Using the Adapt-N Tool
A preview of the web-interface

Jeff Melkonian, Laura Joseph, Bianca Moebius-Clune, Harold van Es

http://adapt-n.cals.cornell.edu/
I. Logging into Adapt-N
II. Adding fields to your account
III. Entering data for a field
IV. The Adapt-N Report
V. Modifying field information
I. Logging into Adapt-N

1. E-mail Jeff Melkonian (jjm11@cornell.edu) for a username and password

2. Click the Sign in button from the main website (adapt-n.cals.cornell.edu)

3. Enter username and password and click Log in button
First Steps on the Adapt-N Interface

The “Manage Locations” tab allows the user to:

- Define a new locations (‘Location’ refers to a field, or a subunit of a field, for which the user wants to get an N recommendation)
- Modify (edit, copy or delete) locations (section V.)
- Select a location (to enter/change field data and run a simulation)
II. Adding fields (Locations) to your account

1. Click on “Setup New Location” and find your longitude and latitude via given link

2. Select the season and assign a unique location name

3. Enter longitude and latitude to the 4th decimal place (0.0000) – if you don’t have GPS coordinates, use the link provided here to get them. Then click ‘Setup New Location’.
III. Selecting a Location for data entry & simulation

To access previously entered fields (Locations), click on Select Location. Select:
- Growing season
- Group (see section V.)
- Location (listed by unique name given when the location was defined)

All inputs for that location are loaded once selected, and information can be provided or edited in the ‘Mineral Nitrogen/Cultivar’, ‘Soil/Tillage’ and ‘Manure/Sod/Soybeans’ tabs.
A tabbed menu for each location allows you to enter the appropriate management information in each category (1). Most items are entered using drop-down menus (2) and pop-up calendars (3).
Entering Management Info for a Location

Mineral Nitrogen/Cultivar Tab – enter all info.

Choose whether Northeast or Iowa Location is being simulated

Click on arrow to enter additional fertilizer applications (up to 4 for current growing season). Each application is entered in a separate screen – see next page.

Sample drop down menu

Click on Soil/Tillage Tab when done entering info on this page.
1. Choose fertilizer type

2. Enter amount and depth of placement
Entering Management Info for a Location

Soil/Tillage Tab—enter all info

Choose soil texture class (for the Northeast) or soil series (for Iowa)

Choose tillage system, and, if some kind of conservation tillage, choose residue remaining on surface

Click on Manure/Sod/Soybean Tab when done entering info on this page.
For Northeast locations, up to 3 manure applications/year for two previous years and 3 for the current year (Jan 1 onward) can be entered. Note that for Iowa fields, only previous fall (from October 1) and current year manure applications can be entered.
Entering Management Info for a Location
Manure Application Info – enter all info for each application if applicable

Adapt-N: A tool for adaptive nitrogen management in corn production.

Please complete the requested information and then click on the submit button.

- Date 04/15/2011
- Incorporated into soil within 1 day
- Manure Added (gal/acre) 10000
- Ammonium N Analysis (lbs/1000 gals) 12
- Organic N Analysis (lbs/1000 gals) 9
- 3%

Click ‘Submit When Complete’ when done entering info for each manure application, then select additional applications in the Manure/Sod/Soybean tab if appropriate.
Entering Management Info for a Location
Manure/Sod/Soybean Info – enter remaining info

If coming out of sod:

- Select Manure Application

N from Sod Rotation
- Previous sod crop in the past three years?
  - Sod terminated in 2010
- Date: 04/06/2010
- % of N from Sod Rotation: 26-50%

- Select Termination Method:
  - Plowdown

Previous Soybean Crop
- First year corn after soybean?
  - No, did not plant soybeans last year

When done entering all field info, click ‘Submit’ to run the simulation.
IV. Adapt-N Results Page

1. Example with need for sidedress N

Sidedress Nitrogen Recommendation: 100 lbs N/Acre (91 - 118 lbs N/Acre)

This recommendation is based on an “Expected Yield” entry that is assumed to be the economically optimum yield for this field. The recommended range reflects the uncertainty with post-application fertilizer losses for the remainder of the growing season due to unknown future weather events. This uncertainty decreases with the progression of the growing season.

1. Calculation of Sidedress N Rate

\[ \text{Sidedress N rate estimated by AdaptN} = \text{CropNHarvest} - \text{CropNCurrent} - \text{SoilNCurrent} - \text{SoilNpostSidedress} - \text{SoybeanNCredit} + \text{Losspostapplication} \]

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CropNHarvest</td>
<td>164 lbs N/acre</td>
</tr>
<tr>
<td>CropNCurrent</td>
<td>1 lbs N/acre</td>
</tr>
<tr>
<td>SoilNCurrent</td>
<td>45 lbs N/acre</td>
</tr>
<tr>
<td>SoilNpostSidedress</td>
<td>31 lbs N/acre</td>
</tr>
<tr>
<td>SoybeanNCredit</td>
<td>0 lbs N/acre</td>
</tr>
<tr>
<td>Losspostapplication</td>
<td>16 lbs N/acre</td>
</tr>
</tbody>
</table>

Equation used to calculate N recommendation, and values as simulated by the model are provided. Variables are defined in ‘Sidedress N Definitions’ link.

N recommendation is based on daily weather data until day prior to simulation. Uncertainty range (+/- 1.15 SD) indicates potential losses from fertilizer application. Sidedressing at beginning of/during rapid N-uptake phase allows more precise estimation of N needs.

Root Zone Crop Available Water

Note that these estimates are for non-irrigated corn production.

- Current root zone crop available water: 4 inches
- Crop available water at field capacity: 4 inches

- Full Report and Graphs (pdf file)
- Sidedress N Definitions
IV. Adapt-N Results Page

2. Example with excess N in the system

Sidedress Nitrogen Recommendation: **No sidedress N recommended at this time (0 - 0 lbs N/Acre)**

This recommendation is based on an "Expected Yield" entry that is assumed to be the economically optimum yield for this field. The recommended range reflects the uncertainty with post-application fertilizer losses for the remainder of the growing season due to unknown future weather events. This uncertainty decreases with the progression of the growing season.

1. Calculation of Sidedress N Rate

   
   \[
   \text{Sidedress N rate estimated by AdaptN} = \text{CropNHarvest} - \text{CropNCurrent} - \text{SoilNCurrent} - \text{SoilNpostsidedress} - \text{SoybeanNCredit} + \text{Losspostapplication}
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<td>149 lbs N/acre</td>
</tr>
<tr>
<td>SoilNpostsidedress</td>
<td>70 lbs N/acre</td>
</tr>
<tr>
<td>SoybeanNCredit</td>
<td>0 lbs N/acre</td>
</tr>
<tr>
<td>Losspostapplication</td>
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2. Excess N

   Adapt-N has estimated that the seasonal N supplied (all sources) will exceed total crop N demand (CropNHarvest) by at least 10 lbs N/acre.

   Estimated Excess N: **55 lbs N/acre**

   **Root Zone Crop Available Water**

   Note that these estimates are for non-irrigated corn production.

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<td>Current root zone crop available water</td>
<td>4 inches</td>
</tr>
<tr>
<td>Crop available water at field capacity</td>
<td>4 inches</td>
</tr>
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Click on first link to download a full report, including graphs. This pdf can be saved electronically or printed.

In this case no sidedress is needed because there is more than enough N in the system (therefore the range is 0-0lb – it is certain that no more is needed).

Note that the amount of Excess N in the system is provided when applicable.
Adapt-N Results
Sample Full Report (for Example 1.)

A downloadable pdf file provides:

- All user inputs listed for easy record keeping.
- Results from Results page on interface
- Graphs describing N dynamics and relevant weather, soil water and plant parameters
Adapt-N Report

Cumulative N Mineralization
(all organic N sources)

Cumulative N uptake by Crop

For Example 1.
Adapt-N Report

Adapt-N Graphs

Cumulative N Losses & Cumulative N Leaching Losses from Root Zone

For Example 1.
Nitrate-N in top 0-12” of the Root Zone (a simulated daily PSNT value) & All inorganic N available in the full Root Zone

For Example 1.
Adapt-N Graphs

Growing Season Daily Rainfall & Cumulative Rainfall

For Example 1.
Adapt-N Graphs

Post-Emergence Growing Degree Days & Leaf Number
For Example 1.
Adapt-N Graphs

Growing Season Average Temperature

For Example 1.
V. Modifying Field Information

Overview of options

<table>
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<th>Manage Locations Tab</th>
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There are a number of ways locations, and the groups they are in, can be edited in batches (in addition to edits that can be made to a single location by loading it).

- Locations can be **deleted** if they are no longer needed.
- Locations can be **copied** or **edited**.
- Locations can be **assigned to a group**.
V. Modifying Field Information

Copying locations

Locations can be copied. This could be useful for a number of applications. For example: 1) creating sub-fields for different soil-types or management history in the same field for site-specific N application, or 2) saving time when creating a large number of fields that have very similar management history – the longitude/latitude...
Locations can be **edited** in batches. This can save time for various applications. For example: 1) editing latitude/longitude, soil test, or soil type info for newly created locations that are copies of another location, 2) adjusting expected yield for all fields based on new information.
V. Modifying Field Information

Editing information for locations in batches

- Select Location

Modify Location

- Growing Season: 2011
- Action: Edit Location
- Expected Yield
- Group: NY locations

Location | Action | Yield Information | Update Button | status
---|---|---|---|---
1stYearCorn | Grain Cultivars (bu/acre) | 170 - 190 | Save Update | 
CommunityGardn | Sweet Corn (fresh market) (ears/acre) | 15000 - 17000 | Save Update | 
NWAltmarPulaski | Sweet Corn (processing) (tons/acre, unhusked) | 9 - 10 | Save Update | 
SENY | Grain Cultivars (bu/acre) | 150 - 170 | Save Update | 
SENYWoodstock | Silage Cultivars (tons(65% moisture))/acre) | 21 - 23 | Save Update | 
testfield1 | Silage Cultivars (tons(65% moisture))/acre) | 17 - 19 | Save Update | 

- Setup New Location

Log Off
V. Modifying Field Information

Creating groups of locations

Locations can be **assigned to a group**. For example: 1) A grower might put subunits of a field with different soil types into one group. 2) A consultant might put each client’s fields into a group. Locations are ungrouped when set up.
Questions?

Please contact the Project Coordinator
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Thanks to our funders

The development and testing of the Adapt-N tool was supported through funds from USDA-NIFA Special Grants on Computational Agriculture (U.S. Rep. Maurice Hinchey-NY) and the Agricultural Ecosystems Program (U.S. Rep. Maurice Hinchey-NY), a USDA Natural Resources Conservation Service Conservation Innovation Grant, New York Farm Viability Institute, and the Northern New York Agricultural Development Program.