

**Report on Practical 4**

**Topic: Change Detection**

**Submitted by: Kazi Jahidur Rahaman**

Course title: Digital Processing of Remotely Sensed Data

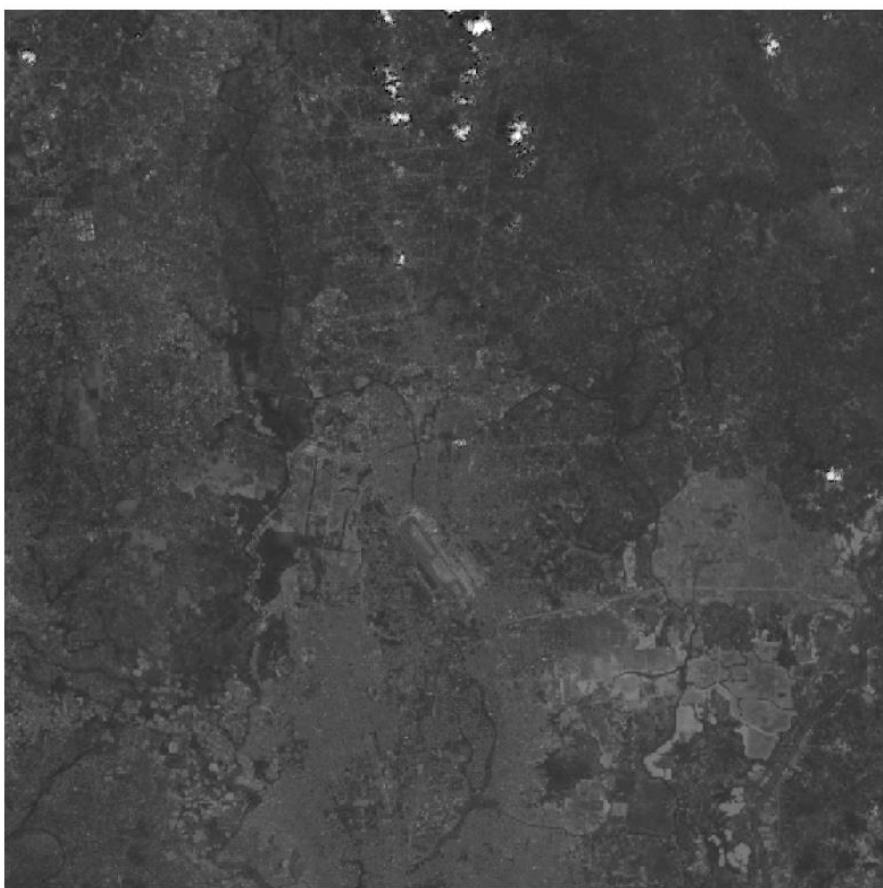
Warsaw University of Life Sciences, and

Eberswalde University for Sustainable Development

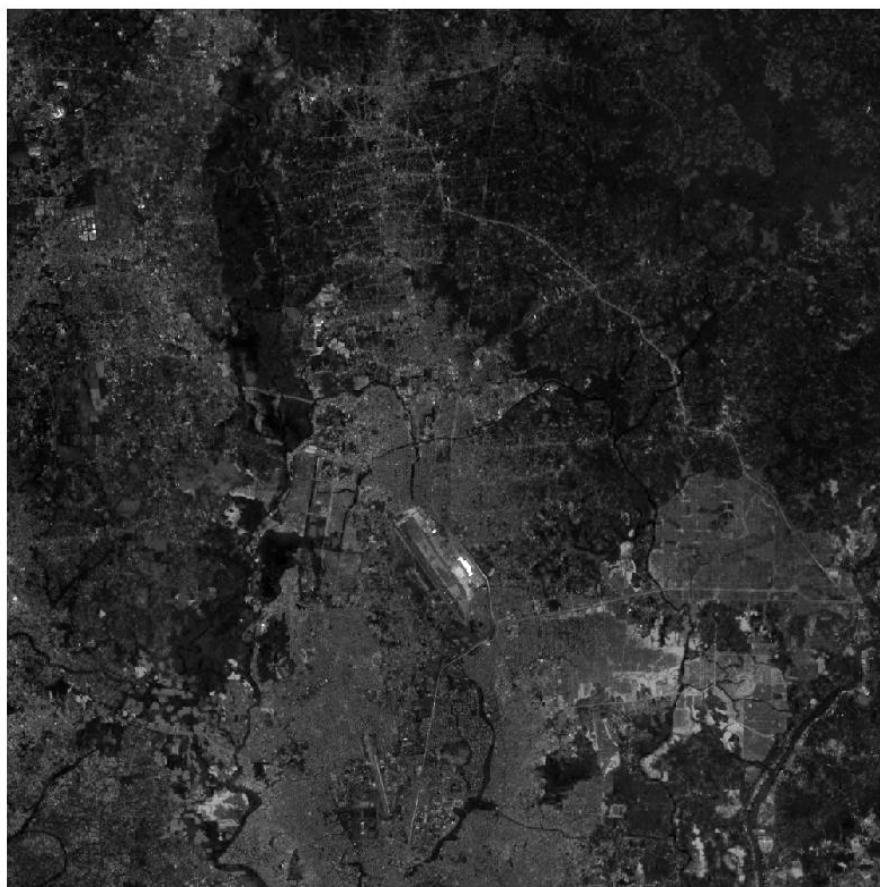
Date: 28/05/2023

## Exercise 1- Change Detection

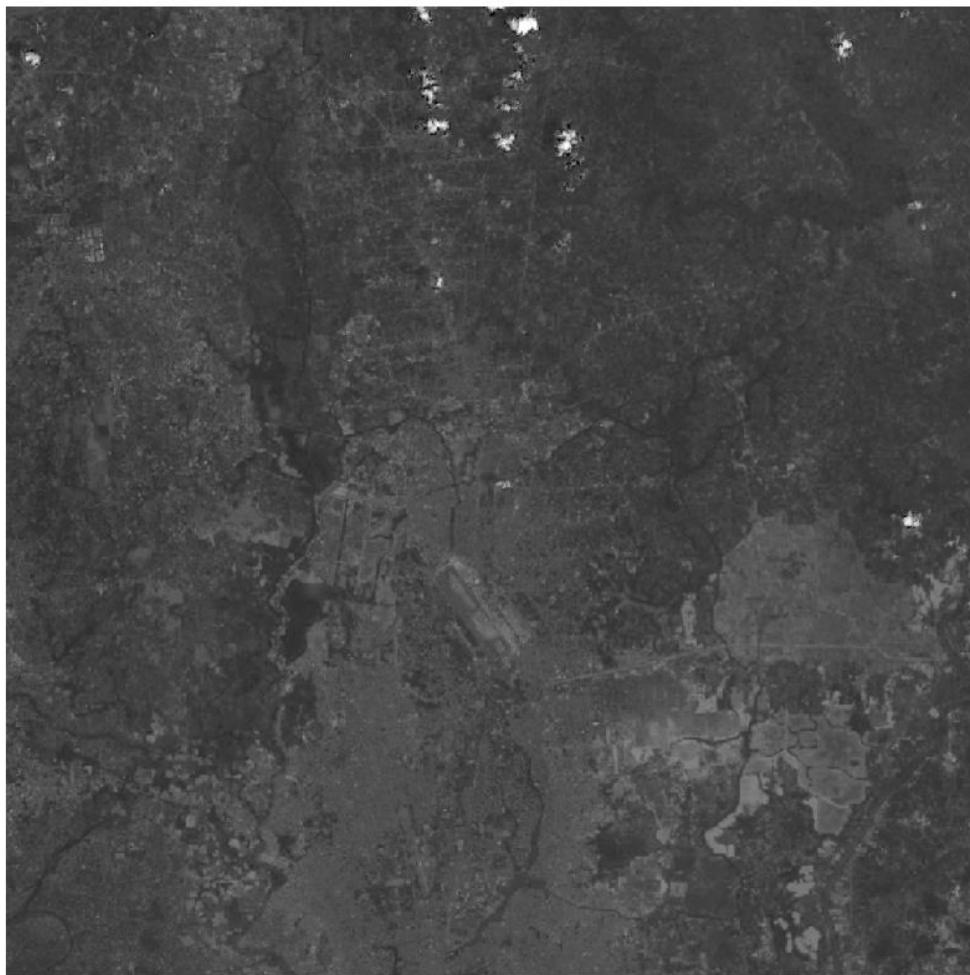
**Band 2 Year 2021:**



**Band 2 Year 2023:**



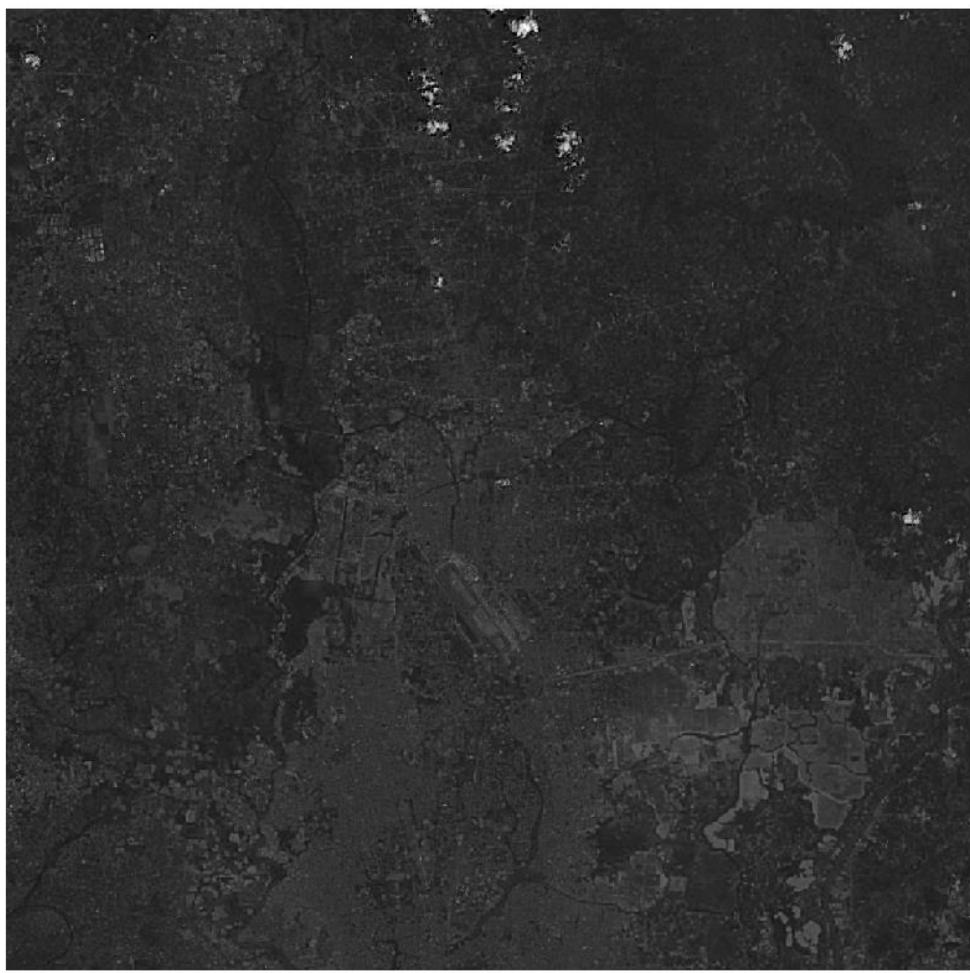
**Band 2 Year 2021-After Histogram Matching:**



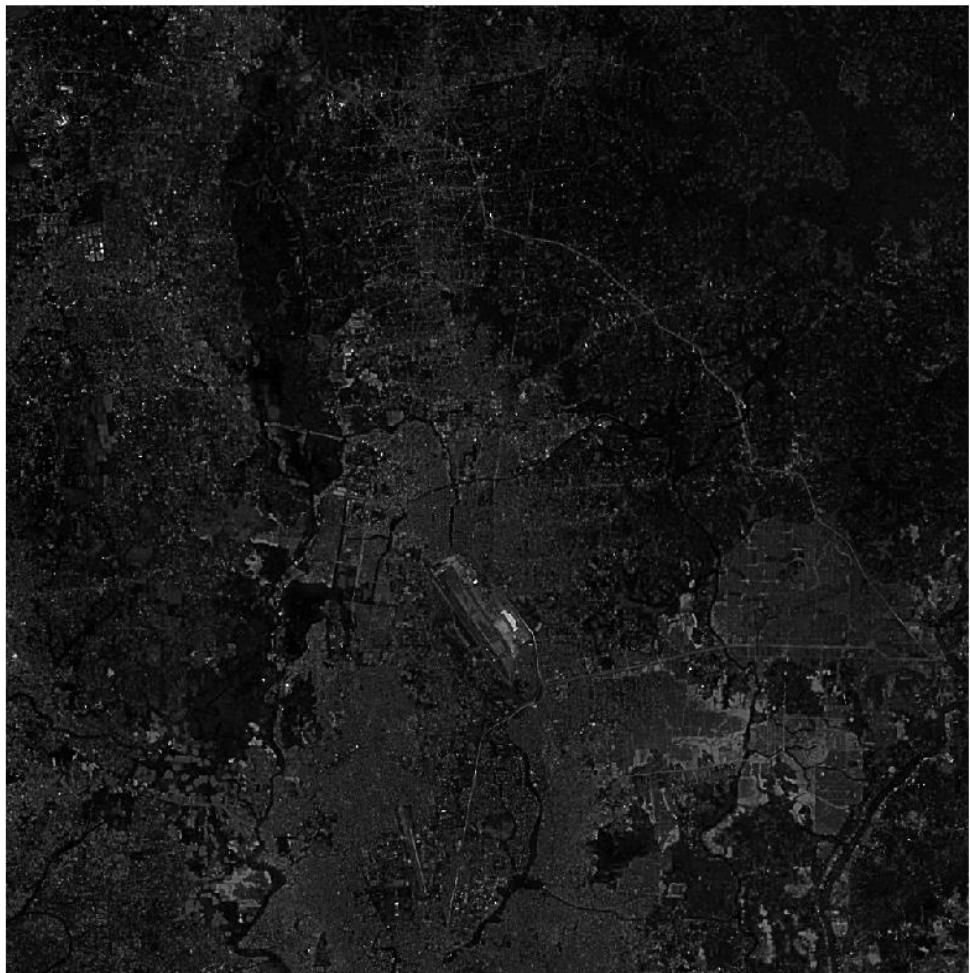
**Band 2 Year 2023-After Histogram Matching:**



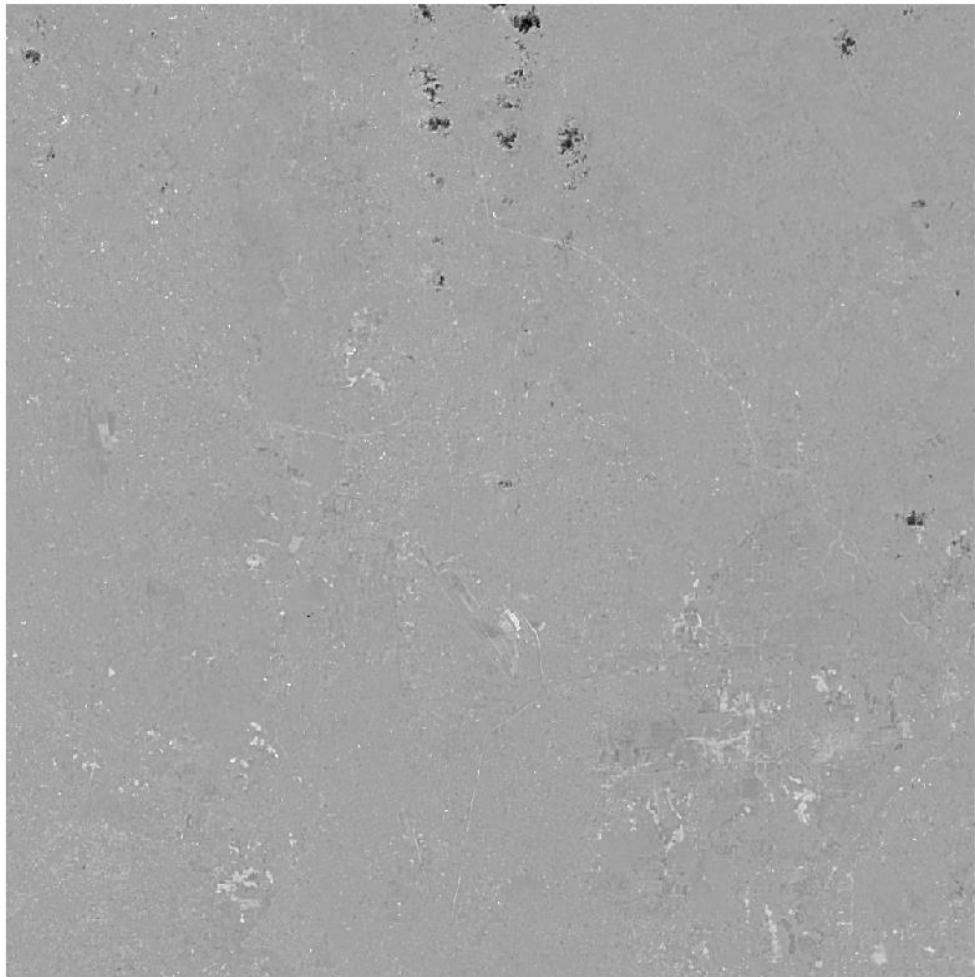
**Band 2 Year 2021 After Histogram Matching and Pan-sharpening:**



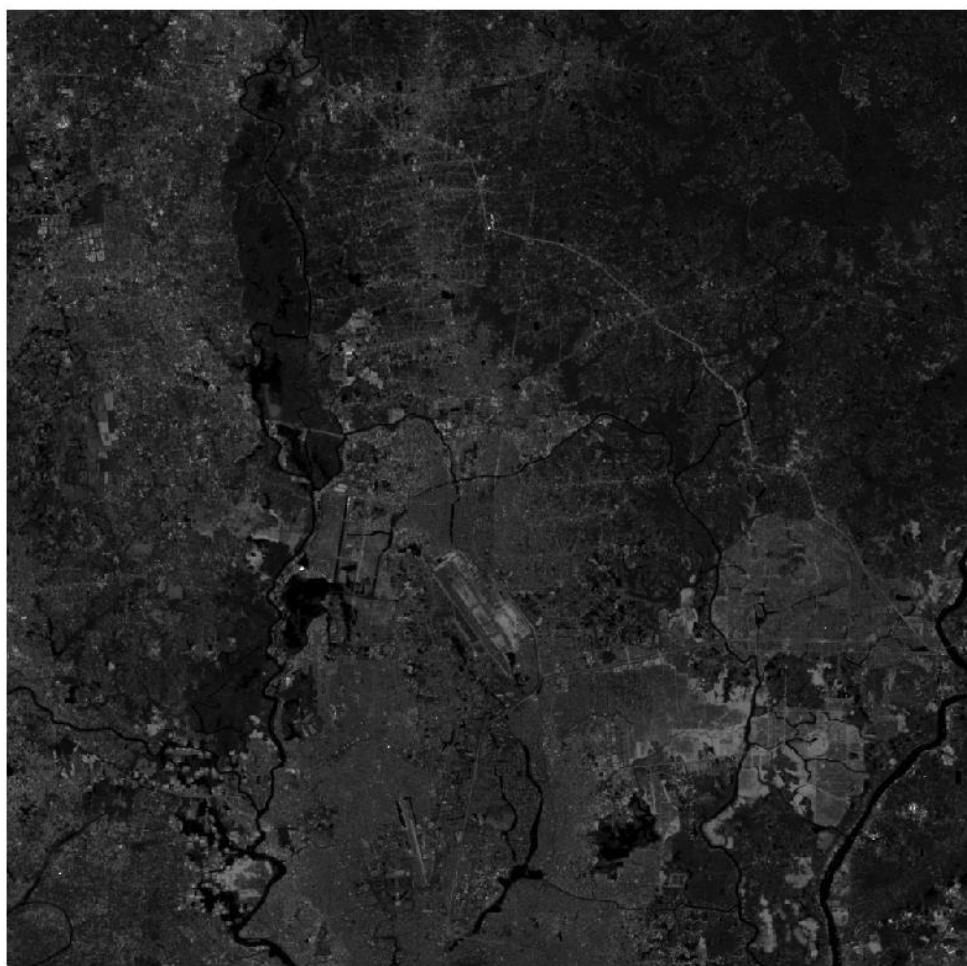
**Band 2 Year 2023 After Histogram Matching and Pan-sharpening:**



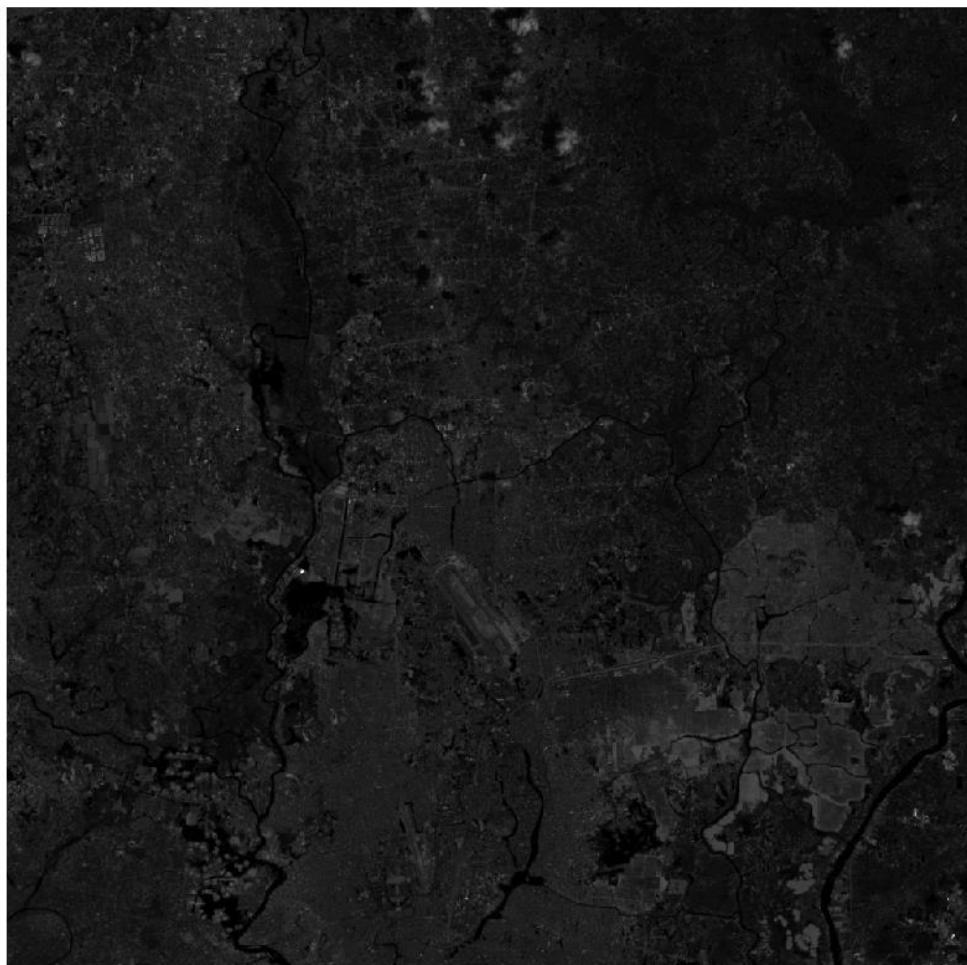
**Band 2 – Differenced (2023-2021) After Histogram Matching and Pan-sharpening:**



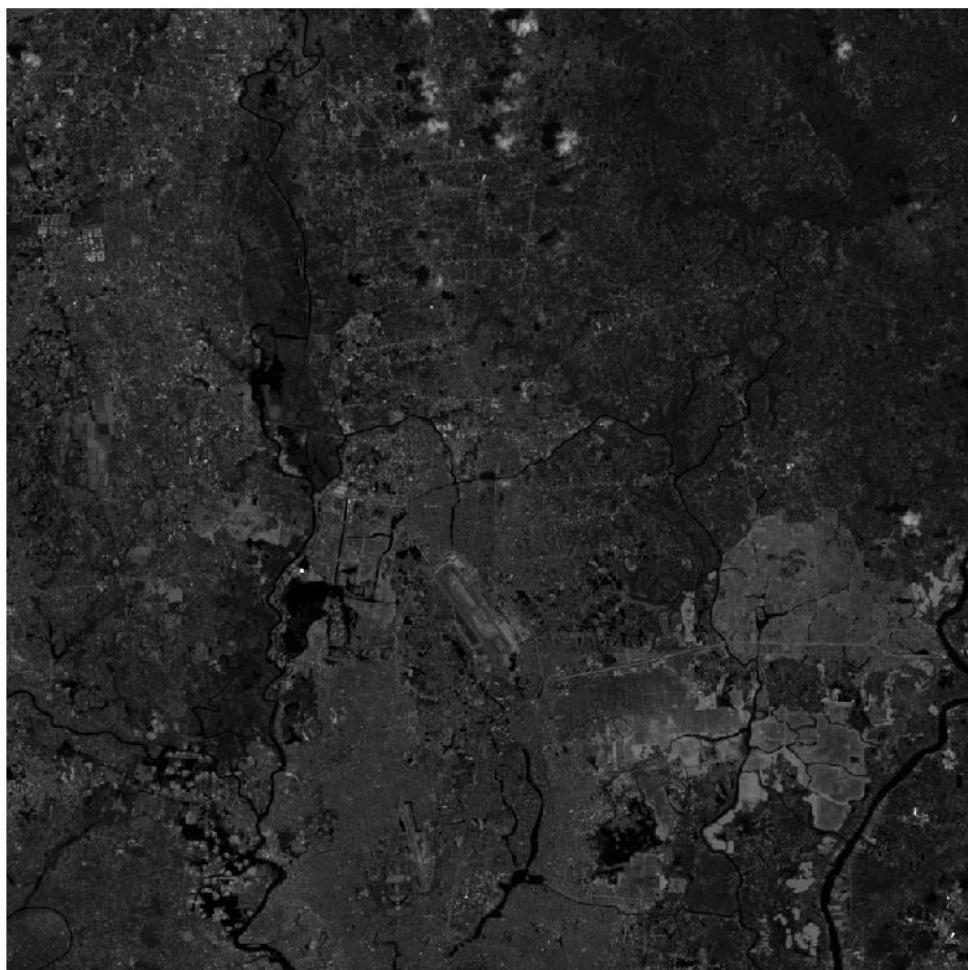
**Band 7 Year 2021:**



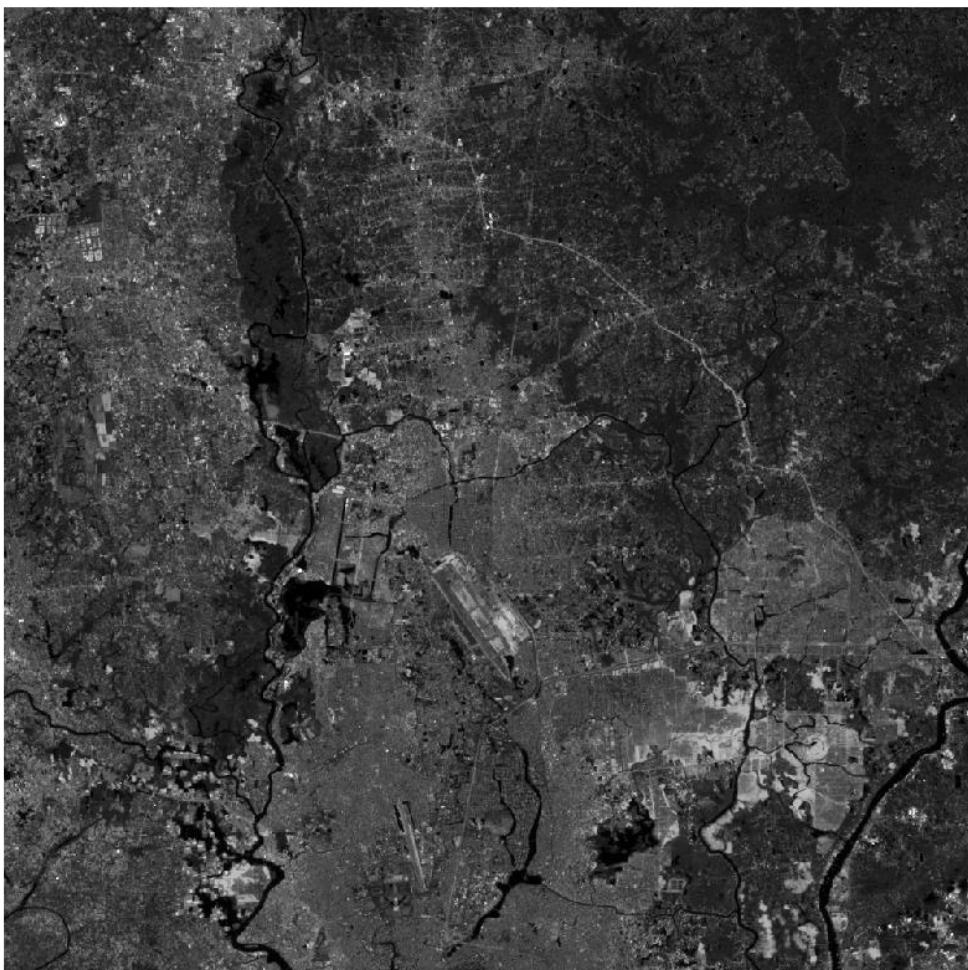
**Band 7 Year 2023:**



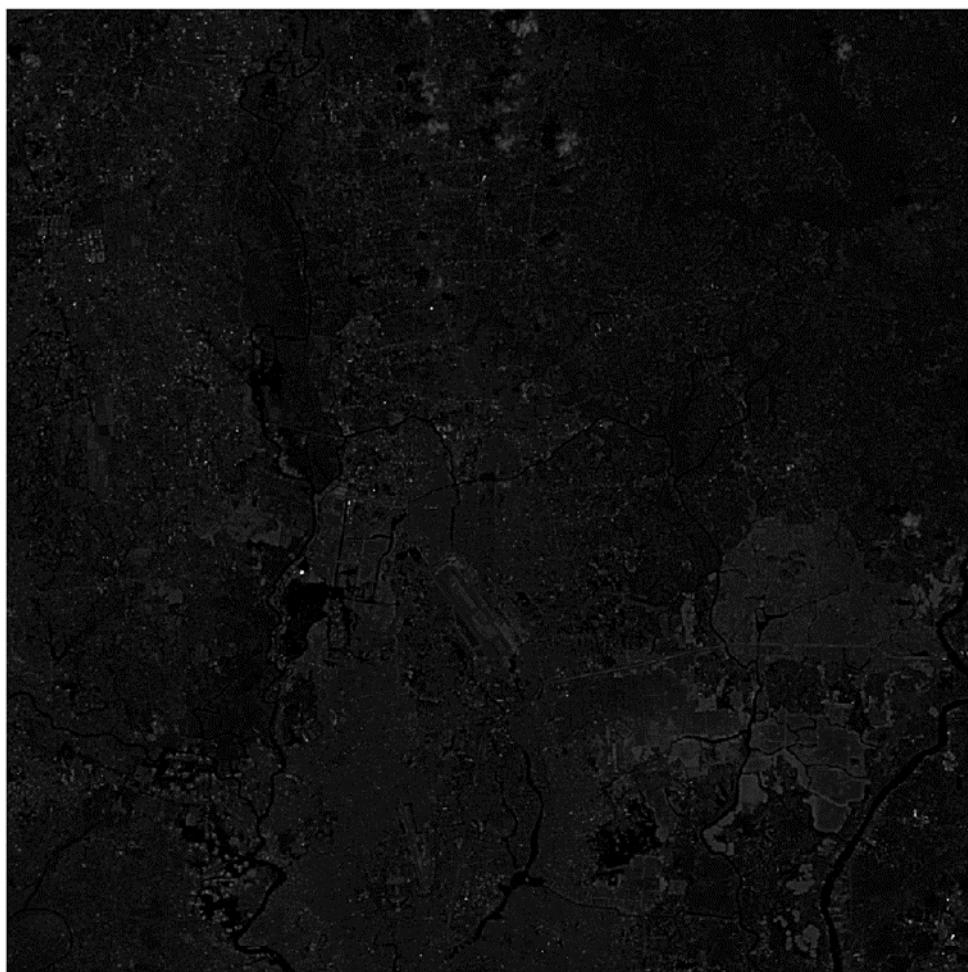
**Band 7 Year 2021-After Histogram Matching:**



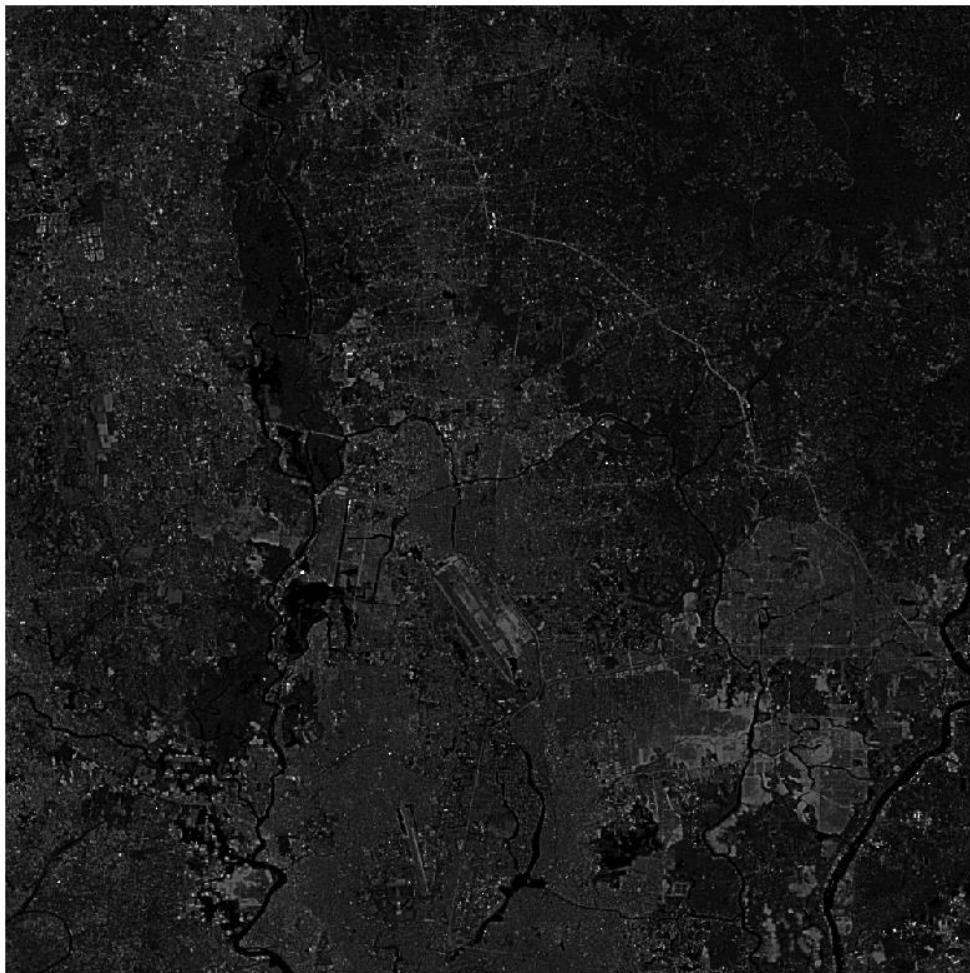
**Band 7 Year 2023-After Histogram Matching:**



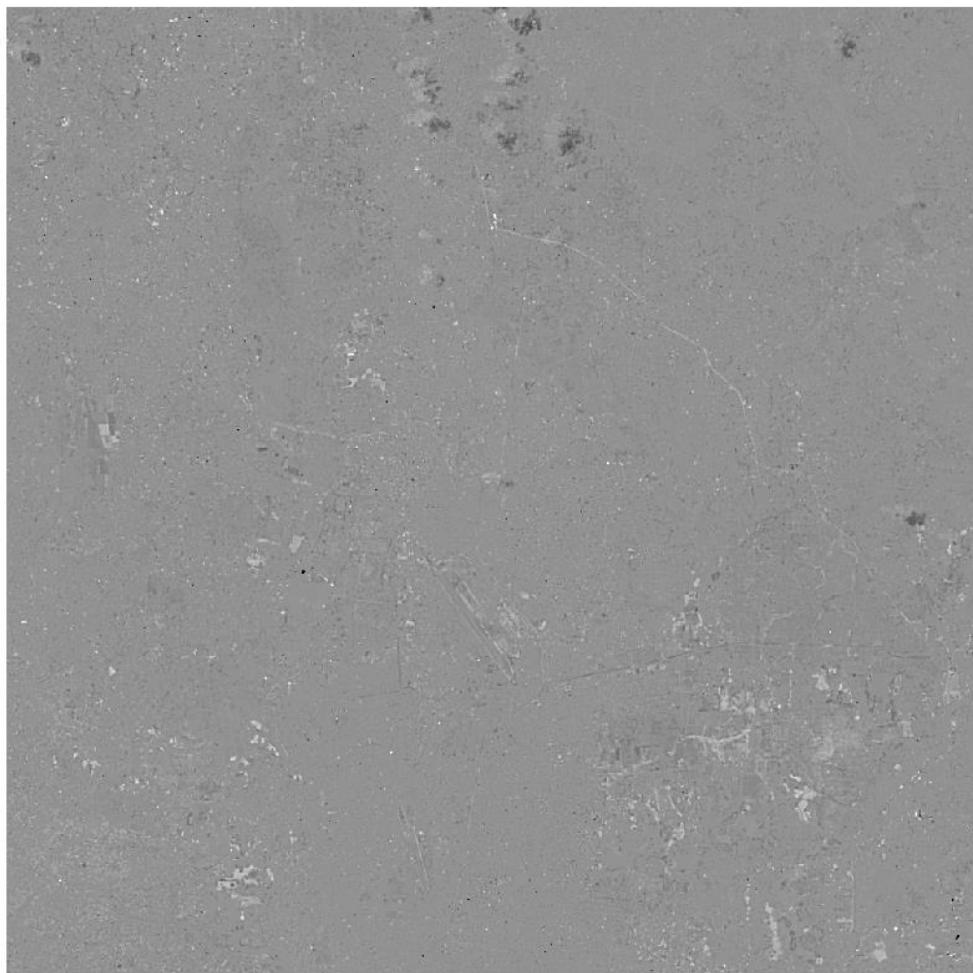
**Band 7 Year 2021 After Histogram Matching and Pan-sharpening:**



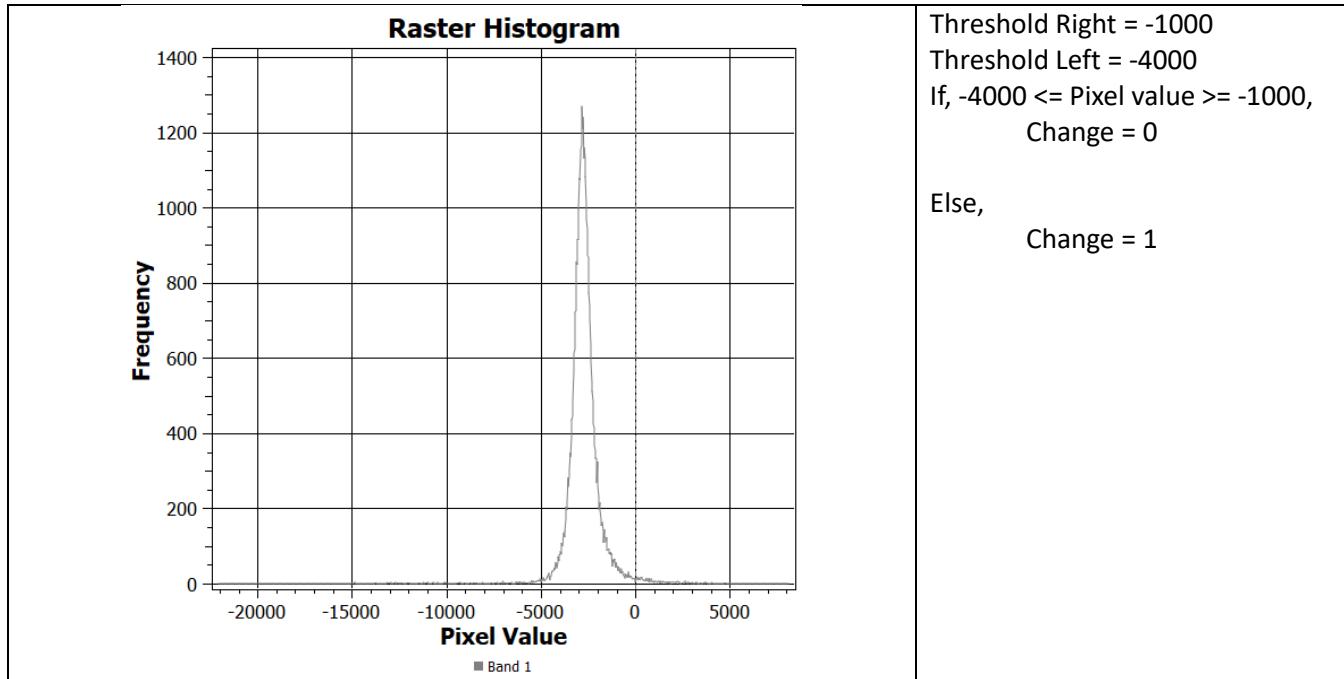
**Band 7 Year 2023 After Histogram Matching and Pan-sharpening:**



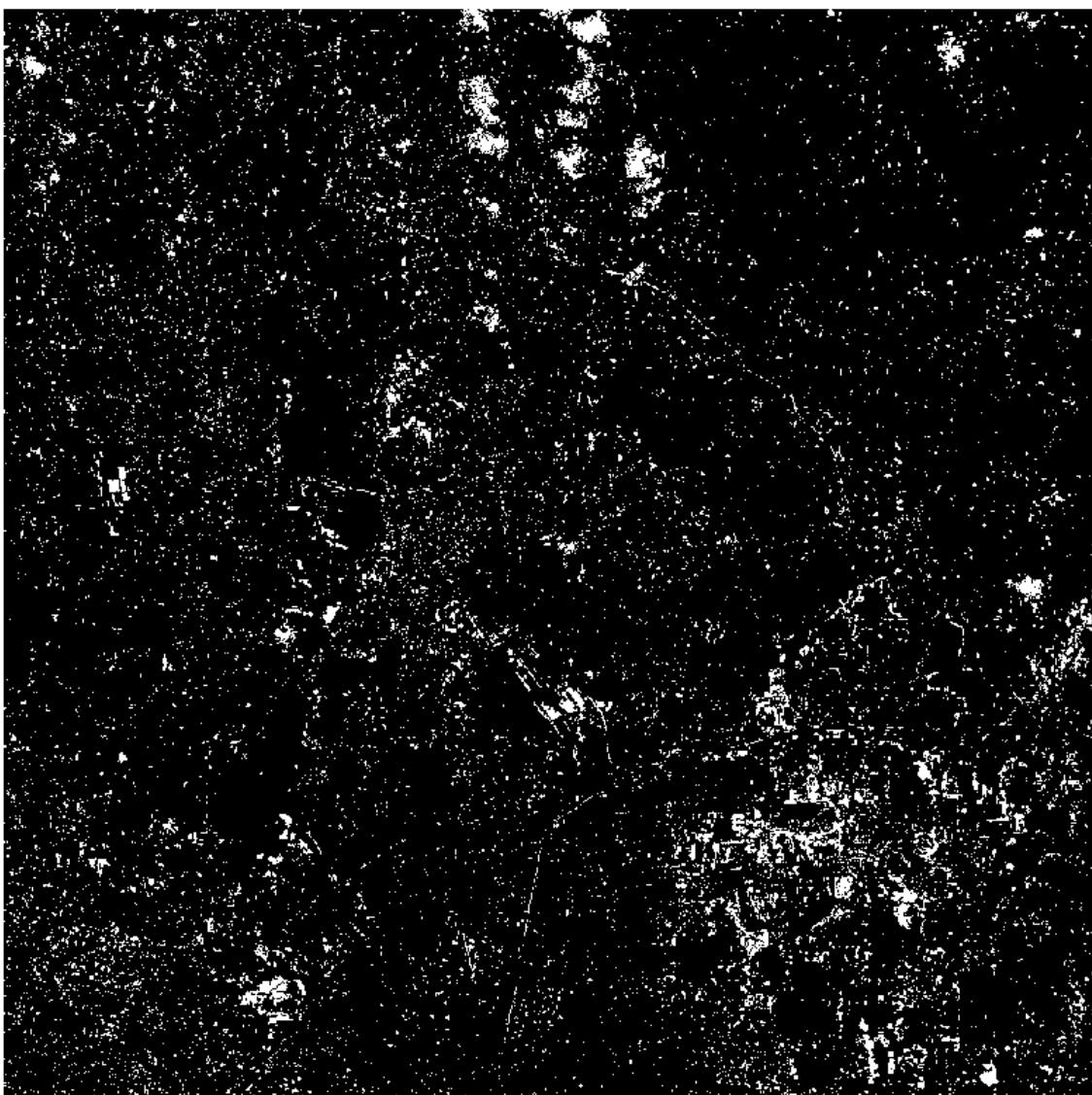
**Band 7 - Differenced After Histogram Matching and Pan-sharpening:**



## Band 2 Differenced After Histogram Matching and Pan-sharpening – Binary Conversion:

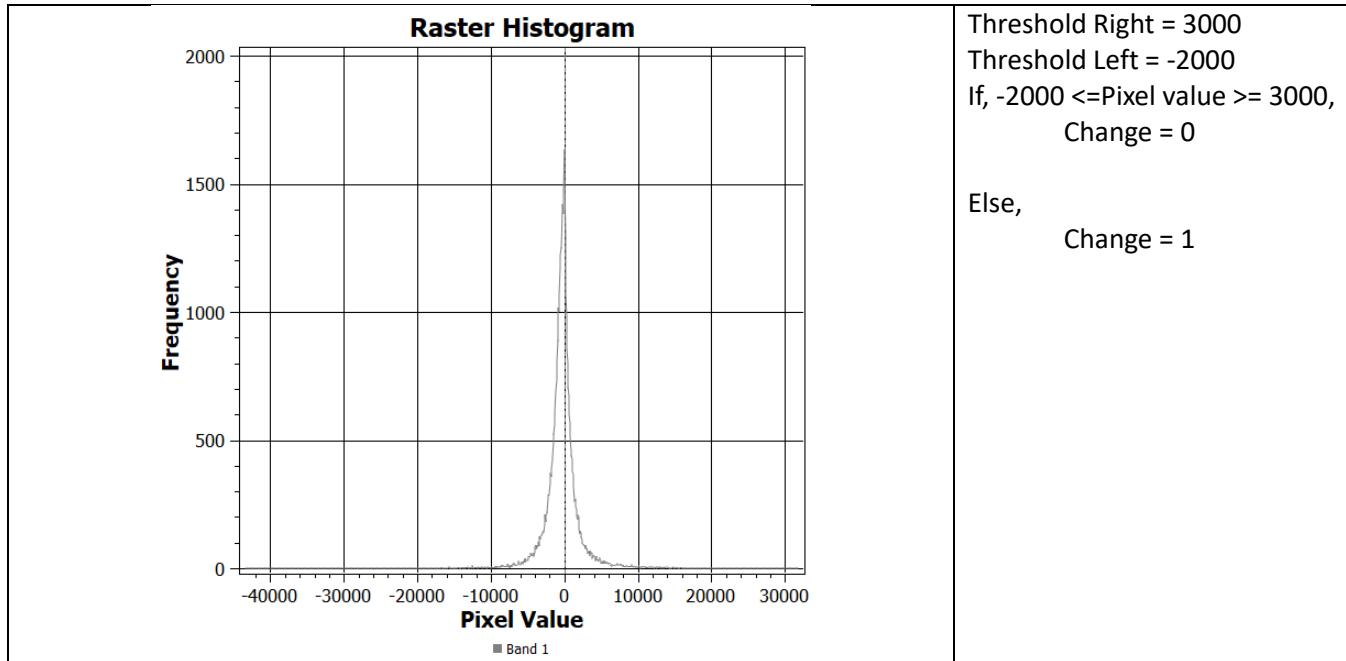


**B2 Difference Binary Image**

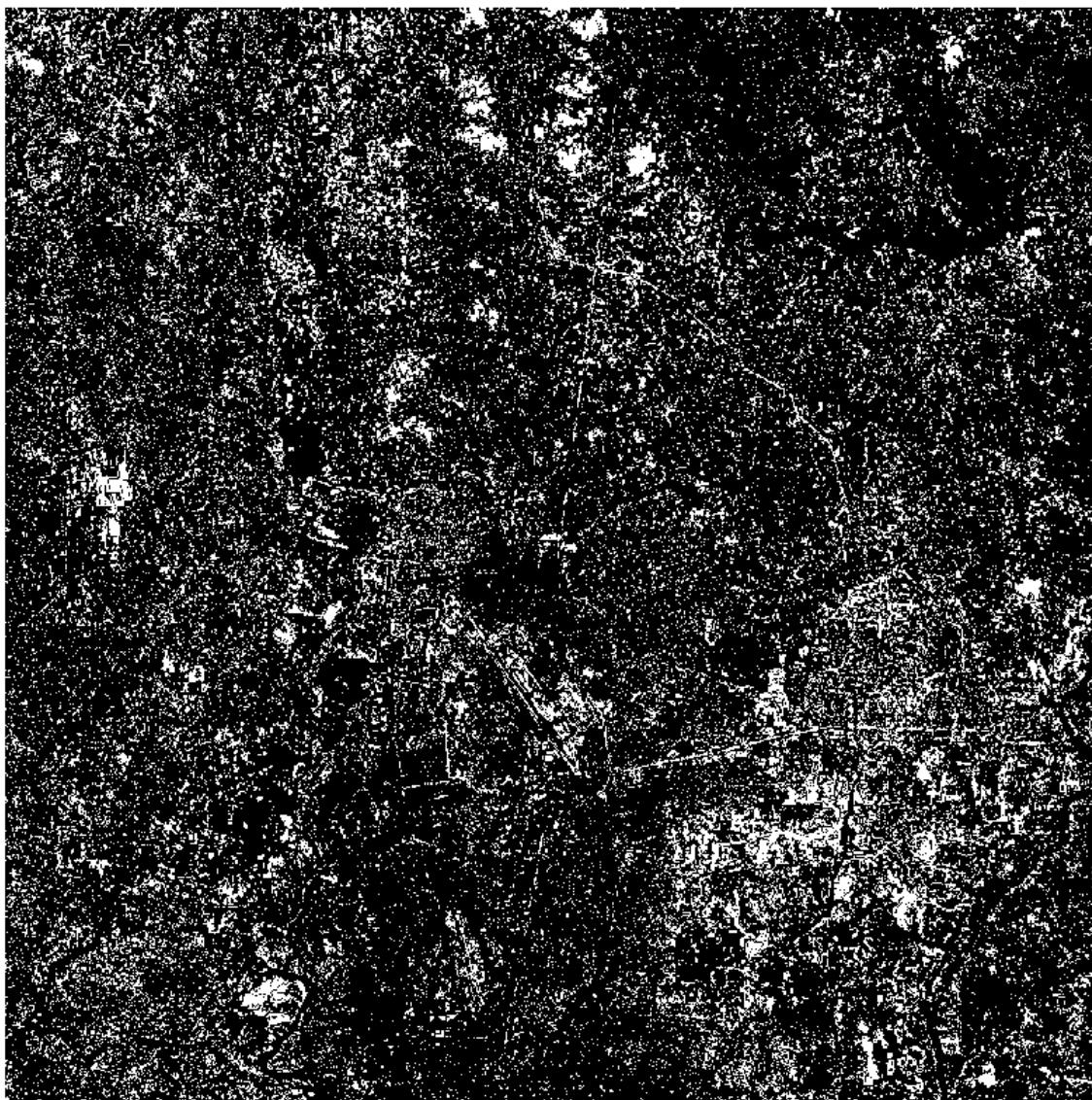


White = 1 = Change, Black = 0 = No Change

## Band 2 Differenced After Histogram Matching and Pan-sharpening – Binary Conversion:

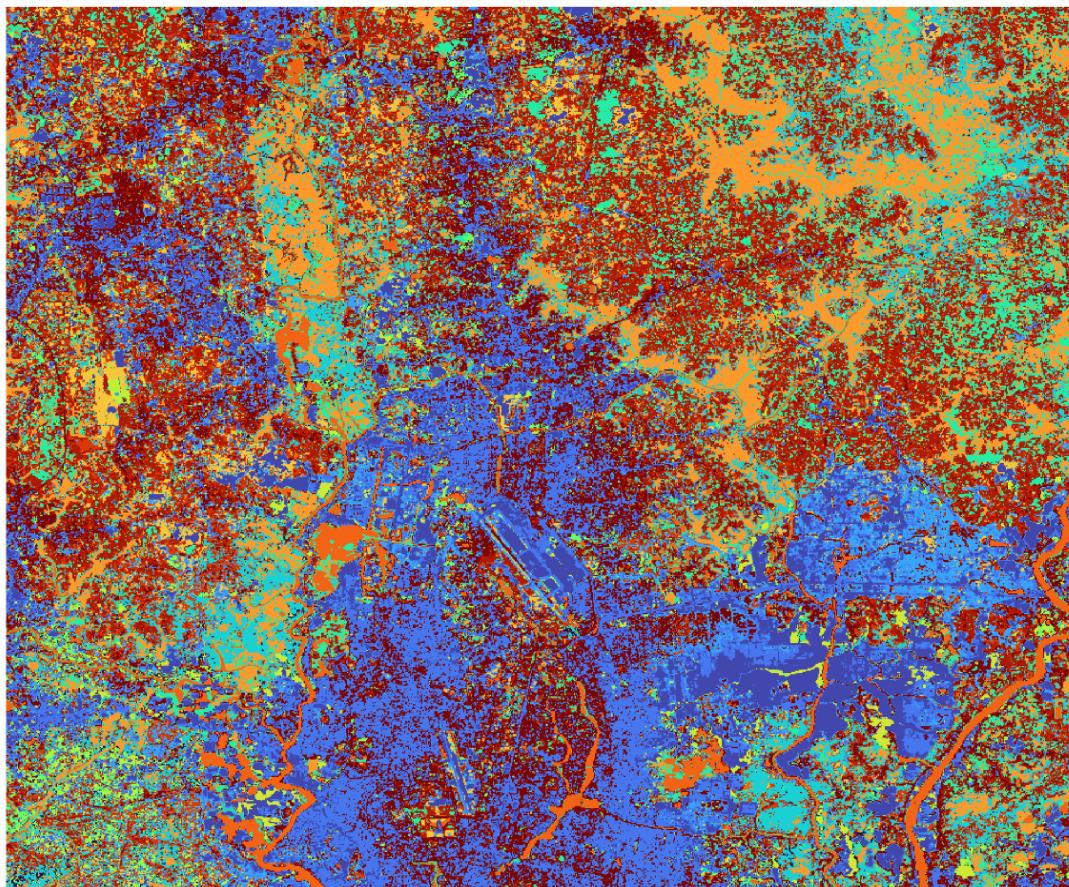


**B7 Difference Binary Image:**



White = 1 = Change, Black = 0 = No Change

## Exercise 2- Unsupervised clustering change detection



**K Means Unsupervised Classification of Dhaka**

Kmeans Classified	7
Band 1 (Gray)	8
0	9
1	10
2	11
3	12
4	13
5	14
6	

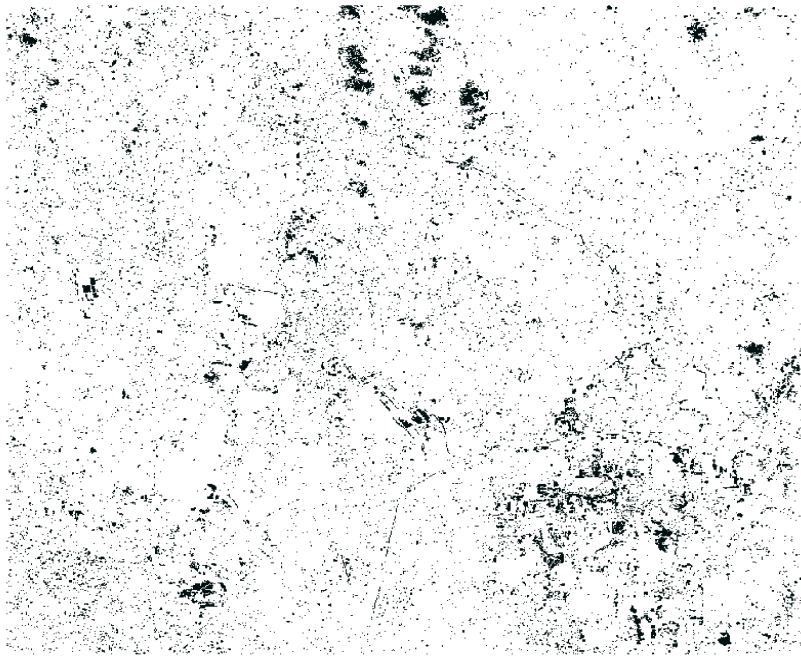
0 2,5 5 km



### Identifying The Changes:

For identifying the change clusters of K-Means Classification, I will take help from the differenced binary image of Band 2. Below we can see the only pixels with value '1' in black color. We assume, according to the threshold that we used for binary conversion, only in these pixels, change bigger than the threshold occurred. Now, I will use this Differenced B2 Binary Image as a mask and clip the K-Means classified image only for these pixels.

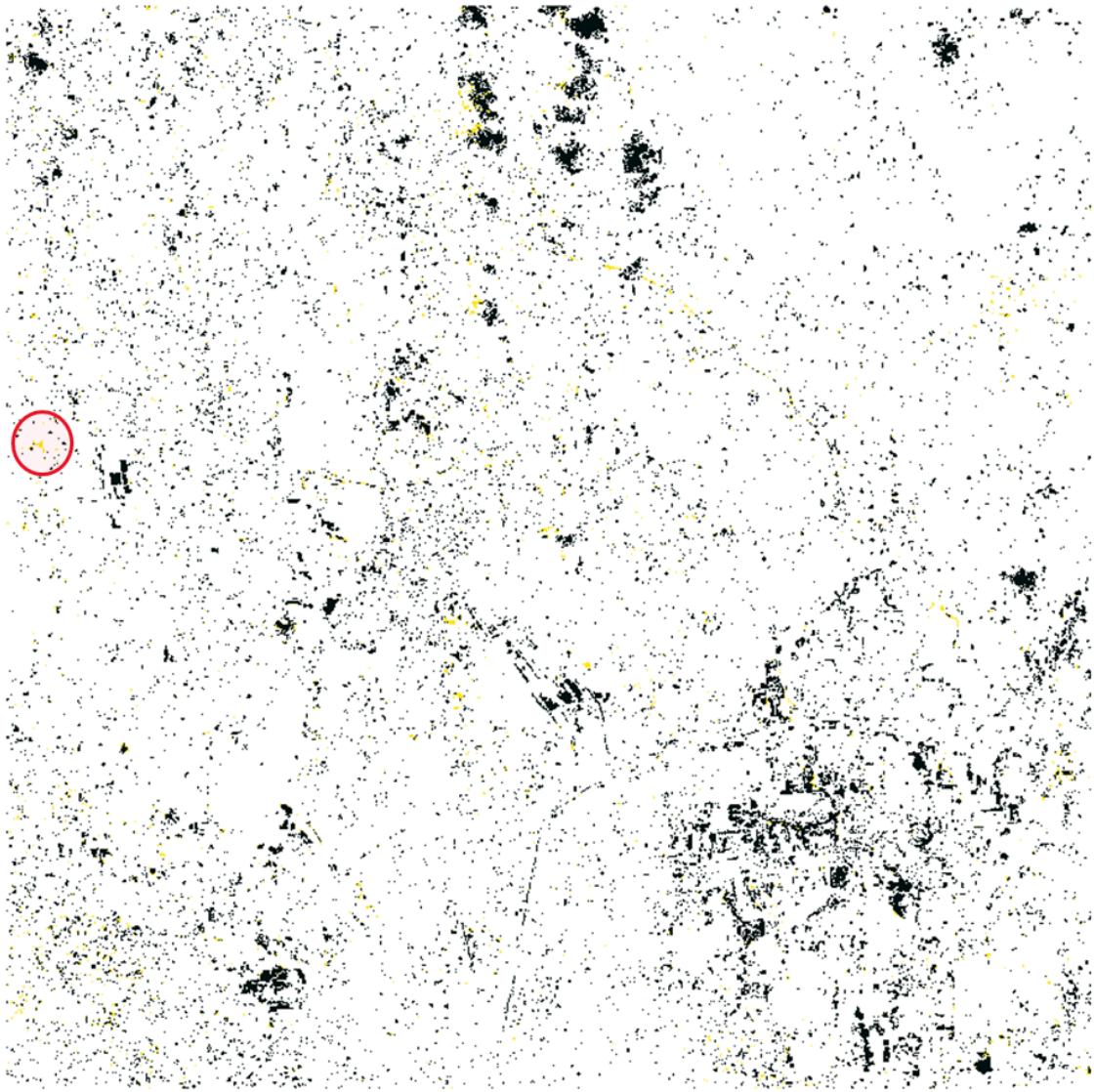
In the mask layer pixels with 0, are considered as a No Data by QGIS. In classified K-Means Image, also we have the cluster numbers 0-14. Therefore, I will add 1 to all the classes to ignore confusion. Therefore now we have clusters from 1-15.



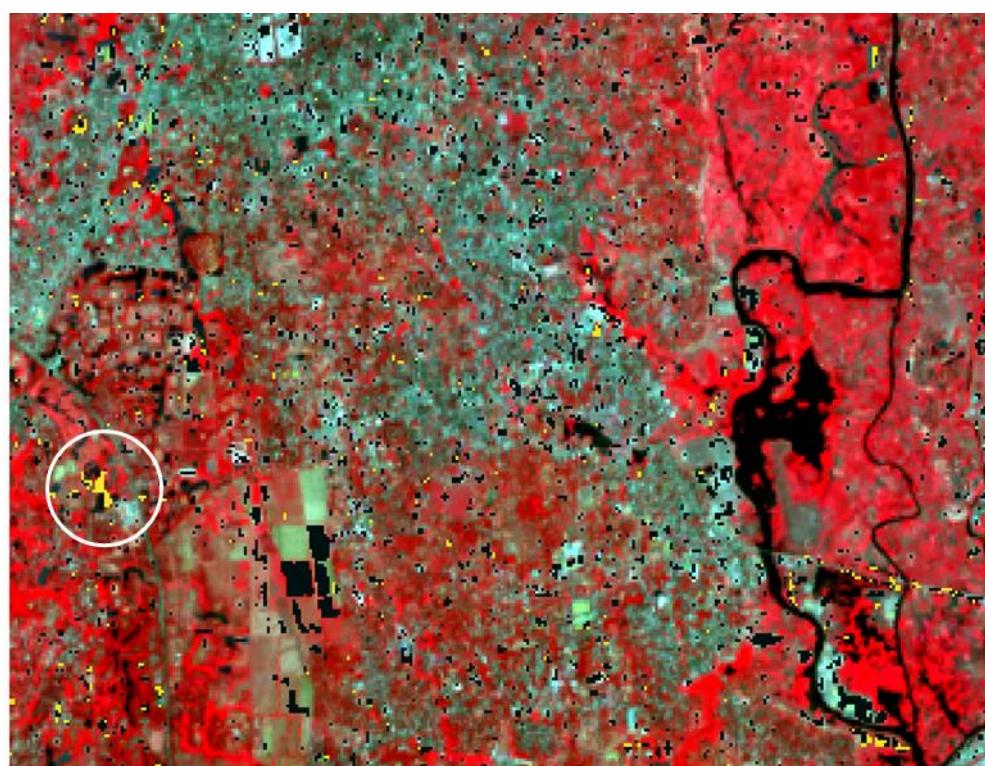
**Identifying Cluster 7:** Below, you can see the k-Means Classified Image only for the pixels in the mask. It has 15 clusters from 1 to 15. In the Image the red marked location is an example of cluster 7.



Now, we are going to identify cluster 7. In the below Image, all the values of cluster 7 are shown in yellow colour, and rest of the clusters in black.



Since, it is difficult to understand the yellow pixels (cluster 7) perfectly in this zoom level. I will zoom it to an area where cluster 7 (in colour Yellow) can be visible.



Here, in the left side of the image we can see some pixels in cluster 7(in yellow colour, within the circle). Now we will look at the 2021 image and 2023 image of the same location in 5,4,3 false colour composite.

In the image in 2021, we can see the location was dark in 5,4,3 false colour composite, which means, it was a Waterbody.

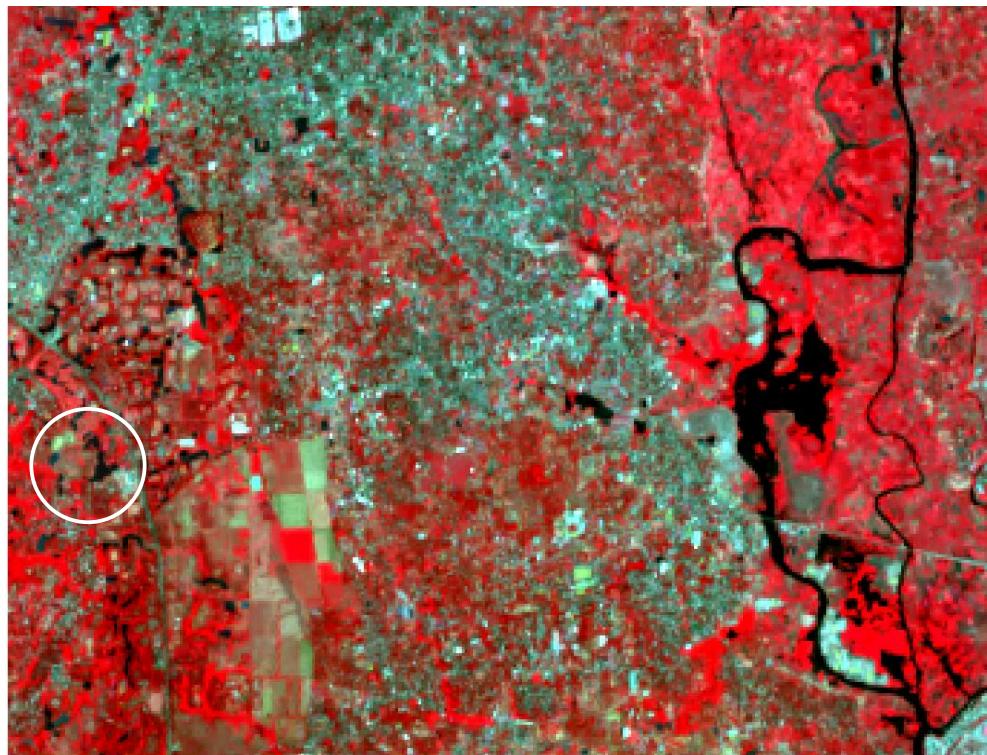
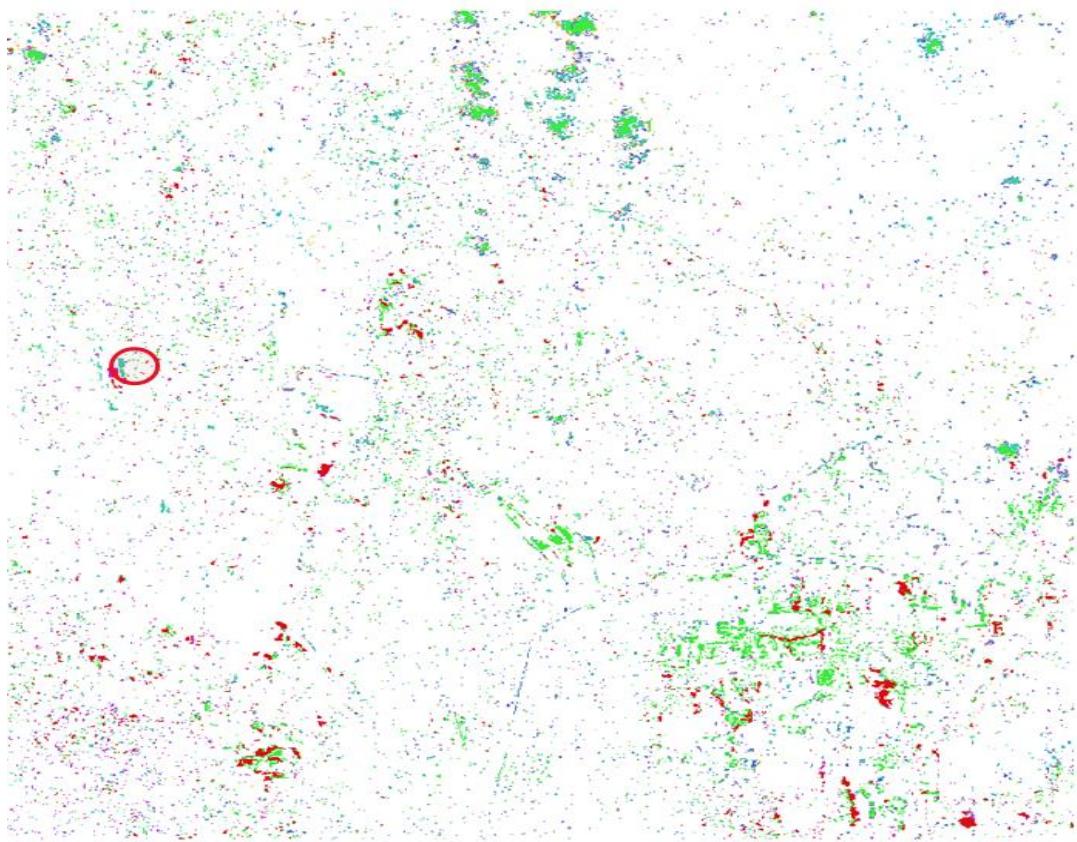


Image in 2023, we see the same location in bright colours, which means it is a bare soil.

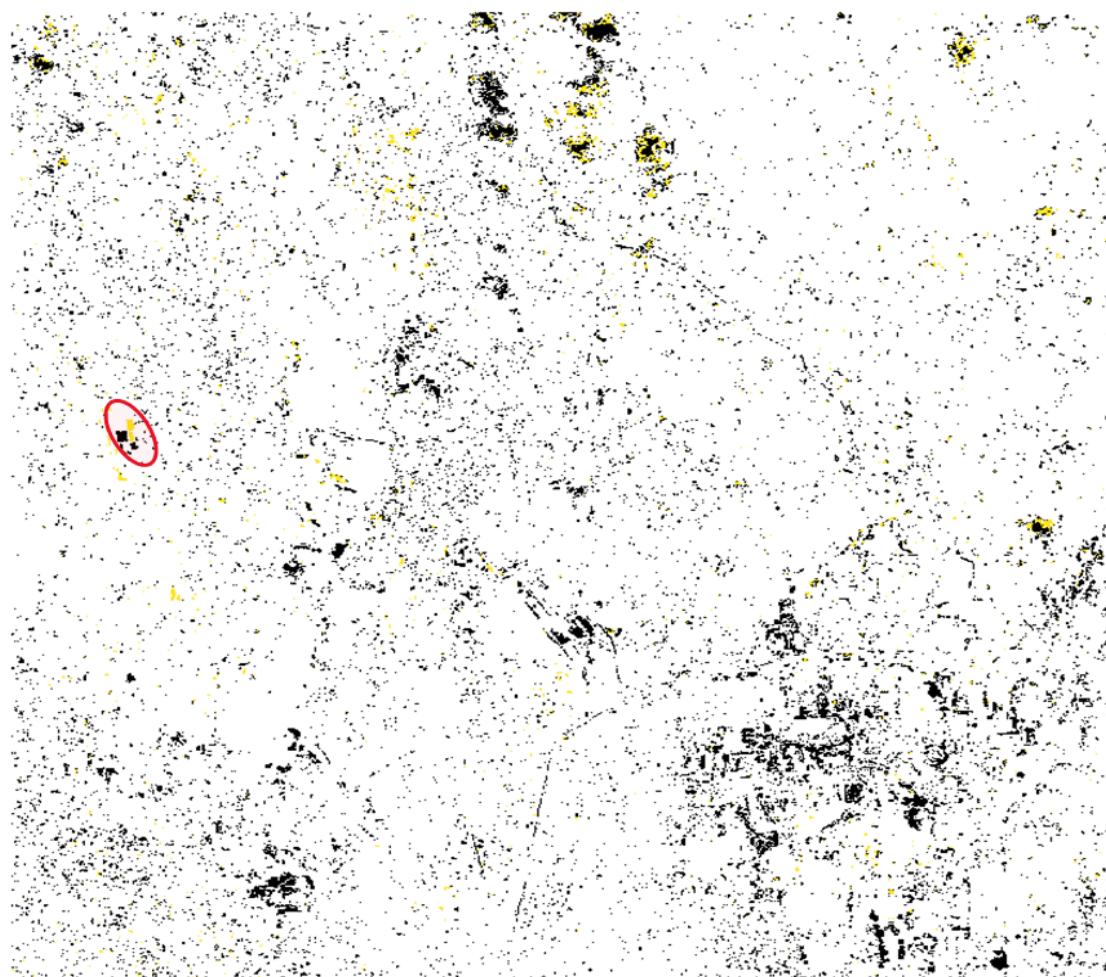


Therefore, we can say that **Cluster 7** represents the change from **Waterbody** to **Bareland**.

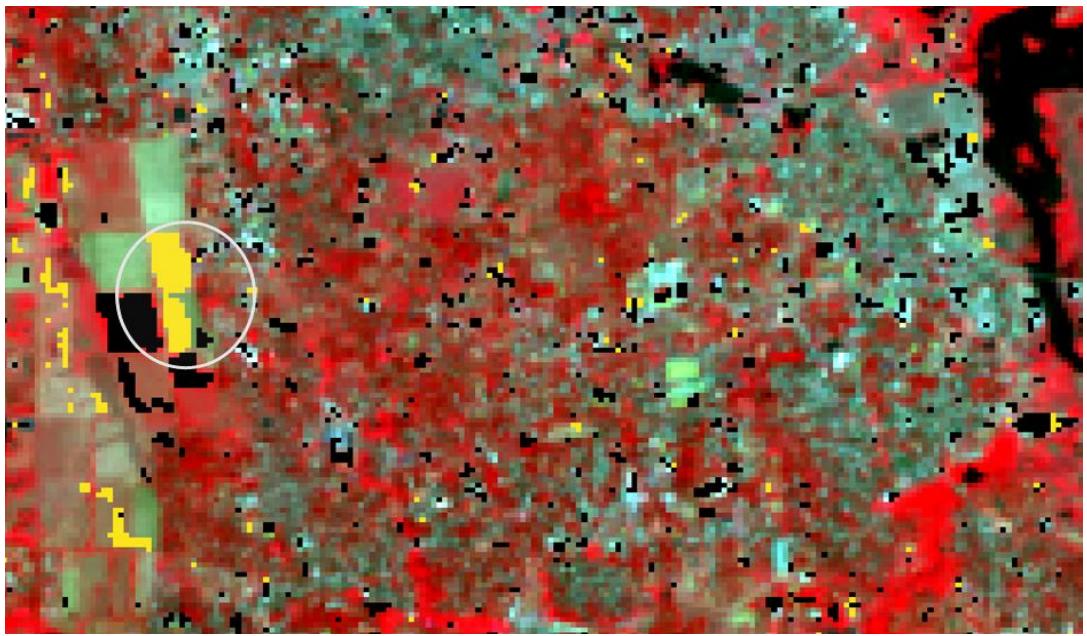
**Identifying Cluster 10:** In the below image we can see all the clusters, in categorized colour symbology. The red circled area is an example of cluster 10.



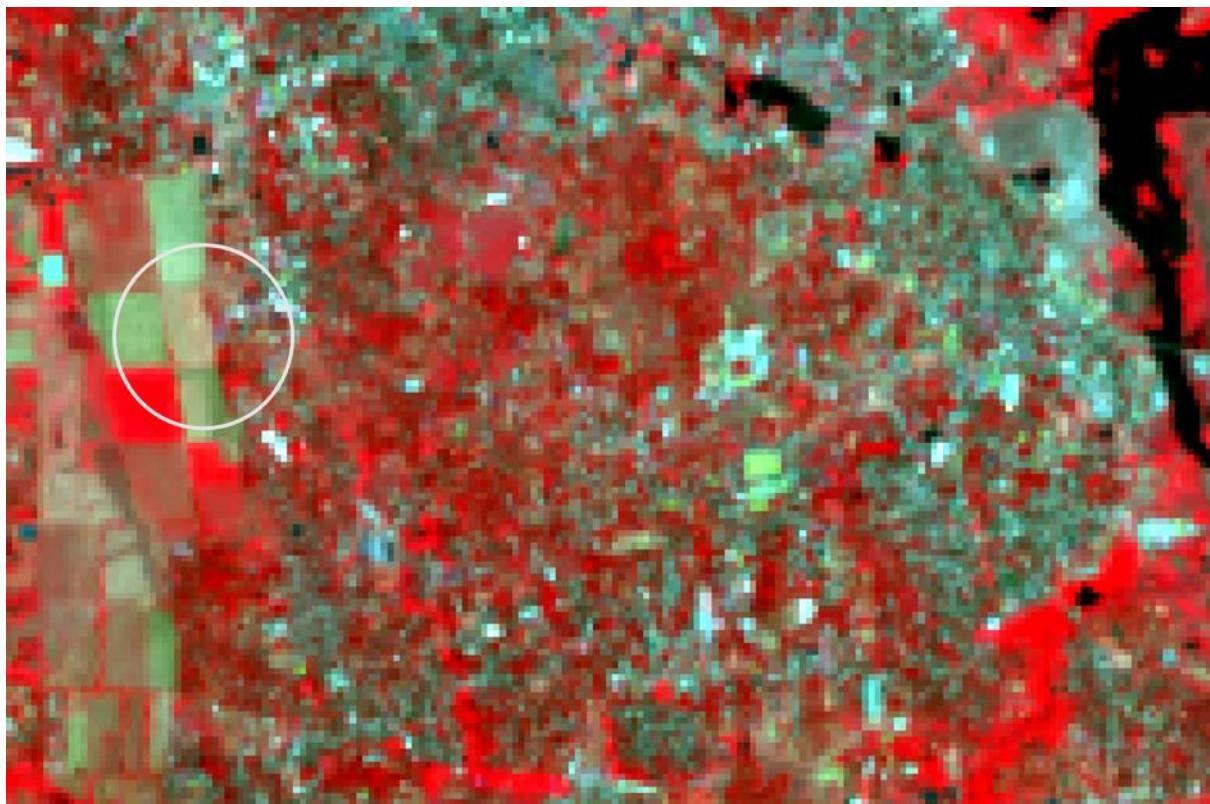
Now, for better understanding, we assign the cluster 10 as yellow colour and rest of the clusters as Black.



For better understanding, we zoom further to the location.



Now we will look at the images from 2021 and 2023 to identify the land use type in corresponding years. We can see that, in 2021 the location is dark green in 5,4,3 false colour, which means it is a crop land/grass land.



Below we can see the same location in 2023. Where it is seen in red colour. Which means it a deeper vegetation or Forest. Therefore, we can say that **Cluster 10** represents change from **Cropland to Forest**.

