

## Final Project Report for APN Project 2003-06

### Project Title: PABITRA Network for Collaborative Research on the Ecology of Global Change in Island Landscapes of the Tropical Pacific

**Abstract:** During 2003, PABITRA activity was focused on Samoa. An Initial Synthesis Meeting was arranged at NUS, the National University of Samoa in Apia, in June 2003. This was followed by a Joint Analysis and Biodiversity Field Training Workshop in Samoa from November 25 to December 5, 2003. It began November 25 with an illustrated talk on the flora and vegetation of Samoa. The open forum continued all next day with PABITRA related presentations. They included three experts each from Fiji and Samoa, one each from Guam and Japan, and five from Hawai'i. These meetings drew about 40 participants, many of whom got involved in discussions. The following week was spent in Savai'i with a group of ten pre-selected Samoan students and government officers and ten overseas collaborators. Here, we visited three mountain-to-ocean landscape transects, designated as Matavanu, A'opo, and Taga. We also visited the twice hurricane-disturbed Falealupo forest preserve at the NW tip of Savai'i. We stayed two nights each in three coastal villages, where we were received with welcome ceremonies by the villagers. We explained the PABITRA objectives to them, and thereafter received permission of access to their lands. At different field locations, we discussed and exercised a number of biodiversity assessment techniques to provide a first hands-on experience. The landscape approach to biodiversity assessment was clarified repeatedly. A last day was spent at NUS, writing and presenting reports. In a brief closing ceremony, Certificates of participation were handed to the ten Samoan students and government officers after they had made presentations on their learning experience during the workshop.

#### Project Information

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- Total Amount of APN Funding received for Project 2003-06: \$31,815
- Project Duration: April 2003 to March 2004
- List of Collaborating APN Approved Countries: Fiji, Japan, New Zealand, Pacific Island Countries (Samoa, Guam), USA (Hawai'i)

#### Introduction

The **Pacific-Asia Biodiversity Transect Network** is a program of the Ecosystem Division in the PSA Task Force on Biodiversity. Its aim is to collaborate with resident Pacific Islanders on biodiversity research and ecosystem conservation. Its research strategy is

two-fold: to encourage comparative studies across Oceania in ecosystems that belong to the same biomes (the horizontal strategy) and to study selected island landscapes from the mountains to the ocean (the vertical strategy). After establishing the “Gateway Transect” in Fiji during 2002 and conducting the PABITRA Symposium/Workshop on “Island Landscapes under Global Change” in Bangkok, March 2003, PABITRA received new funding from APN in April 2003 to conduct similar activities in Samoa under Project 2003-06.

### **Activities Conducted**

Two workshops were held in Samoa

- An Initial Synthesis Meeting, June 10-16, 2003
- A Joint Analysis and Biodiversity Field Training Workshop, November 25-December 5, 2003

**The Initial Synthesis Meeting** was arranged by Dr. Nat Tuivavalagi, the PABITRA Coordinator for Samoa, with cooperation by Dr. Karoline Afamasaga-Fuatai, Dean of the Science Faculty at the National University of Samoa (NUS) in Apia. Two overseas network collaborators, Dr. Art Whistler (expert on Samoan plants and vegetation) and the writer, were invited to explain the PABITRA concept. After arrival, we met with six members of the NUS Science faculty for an introductory discussion in the Conference facility on the NUS Campus. The afternoon of June 10 was spent visiting with members of the South Pacific Regional Environment Program (SPREP) and Conservation International (CI). The day ended with a meeting at the Ministry of Natural Resources and Environment (MNRE). The next day (June 11) was spent in form of a Conference Workshop with 18 local professionals and some students from NUS, Alafua Campus of USP, Samoa Government departments, two local and two international NGOs. The PABITRA concept was scrutinized; a number of local professionals discussed and presented their work: maps of environmental parameters (geology, soils, climate, hydrology, land use, air photos) were presented and discussed. With some members of the Forestry Department, a fieldtrip was arranged on Upolu Island, visiting a number of potential study sites on June 12. Another day was spent on synthesizing the existing information, finding information gaps that could be filled by PABITRA, and on writing proposals.

With a few local professionals, a weekend trip to Savai'i Island followed. The focus here was to locate potential PABITRA transects and landscape segments from the central mountain range down to the coast for the second workshop to follow later in the year.

**The Joint Analysis Workshop** with Biodiversity Assessment Training for local students and young professionals in the environmental sectors of Samoa followed in November-December 2003. For this more elaborate workshop, ten overseas PABITRA network members were invited by the Vice Chancellor of NUS. They included two members from Fiji, one each from Guam and Japan, and six from Hawai'i. Likewise, ten students and young Samoan professionals were selected from a competition arranged by a local committee under Dr. Tuivavalagi. This workshop began again at NUS in Apia with Day

1 and Day 2 in an open public forum, which was attended by forty local residents and professionals. At the public forum, we had an agenda with 14 speakers including four local experts. Much discussion was focused on PABITRA's long-term goals. This was followed on the third day (Nov. 27) by hired bus and van via ferry transport (one hour crossing) to Savai'i Island. Here, we spent seven days together with ten young Samoans. We visited three pre-determined landscape transects, designated as Matavanu, A`opo and Taga Transects, and including the lowland rain forest preserve at Falealupo. We stayed two nights each in the villages of A`opo, Falealupo, and Taga, where we were welcomed by the village elders with traditional kawa (*Piper methysticum*) ceremonies. After explaining our PABITRA objectives to the village elders, they gave us access to their lands. Along the three landscape transects we explained the process of entitation as a pre-condition for quantitative biodiversity sampling. We exercised several methods of biodiversity assessment, relevé analysis, count-plot method, point-centered quarter analysis for tree density and basal area assessment by species, arthropod sampling with malaise trap. We determined tree heights and diameters, measured distance with tape and/or range finder, and taught use of GPS (geographic positioning systems). We explained installation and operation of weather stations and the use of existing meteorological information for producing climate diagrams. After seven days of field work, we returned to Upolu Island. Here, all participants spent another day at NUS, first in the computer room writing reports, and thereafter presenting them orally. The day closed with a short ceremony of presenting Certificates of Participation. The Samoan group spent a follow-up day with the Fijian PABITRA group discussing future strategies.

### **Outcomes and Products**

The **Initial Synthesis Meeting** in June resulted in the first welcome and a great encouragement to return by NUS faculty, relevant Samoan Government agencies, and NGOs to continue with PABITRA activities. This meeting also resulted in the collection of existing data on climate, soils, vegetation, flora and fauna, and relevant reports. Some of these data were thereafter synthesized and put on the PABITRA website [www.botany.hawaii.edu/pabitra](http://www.botany.hawaii.edu/pabitra). Here they can be found under APN/PABITRA Joint Analysis Workshop Samoa: Background Information Files.

Another, most important, outcome of the initial meeting were the various personal contacts, so essential for any collaborative work. This included insights into some aspects of Samoan culture and economy. Of indispensable value was the three-day field excursion on Savai'i Island, which allowed for a preliminary search and selection of landscape transects and biodiversity sites.

The **Second Meeting**, the 25 November to 5 December **Joint Analysis** and Biodiversity Training Workshop, resulted in active cooperation received from the above agencies by delegating student and young Government officers to participate in the week-long field biology training program on Savai'i Island. The ten selected indigenous young Samoan islanders participated with enthusiasm in the heuristic learning process of entitation, map unit recognizing, and ground truthing, climate data conversion into climate diagrams (a method for international climate interpretation for ecological purposes), in quantification

of vegetation analysis through demonstrating the relevé and count-plot methods, the point-centered quarter method, plant identification, collection and digital photography, the use of modern tools, such as the GPS (geographic positioning system), detection and collection of charcoal samples for determining the ages of lava flows (a procedure taught by the volcanologist on our team). At the end, the Samoan PABITRA team received our survey equipment, including a GPS instrument, laptop computer with printer, compass, telescopic height and distance meters, abney levels, digital camera, flag tape, diameter tapes, automatic rain gauge, write-in-the-rain notebooks, malaise traps, and other supplies for continued work and data collection. These items are now cared for by a NUS faculty member. As an outcome product, our biodiversity training workshop is summarized on a two-panel illustrated poster together with a student report on the PABITRA website. Here also the itinerary, the maps, topographic profiles, climate diagrams, plant check lists and references are listed and made available for printout. The two-panel poster is hung out in Samoa at the NUS Campus and in Government offices as well as in the Botany and Zoology Departments of the University of Hawai`i Manoa Campus.

### **Conclusions**

Overall, the results confirm the PABITRA objectives as listed in the final updated proposal:

- Capacity building for ecosystem and biodiversity research in island landscapes to mitigate their degradation as caused by local, regional, and global change parameters
- Involving Pacific islanders in all work aspects with a focus on the human dimensions of global change
- Integrating the findings of natural science with social, cultural, and economic factors through interdisciplinary workshops
- Providing information for policy making and ecosystem management based on the islands' resource systems

Our Samoan APN/PABITRA project can be considered another milestone for empowering young island scientists and professionals to become interested in working on their own country's biodiversity and ecosystem resources. The effort to include Pacific Islanders in cooperative, national and international activities has been a long-term goal of the Pacific Science Association. This goal had never been effectively materialized until now. It was made possible through the mission and funding opportunity offered by the Asia-Pacific Network for Global Change Research. Therefore, APN deserves a major credit in this accomplishment.

### **Future Directions**

Following the second workshop in Samoa, the PABITRA coordinator was invited to a DIWPA symposium in Kyoto. Here, a summary paper was presented about the progress of the PABITRA projects in Fiji (2002) and Samoa (2003), with the PABITRA (Fiji) coordinator, Marika Tuiwawa, as co-author. This paper points to future directions. It is on the PABITRA website [www.botany.hawaii.edu/pabitra](http://www.botany.hawaii.edu/pabitra) under "Report presented at the DIWPA meeting, Kyoto, Japan, December 2003." Likewise, a new Funding Proposal

requested by and sent to DIWPA, with the title “PABITRA Island Landscapes under Global Change” has recently been added to our website. It explains the future direction of PABITRA.

A third future aspect is the PABITRA island landscape session in the upcoming IAVS (International Association of Vegetation Science) Conference, July 18-23, 2004 in Kailua-Kona [www.iavs.org](http://www.iavs.org). This symposium session is currently in the final planning stage by the Fijian session coordinator, Gunnar Keppel. The session will involve about 8-10 Pacific Islanders from Fiji and Samoa with topics that arose from the APN/PABITRA workshops in 2002-2003 in the respective islands. Funding for inviting students and other attendees from less developed countries was obtained from six different sources other than APN.

### **Appendices**

1. Agenda of Initial Synthesis Meeting in Samoa, June 10-16, 2003 (2 pages).
2. List of 18 persons (with their affiliations) that attended the first Conference on June 11. The two overseas coordinators and people who came to the meeting transiently are not listed.
3. Agenda of the Joint Analysis and Field Training Workshop, November 25-December 5, 2003 (2 pages).
4. List of 36 persons participating in the all-day Conference, November 26, 2003 that preceded the Field Workshop. Some of the speakers and stragglers are not listed.
5. List of persons that intended to come to the Field Workshop in Savai'i.
6. List of Samoan participants that received a Certificate of Participation is given on the two-panel poster on our website.
7. List of acronyms and agencies who participated with delegates at both meetings.

## **Appendix 1**

### **Agenda of Initial Synthesis Meeting in Samoa June 10-16, 2003**

**Tuesday, June 10** Visiting Team meets with NUS Team. Venue: NUS from 9 AM to 12 noon. (PM: Prof. Mueller-Dombois visits SPREP and CI – to be coordinated by Mr. James Atherton).

**Wednesday, June 11** open seminar at NUS for all interested in PABITRA. Venue: NUS from 10 AM to 3:30 PM. Brief introduction by Dr. Tuivavalagi. Presentations by Visiting Team before lunch (10 AM to 12 noon): Prof. Mueller-Dombois, Dr. Whistler. Presentations by locals after lunch (NUS, OLSSI, DEC, Forestry and USP-Alafua) from 1 PM to 3:30 PM. Each speaker will be given 30 minutes – i.e., 20 minutes for talk and 10 minutes for questions and discussion.

**Thursday, June 12** continue discussions and planning during Upolu Island fieldtrip. Timing: leave Apia at 9 AM and return at 3 PM. People involved will include (a) Visiting Team, (b) NUS, (c) DEC, (d) MAFFM, Forestry).

**Friday, June 13** discuss background data and possible activities, including proposal writing. Finalize November workshop. Venue and time: NUS, 9 AM to 12 noon. People involved: Visiting Team, NUS.

**Saturday, June 14/Sunday, June 15** Savai'i fieldtrip. Visiting team, NUS (2), OLSSI (1), Forestry (1). Will meet in Savai'i with Faasao Savai'i (Savai'i's environmental NGO).

**Monday, June 16** return day of Visiting Team.

## Appendix 2

### List of 18 Persons that Attended the Conference on June 11, 2003

1. Karoline Afamasaga-Fuata'i, NUS [k.fuatiu@nus.edu.ws](mailto:k.fuatiu@nus.edu.ws)
2. Jacinta Moreau, NUS [moreau@samoa.ws](mailto:moreau@samoa.ws)
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16. Faainu Latu, NUS [F\\_latu@yahoo.com](mailto:F_latu@yahoo.com)
17. Siliko Silko, NUS [siliko@yahoo.com](mailto:siliko@yahoo.com)
18. Vaasiliifiti Moelagi Jackson Safue Hotel/Feasao Savaii Soc.  
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## **Appendix 3**

### **Agenda of the Joint Analysis and Field Training Workshop**

#### **25-26 November: Based at NUS**

25 November, Tuesday: NUS

26 November, Wednesday: NUS

27 November, Thursday: Take 8 AM Ferry from Mulifanua to Salelologa

#### **27-29 November: Based at Aopo Village**

27 November, Thursday: Transect B: Safotu – Paia – Mt. Matavanu

28 November, Friday: Transect C: Anini – Aopo – Mt. Mata-o-le-Afi

29 November, Saturday: Transect C: Anini – Aopo – Mt. Mata-o-le-Afi

#### **30 November-1 December: Based at Falealupo Village**

30 November, Sunday: Study Site: Falealupo Rainforest Reserve

1 December, Monday: Study Site: Falealupo Rainforest Reserve

#### **2-3 December: Based at Taga Village**

2 December, Tuesday: Transect F: Taga – Le`eka – Mt. Fatufafie

3 December, Wednesday: Transect F: Taga – Le`eka – Mt. Fatufafie

3 December, Wednesday: Take 2 PM Ferry from Salelologa to Mulifanua

#### **4-5 December: Based at NUS**

4 December, Thursday: NUS – Mainly on report/proposal writing

5 December, Friday: NUS – Mainly on report/proposal writing

### **Detailed Program for 25 and 26 November (Venue: NUS Conference Room)**

#### **Tuesday, 25 November**

2:00-3:00 Art Whistler: The Flora and Vegetation of Samoa

#### **Wednesday, 26 November**

8:30-8:40 NUS A word of Welcome: Nat Tuivavalagi

8:40-9:00 Dieter Mueller-Dombois: PABITRA: Objectives and goals

9:00-9:20 Jack Lockwood: How to age lava flows and why this is important in PABITRA research

9:20-9:40 Jim Juvik: Meteorological information needs for PABITRA

9:40-10:00 Marika Tuiwawa: PABITRA in Fiji, its coordination and management

10:00-10:30 Coffee/Tea

10:30-10:50 Gunnar Keppel: PABITRA in Fiji, recent accomplishments

10:50-11:10 Kanehiro Kitayama: The DIWPA connection to IBOY and PABITRA



11:10-11:30 Dan Gruner: How to trap insects as part of PABITRA's biodiversity assessment

11:30-12:00 Cedric Schuster: Biodiversity and conservation in Samoa

12:00-1:30 Lunch Break

1:30-2:00 Luigi Guarion: Genetic resources of agricultural crops

2:00-2:30 Harley Manner: Traditional agroecosystems and sustainable development

2:30-3:00 Kim Bridges: Visualization for ecological studies

3:00-3:30 Coffee/Tee

3:30-4:00 James Atherton: GIS and biological research

4:00-4:30 Akuso Leavasa: Samoa Forestry Division: Current activities

### **Field Trip to Savai'i: Steve Brown/Ecotour**

#### **Day 1 Thursday, November 27**

5:30 AM pick-up at Outrigger by Eco-Bus

Breakfast at Wharf

8:00 AM Ferry to Savai'i

Arrive Savai'i 9:00 AM

Matavanu Fieldwork

Arrive Aopo 5:00PM for dinner

Overnight Aopo Village with Eetau (Village Chief)

#### **Day 2 Friday, November 28**

Aopo Fieldwork

Overnight Aopo Village with Eetau

#### **Day 3 Saturday, November 29**

Depart Aopo after breakfast

Arrive Falealupo for fieldwork

Overnight Falealupo Village with Lamosetele (Village Chief)

#### **Day 4 Sunday, November 30**

Continue fieldwork/write-up

Overnight Falealupo Village with Lamosetele

#### **Day 5 Monday, December 1**

Depart Falealupo after breakfast

Arrive Taga for fieldwork

Overnight Taga Village with Lealofi (Village Chief)

**Day 6 Tuesday, December 2**

Continue fieldwork

Overnight Taga Village with Lealofi

**Day 7 Wednesday, December 3**

Fieldwork

Depart Taga 12:00 noon

2:00 PM Ferry to Upolu

Arrive at Outrigger Hotel 4:30 PM

## Appendix 4

### List of Persons Participating in the All-Day Conference, November 26, 2003

Omega M. Jackson, USP student [omegamj@yahoo.com](mailto:omegamj@yahoo.com)  
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Filia Tuivavalagi, (wife of Nat Tuivavalagi)  
Jacinta Moreau, NUS Chemistry [moreau@samoa.ws](mailto:moreau@samoa.ws)  
Solomona Gaopoa, Ag. Science (MESC)  
Afatia Niue, MESC  
Malaki Iakopo, MNRE (Marine) [mal-iakopo@yahoo.com](mailto:mal-iakopo@yahoo.com)  
Nat Tuivavalagi, Global Consultancy [filia@samoa.ws](mailto:filia@samoa.ws)  
Micah Van der Ryn, Am. Samoa Community College [tatau.m@yahoo.com](mailto:tatau.m@yahoo.com)

## **Appendix 5**

### **List of Persons that intended to come to the Field Workshop in Savai`i**

Mila Misa, ASCC-CNR-AS  
Luigi Guarino, SPC Fiji  
Fiauu Faletoese, METI  
Natanya Potoi, USP student, lab assistant  
Olafa Tuaopepe, USP student  
Susau Siolo, MNRE, DEC  
Siliko Silko, NUS Math and Physics Teacher  
Afatia Niue, Secondary Teacher  
Elin Claridge, UC Berkeley  
Talie Foliga, MNRE  
Tuuau Letaulau, MNRE  
Solomona Gaopoa, Ag. Sci. Teacher  
Sooalo Tito Alatimu Forestry Savai`i  
Maiava Veni Gaugatao, Forestry Savai`i

## **Appendix 6**

### **List of Samoan Participants that received a Certificate of Participation**

Fiauu Faletoese  
Talie Foliga  
Solomona Tasi Gaopoa  
Tuuau Letaulau  
Mila Misa  
Afatia Niue  
Natanya Potoi  
Siliko Siliko  
Susau Siolo  
Olofa Tuaopepe

## **Appendix 7**

### **List of Acronyms with Agencies who participated at the APN/PABITRA Meetings**

ASCC-CNR = American Samoa Conservation Council-Conservation of Natural Resources

CI = Conservation International

CER = Center for Ecological Research (Kyoto University)

DEC = Department of Environment and Conservation (of Samoan Government)

DIWPA = DIVERSITAS in Western Pacific and Asia

IAMS = International Association of Vegetation Science

IBOY = International Biodiversity Observation Year

MAFFM = Ministry of Agriculture, Forestry, Fisheries, and Meteorology

MESC = Ministry of Education, Agricultural Science

METI = Matuaileoo Environment Trust Inc. (environmental NGO)

MNRE = Ministry of Natural Resources and Environment

NGO = Non-Government Organization

NUS = National University of Samoa

OLSSI = O Le Siosiomaga Society Inc. (environmental NGO)

PABITRA = Pacific-Asia Biodiversity Transect Network

PEC = Private Environmental Consultancy (Samoa)

PSA = Pacific Science Association

SPC = South Pacific Commission

SPREP = South Pacific Regional Environmental Program

UC = University of California

UH = University of Hawai'i

USP = The University of the South Pacific

# APN—PABITRA—NUS BIODIVERSITY TRAINING WORKSHOP

ASIA-PACIFIC NETWORK FOR GLOBAL CHANGE RESEARCH — PACIFIC ASIA BIODIVERSITY TRANSECT NETWORK — NATIONAL UNIVERSITY OF SAMOA

25 November — 5 December 2003

## Participants

**Samoa**  
 Fiauu Faletose  
 Tale Foliga  
 Solomona Tasi Gaopoa  
 Tuuau Letaufau  
 Afatia Niue  
 Natanya Potoi  
 Siliko Siliko  
 Susau Siolo  
 Olofa Tuaoepe  
 Nat Tuivavalagi

**American Samoa**  
 Mila Misa

**Fiji**  
 Luigi Guarino  
 Gunnar Keppel  
 Marika Tuivawa

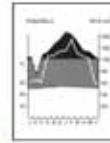
**Hawai'i**  
 Kim Bridges  
 Dan Gruner  
 Jim Juvik  
 Jack Lockwood  
 Dieter Mueller-Dombois  
 Art Whistler

**Guam**  
 Harley Manner

**Japan**  
 Kanehiro Kitayama

**New Zealand**  
 Keith Morrison

## Samoa Joint Analysis Field Sites



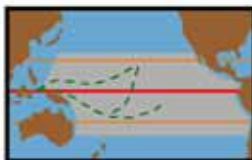
0 miles 10  
 0 km 16



Campus of the National University of Samoa in Apia, the host institution.

## Itinerary

- Conference Day (NUS campus)
- Field Workshop (Savai'i)
- Reporting day (NUS campus)
- Certification (NUS campus)
- Follow-up Network Discussion (NUS campus)



*The Samoa Workshop was the second of a series involving the development of sites and indigenous research capabilities on biodiversity. The research design uses a network of horizontal and vertical transects on islands across the Pacific Ocean.*

For more information: [www.botany.hawaii.edu/pabitra/](http://www.botany.hawaii.edu/pabitra/)



## Examples of the Joint Analysis Workshop Methods



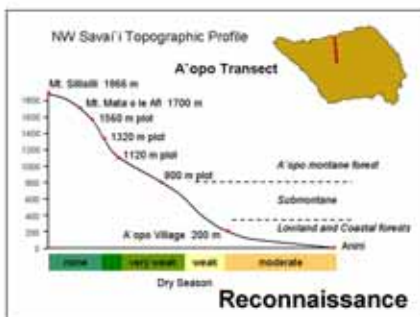
Count-Plot Technique



Plant Identification



Relevé & Point-Center Quarter Methods



Digital Photography



GPS & Laser Range Finder



Insect Collecting