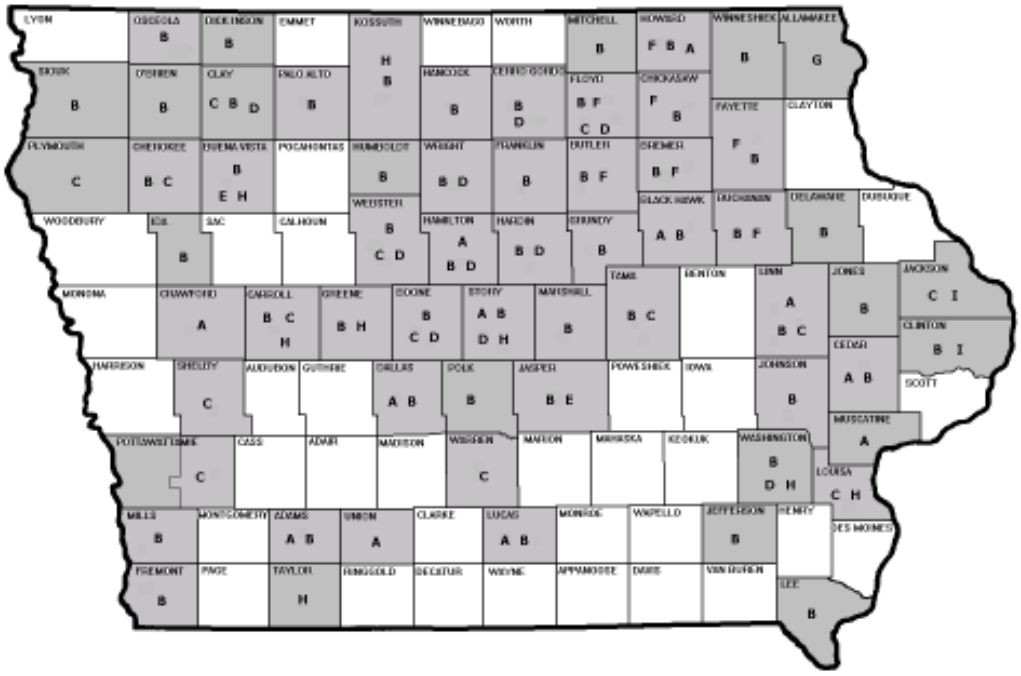
Integrated Farm/Livestock Management Demonstration Program

Crop Year 2002 Executive Summary



A = CEMSA (10 operators)
B = On-Farm N Demo Network (136 operators)
C = N Requirements & C Status (11 operators)
D = Swine Manure Nutrient Utilization (18 operators)
E = Strip Tillage Effects on Crop Production (2 sites)
F = Hub & Spokes Manure Delivery (11 operators)
G = Cover Crops (3 operators)
H = Producer-Oriented Tillage (8 operators)
I = Tillage & Manure Management (12 operators)

Shaded counties show IFLM activities. Each letter indicates participation by one or more project cooperators. Location of letters does not delineate location of cooperators.

Input management is key in balancing agricultural production and environmental protection.

Rob Stout demonstrates manure and nitrogen management on his Washington County farm.

Through the IFLM Program, farmers demonstrate to farmers input management practices that are effective and adaptable to their farming operations, resulting in environmental and economic benefits.

Improved Input Management

Through the Integrated Farm/Livestock Management (IFLM) Demonstration Program, farm operators participate in and demonstrate on their farms new and emerging technologies that refine management input, resulting in decreased environmental risk and an improved bottomline.

In 2002, 230 producers were actively engaged in nine IFLM projects throughout the state. These producers demonstrated to themselves and their communities how to efficiently and effectively utilize animal waste as a commodity rather than a waste. They maximized their yields with reduced application of commercial fertilizers. Erosion was reduced erosion and the soil resource base has been sustained. As a result, nutrient and sediment loading into Iowa's water bodies has been reduced.

In 2003, eight projects will be underway involving nearly 150 producers.

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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) 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 ranged of experiences with the project and current management practices. In total, 91 project cooperators were interviewed: 68 "On-Farm Nitrogen Network" cooperators, 10 "Hub and Spokes" cooperators, and 13 "Nitrogen and Carbon" cooperators.

In this report the responses to the several components of the project are aggregated. The involvement of cooperators was quite different. For some, their role was more passive in providing fields for demonstrations. For most others, they were more actively involved in developing and implementing plots as part of their own management operations.

IFLM provides synergy of the farmer's equipment and resources and the coordinator's knowledge and technology.

Among the 34 open-ended questions posed to the cooperators was one asking cooperators how satisfied they were with their participation in the project. There was a clear pattern in their answers of being quite satisfied with the project. Most (81%) gave a positive response, with 6% giving a negative or qualified answer. Ten respondents answered with a comment without a positive or negative context. The following statement is exemplary of a positive response: "(I am) extremely satisfied. The people and results have been over and above my wildest expectations. Great integrity of (name) and staff. It's like having (my) own research department. Much synergy of farmers' equipment/resources and researchers' technology and knowledge."

Respondents were asked what they had done differently in terms of nitrogen rates, timing, and/or applications as a result of their participation in the IFLM project. Sixty-three of 96 answered. Among N Network cooperators, 59 of 68 (87%) answered, and especially noteworthy is the detail in most of their answers. A wide range of activities and trials are occurring. Among dominant themes in responses were:

- Changing from fall to spring application.
- Changing timing of application to when plants would best use the nutrient.
- Using split applications, including side-dresssing.
- 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.

When asked if the project would likely affect how nitrogen is managed in their area, most cooperators were optimistic. The responses were fairly evenly divided between an outright endorsement and more guarded comments about eventual and potential impacts. Only one or two isolated comments were doubtful about the potential of the project to affect nitrogen practices. However, when further asked if they were aware whether their participation had affected any of their neighbor's practices, most responded they were not aware that it had. A few did indicate other farmers were extremely interested in the demonstrations and the work being done. One respondent indicated a custom operator he employs has started to reduce nitrogen rates on the farms the operator manages. A common response among respondents was that only a year's findings were available, and it was too early and perhaps the results too inconclusive to influence others. They anticipated this would come later.

Motivations for participating in the IFLM project were highly varied. Many dealt with production and profit factors, but environmental concerns were also part of the mix. When asked specifically how serious they felt groundwater and surface water pollution from nitrogen was on their own farm, 29% answered not a problem, 58% answered a slight problem, and 9% answered a serious problem.

The other initiative was in conjunction with the 2002 Iowa Farm and Rural Life Poll, which was conducted in February and March and 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.

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.

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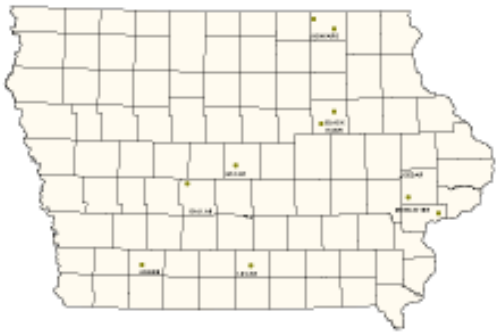
Certified Environmental Management Systems for Agriculture
Iowa Soybean Association

The vision of the Certified Environmental Systems for Agriculture (CEMSA) is to enable agricultural producers to become better managers. The Iowa Soybean Association (ISA) believes most producers desire to be the best possible managers both from a financial and environmental basis. The objective of CEMSA is to provide both information and a formalized framework to enable producers to select and evaluate best practices for application on their specific farming operation. The Integrated Farm and Livestock Management Demonstration program funding for this project is to demonstrate and evaluate the use of Environmental Management System (EMS) with 10 producers.



Three group meetings have been facilitated with the 10 participating growers to develop EMS prototypes. Each grower is developing an individualized EMS plan. Each is at a slightly different stage in plan development. ISA staff is now assisting each of the participants one-on-one to complete the EMS development process. To assist with proto-type development, a variety of worksheets and planning aids have been prepared. Such tools relate to the plan steps and correspond with contractual requirements of the US Department of Agriculture.

The following explains the overall series of steps involved with EMS design and identifies the current status for the initial proto-type participants:

- Definition of scope of their EMS: 10 participants completed 12/02
- Identification of aspects and environmental impacts of their operation: 10 participants completed 12/02
- Evaluation of pertinent legal, regulatory or other requirements pertaining to the scope identified previously: 6 participants completed 12/02 and 4 in progress
- Assessment of significance enabling user to prioritize aspects and impacts their system will address: 6 completed 12/02 and 4 in progress
- Preparation of an environmental policy, providing overarching principles guiding EMS use: 6 participants in progress
- Establishment of objectives and targets and identification of specific actions the users will take: 1 participant in progress
- Establishment of programs with timelines and procedures for monitoring progress and making adjustments: none in progress

ISA staff coordinated with Iowa Waste Reduction Center, who is now under contract to develop the CEMSA Implementation Manual. Lessons learned and information gleaned during the prototype development process is contributing to the manual development.

In addition to the above, plans and materials were prepared to form the next group(s) for CEMSA plan development, hopefully to start in March 2003. Also, ISA staff coordinated with Dr. William Batchelor, Iowa State University, to initiate development of a user interface/decision support tool for CEMSA.

A well-designed EMS can:

- Help an organization identify and catalogue all of its environmental risks and impacts (not just those regulated by law.)
- Help set criteria to prioritize those risks and impacts; and
- Help an organization systematically apply greater management control to the risk and impacts it deems most important, with the goal of reducing them to the minimum extent practical.

The following materials have been developed and are posted on the ISA website: www.iasoybeans.com/isa/cemsa:

- Certified Environmental Management Systems for Agriculture (CEMSA)
- Commonly asked Questions about CEMSA
- Outline of Four CEMSA Workshops
- Reasons for Farmer Participation in CEMSA
- Pledge to participate in the ISA's CEMSA project
- Iowa Soybean Association's Environmental Program

The vision of CEMSA is to enable ag producers to become better managers.

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Cover Crops Project
Allamakee County Soil and Water Conservation District

According to the Soil and Water Conservation District (SWCD) Chair, "We keep losing our dairy and beef farms which is resulting in steep hills that used to be in hay being farmed with a corn/bean rotation. This rotation, especially the soybeans, is leading to some terrible erosion on our steep hills." As a result, cover crop demonstrations were conducted in Allamakee County in the fall of 2002 to address the excessive erosion.

Site #1 included an aerial application of oats and rye on corn silage ground prior to harvest. Flying the cover crop on soybeans just prior to leaf drop puts the seed below the leaves, closer to any available moisture, and may make it catch better. Also, flying it on before silage and bean harvest increases the chance of wheel traffic creating more seed to soil contact. In addition, small plots of corn silage were disked and drilled and disked and broadcast with an oats plot and a rye plot.

Site #2 consisted of oats and rye flown on prior to leaf dropping in soybeans. There were also small plots of simulated aerial application of oats, rye and rye grass at the one-half, full and double rate.

Conversion from hay to a corn/bean rotation is leading to excessive erosion on steep hills.

On Site #3 oats, rye and rye grass were no-till drilled after silage harvest. Immediately after drilling, pack manure was applied.

All the trials showed good growth. The emergence from the aerial applications was not as even as the drilled trials. In Northeast Iowa the aerial application is not a viable option for all producers. In this hilly region, there are not enough flat gravel roads to accommodate the plane so they would have to return to the airport to reload. In an area where the planes could easily land, the cost is approximately $10/ac. for the seeding, which is comparable to the cost of drilling.

The weather in September, immediately following seeding, was warm and moist allowing for some good growth. October ended up being the coldest in 88 years, not allowing for good growth. There was, however, sufficient oats and cereal rye growth to establish a satifactory ground cover to reduce erosion. There was not good enough growth to create adequate forage for grazing or chopping.

The producer on Site #1 intends to use his cover crop areas for spring calving. "I think I've got good cover for this spring. There will be enough so the calves won't be born on mud, and that's what I was looking for." the producer said.

On Site #1 the producer did not see any difference in the disked areas over the no-tilled areas on silage ground.

The only disappointing cover was the annual rye grass. The cool October was partly responsible for the poor stand. It may take off again in late April or May, but this is probably too late for good cover. A producer would have to seed ryegrass really heavy to produce good cover, which becomes too cost prohibitive.

The best cover was the cereal rye, which had the best stand and was the most vigorous. It will continue to grow next spring and may provide forage at that time. However, there are some disadvantages to the cereal rye for a cover crop. There is an alleopathic effect from the rye that consistently reduces corn yield. While trials vary, there may be a 10 to 20 percent reduction from the rye. There is no yield reduction if the rye is followed by soybeans. Another disadvantage to the cereal rye is that it needs to be either chemically or mechanically killed in the spring. Some producers do not like using chemicals; and a mechanical killing, by chiseling or plowing, may lead to erosion. The cereal rye will also be nice and green in the spring and may act as an attractant to army worms. This isn't typically a big problem and would probably only affect small areas, not the whole field.

Bin run oats may be the least expensive option. There is no need to kill it in the spring, and the seed cost is minimal.

The pack manure did not reduce the cover crop stand and in fact may have enhanced it.

General adoption of cover crops may require some sort of incentive. This might be one lower cost alternative to terraces with good conservation benefits. If a farmer is dealing with high soil P levels, a cover crop will uptake a lot of nutrients and may serve to reduce the soil test levels.

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Cropping Practices Baseline Data

Iowa State University

Rapid change is occurring in Iowa cropping practices. In the last decade alone, there have been significant shifts in the practices followed. Cultivation practices, the introduction of genetically modified (GM) crops, rapidly changing farm prices, and other events have significantly affected returns to land, labor, and management.

This project presents summary statistics and initial analysis from the 2000 cropping practices survey. Farmers were randomly selected and the data were collected from one of their fields. The data presented are for 29 fields with corn following corn (referred throughout as "continuous corn"); 149 fields with rotated corn; and 172 soybean fields. In addition to the 2000 survey, selected comparisons and references were made to similar surveys conducted in 1989, 1994, 1996, and 1998. The 1989 survey summary can be found in ISU Extension Publication FM1849. The 1994, 1996, and 1998 surveys are summarized in various USDA publications. Data from the 1996 and 1998 surveys were expanded in a similar manner to this survey.

The leading results illustrate that there have been significant changes in Iowa agricultural practices over the past decade with shifts toward labor saving technology (increasing use of no-till and genetically modified seeds). If the economic environment remains the same, continued change is likely to occur in the future.

With respect to the total number of trips across the field for all machinery operations there was some differences among the crops, although the differences were not significant. The majority of the fields reported less than seven trips across the field and fewer than five percent of the fields reported more than 10 trips, regardless of the crop.

There was some difference observed among the primary tillage practices used. Continuous corn showed the most frequent use of primary tillage operations and in many cases there was more than one operation reported. The use of the moldboard plow and even the chisel plow has decreased for all crops relative to previous years.

The decrease in row cultivations for all crops is one of the most significant changes over time. In 1989 over 80 percent of all acres were row cultivated at least once. For 2000 this had had dropped to approximately 50 percent. The change in row cultivations is indicative of the overall changes in production practices occurring in Iowa.

No-till planting methods are an example of these changes. From 1996 to 2000 the use of no-till on rotated corn went from 20 to nearly 33 percent of the acres. No-till was used on 29 percent of the soybean fields but only 9 percent of the continuous corn fields.

The introduction and widespread use of genetically modified crops offers the most noticeable shift from past surveys. In soybeans, the use of genetically modified seeds has gone from virtually zero to 56 percent of the acres in 2000.

Fertilizer use remained relatively high on corn, especially nitrogen. In 2000, continuous corn received 132 pound of nitrogen while rotated corn received 120 pounds. Approximately 40 percent of the nitrogen was applied as anhydrous ammonia. The use of manure on a field did not significantly change the amount of commercial nitrogen applied. Economic analysis showed a high degree of variability across fields. The average return was negative but many of the fields showed a positive return to management.

In analysis of the use of genetically modified seed, the overall finding was that there was no significant difference in return to management whether or not genetically modified seeds were used. In soybeans, costs were lower but these were offset by the lower reported yields. For corn, the yields were higher but so too were the costs. This analysis was simply based on the cross-sectional data used in this report, it did not examine the non-quantifiable positive and negative associated with genetically modified seed.

Crop production practices in Iowa are changing rapidly as new technologies, techniques, and materials are introduced. Considerable variation still remains in the practices that are followed. With the advent of such new technology, Iowa farmers are continually facing additional choices. Although the new options often can make production easier and use time more efficiently, operators should continually evaluate the needs and goals of their situation and choose appropriate technologies. Low economic returns from 2000 and the current depressed commodity market show that product prices are more difficult to control and predict than production practices. Careful selection of production practices, however, can help producers shape their production and marketing situation to take advantage of the often volatile climate in which they operate.

Rapid change is occurring in Iowa cropping practices.

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Eastern Iowa Tillage and Manure Management
Clinton County Soil and Water Conservation District

Manure, nitrogen (N) and phosphorus (P) management field demonstrations are used to promote refined manure and nutrient use by livestock and crop operations in the Maquoketa River Watershed. Producers find confidence in these locally conducted field demonstrations because of similar soils, weather patterns and corn hybrids. The Clinton County Soil and Water Conservation District (SWCD) wished to expand the field demonstration program to the southern reaches of the watershed and the adjacent Elk River Watershed. Livestock and crop producers in these areas would also have locally-derived data to use during future crop nutrient input planning.

Producers find confidence in these locally conducted field demonstrations.

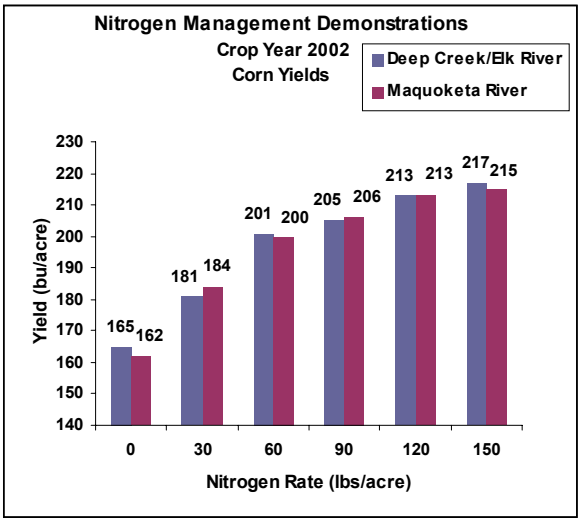
Twelve field demonstration sites were located in the Deep Creek and Elk River Watersheds. The six manure management sites and six corn-following-soybean N and P management sites were identified and soil sampled following the 2001 harvest. Manure and P applications were replicated at each site during that fall. N applications were made at planting time. To allow integration with other Maquoketa field demonstration data, the methods used at the demonstrations matched those conducted in the northern portion of the watershed during crop years 2000-02.

The manure management demonstrations involved producers applying solid cattle or swine manure at individual historic rates with their own equipment. The manure spreaders were calibrated and nutrient application rates were determined using manure analysis results from each location. On average, the manure supplied 84 pounds N per acre and 121 pounds P_2O_5 per acre. The following treatments were included at each location: zero check, 100 N, MN rate, manure (M), M plus 50 N, M plus 100 N, 100 N plus 46 P, 100 N plus MP rate and manure plus 46 P. The “MN rate” and “MP rate” is commercial N and P applied at the same rate as the first-year crop-available N and P from the manure.

The corn-following-soybean demonstrations were fertilized with replicated N rates of zero, 30, 60, 90, 120 and 150 pounds N per acre. These sites also had replicated treatments of P_2O_5 at zero, 46 (crop removal rate) and 92 pounds P per acre (two-year crop removal rate) in addition to 120 pounds N per acre.

Measurements taken during the demonstration process included pre- and post-demonstration P soil test levels, late spring soil nitrate-nitrogen analysis, corn yield and end-of-season cornstalk nitrate-nitrogen analysis. The return on the N and P investment was calculated to determine which manure, N and P application rate is the most profitable for producers.

Yield results from the manure management field demonstrations show that the highest return to the N investment occurs when a moderate application of manure is supplemented with 50 pounds N per acre. The end-of-season cornstalk nitrate N was in the optimum range, 1,501 parts per million (ppm), indicating that the appropriate N rate was applied to provide the most profitable return. The optimum range for cornstalk nitrate is 700 to 2,000 ppm. Applying more than 50 pounds N to manured fields does not increase yield and actually reduces profitability.



The results of the corn-following-soybean demonstrations show that yields do not increase enough to pay for the additional N when N is applied at rates greater than 120 pounds per acre, when N is priced at $.20 per pound and corn is priced at $2.00 per bushel. When P is applied to high or very high P testing soil, yield does not increase and corn value per acre is reduced by the cost of the fertilizer and application costs. Nearly 90 percent of demonstration fields test high or very high for soil P.

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Hub and Spokes Model of Nutrient Management
Iowa State University

Tillage, nutrient and manure management have a significant impact on surface and groundwater quality, especially surface water runoff. In order to meet the designated criteria set by the TMDL rules for over 157 impaired water bodies in the state of Iowa, tillage and manure management must play a significant role. An integrated approach in development and adoption of best management practices for manure, nutrient, tillage, and crop residue management is essential. 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. Ten 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 850 producers and agriculture professionals participated in the educational programs of two field days, six workshops, and one winter meeting in 2002.

When producers were asked about the importance of the Hub and Spokes project, the consensus was "it helps us fine-tune our management practices" and "the project gives an opportunity to increase manure management knowledge." The cooperators stress the fact that the project provides "actual results, it's exactly what happens at our fields" and "the information is site specific and readily available to us." Seventy-one percent of the cooperators involved in this project have learned new skills or improved existing skills due to working with the project and 79 percent indicated they are managing their manure much more efficiently due to their involvement in this project.

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.

This project demonstrates an integrated approach of tillage and manure management strategies.

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Iowa Soil Properties and Interpretation Database
Iowa State University

To bring about improved input management, current and usable soils data must be available to land users in Iowa. 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.

Soil Survey Information That Influences Agronomic Use

	Soil Properties							
Agronomic Use	Organic Matter	Flooding	Texture	Soil Depth	Carbonates	Slope	Available Water	Water Table
Tillage Suitability	x	x	x	x		x		x
Plant Adaptability	x	x	x	x	x	x	x	x
Drainage		x	x	x		x		x
Crop Yield Productivity	x	x	x	x	x	x	x	x
Land Use Capability		x	x	x	x	x	x	x

"x" indicates the soil properties listed in the soil interpretations data base

ISPAID provides current and usable soils data.

The current version of ISPAID available to users, ISPAID 6.0, was released in July, 1996. Through the IFLM program in Crop Year 2002:

- Responsibility for maintenance, quality control and assurance of the database was transferred to the computer system support specialist supported by the IFLM Demonstration Program.
- Initial effort included a thorough review and reorganization of the database.
- Revised and updated soils data for newly completed and correlated soil surveys for Humboldt, Monona, and Van Buren counties, and verified that ISPAID data for these counties is consistent with pending Soil Survey Report publications.
- Reviewed and updated the ISAID manual to conform with the reorganized database.
- Developed an automated process to verify the accuracy of the information in the database, referred to as an integrity check.
- ISPAID 7.0 and the ISPAID 7.0 Manual are scheduled for release prior to March 31, 2003. As each new version of the database (including ISPAID 7.0) is prepared for release, a full integrity check will be completed before the official release of the new version.
- Developed a system for archiving current data as future county revisions become available.

The computer system support specialist supported by this project regularly provides database information, extracts, selected files and analyses for coordinators, producers, and service providers in a format they can readily use.

Examples of selected projects requiring extensive analysis of the data include:

- Revision of Tables 15A-L in ISU Publication PM-1688, “General Guide for Crop Nutrient and Limestone Recommendations in Iowa”. In ISPAID, Subsoil P has 10 possible values, and Subsoil K has 8 possible values. This data was translated into “Low” and “High” for each database entry, based on criteria used for the original publication. The resulting data were then added to ISPAID as two new database fields. A tables was created for each MSA listing all soil series which had 5,000 or more acres with a CSR of 30 or greater showing these new SubsoilP and SubsoilK values.
- Summary of Soil Map Units with the Missouri River Bottomland. Created tables for Fremont, Harrison, Mills, Monona, Pottawattamie, and Woodbury counties as well as a summary composite table.
- Categorizing the suitability of possible feedlot sites in Butler, Calhoun, Carroll, Cass, Cherokee, Crawford, Decatur, Dickinson, Emmett, Harrison, Ida, Jones, Lyon, Mahaska, Mills, Montgomery, O’Brien, Osceola, Plymouth, Pottawattamie, Sac, Shelby, Sioux, Story, Taylor, and Woodbury Counties. Wrote a computer program to divide soils into 5 categories, from "Best Suited" to "Not Recommended".
- Production of a report titled “Iowa Soils Requiring Tile Drainage to Achieve Optimal Agronomic Yields or Row Crops”.

The primary access to the current database is through the Iowa Cooperative Soil Survey web site: http://icss.agron.iastate.edu/

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On-Farm Nitrogen Network
Iowa Soybean Association

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 to 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 incentivizing 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 of 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.

All of the growers involved in the On-Farm N Network have combines equipped with a Global Positioning System (GPS) and yield monitors. The growers were given guidance and a design protocol that is both easy to implement and will give meaningful information. The basic design is for a grower to put out replicated strips.

The majority of these reports show growers are applying less N than would be recommended based upon yield goal based recommendations. 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 occurred so far this year, the following points have emerged:

1. The second year of evaluation adds tremendous credibility to past findings. In one meeting all the growers had changed their management based upon the results of the trials 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 with it, there was a desire to set up more trials 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.

The vision of this project is that the operator will do the evaluation of alternative practices.

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Producer-Oriented Tillage Project

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.

Producers demonstrate that reduced tillage will not increase risk in crop yield.

This project was designed to compare four tillage systems in both corn and soybean production on producer fields across Iowa to demonstrate that reduced tillage would not increase risk in crop 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 soybeans 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 demonstration 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 help to provide assistance with data collection.

Observations were collected on stand establishment, rate of emergence, plant height, leaf chlorophyll content, crop yield, grain quality, crop residue mass at harvest, and ground cover before and after fall tillage. Prior to planting soil samples were collected from each treatment to characterize the soil conditions, e.g., wet aggregate stability, pH, CEC, N, P, K, soil organic matter content and these observations will be collected each year to determine what is changing in the soil profile due to tillage practice.

There were differences among the tillage practices in the stand establishment primarily due to differences in the soil water content at the time of planting. Differences emerged in the potential ear size in corn across the tillage practices caused by the soil water availability in the different treatments and this changed among location. Grain yields across the tillage practices varied among tillage practices and location due to seasonal weather pattern.

Observations to be collected during 2003 will include these measurements with more detail on soil erosion differences among tillage practices and the economic and labor comparisons.

Field days were held at the sites to acquaint the local producers with the project goals and initial results.

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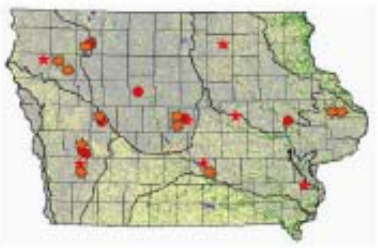
Soil Nitrogen and Carbon Management Project

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 to: 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 Soil N Test (based on the soil amino sugar organic-N fraction), as a predictor of soil N supply, corn response to applied N, and adjustments to corn N fertilization.



The strategy for this study 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, with seven sites specifically identified for multi-year soil C sampling and three sites for carbon dioxide flux measurements, and eleven sites identified for the project in 2002. 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.

Preliminary results show that corn yield level and yield increase from applied N varied considerably between sites in 2001 and 2002. Overall productivity was high (average maximum yield of 183 bu/acre), with the yield produced with no applied N quite large (average of 158 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. In some instances the low yield response to applied N related to producer indicated recent history of N fertilizer application, manure inputs and management, but not in all cases.

Results of profile soil sampling show 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. Higher spring N application rates resulted in higher measured carbon dioxide flux, which indicates that N management can impact C loss and influence the dynamic soil system.

Overall the project exceeded expectations. There were more demonstration sites than anticipated; site cooperators and other project partners are excellent to work with; and there is a good range in soils, geographic location, productivity, and tillage system for meeting the goals of the project.

Project results were shared at twenty-two outreach activities held at project sites or meetings in conjunction project partners or other education programs. Producer interest remains high and sites are identified for the 2003 crop year, including areas of the state not previously included in the project.

Managing soil nitrogen and carbon is important for economical corn production and the environment.

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Strip Tillage Effects on Crop Production and Soil Erosion

Iowa State University

The strip tillage system has production and environmental advantages compared to other tillage systems used for corn and soybean production in Iowa. Tillage in the row zone helps warm soil for planting while the no till interrow zone reduces surface run off and soil erosion. The goal of this project is to facilitate strip tillage adoption for row crop production in Iowa. The demonstration sites were established in Buena Vista and Jasper counties.

Soil losses and water run off were measured on a cornfield between May and August 2002, on Buena Vista County. Two tillage systems were assessed; strip tillage and chisel plow tillage. Strip tillage reduced soil erosion by 25% and run off by 27 % in relation to chisel plow/ field cultivated areas.

Strip tillage reduces soil losses and water run off, while it maintains good levels of corn and soybean production.

In Jasper county two demonstration sites were established, one for corn, and the other one for soybean. Three tillage systems were set up in each demonstration site, conventional tillage (CT), strip tillage (ST), and no tillage (NT). Planting date, in both demonstration sites, was established when soil temperature at 2" depth was greater than 50 F for corn, or greater than 65 F for soybean for 12 consecutives hours, and soil water content was at or below the lower plastic limit. Based on these criteria, the planting dates were April 11 (for CT), April 16 (for ST), and May 6 (for NT) for corn. For soybean the planting dates were May 6 (CT), May 22 (ST) and June 7 (NT). Neither corn yield nor soybean yield was affected by tillage systems. For corn, the first planting date had the lowest average yield. In spite of planting date effects, yields obtained were excellent for all planting dates in 2002. Planting date did not affect soybean yield.

The two demonstrations indicate that strip tillage reduces the soil losses and water run off, while it maintains good levels of corn and soybean production.

Three field day events took place with more than 80 attendees. Also, six Certified Crop Advisors short courses were presented at Iowa State University addressing strip tillage; approximately 120 agronomists attended. Iowa State University and Monsanto were additional partners in this project.

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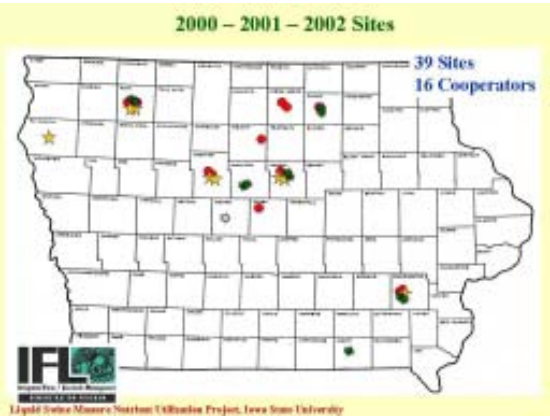
Swine Manure Nutrient Utilization Project
Iowa State University

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.

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, education programs, and field days (and field signage).



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 yields with manure to crop yields with commercial fertilizer. In the first three years of the project 39 demonstration sites were established in 11 counties.

Swine manure was applied before corn and soybean crops, and at some sites second-year residual manure nutrient response was monitored. Three field-length manure application strips (strip width matching a multiple of the cooperator's combine header width) are 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). Replicated small plots are superimposed within each manure application strip. Four fertilizer application rates of N and P fertilizer are evaluated within the small plots. All other field activities are completed as normal by the cooperator, including grain harvest of the application strips.

Preliminary results show that corn and soybean yield levels and response to manure and supplemental fertilizer varied between sites in 2002. Preliminary corn yield data suggest that supplementing swine manure application with additional fertilizer N is not a requirement, and a consistent, economical yield response to additional fertilizer will occur only when the manure application does not supply sufficient N to meet corn needs at responsive sites. Preliminary soybean yield data suggest that swine manure application increases yields on low P-testing soils and can increase yields on high P-testing soils. Preliminary 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.

Generally the project has achieved its objectives and exceeded expectations in its first three years. Data has been collected from 39 demonstration sites in 11 counties, and two new sites and counties have been added for 2003. Field signs indicating the project name, program, and cooperating organizations were located at many sites in 2001 and 2002.

In cooperation with producers, site cooperators, IDALS personnel, and ISU Extension six outreach field days were conducted in the summer of 2002 at the demonstration sites. Producer interest in the project remains high, and additional new sites are being identified for 2003.

The goal of this project is to expand knowledge about liquid swine manure N and P availability.

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Working Lands Assessment Tool
Agribusiness Association of Iowa Foundation


Photo Courtesy of NRCS

Agribusiness Association of Iowa (AAI) Foundation is participating in this Integrated Farm and Livestock Management (IFLM) Demonstration Project for the development of the Working Lands Assessment Tool to be used by landowners and farm operators to evaluate the status of their active farming practices and the effects on their farm management on the land.

A task force of practicing agronomists, Iowa Certified Crop Advisers (CCA) and members of the Agribusiness Association of Iowa (AAI) standing Agronomy Committee volunteered to help develop the assessment tool. The task force, including those indvidiauls listed below, has had much input over the last 18 months:

Hovey Tinsman III,Twin State, Inc.
Howard Brown, Ph.D., Growmark
Steve Geherls, Dow Agro Sciences
Rich Finstad, Frontier Labs, Inc
Kent Krause, Heartland Pork Ent.
Mark Young, Smith Fertilizer and Grain
Gary Tuxhorn, United Suppliers
Steve Heilskov, Twin State, Inc.
Russ Fullenkamp, Golden Furrow
James Russeman, Farm Service Coop
Dick Groen, NW Iowa Coop

This tool can be used as a guidance document for planning the cropping system on individual fields in Iowa.

The process of primary development has proceeded much slower than anticipated. The task force has opted for a much simpler format that will be more user friendly. This has made a major rewrite necessary. Changes in the Iowa Department of Natural Resources (IDNR) rules for animal feeding operations, the US Environmental Protection Agency (EPA) Confined Animal Feeding Operations (CAFO) rules, and inclusion of a conservation component have also added time to the development of the assessment tool.

This assessment tool quantifies the conservation practices in use on the farm, the soil type and results of the chemical soil analysis. The tool will explain the interrelationships of the entire system in profitable crop production.

Each nutrient will be examined for it's role in crop production and it's environmental impact. Sources of each nutrient are addressed with an eye toward the use of manure. A nutrient budget plan format is included for the farm.

A listing of the necessary information needed from the producer's records to complete an IDNR manure management plan, Natural Resources Conservation Service (NRCS) programs like EQIP, and EPA National Pollution Discharge Elimination System (NPDES) permits required for the new CAFO rules is included.

The second part of this project will be to develop an outreach system and education program to the landowners, farm operators and service providers.

The goal of this IFLM project is to assess the present farming practices including the conservation efforts, nutrient management and crop management. When properly implemented, the landowner can evaluate her/his practices and procedures in crop production. The tool will point out areas where profitable changes could reduce the off site consequences of active farming practices.


Photo Courtesy of NRCS

The task force believes that this tool can be used as a guidance document for planning the cropping system on individual fields in Iowa. To insure that the assessment tool is used, the task force will ask for the assistance of Iowa livestock producer groups, the NRCS in Iowa, and IDNR to assist in it's promotion and use. Presentations and presentation materials will be developed to promote the tool at meetings and conventions throughout the state. AAI and the Iowa CCA Board of Directors are committed to this type of useful planning instrument.

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