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 $398 million to more than 8,716 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.

www.sare.org

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 consists 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/sare-in-your-state/guam

$1,333,586 in total funding
12 grant project (since 1988)

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

Grants awarded
2019–2024

Total awards: 12 grants
2 Farmer/Rancher
2 Research and Education
5 Professional Development Program
1 On Farm Research/Partnership
2 Research to Grass Roots

Total funding: $1,333,586
$35,612 Farmer/Rancher
$654,254 Research and Education
$413,072 Professional Development Program
$58,401 On Farm Research/Partnership
$172,247 Research to Grass Roots

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:

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

Find a complete list of projects on page 3.

Learn about local impacts at:
western.sare.org/sare-in-your-state/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-pages/guam to learn more.

Mark Acosta
University of Guam, Cooperative Extension
(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

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 $2,781,806 grants to support 52 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 |
<table>
<thead>
<tr>
<th>Project #</th>
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<th>Project Leaders</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW99-048</td>
<td>Evaluation and implementation of nitrogen fixing species in hedgerow intercropping in Marianas</td>
<td>$132,000</td>
<td>Mari Marutani&lt;br&gt;College of Nat. &amp; Appl. Sciences, Univ. of Guam</td>
</tr>
<tr>
<td>SW99-047</td>
<td>Strengthening through Education the Sustainability of Solanaceous Crop Production in the Western Pacific Region</td>
<td>$16,000</td>
<td>Dr. Robert Schlub&lt;br&gt;University of Guam</td>
</tr>
<tr>
<td>SW98-041</td>
<td>Evaluation of Processing Food Refuse and By-products for Growing Finishing Swine</td>
<td>$121,850</td>
<td>Farouq Abawi&lt;br&gt;University of Guam</td>
</tr>
</tbody>
</table>

### RESEARCH TO GRASS ROOTS GRANTS

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<thead>
<tr>
<th>Project #</th>
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<th>Project Leaders</th>
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<tbody>
<tr>
<td>WRGR22-003</td>
<td>Developing the Economic Sustainability and Viability of Value-added Products on Guam</td>
<td>$99,376</td>
<td>Kuan-Ju Chen&lt;br&gt;University of Guam&lt;br&gt;Tanisha Aflague&lt;br&gt;College of Natural and Applied Sciences, University of Guam&lt;br&gt;Jian Yang</td>
</tr>
<tr>
<td>RGR20-003</td>
<td>Expanding Small-scale Sustainable Agroforestry Demonstration Plots in the Western Pacific</td>
<td>$72,871</td>
<td>Joseph Tuquero&lt;br&gt;University of Guam&lt;br&gt;Mark Acosta&lt;br&gt;University of Guam, Cooperative Extension&lt;br&gt;Engly Ioanis&lt;br&gt;College of Micronesia Land Grant Programmmmm</td>
</tr>
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### PROFESSIONAL DEVELOPMENT PROGRAM GRANTS

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<tr>
<th>Project #</th>
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<th>Project Leaders</th>
</tr>
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<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&lt;br&gt;University of Guam Sea Grant&lt;br&gt;Johnny Borja&lt;br&gt;University of Guam Sea Grant</td>
</tr>
<tr>
<td>WPDP23-016</td>
<td>Pesticide Safety Education for Pacific Island Educators and Stakeholders</td>
<td>$99,099</td>
<td>Jesse Bamba&lt;br&gt;University of Guam&lt;br&gt;Kerry Richards&lt;br&gt;PCASH</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&lt;br&gt;University of Guam, Cooperative Extension &amp; Outreach</td>
</tr>
<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&lt;br&gt;University of Guam&lt;br&gt;Christopher Byrd&lt;br&gt;North Dakota State University&lt;br&gt;Dr. Jennifer Young&lt;br&gt;North Dakota State University</td>
</tr>
</tbody>
</table>
PDP20-001  Fungal leaf spots: field, lab, and online tutorial for professionals in Guam and the Northern Mariana Islands $66,013  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

EW14-006  Plant Disease Diagnostic Training for Agricultural Professionals in Guam and the Northern Mariana Islands $63,900  Dr. Robert Schlub  University of Guam

EW09-012  Increasing Ecological Insect Pest Management on Guam Through Building Agriculture Professionals' Understanding of Semiochemicals $59,990  Gadi V.P. Reddy, Ph.D.  University of Guam  Dr. Michael Ivie  Montana State University-Bozeman

EW08-018  Enhancing Ecological Disease Management on Guam Through Building Agriculture Professionals' Understanding of Soil Nutrients $49,962  Roger Brown, Jr.  University of Guam  Dr. Robert Schlub  University of Guam

EW05-017  Capacity Building and Training in Commercial Aquaculture for Guam, Commonwealth of the Northern Marianas, and American Samoa $90,000  Dr. L. Robert (Bob) Barber, Jr.  University of Guam Cooperative Extension Service

EW05-007  Transfer of Research Based Knowledge in Agriculture in the American Pacific $74,507  Dr. Manuel Duguies  Cooperative Extension Service

EW99-002  People Improving Growth for Swine (PIGS) in Micronesia $47,540  Dr. Manuel Duguies  Cooperative Extension Service

EW98-011  Portable Extension Office for Program Literature Exchange (PEOPLE) $41,360  Dr. L. Robert (Bob) Barber, Jr.  University of Guam Cooperative Extension Service

FARMER/RANCHER GRANTS

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<tr>
<th>Project #</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.  PCS INC</td>
</tr>
<tr>
<td>FW19-348</td>
<td>Sheet Mulch Using Cardboard and NFTs</td>
<td>$11,000</td>
<td>Glenn Takai  Takai Farm</td>
</tr>
</tbody>
</table>
Ducks in a Row: Raising Ducks on Guam for Production and Pest Control $19,206 Maegan Paloma

My Boars Are In Iowa $13,597 Eddie Saure

Rotating Paddock-style Systems in Tropical Environments $17,196 Hertha Van Beurden, Paradise Natural Farm

From Peewee to Large Eggs $11,393 Alex Coloma, Agriculture

Raising Black Soldier Fly Larvae as Chicken Feed in a Tropical Region $8,232 Chelsa Muna-Brecht, P.U.N.G.Co Farms

Kona to Guam Weaving the Farmer Chef Network $19,625 Phoebe Wall, University of Guam
Dr. L. Robert (Bob) Barber, Jr., University of Guam Cooperative Extension Service

Living Mulch on Guam $13,000 Laila Pierson

Growing Papaya Using Aquaculture Effluent in an Automated Drip Irrigation System $14,800 David Crisostomo

Multi-crops on Plant Beds on Guam $5,915 Laila Pierson

Wastewater Delivery System for Irrigation and Soil Enrichment on Guam $4,570 John Benaventa, Triple B Farms

Maximizing Production Efficiency in a Three-Stage Integrated Agriculture System Using Taro, Tilapia, Aquatic Plants and Fancy Guppies $9,951 Dr. L. Robert (Bob) Barber, Jr., University of Guam Cooperative Extension Service

Recycling Fish Waste to Fertilize Guam Farms $19,809 Ernie Wusstig

Greenhouse Water Barrier $10,871 Pete Terlane, Guam Department of Agriculture
<table>
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<tr>
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<tbody>
<tr>
<td>FW04-104</td>
<td>Lei Making and Marketing - A New Approach to Marketing</td>
<td>$6,750</td>
<td>Antoinette Okada</td>
</tr>
<tr>
<td>FW02-017</td>
<td>Decreasing Dependence on Man-Made Fertilizers for Crop Production in Tropical</td>
<td>$5,200</td>
<td>Ernie Wusstig</td>
</tr>
<tr>
<td>FW00-064</td>
<td>Adopting Health Programs and Improving Weaning Facilities in Management of Piglet</td>
<td>$7,085</td>
<td>Ricardo Cruz, Jr.</td>
</tr>
<tr>
<td>FW99-031</td>
<td>Genetic Upgrading and Improving Goat Management Practices on Guam</td>
<td>$6,000</td>
<td>Loella Armstrong</td>
</tr>
<tr>
<td>FW99-015</td>
<td>Mushroom Production</td>
<td>$3,950</td>
<td>David Nelson</td>
</tr>
<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>
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</tbody>
</table>

**ON FARM RESEARCH/PARTNERSHIP GRANTS**

<table>
<thead>
<tr>
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</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 Joseph Tuquero University of Guam</td>
</tr>
<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. University of Guam Cooperative Extension Service</td>
</tr>
<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  
$2,781,806

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).