IMPROVED CLASSIFICATION OF MODERATE RESOLUTION SATELLITE IMAGE USING BAND RATIO, NBAI AND PC TRANSFORM

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Abstract: Successful image classification can be achieved if classes are spectrally separable and each pixel in the image can be assigned accurately to a specific class. However, this scenario is difficult to achieve owing to the fact that several land cover classes exhibit similar spectral characteristics leading to a confused classification. Built up and bare soil classes are among these classes that are very difficult to differentiate from each other during image classification. This study explored the technique of using band ratio (Band 4/Band 3 of Landsat ETM+), Normalized Built-up Area Index (NBAI) and Principal Component Transform (PCT) as supplementary bands to aid in properly classifying pixels that are either built up or soil classes. The image classification was done using supervised Maximum Likelihood Classifier for two cases. The first case utilized the six original Landsat bands (1-5, 7) as input to the image classification while for the second case, the band ratio, NBAI and fourth PC band (PC4) were used in addition to the input Landsat bands of the first case. The use, however, of a particular PC band is site-dependent. For this study, PC4 was used due to its apparent good discrimination between soil and built-up pixels. The technique was applied to a test area located in the island of Negros, Philippines utilizing a stratified random sampling scheme in choosing representative pixels for accuracy assessment. An improvement of 5.2% to the classification's over-all accuracy was reported after comparing the image classification results for the two cases. Moreover, the producer's and user's accuracies for built-up and soil classes are improved by a maximum increase of 4.6% and kappa coefficient by 8%. This made the image classification within the suggested minimum level of interpretation accuracy (85%) for land use/cover classes derived from remotely sensed data. The improvement is also significant, as in the case of this study, if the resulting land use/cover map will be used as input data to subsequent analysis such as in hydrological modeling which necessitates spatial data of highest available accuracy.

Keywords: Image classification, band ratio, built up-bare soil index, PCT, Landsat images