Crop Management and Diagnostic Clinic IMPACT REPORT

Meeting the Challenge

Vision and Mission
Keeping up with the latest in genetics, pest management, technology and crop production in a timely manner is a constant challenge for agricultural producers and professional consultants. To meet this challenge a team of extension educators and specialists from the University of Nebraska-Lincoln developed a series of in-field educational training programs. The Crop Management Diagnostic Clinics (CMDC) is a systems approach to training in four interrelated areas: crop management, nutrient management, pest management and soil-water management. To design the clinics educators meet with industry representatives and producers to identify emerging issues.

The clinics have been conducted annually for the past 12 years at the Agricultural Research and Development Center. They are a fee based program. Instruction includes: hands-on infield diagnostic training, field demonstrations, classroom lectures, demonstrations and problem solving exercises. Small groups promote interaction between faculty and participants with an opportunity to engage in discussion about cutting edge research. Trainings include public field scout trainings, in-season trainings and late season trainings. Each year training sessions are customized for private industry. Specialized sessions include precision farming and manure management.

Program Scope
Since 1996, over 12,000 agriculture business representatives, ag producers, crop consultants and educators have attended the sessions. They manage or influence 3.7 million acres annually or about 57% of the row crop production in Nebraska. Professionals and producers attending represent 64 Nebraska counties and 13 states.

Economic Impact
Corn Yield increases as a result of the training
1 - 5 bushel per acre increase 33% of producers 39% of customers of professionals
6 - 10 bushel per acre increase 25% of producers 49% of customers of professionals
Soybean Yield increases as a result of the training
1 - 5 bushel per acre increase 42% of producers 68% of customers of professionals
6 - 10 bushel per acre increase 12% of producers 10% of customers of professionals

The total value of increased production resulting from CMDC from the audience who responded to the survey was 36.4 million dollars annually.

Educational Experience
The top three educational experiences that influenced producers to adopt practices and professionals to recommend practices were

Hands-on classroom training 63% producers 70% professionals
Talking to Ag Professionals 74% producers 78% professionals
Hands-on in field trainings 89% producers 88% professionals

Partnership
The Crop Management and Diagnostic Clinics are a partnership with private industries and the following University of Nebraska Departments:

- Agricultural Research and Development Center
- Southeast Research and Extension Center
- Department of Agronomy and Horticulture
- Department of Plant Pathology
- Department of Entomology
- Department of Biological Systems Engineering
- School of Natural Resources
- District Research and Extension Centers

Conclusion
The results show the tremendous economic impact of the CMDC and indicate significant environmental benefits. The results indicate that producers and agricultural advisors have similar interests and that CMDCs need not be tailored differently for producers and advisors.

Impact was greater with some topics than others and was attributed to three factors: the subject matter newness, prior knowledge of the professional and producer, and the degree of emphasis placed on the topics during the five year period.

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Clinic Goal...
Increase crop production, improve profitability and protect the environment through research-based management practices.

About the Study
An evaluation was conducted to determine which practices taught at the clinics were actually adopted by producers or recommended by crop advisors. Clinic participants between 2003 and 2007 were asked to complete an online survey. Over the 5 years of the study, 652 attendees participated in 47 clinics in the following areas: 137 on crop management, 141 on crop protection, 72 on soil and water management and 38 on nutrient management. The response rate to the survey was 23% and included: 127 agricultural advisors influencing a mean of 27,000 acres each and 21 producers farming an average of 1,130 acres of row crops.

Producers and advisors attending the CMDC are well-qualified professionals operating or advising an already fine-tuned production system. Adoption of new practices and improvements in skills can only be modest for these professionals. However, modest changes over a large production scale can have a big impact.
**Crop Management**

**Educational Objective**
Producers and agribusiness professionals will gain:
- Knowledge of the science of biotechnology and germplasm related to yield, reduced chemical use and specialty grains.
- Knowledge of precision ag technologies to manage variable rate application and improve accuracy of application.

Before the training, only 54% of the professionals expressed a confidence level of 75% in their knowledge of biotechnology and 21% in their knowledge of precision ag.

**Biotechnology and Germplasm in Hybrid/Variety Selection**

- The number of producers that reduced the use of crop protection chemicals over 50% of the time increased by 25% as a result of training.
- The number of producers that used their knowledge of biotechnology and germplasm development to increase yield over 50% of the time increased by 40% after training.
- The number of professionals that made better recommendations on the use of hybrid/varieties with biotech traits over 75% of the time increased by 10% as a result of training.
- The number of professionals confident in making recommendations about hybrid/varieties with biotech traits over 75% of the time increased by 8% as a result of the training.

**Precision Ag Navigational Technologies**

- The number of producers that used precision ag technologies to improve the accuracy of application over 50% of the time increased by 25% as a result of the training.
- The number of producers that used precision ag technologies to document yield variation and adjust crop inputs over 50% of the time increased by 25% as a result of the training.
- The number of professionals that were over 75% confident in their recommendations of precision ag navigational equipment to improve accuracy of application increased by 10% as a result of the training.

**Soil and Water Management**

**Educational Objective**
Producers and agribusiness professionals will gain:
- Skills in monitoring crop water use and knowledge of effective irrigation management practices.
- Techniques to improve no-till and conservation tillage practices.

As a result of the training, only 54% of the professionals expressed a confidence level of 75% in their knowledge of precision ag.

**Biotechnology and Germplasm**

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- The number of professionals that were over 75% confident in their recommendations of precision ag navigational equipment to improve accuracy of application increased by 10% as a result of the training.

**Crop Production and the Environment**

- Crop production can be enhanced and nutrients and water can be utilized more efficiently.
- The impact on crop production is knowing when to use traits and when traits are not really needed.

**Pest Management**

**Educational Objective**
Producers and agribusiness professionals will gain:
- Skills to diagnose weed, disease and insect problems in corn, alfalfa and soybeans.
- Use transgenic crops to control insects.

Top three diagnostic skills producers developed as a result of the trainings:
- 33% greatly improved skills in identifying plant disease damage.
- 30% greatly improved skills in identifying plant disease.
- 26% greatly improved skills in identifying problems with crop growth and development.

Top four skills producers developed as a result of the trainings:
- 44% greatly improved skills in identifying plant disease damage.
- 40% greatly improved skills in identifying plant disease.
- 37% improved skills in identifying herbicide injury.
- 34% improved skills in identifying problems with crop growth and development.

Producers increased their use of transgenic corn hybrids to control insects by 12% of acres for BT corn rootworm resistant and 28% of acres for BT corn borer resistant.

Professionals increased their recommendations of transgenic corn hybrids to control insects by 12% of acres for BT corn rootworm resistant and 9% of acres for BT corn borer resistant.

Professionals that recommended more timely herbicide applications over 50% of the time increased by 35% as a result of the training.

Professionals that recommended more timely herbicide application over more than 75% of the time increased by 22% as a result of the training.

Professionals that recommended timely herbicide application more than 75% of the time to control weeds and reduce the potential for developing herbicide resistant weeds increased by 13%.

Professionals that recommended timely herbicide application over more than 75% of the time to control weeds and reduce the potential for developing herbicide resistant weeds increased by 15%.

Professionals that recommended their ability to diagnose crop diseases over 50% of the time increased by 15%.

Professionals that recommended their ability to manage crop diseases over 75% of the time increased by 22% as a result of the training.

**Nutrient Management**

**Educational Objective**
Producers and agribusiness professionals will gain:
- Skills to implement nutrient management practices to correct nutrient deficiencies and protect water resources.

The number of producers that aligned nitrogen, phosphorus, potassium nutrient management practices with UNL recommendations over 50% of the time increased by 17% as a result of the trainings.

The number of producers that aligned micro nutrient management practices with UNL recommendations over 50% of the time increased by 10% as a result of the training.

As a result of the training, only 54% of the professionals expressed a confidence level of 75% in their knowledge of biotechnology and 21% in their knowledge of precision ag.

**What were the effects on crop production and the environment?**

- Crop production has become more economical as a result of soil building and fertility management.
- Environmentally I don't have P levels that are approaching any thresholds so I am reinforcing my practices and theories with the info from the clinics.

**Soil and Water Management**

**Educational Objective**
Producers and agribusiness professionals will gain:
- Techniques to improve no till and conservation tillage practices.
- Skills in monitoring crop water use and knowledge of effective irrigation management practices.

Professionals reported an 11% increase in no-till acres and other conservation practices as a result of the trainings.

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What were the effects on crop production and the environment?

- Better information to select varieties and the improvement of yields and grain quality due to variable rate application of fertilizer.

"The impact on crop production is knowing when to use traits and when traits are not really needed.

As a result of the training, the percent increase in confidence in management ability:

<table>
<thead>
<tr>
<th>Management Area</th>
<th>Producers</th>
<th>Professionals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weed identification</td>
<td>22%</td>
<td>18%</td>
</tr>
<tr>
<td>Non-herbicide strategies</td>
<td>11%</td>
<td>5%</td>
</tr>
<tr>
<td>Practice to reduce resistance</td>
<td>15%</td>
<td>19%</td>
</tr>
<tr>
<td>Selecting appropriate herbicide</td>
<td>23%</td>
<td>10%</td>
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<tr>
<td>Timing herbicide applications</td>
<td>7%</td>
<td>12%</td>
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