



MAKING THE MOST OF YOUR MOST VALUABLE ASSET

Your best asset is right under your feet.
And keeping it healthy is more important than ever.

4R Plus

Nutrient management and conservation for healthier soils.

4R PLUS – IT MEANS DOLLARS AND MAKES SENSE

Healthy soil retains nutrients and moisture – and generates a corresponding rise in productivity, profitability and resiliency. It also can increase the value of your land for the next generation.

4R Plus involves using precise nutrient management to provide nutrients when the crops need them and targeted conservation practices that enhance soil health and improve water quality.

4R Plus is ...

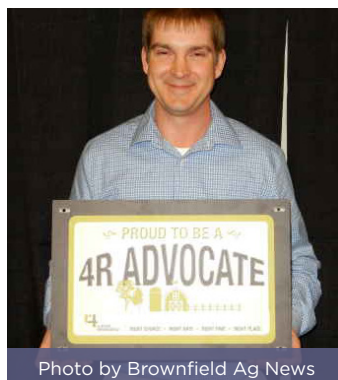
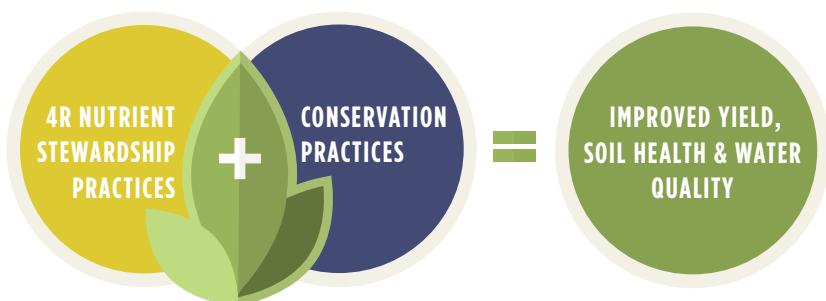


Photo by Brownfield Ag News

"I've been using the 4Rs for some time. I'm able to reduce nutrient runoff by applying them when the crop is ready to uptake them. I also use split-applied nitrogen because I have many soil types and some cannot hold a large amount of nutrients at once. Corn yields have increased by 25-30 bushels/acre using the 4Rs. In 2015, one field averaged above 250 bushels for the first time."

– Darin Stolte, corn, soybean and alfalfa farmer, 2016 4R Advocate award winner, Jones County, Iowa

THE 4RS OF NUTRIENT STEWARDSHIP

A few examples of 4R practices that help keep nutrients in the root zone when the crop needs them are below.



RIGHT SOURCE

Matches fertilizer type to crop needs.

- ▶ All fertilizer sources applied have a guaranteed or known analysis
- ▶ Use controlled, slow-release or stabilized nitrogen blends
- ▶ Apply secondary and micronutrients based on soil and tissue tests



RIGHT TIME

Makes nutrients available when crops need them.

- ▶ Split-apply nitrogen to increase availability
- ▶ No phosphorus applied to frozen or snow-covered soils
- ▶ Apply fall nitrogen when soil temperatures are consistently below 50 degrees at a 4-inch depth



RIGHT RATE

Matches amount of fertilizer type to crop needs.

- ▶ Perform a nutrient budget to account for all inputs and harvest removal
- ▶ Utilize regular soil sampling to determine fertilizer rates
- ▶ Use variable-rate applications based on grid sampling



RIGHT PLACE

Keeps nutrients where crops can use them.

- ▶ Manage fields based on zone maps
- ▶ Use precision guidance technology for accurate applications
- ▶ Incorporate broadcast-applied phosphorus fertilizers

Source: The Fertilizer Institute.

WHAT'S THE "PLUS"?

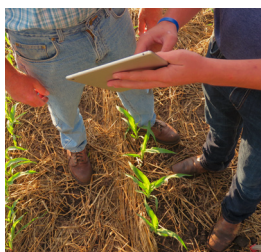
The "Plus" in **4R Plus** relates to in-field and edge-of-field conservation practices that increase the resiliency of your soil and improve water quality. These practices help your soil remain productive,

even under variable weather conditions. "Plus" practices help retain moisture, soil and nutrients, and reduce erosion and runoff. And the end result is healthier soil and cleaner water.

4R Plus conservation practices are more effective when they are targeted in areas with the greatest runoff, nutrient loss and soil loss. Examples of "Plus" practices include:



Grass Waterways



Cover Crops



Strip-Till



Stream Buffers



No-Till



Prairie Strips

soil health

Soil health is the continued capacity of soil to function as a vital living ecosystem that sustains plants, animals and humans.



SOIL ORGANIC MATTER

Depending on the inherent organic matter of their land, farmers can increase their soil organic matter in as few as three years with **4R Plus** practices.

Sources:

- Conservation Choices, Your Guide to 32 Conservation and Environmental Farming Practices, Natural Resources Conservation Service.
- Soil Health Key Points, Natural Resources Conservation Service, February 2016.

4R PLUS MAKES AGRONOMIC AND ECONOMIC SENSE

It all works together. When you improve soil health, you enhance crop growth and increase soil productivity, which can boost your yield potential and return on investment.

SOME EXAMPLES:

- ▶ Practices like no-till mean fewer trips across the field
- ▶ 4R fertilizer practices increase nutrient uptake and reduce nutrient losses
- ▶ Soils with better structure hold more water and nutrients
- ▶ Cover crops reduce erosion and increase organic matter
- ▶ Healthy soils allow crops to better withstand weather extremes

Sources:

- Soil Health Key Points, Natural Resources Conservation Service, February 2016.
- Healthy, Productive Soils Checklist for Growers, Natural Resources Conservation Service, March 2017.

“THE ECONOMIC BENEFITS ARE TREMENDOUS”



“I use strip-tillage, strip-cropping, variable-rate nutrients and cover crops. I started the conservation practices for economic reasons, especially strip-tilling. A neighbor wanted me to try strip-cropping. We found out that the economic benefits from it are tremendous, and it’s also a great conservation piece. It keeps the soil intact and actually holds more snow in the wintertime.”

– **Dean Sponheim**, corn and soybean farmer, Mitchell County, Iowa

DOES IT PENCIL? THE PAYOFF FROM 4R PLUS

THE VALUE OF REDUCING SOIL EROSION



Implementing conservation practices pays off. Iowa State University Extension and Outreach Agricultural Economist Michael Duffy estimates more than \$18 per acre of benefit to farmers based on the fertilizer value per ton of eroded soil. The benefits to society were more than \$42 per acre.

Source: The Cost of Soil Erosion: Iowa Learning Farms, 2013.

SOIL HEALTH AND EQUIPMENT



"I did an equipment cost analysis for eight years and concluded I was saving \$65 per acre in equipment and \$27 an acre in labor costs each year with a combination of strip-till/no-till compared to conventional tillage. Using no-till, strip-till and cover crops, I've seen organic matter levels grow from 3 percent in 1984 to 4 to 6 percent in 2015."

- Wayne Fredericks, corn and soybean farmer, Mitchell County, Iowa

FARMLAND VALUES

In some areas, farmland managed for soil health is valued higher because farmers know that healthier soil is capable of higher productivity.



"Farms that have been managed in a sustainable manner addressing soil health are more sought after than farms that are not. There are clearly market advantages to farms that are well cared for, as neighboring farmers and landowners recognize that added value. Better soil health ultimately improves yields and increases farmland values."

- Steve Bruere, president of Peoples Company



"I use nutrient management practices and changed my tillage practices to strip tillage. I've also incorporated cover crops. When I consider the money I spend on different types of insurance to protect my assets, my most important asset as a farmer is my land."

- Tim Smith, corn and soybean farmer, Wright County, Iowa

LEAVING A LEGACY

"I know that if we don't take care of the ground, the ground isn't going to take care of us. We feel it is our legacy to leave the farm in better shape than when we got it."

- Jolene Riessen, corn and soybean farmer, Ida and Sac counties, Iowa



ON YOUR FARM ...

- ▶ Improved soil health for higher yields
- ▶ Reduced runoff, erosion and compaction
- ▶ Better water infiltration for the crop during dry periods
- ▶ Increased soil capacity to store and recycle carbon
- ▶ Optimized 4R practices to meet crop nutrient needs and reduce losses

NEAR YOUR FARM ...

Edge-of-field practices like wetlands and saturated buffers:

- ▶ Trap soil and nutrients
- ▶ Improve water quality
- ▶ Enhance wildlife habitat

AND BEYOND YOUR FARM

4R Plus practices help retain water, soil and nutrients, resulting in:

- ▶ Improved water quality downstream
- ▶ Reduced flooding potential
- ▶ Decreased sediment movement into water bodies



BENEFITS OF 4R PLUS

Sources:

- Soil Health Key Points, Natural Resources Conservation Service, February 2016.
- Iowa Conservation Reserve Enhancement Program, Iowa Department of Agriculture and Land Stewardship.
- Watershed Structures and Conservation Practices help Reduce Flooding Damages: Natural Resources Conservation Service, May 2015.

PROTECTING THE GREATEST EARTH ON EARTH

Implementing **4R Plus** practices will help safeguard and improve the health of Iowa soil and water for generations to come.

IOWA NUTRIENT REDUCTION STRATEGY (INRS)

We'll need nutrient management plus conservation practices to meet INRS goals, which are to reduce nitrogen and phosphorus loading into Iowa waters by 45 percent.

COST-SHARE OPTIONS

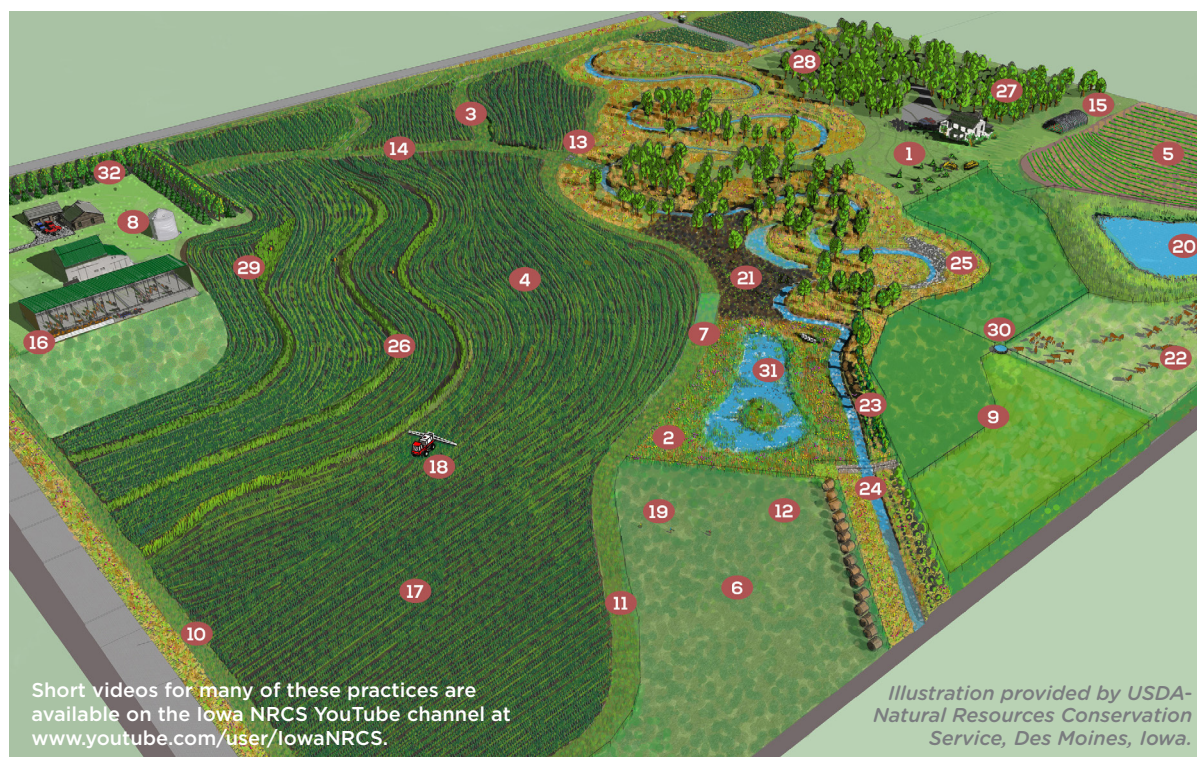
The good news is there are state, federal and other financial assistance programs available for implementing **4R Plus** practices. Check with your county Soil and Water Conservation District office for information on cost-share programs.

Source: Reducing Nutrient Loss: Science Shows What Works, (SP 435), Iowa State University Extension and Outreach, September 2014.

WHEN 4R NUTRIENT MANAGEMENT MEETS CONSERVATION PRACTICES, IT LOOKS LIKE THIS:

- | | | |
|----------------------------------|---------------------------------------|--|
| 1 Brush Management | 12 Forage and Biomass Planting | 24 Stream Crossing |
| 2 Conservation Cover | 13 Grade Stabilization Structure | 25 Stream Bank Protection |
| 3 Contour Buffer Strip | 14 Grassed Waterway | 26 Terrace |
| 4 Contour Farming | 15 High Tunnel System | 27 Tree/Shrub Establishment |
| 5 Cover Crop | 16 Manure Storage | 28 Upland Wildlife Habitat Management |
| 6 Crop Rotation | 17 No-Till/Strip-Till | 29 Water and Sediment Control Basin |
| 7 Denitrifying Bioreactor | 18 4R Nutrient Management | 30 Watering Facility |
| 8 Farmstead Energy | 19 Pest Management | 31 Wetland |
| 9 Fence | 20 Pond | 32 Windbreak/Shelterbelt |
| 10 Field Border | 21 Prescribed Burning | |
| 11 Filter Strip | 22 Prescribed Grazing | |
| | 23 Riparian Forest Buffer | |

Bolded practices are included in the Iowa Nutrient Reduction Strategy



Short videos for many of these practices are available on the Iowa NRCS YouTube channel at www.youtube.com/user/IowaNRCS.

Illustration provided by USDA-Natural Resources Conservation Service, Des Moines, Iowa.

Talk to your agronomic adviser about 4R Plus or visit 4RPlus.org.

4R Plus



This brochure was developed by agricultural and conservation organizations as a part of the Iowa 4R Plus program.