nutrient stewardship

Implementing the 4Rs:
Engagement, Resources & Examples

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The Fertilizer Institute
Nourish, Replenish, Grow

30 Years 1982 • CTIC • 2012

Essential Goal of Agriculture

- Simultaneously improve productivity & efficiency
  - Increasing societal demands
  - Global financial stress
  - Growing concerns on impact to air and water quality
- Efficiency without productivity
  - Increases pressure to use marginal lands
- Productivity without efficiency
  - Squanders resources & increases environmental impact

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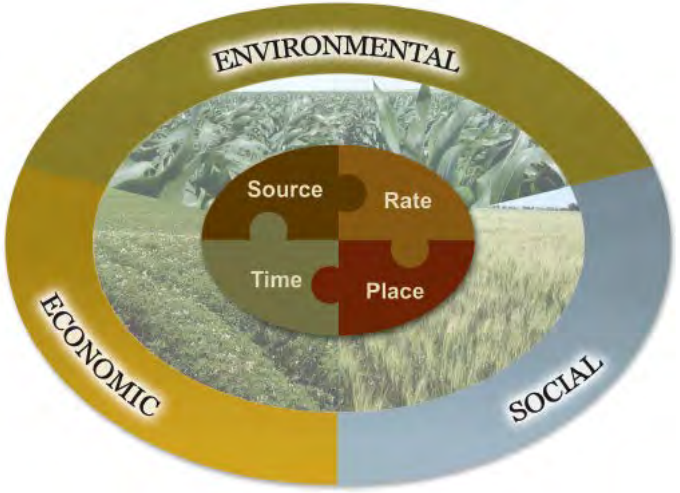
U.S. Department of Agriculture

Upper Mississippi River Basin, Chesapeake Bay, and Great Lakes CEAP report:

- Increase complete and consistent use of nutrient management (proper rate, form, timing, and method of application)
  - 53-80% of the cultivated cropland require additional nutrient management to reduce the loss of N or P from fields
- Nutrient losses are acceptable when practices for soil erosion are paired with management of rate, form, timing, and placement of nutrient application to maximize nutrient availability for crop growth while minimizing environmental losses
  - Suites of practices to reduce soil erosion and manage nutrients are required to simultaneously address soil erosion and nutrient loss

4R Nutrient Stewardship

- Improve agricultural production while contributing to social well being and minimizing environmental impacts (benefits water and air quality)



- 4R represents the use of fertilizer Best Management Practices to ensure:
  - the right source
  - at the right rate
  - at the right time
  - in the right place

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4R Nutrient Stewardship

- Match nutrient supply with crop requirements and to minimize nutrient losses from fields
- BMPs effecting fertilizer are site specific
- Prevention vs. mitigation
  - Fertilizer BMPs help prevent nutrient losses from occurring
  - 4Rs work in conjunction with other conservation practices and ‘green infrastructure’

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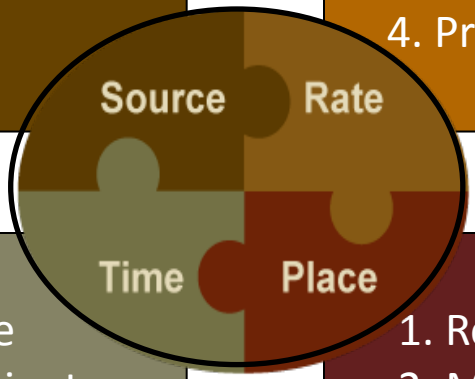
Framework for management systems and education based on basic universal scientific principles

1. Supply in plant available forms
2. Suit soil properties
3. Recognize synergisms among elements
4. Blend compatibility

1. Appropriately assess soil nutrient supply
2. Assess all available indigenous nutrient sources
3. Assess plant demand
4. Predict fertilizer use efficiency



1. Assess timing of crop uptake
2. Assess dynamics of soil nutrient supply
3. Recognize timing of weather factors
4. Evaluate logistics of operations

1. Recognize root-soil dynamics
2. Manage spatial variability
3. Fit needs of tillage system
4. Limit potential off-field transport

4R nutrient stewardship

Example Fertilizer BMPs

- Source
  - Select appropriate fertilizer nutrient source
  - Consider fertilizer form for soil type and conditions
  - Consider fertilizer form for application time
  - Consider enhanced efficiency fertilizers
- Rate
  - Grid or zone soil testing for rates
  - Nutrient budgeting to plan management and application
  - Address spatial variability with variable rate application technology
  - Use in-season methods for in season rate decisions

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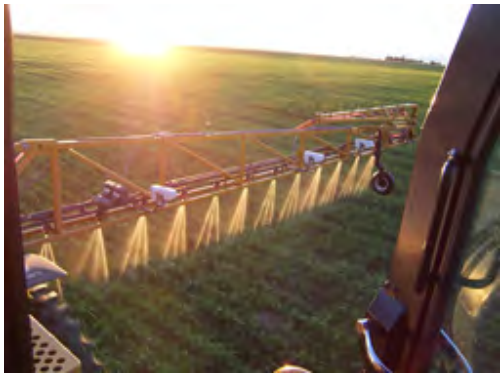
Example Fertilizer BMPs



- Time
  - Follow recommended times for nutrient applications
  - When necessary utilize enhanced efficiency fertilizers for controlled nutrient release and urease or nitrification inhibition
  - Utilize split applications to improve crop nutrient uptake.

- Place
  - Utilize application methods that limit nutrient losses
  - Incorporate fertilizers
  - Adjust applications to avoid unnecessary applications to non-crop areas
  - Couple applications with appropriate soil conservation practices
  - Utilize controlled drain management in tile drained fields.

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Grower Examples

- The Fertilizer Institute's "4R Advocate Program"
  - http://www.nutrientstewardship.com/4r-advocate
  - Recognize producers and retailers utilizing 4Rs
  - Engage producers and share success stories

- Conservation Technology Information Center's "Indian Creek Project"

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4R Advocate

Favinger Farms is a corn and soybean operation.

Grower: Bruce Favinger (above)
Location: Minden, Nebraska
Retail Facility: Cooperative Producers, Inc.
Crop Advisor: Ty Fickenscher
Retailer Location: Hastings, Nebraska

Cropping System Objectives:
Use emerging tools and technologies to maintain responsible and sustainable agriculture.

BEST MANAGEMENT PRACTICES IMPLEMENTED ON THE FARM:

- Grid soil samples all acres for variable rate application of nutrients to help determine the right rate and right placement of nutrients
- Account for nutrient credits from the previous year to help determine the right rate
- Utilize split application of nitrogen, pre-season urea applications followed by liquid UAN as either a pre-plant or side-dress to assure the right rate is available at critical growth stages for the crop and to minimize N loss to volatilization and leaching
- Use GPS technology to avoid skips and prevent over-application
- Deploy variable rate seeding to maximize yield while controlling input costs
- Utilize nitrogen stabilizers for liquid and dry fertilizers
- Use phosphate efficiency enhancement additives to maximize benefit of the fertilizer and minimize build up of unused nutrients in the soil
- Utilize CPI's technology-driven decision-making tool (CPI-300) for precision agriculture decision making to enhance producer profitability and environmental stewardship
- Plant 800 acres of cover crops to help naturally control weeds and to hold moisture and nutrients in the soil
- Auto steer and GPS guidance is used on all field operations and spraying applications
- Use plant tissue testing to evaluate effectiveness of the fertilizer program and as a diagnostic tool when needed
- Use satellite imaging to help with yield potential and fertilizer plans
- Test irrigation water on some fields for nitrogen content and adjust application rates of fertilizer as needed
- Utilize irrigation management to avoid over or under watering

FORMS OF NUTRIENTS APPLIED:

No fall applied nutrients

Preplant	Variable rate dry fertilizer applied based on of the grid samples
Planting	In furrow application of starter fertilizer (usually 5 gallons of 10-34-0)
Preemerge	Application of 32% nitrogen with herbicide (usually 10 gallons / acre)
Sidedress	Final application of 32% nitrogen is injected into the soil with a coulter / knife combination
Irrigation	If needed will apply some product through pivot systems (usually Thiosulfate)

NUTRIENT USE EFFICIENCY: We have been using 0.9 pound of N per bushel of expected yield

Average Yield for Each Crop:

Corn yields average between 224 and 260 bushels / acre

Soybean yields average between 62 and 81 bushels / acre

4R Advocate

Chestnut Manor Farm is a 2,200 acre corn and soybean operation with 700 acres irrigated cropland and 150 head of beef cattle.

Grower: Temple Rhodes (above)
Location: Centreville, Maryland
Retail Facility: Willard Agri-Service of Lynch
Crop Advisor: Allen Spray
Retailer Location: Worton, Maryland

Cropping System Objectives:
Make cropping decisions that result in higher nutrient use efficiency and increase farm profitability.

BEST MANAGEMENT PRACTICES IMPLEMENTED ON THE FARM:

- Utilize Willard Agri-Service decision support tool, HighQ, to make better overall cropping decisions that result in higher nutrient use efficiency and profitability
- Use RTK guidance to enable better implementation of precision practices
- Implement strip tillage and banding of fertilizer to ensure the right placement of critical nutrients and minimize the risk of erosion and runoff
- Utilize soil maps for variable rate application of fertilizer and seed populations to ensure the right rate is matched to each productivity environment on the farm
- Inject liquid N, P and K 6-8 inches underground to prevent runoff and volatilization
- Utilize a nitrogen stabilizer to further reduce risk of N loss
- Implement fertigation on irrigated acres to apply nutrients to the most productive field areas
- Tissue sample throughout the season to assess and add plant nutrition for each stage of plant development for N, P and K as well as minor elements
- Use Daikon forage oilseed radishes as cover crops to reduce soil compaction and retain residual N, P and K through winter; in addition these cover crops minimize tillage and erosion

FORMS OF NUTRIENTS APPLIED:
Custom blend of ammoniacal nitrogen, liquid phosphorous and potash that are mixed with proven nitrogen inhibitors. Minor elements are added based on soil and tissue results and are derived from highly plant available ammoniated or chelated sources. These are balanced to ensure maximum uptake of both the minor and macro elements.

NUTRIENT USE EFFICIENCY: Documented a 17% improvement in nutrient use efficiency of nitrogen even in drought conditions by utilizing a 4R management approach. This involved strip tillage and banding of custom liquid blends and the use of stabilizers and biostimulants.

Average Yield for Each Crop:

Corn Yields = 150 bushels / acre
Soybean Yields = 40 bushels / acre (Full Season and Double Crop Beans Combined)
Wheat Yields = 70 bushels / acre

Economic Measure of Savings: Improved nitrogen use efficiency has returned proven yield increases in corn, resulting in well over $106 / acre returns on the same investment in fertilizer. We have reduced on average 2 trips over the field resulting in at least a $30 / acre labor and equipment savings. Variable rate technology has helped us utilize the same amount of fertilizer and seed and realize higher yields.

4R Advocate

Operation consists of 2,300 acres of corn, soybean and wheat; also finish 25,000 pigs

Grower: Todd Welch (above)
Location: Lafayette, Indiana
Retail Facility: Crop Production Services
Crop Advisor: Nick Sommers
Retailer Location: Delphi, Indiana

Cropping System Objectives:
Maintain and grow the farming operation to preserve the history, heritage and promise of the future for the next generation.

BEST MANAGEMENT PRACTICES IMPLEMENTED ON THE FARM:

- Utilize grid soil samples to create management zones
- Use manure nutrients from the hog operation to meet a fraction of fertilizer needs by applying to acres most in need of P and K
- Utilize Phytase in feed rations to improve phosphorus efficiency in the animal diet
- Utilize amendment to increase availability of P and K throughout the crop year
- Account for manure nutrients and adjust levels of commercial fertilizer to meet remainder of plants' needs
- Utilize variable rate technology to apply commercial fertilizer
- Split apply nitrogen in fall and spring to reduce losses
- Incorporate nitrogen stabilizer with fall ammonia application to reduce losses
- Utilize in-season tissue sampling to obtain a snapshot of plant nutrient needs
- Utilize post-season stalk tests to evaluate nitrogen utilization
- Implement minimum tillage to help build and maintain organic residue
- Plant cover crops to generate organic matter, improve soil tilth, reduce compaction and improve nitrogen management
- Enhance water management through utilization of waterways and tile control
- Install a precision planter system for better seed placement and spacing

FORMS OF NUTRIENTS APPLIED:
Swine manure, N-Serve with fall ammonia, ESN, Potash, Urea, Microessentials (MESZ), Black Label Zn Pop-Up Fertilizer

NUTRIENT USE EFFICIENCY: 0.78 lbs N applied / bushels, 1.23 lbs P applied / bushels

Average Yield for Each Crop:

Corn Yields = 185 bushels / acre
Soybean Yields = 60 bushels / acre

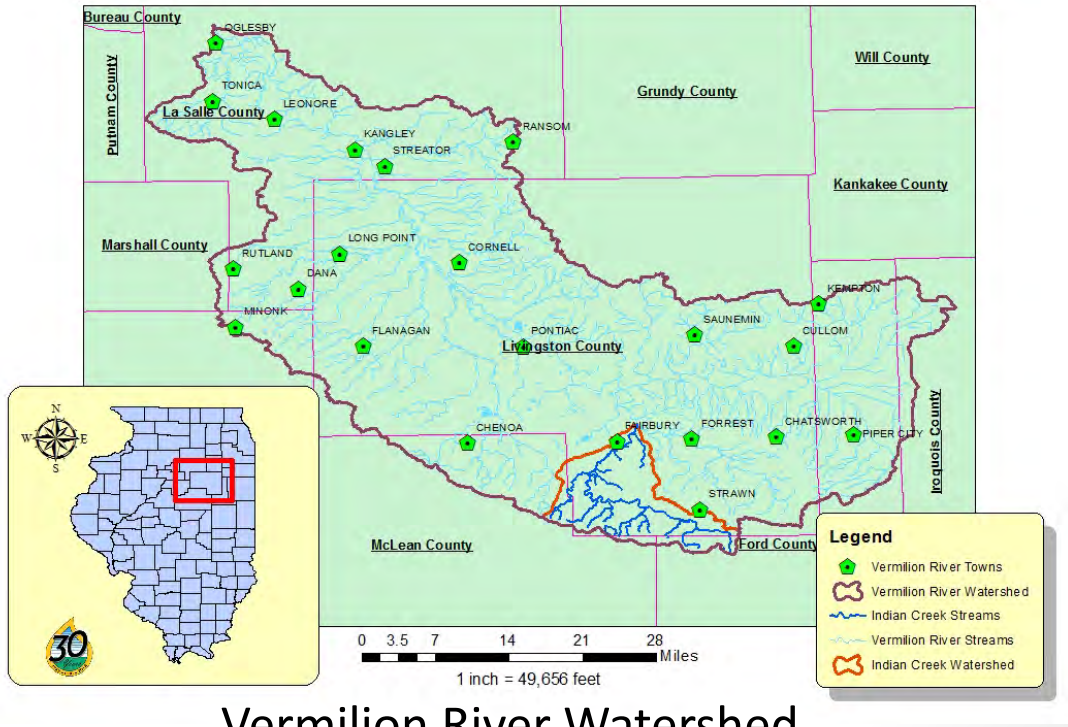
Economic Measure of Savings: By giving an accurate credit for the manure application, we have reduced the commercial fertilizer needs in a building plan by $94 per acre over a 4-year time period. This allows us to free up cash flow to build the low areas in the fields, making us more accurate and efficient in building the P and K levels in the soils.

Indian Creek Examples

Indian Creek Watershed Project

- Collaborative effort led by watershed farmers who demonstrate and test best conservation practices on their land

Determine water quality impacts that result when 50% of farms and acres in watershed adopt conservation systems



Vermilion River Watershed
Illinois River

www.ctic.org/indiancreek

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Demonstrations & Nutrient Use Efficiency

- Demonstrations
  - 20 acres or more
  - N management practices
  - Applied by farmer
- Nutrient Use Efficiency Calculations
  - Evaluate N management for agronomic, economic, environmental response
  - N rates from 0 to 240 lb N/acre, replicated 4 times in randomized complete block design
  - Based on final crop yield
  - Use Crop Nutrient Response Tool by International Plant Nutrition Institute

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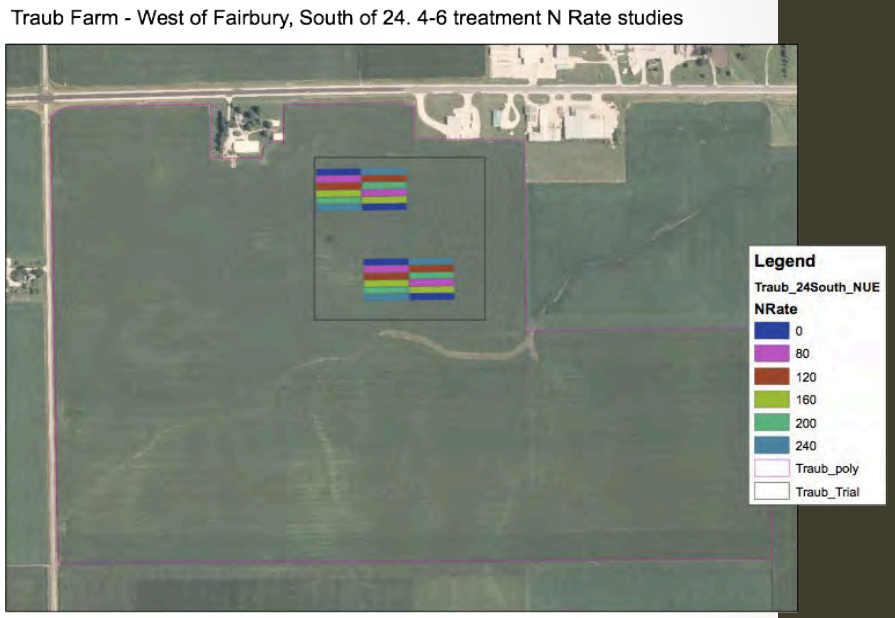
Strip-Till, Strip Application of Anhydrous Ammonia

John Traub Farm



- Fall
  - Till narrow strip
  - Strip application of nutrients
- Spring
  - Plant in strip with RTK guidance
- NUE
  - Farmer's equipment
  - Precise treatment layout with precision equipment
  - Yield data extracted using GIS

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Strip-Till, Strip Application of Anhydrous Ammonia

Crop Nutrient Response Tool (CNRT) v4.1

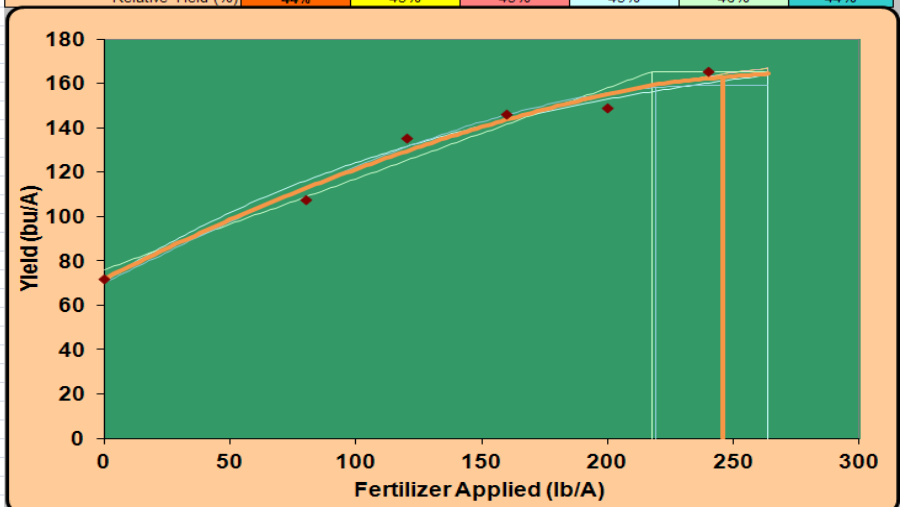
Step 1: Enter rate and yield data.
Step 2: Click the Fit button.
Step 3: Adjust crop and fertilizer prices.
Step 4: Click to append information to summary.

Site Details	
Site	Traub
Year	2011
Town	
County	Livingston
State or province	
Latitude	
Longitude	
Altitude	
Soil texture class	
Preceding crop	
Expected Yield (bu/A)	200
Timing and placement	Fall Strip
Tillage	
Site degree-days	
Crop species	Corn
Cultivar	
PSNT (ppm)	
Manure N (lb/A)	
Planting date	
Harvest date	
Crop ($/bu)	6.00
Fertilizer ($/lb)	0.55
Price ratio (f/c)	0.092
Crop N content (lb/bu)	0.70
N harvest index	0.67
Fertilizer source	

Append site information to summary

Fertilizer rate, lb/A	Crop Yield, bu/A
0	71.7992168
80	107.62509
120	135.185661
160	145.945572
200	148.912857
240	165.266646

Fit	R²-weighted Mean	Quadratic (Q)	Quadratic-Plateau (QP)	Mitscherlich (M)	Linear-Plateau (LP)	Spherical (SP)
A:		71	71	186	76	70
B:		0.59	0.59	-115	0.41	89
C:		-0.0009	-0.0009	-0.006	165	240
R^2:		99%	99%	98%	97%	98%
MERN (lb/A):	246	264	264	264	218	219
Yield @ MERN (bu/A)	163	167	167	164	165	158
Partial Factor Productivity (PFP)	0.66	0.63	0.63	0.62	0.76	0.72
Agronomic Efficiency (AE_N)	0.37	0.36	0.36	0.35	0.41	0.40
Partial N Balance (PNB):	46%	44%	44%	43%	53%	50%
Recovery Efficiency (RE_N)	39%	38%	38%	37%	43%	42%
Delta Yield (bu/A)	91	96	96	93	89	88
Relative Yield (%)	44%	43%	43%	43%	46%	44%



NUE Calculations using the IPNI Crop Nutrient Response Tool.
Optimum N rate about 246 lb N/acre

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Late-Season Top-Dress Application of Urea

Marcus Maier Farm

- Spring
  - 140 lb N/acre applied pre-plant
  - Second application at V-8 stage with Agrotain Plus Treated Urea
- NUE
  - Analysis on second application

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Late-Season Top-Dress Application of Urea

Minor crop injury from urea with Agrotain-Plus.

Close-up viewing showed minor injury; mostly margins of leaves that were in whorl at application.

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Source (N &P) and Rate

Steffen Farm

Corn after corn no-till

- Spring
  - Surface-applied urea vs SUPERU (controlled-release N)
  - MicroEssentials side-dress
- NUE
  - SUPERU returned $106/acre more than untreated urea
  - SUPERU showed best agronomic efficiency of all products in trials
  - MicroEssentials showed 7-bushel yield response
  - Phosphate applied under soil surface has potential to reduce P runoff

NRCS - 4Rs in 590 Standard

- NRCS incorporated 4Rs in the revised 590 Nutrient Mgmt. conservation practice standard
- 590 Std. an important NRCS tool
- Used to help farmers apply nutrients more efficiently
- With 590 as base, NRCS will offer voluntary technical and financial assistance to producers for planning and implementing on-farm nutrient management plans

NRCS 590 Nutrient Mgmt. Std.

- From 590 “Nutrients must be applied with the right placement, in the right amount, at the right time, and from the right source to minimize nutrient losses to surface and groundwater.

- NRCS Chief White – “If we can get those four R's right, we will have gone a tremendous way towards:
  - maximizing the efficiency of fertilizer
  - helping protect the environment
  - saving producers money

Current State Efforts Using 4Rs

- Illinois – KIC 2025
- Ohio – 4Rs as the Foundation
- Pennsylvania – 4R Alliance
- Missouri – 4Rs for Fertilizer
- Indiana – Stakeholders take Lead

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Illinois – KIC 2025

KIC 2025
Keep It for the Crop by 2025

- Ag stakeholders created "KIC" as a strategy for NPS ag
  - Needed strategy to put forth for ag
  - IL EPA accepted "KIC" as ag component of NPS strategy
- Ag stakeholders: IL CBMP
  - Illinois Corn Growers, Illinois Farm Bureau, Illinois Fertilizer & Chemical Association, Illinois Soybean Association, Illinois Pork Producers and Syngenta Crop
- KIC established goals for reducing nutrient losses from ag through adoption of the 4Rs
- Seeks to – educate, dedicate research resources, and measure

Illinois Nutrient Research & Education Council

C-BMP
Illinois Council on Best Management Practices

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Illinois – NREC

- Provides funding for “KIC” and the following priorities:
  - Reinvesting in critical nutrient research to sustain soil fertility and enhance yields
  - Determine BMPs to reduce nutrient losses from applied fertilizer
  - Communication and implementation of results
- NREC is a 13 member council – 9 voting members from ag and 4 non-voting members from academia and environmental orgs
- Funded by HB5539/Public Act 97-0960
  - $0.50 – $3 / ton assessment on fertilizer sold

KIC 2025
Keep It for the Crop by 2025

C-BMP
Illinois Council on Best Management Practices

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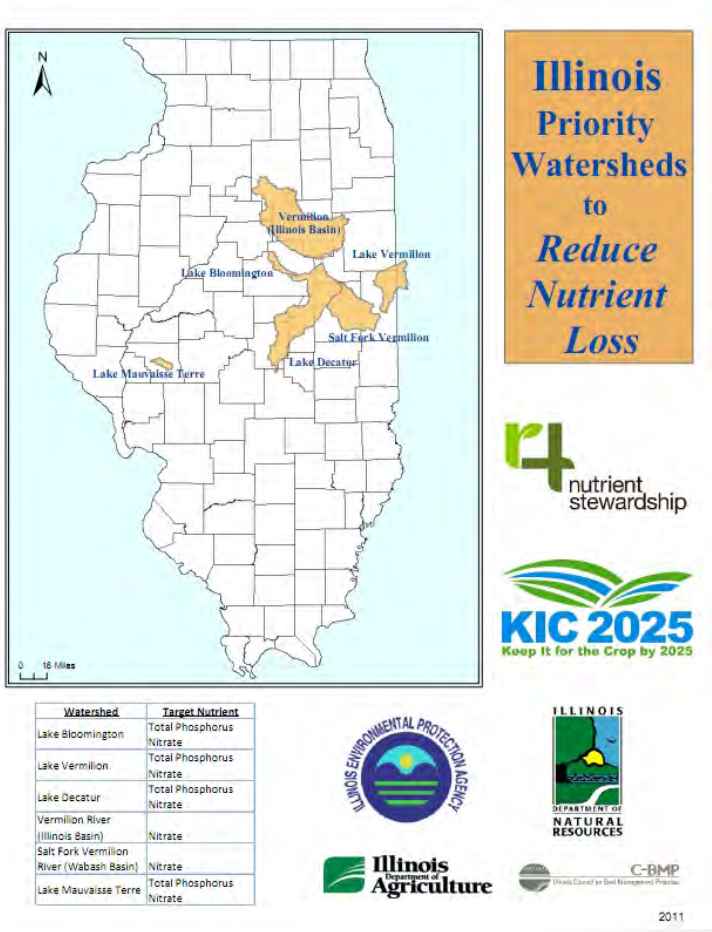
Illinois – KIC 2025 & NREC

- Additional Information
  - http://www.kic2025.org/
  - Direct Questions about KIC by 2025 to:

    Mike Plumer, CBMP Coordinator,
    (618) 364-2219

    Jean Payne, Illinois Fertilizer & Chemical Association,
    (309) 827-2774

    Dan Schaefer, KIC Director of Nutrient Stewardship
    (217) 202-5173



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Ohio – 4R as Foundation

- Summer 2011 – Fertilizer community initiates engagement
- October 2011 – OH Dept. of Ag, OH EPA, OH DNR adopt 4Rs
- March 2012 – Above groups issue final report naming 4Rs Foundation of Nutrient Management
- June 2012 – Healthy Lake Erie Fund, $3M – to help implement 4Rs

The Foundation: 4R Nutrient Management

In October, the Directors established the foundation of their recommendations by encouraging farmers to adopt production guidelines known as 4R Nutrient Stewardship, which is effective in reducing dissolved forms of phosphorus from impacting waterways across the state.

The 4R concept promotes using the right fertilizer source, at the right rate, at the right time, with the right placement. Recent studies indicate that the timing of fertilizer application, and how well it is incorporated into the soil layer, significantly reduces dissolved phosphorus runoff.

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Ohio – 4Rs as Foundation

- November 14, 2012 – OH EPA holds Nutrient Forum Visioning Workshop to:
  - Gather ideas, opinions, and feedback from key stakeholders
  - Convey basic information on current water quality conditions
  - Inform all interest groups of what is being done to reduce nutrient loadings in Ohio's waterways
  - Show that the current state of nutrient issues in Ohio requires new and innovative approaches
  - Establish the *Nutrient Strategy Framework* and the Ohio Nutrient Forum as a way to work together to tackle the problem

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Ohio – Industry Involvement

- Participated in state meetings
- Provided outreach at expos and meetings
- Actively encouraging producers to use the 4Rs
- Supporting research needs
- Developing 4R service provided recognition program

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Learn more about 4R nutrient stewardship at www.nutrientstewardship.com.

KEEP PHOSPHORUS IN YOUR FIELD

THE ISSUE

An aerial photo of a Lake Erie algal bloom on August 19, 2011.
Source: www.glerl.noaa.gov/res/Centers/HABS/western_lake_erie

Historically, commercial fertilizer phosphorus was considered immobile on or in the soil. However, new data suggests fertilizer phosphorus left on the surface when followed by heavy rainfall can also be a major source of phosphorus loading. Research suggests current agricultural practices within the Western Lake Erie Basin contribute to the growing algal crisis, with more than 50 percent of the phosphorus load potentially attributed to agriculture.

THE ACTION

4R nutrient stewardship provides a framework to achieve cropping system goals – increased production, increased farmer profitability, and enhanced environmental protection. To achieve those goals the 4Rs utilize fertilizer best management practices that address the Right Nutrient Source, at the Right Rate, the Right Time, and in the Right Place. The 4R nutrient stewardship principles are the same globally, but how they are used locally varies depending on field and site specific characteristics such as soil, cropping system, management techniques and climate. **The following describes the principles generally, and their specific application to lake-friendly P management.**

RIGHT SOURCE: Ensure a balanced supply of each of the essential nutrients in plant available forms, utilizing all available sources. **Specifically, choose sources of P that can be placed in the soil.**

RIGHT RATE: Assess and make decisions based on soil nutrient supply and plant demand. **Specifically, soil test and determine the P rate appropriate to the crop.**

RIGHT TIME: Assess and make decisions based on the dynamics of crop uptake, soil supply, loss risks, and field operation logistics. **Specifically, avoid applying over snow or frozen soil during mid-winter, and consider replacing fall applications with spring applications where possible.**

RIGHT PLACE: Place nutrients where they are accessible to crops, addressing root-soil dynamics, and managing spatial variability within the field. **Specifically, place P in the soil for each crop, in ways that attain the goals of conservation tillage.**

There is no *single* practice to solve the problem. *Each farm* has different circumstances such as soil type, surface drainage, tile drainage, soil test levels, and tillage programs, which can be modified to make a difference. *Farmers can play a critical role in reducing the algal blooms in Lake Erie and we all need to do our part.*

SUGGESTED PRACTICES TO REDUCE PHOSPHORUS TRANSPORTATION INTO LAKE ERIE

- Inject or incorporate phosphorus when ever possible.
- For low-lying fields that are prone to flooding, delay application to just before planting, and either incorporate, band-place, or inject.
- Avoid spreading phosphorus near tile stand pipes or surface drains.
- Utilize cover crops to improve soil health and increase water holding capacity thereby reducing surface run-off.
- Include starter phosphorus or row fertilizer phosphorus where ever practical.
- Schedule phosphorus broadcast applications when shallow tillage is possible for conventional/reduced tillage programs.
- Schedule phosphorus applications for no-till programs as close to crop utilization as practical.
- Do not schedule phosphorus applications just prior to heavy rainfall.
- Do not schedule phosphorus applications when soils are frozen during mid-winter.
- Do not schedule phosphorus applications when soils are snow covered.
- Soil test to determine nutrient requirements for the next crop.
- Keep fertilizer phosphorus out of ditches, streams and waterways while making application.
- Consider all nutrient sources available to the crop when deciding on how much to apply.

Pennsylvania – 4R Alliance

- Industry-based effort formed as affiliate to PennAg Industries Association
- Support nutrient management and implementation of 590 standard
- Goal - PennAg members and other PA agricultural stakeholders to work with farmers to deliver science-based systems that improve crop productivity through increased nutrient use efficiency and to reduce losses of nutrients to the environment
  - PA 4R Alliance to focus these goals and gain support among farm groups, government agencies, industry and CCAs
  - PennAg received specific expressions of need from farm groups to form the Alliance
  - The government agency stakeholders enthusiastic and supportive of “4Rs are what all farmers should be doing.”

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Pennsylvania – 4R Alliance

- Currently being funded with PennAg member and other stakeholder contributions
- Working with PA NRCS and Penn State Extension, to develop communication strategy
  - Identify and publicize farm 4Rs success stories
  - Designing 4R fact sheets to be utilized in the EQIP & CSP application/contract process to elevate awareness of 4Rs practices for financial and technical assistance
- Working with Conservation District nutrient management technicians, private crop consultants, and fertilizer retailers to create awareness for 4Rs crop management systems to increase nutrient use efficiency

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Missouri – 4Rs for Fertilizer

- State formed a “Nutrient Reduction Strategy Committee”
- Committee has adopted 4R Nutrient Stewardship for NPS agriculture effort
- State is working with stakeholders in the state to develop full strategy

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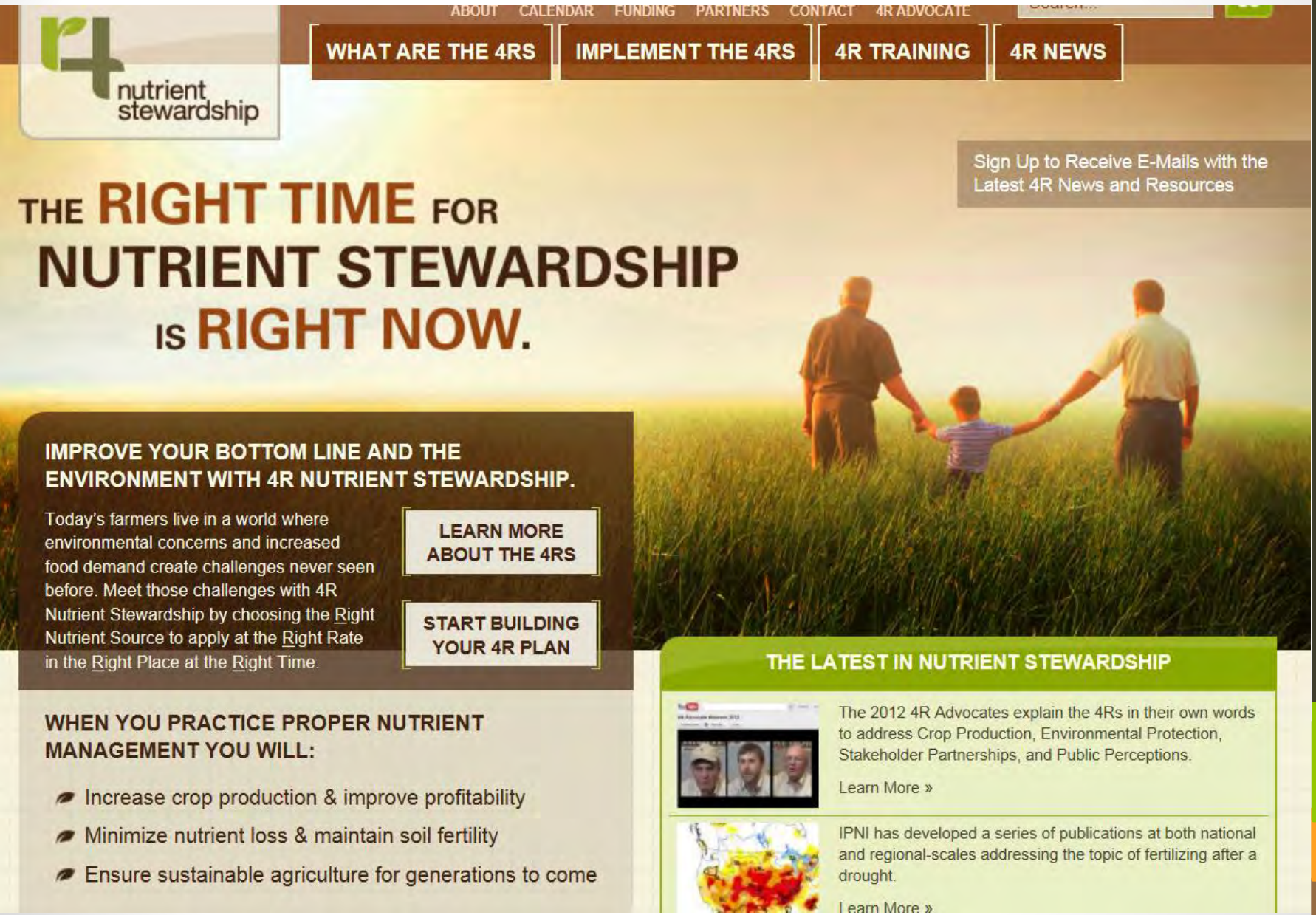
www.nutrientstewardship.org



4R Website Highlights

- Submit info to “Contact Us” to receive the 4R Quarterly Newsletter
- Learn more about 4R practices in “Implement the 4Rs”
  - Fact sheets on each fertilizer BMP
- Learn about resources that can be used for outreach
- Access video content that can be used to educate on the 4Rs

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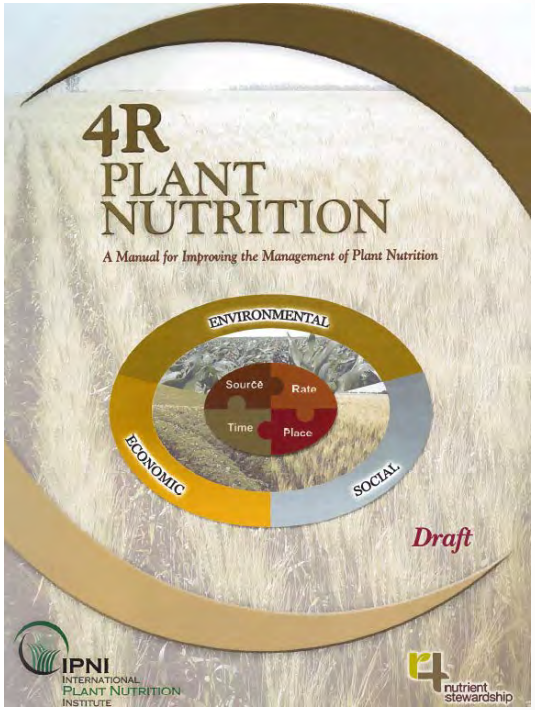
IPNI 4R Manual

- Educate reader on adapting and integrating fundamental agronomic principles into a comprehensive method of nutrient management
- Includes chapters on:
  - Scientific principles and supporting practices for each “R”
  - Approaches for nutrient management planning
  - Measuring sustainability performance
  - Case studies

IPNI
INTERNATIONAL
PLANT NUTRITION
INSTITUTE



http://www.ipni.net/4r

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Upcoming Education Tools

- NRCS 4R/590 On-line Learning Modules
  - Materials developed with ISU, IPNI, NRCS and TFI
  - Addresses major and minor nutrients and provides info on BMPs relative to each
  - Will be available for free in early spring 2013
  - Contact Lara Moody for more details (lmoody@tfi.org)

- CCA Webinar Series based on IPNI Manual
  - 1st webinar series underway
  - 2nd offering January 24th – March 15th
  - TFI and IPNI sponsoring participation of academic, extension and conservation district staff
  - https://www.agronomy.org/education/4r-approach

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CTIC Website

www.ctic.org/indiancreek

CTIC Website

http://www.ctic.org/CTIC HOME/FIND INFORMATION/

CTIC Conservation In Action Tour July 9-10, 2013

2012 CIA Tour Comments:

"The tour was invaluable for me in learning about conservation in agriculture in the US, not only through the tour stops but also the opportunity to meet so many people working in the area."

"Loved networking with other participants."

"This was a very good experience and well worth the time and expense. I will attend in 2013."

Trainor Farm

- Nutrient Use Efficiency plot
- End of tile nitrate monitoring
- Drainage water management

Bachtold Farm

- Nutrient Use Efficiency plot
- Cover crops / Soil pit
- Prescribed grazing

Kilgus Dairy

- Locally grown food
- Confined livestock BMPs

4 nutrient stewardship

Commodity Classic Learning Session

March 1, 2013 12:30 pm – 1:30 pm

Navigating troubled waters:
A community initiative to increase yield and protect resources

- Successfully navigating risks while producing more and protecting resources requires:
  - science-based conservation cropping systems;
  - using the right source, right rate, right time and right place (4Rs) for nutrient management;
  - strategic local partnerships uniting growers, agribusiness, government, advisors and the public in common goals.
  - agricultural advocacy.

- **Speakers:**
  - John Traub, Indian Creek Watershed producer
  - Ron Olson, North American Country Agronomist, The Mosaic Company
  - Dr. Rob Zemenchik, North American Sales & Marketing Manager, Case IH Tillage Products
  - Karen Scanlon, Executive Director, Conservation Technology Information Center

The Fertilizer Institute Nourish, Replenish, Grow | Mosaic | 30 Years 1982 • CTIC • 2012 | CASE IH AGRICULTURE | Agri Drain CORPORATION | 4R nutrient stewardship

Questions?

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- Karen Scanlon – kscanlon@ctic.org

4 nutrient stewardship