

2012 CMDC

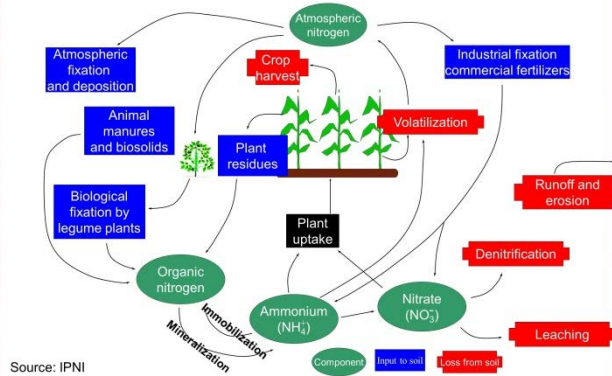
In-Season N Application Using Canopy Sensor FRANCIS and SCHMER

Use & Copyright The materials in this document were developed by and for use by University of Nebraska–Lincoln Extension in the Institute of Agriculture and Natural Resources. The materials are copyrighted by the Board of Regents of the University of Nebraska–Lincoln on behalf of the University of Nebraska-Lincoln Extension. All rights are reserved. Copies may be printed for individual personal use; however, these materials cannot be republished in print, on another Web site or used commercially without prior written permission. To seek permission to print a publication for educational use, please email us at dpittman1@unl.edu.

Disclaimer Reference to commercial products or trade names in these publications is made with the understanding that no discrimination is intended and no endorsement by University of Nebraska-Lincoln Extension is implied.

© 2012 University of Nebraska-Lincoln Extension CMDC

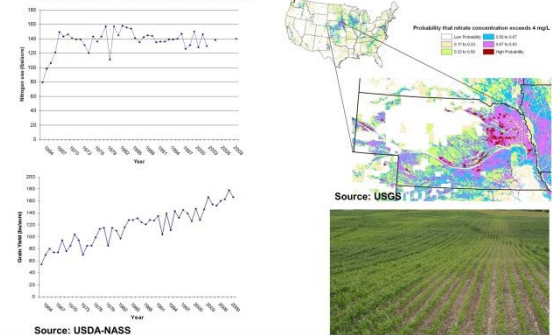
The Nitrogen Cycle



2012CMDC-7-18-FrancisSchmer (1)

Nitrogen and Yield Trends

Nebraska Yield and Fertilizer Trends



2012CMDC-7-18-FrancisSchmer (2)

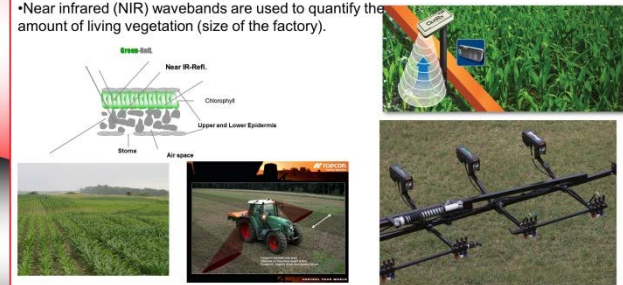
Ag Trends and Sensor Technology

- **Increase availability of high clearance sprayers**
- **Increase use of precision ag technology**
- **Mature support network for sensors**
- **Customizable and automatic**

2012CMDC-7-18-FrancisSchmer (3)

Crop Sensor Types

- Specific wavebands are used to characterize the desired plant attributes.
- Visible wavebands (red, amber, or green) are used to quantify photosynthetic capacity at the time of sensing.
- Near infrared (NIR) wavebands are used to quantify the amount of living vegetation (size of the factory).

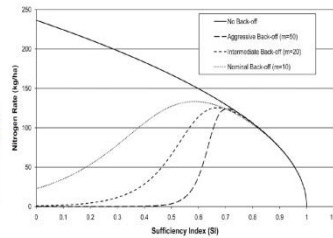
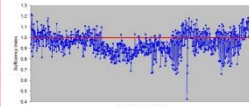


2012CMDC-7-18-FrancisSchmer (4)

Sensor Algorithm

$$N_{\text{applied}} = (N_{\text{optimum}} - N_{\text{credits}}) \sqrt{\frac{(1 - SI)}{\Delta SI}}$$

$$\text{Sufficiency Index} = \frac{\text{Sensed crop}}{\text{non-N limited crop}}$$



Holland and Schemers, 2010

2012CMDC-7-18-FrancisSchmer (5)

Summary

- **Match fertilizer inputs to crop need**
 - **Economics**
 - **Reduce environmental risk**
- **Improve decision making**
- **Optimize field level management**
 - **Information to identify spatial and temporal trends**

2012CMDC-7-18-FrancisSchmer (6)