

## **Problem Statement Change detection using LISS 3 data**

### **METHODOLOGY:**

**NDVI:** Use of Vegetation Indices is employed in this problem statement in QGIS3.10 . This formula is used to quantify the density of plant growth on the Earth. The result of this is called the Normalized Difference Vegetation Index (NDVI).

Its formula is:  $NDVI = (NIR - VIS) / (NIR + VIS)$

Calculations of NDVI for a given pixel always result in a number that ranges from minus one (-1) to plus one (+1); however, no green leaves gives a value close to zero. A zero means no vegetation and close to +1 (0.8 - 0.9) indicates the highest possible density of green leaves.

**DATA USED:** ( Name of Satellite - Resourcesat-2 ; Sensor-LISS-III; File Format – Geotiff ; Spatial Resolution -24; No. of Bands – 4; 20 Tiles of data for Nainital District of Uttarakhand for 2 time frame i.e. 2011 and 2017) ; India District Boundary vector layer.

**STEPS:** **1.** Merging of the raster data tiles with respect to bands. **2.** Extraction of the Nainital District from the India District Boundary Shapefile **3.** Masking the Raster data with respect to the Nainital District Boundary. **4.** Check for the reflectance value from the metadata. **5** Apply for the preprocessing to the raster data using cloud masking from semi automatic classification tool. **6.** Using the Raster calculator finding the NDVI for the 2 data for 2011 and 2017 using band 3 and band 4 of the data. **7.** Do the classification of the Final Output NDVI layers according to the predefined value set. **8.** Then do the raster calculation using these two layers and obtain the final change detection layer. **9.** Use Print layout tool for cartography.

**COMPLEXITIES:** **1.** There is so much clouds in the obtained dataset which needs the immense skill set to work with it which affect the usability of the data in the general. **2.** Bhuvan portal is not updated with the proper dataset for searching like districts etc which make it difficult to obtain the satellite data for the respective place. **3.** Also the data available is not in the hierarchical order to use as the distribution over the year is not equally distributed.

### **APPLICATION OF THE MAP:**

**1.** It can be used in studying the land degradation pattern. **2.** This map can also be integrated with the economics study for this area . **3.** This map can be link with the climatic change pattern in the area. **4.** One of the major inclination of the map is towards the agricultural land use in the area as this area is well suited for the cultivation of the herbs. **5.** Also this area is prone to the landslides so this map can also be used for the mitigation purposes and in the disaster management.

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