An Assignment on

Introduction to Google Earth Engine (GEE) for Satellite Image Time Series (SITS) Analysis

Mustafa Kamal Shahadat
Scientific Officer (agronomy)
Bangladesh Agricultural Research Institute
On-Farm Research Division
Daulatpur, Khulna-9202.

Answer to the problems have been presented as screenshots below:

Creating Function in Java script for calculating NDVI (Link)

```
//======================
//HOW TO MAKE A FUNCTION
//======================

// function calculate_Sum (in_value1, in_value2) {
//   var Sum = ee.Number(in_value1).add(ee.Number(in_value2));
//   print(Sum);
// }

// calculate_Sum(75,82)

function calculate_NDVI (NIR, red){
  var NDVI = ee.Number(NIR).subtract(ee.Number(red))
  .divide(ee.Number(NIR).add(ee.Number(red)));
  print(NDVI);
}

calculate_NDVI(0.7, 0.1)
```

1. Image visualization (Link)

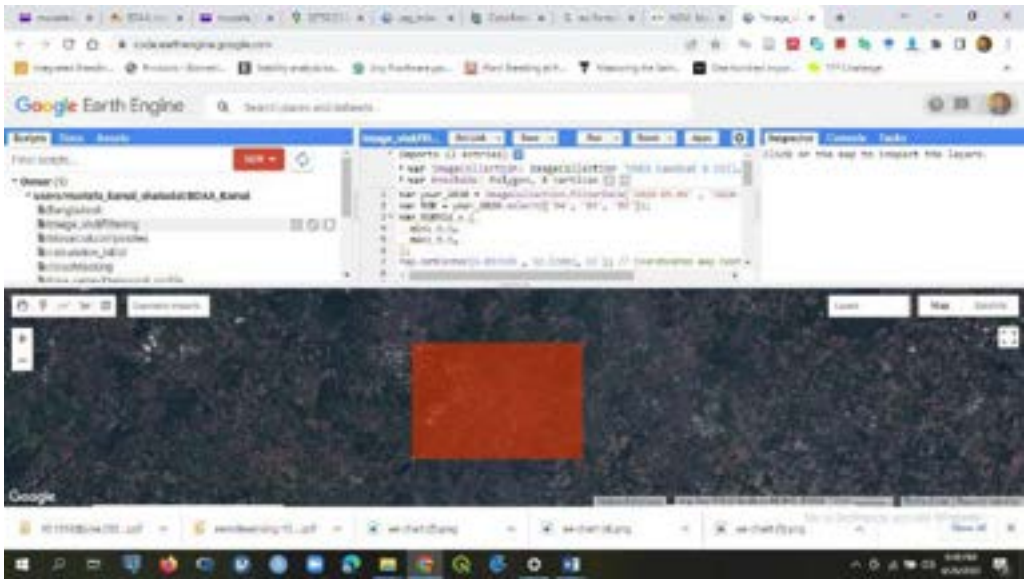

Fig.1. Area of Interest (AoI) of Enschede region for image visualization

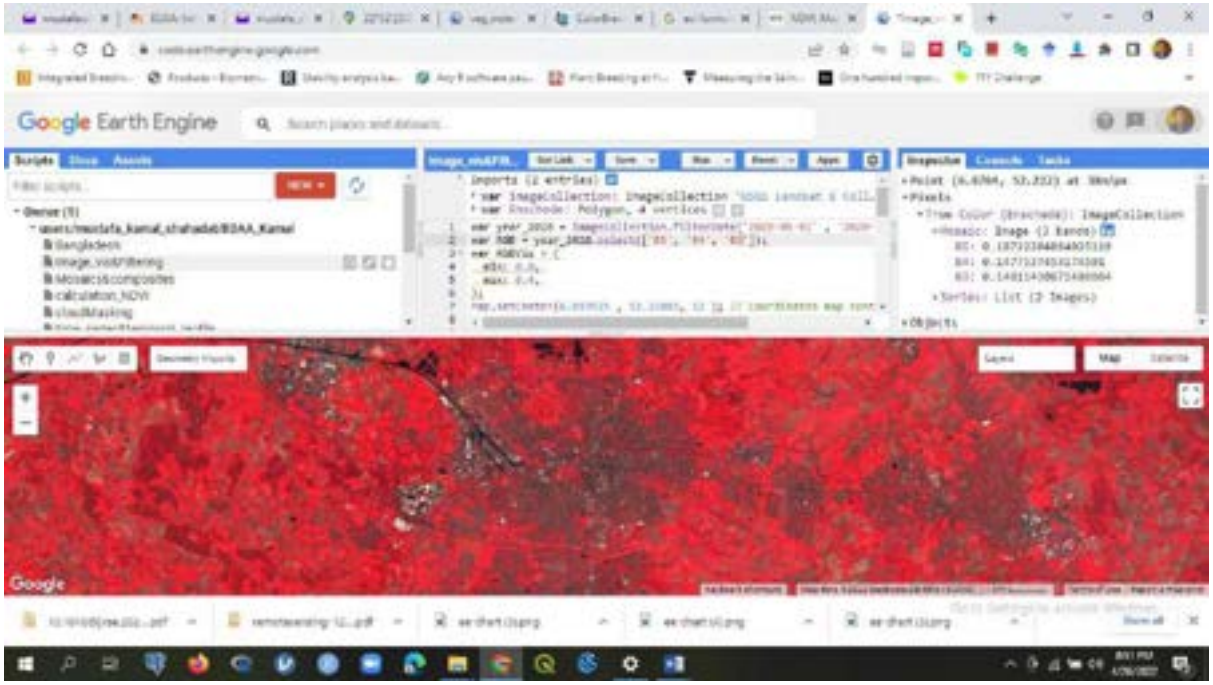

Fig.2. Infrared band composition (5,4,3) of Landsat 8 for selected AoI over Enschede region

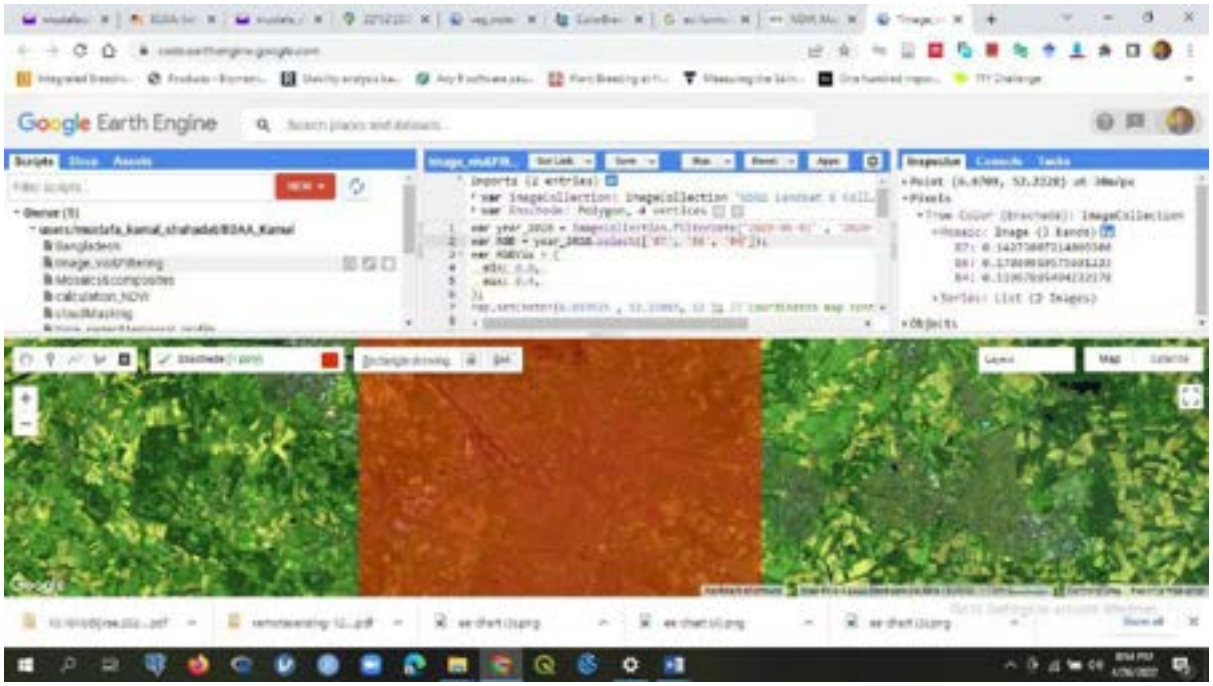

Fig.3. Short-Wave Infrared band composition (7,6,4) of Landsat 8 for selected AoI over Enschede region

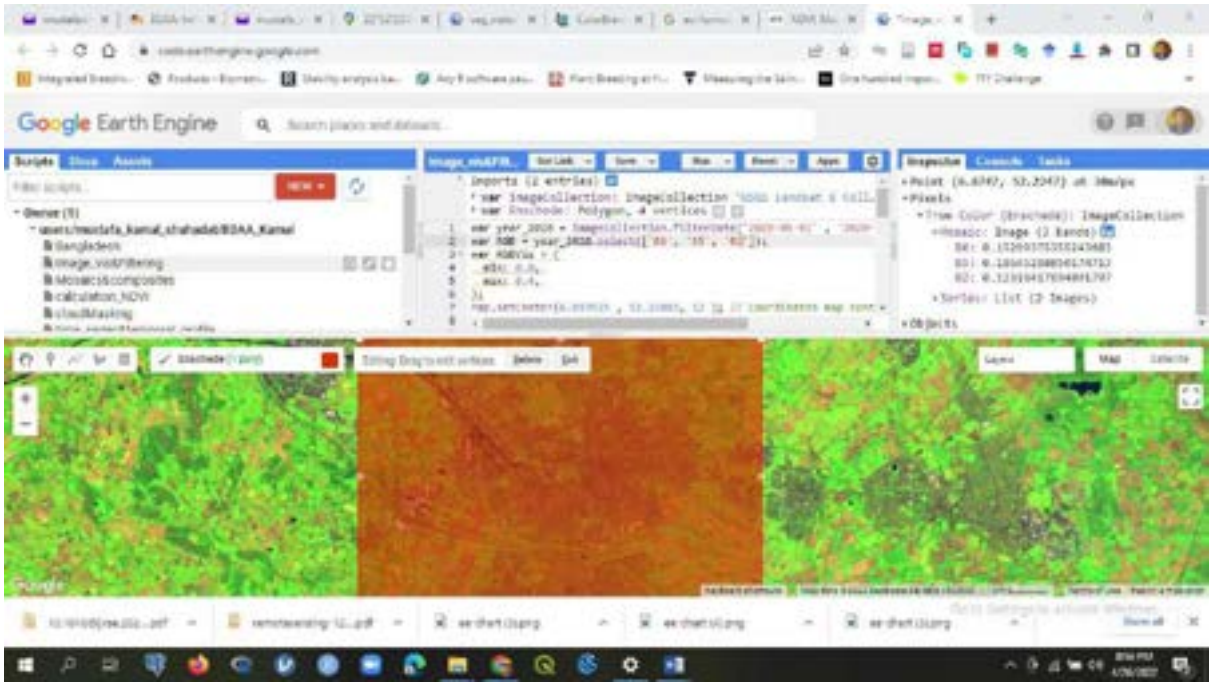

Fig.4. Agricultural band composition (6,5,2) of Landsat 8 for selected AoI over Enschede region

Image visualization of my home town (Khulna, Bangladesh) using Sentinel-2 Level 2A product from '2020-12-01' to '2020-12-31' with cloud threshold at 10%. (Link)

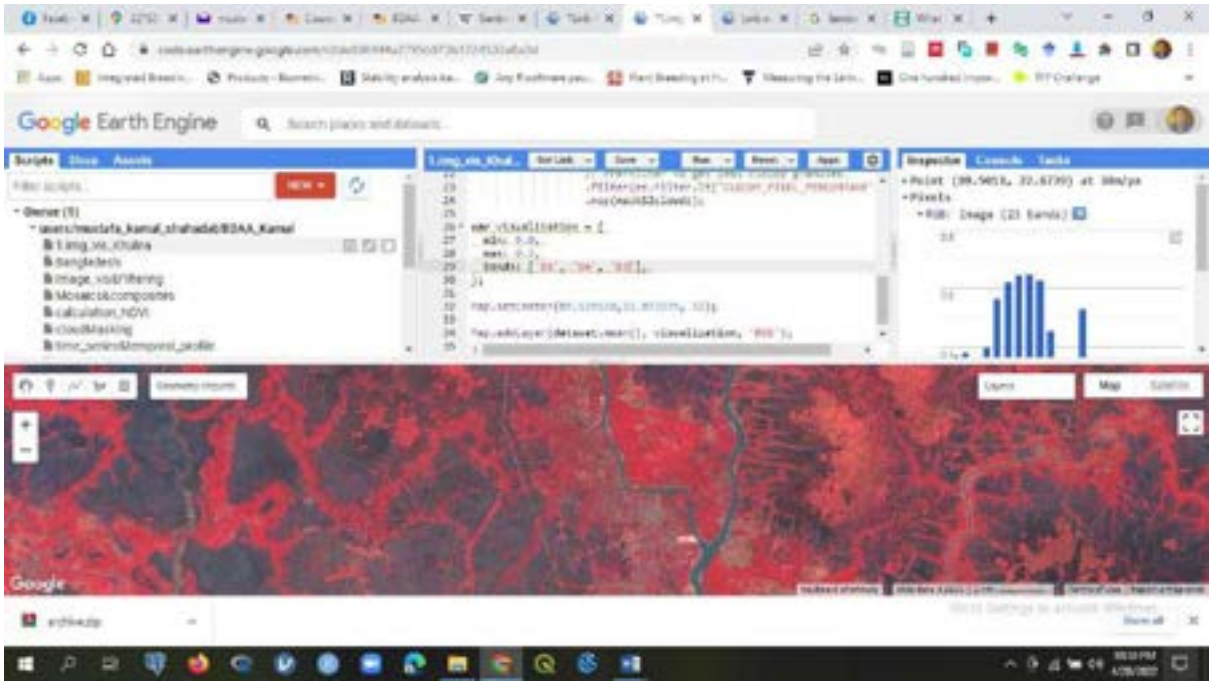

Fig. Color infrared (8,4,3) of Sentinel-2 at Khulna, Bangladesh

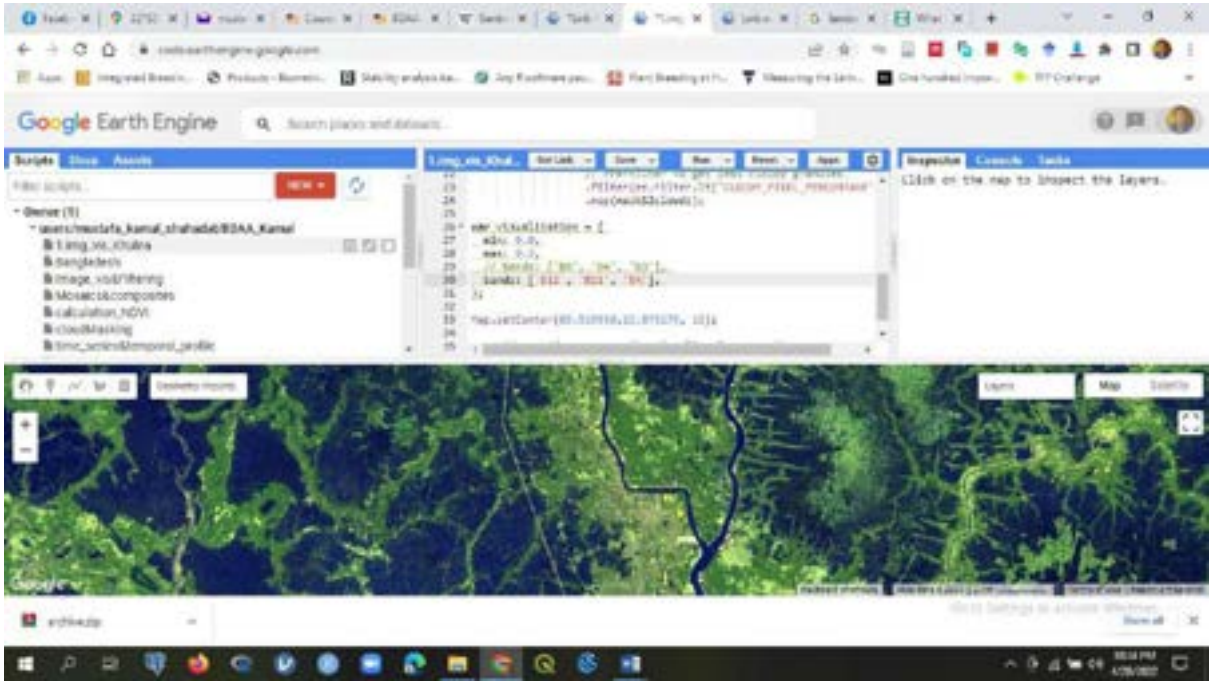

Fig. Short wave infrared (12,11,4) of Sentinel-2 at Khulna, Bangladesh.

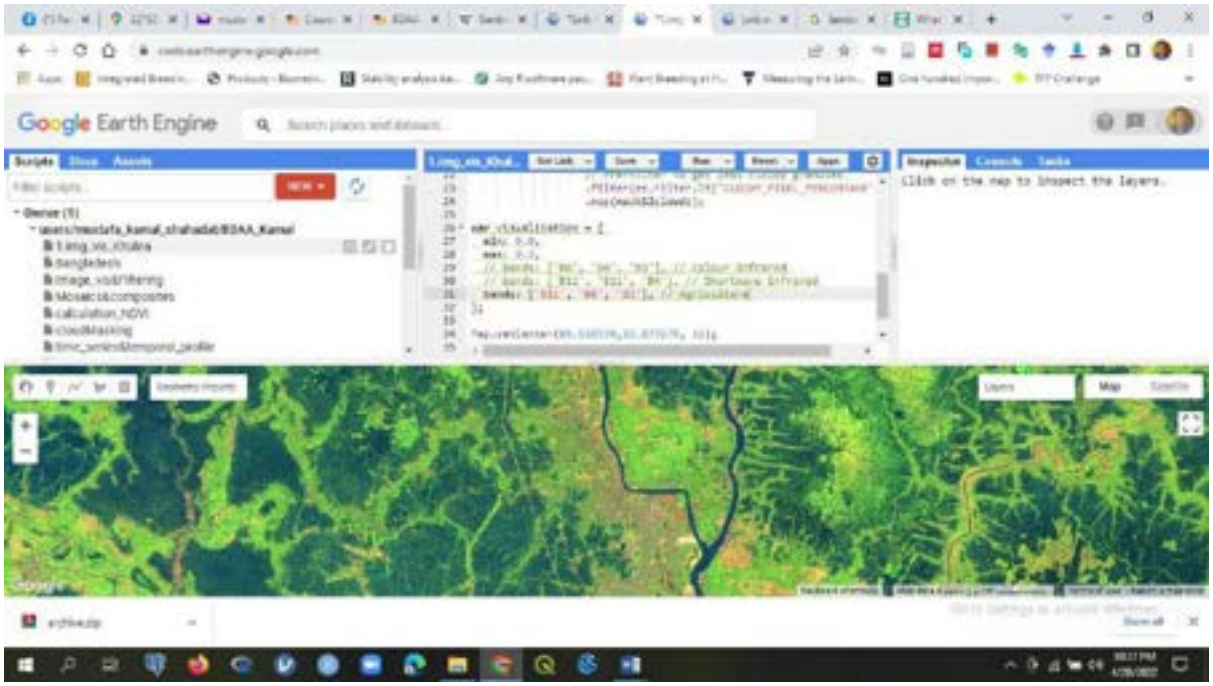

Fig. Fig. Agriculture (11,8,2) of Sentinel-2 at Khulna, Bangladesh.

2. Filtering image collection (Link)

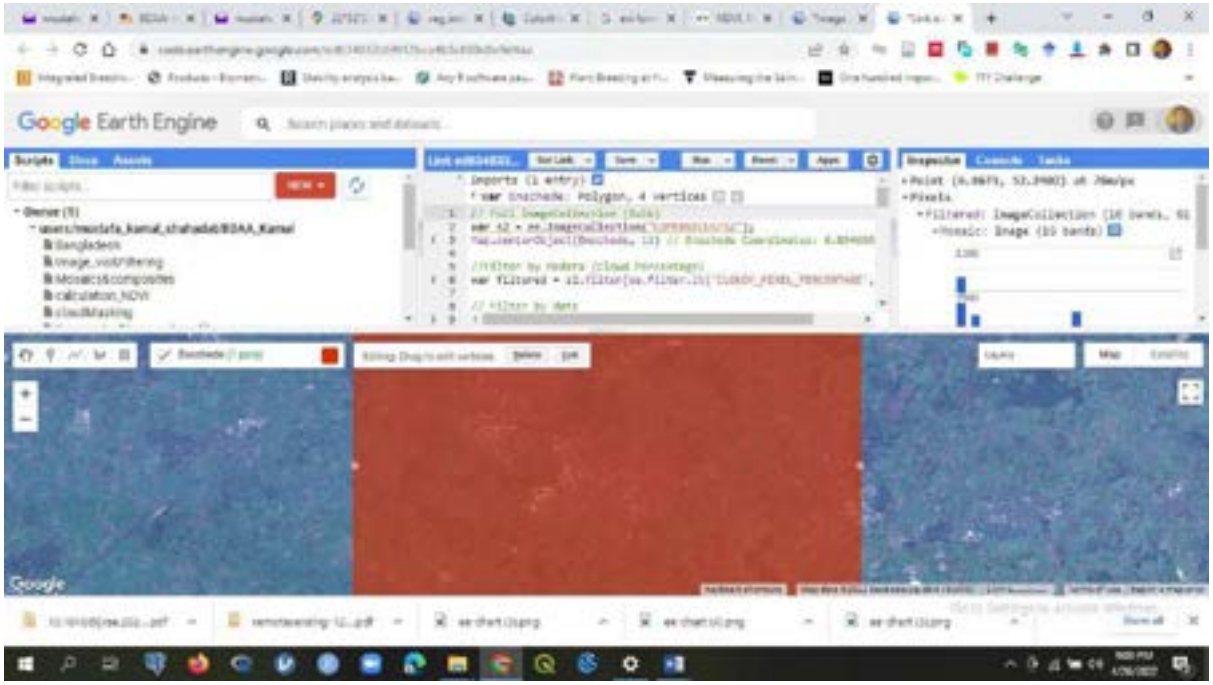

Fig.5 Image filtering for selected AoI over Enschede region

3. Creating Mosaics & Composites from image collections (Link)

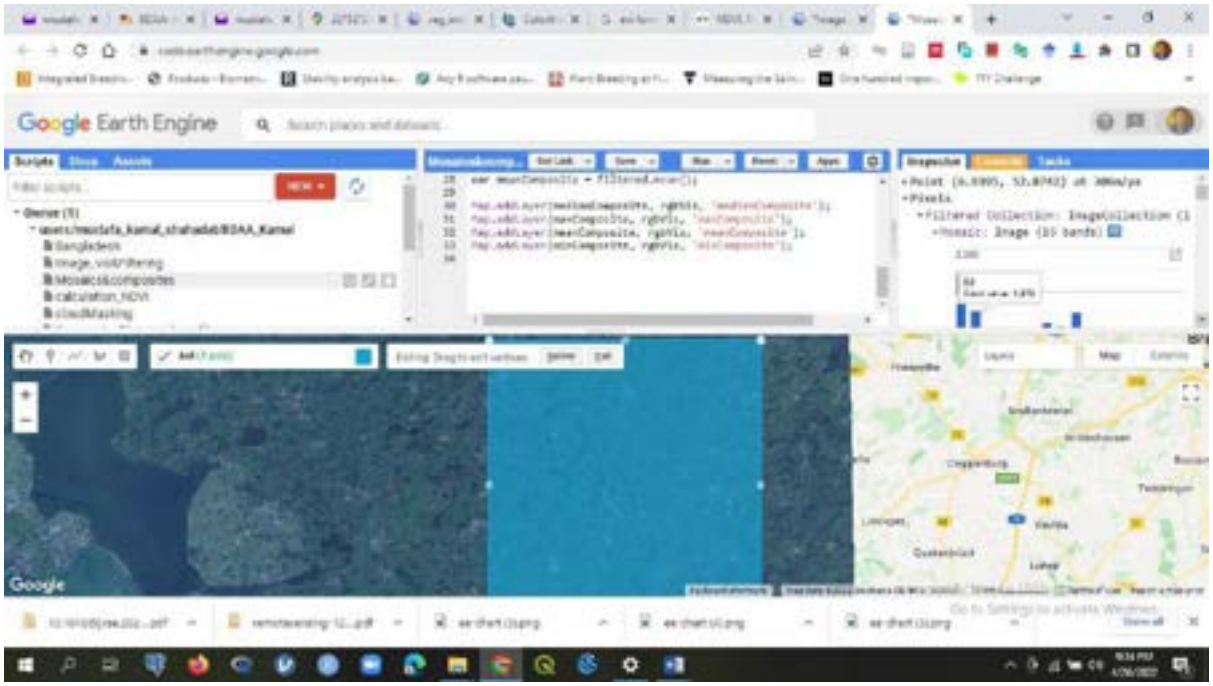

Fig. 6 Mosaics and composites of image collection in a AoI of the Netherlands

I also tried with Landsat-8 images for Bangladesh also but it did not work (Link).

4. Cloud Masking

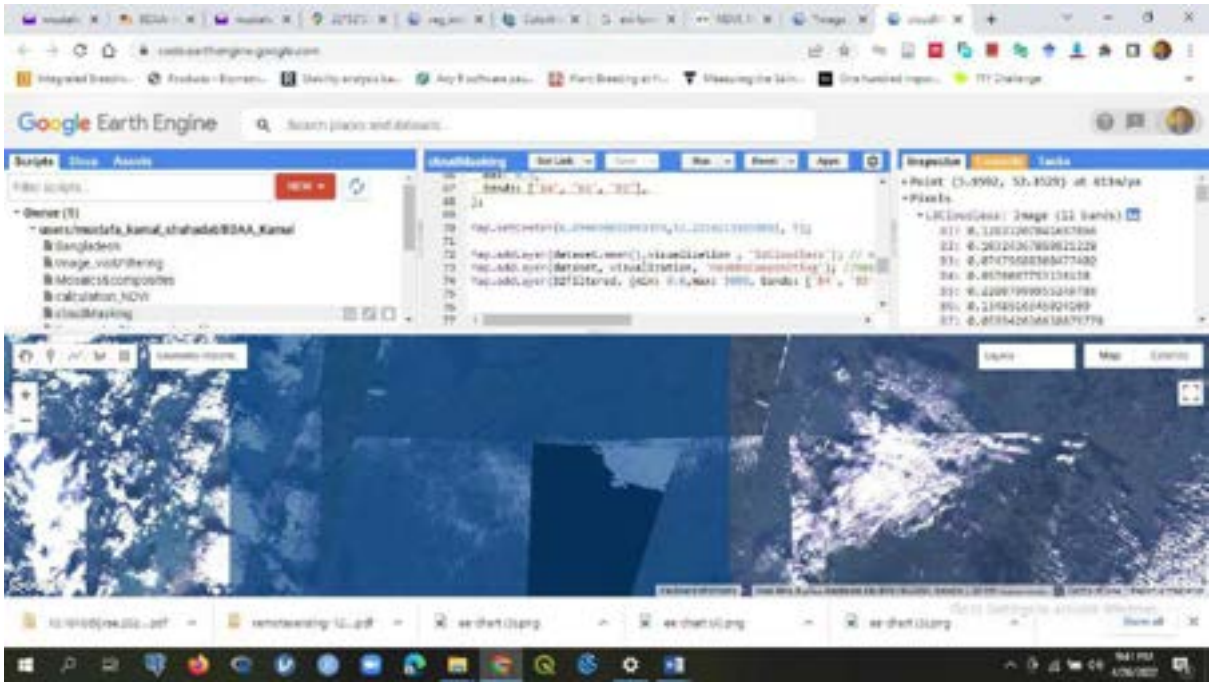

Fig.7 Cloud masking of Twente region

5. Calculating vegetation index

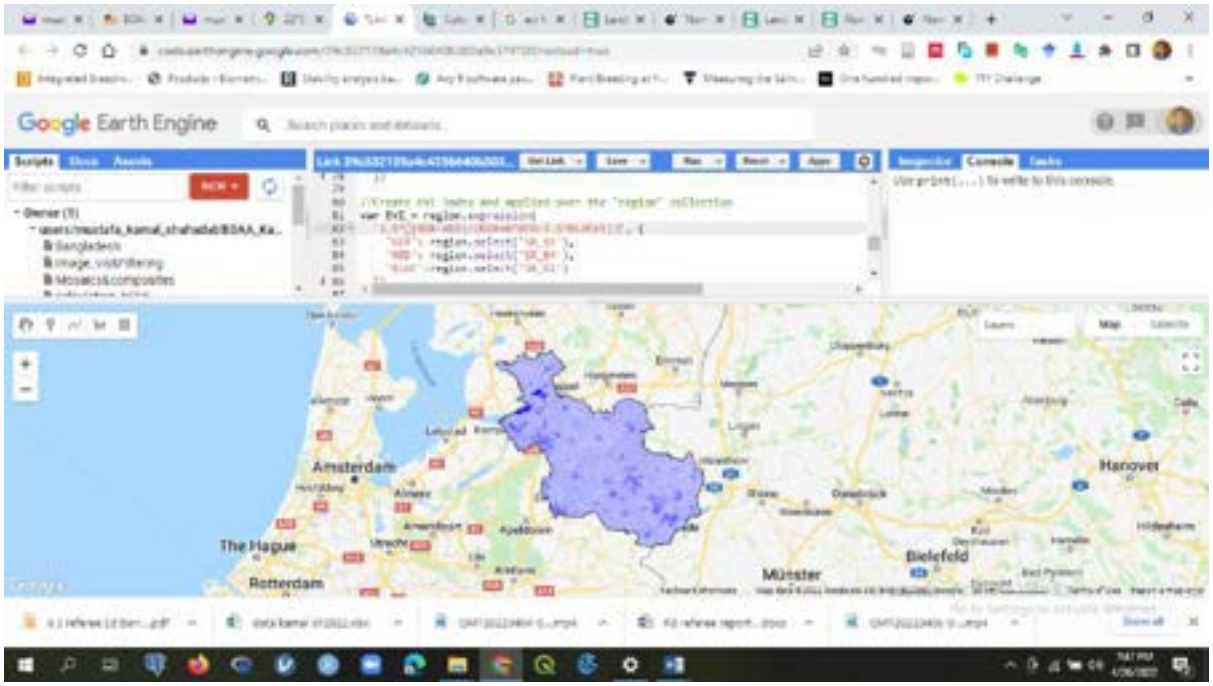

Fig.8 Normalized Difference Water Index (NDWI)

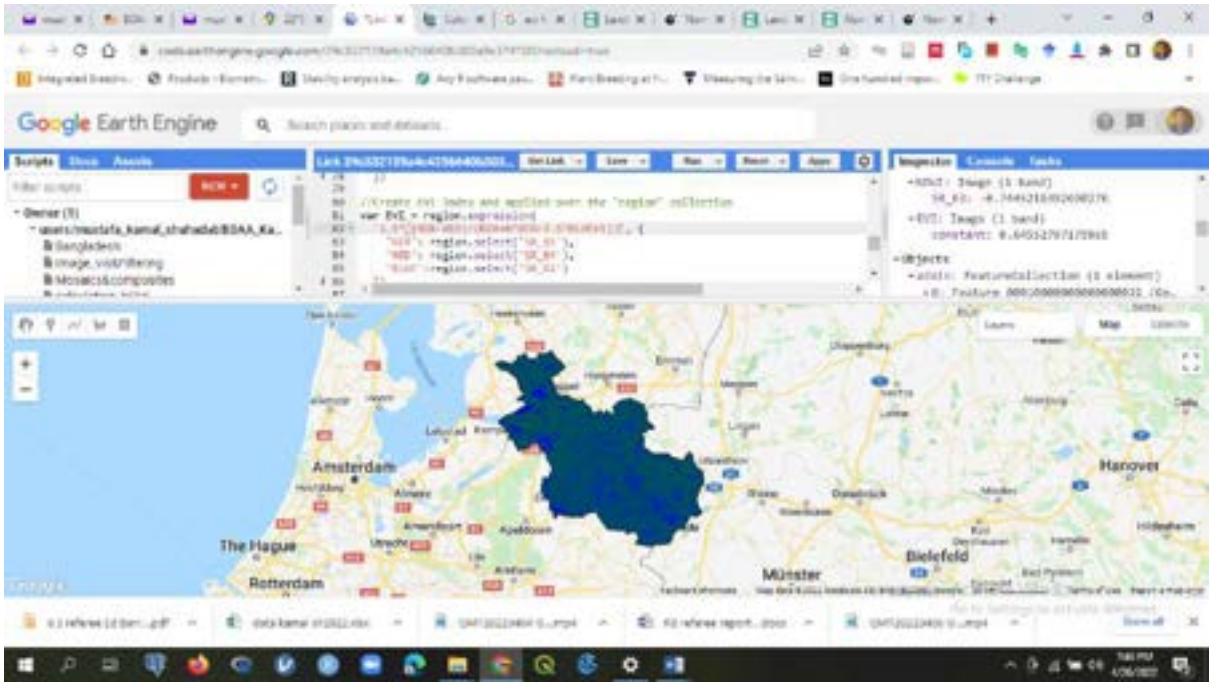

Fig.9. Enhanced Vegetation Index (EVI)

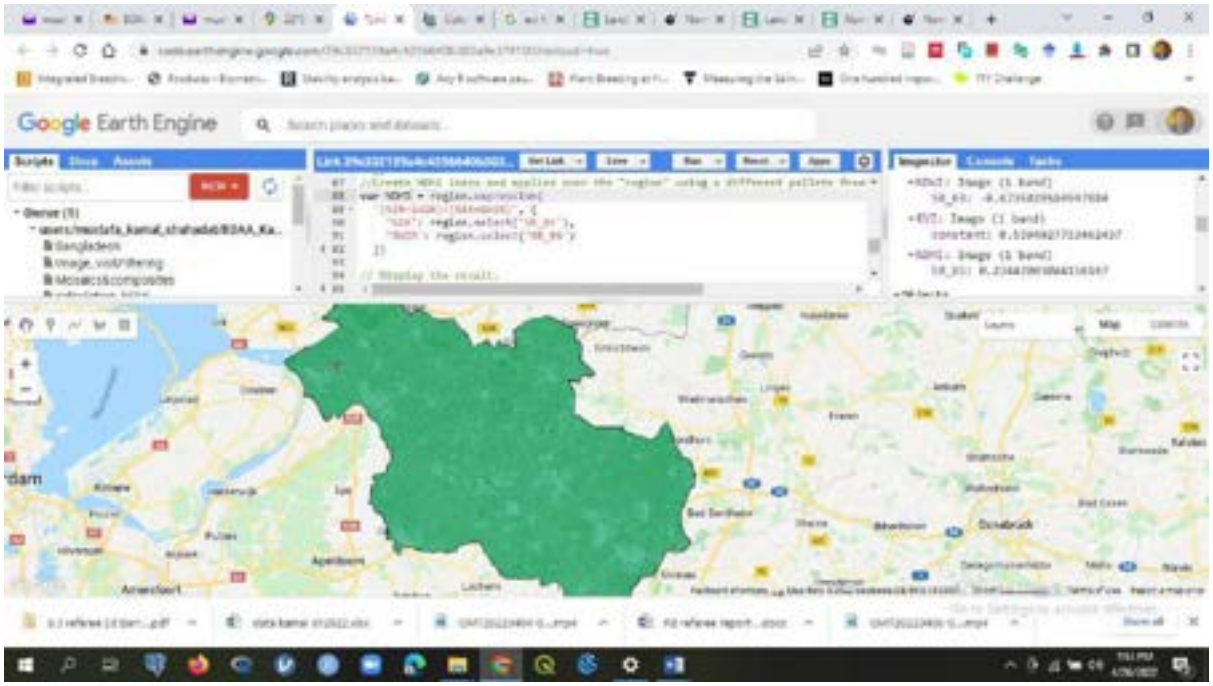

Fig.10. Normalized Difference Moisture Index (NDMI)

6. Time series and temporal profiles

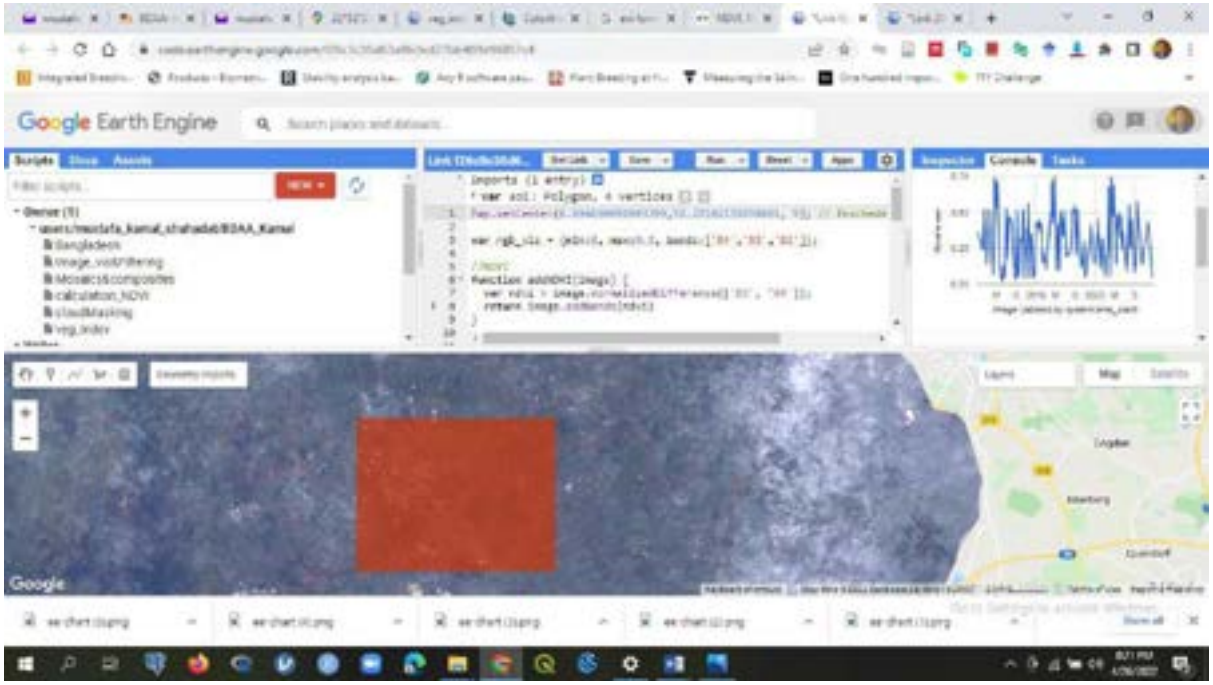

Fig.11 Area of Interest (AoI) of Enschede region

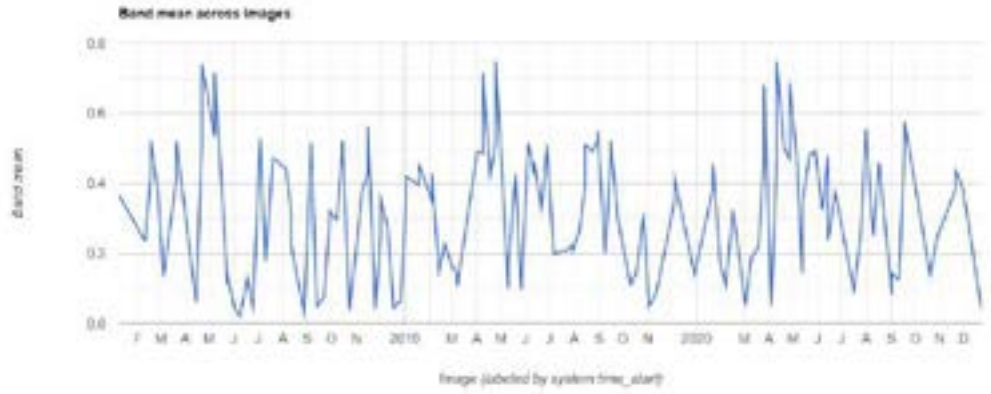

Fig. 12. Band mean across AoI of Enschede region

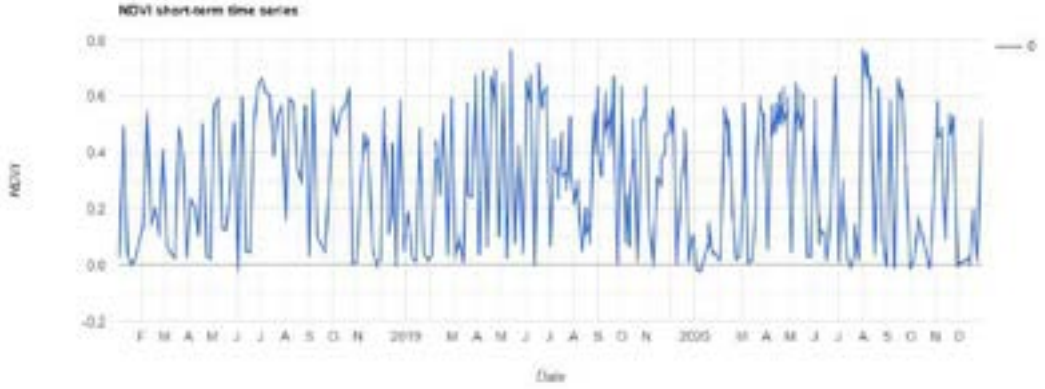

Fig.13. Short-term time series of NDVI at selected AoI of Enschede region

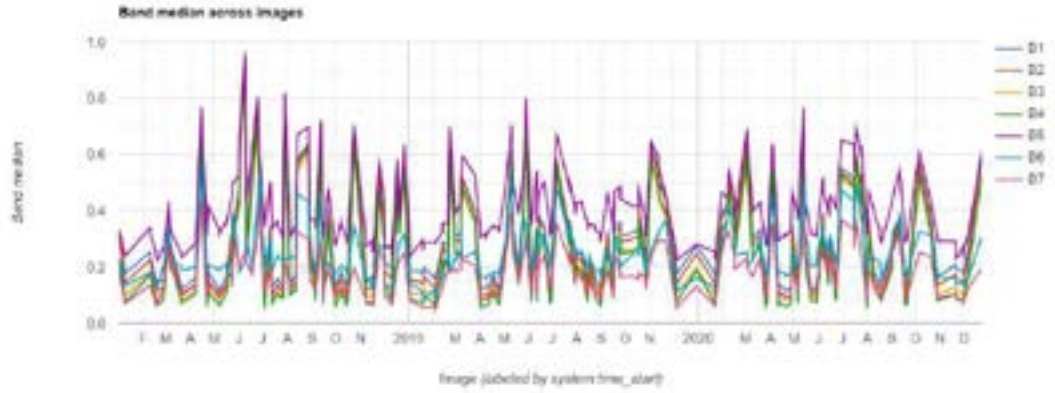

Fig.14. Band median across Enschede region at selected AoI.

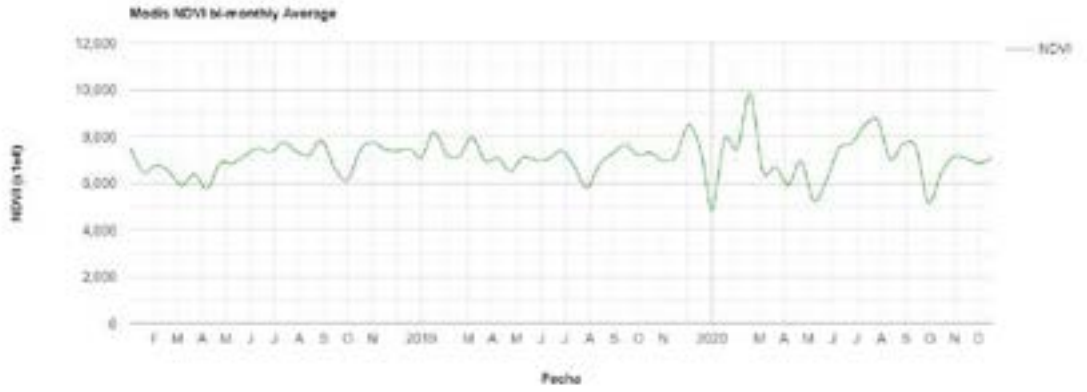

Fig.15. Modis NDVI bi-monthly average over the AoI

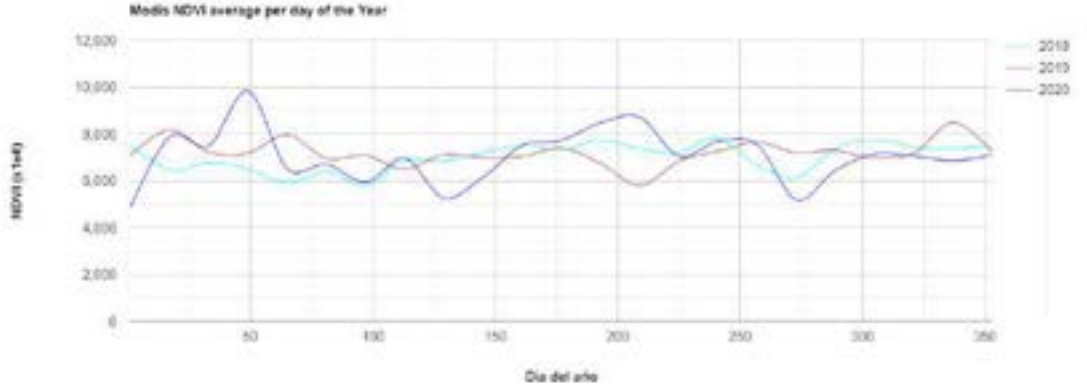

Fig.16. Modis NDVI average per day of three consecutive years at AoI

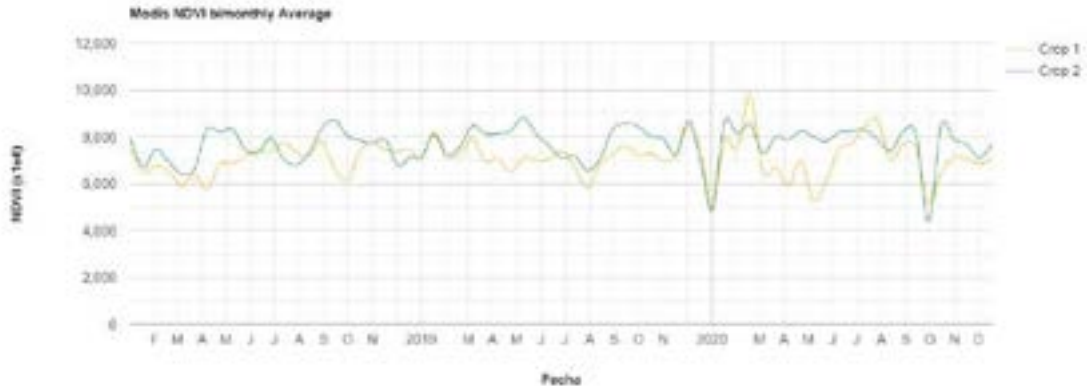

Fig.17. Modis NDVI bimonthly average in two crops

7. Harmonization

I tried this task but couldn’t find any clue. If you could demonstrate it, it will be easier to get the idea.