2019 AG RETAILER FIELD APPLICATION AND SERVICES REPORT

Survey report findings from across the Great Lakes and Mississippi River Basins
# Table of Contents

I. Introduction .................................................................................................................................................... 1-5
   1. About PARM ............................................................................................................................................... 1-2
   2. Support our work ....................................................................................................................................... 3
   3. Appreciation ............................................................................................................................................. 4-5
II. Report background and findings ......................................................................................................................... 6
III. Overview .......................................................................................................................................................... 7-10
   1. Participation .............................................................................................................................................. 7-8
   2. Major product and service trends ................................................................................................................ 8-10
IV. Economics ...................................................................................................................................................... 11
V. Cover Crops .................................................................................................................................................... 12
VI. Specialized phosphorus application methods ................................................................................................. 13
VII. Specialized nitrogen application methods .................................................................................................... 14
VIII. Economics .................................................................................................................................................... 15
IX. Light incorporation .......................................................................................................................................... 16
X. Precision agriculture ......................................................................................................................................... 17-18
   1. Practices informing variable rate application ........................................................................................... 17
   2. Precision ag profitability, software use ....................................................................................................... 18
XI. Best Management Practices ....................................................................................................................................... 19-20
   1. Profitability ............................................................................................................................................. 19
   2. Dealer and customer barriers .................................................................................................................. 19-20
XII. Regenerative agriculture .................................................................................................................................... 20-21
XIII. Nutrient management certification and plans ............................................................................................... 22
XIV. Ag retailer resources ..................................................................................................................................... 23
XV. Make a difference ......................................................................................................................................... 24
Who we are

The Partnership for Ag Resource Management (PARM) is a project of the IPM Institute of North America, a nonprofit focused on using the power of the marketplace to improve sustainability in agriculture and communities.

For nine years, PARM has worked with agricultural retailers across the United States to increase sales in products and services that retain vital inputs on fields, instead of running off into nearby waterways.

Why Retailers?

Individual ag retailer locations service tens to hundreds of thousands of farm fields annually and remain one of the most trusted advisers to their farmer customers. Retailers, their customers and PARM work together to improve operation efficiency by tackling runoff through products and services like cover crops, variable rate technology, split application of fertilizers and more.

We support retailers through the following free resources found on our website. www.partnershipfarm.org:

- **Webinar trainings** offering Certified Crop Adviser continuing education units that host experts in nutrient management practices and technology.

- **Incentive programs** that allow farmers to try new practices on owned and rented lands.

- **Individual nutrient stewardship reports** showcasing retail location phosphorus (P) and nitrogen (N) retention per acre for different products and services, and the resulting economic savings. Retailers can compare their results to aggregate data from within their state and basin.

- **Educational resources** including:

  - Our [4R-approved Phosphorus Loss Reduction Handbook for Agronomists](https://www.partnershipfarm.org) containing one-pager "sell sheets" for growers explaining the benefits of practices/products like cover crops, foliar feeding and enhanced efficiency fertilizers.

  - [4R-approved wallet cards](https://www.partnershipfarm.org) containing nutrient management tips.

  - [Online courses](https://www.partnershipfarm.org) developed in collaboration with the Sustainability Programming for Ag Retailers and CCAs (SPARC) Initiative focused on packaging service offerings to include sustainability insights, engaging new and existing customers around those, and more, found on the American Society of Agronomy online classroom.
Our incentive work

Since 2015, PARM has implemented approximately 30,000 acres of variable rate technology (VRT) with our ag retail partners in high-risk watersheds. Investment in these acres by third-party funders we recruited has allowed our ag retailers to try out VRT at no cost to them. Funders include the National Fish and Wildlife Foundation, the EPA’s Great Lakes Restoration Initiative and the Great Lakes Protection Fund. VRT relies on soil sampling to determine P and/or N amounts needed in applications, rather than broadcasting fertilizer with one prescription. This allows for better uptake by the crop, leaving less fertilizer on the surface, subject to runoff.

In 2019, PARM launched a pilot cover crop incentive program in Minnesota and Iowa totaling 2000 acres. Our team is working to expand both programs to other watersheds and states. Hear what our participants have to say about our cost-shares and educational resources!

"The VRT program has gotten many people to soil sample and apply according to needs. This is what we have needed for years."

Lee Orians, Heritage Cooperative

"PARM's an important partner in addressing agriculture's role in reducing nutrient losses from cropland by offering programs retailers can give to their growers."

Kate Welch, Nutrien Ag Solutions

"I would recommend PARM to other retailers. PARM is an ally for our industry; they provide a research and science-based approach on how ag retailers and our customers are working to improve water quality."

John Meadows, Nutrien Ag Solutions

View our testimonial videos: https://partnershipfarm.org/testimonials/
Support our work

As a nonprofit project, we need strong partners that recognize the importance of implementing sound practices on farm fields through incentives and targeted education. Your support is needed now more than ever as climate change continues to affect farm resilience and runoff. According to the National Oceanic and Atmospheric Administration (NOAA), January-August 2019 was the wettest period on record since data collection began in 1895. The result was over 19 million unplanted acres across the US, with majority of fields affected in the Midwest. Climate change directly affects our access to food, a big reason to support those on the front lines.

Increased rainfall also exacerbates an already existing problem of nutrient runoff. In 2014, 500,000 residents in and surrounding Toledo, Ohio had their water supplies shut off due to high toxicity levels caused by harmful algal blooms. These blooms are fed primarily by farm runoff in the form of dissolved reactive P (DRP), the most bioavailable form of P, and are a recurring problem throughout the Nation.

![Harmful Algal Bloom in Western Basin of Lake Erie, August 5, 2019. Credit: Aerial Associates Photography, Inc. by Zachary Haslick for NOAA.](image)

Ag retailers and their customers can't solve these issues alone. By supporting our project as a member (ag retailers only), corporate sponsor or donor, retailers and industry leaders will continue to receive our dedicated outreach and support including vital gap research on best management practices and technology presented in our webinars to move the industry forward.

Visit our website, [www.partnershipfarm.org](http://www.partnershipfarm.org), to start your partnership with us today. To find out more, contact Caitlin Leahy at caitlin@partnershipfarm.org.

As a 4R partner, PARM supports the 4R principles of right source, right rate, right time and right place.
Appreciation

We stand on the shoulders of grant funders, sponsorships, donors, and, of course, our ag retail members. The **Great Lakes Protection Fund** has worked with PARM for a decade to combat nutrient losses in the Great Lakes Basin. Together, we continue to pursue the Fund’s mission to identify, demonstrate and promote regional action to enhance the health of the Great Lakes ecosystem.

The **McKnight Foundation** supports our work in the Mississippi River Basin to increase adoption of best management practices throughout at-risk watersheds.

A very special thanks to our supporting retail members who continue to do essential work to increase nutrient stewardship at their specific locations.

Gold Members

![Gold Members Logos](image1)

Silver Members

![Silver Members Logos](image2)

We would also like to acknowledge individuals who developed and contributed to this year’s report and previous reports including, Caitlin Leahy, Julia Freuck, Dr. Tom Green, Richard Mansheim, Mark Adelsperger, and Michele Wigern. A special thanks to New Mexico State University, Chris Goshe (Sunrise Cooperative) and Nick Clymer (Pandora Grain & Supply) for their contributions and to the Ohio Agribusiness Association, The Fertilizer Institute, the Ohio Department of Agriculture, American Society of Agronomy, and Todd Peterson (Cottonwood Ag Services LLC) for their survey review.
Donors, sponsors and participants

Donors and sponsors support our educational outreach, including a webinar series reaching an average of 335 viewers per webinar from across the US. Sponsor a webinar today to advertise your company to direct markets by visiting https://partnershipfarm.org/webinar-sponsorship/.

Many thanks to our 2019 sponsors and donors:

A very special thanks to our ag retail survey participants, who continue to advance nutrient stewardship at their locations. View participating locations at partnershipfarm.org/participating-ag-retailers/.

MARK A. RUDDY

Adell Cooperative
Ag Plus, Inc.
Ag View FS, Inc.
AGRIS Cooperative
Agronomy Services LLP
AJ Vogt
B & B Farm Service
Berkey Farm Center
Brickner Farm Service LLC
Carolina Eastern-Vail Inc.
Centerra Co-op
Centra Sota Cooperative
Central Farm Service
Central Ohio Farmers Co-op
Ceres Solutions Cooperative
CHS Inc.
Co-Alliance LLP
Cold Spring Co-op
Conserv FS
Cooperative Elevator Co.
Country Visions Cooperative
Countyline Co-op, Inc.
DeRuiter Farm & Garden Co-op
DL Custom Ag Services
Edd’s Supplies, Inc.
Edon Farmers Co-op
Gold Star FS
Growmark FS LLC
Harvest Land Co-op
Harvest Land Ran Del Ag Center
Heiman Inc
Helena Agri-Enterprises, LLC
Heritage Cooperative Inc.
Huron Co-Operative Inc.
Innovative Ag Management LLC
Jennings-Gomer Equity
Landmark Services Cooperative
Legacy Farmers Cooperative
LeRoy Fertilizer Services
Luckey Farmers Inc.
Lucknow District Co-Operative Inc.
Mercer Landmark, Inc.
Michigan Ag Commodities
Middleton Farmer’s Cooperative
Midwestern BioAg
Mid-Wood, Inc.
More’s Ag Center
Moss Fertilizer Service Inc.
Nutrien Ag Solutions
NuWay - K & H Cooperative
O’Harrows Farm Service LLC
OHIGRO, Inc.
Pandora Grain & Supply
Prairie Fert.
Prattville Fertilizer and Grain
Preston Dairy & Farm Association
River Country Co-op
Rudd Spray Service Inc.
Silver Creek Supply
Sunrise Cooperative, Inc.
Tarter Feed & Fertilizer
The Andersons, Inc.
The DeLong Company Inc.
The Mill of Black Horse LLC
TMK Bakersville
Trainor Ag Products LLC
Union Mill Division of Chemgro
United Cooperative
United Equity, Inc.
United Farmer’s Cooperative
United Prairie
Urbana Ag Pro
West Central FS, Inc.
Westville Farm Supply Inc.
Wilbur-Ellis Company
Since 2011, PARM has worked with ag retailers to identify products and services that keep valuable fertilizer on cropland. We promote, track and report those practices and estimate nutrient loss reductions using a calculation system developed with the National Center for Water Quality Research. This system uses monitoring and modeling data paired with a continually updated literature review of available research on nutrient loss reduction capacities of ag retail-offered products and services. Estimates produced in this survey are specifically for:

- Cover crops
- Soil testing
- VRT
- Subsurface preplant
- Strip-till
- Light Incorporation of P
- N-loss inhibitors
- Split N application

We qualify our calculations as estimates based on variability in factors such as soil type, slope and proximity to surface water. However, these estimates give our participants and industry the best idea of where we can likely make a difference. Readers should note that the synergy between practices is still not well-understood, thus loss reductions should not be presumed wholly additive. Additive total loss reduction numbers are found in select places in this report and will be refined over time as research becomes available.

PARM’s annual surveys help our ag industry understand what is happening on the ground in terms of nutrient management practice adoption on corn/soy operations, profitability, and barriers experienced by both retailers and their customers to increasing adoption. This year we have compiled economic savings for specific practices based off determined amounts of nutrient retention. We have calculated P and N separately for monoammonium phosphate (MAP), diammonium phosphate (DAP), urea ammonium nitrate 28% (UAN), urea and anhydrous ammonia using a process verified by New Mexico State University. The cost savings per pound of N or P retention is calculated based on the total cost and nutrient percentage in the different fertilizer types.

This season, 126 ag retail locations participated in the survey, representing over 8.7 million acres. Their combined customer adoption of nutrient management practices listed above retained:

- 71,954,750 POUNDS TOTAL N
- 7,126,492 POUNDS TOTAL P
- 1,387,073 POUNDS DRP
Overview

Of the 126 survey respondents, 60 were first-time participants. Four participants fell outside the Great Lakes and Mississippi River Basins, within the Mid-Atlantic Basin. For graphical presentation, these four were placed within the closest basin boundary. The 2019 respondents were split evenly in half, 63 within the Great Lakes Basin (GLB) and 63 within the Mississippi River Basin (MRB). The majority of respondents were based in Ohio, where the PARM project started and continues to remain active.

![Survey Respondents by State](chart1)

Thirty-nine percent of respondents identified as owner/general manager/location managers, followed by consultants/agronomists (34%). The participant numbers are a positive indicator that water quality is a priority for ag retailer staff at participating locations.

![Respondent Position Title](chart2)
When the PARM project started in 2011, we began our work within the Sandusky River Watershed, Ohio, an at-risk area suffering from recurring harmful algal blooms. Twelve retailers partnered with us and have remained active in their efforts to reduce nutrient impairments. Our targeted VRT incentive program along with other multi-pronged efforts in the Watershed encouraged an increase of 44% in VRT application of P over the course of eight years.

<table>
<thead>
<tr>
<th></th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sum</td>
<td>8,753,850</td>
</tr>
<tr>
<td>Average</td>
<td>69,475</td>
</tr>
<tr>
<td>Maximum</td>
<td>500,000</td>
</tr>
<tr>
<td>Minimum</td>
<td>5000</td>
</tr>
</tbody>
</table>

The number of ag retail participants and serviced acres increased by 40% and 63% respectively in 2019 from the year prior. The average number of acres per facility also increased from 59.549 to 69.475.

*In 2017, the survey incorporated new questions on products and services that retain N.*
In 2015, with support from the Great Lakes Protection Fund, the project expanded into the entire GLB, and later on in 2018, with funding from the McKnight Foundation, we extended our reach further to the MRB. Although 2019 was the wettest year on record, with most prevented plant acres found in the Midwest, cover crop adoption did not fall, but remained the same in the GLB from the year prior.

The below graphs illustrate loss reductions in total P, DRP and total N for major products and services in the GLB. Cover crop adoption retained a total of 586,698 lbs. of total P and 5,865,053 lbs. total N. VRT retained 1,158,968 lbs. of total N and 643,585 lbs. total P.
In 2019, the number of total acres serviced in the MRB increased by 3.5 million compared to the previous year, with an additional 502,480 acres implementing cover crops. In contrast, VRT P and VRT N declined this past season, with many reports from partners stating wet conditions and delayed harvest as major contributors.

In the MRB, the percent of total acres implementing cover crop adoption was 7.2% less than in the GLB. Total P loss reduced from these acres amounted to 427,456 lbs. and 4,273,157 lbs. of total N. Comparatively, the MRB showed higher percentages in VRT P adoption (44.5%) than the GLB (33.3%). VRT N adoption was similar in both, with 8.5% in the GLB and 8.2% in the MRB. VRT adoption retained an additional 1,119,074 lbs. of total P and 1,451,307 of total N in the MRB.
Economics

P and N losses reduced from beneficial product and service use in the MRB and GLB have significant impacts on water quality, but also greatly affect the amount of money saved through efficiency. When relating nutrient retention for different practices with fertilizer costs per acre, the following potential savings may occur. Based on reports from retailers, MAP has higher adoption than DAP in the Midwest due to the amount of available phosphorus (11-52-0 versus 18-46-0) and savings from shipping. The P savings from using MAP alone for the below practices, amounted to over $5.4 million and $11.2 million in N savings. With UAN 28 use, over $21.2 million was saved in fertilizer losses.

MRB and GLB Combined Economic Savings from Major Products and Services

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Rotational Soil Sampling</td>
<td>$0.39</td>
<td>$11.77</td>
<td>$0.44</td>
<td>$7.21</td>
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<td></td>
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<tr>
<td>Cover Crops</td>
<td>$0.74</td>
<td>$15.30</td>
<td>$0.84</td>
<td>$9.37</td>
<td>$3.17</td>
<td></td>
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<tr>
<td>VRT P &amp; N Application</td>
<td>$1.08</td>
<td>$15.85</td>
<td>$1.23</td>
<td>$9.71</td>
<td>$3.28</td>
<td>$3.14</td>
<td></td>
</tr>
<tr>
<td>Custom Strip-Till Application</td>
<td>$0.59</td>
<td>$2.46</td>
<td>$0.67</td>
<td>$1.51</td>
<td>$0.51</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subsurface Preplant Application</td>
<td>$0.59</td>
<td>$25.69</td>
<td>$0.67</td>
<td>$15.74</td>
<td>$5.32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incorporation of Fertilizer</td>
<td>$0.76</td>
<td>$24.71</td>
<td>$0.87</td>
<td>$15.14</td>
<td>$5.12</td>
<td></td>
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<tr>
<td>N-Loss (Nitrification) Inhibitors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$1.73</td>
<td>$1.20</td>
<td></td>
</tr>
<tr>
<td>Split Application of N</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$2.50</td>
<td>$2.39</td>
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Cover crops

Results show only a small portion of ag retailers are not offering cover crop services. Broadcast application continues to have the highest sales, with 88% customer use, followed by aerial (46%). Most retail branches now sell cover crop seed and just over half offer cover crop planning services.

Types of cover crops applied varied between respondents, with rye (both annual and cereal) having the highest adoption rate (29%). In this open question, several responded "rye" without annual or cereal distinction, therefore, rye was placed in a separate category. Radish placed second in ranking with 16% adoption followed closely by oats (15%).
Specialized P application

In the GLB, substantial reductions were found in adoption of sidedress P (10.4%) and foliar feeding (6.3%) from the year prior. Due to the wet weather, custom application was affected more than in a typical year. Declines in planted corn left little opportunity to sidedress for many retail locations. Increases, however, were found in subsurface preplant (4.5%). This may be attributed to increased rainfall and the drive to protect nutrients from runoff.

In the MRB, all specialized P methods declined, most likely due to prevent plant acres and wet conditions. According to the American Farm Bureau Federation, Ohio ranked second highest in prevented planting across all major crops with 1.6 million acres. Illinois and Minnesota ranked second highest in prevent plant corn acres with more than one million acres each. With approximately 628,000 prevent plant soybean acres, Ohio ranked second and Michigan third (362,000 acres). With climate change drastically affecting our food production, it is vital now more than ever to assess and integrate practices that effectively address increased rainfall and drought.
Specialized N application

Custom N applications were also affected in 2019, but with less drastic reductions. Subsurface preplant rose 0.8% in the GLB, but declined 7.7% in the MRB. Strip-till equipment with the capability of subsurface preplant had a higher rate of use this year in the GLB to reduce surface runoff from excess rainfall. Substantial increases in enhanced efficiency fertilizer use were found in the MRB (9.7%).

Over 25.7 million pounds of total nitrogen was retained on fields using custom application methods listed below and over 176,000 pounds of total P.
The amount of nutrient loss reductions from specialized P practices generated a savings of $189,159.81 from total P and $392,462.40 from total N when using MAP. An additional $11,827,374.02 from UAN28 was saved based on custom N application methods.
Light incorporation

Increases in fall and spring light incorporation of P (2-3 inches below the soil surface) were found in the GLB compared to reduced use in the MRB in 2019. In the GLB, additional tillage was performed to prevent weeds, with some fields worked multiple times to eliminate the use of herbicides. Both basins reduced 1.89 million pounds of total P from entering waterways.

![Bar chart comparing GLB vs. MRB Broadcast Fertilizer Incorporation 2018-2019]

Light incorporation has substantial affects on nutrient loss reductions, with 0.71 pounds reduced per acre. Adoption in both basins saved over $2 million in total P and $4.2 million in total N from MAP applications alone.

![Bar chart showing MRB and GLB Economic Savings from Broadcast Fertilizer Incorporation]
Precision ag, profitability, barriers

Survey takers were asked what systems were used to inform variable rate applications in 2019. Grid or zone sampling continues to show high adoption rates; increases were found in both basins this year and over two seasons in the GLB. Retail participants in Ohio found prevent plant acres allowed staff to soil sample additional fields that pose more difficult when in full production. Low crop prices and extreme weather patterns will likely increase grid or zone sampling in coming years, retail partners report.

For applications made without VRT, GPS-guided application continues to have high adoption in both basins. GPS guidance eliminates overlaps and skips, making fertilizer application more efficient.
Top precision ag software in 2019 included SST (16%), SMS (14%), Mapshots (12%), and AgVance (12%). The year prior, SMS placed fourth. Each year, the number of systems available grows, showing remarkable adoption rates in precision ag across the board.

When asked whether a profit was generated from precision ag services, participants reported high percentages in VRT P application (83.3%), grid or zone soil sampling (74%), and VRT N application (62.5%). Of the practices informing variable rate applications, yield monitors with GPS ranked highest in profitability (30.6%) after grid/zone sampling.
Profits were found across all products and services listed below, with 64.7% of participants achieving gains from cover crops. Strip-till increased in reported profitability from 23.8% in 2018 to 44% in 2019. Subsurface preplant also had a 10.7% increase from the year prior.

Ag retailers were asked what barriers their customers experience to adopting best management practices. Cost ranked highest across all practices. Local climate also played a substantial role in practice establishment, especially in cover crops, strip-till and no-till. Planning and decision making surrounding cover crops and precision ag also proved to be relevant barriers. Surprisingly, 48.4% stated there were no customer barriers to no-till adoption.
Barriers (cont.), regenerative ag

When asked about their own barriers to selling beneficial practices, ag retailers reported cost as the dominating factor. For cover crops, 27.8% of respondents stated that communicating and presenting the benefits is too challenging. This report means advocates in Soil and Water Conservation Districts, universities/extension, and in nonprofits like PARM, need to continue to provide resources and tools to retailers to help close this gap. Lack of equipment also was a high-ranking barrier for subsurface preplant, strip-till, no-till and sidedress, a component that could be addressed with local incentive programs and rent/share.

Dealer Barriers to Adopting Best Management Practices 2019

Retailers were questioned on their familiarity with the term “regenerative ag” on a scale from one to five, one being “not familiar” and five being “very familiar”. Many were largely unfamiliar with the term, but 38% felt fairly confident in their knowledge. As an emerging enterprise, with products already marketed by highlighting regenerative practices, we asked retailers their impressions of this “new” movement.

Ag Retailer Familiarity With the Term “Regenerative Agriculture” on a Scale of 1-5
"There will be a lot of adaption and training needed. Applicators will need to be trained to get their “buy in” for changing current practices. Also, with more management of the farms there will be higher demand for labor to get practices done in a timely manner. Quality labor seems to be short in the ag retailer space currently."

"Regenerative agriculture could impair total crop nutrients applied; on-farm cash receipts may not stay high, ag retail will need to alter the business model and consider other services."

"I farm with my dad, in addition to my retail sales job. We farm to protect our soil. We believe in the benefits and the movement. But as a retailer sometimes farmers have jumped into "regenerative ag" very quickly, and we have seen huge economic losses on our farmer's fields. "Regenerative ag" needs to be done correctly, and cautiously, with a strong game plan. You can't run into it full steam without a game plan."

"Promoting soil health and soil structure improvements means more productive growing environments. These improvements take more management and increase ag retail importance."
Nutrient management certification, plans

This season, retailers were asked whether their facility holds 4R nutrient stewardship or other state certification. Fifty percent confirmed 4R certification while the remaining 46% did not have any nutrient stewardship certification.

Survey respondents were asked what percent of their serviced acres had nutrient management plans written. Participants reported 2,356,200 acres, 26.9% of the total acres serviced in this survey. When asked what the greatest barriers are to writing nutrient management plans, the largest percentage reported lack of compensation (19%), followed by lack of staff (16%) and time (13%).
A plan for action

At PARM, we take barriers to nutrient management adoption seriously. Retailers looking for information on how to translate the benefits of different products and services to their farmers, should visit https://partnershipfarm.org/agronomist-handbook/ to download or receive in print our *Phosphorus Loss Reduction Handbook for Agronomists*. Retailers can distribute one-pager fact sheets found inside to farmers during one-on-one consultations or group meetings. Our 4R nutrient management wallet cards to the left can also be ordered for free on our website. Over 28,000 cards have been distributed to our retail partners!

Our webinar series addresses all areas of nutrient management from experts across the Nation. Topics are requested by our retail, independent consultant or farmer audience members. Sign up to receive upcoming webinar notifications at https://partnershipfarm.org/webinars/. For additional trainings, visit our collaborative modules with the SPARC Initiative on the American Society of Agronomy online classroom: https://www.agronomy.org/education/classroom/classes/666.
Make a difference

We can't expect agriculture to advance soil health and improved water quality if we don't work together. **Become a member** with PARM so we can go above and beyond to help you with your retail service needs, including educational trainings, print resources, nutrient stewardship reports and more. Visit [https://partnershipfarm.org/become-a-parm-member/](https://partnershipfarm.org/become-a-parm-member/) or email caitlin@partnershipfarm.org for more information.

As a **sponsor or donor**, you can support the work we do to increase adoption of agricultural practices that improve our water and soil so that our food industry and communities continue to remain prosperous. We are part of a 501(c)(3) organization; tax deductible donations can be made on our website: [https://partnershipfarm.org/donate/](https://partnershipfarm.org/donate/).