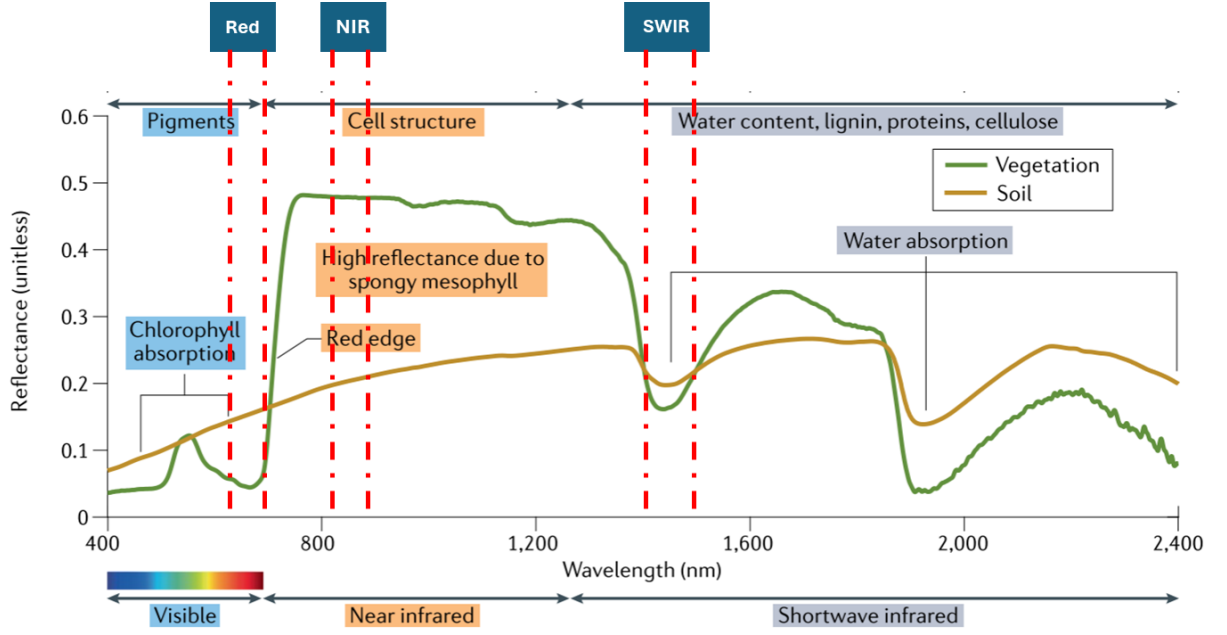


Figure 1: Reflectance behavior of vegetation and soil across wavelengths of interest. Diagram edited from the original version by Zeng et al. (2022).

NIR<sub>v</sub> and NDWI were computed using MOD09GA version 6.1 bands as shown in equations 1 and 2 respectively:

$$NIR_v = \frac{NIR - Red}{NIR + Red} * NIR \quad \text{equation 1}$$

$$NDWI = \frac{NIR - SWIR_{1240}}{NIR + SWIR_{1240}} \quad \text{equation 2}$$

Where SWIR<sub>1240</sub> NIR and Red are MOD09GA reflectance bands 5, 2, and 1 respectively, NIR<sub>v</sub> is the Near Infrared reflectance of terrestrial Vegetation index. Finally, a monthly time series of vegetation indices was generated by computing an average value of both NIR<sub>v</sub> and NDWI throughout the respective month.

Equation 3 was used to derive the vegetation indices anomaly (Veg<sub>anom</sub>) for each location. A simple vegetation anomaly representing the deviation of a vegetation index (Veg<sub>i</sub>) from the mean pixel value over the 20-year study period.

$$Veg_{anom} = \frac{Veg_i - Veg_{\alpha}}{Veg_{\sigma}} \quad \text{equation 3}$$

Where Veg<sub>i</sub> is an incident vegetation index of interest (NIR<sub>v</sub> or NDWI) at a certain point in time and Veg<sub>σ</sub> and Veg<sub>α</sub> represent the mean and standard deviation of the respective vegetation index at a pixel level.