Course Code: URP 2244
Course Title: GIS and Remote Sensing Studio

# **Title of assignment**: Calculating Land Surface Temperature


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# A report about the difference of Land Surface Temperature in Rajshahi between 2006 and 2011.

**Study Area:** We took landsat 5 image of Rajshahi area to determine the difference of Land Surface Temperature. We took two landsat 5 images of year 2006 and year 2011 of Rajshahi. Here is our study area.

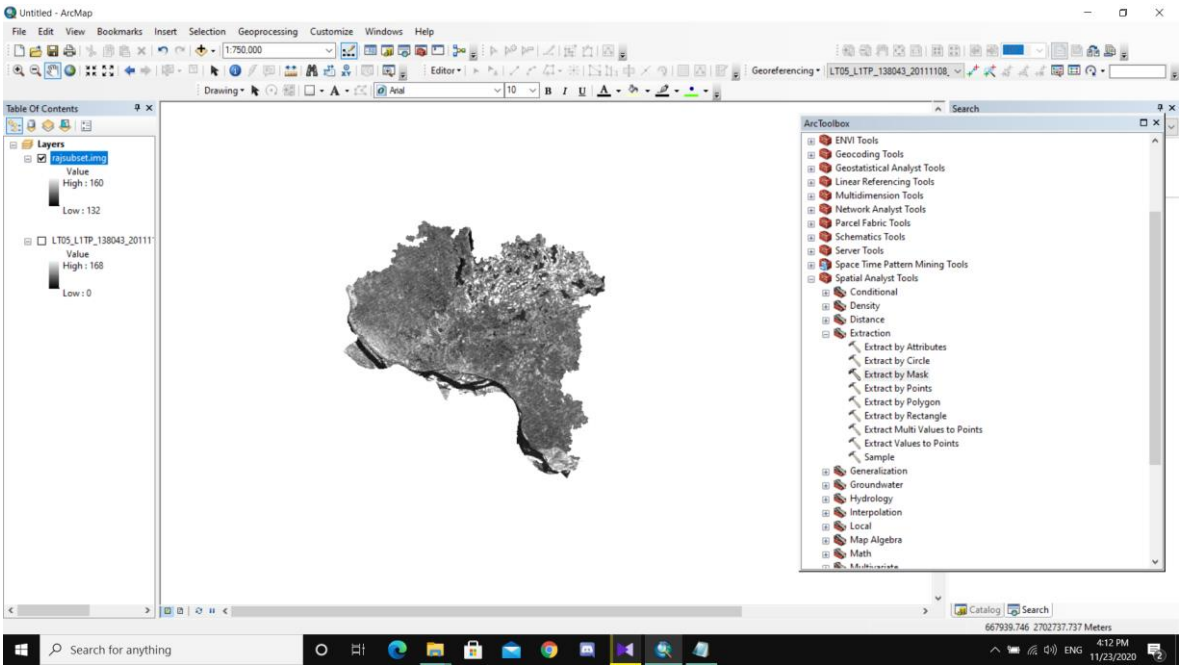


Figure 01: Rajshahi Area

We need two landsat 5 images of year 2006 and year 2011 of Rajshahi and a shapefile of Rajshahi to calculate the difference between the Land Surface Temperature of Rajshahi between 2006 and 2011. Then we need to follow some steps to complete the work.

**Method:**

1. Firstly, we opened ArcMap and add the band 6 of the landsat 5 image of 2011. And using the extract by mask tool and Rajshahi shapefile we differentiated the Rajshahi area. (Figure 01).
2. Now in order to convert the DN to radiance we used the LST formula in Raster calculator tool. We input the values from the .mtl file of the landsat 5 image. Then we find a output.

**Formula:**

$$L= (( Lmax – Lmin ) / ( QCALmax-QCALmin )) * ( QCAL- QCALmin ) + Lmin$$

3. Then in order to convert the radiance into temperature we used this formula and input the values from the .mtl file.

$$T = k2/\ln(k1/L+1)$$

4. Then we convert kelvin to degree Celsius using the formula

$$C = K - 273.15$$

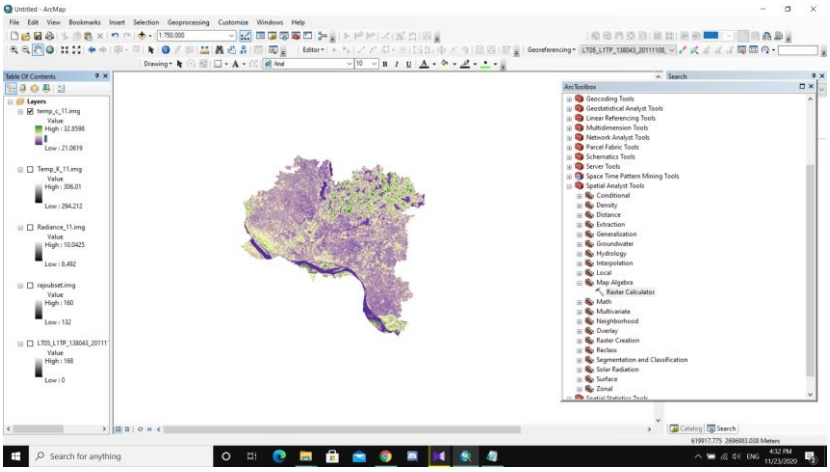

Figure 02: In Degree Celsius

5. Then we classified the image in 4 categories with layer properties.
6. Then we created shape files named urban, vegetation, bare land and water feature. And point out (min 200) the urban area, vegetation area, bare land area and water features with editing tool.
7. Then we extracted these points by extract values to point and saved the files for different names.
8. Then we opened the individuals attribute table and copied those data to excel for further calculation.

Figure 03: Attribute table of Urban area.

9. In excel, we find the mean value for urban area, vegetation, bare land and water feature.
10. In the same process we did it in 2006 image also and calculate the mean value for each feature.

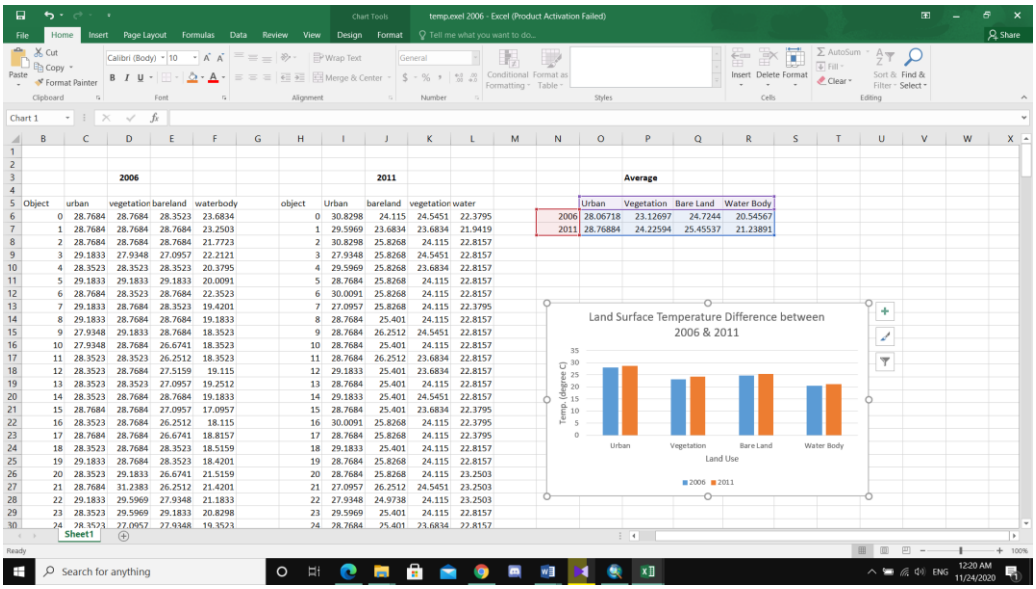


Figure 04: Data in excel.

11. Now, we can see the difference of Land Surface Temperature in Rajshahi between 2006 and 2011 by bar chart.

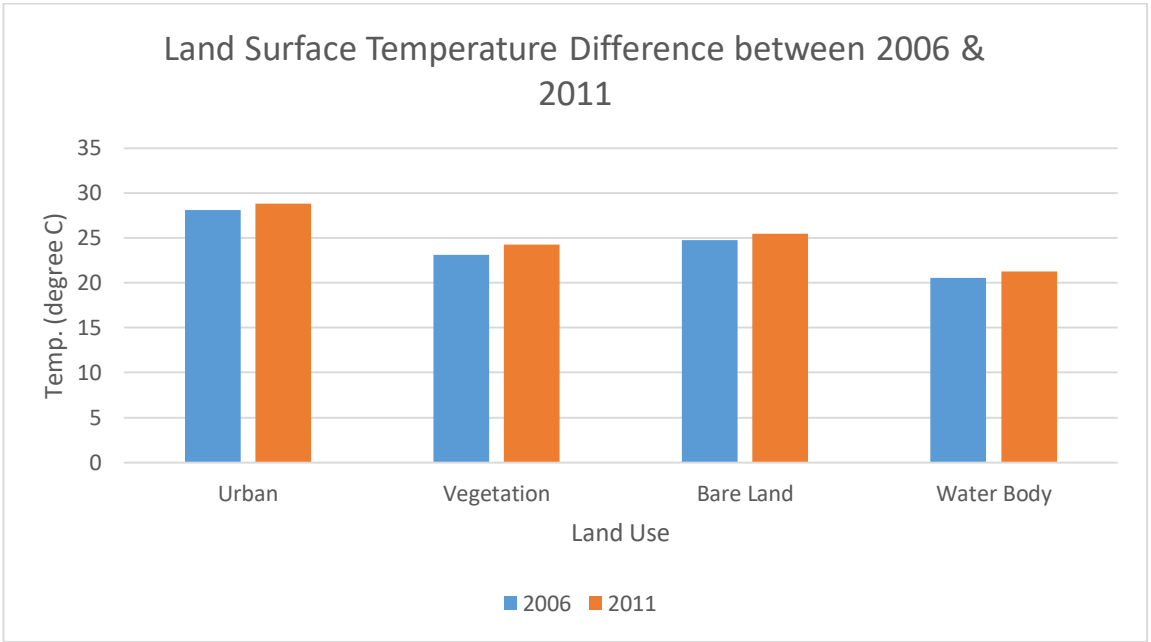


Figure 05: Difference of LST of Rajshahi between 2006 and 2011.