Estimating Soil Water Characteristics From Remote Sensing Observations

Maps of soil characteristics are useful for crop production planning and precision farming-based crop management. Mapping soil characteristics such as the ability of soil to hold water, are traditionally conducted using costly, time-consuming procedures that inadequately characterize spatial variability. The inference of soil procedures from plant foliage density expressed as leaf area index (LAI) mapped from remote sensing imagery, is being explored. Relationships between LAI and soil water holding capacity (SWHC) are being modeled using a plant growth simulation model, a neural network model, multiple linear regression, and decision trees.
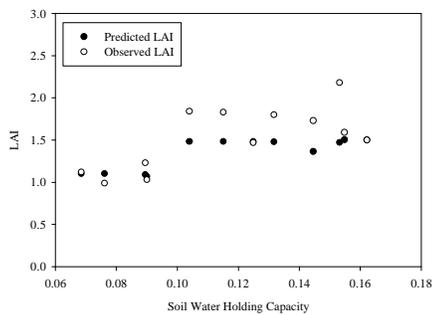

Figure 4. Leaf Area Index (LAI) Predicted Values Derived From Neural Network ModelsVersus Soil Water Holding Capacity for 1997.
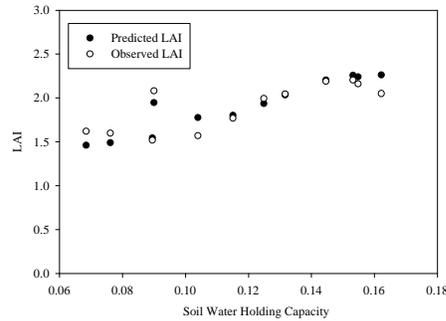
Figure 7. Leaf Area Index (LAI) Predicted Values Derived From Neural Network ModelsVersus Soil Water Holding Capacity for 1998.

| 1997 OPE3 Data | 1998 OPE3 Data |

The plots show the results of comparing observed LAI with LAI predicted from a neural network model. Further refinements of this procedure will permit producers to map SWHC using imagery archives and weather data records.

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