Adaptive Management
a concept for
Producers and CCA

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What If…
Or
How…
On
My Farm
Adaptive Management

Definition:

- Adaptive management is a process of testing an idea to evaluate and adjust the application of a conservation practice over multiple seasons.

Goal:

- Test and evaluate how a practice or technology can best be applied on a given farming operation or site condition.
- Learning experience for the producer and consultant.
Origin of Adaptive Management

- A component of a planning or problem solving process.
- A method to reduce risk and deal with uncertainty.
- A learning process (individual and group).
- Many questions can only be answered by experience and experiment.

A process used by the Iowa Soybean Association & On Farm Network.
NRCS Technical Notes Adaptive Management

Agronomy Technical Note No. 7

Adaptive Nutrient Management Process

Agronomy Technical Note No. 10

Adaptive Management for Conservation Practices

http://directives.sc.egov.usda.gov/
Under Technical Notes>Title 190>Agronomy
Supporting Reference Material

329 No Till

Introduction and Purpose
Adaptive management is a systematic process to collect, monitor, analyze, and learn from results of evaluations of practices conducted on growers’ fields. The goal of the adaptive management approach is to test and evaluate how a practice can best be applied on a given farming operation or site condition.

Guidelines for Adaptive Management Application for No Till:
2. The evaluation should be carried out for at least 3 years and preferably on the same area each year. There may be cases where this is not practical.
3. The application and hypothesis of at least one variable must address and meet the criteria and specifications of the CPS Code 329, Residue and Tillage Management, No Till, for at least one of the purposes. Example trials/evaluations may include:
   a. Compare no till vs. conventional till or multi till.
   b. Compare no till in a cover crop to no till without a cover crop.
   c. Compare different no till or mulch till planting types or configurations (e.g., cross slot planting vs. no till drill).
   d. Evaluate different cover crops or residue levels.
   e. Evaluate crop yield vs conventional till.
4. The evaluation should include the services of a consultant with knowledge of no till farming to help plan the evaluation, layout the plots, monitor the plots during the season, assist in gathering the required data (yield, soil tests, residue counts, soil health measurements, etc.), and analyze the data that will support the purpose of the evaluation.
5. The evaluation can focus on one or more results, e.g., may collect data on not only yield but also changes in soil health parameters (aggregate stability, infiltration, organic matter, etc.).
6. Analyze the data each year and at the end of the trial period, usually 3 years.
7. The annual and final results and analysis should be jointly reviewed with NRCS, the grower, and consultant involved.

345 Reduced Till

Introduction and Purpose
Adaptive management is a systematic process to collect, monitor, analyze, and learn from results of evaluations of practices conducted on growers’ fields. The goal of the adaptive management approach is to test and evaluate how a practice can best be applied on a given farming operation or site condition.

Guidelines for Adaptive Management Application for Reduced Till:
2. The evaluation should be carried out for at least 3 years and preferably on the same area each year. There may be cases where this is not practical.
3. The application and hypothesis of at least one variable must address and meet the criteria and specifications of the CPS Code 345, Residue and Tillage Management, Reduced Till, for at least one of the purposes. Example trials/evaluations may include:
   a. Compare no till vs reduced till.
   b. Compare reduced till with a cover crop to mulch till without a cover crop.
   c. Compare different mulch till types or configurations to compare yield and surface residue management.
   d. Evaluate different residue management practices.
   e. Evaluate different tillage practices.
   f. Compare reduced till vs conventional till.
4. The evaluation should include the services of a consultant with knowledge of reduced till farming to help plan the evaluation, layout the plots, monitor the plots during the season, assist in gathering the required data (yield, soil tests, residue counts, soil health measurements, etc.), and analyze the data that will support the purpose of the evaluation.
5. The evaluation can focus on one or more results, e.g., may collect data on not only yield but also changes in soil health parameters (aggregate stability, infiltration, organic matter, etc.).
6. Analyze the data each year and at the end of the trial period, usually 3 years.
7. The annual and final results and analysis should be jointly reviewed with NRCS, the grower, and consultant involved.

340 Cover Crop

Introduction and Purpose
Adaptive management is a systematic process to collect, monitor, analyze, and learn from results of evaluations of practices conducted on growers’ fields. The goal of the adaptive management approach is to test and evaluate how a practice can best be applied on a given farming operation or site condition.

Guidelines for Adaptive Management Application for Cover Crops:
2. The evaluation should be carried out for at least 3 years and preferably on the same area each year. There may be cases where this is not practical.
3. The application and hypothesis of at least one variable must address and meet the criteria and specifications of the CPS Code 340, Cover Crop, for at least one of the purposes. Example trials/evaluations may include:
   a. Compare cover crops vs no cover crop.
   b. Compare species of cover crops.
   c. Compare a mixture of cover crops vs single species.
   d. Compare 2 different termination methods or tillage.
4. The evaluation should include the services of a consultant with knowledge of cover crops to help plan the evaluation, layout the plots, monitor the plots during the season, assist in gathering the required data (yield, soil tests, residue counts, soil health measurements, etc.), and analyze the data that will support the purpose of the evaluation.
5. The evaluation can focus on one or more results, e.g., may collect data on not only yield but also changes in soil health parameters (aggregate stability, infiltration, organic matter, etc.).
6. Analyze the data each year and at the end of the trial period, usually 3 years.
7. The annual and final results and analysis should be jointly reviewed with NRCS, the grower, and consultant involved.
Adaptive Management Process

1. Step 1 Plan
2. Step 2 Implement
3. Step 3 Evaluate
4. Step 4 Adjust
Conducting on-farm field trials – a process:

- **Planning**
  - Developing a hypothesis—“If I make this change, I expect these results.”
  - Planning of replicated plot trials.
  - Determining the resources needed to carry out the plot trials.
  - Measuring or “laying out” the replicated plot trials in the field.

- **Implementing**
  - Establish / Install
  - Collecting data important to the evaluation of your hypothesis (may involve multiple data collections throughout the year).

- **Evaluate**
  - Analyzing & Summarize the data collected.

- **Adjust**
  - Conclusions, “Adapting”.
What does it look like?

Table 1  Plot trial with two treatments replicated four times

<table>
<thead>
<tr>
<th>Replication 1</th>
<th>Replication 2</th>
<th>Replication 3</th>
<th>Replication 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>B Treatment</td>
<td>A Treatment</td>
<td>B Treatment</td>
<td>A Treatment</td>
</tr>
<tr>
<td>A Treatment</td>
<td>A Treatment</td>
<td>A Treatment</td>
<td>B Treatment</td>
</tr>
</tbody>
</table>

Replications improve accuracy of the results
Provides better information to make decisions
Adaptive Management

Single Producer

Multiple Producers
Adaptive Management - The Learning Process

- **Producer Involvement** on Their Land & Their Question or Opportunity with a Consultant

- **Data** is collected, summarized, analyzed, and presented in a format that gives context and meaning to the farmer.
  - A process is provided to determine LSD

- Options for **Farmer Interaction**
  - Individual Farmers
  - Farmer Group – up to about 20 producers
    - Present data and “facilitate” producers to discuss, ask questions, propose improvements
NRC S Assistance

- Technical Support
  - Conservation Planning
  - Plan new practice/technology
- Financial Support via EQIP
  - Current Eligible Practices
    - CPS 590 Nutrient Management
    - CPS 329 Residue Management, No Till
    - CPS 345 Residue Management, Reduced Till
    - CPS 340 Cover Crops
Adaptive Management

Opportunities: Win-Win

• For the Producers
  • Try and evaluate new practices and technologies
  • Minimize risk
  • Make sound decisions

• For Consultants and Ag Retailers
  • Technical service
  • Promotes new technology
  • Develops experiences that can improve your services

Helping People Help the Land
Sound Agronomy ➔ Healthy Environment