

APPLIICATION OF FIELD MODEL ON QUICKBIRD SATELLITE IMAGE FOR THE BIOMASS ESTIMATION IN AGRO-ECOSYSTEM

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ABSTRACT:

Vegetation biomass which fixed the CO₂ is an important factor, affecting biosphere and atmosphere. The measurements of biomass per unit area of agricultural fields are important to understand the carbon dynamics in agro-ecosystem (AES). Ground assessment of biomass, done by the conventional methods is insufficient for spatial extent, which can be overcome by satellite estimation. In this study 5 different Vegetation Indices (VI) were used to estimate the biomass of cropland and abandoned cropland in agro-ecosystem from field measurement. At the field, a significant linear regression was observed between biomass and the vegetation indices. The Normalized Difference Vegetation Index (NDVI) provides the most accurate estimation of biomass at agro-ecosystem from field with coefficient of determination as 0.75. Subsequent validation was done by direct application of field biomass estimation model on to the QuickBird satellite image dated July 08, 2007. A coefficient of determination between QB band and QB simulated field spectral band were observed as 0.10 for blue band, 0.10 for green band, 0.52 for red band and 0.40 for NIR band. But the relationship between QuickBird image derived VI's and field VI's were calculated as 0.99 for Normalized Difference Vegetation Index (NDVI), 0.99 for Ratio Vegetation Index (RVI), 0.68 for (Enhanced Vegetation Index) EVI, 0.73 for GreenNDVI(GNDVI) and 0.68 for Green Red Difference Index (GRDI), which indicates the possibility of application of ground derived equation on the satellite image. Relationship between estimated biomass and observed biomass for validation of field derived model also shows the coefficient of determination of 0.72 for NDVI. According to the findings, field data and satellite images provide sufficient information regarding biomass scenario of agro-ecosystem.