Since 1988, the Sustainable Agriculture Research & Education (SARE) program has been the go-to USDA grants and outreach program for farmers, ranchers, researchers and educators who want to develop innovations that improve farm profitability, protect water and land, and revitalize communities. To date, SARE has awarded over $389 million to more than 8,542 initiatives.

SARE: Advancing the Frontier of Sustainable Agriculture in...

Delaware

Project Highlight: Using Drones to Measure Cover Crop Biomass as a Predictor of Soil Nitrogen And Corn Emergence Issues

Jamie Taraila, a graduate student at the University of Delaware, is using drone technology to investigate how seeding rates of cover crops impact crop yields. Cover crops are a common soil health management practice adopted by Delaware farmers who seek to capitalize on ecosystem services like N fixation, nutrient scavenging and soil cover. The services that cover crops provide make them valuable for increasing crop productivity; however, the timing of cover crop termination plays a significant role in the level of ecosystem services provided. The goal of this project was to integrate consumer drone technology into cover crop scouting to figure out how to improve productivity while maximizing the soil health benefits of cover crops.

With the help of a SARE grant, Taraila and a team of researchers from the University of Delaware used drone imaging technology to observe and compare cover crop biomass readings and stand counts. By using drones, the researchers were able to rapidly collect and analyze cover crop data to identify what termination timing and seeding rate provide the most opportunity for ecosystem services. This research will help producers improve crop productivity and will support future uses of drone technology for sustainable agriculture research.

For more information on this project, see sare.org/projects and search for project number GNE20-241.

SARE in Delaware

northeast.sare.org/sare-in-your-state/delaware

$1,254,586 in total funding

35 grant projects

(since 1988)

For a complete list of grant projects state by state, go to www.sare.org/state-summaries
SARE Grants in Delaware

Total awards: 35 grants
6 Research and Education
2 Professional Development Program
11 Farmer/Rancher
9 Graduate Student
7 On Farm Research/Partnership

Total funding: $1,254,586
$735,817 Research and Education
$140,943 Professional Development Program
$124,565 Farmer/Rancher
$130,921 Graduate Student
$122,340 On Farm Research/Partnership

Find a complete list of projects on page 3.

SARE's Impact

53 percent of producers report using a new production technique after reading a SARE publication.

79 percent of producers said they improved soil quality through their SARE project.

64 percent of producers said their SARE project helped them achieve higher sales.

Learn about local impacts at: northeast.sare.org/sare-in-your-state/delaware

Contact Your SARE State Coordinator

SARE sustainable ag coordinators run state-level educational programs for Extension and other ag professionals, and many help grant applicants and recipients with planning and outreach. Visit northeast.sare.org/state-pages/delaware to learn more.

Rose Ogutu
Delaware State University
(302) 857-6397
rogutu@desu.edu

For detailed information on SARE projects, go to www.SARE.org

SARE is funded by the USDA’s National Institute of Food and Agriculture (NIFA).

This report includes summaries of competitive grant programs only. Some competitive grant programs that are no longer offered may be included or excluded from the totals in this report depending on the grant program and SARE region.
Delaware has been awarded $1,254,586 grants to support 34 projects, including but not limited to, 5 research and/or education projects, 2 professional development projects and 11 producer-led projects. Delaware has also received additional SARE support through multi-state projects.

### RESEARCH AND EDUCATION GRANTS

<table>
<thead>
<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
</tr>
</thead>
<tbody>
<tr>
<td>LNE21-418</td>
<td>Increasing the Use of a Natural Fungus (Duddingtonia flagrans) to Control Internal Parasites in Small Ruminants</td>
<td>$199,992</td>
<td>Dr. Kwame Matthews Delaware State University</td>
</tr>
<tr>
<td>LNE12-314</td>
<td>Improving water and nitrogen use efficiency using soil moisture monitoring to improve irrigation management</td>
<td>$210,666</td>
<td>James Adkins University of Delaware</td>
</tr>
<tr>
<td>LNE08-269</td>
<td>Efficacy of Natural Dewormers in the Control of Gastrointestinal Nematodes of Small Ruminants</td>
<td>$166,168</td>
<td>Dr. Dahlia Jackson-O’Brien Delaware State University</td>
</tr>
<tr>
<td>LNE07-261</td>
<td>Farming for native bees</td>
<td>$93,991</td>
<td>Dr. Faith Kuehn Plant Industries Administrator</td>
</tr>
<tr>
<td>LNE05-221</td>
<td>Mentoring small fresh produce farmers who want to increase farm revenue by selling value-added products through direct-market channels</td>
<td>$65,000</td>
<td>Anne Fitzgerald Delaware Department of Agriculture</td>
</tr>
</tbody>
</table>

### PROFESSIONAL DEVELOPMENT PROGRAM GRANTS

<table>
<thead>
<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENE15-141</td>
<td>2016 Northeast SARE Regional Cover Crops Training</td>
<td>$134,443</td>
<td>John Clendaniel Delaware State University</td>
</tr>
<tr>
<td>ENE98-043</td>
<td>Nutrient Management Education: Development and Implementation of Training Modules on Basic Principles, Current State of Knowledge and Advances in Research</td>
<td>$6,500</td>
<td>Karen L. Gartley University of Delaware</td>
</tr>
</tbody>
</table>

### FARMER/RANCHER GRANTS

<table>
<thead>
<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
</tr>
</thead>
<tbody>
<tr>
<td>FNE23-035</td>
<td>Technology Boosts Rate of Gain: Evaluating the Effects of Repurposed Poultry Housing Versus Intensive Grazing for the Modern Sheep Producer</td>
<td>$29,997</td>
<td>Steven Breeding Shepherd’s Hope Farm</td>
</tr>
<tr>
<td>FNE22-004</td>
<td>Automated Drainage Water Management for Improved Precision, Yield, and Water Quality</td>
<td>$29,995</td>
<td>Chris Breeding Twin Cedar Ag</td>
</tr>
<tr>
<td>FNE17-873</td>
<td>Improving poultry farm sustainability through pollinator buffers</td>
<td>$11,481</td>
<td>Tina Hill Hill Farms, Inc</td>
</tr>
</tbody>
</table>
FNE13-786  Economic analysis of oyster mushroom production in an unused poultry house  $8,849  Ramrattan sagram

FNE12-746  Survivability and production of heritage breed egg layers on pasture in Delmarva  $13,784  Kim Hartline
Spring Morning Farm LLC.

FNE11-735  Effects of Pole Lima Production in North/South vs. East/West Row Placement  $5,375  Edward Zitvogel
Zitvogel Farms

FNE09-655  Sustainable cropping systems for processing baby lima bean production  $10,000  Wm. Donald (Don) Clifton, II
Clifton Farms, Inc.

FNE07-598  Greenhouse heating system  $2,744  Katherine Brooks

FNE04-505  Using Innovative Production Systems to Meet the Needs of new Emerging Markets  $5,000  Luke Chappel


FNE96-147  Economical Analysis of Kenaf Grown with Different Nutrient Sources  $3,140  Daniel Palmer

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**GRADUATE STUDENT GRANTS**

<table>
<thead>
<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
</tr>
</thead>
<tbody>
<tr>
<td>GNE22-294</td>
<td>Promoting natural suppression of slugs using local parasitic nematodes</td>
<td>$15,000</td>
<td>Dr. Michael Crossley University of Delaware</td>
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<tr>
<td></td>
<td></td>
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<td>Thabu Mugala University of Delaware</td>
</tr>
<tr>
<td>GNE20-241</td>
<td>Using Drones to Measure Cover Crop Biomass as a Predictor of Soil Nitrogen And Corn Emergence Issues</td>
<td>$14,832</td>
<td>Dr. Jarrod Miller University of Delaware</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>Jamie Taraila University of Delaware</td>
</tr>
<tr>
<td>GNE19-219</td>
<td>Soil Microbiome Impacts on Floral Rewards and Implications for Pollinator Nutrition</td>
<td>$14,984</td>
<td>Dr. Deborah Delaney University of Delaware</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Grace Savoy-Burke University of Delaware</td>
</tr>
<tr>
<td>GNE19-203</td>
<td>Improvements to Quality-related Limitations to Market Growth of Biodiesel and Renewable Hydrocarbon Diesel Produced from Low-value Feedstocks</td>
<td>$15,000</td>
<td>Dr. Gulnihal Ozbay Delaware State University</td>
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<tr>
<td></td>
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<td>Dr. Shehu Isah Delaware State University</td>
</tr>
<tr>
<td>GNE19-217</td>
<td>Microbial Inoculants for the Improvement of Alfalfa Crop Productivity and Health</td>
<td>$12,453</td>
<td>Dr. Harsh Bais University of Delaware</td>
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<td></td>
<td></td>
<td></td>
<td>Amanda Rosier University of Delaware</td>
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<td></td>
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<td></td>
<td>Lauren Mosesso University of Delaware</td>
</tr>
<tr>
<td>GNE15-111</td>
<td>Using silicon fertilizers to improve soil phosphorus availability and uptake by winter wheat in high-phosphorus soils</td>
<td>$14,995</td>
<td>Amy Shober University of Delaware</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Angelia Seyfferth University of Delaware</td>
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<tr>
<td></td>
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<td></td>
<td>Zhixuan Qin University of Delaware</td>
</tr>
</tbody>
</table>

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GNE14-086 Use of a Natural Biocontrol Agent Bacillus subtilis UD1022 to Increase Crop Yield and Reduce Contamination by Listeria monocytogenes On Cantaloupes $14,035 Dr. Kalmia Kniel University of Delaware Dr. Harsh Bais University of Delaware Sarah Markland University of Delaware

GNE11-023 Developing sustainable aquaculture methods for the mummichog, Fundulus heteroclitus, with emphasis on egg production $14,909 Dennis McIntosh, Ph.D. Delaware State University Courtinay Janiak Delaware State University

ON FARM RESEARCH/PARTNERSHIP GRANTS

<table>
<thead>
<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
</tr>
</thead>
<tbody>
<tr>
<td>ONE22-417</td>
<td>Providing a Research Base for Indoor Lighted Production of Strawberries in a Repurposed Poultry House.</td>
<td>$21,039</td>
<td>Dr. Gordon Johnson University of Delaware Erik Ervin</td>
</tr>
<tr>
<td>ONE20-372</td>
<td>Prevalence of Toxoplasma gondii on Small Ruminant Farms in Delaware</td>
<td>$29,992</td>
<td>Dr. Kwame Matthews Delaware State University</td>
</tr>
<tr>
<td>ONE19-344</td>
<td>Cost Benefits of Common Insecticide Practices Used to Prevent Soybean Pest Problems in Delaware</td>
<td>$28,221</td>
<td>Dr. David Owens University of Delaware</td>
</tr>
<tr>
<td>ONE18-317</td>
<td>Characterization of Gastrointestinal Nematode Anthelmintic Resistance on Small Ruminant Farms in Delaware</td>
<td>$14,974</td>
<td>Dr. Kwame Matthews Delaware State University</td>
</tr>
<tr>
<td>ONE16-280c</td>
<td>Utilizing cover crops for additional benefits in Delaware</td>
<td>$11,111</td>
<td>Mark Van Gessel University of Delaware</td>
</tr>
<tr>
<td>ONE14-215</td>
<td>Determining the risks associated with scavenging raptors to the biosecurity of broiler farms on Delmarva.</td>
<td>$11,307</td>
<td>Dr. Brigid McCrea Delaware State University Cooperative Extension</td>
</tr>
<tr>
<td>ONE12-157</td>
<td>Development of best use practices on commercial colonies of Bombus impatien on crops in Delaware</td>
<td>$5,696</td>
<td>Dr. Deborah Delaney University of Delaware Jacquelyn Marchese University of Delaware</td>
</tr>
</tbody>
</table>

Total funding from the USDA SARE program to Delaware $1,254,586

For further information on projects, contact 802-651-8335 or nesare@uvm.edu. Sustainable Agriculture Research and Education (SARE) is funded by USDA’s National Institute of Food and Agriculture (NIFA).