

Category	: International Rice Research Conference
Select Theme	: Disruptive technologies and innovations
Endorsement email	:
Keyword 1	: Satellite technology and remote sensing
Keyword 2	: Precision agriculture
Keyword 3	: Innovation systems
Title of Entry	: Assessing the spatial variability of crop nitrogen and water content using advanced techniques of hyperspectral remote sensing
Presenting author	: Shreedevi Moharana
Presenting author email	: shreedevimoharana@gmail.com
Co author 1	: Subashisa Dutta
Co author 2	: Parvesh Kumar Chandna
Co author 3	:
Co author 4	:
Co author 5	:
Co author 6	:
Co author 7	:
Co author 8	:
Co author 9	:
Co author 10	:
Co author 11	:
Co author 12	:
Co author 13	:
Co author 14	:
Affiliation presenting author	: Specialist, Remote Sensing & GIS, International Rice Research Institute, Assam Agriculture University Jorhat, Assam -785013, India
Affiliation 1	: Specialist, Remote Sensing & GIS, International Rice Research Institute, Assam Agriculture University Jorhat, Assam -785013, India
Affiliation 2	: Professor, Department of Civil Engineering, Indian Institute of Technology Guwahati, Guwahati, Assam -781039, India
Affiliation 3	: Scientist, Remote Sensing & GIS, South Asia, International Rice Research Institute, Agarwal Corporate Tower, Rajendra Place, New Delhi -110008, India
Affiliation 4	:
Affiliation 5	:
Affiliation 6	:
Affiliation 7	:

Affiliation 8	:
Affiliation 9	:
Affiliation 10	:
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Abstract : Satellite remote sensing based precision agriculture offers a potential solution to increase crop productivity at low cost through site-specific nutrient management. To understand the spatial variability in terms of crop growth and health, assessment of plant's chlorophyll, nitrogen and leaf water content is required. Advancement in remote sensing techniques has provided new opportunities to understand the spatial variability of crop parameters at the field level. The objective of this study is to investigate crop growth parameters under different nitrogen fertilizer treatments in rice crop using improved methods of hyperspectral remote sensing. The spatial variability of total chlorophyll and nitrogen content at field scale is investigated using EO-1 Hyperion images. New regression index spatial models are developed to extract the relative value of various growth parameters of paddy crop. Advanced agglomerative clustering technique and geo-statistical methods are adapted to segregate different classes of nitrogen and water content. Spectroradiometer observations of rice canopy are taken at weekly intervals from 72 plots comprising 24 rice varieties and three nitrogen treatments. It is observed that the proposed improved narrow band indices (, ,) were able to detect water stress and discriminate different levels of nitrogen applications for monitoring rice growth. The critical wavelengths, where the effect of nitrogen applications and varietal paddy crop growth on spectral reflectance response are found significant, are . It is evident from the study that the proposed vegetation indices, VI1 and VI2, have performed better in discriminating the nitrogen treatments for most of the varieties as compared to vegetation index (VI) and Green ratio index (GRI). The remote sensing based information on the spatial variability of existing nitrogen and water content in plants will assist in assessing the paddy crop health, nutrient requirement and stresses during its different crop growth stages.

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