Sustaining Pacific Island Agriculture

Counting Our Success, Charting Our Future

October 16-18, Tumon Bay, Guam

Western Region Sustainable Agriculture Research and Education

Oceania: A very large place

- The Pacific Ocean covers 28% of the earth
- It's 15 times the size of the United States
- It contains more than 30,000 islands
- For every acre of island land in the Pacific (including Japan and the Philippines) there are 400 acres of water.

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Western SARE in the Pacific

- American Samoa
- Federated States of Micronesia
  - Includes four states, east to west
    - Kosrae
    - Pohnpei
    - Chuuk (formerly Truk)
    - Yap
- Guam (the southernmost island of the Mariana chain)
- Northern Mariana Islands

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It's a long way to Pohnpei

Air miles and travel time between SARE cities

- Baltimore to Atlanta 577 miles, 1.2 hrs*
- Baltimore to Salt Lake: 1,860 miles, 3.5 hrs
- Baltimore to Honolulu: 4,852 miles, 7.5 hrs
- Baltimore to Pohnpei: 7,714 miles, 15.5 hrs
- Baltimore to Guam: 7,920 miles, 16.0 hrs
- Baltimore to Pago Pago: 7,050 miles, 14.0 hrs

* @ 500 miles per hour

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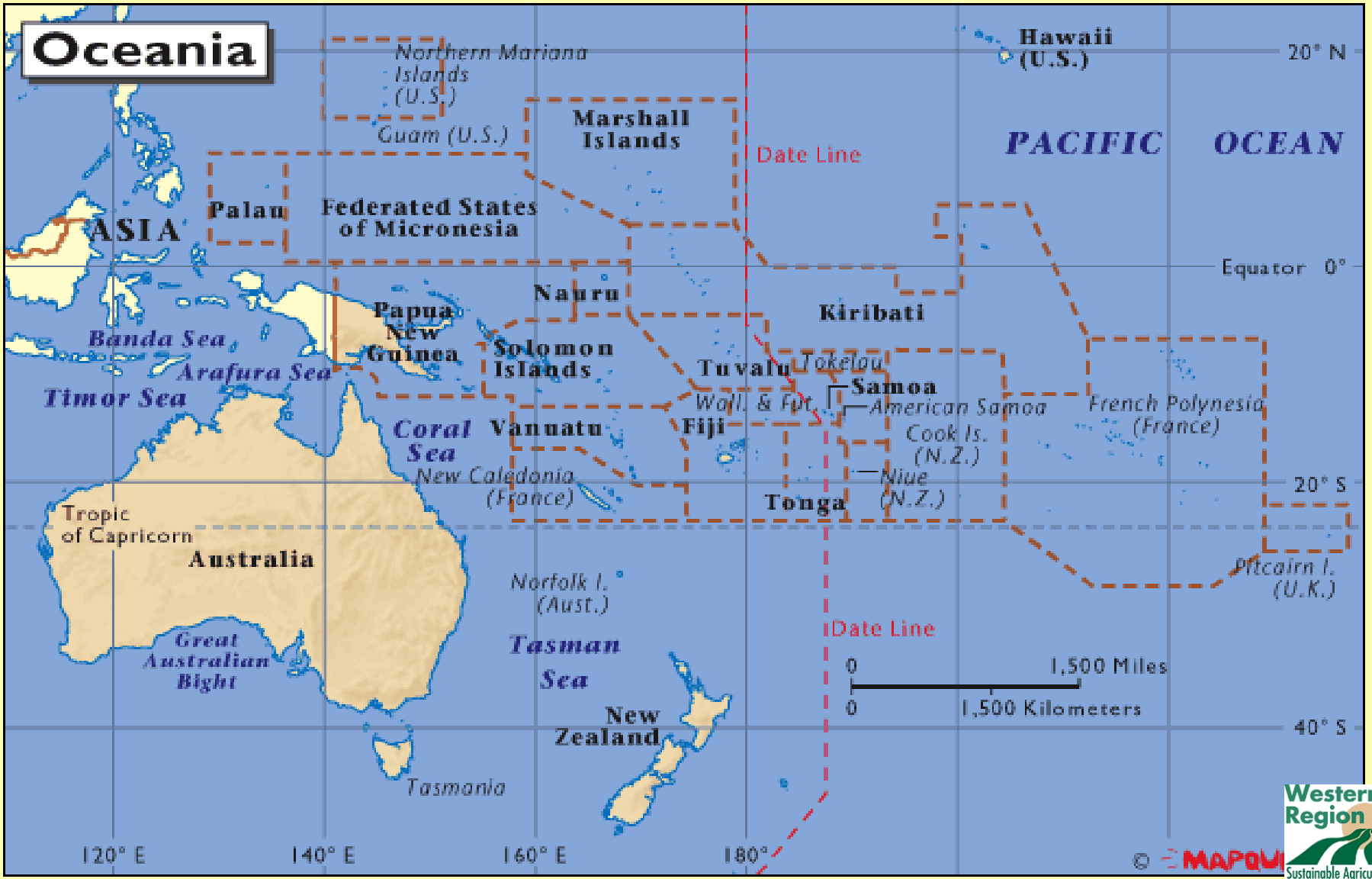
Oceania
Northern Mariana Islands (U.S.)
Guam (U.S.)
Marshall Islands
Hawaii (U.S.)
20° N
PACIFIC OCEAN
Date Line
Palau
Federated States of Micronesia
ASIA
Equator 0°
Nauru
Kiribati
Papua New Guinea
Banda Sea
Arafura Sea
Timor Sea
Solomon Islands
Tuvalu
Tokelau
Samoa
Wall. & Fut.
American Samoa
French Polynesia (France)
Coral Sea
Vanuatu
Fiji
Cook Is. (N.Z.)
New Caledonia (France)
Niue (N.Z.)
Tonga
20° S
Tropic of Capricorn
Australia
Pitcairn I. (U.K.)
Norfolk I. (Aust.)
Great Australian Bight
Tasman Sea
Date Line
0
1,500 Miles
0
1,500 Kilometers
New Zealand
40° S
Tasmania
120° E
140° E
160° E
180°
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American Samoa

Only part of the U.S. south of the equator

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American Samoa (Samoa Amelika)

- U.S. Territory in 1900
- Capital: Pago Pago
- Population: 57,663
- Per capita GDP: $8,000 (U.S. GDP = $46,000)
- Land mass: 6 islands, 77 square miles; island of Tutuila is 53 square miles
- Arable land: 10%
- Permanent crops: 15%
- 90% of lands are communally owned

Don Vargo, SARE coordinator for American Samoa, with breadfruit.

-- Jim Freeburn Photo

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American Samoa

- Economy is based on government (33%), tuna fishing and processing (34%) and other (33%).
- 95% of food is imported
- Ag is mostly subsistence and includes: bananas, breadfruit, coconuts, yams, vegetables, taro, papaya and pineapple
- Swine culturally important

Farmer/Rancher grant recipient Yvonne Ballard

-- Jim Freeburn Photo

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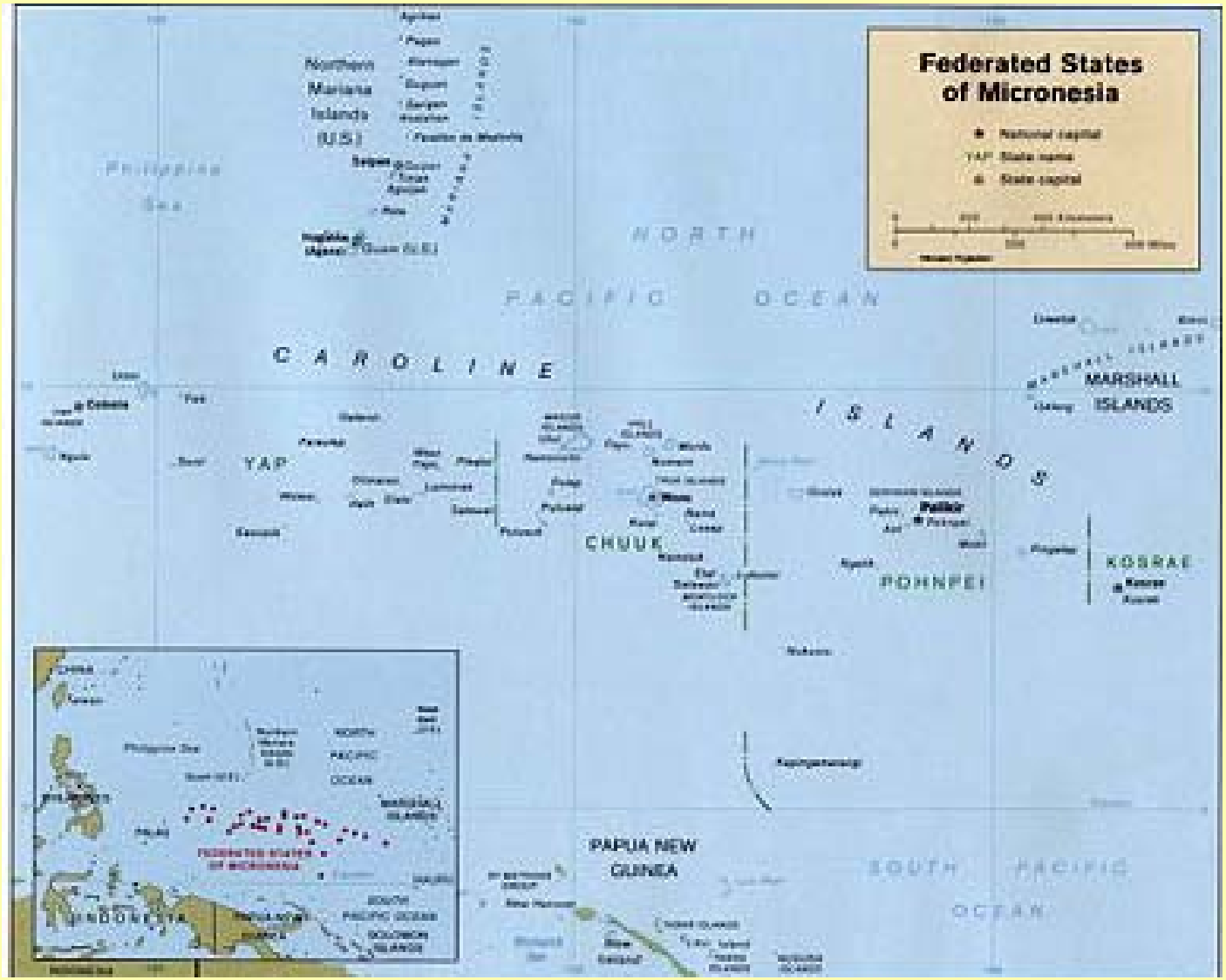
Federated States of Micronesia



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Federated States of Micronesia

- Capitals
  - Pohnpei, Kolonia
  - Chuuk, Weno
  - Kosrae, Tofol
  - Yap, Colonia
- Population: 107,862
- Per capita GDP: $1,467
- 26.7% below poverty line
- Land mass: 607 islands totaling 270.8 sq. miles
- Arable land: 5.7%
- Permanent crops: 45.7%
- Overweight population, 91%, No. 2 in the world (U.S. is No. 9 @ 74.1%)

- Settled 4,000 years ago
- Spanish control 1600s to 1899
- German from 1899-1919
- Japanese from 1919-45
- U.S. Trust Territory 1945-79
- May 10, 1979, four districts ratified a constitution to become Federated States of Micronesia (Palau, Marshall Islands and Northern Mariana Islands opted out)
- 1986, FSM signed a Compact of Free Association with U.S.
- Compact amended June 4, 2004

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Federated States of Micronesia

Jackson Phillip, SARE coordinator for the Federated States of Micronesia

- Economy relies on fishing, subsistence ag and U.S. aid
- Crops include taro, sweet potato, banana, tapioca, breadfruit, vegetables, coconut, mangoes, papaya, pandanus, pineapple, and citrus
- Swine and a few cattle and buffalo
- Pohnpei has 300 inches of rain a year
- Except for pepper, hardly any commercial ag

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Guam

Uninvited Guam pests

brown tree snake

cane toad

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Guam

- Capital: Agana (Hagatna)
- Population: 173,456
- Per capita GDP: $15,000
- 23% below poverty line
- Guam sometimes called the “tip of the spear” for defense role on the western edge of U.S.
- Land mass: 209 square miles
- Arable land: 3.64%
- Permanent crops: 18%

Bob Barber, Western SARE coordinator for Guam

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Guam

- Economy is based mainly on U.S. military spending, tourism
- Dept. of Ag. is located on Dairy Road, but Guam has no dairies cows
- 153 farms, 90 with less than $10,000 in receipts
- A products include fruits, copra, vegetables; eggs, melons, pork, poultry, beef

Western SARE R&E grant recipient Dr. Mari Marutani of the University of Guam

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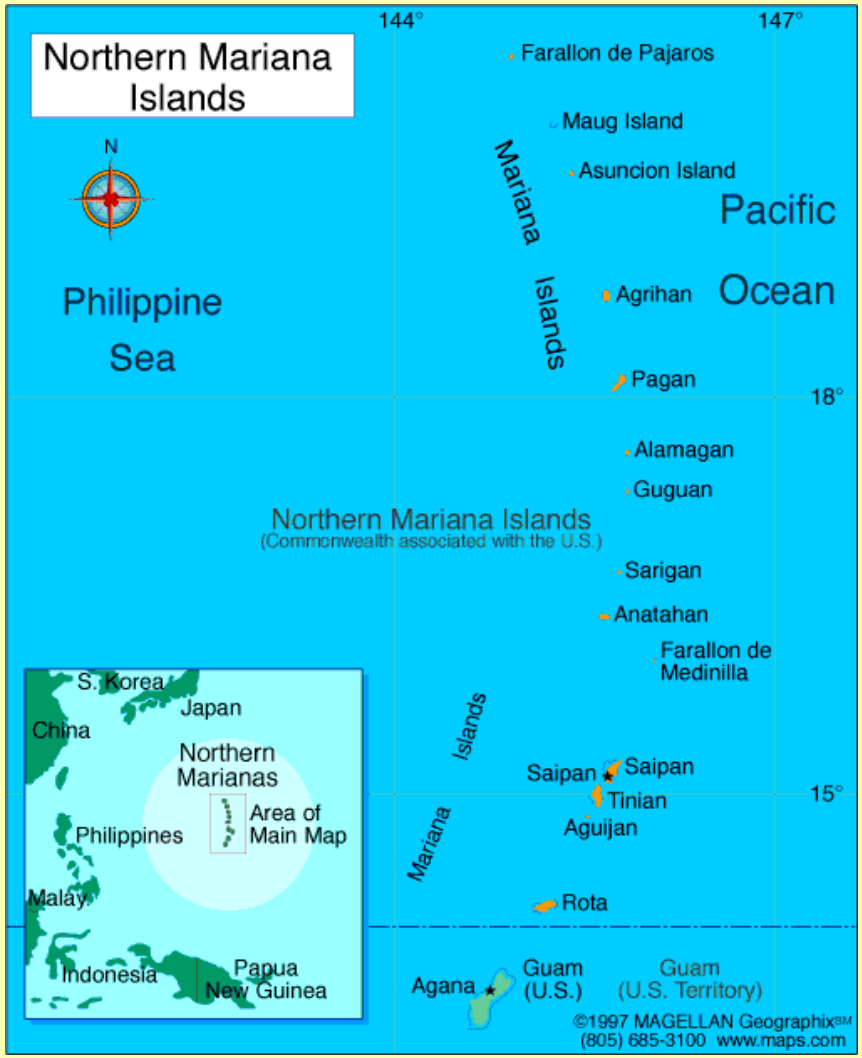
Northern Mariana Islands



- Claimed by Ferdinand Magellan for Spain in 1521
- In 1898, after the Spanish-American War, Spain sold Northern Marianas to Germany (ceded Guam to United States)
- In 1919, Japan declared war on Germany in WWI and took over Northern Marianas
- Hours after Pearl Harbor, Japan invaded Guam
- U.S. took over in 1941:
  - June 15, 1941, Battle of Saipan
  - July 21, 1941, U.S. took Guam
  - July 24, 1941, Battle of Tinian

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Northern Mariana Islands

- Capital: Saipan
- Population: 84,546
- Per capita GDP: $9,300
- Land mass: 187 square miles; southern islands of Saipan, Tinian and Rota make up 70% of land
- Arable land: 13%
- Permanent crops: 4.4%
- Northern Marianas has the highest female ratio in the world: 0.77, or 77 men for every 100 women

Allan Sabaldica, SARE coordinator for the Northern Mariana Islands.

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Northern Mariana Islands

- Economy based on tourism (50% of work force) and garment production, which employs 30,000 foreign workers (probably the reason for the aforementioned ratio)
- Ag sector, of minor importance, made up of cattle ranches and small farms producing tomatoes, vegetables, melons, coconuts and breadfruit

Alejandro Badilles, CREES agent on Rota, hosts Dr. Carmen Fernandez, president of Northern Marianas College, at his BBQ stand in Songsong.

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Western SARE Arrives

October 15 Guam Farm Tour

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October 15 Guam Farm Tour

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October 16 Reception at Government House

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October 16 Reception at Government House

Guam Gov. Felix Comacho and First Lady Joann Comacho

Lee Yudin, University of Guam

Jim Currie, left, College of Micronesia, and Frank Atalig of Rota

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Western SARE AC Charge for Subregional Showcase Conferences

Desired Outcomes

- Identify and prioritize emerging and unmet research and education needs in sustainable food, fiber and energy systems
- Increase stakeholder and policymaker awareness of the accomplishments of the Western SARE program and its projects

Allan Sabaldica, CNMI SARE Coordinator, and Alejandro Badilles, CREES IPM agent, Rota, CNMI.

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Pacific Subregional Conference

Bob Barber, Western SARE coordinator for Guam and coordinator of the Pacific conference.

The Pacific Subregional Conference coordinator was **Bob Barber**, Extension Economist at the University Guam, assisted by **Manny Duguies**, DVM, University of Guam Extension Veterinarian

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Western SARE Conference Moderator

Dewitt behind the camera.

LEOPOLD CENTER
FOR SUSTAINABLE AGRICULTURE

Jerry Dewitt, Director of the Leopold Center in Iowa, is serving as moderator for all Western SARE subregional conferences.

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Western SARE AC Members Facilitating/Listening at the Pacific Subregional Conference

Cindy Lair

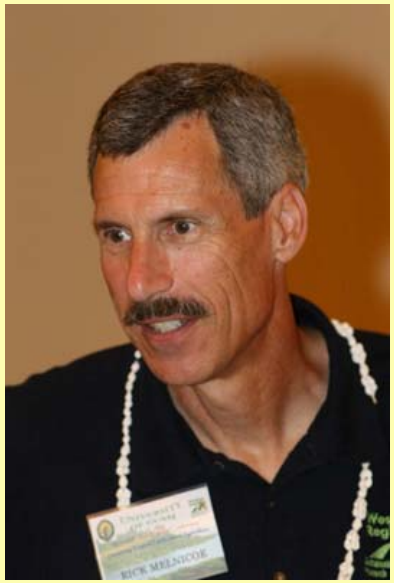
Colorado

Department of Agriculture

Stacie Clary

California

Nonprofit Eco-Farm



Rich Melnicoe

California

Western Region IPM

Chuck Boerner

Hawaii

Organic Farmer Ono Farms

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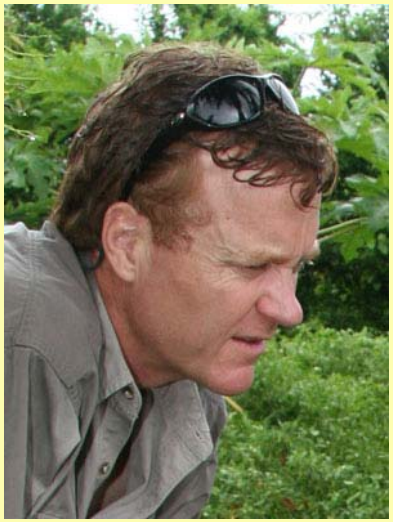
Conference Facilitators and Recorders

Michele Hebert, Alaska


Craig Elevitch, Hawaii


Brian Tuck, Oregon


Jody Smith, Hawaii


Will Lanier, Montana

Linda Rasmussen, Utah


Ilene Iriarte, Guam

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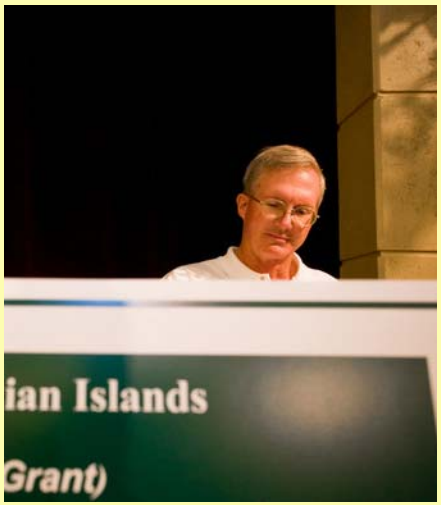
Western SARE Staff Support
Pacific Subregional Conference



Bob Newhall

Deputy Western SARE Coordinator

Logan, Utah

-- Craig Elevitch Photo

Al Kurki

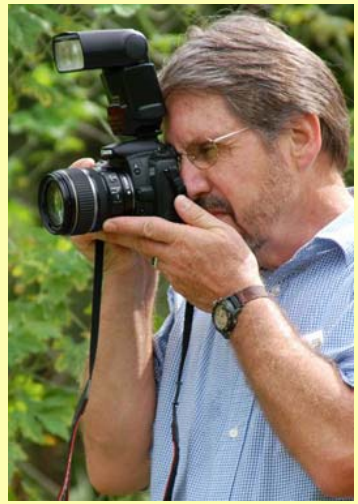
Associate PDP Coordinator

Helena, Montana

Dr. Phil Rasmussen

Coordinator Western SARE

Logan, Utah



Ron Daines

Communications Specialist

Logan, Utah

-- Jerry Dewitt Photo

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Setting the Tone

"We need your ideas for planning the future of Western SARE. You're the first of five (subregional conferences), and we're going to listen to your needs."

-- Jerry Dewitt

Conference Moderator

Craig Elevitch Photo

Homework: Mull Over 5 Key Questions

1. What will be needed to create stronger local food systems that are less reliant on imports?
2. What are the local food production trends on your island? Do you think local farmers can produce enough food for your area 5-10 years from now? What areas of production need improvement?
3. The SARE program was commissioned, by Congress, to get its research results to the farmer and rancher. Has this been an area of success in your area of influence? Why or why not?
4. What type of research, education or development will be necessary over the next 10 years to help economically sustain farming and the environment?
5. If Western SARE received (from Congress) an additional $1 million per region, what types of projects should be targeted or emphasized?

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Seven island groups did their homework, providing thorough responses to the 5 Qs

Alfred Peters,
American Samoa

Nat Tuivavalagi
Marshall Islands,

Tarita Holm
Palau

Bob Barber
Guam

Allan Sabaldica
Tinian, CNMI

Ken Love
Hawaii

Jackson Phillip
Pohnpei, FSM

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Tabletop Discussions of Key Topics

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Tabletop Discussions of Key Topics

Representatives from Palau

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Common threads among the islands:

- Question 1: Needs for stronger food systems
  - More technical assistance
  - Targeted training
  - Fruit fly eradication
  - More farmers (youth, women)
  - Focus on invasive species
  - Develop organic agriculture
  - Focus on local and traditional foods
  - Increased local and off-island markets
  - Inventory of local versus imported foods
  - Farmers markets and/or cooperatives

Ephram Taimanao
SARE FRG recipient
Rota, CNMI

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Common threads among the islands:

- Question 2: Local food trends and capabilities
  - Not enough local protein sources
  - Farmers can produce enough
  - Need increased chicken and swine production
  - Promote local produce and producers
  - Promote farming as a noble profession
  - Integrate crops and livestock
  - Improve livestock genetics
  - Enrich soils
  - Educate chefs and consumers

Invasive African snails
Rota, CNMI

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Common threads among the islands:

- Question 3: Getting results to producers:
  - Not enough communications
  - SARE applications not user friendly
  - Lack of information sharing
  - SARE succeeds but successes are not widely known
  - State coordinator is 1,000 miles away
  - Grossly underserved; only 3 grants
  - Lack of confidence among producers
  - Little information dissemination or awareness of grants or programs

Beato Calvo
SARE FRG
recipient, Rota
CNMI

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Common threads among the islands:

- Question 4: Research, Education & Development Needs
  - Plant propagation
  - Control invaders
  - Environmental education
  - Feed and feedmill development
  - More advanced degrees in ag
  - Target women and youth
  - Develop linkages and networks
  - Improve marketing/value-added
  - Ag diversification
  - Demonstration farms
  - Livestock and crop breeding

Sei Uemoto,
SARE FRG
recipient
Pohnpei, FSM

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Common threads among the islands:

- Question 5: What to do with $1 million?
  - Put livestock at top of list
  - Focus on local production and use
  - Education for students and staff
  - Assistant coordinators on remote islands
  - Emphasize projects in line with human resources
  - Empower groups like NGOs
  - Use individuals as role models
  - Increase professional development
  - Regional programs on livestock genetics, feed production and outreach
  - Coordinate and enhance marketing
  - Develop farm demonstration sites

Engly Ioanis of Pohnpei climbs a breadfruit tree to demonstrate harvest techniques.

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What has SARE done?
20 Posters for 20 SARE Projects

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Replacing Imported Energy Feeds by Storage of Excessive Breadfruits as Out-of-Season Pig Feed

James Currie, Vice President (FSM: Professional + Producer Grant)

Project Number: FW06-307

Title: Replacing Imported Energy Feeds by Storage of Excessive Breadfruits as Out-of-Season Pig Feed

Coordinator: James Currie
Vice President
Cooperative Research and Extension
College of Micronesia-FSM
P.O. Box 159
Kolonia, Pohnpei, FSM 96941

Producers Advisor: Kalwin Kephas
Director
College of Micronesia-FSM
Kosrae Campus
P.O. Box 37
Tofol, Kosrae, FSM 96944

A perfect breadfruit

SARE Grant: $16,712

Situation:

Swine production is the primary livestock industry of the Federated States of Micronesia. Pigs are a major part of traditional and cultural practices. However, the cost of producing pigs in Micronesia is extremely high, owing mainly to the expense of importing commercial feeds.

Breadfruit, meanwhile, is one of the most common indigenous trees in the tropical islands. Its football-size fruit has long been a traditional starch crop throughout Oceania. Breadfruit is relatively high (40-50%) in dry matter and produces twice as much energy as bananas. Although not rich in protein, breadfruit is a fair source of minerals and vitamins.

Scavenging domestic pigs routinely eat over-ripe breadfruit that has fallen to the ground, which suggests that breadfruit can be an acceptable energy source for swine

Damaged breadfruit, unfit for humans but great for pig feed

Objectives:

- Develop a feeding regime using fermented breadfruit to reduce feed cost by at least 25% for growing-finishing pigs and breeding stocks
- Develop a feed formula using fermented breadfruit
- Develop sustainable practices for preparing fermented breadfruit for swine feed
- Conduct workshop/trainings in the Federated States of Micronesia based on the results of feeding trials and preparation methods
- Determine the actual cost of production in the Federated States of Micronesia

Cut breadfruit showing damage from disease

Actions:

The project team will takes these approaches:

- Randomly select experimental and control growers from the College of Micronesia-Kosrae State Agriculture station and two private farms in Chuuk and Pohnpei
- Conduct feeding trials at each farm until the growing-finishing groups reach a market weight of 150 pounds
- Analyze an experimental formulated ration of fermented breadfruit for crude protein, energy, phosphorus, calcium and fat
- Compare the growth rate, feed conversion and body condition of pigs fed the experimental ration with those fed the control ration, which constitutes the current diet of imported commercial feed, at both Pohnpei and Chuuk
- Compare the price of each ration type at both Pohnpei and Chuuk

As of fall 2007, these activities had been conducted:

- 700 pounds of breadfruit had been stored for feeding, with storage at project sites in Pohnpei and Chuuk
- Identification tags, scales and equipment had been ordered
- A 50% feed supplement had been identified and ordered

Results:

Results of the first year's activities will be available in early 2008.

Breadfruit mash in storage bags, where it is sealed for an extended period

Potential Benefits:

The project will shed more light and information on how to be more effective in utilizing excess breadfruit during the full season, which will help producers save on the cost of expensive imported feeds.

All island cultures have a history of preserving breadfruit for human consumption during off seasons and for food security. These islands normally experience an overabundance of breadfruit during the main seasons, but they lose a large portion of the late-season fruit to diseases and fruit fly infestations. Instead of risking crop loss, storing the breadfruit out of season and preserving it in the traditional pit fermentation system will allow producers to use it as pig feed.

Breadfruit after three months of fermentation

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20 Handouts for 20 SARE Projects

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Western SARE Program

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(435) 797-3344 fax

Commonwealth of the Northern Mariana Islands SARE Coordinator:

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Utah
Washington
Wyoming

Rat Patrol with Electric Fence

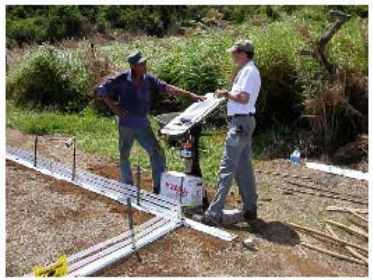
Situation

In the Commonwealth of the Northern Mariana Islands, three species of urban rats damage nearly every crop grown in the country. High-value crops like melons, sweet corn and pineapples are particularly vulnerable to rats. Lino Mendiola of Rota found that local rats had developed a taste for his expanding pineapple crops.

Standard rodent poisons are available at most agricultural retail outlets, but farmers find them expensive and ineffective as residential rats continue to enter farming areas. What's more, coconut crab, a land-based scavenger and historically and culturally important food species, eats poisoned rats and dies.

In addition to damage from rats, crops grown on exposed hillsides, including Mendiola's, suffer from wind and salt spray.

The fence is charge with a flexible solar panel.



Lino Mendiola and Scott Crocket with the electric rat control fence.

Objectives

- Establish a method for using an electric fence to control the rats that cause damage to pineapples
- Plant a double row of trees as a windbreak, da'ok (Calliophyllium inophyllum) and Gliricidia sepium. (Powerful Typhoon Chaba in August 2004 interrupted the windbreak project.)

Actions

Mendiola built an electric rat-protection fence using materials readily available for purchase on the Internet. Scott Crockett, district conservationist with the Natural Resources Conservation Service, designed the fence:

- The electrified tape was 1.5-inch nylon/wire typically used for horse fences
- Aluminum building studs were bent flat along the ground under the tape
- The studs were staked

Farmer/Rancher Grant

Project Number: FW03-017
Project Title: Rat Control in Pineapples on Rota
Project Coordinator:
Lino Mendiola
P.O. Box 1092
Rota, MP 96951
(670) 532-0278
Technical Advisor:
Scott Crockett
Soil Conservationist
Natural Resources Conservation Service, Rota, MP
SARE Grant: $5,569

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Washington
Wyoming

12 Fruits for Island Promotion

Situation

Small producers of coffee and macadamia nuts in the Kona region of Hawaii have struggled with high costs and limited land and labor. Producing locally adapted tropical fruits, and creating marketing linkages between the farms and high-end restaurants within marketing distance, could add profitable crop alternatives.

Figs, one of the 12 fruit species selected, have proved popular among island chefs.

Objectives

1. Identify 12 species of exotic tropical fruits with high potential for year-round market acceptance
2. Develop and demonstrate a prototype polyculture tropical fruit production system based on sustainable production technologies
3. Develop direct and wholesale markets for both fresh fruit and processed products
4. Help the Kona Pacific Farmers Cooperative expand into new activities, including the long-term marketing of the fruits developed from this project

Actions

The project team conducted these activities:

- Gathered information on 100 fruits already grown in the region
- Based on surveys of 54 island chefs, selected 12 trees for demonstration
  1. Loquat – three varieties
  2. Mysore berry
  3. Pohe (Cape gooseberry)
  4. Pomegranate – four varieties
  5. Cherimoya – two varieties
  6. Tamarillo (tree tomato)
  7. Rangpur "Kona" lime
  8. Tropical apricot
  9. Grumichama
  10. Surinam cherry – two varieties
  11. Kumquat – two varieties
  12. Figs – two varieties
- Developed a 1-acre demonstration site on land

Rangpur "Kona lime has also proved popular.

Research and Education Grant

Project Number: SW03-055
Project Title: Development of A Sustainable Polyculture and Marketing System for Exotic Tropical Fruits
Project Coordinator:
Richard Bowen
Natural Resources and Environmental Mgt. Specialist
1910 East-West Road
Sherman Lab
University of Hawaii
Honolulu, HI 96822
(808) 956-8419
rbowen@hawaii.edu
Major Participant:
Ken Love
P.O. Box 1242
Captain Cook, HI 96704
(808) 323-2717
kenlove@hawaii.edu
SARE Grant: $156,800

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Poster Session

Western SARE Farmer/Rancher grant recipient Antoinette Okada of Guam reviews the poster describing her flower-growing and lei-making project.

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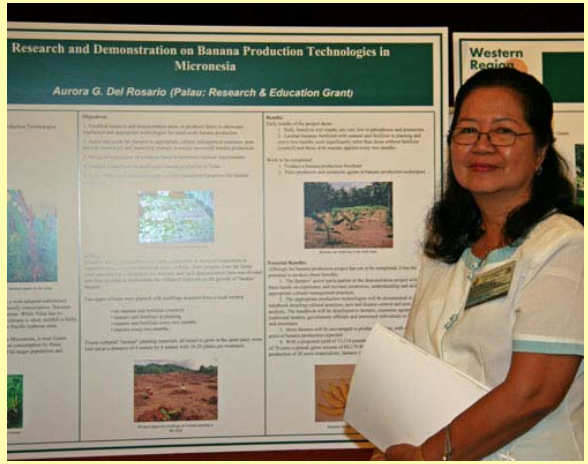
Poster Session

Craig Elevitch of Hawaii, a PDP recipient, and Ernie Wusstig of Guam, cooperator on a P+P grant.



R&E grant recipient Aurora del Rosario of Palua.

P+P grant cooperator Louis Bumoon of Yap.

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Satisfied Conference Participants

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Summary Comments

"I've never seen this kind of representation from so many islands at one conference… This is the best conference I've ever attended in my career."

-- Bob Barber, University of Guam

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Summary Comments

"Bob (Newhall) and I have discussed this, and never before have we put on a conference where so many attendees stayed through the whole thing."

-- Phil Rasmussen, Western SARE Regional Coordinator

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Summary comments

"You have exceeded what I thought was possible."

-- Jerry Dewitt, Conference Moderator

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Hafa Adai

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Questions?

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