APPLICATION OF THE USLE MODEL AND THE MORGAN MODEL FOR SOIL EROSION MAPPING THE CASE STUDY IN TAMBON KHAO HIN SORN, AMPHOE PHANOMSARAKAM, CHACHOENGSAO PROVINCE, THAILAND

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Abstract:

The USLE, the Universal Soil Loss Equation (Wischmeier & Smith, 1978), is the best known and widely used soil erosion model in Thailand. The USLE equation does not estimate deposition, sediment yield, channel erosion or gully erosion. The MMF model (Morgan, Morgan and Finney model) (Morgan et al., 1984) was introduced to assess soil loss because of its simplicity, flexibility and strong physical base. It separates the soil erosion process into a water phase and a sediment phase. A soil erosion risk map based on field observations in a 5.57 km2 study area in Chachoengsao province (Thailand) is compared with soil erosion maps calculated with the USLE and the MMF model. Testing of the different routing and LS algorithm options in Usle2D (Desmet, P.J.J. and G. Govers, 1996) for calculation of the LS factor within the USLE, allowed to define the algorithm \'Steepest Descent, McCool (1987,1989) with high (rill>interrill), C>0.7\' as the most suitable for this study. Mapping of soil erosion with the USLE yields average overall mapping accuracy, but good producer accuracies for the lower erosion categories observed in the field. The computed average amounts of erosion for each category are fairly consistent. The MMF produces a significantly higher overall mapping accuracy and slightly better producer accuracies. Overall mapping accuracies and producer accuracies prove a better performance of the MMF produced map as compared to the USLE maps.