Delineating Rice Cropping Practices Using Remote Sensing Data in Mainland Southeast Asia

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Mainland Southeast Asia is one of the most famous rice-bowl regions in the world. Information on rice growing areas and cropping activities is thus important for crop management. Policy makers need such information for crop production estimation to devise successful strategies to ensure food security and rice grain exports for the region. This study aimed to investigate the application of time series of satellite data for delineate rice-cropping practices in Indochina region. The data were processed following three main steps: (1) data preprocessing to construct time-series normal difference vegetation index (NDVI) and to account for noise issues caused by cloud cover in the satellite data using the wavelet transform, (2) image classification using the machine-learning classification, and (3) accuracy assessment. Although there were several error sources including mixed-pixel problems and low-resolution bias that lowered the level of classification accuracy, the comparison results between classification maps and the ground reference data indicated that the classification approach using wavelet transform-based filtered time-series NDVI data and machine-learning classification yield satisfactory classification results. The results not only confirmed its validity for delineating rice farming activities, but also provided quantitative information on rice cropping areas and farming activities in the study region. This classification approach is thus proposed for monitoring rice cropping activities in the study area and other regions in the world.