

STUBBLE BURNT AREA MAP

The data used for this study is LISS-3. The Indian Space Research Organization's (ISRO) Indian Remote Sensing (IRS) Resourcesat-1 (2003- present) and Resourcesat-2 (2011-present) satellites provide multispectral images at 24- (LISS-3) and 56- (AWiFs) meter resolution. The Resourcesat-1 satellite was launched by the Indian Space Research Organisation (ISRO) on October 17, 2003, followed by Resourcesat-2 on April 20, 2011, to ensure systematic and repetitive coverage of the earth's surface. The objective of these Indian Remote Sensing (IRS) satellites is to provide data for integrated land and water resource management. A collaborative effort between ISRO and the U.S. Geological Survey (USGS) provides open access to Linear Imaging Self Scanning (LISS-3) sensor and Advanced Wide Field Sensor (AWiFS) data products through Earth Explorer.

The stubble burning activities are usually observed in April-May and October-November months. The LISS-3 data on 17th October 2017 is downloaded from Bhuvan's website. The study area was Patiala in Punjab. The software used is Arc GIS 10.3. The Normalized Burn Ratio (NBR) Index was calculated from the data by using the 'Raster calculator' tool. A pre-burned image was also downloaded. By using both images Δ NBR is calculated. The threshold value of the Δ NBR is selected as 0.5-0.7. The areas having Δ NBR value in the range 0.5-0.7 is taken as burnt areas and higher than 0.7 is taken as unburnt. This is done by using the 'Reclassify' tool in Arc GIS. Finally the total burnt and unburnt areas are calculated by using the 'Field calculator' tool. The burnt area is obtained as 126.65 km². Built up areas and Fallow land are also classified.

The complexity involved was the fixing of threshold value for Δ NBR. By referring various journals the Δ NBR was selected as 0.5-0.7. The areas having Δ NBR value in the range 0.5-0.7 is taken as burnt areas and higher than 0.7 is taken as unburnt.

The main adverse effects of crop residue burning include the emission of greenhouse gases (GHGs) that contributes to the global warming, increased levels of particulate matter (PM) and smog that cause health hazards, loss of biodiversity of agricultural lands, and the deterioration of soil fertility. Stubble burning in Punjab and Haryana in northwest India has been cited as a major cause of air pollution in Delhi. The stubble burnt area map can be used as an effective tool for the analysis of burnt areas.