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Spatial Variation of Vegetation Moisture Mapping Using Advanced Spaceborne Thermal Emission & Reflection Radiometer (ASTER) Data

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Author(s)

Vivek Kumar Singh, Rajat Satpathy, Reshma Parveen, Ayyem Perumal Thillai Jeyaseelan

ABSTRACT

Drought is a recurrent phenomenon in Jharkhand. It affects the livelihoods of the majority of its people, particularly tribals and dalits living in rural areas. Twelve of the 24 districts of the state, covering 43% of the total land area, are covered under the Drought Prone Areas Programme (DPAP). Hunger and starvation deaths are reported almost every year. Vegetation moisture content is one of the key parameters in drought monitoring, agricultural modelling and forest health mapping. In this paper the three different approaches is described using Advanced Spaceborne Thermal Emission & Reflection Radiometer (ASTER) data for measuring the vegetation moisture content in a part of Palamu Commissionaire of Jharkhand state, which is prone to severe drought. ASTER thermal data was used to calculate land surface temperature using Normalized Differential Vegetation Index (NDVI) emissivity correction method. Reflective bands are used to determine NDVI, Modified Soil Adjustment Vegetation Index (MSAVI) & Normalised Differential Water Index (NDWI). The three different vegetation moisture estimation methods namely MSAVI – LST (land surface temperature) feature space identification, NDWI & Vegetation Dryness Index (VDI) is applied to determine the vegetation moisture level. The results of three methods were classified and final moisture content map was produced. The result was validated using rainfall data of study area. This study indicates that by proper pre-processing of ASTER data, it can be used to estimate the land surface temperature and vegetation moisture content and can be used for drought prediction.

KEYWORDS

Vegetation Moisture, ASTER, LST, NDWI, VDI

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