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...

Guam

Project Highlight: Sheet Mulch Using Cardboard and NFTs
Weeds grow at a very fast pace in Guam. Hand weeding, herbicides, and bush cutting (commercial high powered gas trimmers) are common methods to suppress weeds. However, bush cutters can damage crops and be costly and hand weeding takes a lot of labor.

In this project, farmer Glen Takai proposed testing sheet mulch and nitrogen fixing trees (NFTs) as a solution. Sheet mulching is a layered method of mulching. Typical sheet mulching methods consist of initially laying single or multiple layers of cardboard over a targeted area. Cardboard layers can be topped with shredded/chipped organic waste material. Cardboard is an abundant resource on this remote island due to high imports, and it creates much waste into the landfill. The use of cardboard and NFTs as sheet mulch to manage weeds could also improve soil quality through adding organic matter.

The project has demonstrated significant differences in labor cost savings using sheet mulch compared to not using sheet mulch. Yield data shows that plants using sheet mulch produced significantly higher than plants not mulched. The common use of herbicides was completely eliminated. Lastly, the project promotes the idea of reduce, reuse, and recycle.

For more information on this project, see sare.org/projects, and search for project number FW19-348.

SARE in Guam
western.sare.org/state-profiles/guam/

$1,161,339 in total funding

10 grant project
(since 1988)

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

www.sare.org
SARE in Guam

Grants awarded 2019–2024

Total awards: **10 grants**
- 2 Farmer/Rancher
- 2 Research and Education
- 5 Professional Development Program
- 1 On Farm Research/Partnership

Total funding: **$1,161,339**
- $35,612 Farmer/Rancher
- $654,254 Research and Education
- $413,072 Professional Development Program
- $58,401 On Farm Research/Partnership

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:

- **481 farmers participated in a SARE-funded project**
- **31 farmers reported a change in knowledge, awareness, skills or attitude**
- **10 farmers changed a practice**

Learn about local impacts at: 
[western.sare.org/sare-in-your-state/guam/](western.sare.org/sare-in-your-state/guam/)

Photo credit: University of Guam

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 [western.sare.org/state-profiles/guam/](western.sare.org/state-profiles/guam/) to learn more.

Mark Acosta  
University of Guam  
(671) 735-2092  
macosta@triton.uog.edu

Bob Barber  
University of Guam Cooperative Extension  
(671) 787-7391  
bbarber@triton.uog.edu

For detailed information on SARE projects, go to [www.SARE.org](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.
Guam has been awarded $2,609,559 grants to support 50 projects, including but not limited to, 11 research and/or education projects, 12 professional development projects and 23 producer-led projects. Guam 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>
</table>
| SW23-954 | Guam’s Upgrowing Agricultural Markets (GUAM): Developing Profitable Local Food Markets and Sustainable Agriculture for Small Island Economies | $349,981     | Kuan-Ju Chen  
University of Guam  
Dr. Tongzhe Li  
University of Guelph  
Dr. Fred Schumann  
University of Guam  
Dr. L. Jen Shaffer  
University of Maryland, College Park |
| SW19-906 | Reducing tree decline of Casuarina equisetifolia in Guam through replacement of bacterial wilt infected trees and research into the bacterial microbiomes of trees and associated termites | $304,273     | Dr. Robert Schlub  
University of Guam |
| SW09-304 | Replacing Feed Imports With Local Feed Resources in the Western Pacific       | $47,207      | Dr. Manuel Duguies  
Cooperative Extension Service |
| SW09-067 | Island to Island, Farmer to Chef: Ag Agricultural Marketing Proposal          | $133,967     | Dr. L. Robert (Bob) Barber, Jr.  
University of Guam Cooperative Extension Service |
| SW08-067 | Decline of Casuarina equisetifolia: A Loss to Pacific Island Agroforestry     | $140,680     | Roger Brown, Jr.  
University of Guam  
Dr. Robert Schlub  
University of Guam |
| SW05-00B | Preservation of Traditional Medicinal Plants on Guam                           | $18,615      | Dr. L. Robert (Bob) Barber, Jr.  
University of Guam Cooperative Extension Service |
| SW02-048 | Alternative Housing Structure for Livestock and Poultry in Micronesia         | $26,857      | Dr. Manuel Duguies  
Cooperative Extension Service |
| SW01-017 | Commercial Production of Tropical Mushrooms Grown Organically                 | $36,081      | George Wall  
CALS/AES, University of Guam |
Evaluation and implementation of nitrogen fixing species in hedgerow intercropping in Marianas

$132,000
Mari Marutani
College of Nat. & Appl. Sciences, Univ. of Guam

Strengthening through Education the Sustainability of Solanaceous Crop Production in the Western Pacific Region

$16,000
Dr. Robert Schlub
University of Guam

Evaluation of Processing Food Refuse and By-products for Growing Finishing Swine

$121,850
Farouq Abawi
University of Guam

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>WPDP23-004</td>
<td>Increasing Capacity of Aquaculture Farmers in Guam with On-Farm Hatchery Demonstration for All-Male Tilapia Production.</td>
<td>$98,668</td>
<td>David Crisostomo University of Guam Sea Grant Johnny Borja University of Guam Sea Grant</td>
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<tr>
<td>WPDP23-016</td>
<td>Pesticide Safety Education for Pacific Island Educators and Stakeholders</td>
<td>$99,099</td>
<td>Jesse Bamba University of Guam Funding partner that submits proposal PennAg Industries Association Educational Foundation or Feeding Pennsylvania or PASS</td>
</tr>
<tr>
<td>WPDP22-006</td>
<td>Information Network for Sustainable Pacific Islands Research and Education (INSPIRE)</td>
<td>$98,653</td>
<td>Mark Acosta University of Guam, Cooperative Extension &amp; Outreach</td>
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<tr>
<td>WPDP22-012</td>
<td>The promotion of Heat Stress awareness and Animal Nutrition for egg and hog production on Guam and the Western Region</td>
<td>$50,639</td>
<td>Dr. Jeng-Hung Liu University of Guam Christopher Byrd North Dakota State University Dr. Jennifer Young North Dakota State University</td>
</tr>
<tr>
<td>PDP20-001</td>
<td>Fungal leaf spots: field, lab, and online tutorial for professionals in Guam and the Northern Mariana Islands</td>
<td>$66,013</td>
<td>Dr. Robert Schlub University of Guam Dr. Marin Brewer University of Georgia Dr. Robert Kemerait University of Georgia Dr. Kisha Shelton University of Georgia Dr. Leilan Sumabat-Dacones University of Philippines</td>
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<tr>
<td>EW14-006</td>
<td>Plant Disease Diagnostic Training for Agricultural Professionals in Guam and the Northern Mariana Islands</td>
<td>$63,900</td>
<td>Dr. Robert Schlub University of Guam</td>
</tr>
</tbody>
</table>
**Increasing Ecological Insect Pest Management on Guam Through Building Agriculture Professionals' Understanding of Semiochemicals**

- **Project #:** EW09-012
- **Support:** $59,990
- **Leaders:**
  - Gadi V.P. Reddy, Ph.D.
  - University of Guam
  - Dr. Michael Ivie
  - Montana State University-Bozeman

**Enhancing Ecological Disease Management on Guam Through Building Agriculture professionals' Understanding of Soil Nutrients**

- **Project #:** EW08-018
- **Support:** $49,962
- **Leaders:**
  - Roger Brown, Jr.
  - University of Guam
  - Dr. Robert Schlub
  - University of Guam

**Capacity Building and Training in Commercial Aquaculture for Guam, Commonwealth of the Northern Marianas, and American Samoa**

- **Project #:** EW05-017
- **Support:** $90,000
- **Leaders:**
  - Dr. L. Robert (Bob) Barber, Jr.
  - University of Guam Cooperative Extension Service

**Transfer of Research Based Knowledge in Agriculture in the American Pacific**

- **Project #:** EW05-007
- **Support:** $74,507
- **Leaders:**
  - Dr. Manuel Duguies
  - Cooperative Extension Service

**People Improving Growth for Swine (PIGS) in Micronesia**

- **Project #:** EW99-002
- **Support:** $47,540
- **Leaders:**
  - Dr. Manuel Duguies
  - Cooperative Extension Service

**Portable Extension Office for Program Literature Exchange (PEOPLE)**

- **Project #:** EW98-011
- **Support:** $41,360
- **Leaders:**
  - Dr. L. Robert (Bob) Barber, Jr.
  - University of Guam Cooperative Extension Service

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**FARMER/RANCHER GRANTS**

<table>
<thead>
<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
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<tbody>
<tr>
<td>FW23-414</td>
<td>Local Feeds for Poultry Farming on Guam</td>
<td>$24,612</td>
<td>Thomas Tanaka, Jr.</td>
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<tr>
<td>FW19-348</td>
<td>Sheet Mulch Using Cardboard and NFTs</td>
<td>$11,000</td>
<td>Glenn Takai</td>
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<tr>
<td>FW17-050</td>
<td>Ducks in a Row: Raising Ducks on Guam for Production and Pest Control</td>
<td>$19,206</td>
<td>Maegan Paloma</td>
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<td></td>
<td></td>
<td></td>
<td>Maegan Paloma</td>
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<tr>
<td>FW17-014</td>
<td>My Boars Are In Iowa</td>
<td>$13,597</td>
<td>Eddie Saure</td>
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<tr>
<td>FW16-030</td>
<td>Rotating Paddock-style Systems in Tropical Environments</td>
<td>$17,196</td>
<td>Hertha Van Beurden</td>
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<tr>
<td>FW16-015</td>
<td>From Peewee to Large Eggs</td>
<td>$11,393</td>
<td>Alex Coloma</td>
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<td>Agriculture</td>
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<td>Project Code</td>
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<td>Budget</td>
<td>Principal Investigator</td>
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<tr>
<td>FW15-041</td>
<td>Raising Black Soldier Fly Larvae as Chicken Feed in a Tropical Region</td>
<td>$8,232</td>
<td>Chelsa Muna-Brecht</td>
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<tr>
<td>FW08-048</td>
<td>Living Mulch on Guam</td>
<td>$13,000</td>
<td>Laila Pierson</td>
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<tr>
<td>FW08-313</td>
<td>Kona to Guam Weaving the Farmer Chef Network</td>
<td>$19,625</td>
<td>Phoebe Wall</td>
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<tr>
<td>FW08-046</td>
<td>Growing Papaya Using Aquaculture Effluent in an Automated Drip Irrigation System</td>
<td>$14,800</td>
<td>David Crisostomo</td>
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<tr>
<td>FW06-026</td>
<td>Multi-crops on Plant Beds on Guam</td>
<td>$5,915</td>
<td>Laila Pierson</td>
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<tr>
<td>FW05-312</td>
<td>Maximizing Production Efficiency in a Three-Stage Integrated Agriculture System Using Taro, Tilapia, Aquatic Plants and Fancy Guppies</td>
<td>$9,951</td>
<td>Dr.L. Robert (Bob) Barber, Jr. University of Guam Cooperative Extension Service</td>
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<tr>
<td>FW05-003</td>
<td>Wastewater Delivery System for Irrigation and Soil Enrichment on Guam</td>
<td>$4,570</td>
<td>John Benaventa</td>
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<tr>
<td>FW05-013</td>
<td>Recycling Fish Waste to Fertilize Guam Farms</td>
<td>$19,809</td>
<td>Ernie Wusstig</td>
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<tr>
<td>FW04-302</td>
<td>Greenhouse Water Barrier</td>
<td>$10,871</td>
<td>Pete Terlane</td>
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<tr>
<td>FW04-104</td>
<td>Lei Making and Marketing - A New Approach to Marketing</td>
<td>$6,750</td>
<td>Antoinette Okada</td>
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<tr>
<td>FW02-017</td>
<td>Decreasing Dependence on Man-Made Fertilizers for Crop Production in Tropical Limestone Soils</td>
<td>$5,200</td>
<td>Ernie Wusstig</td>
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<tr>
<td>FW00-064</td>
<td>Adopting Health Programs and Improving Weaning Facilities in Management of Piglet Diarrhea on Guam</td>
<td>$7,085</td>
<td>Ricardo Cruz, Jr.</td>
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<tr>
<td>FW99-015</td>
<td>Mushroom Production</td>
<td>$3,950</td>
<td>David Nelson</td>
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<tr>
<td>Project #</td>
<td>Project Title</td>
<td>SARE Support</td>
<td>Project Leaders</td>
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<tr>
<td>FW99-031</td>
<td>Genetic Upgrading and Improving Goat Management Practices on Guam</td>
<td>$6,000</td>
<td>Loella Armstrong</td>
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<tr>
<td>FW97-054</td>
<td>Use of Sunnhemp in Cucumber Production</td>
<td>$4,300</td>
<td>Felix Quan</td>
</tr>
<tr>
<td>FW96-030</td>
<td>Vegetable Soybean Cultivar Trials</td>
<td>$3,020</td>
<td>Felix Quan</td>
</tr>
<tr>
<td>FW96-029</td>
<td>Dry-Extrusion of Wet Garbage for Swine Feeding</td>
<td>$4,350</td>
<td>George Pangelinan</td>
</tr>
</tbody>
</table>

**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>OW22-375</td>
<td>5 Future Trainers: Developing a farmer run agriculture production monitoring program for the Farmer’s Cooperative Association of Guam (FCAG)</td>
<td>$58,401</td>
<td>Jesse Bamba University of Guam</td>
</tr>
<tr>
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<td>Joseph Tuquero University of Guam</td>
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<tr>
<td>OW15-031</td>
<td>Seven Trees, Seven Practices: Demonstrating Agroforestry in the Western Pacific</td>
<td>$47,899</td>
<td>Dr. L. Robert (Bob) Barber, Jr.</td>
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<td>University of Guam Cooperative Extension Service</td>
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<tr>
<td>OW14-026</td>
<td>Screening tomato varieties for suitability on Guam in response to the arrival of Tomato leaf curl Guam virus in the Western Region</td>
<td>$49,500</td>
<td>Dr. Robert Schlub University of Guam</td>
</tr>
<tr>
<td>OW10-322</td>
<td>Local Feed Formulation for Goats</td>
<td>$41,485</td>
<td>Dr. Manuel Duguies Cooperative Extension Service</td>
</tr>
</tbody>
</table>

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

$2,609,559

For further information on projects, contact Western SARE at (406) 994-4785 or wsare@montana.edu.

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