Mapping Winter Rice (2022-23) in Mekong River Delta using EOS-04 data

The launch of EOS-04 (RISAT-1A) - India's indigenous microwave satellite – has opened up new prospects for use of SAR data for various thematic applications, with the availability of high quality images under all-weather conditions. The C-band SAR sensor can acquire data in four different modes – Fine Resolution Stripmap (FRS 1 and 2), Medium Resolution ScanSAR (MRS), Coarse Resolution ScanSAR (CRS) and High Resolution Spotlight (HRS). The MRS dual pol. (HH and HV) data is acquired systematically over the same area every 17 days with a pixel spacing of 18 m and swath width of 160 km.

This study was carried out to explore the feasibility of EOS-04 MRS HV data for mapping of winter rice crop (2022-23 season) in Mekong river delta area in Vietnam, which is amongst the most significant rice-growing regions in the world.

EOS-04 MRS data was programmed for systematic coverage over Mekong river delta, where 26 datasets were acquired at 17-day interval spanning between 24th Oct 2022 to 3rd Jan 2023. This period encompasses the winter rice sowing and growth period. Pre-processing of all datasets was carried out for conversion to Sigma0 (σ_0) image. Rice crop signatures were generated from temporal HV images based on color combinations resulting from unique backscatter response of different rice sowings. The low backscatter (less than -20 dB) in transplantation stage, followed by increase in the backscatter due to crop growth, is indicative of rice crop. Decision rule-based classification was implemented to generate spatially distributed rice crop map in the study region. Province-wise area statistics were also extracted for all 12 provinces.

The analysis could distinguish three different transplantation dates of rice crop in the Mekong delta region. A total of 3.42 lakh ha was estimated as winter rice crop in 2022-23 season in the Mekong delta. Of this, the three districts namely, An Giang, Kien Giang and Dong Thap accounted for about 50% of the total rice cropped area.





The study has successfully demonstrated the feasibility of EOS-04 MRS HV data for estimation of rice cropped areas in large regions, while also classifying the different sowing periods in transplanted rice scenario. Similar analysis can be taken up for major rice-growing regions in the other South-East Asian countries as well.