MKSSS Cummins College OF Engineering for Women, Pune

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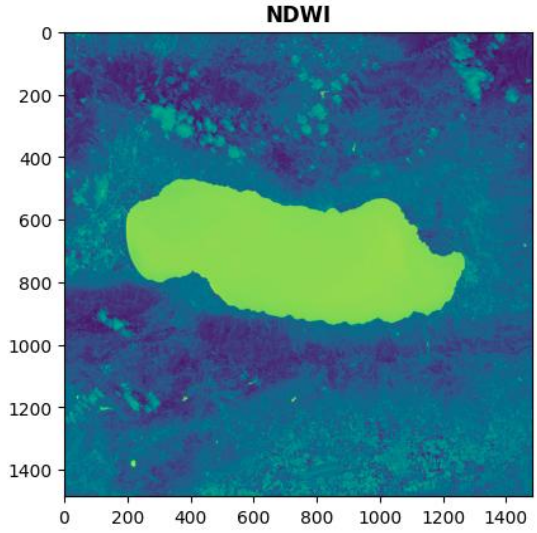
Date: 17 Feb 2025

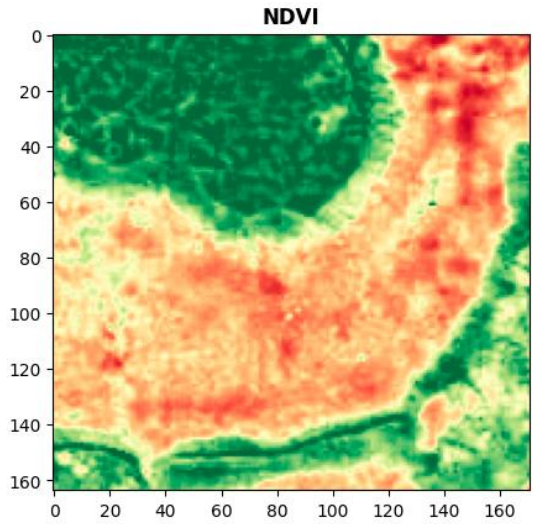
Remote Sensing Lab

EXPERIMENT 3

Title: Calculate vegetation and water/ soil indices

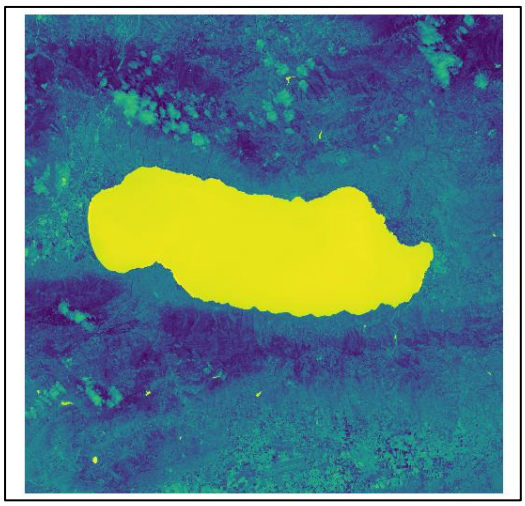
Colab Outputs:



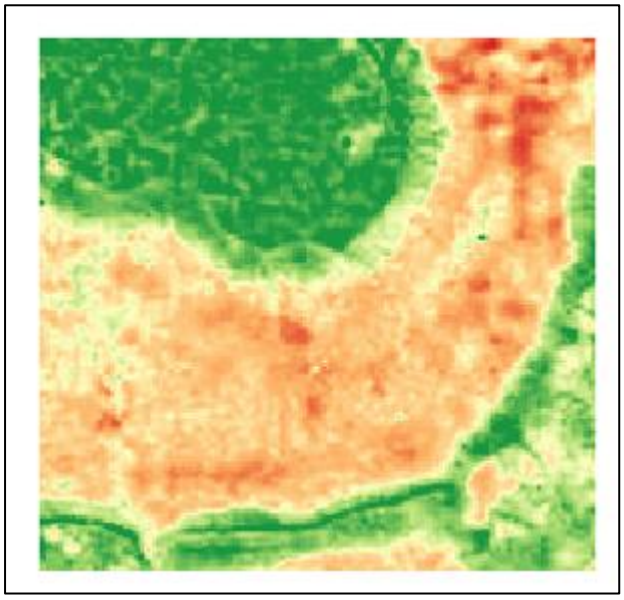


Qgis Outputs:

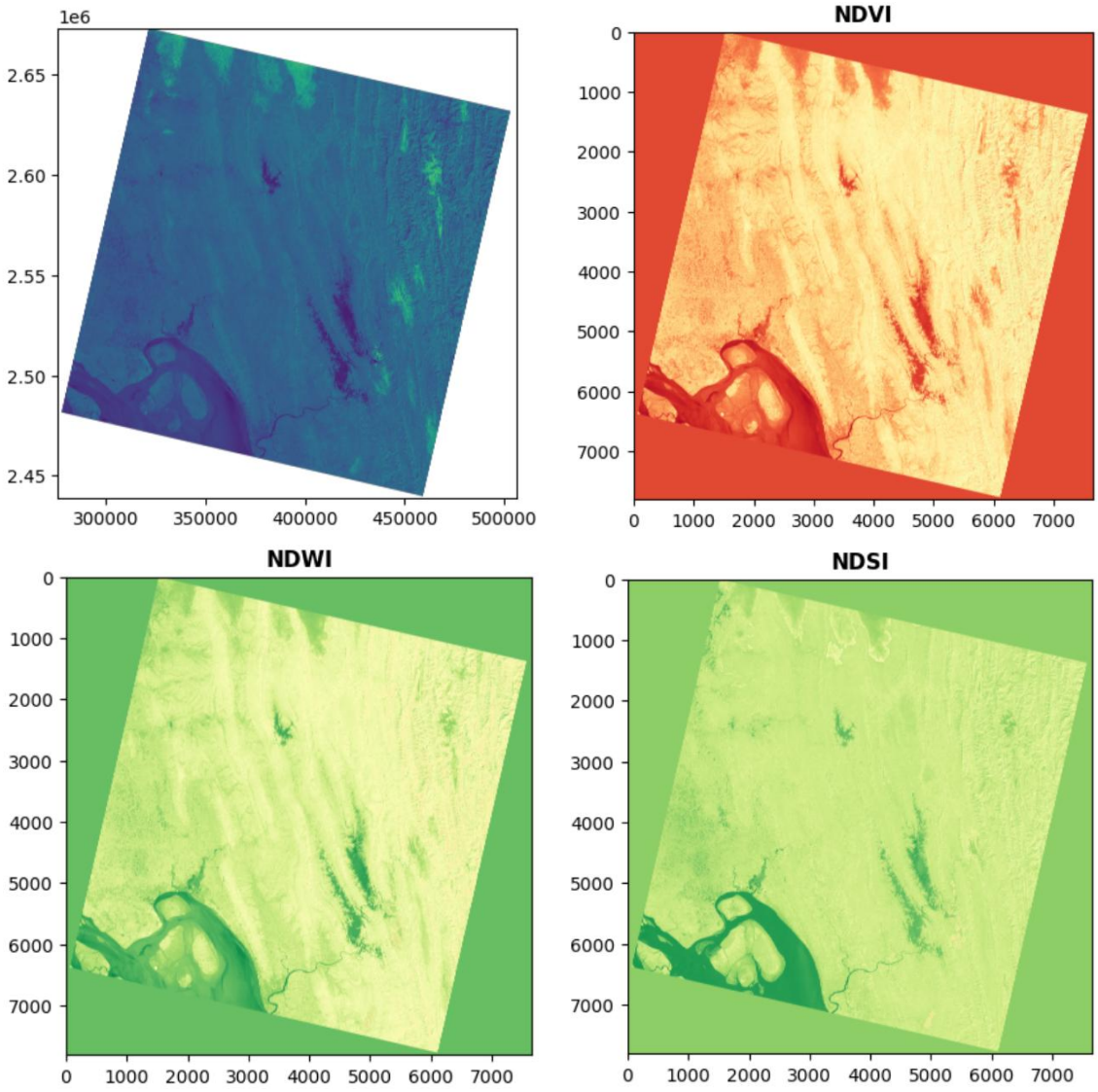
NDWI

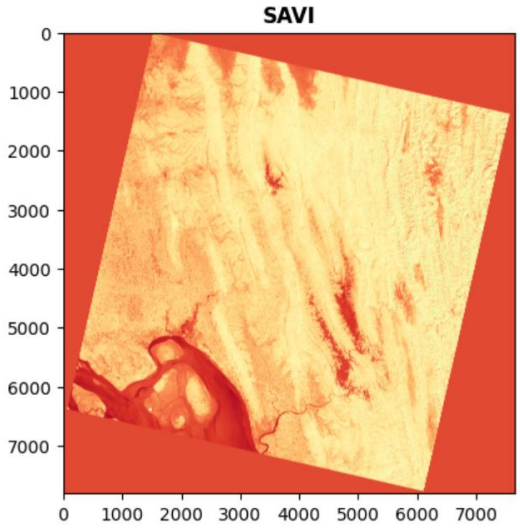


NDVI



Landsat:


1e6
2.65
2.60
2.55
2.50
2.45
300000
350000
400000
450000
500000
NDVI
0
1000
2000
3000
4000
5000
6000
7000
NDWI
NDSI


SAVI
0
1000
2000
3000
4000
5000
6000
7000
0
1000
2000
3000
4000
5000
6000
7000

```
pip install rasterio
```

```
Collecting rasterio
  Downloading rasterio-1.4.3-cp311-cp311-manylinux_2_17_x86_64.manylinux2014_x86_64.whl.metadata (9.1 kB)
Collecting affine (from rasterio)
  Downloading affine-2.4.0-py3-none-any.whl.metadata (4.0 kB)
Requirement already satisfied: attrs in /usr/local/lib/python3.11/dist-packages (from rasterio) (25.1.0)
Requirement already satisfied: certifi in /usr/local/lib/python3.11/dist-packages (from rasterio) (2025.1.31)
Requirement already satisfied: click>=4.0 in /usr/local/lib/python3.11/dist-packages (from rasterio) (8.1.8)
Collecting cligj>=0.5 (from rasterio)
  Downloading cligj-0.7.2-py3-none-any.whl.metadata (5.0 kB)
Requirement already satisfied: numpy>=1.24 in /usr/local/lib/python3.11/dist-packages (from rasterio) (1.26.4)
Collecting click-plugins (from rasterio)
  Downloading click_plugins-1.1.1-py2.py3-none-any.whl.metadata (6.4 kB)
Requirement already satisfied: pyparsing in /usr/local/lib/python3.11/dist-packages (from rasterio) (3.2.1)
Downloading rasterio-1.4.3-cp311-cp311-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (22.2 MB)
   ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 22.2/22.2 MB 45.4 MB/s eta 0:00:00
Downloading cligj-0.7.2-py3-none-any.whl (7.1 kB)
Downloading affine-2.4.0-py3-none-any.whl (15 kB)
Downloading click_plugins-1.1.1-py2.py3-none-any.whl (7.5 kB)
Installing collected packages: cligj, click-plugins, affine, rasterio
Successfully installed affine-2.4.0 click-plugins-1.1.1 cligj-0.7.2 rasterio-1.4.3
```

```
import rasterio as rio
from rasterio.plot import show
import numpy as np
```

+ Code + Text

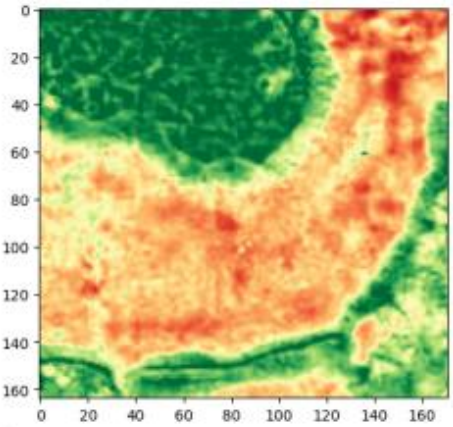
```
nir1 = rio.open("/content/MODIS_18Dec17_NIR (4).tif")
red = rio.open("/content/MODIS_18Dec17_RED (4).tif")

red_1 = red.read(1).astype('float32')
nir_11 = nir1.read(1).astype('float32')

ndvi = (nir_11 - red_1)/ (nir_11 + red_1)

ndvi[np.isnan(ndvi)] = -9999

show(ndvi, cmap='RdYlGn')
```




```
green = rio.open("/content/B3 (4).tif")
nir = rio.open("/content/B5 (4).tif")
```

```
green_1 = green.read(1).astype('float32')
nir_1 = nir.read(1).astype('float32')
```

```
ndwi = (green_1 - nir_1)/ (green_1 + nir_1)
```

```
ndwi[np.isnan(ndwi)] = -9999
```

```
show(ndwi, cmap='viridis')
```