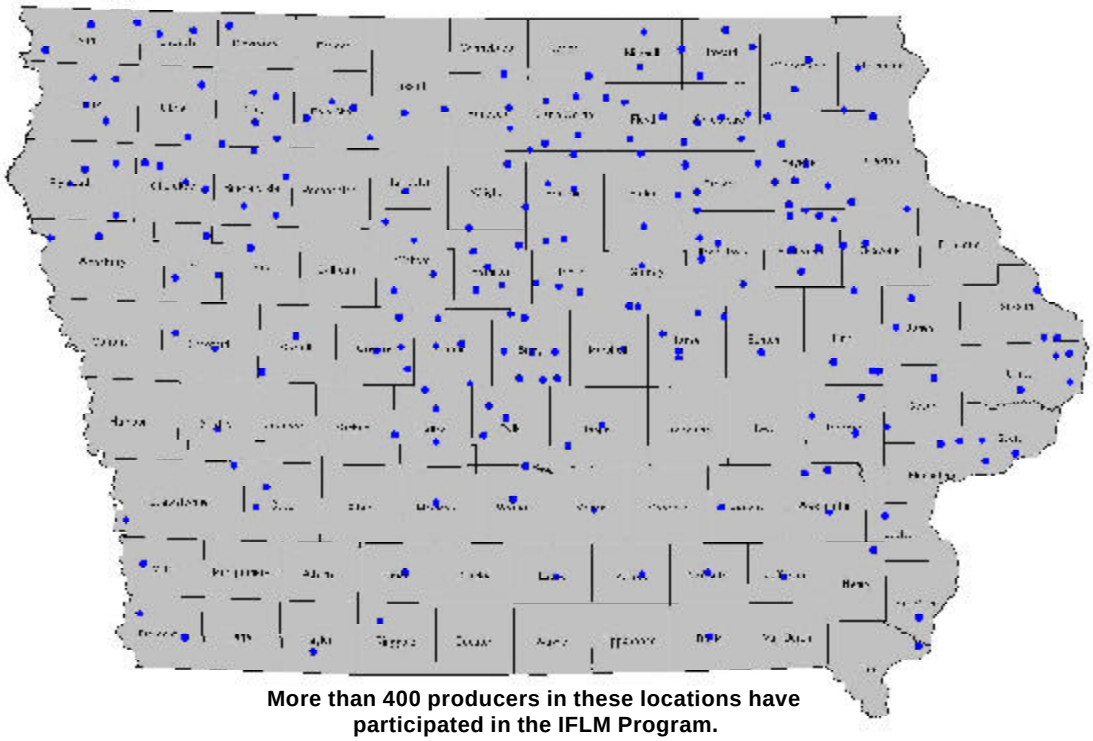
Integrated Farm/Livestock Management Demonstration Program

Crop Year 2003 Executive Summary



More than 400 producers in these locations have participated in the IFLM Program.

Unique partnerships expand the financial and educational resources available to Iowa producers to address increasing environmental concerns.

IFLM Program Overview

The Integrated Farm/Livestock Management (IFLM) Demonstration Program was created in 2000 as part of the Iowa Water Quality Initiative. This statewide program, administered by the Iowa Department of Agriculture and Land Stewardship, Division of Soil Conservation, concentrates on efficient management techniques in livestock and crop production systems in a demonstration/ education setting. It provides a valuable link between sound research and actual in-field application.

Working in cooperation with soil and water conservation districts, Agribusiness Association of Iowa, community colleges, Iowa Department of Natural Resources, Iowa Soybean Association, Iowa State University, and USDA National Soil Tilth Laboratory and Natural Resources Conservation Service, IFLM has formed a unique partnership with the realization that we achieve much more working together toward our common goals. These unique partnerships expand the financial and educational resources available to Iowa producers to address increasing environmental concerns.

Through Crop Year 2003, 27 projects have been funded through the IFLM program to demonstrate the effectiveness and adaptability of emerging agricultural systems for nutrient and pesticide management, water quality protection and soil conservation. Their ultimate goal is changing farming practices in Iowa, resulting in sustainable farm input management and environmental benefits.

The efforts of participating producers are being demonstrated to a widespread audience, through regional field days and tours and statewide forums. Information gained is being widely disseminated to producers, agribusiness, educators, researchers, and private and government agencies.

In Crop Year 2004, 10 IFLM projects are funded demonstrating tillage management, manure nutrient utilization, nitrogen and phosphorus management, composting of manure, and alternative cropping systems. (See page 12.)

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Baseline Cooperator Feedback
Iowa State University

During 2002, two data collection initiatives were conducted to generate information supporting the Integrated Farm and Livestock Management (IFLM) Demonstration Program.

In one of these, Iowa State University (ISU) interviewers gathered information from corn growers participating in IFLM projects. In a series of open-ended directed conversations and closed-ended questions, information was gathered on a range of experiences with the project and current management practices. In total, 91 project cooperators were interviewed: 68 On-Farm Nitrogen Network cooperators and 23 "Hub and Spokes cooperators and Nitrogen and Carbon Management cooperators.

IFLM provides synergy of the farmers' equipment and resources and the coordinators' knowledge and technology.

The Crop Year 2002 Executive Summary aggregated the responses to several components of this project.

The other initiative was in conjunction with the 2002 Iowa Farm and Rural Life Poll, which contained special sections on the use of and attitudes toward nitrogen use. Findings from the Farm Poll give an estimate on a broader scale of production practices prior to more wide distribution and adoption of practices potentially resulting from the IFLM project.

In 2003, the data gathered from the 91 IFLM cooperators was further analyzed and merged with data from the 2002 Iowa Farm and Rural Life Poll. Telephone interviews with the initial set of cooperators, as well as additional cooperators in the On-Farm Nitrogen and Phosphorous Network projects, were conducted in 2004.

The table below lists the reasons cited for changing nitrogen fertilizer rates. When asked to elaborate on changes they hade made, other than changes in rates, the dominanet themes in respondents' comments were:

· Changing from fall to spring application.
· Changing timing of application to when plants would best use the nutrient.
· Using split applications, including side-dressing.
· Sampling manure for nutrients and not using commercial fertilizer on fields where manure was applied.
· Giving greater attention to rates and applying "optimum" rates.
· Making no changes, but waiting for additional research data.

More detailed findings from the IFLM project cooperators, as well as the findings from the Farm and Rural Life Poll, are included in the comprehensive report, which can be viewed on the IDALS website: www.agriculture.state.ia.us

Reasons Cited for Changing Nitrogen Fertilizer Rates

	Farm Poll	ISA Cooperators	ISU Cooperators
Reducing costs	75%	92%	94%
Concern for groundwater pollution	54%	53%	56%
New knowledge/understanding	63%	66%	61%
On-farm tests	34%	66%	50%
Supplier/dealer recommendation	26%	13%	11%
Taking credits (manure/legumes)	43%	45%	56%
Health safety concerns	18%	13%	22%
Crop consultant recommendation	17%	28%	6%
Increase yield	24%	17%	22%

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Cedar Lake Watershed Variable Rate Nitrogen Demonstration
Madison Soil and Water Conservation District

Cedar Lake, drinking water source for Winterset, Iowa, was targeted for a watershed project. The goal of the project was to reduce the impacts of nitrate (NO_3^-) from agricultural sources, fertilizers and tile line water. To help landowners and crop producers reduce fertilizer loss due to leaching of nitrate, a variable rate nitrogen (VRN) program was selected.

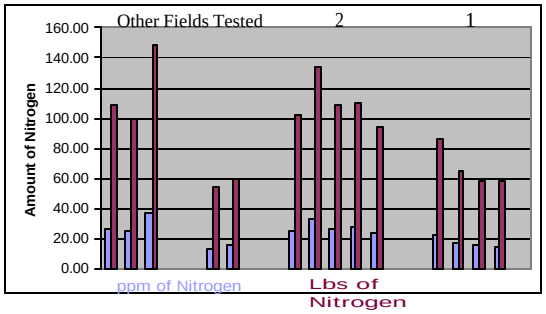
The purpose of this demonstration was to examine the feasibility of a VRN program. Cargill Crop Nutrition developed a patent pending program, InSite VRN™, which prescribed nitrogen recommendations. The program gave nitrogen credits for soil organic matter, residual nitrate levels, and any manure that has been applied to the field. The program looked at increasing the yield of the better producing soils and reducing fertilization of less fertile soils, not concentrating as much on the lower producing areas and applying the nitrogen accordingly. The program was applied in the Cedar Lake Watershed using the global position system (GPS) and variable rate equipment.

Field 1: A 125-acre field received a 130-pound flat rate application of nitrogen in 3 flat rate test strips.

Field 2: A 211-acre field received a 150-pound flat rate application of nitrogen with 4 flat rate test strips.

Observations were made during the growing season including nitrogen levels of the soil using spring nitrate soil tests and fall stalk tests.

Late Spring Nitrate Tests for Test Fields



In Field 1, the spring nitrate tests show that available nitrogen was below recommended levels.

In Field 2, the spring nitrate tests show that available nitrogen was more than adequate.

Condition of the corn crop was good for both fields, but moisture was deficient in July. The fields were harvested with yield monitoring equipment to determine if yield was decreased, maintained, or improved.

Field 1 yield results show an overall increase in yield for the producers. In an evaluation, the producers felt satisfied with the results. This program helped them save some nitrogen fertilizer from being applied.

Field 2 yield results show good yields throughout the field. There was a decrease in the lower producing, more sloping soils. This was the first year of production on this farm for the producers, seeing how this field produced provided information for their future crop years.

Educational efforts for this program included one field day that was held to examine the condition of the fields. There were 15 people in attendance. At the conclusion of the harvest season, one review meeting was held with 18 people in attendance. Available information was published in the watershed newsletter.

The Madison Soil and Water Conservation District (SWCD) hoped to see a correlation between nitrogen testing data and the yield results with this program. The collected information from this program did not show a clear result as to whether this program would accomplish the watershed's goal of reducing nitrogen per field while maintaining the producers' expected yields.

The local farming community has shown interest in using nutrient management systems to reduce the impact of nitrogen. Many have commented that there are numerous programs using VRN technology and those options should be considered further. The local producers and the Madison SWCD are interested in continuing participation with future VRN programs.

The local farming community has shown interest in using nutrient management systems to reduce the impact of nitrogen.

Hub and Spokes Model of Nutrient Management
Iowa State University

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 Total Maximum Daily Load (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.

By addressing tillage and manure management using an integrated approach, nitrogen utilization can be more efficient.

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 12 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 consistent results from on-farm demonstrations and research plots will enable us to couple both concepts together to provide quality educational programs to producers and the agribusiness industry.

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Iowa Soil Properties and Interpretation Database
Iowa State University

Current and usable soils data must be available to enable land users to improve their input management. The Iowa Soil Properties and Interpretation Database (ISPAID) makes this data available to IFLM project coordinators, agricultural producers and service providers, and others in the public and private sectors.

During 2003, a major effort has been allocated to reviewing, refining, and updating the ISPAID database and ISPAID Manual. ISPAID 7.0 and the ISPAID 7.0 Manual were released on January 30, 2004. ISPAID 7.0 will be delivered on CD to the Division of Soil Conservation, Iowa Department of Agriculture and Land Stewardship (DSC-IDALS) and the other cooperating agencies of the Iowa Cooperative Soil Survey in March 2004. The previous version of ISPAID, ISPAID 6.0, has been available to users since July 1996.

Through the IFLM project in Crop Year 2003:

Ø Responsibility for maintenance, quality control and assurance of the database was transferred to the computer system support specialist located in my office. This position is supported by the IFLM Demonstration Program.

Ø ISPAID information is now available for all 99 counties.

Ø A thorough review and reorganization of the database has taken place:

§ The size of the database has been reduced from 11.4 MB to 5.2 MB

§ Over 71,000 records have been updated and/or corrected as a result of the integrity check, an automated process developed to verify the accuracy of the information in the database.

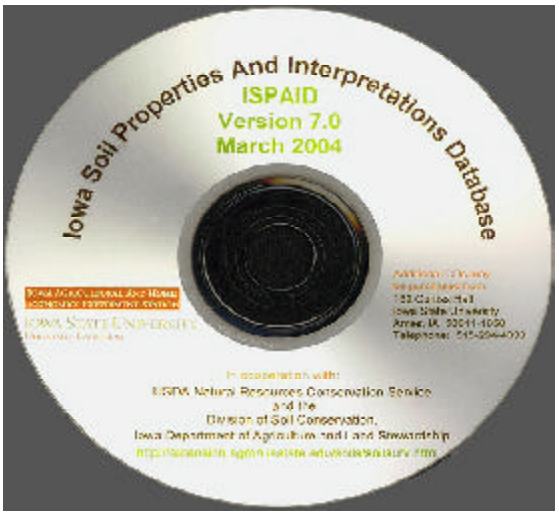
Ø Reviewed and updated the ISPAID manual to conform to the reorganized database. Added web links and a linked table of contents.

Ø Developed system for archiving current data as future county revisions become available.

Ø Outlined future plans for ISPAID.

The educational outreach of this project includes:

Ø ISPAID 7.0 will be available on CD to IFLM project coordinators, agricultural producers and service providers, and others in the public and private sectors through our office.



Ø ISPAID 7.0 will also be available on the Iowa Cooperative Soil Survey web site: http://icss.agron.iastate.edu/

Ø The computer system support specialist will coordinate the release of ISPAID 7.0 on this web site with the Natural Resources Conservation Service (NRCS).

Ø The ISPAID 7.0 Manual is available on the web at: http://extension.agron.iastate.edu/soils/soilsurv.html

Ø The computer system support specialist employed by this project regularly provides database information, extracts from the database, selected files and analyses for IFLM demonstration and education project coordinators, producers, and service providers in a format they can readily use.

ISPAID 7.0 development was coordinated with the NRCS Global Information System (GIS) Analyst. The GIS Analyst assists in the distribution of information about the database to NRCS and soil and water conservation district (SWCD) offices.

Current and usable soils data must be available to enable land users to improve their input management.

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Manure Management for the 21st Century
Iowa State University

The project goals were to improve manure management through manure sample testing, manure spreader calibration and education of livestock producers in northwest Iowa. The project involved sampling 39 manure samples from swine, cattle, dairy cattle, turkeys and composted poultry manure. Liquid swine manure from finishing buildings made up the largest part of the sample data with a total of 28 complete data sets. The project provided 50% cost-share for producers to participate.

The mean nutrient content was 50.6 lbs. N 26.4 lbs. P205 and 30 lbs. K20 per 1000 gallons of manure. The nitrogen and potassium values are very close to the book values while the phosphorus value was 37% below the book values. Changes in feeding phytase have made a significant reduction in phosphorus levels in swine manure. While the overall change in nitrogen content in finishing manure was small, many samples showed lower nutrient contents due to feeding dried distiller's grains from the emerging ethanol industry in the area.

This project has helped northwest Iowa producers improve their manure management and protect the environment.

Nine manure spreaders were calibrated during the project. The average spreader held about 91% of what the producers thought the capacity would be. Knowing the real application rate has helped producers meet the requirements of their manure management plans.

Two manure application field days were held with 32 participants. The project will share the knowledge gained with producers statewide through the manure certification program.

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The conclusions of this project are:

1. Livestock producers are willing to increase their manure application skills with modern technology.

2. Swine manure tested in 2003 had lower nutrient content due to more efficient use of feed additives.

3. Phosphorus had the largest reduction from standard table values with a 41% reduction for standard finishing values.

4. Liquid manure spreaders held an average of 91% of the expected capacity.

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On-Farm Nitrogen Network
Iowa Soybean Association

Iowa agriculture is increasingly identified as a primary source of pollution, particularly losses of nitrogen (N) from row crop fields and associated impacts upon local and regional water quality. The form, timing and application rate of N fertilizers are management aspects that farmers have the ability to control. Effective management of these aspects may minimize negative environmental impacts and increase management efficiency, providing farmers an economic return. Recognizing the need to improve environmental performance, while improving the profitability of farmers, the Iowa Soybean Association, with support from the Iowa Department of Agriculture and Land Stewardship, crop consultants, farmer coops, community colleges, Iowa State University researchers, John Deere, United Agri-Products, GeoVantage and the Iowa Soybean Promotion Board, are empowering a network of over 100 Iowa farmers to evaluate, validate and demonstrate performance of on-farm nitrogen management.

The purpose of the Iowa On-Farm N Network is to enable growers to improve nitrogen management by evaluating their current practice with an alternative or modified management practice. Historic efforts to improve N management have often focused on "telling" and "showing" farmers prescriptions of better management practices (BMPs) and then convincing or offering an incentive for them to adopt the "BMPs". The vision of the Iowa On-Farm Network is to enable farmers to "do" evaluation of alternative practices themselves on their own farms, across entire fields (not small plots), where performance data and information they receive is real world and directly applicable to their situations. Results indicate the potential for growers to improve N management is great. Many of the common BMPs advocated by universities and agencies are generally broadened for simplicity sake and wide-range adoption.

Growers doing their own evaluations can further refine their management so the room for local improvement is real. By sharing data from multiple growers in an area, the impact of these demonstrations becomes much more valuable and, therefore, more effective. Because of the varying effect of weather, the need to evaluate over several years becomes more important. After completing a second year of evaluation, many growers developed confidence to change their management practice.

Despite operating within the current BMPs available, the growers identified an opportunity for additional improvement by adopting a self-evaluation process on their farm. From the grower meetings that have occurred, the following points have emerged:

1. The second year of evaluation adds tremendous credibility to past findings. In two groups all the growers had changed their management based upon the results of the demonstrations from their group.

2. A number of growers question why yield goal based recommendations are still considered the foundation for determining N rates.

3. As growers learned more about the complexities of N management and the potential profit associated, there was a desire to set up more demonstrations to further fine-tune certain management aspects.

4. For sites that did show differences in yield due to N, it was usually not the highest yielding areas that needed higher rates of N. Growers could often identify patterns of yield response within a field to organic matter. Usually the higher yielding areas had the most organic matter, the highest yield, and the lowest N fertilizer requirement.

5. The heavy rains around planting time resulted in significant losses for sites using liquid N prior to the rain.

This project enables growers to improve N management by evaluating their current practice with an alternative management practice.

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On-Farm Phosphorus Network
Iowa Soybean Association

Iowa agriculture is increasingly identified as a primary source of pollution, particularly losses of phosphorus (P) and sediment carrying P from row crop fields and associated impacts upon local and regional water quality. The rate, timing and type of tillage are three management aspects that farmers have the ability to control. Effective management of these aspects may minimize negative environmental impacts and increase management efficiency, providing farmers an economic return. Recognizing the need to improve environmental performance, while improving the profitability of farmers, the Iowa Soybean Association, with support from the Iowa Department of Agriculture and Land Stewardship, crop consultants, farmer coops, community colleges, Iowa State University researchers, John Deere, Geovantage and the Iowa Soybean Promotion Board, are empowering a network of Iowa farmers to evaluate, validate and demonstrate performance of on-farm P and tillage management.

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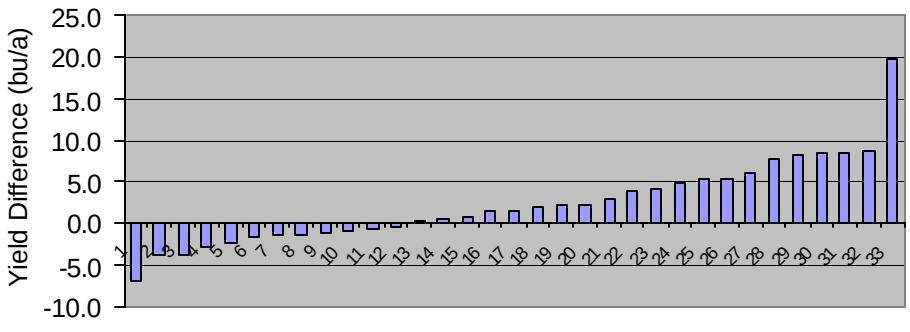
The types of trials implemented were added P to soils testing high or above for soil test P, deep ripping of soybean stubble, or injection of P in the form of manure. Each of these practices is common in Iowa and each of these practices could be changed to reduce P pollution.

This is the first year and trials are only preliminary, but the data supports that all three of these practices were not justified economically in the environments tested and environmental risk could be reduced by changing from these practices.

At the time of preparing this report, the analysis is only partially completed. The majority of these reports show growers did not benefit from deep ripping, adding extra P to soils testing above medium for soil test P, or by adding manure to soybeans.

Below is a table with the results of the deep ripping trials with the reports analyzed to date. The average across all the trials was only 2.4 bu/a. The custom rate ranges from $11-15/a.

Corn Grain Yield Advantage from Deep Ripping for 33 Locations



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Producer-Oriented Tillage Demonstration
USDA-ARS National Soil Tilth Laboratory

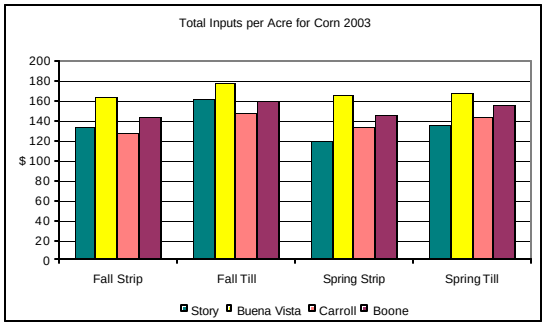
Tillage represents one of the critical components in a farming system; and producers view tillage as a necessary process to prepare a seedbed, incorporate nutrients and pesticides, or control weeds. Reduction in tillage reduces erosion because of greater protection of the soil surface from the effects of wind and water; however, producers often view reduced tillage as increasing risk in crop yield due to pests, nutrient availability, or compaction. This study compares four tillage systems on producer fields across Iowa to demonstrate that reduced tillage will not increase risk of lower corn and soybean yield. The four tillage systems selected in consultation with the cooperating producers were: fall-chisel, fall-strip, spring tillage, and spring strip tillage at planting. Both corn and soybean were planted on the tillage systems within the same field in order to provide a direct comparison of the rotation effect of the crops under the same tillage system within the same year.

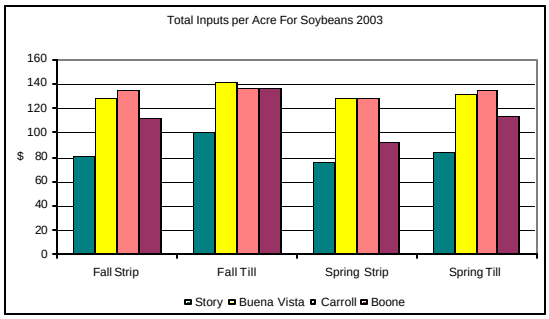
The objectives of this study are to:

1. Quantify the effect of four tillage practices on changes in soil properties.
2. Quantify the effect of four tillage practices on crop performance and economic return.
3. Quantify the response of local producers in each region to the study results.
4. Evaluate the potential behavioral change in producers in each region in terms of changing tillage practices that will increase profit and improve environmental quality.

Sites were established in Boone, Buena Vista, Carroll, Greene, Kossuth, Louisa, Story, and Taylor counties and observations commenced in 2002 and will continue through 2004. Cooperation with the local FFA chapters at each site helps to provide assistance with data collection.

Implementation of the tillage study on corn and soybean production at producer fields throughout Iowa has provided a unique opportunity to evaluate the impact of tillage on corn and soybean production and economic return. This study is in the second year and it is apparent that the variation in precipitation timing and amounts among the years is a major factor affecting yield. The effect of precipitation outweighs the temperature effect on early season crop growth. The responses observed in the second year showed that as we transition from one tillage system these changes affect crop growth and yield. This information provides producers with a better understanding of where risk may be introduced into the soil management system and the changes necessary to reduce the level of risk. As the study continues we will be able to provide a clearer picture of these changes and the potential economic impact of the changes. The input cost comparisons across the tillage systems showed the spring strip and fall strip systems were the least cost and produced a higher profit. The assembly of the input costs and labor requirements for each tillage system provides producers with information they can use to assess the different tillage systems.





Grain yield coupled with grain quality offers a perspective on crop response to tillage management that may provide information for future soil management systems. There is not a premium for protein or oil at the present time but development of an information base that begins to quantify these interactions will be useful in the future. The detailed analysis of the changes that occur within the soil volume as a result of the changes in tillage will help provide producers understand the changes that will occur as a result of soil management and how to transition with a reduction in risk. Conduct of this type of study provides new insights into agronomic systems for the next decade that will enhance crop production efficiency.

Observations to be collected in the 2004 growing season expand from the agronomic evaluation and the cost and labor analysis for decision-making on changing tillage systems. Detailed analyses of the changes in the soil properties under the different systems will be conducted during 2004 along with measurements of infiltration and surface runoff across the tillage practices. Producers are interested in these studies and there is interest in establishing sites in areas of Iowa that are not represented by the current demonstration sites.

Comparing four tillage systems demonstrates that reduced tillage will not increase risk of lower corn and soybean yield.

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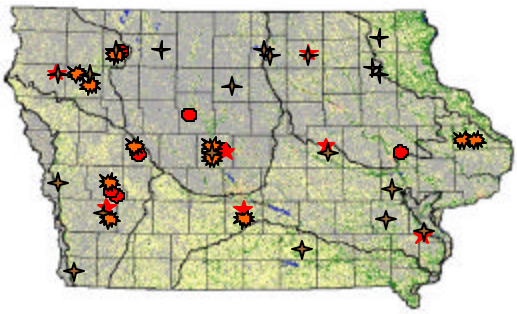
Soil Nitrogen and Carbon Management
Iowa State University

Managing soil nitrogen (N) and carbon (C) is important for economical corn production and environmental issues of nitrate movement to water bodies, C sequestration in soil, and carbon dioxide release to the atmosphere. Through on-farm demonstrations this project explores the tie between soil organic N and C, and incorporates that relationship into study of corn N requirements, soil N supply, and impacts of N application and soil management on soil C dynamics.

The objectives of this project are: 1) demonstrate the importance of soil N supply for corn N fertilization needs and the short- and long-term soil N–C relationships across diverse soils, productivity, and crop management systems; and 2) demonstrate the potential of a new soil N test, the Illinois N Soil Test as a predictor of soil N supply, corn response to applied N, and adjustments to corn N fertilization.



Demonstration sites encompass a range of soil characteristics, tillage systems, crop productivity and N application histories.

The strategy for this project is to conduct on-farm demonstrations at sites that encompass a range of soil characteristics, tillage system, crop productivity, and N application histories. Fourteen sites were identified for the project in 2001, 11 new sites in 2002, and 13 new sites in 2003. In addition, seven sites were used each year and specifically targeted for multi-year soil and crop residue C sampling, and three sites targeted for carbon dioxide flux measurements. A history of N application, manure use, tillage system, crop rotation, and yield for each site was obtained from the cooperating producers. The field sites were chosen based on criteria of corn after soybean, no manure or primary fertilizer N applied in the fall or spring preceding the project crop year, and a conservation tillage or no-tillage system. Cooperators did not apply N or manure to the area designated for the demonstration site, but the cooperators completed other normal crop management practices. Replicated rates of N (0 to 200 lb N/acre in 40 lb increments) were applied shortly after corn planting to the demonstration area.

In 2003 corn yield level and yield increase from applied N varied between sites. Optimum economic N rate ranged from zero to 182 lb N/acre, and was not greater with highest yields. Overall productivity was high (average maximum yield of 190 bu/acre), with the yield produced with no applied N quite large (average of 141 bu/acre). The measured range in site responsiveness was hoped for the project as this provides a good evaluation of soil N supply, and for this demonstration project evaluation of the new soil N test.

Results of profile soil sampling indicate the large amount of total C and N in soils, and the variation across the state with different soils and farming practices. The results also show that total C and total N decreases with depth regardless of past history. The release of carbon dioxide was measured at the soil surface to monitor the impact of N rate on microbial activity and as an indicator of organic matter decomposition. Fertilizer N application rates resulted in slightly different measured carbon dioxide flux, which indicates that N management may impact short-term C loss and influence the dynamic soil C system.

Overall the project exceeded expectations. There were more demonstration sites than anticipated; site cooperators and other project partners were excellent to work with; and there was a good range in soils, geographic location, productivity, and tillage systems for meeting the goals of the project. In 2003, project results were shared at 19 outreach activities held at project sites or meetings in conjunction with project partners or other education programs. The 2003 crop year was the last year for field activities.

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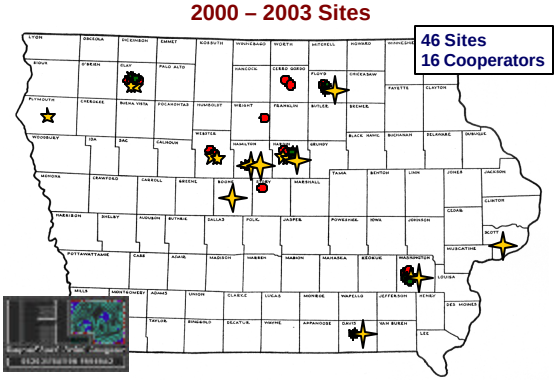
Swine Manure Nutrient Utilization
Iowa State University

The goal of this project is to expand knowledge about liquid swine manure nitrogen (N) and phosphorus (P) availability for corn and soybean production in Iowa and to cause change in manure management practices by crop and livestock farmers.

Swine Manure Nutrient Utilization Project
2000 – 2003 Sites



The objectives of this project are: 1) work directly with swine producers and custom manure applicators to implement field demonstrations and to calibrate manure application equipment or demonstrate state-of-the-art application equipment – to document current application rates and calibration procedures and share with producers appropriate manure application rates based on their manure analysis, calibration, and tractor speed; 2) document crop productivity based on manure N and P nutrients and compare yield and soil test P responses to fertilizer sources; and 3) provide information transfer to additional producers and custom applicators via on-farm demonstrations, field signage, education programs, and field days.

The strategy for this project is to conduct on-farm field demonstrations across Iowa with concurrent data collection to document liquid swine manure N and P availability to crops and compare crop yield with manure to yield with commercial fertilizer. In four years of the project, 46 demonstration sites were established in 13 counties. Eight sites were identified for the project in 2000, 15 sites each in 2001 and 2002, and eight sites in 2003. Swine manure was applied before corn at 21 sites and soybeans at 8 sites; and at 17 sites second-year residual manure nutrient response was monitored in the year following manure application to corn or soybean. Three field-length manure application strips (strip width matching a multiple of the cooperator's combine header width) were randomized and replicated three times: check – no manure, fertilizer N, or fertilizer P; low – manure applied at a rate to supply approximately half corn N need or soybean grain N removal (75 lb or 100 lb total N/acre, respectively); and high – manure applied at a rate to supply approximately full corn N need or soybean grain N removal (150 lb or 200 lb total N/acre, respectively). Four fertilizer application rates of N and P fertilizer were evaluated in separate, replicated small plots superimposed within each manure application strip. All other field activities were completed as normal by the cooperator, including grain harvest of the application strips. Four years of corn yield data suggest that supplementing swine manure with additional fertilizer N is only necessary when the manure-N rate is inadequate to meet specific corn needs or losses reduce N supply. A statistically significant soybean yield response to manure application occurred at only one of eight sites. These results are similar to results from other studies in Iowa and other states that show inconsistent, unpredictable, and usually small soybean yield increases from liquid swine manure applied before soybean. Results from post-harvest soil testing suggest strong correlations between performance of five soil P tests; increases in soil test P resulting from full manure application rates highlight the high crop availability of P in liquid swine manure.

Overall the project achieved its objectives and exceeded expectations. Field signs indicating the project name, program, and cooperating organizations were located at many sites in 2001, 2002, and 2003. In cooperation with the site cooperator, IDALS personnel, and ISU Extension, an outreach field day attended by 30 agency personnel and area producers was conducted at the Scott County demonstration site. The 2003 crop year was the last year for field activities.

This project documents liquid swine manure N and P availability to crops and compares yield with manure and with commercial fertilizer.

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IFLM Program Crop Year 2004

In Fiscal Year 2004, $850,000 was appropriate for the IFLM program. The following 10 projects have been funded for Crop Year 2004, including more than 130 cooperators in demonstrations in over one-half of Iowa's counties.

Composted Swine Hoop Manure Utilization: Four swine producers will demonstrate to others in Henry, Iowa, Johnson and Washington Counties how to effectively utilize composted swine manure and bedding from hoop structures and to reduce nutrient losses. Contact: Terry Steinhart and Greg Brennenman, Iowa State University Extension, Sigourney, (641) 622-2680

Conservation Tillage Management: Demonstrations at five sites will consist of strip tillage, no-till, and conventional tillage systems on a corn/soybean rotation. Following each natural runoff from rain events, water samples will be collected and analyzed for runoff quantity, sediment concentration, and sediment loss. Contact: Richard M. Cruse, Iowa State University Extension, Ames, (515) 294-3163

Ten projects have been funded for Crop Year 2003, including demonstrations in over one-half of Iowa's counties.

Hub & Spokes Tillage/Manure Model: In this project, the Northeast Iowa Agricultural Association of Nashua serves as the "hub" from demonstration and provides support to cooperator field sites "spokes". Cooperator sites in 10-15 counties in northeast and central Iowa include utilization of manure from cattle, hogs and sheep in their cropping systems. Contact: Mahdi Al-Kaisi, Iowa State University Extension, Ames, (515) 294-1923

In-Season N Management: Ten sites will demonstrate the use of emerging in-season N application strategies through corn plant N status monitoring as a timing approach to allow for integration of seasonal N supplies differences into N rate recommendations. Contact: John E. Sawyer, Iowa State University Extension, Ames, (515) 294-1923

Living Mulch Systems: Six sites will be established in northeast Iowa to compare a kura clover living mulch system to a traditional production system. The project will document reduced runoff and N availability to crops in living mulch, and will evaluate environmental and economic benefits of this alternative system. Contact: Palle Pedersen, Iowa State University Extension, Ames, (515) 294-9905

Manure P Management: Approximately 20 northeast Iowa dairy, swine and poultry producers will demonstrate the impact of manure applied at N-based and P-based rates on corn yield, soil test P and residual plant-available N. Contact: Gerald A. Miller, Iowa State University Extension, Ames, (515) 294-4333

N & P Content in Poultry Manure: Four or five Iowa crop and poultry producers will demonstrate manure sampling, assessment of N and P content based on chemical analyses, availability of N and P for crops, the importance of proper applicator calibration, and the effectve of manure application on nutrient levels in soils and also on potential N and P losses with surface runoff. Contact: Antonio P. Mallarino, Iowa State University Extension, Ames, (515) 294-9865

On-Farm Network: Approximately 70 cooperators throughout the state will demonstrate input management alternatives utilizing new tools that affect nutrient, manure and tillage impacts on the environment while quantifying the costs and benefits. Contact: Doug Lindgren, Iowa Soybean Association, Urbandale, (515) 251-8640

Producer-Oriented Tillage: Demonstrations at eight sites compare tillage methods to determine the effect of fall-strip, spring-strip, fall-chisel or spring tillage on corn and soybean production and changes in soil properties. Contact: Jerry L. Hatfield and Tom J. Sauer, USDA-ARS, National Soil Tilth Laboratory, Ames, (515) 294-5723

Strip Till to Enhance No-Till: This project demonstrates the use of fall-strip tillage as a practice to enhance the acceptance of no-till for corn production in cold, wet soils and will show the benefits of no-till corn for the environment and for profitability to the producer. Contact: Jerry Crew, Clay Soil and Water Conservation District, Spencer, (712) 262-3432

Contact: Ed Beaman, 900 Des Moines St., Des Moines, IA 50309, Tel: 515-262-8323, ebeaman@agribix.org