Title: NDWI based Change Detection Analysis of Dehradun District

Map description and analysis
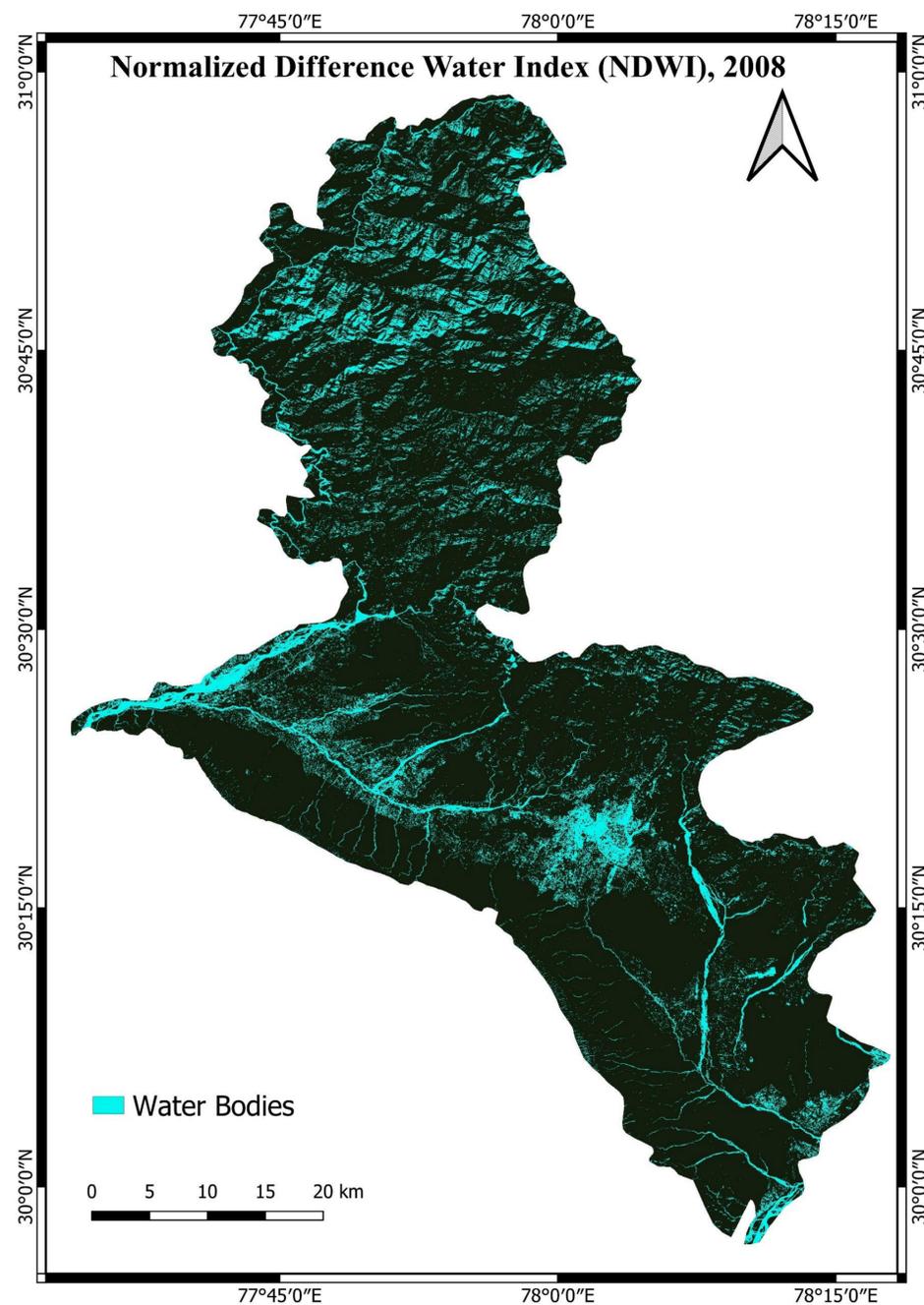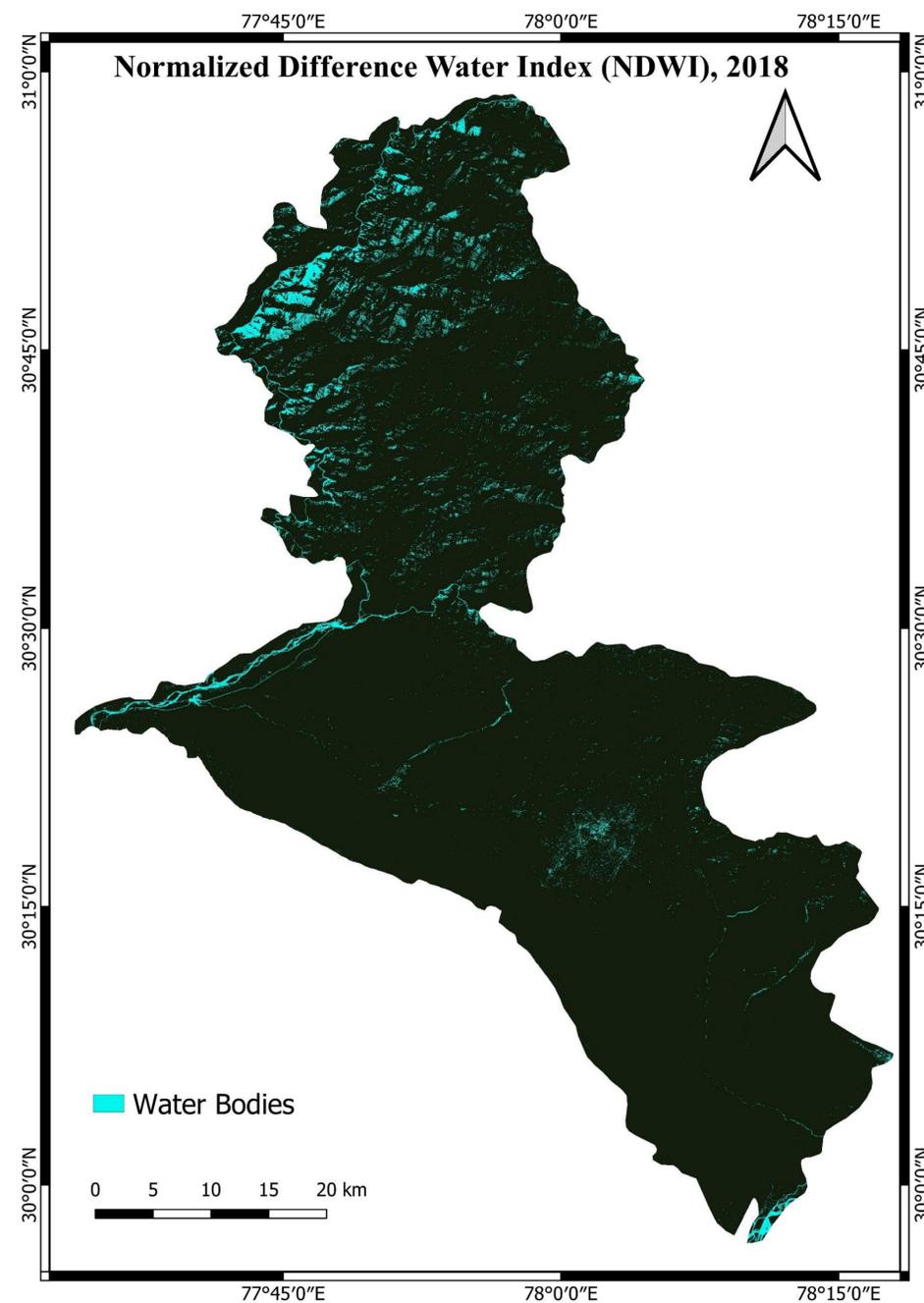
Introduction:
The Dehradun District is a district of Uttarakhand state in Northern India. It is nested in the mountain ranges of Himalayas. It lies at 30.3°N and 77.9°E covering area 3071 Sq. Kms.

Data used :
IRS LISS III geo-rectified data collected from National Remote Sensing Centre (NRSC) Bhuvan geo-portal is used to calculate NDWI for years 2008 and 2018..Date of acquisitions are Oct-Nov 2008 and Jan-March 2018 respectively. Bhuvan provides LISS III data with 23.5 meter spatial resolution and 4 spectral bands.

NDWI Calculation :
The Normalized Difference Water Index (NDWI) can be calculated using multispectral data by using the expression :

$$NDWI = (GREEN - NIR)/(GREEN + NIR)$$

LISS-III IRS data has band combinations as Band 2, 3,4,5 as Green, Red, Near Infrared and Mid Infrared respectively , therefore the NDWI formula becomes :

$$NDWI = (Band\ 2 - Band\ 4)/(Band\ 2 + Band\ 4)$$

NDWI Maps :
The NDWI value lies between -1 to +1. It is used to identify the water bodies. 0 to +1 values depicts the presence of water bodies or vegetation moisture. Therefore it is a good proxy for plant water stress. These maps have significance in agriculture. Highest NDWI value for 2008 and 2018 are 0.708 and 0.517 respectively which depicts the decrease in water bodies in year 2018.

Normalized Difference Water Index (NDWI), 2008

□ Water Bodies

0 5 10 15 20 km

NDWI map for 2008

Normalized Difference Water Index (NDWI), 2018

□ Water Bodies

0 5 10 15 20 km

NDWI map for 2018

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