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Identification of Pomegranate Orchard using combination of image analysis techniques

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Abstract

Horticulture crops are an important component of food and a source of income to the farmers. These commodities undergo severe fluctuations both in production and consumption, thus facing unreliable price and market. Reliable and timely estimates of area of horticultural crops provide valuable information in market planning and export. Updated and accurate database is pre-requisite for systematic planning of horticulture sector be it area expansion, increase in productivity or creating post harvest handling facilities. There is no systematic survey of orchard crops for area, and orchard status in the country, which act as the major impediment in the development of horticulture scenario. Pomegranate is one of the most important fruit crop of India and grown for domestic and export purposes. Keeping in view the importance of pomegranate in India, the space technology including remote sensing, Global Positioning System (GPS) and Geographical Information System (GIS) are used in delineating the pomegranate orchard area of Anantapur district of Andhra Pradesh was selected as study area, to estimate the pomegranate acreage. Ground truth data were collected on orchard locations, condition and phonological stages. IRS -1D digital data from LISS – III (path 99/62, of 1st February 2011,99/63 of 1st February 2011 and 100/62 of 2nd March 2011 and 100/63 of 13th January 2011) and LIS IV were acquired and ERDAS image 9.2 package was used for image processing. Satellite images were registered and joined using mosaic option of ERDAS package. Toposheet of Anantapur district was used to extract the subset of Anantapur district from scene. Ground truth data were used to identify the clusters belonging to pomegranate classes. The NDVI map is derived first and refined to set the threshold level for vegetation. Next, a query was developed to set zero to the non vegetative features in IRS 1D image. This image was further classified with unsupervised classification using ISODATA for clustering. It is shown from our study that the combination method of NDVI and unsupervised classification appears to be better choice for estimating area under pomegranate.

Keywords: Global Positioning, Pomegranate acreage estimation, Remote Sensing, Ground truth data, NDVI.

Biography

R. Nagarjuna Kumar has been working as Scientist (Computer Applications in Agriculture) at Central Research Institute for Dryland Agriculture, Hyderabad under ICAR. He has experience in applying information technology tools to Horticultural crops and Dry land Agriculture in India. He has experience in teaching and guided students for their project works. He has developed information systems expert system and decision support systems. His areas of research are developing web based applications and application of GIS and Remote sensing for land use land classification for management of agricultural resources.