A NEW APPROACH FOR PREDICTING SOIL NITRATE USING IMAGERY AND NON IMAGERY INFORMATION: MODEL DEVELOPMENT AND VALIDATION

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Abstract

Soil nitrate, a key nutrient for optimal growth and development of crop, can be predicted using a new approach based on imagery and non imagery information. This paper presents an algorithm to predict soil nitrate using imagery and non imagery information. LANDSAT TM satellite image, topography, soil electrical conductivity, crop yield, and soil type have been used to develop prediction models based on artificial intelligence technique called neural network. The models have been developed and evaluated for several research sites in Minnesota and North Dakota. Moreover, considerations of different crop types and rotations have also been incorporated into the models. The correlation coefficient ranges from 0.72 to 0.80 with corresponding root mean square error of prediction of 5 to 10%. This technique has potential to be used as a complementary or an alternative to other methods of soil nitrate predictions.

Key words: soil nitrate, nutrient management, neural network, remote sensing, LANDSAT image.

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