Tillage and manure management is a significant issue in Iowa. The interactions between tillage and manure management, and their impacts on soil erosion, have a significant impact on surface water quality due to sediment, phosphorous, and other chemical transport to our lakes and rivers. Soil erosion is highly influenced by soil and residue management. In order to meet the designated criteria set by the TMDL rules for over 187 impaired water bodies in the state of Iowa, tillage and manure management must play a significant role in soil erosion control and residue management. A tillage survey sponsored by the Iowa Resource Management Partnership (IRMP) committee in 1999, and published in 2000, indicated the need for improvement in adopting conservation practices. The survey shows no increase in conservation tillage practice (i.e., no-till) for the period of 1997-1999. The major goal of this project is to demonstrate an integrated approach of tillage and manure management strategies on field-scale demonstrations utilizing the concept of the “Hub and Spokes” model.

At the Northeast Research Farm (Hub), evaluations of liquid swine manure and commercial fertilizer have been established over three tillage systems consisting of no-tillage, conventional tillage, and fall strip-tillage. Manure and commercial nitrogen fertilizer rates (0, 75, 150, and 225 lbs N/acre) were applied over each tillage system. The tillage and nitrogen rates were replicated three times. Eleven cooperators established twelve on-farm demonstration sites (Spokes) to evaluate the effects of liquid swine manure rates on corn production, cost, and soil nutrient analysis. For each demonstration site manure applicators were calibrated to determine or check the application rates. Four rates of manure (0, ½ agronomic, full agronomic, and 1½ times the agronomic nitrogen rate pounds per acre) were applied at each demonstration site in three replications.

The results from both the on-farm demonstrations and the research farm show similar trends. Initial soil and manure analyses show significant variability within each site and between all sites. Late spring nitrate and fall stalk nitrate tests show a high dependence on manure management and application rates. Yield response to additional nitrogen and nitrogen source was affected by the site-specific history.

The outcome of this approach is very encouraging, over 1050 producers and agriculture professionals participated in the educational programs of three field days, Crop Advantage Series, CCA training, Crop Diagnostic Clinics, Soil Management Clinic, Agriculture Chemical Dealer Updates, and several local, regional, and national conferences during 2003.

By addressing tillage and manure management using an integrated approach, nitrogen utilization can be more efficient. An integrated approach that utilizes large scale field demonstrations and research size plots is essential in addressing manure and tillage management challenges. The ability to obtain results from on-farm trials and research plots that are consistent, will enable us to couple both concepts together to provide quality educational programs to producers and the agribusiness industry.