**NDBI**

var featureCollection = ee.FeatureCollection('projects/rgee-390207/assets/BBMP-polygon');

// Load Landsat 8 Surface Reflectance imagery

var dataset = ee.ImageCollection('LANDSAT/LC08/C01/T1\_SR')

.filterDate('2021-01-01', '2021-12-31')

.filterBounds(featureCollection);

// Function to mask clouds using the pixel\_qa band

function maskL8sr(image) {

var cloudShadowBitMask = ee.Number(2).pow(3).int();

var cloudsBitMask = ee.Number(2).pow(5).int();

var qa = image.select('pixel\_qa');

var mask = qa.bitwiseAnd(cloudShadowBitMask).eq(0)

.and(qa.bitwiseAnd(cloudsBitMask).eq(0));

return image.updateMask(mask);

}

// Apply the cloud mask function to the dataset

var datasetMasked = dataset.map(maskL8sr);

// Function to calculate NDBI

function calculateNDBI(image) {

var ndvi = image.normalizedDifference(['B5', 'B4']).rename('NDVI');

var ndwi = image.normalizedDifference(['B3', 'B5']).rename('NDWI');

var ndbi = ndvi.subtract(ndwi).rename('NDBI');

return image.addBands(ndbi);

}

// Apply the NDBI calculation function to the masked dataset

var datasetNDBI = datasetMasked.map(calculateNDBI);

// Select the NDBI band from the first image in the collection

var ndbiLayer = datasetNDBI.select('NDBI').mosaic();

// Mask the NDBI layer using the shapefile polygons

var ndbiMasked = ndbiLayer.clipToCollection(featureCollection);

// Set visualization parameters for NDBI

var ndbiVis = {

min: -1,

max: 1,

palette: ['0000FF', 'green', 'FF0000'],

};

// Display the NDBI values within the shapefile polygons on the map

Map.addLayer(ndbiMasked, ndbiVis, 'NDBI within Shapefile');

// Display the shapefile

Map.addLayer(featureCollection, {}, 'Shapefile');

// Create a custom legend

var legend = ui.Panel({

style: {

position: 'bottom-left',

padding: '8px 15px',

fontSize: '18px',

backgroundColor: 'white'

}

});

// Create the legend title

var legendTitle = ui.Label({

value: 'NDBI Legend',

style: {

fontWeight: 'bold',

fontSize: '20px',

margin: '0 0 4px 0',

padding: '0px'

}

});

// Add the legend title to the legend panel

legend.add(legendTitle);

// Create a label for the year

var yearLabel = ui.Label({

value: 'Year: 2021',

style: {

fontSize: '18px',

margin: '4px 0'

}

});

// Add the year label to the legend panel

legend.add(yearLabel);

// Create the legend entries

var makeRow = function(color, label) {

var colorBox = ui.Label({

style: {

backgroundColor: color,

padding: '8px',

margin: '0 0 4px 0'

}

});

var description = ui.Label({

value: label,

style: {

margin: '0 0 4px 6px'

}

});

return ui.Panel({

widgets: [colorBox, description],

layout: ui.Panel.Layout.Flow('horizontal')

});

};

// Add legend entries to the legend panel

legend.add(makeRow('0000FF', 'Water'));

legend.add(makeRow('FF0000', 'Built-up'));

legend.add(makeRow('green', 'Vegetation'));

// Add the legend to the map

Map.add(legend);