



Sustainable Agriculture
Research & Education

A Comparative Study of Low Input and High Input Taro Production in the American Pacific with Special Reference to Pest Control

Agnes Vargo (American Samoa – Research & Education Grant)

Project Number: 88-93

Title: A Comparative Study of Low Input and High Input Taro Production in the American Pacific with Special Reference to Pest Control

Principal Investigator:

Agnes Vargo
Entomologist
American Samoa Community College
Community and Natural Resources
P.O. Box 5319
Pago Pago, AS 96799
(684) 699-1394
(684) 699-5011 fax
amsvargo@yahoo.com



Coleus blumei, or pate in Samoan, is used to attract beneficial insects.

Co-Principal Investigators, Cooperators and (Rapid Rural Appraisal [RRA] Team):

- University of Guam: Harley I. Manner, Don Nafus, Frank Cruz, Ilse Schreiner, Peter Tainotongo, George Wall, Randy Workman, Phoebe Wall, Lee Yudin, Vince Santos
- University of Hawai'i: Dwight Sato, Ping Sun Leung, Hal McArthur, Linda Hamilton, Ramon de la Pena, Jim Fownes, Jim Silva, George Santos, Peter Rotar, Perry Phillips.
- Northern Marianas Community College: Lolita Ragus, Sid Cabrera, Harly Richards, Chao Hon Chiu, Florendo C. Quebral, Isodoro Cabera.
- Pohnpei: Bill and Pelihter Raynor
- Yap: Marjorie Falanruw
- College of Micronesia: Nelson Esquerra
- Palau: Meresbang Ngiralmaw and Robert Bishop
- American Samoa: Pamerika Tautilili, Fufui Taotua, Lloyd Ali, Ropeti Areta, Sosen Asifoa, Dan Costa, Sufaga Fanene, Mike Misa, John Enright, Dawn Dana, Carole Sinavigana, Larry Hirata, Tavita Elisara, Sipaia Fatuesi, Jessi Fomoti, Ikenasio Sagaga, Don Vargo, Willy Wong, Dan Gehring, Olo, Tui.
- University of the South Pacific: Alafua Camous, Apia, W. Samoa: Brent Jacobs, Freddy Waiti
- United States Forest Service: Len Newell

Special Recognition:

- Joe O'Reilly: University of Hawai'i, RRA Methodology
- Ken Rohrbach: University of Hawai'i, facilitation of grant writing
- Lisa Ferentinos: Overall administrative facilitation of grant and RRA.
- Doug Hamasaki: Video

Western SARE Grant: \$258,430

Situation:

Taro, used as a food, a medicine or an ornamental, is a special crop in the Pacific islands. For centuries, islanders have maintained their fragile ecosystems using traditional agricultural practices that incorporate a wealth of environmental knowledge. With an influx of "modern, Western methods," project planners realized the importance of documenting these traditional methods and verifying and publicizing them to prevent their abandonment.

Objectives:

1. Conduct a Rapid Rural Appraisal in the American Pacific islands to document traditional methods of pest control, soil fertility and soil conservation practices in growing taro (*Colocasia esculenta*)
2. Document and publicize the traditional methods as a way to preserve and promote their use in island agriculture

Actions:

In 1989 and 1990, principal investigator Agnes Vargo led a multidisciplinary team that conducted a Rapid Rural Appraisal of Pacific island agricultural practices.

RRA is a survey tool that contains both open-ended (sociological) and specific questions. The farmer provides his or her own answer, and subsequent questions are based on that answer.

The RRA team included:

- Agricultural economist
- Agricultural extension specialist
- Animal scientist
- Anthropologist
- Community development specialist
- Entomologist
- Environmental psychologist
- Forester
- Plant Pathologist
- Soil scientist
- Weed Scientist
- Geographer



Giant taro, ta'amu in Samoan, *Alocasia* sp.

The islands or island groups visited included:

- Hilo, Hawai'i
- Guam
- Palau
- Saipan, Rota and Tinian
- Pohnpei
- Yap
- Ulithi
- Chuuk (Truk)
- American Samoa



Planting stick, or oso in Samoan.

These islands, north and south of the Equator, are peopled with various ethnic groups: Polynesians, Micronesians, Chamorro and others. Locals (extension agents or farmers) were also on the teams, allowing them to compare and exchange ideas with at least one other island group.

In a second phase of funding, experiments based on the traditional practices were conducted, a conference was held in Hawai'i to present findings and several publications and a video were produced.



Taro intercropped with banana and papaya.

Results:

The survey found that indigenous cultures incorporate natural pest management as well as sustainable and effective methods of soil conservation and fertility into their traditional taro agriculture systems:

- In Pohnpei and American Samoa, *Coleus blumei*, also known as "pate," is grown in and around taro fields to repel insects, like taro armyworms or taro plant hoppers.
- Taro patches in Palau and Yap are surrounded by a variety of medicinal plants, thought to reduce pest numbers. While the mode of action is unknown, one theory suggests that certain trees increase soil fertility, resulting in healthier, more pest-resistant taro.
- Farmers in Samoa report that taro grows well when planted near *Erythrina*, a tree known to fix nitrogen. Some farmers believe the tree's roots secrete a substance that enhances taro growth; others believe a substance from the root suppresses weeds; still others believe the substance stimulates taro growth, blocking sunlight that might encourage weed growth.
- On Palau, where taro is considered the "Mother of Life," *Hibiscus tiliaceus* (Hau Fau) has been credited with soil-enriching attributes. Specific formulas have been developed to combat corn rot diseases.
- At most locations, decomposing plant and animal materials, including coconut fronds, macademia husks, banana and breadfruit leaves and pig waste, were used as natural fertilizers.
- Soil conservation measures include digging drainage ditches, planting on the contour, placing rocks and leaving tree stumps to hold the soil.
- Women play a key role in taro production on Palau and Yap, developing an attachment and care for the sacred food. One woman on Palau said she had to return to the taro patch to "watch the taro grow to feel herself grow."

In most regions, variations of the Hawaiian proverb best summarize what the farmer believes is the most important factor in maintaining soil fertility: "The best fertilizer is the footsteps around the plant."

Potential Benefits:

These results are just the beginning of attempts to document and preserve valuable traditional agricultural practices. As a Samoan proverb states, "la saosao lautalo," literally, to "collect the taro leaves." In a practical sense, it means a critical situation exists that requires gathering the opinions of all to find appropriate solutions.

While Hawai'i, Guam and Saipan have lost many of their traditional values, American Samoa, Chuuk, Palau and Pohnpei actively maintain their cultures. But they too face a steady flux of Western influences.

Coupling the environmentally aware advancements of modern technology with time-proven practices of traditional Pacific agriculture can promote a more self-sufficient, ecologically sound economy and environment for the future.



Taro intercropped with gatae, *Erythrina* sp., which fixes nitrogen.



Taro mulched with dried grass.