

# Supporting Agriculture in the Pacific Islands



**Western SARE's 2019 Island Extension Project**



# Western Sustainable Agriculture Research and Education

SARE's mission is to advance—to the whole of American agriculture—innovations that improve profitability, stewardship and quality of life by investing in groundbreaking research and education.

SARE's vision is an enduring American agriculture of the highest quality. This agriculture is profitable, protects the nation's land and water and is a force for a rewarding way of life for farmers and ranchers whose quality products and operations sustain their communities and society.

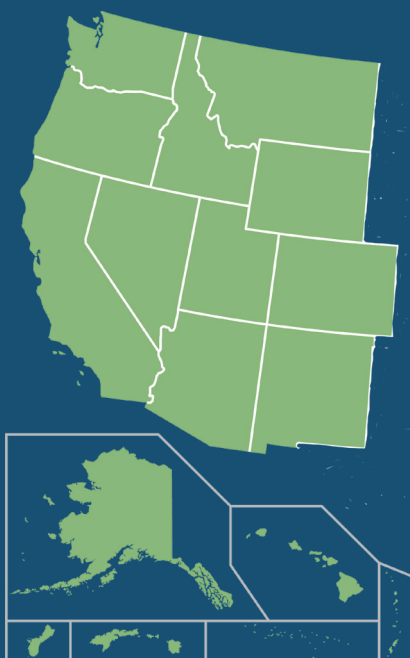
At Western SARE, we serve 13 western states and the four Pacific island territories and are supported by the USDA's National Institute of Food and Agriculture.

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### On the Cover:

Guam farmer Brian Leon Guerrero  
Photo by Steve Elliott

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## Western SARE in the Pacific Islands

When twenty-seven Administrative Council members, state coordinators, and Western SARE staff traveled to nine Pacific islands, meeting with and providing training to 200+ farmers, ag professionals, officials, and teachers, it was a true collaboration between Western SARE and local ag leaders.

The trainings were designed to meet locally-identified needs. Topics ranged from soil health and plant propagation to IPM and swine production. Participants also learned about techniques suited for their location such as small scale irrigation, creative ideas for livestock feeds, and solar pumps. There was an emphasis on education for youth and beginning farmers. All islands held grant writing workshops as well.



Photo by Steve Elliott

**Seeing the opportunities - and challenges - of farming in the Pacific islands.**



Photo by Steve Elliott

**Learning about agro-forestry in Guam.**

The evaluations demonstrate that the majority of local participants found the investment of time and money to be beneficial.

The AC and staff are now working to determine next steps needed by Western SARE to leverage the time and investment this year that will continue to provide the services and assistance needed by the Pacific Island's ag community.

We hope you enjoy the stories, photos, and videos from this very special trip.

*Jim Freeburn*

**Professional Development Program Coordinator**

P.S. For more from the islands, follow these links:

### Photo essays

- [westernsare.exposure.co/building-ag-partnerships](http://westernsare.exposure.co/building-ag-partnerships)
- [ipmwest.exposure.co/growing-in-guam](http://ipmwest.exposure.co/growing-in-guam)

### Videos

- Ironwood Tree Decline: [www.youtube.com/watch?v=Vet0o1fJ6E4](http://www.youtube.com/watch?v=Vet0o1fJ6E4)
- Cacao Production on Hawaii: [www.youtube.com/watch?v=nB9YDaAcwzM](http://www.youtube.com/watch?v=nB9YDaAcwzM)



# Keeping Coffee Safe from

When the coffee berry borer arrived in Hawaii 2010, Suzanne Shriner had a hard conversation with her parents.

“I sat down with them at the kitchen table and told them we might have to get out of the coffee business,” she remembered. “It was a pretty sober moment, and it wouldn’t have been a good time to sell.”

Shriner owns Lions Gate Farms, a successful estate coffee operation on the Kona Coast of Hawaii’s Big Island and her parents also operate a small coffee and macadamia nut farm nearby. Their farms—and the rest of Hawaii’s profitable coffee industry – were under threat from the coffee berry borer, a small (and aptly named) insect that bores into ripening coffee berries.

“In those first years, I had friends stump their fields rather than harvest,” Shriner said. “This insect really took a toll on small farmers and farmers who had second jobs.”

What saved Shriner’s five-acre farm and the islands’ industry was an integrated pest management program for coffee berry borer developed by growers like Shriner and University of Hawaii and U.S. Department of Agriculture researchers.

The IPM program for coffee isn’t easy and it hasn’t eliminated the coffee berry borer from the islands. What it has done is given growers a way to limit the damage done by the pest to economically manageable levels.

“The IPM program for coffee berry borer is true integrated pest management,” said University of Hawaii researchers Alyssa Cho. “It has a number of steps and you have to do them all for it to be effective. It’s complicated, and being in the tropics complicates things.”

But it is working, and a number of researchers are



Photo by Steve Elliott

**Suzanne Shriner inspects her coffee plants for signs of the coffee berry borer.**

looking into ways to make it work better.

## Coffee Was Easy

The coffee berry borer is a pest in all the major coffee-growing regions of the world except Nepal. Female beetles bore into the base of the coffee berry (or cherry, as they are more commonly called) and lays eggs inside galleries she bores in the coffee seed, which when roasted is called a coffee bean.

“The galleries have a discoloration that gives roasted coffee a dirty flavor,” Shriner explained. “The feeding also forms sharp edges on the bean, which scorch during roasting and also impact flavor.”

That’s direct damage to the end product, and heavy infestations can result in beans being downgraded or rejected outright. It’s quite a difference to what Hawaii’s coffee growers used to experience.

“Coffee was easy before the coffee berry borer,” Shriner said. “Most growers had second jobs because for coffee all you had to do was plant, fertilize and pick.



# om Coffee Berry Borer

The university didn't have a coffee extension agent."

That's changed.

Now growers have to spray insecticide in the spring when female beetles emerge from the berries to colonize new fruit. The insects breed inside the cherries, so the emerging females are already impregnated and ready to lay eggs. Once they burrow into a new cherry, sprays don't reach them.

"Because of that, spraying is only effective for a short window of time," Shriner explained. "Mostly in March and April, when you can catch them sitting on the end of the bean."

The biggest weapon against the borer is sanitation – strip-picking coffee fields bare at the end of the season. It's expensive and annoying and effective.

"The fruit that doesn't get harvested we call raisins and there can be 70 to 120 coffee berry borers in each raisin," Shriner said. "After harvest is over, we send the pickers through the fields one final time to strip the trees of any raisins left. It keeps the pest presence low."

That strip-picking costs about \$500 an acre and eliminates one reservoir of the pests. The other big source is berries that have fallen to the ground. Sweeping those up would further reduce future generations but is all but impossible to do on many farms built on Hawaii's rocky and rugged volcanic hillsides.

## Potential Predators of the Pest

There are several research projects under way to improve IPM control of the coffee berry borer. University of Hawaii graduate student David Honsberger is studying parasitic wasps native to central Africa, where the coffee berry borer originated, as a biocontrol option.

Parasitic wasps are present in other coffee-growing regions, but introducing non-native species is always delicate and especially so on an island, so Honsberger and other researchers are looking at how specific the parasitic wasps are in selecting hosts.

A possible side benefit to one species he's studying is that it also seems to feed on another type of boring



Hawaii's rugged terrain makes some sanitation practices hard.

Photo by Steve Elliott

beetle that may be spreading the fungus responsible for rapid ohia death, a disease killing the most common native tree in Hawaii's forests.

Another research project, funded by the Western Sustainable Agriculture and Research and Education program, is examining whether mulch applied in coffee fields can protect and encourage a type of nematode that feeds on the borer larva in fallen cherries.

Exclusion, another IPM tactic, is also being practiced to keep the berry borer from the Hawaiian island of Kauai, which has 3,000 acres of coffee under cultivation. The main grower there recently moved its visitors' center away from the coffee fields to better prevent accidental introductions of the pest.

"What we're doing now is keeping the damage level to about 5%, which for the rest of the world would be barely acceptable," Shriner said. "Here that's what we're shooting for."



More information: [projects.sare.org/sare\\_project/gw18-104/](https://projects.sare.org/sare_project/gw18-104/)



# Pacific Island Agr



Photo

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Jim F

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Mario

Caitlin Pri

Shell

Tara Zi



# Agriculture in Images



Photos by

Kurki  
Freeburn  
Farrar  
Murray  
Youngquist  
Mills  
Mmmerman



# Turning the tide on over-fishing

According to Simon Ellis, director of MERIP Micronesia, over-fishing is depleting natural resources in Micronesia and other parts of the Pacific, creating a clear need to develop alternatives for the economy and food security for fishing communities.

Sustainable, capture-based aquaculture and hatchery rearing methods of Rabbitfish hold promise not only for fisheries management and coral reef conservation, but also for rural aquaculture livelihoods and nutrition. Thirteen species of Rabbitfish can be found in Micronesia, some with traits making them suitable for aquaculture. Those desirable traits include fast growth, schooling behavior, non-aggressive behavior, tolerance of changing temperatures and salinity, tolerance of poor water quality, and good feed conversion.

Understanding this potential for sustainable development, Ellis designed a Professional Develop-



Photo by Andrea Seale

## Aquaculture presents good opportunities for Micronesia.

ment Program project aimed toward expanding rabbitfish aquaculture in the Pacific Islands. The highly collaborative project shares information and resources with agriculture/aquaculture professionals, extension agents, private sector aquaculture entrepreneurs, and sustainable development NGOs in the Micronesia region. The project covers two

islands in the Federated States of Micronesia (Kosrae and Pohnpei) and one island in the Republic of the Marshall Islands (Majuro).

The project includes a four-day training at MERIP, a study tour for three personnel to Hawaii to train in marine fish hatchery techniques, and an easy to read pictorial manual on raising rabbitfish.

“The workshop led to a very positive collaboration with the University of Hawaii College of Tropical Agriculture and Hawaii Sea Grant,” Ellis said. “Personnel from these agencies attended the workshop in June 2018. As a result, a collaborative extension publication has been produced and a further, more detailed publication, is also a potential outcome of this collaboration.”

**Download the Extension Publication:** [www.ctahr.hawaii.edu/oc/freepubs/pdf/AA-1.pdf](http://www.ctahr.hawaii.edu/oc/freepubs/pdf/AA-1.pdf)

**Read updates on the project:** [projects.sare.org/sare\\_project/ew18-006/](http://projects.sare.org/sare_project/ew18-006/)

**Learn more about MERIP:** [merip-micronesia.org/](http://merip-micronesia.org/)



Photo by Andrea Seale

Learning marine hatchery techniques in Micronesia.



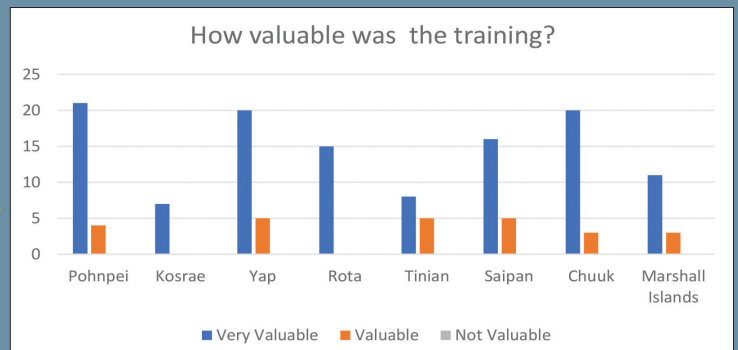
# Measuring the Impact of Western SARE's Island Trainings

The Western SARE training trip to the Pacific Islands was a massive undertaking. Twenty-seven AC members, state coordinators, and staff traveled to nine islands, meeting with and providing training to more than 200 farmers, ag professionals, officials, teachers, and others. Workshops were designed to meet locally-identified needs. It was a true collaboration between Western SARE and local ag leaders, and we're happy to report it was very successful.

Trainers and those who attended the trainings on all the islands were surveyed about the value of the training, what they learned, and topics they wanted to learn but didn't feel were well covered.

## Top-line takeaways:

- All the participants found the trainings very valuable or valuable.
- All the participants would recommend or maybe recommend the training to others.
- Participants reported very few topics that were not covered during the trainings.



## Island Grant Proposals Increase

One goal for the training visits to the Pacific was to increase the number of grant applications from the islands. And, in the Research to Grass-roots Grants, that definitely happened. There were three R2GR grant applications in 2020, up from zero in 2019. Professional Development Grants held steady at one each in 2019 and 2020.



Word clouds showing topics participants felt were covered well (right) and not covered well (left) during the trainings.





# *Testimonials in the Words*

“As our team was conducting trainings on Yap, we saw that farmers have a rich connection to the land and were eager to improve their agricultural skills. The island does not have access to many organic pesticides, and so we trained them about preventive techniques such as sanitation, which will go a long way in reducing spread of fungal and bacterial diseases affecting taro, banana, lettuce, and other crops.”

*Marion Murray, State Coordinator, Utah*

“Face to face interaction is so much different than reading information, so these visits definitely increased awareness of SARE. People in Pohnpei are now more familiar with selecting breeding stock, how to remove diseased plant parts, and the uses of parasite medications and antibiotics.”

*Jackson Phillip, State Coordinator, FSM*

# *of Training Participants*

“The organizers did a wonderful job in Chuuk, with farm tours in two areas. Twenty-one participants were able to ask direct questions during the trainings and received packets of seeds to bring back home. There was a desire from all for SARE to return as soon as possible for more training.”

*Norman Emanuel, Cooperative Research and Extension, Chuuk*

“Farmers found the workshops important since we don’t have any professional agriculture trainings. Trainings allow us to decrease the amount of time spent on experimenting as we learn what does and doesn’t work. We also gained knowledge on how to apply for Western SARE grants.”

*Soni Charley, Farmer, Kosrae*





Fresh produce on Guam

Photo by Stacie Clary

# Connecting Growers and Chefs on Guam

Guam farmers have identified marketing as the number one concern for sustainability of their farming practices. University of Guam Professor and Extension Specialist Bob Barber’s project Kona to Guam: Weaving the Farmer Chef Network expanded direct marketing potential by significantly improving relationships between local chefs and farmers.

To enrich farmer-chef relationships, Barber and the Farmers Cooperative developed a “What’s Fresh Now” campaign with displays at the Micronesian Chef’s Association (MCA) meetings. Co-Op members attend MCA meetings regularly and took to heart a valuable suggestion from the chefs.

As the chefs and farmers continue to meet and learn from each other, they participate in cook-offs and educational events about seasonality of local foods. When Western SARE visited a local restaurant and attended one of the cook-offs, they learned that the project has made a large impact in Guam, with many of the hotels and restaurants using local produce such as watermelon and cucumbers.

Peter Duenas, owner of Meskla Chamoru Fusion Bistro and President of the Micronesian Chef’s Association, told the group “The collaboration has come a long way

in the past 12 years. Eight years ago, the watermelon and cucumber came from the U.S. Now I can guarantee what you see is locally grown.”

**Learn more:** [projects.sare.org/sare\\_project/fw08-313/](http://projects.sare.org/sare_project/fw08-313/)

**Video:** [www.youtube.com/watch?v=sNuFyx-OyH-c&t=29s](http://www.youtube.com/watch?v=sNuFyx-OyH-c&t=29s)

**Micronesian Chef’s Association:** [www.facebook.com/Micronesian-Chefs-Association-213718985872/](http://www.facebook.com/Micronesian-Chefs-Association-213718985872/)

**Meskla Chamoru Fusion Bistro:** [mesklaguam.com/](http://mesklaguam.com/)



Photo by Stacie Clary



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