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 $389 million to more than 8,542 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.

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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

$2,781,806 in total funding

52 grant projects

(since 1988)

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

Total awards: **52 grants**

- 12 Professional Development Program
- 23 Farmer/Rancher
- 4 On Farm Research/Partnership
- 11 Research and Education
- 2 Research to Grass Roots

Total funding: **$2,781,806**

- **$840,331** Professional Development Program
- **$244,432** Farmer/Rancher
- **$197,285** On Farm Research/Partnership
- **$1,327,511** Research and Education
- **$172,247** Research to Grass Roots

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: 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  
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(671) 787-7391  
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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.

For detailed information on SARE projects, go to www.SARE.org
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>
<tbody>
<tr>
<td>SW23-954</td>
<td>Guam’s Upgrowing Agricultural Markets (GUAM): Developing Profitable Local Food Markets and Sustainable Agriculture for Small Island Economies</td>
<td>$349,981</td>
<td>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)</td>
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<tr>
<td>SW19-906</td>
<td>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</td>
<td>$304,273</td>
<td>Dr. Robert Schlub (University of Guam)</td>
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<tr>
<td>SW09-304</td>
<td>Replacing Feed Imports With Local Feed Resources in the Western Pacific</td>
<td>$47,207</td>
<td>Dr. Manuel Duguies (Cooperative Extension Service)</td>
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<tr>
<td>SW09-067</td>
<td>Island to Island, Farmer to Chef: Ag Agricultural Marketing Proposal</td>
<td>$133,967</td>
<td>Dr. L. Robert (Bob) Barber, Jr. (University of Guam Cooperative Extension Service)</td>
</tr>
<tr>
<td>SW08-067</td>
<td>Decline of Casuarina equisetifolia: A Loss to Pacific Island Agroforestry</td>
<td>$140,680</td>
<td>Roger Brown, Jr. (University of Guam), Dr. Robert Schlub (University of Guam)</td>
</tr>
<tr>
<td>SW05-00B</td>
<td>Preservation of Traditional Medicinal Plants on Guam</td>
<td>$18,615</td>
<td>Dr. L. Robert (Bob) Barber, Jr. (University of Guam Cooperative Extension Service)</td>
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<tr>
<td>SW02-048</td>
<td>Alternative Housing Structure for Livestock and Poultry in Micronesia</td>
<td>$26,857</td>
<td>Dr. Manuel Duguies (Cooperative Extension Service)</td>
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<tr>
<td>SW01-017</td>
<td>Commercial Production of Tropical Mushrooms Grown Organically</td>
<td>$36,081</td>
<td>George Wall (CALS/AES, University of Guam)</td>
</tr>
<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 (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 (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 (University of Guam)</td>
</tr>
</tbody>
</table>

### RESEARCH TO GRASS ROOTS GRANTS
<table>
<thead>
<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
</tr>
</thead>
</table>
| WRGR22-003   | Developing the Economic Sustainability and Viability of Value-added Products on Guam | $99,376      | Kuan-Ju Chen  
University of Guam  
Tanisha Aflague  
College of Natural and Applied Sciences, University of Guam  
Jian Yang |
| RGR20-003    | Expanding Small-scale Sustainable Agroforestry Demonstration Plots in the Western Pacific | $72,871      | Joseph Tuquero  
University of Guam  
Mark Acosta  
University of Guam, Cooperative Extension  
Engly Ioanis  
College of Micronesia Land Grant Program |

**PROFESSIONAL DEVELOPMENT PROGRAM GRANTS**

<table>
<thead>
<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
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</tr>
</thead>
</table>
| WPDP23-004   | Increasing Capacity of Aquaculture Farmers in Guam with On-Farm Hatchery Demonstration for All-Male Tilapia Production. | $98,668      | David Crisostomo  
University of Guam Sea Grant  
Johnny Borja  
University of Guam Sea Grant |
| WPDP23-016   | Pesticide Safety Education for Pacific Island Educators and Stakeholders | $99,099      | Jesse Bamba  
University of Guam  
Kerry Richards  
PCASH |
| WPDP22-006   | Information Network for Sustainable Pacific Islands Research and Education (INSPIRE) | $98,653      | Mark Acosta  
University of Guam, Cooperative Extension & Outreach |
| WPDP22-012   | The promotion of Heat Stress awareness and Animal Nutrition for egg and hog production on Guam and the Western Region | $50,639      | Dr.Jeng-Hung Liu  
University of Guam  
Christopher Byrd  
North Dakota State University  
Dr.jennifer young  
North Dakota State University |
| 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 Kemeraït  
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 |
<table>
<thead>
<tr>
<th>Project #</th>
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<th>Project Leaders</th>
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</thead>
<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>
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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 Maegan Paloma</td>
</tr>
<tr>
<td>FW17-014</td>
<td>My Boars Are In Iowa</td>
<td>$13,597</td>
<td>Eddie Saure Eddie Saure</td>
</tr>
<tr>
<td>FW16-030</td>
<td>Rotating Paddock-style Systems in Tropical Environments</td>
<td>$17,196</td>
<td>Hertha Van Beurden Paradise Natural Farm</td>
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<tr>
<td>FW16-015</td>
<td>From Peewee to Large Eggs</td>
<td>$11,393</td>
<td>Alex Coloma Agriculture</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 P.U.N.G.Co Farms</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 University of Guam Dr.L. Robert (Bob) Barber, Jr. University of Guam Cooperative Extension Service</td>
</tr>
<tr>
<td>FW08-048</td>
<td>Living Mulch on Guam</td>
<td>$13,000</td>
<td>Laila Pierson</td>
</tr>
<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>
</tr>
<tr>
<td>FW05-003</td>
<td>Wastewater Delivery System for Irrigation and Soil Enrichment on Guam</td>
<td>$4,570</td>
<td>John Benaventa Triple B Farms</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>
</tr>
<tr>
<td>FW05-013</td>
<td>Recycling Fish Waste to Fertilize Guam Farms</td>
<td>$19,809</td>
<td>Ernie Wusstig</td>
</tr>
<tr>
<td>FW04-302</td>
<td>Greenhouse Water Barrier</td>
<td>$10,871</td>
<td>Pete Terlane Guam Department of Agriculture</td>
</tr>
</tbody>
</table>
FW04-104  Lei Making and Marketing - A New Approach to Marketing  $6,750  Antoinette Okada
FW02-017  Decreasing Dependence on Man-Made Fertilizers for Crop Production in Tropical Limestone Soils  $5,200  Ernie Wusstig
FW00-064  Adopting Health Programs and Improving Weaning Facilities in Management of Piglet Diarrhea on Guam  $7,085  Ricardo Cruz, Jr.
FW99-031  Genetic Upgrading and Improving Goat Management Practices on Guam  $6,000  Loella Armstrong
FW99-015  Mushroom Production  $3,950  David Nelson
FW97-054  Use of Sunnhemp in Cucumber Production  $4,300  Felix Quan
FW96-030  Vegetable Soybean Cultivar Trials  $3,020  Felix Quan
FW96-029  Dry-Extrusion of Wet Garbage for Swine Feeding  $4,350  George Pangelinan

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

**Total funding from the USDA SARE program to Guam**  
$2,781,806

For further information on projects, contact Western SARE at (406) 994-4789 or wsare@montana.edu.  
Sustainable Agriculture Research and Education (SARE) is funded by USDA’s National Institute of Food and Agriculture (NIFA).