

Title: Water mask of Bangladesh, 2014-16

Year: 2016

Author: Rashed Jalal, Andreas Vollrath, Matieu Henry and Tasnuva Shabnam Udita

Reference:

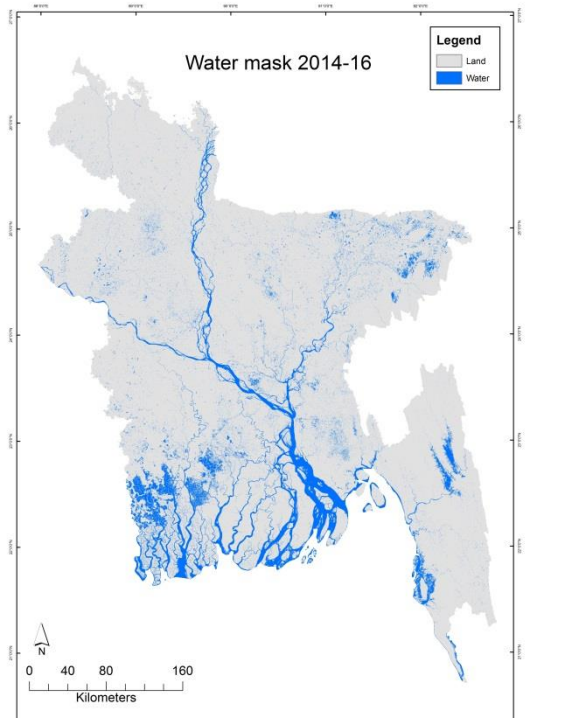
Jalal R, Vollrath A, Henry M, Udita TS. Water mask of Bangladesh, 2014-16. In: Bangladesh Forest Department, Food and Agriculture Organization of the United Nations Dhaka Bangladesh, editors. Dhaka2016.

Methodology:

Landsat 8 (L1T TOA) images for dry season (October to March) for 2014 to 2016, with cloud coverage less than 5%, were used to develop water-land mask.

Both normalized difference water index (NDWI) and modified normalized difference water index (MNDWI) were developed and compared. MNDWI was based on green (Band 3) and SWIR 1 (Band 6), whereas NDWI was based on on green (Band 3) and NIR (Band 5). The MNDWI was preferred in delineating water body over NDWI because when the two indices were applied, it was observed that the MNDWI detected water more efficiently. MNDWI was more accurate in delineating water bodies than NDWI because the former could eliminate the noise caused by the built-up urban lands. A threshold of 0.1 is used to delineate water from land. Values higher than 0.1 were considered as water, the remaining are land.

Results:

Description	Image
<p>CRS: GCS_WGS_1984 EPSG 4326</p> <p>Angular Unit: Degree (0.0174532925199433) Prime Meridian: Greenwich (0.0) Datum: D_WGS_1984 Spheroid: WGS_1984 Semimajor Axis: 6378137.0 Semiminor Axis: 6356752.314245179 Inverse Flattening: 298.257223563</p>	 <p>The image is a map of Bangladesh titled "Water mask 2014-16". It shows the geographical outline of Bangladesh with water bodies highlighted in blue and land areas in grey. A legend in the top right corner identifies "Land" as grey and "Water" as blue. A scale bar at the bottom indicates distances up to 160 kilometers, and a north arrow is located in the bottom left corner. The map is framed by a coordinate grid.</p>

Data:

The map is available at the BFI team under the name water_mask_2014_16.

Contact:

FAO: Rashed.jalal@fao.org

Earth Engine Script

```
// Water mask bangladesh 2014-16
// set filter for Landsat
//-----
// time period
var startdate = '2014-01-01';
var enddate = '2016-04-01';

// Specify the area of interest - Use the specific path and row
var minpath = 134;
var maxpath = 140;
var minrow = 41;
var maxrow = 46;

// Which days of the year to use?
var julianDayStart3 = 274;
var julianDayEnd3 = 90;

// cloud cover threshold
var cloudcovthres = 5;

//-----
// combine filters into a script variable
//-----

// Filter to include images from Bangladesh
var PathFilter = ee.Filter.and(ee.Filter.gt('WRS_PATH', minpath), ee.Filter.lt('WRS_PATH',
maxpath));
var RowFilter = ee.Filter.and(ee.Filter.gt('WRS_ROW',
minrow), ee.Filter.lt('WRS_ROW', maxrow));
//Combine into a localisation filter
var LocFilter = ee.Filter.and(PathFilter, RowFilter);
```

```

// Create a range of date to filter imagery to use
var DateFilter = ee.Filter.date(new Date(startdate), new Date(enddate));

// Combine date and localisation Filters into single filters
var DateLocFilter = ee.Filter.and(LocFilter,DateFilter);

// Which days of the year to use ? Which cloud cover is accepted?
// var DoyFilter1 = ee.Filter.calendarRange(julianDayStart1,julianDayEnd1);
// var DoyFilter2 = ee.Filter.calendarRange(julianDayStart2,julianDayEnd2);

var DoyFilter3 = ee.Filter.calendarRange(julianDayStart3,julianDayEnd3);

var cloudCoverFilter = ee.Filter.lt('CLOUD_COVER',cloudcovthres);

// Combine the filters for both time periods
//var DateLocDoyFilter =
ee.Filter.and(DateLocFilter,DoyFilter1,DoyFilter2,cloudCoverFilter);

var DateLocDoyFilter = ee.Filter.and(DateLocFilter,DoyFilter3, cloudCoverFilter);

//-----
// import Landsat 8 data
//-----

// get the image collection with the filters applied
var input_l8 = ee.ImageCollection('LC8_L1T_TOA').filter(DateLocDoyFilter);

print(input_l8);

var count = input_l8.size();
print('Number of images: ', count);

// Select the bands we're going to use
var bands = ['B2','B3','B4', 'B5', 'B6', 'B7'];

// take median and subset selected bands
var image = input_l8.median().select(bands)

// viusalize Landsat
Map.addLayer(image,
{bands:['B5','B6','B4'], min:0,max:0.3}, 'image');
var ndwi = image.normalizedDifference(['B3', 'B5']);
var mndwi = image.normalizedDifference(['B3', 'B6']);

```

```
// visualize the results
Map.addLayer(mndwi,[], 'mndwi');

// extract the results
var rectangle = ee.Geometry.Rectangle( 87.87847222, 20.59257778, 93.06514444,
26.66936667);
var AOI = ee.Feature(rectangle);

Map.setCenter(90, 23, 6);
Map.addLayer(AOI);

Export.image(mndwi, 'Water_mndwi_2014_to_16_dry', {
  scale: 30,
  maxPixels: 5381638016,
  region: AOI
});
```