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, grantee-produced information products and other educational materials.

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

Project Highlight: Cover Crops Help Manage Appletree Borer
The flatheaded appletree borer (FAB) is a significant economic pest in orchards, nurseries and urban landscapes, and in Tennessee’s production nurseries, red maples are one of the most problematic trees for FAB attacks. Determined to find a solution to this problem, Tennessee State University researcher Karla Addesso and her project team used a SARE grant to evaluate the efficacy of applying a winter cover crop to field-grown nursery red maple trees to act as a barrier to FAB oviposition, an aid to preventing leaching of imidacloprid (a commonly used insecticide) from the root zone of the trees, and as a natural weed suppression technique.

After trying a few mixes, the team determined that a ryegrass/crimson clover mix was extremely effective at camouflaging the tree trunks from the pest, making it less likely to lay eggs. The cover crops reduced pest attacks by 95 percent. In addition to acting as a barrier, the cover crop mix also reduced the temperatures of the tree trunks, making the trees a less preferable egg-laying site.

Based on their highly promising results, the team proposes a systems approach to in-field nursery tree production by incorporating a winter cover crop combined with optimized pesticide use to simultaneously maximize FAB control and plant growth while minimizing crop damage, weed competition and insecticide runoff.

For more information on this project, see sare.org/projects, and search for project number OS14-084.

SARE in Tennessee
southern.sare.org/state-profiles/tennessee/

$4,600,877 in total funding
98 grant projects
(since 1988)

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

Grants awarded
2019–2024

Total awards: 22 grants

3 Farmer/Rancher
4 Research and Education
1 Professional Development Program
2 On Farm Research/Partnership
7 Graduate Student
5 Education Only

Total funding: $1,928,495

$33,221 Farmer/Rancher
$1,443,986 Research and Education
$79,998 Professional Development Program
$40,000 On Farm Research/Partnership
$114,899 Graduate Student
$216,391 Education Only

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:

1,936 farmers participated in a SARE-funded project

428 farmers reported a change in knowledge, awareness, skills or attitude

35 farmers changed a practice

Learn about local impacts at:
southern.sare.org/sare-in-your-state/tennessee/

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 southern.sare.org/state-profiles/tennessee/ to learn more.

Jason de Koff
Tennessee State University
(615) 963-4929
jdekoff@tnstate.edu

Patrick Troy Dugger
University of Tennessee
(931) 486-2777
pdugger2@utk.edu

Rob Holland
University of Tennessee
(931) 486-2777
rwholland@utk.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.
Tennessee has been awarded $4,237,065 grants to support 85 projects, including but not limited to, 14 research and/or education projects, 7 professional development projects and 25 producer-led projects. Tennessee 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>LS24-391</td>
<td>Improving Soil Health and Cropping Systems Sustainability through Cover Crops: An Integrated Research, Education, and Support Approach</td>
<td>$399,991</td>
<td>Dr.Samuel Haruna Middle Tennessee State University, Dr.Song Cui Middle Tennessee State University, Dr.Justin Gardner Middle Tennessee State University, Dr.John Grove University of Kentucky, Dr.Chaney Mosley Middle Tennessee State University, Dr.Edwin Ritchey University of Kentucky</td>
</tr>
<tr>
<td>LS23-376</td>
<td>Alley cropping agroforestry as a climate change resiliency strategy for vegetable production in the southeastern US</td>
<td>$367,000</td>
<td>Dr.David Butler University of Tennessee, Knoxville, Dr.Avat Shekoofa Dept. of Plant Sciences, University of Tennessee, Dr.Carlos Trejo-Pech Dept. of Agric. &amp; Resource Economics, University of Tennessee, Dr.Margarita Velandia Dept. of Agric. &amp; Resource Economics, University of Tennessee, Dr.Annette Wszelaki Dept. of Plant Sciences, University of Tennessee, Le Chen University of Tennessee</td>
</tr>
<tr>
<td>LS23-388</td>
<td>An Approach to Building a Sustainable Small Flock Poultry Operation Through Improvement in Nutrition, Food safety, and Marketing</td>
<td>$377,000</td>
<td>Dr.Pramir Maharjan Tennessee State University</td>
</tr>
</tbody>
</table>
Cover Crops and Cropping System Sustainability in a Changing Global Climate

$299,995

Dr. Samuel Haruna
Middle Tennessee State University

Dr. Song Cui
Middle Tennessee State University

Dr. Audrey Gamble
Auburn University

Dr. Seockmo Ku
Middle Tennessee State University

Dr. Chaney Mosley
Middle Tennessee State University

Dr. Edwin Ritchey
University of Kentucky

Cover Crops in Woody Ornamental Production: Impact on Plant Growth, Arthropod Pests, Soil-Borne Pathogens and Weeds

$284,869

Dr. Karla Addesso
Tennessee State University

Improving Fitness in Meat Goat Herds through Better Genetic Management

$230,000

Dr. Richard Browning, Jr.
Tennessee State University

Breeding Organic Corn varieties to resist GMO contamination

$48,183

Dr. Dennis West
University of Tennessee

Forage systems for the sustainable production of uniform goat carcasses

$200,000

Richard Joost
University of Tennessee at Martin

Improving Organic Crop Production with Enhanced Biofumigation and Composting Systems

$273,440

Carl Sams
The University of Tennessee

Bioactive Natural Products: A feasible method of organic disease management in float bed production systems

$19,883

Kimberly Gwinn
University of Tennessee

Using Farm Family Studies to Teach Sustainable Agriculture

$146,630

Tim Cross
University of Tennessee, Ag Economics

Development of Sustainable Area-Wide Weed Management Practices for Improved Land Utilization (AS93-08)

$3,760

Jerome F. Grant
University of Tennessee, Entomology & Plant Pathology

Utilization of Dairy Manure in Low-input, Conservation Tillage Animal Feed Production Systems

$90,635

Michael D. Mullen
University of Tennessee, Plant and Soil Science

Influence of Integrated Pest Management (IPM) On Low-input Sustainable Agriculture (LISA) in the Southern Region

$25,000

Charles H. Hadden
University of Tennessee
## PROFESSIONAL DEVELOPMENT PROGRAM GRANTS

<table>
<thead>
<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
</tr>
</thead>
</table>
| SPDP23-022 | Sustaining Small Flock Poultry Producers Utilizing a Train-the-trainer Model on Identified Poultry Needs | $79,998       | Thomas Broyles  
Tennessee State University  
Dr.Pramir Maharjan  
Tennessee State University |
| ES18-141   | Soil SMaRTS (Specific Management and Resources Training for Sustainability) for Soil Health in Tennessee | $77,413       | Dr.Jason deKoff  
Tennessee State University |
| ES14-121   | Sustainable ACES (Agriculture, Curricula, Energy) for Tennessee                 | $77,757       | Dr.Jason deKoff  
Tennessee State University |
| ES03-069   | Training Educators to Protect Honey Bee Pollinators with Sustainable Pest Management | $126,648     | Dr.John Skinner  
Univ. Tennessee |
| ES02-061   | A Statewide Journey of Sustainable Success: Hands-On Training                   | $48,000       | Rob Holland  
UT Extension |
| ES97-029   | Implementing Tennessee’s Strategic Plan for Sustainable Agriculture: Utilizing On-Farm Case Studies for Teaching Advanced Management and Marketing to Extension Staff | $10,000      | Dr.Clark Garland  
University of Tennessee |
| LST94-004  | Sustainable Dairy Systems Manual and Training                                   | $90,000       | Dr.Clark Garland  
University of Tennessee |

## FARMER/RANCHER GRANTS

<table>
<thead>
<tr>
<th>Project #</th>
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<th>Project Leaders</th>
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</thead>
</table>
| FS22-342   | Improving the Cost-Efficacy of Silvopasture Establishment in the Southeast    | $12,771       | Wyn Miller  
Lick Skillet Farm |
| FS21-331   | Successional Mushroom Production: Farming Multiple Species of Mushrooms on One Substrate to Lower Input Cost, and Increase Revenue and Products Sold | $10,780       | David Wells, III  
Henosis |
| FS19-315   | A Study of the Effects of Black Woven Polypropylene on Soil Biota              | $9,670        | Tera Kurtz |
| FS18-310   | Increasing Farm Fertility and Profits with Mushroom Mulches                   | $9,774        | David Wells, III  
Henosis |
**FS17-297**  Bacillus thuringiensis var. Israelensis as a Larvacidal on a Rotational Grazing System for Ruminants to Combat Haemonchus contortus  $10,000  Jo Ann Harris  Farmer

**FS17-295**  Incorporating Conservation Solutions into Alternative Crop Transplant Systems  $9,999  Sarah Bellos  Farmer

**FS17-294**  Adaptive Winter Squash  $1,822  Megan Allen  Care of the Earth Community Farm

**FS12-263**  Selective breeding of honey bees for multiple traits with a priority on nosema disease resistance  $10,000  Michael Wilson  Rosecomb Apiaries

**FS10-241**  Sustainable Cultivation of Plant-derived Indigo for Diversification and On-farm Value-added Dye Pigment Production  $9,871  Sarah Bellos  Farmer

**FS07-221**  Natural Comb Management of Honey Bees for Varroa Control  $15,000  Michael Wilson

**FS07-214**  Sustainable Low-Cost Heating for Season Extension Structures  $14,928  Steve Hodges  Clinch Appalachian Farm Enterprises

**FS06-203**  A Demand-Driven Approach to Specialty Crop Market Development  $12,324  Dianne Levy  Appalachian Spring Cooperative

**FS06-200**  Establishing Natural Controls of Competitive Fungi in the Production of Shiitake Mushrooms  $8,832  James DAy

**FS05-189**  Salsa Pepper Project  $9,660  Sara Gardner

**FS05-188**  Aquaculturally Derived Products as Fertilizers for High-value Organic Crop Production  $9,953  Marc Cardosa

**FS04-181**  Selection of Hygienic Honey Bee Queens Resistant to Tracheal Mites  $9,987  Edwin Holcombe

**FS02-157**  Northern Tennessee Farmer’s Association Cooperative Farmers Market Project  $13,755  Michael Osborne  Northern Tennessee Farmer’s Assn. Cooperative
Cooperating for Success: Building a Value-added Marketing Cooperative for Advantage in the Marketplace

Fungicidal Effects of Compost Tea on Organic Strawberry Production

The Effect of Municipal Compost on Christmas Trees

Evaluating the Cost of Production of Row Crops Using Precision Farming Technologies

Low Input Sustainable Agriculture Short Course

Sustainable Cultivation of Medicinal Herbs as a Cash Crop Alternative to Tobacco

Grazing Alternatives to Tall Fescue for Stocker Cattle

Swine Lagoon Management System

GRADUATE STUDENT GRANTS

<table>
<thead>
<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
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</tr>
</thead>
<tbody>
<tr>
<td>GS23-282</td>
<td>Role of Local Trichoderma spp. Isolates in Reducing Tomato Fusarium Wilt and Increasing Phosphorus Uptake</td>
<td>$16,500</td>
<td>Dr. David Butler University of Tennessee, Knoxville Caitlin Dalton University of Tennessee</td>
</tr>
<tr>
<td>GS23-288</td>
<td>Ambrosia Beetles and Phytophthora cinnamomi Management Using Plant Defense Elicitors Under Flood Stress Condition</td>
<td>$16,500</td>
<td>Dr. Fulya Baysal-Gurel Tennessee State University Madhav Parajuli Tennessee State University</td>
</tr>
<tr>
<td>GS23-289</td>
<td>Enhancing Sustainability and Productivity of Organic Wheat-Soybean Double-Crop Systems in the Southeastern USA</td>
<td>$16,200</td>
<td>Dr. Sindhu Jagadamma University of Tennessee Ravi Teja Neelipally University of Tennessee</td>
</tr>
<tr>
<td>GS23-296</td>
<td>Identifying Genetic Sources of High Nutritive Value in a Panel of American Southern Pea (Vigna unguiculata L. Walp.) Germplasm</td>
<td>$16,368</td>
<td>Dr. Matthew Blair Tennessee State University Max Miller, II Tennessee State University</td>
</tr>
</tbody>
</table>
| GS22-266 | Optimizing Anaerobic/Biological Soil Disinfestation Amendment Composition Through Soil Fermentation Experiments | $16,500 | Dr. David Butler  
University of Tennessee, Knoxville  
James Littrell  
University of Tennessee |
Middle Tennessee State University  
Festus Aigbogun  
Middle Tennessee State University |
| GS20-228 | Sustainable Management of Phytophthora Cinnamomi and Ambrosia Beetles Under Stress Conditions | $16,335 | Dr. Fulya Baysal-Gurel  
Tennessee State University  
Krishna Neupane  
Tennessee State University |
| GS17-168 | Evaluating Soil Microbial Communities and Cropping Systems for Biomass Feedstock Production on Degraded Lands | $14,838 | E. Kudjo Dzantor  
Tennessee State University  
Ekundayo Adeleke  
Tennessee State University |
| GS17-175 | Investigating the Impact of Plant Spacing on Yields of Sweet Potato Produced in Organic Systems | $16,443 | Dilip Nandwani  
Tennessee State University  
Sochinwechi Nwosisi  
Tennessee State University |
| GS16-155 | Sustainable Management of Soil-borne Diseases in Nursery Production | $11,000 | Dr. Fulya Baysal-Gurel  
Tennessee State University  
Prabha Liyanapathiranage  
Tennessee State University |
| GS16-157 | Integration of Silvopasture and Nut Production in the Southeast | $7,906 | Dr. Hill Craddock  
University of Tennessee at Chattanooga  
Conrad Blunck  
Tennessee State University |
| GS14-128 | Assessment of beneficial microorganisms: Trichoderma, Actinomycetes, and Bacillus in anaerobic soil disinfestation (ASD) | $10,993 | Dr. David Butler  
University of Tennessee, Knoxville  
Utsala Shrestha  
University of Tennessee, Plant Sciences |
| GS13-124 | Examining the Influence of Farmers’ Market Managers Perceived Roles on Business Opportunities for Small- and Moderate-size Farms and Access to Healthful Foods for Low-income Households | $6,479 | Dr. Deborah Slawson  
East Tennessee State University  
Rachel Ward  
East Tennessee State University |
| GS10-095 | Efficacy of entomopathogenic fungi in an integrated pest management plan for cucumber beetles in melons and pumpkins | $8,154 | Annette Wszelaki  
University of Tennessee  
Mary Rogers  
University of Tennessee |
<table>
<thead>
<tr>
<th>Project #</th>
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</thead>
</table>
| GS09-086  | Testing the efficacy of three new alternative treatments for Nosema disease of honey bees in Tennessee | $9,963        | Dr. John Skinner  
Paul Rhoades  
University of Tennessee |
| GS08-077  | Providing habitat for native pollinators and determination of native pollinator contribution to pollination of cucurbits and blueberries at farm sites | $10,000       | Dr. John Skinner  
Michael Wilson  
Rosecomb Apiaries |
University of Tennessee  
Candice Jones  
University of Tennessee |
| GS02-016  | Collaborative Learning among Farmers as an Approach to Alternative Agricultural Education            | $9,540        | John Peters  
University of Tennessee  
Robin Fazio  
Sonrisa Farm |
| GS01-011  | Suppression of Soilborne Phytopathogenic Fungi of Tomatoes via Integrated Production Systems that Utilize Biofumigation, Composted Amendments, Solarization, and Chemical Fumigants. | $10,000       | Carl Sams  
The University of Tennessee  
Martin Lyons  
University of Tennessee |
| GS00-002  | Control of Soilborne Plant Pathogens of tomatoes with incorporation of Indian Mustard (Brassica juncea) | $10,000       | Carl Sams  
The University of Tennessee  
Stephanie G Harvey  
Georgia Southwestern 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>
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</thead>
</table>
| OS22-160  | Development of Novel Directed Optical Energy Weed Management Robotics Platform for Sustainable Soybean Farming | $20,000       | hongbo zhang  
Middle Tennessee State University |
| OS21-149  | Predicting Corn N Response Using Alkaline Mineralizable-Nitrogen and Haney Soil Health Tool-Nitrogen in TN | $20,000       | Dr. Nutifafa Adotey  
University of Tennessee |
| OS18-112  | Biofumigants for Sustainable Soil-borne Disease Management in Nursery Production | $15,000       | Dr. Fulya Baysal-Gurel  
Tennessee State University |
<table>
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<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
</tr>
</thead>
</table>
| OS17-101 | Amblyseius swirksii Athias-Henriot for Control of Arthropod Pests in Woody Ornamental Propagation | $14,872      | Dr.Karla Addesso
|          |                                                                                |              | Tennessee State University                           |
| OS14-084 | Incorporating a Cover Crop into Field Grown Nursery Production to Manage Flatheaded Appletree Borer with the Simultaneous Benefit of Improved and Sustainable Weed Management | $14,997      | Dr.Karla Addesso
|          |                                                                                |              | Tennessee State University                           |
| OS11-057 | Organic forage production systems for organic dairies in the Southern region  | $14,993      | Dr.David Butler
|          |                                                                                |              | University of Tennessee, Knoxville                   |
| OS02-002 | Specialty Flowering Bulbs as a Sustainable Alternative Crop for Tobacco Farmers in Middle Tennessee | $14,910      | Steve Garton                                         |
|          |                                                                                |              |                                                     |
|          | **SUSTAINABLE COMMUNITY INNOVATION GRANTS**                                   |              |                                                     |
|          |                                                                                |              |                                                     |
| CS10-077 | Live Green and Prosper Community Education and Outreach Initiative             | $10,000      | Erica Duarte
|          |                                                                                |              | Upper Cumberland Broadcast Council - WCTE           |
| CS10-075 | Building Sustainable Families through a Celebration of Low-Impact and Organic Community-Supported Agriculture | $10,000      | Ruth Correll
|          |                                                                                |              | UT Extension, Wilson County                         |
| CS07-056A| “Gathering” of Homestead Economic and Entrepreneurs of Food Based, Organic Foods and Other Related Businesses | $10,000      | Martha Pile
|          |                                                                                |              | UT Extension of Montgomery County                   |
| CS07-056 | “Gathering” of Homestead Economic and Entrepreneurs of Food Based, Organic Foods and Other Related Businesses | $10,000      | Martha Pile
|          |                                                                                |              | UT Extension of Montgomery County                   |
| CS06-049 | Appalachian Sustainable Agriculture and Energy Project                         | $40,000      | John Jackson
|          |                                                                                |              | Appalachian Native Plants Inc                       |
| CS06-048 | Schools + Potatoes Upper E. Tennessee Development System (SPUDS)               | $39,762      | Steve Hodges
|          |                                                                                |              | Clinch Appalachian Farm Enterprises                  |
| CS02-004 | Homegrown, From Our Farms to Your Table: Growing a Farmers’ Cooperative in East Tennessee | $6,436       | Steve Hodges
<p>|          |                                                                                |              | Clinch Appalachian Farm Enterprises                  |
|          |                                                                                |              |                                                     |
|          | <strong>EDUCATION ONLY GRANTS</strong>                                                      |              |                                                     |
|          |                                                                                |              |                                                     |</p>
<table>
<thead>
<tr>
<th>Project Number</th>
<th>Project Title</th>
<th>Funding</th>
<th>Contact Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDS24-071</td>
<td>River Friendly Farms Grazing School</td>
<td>$40,680</td>
<td>Mekayle Houghton&lt;br&gt;Caroline Hutchins&lt;br&gt;Cumberland River Compact</td>
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<tr>
<td>EDS24-067</td>
<td>South East Tennessee Collaborative Regional Alliance for Farmer Training (SETN CRAFT)</td>
<td>$49,144</td>
<td>Melonie Lusk&lt;br&gt;Emily Heid&lt;br&gt;Crabtree Farms&lt;br&gt;Southeast Tennessee Young Farmers Coalition</td>
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<tr>
<td>EDS24-062</td>
<td>Increasing Sustainable Agriculture and Economic Viability of Farms in Tennessee Through Education</td>
<td>$39,703</td>
<td>Natalie Seevers&lt;br&gt;Tennessee Local Food</td>
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<tr>
<td>EDS24-057</td>
<td>Soil SMaRTS 2: Virtual farm tours for enhanced and inclusive learning about soil health.</td>
<td>$44,864</td>
<td>Dr. Jason deKoff&lt;br&gt;Tennessee State University</td>
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<tr>
<td>EDS23-049</td>
<td>Beyond Agri-Curious: Training New Farmers in the Business of Farming</td>
<td>$42,000</td>
<td>Mekayle Houghton&lt;br&gt;C.J. Sentell&lt;br&gt;Nashville Food Project</td>
</tr>
</tbody>
</table>

**Total funding from the USDA SARE program to Tennessee**

$4,237,065

For further information on projects, contact 770-412-4787 or ssare@uga.edu. Sustainable Agriculture Research and Education (SARE) is funded by USDA’s National Institute of Food and Agriculture (NIFA).