

NDVI function

ArcGIS Pro 3.1

The Normalized Difference Vegetation Index (NDVI) is a standardized index allowing you to generate an image displaying greenness (relative biomass). This index takes advantage of the contrast of the characteristics of two bands from a multispectral raster dataset—the chlorophyll pigment absorptions in the red band and the high reflectivity of plant materials in the near-infrared (NIR) band.

An NDVI is often used worldwide to monitor drought, monitor and predict agricultural production, assist in predicting hazardous fire zones, and map desert encroachment. The NDVI is preferred for global vegetation monitoring because it helps compensate for changing illumination conditions, surface slope, aspect, and other extraneous factors (Lillesand 2004).

The differential reflection in the red and infrared (IR) bands enables you to monitor density and intensity of green vegetation growth using the spectral reflectivity of solar radiation. Green leaves commonly show better reflection in the near-infrared wavelength range than in visible wavelength ranges. When leaves are water stressed, diseased, or dead, they become more yellow and reflect significantly less in the near-infrared range. Clouds, water, and snow show better reflection in the visible range than in the near-infrared range, while the difference is almost zero for rock and bare soil. The NDVI process creates a single-band dataset that mainly represents greenery. The negative values represent clouds, water, and snow, and values near zero represent rock and bare soil.

The documented and default NDVI equation is as follows:

$$\text{NDVI} = ((\text{IR} - \text{R}) / (\text{IR} + \text{R}))$$

- IR = pixel values from the infrared band
- R = pixel values from the red band

This index outputs values between -1.0 and 1.0, mostly representing greenness, where any negative values are mainly generated from clouds, water, and snow, and values near zero are mainly generated from rock and bare soil. Very low values (0.1 and below) of NDVI correspond to barren areas of rock, sand, or snow. Moderate values (0.2 to 0.3) represent shrub and grassland, while high values (0.6 to 0.8) indicate temperate and tropical rainforests.

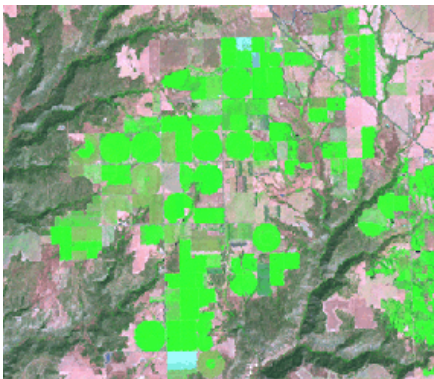
The equation that is used to generate the output is as follows:

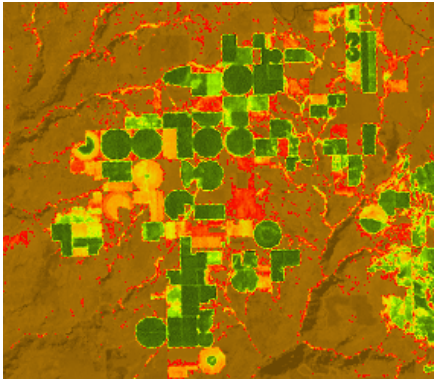
$$\text{NDVI} = ((\text{IR} - \text{R}) / (\text{IR} + \text{R})) * 100 + 100$$

This will result in a value range of 0–200 and fit within an 8-bit structure, which can easily be rendered with a specific color ramp or color map.

If you need the specific pixel values (-1.0 to 1.0), use the [Band Arithmetic function](#) and pick the NDVI method.

Below are examples of a Landsat 7,4,3 band combination (left) and an NDVI using a color map that highlights the agricultural activity of the area (right).





The inputs for this function are the following:

- Input Raster
- Visible Band ID
- Infrared Band ID

Use the [Colormap function](#) to visualize the result with an NDVI color ramp.

You can also use the [NDVI Colorized function](#) to apply a color map directly.

Related topics

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 - [Export or convert raster datasets](#)
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