**Rice yield estimation with satellite data**

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**Abstract.** Rice is one of the most important food crops worldwide. Information on rice yield is thus critical for agronomic planners to estimate rice production in respect to successful strategies to address food security and rice grain export issues. This study aimed at modelling rice yields based on rice crop phenology with Moderate Resolution Imaging Spectroradiometer (MODIS) satellite data in the Mekong River Delta, Vietnam. The data processed for a 10-year period (2002 to 2011) comprised of three main steps: (1) constructing the filtered time-series enhanced vegetation index (EVI) data, (2) model rice crop yields, and (3) verify the yield model. The comparison results between the satellite-based estimated yields and government’s yield statistics indicated a significant relationship between the two datasets (*p*-value < 0.001) with the correlation coefficients (R2) ranging from 0.62 to 0.71 for spring–winter and 0.4 to 0.56 for summer–autumn rice crops, respectively. The RMSE values for winter–spring and summer–autumn crops were, respectively, 6.9–8.1% and 5.4–6.7%, and MAE values were 5.4–6.7% and 6.5–9.5%, respectively. This study demonstrates advantages of using remote sensing data for rice yield modeling at a regional scale using the heading date prior to the harvest period.

*Keywords:* Remote sensing, rice yield modelling, crop phenology, Mekong River Delta