**What is SARE?**

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 $404 million to more than 8,776 initiatives.

**SARE is grassroots with far-reaching impact**

Four regional councils of expert practitioners set priorities and make grants in every state and island protectorate.

**SARE communicates results**

SARE shares project results by requiring grantees to conduct outreach and grower engagement; and by maintaining an online library of practical publications, granteeproduced information products and other educational materials.

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**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.

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**SARE in Delaware**

northeast.sare.org/state-profiles/delaware/

$2,196,925 in total funding

50 grant projects

(since 1988)

For a complete list of grant projects state by state, go to www.sare.org/state-summaries
Grants awarded 2019–2024

Total awards: **12 grants**
- 2 Farmer/Rancher
- 1 Research and Education
- 3 On Farm Research/Partnership
- 6 Graduate Student

Total funding: **$426,218**
- $59,992 Farmer/Rancher
- $199,992 Research and Education
- $79,252 On Farm Research/Partnership
- $86,982 Graduate Student

Find a complete list of projects on page 3.

Farmer and rancher impacts 2019–2024

SARE grantees have reported the following impacts from their projects:

- **2,243 farmers participated in a SARE-funded project**
- **2,233 farmers reported a change in knowledge, awareness, skills or attitude**
- **18 farmers changed a practice**

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-profiles/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>
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</tr>
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<tr>
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<td>Project Leaders</td>
</tr>
<tr>
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<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>
<tr>
<td>FNE13-786</td>
<td>Economic analysis of oyster mushroom production in an unused poultry house</td>
<td>$8,849</td>
<td>Ramrattan sagram</td>
</tr>
<tr>
<td>FNE12-746</td>
<td>Survivability and production of heritage breed egg layers on pasture in Delmarva</td>
<td>$13,784</td>
<td>Kim Hartline Spring Morning Farm LLC.</td>
</tr>
<tr>
<td>FNE11-735</td>
<td>Effects of Pole Lima Production in North/South vs. East/West Row Placement</td>
<td>$5,375</td>
<td>Edward Zitvogel Zitvogel Farms</td>
</tr>
<tr>
<td>FNE09-655</td>
<td>Sustainable cropping systems for processing baby lima bean production</td>
<td>$10,000</td>
<td>Wm. Donald (Don) Clifton, II Clifton Farms, Inc.</td>
</tr>
<tr>
<td>FNE07-598</td>
<td>Greenhouse heating system</td>
<td>$2,744</td>
<td>Katherine Brooks</td>
</tr>
<tr>
<td>FNE04-505</td>
<td>Using Innovative Production Systems to Meet the Needs of new Emerging Markets</td>
<td>$5,000</td>
<td>Luke Chappel</td>
</tr>
<tr>
<td>FNE96-147</td>
<td>Economical Analysis of Kenaf Grown with Different Nutrient Sources</td>
<td>$3,140</td>
<td>Daniel Palmer</td>
</tr>
</tbody>
</table>

**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 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 Jamie Taraila University of Delaware</td>
</tr>
</tbody>
</table>
GNE19-219 Soil Microbiome Impacts on Floral Rewards and Implications for Pollinator Nutrition $14,984 Dr. Deborah Delaney
University of Delaware
Grace Savoy-Burke
University of Delaware

GNE19-203 Improvements to Quality-related Limitations to Market Growth of Biodiesel and Renewable Hydrocarbon Diesel Produced from Low-value Feedstocks $15,000 Dr. Gulnihal Ozbay
Delaware State University
Dr. Shehu Isah
Delaware State University

GNE19-217 Microbial Inoculants for the Improvement of Alfalfa Crop Productivity and Health $12,453 Dr. Harsh Bais
University of Delaware
Amanda Rosier
University of Delaware

University of Delaware
Lauren Mosesso
University of Delaware

GNE15-111 Using silicon fertilizers to improve soil phosphorus availability and uptake by winter wheat in high-phosphorus soils $14,995 Amy Shober
University of Delaware
Angelia Seyfferth
University of Delaware
Zhixuan Qin
University of Delaware

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
Courtnay 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>
</table>
| ONE22-417  | Providing a Research Base for Indoor Lighted Production of Strawberries in a Repurposed Poultry House. | $21,039      | Dr. Gordon Johnson
University of Delaware
Erik Ervin |
| ONE20-372  | Prevalence of Toxoplasma gondii on Small Ruminant Farms in Delaware            | $29,992      | Dr. Kwame Matthews
Delaware State University |
| ONE19-344  | Cost Benefits of Common Insecticide Practices Used to Prevent Soybean Pest Problems in Delaware | $28,221      | Dr. David Owens
University of Delaware |
<table>
<thead>
<tr>
<th>Project Code</th>
<th>Project Title</th>
<th>Funding</th>
<th>Principal Investigator(s)</th>
</tr>
</thead>
<tbody>
<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 VanGessel, 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 impatiens 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).